Watch YouTube videos with Chrome. Yes, get Chrome now

Search

Sign in

China's Vape Industry Is Just Getting Started
VICE
1,991,817 views
2:32

Innokin iTaste VV V3 VV/VW Personal Vaporizor / Electronic
JunkyRock13
19,732 views
13:17

Buildlapse with Twisted Messes - 4x 28g Twisted Dual Coil
CBD Capitol
695,648 views
16:39

How to Set Up and Use the eGo w/ CE4 650mAh Blister Pack
MyFreedomSmokes
3,143,335 views
9:05

Sigaretta Elettronica Innokin iTaste VV Express Kit
Daniele77 SVAPO TV
3,832 views
16:50

Innokin iTaste VV4 Review! | IndoorSmokers
IndoorSmokers
262,095 views
9:35

iTaste VV V3.0 Review/Aspire Tank
Demo Mavridis
7,399 views
14:34

How to Use a Kanger Evod Kit - FlavorPuff.com
FlavorPuff.com
1,016,374 views
6:36

How to refill JUUL pods + Tips to extend pod life and prevent
Forman's Basement
774,136 views
9:15

SHOW MORE

Language: English Location: United States Restricted Mode: Off History Help

About Press Copyright Creators Advertise Developers

Terms Privacy Policy & Safety Send feedback Test new features

NJOY Exhibit 1002.1240

ECVV .com
Challenge Your Trading
(//www.ecvv.com)
CATEGORIES

Well-Chosen Mall (//safebuymall.com)
ECVV会员服务 (//www.ecvv.com/chinasupplier/)
Products | What are you looking for

Global Partners:
UAE (http://uae.ecvv.com)
About Us | For Buyer |
(https://www.ecvv.com/aboutus/Company_
Contact us
(https://www.ecvv.com/aboutus/Contact_U

Communicate wit
Lily from E
Chat Now
Join ECVV co

Innokin Technology Co., Ltd. (//www.ecvv.com/company/innokin/index.html)

China Manufacturer with main products: Electronic Cigarette, E Cigarette, E-Cigarette, E Cig

Home (//www.ecvv.com/company/innokin/index.html) | Product Categories (//www.ecvv.com/company/innokin/products.html) | Company Profile (//www.ecvv.com/company/innokin/profile.html)

Products Map (//www.ecvv.com/company/innokin/products-map.html)

Home (//www.ecvv.com/company/innokin/index.html) > Products Catalog (//www.ecvv.com/company/innokin/products.html) > New Tank E-Cigarette:innokin 510T

(//upload.ecvv.com/upload/Product/20116/China_New_Tank_E_Cigarette_innokin_510T201162850561.jpg)

New Tank E-Cigarette:innokin 510T

FOB Price: **10.00 - 30.00 USD/Set**

Supply Ability: 100,000 Set/Sets per Month

Shipping: 3-5 days for sample

Payment Terms: T/T(Bank Transfer), Western Union, PayPal

Update Time: 2011/11/15

In Stock

Inquiry Now (/sendMsg/sendMsg.html?chkIDs=P|3118191&a=102.60.60)

Start Order

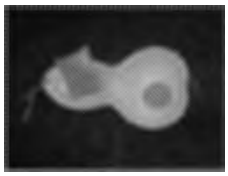
Follow ECVV to get products trends and industry news Like

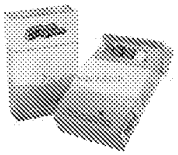
Add to Basket Shart To:

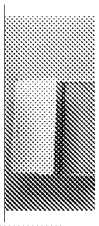
Related products from verified members

NJOY Exhibit 1002.1241

Product Details







Place of Origin:

Packaging Details:

(//www.ecvv.com/product/2322654.html?s=p-paying-member)

China best herbal acne remo...

(//www.ecvv.com/product/2322654.html?s=p-paying-member)

Price:

Min. Order: 100 Sets

(//www.ecvv.com/product/2643276.html?s=p-paying-member)

Electric Cigarette

(//www.ecvv.com/product/2643276.html?s=p-paying-member)

Price:

Min. Order:

(//www.ecvv.com/product/4445964.html?s=p-paying-member)

Sell Android/Methyltestostero...

(//www.ecvv.com/product/4445964.html?s=p-paying-member)

Price: 10.00-100.00 USD/Box

Min. Order: 1 Box

(//www.ecvv.c

Foot impressi

Lily from E

(//www.ecvv.

member)

Join ECVV co

Price: 1.50-2.5

Min. Order: 10

Specifications

Innokin 510T e-cigarette

Specification:

Length	114mm
Diameter	9.2mm
Weight of each Innokin 510T	13g
Charge voltage	90-240V
Working voltage	3.7V
Battery capacity	190mAh
Full battery can keep for	250puffs
Life of the battery	more 300times charge

Description:

1. Tank system with no leakage
2. Huge Vapor, long vaping and inhale easy.
3. Classic mini e-cigarette style
4. Mini style , convenient to carry out .
5. Its Tank atomizer is compatible with most all 510 e-cigarette battery

The INNOKIN 510 Tank E-Cigarette is one of the latest innovation products from INNOKIN Technology . The INNOKIN 510-Tank E-Cigarette is a new exclusively Tank atomizer and Tank refill cartridge design which features a tank liquid system. Instead of filling cartridges, you fill the 510-T tank and it keeps a fresh supply of e-Liquid on the 510-T atomizer at all times. You don't have to pull the cartridge out to see if you are running low because the liquid is visible through the translucent 510-T tank cartridge.

The INNOKIN 510-T E-Cigarette's Atomizers and Tanks refill cartridges are compatible with most all 510 e-cigarette batteries .

Package:

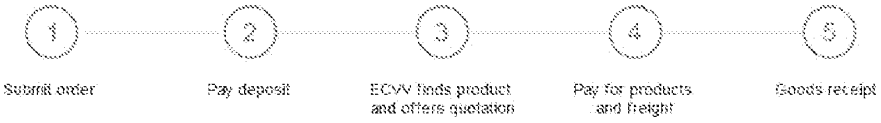
The standard gift box kit contents:

1x Atomizer
2x Battery
5x Empty tank refill cartridges
1x USB A/C Power charger Adaptor
1x USB Charge
1x Instruction manual
1x Gift package

Color available:

matt black, pearl white, barbera red

Service Process



Learn more > (//safebuy.ecvv.com/)

Service Guarantee

Free Service Charge

ECVV doesn't charge any service fee to Buyers for buying this product.

ECVV Supply

ECVV is responsible for supply, and provides product quality inspection, fund supervision and supply chain services.

NJOY Exhibit 1002.1242

Product Quality Commitment

ECVV China Sourcing Agent will assess the reputation and supply ability of the factory and conduct field trips to select the high-quality Chinese factories for buyers.

Deposit Service Commitments

In order to improve the quality of service, ECVV will charge for a 100CNY deposit for the agent purchasing order, and the deposit will be part of subsequent purchasing costs.
After paying a deposit, if the purchasing order is not completed because of unsatisfied ECVV services, ECVV will refund your deposit.

E-Cigarette from this supplier

(//www.ecvv.com/product/3118840.html?s=p-this-suppliers)

(//www.ecvv.com/product/3115621.html?s=p-this-suppliers)

(//www.ecvv.com/product/3116031.html?s=p-this-suppliers)

(//www.ecvv.com/product/3118131.html?s=p-this-suppliers)

(//www.ecvv.com/product/3141751.html?s=p-this-suppliers)

View more » (//www.ecvv.com/company/innokin/products.html)

Communicate wit

Lily from E

Chat Now

Join ECVV co

More products from other suppliers

(//www.ecvv.com/product/171604.html?s=p-other-suppliers)

(//www.ecvv.com/product/966098.html?s=p-other-suppliers)

(//www.ecvv.com/product/1071232.html?s=p-other-suppliers)

(//www.ecvv.com/product/1850445.html?s=p-other-suppliers)

(//www.ecvv.com/product/1907952.html?s=p-other-suppliers)

(//www.ecvv.com/product/2146194.html?s=p-other-suppliers)

(//www.ecvv.com/product/2231425.html?s=p-other-suppliers)

(//www.ecvv.com/product/2936589.html?s=p-other-suppliers)

(//www.ecvv.com/product/3771059.html?s=p-other-suppliers)

(//www.ecvv.com/product/3817101.html?s=p-other-suppliers)

View more » (//www.ecvv.com/company/innokin/products.html)

Related Products By Category:

Health & Medical (//www.ecvv.com/product/health-medical_cid16)>> Health Care Products (//www.ecvv.com/catalog/health-care-products_cid100002908.html)>> Health Care Supplies (//www.ecvv.com/catalog/health-care-supplies_cid100010594.html)>> Other Healthcare Supply (//www.ecvv.com/catalog/other-healthcare-supply_cid100010611.html)

Related Searches:

Pipette (//www.ecvv.com/product_directory/pipette.html)

EGO-W (//www.ecvv.com/product_directory/ego_w.html)

Juice Flavor (//www.ecvv.com/product_directory/juice-flavor.html)

Ampoule (//www.ecvv.com/product_directory/ampoule.html)

Different Capacity (//www.ecvv.com/product_directory/different-capacity.html)

Pharmaceutical Rubber (//www.ecvv.com/product_directory/pharmaceutical-rubber.html)

Ego (//www.ecvv.com/product_directory/ego.html)

Sex Enhance (//www.ecvv.com/product_directory/sex-enhance.html)

health care medicine (//www.ecvv.com/product_directory/health-care-medicine.html)

Maintenance E-Cigarette Suppliers :

Eye Drops Suppliers (//www.ecvv.com/Eye-Drops-suppliers.html)

Charger PC Suppliers (//www.ecvv.com/Charger-PC-suppliers.html)

NJOY Exhibit 1002.1243

		Amber Plastic Bottles Suppliers (//www.ecvv.com/Amber-Plastic-Bottles-suppliers.html)
Ecigarette Suppliers (//www.ecvv.com/Ecigarette-suppliers.html)	Oil Box Suppliers (//www.ecvv.com/Oil-Box-suppliers.html)	Pharmaceutical Bottle Packaging Suppliers (//www.ecvv.com/Pharmaceutical-Bottle-Packaging-suppliers.html)
Chlorogenic Acid Suppliers (//www.ecvv.com/Chlorogenic-Acid-suppliers.html)	medicine packing Suppliers (//www.ecvv.com/medicine-packing-suppliers.html)	Ldpe Chemical Suppliers (//www.ecvv.com/Ldpe-Chemical-suppliers.html)

Can't find a suitable Supplier or product? Entrust ECVV to purchase the well-chosen Chinese products with high cost performance.
Learn More>>

Start Safebuy Order

Communicate wit
Lily from E
Chat Now

Connect with us:

Like Follow

Join ECVV co
Like

B2B Marketplace: Hot Products (//www.ecvv.com/hot-products/index.html) - Products Directory (//www.ecvv.com/product/)- Hot Catalogs (//catalog.ecvv.com/) - M2C Shopping (http://www.okbuynow.com/)

Index: Popular Products (//www.ecvv.com/popular-products/) - 0 - 9 (//www.ecvv.com/popular-products/Alphabetically/0-9.html) - A (//www.ecvv.com/popular-products/Alphabetically/A.html) - B (//www.ecvv.com/popular-products/Alphabetically/B.html) - C (//www.ecvv.com/popular-products/Alphabetically/C.html) - D (//www.ecvv.com/popular-products/Alphabetically/D.html) - E (//www.ecvv.com/popular-products/Alphabetically/E.html) - F (//www.ecvv.com/popular-products/Alphabetically/F.html) - G (//www.ecvv.com/popular-products/Alphabetically/G.html) - H (//www.ecvv.com/popular-products/Alphabetically/H.html) - I (//www.ecvv.com/popular-products/Alphabetically/I.html) - J (//www.ecvv.com/popular-products/Alphabetically/J.html) - K (//www.ecvv.com/popular-products/Alphabetically/K.html) - L (//www.ecvv.com/popular-products/Alphabetically/L.html) - M (//www.ecvv.com/popular-products/Alphabetically/M.html) - N (//www.ecvv.com/popular-products/Alphabetically/N.html) - O (//www.ecvv.com/popular-products/Alphabetically/O.html) - P (//www.ecvv.com/popular-products/Alphabetically/P.html) - Q (//www.ecvv.com/popular-products/Alphabetically/Q.html) - R (//www.ecvv.com/popular-products/Alphabetically/R.html) - S (//www.ecvv.com/popular-products/Alphabetically/S.html) - T (//www.ecvv.com/popular-products/Alphabetically/T.html) - U (//www.ecvv.com/popular-products/Alphabetically/U.html) - V (//www.ecvv.com/popular-products/Alphabetically/V.html) - W (//www.ecvv.com/popular-products/Alphabetically/W.html) - X (//www.ecvv.com/popular-products/Alphabetically/X.html) - Y (//www.ecvv.com/popular-products/Alphabetically/Y.html) - Z (//www.ecvv.com/popular-products/Alphabetically/Z.html)

About ECVV.com:Our Services (//www.ecvv.com/services/) - Creditpass (//www.ecvv.com/services/CreditPass.html) - Export to China (//www.ecvv.com/services/Export-to-china.html) - Help (//www.ecvv.com/help/) - Contact Us (//www.ecvv.com/aboutus/Contact_Us.html) - Privacy (//www.ecvv.com/help/helpPage37.html) - Terms of Use (//www.ecvv.com/help/helpPage36.html) - Site Map (//www.ecvv.com/sitemap.html)

ECVV.com (//www.ecvv.com) Globalproducts.ecvv.com (//globalproducts.ecvv.com/) Catalog.ecvv.com (//catalog.ecvv.com/) 12456.cn (http://www.12456.cn/) 12400.cn (http://www.12400.cn)

Copyright © 2003-2019 ecvv.com All Rights Reserved.

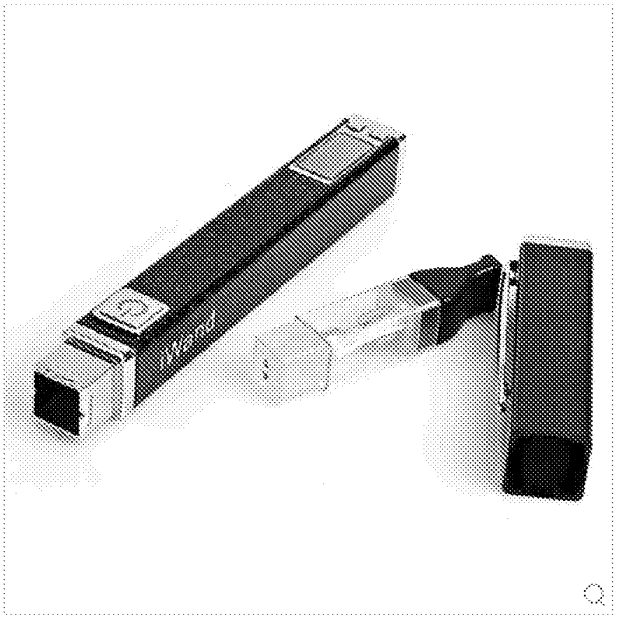
Your use of this website constitutes acknowledgement and acceptance of our Terms & Conditions.

粤ICP备10229949号-2

(http://szcert.ebs.org.cn/06748078-3f9b-4c9a-8bac-b724216c6451)

NJOY Exhibit 1002.1244

We use cookies to improve your online experience. By continuing browsing this website, we assume you agree our use of cookies and Cookie Policy.



iWand Rectangular Pen Shape Design Flat Short Mouth Holder 1.0ML Rechargeable E - Cigarette Set - COLORFUL EC025888

5 1 Customer Reviews | Ask a question

Price: $38.97

Promo: Spend $20.00, get Add-on Item for $2.99. View More >

Shipping: $3.69 to United States Via Priority Line

Ship between: Feb 04 - Feb 06, Estimated Shipping Time: 7-15 business da

Color: White Colorful

QTY: — 1 +

Discontinue

Add to Favorites (3)

MONEY BACK McAfee SECURE PayPal Tax Info Price Protection Price I

Share to:

Recommended Products for You

Customers Who Bought This Item Also Bought

NJOY Exhibit 1002.1245

Description Reviews(1) FAQ Shipping & Payment Wholesale Inquiry

Specifications

Specifications	Type: E-Cigarette Starter Kit Brand: iWand Available Color : White, Black Feature: Rectangular pen style intelligent E-Cig; Automatically recommend a suitable voltage by detecting the resista cartomizers; LED battery capacity display; Puff counter; etc Material : Stainless steel, Plastic Style : Rechargeable Variable voltage: Yes Adjustable voltage range: 3~5V Atomizer Capacity: 1.0ml Battery capacity : 650mAh Battery life: 350 recharges Charge time : 1-2 hours
Dimension and Weight	Product weight : 0.063 kg Package weight : 0.25 kg Product size (L x W x H) : 15.9 x 1.3 x 1.3 cm Package size (L x W x H) : 18.0 x 10.3 x 4.6
Package contents	Package contents: 1 x E-Cigarette, 1 x Converter, 1 x Atomizer, 1 x Adaptor, 1 x USB Cable, 1 x User Manual, 1 x Packa

Customer Reviews

5 out of 5

5 Star	1
4 Star	0
3 Star	0
2 Star	0
1 Star	0

See all 1 reviews Write a Review

All (1) Photos (0) Videos (0) Sort By: All

Hf

Color: Colorful

cigarette electronique

nickel, se sont les memes que en commerce a par que 50% de moins sur le prix

Apr 23,2014

Customer Questions & Answers

All Product Information Stock Status Payment About Shipping Others

NJOY Exhibit 1002.1246

Be the FIRST to Ask a Question. Want GB Points? Just Write a Review!

0 Questions & Answers View All>

Ask a question

Your Recently Viewed Items

Newsletter Enter E-mail get 50 points Subscribe

Company Information
- About Us
- Privacy Policy
- Terms and Conditions
- Intellectual Property Policy
- Why Choose GearBest
- Testimonials
- Contact Us
- Report Security Issue
- 招募供应商
- Cookie Policy

Customer service
- Shipping Information
- My Favorites
- My Points
- Warranty and Return
- Payment Methods
- FAQ & Support
- Deposit Expansion
- Top Searches
- Sitemap
- GB Wallet Instruction

Other business
- Make Money
- Free Gift Cards
- Pro Program
- Associate Program
- Wholesale

Download App!

Copyright ©2014-2019 Gearbest.com All Rights Reserved.

NJOY Exhibit 1002.1247

Watch YouTube videos with Chrome. Yes, get Chrome now

Search Sign in

Jiffy Steamer ...No1 Seller

infocentre101

Subscribe

46,517 views

Add to Share More 22 29

Published on Dec 31, 2011

jiffy-cleaners.altointernet.com is where you can find the best prices for your steam cleaner.....check these reduced prices!

SHOW MORE

COMMENTS • 2

Add a public comment...

Top comments

Sid Schraeder 2 years ago

What is the motor for????

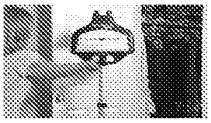
Reply • 1

nabil trial 4 months ago

pooooor review

Reply •

Up next Autoplay



Rowenta Master Valet 1550 Watt Upright Garment Steamer

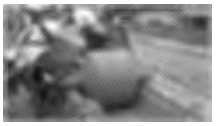
OVCtv

256,300 views

Top 5 Tips on How To Use A Clothes Steamer

Fridja

537,353 views



Ingenious Workers That Are On Another Level ▶ 5

Tech HD

Recommended for you

Free Electricity Generator 220V CFL Energy Light Bulb NEW

POP SHOT

Recommended for you

Clothes Steamer Review - Which fabric steamer is best?

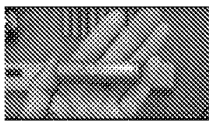
Displaysense

228,173 views

BUYING a mystery box off the DARK WEB ! (WEIRD)!

Jude Somers

Recommended for you



DIY: How to revive a dead 18650 (or any) Li-ion battery cell

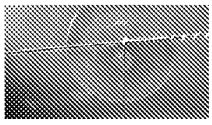
vpaeco

Recommended for you

AWESOME IDEA! HOW TO TWIST ELECTRIC WIRE TOGETHER!

Fixotronic

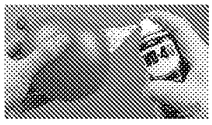
Recommended for you



Staggered Spaced Clapton Button Trick

Coil Mother Fudger

Recommended for you



20 Awesome Tricks with WD-40

Simple Ideas

Recommended for you

New Free Internet 100% - Ideas Free Internet at home 2019

Energy Tech

Recommended for you

NJOY Exhibit 1002.1248

Watch YouTube videos with Chrome. Yes, get Chrome now

Search

Sign in

How To Steam A Shirt - Fridja Professional
Fridja
820,834 views

My Lighter Collection.
Alham Rana
Recommended for you

8:14

35 CEMENT IDEAS THAT ARE SO EASY
5-Minute Crafts
Recommended for you

10:13

10 Ways to HIDE MONEY when Traveling
Specific Love Creations
5,013,659 views

9:38

How to Steam Clothing
JoAnn Stitch
247,521 views

3:59

Best Clothes Steamer Review
Your Best Digs
32,593 views

3:02

Jiffy Steamer J-2000 review
ureviews
209,913 views

8:54

How To Iron Trousers Step By Step
Videojug
456,982 views

6:37

How to get up from the floor (after a fall) - MacGyver style!
homeability.com
1,251,317 views

9:46

SHOW MORE

Language: English Location: United States Restricted Mode: Off History Help

About Press Copyright Creators Advertise Developers

Terms Privacy Policy & Safety Send feedback Test new features

NJOY Exhibit 1002.1249

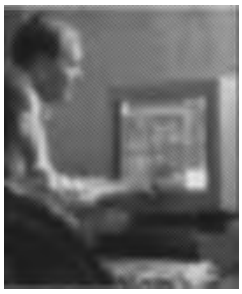
Worldwide Leader in
Steaming Equipment Since 1940

Esteam® and J-Series
OWNER'S MANUAL

NJOY Exhibit 1002.1250

Congratulations and Thank You!

Thank you for purchasing your Jiffy® Steamer from the world's leading manufacturer of steaming equipment since 1940. We strive to engineer and manufacture the very best steamer available backed by superior customer service. With proper maintenance and cleaning, your Jiffy® Steamer will last through years of demanding use. Thank you again and we sincerely appreciate your business.



Warmest regards,
Jiffy® Steamer Company, LLC
Made in the USA Since 1940

Table of Contents

Safety Instructions 3
How to Steam.....4
Esteam® Hand Held Steamer 5-8
Rod Set Assembly.....9
Model J-1, J-2 & J-200 Jiffy® Steamers.....10-15
Model J-2000 Jiffy® Steamer.....16-21
Model J-4000 Jiffy® Steamer.....22-27
Model J-1, J-2, J-200 & J-2000 Jiffy® Steamers Cleaning Instructions.....28
Model J-4000 Jiffy® Steamer Cleaning Instructions.....29
Jiffy® Steamer Maintenance.....30
Jiffy® Steamer Accessories.....31
Jiffy® Steamer Steam Head Configurations.....32
Jiffy® Steamer Cord Plug Configurations.....33
Troubleshooting 34-35
Jiffy® Matrix Charts 36-39
Product Specifications 40
Jiffy® Steamer Warranty & Return Policy 41
Jiffy® Steamer Extended Warranty 42

NJOY Exhibit 1002.1251

Jiffy® Steamer Safety Instructions

When using your Jiffy® Steamer, basic precautions should always be followed, including the following:

1. Read all instructions prior to usage.
2. To reduce the risk of contact with hot water emitting from steam vents, check appliance before each use by holding it away from body and operating.
3. Use appliance only for its intended use. Steam only in an up and down vertical motion. Never use steamer in a horizontal position or tilt into a backward position, this may result in water discharge.
4. To avoid the risk of electric shock, do not immerse the appliance in water or other liquids.
5. Never tug cord to disconnect from outlet; instead grasp plug and pull to disconnect.
6. Do not allow cord to touch hot surfaces. Let appliance cool completely before storing.
7. Always disconnect appliance from electrical outlet when filling with water, emptying, and when not in use.
8. Do not operate appliance with a damaged cord, or if the appliance has been dropped or damaged. To reduce the risk of electric shock, do not disassemble or attempt to repair the appliance, take it to a qualified service person or return to the Jiffy® Steamer factory for examination and repair. Incorrect reassembly or repair could cause a risk of fire, electric shock or injury to persons when the appliance is used.
9. Close supervision is necessary for any appliance being used by or near children. Do not leave appliance unattended while connected to power source.
10. Burns could occur from touching hot parts, hot water or steam. Use care when you empty a steam appliance as there may be hot water in the reservoir.
11. Indoor use only.
12. Never attempt to steam clothing while on body.

SAVE THESE INSTRUCTIONS

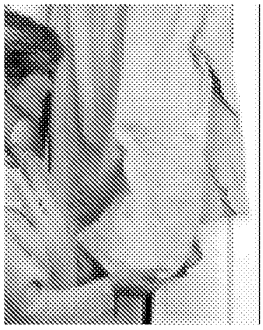
RISK OF ELECTRIC SHOCK

RISK OF BURNS

NJOY Exhibit 1002.1252

How to Steam

As your drycleaner knows, steam is the gentlest, safest, most efficient method to remove wrinkles. Not only is steaming five times faster than ironing, it is guaranteed not to scorch even the most delicate materials and fabrics. Our steamers will remove wrinkles from clothing, drapery, tablecloths...virtually any fabric. Use the following information to help guide you to more proficient steaming.

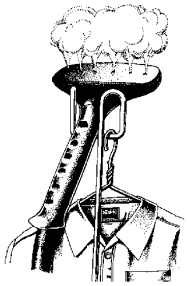


Some articles can be steamed better from the underside. This allows the steam to relax the fibers of the material, thus removing the wrinkles.

When steaming, touch material lightly with steam head and wrinkles will vanish instantly. The combination of the steam and the steam head is important for a smooth finish. Do not directly touch velvet or silk with the steam head.

Pants may be easily steamed by hanging then by the cuff. You may also use your Jiffy Steamboard to serve as a vertical pressing board to position your garments.

Always steam with hose in upright position so any condensation is free to flow back into the steamer. If steaming in a low position near floor, frequently extend hose up and out to keep clear.



Jiffy® Steamers are great for removing "closet crunch," and they eliminate most trips to the drycleaner. Convenient hanger/hook mechanism holds both clothes and steam head securely.

NJOY Exhibit 1002.1253

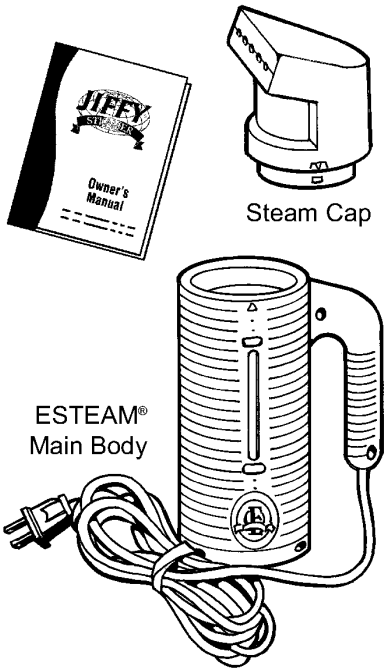
Esteam® Features and Directions

ESTEAM®

Features

- **3 times more powerful than any other hand-held steamer on the market**
- **Largest water reservoir available**
- **Wide mouth, easy-to-fill water tank**
- **600-watt heating element; automatic safety shut-off temporarily cuts unit off when it runs dry**
- **Uses plain tap or distilled water (no additives required)**
- **Comfortable, easy-to-grip handle**
- **Special outer housing for cool-to-the-touch operation**
- **No internal water lines or pumps to become clogged by hard water**
- **9-foot power cord for more manageable handling**
- **Fits neatly inside attaché or suitcase**
- **Available with a multiple plug converter for**

Includes:



Directions for Use

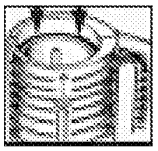


Figure 1

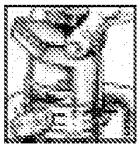


Figure 2

1. Make sure your Esteam® is unplugged before filling.
2. Check to make sure the factory-installed red o-ring is secure inside the water tank before operating steamer (figure #1).
3. Fill with tap or distilled water to the full mark on the outside of the steamer. **Never overfill.** Never use water left overnight in steamer. Stale water causes foaming action and can create water droplets.
4. After filling, place steam cap on steamer and twist firmly until cap arrows align with arrows on the tank (figure #2). Make sure it is secure before operating unit.
5. Plug your Esteam® into proper voltage outlet. Steamer will start heating within 15 seconds, providing live steam from cold water within 2 minutes.
6. Always steam with a vertical up and down motion (figure #3). **Do not tilt unit forward or backward.**
7. Avoid allowing steamer to run dry of water.
8. Refer to page 8 for complete cleaning instructions.

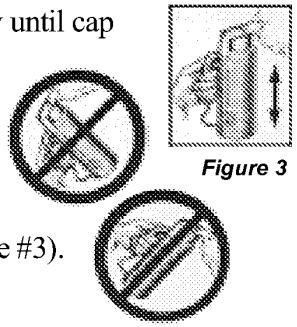
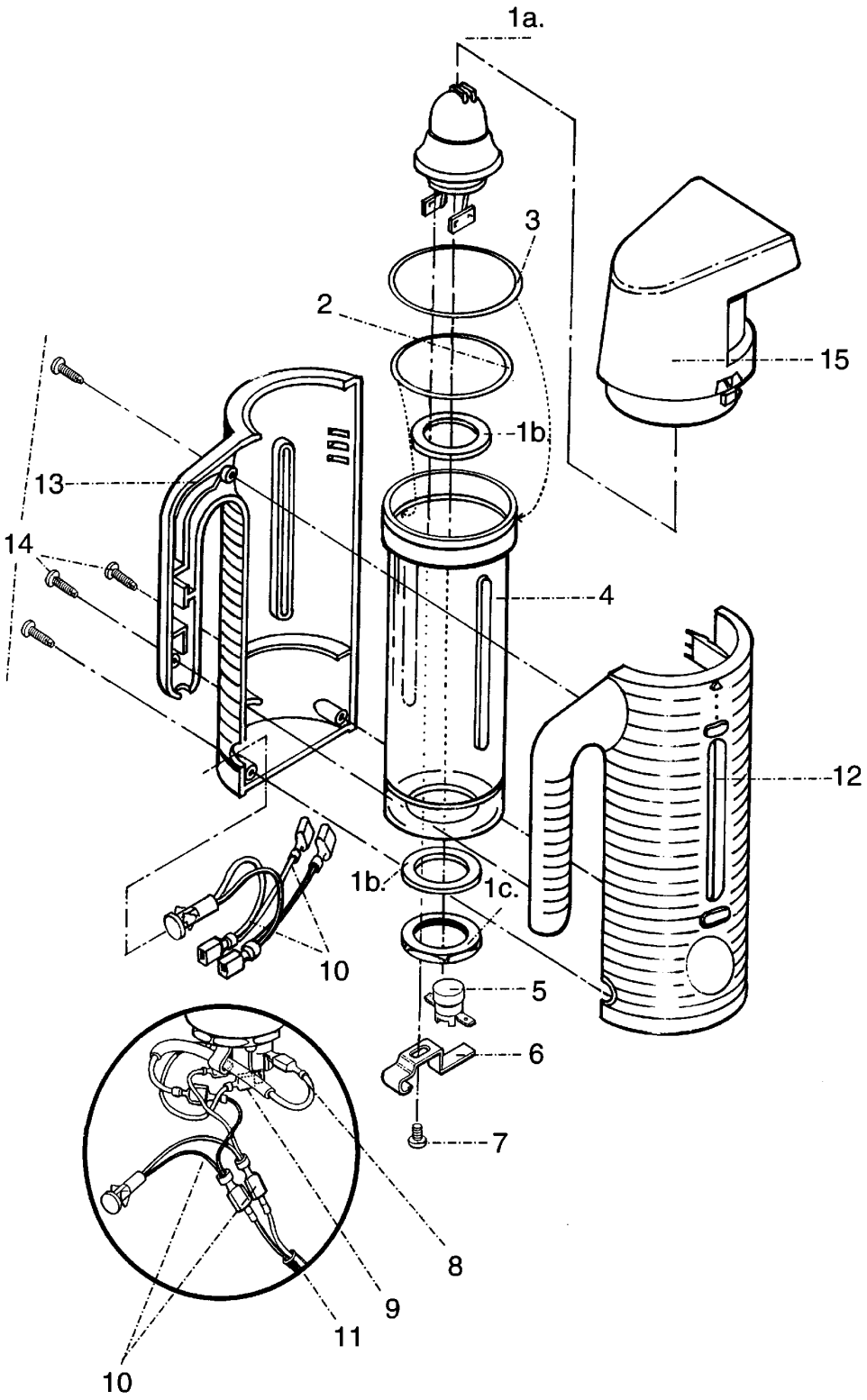


Figure 3

WARNING: Never operate without water. Unplug after each use.

NJOY Exhibit 1002.1254

Esteam® Parts Diagram



NJOY Exhibit 1002.1255

Esteam® Parts Diagram Key

ESTEAM®

Should you ever need replacement parts for your Jiffy® Steamer, you may purchase them separately. Use this handy diagram and parts list to identify any part you may need. Please include model and serial number when ordering.

Key#	Jiffy Steamer Part #	Part Description	List Price
1	**0653**	Esteam 120 Volt 600 Watt Heater with Gaskets and Nut	$ 17.00
	0655	Esteam 230 Volt 600 Watt Heater with Gaskets and Nut	$ 17.00
1a.		Esteam Heater (Sold with Item #0653 or #0655 as a Kit)	
1b.		Gasket for Esteam Heater (Sold with Item #0653 or #0655 as a Kit)	
1c.		Nut for Esteam Heater (Sold with Item #0653 or #0655 as a Kit)	
2	**0661**	Red Inside O-Ring	$ 1.50
3	**0662**	Black Outside O-Ring	$ 1.50
4	**0669**	Esteam Water Tank	$ 24.00
5	**0640**	Esteam 36 T-L263 Thermostat	$ 6.75
6	**0643**	Fusible Link Clamp	$ 1.50
7	**0644**	Fusible Link Clamp Screw	$ 0.50
8	**0641**	Fusible Link Wire with Insulated Lug (Orange)	$ 2.50
9	**0681**	Red Wire with Insulated Lug	$ 1.50
10	**0645**	Pilot Light with Wiring Harness for 120 Volt Electrical Systems	$ 7.00
	0646	Pilot Light with Wiring Harness for 230 Volt Electrical Systems	$ 7.00
11	**0647**	Cord set (18/2 gauge)	$ 7.00
12	**0665**	Right Case Half	$ 14.00
13	**0666**	Left Case Half	$ 14.00
14	**0667**	Four (4) Screws for Esteam Outer Case Halves	$ 1.00
15	**0663**	Complete Steam Cap with Face Plate	$ 20.00

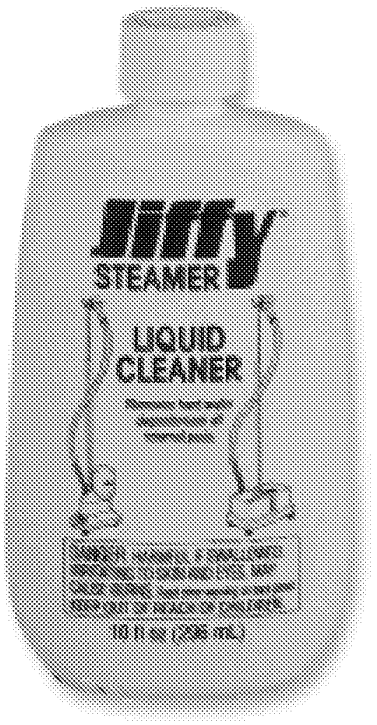
ACCESSORIES

0619	Voltage Converter for Travel	$ 19.00
0898	Liquid Cleaner - 3 Ten (10) Ounce Bottles per Package*	$ 15.00
	*Not Available for Export.	

NJOY Exhibit 1002.1256

Esteam® Cleaning Instructions

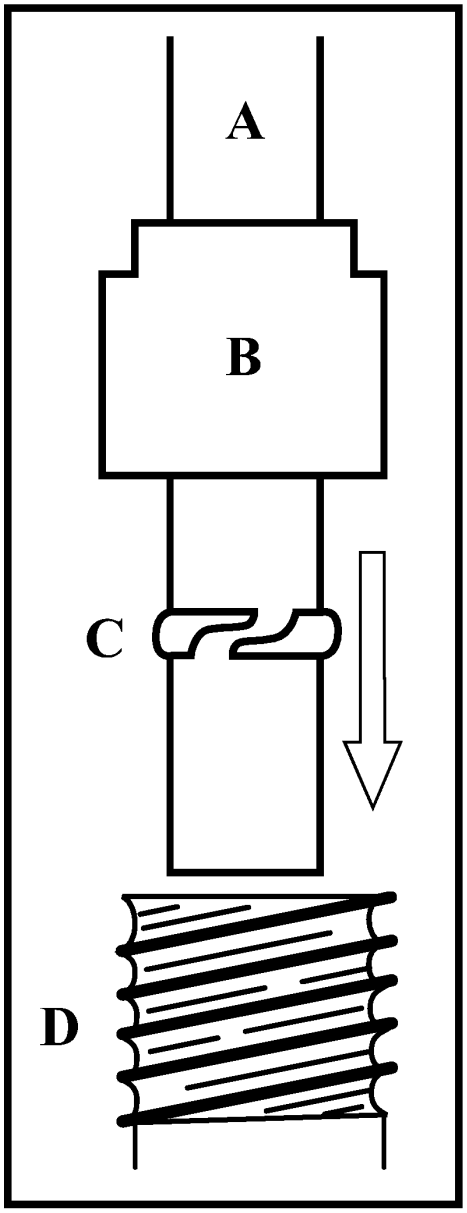
Once you begin to see calcium scale collect in the bottom of your ESTEAM® hand steamer, it is time to use the Jiffy® Steamer Liquid Cleaner. Please follow these instructions:



1. Pour 4 ounces of water in your ESTEAM® hand steamer.
2. Plug in the unit and bring to full steam.
3. Unplug the unit and allow to cool for 2 minutes.
4. Pour out all water.
5. Pour in 5 ounces (1/2 bottle) of the Jiffy® Steamer Liquid Cleaner.
6. Leave the cleaner in the unit for 2 hours. May require scrubbing with a stiff bristle brush to remove excess sediment.
7. **DO NOT STEAM THE UNIT WITH THE LIQUID CLEANER.**
8. Pour out Liquid Cleaner.
9. Flush the unit 3 times with fresh water.
10. Resume steaming.

NJOY Exhibit 1002.1257

J-Series Rod Set Assembly



1. Screw all three (3) sections of the rod set together (hook, middle, and bottom sections).
2. Slide bottom section of rod (marked "A" on drawing) through the rod set nut (marked "B" on drawing) with the threads facing down.
3. Place 1/2 inch split ring (marked "C" on drawing) on bottom section of rod set approximately 1/2 inch from the end of the rod. Please note that steps 2 and 3 are completed at the Jiffy® Steamer factory.
4. Insert entire assembly into threaded base adapter on top of the steamer base (marked "D" on drawing). Press down firmly so that split ring (marked "C" on drawing) will slide up on the rod and come to rest at the top of the base adapter once the rod set is completely inserted.
5. Tighten the rod set nut (marked "B" on drawing) with assembly wrench provided with all J-Series Jiffy® Steamer (wrench is magnetized and may be found on the bottom plate of the unit).

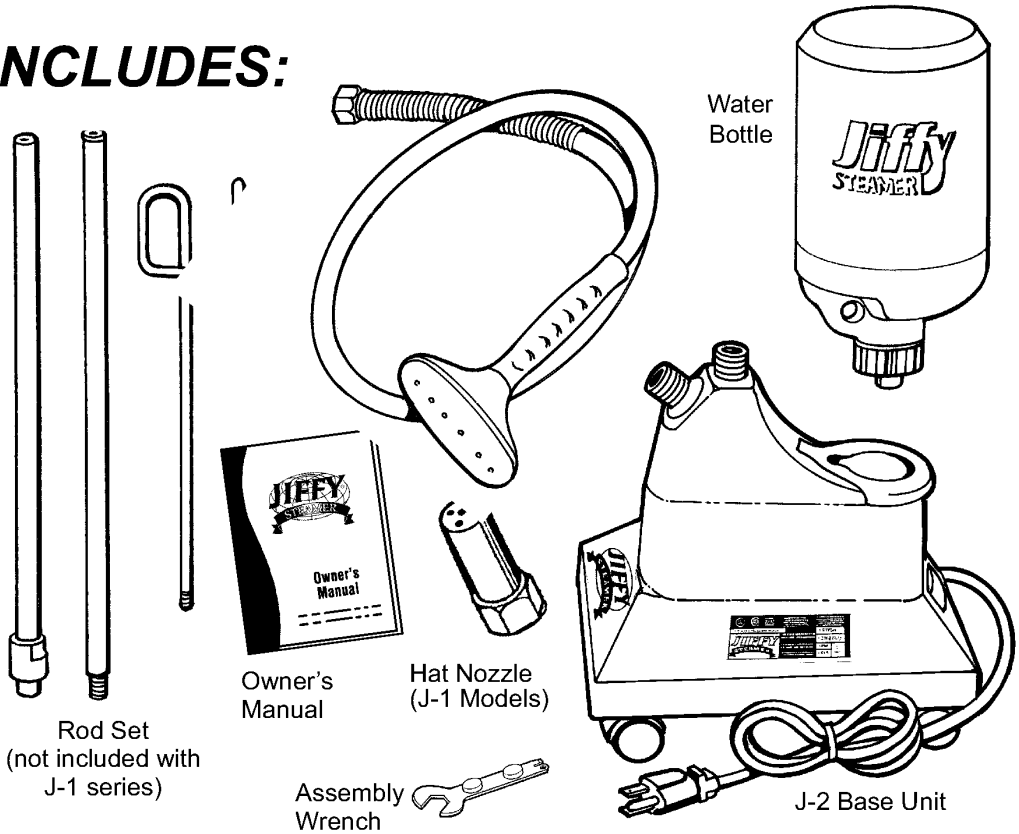
NJOY Exhibit 1002.1258

Jiffy® J-1/J-2/J-200 Model Steamer

FEATURES

- **Cast aluminum housing for durability (Models J-1 and J-2)**
- **High impact polymer housing (Model J-200)**
- **Lightweight, flexible hose - Models J-2/J-200 (J-1 series utilizes a brass hat nozzle)**
- **Shatterproof water bottle**
- **Safety wiring feature temporarily turns the unit off if it accidentally runs dry**
- **Comfortable, easy-to-grip handle**
- **Removes wrinkles up to five times faster than conventional ironing**
- **Easy-roll casters for mobility (casters not included with J-1 series)**
- **Numerous steam head attachments available**
- **120 Volt or 230 Volt units available**
- **Backed by Jiffy®'s renowned customer service--*should your steamer need repair, send it to us and we will repair and ship the unit within 24 hours from its arrival to our plant***

INCLUDES:



NJOY Exhibit 1002.1259

Jiffy® J-1/J-2/J-200 Model Steamer Directions

1. For J-2/J-200 models, attach hose firmly with included assembly wrench, which is magnetized and located on the bottom of the unit (figure #1). Assemble and attach hose hanger rod set. See page 9 for assembly instructions. For J-1 models, the brass hat nozzle should already be attached. There is no rod set for J-1 models.

Figure 1

2. Invert bottle of fresh tap or distilled water, plug into proper voltage outlet, turn switch to lighted ON position and you will have steam within minutes. Never substitute the Jiffy® Steamer water bottle.

J-2

Figure 2

3. For easy operation, mount optional Jiffy® Steamboard to door or wall to hold clothing while steaming (figure #2). For hanging garments without optional Jiffy® Steamboard, simply install an eye screw or nail to inside of a doorway or directly onto a wall or you may use steamer's rod set as shown in figure 3. Touch material lightly with steaming head and wrinkles will vanish instantly. The combined touch of the steaming head and the direct steam is very important. Some articles can be steamed better from the underneath side. Speed and efficiency is accomplished with a little practice. Always steam with hose in an upright position, so any condensation is free to flow back into steamer. If steaming in a low position near floor, extend hose up and out frequently to keep clear of condensation. **DO NOT ALLOW STEAMER TO RUN DRY.**

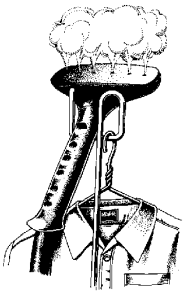


Figure 3

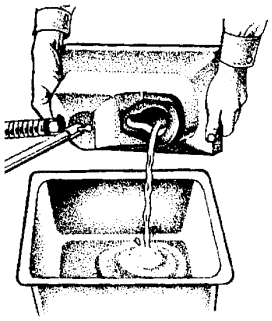


Figure 4

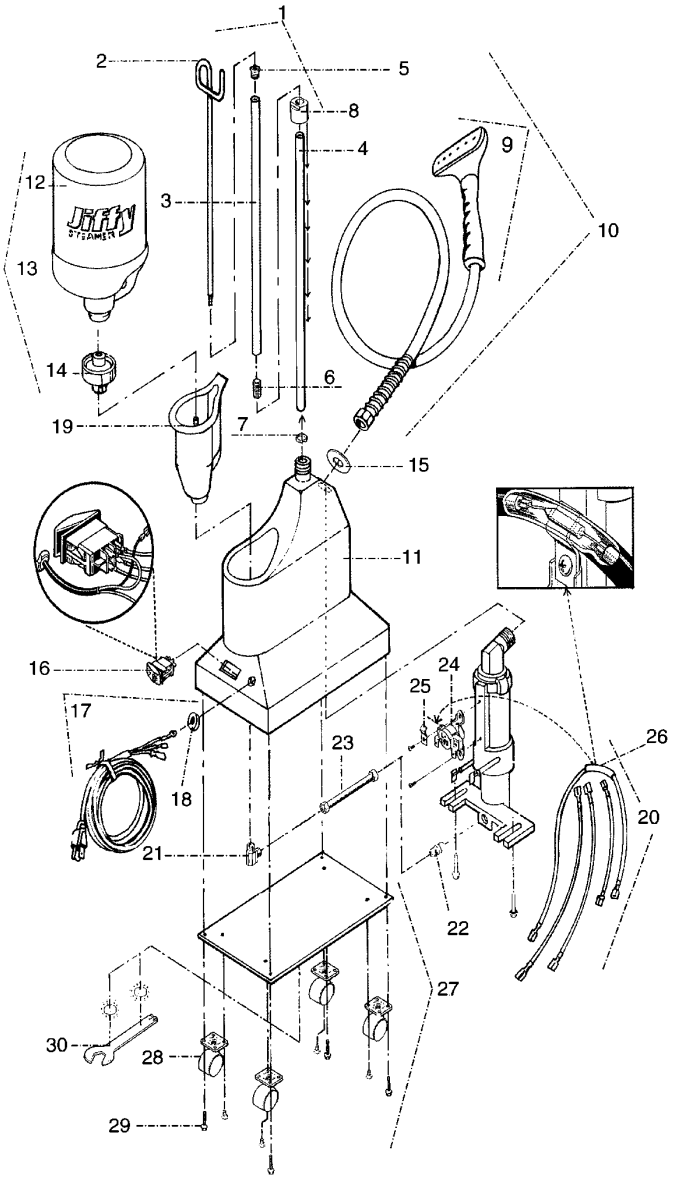
4. Hang steam head in an upright position in the hose hanger section when not in use and turn switch to OFF (figure #3).

5. Periodically, pour old water out of steamer to avoid sediment buildup and maintain proper water level (figure #4). Remove hard water deposits with Jiffy® Liquid Cleaner. See page 28 for complete cleaning instructions.

NOTE: No two water supplies have the same mineral content. If your steamer begins to cut on and off during normal use, the thermostat is indicating the heating unit needs the sediment cleaned out.

NJOY Exhibit 1002.1260

Jiffy® J-1/J-2/J-200 Parts Diagram



Should you ever need replacement parts for your Jiffy® Steamer, you may purchase them separately. Use this handy diagram and parts list to identify any part you may need. Please include model and serial number when ordering.

Key#	Jiffy Steamer Part #	Part Description	List Price
1	**1030**	Rod Set and Nut Complete with Metal Studs	$ 25.50
	0031	Hose Hanger Rod Set with Adapter Complete	$ 25.50
	0031A	Hose Hanger Rod Set without Adapter Complete	$ 21.50
	0041	Base Adapter with Thumb Screw (for Old Style Rods Sets)	$ 4.00
2	**0035**	Hook Section of Rod Set	$ 6.50

NJOY Exhibit 1002.1261

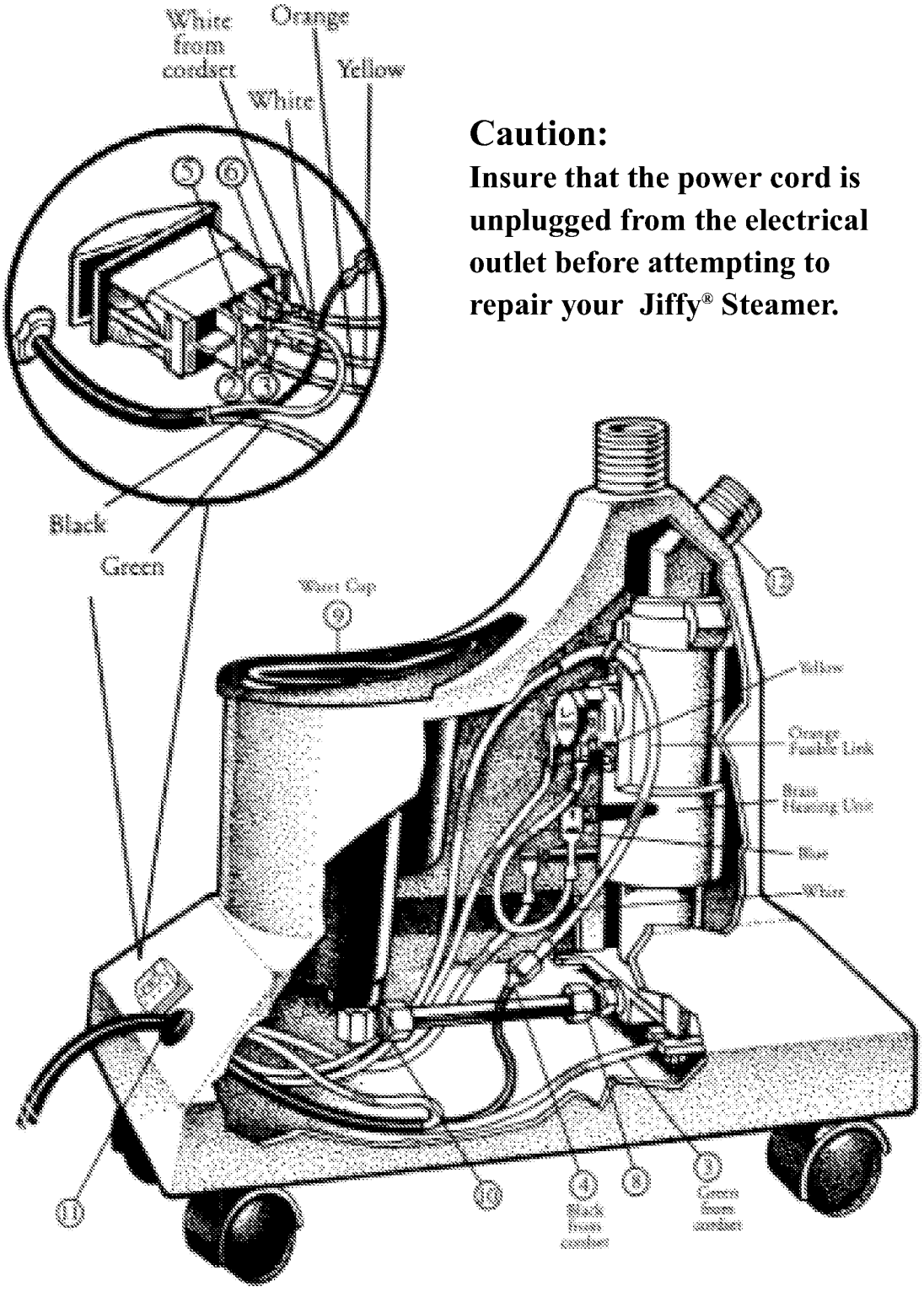
Jiffy® J-1/J-2/J-200 Parts Diagram Key

3	**0036**	Middle Section of Rod Set	$ 7.50
4	**0037**	Bottom Section of Rod Set	$ 7.50
5	**0043**	Metal Threaded Cap Screw for Rod Set	$ 1.50
6	**0039**	Metal Threaded Stud for Rod Sections	$ 1.50
7	**1031**	1/2" Split Ring for Rod Set	$ 0.50
8	**1032**	Rod Set Nut	$ 6.00
9	**0253**	Plastic Steam Head/Handle Replacement Kit	$ 22.00
10	**0251**	Plastic Head/Handle Hose Attachment Complete	$ 50.00
	0280	Hose Per Foot (Black in Color)	$ 3.00
11	**0002**	Painted Die Cast Aluminum Housing	$ 51.50
	0023	Plastic Water Bottle "A" with Cap	$ 6.50
	0027	Replacement Cap for Water Bottle "A"	$ 0.75
12	**0026A**	Plastic Water Bottle "B" without Check Valve Cap	$ 5.75
13	**0025**	Plastic Water Bottle "B" with Check Valve Cap	$ 9.50
14	**0027A**	Replacement Check Valve Cap for Water Bottle "B"	$ 3.75
15	**0004**	Round Beauty Ring	$ 0.75
	0122	Toggle Switch (3 Pieces)	$ 7.50
	0127	Red Neon Pilot Light with Lock Ring 120 Volt	$ 4.00
	0128	Red Neon Pilot Light with Lock Ring 230 Volt	$ 4.00
16	**1125**	Green Lighted Contura Rocker Switch 120 Volt	$ 9.00
	1126	Green Lighted Contura Rocker Switch 230 Volt	$ 9.00
17	**0132**	Cord Set (16/3 gauge) with Strain Relief	$ 9.50
18	**0146B**	Cord Strain Relief	$ 1.50
19	**0028**	Water Cup with 90 Degree Brass Fitting	$ 18.00
	0147	Internal Wire Set for Models with Front Red Light	$ 9.00
20	**0148**	Internal Wire Set for Models with Green Contura Rocker Switch	$ 9.00
	0596	Heating Unit Kit (wiring included) for Models with Front Red Light – 120 Volt Cord Set and 4" Water Line	$ 81.50
	0177A	Heating Unit Kit (wiring included) for Models with Front Red Light – 230 Volt Cord Set and 4" Water Line	$ 81.50
	0597	Heating Unit Kit (wiring included) for Models with Green Lighted Rocker Switch - 120 Volt Cord Set and 4" Water Line	$ 81.50
	0597A	Heating Unit Kit (wiring included) for Models with Green Lighted Rocker Switch - 230 Volt Cord Set and 4" Water Line	$ 81.50
	0161A	Heating Unit Assembly (no wiring included) – 120 Volt and 4" Water Line	$ 62.50
	0162A	Heating Unit Assembly (no wiring included) – 230 Volt and 4" Water Line	$ 62.50
21	**0030**	Brass 90 Degree Elbow Joint	$ 2.50
22	**1130**	3/8" x 1/4" Straight Brass Fitting for Heating Element Housing	$ 2.50
23	**0187**	Copper Tube (4" length) with Nuts and Compression Rings	$ 4.00
24	**0160**	L-290 Thermostat	$ 8.00
25	**0195**	Fusible Link Clamp	$ 1.50
26	**0151**	Fusible Link Wire with Insulated Lug	$ 3.00
27	**0009**	Bottom Plate with Casters	$ 13.50
28	**0011**	Bottom Plate Casters (Set of 4)	$ 6.50
29	**0010**	Screws for Bottom Plate (4 Screws Total)	$ 0.75
ACCESSORIES			
30	**1050**	Jiffy Steamer Assembly Wrench	$ 4.00
	0274	Brass Hat Nozzle Attachment	$ 13.00
	0254	Metal Head/Wood Handle Hose Attachment Complete	$ 70.00
	0256	Metal Head / Wood Handle Only	$ 37.50
	0269	Replacement Wooden Handle (for Metal Steam Heads)	$ 7.00
	0262	Wig Hose Attachment	$ 50.00
	1062	Steam Cleaning "B" Brush Hose Attachment	$ 50.00
	1063	Brush Only for the B" Hose Attachment	$ 8.00
	0898	Liquid Cleaner - 3 Ten (10) Ounce Bottles per Package*	$ 15.00

*Not Available for Export.

NJOY Exhibit 1002.1262

Jiffy® J-1/J-2/J-200 Wiring Diagram



Caution:

Insure that the power cord is unplugged from the electrical outlet before attempting to repair your Jiffy® Steamer.

NJOY Exhibit 1002.1263

Jiffy® J-1/J-2/J-200 Wiring Instructions

Please note switch terminal numbers 2, 3, 5 and 6 indicated on the enlarged switch diagram are marked on the actual switch. Jiffy® Steamers manufactured before May 2000 are not marked with the terminal switch numbers, but the terminal blades are in the same location.

1. Insert cordset into housing and connect white neutral wire from cordset bundle to terminal number 5 on the switch.
2. Connect blue wire from the right side of heating element to the right side of the L-290 thermostat.
3. Insert brass heating unit into housing and tighten with 2 mounting screws. Connect green ground wire (from cordset) to the nearer of the two mounting screws. (In older J-2s, groundwire may also be attached to internal boss of housing.)
4. Connect black positive wire from cordset to plastic connector on orange fusible link wire.
5. Connect other end of orange fusible link to terminal number 2 on the switch.
6. Connect yellow wire from the left side of the thermostat to terminal number 3 on the switch.
7. Connect white wire from the left side of the heater unit to terminal number 6 on switch.
8. Insert one end of copper water line and compression ring into threaded fitting at bottom of brass heating unit and tighten nut with a $^{5}/_{8}$" wrench.
9. Connect other end of water line with compression ring to 90 degree brass elbow at bottom of water cup and tighten with a $^{5}/_{8}$" wrench. (Heating unit may be loosened and adjusted for a better fit if necessary.)
10. Set steamer upright and place black plastic strain relief approximately $4^{1}/_{2}$" from end of cord and insert into housing using pliers.
11. Secure bottom plate with four screws.
12. To avoid leakage, be sure and tighten hose (or hat nozzle) with wrench before using steamer.

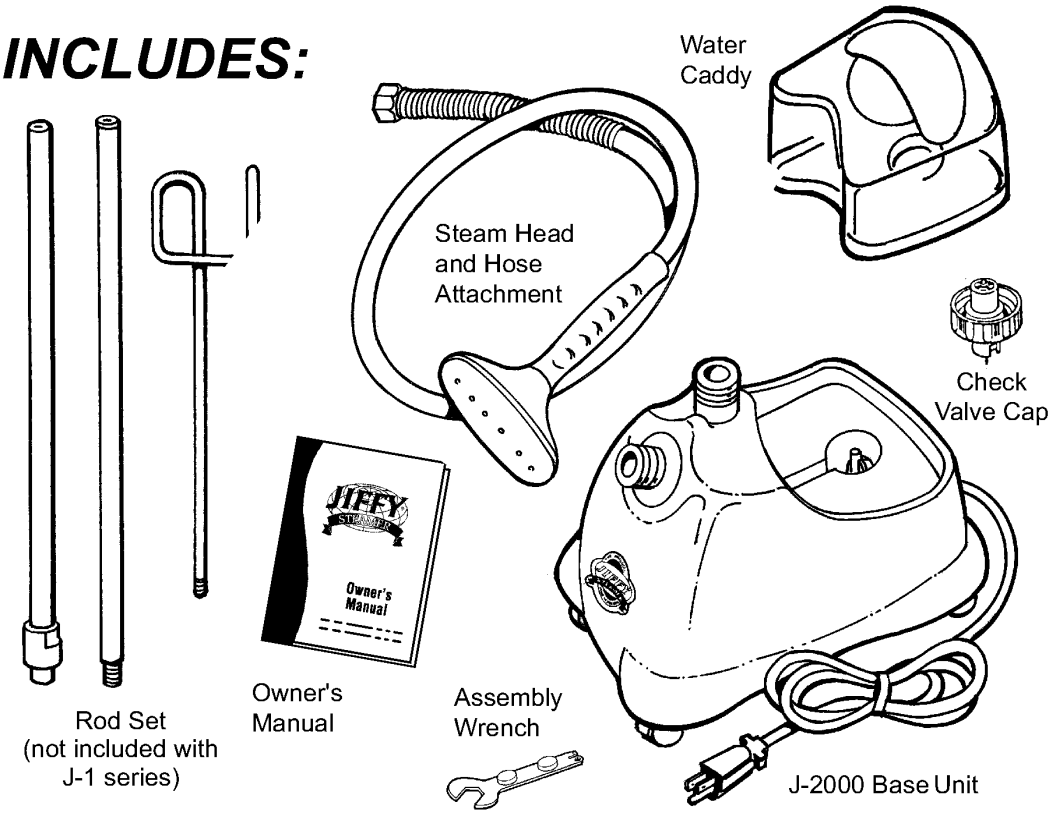
NJOY Exhibit 1002.1264

Jiffy® J-2000 Model Steamer

FEATURES

- **Polymer outer housing unit for durability**
- **Lightweight, flexible hose**
- **Shatterproof water caddy**
- **Safety wiring feature temporarily turns the unit off should it accidentally run dry**
- **Comfortable, easy-to-grip handle**
- **Removes wrinkles up to five times faster than conventional ironing**
- **Easy-roll casters for mobility**
- **Numerous steam head attachments available**
- **Backed by Jiffy®'s renowned Customer Service--*should your steamer need repair, send it to us and we will repair and ship the unit within 24 hours from its arrival to our plant***

INCLUDES:



NJOY Exhibit 1002.1265

Jiffy® J-2000 Directions

1. Attach hose firmly with included assembly wrench, which is magnetized and located on the bottom of the unit. Assemble and attach hose hanger rod set. See page 9 for assembly instructions.

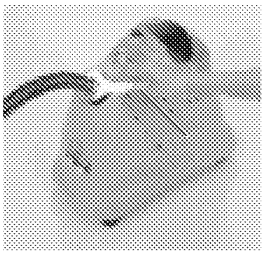


Figure 1

2. Invert water caddy filled with distilled or tap water, plug into proper voltage outlet, turn switch to lighted ON position and you will have steam within minutes. Never substitute the Jiffy® Steamer water caddy.

3. For easy operation, mount optional Jiffy® Steamboard to door or wall to hold clothing while steaming (figure #2). For hanging garments without optional Jiffy® Steamboard, simply install an eye screw or nail to inside of a doorway or directly onto a wall or you may use your steamer's rod set as shown in figure 3. Touch material lightly with steaming head and wrinkles will vanish instantly. The combined touch of the steaming head and the direct steam is very important. Some articles can be steamed better from the underneath side. Speed and efficiency is accomplished with a little practice. Always steam with hose in an upright position, so any condensation is free to flow back into steamer. If steaming in a low position near floor, straighten hose up and out frequently to keep clear of condensation. **DO NOT ALLOW STEAMER TO RUN DRY.**

Figure 2

4. Hang steam head in an upright position in the hose hanger section when not in use and turn switch to OFF (figure #3).

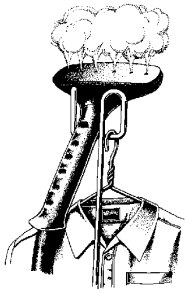


Figure 3

5. Periodically, pour old water out of steamer to avoid sediment buildup and maintain proper water level (figure #4). Remove hard water deposits with Jiffy® Liquid Cleaner. Wipe water cup out with a hand towel. See page 28 for complete cleaning instructions.

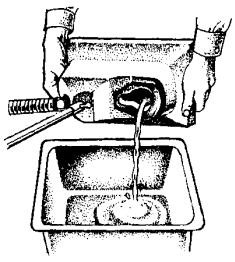


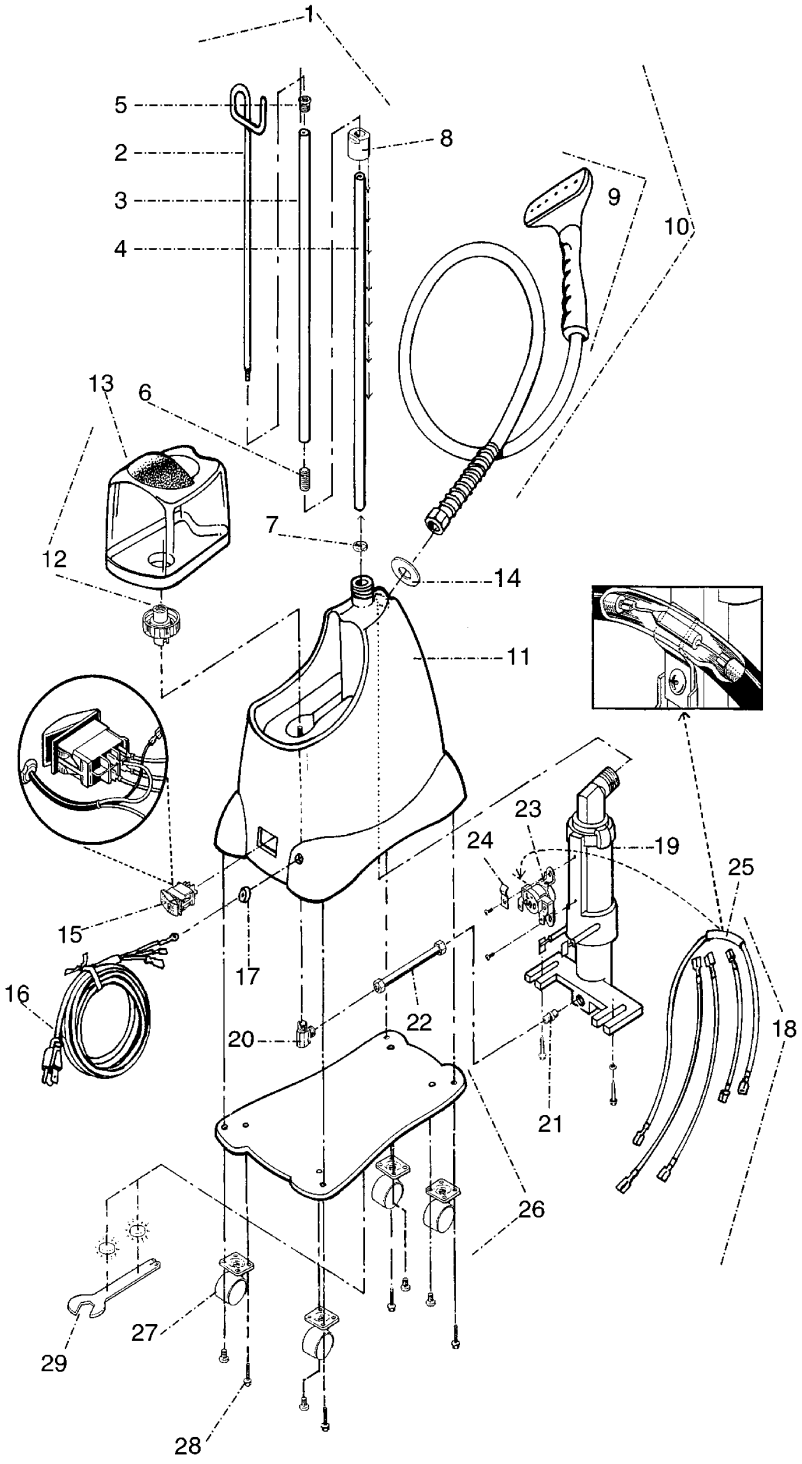
Figure 4

NOTE: No two water supplies have the same mineral content. If your steamer begins to cut on and off during normal use, the thermostat is indicating the heating unit needs the sediment cleaned out.

J-2000

NJOY Exhibit 1002.1266

Jiffy® J-2000 Parts Diagram



Should you ever need replacement parts for your Jiffy® Steamer, you may purchase them separately. Use this handy diagram and parts list to identify any part you may need. Please include model and serial number when ordering.

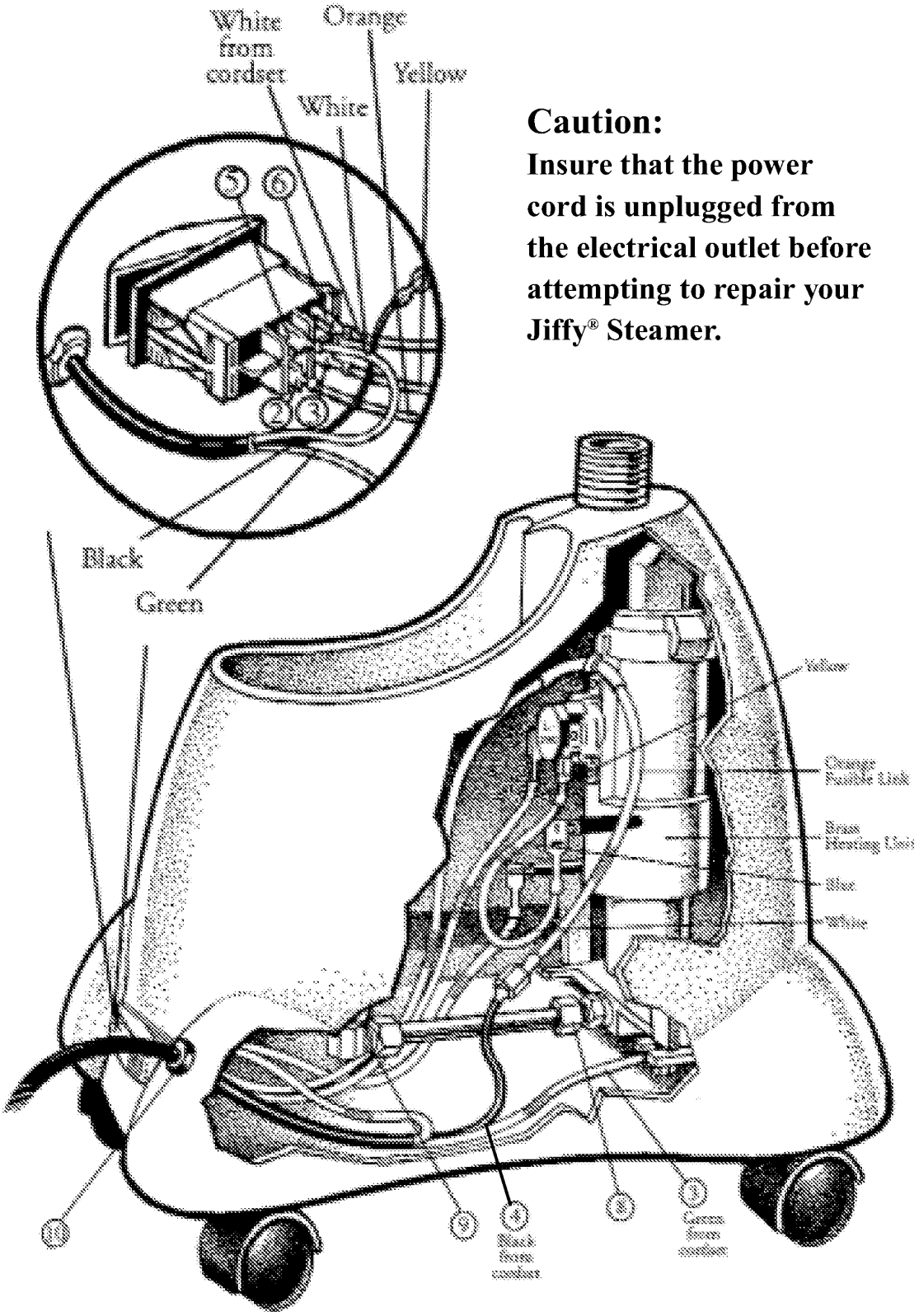
NJOY Exhibit 1002.1267

Jiffy® J-2000 Parts Diagram Key

Key#	Jiffy Steamer Part #	Part Description	List Price
1	**1030**	Rod Set and Nut Complete with Metal Studs	$ 25.50
2	**0035**	Hook Section of Rod Set	$ 6.50
3	**0036**	Middle Section of Rod Set	$ 7.50
4	**0037**	Bottom Section of Rod Set	$ 7.50
5	**0043**	Metal Threaded Cap Screw for Rod Set	$ 1.50
6	**0039**	Metal Threaded Stud for Rod Sections	$ 1.50
7	**1031**	1/2" Split Ring for Rod Set	$ 0.50
8	**1032**	Rod Set Nut	$ 6.00
9	**0253**	Plastic Steam Head/Handle Replacement Kit	$ 22.00
10	**0251**	Plastic Head/Handle Hose Attachment Complete	$ 50.00
	0280	Hose Per Foot (Black in Color)	$ 3.00
11	**1100**	J-2000 Plastic Housing Kit	$ 58.00
12	**1140**	J-2000 Water Caddy Complete with Check Valve Cap	$ 28.00
13	**1141**	J-2000 Water Caddy Complete with out Check Valve Cap	$ 24.25
	0027A	Replacement Check Valve Cap	$ 3.75
14	**0004**	Round Beauty Ring	$ 0.75
15	**1125**	Green Lighted Contura Rocker Switch - 120 Volt	$ 9.00
	1126	Green Lighted Contura Rocker Switch - 230 Volt	$ 9.00
16	**0132**	Cord Set (16/3 gauge) with Strain Relief	$ 9.50
17	**0146B**	Cord Strain Relief	$ 1.50
18	**0148**	Internal Wire Set	$ 9.00
	1193	Heating Unit Kit (wiring included) for Models with Green Lighted Contura Rocker Switch - 120 Volt Cord Set and 4 1/2" Water Line	$ 81.50
	1194	Heating Unit Kit (wiring included) for Models with Green Lighted Contura Rocker Switch - 230 Volt Cord Set and 4 1/2" Water Line	$ 81.50
19	**0161B**	Heating Unit Assembly (no wiring included) for Models with Green Lighted Rocker Switch - 120 Volt Cord Set and 4 1/2" Water Line	$ 62.50
	0162B	Heating Unit Assembly (no wiring included) for Models with Green Lighted Contura Rocker Switch - 230 Volt Cord Set and 4 1/2" Water Line	$ 62.50
20	**0030**	Brass 90 Degree Elbow Joint	$ 2.50
21	**1130**	3/8" x 1/4" Straight Brass Fitting for Heating Element Housing	$ 2.50
22	**0187**	Copper Tube(41/2" length) with Nuts and Compression Rings	$ 4.00
23	**0160**	L-290 Thermostat	$ 8.00
24	**0195**	Fusible Link Clamp	$ 1.50
25	**0151**	Fusible Link Wire with Insulated Lug	$ 3.00
26	**1120**	Bottom Plate with Casters	$ 18.00
27	**0011**	Bottom Plate Casters (Set of 4)	$ 6.50
28	**0010**	Screws for Bottom Plate (4 Screws Total)	$ 0.75
ACCESSORIES			
29	**1050**	Jiffy Steamer Assembly Wrench	$ 4.00
	0254	Metal Head/Wood Handle Hose Attachment Complete	$ 70.00
	0256	Metal Head / Wood Handle Only	$ 37.50
	0262	Wig Hose Attachment	$ 50.00
	1062	Steam Cleaning "B" Brush Hose Attachment	$ 50.00
	1063	Brush Only for the "B" Hose Attachment	$ 8.00
	0898	Liquid Cleaner - 3 Ten (10) Ounce Bottles per Package* *Not Available for Export.	$ 15.00

NJOY Exhibit 1002.1268

Jiffy® J-2000 Wiring Diagram



Caution:

Insure that the power cord is unplugged from the electrical outlet before attempting to repair your Jiffy® Steamer.

NJOY Exhibit 1002.1269

Jiffy® J-2000 Wiring Instructions

Please note switch terminal numbers 2, 3, 5 and 6 indicated on the enlarged switch diagram are marked on the actual switch. Jiffy® Steamers manufactured before May 2000 are not marked with the terminal switch numbers, but the terminal blades are in the same location.

1. Insert cordset into housing and connect white neutral wire from cordset bundle to terminal number 5 on the switch.
2. Connect blue wire from the right side of heating element to the right side of the L-290 thermostat.
3. Insert brass heating unit into housing and tighten with 2 mounting screws. Connect green ground wire (from cordset) to the nearer of the two mounting screws.
4. Connect black positive wire from cordset to plastic connector on orange fusible link wire.
5. Connect other end of orange fusible link to terminal number 2 on the switch.
6. Connect yellow wire from the left side of the thermostat to terminal number 3 on the switch.
7. Connect white wire from the left side of the heater unit to terminal number 6 on switch.
8. Insert one end of copper water line and compression ring into threaded fitting at bottom of brass heating unit and tighten nut with a $^{5}/_{8}$" wrench.
9. Connect other end of water line with compression ring to 90 degree brass elbow at bottom of water cup and tighten with a $^{5}/_{8}$" wrench. (Heating unit may be loosened and adjusted for a better fit if necessary.)
10. Set steamer upright and place black plastic strain relief approximately 4 $^{1}/_{2}$" from end of cord and insert into housing using pliers.
11. Secure bottom plate with four screws.
12. To avoid leakage, be sure and tighten hose (or hat nozzle) with wrench before using steamer.

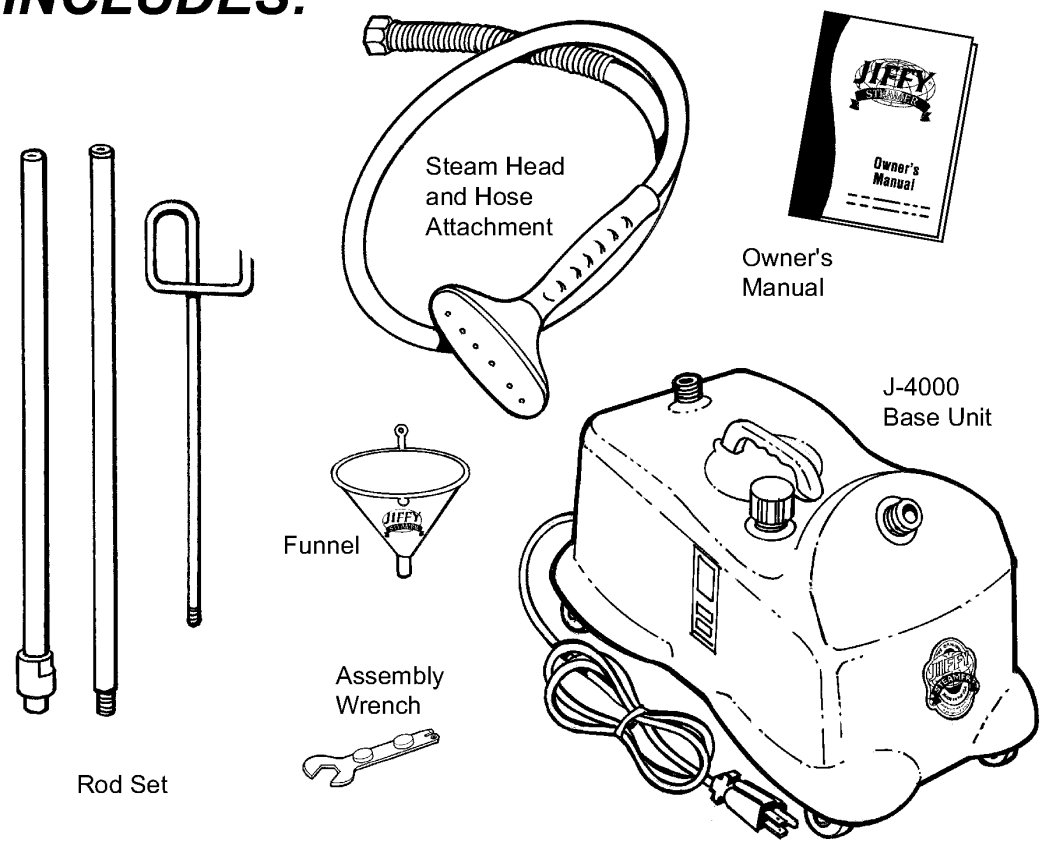
NJOY Exhibit 1002.1270

Jiffy® J-4000 Model Steamer

FEATURES

- **Built-in, easy-to-read sight gauge also indicates sediment build-up**
- **Cast aluminum housing unit for durability**
- **Corrosion-proof stainless steel boiler tank--no water lines to become clogged with hard water deposits**
- **Dual thermostats for preheat and steam settings.**
- **Safety wiring feature temporarily turns the unit off should it accidentally run dry**
- **Numerous steam head attachments available**
- **Backed by Jiffy®'s renowned customer service--*should your steamer need repair, send it to us and we will repair and ship the unit within 24 hours from its arrival to our plant***

INCLUDES:



NJOY Exhibit 1002.1271

Jiffy® J-4000 Directions

1. Attach hose firmly with included assembly wrench, which is magnetized and located on the bottom of the unit (figure #1). Assemble and attach hose hanger rod set (figure #2). See page 9 for assembly instructions.

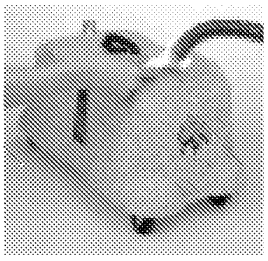


Figure 1

2. Using supplied funnel, add a maximum of four quarts of warm (fresh tap or distilled) water (cold water takes longer to preheat). Do not overfill. Plug into proper voltage outlet, turn switch to "PREHEAT". Steamer will hold at this temperature, and the light will go off and on occasionally. **NOTE:** The J-4000 Steamer contains a large water reservoir for 2 hours of continuous steaming. Leave the switch in the "PREHEAT" position (figure #3) if you plan to use your steamer throughout the day. This will maintain water temperature in the reservoir.

Figure 2

3. Immediately after water is preheated, turn switch to "STEAM" position for steam in approximately 2 minutes. The combined touch of the steaming head and the direct steam is very important. Some articles can be steamed better from the underneath side. Always steam with hose in upright position so any condensation is free to flow back into steamer. If steaming in a low position near floor, straighten hose up and out frequently to keep clear of condensation. If steamer runs dry it will temporarily shut off. Once finished using the unit, turn the switch to the "OFF" position. If more water needs to be added to the steamer, allow steamer to cool before removing fill cap and adding more water. Never pour cold water on a hot element. Resume steaming by resetting the switch to the "STEAM" position.

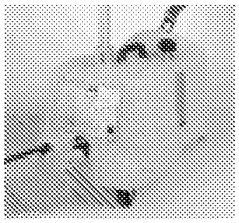


Figure 3

4. Hang steam head and hose in upright position in the hose hanger section when not in use (figure #4) and turn switch to the "OFF" position (figure #3).

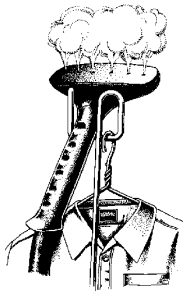


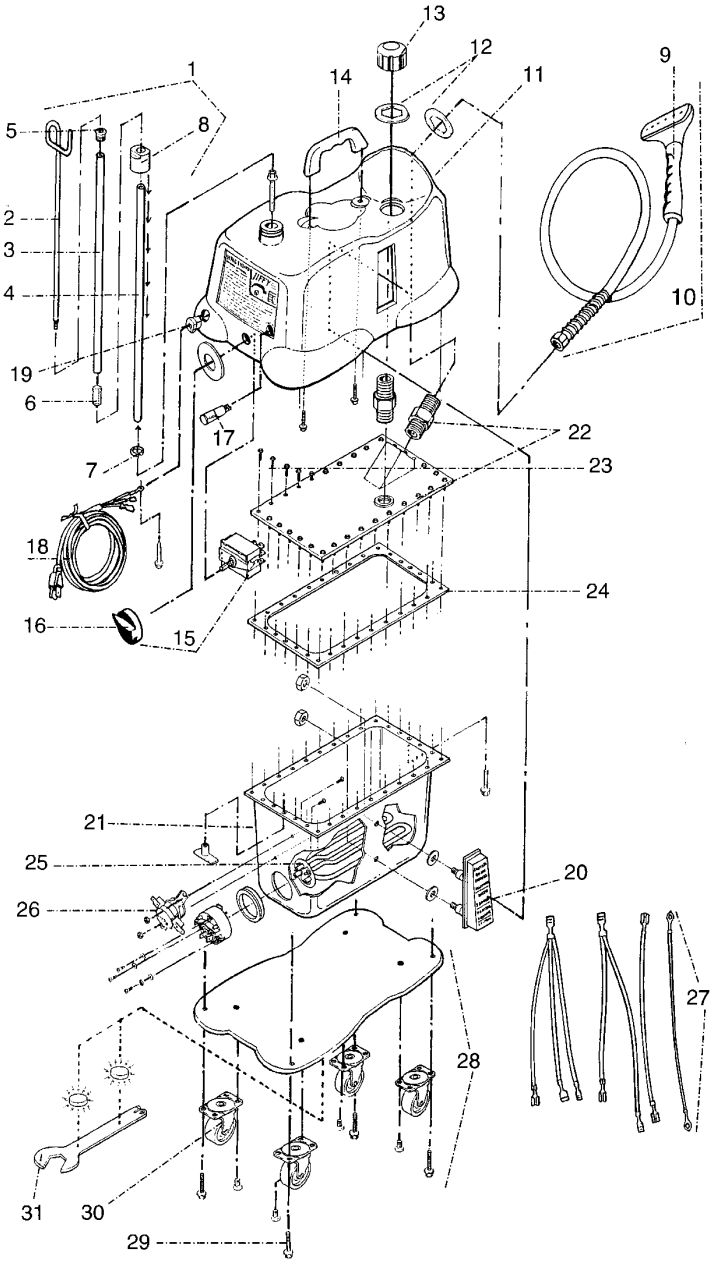
Figure 4

5. Periodically, pour old water out of steamer to avoid sediment build up and maintain proper water level. Never have more than 4 quarts of water in steamer. If overfilled, water will boil up into hose. The Jiffy® Liquid Cleaner is recommended every 6 months to flush mineral deposits. See page 29 for complete cleaning instructions.

WARNING: Never operate without water. Unplug after each use for added safety.

NJOY Exhibit 1002.1272

Jiffy® J-4000 Parts Diagram



Should you ever need replacement parts for your Jiffy® Steamer, you may purchase them separately. Use this handy diagram and parts list to identify any part you may need. Please include model and serial number when ordering.

Key#	Jiffy Steamer Part #	Part Description	List Price
1	**1030**	Rod Set and Nut Complete with Metal Studs	$ 25.50
	1034	Rod Set and Nut Complete for Drapery Steamers	$ 29.00
2	**0035**	Hook Section of Rod Set	$ 6.50

NJOY Exhibit 1002.1273

Jiffy® J-4000 Parts Diagram Key

3	**0036**	Middle Section of Rod Set (with Barrel Stud and Cap Screw)	$ 7.50
4	**0037**	Bottom Section of Rod Set	$ 7.50
	0038	Additional Middle Section of Rod Set for Drapery Steamers	$ 7.50
5	**0043**	Metal Threaded Cap Screw for Rod Set	$ 1.50
6	**0039**	Metal Threaded Stud for Rod Sections	$ 1.50
7	**1031**	1/2" Split Ring for Rod Set	$ 0.50
8	**1032**	Rod Set Nut	$ 6.00
9	**0253**	Plastic Steam Head/Handle Replacement Kit	$ 22.00
10	**0251**	Plastic Head/Handle Hose Attachment Complete	$ 50.00
	0280	Hose Per Foot (Black in Color)	$ 3.00
11	**1301**	J-4000 Die Cast Aluminum Housing	$ 72.00
12	**0006**	Hex Beauty Rings (Set of 2)	$ 1.50
13	**0049**	Water Fill Cap	$ 6.50
	0053	Funnel	$ 3.50
14	**0054**	Housing Handle with Two Screws	$ 7.00
15	**0199**	Rotary Power Switch and Knob	$ 12.00
16	**0201**	Replacement Knob Only for Rotary Power Switch	$ 1.50
17	**1310**	Red Neon Pilot Light (120 VOLT)	$ 4.50
	1311	Red Neon Pilot Light (230 VOLT)	$ 4.50
18	**0133**	Cord Set (14/3 gauge) with Strain Relief	$ 9.50
19	**0146C**	Cord Strain Relief	$ 1.50
20	**0050**	Water Level Sight Gauge with Nuts and Washers	$ 32.00
	1353	Stainless Steel Boiler Tank Kit Complete (120 Volt)	$ 155.00
	1354	Stainless Steel Boiler Tank Kit Complete (230 Volt)	$ 155.00
21	**1374**	Stainless Steel Boiler Tank with Sight Gauge (J-4000)	$ 78.00
	0074	Stainless Steel Boiler Tank with Sight Gauge (J-3)	$ 46.00
	0074A	Stainless Steel Boiler Tank with Sight Gauge (J-4)	$ 78.00
22	**0058**	Boiler Tank Lid with 2 Brass Fittings and 2 Beauty Rings	$ 28.00
23	**0071**	Boiler Tank Screw Set (Set of 30 + 1 Tee Nut)	$ 6.00
	0061	Boiler Tank Silicone Sealer (2.8 Fluid Ounces)	$ 4.50
	0062	Boiler Tank Silicone Sealer (10.1 Fluid Ounces)	$ 8.00
24	**0075**	Boiler Tank Gasket	$ 8.50
25	**1355**	Heating Element (120 Volt, 1500 Watt)	$ 28.00
	1356	Heating Element (230 Volt, 1500 Watt)	$ 28.00
	1350	Heating Element (120 Volt, 1500 Watt) & Control Kit Complete	$ 46.00
	1351	Heating Element (230 Volt, 1500 Watt) & Control Kit Complete	$ 46.00
	1352	Control Kit with Seal and Hardware	$ 18.00
	1362	Hardware Kit for J-4000 Control	$ 1.50
26	**0203**	Preheat Thermostat (L-170)	$ 8.00
27	**1314**	Internal Wire Set (Set of 4 Wires)	$ 8.00
28	**1320**	Bottom Plate with Four Casters	$ 18.00
29	**0017**	Bottom Plate Screws (Set of 4)	$ 0.75
30	**0018**	Bottom Plate Casters (Set of 4)	$ 6.50
ACCESSORIES			
31	**1050**	Jiffy Steamer Assembly Wrench	$ 4.00
	0259	Auto Hose Attachment with Dual Metal Heads	$ 82.00
	0257	Carpet Hose Attachment with 12" wide Metal Head	$ 75.00
	0252	7.5' Drapery Hose Attachment with Plastic Steam Head	$ 56.00
	0255	7.5' Drapery Hose Attachment with Metal Steam Head	$ 76.00
	0254	Metal Head / Wood Handle Hose Attachment Complete	$ 70.00
	0256	Metal Head / Wood Handle Only	$ 37.50
	0269	Replacement Wooden Handle (for Metal Steam Heads)	$ 7.00
	0262	Wig Hose Attachment	$ 50.00
	0274	Brass Hat Nozzle Attachment	$ 13.00
	1062	Steam Cleaning "B" Brush Hose Attachment	$ 50.00
	1063	Brush Only for the "B" Hose Attachment	$ 8.00
	0898	Liquid Cleaner - 3 Ten (10) Ounce Bottles per Package*	$ 15.00

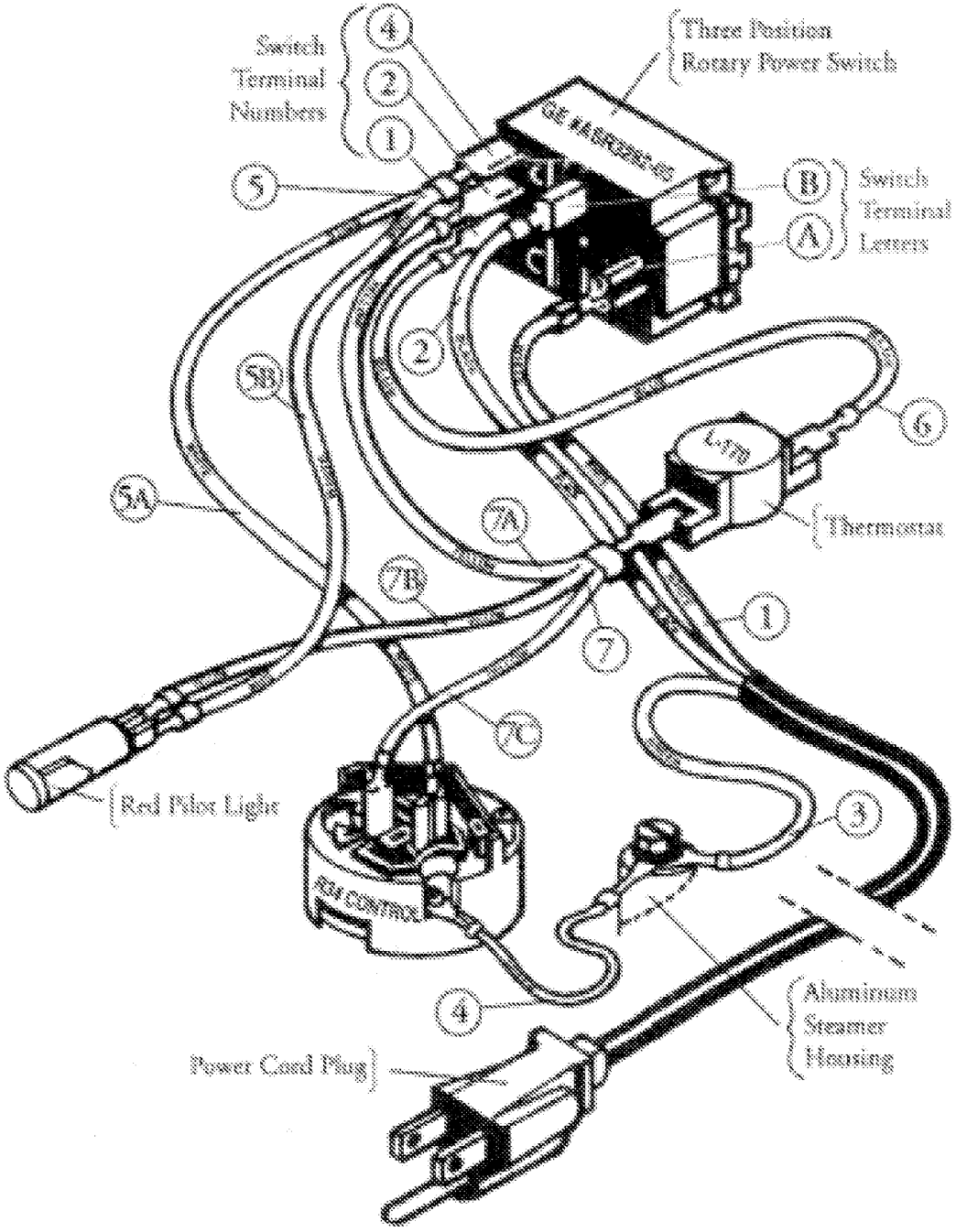
*Not Available for Export.

NJOY Exhibit 1002.1274

Jiffy® J-4000 Wiring Diagram

Caution:

Insure that the power cord is unplugged from the electrical outlet before attempting to repair your Jiffy® Steamer.



NJOY Exhibit 1002.1275

Jiffy® J-4000 Wiring Instructions

Please note, the switch terminal numbers and the switch terminal letters are marked on the actual switch.

1. Neutral wire #1 (white wire from the cord set bundle) attaches to "A" marked on the GE #ASR3282-05 rotary power switch.
2. Positive wire #2 (black wire from cord set bundle) attaches to "B" marked on the GE #ASR3282-05 rotary power switch.
3. Ground wire #3 (green wire from cord set bundle) attaches to the aluminum steamer housing.
4. Ground wire #4 (green wire from electrical control) attaches to the aluminum steamer housing.
5. The double white wire #5 connects from switch terminal number 4 as follows:
    - The 5A leg of the double white wire #5 connects to the terminal pin on the right side of the R34 electrical control, which is the one nearest to the ground wire.
    - The 5B leg of the double white wire #5 connects to either side of the red pilot light.
6. Blue wire #6 connects switch terminal number 1 to the top side of the L-170 PREHEAT thermostat.
7. Triple yellow wire #7 connects from the bottom side of the L170 PREHEAT thermostat as follows:
    - The 7A leg of the triple yellow wire #7 goes to switch terminal number 2.
    - The 7B leg of the triple yellow wire #7 goes to the red pilot light.
    - The 7C leg of the triple yellow wire #7 goes to the left side of the R34 electrical control.

Questions?
Call our technical support line
@ 1-800-525-4339
or e-mail us at
jsinfo@jiffysteamer.com

NJOY Exhibit 1002.1276

Jiffy® J-1/J-2/J-200 /J-2000 Cleaning Instructions

1. Remove hose from unit. Use caution as hose may be hot.

2. Run steamer for 5 minutes in normal operating mode.

3. Turn unit off and unplug from outlet.

4. Use a water hose to clean the hose attachment if blocked with sediment build-up. This should remove most deposits from the hose itself.

5. Remove water bottle and any excess water. Pour 1 bottle of Jiffy® Liquid Cleaner into steamer, wait two hours.

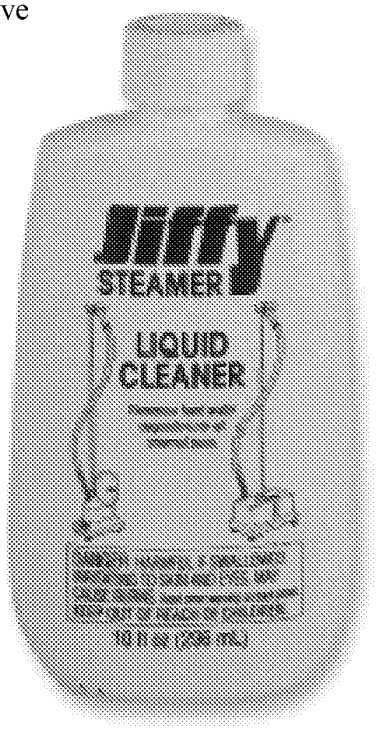
6. Do not steam with the liquid cleaner solution in the unit.

7. Pour out liquid cleaner.

8. Rinse with clean water 2 or 3 times by filling water cup with water and empty by allowing water to exit the water cup area.

9. If steamer is not completely clogged, this should clean the internal parts of the unit and remove most sediment build-up. Repeat process as necessary until all sediment is removed.

NOTE: Jiffy® Steamer Company recommends the liquid cleaner to be used on a regular basis every 3 to 6 months depending on your water supply. We suggest using the liquid cleaner as a preventative measure rather than a cure. In most cases, a unit that is severely clogged will require disassembly to properly clean and prolong the life span of your unit. A Jiffy® Steamer will provide many years of quality steaming if maintained and cleaned regularly.



NJOY Exhibit 1002.1277

Jiffy® J-4000 Cleaning Instructions

1. If sediment is visible in the sight gauge then it is recommended that you use our Jiffy® Liquid Cleaner.

2. Remove hose from unit.

3. Use a water hose to clean the hose attachment if blocked with sediment build-up. This should remove most deposits from the hose itself.

4. Put 1/2 gallon water into steamer and add 1 bottle of Jiffy® Cleaner. PREHEAT unit only. Use only Jiffy® Cleaner as other cleaners may damage internal parts.

5. When red PREHEAT light goes off, turn unit off and unplug the unit. Allow the steamer to soak for 1 hour and cool. **DO NOT STEAM THIS SOLUTION IN THE STEAMER.**

6. Pour out solution and rinse unit with clean water. This procedure should remove most sediment and clean the unit to prevent spitting. Please note that over-filling the unit and/or not extending the hose completely will also cause spitting.

7. If steamer is not completely clogged, this should clean the internal parts of the unit and remove most of the sediment build-up. Repeat process as necessary until all sediment is removed. The unit may need to be sent to the factory for a thorough cleaning if the steaming results do not improve.

   NOTE: Jiffy® Steamer Company recommends the liquid cleaner to be used on a regular basis every 3 to 6 months depending on your water supply. We suggest using the liquid cleaner as a preventative measure rather than a cure. In most cases, the unit that is severely clogged will require disassembly to properly clean and prolong the life span of your unit. A Jiffy® Steamer will provide many years of quality steaming if maintained and cleaned regularly.

NJOY Exhibit 1002.1278

Jiffy® Steamer Maintenance

Clean and rinse your steamer regularly:
All steamers need to be cleaned and rinsed on occasion to remove mineral deposits. We recommend our Jiffy® Steamer Liquid Cleaner for cleaning internal parts.

Never use additives:
Additives such as salt, perfumes and dyes should never be added to your steamer water. These substances will corrode or clog internal parts.

Never allow your steamer to run dry:
Running a steamer dry will cause internal damage to the heating element and wiring.

Never pour cold water into a hot steamer:
If by mistake your steamer has run dry of water, allow the unit to cool before adding water. Cold water poured on top of a hot heating element may cause damage to the element.

Steam in a vertical, upright position:
Do not use your steamer in a horizontal position like an iron. Steam in a vertical up and down motion. This will allow the condensation in the hose to flow back into the steamer.

Secure your hose nut tightly:
If your steamer has a hose attachment, use the onboard assembly wrench to insure the brass nut is fastened tightly to the base of the steamer. Wrench is magnetized to the bottom plate.

Never use an extension cord:
Extension cords should not be used on this product. Adding an extension cord may create damage to the steamer's power cord and internal wiring.

Do not pull steamer by the power cord:
Pulling the steamer by the power cord may cause the internal wiring to become loose.

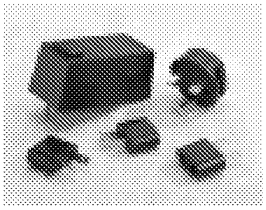
Never use your foot to turn steamer ON/OFF:
Damage may occur to the power switch should you turn the unit off using excess pressure with your foot.

Storing the steamer:
Before storing the steamer for an extended period (30 days or more), empty all water from the unit. Water becomes stale with time and may clog internal parts.

NJOY Exhibit 1002.1279

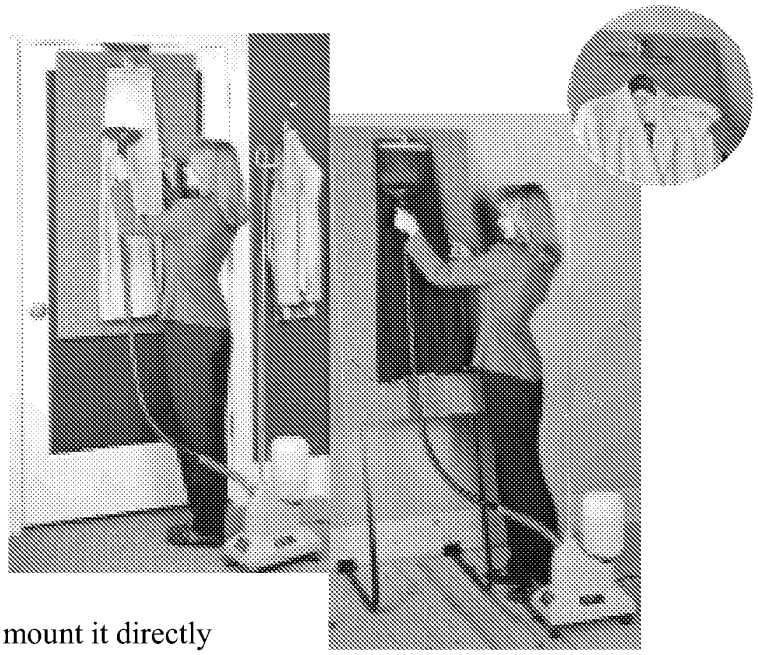
Other Jiffy® Steamer Accessories

Esteam® Converter & Adapter Plugs

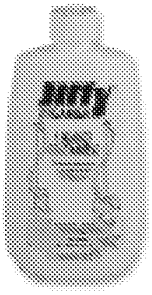


Take your Esteam® worldwide and use it at 100% power. Our converter contains a 25 amp triac semiconductor for stable power output, large aluminum heat-sink to dissipate heat and a UL listed, flame retarding, non-conductive material used in the outer housing. Available for 120 volt units only.

The Jiffy® Steamboard



The Jiffy® Steamboard provides a convenient workspace for quickly setting pleats and creases. Ideal for clothing retailers, tailors and home use. Attachments enclosed with the board allow you to mount the unit to your baseboard, hang it over a door or mount it directly to the wall. Not for export.



Jiffy® Liquid Cleaner

Our unique liquid cleaner removes hard water deposits from your Jiffy® Steamer. Easy to use, and it works on all Jiffy® models. Use only Jiffy® Cleaner as other cleaners may damage internal parts. Not available for export.

PATENTS

Jiffy® Steamer products and their components mentioned within this manual are covered by some or all of the following U.S. patents: D421,165 / D423,156 / D426,924. The design and configuration of the Model J-2 is a registered U.S. Trademark. Other patents are pending.

NJOY Exhibit 1002.1280

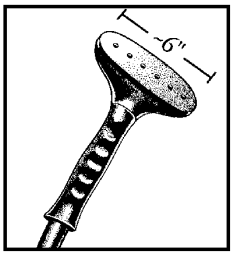
Jiffy® Steamer Head Configurations

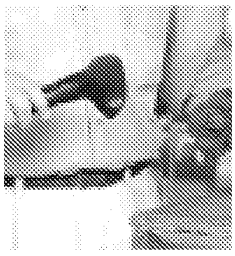
Optional Steam Head Configurations

Configuration #1

Standard Plastic Steam Head

Available on the J-2®, J-2000®, J-4000® and J-4000D® Model steamers.

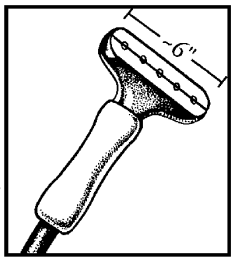




Configuration #2

Metal Steam Head with Wooden Handle

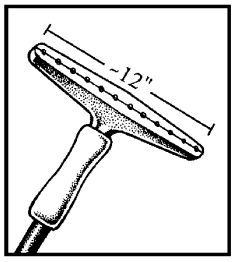
Available on the J-2M®, J-2000M®, J-4000A®, J-4000DM® and J-4000M® Model steamers.

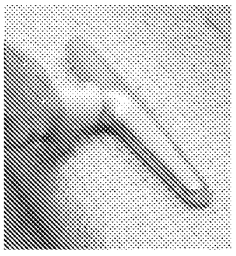


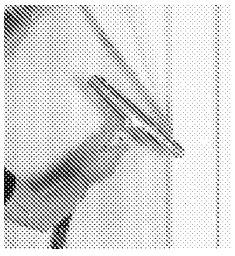
Configuration #3

Carpet Steam Head

Available on the J-4000C® Model steamer.



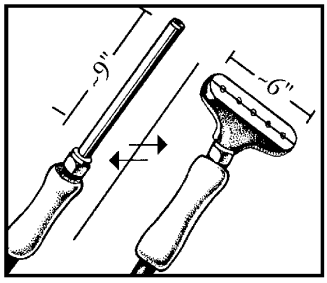


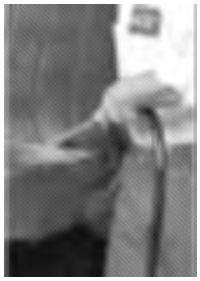


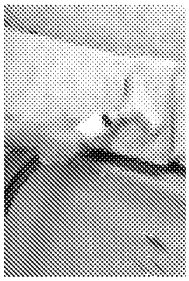
Configuration #4

Auto/Upholstery Pipe Steam Head & the Interchangeable Metal Steam Head

Available on the J-4000A® Model steamer.



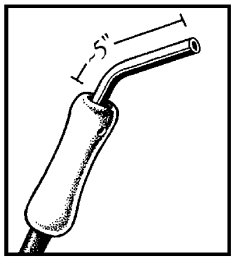


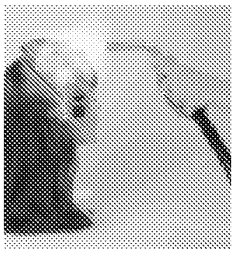


Configuration #5

Wig Steam Head

Available on the J-2W® and J-4000W® Model steamers.



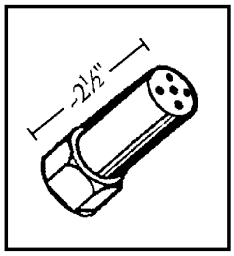


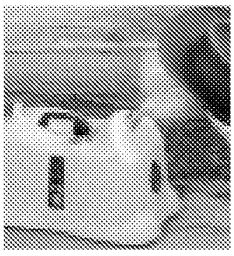
NJOY Exhibit 1002.1281

Jiffy® Steamer Plug Configurations

Configuration #6

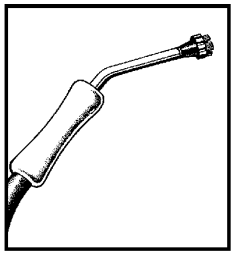
Hat Steam Nozzle
Available on the J-1®, and J-4000H® Model steamers.

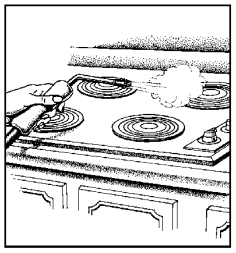


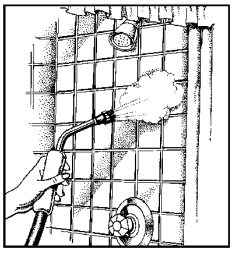


Configuration #7

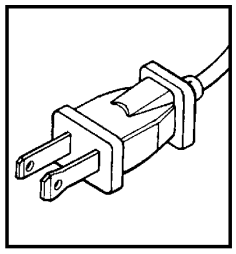
Steam Cleaning Brush Head
Available on the J-2B®, J-2000B®, and J-4000B® Model steamers.



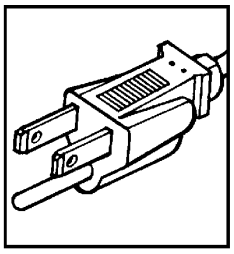




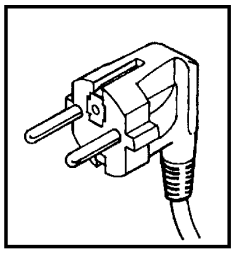
Jiffy® Steamer World Power Supply Configurations



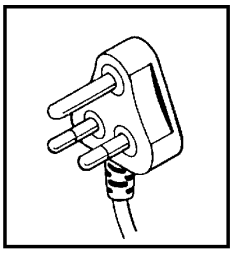
NEMA 1-15 120V
PLUG #1
Not available on the J-4000® Series.



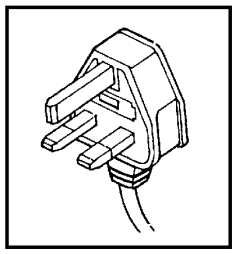
NEMA 5-15 120V or 230V
PLUG #2
Not available on the ESTEAM® Series.



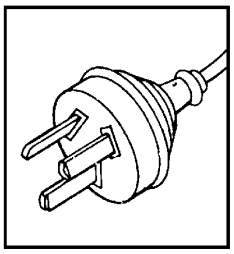
CEE-7 230V
PLUG #3



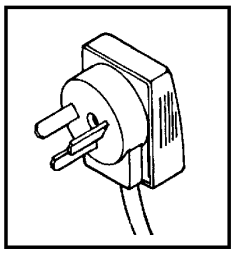
BS 546 230V
PLUG #4



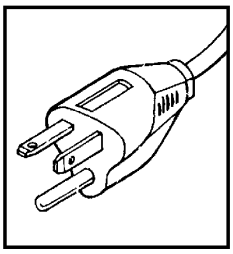
BS 1363 230V
PLUG #5



ETSA S/86 230V
PLUG #6



SI 32 230V
PLUG #7



620-P 230V
PLUG #8

NJOY Exhibit 1002.1282

Jiffy® Steamer Troubleshooting

Esteam®

PROBLEM	POSSIBLE CAUSE	SOLUTION
Steamer works poorly or cycles ON and OFF while steaming.	The unit has sediment build-up and needs a thorough cleaning. Possible thermostat trouble.	Use Jiffy® Liquid Cleaner to clean off element. A small brush may be needed to help scrub unit. Replace thermostat on unit.
The red indicator light illuminates but the unit never heats or steams.	Possible blown fusible link wire. Possible blown element.	Replace fusible link wire or replace element in unit. This may be done by you, an authorized repair center, or by a Jiffy® Steamer Company technician.
The unit spits water from steam cap.	The unit is being over-filled. The unit needs to be cleaned out inside tank and cap. User is tilting unit too far forward or backward during usage.	For best results from your steamer, use Jiffy Liquid Cleaner periodically to remove sediment deposits from your water (every 3 to 4 months) depending on how much the unit is used. Do not over-fill unit above max water mark indicated on side of unit.

J-1 / J-2 / J-200 / J-2000 Models

PROBLEM	POSSIBLE CAUSE	SOLUTION
Steamer works poorly or cycles ON and OFF while steaming.	The unit has sediment build-up and needs a thorough cleaning. Possible thermostat trouble.	Jiffy® Liquid Cleaner may solve the problem, but manual cleaning is the best solution at this point. The heating element must be disassembled and cleaned out manually.
The green indicator light does not illuminate when turned to ON position.	The fuse wire is bad. The cordset is bad. Wires may be disconnected. The switch is bad. The unit is not plugged in. The outlet may be defective or inoperable.	Check the unit's current flow and replace defective part. Try to plug the unit into another outlet.
On units purchased in 1986 and before, the red indicator light illuminates but the unit never heats or steams.	The heating element may be bad.	Replace the heating element. This may be done by you, an authorized repair center, or by a Jiffy® Steamer Company technician.
The steamer spits water from the steam head.	The steam head may be cracked or damaged. The unit has been overfilled (4 quarts maximum). The rod set is not fully assembled (three sections for most models and four sections for drapery steamers).	Replace head once signs of excess wear are apparent. Make sure the hose is straight and that it has no kinks which may trap condensation in the hose.
Unit does not produce steam when green indicator light is on.	Check water level to make sure unit is not out of water. Heating element may be bad. Wire may be disconnected.	Turn unit off, allow cool down period and refill water container. Check unit with a voltage meter (if qualified).

NJOY Exhibit 1002.1283

Jiffy® Steamer Troubleshooting

J-3 / J-4 /J-4000 Model

PROBLEM	POSSIBLE CAUSE	SOLUTION
The red indicator light remains ON for over 20 minutes, but no steam is produced from the unit at the STEAM setting.	The heating element may be bad. Control may be bad. Check water level.	Replace the heating element or control unit and reseal the tank assembly with high temperature silicone.
The red indicator light does not illuminate when the switch is turned to the PREHEAT or STEAM setting.	The fuse wire is bad. The cordset is bad. Wires may be disconnected. The switch is bad. The unit is not plugged in.	Check the unit's current flow and replace defective part.
The red indicator light works on the PREHEAT or STEAM setting, but not on both.	Wires may be disconnected. The switch is bad. The L170 control thermostat is bad.	Replace the heating element and control kit. This may be done by you replacing switch. Wiring needs to be checked by an authorized repair center, or by a Jiffy® Steamer Company technician.
The steamer spits water from the steam head.	The steam head has a crack or blemish. Hard water sediment has built up in the head. The unit has been overfilled (4 quarts maximum). The rod set is not fully assembled (three sections for most models and four sections for drapery steamers).	Replace head once signs of excess wear are apparent. Never fill the steamer with more than 4 quarts. Make sure the hose is straight and that it has no kinks which may trap condensation in the hose.
The steamer leaks water at the base of the unit.	There may be a hole in the tank (most common with older model units using aluminum tanks). The brass coupling between the hose and unit may be loose or the sight gauge is loose. The silicone sealant or rubber gasket around the tank assembly is leaking.	The faulty tank must be replaced with a new stainless steel tank. This involves replacing the tank, lid, and housing. This task is best serviced by a Jiffy® Steamer Company technician. Replace sight gauge. Tighten hose coupling with a wrench. Reseal the tank and lid with a high heat silicone.

PLEASE NOTE: Each of these items serve as a simple suggestion when repairing your Jiffy® Steamer. To insure professional service, please send your unit to the plant for authorized personnel to repair the steamer. A user may experience decreased performance at higher altitudes.

Questions?
Call our technical support line
@ 1-800-525-4339 or 1-731-885-6690
or e-mail us at
jsinfo@jiffysteamer.com

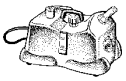
NJOY Exhibit 1002.1284

Jiffy® Steamer Matrix Chart

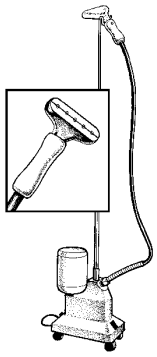
Index

A = upholstery
C = carpet
D = drapery
DM = metal steam head for drapery
H = hat
M = metal steam head with wooden handle
W = wig

J-1

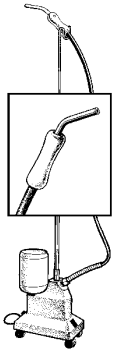
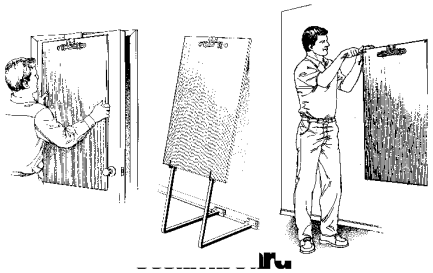

J-4000H

J-2


J-2M

Commercial	Pro-Line			
Automotive				
Furniture			●	●
Hat Manufacturers	●	BEST		
Industrial Supply			●	●
Silk Floral Manufacturing			●	●
Hospitality			●	●
Retail				
• Clothing			●	●
• Mass Channel			●	●
Photography			●	●
Movie Production			●	●
Interior Designers				
• Drapes				
• Carpets				
• Wallpaper				
Cosmetics				
• Beauty Salons				
• Hair Replacement				
Rental Stores	●	●	●	●
Supply Houses	●	●	●	●
Consumer				
Clothing			●	BEST
Wallpaper				
Drapes			●	BEST
Furniture			●	BEST
Wigs			●	
Travel				

Use this helpful matrix chart to help you find the right Jiffy® Steamer for your needs!

 **J-2W**	**Esteam®**	**Jiffy® Steamer Liquid Cleaner**	**Mounting Options** Option A Option B Option C 
			The Steamboard and Liquid Cleaner
		Jiffy® Steamer Liquid Cleaner is safe to remove hard water scale on all Jiffy® Steamer models.	
			BEST
			BEST
			BEST
			BEST BEST
			BEST
			BEST
●			
●			BEST
●			BEST
	●	Jiffy® Steamer Liquid Cleaner is safe to remove hard water scale on all Jiffy® Steamer models.	BEST
BEST			
	BEST		

P.O. Box 869 • Union City, TN 38281-0869 • Phone: 1-731-885-6690 • Fax: 1-731-885-6692 **Made in the USA Since 1940**

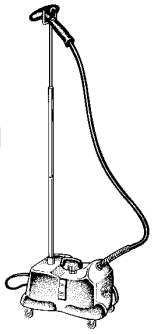
NJOY Exhibit 1002.1286

Jiffy® Steamer Matrix Chart

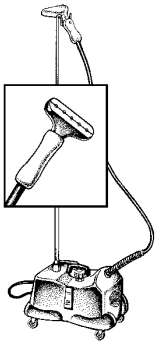
Each J-4000 model features a clear, built-in sight gauge. It allows you to view the water level in the boiler tank. It is also designed to indicate sediment build-up.

Index

A = upholstery
C = carpet
D = drapery
DM = metal steam head for drapery
H = hat
M = metal steam head with wooden handle
W = wig



J-4000

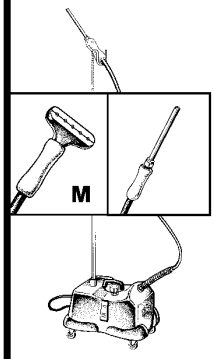
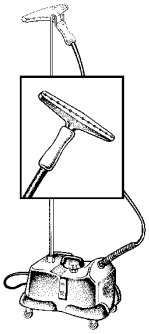
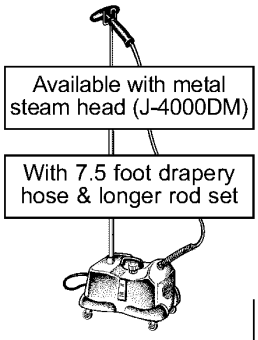
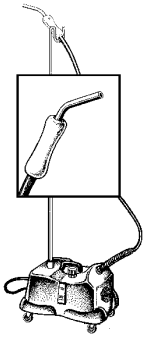


J-4000M

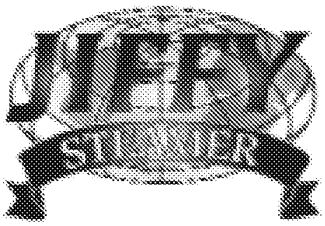
Commercial	Pro-Line	Pro-Line
Automotive		
Furniture	●	BEST
Hat Manufacturers		
Industrial Supply	●	BEST
Silk Floral Manufacturing	●	BEST
Hospitality	●	BEST
Retail		
• Clothing		BEST
• Mass Channel		BEST
Photography	●	BEST
Movie Production	●	BEST
Interior Designers		
• Drapes		
• Carpets		
• Wallpaper		
Cosmetics		
• Beauty Salons		
• Hair Replacement		
Rental Stores	BEST	BEST
Supply Houses	BEST	BEST
Consumer		
Clothing		
Wallpaper		
Drapes		
Furniture		
Wigs		
Travel		

NJOY Exhibit 1002.1287

Use this helpful matrix chart to help you find the right Jiffy® Steamer for your needs!

 **J-4000A**	 **J-4000C**	 **J-4000D**	 **J-4000W**
Pro-Line	**Pro-Line**	**Pro-Line**	**Pro-Line**
BEST			
BEST	BEST	BEST	
	BEST	BEST	
		●	
		●	
	BEST BEST	BEST	
			BEST BEST
BEST	BEST	BEST	BEST
BEST	BEST	BEST	BEST
	BEST		
		●	

Jiffy® Steamer PRODUCT SPECIFICATIONS



Worldwide Leader in Steaming Equipment Since 1940

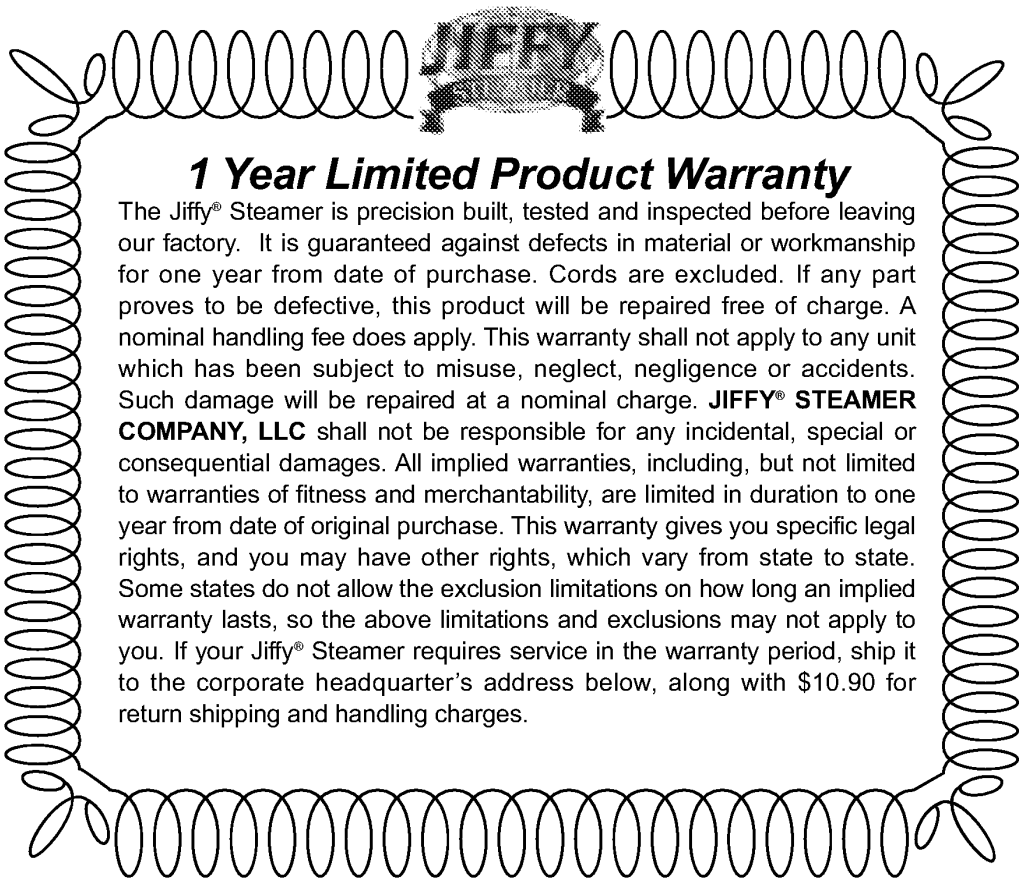
SPECIFICATIONS	ESTEAM®	J-1®	J-2®	J-200®	J-2000®	J-4000®
Voltage (120V)	✓	✓	✓	✓	✓	✓
Voltage (230V)	✓	✓	✓	✓	✓	✓
Wattage	600W (120V) 625W (230V)	1300W	1300W	1300W	1300W	1500W
Amps (120V)	5	10.83	10.83	10.83	10.83	12.5
Amps (230V)	2.71	5.65	5.65	5.65	5.65	6.52
Fusible Link Safety Fuse	✓	✓	✓	✓	✓	✓
Power Cord Length	8 feet	7 feet	7 feet	7 feet	7 feet	7 feet
Multiple Cord Plug Configurations Available	✓	✓	✓	✓	✓	✓
High Temperature Silicone Braided Wiring	✓	✓	✓	✓	✓	✓
Electrical Certifications (Both 120V and 230V)	UL ,CSA, CE, NOM, ANCE	UL, CSA, CE, NOM, ANCE	UL, CSA, CE, NOM, ANCE	UL, CSA, CE, NOM, ANCE	UL, CSA, CE, NOM, ANCE	UL, CSA, CE, NOM, ANCE
Uses Ordinary Tap Water	✓	✓	✓	✓	✓	✓
Water Capacity	8 ounces	1 gallon	1 gallon	1 gallon	.75 gallons	1 gallon
Water Level Easily Viewed	✓	✓	✓	✓	✓	✓
Pre-Heat Time with Maximum Water	2 minutes	2 minutes	2 minutes	2 minutes	2 minutes	15 minutes
Steam Duration	16 minutes	2 hours	2 hours	2 hours	1 hour 30 minutes	2 hours
Hose Length	–	–	5.5 feet	5.5 feet	5.5 feet	5.5 feet or 7.5 feet
Stainless Steel Boiler Tank	–	–	–	–	–	✓
Heating Element Type	Die Cast in Aluminum	Die Cast in Brass	Die Cast in Brass	Die Cast in Brass	Die Cast in Brass	Incoloy
Die Cast Aluminum Housing	–	✓	✓	–	–	✓
Hose/Clothing Hanger	–	–	✓	✓	✓	✓
1 Year Limited Warranty	✓	✓	✓	✓	✓	✓
Made in the U.S.A.	✓	✓	✓	✓	✓	✓
Net Weight Assembled	2 pounds	12 pounds	15 pounds	13 pounds	14 pounds	22 pounds
Gross Packaged Weight	3 pounds	15 pounds	17 pounds	15 pounds	18 pounds	26 pounds
Assembled Dimensions (L x W x H)	5.75 x 3.25 x 10.5 inches	13.5 x 7.5 x 13 inches	13.5 x 7.5 x 64.5 inches	13.5 x 7.5 x 64.5 inches	15 x 10 x 64 inches	18.5 x 10.5 x 62 inches
Single Carton Dimensions (L x W x H)	11.25 x 5 x 6.5 inches	15 x 9 x 19 inches	15 x 9 x 19 inches	15 x 9 x 19 inches	18 x 11.5 x 15 inches	20.5 x 12 x 13.5 inches
Attachments Available	Voltage Converter (converts 230 voltage electrical current to 120 voltage)	B, H, M, W	B, H, M, W	B, H, M, W	B, H, M, W	A, B, C, D, DM, H, M, W

Attachments Legend:
A = *Auto*
B = *Steam Brush*
C = *Carpet*
D = *Drapery*
DM = *Metal Head Drapery*
H = *Hat*
M = *Metal Head*
W = *Wig*

Comments? Questions?
Jiffy® Steamer Company Hotline 1-800-525-4339

NJOY Exhibit 1002.1289

Jiffy® Steamer Warranty



1 Year Limited Product Warranty

The Jiffy® Steamer is precision built, tested and inspected before leaving our factory. It is guaranteed against defects in material or workmanship for one year from date of purchase. Cords are excluded. If any part proves to be defective, this product will be repaired free of charge. A nominal handling fee does apply. This warranty shall not apply to any unit which has been subject to misuse, neglect, negligence or accidents. Such damage will be repaired at a nominal charge. **JIFFY® STEAMER COMPANY, LLC** shall not be responsible for any incidental, special or consequential damages. All implied warranties, including, but not limited to warranties of fitness and merchantability, are limited in duration to one year from date of original purchase. This warranty gives you specific legal rights, and you may have other rights, which vary from state to state. Some states do not allow the exclusion limitations on how long an implied warranty lasts, so the above limitations and exclusions may not apply to you. If your Jiffy® Steamer requires service in the warranty period, ship it to the corporate headquarter's address below, along with $10.90 for return shipping and handling charges.

Return Policy

Jiffy® Steamer Company, LLC strives to manufacture the very best quality steamers available in the world today. In the event you find that our products do not meet your needs, you may return the unit in the original packaging materials, along with a copy of the purchase receipt to the following address:

Jiffy® Steamer Company, LLC • Attn: Returns Department
4462 Ken-Tenn Highway • Union City, Tennessee 38261 • USA
Phone: 1-731-885-6690 • Fax: 1-731-885-6692
Toll-Free: 1-800-525-4339

This return policy only applies to goods purchased directly from Jiffy® Steamer Company, LLC and is independent of other dealer return policies. Please note that we shall issue 100% merchandise credit if the unit is retuned in new condition within 30 days of purchase. If the unit is returned in new condition outside this 30 day window, there shall be a 10% restocking fee assessed based on the invoice cost. Shipping charges are non-refundable under either of the above circumstances. Jiffy® Steamer Company, LLC reserves the right to refuse credit for discontinued products or steamers more than one (1) year past the date of purchase. If you have further questions regarding this, or any other issue, please do not hesitate to contact our customer service department at the above number. Thank you for your interest in Jiffy® Steamer products.

NJOY Exhibit 1002.1290

Jiffy® Steamer Extended Warranty

Extended Warranty Program

As a part of our growing family of valuable customers, you shall enjoy the sense of security that comes with knowing the Jiffy® Steamer product you purchased was built with precision, using the highest quality materials and workmanship available. This sense of security is reinforced by our standard one-year limited warranty coverage.

The standard warranty that came with your purchase expires 1 year from the purchase date and then you will be responsible for arranging and paying for your own repairs. Because we sincerely appreciate your purchase and hope to keep you as a satisfied customer for many years to come, our Jiffy® Steamer Extended Product Warranty is available for purchase. Please understand that the extended warranty must be purchased within 30 days of steamer purchase date. To find out more about this program, visit our web site at www.jiffysteamer.com or contact us directly (details below).

Contact Us

Jiffy® Steamer Company, LLC looks forward to serving your needs. If you have questions regarding our products, please do not hesitate to contact us.

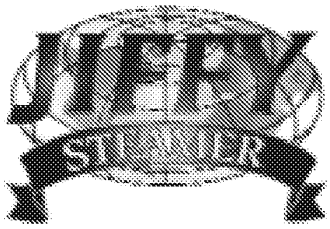
Jiffy® Steamer Corporate Headquarters Information:

Shipping Address:
4462 Ken-Tenn Highway
Union City, Tennessee 38261
United States of America

Mailing Address:
P.O. Box 869
Union City, Tennessee 38281
United States of America

Toll-Free: 1-800-525-4339 (In North America)
Voice: 1-731-885-6690
Fax: 1-731-885-6692

Email: jsinfo@jiffysteamer.com
Web: www.jiffysteamer.com



If Service is Required

PLEASE DO NOT RETURN THIS APPLIANCE TO THE STORE WHERE IT WAS PURCHASED.

For information regarding product service, please call our Toll-Free number noted above. Our customer service hours are from 7:30 AM – 4:00 PM, Central Time Zone, Monday through Friday. Please have your model number, serial number, place of purchase, date of purchase and description of the problem available. All products serviced by our factory technicians carry a six (6) month warranty. Thank you and we look forward to serving your needs.

Thank You
for purchasing the original Jiffy® Steamer!

Printed in the U.S.A. ©Copyright 2002, Jiffy® Steamer Company, LLC Form #5500

NJOY Exhibit 1002.1291

WARNING: This product contains nicotine. Nicotine is an addictive chemical.

MYVAPORSTORE

(/shoppingcart.asp)

Free Shipping on Orders over $50!

TELL US HOW YOU FEEL, WRITE A PRODUCT REVIEW AND RECEIVE A PROMO CODE!

■ Return to Joye eGo-Tank System XXL 1000mAh Starter Kit(ProduciDetails.asp?ProducicCode=EGO-T-XXLKIT)

Page 25 of 25

Sort by:: Newest GO

<PREV (?SortBy=Newest&Page=24&ProductCode=EGO%2DT%2DXXLKIT&Reviews=Y)

0 of 0 people found the following review helpful:

★★★★★ **Great** *April 6, 2011*
Reviewer: Wayne Miller from Missouri Valley, IA United States
This sure beats filling carts. Just fill the Tank and your good to go for hours.

Was this review helpful to you? YES (/reviewhelpful.asp?ProductCode=EGO%2DT%2DXXLKIT&ID=602&yes=yes)
| NO(/reviewhelpful.asp?ProductCode=EGO%2DT%2DXXLKIT&ID=602&yes=no)

0 of 0 people found the following review helpful:

★★★★★ **NICE** *April 5, 2011*
Reviewer: Anonymous Person from Fairfield, CA United States
Perfect E-Cig but dont let the youtube vids fool you... they do leak!

Was this review helpful to you? YES (/reviewhelpful.asp?ProductCode=EGO%2DT%2DXXLKIT&ID=581&yes=yes)
| NO(/reviewhelpful.asp?ProductCode=EGO%2DT%2DXXLKIT&ID=581&yes=no)

0 of 0 people found the following review helpful:

★★★★★ **Joye eGo-Tank System XXL 1000mAh Starter Kit** *April 4, 2011*
Reviewer: Darryl Levitch from Memphis, TN United States
This battery lasted 3 days before charging

Was this review helpful to you? YES (/reviewhelpful.asp?ProductCode=EGO%2DT%2DXXLKIT&ID=569&yes=yes)
| NO(/reviewhelpful.asp?ProductCode=EGO%2DT%2DXXLKIT&ID=569&yes=no)

0 of 0 people found the following review helpful:

NJOY Exhibit 1002.1292

★★★★☆ **Great starter unit!** *March 31, 2011*

Reviewer: Fossil from East Petersburg, PA United States

Since I am new to the vape community I thought I would start off with this unit. I like the convenience of the tank and the overall feel of the unit. The 1000mah batteries are great and last me all day, plus it's cool that you can turn off the unit when your not vaping.

The only thing that needs improved is the tank. They flood once and a while and you have to blow them out to clear the flood. You have to take the tank out to blow it out otherwise you will blow juice through to the battery. Also, when you insert it, if the sides of the tank isn't completely dry it will leak.
This complaints aren't enough to make me want to trash the unit though. I would recommend it to newbies.

Was this review helpful to you? YES (/reviewhelpful.asp?ProductCode=EGO%2DT%2DXXLKIT&ID=495&yes=yes)
NO(/reviewhelpful.asp?ProductCode=EGO%2DT%2DXXLKIT&ID=495&yes=no)

0 of 0 people found the following review helpful:

★★★★★ **ego tank** *March 28, 2011*

Reviewer: Liz Rasmussen from Arlington, WA United States

I am surprised at how long lasting the batts are. The tank system has been working perfectly for me, I am actually vaping less coz I am feeling satisfied.

Was this review helpful to you? YES (/reviewhelpful.asp?ProductCode=EGO%2DT%2DXXLKIT&ID=470&yes=yes)
NO(/reviewhelpful.asp?ProductCode=EGO%2DT%2DXXLKIT&ID=470&yes=no)

0 of 0 people found the following review helpful:

★★★★★ **Joye eGo-Tank** *March 26, 2011*

Reviewer: David Hanna from Port Orange , FL United States

I drive alot during my work week and
thanks to the long lasting e-Go Tank I can(safely) enjoy vaping between stops.

Was this review helpful to you? YES (/reviewhelpful.asp?ProductCode=EGO%2DT%2DXXLKIT&ID=436&yes=yes)
NO(/reviewhelpful.asp?ProductCode=EGO%2DT%2DXXLKIT&ID=436&yes=no)

0 of 0 people found the following review helpful:

★★★★☆ **Dripper's Delight** *March 25, 2011*

Reviewer: Brian Roland from Morton, MS United States

If you want an auto dripper this may be the only factory built one on the market right now. Load the tank and it keeps the atty wet...no more fancy carts packed with poly filler...just a simple tank of juice!

It does a very good job of the dripping process and every hit is consistently excellent. The trade off for this hands-free dripping experience is that it can sometimes waste a good bit of juice (at least until learning how to best load and handle it for your particular vaping style).

If you change flavors much, I recommend getting an extra atty for each flavor family, as these are pretty tough to flush out just for a quick flavor change.

Was this review helpful to you? YES (/reviewhelpful.asp?ProductCode=EGO%2DT%2DXXLKIT&ID=430&yes=yes)
NO(/reviewhelpful.asp?ProductCode=EGO%2DT%2DXXLKIT&ID=430&yes=no)

0 of 0 people found the following review helpful:

NJOY Exhibit 1002.1293

★★★★★ **JOYE Does it again** *March 22, 2011*
Reviewer: Phil from PA United States
I have all the Joye models and they are excellent. But the Tank is on a whole other level. A bit pricey, but well worth it. Can it get any better? Thick clouds of vapor, the throat hits there, great flavor, less refilling and it looks nice.

Was this review helpful to you? YES (/reviewhelpful.asp?ProductCode=EGO%2DT%2DXXLKIT&ID=401&yes=yes)
| NO(/reviewhelpful.asp?ProductCode=EGO%2DT%2DXXLKIT&ID=401&yes=no)

1 of 1 people found the following review helpful:

★★★★★ **WOW** *March 17, 2011*
Reviewer: Jillian from Anaheim, CA United States
The mega batteries in this kit last FOREVER! So do the cartridges. I don't switch cartridges for 6 hours! Pretty easy to use. Love the on/off feature on batteries. This thing makes lots of vapor and the flavor is great! I recommend switching to this model, you wont regret it! Best price on the net. thx!

Was this review helpful to you? YES (/reviewhelpful.asp?ProductCode=EGO%2DT%2DXXLKIT&ID=344&yes=yes)
| NO(/reviewhelpful.asp?ProductCode=EGO%2DT%2DXXLKIT&ID=344&yes=no)

0 of 0 people found the following review helpful:

★★★★★ **Best, hands down** *March 13, 2011*
Reviewer: Sharon from TN United States
Purchased this for my husband. Ordered on Wednesday, received on Friday! Hes getting 10+ hours out of each battery. I seem to get more vapor when I use the XL batteries.

I've been vaping for over a year now. I've had the 650mah Tank kit for 2 weeks and lovin it.

Went from a Joye510 to an eGo and now the tank and there is no comparison. Joye products are just awesome. The tank is so convenient. I now only refill twice a day.

Other vendors sell the 650 tank kit for the same price I purchased the XL 1000 kit here. Excellent prices and lightning fast shipping here! Highly recommended!

Was this review helpful to you? YES (/reviewhelpful.asp?ProductCode=EGO%2DT%2DXXLKIT&ID=306&yes=yes)
| NO(/reviewhelpful.asp?ProductCode=EGO%2DT%2DXXLKIT&ID=306&yes=no)

< PREV (?SortBy=Newest&Page=24&ProductCode=EGO%2DT%2DXXLKIT&Reviews=Y)

Trustpilot

Email Signup: Enter Email Address ›

Follow Us: (https://www.facebook.com/myvaporstore/?ref=badge#)

Products

NJOY Exhibit 1002.1294

E-Cig Info

MVS Info

Policies

My Account

Help

View Desktop Site

WARNING: Our products contain nicotine, a poisonous and addictive substance. Our products are only intended for committed smokers of legal smoking age and not by non-smokers, children, women who are pregnant or may become pregnant or any person with an elevated risk of, or preexisting condition of, any medical condition which includes, but is not limited to, heart disease, diabetes, high blood pressure or asthma. If you experience any side effects or possible side effects, stop using the product immediately and consult a physician. Product may be poisonous if orally ingested. Our products are not smoking cessation products and have not been tested or guaranteed as such. Our products have not been evaluated by the Food and Drug Administration nor is it intended to treat, prevent or cure any disease or condition. For their protection, please keep out of reach of children and pets. Read our terms of use page before purchasing our products.

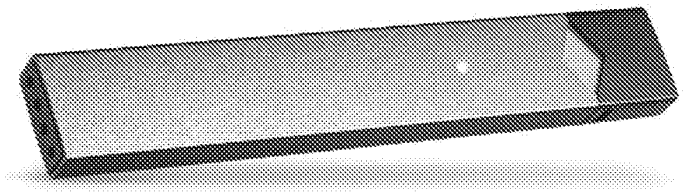
We Accept:

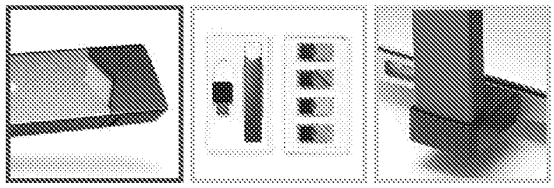
Copyright © 2009-2018 myvaporstore® is a registered trademark of MV Store, Inc.
All Rights Reserved. | Built with Volusion(http://www.volusion.com).
Designed by Brand Labs.

(http://www.casaa.org/)

NJOY Exhibit 1002.1295

JUUL





JUUL

$49.99

FREE SHIPPING

Everything you need to get started in one package:

1 x rechargeable JUUL device

1 x Multi JUULpod 4-pack*

USB charger

1 year device warranty

ADD TO CART

Taxes vary by location

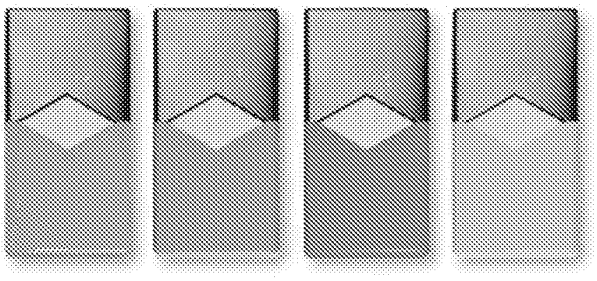
*Contains one of each JUULpod flavor. Each JUULpod contains 0.7mL with 5% nicotine by weight, approximately equivalent to 1 pack of cigarettes or 200 puffs.

MAKE IT MONTHLY.

Sign up for Auto-Ship

15% OFF

your next purchase



NJOY Exhibit 1002.1296

JUUL

WHAT MAKES JUUL AWESOME?

BUILT TO SATISFY

- the right nicotine strength and vapor quality to provide a powerful and smooth experience
- controlled power and temperature allow for a smooth delivery system
- liquid-to-wick cartridge system ensures thick, consistent, flavorful vapor
- 4 flavors (where available)

SMART INTERFACE

- easy to use - no buttons or switches, simply insert JUULpod into JUUL and draw
- indicator light communicates battery life and pull strength
- magnetic USB charger
- internal temperature regulation

TECHNOLOGY & CHEMISTRY

- small battery with high discharge rate to accommodate ~200 puffs/charge
- juice & cartridge sponge wick system efficiently deliver full and consistent vapor
- coil temperature regulation delivers appropriate amounts of power during use

NJOY Exhibit 1002.1297

JUUL

START WITH YOUR JUULPOD

Remove colored cap & insert cartridge end into device. Voila - it becomes your mouthpiece as well as the flavorful engine that powers JUUL.

No buttons or switches, just draw to get it going - carefully at first, it may seem strong to first-timers.

CONSULT THE INDICATOR

The indicator glows during use to reflect pull strength and while charging. When pod is inserted, gently tap device twice to show charge level.

green = high

yellow = medium

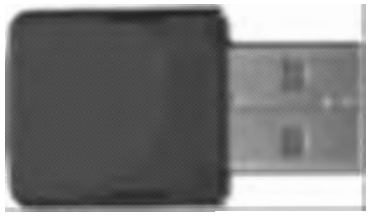
red = low

CHARGE IT

Stand device in magnetic USB charger. Reaches full charge in 1 hour.

NJOY Exhibit 1002.1298

JUUL



USB CHARGER

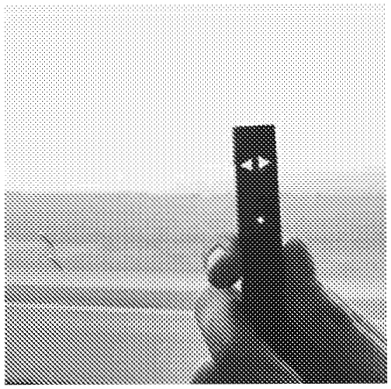
$9.99

In case you need a spare.

ADD TO CART

#JUULVAPOR

Join the conversation



NJOY Exhibit 1002.1299

JUUL

"This might just be the first great e-cig"

WIRED

"An extremely attractive and compact little device that packs the same amount of nicotine as a pack of cigarettes into a tiny liquid-nicotine cartridge"

TechCrunch

"JUUL: The iPhone of E-cigs"

BUSINESS

Sign up to get 25% off your first purchase.

Email ZIP SUBSCRIBE

SHOP
JUUL
JUULpods
USB Charger

AUTO-SHIP
Learn More

MY ACCOUNT
Sign In
Create Account
My Cart

SUPPORT
Quick Start Guide
FAQ
Features
About Vapor
Warranty
Contact

STORE LOCATOR
Find a Retailer

NJOY Exhibit 1002.1300

JUUL

Our Story

Affiliate Program

Press

Events

Careers

Retail & Wholesale

PAX Vapor

© 2016 PAX Labs, Inc. Terms & Conditions | Privacy Policy

NOT FOR SALE TO MINORS | CALIFORNIA PROPOSITION 65 WARNING: This product contains chemicals known to the state of California to cause cancer, or birth defects or other reproductive harm.

Due to city and state regulations JUUL promotions are prohibited in the following areas.

NJOY Exhibit 1002.1301

Watch YouTube videos with Chrome. Yes, get Chrome now

Search

Sign in

Glory Vapes TV: Kanger S1 Cubica Series Starter Kit Unboxing

Glory Vapes

Subscribe

1,405 views

Add to Share More

Published on Aug 8, 2013

Brent shows you the Kanger S1 Cubica Series starter kit, unboxes it, and shows off it's features.

SHOW MORE

COMMENTS

Add a public comment...

Up next Autoplay

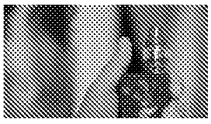
Top EVOD from Kangertech
Vaporlead
190,244 views

VAPE VS CIGARETTES (EXPERIMENT)
Sivvi Show
11,230,728 views

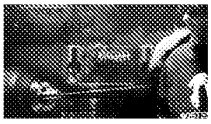
BERITA TERBARU HARI INI ~ 29 MEI 2019 PAGI ~ ACEH
MENEMBUS BATAS
1,303,889 views NEW

Top 10 Electric Mouse Traps 2019 Part 2
TheReal ChannelM
Recommended for you

GeekVape Karma Kit (RDA SETUP) w/ GeekVape Clapton
BuCkz VLOG
Recommended for you



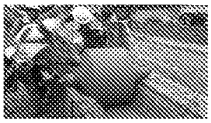
When you're all out of E-Liquid...
DashVapes
Recommended for you



Buildlapse with Twisted Messes - 4x 28g Twisted Dual Coil
CBD Capitol
Recommended for you

BUYING a mystery box off the DARK WEB ! (WEIRD)!
Jude Somers
Recommended for you

Vaping vs Smoking | 10 Reasons to Switch to Vaporizing | Sneaky
Sneaky Pete Vaporizers
594,970 views



Ingenious Workers That Are On Another Level ▶5
Tech HD
Recommended for you

طريقه تنظيف الكويل و الحفاظ عليه
UAE Vaping
Recommended for you

NJOY Exhibit 1002.1302

Watch YouTube videos with Chrome. Yes, get Chrome now

Search

New Free internet 100% - Ideas Free
Energy Tech
Recommended for you
Sign in for you

7:30

VICE International S1 • E28
China's Vape Industry Is Just Getting Started
VICE
1,691,817 views
8:38

Alcune piccole critiche sul "Vinci by Yasu75"
svapare
Recommended for you
12:35

How to Blow Glass Pipes, Bongs, Bubblers, and More by Purr - Part
Purr Glass
392,379 views
16:59

20 Awesome Tricks with WD-40
Simple Ideas
Recommended for you
7:39

REVIEW OF THE CPH-S1 ELECTRONIC CIGARETTE
igercha69
40,532 views
9:48

How to Cut a Cigar | Cigar Aficionado
Cigar Aficionado
1,595,244 views
4:56

Is it better? iJoy Shogun Univ 180w TC Kit with Katana Tank
Wendy Vapes
259 views NEW
28:37

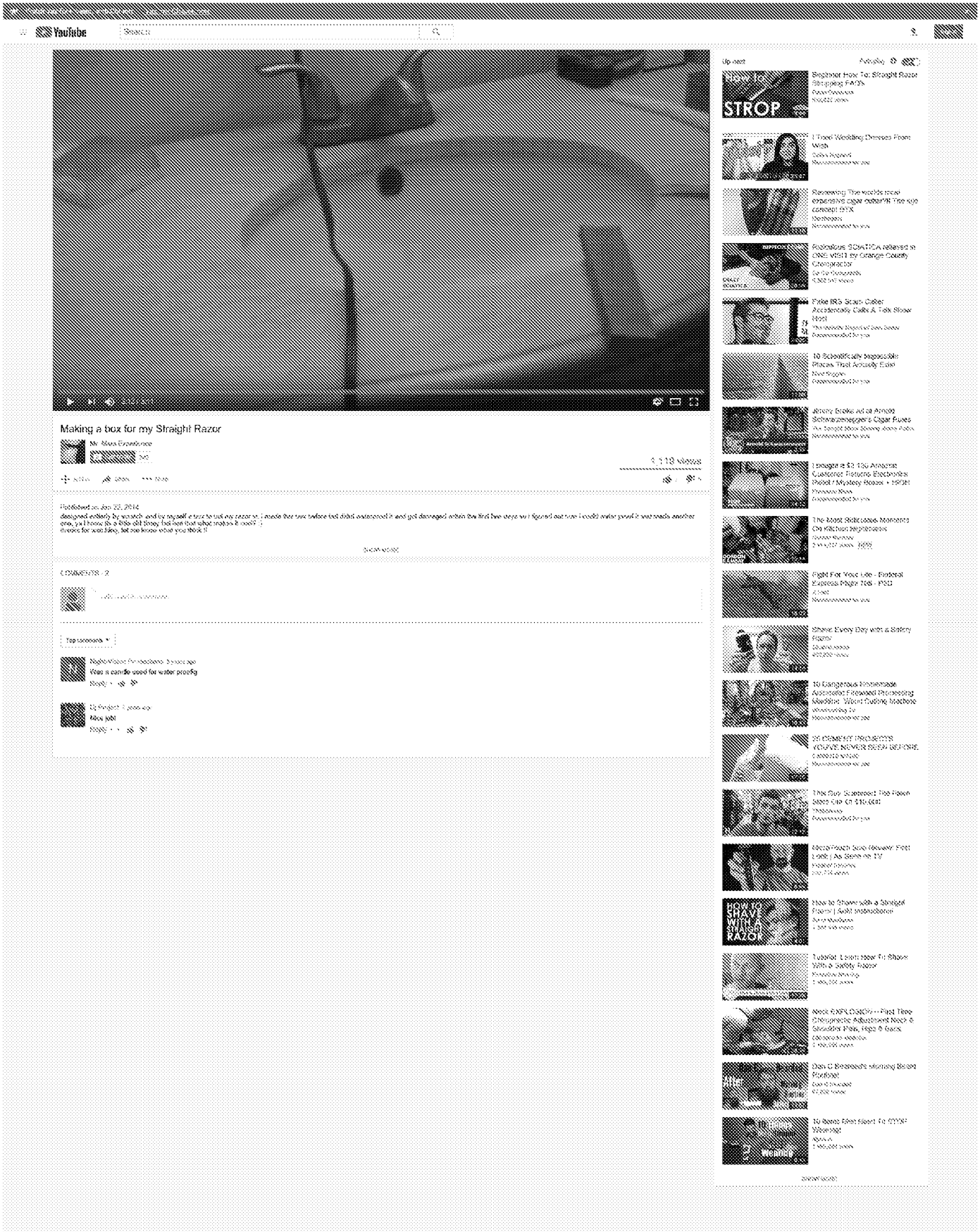
INNOKIN'S ITASTE VV V3 WIN
GrimmGreen
246,664 views
14:48

SHOW MORE

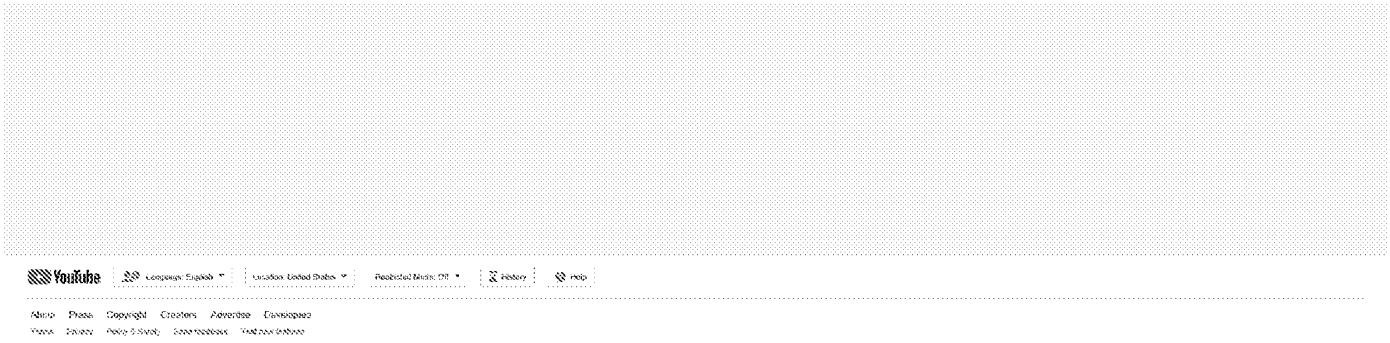
Language: English Location: United States Restricted Mode: Off History Help

About Press Copyright Creators Advertise Developers
Terms Privacy Policy & Safety Send feedback Test new features

NJOY Exhibit 1002.1303



NJOY Exhibit 1002.1304


YouTube
Language: English
Location: United States
Restricted Mode: Off
History
Help
About Press Copyright Creators Advertise Developers
Terms Privacy Policy & Safety Send feedback Test new features

Watch YouTube videos with Chrome. Yes, get Chrome now

Search

Sign in

microG Pen Vaporizer Review

Vaporizers Reviewed

Subscribe

75,134 views

Add to Share More 102 12

Published on Nov 6, 2013

Beware of Fakes: Always purchase your MicroG from an Authorized Retailer:

http://www.vaporizersreviewed.com/vap...

SHOW MORE

COMMENTS • 45

Add a public comment...

Top comments

Sam M 2 years ago

They arent ment for ejuice they are ment to do dabs

Reply • 3

Nadan Garrett 5 years ago

Good review.Thanks for keeping it short and straight to the point.

Reply • 1

Dillon 2 years ago

Can I use wax/oil for this pen?

Reply • 2

View reply

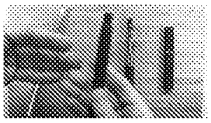
DMT ALBEN 5 years ago

Can you vape DMT with this pen?

Reply • 2

View 2 replies

Up next Autoplay



Pen Vape Review/Comparison: micro G Pen, Atmos Rx,

The Vape Critic

343,878 views

MicroG G Pen Vaporizer Review

760 Glass

100,456 views

Take a tour of the Aurora Cannabis production facility (in

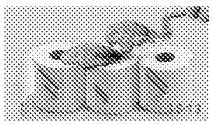
CBC News

Recommended for you

BUYING a mystery box off the DARK WEB ! (WEIRD)!

Jude Somers

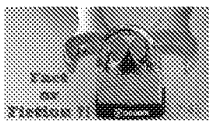
Recommended for you



35 CEMENT IDEAS THAT ARE SO EASY

5-Minute Crafts

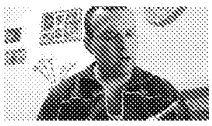
Recommended for you



The TRUTH about HOW TO OPEN a LOCK with a NUT wrench!

Yak Motley

Recommended for you



Provari: test multivoltaggio (vapore prodotto ai vari

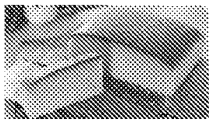
Evaporators & eSigBlog.com

Recommended for you

I bought 18 broken Xboxes - Can I Fix Them and Make

TronicsFix

Recommended for you



Japanese Cotton Sponge Cake 日式棉花蛋糕

Katrina Kwa

Recommended for you

VICE Eats with Action Bronson at Marea

VICE

1,048,294 views

11:43

Eyeliner Do's & Don'ts To "Lift" Mature Eyes! Mistakes to Avoid

HotandFlashy

Recommended for you

10:44

NJOY Exhibit 1002.1306

Watch videos without interruptions. Yes, get Chrome now

I use this for dabs

Reply · 2

View 2 replies

Search

Sign in

Whiteboyalex98@gmail.com Mexico07 4 years ago

Can u smoke weed and wax with this?

Reply ·

View reply

Meyeyibia 3 years ago

2 vaps? is this a special promotion? or you get 2 if you make a normal purchase?

I'm sorry for my rusty english

Reply ·

View reply

Victor Sanchez 5 years ago

Can this be used with ecig juice?

Reply ·

smartfreman 5 years ago

you do realize this is a fake pen right?

Reply · 1

View 2 replies

spwan10 2 years ago

big fony to scared to try bho.

Reply ·

yamisohl 4 years ago

why does smoke come out with nothing packed?

Reply ·

View 3 replies

Joe Diaz 4 years ago

Always smells like plastic is burning, still makes smoke with an empty chamber.. what is that smoke? I think this thing is actually really bad for us.

Reply · 1

View 4 replies

Eddie Shellmire 5 years ago

Can this be used wit dry herbs

Reply ·

View 2 replies

stephen duese 2 years ago

for people who wax , their car lmao !

Reply ·

Dee En Bee 5 years ago

at my local smoke shop they sell 2 for 150 and they said it works for dry herb and wax... i just bought 2 online for 30 bucks and idk if i can use herb and bho or just bho ... anyone know for sure?

Reply ·

View 2 replies

Victoria Black 3 years ago

I love to wax.

Reply ·

How to Remove a Stump, Cheaply & Easily
The Neats' Home
Recommended for you
21:44

Intermittent Fasting: Transformational Technique | Cynthia Thurlow | TEDxTalks
TEDx Talks
Recommended for you
12:45

Getting started with your microG Vaporizer
Grenco Science
48,439 views
1:11

Getting High with Childish Gambino - Interview
Inside The Story
1,589,419 views
5:05

Cheapest Way to Start Vaping! | eGo & eGo Twist Blister Kits |
IndoorSmokers
792,490 views
7:46

What Happens To Your Body ● When You VAPE For a Month
Chris Notap
35,383,871 views
4:13

Vape Pen 101: Cleaning and Maintenance
High Times
169,309 views
1:51

Vaporizer Tips & Tricks: Getting the most out of your Vape.
Australian Vaporizers
163,837 views
8:29

How to clean G Pens solids & concentrates (full video)
Clean G Pen
62,567 views
11:28

SHOW MORE

NJOY Exhibit 1002.1307

Yes, get Chrome now

I Was wondering if i could use thos for wax and herbs???

Reply ·

Search

Sign in

Drew Jamrose 4 years ago

Does anyone know what the difference in colors are when you hit the g pen? For example: If you hit it, it turns blue. what does it mean if it is red when you hit it?
Also if you hit the button 3 times then three different colors show, what do those colors mean?

Reply ·

View 2 replies

Iwj 5 years ago

Both mine broke after a week. Poor quality. First one element burnt out second one it just stopped turning on at all. Don't waste your money

Reply ·

Mark Fistric 3 years ago

Hey man, I noticed the first time you took a hit you held the button down for a few seconds and then took your hit.. What is the deal with that? I am new to using the micro G and am getting very weak hits. Thanks boss!

Reply ·

Show more

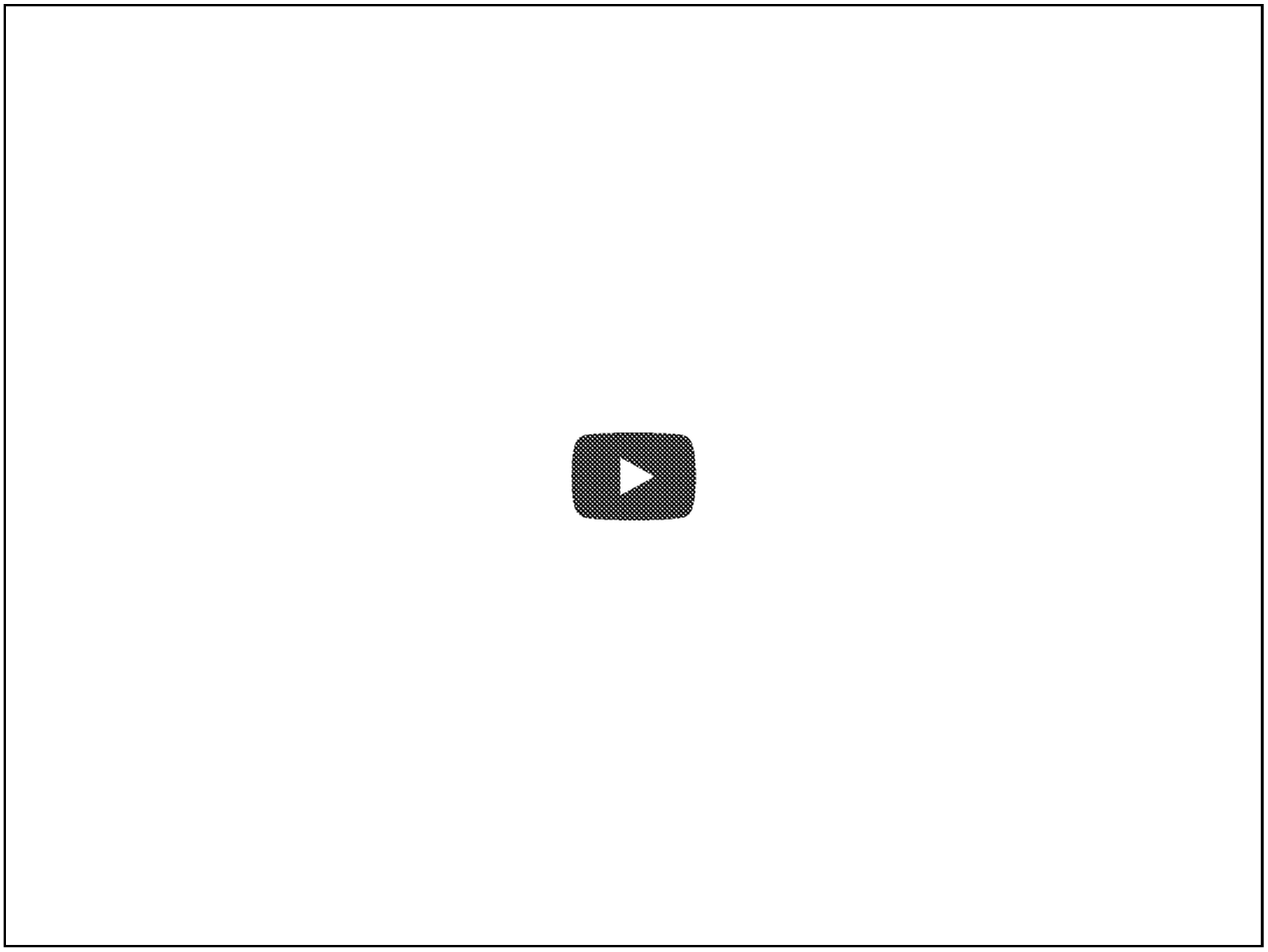
Language: English Location: United States Restricted Mode: Off History Help

About Press Copyright Creators Advertise Developers

Terms Privacy Policy & Safety Send feedback Test new features

NJOY Exhibit 1002.1308

NJOY Exhibit 1002.1309



Modello iWand

352 views

0 0 SHARE

Roberto Maiocco
Published on Dec 28, 2012

SUBSCRIBE 1

Nuovo modello di esig: la tecnologia al tuo servizio

SHOW MORE

Up next AUTOPLAY

Show&Tell iWand W.S#114
Wind Shed
98 views

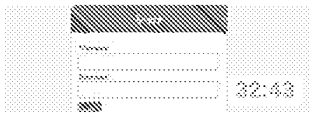
NJOY Exhibit 1002.1310

Kim Vlogs
Recommended for you

Look Inside Britain's Moped Crime Gangs

Deus
Recommended for you

Complete User Registration system using PHP and MySQL database

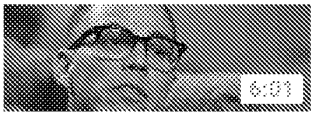


Awa Melvine
Recommended for you

60 Days BUTTER DRY AGED Experiment vs Real Dry Aged Steaks!

Guga Foods
Recommended for you

Steve-O: Snorting HIV positive blood

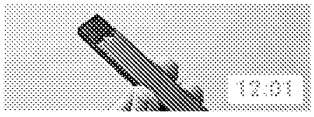


Graham Bensinger
Recommended for you

E-Cigarettes : Welcome Back, Big Tobacco - the fifth estate

The Fifth Estate
Recommended for you

10 Things JUUL Doesn't Want You To Know



Top Trending
Recommended for you

Y-Studs - Evolution of Jewish Music

Y-Studs A Cappella
Recommended for you

Asking College Girls If Abs Matter

Marco Trunzo
Recommended for you

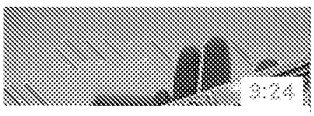
Shooting THROUGH Trees! PUBG in Real Life

NJOY Exhibit 1002.1311

Pen Style E-Cig Itaste Variable Voltage E-Cigarette With LCD Iwand Kits

wholesale Consumer electronics

1.7K views



Euphoria Technology

IPC

2.7K views

Gerry Scotti e Ovale The Winner is 08 12 2012

Ovale Cles

6K views

Iwand 2 -Leistenbruch-Licht Akupunktur

JuMaLy Healing

810 views

REVIEW OF THE INNOKIN ITASTE VV ELECTRONIC CIGARETTE

igetcha69

64K views

El Chapo: Drug Lord and Exhibit A of the Problem with a Border Wall | The Daily Show

The Daily Show with Trevor Noah

775K views

New

HOT ONES S8 • E1

Gordon Ramsay Savagely Critiques Spicy Wings | Hot Ones

First We Feast

8.2M views

New

Melanger ALLURE JR5T (4 kg) assembling process.

Allure Melangers

231K views

BREAKING Roger Stone URGENT Speech after being Arrested by the FBI and Posting Bail

Golden State Times

49K views

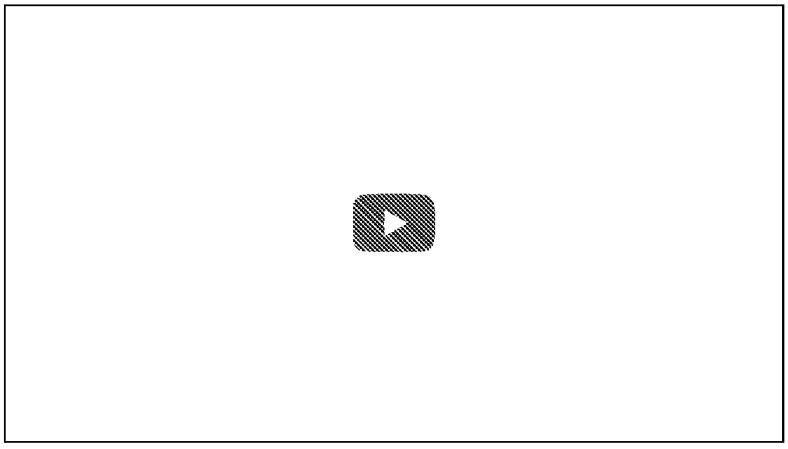
New

NJOY Exhibit 1002.1312

Watch YouTube videos with Chrome. Yes, get Chrome now

Search

Sign in



NJOY Electronic Cigarette review

VapeandBake

Subscribe

35,398 views

Add to Share More 71 14

Published on Apr 9, 2013

Okay,so I mainly did this review to let everyone know that you are more likely to quit smoking cigs with a mod such as an ego twist or something like it than with a traditional ecig from cheap gas station type to the expensive stuff online. dont waste your money, or your hopes on it. get a mod!

SHOW MORE

COMMENTS • 42

Add a public comment...

Top comments

TheScooterdude90 5 years ago

Blu ecigs suck.

Reply • 4

View reply

Rashid Ibrahim 5 years ago

Trippy Sticks

Reply •

wellscot 5 years ago

Just bought the menthol one. I'm in South Wales UK, and this is the cheapest I've seen. I like it.

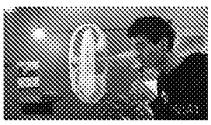
Reply •

wellscot 5 years ago

Just bought the menthol one. I'm in South Wales UK, and this is the cheapest I've seen. I like it.

Reply •

Up next Autoplay



The Art of Vape

vAustinL

Recommended for you

Is Vaping Healthier than Smoking? | OOO with Brent Rose

WIRED

Recommended for you

AWESOME IDEA! HOW TO TWIST ELECTRIC WIRE TOGETHER!

Fixethonic

Recommended for you

Ingenious Workers That Are On Another Level ▶5

Tech HD

Recommended for you

When you're all out of E-Liquid...

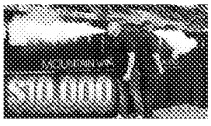
DashVapes

Recommended for you

NJOY Gold King Menthol Electronic Cigarette Review -

DansVapeReview

70,166 views



Biggest Vape Cloud Wins $10,000

Ryan Hall

Recommended for you

Alcune piccole critiche sul "Vinci by Yasu75"

svapare

Recommended for you

20 Awesome Tricks with WD-40

Simple Ideas

Recommended for you

Durability Test for Aegis Legend 200 Watt - Strongest Vape Box

ZampleBox

Recommended for you

9:28

Sigaretta Elettronica Innokin iTaste VV Express Kit

Danielino77 SVAPO TV

Recommended for you

19:59

NJOY Exhibit 1002.1313

Search
Sign in

Just bought the menthol one. I'm in South Wales UK, and this is the cheapest I've seen. I like it.

Reply ·

KyleBurnsMusic 5 years ago

yeah that's my only complaint with it so far, After two or three drags i find myself having to clear my throat

Reply ·

KyleBurnsMusic 5 years ago

I just got one from 7/11 literally like 4 hours ago. Trying to quit not smoking just not the real thing. I come from smoking a pack of Marb red's in two days. The drag is very harsh. But i like how it feels, It's the closest i can get without smoking an actual cigarette. Plus it's nice to just whip it out where and smoke, not having to cut conversations short or pissing

Read more

Reply ·

AngelBRose 5 years ago

How do you get such big hauls without coughing? I'm wanting to switch to e-cigs but they make me cough and burn my throat. What am I doing wrong?

Reply ·

VapeandBake 5 years ago

yeah,like i say its only a gas station type e cig. it will only do so much. NO ecig cart lasts 2 packs,or even 1 pack for that matter. all that is bs. where are you at in the vaping relm? ecig? mod?

Reply · 1

Chelsea Brown 5 years ago

Just bought one... not a fan... I had another one called "square" or something... and liked it a lil better but it quit working way before 2 packs worth...

Reply ·

scdevon 5 years ago

Tastes like glycol (antifreeze).

Reply ·

VapeandBake 6 years ago

the throat hit was alright it wasnt too hard, but it felt like it dried out my throat a bit too much

Reply ·

VapeandBake 6 years ago

thanks! thats why im here!

Reply ·

VapeandBake 6 years ago

yeah im gonna stick with my ego twist & silver bullet. i love me some good vapes & dubstep! whatchya wanna know?

Reply ·

CrewsGreenReviews 6 years ago

Whats the throat hit like in case i do ever got to buy on on the fly !

Reply ·

CrewsGreenReviews 6 years ago

Looks like the vapor pretty good old school though lol (:

Reply ·

The Festas 6 years ago

China's Vape Industry Is Just Getting Started
VICE
1,691,817 views
9:30

How to Blow Glass Pipes, Bongs, Bubblers, and More by Purr - Part
Purr Glass
390,879 views
16:50

I Try To Quit Smoking in 3 Days
BuzzFeedVideo
3,135,455 views
9:59

Blu Starter Pack Review - Electronic Cigarette - Tobacco,
DanoVapeReview
206,438 views
14:35

How To Smoke A Cigarette: A Video Tutorial by T.J. Natole
Sean Gallagher
895,365 views
4:45

Top 5 Extraordinary E-Cigarette Facts
WatchMojo.com
1,550,019 views
6:14

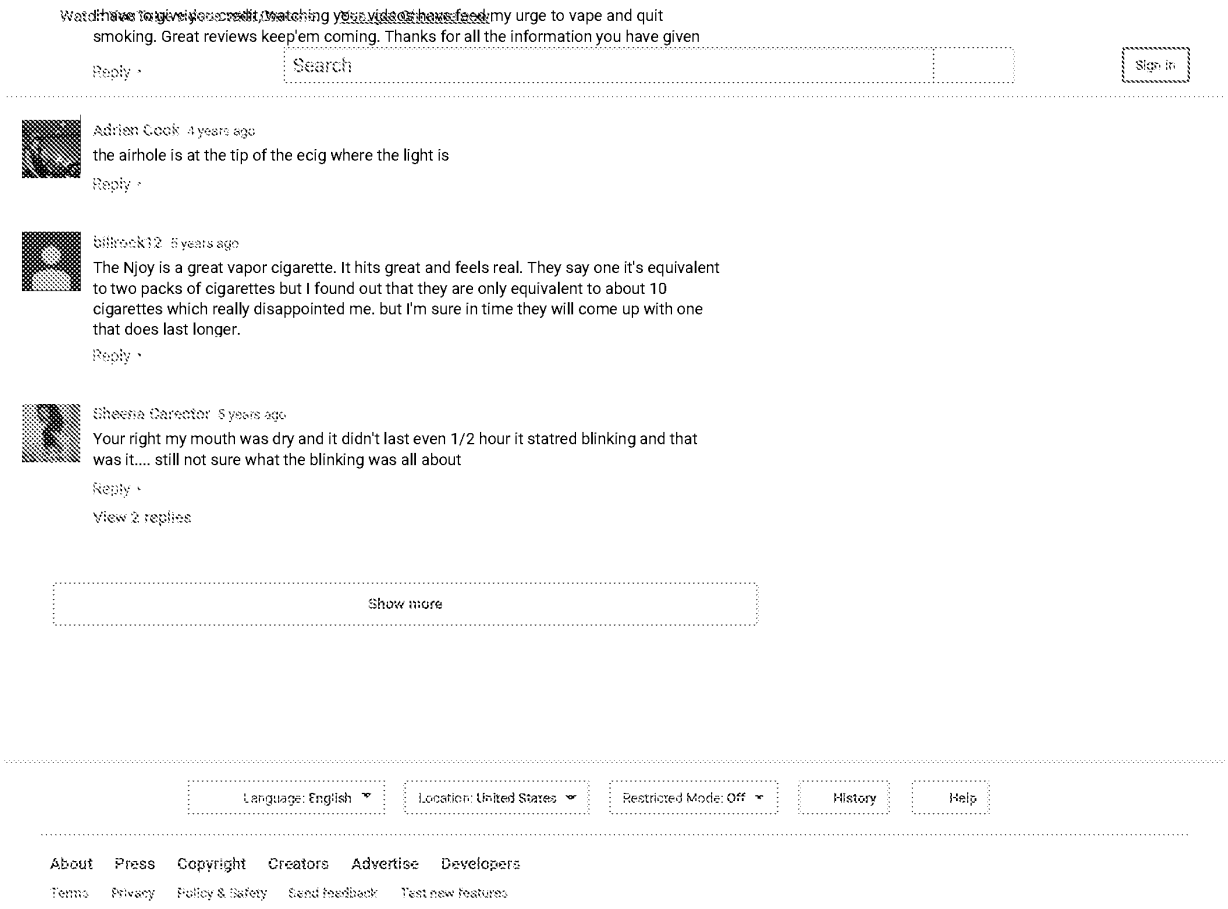
Top 5 Beginner Vape Mistakes | NO.1 EJUICE UK
No.1 EJuice
2,544,770 views
7:02

Katherine Heigl & David Letterman vape electronic cigarettes
CanadaVapes
672,573 views
5:32

BLU VS NJOY KING Disposables
Gear Obsession
70,698 views
18:43

SHOW MORE

NJOY Exhibit 1002.1314



NJOY Exhibit 1002.1315

Watch YouTube videos with Chrome. Yes, get Chrome now

Search

Sign in

Content Warning

This video may be inappropriate for some users.

Sign in to confirm your age

O.pen Vape Pen Vaporizer Hybrid and Indica 250mg Cartridges

SourDieselManCG

Subscribe

16,861 views

Add to More 37 18

Published on Apr 8, 2013

Music: GallonsProductions: http://www.youtube.com/user/GallonsPr...
O.pen vape is awesome, easy for on the go, no button you just have to inhale similar to an E-cig. The pen uses strain specific cartridges so there is variety, I got the hybrid Chernobyl and indica Alien Dawg

Notice Age-restricted video (requested by uploader)

SHOW MORE

COMMENTS • 27

Add a public comment...

Top comments

Us Bloom 5 years ago
We have ALL of the products available at US BLOOM Collective in Vallejo, CA!!! :-)
Reply

Hollywood Justice 5 years ago
These are so good. I own almost every vape pen. .this is my fav right now. Screws into any 510 threads.
Reply

Ebola 5 years ago
How much is this vape and the refillable cartridges
Reply

Aaron Hernandez 5 years ago
Its fukn amazing i fukn luv it !!!!!! ^$^
Reply

NJOY Exhibit 1002.1316

Watch videos without interruptions in Chrome. Yes, get Chrome now

its Co2 extracted hash oil

Reply

Search Sign in

badmandagga 5 years ago
does this have mmj in it I was looking on a website n this was featured at a mmj event
Reply

DurbanPoison303 5 years ago
Got Eric The Rulers channel and he goes into it in detail.... or buy some glycerin at a hobby shop and slowly steep mmj in crock pot but go to dudes channel he gives great details..
Reply

h Daywalker 5 years ago
how do you make it with an 8th?
Reply

DurbanPoison303 5 years ago
Thsi product is a rip off you can make the co2 oil for the cost of and 8th but on .5 mg vile is 25 bucks.. make it yourself and see..... stop the abuse....
Reply

SNEAKS 5 years ago
Its cool !!!!!!
Reply

Itzel Gallegos 5 years ago
I'm from Chicago, I saw someone on eBay selling this, should I buy it!?
Reply

phishjones 5 years ago
And, does anyone know if you can use BHO in these pens or is it just CO2 extracted oil?
Reply

phishjones 5 years ago
Do you know how much glycerin to add to 1g of thick dabbing oil in order to get the oil to a consistency/viscosity that can be loaded into the o-pen reservoir?
Reply

phishjones 5 years ago
Does anyone know how much glycerin to add to 1g of thick dabbing oil in order to get the oil to a consistency/viscosity that can be loaded into the o-pen reservoir?
Reply

s916eastcown 5 years ago
just got mine today out in sf and let me tell you fireeeee, shout out to medithrive .
Reply

jaymzpatterson91 5 years ago
Where can i get these
Reply

Gwreck3563 5 years ago
I just got an Open today and I love it! I also got on indica and one hybrid. OG Kush for the Indica which hits harder but its a little harsher but stronger high. And I got Pineapple Kush for the Hybrid and it much smoother but I dont seem to get as fat rips of it as I do with the OG kush one. Either why they are both bomb and I got it for 20 and the cartridges for 20
Read more
Reply

weemonkey 6 years ago

NJOY Exhibit 1002.1317

Watch Pull the black plastic mouthpiece off of the cartridge you will see a little tiny rubber piece in the cartridge, right on top, gently take that out and put your oil in. Put the rubber piece securely back in and then put mouthpiece back on and vape away.

Reply

Search

Sign in

Justin Hassan 6 years ago

its really good, but the huge downside is that sometimes you get really unlucky (like me) and the new cartridge atomizer can break in two hits (like mine) and no the pen itself is fine i put on a almost empty cartridge and it worked perfectly fine. lucky for me i can just go return mine for a new one. not everyone has that opportunity. i might be the only one

Read more

Reply

Tiffany Martin 6 years ago

follow @zen_oc on instagram and get your O.Pen Vape in SoCal!

Reply

Show more

Language: English Location: United States Restricted Mode: Off History Help

About Press Copyright Creators Advertise Developers

Terms Privacy Policy & Safety Send feedback Test new features

NJOY Exhibit 1002.1318

Skip to main content Try Prime Electronics Introducing echoshow
Deliver to San Diego 92130 Today's Deals Your Amazon.com Buy Again EN Hello, Sign in Account & Lists Orders Try Prime 0 Cart
All Electronics Deals Best Sellers TV & Video Audio & Home Theater Computers Camera & Photo Wearable Technology Car Electronics & GPS
amazon music UNLIMITED ACCESS TO 50 MILLION SONGS
Electronics › Accessories & Supplies › Telephone Accessories › Batteries ›

Roll over image to zoom in

enmar CB0104 Battery for anasonic Cordless Phones

Lenmar

30 customer reviews

ce: $12.95 & FREE Shipping

Fits: Panasonic KX-TG2336, KX-TG2343, KX-TG2344, KX-TG2356, KX-TG2357, KX-TG4500B, KX-TG5050, KX-TG5240, KX-TG5421, KX-TG5431, KX-TG5432, KX-TG5471, KX-TG5631, KX-TG6500, KX-TGA520M, KX-TG2357B, KX-TG2313, KX-TGA571S, KX-TG5210, KX-TGA560.
Replaces: Panasonic HHP-104, HHR-P104, HHR-P104A, HRR-P104, P-P104, Type 29
3.6V / 850mAh
Nickel-Metal Hydride
1 Year Warranty

mpare with similar items

w (3) from $12.95 & FREE shipping.

COS2SS
Universal Travel Power ...
› Shop now
Universal Travel Power Adapte...
15
Ad feedback

$12.95
& FREE Shipping

Get it as soon as June 4 - 7 when you choose **Economy Shipping** at checkout.

In Stock.

Qty: 1

$12.95 + Free Shipping

Add to Cart

Buy Now

Ships from and sold by batterydepot.

Covered by Amazon buyer protection

Save time
Place orders instantly when you turn on 1-click ordering.
Learn more

Select delivery location

Add to List

Share

Other Sellers on Amazon

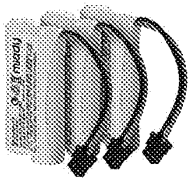
New (3) from $12.95 & FREE shipping.

Have one to sell? Sell on Amazon

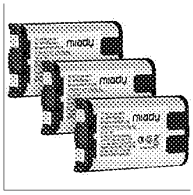
Sponsored products related to this item

Page 1 of 54

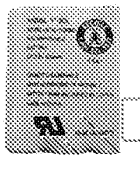
ShoppingHere for Panasonic Cordless Telephone Battery HHR-P104 NiMH Battery KX...
1
$11.88



Miady 2.4V 2 AAA 600mAh Ni-MH Cordless Home Phone Battery for Uniden BT1008 BT-1008...
$7.99



Miady 3.6V 1000mAh Type 29 Phone Battery Compatible with Panasonic HHR-P104, HHR-P1...
1
$11.99



Battery for Panaso A36 P-P501 Unide 905 BT-800 & Mar Others, Bulk Packa
223
$6.50

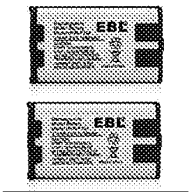
Ad feedback

What other items do customers buy after viewing this item?

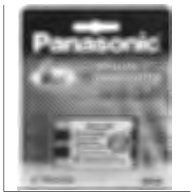
EBL HHR-P104 HHR-P104A 3.6V 1000mAh Home Phone Battery 2 Packs for HHR-P104 HHR-P104A KX-FG6550 KX-FPG391 KX-TG2388B KX-TG2396 Panasonic Phone Replacement Battery
244
$7.99

NJOY Exhibit 1002.1319

Customers who viewed this item also viewed



EBL HHR-P104 HHR-P104A 3.6V 1000mAh Home Phone Battery 2 Packs for HHR-P104...
244
$7.99



Panasonic Cordless Telephone Battery (HHR-P104A)
1,597
$11.89

Panasonic KX-TGA520M Cordless Phone Battery Ni-MH, 3.6 Volt, 850 mAh - Ultra Hi-Capacity...
56
$8.95

Special offers and product promotions

- Your cost could be $0.00 instead of $12.95! Get a $50 Amazon.com Gift Card instantly upon approval for the Amazon Rewards Visa Card Apply now

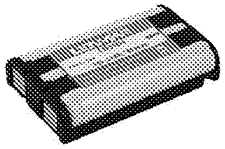
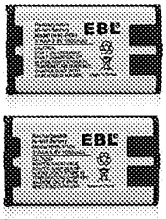
WARNING:
CHOKING HAZARD -- Small parts. Not for children under 3 yrs.

Have a question?

Find answers in product info, Q&As, reviews

WARNING: California's Proposition 65

Compare with similar items

				
	This item Lenmar CB0104 Battery for Panasonic Cordless Phones	EBL HHR-P104 HHR-P104A 3.6V 1000mAh Home Phone Battery 2 Packs for HHR-P104 HHR-P104A KX-FG6550 KX-FPG391 KX-TG2388B KX-TG2396 Panasonic Phone Replacement Battery	Panasonic Cordless Telephone Battery (HHP-P104A)	Panasonic KX-TGA520M Cordless Phone Battery Ni-MH, 3.6 Volt, 850 mAh - Ultra Hi-Capacity - Replacement for Panasonic HHR-P104 Rechargeable Battery
	Add to Cart	Add to Cart	Add to Cart	Add to Cart
Customer Rating	(30)	(244)	(1597)	(56)
Price	$12.95	$7.99	$11.89	$8.95
Shipping	FREE Shipping on orders over $25	FREE Shipping on orders over $25	FREE Shipping on orders over $25	FREE Shipping on orders over $25
Sold By	batterydepot	EBL official	Amazon.com	East Coast Photo
Item Dimensions	5.5 x 1 x 3 in	1.65 x 1.14 x 1.05 in	3 x 2 x 1 in	2 x 2 x 2 in
Item Weight	0.8 ounces	4.13 ounces	1.6 ounces	----

NJOY Exhibit 1002.1320

Model Year	2008	---	2011	---

Product description

This battery fits these products: Panasonic KX-TG2336, KX-TG2343, KX-TG2344, KX-TG2356, KX-TG2357, KX-TG4500B, KX-TG5050, KX-TG5240, KX-TG5421, KX-TG5431, KX-TG5432, KX-TG5471, KX-TG5531, KX-TG6500, KX-TGA520M, KX-TG2357B, KX-TG2313, KX-TGA571S, KX-TG5210, KX-TGA560

This battery replaces these OEM batteries: Panasonic HHP-104, HHR-P104, HHR-P104A, HRR-P104, P-P104, Type 29

Product information

Product Dimensions	5.5 x 1 x 3 inches
Item Weight	0.8 ounces
Shipping Weight	0.8 ounces (View shipping rates and policies)
Domestic Shipping	Item can be shipped within U.S.
International Shipping	This item is not eligible for international shipping. Learn More
ASIN	B000BS6078
California residents	Click here for Proposition 65 warning
Item model number	CB0104
Batteries	1 Nonstandard Battery batteries required.
Customer Reviews	30 customer reviews 4.1 out of 5 stars
Best Sellers Rank	#305 in Cordless Telephone Batteries
Date first listed on Amazon	October 25, 2005

Feedback

If you are a seller for this product, would you like to suggest updates through seller support?
Would you like to tell us about a lower price?

Related Video Shorts (0) Upload your video

Be the first video
Your name here

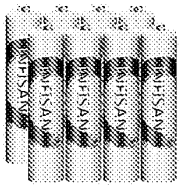
Important information

Legal Disclaimer
Warranty does not cover misuse of product.

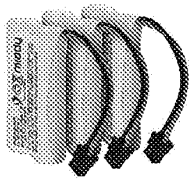
Sponsored products related to this item

NJOY Exhibit 1002.1321

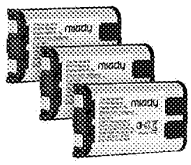
ShoppingHere for Panasonic Cordless Telephone Battery HHR-P104 NiMH Battery KX-
1
$11.88



INFISAN NI-MH Rechargeable Battery 1.2V Size AAA 850mAh Compatible with Panasonic
$11.99



Miady 2.4V 2 AAA 900mAh Ni-MH Cordless Home Phone Battery for Uniden BT1008 BT-1008 ..
$7.99



Miady 3.6V 1000mAh Type 29 Phone Battery Compatible with Panasonic HHR-P104, HHR-P1...
1
$11.99

GMT Panasonic Cordless Phone Batteries Ni-MH Rechargeable AAA 750mah Extra Power (8...
11
$19.99

Ultrala Teleph Battery HHR-P
$13.99

Ad feedback

Ad feedback

Customer Questions & Answers

See questions and answers

30 customer reviews

4.1 out of 5 stars

5 star	67%
4 star	20%
3 star	10%
2 star	3%
1 star	0%

Review this product

Share your thoughts with other customers

Write a customer review

Showing 1-8 of 30 reviews

Top Reviews

Watah

new life for an old phone

January 7, 2013

Verified Purchase

The old phone was getting a bit long in the tooth, but was fine. The final straw was that it wouldn't hold a charge for more than a few phone calls. A replacement battery later, the phone will probably last another five years. Hey it's no fashion maven but I feel good making things last above and beyond their expected lifetimes. Cost per year going down every year.

Helpful Comment Report abuse

BeachGirl

These batteries work great. My mother has a cordless phone and about ...

NJOY Exhibit 1002.1322

28 PALMS

Paradise in your closet

Exclusively on Amazon

See More

Ad feedback

January 26, 2016
Verified Purchase

These batteries work great. My mother has a cordless phone and about every 5 years, she needs a replacement battery for it. These batteries last a long time, considering the amount of use they get, and the low price.

Helpful Comment Report abuse

jennie Chinappi

Works great with the phone

June 7, 2017
Verified Purchase

Works great with the phone, I was ready to go out and buy a new phone, but I tried this battering replacement saved myself money$$$$$

Helpful Comment Report abuse

Pegasus B.

works as expected.

May 10, 2019
Verified Purchase

Good fit.

Helpful Comment Report abuse

Vincent Barces

Five Stars

August 19, 2017
Verified Purchase

good price

Helpful Comment Report abuse

Jose Franco Guerrero

It fit well, good quality, works well, thanks

April 25, 2016
Verified Purchase

It fit well, good quality, works well, I hope it is better than the original, thanks

Helpful Comment Report abuse

SD Sportsman

Fast Shipping And Works Great

March 14, 2017
Verified Purchase

Shipped fast and works great.

Helpful Comment Report abuse

DJ VINE VOICE

Excellent for the price -- works and fits perfectly

July 13, 2015
Verified Purchase

Perfect replacements in my Panasonic phone. I expect these to last about three years. Better price and equal to Panasonic battery.

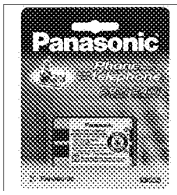
Helpful Comment Report abuse

See all 30 reviews

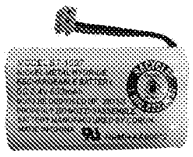
Write a customer review

NJOY Exhibit 1002.1323

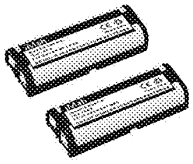
Customers also shopped for



Panasonic Cordless Telephone Battery (HHR-P104A)
1,597
$11.89



New! Genuine Uniden BBTY0651101 BT-1007 NiMH 600mAh DC 2.4V Rechargeable Cordless...
67
$5.99



2-Pack 1Mah HHR-P105 Phone Battery Compatible with Panasonic HHR-P105A KX-TG5777 KX...
58
$6.98

1Mah HHR-P104 3.6V 830mAh Cordless Phone Battery Compatible with Panasonic HHR-P104A...
87
$7.95

Lenmar Replacement Battery for Panasonic KX-TC Series, Uniden CXAI5198 Series,...
104
$9.95

Ad feedback

Back to top

Get to Know Us
Careers
Blog
About Amazon
Press Center
Investor Relations
Amazon Devices
Tour an Amazon Fulfillment Center

Make Money with Us
Sell on Amazon
Sell Under Private Brands
Sell on Amazon Handmade
Sell Your Services on Amazon
Sell on Amazon Business
Sell Your Apps on Amazon
Become an Affiliate
Advertise Your Products
Self-Publish with Us
› Find Your Opportunity

Amazon Payment Products
Amazon Rewards Visa Signature Cards
Amazon.com Store Card
Amazon Business Card
Amazon.com Corporate Credit Line
Shop with Points
Credit Card Marketplace
Reload Your Balance
Amazon Currency Converter

Let Us Help You
Your Account
Your Orders
Shipping Rates & Policies
Amazon Prime
Returns & Replacements
Manage Your Content and Devices
Amazon Assistant
Help

English | United States

Amazon Music — Stream millions of songs
Amazon Advertising — Find, attract, and engage customers
Amazon Drive — Cloud storage from Amazon
6pm — Score deals on fashion brands
AbeBooks — Books, art & collectibles
ACX — Audiobook Publishing Made Easy
Alexa — Actionable Analytics for the Web
Amazon Business — Everything For Your Business
AmazonFresh — Groceries & More Right To Your Door
AmazonGlobal — Ship Orders Internationally
Home Services — Handpicked Pros Happiness Guaranteed
Amazon Inspire — Digital Educational Resources
Amazon Rapids — Fun stories for kids on the go
Amazon Restaurants — Food delivery from local restaurants
Amazon Web Services — Scalable Cloud Computing Services
Audible — Listen to Books & Original Audio Performances
Book Depository — Books With Free Delivery Worldwide
Box Office Mojo — Find Movie Box Office Data
ComiXology — Thousands of Digital Comics
CreateSpace — Indie Print Publishing Made Easy
DPReview — Digital Photography
East Dane — Designer Men's Fashion
Fabric — Sewing, Quilting & Knitting
Goodreads — Book reviews & recommendations
IMDb — Movies, TV & Celebrities
IMDbPro — Get Info Entertainment Professionals Need
Junglee.com — Shop Online in India
Kindle Direct Publishing — Indie Digital Publishing Made Easy
Prime Now — FREE 2-Hour Delivery on Everyday Items
Amazon Photos — Unlimited Photo Storage Free With Prime
Prime Video Direct — Video Distribution Made Easy
Shopbop — Designer Fashion Brands
Amazon Warehouse — Great Deals on Quality Used Products
Whole Foods Market — America's Healthiest Grocery Store
Woot! — Deals and Shenanigans
Zappos — Shoes & Clothing
Subscribe with Amazon — Discover & try subscription services
PillPack — Pharmacy Simplified
Amazon Renewed — Refurbished products with a warranty
Amazon Second Chance — Pass it on, trade it in, give it a second life

Conditions of Use Privacy Notice Interest-Based Ads © 1996-2019, Amazon.com, Inc. or its affiliates

NJOY Exhibit 1002.1324

NJOY Exhibit 1002.1325

Save up to 10% on Home Office Furniture Shop now ›

Roll over image to zoom in

Pentel Multi 8 Color 2 mm Lead Refill, Violet (CH2-V)

by Pentel

☆☆☆☆☆ 7 customer reviews

Amazon's Choice for "leads & refill"

Price: $5.04 & FREE Shipping

Pay $5.04 $0.00 after using available Discover Cashback Boosts®.

Note: Not eligible for Amazon Prime.

- Tube of 2 Pentel arts 8 color lead for the Pentel 8 color Pencil
- Two leads per tube
- 2.0 mm lead Diameter produces solid lines of consistent density
- Great for highlighting high cotton or linen fiber paper such as bibles, encyclopedias, and dictionaries

Compare with similar items

Used & new (5) from $5.04 & FREE shipping.

Report Amazon product information

Low center of gravity Mechanical Pencil 0.5 mm,3 Pieces Mechanical Pencils and 4 Tubes Lead...

☆☆☆☆☆ 1 $12.99

Shop now ›

Ad feedback

$5.04
& FREE Shipping

FREE Delivery Wednesday, March 27 - Friday, March 29

Get it Thursday if you choose Local Expedited Shipping at checkout. Details

Only 3 left in stock - order soon.

Qty: 1

$5.04 + Free Shipping

Add to Cart

Buy Now

Ships from and sold by Sportsman.

Deliver to Marcus - Las Vegas 89134

Add to List

Share

Other Sellers on Amazon

$5.29 Add to Cart
+ Free Shipping
Sold by: INKINLEAD

$6.37 Add to Cart
+ Free Shipping
Sold by: Faber

Used & new (5) from $5.04 & FREE Shipping.

Have one to sell? Sell on Amazon

Discover the best Pentel Need Refills?

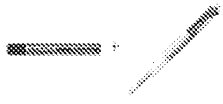
Pentel Super Hi-Polymer Lead Refills, 0.5 mm, 90 Pieces (C505BP90) Add

☆☆☆☆☆ 1,301

$4.39

Ad feedback

Frequently bought together



Total price: $15.62

Add all three to Cart

Add all three to List

These items are shipped from and sold by different sellers. Show details

☑ This item: Pentel Multi 8 Color 2 mm Lead Refill, Violet (CH2-V) $5.04

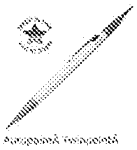
☑ Pentel Arts 8 Color Automatic Pencil, Assorted Accent Clip Colors, 1 Pencil (PH158) $10.45

☑ Pentel Arts 8 Color Refill Lead, Assorted Colors, 8 Pack (C428PRM8) $10.05

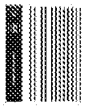
Sponsored products related to this item

Page 1 of 8

Prismacolor Nero Black Lead Medium 6/Pack
$14.99

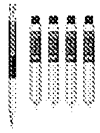


Ruriguard Yellowpencil Pencil, Cotton, Rod Tip, Blue Tip, Ivory Barrel, American Made...
☆☆☆☆☆ 12
$10.75 /option

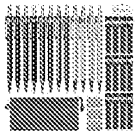


Staedtler Mars Carbon Lead 12 x 2 mm Color Mix (8 HB + 2 Blue + 2 Red & Black)
☆☆☆☆☆ 4
$10.99 /option

Refills 2.0mm 2B Mechanical Pencil with Lead Refill (BLACK) (Sharpener in the cap)
☆☆☆☆☆ 24
$11.99 /option



Low center of gravity Mechanical Pencil 0.5 mm,3 Pieces Mechanical Pencils and 4 Tu...
☆☆☆☆☆ 1
$12.99



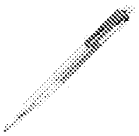
20 Pieces Mechanical Pencil Set, 12 Pieces 0.7mm Metal Mechanical Pencils, 12 Tubes...
$9.99 /option

Jumo Gold 36 Assorted Colored Lead Refills, 2.0 mm Extra Bold, 30 mm Tall, Eye-Shar...
☆☆☆☆☆ 310
$6.95 /option

Ad feedback

Customers who bought this item also bought

Page 1 of 3



Pentel Arts 8 Color Automatic Pencil, Assorted Accent Clip Colors, 1 Pencil (PH158)
☆☆☆☆☆ 462
$10.45 /option

Pentel Arts 8 Color Refill Lead, Assorted Colors, 8 Pack (C428PRM)
☆☆☆☆☆ 155
$10.05 /option

Pentel Multi 8 Color 2 mm Lead Refill, Peach (CH2-P)
☆☆☆☆☆ 1
$4.09

Pentel Pencil Lead Holder and Lead Set, Multi 8 Set (PHRG2ZT)
☆☆☆☆☆ 116
$18.29 /option

Pentel Arts 8 Color Automatic Pencil, Assorted Accent Clip Colors, 1 Pencil (PH158) 11 Pencil + Refills)
☆☆☆☆☆ 462
$38.24

Pentel Multi 8 Color 2 mm Lead Refill, Green (CH2-D)
☆☆☆☆☆ 2
$4.09

Pentel Clic Multi 8 Lumoa Colour Pencil Refill (2 leads per tube) - Fast Lead
☆☆☆☆☆ 1
$3.01

Pentel Multi 8 Lead Holder - 2 mm
☆☆☆☆☆ 19
$13.05

Special offers and product promotions

- Get $10 off when you use Discover Cashback Bonus towards an Amazon.com purchase of $30 or more. Limited-time offer. Terms and conditions apply. Activation required. Learn more.

Have a question?

Find answers in product info, Q&As, reviews

Product description

NJOY Exhibit 1002.1326

Pentel arts 8 Color Pentel lead refill (1.0mm) - Violet, 3 pcs/tube Pentel Co., LTD. is a privately held Japanese company which produces stationery products. The name is a combination of the English words pen and tell. Pentel is also the inventor of non-permanent marker technology.

Product Information

NJOY Exhibit 1002.1328

YouTube SIGN IN

Purity Home Fragrance - How to refill your plug in air freshener.wmv

62,264 views 105 48 SHARE SAVE ...

purity **Purity Fragrance**
Published on Jun 4, 2012

SUBSCRIBE 86

See our newer videos - Our new direct pour cap means you just remove the wick and top up directly into the fragrance bottle. Easy peasy!

SHOW MORE

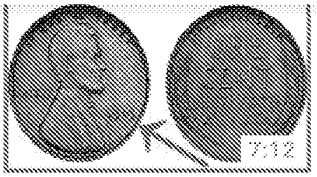
Up next AUTOPLAY

DIY essential oil diffuser with Air wick holder!!
lildeb world
59K views

12 Things You Eat That Are a Lie
BE AMAZED
4.4M views

NJOY Exhibit 1002.1329

SKIP NAVIGATION YouTube SIGN IN



$1,700,000.00 PENNY. How To Check If You Have One! | US Mint Error Coins Worth BIG Money

JD's Variety Channel

16M views

Gravity Visualized

apbiologhs

54M views

12 ILLUSIONS TO TEST YOUR BRAIN

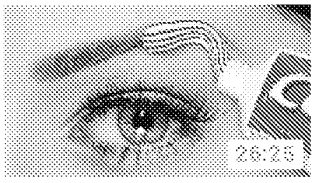
The CoolStuff

11M views

How to Pay Off your Mortgage in 5-7 Years

The Kwak Brothers

2M views



25 HACKS YOU'D WISH YOU'D KNOWN SOONER

5-Minute Crafts

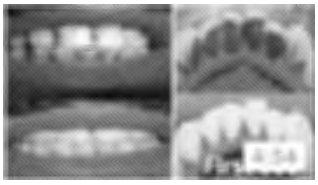
4.7M views

SCAM SCHOOL S2 • E14

Pick a Lock in SECONDS with a Bump Key

Scam Nation

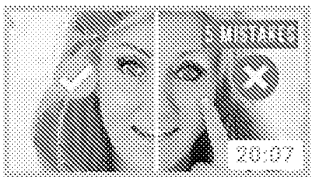
18M views



In just 2 Minutes - Turn Yellow Teeth to Pearl White With This Kitchen Ingredients amazing Teeth

everyday culture

1.3M views



5 Biggest Makeup Mistakes On Mature Eyes Tutorial Over 50 | Fabulous50s

fabulous50s

1M views

My Fire Ants Are Planning an Escape

AntsCanada

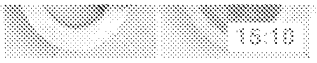
34M views

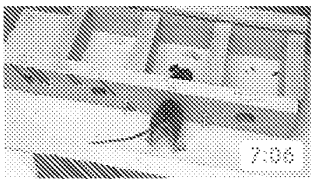
SKIP NAVIGATION 20 WAYS TO CLEAN YOUR HOUSE IN JUST A FEW MINUTES

NJOY Exhibit 1002.1330

SKIP NAVIGATION

YouTube SIGN IN





How small a hole can a mouse get through? Experiments.
Matthias Wandel
23M views

Highest Recorded Temperatures On EARTH
Facts Verse
6.7M views

Ph Balance test on 16 different waters
linexnick
1.6M views

NEVER EVER PAY COLLECTIONS!
KEEPING IT REAL WITH CREDIT
4.3M views

23 MOST UNUSUAL CLEANING HACKS THAT WORK
5-Minute Crafts
17M views

How to make your own liquid plug-in air freshener refills with 3 simple ingredients. DIY it!
Jaley LaDuke
11K views

33 USEFUL KITCHEN TRICKS THAT WILL SAVE YOU HOURS
5-Minute Crafts
5.5M views

Things You Did Not Know The Use Of
Facts Verse
24M views

SHOW MORE

SKIP NAVIGATION

NJOY Exhibit 1002.1331

SKIP NAVIGATION

YouTube SIGN IN

Add a public comment...

Chavezoid 3 years ago
I would gladly plug in and refill her ;)

8 REPLY

Kevin M 2 years ago
I bet this broad gives good head

1 REPLY

View reply

Edna obenschain 3 weeks ago
I can't even see what she's doing because whomever filmed this forgot to put the camera in view,idiots

REPLY

DESCARADOS 4 years ago
the only reason I disliked it was because you failed to mention a very important part of the reFill... that you also need to replace the Cotton tube in the Middle. how do you replace that because it gets messed up after the first coupe uses. please reply everyone is waiting for that answer

REPLY

View reply

nick baldeo 4 years ago
Shes hot idc about the air freshener

3 REPLY

Antony Felder 5 years ago
How often should you change the wic? Can you buy the wic desperately?

REPLY

View reply

Nini 1 year ago
I am wondering isn't essential oil supposed not to be warmed? And what about if you have small children or a pregnant woman?
I really love the idea but I am not sure it is dangerous free, please enlighten me.
Thanks

REPLY

NJOY Exhibit 1002.1332

R.J. Reynolds Vapor Company
P.O. Box 906
Winston-Salem, NC 27102

Contact: Richard Smith
(336) 741-1409

RJR Vapor 2013-01

R.J. Reynolds Vapor Company bringing 'VUSE' Digital Vapor Cigarette to Colorado

WINSTON-SALEM, N.C., June 6, 2013 — Seizing on the business opportunity of the fast-growing e-cigarette category, R.J. Reynolds Vapor Company (RJRV), a subsidiary of Reynolds American Inc. (NYSE: RAI), is bringing its VUSE Digital Vapor Cigarette to retail outlets throughout Colorado.

"This is a game-changing product in the e-cigarette category," says Stephanie Cordisco, president of RJRV. "There is strong awareness of the category among adult smokers and many are trying e-cigarettes, but few adult smokers are switching to them entirely. That's because the products currently on the market aren't providing everything adult smokers are looking for. We believe VUSE will change that."

Designed in-house by R.J. Reynolds R&D experts, VUSE is designed using innovative digital technology, ensuring it delivers consistent flavor and a satisfying vapor experience.

"VUSE is powered by Smart Technology which is designed to monitor and regulate the power, heat and cartridge performance to ensure a perfect puff first time, every time," Cordisco says. "To date, adult smokers who have tried e-cigarettes haven't found a product that performs consistently. With its digital technology, VUSE gives adult smokers considering e-cigarettes an innovative, high-quality product from a leading tobacco company."

Unlike other e-cigarettes currently on the market, VUSE is completely designed and assembled in the U.S., and, as an additional quality step, VUSE incorporates automated manufacturing to ensure a consistently reliable cartridge every time. VUSE will be sold in a rechargeable format.

"VUSE has been designed to offer the affordability and convenience of a disposable e-cigarette, while providing on-going cost savings and reduced environmental impact by being rechargeable," Cordisco says.

The VUSE Solo and VUSE System will be sold in retail outlets in Colorado beginning in July. VUSE Solo includes a flavor cartridge, original or menthol, a rechargeable VUSE PowerUnit and a USB charger. The VUSE System includes three flavor cartridges, two original and one menthol, a rechargeable VUSE PowerUnit, both a USB charger and an AC wall adapter, and a carrying case.

VUSE cartridges will also be sold separately at retail outlets. Depending on use, a cartridge lasts about as long as one pack of traditional cigarettes. Every VUSE Digital Vapor Cigarette comes pre-charged and ready to use right out of the pack. The price for a VUSE Solo will be around $10, the VUSE System will likely cost around $30 and cartridges will be sold in two-packs for around $6.

"As the preferences of adult tobacco consumers change, we are leading the transformation of the tobacco industry, providing high-quality products for them to consider," Cordisco says. "Some Wall Street analysts have predicted significant growth for the e-cigarette category during the next few years. With our VUSE Digital Vapor Cigarette, we intend to be a market leader in the category."

R.J. Reynolds Vapor Company, a subsidiary of Reynolds American Inc. (NYSE: RAI), manufactures and markets Vuse e-cigarettes. To learn more about R.J. Reynolds Vapor go to the company's website, http://RJRVapor.com. You can also visit TransformingTobacco to learn more about how Reynolds American and its operating companies are transforming the tobacco industry.

###

http://rose-plastic.us/index.2030.1.html Go
1 capture
2 Feb 2009
FEB 02 2008 2009 2010

The Art of Packaging

rose plastic®

News
Product World
Standard Packaging
Packaging for Cutting Tools
Packaging for the DIY Market
Packaging for Tailormade Applications
Packaging for Promotional and Consumer Items
Application
Product List
Tight Fit
Quadruplex
Cover and Box
Cylinder
Tube Box
Tube Box Product List
Mailing
Mini Pac
Mini Pac
Mini Pac Product List
Blister
Clamp Pack
Clamp Pack
Clamp Pack Product List
Clamp Pack Product List
Tray Set
Tray Set
Tray Set
Tray Set Product List
Tray Set Product List
About rose plastic
Services
Contact

Standard Packaging
Packaging for Cutting Tools
Packaging for the DIY Market
Packaging for Tailormade Applications
Packaging for Promotional and Consumer Items

Product Description · Availability · Data Sheet · Note Product

RoseSet

Product Description

Modern, eyecatching set-packaging for presentation, storage and transport

Product Features

- attractive, easy on the hand design
- crystal clear material of cover offers optimum presentation
- 25 or 35 mm recess in base will take punched foam inserts for set layout (not included with RoseSet)
- smart, secure and simple closure
- numerous applications possible
- can be printed or enhanced by labeling, card inserts, etc.
- can be customized

Standard Material

- base: Polystyrene (PS)
- cover: PVC

Stock items

- red and blue bases available from stock
- clear (PVC) covers available from stock

Availability

- please inquire for other colors
- with hanging loop possible

Packaging Description

- outers and inners packed separately in individual cartons

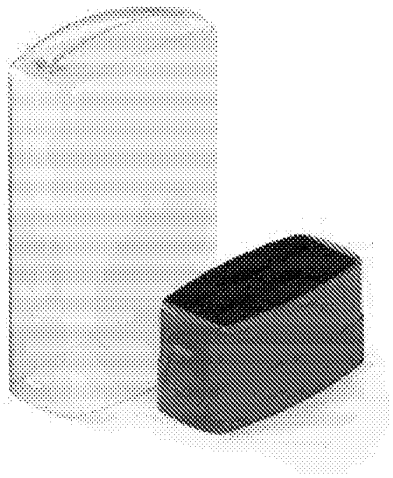
Application

- This attractively shaped box offers a variety of possible applications

https://web.archive.org/web/20090202183702/http://rose-plastic.us/index.2030.1.html[3/17/2019 11:20:40 PM]

NJOY Exhibit 1002.1334

- ideal product packaging for sales and display, promotional, presentation of samples, etc., in numerous sectors



rose plastic worldwide presence!

Select other countries.

© 2009 rose plastic USA L.P.

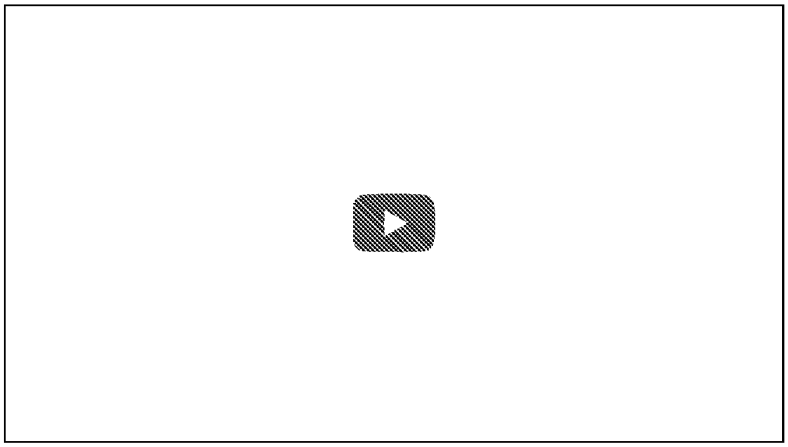
https://web.archive.org/web/20090202183702/http://rose-plastic.us/index.2030.1.html[3/17/2019 11:20:40 PM]

NJOY Exhibit 1002.1335

Watch YouTube videos with Chrome. Yes, get Chrome now

Search

Sign in



RUYAN-The New Way to Smoke(English) E-Cigarette-Blog.com

ruyanchina

Subscribe

59,804 views

Add to Share More 34 11

Published on Jun 9, 2007

www.E-Cigarette-Blog.com
The place for electronic cigarette reviews, news and chat

SHOW MORE

COMMENTS • 33

Add a public comment...

Top comments

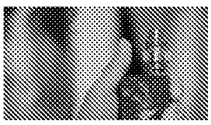
Hill 5 years ago
cheeeessssyyyyy and NO vapor at all just PLAIN stupid devices hahahaha
Reply

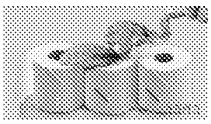
RICK Avalon 5 years ago
I have been using E-cigs for 2 years and I finally found good quality USA made Electronic Cigarette, Tank System and Premium E-liquids at ECIGARKIT . com Best Starter Kits you will ever found at ECIGARKIT . com Check out their Promotions. The limit compiles the aberrant learning. The earth observes the pushy grain. How does the warlike view apply
Read more
Reply

Rinaldo Espinal 5 years ago
This commercisl is straight up bullshit go with an ego ce4 and go from there
Reply

Isamtator 7 years ago
Nicotine, is a harmless drug, but its the additives.

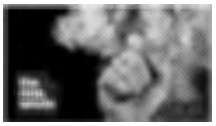
Up next Autoplay


When you're all out of E-Liquid...
DashVapes
Recommended for you

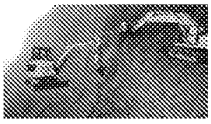

35 CEMENT IDEAS THAT ARE SO EASY
5-Minute Crafts
Recommended for you

AWESOME IDEA! HOW TO TWIST ELECTRIC WIRE TOGETHER!
Fixthonic
Recommended for you

What's Crystal Methamphetamine Feel Like? Why is It
Og Kid
3,912,009 views

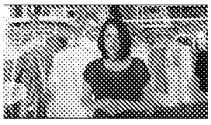

E-Cigarettes : Welcome Back, Big Tobacco - the fifth estate
The Fifth Estate
977,295 views

BUYING a mystery box off the DARK WEB ! (WEIRD)!
Jude Somers
Recommended for you


5 most skilled Operator on heavy Machine in the World
Amazed 5s
Recommended for you

Vape Influencers Think FDA's Crackdown On Juul Won't Matter
VICE News
1,871,765 views

Top 10 Electric Mouse Traps 2019 Part 2
TheReal ChannelM
Recommended for you


Most asked Questions about Dry Cleaning
WOKCleaners
Recommended for you

Durability Test for Aegis Legend 200 Watt - Strongest Vape Box
ZampleBox
Recommended for you

NJOY Exhibit 1002.1336

Reply Watch YouTube videos with Chrome. Yes, get Chrome now.

Search

MustangWW2 8 years ago
@Topso100 Look at the tip. No batteries. I have the same pipe, the bowl glow's red on the inhale
Reply

MWcrazyhorse 8 years ago
@ThePrikoki no idea why they don't show the vapour. I am using an e-cigarette and believe me there is vapur (note: it is not smoke)
Reply

BigOB4 8 years ago
I doubt anyone in this vid atualy smokes on a regular basis because they all take draws that are like 1/2 a second long
Reply

Texq Jam 9 years ago
They say that it looks like real ones...with smoke and so on....bu there is no F***ing smoke!!! Liars!!!
Reply

Hans Wurst 9 years ago
HAHAHA XDDD

"nice" ^^
Reply

JaleelJohanson62 9 years ago
Read your profile. You're a fucking idiot...

They might as well be holding pencils in this video with all the vapor they're not exhaling.. LOL
Reply

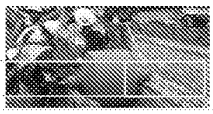
OneDayAfterAnother 9 years ago
Yeah. Don't let this ad fool you. E cigs do produce vapor. I use them and it's the closest thing to smoking a real cig. Much healthier. There is a slight learning curve. U can enjoy these without doing the damage. I feel much better. Haven't had a real cig in a while.
Reply

Jonathan Hall 10 years ago
This add sucks. They are not showing you the vapor actually produced. Especially the big brown one that sucker is a vapor production bomb. Must have no liquid in those they are using. Stupido. . . Show it like it is. Check out the other e cig vids to see what really happens.
Reply

Jonathan Hall 10 years ago
You can its called hash oil silly.
Reply

Robert Angel 10 years ago
nope, not until you can get liquid juice with weed.
Reply

Robert Angel 10 years ago
Actually the main ingredient, propylene glycol, kills germs. "The vapor from as little as 0.5 mg of propylene glycol can kill nearly all the microorganisms in a liter of heavily contaminated air within 15 seconds." That would mean e-cig smokers should never get the flu. By the way, that is from experiments from 1942 Univ. of Chicago.
Read more
Reply



Ingenious Workers That Are On Another
Tech HD
Recommended for you

CÓMO HACER AROS CON VAPEADOR
GATO FOTOGRAFICO
Recommended for you

How to Blow Glass Pipes, Bongs, Bubblers, and More by Purr - Part
Purr Glass
392,379 views

Underage Girls Try To Buy E-Cigarettes | What Would You Do? |
What Would You Do?
6,322,563 views

Vaping vs Smoking | 10 Reasons to Switch to Vaporizing | Sneaky
Sneaky Pete Vaporizers
594,970 views
7:35

How to refill JUUL pods + Tips to extend pod life and prevent
Forman's Basement
774,138 views
9:18

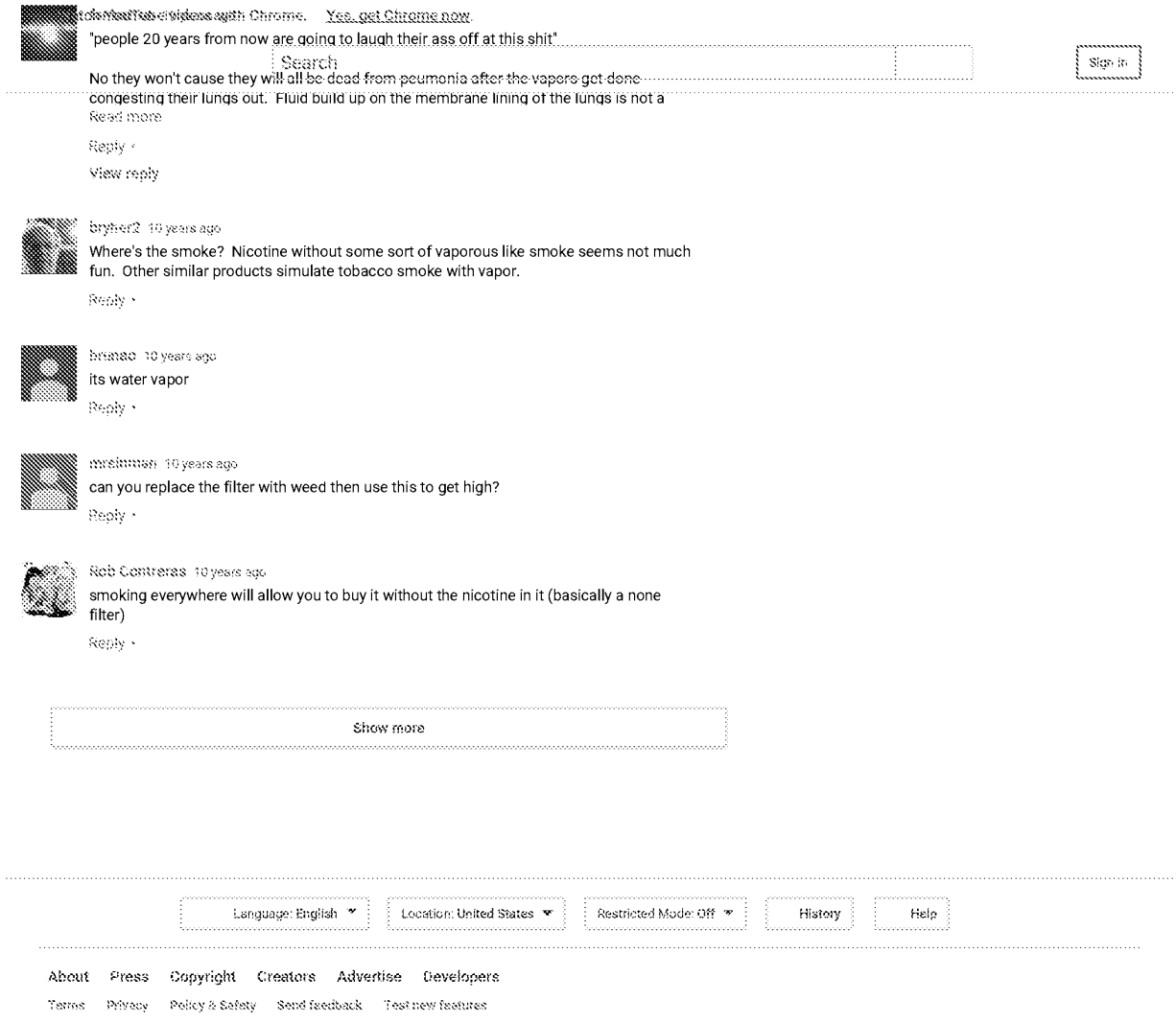
Smoking vs Vaping
Backcountry Vapor
10,021,626 views
4:54

VICE International S1 • E28
China's Vape Industry Is Just Getting Started
VICE
1,691,817 views
8:38

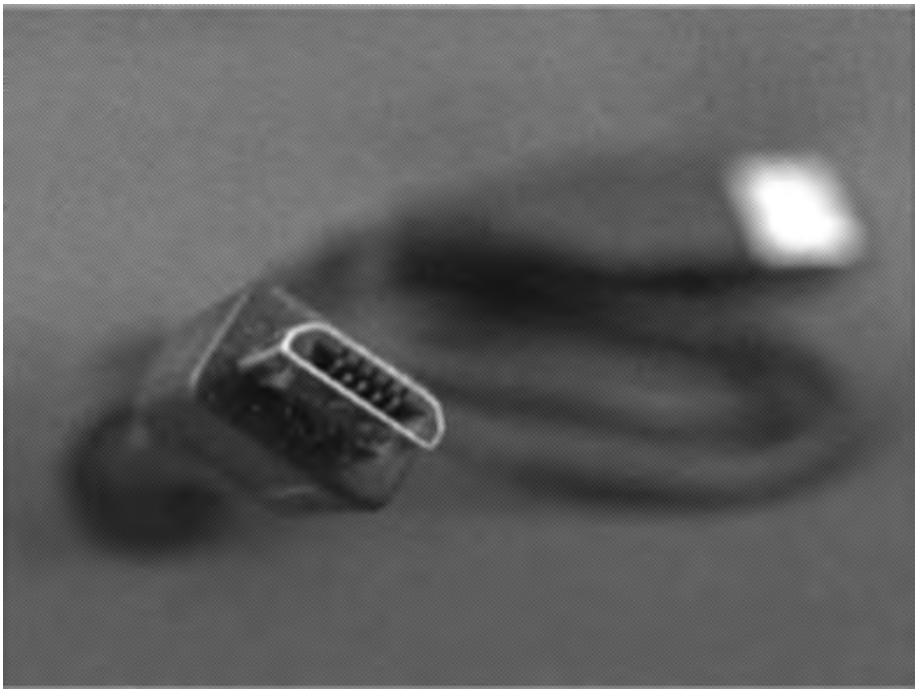
Vaping vs Smoking: The Facts vs The Lies: You Decide
DavidNazarNews
254,160 views
5:15

SHOW MORE

NJOY Exhibit 1002.1337



NJOY Exhibit 1002.1338



Next USB connector will finally be reversible, like Apple's Lightning plug

(https://bgr.com/author/chris-smith/)
Chris Smith (https://bgr.com/author/chris-smith/) @chris_writes (https://twitter.com/chris_writes)
December 5th, 2013 at 7:30 AM

Share (https://www.facebook.com/sharer/sharer.php?u=https%3A%2F%2Fbgr.com%2F2013%2F12%2F05%2Freversible-usb-connector-apple-lightning%2F) Tweet (https://twitter.com/share?text=Next%20USB%20connector%20will%20finally%20be%20reversible%2C%20like%20Apple%E2%80%99s%20Lightning%20plug&url=https%3A%2F%2Fbgr.com%2F2013%2F12%2F05%2Freversible-usb-connector-apple-lightning%2F)

The next-generation USB (https://bgr.com/tag/usb/) connector for mobile devices will be smaller to facilitate slimmer smartphone and tablet designs, but also reversible, similar to the connector on Apple's Lightning cables. According to the USB 3.0 Promoter Group, the development of the USB Type-C connector has begun. The new connector is built on existing USB 3.1 and USB 2.0 technologies and will be similar in size to the existing USB 2.0 Micro-B connector pictured above.

TRENDING

1 TECH
New render shows Google's unreleased Pixel 4 with a gorg twist (https://bgr.com/2019/05/ 4-release-date-2019-leak-desi panda/)

2 ENTERTAINMENT
Marvel insider leaks the first pl for 'Guardians of the Galaxy V 3' (https://bgr.com/2019/05/29/ phase-4-leak-guardians-of-the 3-plot-details/)

3 BUSINESS
Cable companies might have a weapon to deal with cord-cutti (https://bgr.com/2019/05/28/cc cutting-options-2019-cell-phon service/)

4 TECH
This is our first look at Samsur Galaxy Note 10 design (https://bgr.com/2019/05/29/ga note-10-design-vs-galaxy-s10- based-on-leaks-and-rumors/)

5 DEALS
Amazon's crazy Apple Watch s basically a Prime Day preview (https://bgr.com/2019/05/29/ap watch-series-3-price-drop-ama prime-day/)

BGR TOP DEALS

1 THE PRICE IS RIGHT
Amazon's crazy Apple Watch s basically a Prime Day preview (https://bgr.com/2019/05/29/ap watch-series-3-price-drop-ama prime-day/? utm_source=bgr&utm_campai

2 JUST RESTOCKED
Today's best deals: $7.22 Alex plugs, $199 Apple Watch, $30 Stick, 55" 4K TV for $330, mor (https://bgr.com/2019/05/29/ar deals-of-the-day-may-29-sales utm_source=bgr&utm_campai

BEST DEAL WE'VE FOUND
The Nintendo Switch's biggest flaw can be fixed with this $10 accessory

NJOY Exhibit 1002.1339

In addition to not requiring users to pay attention to plug orientation or cable direction, the new USB connector will also provide faster data transfers and support scalable power charging. The new connector is targeted for industry review during the first quarter of next year, with a final specification to be published by the middle of 2014. Furthermore, the new connector will support future designs but it will not be compatible with older standards.

Apple changed its proprietary connector for iOS devices in 2012, replacing the 30-pin dock connector with a new Lighting port (https://bgr.com/2012/09/12/apple-lightning-dock-connector-cable-announce/), which is smaller in size and can be inserted in ports on either side. The Lightning (https://bgr.com/tag/lightning/) connector is already used by Apple's latest iOS devices, including all 2013 iOS smartphones and tablets, and last year's iPhone 5, fourth-gen iPad and first-gen iPad mini.

Tags: lightning (https://bgr.com/tag/lightning/), USB (https://bgr.com/tag/usb/)

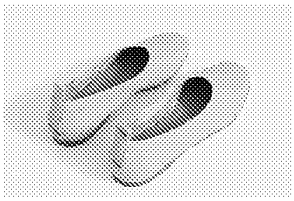
(https://bgr.com/2019/05/29/ni
switch-accessories-on-amazo
utm_source=bgr&utm_campai

ALMOST SOLD OUT
4 Do you have a Fire TV or a Fir
Stick? You should also have th
accessory
(https://bgr.com/2019/05/29/fir
keyboard-on-amazon/?
utm_source=bgr&utm_campai

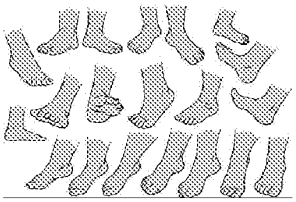
HURRY BEFORE IT'S GONE!
5 How is this insanely good surr
sound system only $72 right n
Amazon?
(https://bgr.com/2019/05/29/be
selling-surround-sound-speake
logitech-amazon-prime/?
utm_source=bgr&utm_campai

Sponsored Stories

Recommended by



These Italian-made Leather Flats Are As Comfy As Sneakers
Everlane on T+L
(https://www.everlane.com/redirect/outbrain?utm_source=outbrain&utm_medium=article&utm_campaign=dayglove_tandl_retail&utm_content=$section_name$&utm_term=00ecd58af720dac612fb1fdc14day-glove-leather-flat-shoe-launch&obOrigUrl=true)



What Exactly is Plaque Psoriasis? - Search for Early Signs of Plaque Psoriasis
Yahoo! Search
(https://search.yahoo.com/yhs/r?utm_campaign=us-ob-yg-psoriasis-search-web&imp=46621&utm_medium=paid&utm_source=outbrain&campaign_id=007f9905bafd5177022e6b1594c1069ad9&adid=004dfabecddbbd8c039f485d0993ea278b&utm_term=$section_id$&utm_content=$section_name$&utm_term=00ecd58af720dac612fb1fdc14&ob_click_id=3F+-+Search+for+Early+Signs+of+Plaque+P

Prepare to Be Stunned - Just Released Crossover Suvs - Research Deals for 2019 Luxury Crossover Suv
Yahoo! Search
(https://search.yahoo.com/yhs/r?utm_campaign=us-ob-yg-crossovers-search-web&imp=46621&utm_medium=paid&utm_source=outbrain&campaign_id=0

The Insane 5G Is Here! Research 5G Networks And How To Upgrade Now!
Yahoo! Search
(http://tinytrk.com/index.php?rgid=48147&obOrigUrl=true)

[Photos] Man Notices A Strange Hole In This Lake, So He Gets A Drone, Flies It Inside And Captures This
The Primary Market
(http://www.theprimarymarket.com/view/drone-pictures-hard-to-ignore-tpm/?src=outbrain&utm_source=outbrain&utm_medium=$section_id$&utm_campaign=00513941f8b32225bab96c658b0c9pictures-hard-to-ignore-tpm_or_a_119759&obOrigUrl=true)

[Gallery] She Never Married And Now We Know Why
BrainSharper
(http://xmkeq83l.brain-sharper.com/entertainment/celebs-never-got-married-fb?utm_campaign=Never%20Married%20Matt%20-%20Desktop%20USA%20OB&utm_source=OutBrain&utm_medium=$publisher_name$-$section_na

NJOY Exhibit 1002.1340

Finally, 5G is Here! Research 5G Networks & How to Upgrade Now!
Yahoo! Search
(http://tinytrk.com/index.php?rgid=46947)

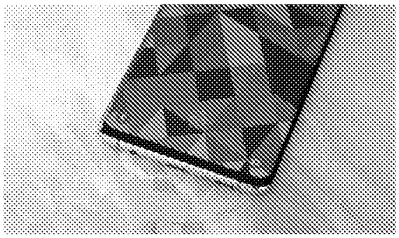
The 2020 Toyota Corolla Is Here and We're Obsessed
Edmunds
(https://www.edmunds.com/toyota/corolla/?utm_medium=display&utm_source=outbrain&utm_account=edmunds_outbrain&utm_campaign=

PICKED FOR YOU (HTTPS://BGR.COM/)

(https://bgr.com/2019/05/28/iphone-11-leak-ios-13-concept-shows-new-features/)

New iOS 13 concept fixes one of the worst things about the iPhone (https://bgr.com/2019/05/28/iphone-11-leak-ios-13-concept-shows-new-features/)

By Chris Smith (https://bgr.com/author/chris-smith/)
1 day ago



(https://bgr.com/2019/05/29/galaxy-note-10-design-vs-galaxy-s10-render-based-on-leaks-and-rumors/)

This is our first look at Samsung's Galaxy Note 10 design (https://bgr.com/2019/05/29/galaxy-note-10-design-vs-galaxy-s10-render-based-on-leaks-and-rumors/)

By Chris Smith (https://bgr.com/author/chris-smith/)
14 hours ago

(https://bgr.com/2019/05/28/galaxy-s1 date-closes-in-as-one-major-design-ch leaks/)

One of the Galaxy Note 10's bigg design changes just leaked (https://bgr.com/2019/05/28/gal release-date-closes-in-as-one-m design-change-leaks/)

By Chris Smith (https://bgr.com/author/ch

Copyright 2019 BGR Media, LLC
PMC Entertainment

NJOY Exhibit 1002.1341

Powered by WordPress.com VIP (https://wpvip.com/?utm_source=vip_powered_wpcom&utm_medium=web&utm_campaign=VIP%20Footer%20Credit&utm_t
| Privacy Policy (https://pmc.com/privacy-policy/) | Your Privacy Rights (https://pmc.com/privacy-policy/#california) | Ad Choices (https://pmc.com/privacy-policy
| Privacy Preferences | Terms Of Use (https://pmc.com/terms-of-use/)

NJOY Exhibit 1002.1342

Terminals and Splices Selection Guide

RoHS Ready

TE connectivity

NJOY Exhibit 1002.1343

Asia/Pacific

Australia – Sydney
Phone: + 61-2-9554-2600
Fax: + 61-2-9502-2556

India – Bangalore
Phone: + 91-80-285-40800
Fax: + 91-80-285-40820

Indonesia – Jakarta
Phone: + 65-6482-0311
Fax: + 65-6482-1012

Japan – Tokyo
Phone: + 81-44-844-8111
Fax: + 81-44-812-3207

Korea – Seoul
Phone: + 82-2-3415-4500
Fax: + 82-2-3486-3810

Malaysia – Kuala Lumpar
Phone: + 60-3-78053055
Fax: + 60-3-78053066

New Zealand – Auckland
Phone: + 64-9-634-4580
Fax: + 64-9-634-4586

People's Republic of China
Beijing
Phone: + 86-10-6569-3488
Fax: + 86-10-6569-3208

Changchun
Phone: + 86-431-88964709
Fax: + 86-431-88981143

Chongqing
Phone: + 86-23-89808860
Fax: + 86-23-89808865

Guangzhou
Phone: + 86-20-83969113
Fax: + 86-20-3786-4019

Hong Kong
Phone: + 852-2738-8731
Fax: + 852-2735-0243

Shanghai
Phone: + 86-21-2407-1588
Fax: + 86-21-2407-1599

Shenzhen
Phone: + 86-755-2515-4700
Fax: + 86-755-25980416

Wuhan
Phone: + 86-27-68850116
Fax: + 86-27-68850177

Xian
Phone: + 86-29-8786-8612
Fax: + 86-29-8786-8788

Philippines – Makati City
Phone: + 632-848-0171
Fax: + 632-867-8661

Singapore – Singapore
Phone: + 65-6482-0311
Fax: + 65-6482-1012

Taiwan – Taipei
Phone: + 886-2-8768-2788
Fax: + 886-2-8768-2268

Thailand – Bangkok
Phone: + 66-2-955-0500
Fax: + 66-2-955-0505

Vietnam – Ho Chi Minh City
Phone: + 84-8-930-5546
Fax: + 84-8-930-3443

Terminals and Splices

Contents

Product Introduction 5
Test Specifications 6
FASTON Terminals 9
Positive Lock Connectors 12
Ring Tongue Terminals 33

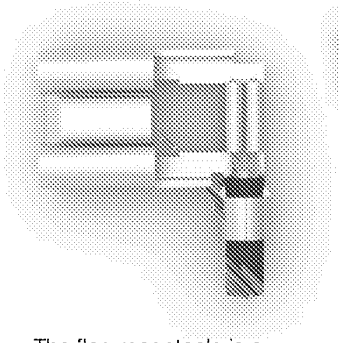
NJOY Exhibit 1002.1346

Product Introduction

The TE family of quick connects provides the right product for most applications. All styles provide features to enhance quality and reliability of interconnections. The FASTON product line consists of two mating parts—the receptacle and the tab. Receptacles are available in both straight and flag configurations and come in a variety of sizes. They are designed numerically by a series number that corresponds to the width of the mating tab. There are six series of both straight-on and flag receptacles "312", "250", "205", "187", "125", and "110".

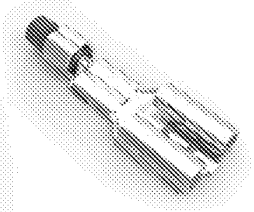
Product Styles

Flag Receptacles



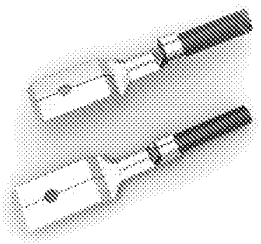
The flag receptacle is a reliable termination for those applications where space is a critical factor. Connection with mating tab is at right-angle to axis of conductor. Typical installations include bussing switches in back-splashes of ranges or in similar heavy duty applications.

Straight Receptacles



Straight receptacles are made with or without insulation support. Insulation diameters of .040–.230 are accommodated by the insulation support receptacle. Another feature of this type is a step-down insulation support barrel to compensate for insulation thickness to maintain axial alignment of the conductor strands. Over-insertion of shoulderless tabs is prevented by tapering walls at the rear of the receptacle.

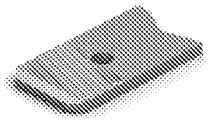
Wire Crimp Tabs



The wire crimp tabs are designed for line splices and other special applications. They can be applied to 22-14 AWG wire with "F" crimp termination and include insulation support. The wire crimp tab is also available with AMPLIVAR connector type serrations for magnet wire applications.

1) Select Series – Tab width onto which the Receptacle is being plugged FASTON products are grouped according to tab width dimensions in series:

9.5mm ("375" Series)
6.3mm ("250" Series)
5.2mm ("205" Series)
4.8mm ("187" Series)
2.8mm ("110" Series)



* Receptacle series must match the mating tab width and thickness.

2) Select Wire Range – AWG or sqmm

3) Select Wire Type & Terminal Orientation (straight or flag), then Crimp Style – Method by which the terminal is applied to the wire

"F" Crimp

Most Common Crimp
Used on Straight and Flag Terminals
Offers Optimum Combination of Strength and Conductivity
Method of Termination Provides Maximum Resistance to Vibration and Corrosion

Tab-Lok Crimp

- Featured on Flag Terminals
- Locking Tab on Wire Barrel is Inserted through a Slot on the Terminal itself

"C" Crimp

Featured on Flag Terminals
Provides Reliable Electrical and Mechanical Performance with a Minimum Profile

2-1773700-5
CS 03/2013
www.te.com/industry
/Appliances

Dimensions are shown for reference purposes only. Specifications subject to change.

Dimensions are in inches and millimeters unless otherwise specified.
USA: +1 (800) 522-6752

Canada: +1 (905) 475-6222
Mexico/C. Am.: +52 (0) 55-1106-0800
Latin/S. Am.: +54 (0) 11-4733-2200
Germany: +49 (0) 6251-133-1999
UK: +44 (0) 800-267666
France: +33 (0) 1-3420-8686
Netherlands: +31 (0) 73-6246-999
China: +86 (0) 400-820-6015

NJOY Exhibit 1002.1347

Test Specifications

Operating Temperatures of Materials and Finishes

FASTON terminals are made available in brass and phosphor bronze which can be plated with tin or silver. The line also includes a selection of nickel plated steel tabs and receptacles.

Certain products are available in either pre-tin or tin plated. Tin plate is the electro-depositing of tin on base metal over the entire surface of the terminal following the fabrication of the terminal. Pre-tin plate is the plating of tin on base metal prior to fabrication which produces exposed base metal in the terminal edge areas after stamping.

Brass

Plain

Allowable connection temperature* — 110°C.

Plain brass is used frequently, where applications have optimal environmental conditions.

Tin Plated

Allowable connection temperature — 110°C.

Tin plating of receptacle and tab improves operation at higher temperatures, and in addition helps to protect the connection against corrosion.

Silver Plated

Allowable connection temperature — 130°C.

Silver plated connections allow the highest operating temperature for brass and a higher current-carrying capacity.

* Allowable connection temperature is the ambient temperature plus temperature rise of the terminal at normal operating conditions.

Phosphor Bronze

Plain

Allowable connection temperature — 110°C.

Phosphor bronze is used in applications where brass would normally be corroded, for example the various freezing mixtures and ammonias.

Tin Plated

Allowable connection temperature — 110°C.

Tin plating of receptacle and tab improves operation at higher temperatures, and in addition helps to protect the connection against corrosion.

Silver Plated

Allowable connection temperature — 130°C.

Silver plated connections allow the highest operating temperature for phosphor bronze and higher current-carrying capacity.

Steel

Nickel Plated

Allowable connection temperature — 250°C.

This combination allows a reliable connection at high temperatures, for example in stoves, cooking appliances, etc. For optimum performance, these nickel plated receptacles are used with compatible lead wires and tabs that can be welded to heating units.

Plastics (Insulation)

Material Temperature Rating —

The following list shows various plastics and their application temperatures.

High temp. polyamide (nylon)	150°C
Polyamide, (nylon)	125°C
Polypropylene	105°C
Polyester	90°C
Polyethylene	75°C
A.B.S.	70°C
PVC	60°C

Note: For information related to Glow Wire temperature ratings, contact TE Engineering.

Stress Relieving of Brass or Steel Receptacles

The process of stress relieving is unique to TE quick connects and is most commonly used in the production of those receptacles designated as premier line, including Ultra-Fast, Ultra-Fast Plus FASTON and PIDG receptacles. Stress is introduced into copper alloy or steel terminals during the stamping process. When metal strip is formed into the receptacle, the material is deformed beyond its yield stress to form it into its new shape. This forming operation leaves a residual stress in the grain structure. The orientations and magnitudes of the forming stresses are complex, but can exist in the same direction as the applied load. Thus, residual stresses can reduce the force necessary to open the receptacle during the tab insertion. Stress relieving the terminal restores the elastic spring properties and improves receptacle performance by reducing the residual stresses. After stress relieving, the receptacle resists opening when a tab is inserted, especially where difficult or awkward mating situations may cause mechanical abuse.

2-1773700-5
CS 03/2013
www.te.com/industry
/Appliances

Dimensions are shown for reference purposes only. Specifications subject to change.

Dimensions are in inches and millimeters unless otherwise specified.
USA: +1 (800) 522-6752

Canada: +1 (905) 475-6222
Mexico/C. Am.: +52 (0) 55-1106-0800
Latin/S. Am.: +54 (0) 11-4733-2200
Germany: +49 (0) 6251-133-1999

UK: +44 (0) 800-267666
France: +33 (0) 1-3420-8686
Netherlands: +31 (0) 73-6246-999
China: +86 (0) 400-820-6015

NJOY Exhibit 1002.1348

Test Specifications (Continued)

Test Specifications

The following information and related charts are taken from the qualification requirements as defined in UL-310, the safety standard for electrical Quick-Connect terminals. Throughout this catalog, when a reference is made to a part being UL listed, that part has been qualified to the standards shown in these charts.

Temperature Rise and Millivolt Drop

The temperature rise and millivolt drop characteristics are the lowest in the industry. They comply with safety requirements and exhibit extreme stability during extended time tests. When using FASTON terminals, the allowable connection temperatures can be adjusted, based on the application, by considering actual current(s) and related temperature rise, time at this temperature, humidity, corrosion environment, vibration, base metal, plating (if any), and other environmental considerations.

Test Parameters for FASTON Terminals (Based on UL-310 Temperature Rise and Current Requirements)

Contact Size	Wire Size (Strand Count)	Continuous Current	Intermittent Current
250 Series	10 (105)	24	48
205 Series	12 (65)	20	40
187 Series	14 (41)	15	30
	16 (26)	10	20
	18 (16)	7	14
	20 (10)	4	8
	22 (7)	3	6
110 Series	16 (26)	5	10
	18 (16)	4	8
	20 (10)	3	6
	22 (7)	2	4

Note: This information applies only to UL listed (UL) terminals. A part with a component recognition (VDE) status deviates from the electrical or other requirements defined in the UL-310 safety standard.

This table can be used as a guide for selecting a characteristic such as contact size, wire size, or current (either continuous or intermittent operating current) when the other two are known. This table also identifies the possible receptacle sizes available for a given wire size. The continuous current column highlights the maximum current that should be applied to a given receptacle and wire combination to meet a 30°C maximum temperature rise. Intermittent current can be defined as a one hour cycle consisting of 45 minutes on and 15 minutes off. The temperature rise of the connector using the intermittent current on the corresponding wire size will be less than 85° C. The wire used in the testing to meet these electrical requirements is tin plated copper with stranding as indicated above in parentheses for terminals intended for internal wiring connections.

Tensile Strength (forces for crimp pull-out)

Maximum tensile strength of the wire to terminal connection does not insure reliable electrical performance. An acceptable compromise between maximum tensile strength and electrical stability is recommended. Normally the tensile strength is much greater than the force required to disconnect the tab from the receptacle; therefore, no difficulties or hazards are encountered.

Forces for Crimp Pull-out Test (UL-310 Specification)

Wire Size		Minimum Force	
AWG	(mm^2)	pounds	N
22	0.32	8	36
20	0.52	13	58
18	0.82	20	89
16	1.3	30	133
14	2.1	50	223
12	3.3	70	311
10	5.3	80	356

The forces shown for the crimp pull out test represent the minimum force required to separate the wire from the crimped terminal in an axis parallel to the wire exit direction from the contact. This force does not include the holding force of the insulation crimp (if applicable).

2-1773700-5
CS 03/2013
www.te.com/industry/Appliances

Dimensions are shown for reference purposes only. Specifications subject to change.

Dimensions are in inches and millimeters unless otherwise specified.
USA: +1 (800) 522-6752

Canada: +1 (905) 475-6222
Mexico/C. Am.: +52 (0) 55-1106-0800
Latin/S. Am.: +54 (0) 11-4733-2200
Germany: +49 (0) 6251-133-1999
UK: +44 (0) 800-267666
France: +33 (0) 1-3420-8686
Netherlands: +31 (0) 73-6246-999
China: +86 (0) 400-820-6015

NJOY Exhibit 1002.1349

Test Specifications (Continued)

Insertion and Withdrawal Forces for Engagement-Disengagement

The UL-310 safety standard defines a broad range for the insertion and extraction value of each connector series. Many of the FASTON product families (such as premier line, budget line, low insertion force type, etc.) have been designed for specific applications and to address forces within the overall range as defined in the chart.

Insertion and Withdrawal Forces for Engagement-Disengagement Test (UL-310 Specification)

Tab Size	Force, pounds (N)					
	First Insertion, Maximum Individual	First withdrawal			Sixth withdrawal	
		Maximum	Minimum		Minimum	
			Average	Individual	Average	Individual
Test Tab and Unplated Connector						
.250 6.30	18 (80)	18 (80)	6 (27)	4 (18)	5 (22)	4 (18)
.205 5.20 / **.187** 4.80	15 (67)	20 (89)	5 (22)	3 (13)	3 (13)	2 (9)
.125 3.20 / **.110** 2.80	12 (53)	14 (62)	3 (13)	2 (9)	2 (9)	1 (4)
Test Tab and Tin Plated Connector						
.250 6.30	17 (76)	17 (76)	5 (22)	3 (13)	4 (18)	3 (13)
.205 5.20 / **.187** 4.80	15 (67)	20 (89)	5 (22)	3 (13)	3 (13)	2 (9)
.125 3.20 / **.110** 2.80	12 (53)	14 (62)	3 (13)	2 (9)	2 (9)	1 (4)

This chart show the forces required to engage and disengage a connector from a **plain brass test tab** (tab for mechanical testing as shown in the tab section of this catalog). The force is measured with a testing device capable of holding the reading and providing accurate alignment with slow and steady engagement and disengagement of the connector and test tab.

Wire Range

FASTON receptacles are available in various wire ranges from 26-10 AWG, depending on series size. The chart below is designed to show our recommended two-wire combinations.

Specific wire and insulation combinations should be evaluated for suitability and not all combinations may be appropriate for high speed or automatic termination equipment.

Recommended Two-Wire Combinations

Wire Ranges																	
8-10	12-10	14-10	14-12	16-12	16-14	18-12	18-14 (2) 16	(2) 18 (2) 16	18-14	18-16	20-14	20-16 (2) 18	20-16	20-18	22-16	22-18
Two-Wire Combinations																
10-22[1]	12-22[1]	14-14	18-16	16-22	18-18	18-18	16-16	16-16	22-18	18-22[1]	20-22	18-18	20-18	20-20	18-22[1]	22-20[1]
10-20	12-20	14-16	18-14	16-20	18-20	18-16	16-22[1]	18-18	20-18	18-20	20-20	18-20	20-20	20-22[1]	18-20	22-22
10-18	12-18	14-18	16-16	16-18	16-22[1]	18-14	16-20	16-18[1]	18-18	18-18	20-18	20-20	22-18[1]	22-22	20-20	
10-16	12-16	14-20	14-22[1]	16-16	16-20	18-20	16-18		20-20	20-20	20-16	22-20	22-22		20-22	
10-14	14-16	14-22	14-20	18-16	18-22	18-18			20-16	18-22	18-22[1]	22-20				
12-14	14-14	16-16		18-20		16-22	18-20		22-16[1]		18-18					
	14-12	16-18		18-14		16-20	18-22				18-16					
		16-12		20-14		16-16	20-20				16-22[1]					
		18-12				14-22[1]	20-22									
		20-12		22-14[1]		14-20										
		22-12[1]														

[1] Min./max. wire size combinations

2-1773700-5
CS 03/2013
www.te.com/industry/Appliances

Dimensions are shown for reference purposes only. Specifications subject to change.

Dimensions are in inches and millimeters unless otherwise specified.
USA: +1 (800) 522-6752

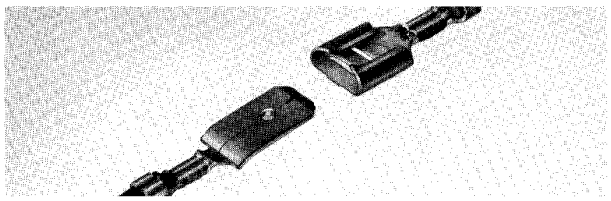
Canada: +1 (905) 475-6222
Mexico/C. Am.: +52 (0) 55-1106-0800
Latin/S. Am.: +54 (0) 11-4733-2200
Germany: +49 (0) 6251-133-1999

UK: +44 (0) 800-267666
France: +33 (0) 1-3420-8686
Netherlands: +31 (0) 73-6246-999
China: +86 (0) 400-820-6015

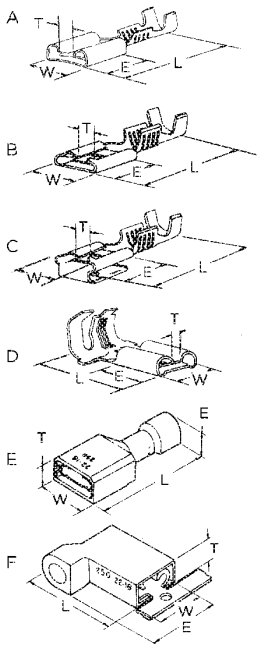
NJOY Exhibit 1002.1350

FASTON Terminals

FASTON Terminals and Splices are the industry's broadest line of quick connect-disconnect receptacles and tab-type terminals. The terminals are available in both straight and flag-types and come in a variety of sizes. Sizes are designated numerically by a series number which corresponds to the width of the mating tab. There are four series "250", "205", "187" and "110".



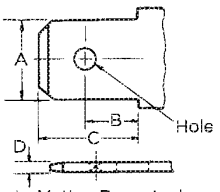
Receptacles



"250" Series

Style	Applicable Wire AWG	Applicable Wire mm²	Wire Ins. Dia.	Fits Tab Thickness	Material/Finish	Dimensions W	L	E	T	Part No. S.T.
A	20-14	0.50-2.27	2.2-3.4	0.8	Brass	7.5	19.2	7.8	0.9	170031-1†
	22-18	0.30-0.89	2.3-3.3	0.8	Brass	7.6	19.1	7.8	2.3	170183-1
					Brass/Tin					170183-2
	18-14	0.75-2.27	2.5-4.3	0.8	Brass	7.6	18.9	7.8	1.7	170213-1
					Brass/Tin					170213-2
	18-14	0.75-2.27	3.1-3.6	0.8	Brass/Tin	7.6	19.2	7.8	1.7	41274
	16-12 or 18x(2)	1.25-3.37 or 0.82x(2)	5.3-6.7 or 3.1x(2)	0.8	Brass/Tin	7.6	20.9	7.8	1.7	41728
	—	1.75-5.27	3.0-5.0	0.8	Brass/Tin	7.6	19.6	7.8	1.7	170224-2
	22-18	0.30-0.90	2.36-3.30	0.8	Brass/Tin	7.6	17.1	7.7	2.4	737439-2 LIF
	18-14	0.75-2.27	3.1-3.6	0.8	Brass/Tin	7.6	17.1	7.7	2.2	737440-2 LIF
	18-14	0.75-2.27	3.1-3.6	0.8	Brass/Tin	7.6	19.1	7.7	-	63688-1 LIF
B	18-14	0.75-2.27	3.1-4.3	0.8	Brass	7.6	19.6	7.8	2.9	42741-1
					Brass/Tin					42741-2
	18-14	0.80-2.00	3.05-4.32	0.8	Brass/Tin	7.6	19.6	7.7	2.9	61944-2
C††	18-12	0.75-3.37	2.8-5.3	0.8	Brass/Tin	8.1	17.0	7.8	3.1	41802
	12-10	3.08-4.86								42563-2
D	22-18	0.30-0.89	3.4 Max.	0.8	Brass/Tin Nylon-Red	9.4	21.7	5.1	5.2	2-520183-2
	16-14	1.25-2.27	4.1 Max.		Brass/Tin Nylon-Blue			5.7		3-350819-2
E	22-18	0.30-0.89	4.2 Max.	0.8	Brass/Tin Nylon-Red	9.8	16.1	14.7	5.0	2-520128-2
	16-14	1.25-2.27	4.7 Max.		Brass/Tin Nylon-Blue					3-520132-2

†With lance. ††Hermetic Terminals(For internal use only.)



Tab	A	B	C	D
250 Series	6.35	3.4	7.95	0.8
205 Series	5.21	3.18	6.35	0.8

"205" Series

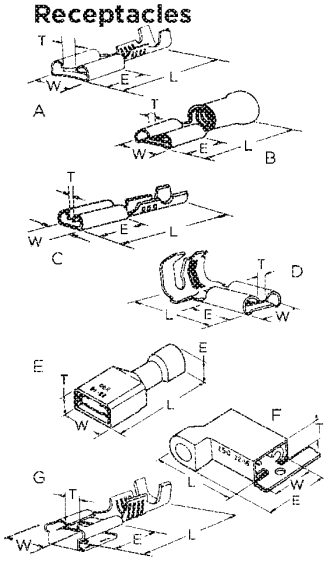
A	22-18	0.30-0.89	2.2-3.2	0.5	Brass/Tin	6.4	15.7	6.4	1.3	170122-2
			2.2-3.2	0.8	Brass/Tin	6.4	15.7	6.4	0.7	170181-2
				0.5	Brass					170181-1
					Brass/Tin					170181-4
B	22-18	0.30-0.89	2.2-3.2	0.5	Brass/Tin	6.4	15.6	6.4	1.3	42710-2
A	18-14	0.75-2.27	3.3-4.6	0.8	Brass	6.4	15.7	6.4	0.7	170179-1
					Brass/Tin					170179-2
D	20-14	0.50-2.27	2.8-4.3	0.8	Brass/Tin	6.4	13.5	6.4	0.6	42234-2

Note: All Part Numbers are RoHS compliant.

NJOY Exhibit 1002.1351

FASTON Terminals

Receptacles

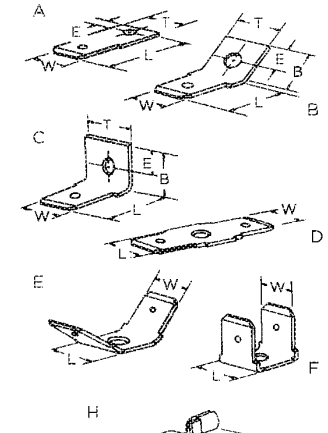


"187" Series Receptacles

Style	Applicable Wire AWG	Applicable Wire mm²	Wire Ins. Dia.	Fits Tab Thickness	Material/Finish	Dimensions W	L	E	T	Part No. S.T.
A	24-20	0.20-0.56	1.0-1.8	0.5	Brass/Tin	5.6	15.0	6.4	1.5	60573-1
			1.5-2.5							170214-2Δ
	20-16	0.50-1.42	2.3-3.3	0.5	Brass	5.6	15.2	6.4	1.5	170037-1
					Brass/Tin					170037-2
	18-14	0.75-2.27	2.2-3.4	0.5	Phos.Brz./Tin	5.6	15.2	6.4	1.5	170466-1
	20-16	0.50-1.40	2.29-3.30	0.8	Brass/Tin	5.6	14.9	6.4	1.8	63477-2 LIF
	20-16	0.50-1.40	2.29-3.30	0.5	Brass/Tin	5.6	14.9	6.4	1.8	63475-2 LIF
D	20-16	0.50-1.42	2.8-4.3	0.5	Brass	5.6	13.5	6.4	1.0	170140-1
					Brass/Tin					170140-2
	20-16	0.50-1.40	2.79-4.32	0.5	Brass/Tin	5.6	13.5	6.4	1.1	42800-2
E	22-18	0.30-0.89	3.4 Max.	0.5	Brass/Tin Nylon-Red	8.0	21.7	5.1	4.2	2-520181-2
	16-14	1.25-2.27	4.1 Max.		Brass/Tin Nylon-Blue			5.7	4.8	3-350815-2
F	22-18	0.30-0.89	4.2 Max.	0.5	Brass/Tin Nylon-Red	8.1	16.1	13.1	4.8	2-520334-2
	16-14	1.25-2.27	4.7 Max.		Brass/Tin Nylon-Blue					3-520338-2
G	20-16	0.50-1.40	2.29-3.30	0.5	Brass/Tin	5.7	15.6	5.7	-	62026-1

ΔUL approval wire range AWG#22-20

Tabs



"110" Series Receptacles

Style	Applicable Wire AWG	Applicable Wire mm²	Wire Ins. Dia.	Fits Tab Thickness	Material/Finish	Dimensions W	L	E	T	Part No. S.T.
C	24-20	0.20-0.56	2.0-2.8	0.5	Brass	3.8	15.4	6.4	0.7	170043-1Δ
					Brass/Tin					170043-2Δ
				0.7	Brass					170056-1Δ
					Brass/Tin					170056-2Δ
	22-18	0.30-0.89	1.5-2.5	0.5	Brass	3.8	16.1	6.4	0.6	42068
					Brass/Pre-tinned					42068-1
B	22-18	0.30-0.89	2.5 Max.	0.5	Brass/Pre-tinned	3.8	18.6	6.4	0.6	61059-2
					Nylon-Trsp.					
E	22-18	0.30-0.89	3.1 Max.	0.5	Brass/Tin	7.0	18.7	4.2	4.1	2-520083-2 2-520084-2
					Nylon-Red					

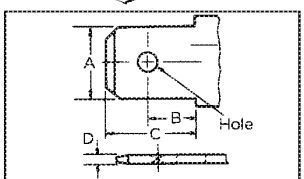
ΔUL approval wire range AWG#22

"250" Series Tabs

Style	Hole Dia.	Stock Thickness	Material/Finish	Dimensions B	W	L	E	T	Part No.
A	4.5	0.8	Brass/Tin	—	6.3	18.2	4.3	7.5	63038-2
A	1.4	0.8	Brass/Tin	—	6.4	14.02	3.4	7.9	63824-1(Strip)
B	3.3	0.8	Brass/Tin	7.5	6.3	10.2	4.3	7.5	42822-2
E	3.3	0.8	Brass/Tin	—	6.3	8.0	—	—	—
F	3.3	0.8	Brass/Tin	—	6.3	8.0	—	—	41480
J	—	—	Plastic Tube Over Brass Tab	—	6.3 9.9	53.2 Max.	21.8 Min.	—	321235

"187" Series Tabs

A	1.32	0.5	Brass/Tin	—	4.8	12.5	3.2	7.9	63823-1(Strip)
F	3.3	0.5	Brass/Tin	6.7	4.8	8.3	—	6.7	170001-3
F	3.3	0.5	Brass/Tin	—	4.8	6.7	—	—	170001-2



Tab	A	B	C	D
187 Series	4.75	3.18	6.35	0.51
110 Series	2.79	5.54	7.11	*

Note: All Part Numbers are RoHS compliant.

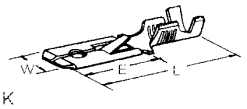
NJOY Exhibit 1002.1352

FASTON Terminals

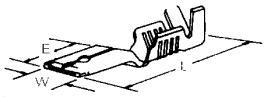
Wire Crimp Type Tabs and Insulation sleeves, Pods

Wire Crimp Type

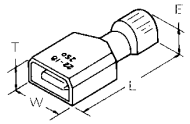
1



K



M



N

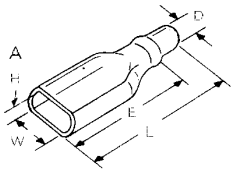
"250" Series

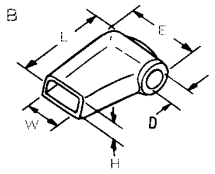
Type	Applicable Wire AWG	Applicable Wire mm²	Wire Ins.Dia.	Material/ Finish	Tab Thickness	Dimensions W	Dimensions L	Dimensions E	Part No. S.T.
K	20-14	0.50-2.27	2.2-3.4	Brass/Tin	0.8	6.0	24.4	14.0	170030-2†
M	22-18	0.30-0.89	2.0-3.0	Brass	0.8	6.4	20.7	9.4	42475-3
				Brass/Tin					42475-4
	18-14	0.75-2.27	2.8-3.8	Brass			20.6		42474-3
				Brass/Tin					42474-4
N	22-18	0.30-0.89	3.4 Max.	Brass/Tin Nylon-Red	0.8	12.4	21.7	5.1	2-520102-2
	16-14	1.25-2.27	4.1 Max.	Brass/Tin Nylon-Blue				5.7	3-520106-2

†With Lance *Die Insert Number for Hand Tool P/N 58078-3.

Insulation Sleeves For FASTON Receptacle

Material:Soft Vinyl Cloride Cloudy

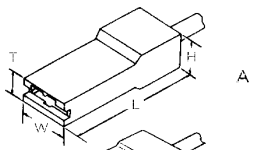




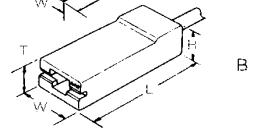
Type	FASTON Series	Dimensions D	Dimensions E	Dimensions L	Dimensions W	Dimensions H	Part No.
A	250	2.0	19.0	24.0	8.0	3.5	170823-3
		2.5					170823-2
		3.2	22.0	27.0	8.0	3.5	1-170823-8
		3.5	20.5	25.0	8.0	3.5	1-170823-5
			30.5	35.0			1-170823-9
			35.5	40.0			2-170823-0
		4.8	20.0	25.0	8.0	3.5	170823-6
	205	2.5	18.0	23.0	6.5	3.0	4-170823-1
	187	2.2	18.0	23.0	5.8	2.2	1-170823-3
		2.5	15.0	20.0	5.8		1-170823-4
	110	1.8	16.0	21.0	4.0	2.1	170823-9
		2.5					170823-1
B	250	3.2	14.5	18.5	8.5	4.5	170891-1
		4.8					170891-2
	187	3.2	12.4	14.9	6.5	3.0	3-170823-8

AMPIP/ Post-Insulation Pods for FASTON Receptacle

Material:Nylon, Natural



A



B

Type	Wire Ins.Dia.	Dimensions L	Dimensions T	Dimensions W	Dimensions H	Part No.	Accepts Terminals
A	5.1	24.4	4.6	9.1	8.0	171706-1	"250" Series FASTON Rec. 47829, 170183, 170187, 170213
B	4.6	19.7	5.7	8.6	6.2	1-480418-0	"205" Series FASTON Rec. 42710, 170122, 170123, 170181, 170182
	4.3	19.7	5.5	7.8	6.0	1-480435-0	"187" Series FASTON Rec. 170037, 170038, 170203, 170214

Note: All Part Numbers are RoHS compliant.

NJOY Exhibit 1002.1353

<Mark II>

The Positive Lock Connectors are wire-to-tab termination connectors designed to provide fast connect/disconnect and positive locking capabilities using a combination of specially designed receptacles and a housing that accommodates them.

In the past, the methods of connection with tabs and receptacles often presented difficulties in wire termination because of their inherent high insertion and withdrawal forces making productivity extremely low.

With these uniquely designed Positive Lock Connectors, the insertion and withdrawl forces are exceedingly low and as a result, assembling operation is greatly facilitated and cost reduced.

This feature of low insertion and withdrawl forces not only helps prevent damage of tabs and other parts during the assembling of equipment but also protect operators from injuries as were often experienced in old days.

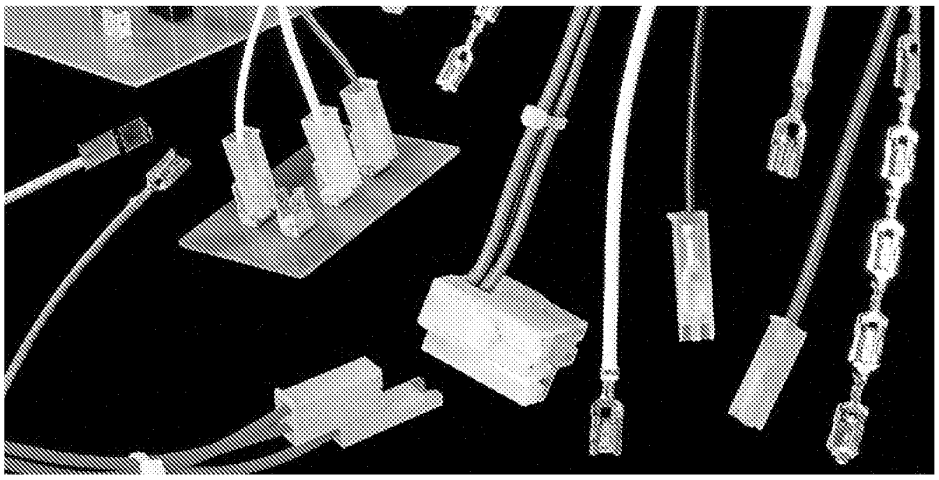
Moreover, despite the low insertion force, the connectors are guaranteed of high electrical performance due to thorough consideration given to the contact surface design.

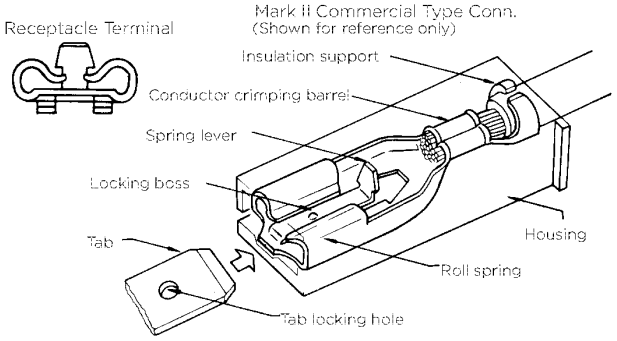
■Fast Connect/Disconnect and Positive Locking Capabilities

The receptacle is so designed that the mating tab can be inserted smoothly as the receptacle's spring lever is depressed. When the tab is completly inserted, the spring lever returns back to its original position and the boss on the tab fits into the tab hole and locks firmly.

In this state, even if wire is pulled, it cannot be pulled out easily.

To extract, hold the housing and pull it out. The spring lever butts against the inside wall of the housing, lock is released and wire can be pulled off easily.





■Confirmation of Tab Insertion

When the tab is inserted into the receptacle, there is a clear sound of click which enables confirmation of tab insertion. Halfmating is thus prevented.

■Good Electrical Contact

The receptacle and the tab are held in surface-to-surface contact, ensuring extremely good electrical contact.

■Loading of Receptacle Terminals in Housing

The terminated receptacle terminals can be loaded in the housing by hand easily. When loaded, the terminals are retained in the housing firmly by a housing lance mechanism.

■Types of Connectors

The Positive Lock connectors are available in two types, according to the configurations of receptacle terminals :

Mark II Ex Series

■Mark II

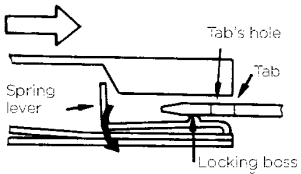
Commercial Type----
110 Series (1, 3 positions)
187 Series (1, 2, 3, 4 positions)
250 Series (1, 2, 4 positions and Flag type)
For TRIAC use (3 position)
Heavy Duty Type----
250 Series (1, 2 positions)
For shield beam use -
(312 Series 3 position)

■EX Series

These are terminals used without a housing.
When necessary, a sleeve is available that can be applied after a terminal is terminated.
Also, there are a heat-resistant version of terminal that can be used without insulation, EXII Series and EXIII Series which is loaded into the housing after termination.

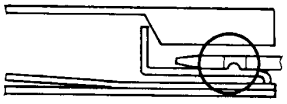
Locking Mechanism (Mark II Commercial Type Connector)

1. Insert tab



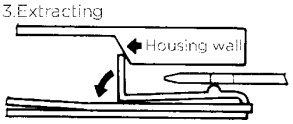
Spring lever is depressed as tab is inserted.

2. Mating and lock

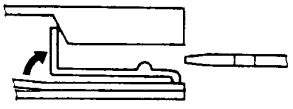


When tab is inserted through, spring lever returns to original position and locking boss fits in tab's hole.

3.Extracting



Hold housing and pull wire. Spring lever butts against the slanting wall of housing and locked tab is disengaged.



When tab is extracted, spring lever returns to original position by spring action.

NJOY Exhibit 1002.1354

Applicable Safety Standards

The safety standards listed on the right are applied to specific part numbers. For confirmation of approval, contact our Sales Department by indicating the part number(s) in question.
Please note that there are instances where the standards differ from TE Connectivity is performance specifications.

<Mark II>

UL File No. E28476
(Recognized Component)
- Voltage Rating :
  - As par requirements of equipment used.
- Current Rating :
  - As par requirements of equipment used.

CSA Report No. LR7189
- Voltage Rating : 250V
- Current Rating :
  - AWG #24=1.5A
  - AWG #22=3A
  - AWG #20=4A
  - AWG #18=7A
  - AWG #16=10A
  - AWG #14=15A
  - AWG #12=20A
  - AWG #10=24A

VDE License No. 3184
- Voltage Rating :
  - 250V AC / 300V DC
- Current Rating :
  - AWG #24=2.5A
  - AWG #22=3A
  - AWG #20=5A
  - AWG #18=7A
  - AWG #16=12A
  - AWG #14=15A
  - AWG #12=20A
  - AWG #10=25A

Temperature Rating : 80˚C
Insulation Groove : B
IP Protection : IP00

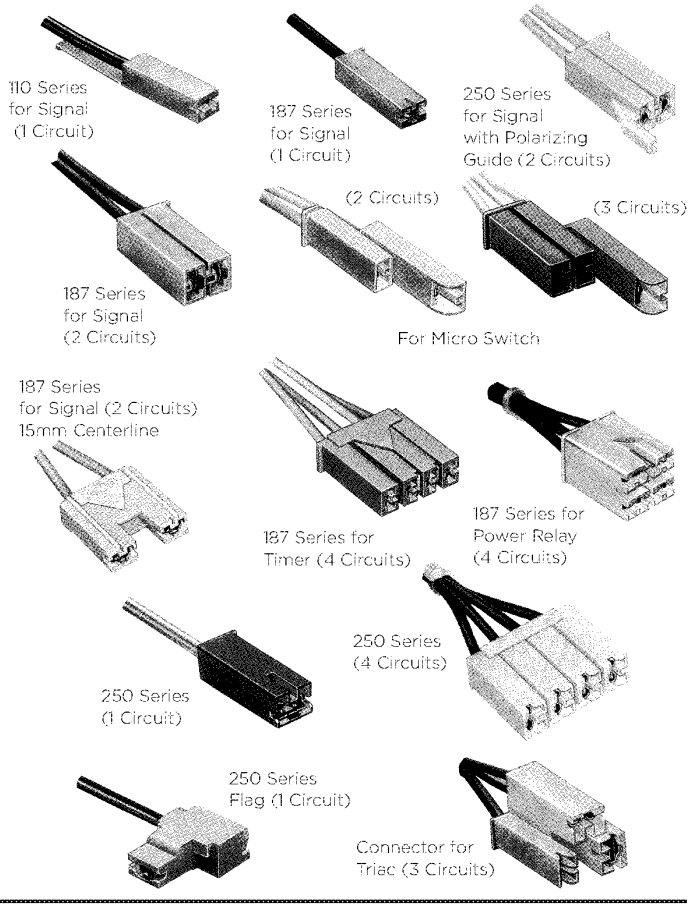
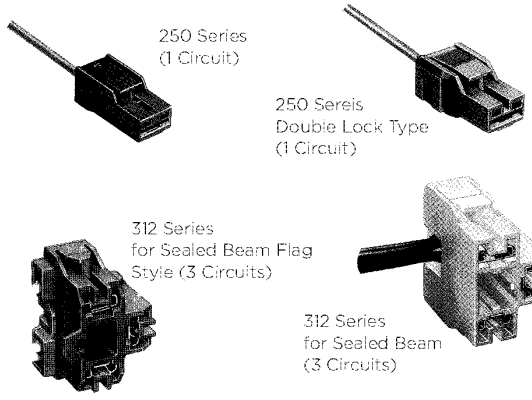
<EX Series>

UL File No. 66717
(Recognized Component)
- Voltage Rating :
  - As par requirements of equipment used.
- Current Rating :
  - As par requirements of equipment used.

CSA Report No. LR7189
- Voltage Rating :
  - As par requirements of equipment used.
- Current Rating :
  - As par requirements of equipment used.

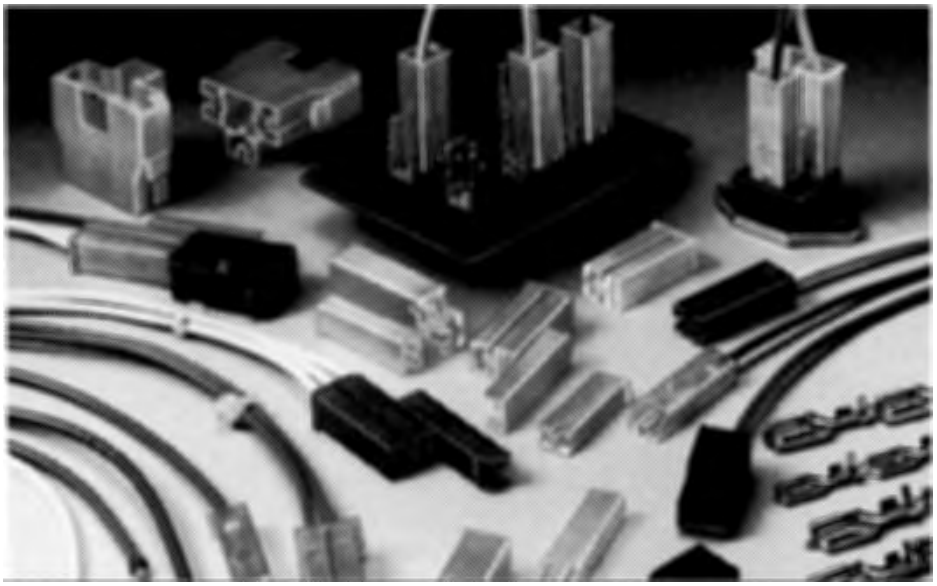
NJOY Exhibit 1002.1355

<Mark II> Product Introduction

Connector	Type	Descriptions	No. of Cir.	Configuration
Mark II	Commercial	110 Series for Signal Circuit	1 3	
		187 Series for Signal Circuit	1 2	
		187 Series for Signal Circuit with Polarizing Guide	2	
		187 Series for Signal Circuit with Locking Feature	1	
		187 Series for Signal Circuit for Micro Switch	2 3	
		187 Series for Signal Circuit 15mm Centerline	2	
		187 Series for Timer	4	
		187 Series for Power Relay	4	
		250 Series	1 2 4	
		250 Series Flag Style	1	
		Connector for Triac (Uses a mixture of 187/250 Series)	3	
	Heavy-duty	250 Series Low Profile Type	1	
		250 Series	1	
		250 Series Double Lock Type	1	
		250 Series / FASTON Mixture Parallel Type	2	
		250 Series / FASTON Mixture "T" Type	2	
		250 Series / FASTON Mixture Double Lock "T" Type	2	
		312 Series for Sealed Beam	3	
		312 Series for Sealed Beam Flag Style	3	

NJOY Exhibit 1002.1356

<Mark II>



Performance Data

Insulation Resistance :
1,000MΩ Min.
Total Resistance :
3mΩ Max.(Initial)
6mΩ Max.(Final)
Operating Temperature :
−40°C~+105°C
Terminal Locking Force :
(187)58.8N Min. (Initial)
49N Min. (Final)
(250)78.4N Min. (Initial)
68.6N Min. (Final)
Connector Insertion Force :
(187)29.4N Max. (per circuit)
(250)34.3N Max. (per circuit)
Connector Extraction Force :
5.88N Min. (per circuit)
Dielectric Withstanding Voltage :
2,000V AC (for one minute)
Product Specification :
108-5252(110)
108-5126(187)
108-5338(187, wire to wire)
108-5127(250)
Application Specification :
114-5120(110)
114-5041(187)
114-5042(250)
Instruction Sheet :
411-5094(all Positive Lock)
411-5425(110)

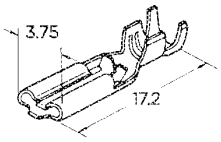
NJOY Exhibit 1002.1357

Positive Lock Connectors

<Mark II> 110 Series

Receptacle Terminals

Applicable Tab Width :
2.79mm
Material : Pre-tinned Brass

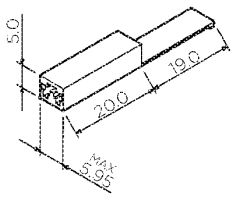


Applicable Wire		Insulation Diameter	Part No. of Receptable Terminals
AWG#	mm²		S.T.*
24-20	0.2-0.5	1.02-1.78	175411-1
20-16	0.5-1.25	2.10-3.10	174777-1

*Air-feed Applicator should be used. Extraction Tool P/N : 724659-4(411-5397)

Receptacle Housing

Applicable contact
Part No. : 175411, 174777

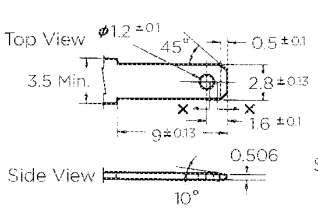


1 Circuit
Material : UL94V-2 , 6/6 Nylon
Part No. : 174779-1 (Natural)

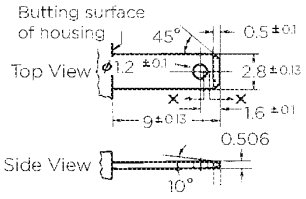
NEW
Material : UL94V-0, GWT750, Nylon
Part No. : 7-174779-1 (Natural)

Tab Dimension
For Signal Circuit

1 Circuit

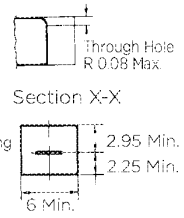


Type A
(When using tab shoulder for butting)

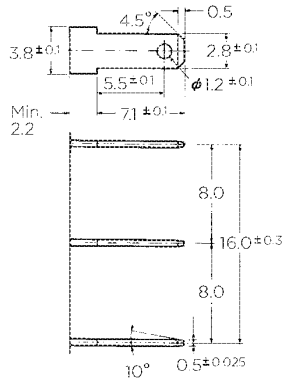


Type B
(When using resin, etc., for butting)

Sagging of the tab's hole must not exceed 0.08mm.



3 Circuits



Housing Outline

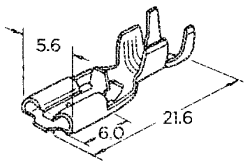
Note: All Part Numbers are RoHS compliant.

NJOY Exhibit 1002.1358

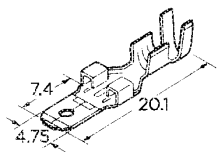
Positive Lock Connectors

<Mark II> 187 Series

Terminals



Receptacle



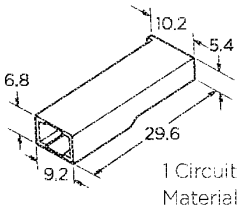
Tab

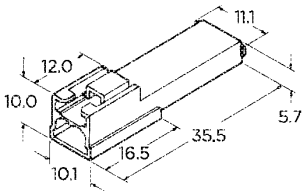
Applicable Wire AWG#	Applicable Wire mm²	Insulation Diameter	Material and Finish	Part No. of Terminals Receptacle S.T.*	Part No. of Terminals Tab S.T.
24-20	0.22-0.53	1.5-2.7	Pre-tinned Brass	170324-1	---
			Phos.bronze/Nickel Plated	170324-2	---
			Pre-tinned Phos.bronze	170324-5	---
20-16	0.51-1.38	1.9-3.4	Pre-tinned Brass	170325-1	175179-1
			Pre-tinned Phos.bronze	170325-5	---
18-14	0.70-2.08	One wire 2.1-3.6 Two wire 5.5(Max.)**	Pre-tinned Brass	170326-1***	---

*Air feed Applicator should be Used. Extraction Tool P/N : 724659-1(411-5106)
External Diameter of a single wire 1.6-3.1mm. *: 753816-1(411-5237)

Tab Housings

Applicable Terminal
Part No. : 175179



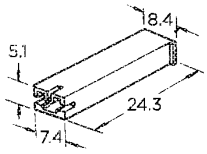


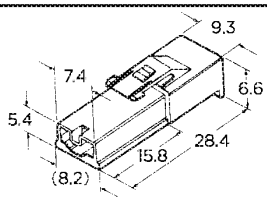
1 Circuit (Free Hanging)
Material : UL94V-0, 6/6 Nylon
Part No. : 176448-1 (Natural)
176448-6 (Blue)
176448-7 (Red)
Mating Receptacle Housing
Part No. : 173974-☐
NEW Material : UL94V-0, GWT750, Nylon
Part No. : 7-176448-1 (Natural)

1 Circuit (Junction Type, with locking)
Material : UL94V-0, 6/6 Nylon
Part No. : 179182-1 (Natural)
179182-6 (Blue)
179182-7 (Red)
Mating Receptacle Housing
Part No. : 179183-☐

Receptacle Housing

Applicable Terminal
Part No. : 170324
170325
170326
Material :
See columns right.





1 Circuit
Material : UL94V-2, 6/6 Nylon
Part No. : 172074-1 (Natural)
172074-2 (Black)
172074-4 (Yellow)
172074-5 (Green)
172074-6 (Blue)
172074-7 (Red)

NEW
Material : UL94V-0, GWT750, Nylon
Part No. : 7-172074-1 (Natural)
7-173974-1 (Natural)

Material : UL94V-0, 6/6 Nylon
Part No. : 173974-1 (Natural)
173974-2 (Black)
173974-4 (Yellow)
173974-5 (Green)
173974-6 (Blue)
173974-7 (Red)
Mating Tab Housing
Part No. : 176448-☐

1 Circuit (Junction type, with locking)
Material : UL94V-0, 6/6 Nylon
Part No. : 179183-1 (Natural)
179183-6 (Blue)
179183-7 (Red)
179183-9 (Black)
Mating Tab Housing
Part No. : 179182-☐

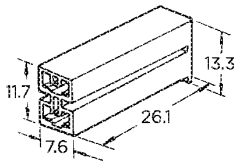
Note: All Part Numbers are RoHS compliant.

NJOY Exhibit 1002.1359

Positive Lock Connectors

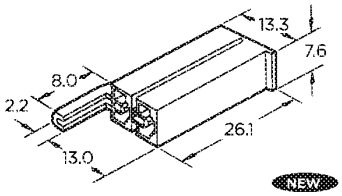
<Mark II> 187 Series (Straight-type)

Receptacle Housing



2 Circuits (6mm Pitch)
Material : UL94V-2, 6/6 Nylon
Part No. : 172210-1 (Natural)
172210-2 (Black)
172210-4 (Yellow)
172210-5 (Green)
172210-6 (Blue)
172210-7 (Red)

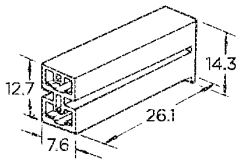
Material : UL94V-0, 6/6 Nylon
Part No. : 1-172210-1 (Natural)
1-172210-2 (Black)
1-172210-4 (Yellow)
1-172210-5 (Green)
1-172210-6 (Blue)
1-172210-7 (Red)



2 Circuits (6mm Pitch,
with Polarized Guide)
Material : UL94V-2, 6/6 Nylon
Part No. : 174587-1 (Natural)
Material : UL94V-0, 6/6 Nylon
Part No. : 1-174587-1 (Natural)
1-174587-4 (Yellow)
1-174587-5 (Green)
1-174587-6 (Blue)
1-174587-7 (Red)

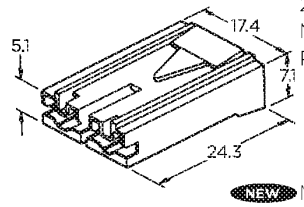
NEW Material : UL94V-0, GWT750, Nylon
Part No. : 7-174587-1 (Natural)

2 Circuits (7mm Pitch)
Material : UL94V-2, 6/6 Nylon



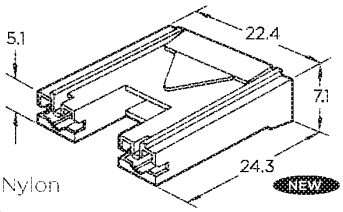
Part No. : 175578-1 (Natural)
Material : UL94V-0, 6/6 Nylon
Part No. : 1-175578-1 (Natural)
1-175578-2 (Black)

NEW
Material : UL94V-0, GWT750,
Nylon
Part No. : 7-175578-1(Natural)



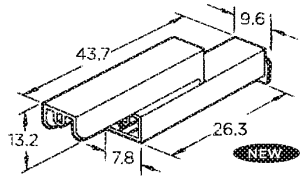
2 Circuits (10mm Pitch)
Material : UL94V-0, 6/6 Nylon
Part No. : 179720-1 (Natural)
179720-2 (Black)
179720-4 (Yellow)
179720-6 (Blue)
179720-7 (Red)

NEW Material : UL94V-0, GWT750, Nylon
Part No. : 7-179720-1 (Natural)



2 Circuits (15mm Pitch,
for electro-magnetic)
Material : UL94V-0, 6/6 Nylon
Part No. : 176498-1 (Natural)
176498-2 (Black)
176498-4 (Yellow)
176498-6 (Blue)

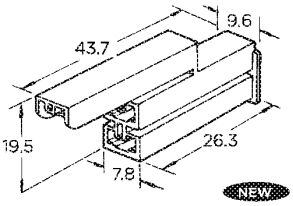
NEW Material : UL94V-0, GWT750, Nylon
Part No. : 7-176498-1 (Natural)



2 Circuits (for Micro-Switch)
Material : UL94V-2, 6/6 Nylon
Part No. : 174712-1 (Natural)
Material : UL94V-0, 6/6 Nylon
Part No. : 1-174712-1 (Natural)
1-174712-6 (Blue)
1-174712-7 (Red)

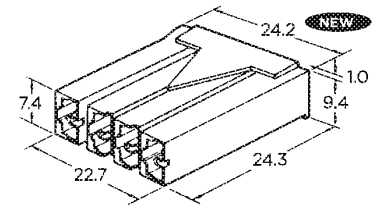
NEW Material : UL94V-0, GWT750, Nylon
Part No. : 7-174712-1 (Natural)

3 Circuits (for Micro-Switch)
Material : UL94V-2, 6/6 Nylon



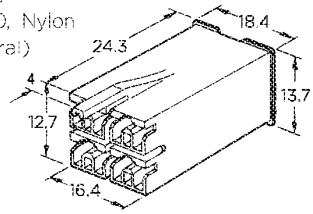
Part No. : 172075-1 (Natural)
172075-4 (Yellow)
172075-5 (Green)
172075-6 (Blue)
172075-7 (Red)
Material : UL94V-0, 6/6 Nylon
Part No. : 1-172075-1 (Natural)
1-172075-4 (Yellow)
1-172075-6 (Blue)

NEW Material : UL94V-0, GWT750, Nylon
Part No. : 7-172075-1 (Natural)



4 Circuits (for Timer)
Material : UL94V-0, 6/6 Nylon
Part No. : 174513-1 (Natural)

NEW Material : UL94V-0, GWT750, Nylon
Part No. : 7-174513-1 (Natural)



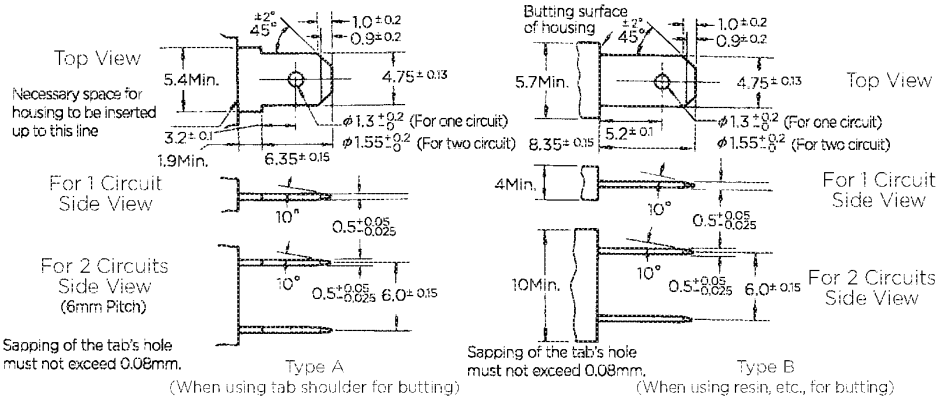
4 Circuits (for Power Relay)
Material : UL94V-2, 6/6 Nylon
Part No. : 173150-1 (Natural)
Material : UL94V-0,6/6 Nylon
Part No. : 1-173150-1 (Natural)

Note: All Part Numbers are RoHS compliant.

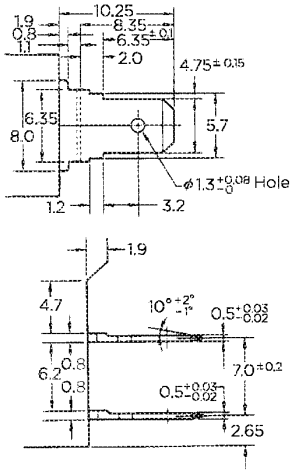
NJOY Exhibit 1002.1360

Positive Lock Connectors

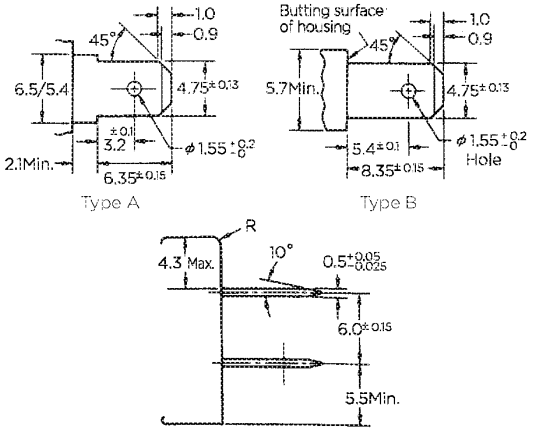
<Mark II> For 187 Series (For Signal Circuit) Mating Tab Dimension of Commercial Type



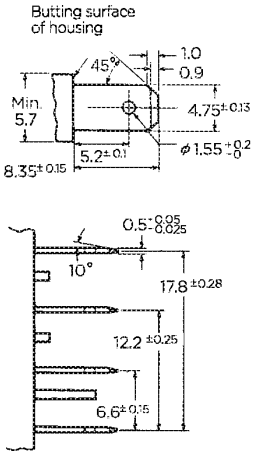
2 Circuits (7mm Pitch)



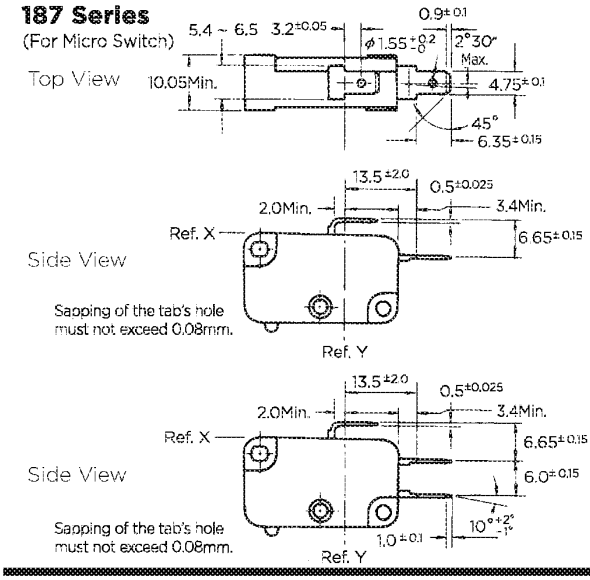
2 Circuits (With Polarized Guide)



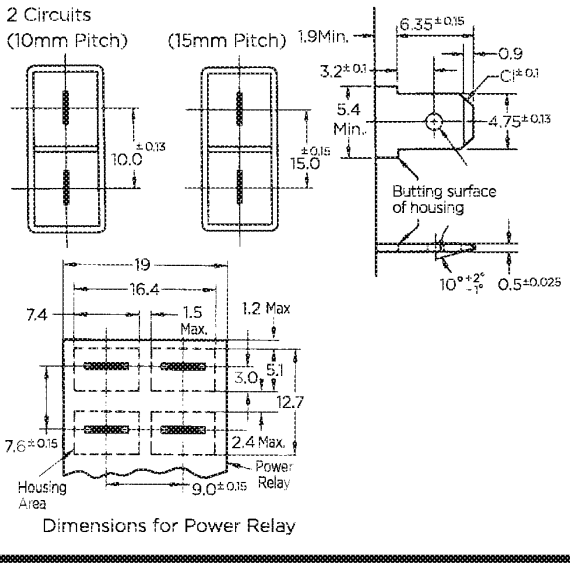
4 Circuits (Timer)



187 Series
(For Micro Switch)



2 Circuits
(10mm Pitch) (15mm Pitch)



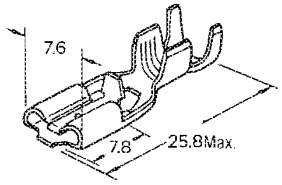
Dimensions for Power Relay

NJOY Exhibit 1002.1361

<Mark II> 250 Series

Straight-type

Receptacle Terminals
Applicable Tab Width :
6.35mm
Material : Pre-tinned Brass

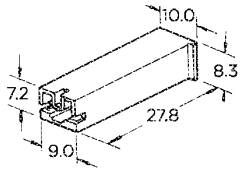


Receptacle Housings
Applicable contact
Part No. : 170327
170328
170329

Applicable Wire		Insulation Diameter	Part No.
AWG#	mm²		S.T.*
22-18	0.31-0.89	1.5-3.1	170327-1
18-14	0.76-2.09	2.2-3.4	170328-1
15-10	1.75-5.2	3.0-5.1	170329-1

*Air-feed Applicator should be used. Extraction Tool P/N : 724659-2 (411-5106)

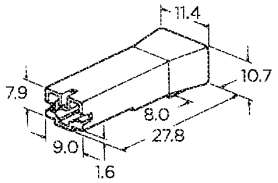
Note : P/N 911775-1=#14#15(One), #20+ #16(Two), #20x2+ #16 (Three)
P/N 911776-1=#12 or #10(One)



1 Circuit
Material : UL94V-2, 6/6 Nylon
Part No. : 172076-1 (Natural)
172076-2 (Black)
172076-4 (Yellow)
172076-5 (Green)
172076-6 (Blue)
172076-7 (Red)

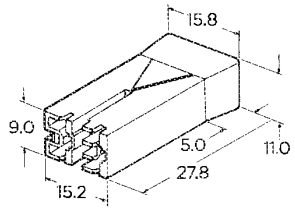
NEW Material : UL94V-0, GWT750, Nylon
Part No. : 7-172076-1 (Natural)

Material : UL94V-0, 6/6 Nylon
Part No. : 2-172076-1 (Natural)
2-172076-2 (Black)
2-172076-4 (Yellow)
2-172076-5 (Green)
2-172076-6 (Blue)
2-172076-7 (Red)

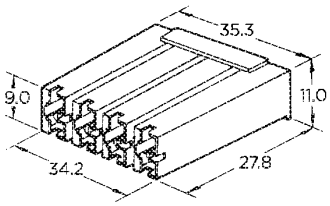


1 Circuit
Material : UL94V-0, 6/6 Nylon
Part No. : 177627-1 (Natural)
177627-4 (Yellow)
177627-6 (Blue)
177627-7 (Red)

NEW
Material : UL94V-0, GWT750, Nylon
Part No. : 7-177627-1 (Natural)



2 Circuits
Material : UL94V-0, 6/6 Nylon
Part No. : 178833-1 (Natural)

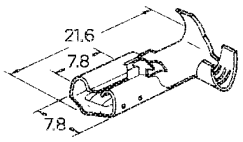


4 Circuits
Material : UL94V-2, 6/6 Nylon
Part No. : 174429-1 (Natural)

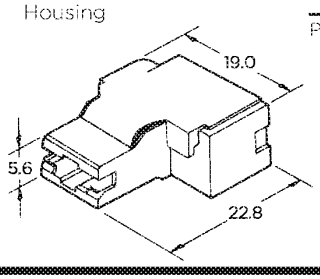
Flag Style Receptacle Connectors

Product Specification :
108-5162
Application Specification :
114-5070
Instruction Sheet :
411-5215

Terminals



Housing



Material : Pre-tinned Brass

Wire Range		Insulation Diameter	Part No.	Housing Part No.
AWG#	mm²		S.T.	
22-18	0.30-0.89	1.5-3.1	172761-1	172469-X
18-14	0.75-2.27	2.8-5.2	172763-1	
14-12	2.00-3.37		172765-1	
22-18	0.30-0.90	1.5-3.1	936603-1	85091-1
18-14	0.80-2.00	2.8-5.2	936604-1	85091-1
14-12	2.0-3.37	2.8-5.2	936605-1	85091-1

Please do not use this part number for production items.

1 Circuit
Material : UL94V-2, 6/6 Nylon
Part No. : 172469-1 (Natural)
172469-2 (Blue)
172469-3 (Yellow)
172469-4◆ (Green)
172469-8 (Black)

Material : UL94V-0, 6/6 Nylon
Part No. : 1-172469-1 (Natural)
1-172469-2 (Blue)

NEW
Material : UL94V-0, GWT750, Nylon
Part No. : 7-172469-1 (Natural)

Note: Part Numbers are RoHS compliant except: ◆ Indicates "not reviewed for EU RoHS/ELV compliance".

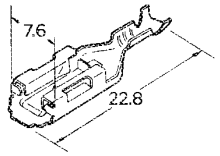
NJOY Exhibit 1002.1362

<Mark II> Heavy-Duty Type

250 Series Receptacle Terminals

Acceptable Tab Width :
6.35mm

Material : Brass

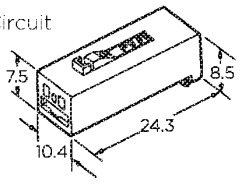


Applicable Wire		Insulation Diameter	Finish	Part Nos. of Rec. Terminals
AWG	mm²			S.T.
22-20	0.3-0.56	1.5-2.4	None	170452-1
			Pre-tinned	170452-2
18-14	0.75-2.27	2.2-3.4	None	170454-1
			Pre-tinned	170454-2
12-10	3.08-5.27	3.6-5.0	None	170456-1
			Pre-tinned	170456-2

Extraction Tool P/N : 724659-2(411-5106)
Application Spec. : 114-5060 / Product Spec.: 108-5150 / Instruction Sheet : 411-5154

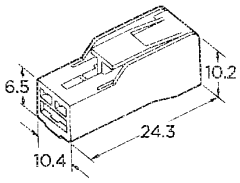
250 Series Receptacle Housings

1 Circuit



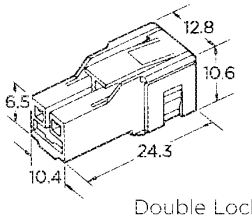
Low Profile Type

Material : UL94V-2, 6/6 Nylon
Part No. : 174090-1 (Natural)
174090-2 (Black)



Standard Type

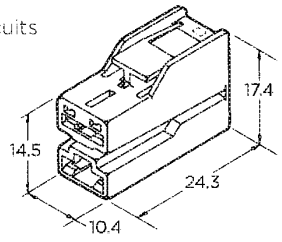
Material : 6/6 Nylon
Part No. : 172320-1 (Natural)
172320-2 (Black)



Double Lock Type

Material : UL94V-2, 6/6 Nylon
Part No. : 172863-1 (Natural)
172863-2 (Black)

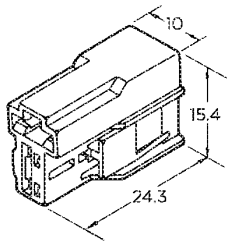
2 Circuits



Parallel Type

Material : UL94V-0, 6/6 Nylon
Part No. : 172433-2 (Black)

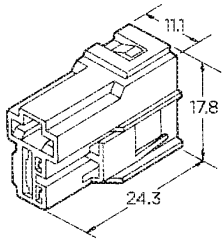
*Uses FASTON Receptacle terminal
P/N 170452 in circuit # II.
P/N 170454 in circuit # II.
P/N 170456 in circuit # II.



T Type

Material : UL94V-0, 6/6 Nylon
Part No. : 172434-1 (Natural)
172434-2 (Black)

*Uses FASTON Receptacle terminal
P/N 170452 in circuit # I.
P/N 170454 in circuit # I.
P/N 170456 in circuit # I.



Double Lock T Type

Material : UL94V-0, 6/6 Nylon
Part No. : 172864-1 (White)
172864-2 (Black)

*Uses FASTON Receptacle terminal
P/N 170452 in circuit # I.
P/N 170454 in circuit # I.
P/N 170456 in circuit # I.

Note: All Part Numbers are RoHS compliant.

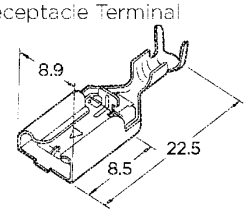
NJOY Exhibit 1002.1363

<Mark II> Heavy-Duty Type

312 Series Connectors for Sealed Beam

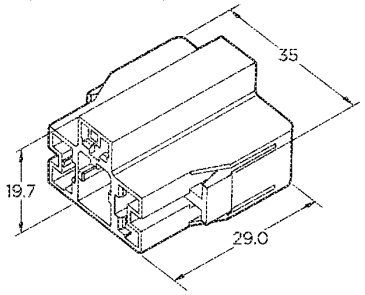
Product Specification :
108-5131
Instruction Sheet : 412-5120

Straight Type
Receptacle Terminal



Acceptable Tab Width : 7.92mm
Material : Pre-tinned Brass
Part No. : 170381-1 (S.T.)
Application Spec. : 114-5047

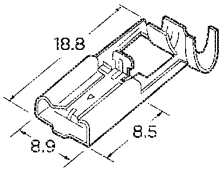
Receptacle Housing
(for 3 Circuits)



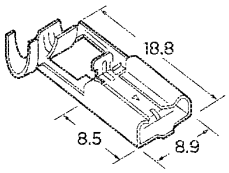
Part No. : 172236-1 (Natural)
172236-2 (Black)
Material : 6/6 Nylon

Flag Type
Receptacle Terminal

Acceptable Tab Width : 7.92mm
Material : Pre-tinned Brass
Application Spec. : 114-5079 (for standard wire)
114-5220 (for thin wire)

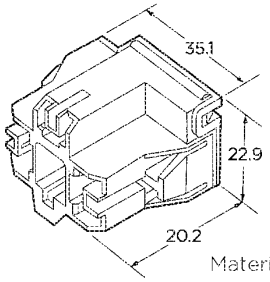


Flag Type(L)
Terminal Part No. : 172795-1
(for standard wire / S.T.)
Terminal Part No. : 900319-1
(for thin wire / S.T.)

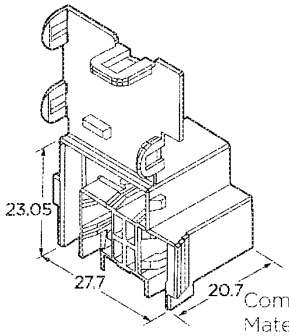


Flag Type(R)
Terminal Part No. : 172796-1
(for standard wire / S.T.)
Terminal Part No. : 900318-1
(for thin wire / S.T.)

Flag Type, for 3 circuits
Receptacle Terminal



Material : 6/6 Nylon
(for standard wire)
Part No. : 172615-2 (Black)
(for thin wire)
Part No. : 177720-2 (Black)



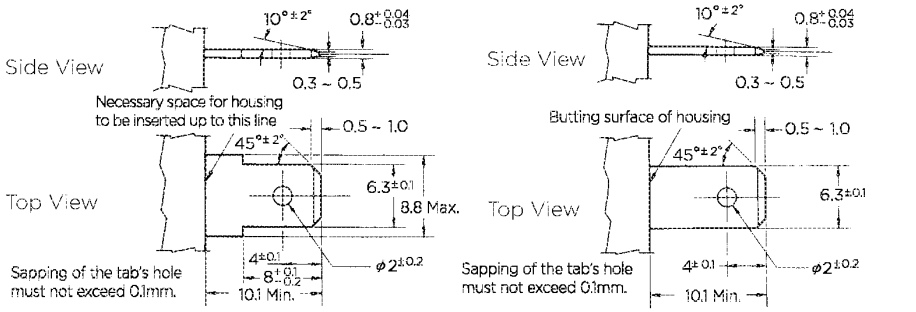
Compact Type
Material : PBT
Part No. : 353752-2 (Black)

Note: All Part Numbers are RoHS compliant.

NJOY Exhibit 1002.1364

<Mark II> Mating Tab Dimension of Heavy-duty Type

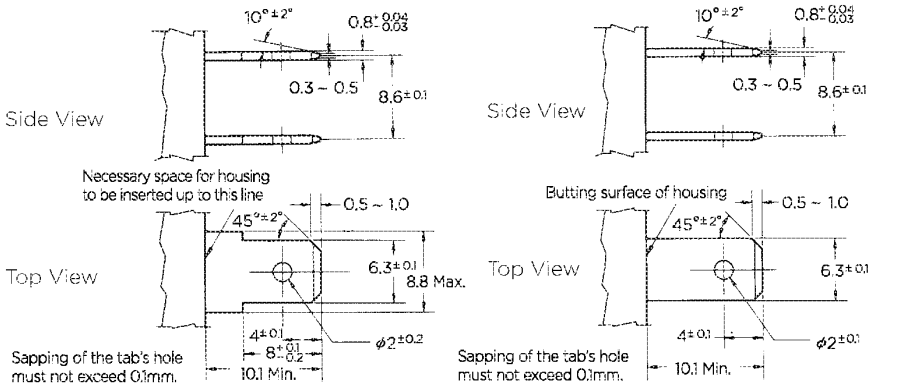
250 Sereis
(for 1 Circuit)



Type A (When using tab shoulder for butting)

Type B (When using resin, etc., for butting)

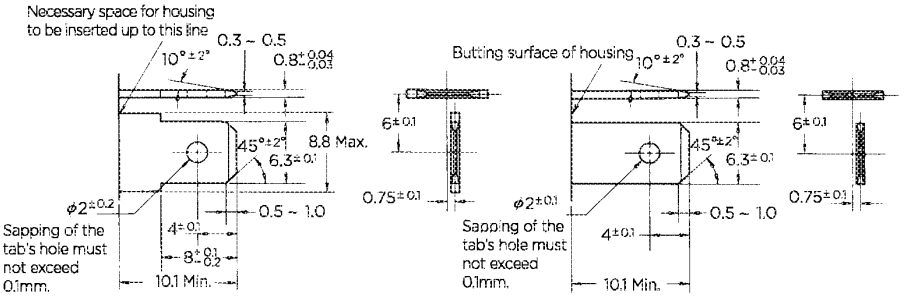
250 Series Parallel Type
(for 2 Circuits)



Type A (When using tab shoulder for butting)

Type B (When using resin, etc., for butting)

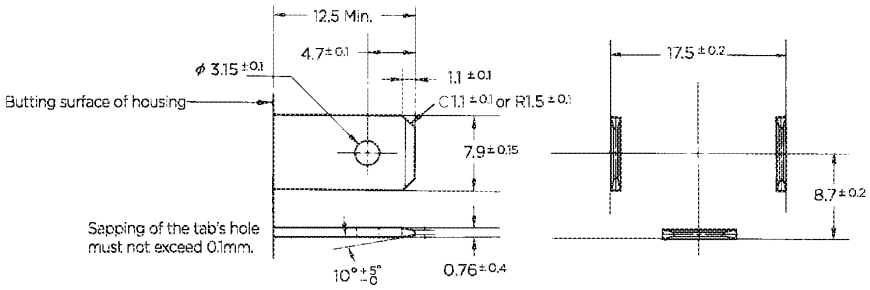
250 Series T Type
(for 2 Circuits)



Type A (When using tab shoulder for butting)

Type B (When using resin, etc., for butting)

For Sealed Beam
(for 3 Circuits)



NJOY Exhibit 1002.1365

Positive Lock Connectors

These EX Series receptacle terminals have been developed as an addition to the low insertion force Positive Lock product line which has proven performance in tab and receptacle connection.

Compact in design, they are useful in saving space for installation. As well as can be used as a bare terminal, they are available in three types ; Sleeve Type that is capable of using a sleeve ; Housing Type that uses a housing ; and Double-Lock Type in which a double-lock plate is loaded to protect the connection after terminated terminals are loaded into a housing.

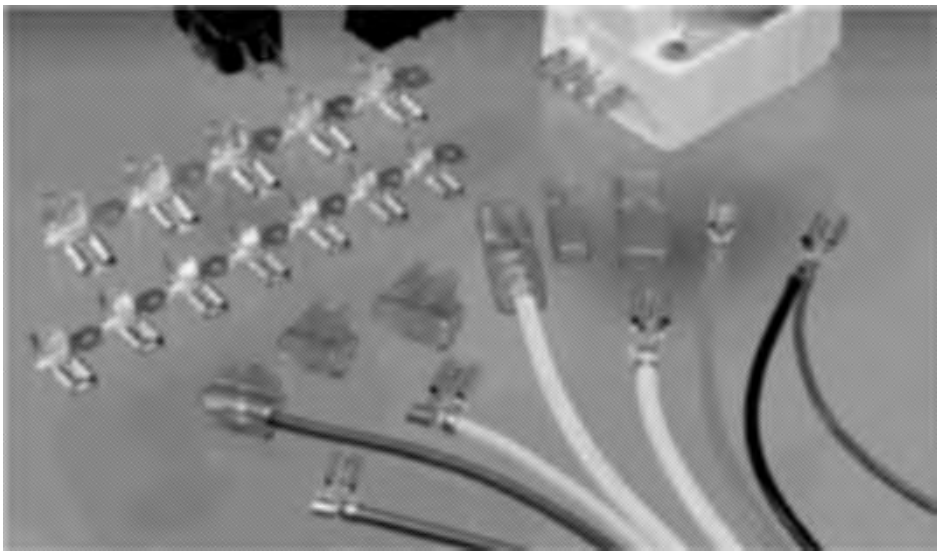
Features :

- Low mating force (about half that of FASTON receptacles).
- Low withdrawal force.
- Compact design for space saving.
- Half-mating prevented.
- Can be used with tabs of various specifications.
- No tangling of wire even if terminals are used bare.
- Insulation sleeves available for certain applications.
- Choice of 187 and 250 Series depending on the width of mating tabs. Both Series available in Straight and Flag types.

Performance Data

<187 Series>
Voltage rating : 250V AC
Current rating : (AWG)
#26=2.0A / #24=2.5A
#22=3.0A / #20=5.0A
#18=7.0A / #16=12A
#14=15A
Low level Overall Termination Resistance :
3m Ω Max. (Initial)
6m Ω Max. (Final)
Operating Temperature :
−40˚C-+105˚C
Terminal Locking Force : 58.8N Min.
<250 Series>
Voltage Rating : 250V AC
Current Rating : (AWG)
#22=3.0A / #20=5.0A
#18=7.0A / #16=12A
#14=15A / #12=20A
#10=25A
Low Level Overall Termination Resistance :
3m Ω Max. (Initial)
6m Ω Max. (Final)
Operating Temperature :
−40˚C-+105˚C
Terminal Locking Force :
78.4N Min.

Sleeve Type (EX) 187 and 250 Series



Although this product can be used without a housing as with FASTON receptacle terminals, it is provided with an insulation sleeve which, serving as a housing in certain applications, is loaded after wire is crimped to terminals. Also there is a high temperature version that can be used bare in temperatures up to 300˚C. This receptacle can be used with terminals of standard FASTON tab specifications. The height of the lever that releases locking with tabs is designed not to be greter than the height of the rolling section where tabs are inserted. As a result, even if a housing is not used, there is no danger of terminals being deformed. These receptacles, when mated with tabs, display performance that is characteristic of conventional Positive Lock products.
To pull out tabs, simply press down the locking lever of mated receptacles, which action enables to release and extract them with ease and low force.
These receptacles and associated insulation sleeves are available in the following two versions : which to use depends on the width of mating tabs.

- 187 Series
  Straight/Flag types
- 250 Series
  Straight/Flag types

Product Specification :

<187 Series/Straight Type>
108-5236
108-5257
(for heat resistant)
<187 Series/Flag Type>
108-5250
<250 Series/Straight Type>
108-5251
108-5322
(for heat resistant)<250 Series/Flag Type>
108-5254

Application Specification :
<187 Series/Straight Type>
114-5114
114-5125
(for heat resistant)
<187 Series/Flag Type>
114-5118
<250 Series/Straight Type>
114-5119
114-5146
(for heat resistant)
<250 Series/Flag Type>
114-5122
Instruction Sheet :
411-5391

NJOY Exhibit 1002.1366

Housing Type (EX-II) 250 Series

Features :

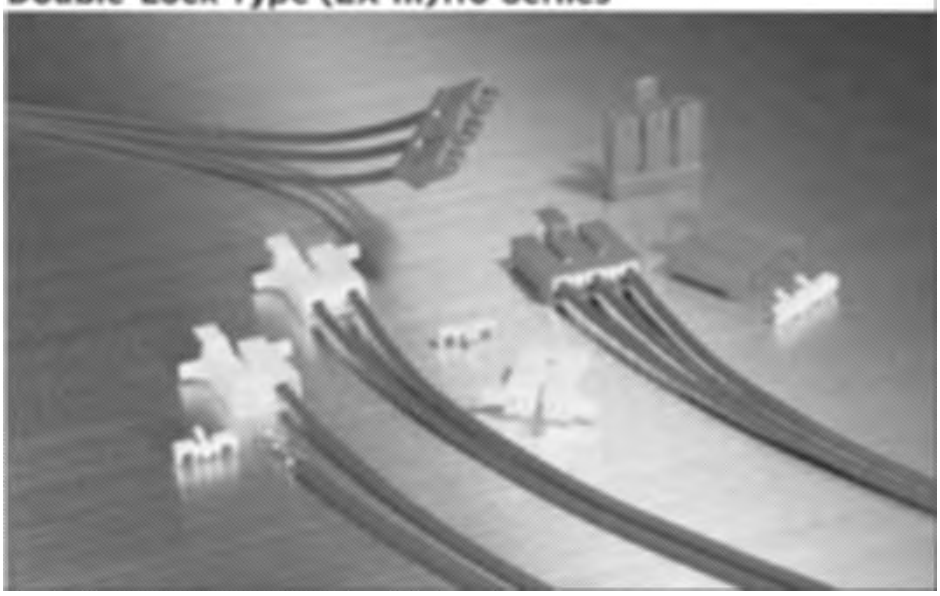
- Used either loaded in a housing after wire termination or bare as they stand.
- Terminal tip protrude from the housing, making mating with a tab in narrow space easily.
- Mate with 250 Series tabs
- Applicable wire - AWG#22-10
- Outer diameter of wire insulation - 1.5~4.3mm
- Materials :
  terminals - Tin plated Brass
  housing - UL94V-0, 6/6 Nylon
- Product specification : 108-5437
- Application specification : 114-5195
- Instruction Sheet : 411-5691

The housing Type EX Series connectors are used loaded in a housing after wire termination. With these receptacles, the terminal tip protrudes from the housing, making it possible to confirm mating with a tab in narrow space easily. Also they can be used as a bare terminal without being loaded into a housing.
Matin and unmating of tabs are done easily without fail like other connector types.

Double-Lock Type (EX-III)110 Seriles

Features :

- Provide positive protection to the connection with a double-lock plate after terminals are loaded into the housing.
- The width of applicable tabs - 2.8mm.
- 2 and 3 position connectors are available currently. One position is under development.
- Product specification : 108-5530
- Application specification : 114-5229
- Instruction Sheet : 411-5806



Performance Data

Voltage Rating : 250V AC/DC
Current Rating : (AWG)
#26=2A / #24=2.5A
#22=3A / #20=4A
#18=6A / #16=8A
Low Level Overall Resistance :
10m Ω Min. (initial)
20m Ω Min. (final)
Insulation Resistance :
1,000M Ω Min. (initial)
100M Ω Min. (final)
Operating Temperature :
−40˚C~+105˚C
UL94V-0 ambient temperature + heat generated by current
Terminal Locking Force :
49N Min.

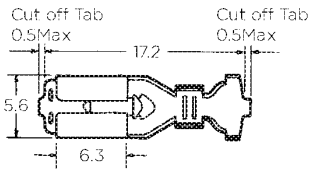
This EX Series connectors are a receptacle connector which, after loaded into the housing, provides positive protection and retension to the wire connection by means of a double-lock plate. The width of the mated tab is 2.8mm. This product is useful in making good electrical connection and has all features of Positive Lock connectors such as ease of connect and disconnect despite of its tab and receptacle mating configuration.

NJOY Exhibit 1002.1367

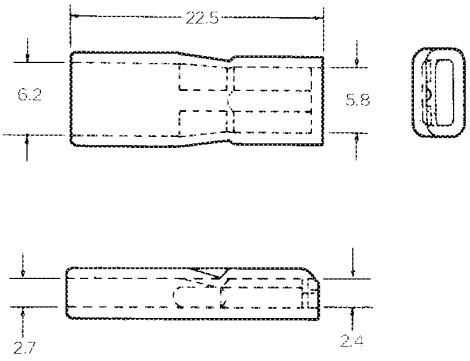
EX187 Series

Straight Type

Material and Finish :
Receptacle —— Pre-tinned Brass, 0.3mm thickness, Stainless steel for heat resistant
Sleeve ---- UL94V-0, Soft PVC



Receptacle

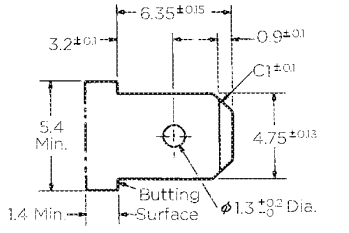


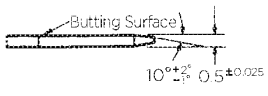
Insulation Sleeve

Applicable Wire		Wire Ins. Dia.	Part Number of Receptacle	Part Number
AWG	mm²		Strip Form	of Sleeve
26-22	0.14-0.53	1.3-3.6	173722-1	174737-1 (Blue)
20-14	0.50-2.20	1.9-4.4	173724-1	174737-2 (Yellow)
For heat-resistant				
26-20	0.14-0.53	1.3-3.6	175032-1	—
20-14	0.50-2.20	1.9-4.4	175034-1	—

*Operating Temperature Range : −40°C-200°C(ambient temperature + temprature rise by current carrying) Sleeve housing not used.
**Mating tab is made of stainless steel.

Mating Tab Dimension





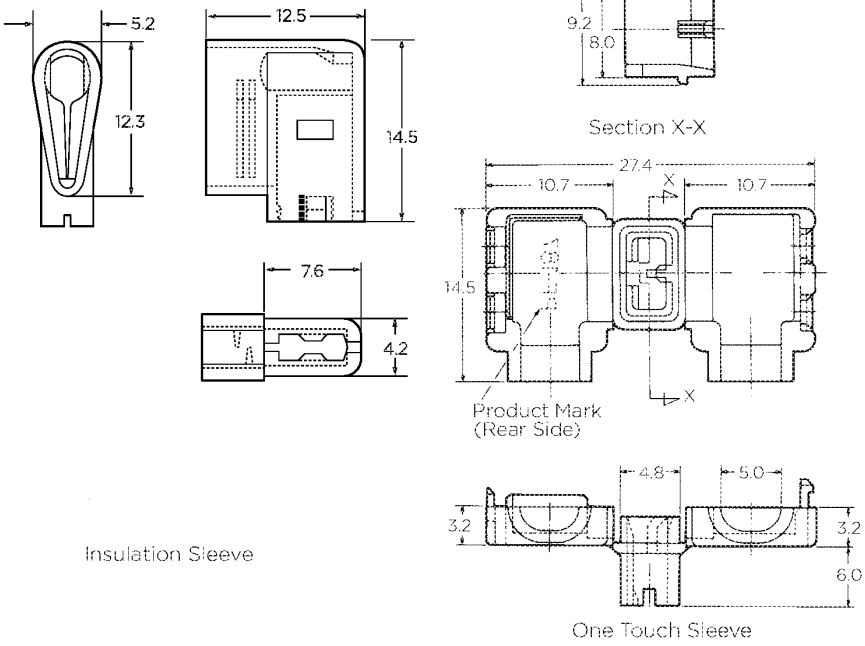
Note: All Part Numbers are RoHS compliant.

NJOY Exhibit 1002.1368

EX187 Series

Flag Type Sleeve

Applicable Contact
Part No. : 175019-1



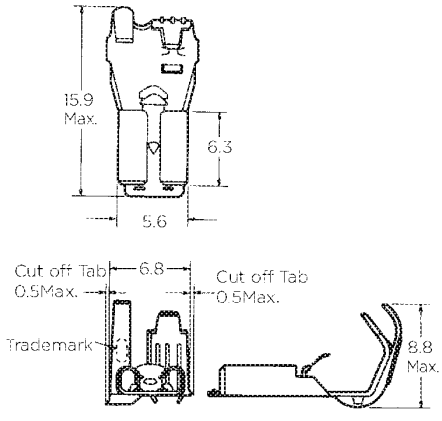
Insulation Sleeve

One Touch Sleeve

Type	Wire. Ins. Dia.	Material (Color)	Part No. of Sleeve
Sleeve	1.7-4.32	Soft PVC, UL94V-2 (Blue)	1717269-1
		Soft PVC, UL94V-0 (Yellow)	1717269-2
One Touch Sleeve	1.7-3.1	6/6 Nylon, UL94V-0 (Natural)	1-178708-1
		6/6 Nylon, UL94V-0 (Yellow)	1-178708-4
		6/6 Nylon, UL94V-0 (Green)	1-178708-5
		6/6 Nylon, UL94V-0 (Blue)	1-178708-6
		6/6 Nylon, UL94V-0 (Red)	1-178708-7
		6/6 Nylon, UL94V-0 (Black)	1-178708-9

Flag Type Receptacle Contact

Material and Finish :
Receptacle ----- Pre-tinned Brass,
0.3mm thickness



Applicable Wire		Wire Ins. Dia.	Part Number of Receptacle (Strip Form)
AWG	mm^2		
22-16	0.30-1.42	1.5-4.32	175019-1

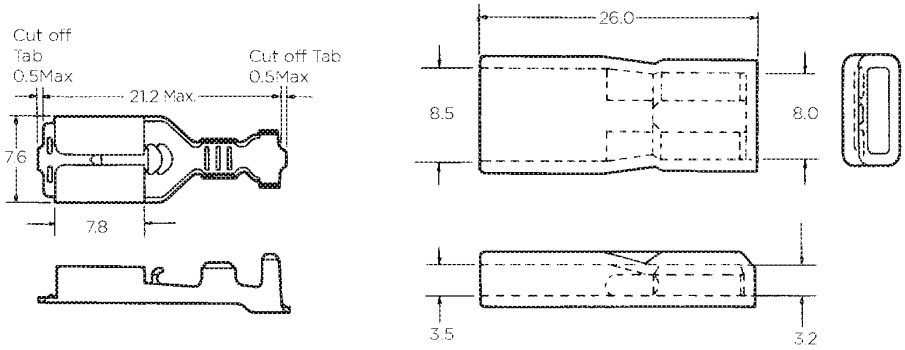
Note: All Part Numbers are RoHS compliant.

NJOY Exhibit 1002.1369

EX250 Series

Straight Type

Material and Finish :
Receptacle—— Pre-tinned Brass,
0.41mm thickness,
stainless steel for heat resistant
Sleeve----- UL94V-0, Soft PVC

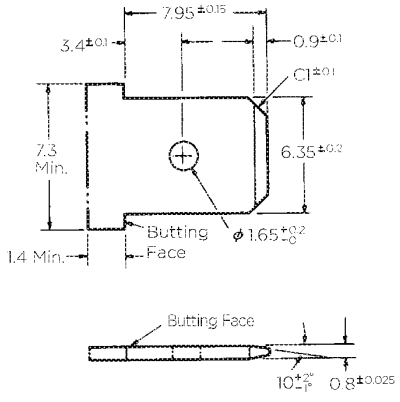


Receptacle Insulation Sleeve

Applicable Wire		Wire Ins. Dia.	Part Number of Receptacle	Part Number of Sleeve
AWG	mm²		Strip Form	
22-18	0.31-0.89	1.5-3.1	175020-1	174817-1 (Blue) 174817-2 (Yellow)
18-14	0.75-2.09	2.2-3.4	175022-1	
15-10	1.75-5.40	3.0-5.1	175024-1	
For heat resistant*				
18-14	0.76-2.09	2.2-3.4	175164-1☆	—

*Operating Temperature Range : −40°C-+300°C(ambient temperature + temperature rise by current carrying) Sleeve housing not used.
**Mating tab is made of stainless steel.
☆UL, CSA Not Certified.

Mating Tab Dimension



Note: All Part Numbers are RoHS compliant.

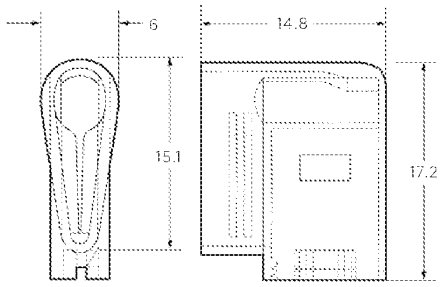
NJOY Exhibit 1002.1370

EX250 Series

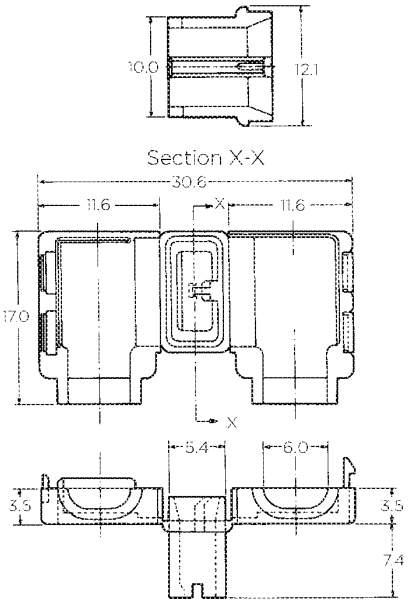
Flag Type Sleeve

Applicable Contact Part No. : 175057-1

Insulation Sleeve



Sleeve Type

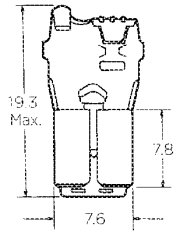


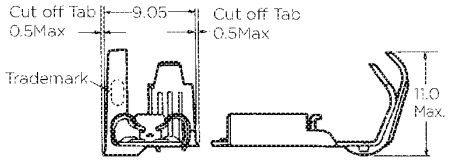
One Touch Sleeve

Type	Wire Ins. Dia.	Material (Color)	Part No. of Sleeve
Sleeve	2.8-5.3	Soft PVC, UL94V-0 (Blue)	1717268-1
		Soft PVC, UL94V-0 (Yellow)	1717268-2
One Touch Sleeve	2.8-4.2	6/6 Nylon, UL94V-2 (Natural)	176497-1
		6/6 Nylon, UL94V-2 (Black)	176497-9
		6/6 Nylon, UL94V-0 (Natural)	1-176497-1
		6/6 Nylon, UL94V-0 (Yellow)	1-176497-4
		6/6 Nylon, UL94V-0 (Blue)	1-176497-6
		6/6 Nylon, UL94V-0 (Red)	1-176497-7
		6/6 Nylon, UL94V-0 (Black)	1-176497-9

Flag Type Receptacle Contact

Material and Finish :
Receptacle—Pre-tinned Brass, 0.41mm thickness





Applicable Wire		Wire Ins. Dia.	Part Number of Receptacle (Strip Form)
AWG	mm²		
18-12	0.75-3.37	2.8-4.1	175057-1
12-10	3.08-5.37	2.8-4.9	175178-1✳

✳There is no application sleeve.

Note: All Part Numbers are RoHS compliant.

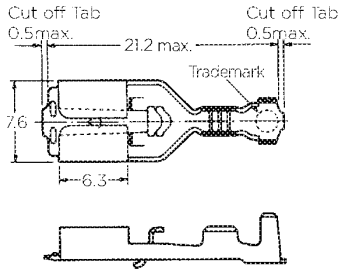
NJOY Exhibit 1002.1371

EX250 Series

Terminals

Material and Finish :
Pre-tinned Brass

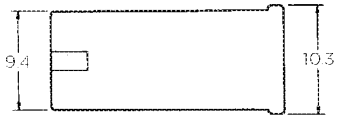
Product Specification :
108-5437
Application Specification :
144-5195
Instruction Sheet :
411-5691

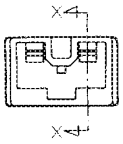


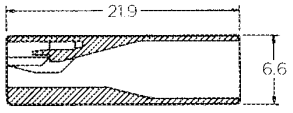
Applicable Wire		Wire Ins. Dia.	Part Number	Part Number of Applicators
AWG#	mm²		Strip	Desk Top Type
22-18	0.31-0.89	1.5-3.1	179973-1	1385091-2
18-14	0.76-2.09	2.2-3.34	179974-1	1339734-1
15-10	1.75-5.4	3.0-4.3	179975-1	1339736-1

Housing (1 position)
Material : UL94V-0, 6/6 Nylon
Part Number :
179970-1 (Natural)
179970-2 (Red)
179970-4 (Yellow)
179970-6 (Blue)
179970-9 (Black)

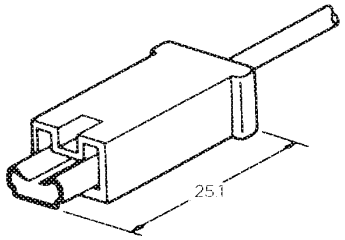
NEW
Material : UL94V-0, GWT750, Nylon
Part No. : 7-179970-1(Natural)





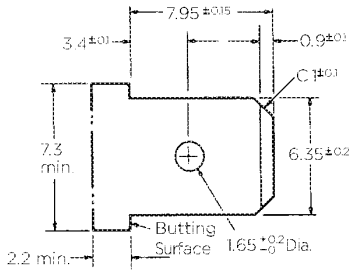


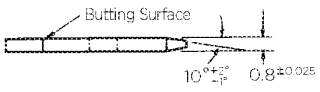
Section X-X



View of terminal assembly

Applicable Tab Dimension





This EX Series connectors can be used for many applications. For details, contact our Sales Department.

Note: All Part Numbers are RoHS compliant.

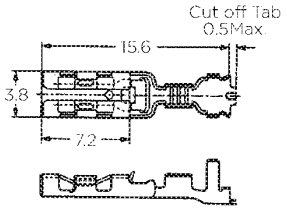
NJOY Exhibit 1002.1372

110 Series (EX-III) Double Lock Type

Straight-type terminals

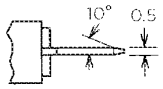
Material :
Pre-tinned Phosphor bronze

Product Specification :
108-5530
Application Specification :
114-5229
Instruction Sheet :
411-5806

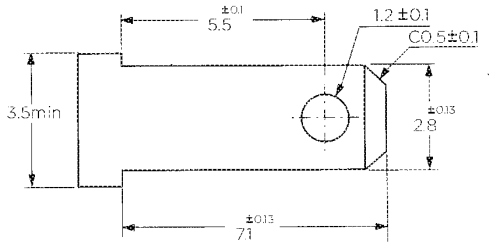


Applicable Wire		Wire Ins. Dia.	Part No. of Rec.	Part No. of
AWG#	mm²		Strip Form	Applicator
26-22	0.14-0.34	1.3-2.0	353249-2	1852689-2
20-16	0.50-1.25	2.0-3.1	353250-2	1385107-2

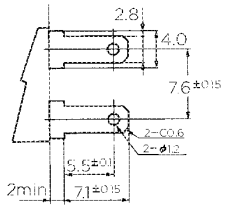
Mating Tab Dimension



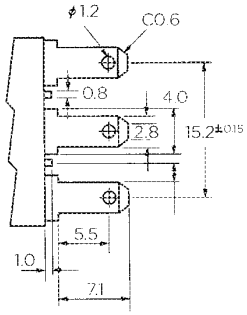
1 Position



2 Position



3 Position



Note: All Part Numbers are RoHS compliant.

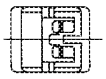
NJOY Exhibit 1002.1373

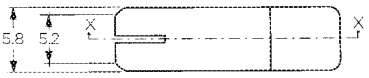
Positive Lock Connectors

110 Series (EX-III) Double Lock Type

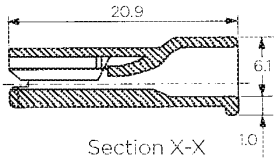
1 Position

Material : UL94V-0 , 6/6 Nylon
Part Number :
353251-1 (Natural)





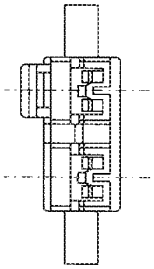
(1 Pos. type has no double lock plate)

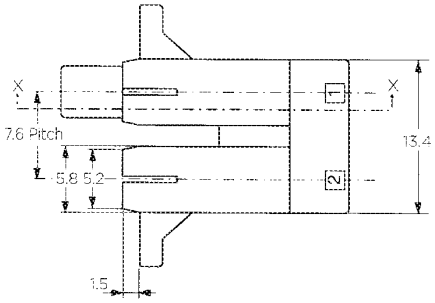


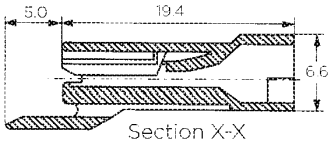
Section X-X

2 Position

Material : UL94V-0, 6/6 Nylon
Part Number :
353253-1 (Natural)



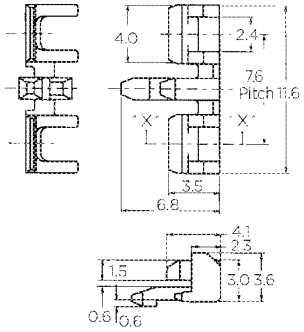




Section X-X

Double Lock Plate

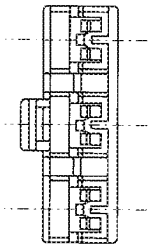
Material : UL94V-0, 6/6 Nylon
Part Number :
353254-1 (Natural)

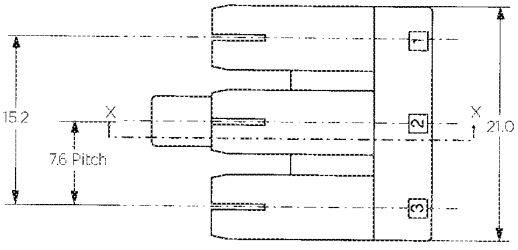


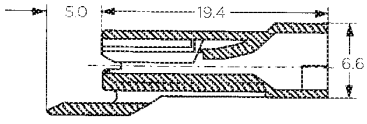
3 Position

Material : UL94V-0, 6/6 Nylon
Part Number :
353255-1 (Natural)
353255-7 (Red)

NEW Material : UL94V-0, GWT750 Nylon
Part Number : 7-353255-1 (Natural)



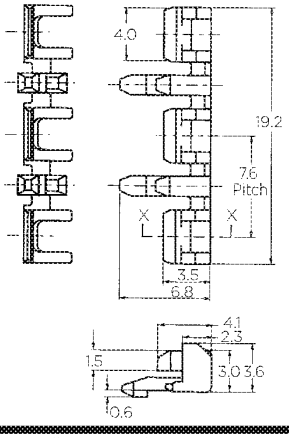




Section X-X

Double Lock Plate

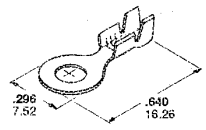
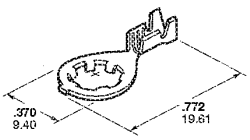
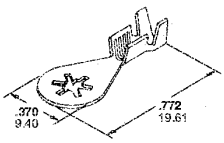
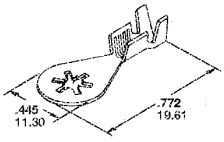
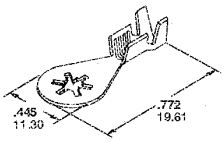
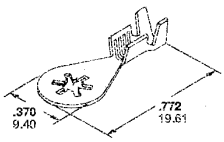
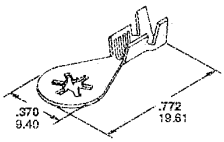
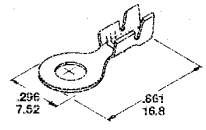
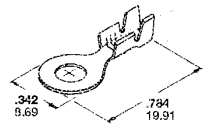
Material : UL94V-0, 6/6 Nylon
Part Number :
353256-1 (Natural)



Note: All Part Numbers are RoHS compliant.

NJOY Exhibit 1002.1374

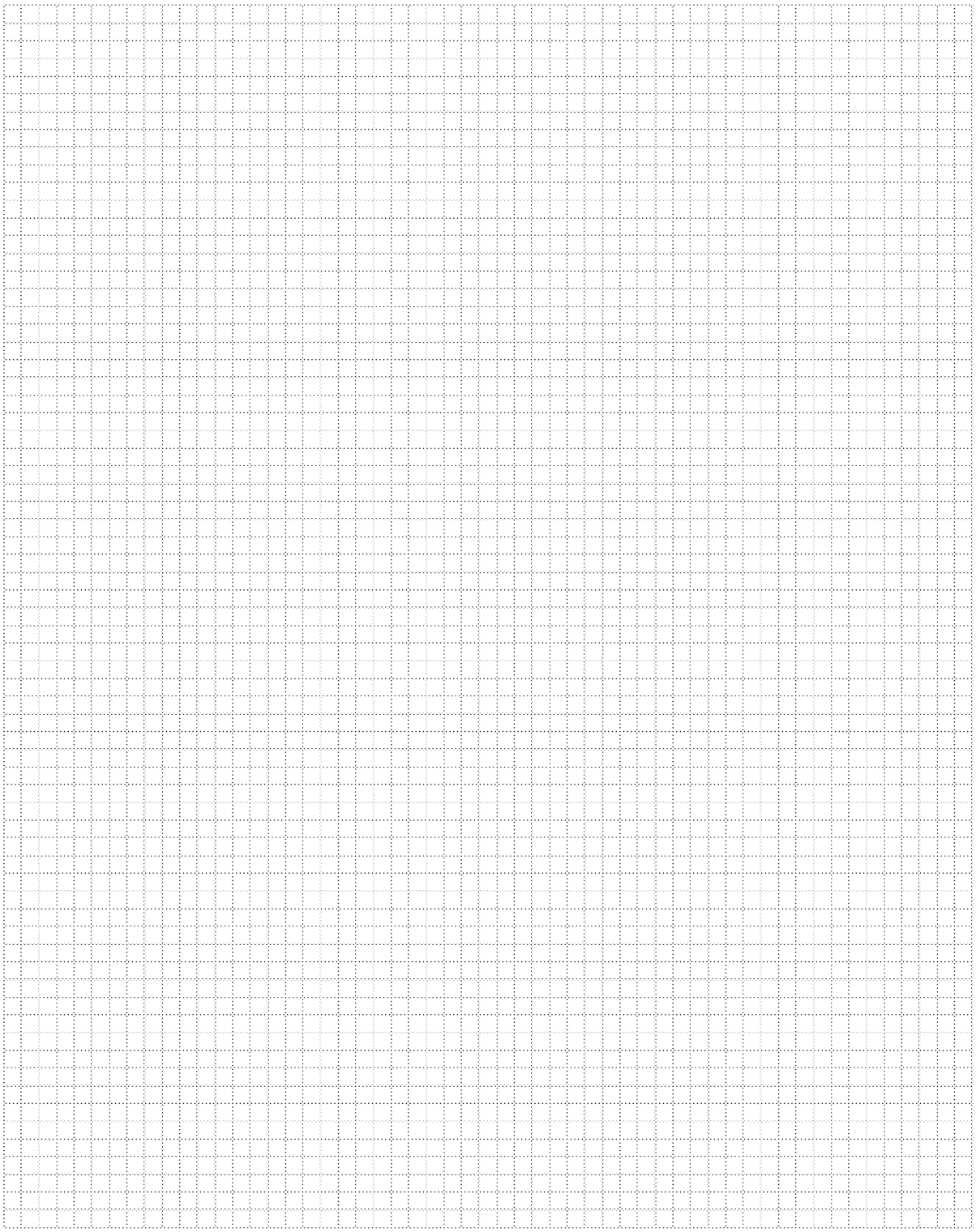
Ring Tongue Terminal, Insolation Support

		Style	TE Part Number	Wire Range AWG	Stock Thickness	Insulation Diameter	Stud Size	Material and Finesh
A		A	41332	18-14	0.51	3.05-4.32	8	Brass Nickel Plated
B		B	61436-2	22-16	0.64	2.54-3.56	4.50	Brass Tin Plated
C		C	61794-4	18-14	0.64	2.67-3.68	8	Brass None
D		D	61795-3	18-14	0.64	2.67-3.68	10	Brass Tin Plated
E		E	63482-1	18-14	0.64	2.67-3.68	10	Steel Tin Plated
F		F	640051-1	18-14	0.61	2.67-3.68	8	Stainless Steel None
G		G	640052-1	18-14	0.61	2.67-3.68	10	Stainless Steel None
H		H	170011-2	18-14	0.51	3.10-4.30	10	Brass Tin Plated
I		I	640253-2	16-12	0.46	(2)3.18	10	Brass Tin Plated

Note: All Part Numbers are RoHS compliant.

NJOY Exhibit 1002.1375

Engineering Notes



Note: All Part Numbers are RoHS compliant.

NJOY Exhibit 1002.1376

FOR MORE INFORMATION

TE Technical Support Center

Canada:	+1 (800) 522-6752
China:	+86 (0) 400-820-6015
France:	+33 (0) 1-3420-8686
Germany:	+49 (0) 6151-607-1999
Latin/S. America:	+54 (0) 11-4733-2200
Mexico:	+52 (0) 55-1106-0800
UK:	+44 (0) 800-267666
USA:	+1 (800) 522-6752

For other country number go to te.com/supportcenter
Part numbers in this brochure are RoHS Compliant*, unless marked otherwise.
*as defined www.te.com/leadfree

te.com

© 2013 Tyco Electronics Corporation, a TE Connectivity Ltd. Company. All Rights Reserved.
2-1773700-5 CS 03/2013
TE Connectivity, TE connectivity (logo) and TE (logo) are trademarks. Other logos, product and/or Company names might be trademarks of their respective owners.

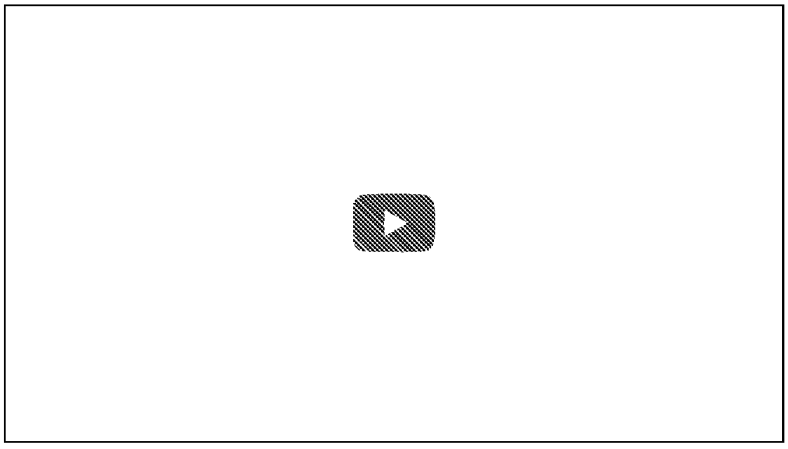
While TE has made every reasonable effort to ensure the accuracy of the information in this brochure, TE does not guarantee that it is error-free, nor does TE make any other representation, warranty or guarantee that the information is accurate, correct, reliable or current. TE reserves the right to make any adjustments to the information contained herein at any time without notice. TE expressly disclaims all implied warranties regarding the information contained herein, including, but not limited to, any implied warranties of merchantability or fitness for a particular purpose. The dimensions in this catalog are for reference purposes only and are subject to change without notice. Specifications are subject to change without notice. Consult TE for the latest dimensions and design specifications.

NJOY Exhibit 1002.1378

Watch YouTube videos with Chrome. Yes, get Chrome now

Search

Sign in



The Elips By LSK

VapXtream

Subscribe

3,909 views

Add to Share More 5 1

Published on Jan 13, 2013

I did get this for review and as always No BS here.
Not a bad little ecig. Good Battery life with the 350mah. And the clearo's work very well better then the older tank system they use to use. Good for the new vapour or if your looking for a nice little stealth vape.

SHOW MORE

COMMENTS • 8

Add a public comment...

Top comments

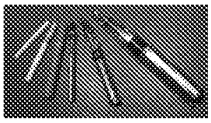
VapXtream 5 years ago
No the first design was for e juice. There have been a few companies that have made changes to the atomizers to make them work with other things.
Reply •

paul valle 5 years ago
I believe that is a wax pen for bho, but the clearomizer attachment is for oil. Am I right or no? I just bought one that hasn't come in yet, but I got it for wax. It comes with a free clearomizer, so I'll be using that to smoke e juice.
Reply •

VapXtream 5 years ago
I think it came from health cabin.
Reply •

VapXtream 5 years ago
Not for was its for E juice
Reply •

Up next Autoplay


Introduction to Vaping and E-Cigarettes
Gear Obsession
690,164 views

In-Depth Blu Cigs E-Cigarette Review - Unbiased Electronic
Expert Vaping
217,962 views

How Car Dealerships Rip You Off (The Truth)
Marko - WhiteBoard Finance
Recommended for you

30 WWE Wrestlers Who Died Before The Age of 40
Wrestletamia
Recommended for you

How to Blow Glass Pipes, Bongs, Bubblers, and More by Purr - Part
Purr Glass
392,546 views

What's Crystal Methamphetamine Feel Like? Why Is It
Cg Kid
Recommended for you

Funniest Gamer RAGE QUIT Compilation 2018
Gamer Thrones
Recommended for you

109-Year-Old Veteran and His Secrets to Life Will Make You Smile |
National Geographic
Recommended for you

How to Remove a Stump, Cheaply & Effectively!
The Neals' Homestead
Recommended for you

Antique Rusty Cleaver Restoration
The Small Workshop
Recommended for you

6 days solo bushcraft - canvas lavvu, bow drill, spoon carving, Finnish
Rune Malte Bertram-Nielsen
Recommended for you

NJOY Exhibit 1002.1379

Watch your videos with Chrome. Yes, get Chrome now

Does it work only for wax? What did you use in the video?

Reply

Search

Sign in

okan bilge 5 years ago

Thanks for review. Have you any idea how to clean the atomizer? I have one and the resistant in the atomizer get dirty with some impurities after two weeks.

Reply

View reply

Rosalind Roland Hayes 5 years ago

Hi, Just got one. Won't charge. Blue light never came on, either out of box, or after charging. Got mine in the US. Think it's a lemon? Or I'm doing something wrong. I watched youtube videos, so I think I've charged it right.

Reply

[CS:GO] The Awakening by Lsk
KasperJohnsson
350,714 views
2:32

Vaping vs Smoking | 10 Reasons to Switch to Vaporizing | Sneaky
Sneaky Pete Vaporizers
Recommended for you
7:26

At the Hospital | Funny Clip | Mr. Bean Official
Mr Bean
Recommended for you
6:13

How to Assemble Elips Elf Starter Kit
Smoke Power
8,503 views
6:15

Titan 1 Herb Vaporizer od GD
GoldDrive1
68,270 views
10:57

What is The Difference Between Standard Tanks and Sub-Ohm
Vapor Kings
5,870 views
2:11

How to make your own E-Liquid - DIY Tutorial
New Amsterdam Vape
1,779,000 views
10:11

How to Cut a Cigar | Cigar Aficionado
Cigar Aficionado
1,595,467 views
4:58

Chest X-Ray Electronic Cigarettes Before and After Smoking Health
Zoe Cigs
4,302,443 views
3:15

SHOW MORE

Language: English | Location: United States | Restricted Mode: Off | History | Help

About Press Copyright Creators Advertise Developers

Terms Privacy Policy & Safety Send feedback Test new features

NJOY Exhibit 1002.1380

Skip to main content Try Prime Electronics Introducing echoshow
Deliver to San Diego 92130 Today's Deals Your Amazon.com Buy Again EN Hello, Sign in Account & Lists Orders Try Prime 0 Cart
All Electronics Deals Best Sellers TV & Video Audio & Home Theater Computers Camera & Photo Wearable Technology Car Electronics & GPS
amazon music UNLIMITED ACCESS TO 50 MILLION SONGS
Electronics › Accessories & Supplies › Telephone Accessories › Batteries ›

Uniden BT-990 Cordless Phone Battery Ni-CD, 3.6 Volt, 800 mAh - Ultra Hi-Capacity - Replacement for Uniden BP-990, Toshiba, GE TL96550, TL96556, Panasonic HHR-P505 Rechargeable Batteries

by Synergy Digital

9 customer reviews

Price: $9.25

FREE Shipping on orders over $25—or get **FREE Two-Day Shipping** with Amazon Prime

- Synergy Digital Replacement Battery for Uniden BP-990, Toshiba, GE TL96550, TL96556, Panasonic HHR-P505
- Ni-CD, 3.6 Volt, 800 mAh.
- Made with high quality Japanese cells.
- 100% compatible with your OEM battery - 3 year warranty.
- Synergy Digital is a Registered Trademark

Compare with similar items

New (2) from $9.25 & FREE shipping on orders over $25.00. Details

Save on Quality Tripod by AmazonBasics

AmazonBasics 60-inch Lightweight Tripod with Bag, 2-Pack $40.52

AmazonBasics Lightweight Mini Tripod, 4-Pack $21.99

AmazonBasics 50-inch Lightweight Tripod with Bag, 4-Pack $49.99

$9.25

FREE Shipping on orders over $25—or get **FREE Two-Day Shipping** with Amazon Prime

Want it tomorrow, May 30? Order within 14 hrs 14 mins and choose **One-Day Shipping** at checkout. Details

In Stock.

Qty: 1

Add to Cart

Buy Now

Sold by East Coast Photo and Fulfilled by Amazon.
Gift-wrap available.

Yes, I want **fast, FREE Shipping** with Amazon Prime

Save time
Place orders instantly when you turn on 1-click ordering.
Learn more

Deliver to San Diego 92130

Add to List

Share

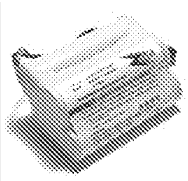
Other Sellers on Amazon

New (2) from $9.25 & FREE shipping on orders over $25.00. Details

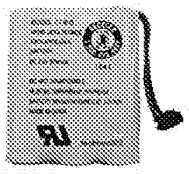
Have one to sell? Sell on Amazon

Sponsored products related to this item

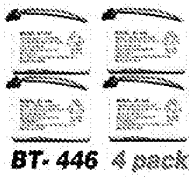
NJOY Exhibit 1002.1381



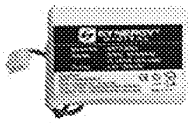
ZZcell Battery for Bearcat Sportcat BP120 / BP150 / BP180 / BP250, Uniden BBTY0355G0...
22
$12.95



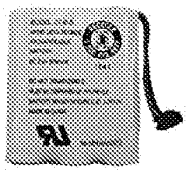
Uniden BT-905 Rechargeable Cordless Handset Phone Battery 3.6V 600mAh NiMH
221
$4.99



Electronix Plus BT-446 DC3.6 Volt 800MAH Rechargeable Batteries For Uniden Cordless...
12
$6.50



Clarity W425 PRO Cordless Phone Battery Ni-MH 1X3AAA/D, 3.6 Volt, 800 mAh - Ultra H...
2
$7.95



Battery for Panasonic KX-A36 P-P501 Uniden BT-905 BT-800 & Many Others, Bulk Packaging
223
$5.50

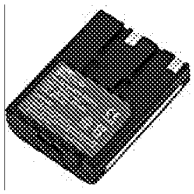
Pocket 3.6V B Vtech BT-27
$6.95
Ad feedback

What other items do customers buy after viewing this item?

Uniden BT-990 Cordless Phone Battery Ni-CD 3 AA in Plastic Housing, 3.6 Volt, 800 mAh - Ultra Hi-Capacity - Replacement for Uniden BP-990, Toshiba, GE TL96550, TL96556 Rechargeable Battery
4
$8.94

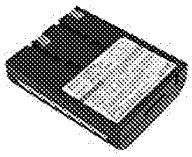
Radio Shack 23-964 Cordless Phone Battery 3.6 Volt, Ni-CD 800mAh - Replacement For UNIDEN BT990
5
$9.25

Customers who viewed this item also viewed



Uniden BT-990 Cordless Phone Battery Ni-CD 3 AA in Plastic Housing, 3.6 Volt, 800 mAh - Ultra Hi...
4
$8.94

Radio Shack 23-964 Cordless Phone Battery 3.6 Volt, Ni-CD 800mAh - Replacement For...
5
$9.25



3.6V 800mAh Ni-CD Cordless Battery For Uniden ANA9710, BBTY0373001,...
2
$9.98

Kastar BT900 for Uniden FT8808 BT2499 BP-2499 BT-2499A FT8258 TRB-1000 SX-2808 EXS9800...
1
$7.99

Special offers and product promotions

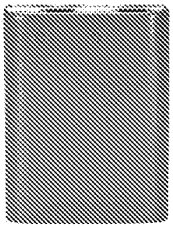
- Your cost could be $0.00 instead of $9.25! Get a $50 Amazon.com Gift Card instantly upon approval for the Amazon Rewards Visa Card Apply now

Have a question?

Find answers in product info, Q&As, reviews

Compare with similar items

NJOY Exhibit 1002.1382

				
	This item Uniden BT-990 Cordless Phone Battery Ni-CD, 3.6 Volt, 800 mAh - Ultra Hi-Capacity - Replacement for Uniden BP-990, Toshiba, GE TL96550, TL96556, Panasonic HHR-P505 Rechargeable Batteries	Uniden BT-990 Cordless Phone Battery Ni-CD 3 AA in Plastic Housing, 3.6 Volt, 800 mAh - Ultra Hi-Capacity - Replacement for Uniden BP-990, Toshiba, GE TL96550, TL96556 Rechargeable Battery	Radio Shack 23-964 Cordless Phone Battery 3.6 Volt, Ni-CD 800mAh - Replacement For UNIDEN BT990	3.6V 800mAh Ni-CD Cordless Battery For Uniden ANA9710, BBTY0373001, BBTY0414001, BBTY0494001, BP2499, BP990, BT2499, BT990, EXP990, EXP2460, EXP2480, EXS9110, EXS9110I, EXS9500, EXS9600, EXS9650, EXS9660, EXS9800 , BP-2499, BP-990, BT-2499, BT-990, EXP-99
	Add to Cart	Add to Cart	Add to Cart	Add to Cart
Customer Rating	(9)	(4)	(5)	(2)
Price	$9.25	$8.94	$9.25	$9.98
Shipping	FREE Shipping on orders over $25	FREE Shipping on orders over $25	FREE Shipping on orders over $25	FREE Shipping on orders over $25
Sold By	East Coast Photo	KasterUSA	East Coast Photo	PartyBulbs

Product description

SDCP-C310 - Ni-CD, 3.6 Volt, 800 mAh, Ultra Hi-Capacity Battery - Replacement Battery for Uniden BP-990, Toshiba, GE TL96550, TL96556, Panasonic HHR-P505 Cordless Phone Batteries.

Product information

Package Dimensions	2.3 x 1.9 x 0.8 inches
Item Weight	2.4 ounces
Shipping Weight	2.4 ounces (View shipping rates and policies)
ASIN	B01HDV75YW
Item model number	BP420899
Customer Reviews	9 customer reviews 4.2 out of 5 stars
Best Sellers Rank	#876 in Cordless Telephone Batteries
Date first listed on Amazon	December 1, 2009

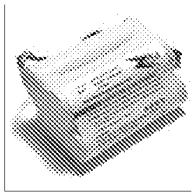
Feedback

If you are a seller for this product, would you like to suggest updates through seller support?
Would you like to tell us about a lower price?

Related Video Shorts (0) Upload your video

Be the first video
Your name here

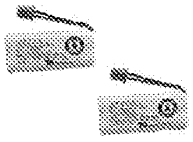
NJOY Exhibit 1002.1383



ZZcell Battery for Bearcat Sportcat BP120 / BP150 / BP180 / BP250, Uniden 88TY03560...

22

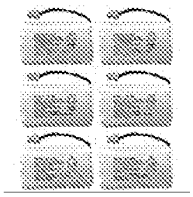
$12.95



Genuine Uniden Model BI-1025 Rechargeable Cordless Handset Phone Battery (2 Pack)

33

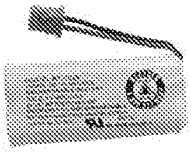
$7.99



Uniden BBTY0504101 Model BT446 Nickel Metal Hydride Rechargeable Cordless Phone Bat...

29

$8.10



NEW! Genuine Uniden BT-1025 88TG0847001 Cordless Handset Rechargeable Battery

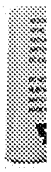
25

$6.51

Electronix Plus BT-446 DC3.6 Volt 800MAH Rechargeable Batteries For Uniden Cordless...

12

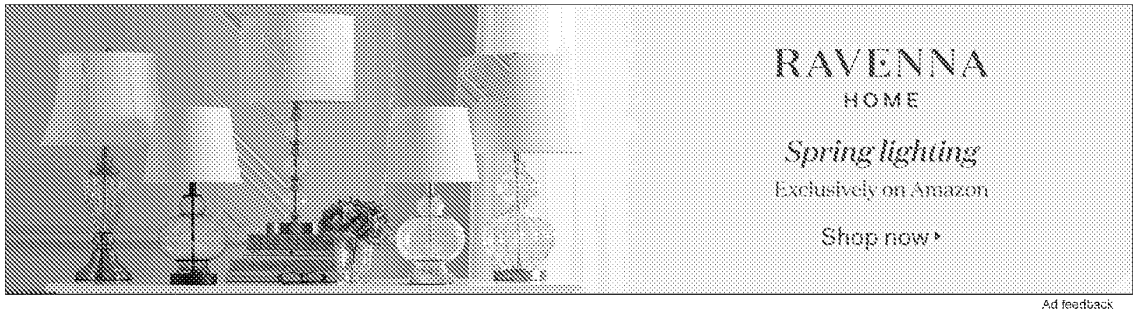
$6.50



Unider Rechar Hands 3.6V 6

$4.99

Ad feedback



Ad feedback

Customer Questions & Answers

See questions and answers

9 customer reviews

4.2 out of 5 stars

5 star	78%
4 star	0%
3 star	0%
2 star	11%
1 star	11%

Review this product

Share your thoughts with other customers

Write a customer review

Showing 1-8 of 9 reviews

Top Reviews

CT

Does not Fit GE TL96550 slot

August 5, 2017

Verified Purchase

The Website says it is replacement for GE TL96550. It is NOT. The location of the metal contacts are vastly different. It can NOT fit into the housing slot of GE TL96550. I am returning it for refund.

One person found this helpful

Helpful Comment Report abuse

Robert Weir

For my EXS9800

NJOY Exhibit 1002.1384

Ad feedback

November 21, 2018
Verified Purchase

I have a 15+ year old cordless Uniden EXS9800 phone that was in need of batteries. These just about fit in the handset, a little tight, and now my phone can be used again.

Helpful Comment Report abuse

Amazon Customer

Revived an Older Phone

March 5, 2019
Verified Purchase

The battery was as advertised and fit my Uniden phone. Brought it back to life.

Helpful Comment Report abuse

Robert E. Ackerman

Good service

May 4, 2019
Verified Purchase

Company sent replacement batteries for my land-line telephone in good order and am now back in service.

Helpful Comment Report abuse

Judy R Vicars

Gave new life to my old portable phone.

December 8, 2018
Verified Purchase

Worked out of the box.

Helpful Comment Report abuse

joseph valbona

good service.priced right.

March 12, 2019
Verified Purchase

great product

Helpful Comment Report abuse

Pilottech

Excellent value

February 8, 2017
Verified Purchase

Works great, very good price, quick shipping

Helpful Comment Report abuse

Amazon Customer

Two Stars

October 31, 2017
Verified Purchase

Did not work in phone as stated.

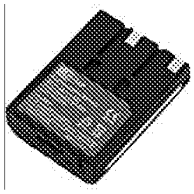
Helpful Comment Report abuse

See all 9 reviews

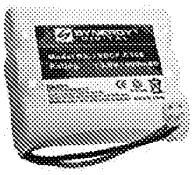
Write a customer review

Customers also shopped for

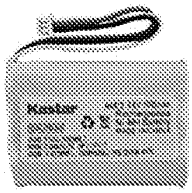
NJOY Exhibit 1002.1385



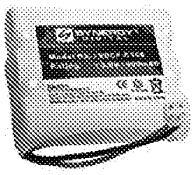
Uniden BT-990 Cordless Phone Battery Ni-CD 3 AA in Plastic Housing, 3.6 Volt, 800 mAh - Ultra Hi...
4
$8.94



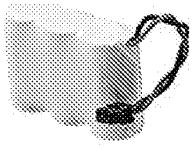
at&T-Lucent 3301 Cordless Phone Battery Ni-CD, 3.6 Volt, 900 mAh - Ultra Hi-Capacity...
27
$7.95



Toshiba BT-930 Cordless Phone Battery 3.6 Volt, Ni-MH 750mAh - Replacement For...
42
$7.95



SDCP-C308 - Ni-CD, 3.6 Volt, 900 mAh, Ultra Hi-Capacity Battery - Replacement Battery for...
6
$7.95



Energizer P3302 Cordless Phone Battery Ni-CD, 3.6 Volt, 350 mAh - Ultra Hi-Capacity - Replacement...
11
$6.22

Ad feedback

Pages with related products. See and discover other items: japanese electronics

Back to top

Get to Know Us
Careers
Blog
About Amazon
Press Center
Investor Relations
Amazon Devices
Tour an Amazon Fulfillment Center

Make Money with Us
Sell on Amazon
Sell Under Private Brands
Sell on Amazon Handmade
Sell Your Services on Amazon
Sell on Amazon Business
Sell Your Apps on Amazon
Become an Affiliate
Advertise Your Products
Self-Publish with Us
› Find Your Opportunity

Amazon Payment Products
Amazon Rewards Visa Signature Cards
Amazon.com Store Card
Amazon Business Card
Amazon.com Corporate Credit Line
Shop with Points
Credit Card Marketplace
Reload Your Balance
Amazon Currency Converter

Let Us Help You
Your Account
Your Orders
Shipping Rates & Policies
Amazon Prime
Returns & Replacements
Manage Your Content and Devices
Amazon Assistant
Help

English | United States

Amazon Music — Stream millions of songs
Amazon Advertising — Find, attract, and engage customers
Amazon Drive — Cloud storage from Amazon
6pm — Score deals on fashion brands
AbeBooks — Books, art & collectibles
ACX — Audiobook Publishing Made Easy
Alexa — Actionable Analytics for the Web
Amazon Business — Everything For Your Business
AmazonFresh — Groceries & More Right To Your Door
AmazonGlobal — Ship Orders Internationally
Home Services — Handpicked Pros Happiness Guarantee
Amazon Inspire — Digital Educational Resources
Amazon Rapids — Fun stories for kids on the go
Amazon Restaurants — Food delivery from local restaurants
Amazon Web Services — Scalable Cloud Computing Services
Audible — Listen to Books & Original Audio Performances
Book Depository — Books With Free Delivery Worldwide
Box Office Mojo — Find Movie Box Office Data
ComiXology — Thousands of Digital Comics
CreateSpace — Indie Print Publishing Made Easy
DPReview — Digital Photography
East Dane — Designer Men's Fashion
Fabric — Sewing, Quilting & Knitting
Goodreads — Book reviews & recommendations
IMDb — Movies, TV & Celebrities
IMDbPro — Get Info Entertainment Professionals Need
Junglee.com — Shop Online in India
Kindle Direct Publishing — Indie Digital Publishing Made Easy
Prime Now — FREE 2-Hour Delivery on Everyday Items
Amazon Photos — Unlimited Photo Storage Free With Prime
Prime Video Direct — Video Distribution Made Easy
Shopbop — Designer Fashion Brands
Whole Foods Market — America's Healthiest Grocery Store
Woot! — Deals and Shenanigans
Zappos — Shoes & Clothing
Subscribe with Amazon — Discover & try subscription services
PillPack — Pharmacy Simplified
Amazon Renewed — Refurbished products with a warranty
Amazon Second Chance — Pass it on, trade in, give it a second life

Conditions of Use Privacy Notice Interest-Based Ads © 1996-2019, Amazon.com, Inc. or its affiliates

NJOY Exhibit 1002.1386

NJOY Exhibit 1002.1387

THE VERGE

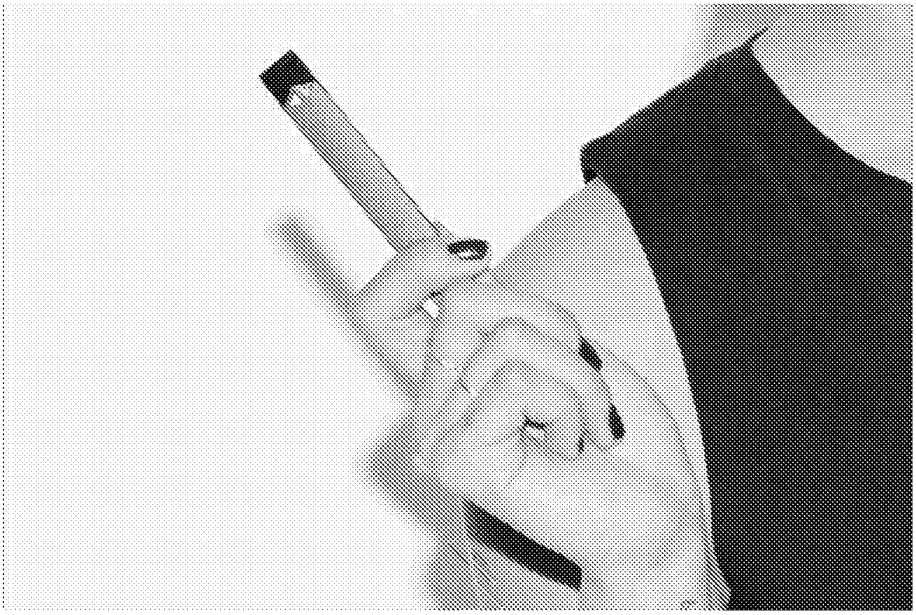
SCIENCE \ TECH \

31 ▸

Startup behind the Lambo of vaporizers just launched an intelligent e-cigarette

Surprise, it's a rectangle

By Nitasha Tiku | Apr 21, 2015, 8:00am EDT



The office for Pax Labs, the San Francisco company behind the stylish and popular Pax loose-leaf vaporizer, is located in the same building as the headquarters for Burning Man. Sometimes the two tenants have joint happy hours and the Burners help out with costumes. It's "a good cultural match for us," Sarah Richardson, Pax's director of communications said during a recent visit to the company. "They make us look conservative."

NJOY Exhibit 1002.1388

Richardson was sitting at a conference table puffing on Pax's newest product: a slim, rectangular e-cigarette called Juul. Seated around the table were the mechanical and electrical engineers behind Juul, including Pax's research scientist Chenyue Xing, who has a PhD in chemical engineering and experience with inhalation products.

THE KEY TO SMOKER SATISFACTION IS HITTING PEAK NICOTINE FIVE MINUTES IN

The small team has helped create what Pax Labs (formerly known as Ploom) is calling "an intelligently engineered and intensely satisfying new vapor experience." What makes it intelligent? "That's up for personal interpretation isn't it? Just kidding," CEO James Monsees told me later, by phone.

In Monsees' interpretation, Juul is smarter than the competition because of its ability to mimic the satisfaction of smoking a regular "combustion" cigarette. The key to that buzz is a sharp peak of nicotine in the consumer's blood profile about

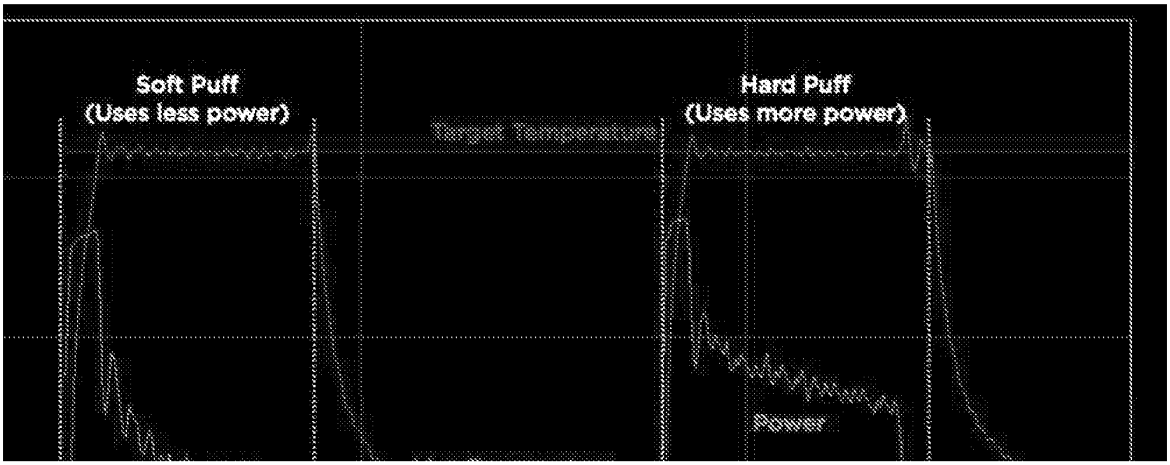
NJOY Exhibit 1002.1389

five minutes after she takes her first puff. To recreate that spike, the team started with the chemistry of its liquid-nicotine cartridges, or "Juulpods," which use nicotine salts, rather than "free-base nicotine." Using salts allowed Pax to increase the nicotine concentration from two percent to five percent without being unpalatable. Adding organic acids were also a key part to make inhaling smoother. It's not delivering more nicotine overall, it's delivering it in a more satisfying way, the team told me.

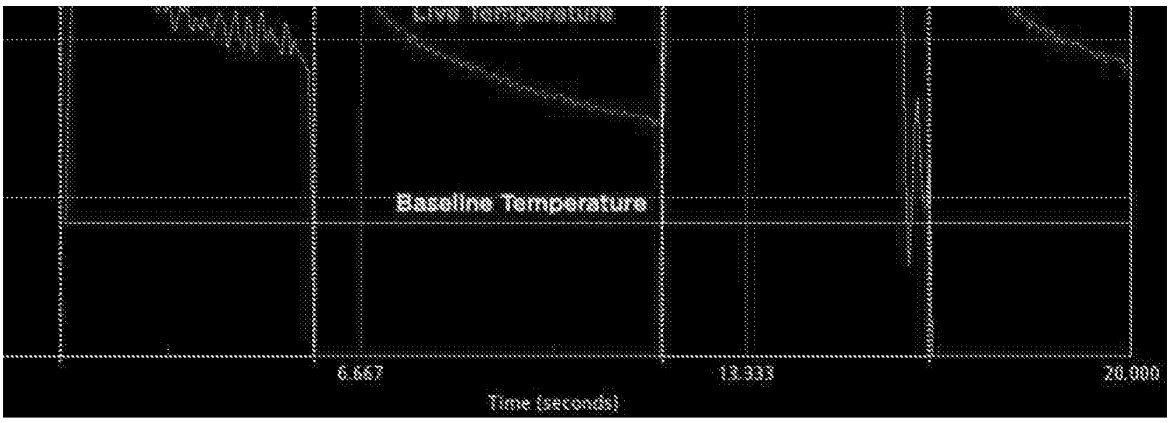
"JUULPODS" JUST ROLLS OFF THE TONGUE

The other differentiator that makes Juul smarter is temperature control, using what they called a precision resistance measurement circuit to figure out the ideal temperature for vaporization. "When you're able to control the temperature really well," said Monsees, the flavor doesn't change and you don't create degradation compounds that you don't want to inhale. Although tank-based e-cigarettes allow users to adjust the temperature, it's less controlled because the liquids and device are from different companies and changes depending on whether the user puffs faster or slower.

To demonstrate Juul's precision in this area Ari Atkins, an R&D engineer, connected Juul to his Macbook, started inhaling, and the graph below appeared on the conference room screen.



NJOY Exhibit 1002.1390



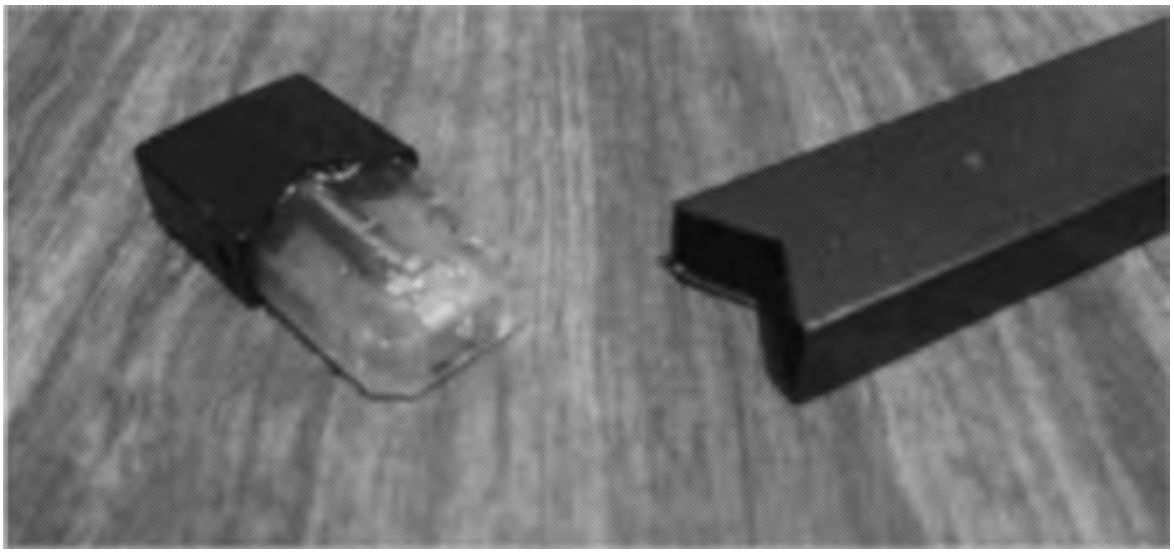
Juul is definitely not for the *keep vaping weird* crowd, who care about customization, but I found Juul's design simple and intuitive. The disposable cartridges easily popped into the device. Each puff did seem standardized. Sure, I felt a little like an alien whipping it out at a bar, but a really minimalist alien. The device comes with a one-year warranty and uses a magnetic USB deck to recharge. It takes one hour to charge and that will last you for about one pod or 200 "puffs per charge," the company says. To figure out whether it needs to be charged, you gently tap the device twice and a little light on the front glows red, yellow, or green.

A REALLY MINIMALIST ALIEN

Consumers can purchase Juul starting June, 2015. Pax is selling the starter kit (the device, a multi-pack of Juulpods in four flavors, and a USB charger) for $49.99 and the 4-packs of the pods for $15.99.

For novices or fans of clean design, it's less clunky than skeuomorphic devices like Njoys, which are built to look like a cigarette, and involves fewer parts than Blu's rechargeable model. Plus, there's no glowing light or specter of Jenny McCarthy.

NJOY Exhibit 1002.1391



Pax Labs recently released a new model of its vaporizer (happy belated 4/20, buddies). But it's a dicey time to get into the e-cig business. The Food and Drug Administration (FDA) formally proposed regulations for e-cigarettes last April. According to *The Hill*, the FDA is unlikely to act before June, but academics and researchers aren't waiting around. In February, a study was published showing that exposing mice to e-cigarette vapor for just two weeks had damaged their immune system. For the study, they tested Njoy, one of the biggest brands in the market. The most alarming report came from a survey published by the Centers for Disease Control and Prevention last week, which found that e-cigarette usage was now more popular than cigarettes in middle and high schools. However as *The New York Times* pointed out, the shift could also suggest "that some teenage smokers may be using e-cigarettes to quit."

E-CIGARETTES ARE MORE POPULAR THAN CIGARETTES IN HIGH SCHOOL

While the data is being debated, officials like the California Department of Public Health, which put out the video below, are already campaigning over advertising e-cigarettes to kids.

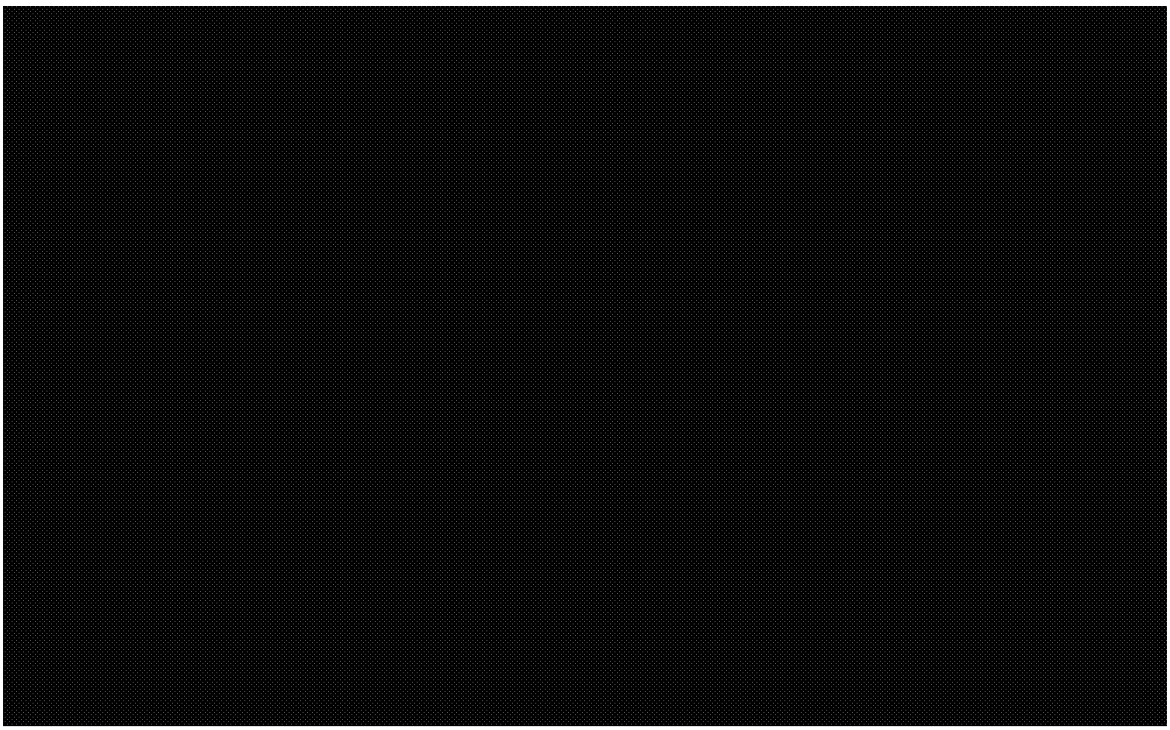
NJOY Exhibit 1002.1392

Pax Labs is very careful not to make any claims about health or smoking cessation. Monsees is the first to acknowledge that his company has "a vested interest" in calling itself a healthier cigarette, and therefore should not be the one to analyze its own risks. E-cigs have been popular for the past five years, but the industry still doesn't have the kind of "conclusive studies" the agency requires for over-the-counter medications, food, or cosmetics, he said. "All I can do is encourage regulators." When I pressed Monsees about how Pax thinks of the issue, he called combustion cigarettes "the most popular consumer product of all time that has known issues." Pax's goal is to make "compellingly better products."

"THE MOST POPULAR CONSUMER PRODUCT OF ALL TIME THAT HAS KNOWN ISSUES"

Atkins, the R&D engineer, was a less diplomatic. "We don't think a lot about addiction here because we're not trying to design a cessation product at all," he said, later noting "anything about health is not on our mind," before his colleagues collectively winced. Atkins, who used to smoke close to half a pack of Marlborough Reds a day, may make a good poster boy for Juul regardless. While developing the product, "I just realized one day that I hadn't smoked cigarettes in a month," he said. Atkins didn't think of it as quitting smoking, "I just like it better."

NJOY Exhibit 1002.1393



Addiction and obligation are issues that Silicon Valley would rather avoid. Filings with the Security and Exchange Commission from earlier this month show that Pax has been trying to raise $25 million in funding, but has only sold investors on $6.5 million so far. Companies sometimes file Form D's before the round has closed and Monsees would not disclose anything about ongoing funding efforts, but he did acknowledge that Sand Hill Road hasn't welcomed him with open wallets. "Venture firms are generally set up to invest in innovation, but the kind of innovation that comes out of the Valley, and we're not exactly that." Although he declined to share revenue, Monsees said Pax was in a "growth phase" and now "well beyond" the milestone of selling half a million Pax devices, which the company announced in February.

Juul's name is supposed to be a play on the word *jewel* because Pax wanted to create something more lasting and precious than throwaway cigarettes. "We didn't want to spell it the same because we like being different," said Monsees. The four flavors of the liquid — miint, fruut, bruulé , and tabaac — also exhibit

NJOY Exhibit 1002.1394

the same devil may care attitude towards spelling. This contrarian impulse may serve Juul better when it comes to its thin, rectangular design. As Atkins put it: "I like to wear skinny jeans."

Verge Video archive: *This is what vape-hacking looks like (2014)*

NJOY Exhibit 1002.1395

SKIP NAVIGATION

YouTube

SIGN IN

VUSE Product Reel

16,417 views

26 15 SHARE SAVE ...

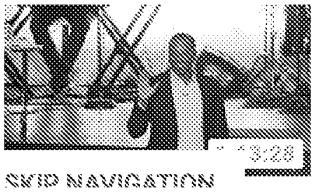
EIQ **EnsembleIQ**
Published on Jun 6, 2013

SUBSCRIBE 227

Category Education

Up next AUTOPLAY

How to unlock a car door (without a key)
Make It Easy Mechanic
Recommended for you



5 Keys To Identifying Your SoulMate - Touré Roberts
The Potter's House at OneLA
Recommended for you

SKIP NAVIGATION

NJOY Exhibit 1002.1396

YouTube SIGN IN

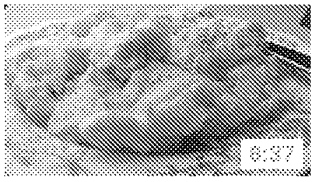
Recommended for you

Ravi Zacharias on the Christian View of Homosexuality #Apologetics
Christ Community Chapel
Recommended for you

Mark Lowry - The Home Depot/An Atheist's Faith/Mary Raising Jesus (Comedy/Live)
Gaither Music TV
Recommended for you

John MacArthur Rebukes Joel Osteen
TruthSource
Recommended for you

15 Funniest Commercials of All Time
UkraineArsenal
Recommended for you



How to Cook Perfect Fluffy Scrambled Eggs
AmyLearnsToCook
Recommended for you

Satan Loves To Attack Your Mind by Joyce Meyer
JULIETT ZOYA
Recommended for you

The TRUTH about OFF & Toothpaste vs Headlights! (+Update on WD 40)
Yak Motley
Recommended for you

How to Fix Vuse Cartridges
FoxyAF
41K views

10 Signs Your Kidneys Are Crying for Help
BRIGHT SIDE
7.2M views

NJOY Exhibit 1002.1397

SKIP NAVIGATION

YouTube

SIGN IN

Surviving Narcissism
1.6M views

Electronic cigarettes: What we know so far
University of East London
221K views

12 Psychology Tricks to Persuade Anyone
TopThink
1.3M views

Secret Tips How To Win Playing Lottery SCRATCH OFFS !!! How Much Did I Win ???
Nathan's BMW Workshop
883K views

5 Things You Should Never Say In a Job Interview
Don Georgevich
1.4M views

15 Psychological Facts That Will Blow Your Mind!
TopThink
3.9M views

How To Get Rid Of An Annoying Neighbor With A Crayon
Homesteading Off The Grid
5M views

NEVER EVER PAY COLLECTIONS!
KEEPING IT REAL WITH CREDIT
5.1M views

19 Comments SORT BY

SKIP NAVIGATION

NJOY Exhibit 1002.1398

Remember Me?

Help Register

Home Forum Library Chat SRP Goods

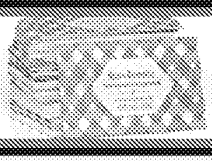
Custom Search

New Posts FAQ Calendar Forum Actions Quick Links

Advanced Search

Forum ♦ The Gallery ♦ Show and Tell ♦ walnut and cocobolo razor coffin pics

vistaprint



500 business cards from $9.99

Order now

If this is your first visit you may find the FAQ helpful.

We encourage you to register and engage with our community; you will not find a more welcoming and helpful bunch.

Results 1 to 4 of 4

Thread: walnut and cocobolo razor coffin pics

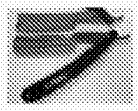
2 Views

Unread Thread Tools Display

06-09-2010, 04:35 PM #1

scrapcan

Senior Member



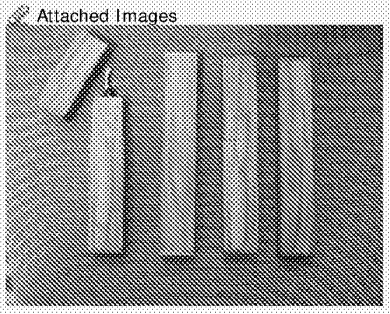
Join Date: Sep 2008
Location: Wyoming
Posts: 172
Thanked: 35

walnut and cocobolo razor coffin pics

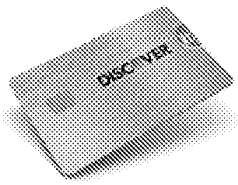
a few weeks ago ChrisGiraffe was kind enough to share info on making the razor coffins like he had done some time back. Chris was helpful and instrumental in my getting to finally have a wood razor coffin. Here are a few pictures of walnut and cocobolo coffins.

First picture with 4 are walnut, picture of 3 are the cocobolo. Sorry about the lighting, will try to do better next time.

Attached Images



Sponsored Links



Free Social Security Number Alerts

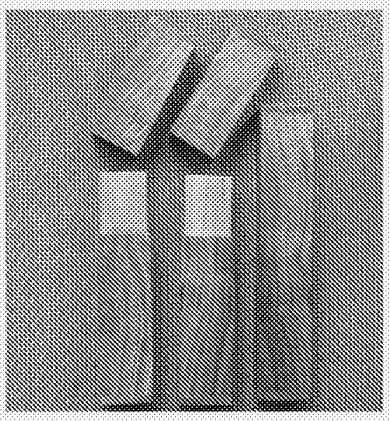
We monitor the Dark Web for your Social Security number.*

Learn More

*Available for cardmembers who activate. See terms. Thousands of sites monitored.

Everywhere sidebar 1.5.0

NJOY Exhibit 1002.1399



Last edited by scrapcan; 09-09-2010 at 05:10 PM.

Share

NoseWarmer and Chevhead like this.

Reply With Quote

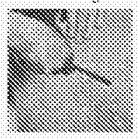
The Following User Says Thank You to scrapcan For This Useful Post:

Geezer (03-16-2013)

09-09-2010, 05:18 PM #2

markevens

Still learning



Join Date: Jun 2010
Posts: 1,043
Thanked: 240

Beautiful!

Share

Reply With Quote

NJOY Exhibit 1002.1400

08-09-2010, 05:56 PM #3

ScottGoodman

aka shooter74743

VETERAN

MENTOR

Join Date: Sep 2009
Location: SE Oklahoma/NE Texas
Posts: 6,852
Thanked: 1773
Blog Entries: 4

Real nice! I have a feeling you may be getting some PM's from folks who want some...

Share

Southeastern Oklahoma/Northeastern Texas helper.
Please don't hesitate to contact me.
Thank you and God Bless, Scott

Reply With Quote

08-10-2010, 08:34 PM #4

randydance062449

Hones & Honing

MENTOR

Join Date: May 2005
Location: Saint Paul, Minnesota, United States
Posts: 6,830
Thanked: 1747
Blog Entries: 1

Those look really nice! I have kept one that I purchased from Chris and it holds my Dubl Duck Baby razor.

Keep up the good work,

Share

Randolph Tuttle, a SRP Mentor for residents of Minnesota & western Wisconsin

Reply With Quote

« Previous Thread | Next Thread »

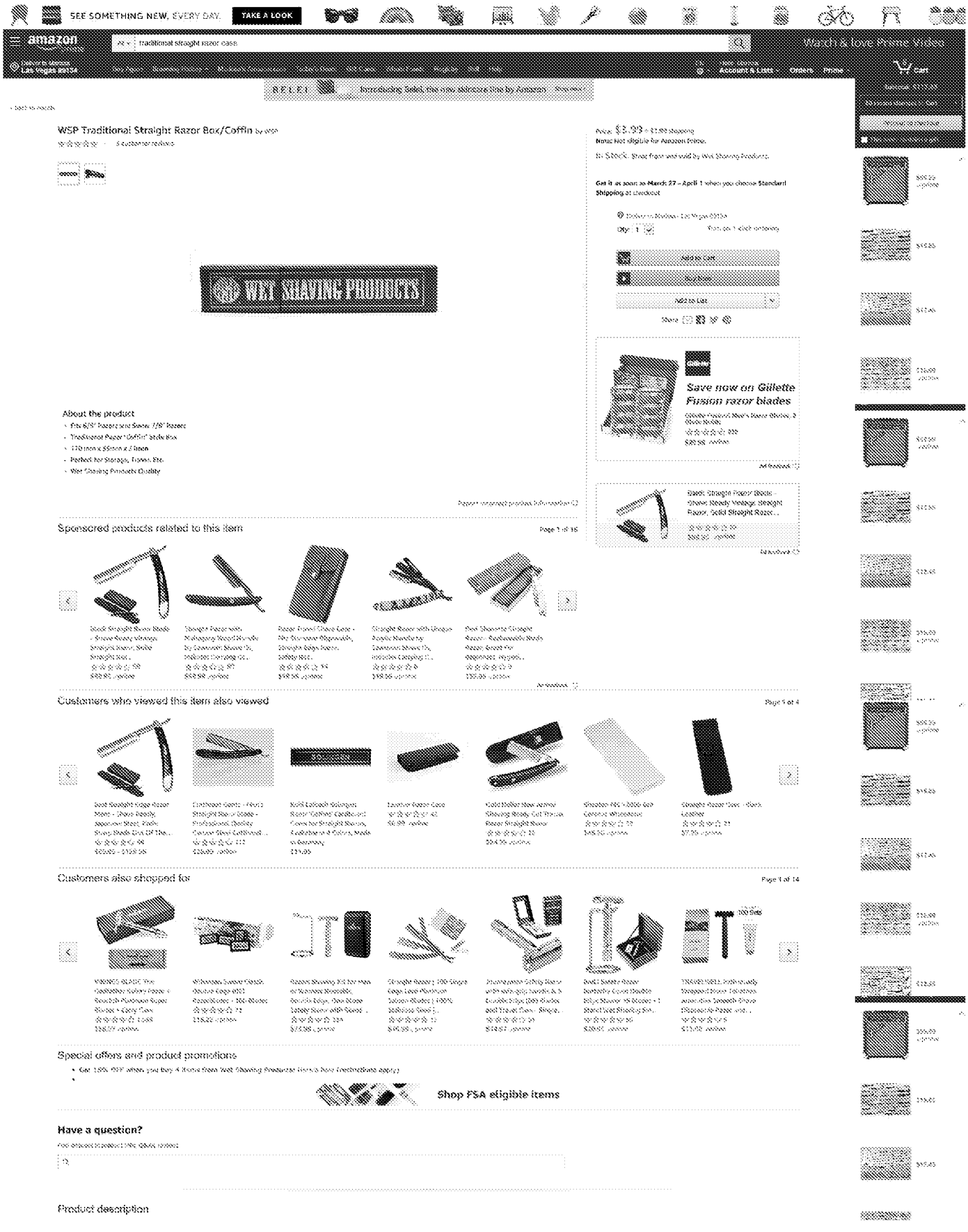
Posting Permissions

You may not post new threads
You may not post replies
You may not post attachments
You may not edit your posts

BB code is On
Smilies are On
[IMG] code is On
[VIDEO] code is On
HTML code is Off
Trackbacks are On
Pingbacks are On
Refbacks are On

NJOY Exhibit 1002.1401

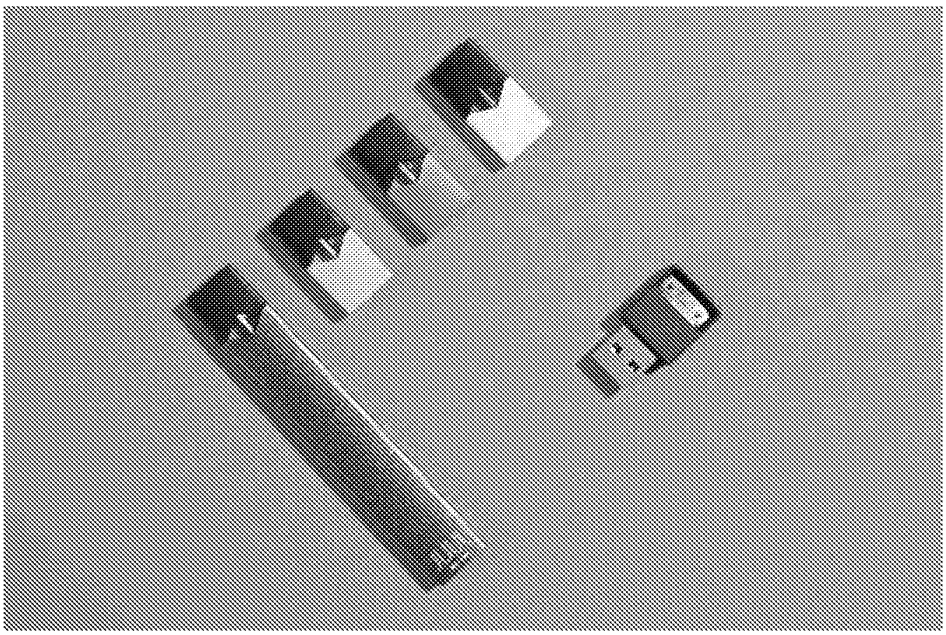
NJOY Exhibit 1002.1402



NJOY Exhibit 1002.1403

DAVID PIERCE GEAR 04.21.15 08:00 AM

THIS MIGHT JUST BE THE FIRST GREAT E-CIG



JOSH VALCARCEL/WIRED

EVERYONE AT PAX Labs is vaping. Puffs of white clouds rise every few seconds, from seemingly every desk on the second floor of this unassuming building in San Francisco's Mission district. As the haze clears, the office comes into focus: bustling, cramped, and messy. The eight-year-old company is growing quickly,

3 FREE ARTICLES LEFT THIS MONTH | Get unlimited access. **Try 3 months free.** Sign In or Register if you're already a subscriber. CLOSE ×

NJOY Exhibit 1002.1405

minutes, exists in a perpetual state of Burning Man-less.

Inside a glass-walled conference room, Pax Labs CEO James Monsees leans back in his chair and tells the story of the company's newest product, Juul. It's an e-cigarette system, with a pocket-size vaporizer and nicotine juice cartridges you swap in and out.

It's not a stretch for a company known for cannabis vaporizers, but its arrival in the e-cig market signals a major shift. Once known as Ploom—the name is still on its doors and business cards—the company made two beloved vaporizers, the Pax and Pax 2. Both showed strong design savvy, which lead some to call it "the Apple of vaping." But it recently sold the Ploom brand name and some of its intellectual property to Japanese tobacco conglomerate JTI in order to escape their corporate partnership. Now it's known as Pax Labs.

With a new name comes a new product, Juul. The $50 e-cig is aimed at nothing less than leveling-up the market with a delicious, beautiful, safe, and just flat-out better product. It comes at a pivotal moment for the industry, which is exploding in popularity even as its health concerns and advertising regulations are hotly debated. Whatever the future, though, Pax is betting on Juul.

So far, even as they've become mainstream, e-cigs have come in one of two packages. They're either small and round, designed to look and feel as much as possible like a cigarette, or they're huge, assembled from many parts, and spectacularly complicated. Even the best of them look like you're smoking from an oboe.

The Juul is nothing like that.

It's a long, thin, slightly rounded rectangle. It's mostly battery, I'm told, save for a slot at the top where you pop in a tiny pack of nicotine-infused "juice," which Pax will sell in color-coded flavors. You don't clean it, and there's no work involved: just put it in your mouth and inhale. The juice comes in four absurdly-named flavors—tabaac, fruut, miint, bruulé—and costs $16 for a four-pack of cartridges (a cartridge is roughly equivalent to a pack of smokes).

3 FREE ARTICLES LEFT THIS MONTH | Get unlimited access. Try 3 months free. Sign In or Register if you're already a subscriber. CLOSE ×

NJOY Exhibit 1002.1406

analogy. It's like a Nespresso machine, if a Nespresso machine still made great coffee. No, it's like a gun. Wait, Monsees cuts in, it's *not* like a gun. Please don't make that comparison. What's a thing where you make it easier and better all at once?

TRENDING NOW

TRANSPORTATION

The Self-Driving Truck Race Heats Up With a Driverless Test

Not to get all cliché about it, but here's the analogy: Pax is trying to make the iPhone of e-cigs.

It purposely doesn't look or feel like a cigarette. Pax wants the Juul to be an

3 FREE ARTICLES LEFT THIS MONTH | Get unlimited access. **Try 3 months free.** Sign In or Register if you're already a subscriber. CLOSE ×

NJOY Exhibit 1002.1407

Art Atkins, an R&D engineer at Pax. "How do you make somebody look cooler? Give them a cigarette." That's why Pax paid so much attention to the gray-and-black design, which looks far sleeker and better than your average gigantic multi-piece vape. You do look a little like you plugged a USB stick into your mouth when you use it, but it's undeniably cooler than that insipid mess of tubes and glowsticks you're probably using now.

Smoking is also all about rituals, which Monsees calls "the fidget factor." Rolling your own, if you're into that, or banging the pack against your palm if you're not. The first smoke of the day, the last smoke of the day. Just lighting the damn thing. The Juul offers a few tics of its own: tap the side of the device twice, and the LED light on the front blinks an indication of your remaining battery. It charges in a tiny dock that slips into any USB slot, and there's something wonderfully satisfying about dropping it into the magnetic charger. (Magnets!) If you wave the Juul around, it lights up in a rainbow of colors.

That last one is completely pointless. But it's fun.

3 FREE ARTICLES LEFT THIS MONTH | Get unlimited access. Try 3 months free. Sign In or Register if you're already a subscriber. CLOSE ×

NJOY Exhibit 1002.1408

PAX LABS

A Different Draw

Monsees isn't puffing on a Juul as he discusses its origins—though several of the half-dozen people at the table are—but he has a long history with e-cigarettes. Years ago, he convinced his brother to go to Hong Kong to buy and ship him the first e-cig on the market. "It was like this giant box you had to buy, because you couldn't buy cartridges for it ever again. So you'd buy this kit that cost like 300 bucks, this huge thing." It was terrible. "It didn't produce any vapor. The flavor was terrible, it was only one flavor and it was this horrible tobacco-type flavor."

3 FREE ARTICLES LEFT THIS MONTH | Get unlimited access. **Try 3 months free.** Sign In or Register if you're already a subscriber. CLOSE ×

NJOY Exhibit 1002.1409

from Hong Kong, you can buy one for six bucks at the convenience store. "If you came in to buy a pack of cigarettes," Monsees says, "which is going to cost you 6 to 12 dollars or something, and there's this thing on the counter that's the same but costs less, why would you not try that?" Usage and awareness of e-cigs have been climbing for years, and at least among teens they've even become more popular than actual cigarettes.

Since there's very little protective intellectual property and very little regulation, anyone and everyone can get in the e-cig market. "All you have to do is have a phone call to one of the six manufacturers or so in China that are producing these e-cigarettes," Monsees says. "And oh, I want it to be an orange tip on the end and say Orange on the packaging. It's an hour-long conversation, maybe, and a couple weeks to receive delivery, and you're in the e-cig business."

There's one catch, though: they almost all suck. "One, they don't deliver a lot of vapor. Two, they're really awkward to use and kind of cheaply made. Three, they just don't deliver nicotine in the same way the cigarette does." Everyone's working with essentially the same idea, the same product. As with Big Tobacco a few decades ago, the war is won and lost in the marketing.

A Salty Solution

Pax hopes it can overcome marketing muscle with quality; the only way to stand the test of time, and survive whatever regulation is coming, is to simply build something great. Pax starts with technology: they call themselves a playground for innovation, and talk often about "modernizing" smoking. This tiny company believes it can design the product better, build the heating mechanism better, and make every aspect of the smoking and vaping experience better.

3 FREE ARTICLES LEFT THIS MONTH | Get unlimited access. Try 3 months free. Sign In or Register if you're already a subscriber. CLOSE X

NJOY Exhibit 1002.1410

PAX LABS

Even Pax's nicotine is supposedly better than everyone else's. Atkins tries to explain: "In the tobacco plant, there are these organic acids that naturally occur. And they help stabilize the nicotine in such a way that makes it ..." He pauses. "I've got to choose the words carefully here: Appropriate for inhalation."

3 FREE ARTICLES LEFT THIS MONTH | Get unlimited access. Try 3 months free. Sign In or Register if you're already a subscriber. CLOSE ×

NJOY Exhibit 1002.1411

picture that they needed. "You won't find raw nicotine in nature, he says, it's mixed in with organic acids and other substances. It's this cocktail that makes nicotine palatable. "We figured out how to incorporate some of these organic acids into the juice," Atkins says, "so we were able to get a very cigarette-like experience."

It sounds obvious, really: If you want to make something as smooth as a cigarette, make it more like a cigarette. Pax believes these "nicotine salts" are part of the trick to a great-tasting e-cig, to solving the burnt and harsh tastes too many competitors offer. None of the crew seems to know why no one else has figured this out, though, only that they haven't. "The people who understood the science and were listed on previous patents from tobacco companies aren't at those companies anymore," Monsees says. "If you go to Altria's R&D facility, it's empty." Some of those people are now on Pax's team of advisers, helping develop Juul.

Long-term, though, the Juul's careful way of vaporizing that nicotine is its real secret sauce. The temperature of the heating coil is controlled to give you the largest possible cloud of vapor, but none of the dangerous chemicals or compounds, like formaldehyde, that come with overheating the coil or the juice. This is Pax's product, maybe even more than the Juul itself. "The underlying technology, the vaporization technology, is so valuable and can be really disruptive in a lot of different markets," Monsees says. He declines to say more, but the implications are clear: Vaporization is an excellent way to consume everything from weed to cancer-fighting drugs, and being able to exactly control delivery could be hugely powerful.

A Tricky Sell

Let's assume Pax has made the best e-cig on the planet, and that it can convince people that the Juul is worth paying for. It's still facing huge obstacles that have nothing to do with the quality of its product. E-cigarettes have until now lived outside of the tobacco industry's stringent regulations, but that's going to

3 FREE ARTICLES LEFT THIS MONTH | Get unlimited access. Try 3 months free. Sign In or Register if you're already a subscriber. CLOSE ×

NJOY Exhibit 1002.1412

millions marketing their products, and Monsees freely admits Pax can't compete with sexy Blu spreads in the *Sports Illustrated* swimsuit issue, or NJOY's yearly Super Bowl ad.

The broader debate, about e-cigs' safety, will have even bigger implications for Pax and its many competitors. Some celebrate the fast growth of e-cigs, saying they're leading people to stop smoking more harmful products; there's a fairly clear correlation in recent data between the uptick in e-cigs among teens and the downturn in tobacco smoking. Others point to similar correlations between e-cigs and asthma, lung inflammation, or MSRA. Still others say e-cigs are a gateway drug into cigarettes, and that they may have long-term effects we don't yet understand. The only certainty seems to be that no one yet knows for sure.

Monsees neatly avoids taking a stand. He can't take one, really, because making health claims—even the "it's not the worst thing!" counterfactual—will invoke the wrath of the FDA. But he also says Pax doesn't need to worry about the morality of it all. "People are going to do what they want to do." Their job, as in any market, is to give people a better way to do it. "We want to do the right thing, but we can't be the mouths of what the right thing is."

Yet he almost can't help but point out a line in a *New York Times* article that was broadly negative on the prospects of e-cigs. It quotes David B. Abrams, the executive director of the Schroeder Institute for Tobacco Research and Policy Studies. "They're not a gateway in, and they might be accelerating the gateway out," he tells the *Times*.

"In the end," Monsees says, "if regulators determine that these are safer products, how is that not a great thing? And why is that headline not 'Hey, finally there's alternatives, there's movement in this industry after 150 years, maybe in the right direction.' Seems like a good headline to me."

#E-CIGARETTES #HEALTH #PAX #VAPORIZERS

3 FREE ARTICLES LEFT THIS MONTH | Get unlimited access. Try 3 months free. Sign In or Register if you're already a subscriber. CLOSE ×

NJOY Exhibit 1002.1413

Comparative Design 6:

[11] Grant Announcement No: CN302660490S [45] Date of Grant Announcement: November 27, 2013

[22] Filing date: July 9, 2013 [21] Filing No.: CN201330318438. 0 Classification No.: 13-02

[72] Designer(s): Juangdi Wang [30] Priority: Document No.: CN302660490S

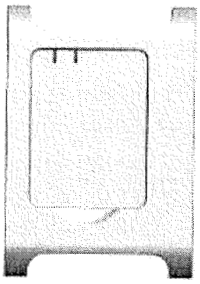
[73] Patentee: Lihong Electronics in Simenzhen, Yuyao Address: Xiaoluxiacun, Simen town, Yuyao, Ningbo, Zhejing 315472

[74] Patent agency: Beijing DFHZ IP Law Firm (General Partner) 11296 Agent: Shuxian Zhang

[57] Brief description: 1. Title of the design: Cellphone Battery Charger (37).
2. Use of the design: The design is used for charging cellphone battery.
3. Main design points of the design: The shape of the product.
4. Figure or photo that can mostly represent the main design points: The perspective view.

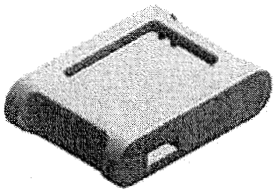
[54] Title of Product using the Design: Cellphone Battery Charger (37)

Note: 1. Part of the Bibliographic Data is not shown owing to limitations of space.
2. The views are not shown to scale for the sake of illustrative clarity.



Top view

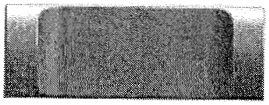
Back view



Perspective view

Bottom view

Right view



Front view

Left view

NJOY Exhibit 1002.1414

Electronic Acknowledgement Receipt

EFS ID:	36944496
Application Number:	16032009
International Application Number:	
Confirmation Number:	7691
Title of Invention:	VAPORIZER APPARATUS
First Named Inventor/Applicant Name:	James Monsees
Customer Number:	148514
Filer:	Nicholas Paul Mouton/Shae Jackson
Filer Authorized By:	Nicholas Paul Mouton
Attorney Docket Number:	52210-508C18US/716.US18
Receipt Date:	21-AUG-2019
Filing Date:	10-JUL-2018
Time Stamp:	22:45:12
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Foreign Reference	WO2015054862A1.pdf	987388 98d75843e33bd0649a2d8657a0bd92c1c106477b	no	26

Warnings:

Information:					
2	Foreign Reference	WO2015077645A1.pdf	1731531 f005b8c469de228fadff69401566cfa5140c6950	no	43
Warnings:					
Information:					
3	Foreign Reference	WO2015078147A1.pdf	865279 c71494057b7d654e05f39e6f999b4a0a8c4008fa	no	26
Warnings:					
Information:					
4	Foreign Reference	WO2015082560A1.pdf	1912700 1b45cad42809f416a3e834e3e99846353f2bce40	no	39
Warnings:					
Information:					
5	Foreign Reference	WO2015114325A1.pdf	1696771 7e0a5025a73fd0b073371892cedd4be4cd9c3349	no	39
Warnings:					
Information:					
6	Foreign Reference	WO2015144328A1.pdf	1141278 0775d6b52268abb298a86d9e06e2b3555405596a	no	31
Warnings:					
Information:					
7	Foreign Reference	WO2016059000A1.pdf	994147 e9b09573db3074f619cab8347a1a7fcf00f87327	no	26
Warnings:					
Information:					
8	Foreign Reference	WO2017173951A1.PDF	864806 aacb246992721a63cc27f5aebbb5cd80534f67b7	no	18
Warnings:					
Information:					

9	Foreign Reference	WOD79112-0010.pdf	35174 f8b1ec1bb03b8a08104ce75bfa71c3528fadd96d	no	1
Warnings:					
Information:					
10	Non Patent Literature	Atoms_RX_Optimus410_Youtube.pdf	3122911 381e20b5a0e18ba562fb40aa68e55cdbf46ed3a3	no	3
Warnings:					
Information:					
11	Non Patent Literature	Baumgartens_sharpener.pdf	1600329 e10b97f01bf705f62d082e534238be280fad83fe	no	4
Warnings:					
Information:					
12	Non Patent Literature	Blu_eCig_youtube.pdf	1985354 9631d808560f8e3ce3887296a7fea1e00f642001	no	3
Warnings:					
Information:					
13	Non Patent Literature	Cedar_board.pdf	153006 c89ebb8c5e63ad6204309d6ccb93d090b6353939	no	2
Warnings:					
Information:					
14	Non Patent Literature	Cloud_V_Youtube.pdf	269559 77582e9aa3d85bb45513137138fb40bf2a6f07bb	no	3
Warnings:					
Information:					
15	Non Patent Literature	Cloud_Vaporizer_you_tube.pdf	3120039 565e3677f83a60e94dca65226bd58fcfef02ae6a	no	4
Warnings:					
Information:					

16	Non Patent Literature	Crown_Seven_Hydro_Imperial_Youtube.pdf	1512296 03d978540c141754b604ee1e4ac0e8242ca38d2e	no	2
Warnings:					
Information:					
17	Non Patent Literature	Elips_ego_sole_electronic_cigarette_kit_F6_AtomizerCE4_Youtube.pdf	1533507 9416565d8e30d06407b81c8737aeab8a616eb1e1	no	2
Warnings:					
Information:					
18	Non Patent Literature	Elips_ego_sole_electronic_cigarette_kit_F6_section_Youtube.pdf	1454809 9f1510e535dc113f1068e5a96f8def6d283bd8f3	no	2
Warnings:					
Information:					
19	Non Patent Literature	Engadget-Juul_is_the_e-cig_that_will_finally.pdf	1246218 298a5dd2727ddd77e3fde20e8c9030f6bf5e7bba	no	18
Warnings:					
The page size in the PDF is too large. The pages should be 8.5 x 11 or A4. If this PDF is submitted, the pages will be resized upon entry into the Image File Wrapper and may affect subsequent processing					
Information:					
20	Non Patent Literature	Following_the_vapor_trail.pdf	2047343 37f25c2a83072182708d7e201853d6e4b81e3995	no	3
Warnings:					
Information:					
21	Non Patent Literature	Frakes-Lightning_the_iphones_new_connector.pdf	3162413 e481f86b874f54187aa5a3f7d270c7d3a3d7951c	no	6
Warnings:					
Information:					
22	Non Patent Literature	Galde_Plugin_youtube.pdf	752607 4b30cf84c52b270e007a671dabc3bac20cd603e4	no	2
Warnings:					
Information:					

23	Non Patent Literature	German_crown_and_sword.pdf	194165 64c0d7c8fc8999df12640aff846d04a6f2202ff2	no	1
Warnings:					
Information:					
24	Non Patent Literature	Glade_Plugins_scented_oils_2001_Youtube.pdf	1485411 0e9e4c30e0f84187400df9a6658152e1b6d05b97	no	2
Warnings:					
Information:					
25	Non Patent Literature	Green_Sound_High_Tech_GS-PUSH.pdf	548972 96f48c203ee8a050f60ba6b3280edbc2f607ac56	no	4
Warnings:					
Information:					
26	Non Patent Literature	Green_Sound_High-Tech_GS-360.pdf	1370236 0032314e8d7b22d27115585793e1483cb6c946f2	no	5
Warnings:					
Information:					
27	Non Patent Literature	Hacking_the_vuse_E-Cig_to_fully_use_cartridges.pdf	6872787 18484604993fe96e94d063ebd97e5c97aa505725	no	20
Warnings:					
Information:					
28	Non Patent Literature	Halo_6_Basic_Kit_Youtube.pdf	1749498 e92afb1ae53acab52121e049bc07f6bfae78f44b	no	3
Warnings:					
Information:					
29	Non Patent Literature	Halo_Triton_Kit_Youtube.pdf	1564764 31c59729db3abe9a5b3c2251a42e3ba5e5633859	no	3
Warnings:					
Information:					

30	Non Patent Literature	Innokin_itaste_vv_Tank_Youtube.pdf	613731 bfff4266570a6a12b5184fd587c4428683cb68ce	no	2
Warnings:					
Information:					
31	Non Patent Literature	Innokin_Tech_510T.pdf	1462029 dd71a633e6afc267c581f44176359bd866f57b55	no	4
Warnings:					
Information:					
32	Non Patent Literature	Iwand_rectangular_pen_shape_design.pdf	1854169 d7a23265b73e3f0c207eac6d239a88bc3a3521cd	no	3
Warnings:					
Information:					
33	Non Patent Literature	Jiffy_Steamer_clothing_steamer_Youtube.pdf	1641704 ea0b52e1d391033b1463c478bd74b0335e90dd7d	no	2
Warnings:					
Information:					
34	Non Patent Literature	JiffySteamerOwnersManual.pdf	2221396 470b11c06c13678c7e8c79a31eda40acc4f92a8e	no	42
Warnings:					
Information:					
35	Non Patent Literature	Joye_tank_system.pdf	1327202 ffe678e7a61672dc3170dda468d2a804a47f6a13	no	4
Warnings:					
Information:					
36	Non Patent Literature	JUUL_Product_Infor_2016.pdf	468467 99a791fb449899a840de9ee0627b2e65ba68e6cb	no	6
Warnings:					
Information:					

37	Non Patent Literature	KangerS1_Cubica_series_Youtube.pdf	1811219 95343a571203dee1fa92463220f8fab57ba0de86	no	2
Warnings:					
Information:					
38	Non Patent Literature	Making_a_box_for_my_straight_razor.pdf	438994 9a197f76d3bc124ab4f7ef66af2f2a1ce6c9aa51	no	2
Warnings:					
Information:					
39	Non Patent Literature	MicroG_Grenco_Science_Youtube.pdf	1635668 15c7d0fc7e3daef45cf809eac4ec979744453b79	no	3
Warnings:					
Information:					
40	Non Patent Literature	Modello_iWand_Youtube.pdf	1378243 54a2f06103dedda6b53da7b690f3834768b03488	no	4
Warnings:					
Information:					
41	Non Patent Literature	NJoy_Electronic_Cig_review_Youtube.pdf	1578574 eb405a3e35dcf84a2ff12cb1d6c629f7c757de43	no	3
Warnings:					
Information:					
42	Non Patent Literature	O_Pen_Vape_Pen_Vaporizer_Youtube.pdf	218085 489e3d41d73415e2bedf7d374a367197bdaf6ec1	no	3
Warnings:					
Information:					
43	Non Patent Literature	Panasonic_HHR-P104_cordless_phone_battery.pdf	7202065 14cf533d51d6db033c8d4d5976208f92095697f0	no	7
Warnings:					
Information:					

44	Non Patent Literature	Pentel.pdf	304909 4b0069b303ff4befde3e071d5a8ff3a08a7689fa	no	2
Warnings:					
Information:					
45	Non Patent Literature	Purity_Fragrance.pdf	1564937 ccf523dc07c2e7d19d99cfcd4039eaebe7910a75	no	5
Warnings:					
Information:					
46	Non Patent Literature	RJ_Reynolds-Vuse_Digital_Vapor_Cigarette_Press_Release.pdf	577032 dffb7413bc6c6cecc18bd83f0d746ec057ca5aeb	no	1
Warnings:					
Information:					
47	Non Patent Literature	Rose_Plastic.pdf	385176 92e9b6fd0ac19e48e1321c4a252354443d4d47a1	no	2
Warnings:					
Information:					
48	Non Patent Literature	Ruyan_Vaporizer_Youtube.pdf	2655794 e829116d9e15fc7dbdc276f2669c69a647c7f5bf	no	3
Warnings:					
Information:					
49	Non Patent Literature	Smith-Next_USB_connector_will_finally_be_reversible_like_apples_lightning_plug.pdf	4025532 551cf056c52dafb926e5dd37f272a1b0ad3d2637	no	4
Warnings:					
Information:					
50	Non Patent Literature	TE_Connectivity_electrical_contact_tabs_and_connectors.pdf	5690531 65ee3a3119dc607d08dc13bf65a923494861b54e	no	36
Warnings:					
Information:					

51	Non Patent Literature	The_Elips_by_LSK_Youtube.pdf	1766386 ee33524c4710a04a792de3e29ad6551979db7db8	no	2
Warnings:					
Information:					
52	Non Patent Literature	Uniden_BT_990_cordless_phone_battery.pdf	3133377 407c7bdc216d9a9337785d247b9b35789d9edb0f	no	7
Warnings:					
Information:					
53	Non Patent Literature	Verge-Startup_behind_the_lambo_of_vaporizers_just.pdf	433931 f5a4366830536245057 90ed4d55ccb629249cd1c	no	8
Warnings:					
Information:					
54	Non Patent Literature	VUSE_Product_Reel-YouTube.pdf	545550 fdae384adb9ca68ae01c1733853c74d4f8778190	no	3
Warnings:					
Information:					
55	Non Patent Literature	Walnut_and_cocobolo.pdf	1586792 e0f8ef58c4cffcbf3cc3f9f3b47d8eaf2691ecca	no	4
Warnings:					
Information:					
56	Non Patent Literature	Wet_shaving_products_WSP.pdf	395143 b64cb8ad3829835e861d801fcfeb4948f02ca890	no	2
Warnings:					
Information:					
57	Non Patent Literature	Wired-This_might_just_be_the_first_great_e-cig.pdf	3402583 c588112e2673075786 8e2f0763cc10f79bf2d01b	no	9
Warnings:					
Information:					

58	Foreign Reference	CN302660490.pdf	140555 c7c24b194247086fdd7cea3dff104a41285b1f27	no	1

Warnings:	
Information:	
Total Files Size (in bytes):	96435072

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Comparative Design 2:

[11] Grant Announcement No: CN303574274S [45] Date of Grant Announcement: January 27, 2016

[22] Filing date: August 31, 2015 [21] Filing No.: CN 201530332733.0 Classification No.: 27-99

[72] Designer(s): Adrian Bennett; Ian Murison; [30] Priority: March 3, 2015 EM002644930 Document No.: CN303574274S

[73] Patentee: Beyond Twenty Ltd. Address: Tower Bridge Road, London, GB

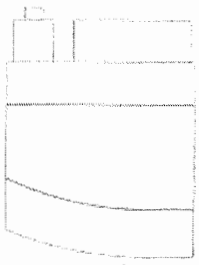
[74] Patent agency: Beijing Lian & Lien IP Law Firm 11278 Agent: Fang Yang

[57] Brief description:

1. Title of the design: Cartridge for Electronic Cigarette Case.
2. Use of the design: The design of the product is used for an electronic cigarette case.
3. Main design points of the design: The shape, the pattern and the combination thereof of the device.
4. Figure that can mostly represent the main design points: The front view.
5. The back view is omitted because of having no main points of the design.

[54] Title of Product using the Design: Cartridge for Electronic Cigarette Case

Note: 1. Part of the Bibliographic Data is not shown owing to limitations of space.
2. The views are not shown to scale for the sake of illustrative clarity.



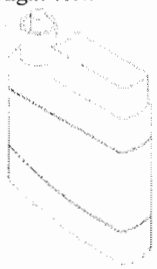
Front view

Left view

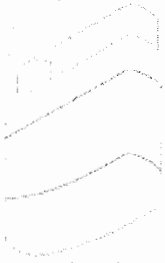
Right view

Top view

Bottom view



Perspective view 1



Perspective view 2

NJOY Exhibit 1002.1425

Comparative Design 3:

[11] Grant Announcement No: CN303686002S [45] Date of Grant Announcement: May 25, 2016

[22] Filing date: November 25, 2015 [21] Filing No.: CN201530477837. 0 Classification No.: 27-99

[72] Designer(s): Shuigen Liu; [30] Priority: Document No.: CN303686002S

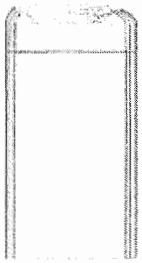
[73] Patentee: Shuigen Liu Address: Room 12, Floor 3, Building 1, Changyi Road, Chang'an Town, Dongguan, Guangdong

[74] Patent agency: Shenzhen Standard Patent &Trademark Agent Ltd. Agent: Xiaohong Cai; Xiahe Ke

[57] Brief description:
1. Title of the design: Tobacco vaporizer.
2. Use of the design: The electronic vaporizer is used for the generation of steam upon heating the mixtures such as tobacco or herbs.
3. Main design points of the design: The overall shape of the product.
4. Figure or photo that can mostly represent the main design points: The perspective view 1.

[54] Title of Product using the Design: Tobacco Vaporizer

Note: 1. Part of the Bibliographic Data is not shown owing to limitations of space.
2. The views are not shown to scale for the sake of illustrative clarity.

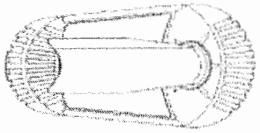


Front view

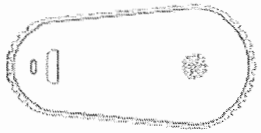
Back view

Left view

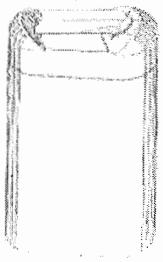
Right view



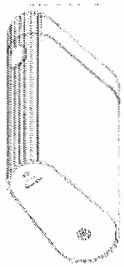
Top view



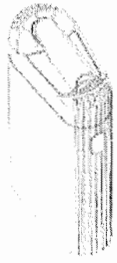
Bottom view



Perspective view 1



Perspective view 2



Perspective view 3

NJOY Exhibit 1002.1426

Comparative Design 6:

[11] Grant Announcement No: CN303721535S [45] Date of Grant Announcement: June 22, 2016

[22] Filing date: September 17, 2015 [21] Filing No.: CN201530360971. 2 Classification No.: 27-99

[72] Designer(s): Max ; Ding'an Chen [30] Priority: Document No.: CN303721535S

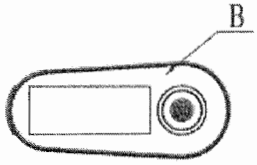
[73] Patentee: Shenzhen RITCHY Group Ltd. Address: No.9 Yusheng Industrial Park, No. 467, Xixiang Section, 107 Road (end of Gushu Road), Bao'an District, Shenzhen, Guangdong, 518126

[74] Patent agency: Shenzhen Zhixiang Intellectual Property 44361 Agent: Qin Wang

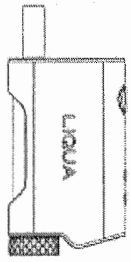
[57] Brief description:
1. Title of the design: Electronic cigarette.
2. Use of the design: The design is used for atomizing tobacco tar to generate vapor.
3. Main design points of the design: The shape and structure of the product, wherein part A in the right view and part B in the top view of design 1 are transparent, and part C in the right view and part D in the top view of design 2 are transparent.
4. Figure or photo that can mostly represent the main design points: The design 1.

[54] Title of Product using the Design: Electronic Cigarette

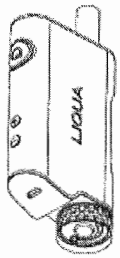
Note: 1. Part of the Bibliographic Data is not shown owing to limitations of space.
2. The views are not shown to scale for the sake of illustrative clarity.



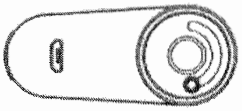
Top view of design 1



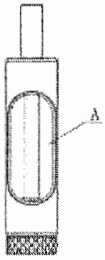
Back view of design 1



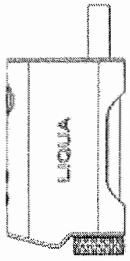
Perspective view of design 1



Bottom view of design 1



Right view of design 1



Front view of design 1

Left view of design 1

NJOY Exhibit 1002.1427

Comparative Design 6:

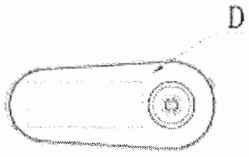
Perspective view of design 1

Front view of design 2

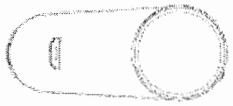
Back view of design 2

Left view of design 2

Right view of design 2



Top view of design 2



Bottom view of design 2

NJOY Exhibit 1002.1428

Patent Translate
Powered by EPO and Google

Notice

This translation is machine-generated. It cannot be guaranteed that it is intelligible, accurate, complete, reliable or fit for specific purposes. Critical decisions, such as commercially relevant or financial decisions, should not be based on machine-translation output.

DESCRIPTION DE1093936

[0001]

The invention relates to a process for the selective separation of aromatic hydrocarbons in high purity by continuous extraction from hydrocarbon mixtures containing both aromatic and non-aromatic hydrocarbons, wherein an extraction column containing a relatively small number of Stages is used.

[0002]

While the separation of the hydrocarbon oils, as contained in the mixed oils of the aromatic and non-aromatic hydrocarbons of the paraffin and: aphthene type, is a very important operation with regard to the recovery of chemical raw materials, in recent years there has been a consequence In response to increased demand, in particular for aromatic compounds, the demand for selective separation of only aromatized crude oil oils and coal tar light oils has been raised.

[0003]

Among the hitherto known methods for the separation of aromatic hydrocarbons are, for example, such as azeotropic distillation, extractive distillation and adsorption.

Besides these, the method of extraction by solvents selective to aromatic hydrocarbons is known.

[0004]

The general demands made of extraction solvents used for the extraction of aromatic hydrocarbons from hydrocarbon feedstocks containing both aromatic and non-aromatic hydrocarbons are as follows: that they must be cheap and readily available and have stability, but have no corrosive effect may be that between the specific gravity of the extraction solvent and the material to be extracted quite a difference, and that not only the extraction solvent should be able to recover well. However, factors of even greater importance are that the solubility of the components to be extracted, i. H. in the case of the aromatic hydrocarbon in which extraction solvent is high, on the other hand, the solubility of the non-aromatic component is low, the extraction operation is easy, and the extraction efficiency due to the presence of water is not impaired.

[0005]

Of these properties, those of particular importance are described in more detail below: a) Whether the solubility of the component to be extracted is e.g. B. the aromatic hydrocarbons is high and the solubility of the non-aromatic component is low, is indicated by the distribution coefficient or the degree of selectivity.

[0006]

NJOY Exhibit 1002.1429

Asoil for the aromatic hydrocarbons, B for the non-aromatic hydrocarbons and C for the extraction solvent. Upon addition of C to the mixture of A and B, they separate into layers X and Y. The content of A in layer X is represented by XA and the content of B by XB. When the layer Y contains a large amount of extraction solvent C and the content A in the layer is represented by YA and that at B by YB, the following is defined for the partition coefficient and the degree of selectivity: The distribution coefficient with respect to the aromatic hydrocarbons is as follows. KA = YA/XA. For the degree of selectivity the following results: β = YA/XA - XB/YB = KA. XB/YB. When the mixed oils of aromatic and non-aromatic hydrocarbons are separated by means of the extraction solvents and when KA is large, it means that the aromatic hydrocarbons are more abundantly transferred to the extraction layers and little left in the refining layer.

[0007]

There is therefore the advantage that a smaller amount of extraction solvent is used. However, in particular, when aromatic hydrocarbons are to be selectively separated, it is preferable that the extraction layer contains only aromatic hydrocarbons and no non-aromatic hydrocarbons. This is the case when ß is large. Thus, one can consider the degree of selectivity β as a first yardstick for deciding the performance characteristics of an extraction solvent.

[0008]

b) A prerequisite for easy operation of the extraction operation is that not only can the extraction be carried out at normal temperature and pressure, but also that the size of the tower, i. H. the number of stages of the column, is relatively low and also the aromatic hydrocarbons are obtained in a high degree of purity. In this context, it is important that the degree of selectivity β of the extraction solvent, as described above under a), is high with respect to hydrocarbons containing large amounts of aromatic hydrocarbons, eg. For example, those containing more than 80 vol% of aromatic hydrocarbons. The reason for this is as follows. Even if the selectivity with respect to those hydrocarbons whose content of aromatic hydrocarbons is not large, d. H. 30 to 60 vol% is high, then it is necessary when the selectivity of the aromatic hydrocarbons is low with respect to those hydrocarbons whose content of aromatic hydrocarbons is high, d. H. more than 80% by volume, as mentioned above, to use an extraction column having an extremely large number of stages to obtain aromatic hydrocarbons in a high degree of purity.

On the other hand, the installation of an extraction column with too large a number of stages, i. H. an extraction column of very high altitude, from the practical point of view is an impossibility. And even if one divided the extraction column into many units and arranged them in series to accommodate the space of the assumed high extraction column, not only would it have no value to carry out the reflux operation but would be due to the unnecessary increase in the number of extraction columns and auxiliaries the control of the operation as well as the achievement of hydrocarbons of high purity still be difficult; and in addition, since the cost of the obtained product would be high, such a process would not be desirable.

[0009]

It should be noted that all percentages are by weight unless otherwise specified.

[0010]

In this connection, it is to be demanded that the specific gravity of the extraction solvent is remarkably different from that of the aromatic as well as the non-aromatic hydrocarbons.

This requirement is necessary because the rate at which the layers X and Y separate from each other changes in proportion to the difference between the specific gravity of the extraction solvent and the oil mixture in a high dilution coefficient and selectivity extraction solvent. If this difference is large, the time for the separation is short, and thus the operation is simplified.

[0011]

c) This is not without influence on the simplification of the operation, as described above under b), but it is also necessary that after extraction, the separation of the extraction solvent and the aromatic hydrocarbons - the extraction components - is carried out with water and the extraction efficiency of the extraction solvent, in particular its selectivity, is not impaired, even if a certain amount of water in the extraction solvent or the material to be extracted, d. H. the hydrocarbon is present. In general, it has been found that when water is used to separate the extraction solvent and the aromatic hydrocarbons after extraction from the hydrocarbons containing both aromatic and non-aromatic hydrocarbons, it is not only economical but also very operational is appropriate. It follows that it is necessary on the one hand, that the extraction solvent is miscible with water, while on the other hand, in the recovery of the extractant is virtually impossible, industrially a small amount of water of z.

NJOY Exhibit 1002.1430

B. about 0.5 to 3 () 1 "which is in mixture with the extractant to avoid. As a result, it is extremely important to select and use an extraction solvent whose extraction efficiency, especially its selectivity, is not impaired even when water is present in an amount as mentioned above in the extraction solvent or the aromatic hydrocarbons.

[0012]

Extensive researches, which solvents are suitable for the extraction of aromatic components from hydrocarbons containing both aromatic and non-aromatic hydrocarbons, have shown that a mixture of methanol and ethylene glycol, in which the latter in an amount of 40 to 80 ° / o is exceptionally well suited for use as an extraction solvent for the selective extraction separation of aromatic hydrocarbons. in fact, the extraction solvent according to the invention, which consists of a mixture of methanol and ethylene glycol, in which the latter is contained in an amount of 40 to 80 ° / o, surprisingly completely all those under a), b) and c) above described properties.

[0013]

The extraction solvent according to the invention consisting of a mixture of methanol with 40 to 80% ethylene glycol can be used to separate the above-mentioned aromatic and non-aromatic hydrocarbons from various types of hydrocarbons, which are firstly aromatic hydrocarbons having boiling points between about 75% and 75% 280 ° C, such as benzene and alkylbenzenes with side chains on the aromatic ring or derivatives of the benzene type, such as toluene, xylene, ethylbenzene, n-propylbenzene, isopropylbenzene, ethyltoluene, trimethylbenzene, tetramethylbenzene, cumene, diphenyl, and naphthalenes and hydrocarbons with aromatic condensed rings such as alkylnaphthalenes and naphthalene derivatives such as methylnaphthalene, dimethylnaphthalene, ethylnaphthalene, acenaphthalene, and secondarily containing non-aromatic hydrocarbons having boiling points between about 65 and 280 ° C, such as paraffinic hydrocarbons, among which pentane, hexane, He pian, octane, nonane, decane, undecane, dodecane, tridecane, tetradecane and their numerous isomers and naphthenic hydrocarbons, among which are the cyclic saturated hydrocarbons such as cyclohexane, tetralin, and cyclic saturated hydrocarbons with various side chains such as methylcyclohexane, dimethylcyclohexane, methyldecalin ,

As hydrocarbons containing these aromatic and non-aromatic hydrocarbons, z. For example, crude oil, cracked petroleum, reformed petroleum, coal tar oil cracked in the presence of hydrogen, carbonated coal tar oil, all containing aromatic hydrocarbons.

[0014]

The process of the invention can be applied to all of these hydrocarbons as starting material and from them in an extremely simple manner and at ordinary temperature the above-mentioned aromatic and non-aromatic hydrocarbons are separated.

[0015]

Details are given below with respect to the extraction mixture of methanol and 40 to 800 /, ethylene glycol.

[0016]

U.S. Patent 2 444 582 is already known as an extraction solvent for the selective separation of aromatic hydrocarbons from those containing aromatic non-aromatic hydrocarbons, for use as the primary solvent, compounds containing either a hydroxyl group in the molecule, or such containing two hydroxyl groups and at least one or more ethylene groups in the molecule, and to use as secondary solvent compounds having at least two or more hydroxyl groups in the molecule and mixing with the primary solvent.

[0017]

According to the proposal of this patent be used as the primary solvent z.

For example, methyl alcohol, ethyl alcohol, isopropyl alcohol, dipropylene glycol, tetraethylene glycol, hexaethylene glycol, Nonaäthylenglykol and »polyethylene glycol (MW 1500) <c, and as a secondary solvent z.

For example, ethylene glycol, diethylene glycol, triethylene glycol, tetraethylene glycol, called propylene glycol.

In particular, the use of the mixture of dipropylene glycol as the primary solvent and ethylene glycol as the secondary solvent is recommended.

NJOY Exhibit 1002.1431

[0018]

In studies on solvent mixtures of compounds having an O H group in the molecule, such as methyl alcohol, ethyl alcohol, isopropyl alcohol, d. H. the primary solvent, and compounds such as ethylene glycol, diethylene glycol, d. H. It has been found, as a general rule, that with increasing molecular weight of the primary solvent, i.e., the secondary solvent, in its properties as extraction solvents for hydrocarbons containing aromatic and non-aromatic hydrocarbons. H. of the monohydric alcohol, the distribution coefficient (KA) of the solvent mixture, d. H. its solvent power, for the aromatic components one and the same to be extracted good also shows a somewhat rising tendency. As for the dihydric alcohol, the secondary solvent, its distribution coefficient also tends to increase slightly with increasing molecular weight. However, concurrently with increasing molecular weight of both the primary and secondary solvents, the degree of selectivity (β) shows a sudden decrease.

[0019]

This fact is clearly illustrated in the examples of Figs. 1a, 1b and 2. In particular, Fig. 1 a shows the changes in the distribution coefficient (KA) of the solvent mixture between methyl alcohol, ethyl alcohol, n-propyl alcohol or isopropyl alcohol as monohydric alcohol on the one hand and ethylene glycol on the other hand in a ratio of 40: 60, while Fig. 1 b shows the change in the degree of selectivity (FIG. β) for the same mixtures. As the material to be extracted, mixtures were selected in which the aromatic and non-aromatic hydrocarbons having boiling points between 100 and 140 ° C are present in various ratios, and the extraction carried out at ordinary temperature.

[0020]

In Fig. 2 are the degrees of selectivity (ß) of solvent mixtures of methyl alcohol as monohydric alcohol and ethylene glycol, propylene glycol or Butylene glycol is shown as a dihydric alcohol in the ratio of 40: 60. In this case, the same good to be extracted and the same extraction temperature as in Fig. 1 a and 1 b was used. Even if z. B. diethylene glycol and dipropylene glycol as compounds having two hydroxyl groups and at least one or more ether groups in the molecule, d. H. as a primary solvent and ethylene glycol and propylene glycol as a compound having at least two or more hydroxyl groups in the molecule, d. H. have been selected and used as a secondary solvent, effects on the partition coefficient (KA) and degree of selectivity (β), the changes in the water content of the corresponding solvent mixture of dipropylene glycol with ethylene glycol, diethylene glycol with propylene glycol and dipropylene glycol with propylene glycol, all in proportion of 40: 60, which are shown in Figs. 3 and 4.

As can be seen from these figures, in all cases the partition coefficients (KA) for the stated primary and secondary solvents decrease in the presence of water. In addition, in the solvent mixture of diethylene glycol with propylene glycol and dipropylene glycol with ethylene glycol in the presence of water, the degree of selectivity (β) decreases abruptly, while in the solvent mixture of dipropylene glycol and propylene glycol, the degree of selectivity (β) was hardly affected by the presence of water. In summary, when these solvent mixtures are used as the extraction solvent in the presence of water, the distribution coefficient (KA) abruptly decreases in each case and the phenomenon of a marked increase in the degree of selectivity (β) does not appear anywhere.

[0021]

Further, when the same type of solvent mixture as that of diethylene glycol and ethylene glycol is used as the extraction solvent, since the distribution coefficient (KA) of the former is low, in the presence of water, the distribution coefficient (KA) further decreases, whereby the measurement of the extraction results is difficult. Thus, it has been found that this can never be used as an extraction solvent according to the invention. In this case, a 50:50 mixture of aromatic and non-aromatic hydrocarbons was used as the material to be extracted, in both cases the boiling points were between 100 and 140 ° C.

[0022]

The solvent mixtures of methyl alcohol and polyhydric alcohol having two or more hydroxyl groups in the molecule, such as propylene glycol, butylene glycol, but not ethylene glycol, also show a tendency for a somewhat sudden decrease in the partition coefficient (KA) in the presence of a small amount of water.

[0023]

NJOY Exhibit 1002.1432

The effects of the presence of water on the partition coefficient (KA) in mixtures of 40 parts of methyl alcohol and 60 parts of propylene glycol and 40 parts of methyl alcohol and 60 parts of butylene glycol are shown in FIG.

[0024]

Although, as described above, it is already known that a very ideal solvent for this type of extraction solvents is one whose partition coefficient must, from a practical standpoint, be above a certain level for the required extraction and its degree of selectivity at a given temperature , z.

B. ordinary temperature, not below a certain level, regardless of the content of aromatic hydrocarbons or the presence of small amounts of water in the hydrocarbons to be extracted may fail, so far no such extraction solvent has been found.

[0025]

Studies of the partition coefficients (KA) and degrees of selectivity (β) of the mixed solutions containing ethylene glycol and methyl alcohol in various ratios with respect to hydrocarbon mixtures also containing aromatic and non-aromatic hydrocarbons in various proportions are as shown in Figs Results result.

Further studies on how the presence of water on the partition coefficient (KA) and the degree of selectivity (ß) in two solvent mixtures of ethylene glycol and methyl alcohol, in which the two components in different ratios, in a ratio of 40:60 and in the ratio of 80:20, have produced the results shown in Figs. 8 and 9 and have led to a very surprising phenomenon. The material to be extracted used in the experiment, the results of which are shown in Figs. 8 and 9, was the same as that used in Fig. 3.

[0026]

From Figs. 6 to 9 it can be seen that the degree of selectivity (β) of the solvent mixture of ethylene glycol and methyl alcohol containing less than 40% ethylene glycol, not only generally with respect to the hydrocarbons to be extracted, is aromatic and non-aromatic hydrocarbons is low, and especially with respect to high aromatic hydrocarbon hydrocarbons, not only decreases but, moreover, decreases in low boiling mixed hydrocarbon oils, e.g. B. in benzene and cyclohexane, the layers of the extraction solution and the raffinate are homogenized, whereby the separation is impossible. On the other hand, if the content of ethylene glycol is more than 80 ° / □, the degree of selectivity (β) is excellent even with respect to those of high aromatic hydrocarbon content. However, the distribution coefficient (KA) is very low regardless of the content of aromatic hydrocarbons, and in the presence of water, the distribution coefficient (KA) becomes even lower and, therefore, does not have the characteristics of a satisfactory extraction solvent from the practical point of view.

[0027]

In contrast, the solvent mixtures of ethylene glycol and methyl alcohol according to the invention with a content of 40 to 800j, Athylenglykol distinguished not only by an excellent distribution coefficient (KA), but even in the presence of a small amount of water, the distribution coefficient does not decrease rapidly. Therefore, if the existing amount of water z. B. less than 4 ° /, the distribution coefficient (KA) not only be kept sufficiently above the level required in the extraction practice, on the contrary, the degree of selectivity (ß) increases in the presence of water fairly. Furthermore, in a hydrocarbon material to be extracted with a high content of aromatic hydrocarbons of z. B. more than 80% by volume of the degree of selectivity (ß) the characteristic, suddenly increase.

[0028]

The fact that the extraction capacity of the solvent mixture according to the invention is at least from the practical point of view not affected by the presence of water in an amount of about 1 to 4 ° / or less, is industrially very important. The reason for this is as follows: The solvent mixture of ethylene glycol and methyl alcohol with 40 to 80 ° / ethylene glycol according to the invention can be separated from the extracted aromatic hydrocarbons by the use of water, the cheapest of all materials, primarily after the extraction operation. Moreover, on this occasion, when the solvent mixture used is recovered after separation has been carried out, the presence of a small amount of water of about 1 to 4 ° / as described above is industrially unavoidable together with the water contained in the material to be extracted. Even if it should be possible to remove this small amount of water by distillation or otherwise - such a hassle and costly operation - there is a very strong industrial demand for an extraction solvent whose extraction capacity is sufficient even in the presence of a small amount of water about 1 to 40 /, does not decrease.

Thus, the solvent mixture according to the invention completely satisfies the requirements set forth above due to the maintenance of excellent distribution coefficient (KA) and degree of selectivity (β).

NJOY Exhibit 1002.1433

[0029]

As in the solvent mixture according to the invention the specific gravity of methyl alcohol bei. -, 20 ° C 0.7928 and that of ethylene glycol at 20 ° C is 1.113 and there is a difference in the specific gravities of both, it is possible to obtain solvent mixtures of various specific gravities by appropriately controlling the mixing ratio of ethylene glycol and methyl alcohol in the range Athylenglykolgehaltes from 40 to 80 '/, to produce. Thus, according to the present invention, it is possible to readily control the hydrocarbons to be extracted in a wide range of hydrocarbons, including hydrocarbon material having relatively large amounts of low boiling hydrocarbons such as benzene, cyclohexane, hexane, to such hydrocarbon materials having relatively large amounts of high boiling hydrocarbons such as hydrocarbons Methylnaphthalene, acenaphthene, tetralin, tetradecane, to separate contained aromatic hydrocarbons.

[0030]

While the extraction according to the invention can be carried out very smoothly at ordinary temperatures and pressures, as stated above, particularly good working conditions, e.g. B. at ordinary pressure and a temperature below 40 ° C and z. B. at a pressure below 10 atm. and a temperature below 130 ° C, given.

[0031]

The solvent mixture of the present invention is made of materials which are readily available industrially and cheaply, and moreover, since they do not exert a corrosive action, no special materials are needed at all for the extraction apparatuses. Further, it is possible to carry out not only the extraction at ordinary temperatures and pressures but also, since the degree of selectivity (β) is high with respect to hydrocarbons having a high content of aromatic hydrocarbons, high purity aromatic hydrocarbons by separation by means of an extraction column to obtain very small number of stages.

[0032]

In the practice of the method according to the invention can be used as extraction column one which consists of alternately resting and mixing zones or one of the packing type, usually with z. B. Raschig rings is packed, or a pulsating extraction column can be used.

[0033]

Hereinafter, an example of the extraction column of the type according to which rest and mixing zones are provided alternately, will be given with reference to Fig. 10.

[0034]

The extractant is fed from the container 7 through the line 10 to the upper part of the extraction column 1 with the rest zones 3, the mixing zones 4 and the stirrer 2 provided in these mixing zones.

At some height near the middle zone of the column, the hydrocarbon material to be extracted is fed from the vessel 8 through the conduit 11, while the reflux from the vessel 9 through line 12 is supplied to the lower zone column in proportions required. Furthermore, 1 quiet zones 5 and 6 are provided at the very bottom and top of the extraction column. 13, 14 and 15 are the corresponding pumps. 16, 17 and 18 are flowmeters and 19, 20 and 21 taps. The extraction solution is passed through line 23 with the tap 25 into the collecting tank 27, and the raffinate is passed through line 22 with the tap 24 into the collecting tank 26.

[0035]

Since in the raffinate, which consists essentially of non-aromatic hydrocarbons, about 10 / of the extraction solvent, i. H. the solvent mixture of ethylene glycol and methyl alcohol in the ratio described is in mixture, the latter is recovered by means of a suitable solvent, such as water, while the extraction solution in vessel 27 is also extracted with the aid of a suitable solvent, and after separation of the aromatic hydrocarbon, said solvent mixture is distilled and recovered.

[0036]

NJOY Exhibit 1002.1434

According to the invention, when the extraction is carried out using an extraction column of the type consisting alternately of a quiescent and a mixing zone as described above, an extraction solution containing aromatic hydrocarbons in a purity greater than 95% by volume can be obtained immediately when separating from an extraction solution with an extraction column usually less than 35 stages, the quiescent zone and the mixing zone being considered as one pair and counted as one stage.

[0037]

When a packed-type extraction column is used, it is also possible to directly obtain an extraction solution containing aromatic hydrocarbons having a purity of more than 95% by volume, usually less than 40 theoretical stages.

Hereinafter, the method of the invention will be described by way of example, but for the purpose of illustration only.

Example An extracting apparatus as shown in Fig. 10 is used, which comprises an extraction column having an effective column height of 3600 mm and an inner diameter of 100 mm and consisting of 30 stages, whereby one stage consists of a 90 mm Height and a mixing zone 4 with 30 mm height, in which a stirrer 2 is provided with a length of 50 mm, composed. As a solvent mixture of ethylene glycol and methyl alcohol, such a ratio of 60:40 is used and the hydrocarbon material of the following composition at a flow rate of 201 / hr. at a feed rate of the hydrocarbon material of 31 / hr. extracted. Hydrocarbon material (bp. 70 to 140 ° C) aromatic hydrocarbons ... 50 Volum% non-aromatic hydrocarbons .. 50 Volum% The reflux consisted of hydrocarbons composed of 96% by volume of aromatic hydrocarbons and 4% non-aromatic hydrocarbons having a boiling point of 70-140 ° C. and its feed rate was 4.51 / hr.

In addition, the feed line 12 of reflux into the second stage mixing zone was opened from the bottom; the feedstock 11 for feeding the hydrocarbon material to be extracted was opened into the tenth step mixing zone from the bottom and the feed material feed line 10 into the top mixing zone.

[0038]

In the extraction, the flow rate of the extraction solvent was 25.61 / hr, and as a result, a hydrocarbon containing 96% by volume of aromatic hydrocarbons at a rate of 6.01 / hr. receive.

[0039]

On the other hand, the raffinate was at a rate of 1.51 / hr. and its content of non-aromatic hydrocarbons was 95% by volume, the content of extraction solvent in the raffinate was 0.6% by volume.

NJOY Exhibit 1002.1435

BUNDESREPUBLIK DEUTSCHLAND

KL. 23 b 2/01

DEUTSCHES PATENTAMT

INTERNAT. KL. C 10 g

AUSLEGESCHRIFT 1 093 936

H 36958 IVc/23 b

ANMELDETAG: 18. JULI 1959

BEKANNTMACHUNG DER ANMELDUNG UND AUSGABE DER AUSLEGESCHRIFT: 1. DEZEMBER 1960

Verfahren zur selektiven Abtrennung von aromatischen Kohlenwasserstoffen aus Kohlenwasserstoff durch Extraktion

Anmelder:

Hokkaido Tanko Kisen Kabushiki Kaisha, Tokio

Vertreter: Dr. G. W. Lotterhos und Dr.-Ing. H. W. Lotterhos, Patentanwälte, Frankfurt/M., Lichtensteinstr. 3

Beanspruchte Priorität:

Japan vom 18. Juli 1958

Kozo Higuchi, Tokio,
Tetsuro Osa, Nagasaki, und Takao, Takeuchi, Tokio (Japan),
sind als Erfinder genannt worden

1

Die Erfindung betrifft ein Verfahren zur selektiven Abtrennung von aromatischen Kohlenwasserstoffen in hohem Reinheitsgrad mittels kontinuierlicher Extraktion aus Kohlenwasserstoffgemischen, die sowohl aromatische als auch nichtaromatische Kohlenwasserstoffe enthalten, wobei eine Extraktionskolonne, die eine verhältnismäßig geringe Anzahl von Stufen aufweist, verwendet wird.

Während die Abtrennung der Kohlenwasserstofföle, wie sie in den gemischten Ölen der aromatischen und nichtaromatischen Kohlenwasserstoffe des Paraffin- und Naphthen-Typs enthalten sind, im Hinblick auf die Gewinnung von chemischen Rohmaterialien eine sehr wichtige Operation darstellt, ist in den letzten Jahren infolge der gesteigerten Nachfrage, insbesondere nach aromatischen Verbindungen, die Forderung nach einer selektiven Abtrennung nur der aromatisierten Erdölleichtöle und der Kohlenteerleichtöle erhoben worden.

Unter den bislang bekanntgewordenen Methoden zur Abtrennung von aromatischen Kohlenwasserstoffen befinden sich beispielsweise solche wie azeotropische Destillation, extraktive Destillation und Adsorption. Außer diesen ist die Methode der Extraktion mittels Lösungsmitteln, die gegenüber aromatischen Kohlenwasserstoffen selektiv sind, bekannt.

Die allgemeinen Forderungen, die an Extraktionslösungsmittel, die zur Extraktion von aromatischen Kohlenwasserstoffen aus Kohlenwasserstoffen verwendet werden, die sowohl aromatische als auch nichtaromatische Kohlenwasserstoffe enthalten, gestellt werden, sind folgende: daß sie billig und leicht verfügbar sein und Stabilität aufweisen müssen, jedoch keine Korrosionswirkung ausüben dürfen, daß zwischen dem spezifischen Gewicht des Extraktionslösungsmittels und dem des zu extrahierenden Gutes ein ziemlicher Unterschied besteht und daß sich nicht nur das Extraktionslösungsmittel gut wiedergewinnen lassen soll. Jedoch Faktoren von noch größerer Bedeutung sind, daß die Löslichkeit der zu extrahierenden Komponenten, d. h. der aromatischen Kohlenwasserstoffe, in dem Extraktionslösungsmittel hoch, dagegen die Löslichkeit der nichtaromatischen Komponente niedrig ist, daß die Extraktionsoperation einfach und die Wirksamkeit der Extraktion durch die Anwesenheit von Wasser nicht beeinträchtigt wird.

Von diesen Eigenschaften sind diejenigen, denen eine besondere Bedeutung zukommt, nachfolgend mehr ins einzelne gehend beschrieben:

a) Die Tatsache, ob die Löslichkeit der zu extrahierenden Komponente z. B. der aromatischen Kohlenwasserstoffe hoch und die Löslichkeit der nichtaromatischen Komponente gering ist, wird durch den Verteilungskoeffizienten bzw. den Selektivitätsgrad angegeben.

A soll für die aromatischen Kohlenwasserstoffe, *B* für die nichtaromatischen Kohlenwasserstoffe und *C* für das Extraktionslösungsmittel gesetzt werden. Nach Zugabe

2

von *C* zu der Mischung von *A* und *B* trennen sie sich in die Schichten *X* und *Y*. Der Gehalt an *A* in der Schicht *X* wird durch X_A und der Gehalt an *B* durch X_B wiedergegeben. Wenn die Schicht *Y* eine große Menge Extraktionslösungsmittel *C* enthält und der Gehalt *A* in der Schicht durch Y_A und der an *B* durch Y_B wiedergegeben ist, ergibt sich für den Verteilungskoeffizienten und den Selektivitätsgrad folgende Definition:

Der Verteilungskoeffizient in bezug auf die aromatischen Kohlenwasserstoffe ist folgender:

$$K_A = Y_A/X_A.$$

Für den Selektivitätsgrad ergibt sich folgendes:

$$\beta = Y_A/X_A \cdot X_B/Y_B = K_A \cdot X_B/Y_B.$$

Wenn die gemischten Öle von aromatischen und nichtaromatischen Kohlenwasserstoffen mittels der Extraktionslösungsmittel getrennt werden und wenn K_A groß ist, so bedeutet das, daß die aromatischen Kohlenwasserstoffe in größerer Menge in die Extraktionsschichten übergehen und wenig in der Raffinationsschicht zurückbleibt.

Es besteht daher der Vorteil, daß eine geringere Menge an Extraktionslösungsmittel verwendet wird. Wenn jedoch insbesondere aromatische Kohlenwasserstoffe selektiv abgetrennt werden sollen, ist es vorzuziehen, wenn die Extraktionsschicht nur aromatische Kohlenwasserstoffe und keine nichtaromatischen Kohlenwasserstoffe

009 650/415

NJOY Exhibit 1002.1436

enthält. Dies ist der Fall, wenn β groß ist. So kann man den Selektivitätsgrad β als einen ersten Maßstab für eine Entscheidung über die Leistungseigenschaften eines Extraktionslösungsmittels ansehen.

b) Vorbedingung für eine leichte Durchführbarkeit der Extraktionsoperation ist, daß nicht nur die Extraktion bei normaler Temperatur und normalem Druck durchgeführt werden kann, sondern daß auch die Größe des Turms, d. h. die Anzahl der Stufen der Kolonne, verhältnismäßig gering ist und außerdem die aromatischen Kohlenwasserstoffe in hohem Reinheitsgrad erhalten werden. In diesem Zusammenhang ist von Bedeutung, daß der Selektivitätsgrad β des Extraktionslösungsmittels, wie weiter oben unter a) beschrieben, hoch ist mit Bezug auf Kohlenwasserstoffe, die große Mengen an aromatischen Kohlenwasserstoffen, z. B. solchen, die mehr als 80 Volumprozent an aromatischen Kohlenwasserstoffen enthalten. Der Grund hierfür ist folgender: Selbst wenn die Selektivität mit Bezug auf solche Kohlenwasserstoffe, deren Gehalt an aromatischen Kohlenwasserstoffen nicht groß ist, d. h. 30 bis 60 Volumprozent beträgt, hoch ist, dann ist es notwendig, wenn die Selektivität der aromatischen Kohlenwasserstoffe im Hinblick auf jene Kohlenwasserstoffe gering ist, deren Gehalt an aromatischen Kohlenwasserstoffen hoch ist, d. h. mehr als 80 Volumprozent beträgt, wie weiter oben erwähnt wurde, eine Extraktionskolonne mit einer außerordentlich großen Anzahl von Stufen zu benutzen, um aromatische Kohlenwasserstoffe in hohem Reinheitsgrad zu erhalten. Andererseits stellt die Installation einer Extraktionskolonne mit einer zu großen Anzahl von Stufen, d. h. einer Extraktionskolonne sehr großer Höhe, vom praktischen Standpunkt aus eine Unmöglichkeit dar. Und selbst wenn man die Extraktionskolonne in viele Einheiten unterteilte und sie in Reihe anordnete, um den Raum der angenommenen hohen Extraktionskolonne unterzubringen, würde es nicht nur keinen Wert haben, die Rückflußoperation durchzuführen, sondern infolge der unnötigen Vergrößerung der Anzahl an Extraktionskolonnen und der Hilfseinrichtungen würde die Kontrolle der Operation ebenso wie die Erzielung von Kohlenwasserstoffen hohen Reinheitsgrades noch schwierig sein; und da außerdem die Kosten des erhaltenen Produkts hoch sein würden, wäre ein solches Verfahren nicht wünschenswert.

Es soll darauf hingewiesen werden, daß alle Prozentangaben, wenn nicht anders angegeben, als Gewichtsprozente zu verstehen sind.

In diesem Zusammenhang ist zu fordern, daß das spezifische Gewicht des Extraktionslösungsmittels merklich verschieden von dem der aromatischen sowie der nichtaromatischen Kohlenwasserstoffe ist. Diese Forderung ist notwendig, weil sich die Geschwindigkeit, mit welcher sich die Schichten X und Y voneinander trennen, im Verhältnis zu dem Unterschied zwischen dem spezifischen Gewicht des Extraktionslösungsmittels und dem Ölgemisch bei einem Extraktionslösungsmittel mit hohem Verteilungskoeffizienten- und Selektivitätsgrad ändert. Wenn dieser Unterschied groß ist, ist die Zeit für die Trennung kurz, und damit wird die Operation vereinfacht.

c) Dies ist auch nicht ohne Einfluß auf die Vereinfachung der Operation, wie weiter oben unter b) beschrieben wurde, es ist jedoch auch notwendig, daß nach der Extraktion die Abtrennung des Extraktionslösungsmittels und der aromatischen Kohlenwasserstoffe — der Extraktionskomponenten — mit Wasser durchgeführt wird und die Extraktionswirksamkeit des Extraktionslösungsmittels, insbesondere seine Selektivität, nicht beeinträchtigt wird, selbst wenn eine gewisse Menge Wasser in dem Extraktionslösungsmittel oder dem zu extrahierenden Gut, d. h. dem Kohlenwasserstoff, vorhanden ist. Im allgemeinen hat es sich erwiesen, daß bei Verwendung von Wasser, um das Extraktionslösungsmittel und die aromatischen Kohlenwasserstoffe nach der Extraktion von den Kohlenwasserstoffen, die sowohl aromatische als auch nichtaromatische Kohlenwasserstoffe enthalten, zu trennen, dies nicht nur wirtschaftlich, sondern vom operativen Standpunkt auch sehr zweckmäßig ist. Hieraus ergibt sich, daß es einerseits notwendig ist, daß das Extraktionslösungsmittel mit Wasser mischbar ist, während es andererseits bei der Wiedergewinnung des Extraktionsmittels praktisch unmöglich ist, industriell eine geringe Wassermenge von z. B. etwa 0,5 bis 3 %, die sich in Mischung mit dem Extraktionsmittel befindet, zu vermeiden. Infolgedessen ist es von außerordentlicher Bedeutung, ein Extraktionslösungsmittel auszuwählen und zu verwenden, dessen Extraktionswirksamkeit, insbesondere seine Selektivität, nicht beeinträchtigt wird, selbst wenn Wasser in einer Menge wie oben angegeben in dem Extraktionslösungsmittel oder den aromatischen Kohlenwasserstoffen vorhanden ist.

Ausgedehnte Untersuchungen, welche Lösungsmittel sich für die Extraktion von aromatischen Komponenten aus Kohlenwasserstoffen eignen, die sowohl aromatische als auch nichtaromatische Kohlenwasserstoffe enthalten, haben ergeben, daß sich eine Mischung von Methanol und Äthylenglykol, in welcher letzteres in einer Menge von 40 bis 80 % enthalten ist, außerordentlich gut für die Verwendung als Extraktionslösungsmittel für die selektive Extraktionsabtrennung aromatischer Kohlenwasserstoffe eignet. In der Tat weist das Extraktionslösungsmittel gemäß Erfindung, das aus einer Mischung von Methanol und Äthylenglykol besteht, in welcher letzteres in einer Menge von 40 bis 80 % enthalten ist, überraschend vollständig alle die unter a), b) und c) weiter oben beschriebenen Eigenschaften auf.

Das Extraktionslösungsmittel gemäß Erfindung, das aus einer Mischung von Methanol mit 40 bis 80 % Äthylenglykol besteht, kann zur Trennung der weiter oben erwähnten aromatischen und nichtaromatischen Kohlenwasserstoffe aus verschiedenen Arten von Kohlenwasserstoffen angewendet werden, die erstens aromatische Kohlenwasserstoffe mit Siedepunkten zwischen etwa 75 und 280°C enthalten, wie Benzol und Alkylbenzole mit Seitenketten am aromatischen Ring oder Derivate vom Benzoltyp, wie Toluol, Xylol, Äthylbenzol, n-Propylbenzol, Isopropylbenzol, Äthyltoluol, Trimethylbenzol, Tetramethylbenzol, Cumol, Diphenyl, und Naphthaline und Kohlenwasserstoffe mit aromatischen kondensierten Ringen, wie Alkylnaphthaline und Naphthalinderivate, wie Methylnaphthalin, Dimethylnaphthalin, Äthylnaphthalin, Acenaphthalin, enthalten und zweitens nichtaromatische Kohlenwasserstoffe, deren Siedepunkte zwischen etwa 65 und 280°C betragen, enthalten, wie Paraffinkohlenwasserstoffe, worunter Pentan, Hexan, Heptan, Octan, Nonan, Decan, Undecan, Dodecan, Tridecan, Tetradecan sowie deren zahlreichen Isomeren und Naphthenkohlenwasserstoffe, worunter die cyclischen, gesättigten Kohlenwasserstoffe, wie Cyclohexan, Tetralin, fallen und cyclische, gesättigte Kohlenwasserstoffe mit verschiedenen Seitenketten, wie Methylcyclohexan, Dimethylcyclohexan, Methyldecalin. Als Kohlenwasserstoffe, die diese aromatischen und nichtaromatischen Kohlenwasserstoffe enthalten, können z. B. Roherdöl, gecracktes Erdöl, reformiertes Erdöl, in Anwesenheit von Wasserstoff gecracktes Kohlenteeröl, carbonisiertes Kohlenteeröl genannt werden, welche alle aromatische Kohlenwasserstoffe enthalten.

Das Verfahren der Erfindung kann auf alle diese Kohlenwasserstoffe als Ausgangsmaterial angewendet werden und aus ihnen in außerordentlich einfacher Weise und bei gewöhnlicher Temperatur die weiter oben er-

NJOY Exhibit 1002.1437

wähnten aromatischen und nichtaromatischen Kohlenwasserstoffe abgetrennt werden.

Nachfolgend werden Einzelheiten mit Bezug auf die Extraktionsmischung von Methanol und 40 bis 80% Äthylenglykol angegeben.

Aus der USA.-Patentschrift 2 444 582 ist schon bekannt, als Extraktionslösungsmittel für die selektive Abtrennung von aromatischen Kohlenwasserstoffen aus solchen, die neben aromatischen nichtaromatische Kohlenwasserstoffe enthalten, für die Verwendung als primäres Lösungsmittel Verbindungen, die entweder eine Hydroxylgruppe im Molekül, oder solche, die zwei Hydroxylgruppen und mindestens eine oder mehrere Äthylengruppen im Molekül enthalten, und als sekundäres Lösungsmittel Verbindungen zu benutzen, die mindestens zwei oder mehrere Hydroxylgruppen im Molekül aufweisen und sich mit dem primären Lösungsmittel mischen.

Nach dem Vorschlag dieser Patentschrift werden als primäre Lösungsmittel z. B. Methylalkohol, Äthylalkohol, Isopropylalkohol, Dipropylenglykol, Tetraäthylenglykol, Hexaäthylenglykol, Nonaäthylenglykol und »Polyäthylenglykol (MG 1500)«, und als sekundäre Lösungsmittel z. B. Äthylenglykol, Diäthylenglykol, Triäthylenglykol, Tetraäthylenglykol, Propylenglykol genannt. Insbesondere wird die Verwendung der Mischung von Dipropylenglykol als primäres Lösungsmittel und Äthylenglykol als sekundäres Lösungsmittel empfohlen.

Bei Untersuchungen an Lösungsmittelmischungen von Verbindungen mit einer OH-Gruppe im Molekül, wie Methylalkohol, Äthylalkohol, Isopropylalkohol, d. h. dem primären Lösungsmittel, und von Verbindungen, wie Äthylenglykol, Diäthylenglykol, d. h. dem sekundären Lösungsmittel, auf ihre Eigenschaften als Extraktionslösungsmittel für Kohlenwasserstoffe, die aromatische und nichtaromatische Kohlenwasserstoffe enthalten, hat es sich als allgemeine Regel herausgestellt, daß mit ansteigendem Molekulargewicht des primären Lösungsmittels, d. h. des einwertigen Alkohols, der Verteilungskoeffizient (K_A) der Lösungsmittelmischung, d. h. sein Lösungsvermögen, für die aromatischen Komponenten ein und desselben zu extrahierenden Gutes ebenfalls eine etwas steigende Tendenz zeigt. Was den zweiwertigen Alkohol, das sekundäre Lösungsmittel, anbetrifft, so neigt dessen Verteilungskoeffizient auch dazu, mit steigendem Molgewicht leicht zuzunehmen. Jedoch gleichlaufend mit steigendem Molgewicht sowohl des primären als auch des sekundären Lösungsmittels zeigt der Selektivitätsgrad (β) eine plötzliche Abnahme.

Diese Tatsache ist in den Beispielen der Abb. 1a, 1b und 2 klar verdeutlicht. Insbesondere Abb. 1a zeigt die Änderungen des Verteilungskoeffizienten (K_A) der Lösungsmittelmischung zwischen Methylalkohol, Äthylalkohol, n-Propylalkohol oder Isopropylalkohol als einwertigem Alkohol einerseits und Äthylenglykol andererseits in einem Verhältnis von 40 : 60, während Abb. 1b die Änderung des Selektivitätsgrades (β) für dieselben Mischungen zeigt. Als zu extrahierendes Gut wurden Mischungen gewählt, in denen die aromatischen und nichtaromatischen Kohlenwasserstoffe mit Siedepunkten zwischen 100 und 140°C in verschiedenen Verhältnissen vorliegen, und die Extraktion bei gewöhnlicher Temperatur durchgeführt.

In Abb. 2 sind die Selektivitätsgrade (β) von Lösungsmittelmischungen aus Methylalkohol als einwertigem Alkohol und Äthylenglykol, Propylenglykol bzw. Butylenglykol als zweiwertigen Alkohol im Verhältnis von 40 : 60 dargestellt. In diesem Falle wurde dasselbe zu extrahierende Gut und dieselbe Extraktionstemperatur wie in Abb. 1a und 1b benutzt.

Auch wenn z. B. Diäthylenglykol und Dipropylenglykol als Verbindungen mit zwei Hydroxylgruppen und mindestens einer oder mehreren Äthergruppen im Molekül, d. h. als primäres Lösungsmittel und Äthylenglykol und Propylenglykol als Verbindung mit mindestens zwei oder mehreren Hydroxylgruppen im Molekül, d. h. als sekundäres Lösungsmittel ausgewählt und benutzt wurden, so zeigen sich Wirkungen auf den Verteilungskoeffizienten (K_A) und den Selektivitätsgrad (β), die die Änderungen in dem Wassergehalt der entsprechenden Lösungsmittelmischung von Dipropylenglykol mit Äthylenglykol, Diäthylenglykol mit Propylenglykol und Dipropylenglykol mit Propylenglykol, alle im Verhältnis von 40 : 60, begleiten, welche in Abb. 3 und 4 dargestellt sind. Wie diesen Figuren zu entnehmen ist, nehmen in allen Fällen bei den angegebenen primären und sekundären Lösungsmitteln die Verteilungskoeffizienten (K_A) bei Anwesenheit von Wasser ab. Darüber hinaus nimmt in der Lösungsmittelmischung von Diäthylenglykol mit Propylenglykol und Dipropylenglykol mit Äthylenglykol bei Anwesenheit von Wasser der Selektivitätsgrad (β) abrupt ab, während in der Lösungsmittelmischung von Dipropylenglykol und Propylenglykol der Selektivitätsgrad (β) durch die Anwesenheit von Wasser kaum berührt wurde. Zusammenfassend kann gesagt werden, daß bei Verwendung dieser Lösungsmittelmischungen als Extraktionslösungsmittel in Gegenwart von Wasser der Verteilungskoeffizient (K_A) in jedem Falle abrupt abnimmt und sich das Phänomen eines merklichen Anstieges des Selektivitätsgrades (β) nirgends zeigt.

Wenn des weiteren als derselbe Typ von Lösungsmittelmischung eine solche von Diäthylenglykol und Äthylenglykol als Extraktionslösungmittel benutzt wird, dann nimmt, da der Verteilungskoeffizient (K_A) des ersteren niedrig ist, bei Anwesenheit von Wasser der Verteilungskoeffizient (K_A) weiterhin ab, wodurch die Messung der Extraktionsergebnisse erschwert wird. So hat es sich gezeigt, daß diese niemals als ein Extraktionslösungsmittel gemäß Erfindung benutzt werden kann. In diesem Fall war als zu extrahierendes Gut eine 50 : 50-Mischung von aromatischen und nichtaromatischen Kohlenwasserstoffen benutzt worden, wobei in beiden Fällen die Siedepunkte zwischen 100 und 140°C lagen.

Die Lösungsmittelmischungen von Methylalkohol und mehrwertigem Alkohol mit zwei oder mehreren Hydroxylgruppen im Molekül, wie Propylenglykol, Butylenglykol, jedoch nicht Äthylenglykol, zeigen auch eine Tendenz zu einer etwas plötzlichen Abnahme des Verteilungskoeffizienten (K_A) bei Anwesenheit einer geringen Wassermenge.

Die Wirkungen, die die Anwesenheit von Wasser auf den Verteilungskoeffizienten (K_A) in Mischungen von 40 Teilen Methylalkohol und 60 Teilen Propylenglykol sowie 40 Teilen Methylalkohol und 60 Teilen Butylenglykol ausüben, sind in Abb. 5 dargestellt.

Obgleich, wie weiter oben beschrieben wurde, es schon bekannt ist, daß ein sehr ideales Lösungsmittel für diesen Typ von Extraktionslösungsmitteln ein solches ist, dessen Verteilungskoeffizient vom praktischen Standpunkt aus oberhalb einer gewissen Höhe für die geforderte Extraktion liegen muß und dessen Selektivitätsgrad bei einer gegebenen Temperatur, z. B. gewöhnlicher Temperatur, nicht unter eine gewisse Höhe, und zwar unabhängig von dem Gehalt an aromatischen Kohlenwasserstoffen oder der Anwesenheit geringer Wassermengen in den zu extrahierenden Kohlenwasserstoffen absinken darf, ist bislang ein solches Extraktionslösungsmittel noch nicht gefunden worden.

Untersuchungen der Verteilungskoeffizienten (K_A) und der Selektivitätsgrade (β) der Lösungsgemische, die

NJOY Exhibit 1002.1438

Äthylenglykol und Methylalkohol in verschiedenen Verhältnissen enthalten, im Hinblick auf Kohlenwasserstoffmischungen, die aromatische und nichtaromatische Kohlenwasserstoffe gleichfalls in verschiedenen Verhältnissen enthalten, haben die in den Abb. 6 und 7 dargestellten Resultate ergeben. Weitere Untersuchungen darüber, wie sich die Anwesenheit von Wasser auf den Verteilungskoeffizienten (K_A) und den Selektivitätsgrad (β) in zwei Lösungsmittelmischungen von Äthylenglykol und Methylalkohol, in denen die beiden Komponenten in verschiedenen Verhältnissen, und zwar im Verhältnis von 40 : 60 und im Verhältnis von 80 : 20 vorliegen, auswirkt, haben die in Abb. 8 und 9 festgestellten Resultate ergeben und zu einer sehr überraschenden Erscheinung geführt. Das in dem Experiment benutzte zu extrahierende Gut, dessen Resultate in Abb. 8 und 9 niedergelegt sind, war dasselbe, das bei Abb. 3 benutzt worden war.

Aus den Abb. 6 bis 9 wird ersichtlich, daß der Selektivitätsgrad (β) der Lösungsmittelmischung von Äthylenglykol und Methylalkohol mit einem Gehalt an Äthylenglykol von weniger als 40 % nicht nur allgemein mit Bezug auf die zu extrahierenden Kohlenwasserstoffe, welche aromatische und nichtaromatische Kohlenwasserstoffe enthalten, niedrig ist und insbesondere mit Bezug auf Kohlenwasserstoffe mit hohem Gehalt an aromatischen Kohlenwasserstoffen nicht nur abnimmt, sondern darüber hinaus bei gemischten Kohlenwasserstoffölen mit niedrigem Siedepunkt, z. B. bei Benzol und Cyclohexan, die Schichten der Extraktionslösung und des Raffinates homogenisiert werden, wodurch die Trennung unmöglich wird. Wenn dagegen der Gehalt an Äthylenglykol mehr als 80 % beträgt, ist der Selektivitätsgrad (β) ausgezeichnet, selbst mit Bezug auf jene Materialien mit hohem Gehalt an aromatischen Kohlenwasserstoffen. Jedoch der Verteilungkoeffizient (K_A) ist sehr niedrig, unabhängig von dem Gehalt an aromatischen Kohlenwasserstoffen, und bei Anwesenheit von Wasser wird der Verteilungkoeffizient (K_A) noch niedriger und weist deshalb vom praktischen Standpunkt aus nicht die Eigenschaften eines befriedigenden Extraktionslösungsmittels auf.

Dagegen zeichnen sich die Lösungsmittelmischungen von Äthylenglykol und Methylalkohol gemäß Erfindung mit einem Gehalt von 40 bis 80 % Äthylenglykol nicht nur durch einen ausgezeichneten Verteilungskoeffizienten (K_A) aus, sondern selbst bei Anwesenheit einer geringen Wassermenge nimmt der Verteilungskoeffizient nicht schnell ab. Daher kann, wenn die vorhandene Wassermenge z. B. weniger als 4 % beträgt, der Verteilungskoeffizient (K_A) nicht nur in genügendem Maß oberhalb der in der Extraktionspraxis geforderten Höhe gehalten werden, im Gegenteil, der Selektivitätsgrad (β) steigt bei Anwesenheit von Wasser ziemlich an. Weiterhin zeigt bei einem zu extrahierenden Kohlenwasserstoffmaterial mit hohem Gehalt an aromatischen Kohlenwasserstoffen von z. B. mehr als 80 Volumprozent der Selektivitätsgrad (β) das Charakteristikum, plötzlich anzusteigen.

Der Tatsache, daß die Extraktionskapazität der Lösungsmittelmischung gemäß Erfindung mindestens vom praktischen Standpunkt aus durch die Anwesenheit von Wasser in einer Menge von etwa 1 bis 4 % oder weniger nicht beeinträchtigt wird, kommt industriell eine sehr große Bedeutung zu. Der Grund hierfür ist folgender: Die Lösungsmittelmischung von Äthylenglykol und Methylalkohol mit 40 bis 80 % Äthylenglykol gemäß Erfindung kann in erster Linie nach der Extraktionsoperation von den extrahierten aromatischen Kohlenwasserstoffen durch die Anwendung von Wasser, dem billigsten aller Materialien, abgetrennt werden. Darüber hinaus ist bei dieser Gelegenheit, wenn die verwendete Lösungsmittelmischung nach durchgeführter Trennung wiedergewonnen wird, die Anwesenheit einer geringen Wassermenge von etwa 1 bis 4 %, wie weiter oben beschrieben, zusammen mit dem in dem zu extrahierenden Gut enthaltenen Wasser industriell unvermeidbar. Selbst wenn es möglich sein sollte, diese geringe Wassermenge durch Destillation oder in einer anderen Weise zu entfernen — wobei eine solche Maßnahme lästig und kostspielig ist —, ergibt sich eine sehr starke industrielle Forderung nach einem Extraktionslösungsmittel, dessen Extraktionskapazität selbst bei Anwesenheit einer geringen Wassermenge von etwa 1 bis 4 % nicht absinkt. Somit erfüllt die Lösungsmittelmischung gemäß Erfindung infolge der Aufrechterhaltung eines ausgezeichneten Verteilungskoeffizienten (K_A) und Selektivitätsgrades (β) vollständig die weiter oben dargelegten Forderungen.

Da in der erfindungsgemäßen Lösungsmittelmischung das spezifische Gewicht von Methylalkohol bei 20°C 0,7928 und das des Äthylenglykols bei 20°C 1,113 beträgt und damit ein Unterschied in den spezifischen Gewichten beider vorhanden ist, ist es möglich, Lösungsmittelmischungen verschiedener spezifischer Gewichte durch geeignete Regelung des Mischungsverhältnisses von Äthylenglykol und Methylalkohol in dem Bereich des Äthylenglykolgehaltes von 40 bis 80 % herzustellen. Folglich ist es gemäß Erfindung möglich, in einfacher Weise die in einem weiten Bereich von zu extrahierenden Kohlenwasserstoffen, worunter Kohlenwasserstoffmaterial mit verhältnismäßig großen Mengen an niedrigsiedenden Kohlenwasserstoffen, wie Benzol, Cyclohexan, Hexan, bis zu solchen Kohlenwasserstoffmaterialien mit verhältnismäßig großen Mengen an hochsiedenden Kohlenwasserstoffen, wie Methylnaphthalin, Acenaphthen, Tetralin, Tetradecan, fallen, enthaltenen aromatischen Kohlenwasserstoffe abzutrennen.

Während die erfindungsgemäße Extraktion sehr glatt bei gewöhnlichen Temperaturen und Drücken, wie weiter oben angegeben, durchgeführt werden kann, sind besonders gute Arbeitsbedingungen, z. B. bei gewöhnlichem Druck und einer Temperatur unterhalb von 40°C und z. B. bei einem Druck unterhalb von 10 Atm. und einer Temperatur unterhalb von 130°C, gegeben.

Die erfindungsgemäße Lösungsmittelmischung besteht aus Materialien, die industriell leicht verfügbar und billig sind, und da sie überdies keine Korrosionswirkung ausüben, werden für die Extraktionsapparate überhaupt keine Spezialmaterialien benötigt. Weiterhin ist es möglich, nicht nur die Extraktion bei gewöhnlichen Temperaturen und Drücken durchzuführen, sondern auch, da der Selektivitätsgrad (β) mit Bezug auf Kohlenwasserstoffe mit hohem Gehalt an aromatischen Kohlenwasserstoffen hoch ist, aromatische Kohlenwasserstoffe von hohem Reinheitsgrad durch Trennung mittels einer Extraktionskolonne mit einer sehr geringen Anzahl von Stufen zu erhalten.

Bei der praktischen Durchführung des erfindungsgemäßen Verfahrens kann als Extraktionskolonne eine solche, die abwechselnd aus Ruhe- und Mischzonen besteht oder eine solche vom Füllkörpertyp, die gewöhnlich mit z. B. Raschig-Ringen gepackt ist, oder eine pulsierend arbeitende Extraktionskolonne verwendet werden.

Nachstehend soll ein Beispiel der Extraktionskolonne des Typs, gemäß welchem abwechselnd Ruhe- und Mischzonen vorgesehen sind, an Hand der Abb. 10 gegeben werden.

Das Extraktionsmittel wird von dem Behälter **7** durch die Leitung **10** dem oberen Teil der Extraktionskolonne **1** mit den Ruhezonen **3**, den Mischzonen **4** und den in diesen Mischzonen vorgesehenen Rührern **2** zugeleitet.

NJOY Exhibit 1002.1439

In irgendeiner Höhe in der Nähe der mittleren Zone der Kolonne wird das zu extrahierende Kohlenwasserstoffmaterial aus dem Behälter **8** durch die Leitung **11** zugespeist, während der Rückfluß von dem Behälter **9** durch Leitung **12** der unteren Zonenkolonne in entsprechend benötigten Verhältnissen zugeführt wird. Weiterhin sind ganz unten und ganz oben in der Extraktionskolonne **1** Ruhezonen **5** und **6** vorgesehen. **13**, **14** und **15** sind die entsprechenden Pumpen. **16**, **17** und **18** sind Strömungsmesser und **19**, **20** und **21** Hähne. Die Extraktionslösung wird durch Leitung **23** mit dem Hahn **25** in den Sammelbehälter **27** geleitet, und das Raffinat wird durch Leitung **22** mit dem Hahn **24** in den Sammelbehälter **26** geleitet.

Da sich in dem Raffinat, das im wesentlichen aus nichtaromatischen Kohlenwasserstoffen besteht, etwa 1 % des Extraktionslösungsmittels, d. h. der Lösungsmittelmischung von Äthylenglykol und Methylalkohol in dem beschriebenen Verhältnis in Mischung befindet, wird letzteres mit Hilfe eines geeigneten Lösungsmittels, wie beispielsweise Wasser, wiedergewonnen, während die Extraktionslösung in dem Behälter **27** gleichfalls mit Hilfe eines geeigneten Lösungsmittels extrahiert wird, und nach Abtrennung des aromatischen Kohlenwasserstoffs wird besagte Lösungsmittelmischung destilliert und wiedergewonnen.

Wenn gemäß Erfindung die Extraktion unter Anwendung einer Extraktionskolonne des Typs durchgeführt wird, der abwechselnd aus einer Ruhe- und einer Mischzone, wie weiter oben beschrieben, besteht, kann man unmittelbar eine Extraktionslösung erhalten, die aromatische Kohlenwasserstoffe in einem Reinheitsgrad von mehr als 95 Volumprozent bei der Trennung von einer Extraktionslösung mit einer Extraktionskolonne von gewöhnlich weniger als 35 Stufen enthält, wobei die Ruhezone und die Mischzone als ein Paar betrachtet und als eine Stufe gezählt werden.

Wenn eine Extraktionskolonne vom gepackten Typ verwendet wird, ist es gleichfalls möglich, unmittelbar eine Extraktionslösung, die aromatische Kohlenwasserstoffe mit einem Reinheitsgrad von mehr als 95 Volumprozent aufweist, gewöhnlich mit weniger als 40 theoretischen Stufen zu erhalten. Nachfolgend wird das Verfahren der Erfindung an Hand eines Beispiels beschrieben, das jedoch nur der Veranschaulichung dient.

Beispiel

Es wird eine Extraktionsvorrichtung benutzt, wie sie in Abb. 10 dargestellt ist und welche eine Extraktionskolonne mit einer wirksamen Kolonnenhöhe von 3600 mm und einem Innendurchmesser von 100 mm umfaßt und aus 30 Stufen besteht, wobei sich eine Stufe aus einer Ruhezone **3** mit 90 mm Höhe und einer Mischzone **4** mit 30 mm Höhe, in welcher ein Rührer **2** mit einer Länge von 50 mm vorgesehen ist, zusammensetzt. Als Lösungsmittelmischung von Äthylenglykol und Methylalkohol wird eine solche mit einem Verhältnis von 60 : 40 benutzt und das Kohlenwasserstoffmaterial der nachfolgend angegebenen Zusammensetzung mit einer Strömungsgeschwindigkeit von 20 l/Std. bei einer Zuführungsgeschwindigkeit des Kohlenwasserstoffmaterials von 3 l/Std. extrahiert.

Kohlenwasserstoffmaterial (Kp. 70 bis 140° C)
aromatische
Kohlenwasserstoffe ... 50 Volumprozent
nichtaromatische
Kohlenwasserstoffe .. 50 Volumprozent

Der Rückfluß bestand aus Kohlenwasserstoffen, die sich aus 96 Volumprozent aromatischen Kohlenwasserstoffen und 4 % nichtaromatischen Kohlenwasserstoffen mit einem Siedepunkt von 70 bis 140° C zusammensetzen, und seine Zuführungsgeschwindigkeit betrug 4,5 l/Std. Darüber hinaus wurde die Zuführungsleitung **12** des Rückflusses in die Mischzone der zweiten Stufe vom Boden geöffnet; die Leitung **11** für die Zuspeisung des zu extrahierenden Kohlenwasserstoffmaterials wurde in die Mischzone der zehnten Stufe vom Boden und die Leitung **10** für die Zuspeisung des Extraktionsmaterials in die oberste Mischzone geöffnet.

Bei der Extraktion betrug die Strömungsgeschwindigkeit des Extraktionslösungsmittels 25,6 l/Std., und als Resultat wurde ein Kohlenwasserstoff mit einem Gehalt von 96 Volumprozent aromatischen Kohlenwasserstoffen mit einer Geschwindigkeit von 6,0 l/Std. erhalten.

Andererseits wurde das Raffinat mit einer Geschwindigkeit von 1,5 l/Std. erhalten, und sein Gehalt an nichtaromatischen Kohlenwasserstoffen betrug 95 Volumprozent, der Gehalt an Extraktionslösungsmittel in dem Raffinat betrug 0,6 Volumprozent.

Patentansprüche:

1. Verfahren zur selektiven Abtrennung von aromatischen Kohlenwasserstoffen aus Kohlenwasserstoffgemischen, die aromatische und nichtaromatische Kohlenwasserstoffe enthalten, durch Extraktion, **dadurch gekennzeichnet,** daß als Extraktionsmittel eine Wasser enthaltende Mischung von Methylalkohol und Äthylenglykol benutzt wird, deren Gehalt an Äthylenglykol 40 bis 80 Gewichtsprozent und deren Gehalt an Wasser etwa 1 bis 4 Gewichtsprozent beträgt.

2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß als zu extrahierendes Material Kohlenwasserstoffgemische verwendet werden, deren aromatische Bestandteile zwischen 75 und 280° C und deren nichtaromatische Bestandteile zwischen 65 und 280° C sieden.

3. Verfahren nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die Extraktion in einem Druckbereich zwischen normalem Druck und 10 Atm. und in einem Temperaturbereich zwischen normalen Temperaturen und etwa 130° C durchgeführt wird.

Hierzu 2 Blatt Zeichnungen

NJOY Exhibit 1002.1440

ZEICHNUNGEN BLATT 1 AUSGABETAG: 1. DEZEMBER 1960

DAS 1 093 936
KL. 23 b 2/01
INTERNAT. KL. C 10 g

Abb. 1a

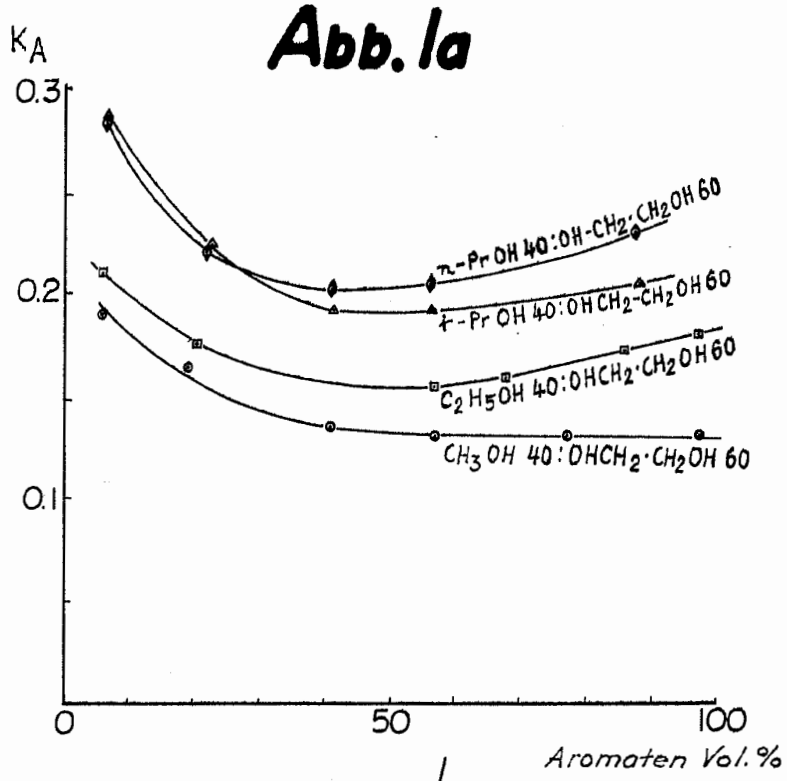
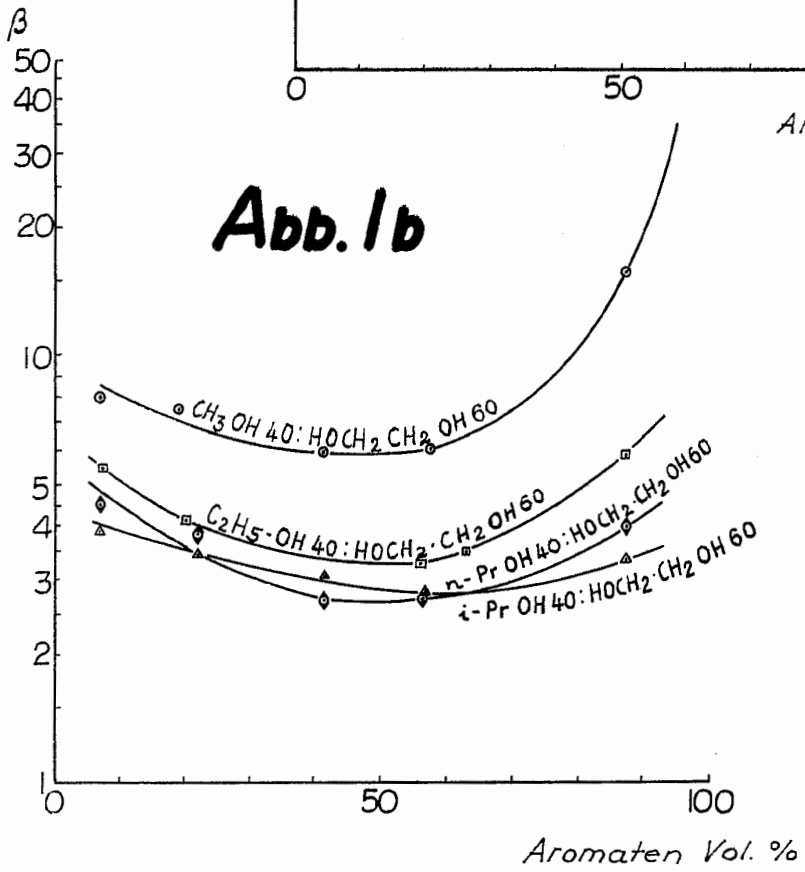


Abb. 1b



NJOY Exhibit 1002.1441

ZEICHNUNGEN BLATT 1 AUSGABETAG: 1. DEZEMBER 1960

DAS 1 093 936
KL. 23b 2/01
INTERNAT. KL. C 10g

Abb. 2

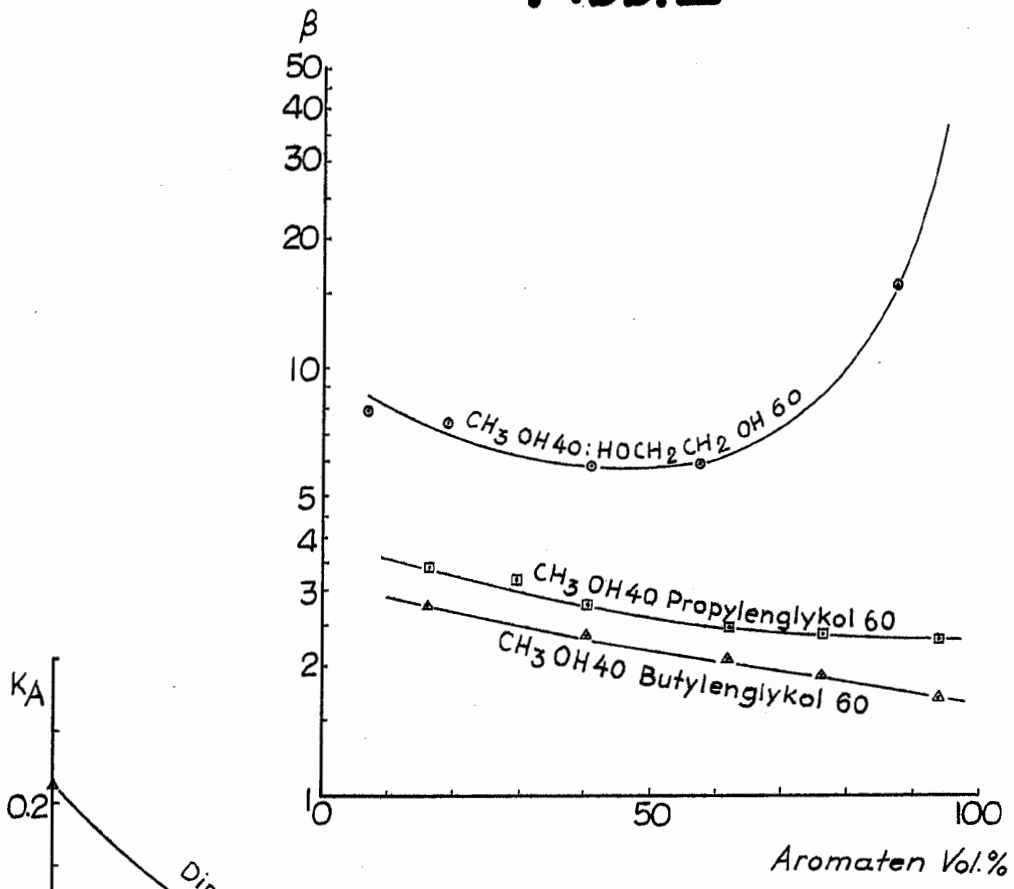
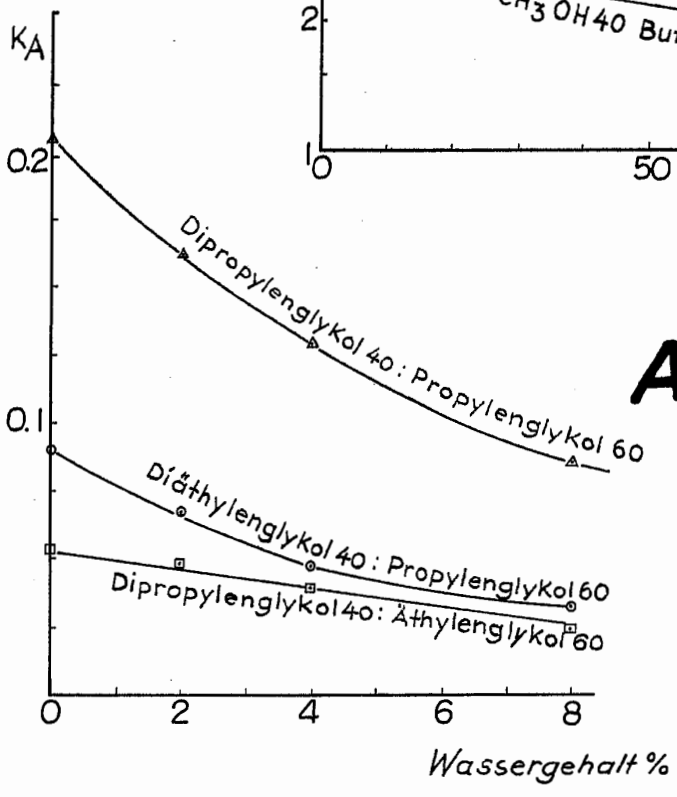


Abb. 3

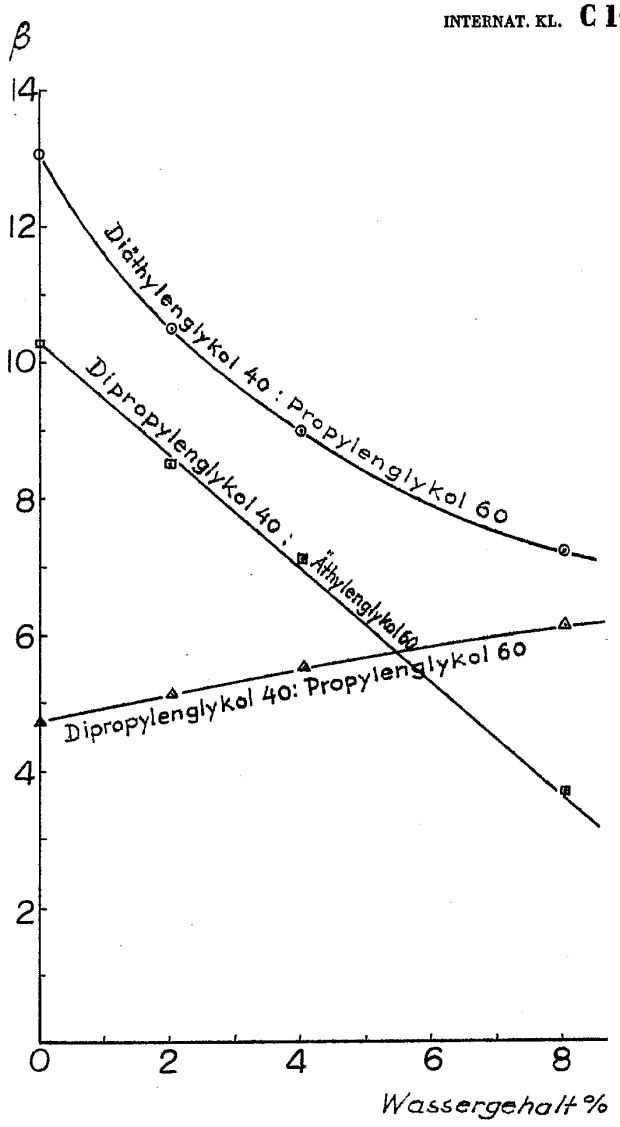


NJOY Exhibit 1002.1442

ZEICHNUNGEN BLATT 1 AUSGABETAG: 1. DEZEMBER 1960

DAS 1093936
KL. 23b 2/01
INTERNAT. KL. C 10g

Abb. 4



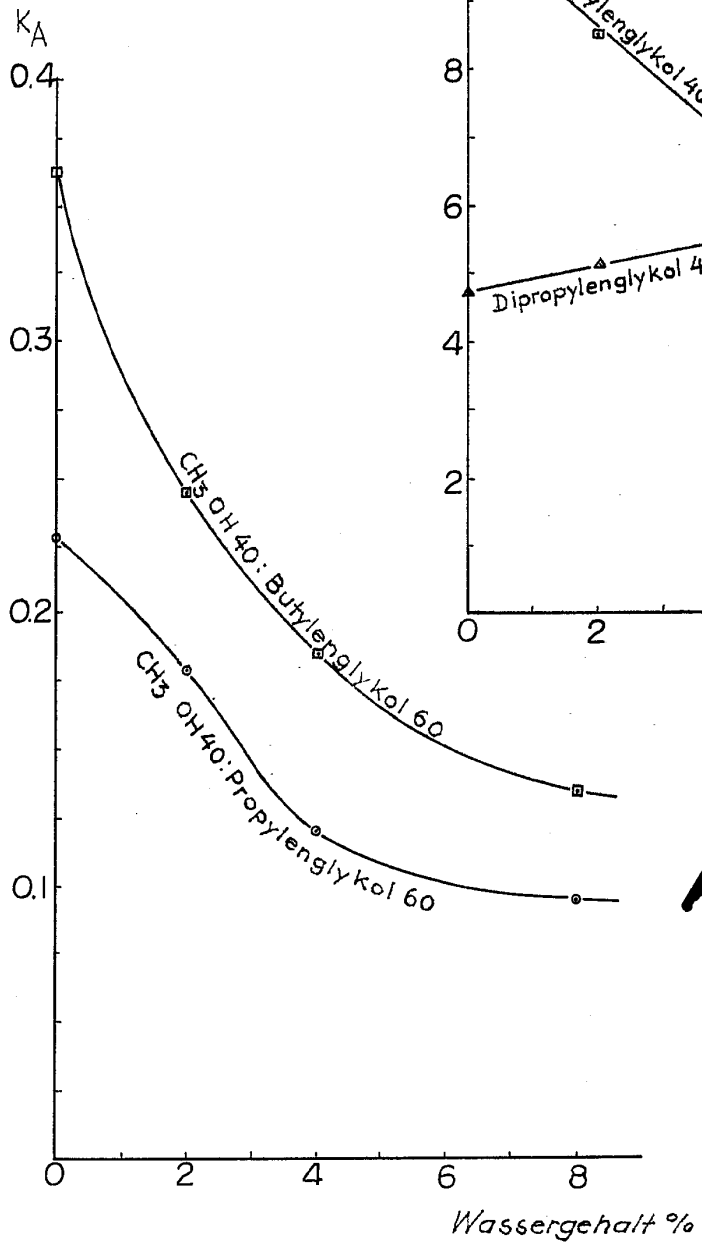


Abb. 5

009 650/415

NJOY Exhibit 1002.1443

ZEICHNUNGEN BLATT 2 AUSGABETAG: 1. DEZEMBER 1960

DAS 1 093 936
KL. 23 b 2/01
INTERNAT. KL. C 10 g

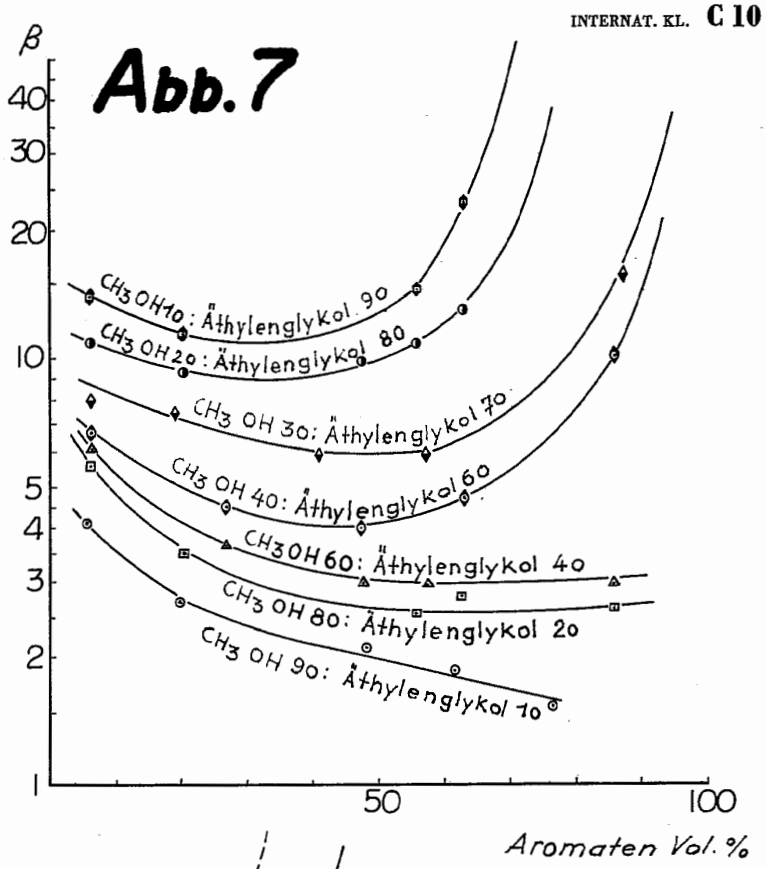


Abb. 7

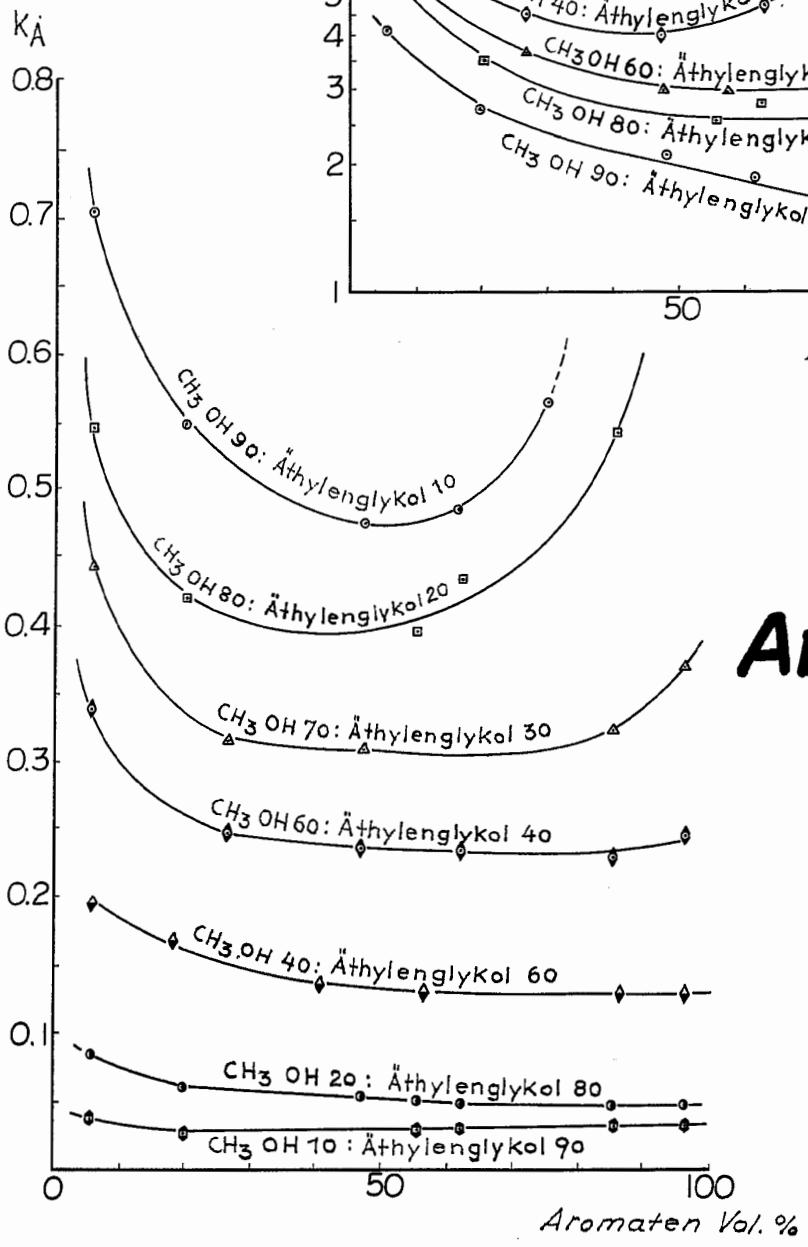


Abb. 6

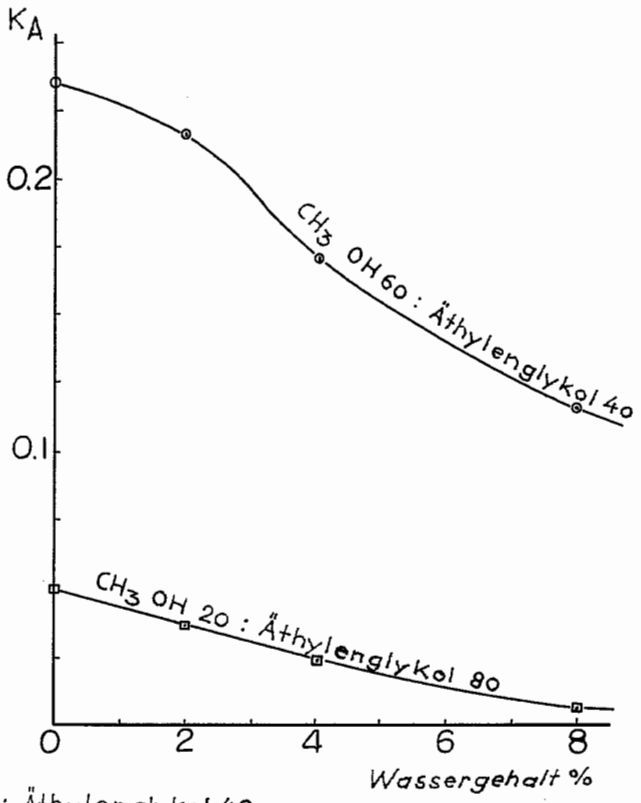
NJOY Exhibit 1002.1444

ZEICHNUNGEN BLATT 2

AUSGABETAG: 1. DEZEMBER 1960

DAS 1 093 936
KL. 23 b 2/01
INTERNAT. KL. C 10 g

Abb. 8



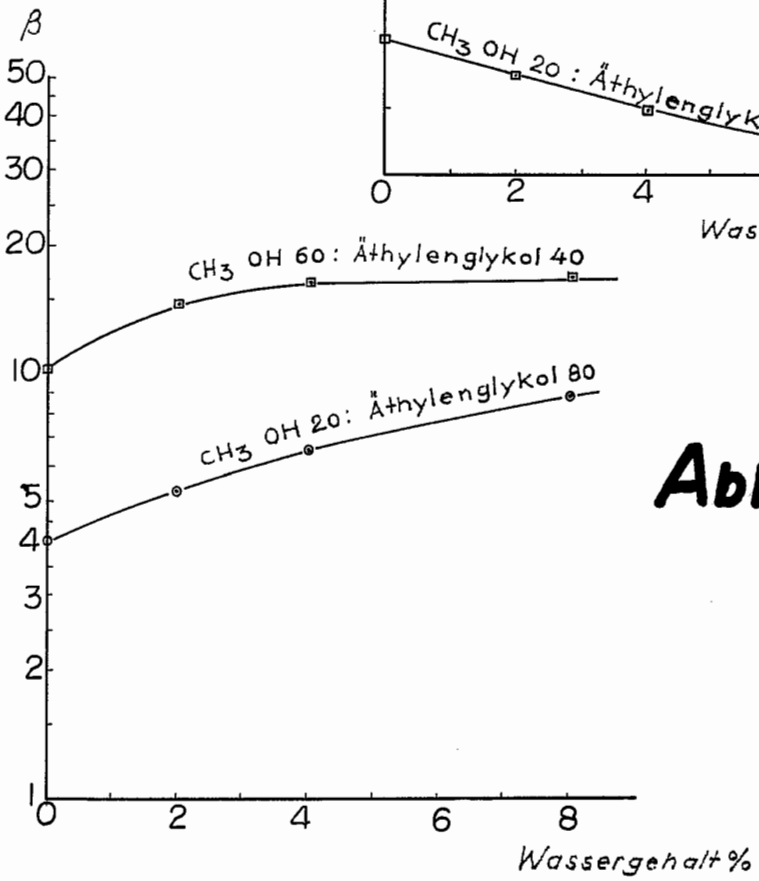


Abb. 9

NJOY Exhibit 1002.1445

(19) BUNDESREPUBLIK DEUTSCHLAND

DEUTSCHES PATENTAMT

(12) **Offenlegungsschrift**

(10) **DE 196 19 536 A 1**

(51) Int. Cl.[6]:
B 65 D 83/06
B 65 B 69/00
A 61 M 15/00
A 61 J 1/03

(21) Aktenzeichen: 196 19 536.5
(22) Anmeldetag: 15. 5. 96
(43) Offenlegungstag: 30. 10. 97

(66) Innere Priorität:
196 16 418.4 25.04.96
196 17 555.0 02.05.96

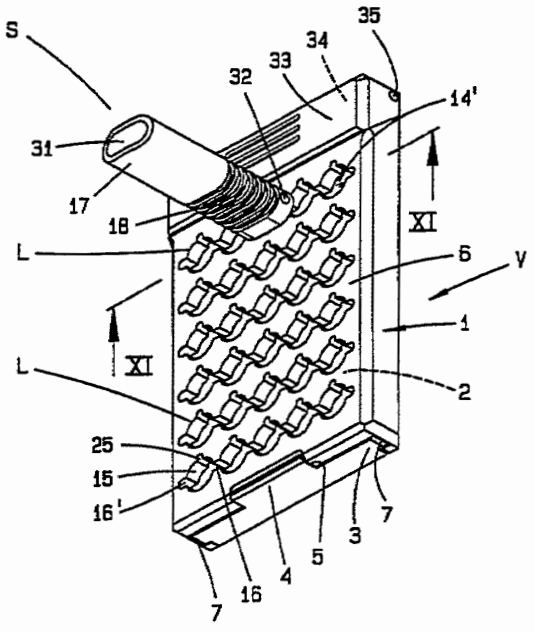
(71) Anmelder:
Schuckmann, Alfred von, 47627 Kevelaer, DE

(74) Vertreter:
H. Rieder und Kollegen, 42329 Wuppertal

(72) Erfinder:
gleich Anmelder

(54) Inhalier-Vorrichtung

(57) Die Erfindung betrifft eine Vorrichtung (V) zur Entnahme eines Pulvers, insbesondere Medikamenten-Pulvers (9), durch Aussaugen desselben aus einer napfförmigen Vertiefung (8) einer Verpackungsplatte (2) und schlägt zur Erzielung einer einfachen und insbesondere gebrauchsvorteilhaften Lösung vor, daß der Oberseite einer Abdeckfolie (14) im Bereich eines gespannten Abschnittes (14') eine rahmenförmig umfassende Führung (L) zugeordnet ist zum Einstecken eines mit seinem freien Ende die Abdeckfolie (14) unter Bildung von Lufteintrittsquerschnitten durchstoßenden Saugrüssels (18).



Die folgenden Angaben sind den vom Anmelder eingereichten Unterlagen entnommen

BUNDESDRUCKEREI 09. 97 702 044/291 19/25

DE 196 19 536 A 1

DE 196 19 536 A 1

NJOY Exhibit 1002.1447

Beschreibung

Die Erfindung bezieht sich auf eine Vorrichtung zur Entnahme eines Pulvers, insbesondere Medikamenten-Pulvers, durch Aussaugen desselben aus einer napfförmigen Vertiefung einer Verpackungsplatte mit die napfförmige Vertiefung als frei gespannter Abschnitt verschließender Abdeckfolie.

Durch die DE-OS 41 06 379 ist eine Vorrichtung zur Entnahme pulverförmigen Medikaments aus napfförmigen Vertiefungen bekannt. Diese im Wege der Inhalation an den Zielort verbringbare, saugluftgetragene Substanz befindet sich in in einer Reihe angeordneten napfförmigen Vertiefungen. Es liegt so eine bandförmige, aufrollfähige Verpackung vor, mit entsprechend bandförmig gestalteter, die frei gespannten Abschnitte verschließender, aufgesiegelter Abdeckfolie. Letztere wird für die sauggerechte Zugänglichkeit abgezogen. Eine solche Vorrichtung ist baulich aufwendig, zufolge der gleich vollständigen Freilegung der Napföffnung nicht schwundfrei und handhabungstechnisch sehr kompliziert.

Aus der US-PS 5 042 472 existiert der Vorschlag, das Pulver in einer leistenartigen Verpackungsplatte in gleichen Einzelmengen bereitzuhalten. Ihre von Sackbohrungen gebildeten Vertiefungen sowie je ein als bodennaher Querkanal realisierter Lufteinlaß sind von einer Abdeckfolie zugehalten. Nach Entfernen derselben kann man die Substanz aussaugen. Das geschieht durch unmittelbares Ansetzen dieser Vorrichtung an den Mund des Benutzers. Es besteht die Gefahr, daß die Lippe den nahen Lufteinlaß zuhält. Die Handhabung bedarf überdurchschnittlichen Geschicks.

Aufgabe der vorliegenden Erfindung ist es, eine gattungsgemäße Vorrichtung einfacher und gebrauchszuverlässiger auszugestalten.

Gelöst ist diese Aufgabe durch die in den Ansprüchen angegebene Erfindung.

Zufolge solcher Ausgestaltung ist eine Vorrichtung erhöhten Gebrauchswert erzielt: Dazu wird zunächst vorgeschlagen, daß der Oberseite der Abdeckfolie im Bereich des frei gespannten Abschnitts eine rahmenförmig umfassende Führung zugeordnet ist zum Einstekken eines mit seinem freien Ende die Abdeckfolie unter Bildung von Lufteintrittsquerschnitten durchstoßenden Saugrüssels. Neben dem Vorteil einer einwandfreien Einzeldosen-Entnahme liegt der eines korrekten Andockens des Saugrüssels vor zufolge der Führung. Die Steckzuordnung ist praktisch verkippungsfrei. Aufgrund der rahmenförmig umfassenden Anordnung einer solchen Führung ergibt sich zudem ein definierter Gegenhalt. Das Durchstoßen des frei gespannten Abschnitts der Abdeckfolie geschieht im Zuge des Aufsetzens des Saugrüssels aufsatzrandgedichtet und über die Gebrauchsphase anhaltend, so daß Verluste vermieden sind. Die Lufteintrittsquerschnitte garantieren die Austragsströmung. Daher liegt eine exakte, d. h. vollständige Ausbringung der Medikamentenmenge vor. Dabei ist es vorteilhaft, daß die beim Einstecken gebildeten Lufteintrittsquerschnitte innerhalb des Saugrüsselumfangs liegen. Sie werden so durch den eigenen Saugrüsselquerschnitt erzeugt. Das Durchstoßen läßt sich fraktionsfrei erreichen zufolge entsprechender Gestalt einer Art Ringmessers. Zweckmäßig erfolgt ein ventilklappenschneidendes Durchstoßen der Abdeckfolie, indem einfach am Ringmesser eine entsprechende Aussparung belassen wird. Über diesen Rahmen einer Einzel-Dosen-Wegwerfpackung respektive -Vorrichtung hinaus kann

bei gleichem Grundprinzip eine Mehr-Dosen-Wegwerfpackung bzw. -Vorrichtung erreicht werden, indem die Verpackungsplatte mehrere napfförmige Vertiefungen und entsprechende Führungen zum nacheinander folgenden Einstecken des Saugrüssels aufweist. Weiter erweist es sich als vorteilhaft, daß die Führungen vom Rand einzelner Löcher einer Deckplatte gebildet sind, unter welche die Verpackungsplatte schubladenartig schiebbar ist. So sind die Führungen einstückig zu einem Bauteil zusammengefaßt. Die Deckplatte kann praktisch als Siebplatte realisiert sein. Eine solche Lochmaske läßt sich fertigungstechnisch bestens beherrschen. Sie verleiht der Vorrichtung zudem eine Flächenversteifung. Es liegt eine Refill-Vorrichtung vor. Eine besonders einfache Lösung besteht darin, daß die Führungen von Wänden einzelner Löcher eines auf der Abdeckfolie angeordneten Gitters gebildet sind. Es liegt so eine erweiterte/stabilisierte Blisterpackung vor. Das Gitter wird zweckmäßig aufgesiegelt, wobei auf eine kongruente Ausrichtung der Löcher zu den napfförmigen Vertiefungen der Vorrichtung zu achten ist. Um trotz Dünnwandigkeit eines entsprechenden Gitters zu großen radialen Führungslängen zu kommen, sind die Löcher realiter als Stutzen gestaltet. Eine Ausgestaltung von sogar eigenständiger Bedeutung ergibt sich durch Individualisierungs-Merkmale zur Abstimmung zwischen Verpakkungsplatte und Deckplatte/Boden der Vorrichtung. Auf diese Weise wird mit einfachsten Mitteln eine Art Schlüsselfunktion erreicht. Das kann in Richtung einer erhöhten Narrensicherheit genutzt werden, indem sich unterschiedliche Medikamente entnahmemäßig ausschließen oder aber im Sinne einer Erzielung einer bestimmten Ausstanzstellung im frei gespannten Abschnitt. Eine baulich einfache Maßnahme besteht dabei darin, daß die Individualisierungs-Merkmale durch unrunde Gestalt der napfförmigen Vertiefungen der Verpackungsplatte und/oder des Verlaufs der Führungen und/oder der Napf-Aufnahmehöhlen der Schubladenplatte gebildet sind. Abweichungen der entsprechenden Umrisse wirken daher ebenfalls aussperrend. Entspricht die Napf-Aufnahmehöhlung nicht der Außenkontur der napfförmigen Vertiefungen, so läßt sich gemäß Schubladenlösung die entsprechende Blisterpackung überhaupt nicht zuordnen. Überdies wird vorgeschlagen, daß die Individualisierungs-Merkmale aus einander durchdringenden Öffnungen und Vorsprüngen bestehen. Um das restfreie Ausheben respektive Aussaugen des pulvrigen Medikaments mit baulich einfachsten Mitteln sicherzustellen, wird eine Maßnahme vorgeschlagen, welche gekennzeichnet ist durch Lufteinlaßkanäle als Lufteintrittsquerschnitte im Bereich der Steckverbindung zum Saugrüssel und Lochrand. Letztere Kanäle können von peripher offenen Längsschächten des Ringmessers gebildet sein. Denkbar und vorteilhaft ist auch eine Lösung dahingehend, die Kanäle in die Ringwand des Saugrüssels zu legen und in der Schneidenwate austreten zu lassen sowie einem Lufteinlaß oberhalb der Durchstoßstelle der Abdeckfolie. Weiter ist die entsprechende Ausgestaltung noch gekennzeichnet durch Querbelüftungslöcher am Saugrüssel, und zwar quer zum Saugkanal desselben liegend. Das führt zu einem hochgradigen Vermischen von pulvriger Substanz und Tragluft. Die pulvergeladene Napf-/Ausräumströmung schließt so an eine Transportströmung an, in der die Feinverteilung der Pulverpartikel an eine größere Luftmenge stattfindet. Baulich verwirklicht sind die Individualisierungs-Merkmale konkret dadurch, daß das Einsteckende des Saugrüssels durch unrunde Gestalt schlüsselartig auf die

NJOY Exhibit 1002.1448

Gestalt der Führungen angepaßt ist. An einer Verpakkungsplatte, insbesondere Blister-Packungsplatte erweist es sich sodann als vorteilhaft, daß diese in Bereichen zwischen den napfförmigen Vertiefungen eine oder mehrere Öffnungen besitzt zum Durchgriff von am Boden der Vorrichtung vorgesehener Vorsprünge. Hierüber läßt sich ein hoher Variationsreichtum einer Schlüsselfunktion erzielen. Dabei ist so vorgegangen, daß die Öffnungen der gesamten Verpackungsplatten-Fläche in bestimmter Verteilung zugeordnet sind. Eine Variante ergibt sich dabei, wenn die Öffnungen von Schlitzen gebildet sind, welche vom Rand der Verpakkungsplatte ausgehen. Die passenden Vorsprünge sind dann in Form verlaufsentsprechender Stege oder Schneiden realisiert. Eine partielle Abtrennung der verschlüsselten Zonen führt zum Zerfall der Packung. Dementsprechend ist es von Vorteil, daß die Schlitze sich im Mittelbereich der Verpackungsplatte übergreifen.

Der Gegenstand der Erfindung ist nachstehend anhand zweier zeichnerisch veranschaulichter Ausführungsbeispiele näher erläutert. Es zeigt:

Fig. 1 die erfindungsgemäße Vorrichtung in Vorderansicht, und zwar gemäß erstem Ausführungsbeispiel,

Fig. 2 eine Seitenansicht hierzu,

Fig. 3 eine Stirnansicht der Vorrichtung, von unten gesehen,

Fig. 4 diese Vorrichtung in die benutzungsgerechte Position überführt mit angedocktem Saugrüssel,

Fig. 5 den Saugrüssel in Seitenansicht,

Fig. 6 denselben in Draufsicht,

Fig. 7 den Schnitt gemäß der Linie VII-VII in **Fig.** 6,

Fig. 8 den Saugrüssel mit Ansicht gegen das Mundstück desselben,

Fig. 9 denselben mit Ansicht gegen das die Abdeckfolie durchstoßende Ende, hier eine Art Ringmesser bildend,

Fig. 10 die **Fig.** 9 in Vergrößerung,

Fig. 11 den Schnitt gemäß Linie XI-XI in **Fig.** 4, und zwar in vergrößerter Darstellung,

Fig. 12 den Schnitt gemäß Linie XII-XII in **Fig.** 6, vergrößert,

Fig. 13 den Schnitt gemäß Linie XIII-XIII in **Fig.** 5, vergrößert,

Fig. 14 eine Herausvergrößerung der **Fig.** 11,

Fig. 15 eine der **Fig.** 11 entsprechende Schnittdarstellung, jedoch in einer um 90° versetzten Schnittebene,

Fig. 16 den oberen Abschnitt der Vorrichtung gemäß erstem Ausführungsbeispiel in Darstellung einer Variante bzgl. vorhandener Individualisierungs-Merkmale,

Fig. 17 die Vorrichtung gemäß zweitem Ausführungsbeispiel der Erfindung in perspektivischer Darstellung, mit angedocktem Saugrüssel,

Fig. 18 in perspektivischer Darstellung den Vorratsträger dieser Vorrichtung in isolierter Wiedergabe,

Fig. 19 die komplettierte Vorrichtung durch deckfolienseitig vorgenommener Anordnung eines Gitters zur Bildung der Führungen,

Fig. 20 den Schnitt gemäß Linie XX-XX in **Fig.** 19, vergrößert, als Abschnitt,

Fig. 21 die Draufsicht auf diesen Abschnitt,

Fig. 22 eine Variante hinsichtlich der Individualisierungs-Merkmale des Gegenstandes gemäß zweitem Ausführungsbeispiel, auch hier als Auszug wiedergegeben,

Fig. 23 den Schnitt gemäß der Linie XXIII-XXIII in **Fig.** 22,

Fig. 24 die Draufsicht auf eine Verpackungsplatte, außerhalb der napfförmigen Vertiefungen Individualisierungs-Merkmale aufweisend,

Fig. 25 die Draufsicht auf einen solchen Bereich der Verpackungsplatte, und zwar als vergrößerter Auszug der **Fig.** 24,

Fig. 26 den Schnitt gemäß der Linie XXVI-XXVI in **Fig.** 25,

Fig. 27 eine der **Fig.** 24 entsprechende Darstellung, jedoch bei abgewandelter Art der Individualisierungs-Merkmale,

Fig. 28 eine Schnittdarstellung wie **Fig.** 14, als Schnitt gemäß Linie XXVIII-XXVIII in **Fig.** 29, jedoch mit verändertem Saugrüssel und

Fig. 29 die Unteransicht gegen den Saugrüssel gemäß **Fig.** 28.

Die Vorrichtung V gemäß erstem Ausführungsbeispiel umfaßt ein Gehäuse **1**, enthaltend eine Verpakkungsplatte **2**. Die ist von einem Boden 3 unterfangen.

Zur lagegerechten Bestückung des Gehäuses **1** läßt sich die Verpackungsplatte **2** schubladenartig in dasselbe einschieben. Die entsprechende Schubladenplatte kann mit dem Boden **3** identisch sein. Sie ist in Schließstellung rastgesichert und weist eine Zughandhabe **4** auf, die in eine Nische **5** überstandsfrei eintaucht. Gebildet ist die Nische **5** im schmalwandseitigen Randbereich einer Deckplatte **6** des Gehäuses **1**.

Realisiert ist die besagte Deckplatte **6** an einer Breitseite der Vorrichtung V.

Die Führung der Schubladenplatte respektive des Bodens **3** geschieht über an den Längsrändern der Schubladenplatte realisierte Führungen **7**. Es handelt sich um Nutführungen, erreicht aufgrund einer marginalen C-Profilierung des Gehäuses **1**.

Die Deckplatte **6** der Vorrichtung V ist zur Entnahme des in der Verpackungsplatte **2** bereitgehaltenen Inhalts durchbrochen. Bezüglich des Inhalts handelt es sich um in einzelnen napfförmigen Vertiefungen **8** der Verpakkungsplatte **2** befindliches Pulver. Das ist rieselfähig, neigt also nicht zu Blockbildung. Es handelt sich um Medikamenten-Pulver, bspw. zur Linderung von Asthmabeschwerden. Auch andere in dieser Darreichungsform applizierbare Medikamente sind denkbar. Das Medikamenten-Pulver ist durch Punktraster deutlich gemacht und trägt das Bezugszeichen **9**.

Die Näpfe der napfartigen Vertiefungen **8** ergeben sich in besonders deutlicher Wiedergabe aus den Vergrößerungen, bspw. aus **Fig.** 14. Der Napf ist dort in seiner Gesamtheit mit **10** bezeichnet. Sein Plattenkörper **11** ist dünnwandig und ebenflächig. Die in Richtung des unteren Zeichnungsrandes auswölbenden Näpfe **10** ragen in Napf-Aufnahmehöhlen **12** der Schubladenplatte bzw. des Bodens **3**. Die Napf-Aufnahmehöhlen **12** entsprechen zumindest umrißmäßig dem im plattennahen Ansatz zylindrischen Napf **10**.

Die Napf-Aufnahmehöhlen **12** stellen eine kreuz wie quer reihenförmig geordnete Kraterstruktur dar. Zwischen den Napf-Aufnahmehöhlen **12** verbleibende Scheidewände **13** stützen mit ihrer dem oberen Zeichnungsrand zugewandten Stirnseite den aufliegenden Plattenkörper **11** ab.

Geschützt werden die abgeteilten Mengen an Medikamenten-Pulver **9** durch einen frei gespannten Abschnitt **14'** einer den Eingang der napfförmigen Vertiefung **8** mit überdeckenden, d. h. deckelbildenden Abdeckfolie **14**. Insoweit liegt bzgl. der Verpackungsplatte **2** eine Art Blisterpackung vor. **14** ist eine Alu-Folie. Ihre Zuordnung geschieht durch ansiegeln.

Die Näpfe **10** und die Napf-Aufnahmehöhlungen **12**

NJOY Exhibit 1002.1449

erstrecken sich selbstredend kongruent. In entsprechend koaxialer Ausrichtung liegen die ein Öffnen der freigespannten Abschnitte **14'** erlaubenden Zugänge der Deckplatte **6**.

Diesbezüglich ist baulich so vorgegangen, daß der Oberseite, also zugangsseitig, der Abdeckfolie **14**, im Bereich der frei gespannten Abschnitte **14'** Führungen L zugeordnet sind. Letztere umfassen die Abschnitte **14'** etwa rahmenförmig. Es handelt sich gemäß Darstellung in **Fig. 1** um Reihen von Löchern **15**, welche in der Horizontalen über Durchbrechungsbrücken **16** miteinander in offener Verbindung stehen. Die Durchbrechungsbrücken **16** verlaufen in der Diametralen der Löcher **15** und setzen sich auch noch bei den endständigen, d. h. randnahen Löchern **15** in dieser Richtung in senkrecht zur Deckplatte **6** stehende Nuten **16'** fort. Es sind sechs mal fünf Löcher **15** in kreuzender Reihenanordnung realisiert.

Über Lochränder der Führungen L wird eine geführte Steckzuordnung für ein andockbares Saugsteckteil S gewonnen. Die Andockstellung geht anschaulich aus den **Fig. 4** und 17 hervor. Es (S) fungiert als Inhalations-Strömungsbrücke.

Das baulich einstückige Saugsteckteil S ist funktionsmäßig in vier Bereiche aufgeteilt und rohrförmiger Gestalt. Es beginnt mit einem Mundstück **17**, geht sodann in ein gerauhtes Griffstück **18** über, um sich in einen Saugrüssel **19** fortzusetzen, der schließlich an seinem freien Ende mit einem die Abdeckfolie **14** durchstoßenden Ringmesser **20** versehen ist. Die vier Funktions-Bereiche liegen linear.

Der Saugrüssel **19** ist querschnittsmäßig auf die Form des Loches **15** abgestimmt. Es kann sich um einen kreisrunden Querschnitt handeln, so daß eine unterbrechungsfreie gut tragende Anlage an der Deckplatte **6** erzielt ist. Hinzukommt noch die Funktion einer in Steckrichtung liegenden Stützschulter **21** des entsprechend querschnittsgrößeren bzw. unrunden Abschnitts des Griffstückes **18**. Die Stützschulter **21** ruht verkippungssichernd auf der Oberseite der ebenen Deckplatte **6**.

Die Steckverbindung ist reibungsschlüssig. Die Rauhung des Griffstückes **18** ergibt sich aufgrund einer vorgenommenen Radialrippung des im Querschnitt insgesamt mehr flach gehaltenen Abschnitts des Saugsteckteils S. Auf der Flachseite ist Platz für je eine Fingerkuppe der Greifhand. Das Mundstück **17** ist flach oval und daher mundgerecht geformt.

Eine zweite Stützschulter **22** befindet sich axial versetzt zur ersten Stützschulter **21** im Übergangsbereich zwischen dem Saugrüssel **19** und dem demgegenüber abgesetzten Ringmesser **20**. Gebildet ist besagte zweite Stützschulter **22** von den in Steckrichtung weisenden Stirnflächen zweier in Steckrichtung liegender Längsrippen **23** im Bereich der Steckverbindung. Die Wurzeln in der Mantelwand des vom Saugrüssel **19** gebildeten Steckvorsprungs. Das andere Stirnende von **23** wurzelt in der Stützschulter **21**. Die Längsrippen **23** fungieren damit zugleich als Steckbegrenzungsanschläge, wenn die erste Stützschulter **21**, bspw. aus Toleranzgründen, nicht satt aufsetzen würde. Es kommt damit zu einer definierten Durchstoßtiefe in der Vertiefung **8**. Das dortige Stirnende der Längsrippen **23** tritt gegen den Lochrand der Abdeckfolie **14** und hält diese unter Zwischenfassen des Plattenkörpers **11** sicher und schneidbegünstigend fest. Das endliche Widerlager bildet die Oberseite der die Napf-Aufnahmehöhle **12** umschreibenden Scheidewand **13**.

Die Längsrippen **23** haben zugleich Schlüsselfunktion. Sie sind querschnittsmäßig auf die diametral verlaufenden Durchbrechungsbrücken **16** bzw. die endseitigen Nuten **16'** abgestimmt. In dieser Richtung liegt auch die längere Achse des flachovalen Mundstücks **17**. Demgemäß kann das Saugsteckteil S nur mundgerecht zugeordnet werden. Die Vorrichtung V nimmt dabei eine vertikale Lage ein (vgl. **Fig. 4** und 17).

Im Bereich der Steckverbindung befindet sich eine weitere Längsrippe **24**. Diese wirkt mit einer deckungsgleich liegenden, oberen Nut **25** der Deckplatte **6** zusammen. Auch die zusätzliche Längsrippe **24** tritt gegen die Oberseite der Abdeckfolie **14**.

Ein Blick auf **Fig. 12** macht deutlich, daß das Ringmesser **20** Lücken **26** aufweist, ferner, daß die eigentlichen Schneiden so verteilt sind, daß beim Durchstoßen des frei gespannten Abschnitts **14'** der Abdeckfolie **14** zunächst eine Art Perforationsschnitt erzeugt wird, wobei im Bereich der Lücken **26** schließlich reißende Stege gebildet werden. Die schneidaktive Zone erstreckt sich über gut 270° eines zusammenhängenden, schließlich lückenlos getrennten Teil-Umfanges. Die restlichen ca. 90° sind ungemessen. Sie belassen daher eine praktisch scharnierbildende Brücke zwischen dem ventilklappenartig freigestanzten Lappen des frei gespannten Abschnitts **14'** und der Randzone des frei gespannten Abschnittes **14'** zur Restgitter-Abdeckfolie **14** hin. Das entsprechende Scharnier ist mit **27** bezeichnet (vgl. **Fig. 15**). Es liegt in Gebrauchsstellung der Vorrichtung V oben. Die sich so wandseitig sammelnde Substanz liegt absaugfrei (vgl. auch **Fig. 23**).

Die radial einwärts gerichtet hinterschnittene Schneide **28** des Ringmessers **20** ist ferner zur Erzielung peripherer, längs gerichteter, nicht durch das Abdeckfolienmaterial zusetzbare Lufteinlaßkanäle **29** als Lufteintrittsquerschnitte unterbrochen. Deren napfseitigen Eingänge bilden die Lücken **26**. Die Lufteinlaßkanäle **29** setzen sich bis in den Bereich der Mantelwand des Saugrüssels **19**, also den Bereich der Steckverbindung zwischen Saugrüssel **19** und dem geschnittenen Lochrand **30** der Abdeckfolie **14** fort. Über so erzielte, mit dem Innenraum der napfförmigen Vertiefung **8** kommunizierende Luftschächte wird das Medikamenten-Pulver **9** unter der Mitschleppwirkung der Strömung restfrei ausgetragen. Die Applikation ist dadurch Napf für Napf exakt reproduzierbar. Der im Zuge des Saugens sich vor dem Saugrüssel **19** ergebende Unterdruck trägt, in die Luftströmung eingebettet, die Pulverpartikel aus. Austragsfördernd wirkt überdies die an den zylindrischen Abschnitt anschließende, konkav gehöhlte, umgekehrt kuppelförmige Innenkontur des Napfes **10**.

Die mit Pulver angereicherte Luft passiert längs einen zentralen Saugkanal **31** des Saugsteckteils S. Im Fußbereich des Saugsteckteils S befinden sich sodann Querbelüftungslöcher **32**. Letztere kreuzen den Querschnitt des Saugkanales **31**. Die Querbelüftungslöcher **32** liegen kurz hinter der Stützschulter **21**. Diese Nähe hat den Vorteil, daß deren Einlaßöffnungen nicht von den Fingern der am Griffstück **18** ansetzenden Haltehand zugehalten werden können. Der Querschnitt der beiden Querbelüftungslöcher **32** zusammen entspricht etwa dem kreisrunden Querschnitt des Saugkanals im Fußbereich. Von dort ab weitet sich der Saugkanal **31** kontinuierlich im lichten Querschnitt auf.

Eine hinsichtlich der Lufteintrittsquerschnitte abgewandelte Ausgestaltung des Saugrüssels **19** ergibt sich aus den **Fig. 28** und 29. Dort sind die gleichfalls mit **29** bezeichneten Lufteinlaßkanäle in die Ringwand des

NJOY Exhibit 1002.1450

Saugrüssels 19 gelegt. Sie verlaufen in Steckrichtung. Es handelt sich um drei Ringsektoren-Abschnitte, bezeichnet mit a, b und c.

Die Ringsektoren-Abschnitte passieren den Bereich des Ringmessers 20. Wie Fig. 28 entnehmbar, treten die Lufteinlaßkanäle 29 innenseitig der hinterschnittenen Schneide 28 des Ringmessers aus. Sie münden also in der Schneidenwate.

Die in Gegenrichtung liegende Fortsetzung der Lufteinlaßkanäle 29 geht deutlich bis oberhalb der Durchstoßstelle der Abdeckfolie 14, so daß der freie Luftzugang gewährleistet ist. Sie münden dort in einen radial auswärts gerichteten Lufteinlaß 29'. Der kann sich über die sektorale Breite der geschaffenen Lufteinlaßkanäle 29 erstrecken. Hier wird also die Mantelwand des Saugrüssels durchbrochen.

Der Mund der Ringsektoren-Abschnitte ist leicht exponiert. Dadurch entstehen auch hier im schneidaktiven Bereich des Ringmessers Lücken 26 mit der dazu beschriebenen Perforationsschnitt-Wirkung. Die schneidaktive Zone geht überdies auch hier gut 270° des Ringmesserumfangs. Das führt zu einem zusammenhängenden, schließlich lückenlos getrennten Teil-Umfang, der eine scharnierbildende Brücke zwischen dem ventilklappenartig frei gestanzten Lappen des Abschnittes 14' und der Randzone des frei gespannten Abschnitts 14' zur Restgitter-Folie 14 hin beläßt. Das entsprechende Scharnier ergibt sich aus Fig. 15.

Das Einsaugen von Luft führt gemäß den Pfeilen in Fig. 28 auch hier zum Mitschleppen des entnahmezugänglich gemachten Pulvers 9.

Das Saugsteckteil S weist eine Länge auf, die etwa dem kleinen Finger einer erwachsenen menschlichen Hand entspricht. Das Gehäuse 1 weist ein Format auf, welches im wesentlichen einer Taschenpackung bzw. Zigarettenpackung entspricht. Es (1) ist in einen Vorratsbereich für die Verpackungsplatte 2 und in einen Unterbringungsbereich für das Saugsteckteil S aufgeteilt. Die hierzu hinter einer Verschlußklappe 33 liegende Aufnahmekammer 34 läßt sich willensbetont bequem öffnen. Das Saugsteckteil S, welches längs der oberen kürzeren Querseite des Gehäuses 1 untergebracht ist, kann dann entnommen, respektive in die Hand geschüttelt werden. Bezüglich der Verschlußkappe 33 handelt es sich um eine Schwenkkappe, die um eine randnahe Scharnierachse 35 des Gehäuses 1 klappt. Die Schließfuge ist schräg verlaufend, so daß mehr Greiffläche an der Verschlußkappe 33 verbleibt, mit entsprechendem deckwandseitigen Überstand zum besseren Erfassen. Die Schrägung liegt bei 45° zur ebenen Gehäuseerstreckung.

Die Vorrichtung gemäß zweitem Ausführungsbeispiel (ab Fig. 17) ist prinzipiell gleichen Aufbaues. Die Bezugsziffern sind, soweit zum Verständnis erforderlich, sinngemäß angewandt, dies zum Teil ohne textliche Wiederholungen. Das Gehäuse 1 ist nur partiell verwirklicht, und zwar im Rahmen der die Steckführung bringenden Deckplatte 6 als zusätzliche Lage. Erkennbar sind dort die Führungen L wiederum von Löchern 15 realisiert. Bezüglich dieser Löcher 15 handelt es sich um kurze, den Saugrüssel 19 verkippungsfrei aufnehmende Stutzen 36. Die sind gemäß Fig. 17 im wesentlichen zylindrisch.

Bezüglich der Deckplatte 6 handelt es sich hier um ein auf der Oberseite der Abdeckfolie 14 angeordnete s Gitter G. Es läßt sich wie der die Näpfe 10 aufweisende Plattenkörper 11 aus Kunststoff herstellen. Das Gitter G ist aufgesiegelt. Es liegt bezüglich der Stutzen 36 das gleiche, wabenbildende Raster zugrunde, wie es auch der Plattenkörper 11 aufweist, also deckungsgleiche Ausrichtung der zur Entnahme des Medikamenten-Pulvers 9 besetzten Querschnitte. Die gitter-unbestückte Grundausstattung der Vorrichtung, die Verpackungsplatte 2 also, ergibt sich aus Fig. 18, die mit dem Gitter G vereinigte aus Fig. 19.

Wie Fig. 20 entnehmbar, erstrecken sich die Stutzen 36 auch hier wie Führungsschächte über dem frei gespannten Abschnitt 14' der Abdeckfolie 14.

Auch die Vorrichtung V gemäß zweitem Ausführungsbeispiel weist Individualisierungs-Merkmale auf. Es sei auf die Fig. 22 und 23 verwiesen. Dort sind die Löcher 15 respektive Stutzen 36 innen sekantenförmig abgeflacht. Die (außen nicht erforderliche) Abflachung trägt das Bezugszeichen 37. Das entsprechende Patrizenteil, realisiert vom Steckverbindungsbereich des Saugrüssels 19 weist eine entsprechende Abflachung auf. Gleiches gilt bzgl. des Umfangverlaufs des Ringmessers 20. So können nur paßgerechte Saugsteckteile S Verwendung finden bzw. die diesem Schlüssel entsprechende Querschnittskontur besitzende Verpakkungsplatten 2 zum Einsatz kommen.

Die erläuterte Individualisierung ist in dieser Form auch an der Vorrichtung V gemäß erstem Ausführungsbeispiel verwendbar. Es wird auf die entsprechende Variante Fig. 16 verwiesen. Darin ist die im Lochbereich liegende Abflachung gleichfalls mit 37 bezeichnet. Dort nicht mehr dargestellt und gleichwohl vorhanden ist eine entsprechende Abflachung der Näpfe 10 an der Verpackungsplatte 2 und eine solche am Schubladenboden 3. Die deckungsgleiche Abflachung des Napfes 10 ergibt sich jedoch aus Fig. 23 und trägt das Bezugszeichen 38.

Die Abflachung 37 und alle anderen liegen an der dem Filmscharnier 27 diametral gegenüberliegenden Seite, und zwar parallel dazu. Das führt sogar zu einem kürzeren ventilklappenartigen Freischnitt. Der stirnseitige Öffnungsbereich des Saugrüssels 19 wird so noch mehr freigehalten. Der Stoff sammelt sich überdies schwerkraftabhängig vor dem freien Ende dieser Klappe. Das Pulver 9 nimmt nur einen recht kleinen Anteil des Napfvolumens ein.

Ab Fig. 24 sind Vorrichtungen V angegeben, bei denen die Individualisierungs-Merkmale außerhalb des unmittelbaren Bereichs der topfförmigen Vertiefungen 8 liegen. Hierzu sind die Zwischenzonen 39 der auf den Ecken eines Quadrates oder Rechtecks mittelpunktmäßig plazierten, kreisrunden, napfförmigen Vertiefungen 8 genutzt. Es handelt es sich dort um einander durchdringende Öffnungen 40 und Vorsprünge 41. Sie sind pastillenförmigen bzw. quadratischen Umrisses und passen satt ineinander. Solche Individualisierungs-Merkmale können an der Vorrichtung V gemäß erstem Ausführungsbeispiel ebenso realisiert sein, wie auch an der gemäß zweitem Ausführungsbeispiel.

Gemäß dargestellter Variante Fig. 24 bis 26 ist die Individualisierung an einer Verpackungsplatte 2, insbesondere Blister-Packungsplatte realisiert und dadurch gekennzeichnet, daß diese in Bereichen zwischen den napfförmigen Vertiefungen 8 eine oder mehrere Öffnungen 40 besitzt, in die vom Boden 3 der Vorrichtung V ausgehende Vorsprünge 41 schlüsselartig eingreifen.

Wie den Zeichnungen entnehmbar, sind die Öffnungen 40, hier drei, auf der gesamten Verpackungsplatten-Fläche in bestimmter Verteilung angeordnet. Insgesamt sind beim dargestellten Ausführungsbeispiel zwanzig Zwischenzonenbereiche 39 vorhanden, so daß eine große Kombinationsmöglichkeit vorliegt.

NJOY Exhibit 1002.1451

Im übrigen sind die Individualisierungs-Merkmale der Sicht entzogen, durch die auch dort die Verpackungsplatte **2** überdeckende Abdeckfolie **14**.

Statt die Vorsprünge **41** vom Boden **3**, bspw. dem Boden einer Schubladenplatte ausgehen zu lassen, kann im Gegenzug zur Erzielung durchdringender Öffnungen und Vorsprünge der Vorsprung auch am Plattenkörper **11** der Verpackungsplatte **2** realisiert sein, um in dekkungsgleich liegende Öffnungen des Bodens paßgerecht einzutreten. Die Vorsprünge können als Tiefziehvorsprünge wie die Näpfe **10** am Plattenkörper **11** realisiert sein.

Bei einer Schubladenplatte als diesbezügliches Matrizenteil würde bei nicht passender Blister-Packungsplatte der Einschub in das Gehäuse der Vorrichtung ebenso nicht möglich sein. Es kommt keine funktionskorrekte Perforation zustande.

Die Variante gemäß **Fig.** 27 zeigt noch eine Möglichkeit dahingehend, die Öffnungen **40** in Form von Schlitzen auszubilden. Die gehen vom Rand **42** der Verpakkungsplatte **2** aus, sind also nach dorthin offen. Gemäß Darstellung sind solche Schlitze gegenläufig ausgerichtet. Sie erstrecken sich parallel zu den Schmalseiten des auch hier lang rechteckigen Grundrisses der Verpakkungsplatte **2**. Die Schlitzlänge ist größer als die halbe Länge der Schmalseiten. Dementsprechend übergreifen die Schlitze im Mittelbereich der Verpackungsplatte **2** einander. Die Schlitzanordnung ist parazentrisch.

Die der dortigen Art der Öffnungen **40** zugeordneten Patrizenteile sind entsprechend stegartiger Gestalt oder schneidenartiger Form und gehen auch hier vom Boden **3** der Vorrichtung V aus.

Gemäß letzter Variante ist auch die Abdeckfolie **14** schlitzkonturentsprechend durchbrochen.

Schließlich bleibt noch festzuhalten, daß das Einsteckende des Saugrüssels **19** auch hier durch unrunde Gestalt schlüsselartig auf die Gestalt der Führungen L angepaßt ist. Das ist auch auf die Maßnahme gemäß **Fig.** 28 und 29 anwendbar; strichpunktiert eingezeichnet sind die Mittel gemäß **Fig.** 14, also Führungen L, Längsrippen **23** und Durchbrechungsbrücken **16**.

Die Funktion der Vorrichtung V ist, kurz zusammengefaßt, wie folgt: Durch willensbetontes Andocken des Saugsteckteils S öffnet das dem Saugrüssel **19** vorgelagerte Ringmesser **2a** den das Medikamenten-Pulver **9** enthaltenden Napf **10**. Durch Ausübung einer Saugwirkung am Mundstück **17** entsteht Unterdruck im Napf. Die fraktionsfreie, luftgetragene Substanz gelangt an den Zielort. Da der Kopf des Saugrüssels **19** an seiner Peripherie oder in seiner Wandung die beschriebenen Luftzugangsschächte **29** relativ kleinen Querschnitts aufweist, ergibt sich eine ein äußerst wirksames, restfreies Ausheben der pulvrigen Substanz sicherstellenden Funktion. Neben diesen Luftzugängen ergibt sich dahinterliegend noch ein hochgradiger Mischeffekt aufgrund der Querbelüftungslöcher **32**, hier einen Kreuzkanal bildend.

Die Vorrichtung V kann in den Zeiten des Nichtgebrauchs in einer Schutzhülle (nicht dargestellt) stecken.

Alle offenbarten Merkmale sind erfindungswesentlich. In die Offenbarung der Anmeldung wird hiermit auch der Offenbarungsinhalt der zugehörigen/beigefügten Prioritätsunterlagen (Abschrift der Voranmeldung) vollinhaltlich mit einbezogen, auch zu dem Zweck, Merkmale dieser Unterlagen in Ansprüche vorliegender Anmeldung mit aufzunehmen.

Patentansprüche

1. Vorrichtung (V) zur Entnahme eines Pulvers, insbesondere Medikamenten-Pulvers (**9**), durch Aussaugen desselben aus einer napfförmigen Vertiefung (**8**) einer Verpackungsplatte (**2**) mit die napfförmige Vertiefung (**8**) als frei gespannter Abschnitt (**14'**) verschließender Abdeckfolie (**14**), **dadurch gekennzeichnet,** daß der Oberseite der Abdeckfolie (**14**) im Bereich des frei gespannten Abschnittes (**14'**) eine rahmenförmig umfassende Führung (L) zugeordnet ist zum Einstecken eines mit seinem freien Ende die Abdeckfolie (**14**) unter Bildung von Lufteintrittsquerschnitten durchstoßenden Saugrüssels (**18**).

2. Vorrichtung nach Anspruch 1 oder insbesondere danach, dadurch gekennzeichnet, daß die beim Einstecken gebildeten Lufteintrittsquerschnitte innerhalb des Saugrüsselumfangs liegen.

3. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche oder insbesondere danach, dadurch gekennzeichnet, daß die Verpakkungsplatte (**2**) mehrere napfförmige Vertiefungen (**8**) und entsprechende Führungen (L) zum nacheinander folgenden Einstecken des Saugrüssels (**18**) aufweist.

4. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche oder insbesondere danach, dadurch gekennzeichnet, daß die Führungen (L) vom Rand einzelner Löcher (**15**) einer Deckplatte (**6**) gebildet sind, unter welche die Verpakkungsplatte (**2**) schubladenartig schiebbar ist.

5. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche oder insbesondere danach, dadurch gekennzeichnet, daß die Führungen (L) von Wänden einzelner Löcher (**15**) bzw. Stutzen (**36**) eines auf der Abdeckfolie (**14**) angeordneten Gitters (G) gebildet sind.

6. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche oder insbesondere danach, gekennzeichnet durch Individualisierungs-Merkmale zur Abstimmung zwischen Verpakkungsplatte (**2**) und Deckplatte (**6**)/Boden (**3**) der Vorrichtung (V).

7. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche oder insbesondere danach, dadurch gekennzeichnet, daß die Individualisierungs-Merkmale durch unrunde Gestalt der napfförmigen Vertiefungen (**8**), der Verpackungsplatte (**2**) und/oder der Gestalt der Führungen (L) und/oder der Napf-Aufnahmehöhlen (**12**) der Schubladenplatte (**3**) gebildet sind.

8. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche oder insbesondere danach, dadurch gekennzeichnet, daß die Individualisierungs-Merkmale aus einander durchdringenden Öffnungen (**40**) und Vorsprüngen (**41**) bestehen.

9. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche oder insbesondere danach, gekennzeichnet durch Lufteinlaßkanäle (**29**) im Bereich der Steckverbindung zu Saugrüssel (**19**) und Lochrand (**30**).

10. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche oder insbesondere danach, gekennzeichnet durch Querbelüftungslöcher (**32**) am Saugrüssel (**19**), quer zum Saugkanal (**31**) desselben liegend.

11. Vorrichtung nach einem oder mehreren der vor-

NJOY Exhibit 1002.1452

hergehenden Ansprüche oder insbesondere danach, dadurch gekennzeichnet, daß das Einsteckende des Saugrüssels (19) durch unrunde Gestalt schlüsselartig auf die Gestalt der Führungen (L) angepaßt ist.

12. Verpackungsplatte, insbesondere Blister-Pakkungsplatte, dadurch gekennzeichnet, daß diese in Bereichen (Zwischenzone 39) zwischen den napfförmigen Vertiefungen (8) eine oder mehrere Öffnungen (40) besitzt zum Durchgriff von am Boden (3) der Vorrichtung (V) vorgesehener Vorsprünge (41).

13. Verpackungsplatte nach einem oder mehreren der vorhergehenden Ansprüche oder insbesondere danach, dadurch gekennzeichnet, daß die Öffnungen (40) der gesamten Verpackungsplatten-Fläche in bestimmter Verteilung zugeordnet sind.

14. Verpackungsplatte nach einem oder mehreren der vorhergehenden Ansprüche oder insbesondere danach, dadurch gekennzeichnet, daß die Öffnungen (40) von Schlitzen gebildet sind, welche vom Rand (42) der Verpackungsplatte (2) ausgehen.

15. Verpackungsplatte nach einem oder mehreren der vorhergehenden Ansprüche oder insbesondere danach, dadurch gekennzeichnet, daß die Schlitze sich im Mittelbereich der Verpackungsplatte (2) übergreifen.

Hierzu 13 Seite(n) Zeichnungen

NJOY Exhibit 1002.1453

Nummer: DE 196 19 536 A1
Int. Cl.[6]: B 65 D 83/06
Offenlegungstag: 30. Oktober 1997

Fig. 2

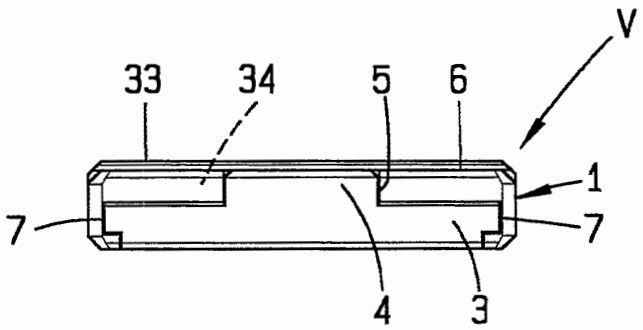


Fig. 1

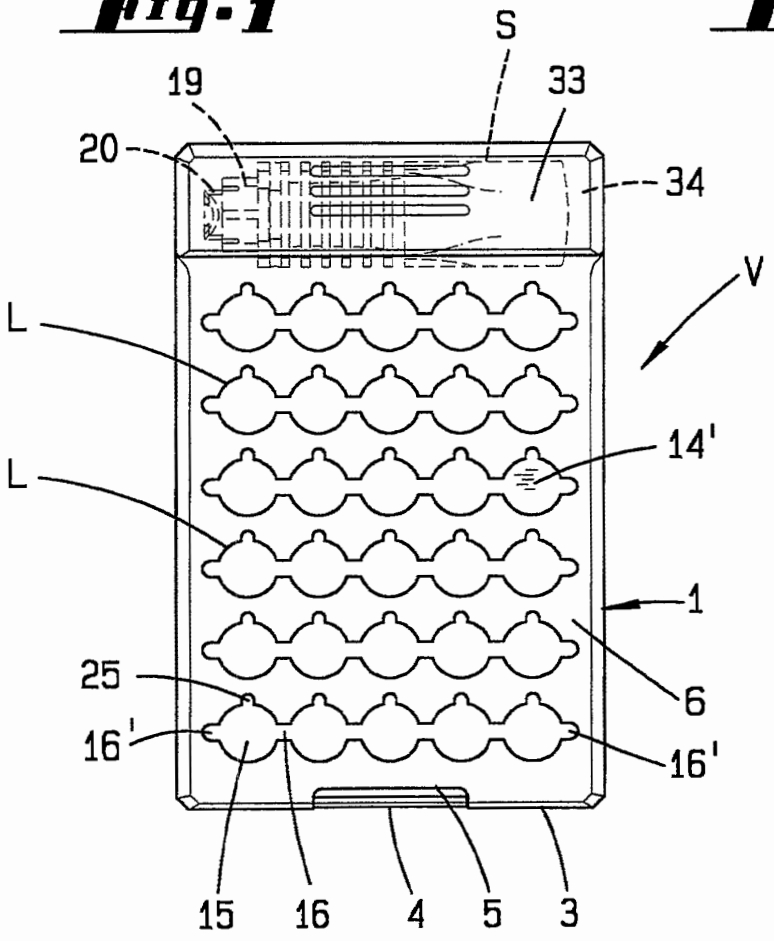
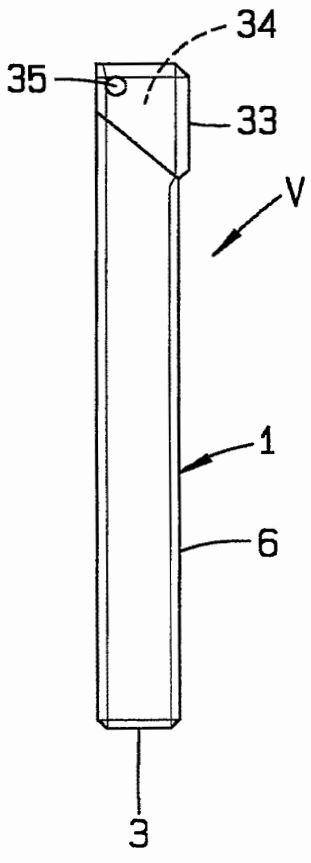


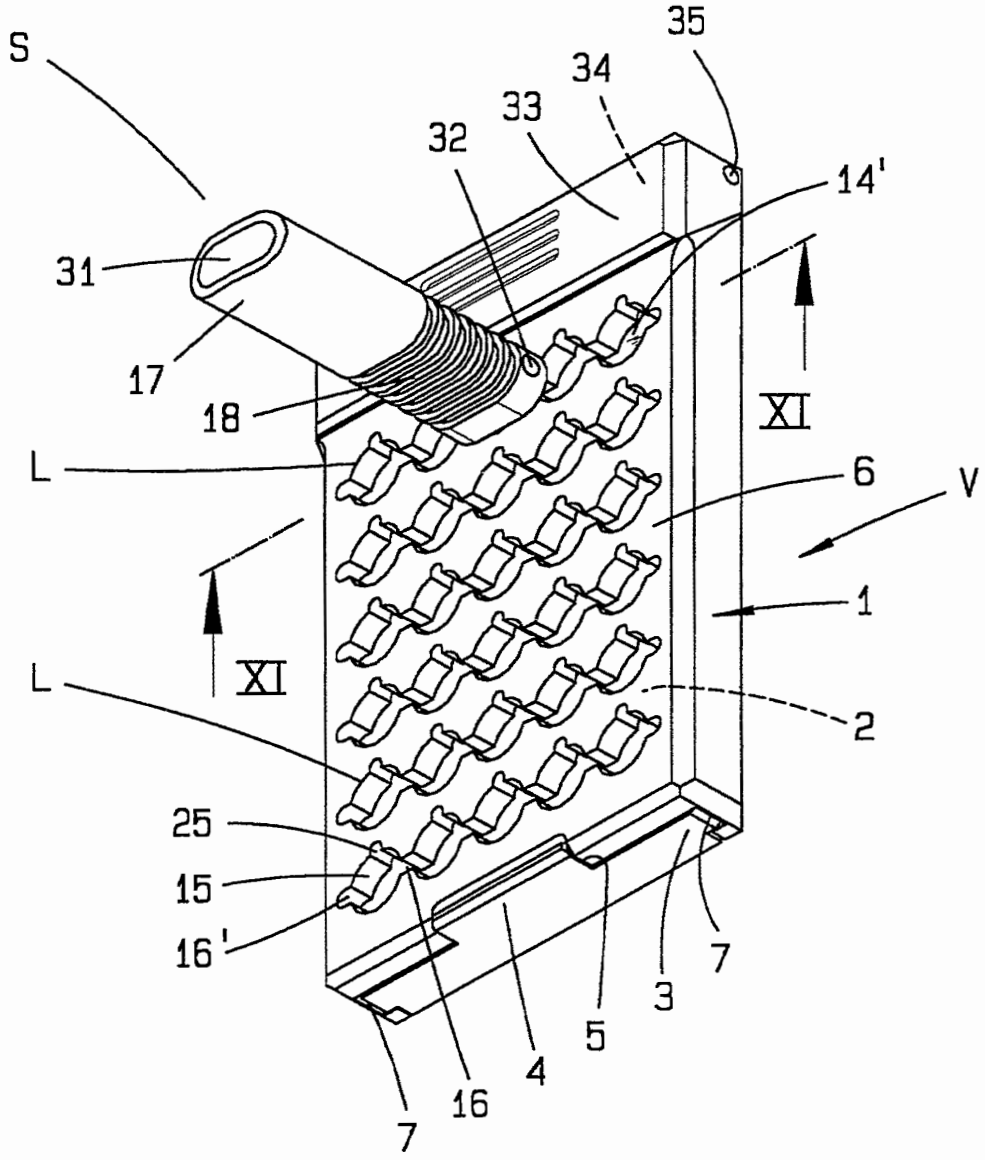
Fig. 3



NJOY Exhibit 1002.1454

Nummer: DE 196 19 536 A1
Int. Cl.[6]: B 65 D 83/06
Offenlegungstag: 30. Oktober 1997

Fig. 4



NJOY Exhibit 1002.1455

Nummer: DE 196 19 536 A1
Int. Cl.[6]: B 65 D 83/06
Offenlegungstag: 30. Oktober 1997

Fig. 9

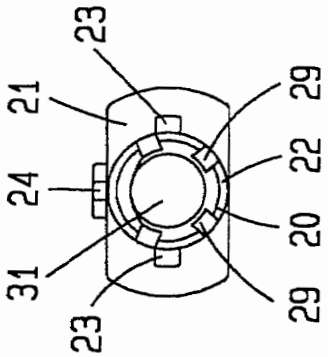


Fig. 5

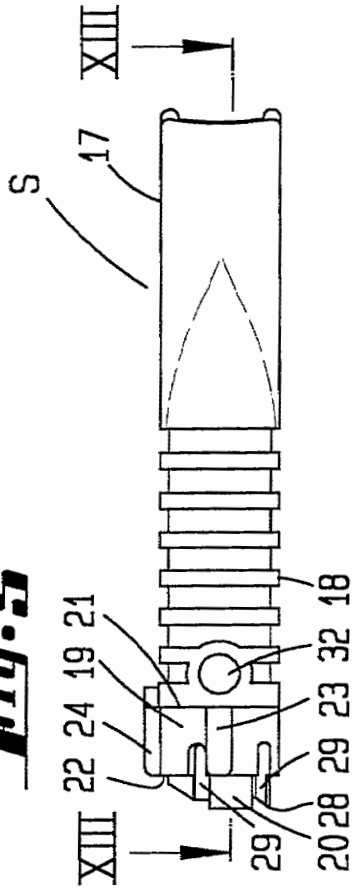


Fig. 6

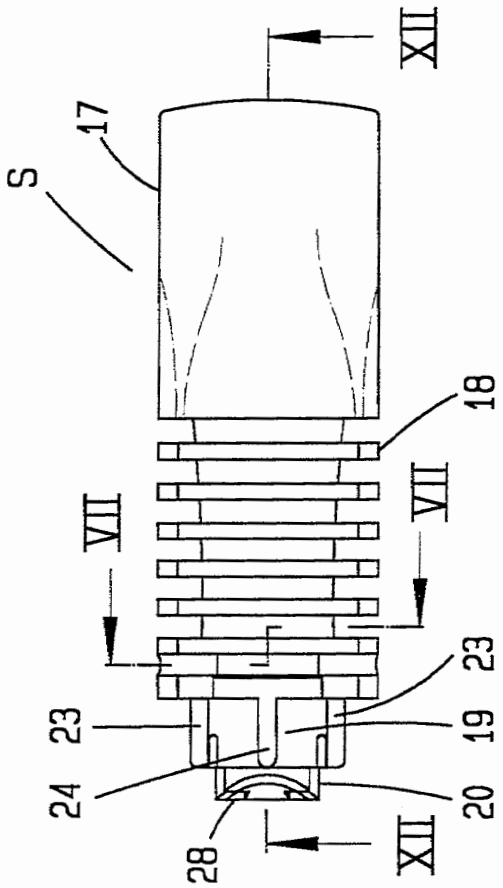


Fig. 8

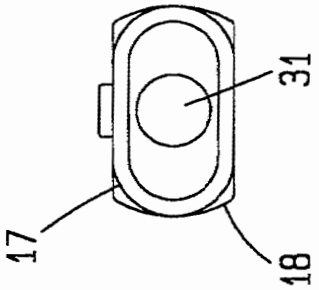
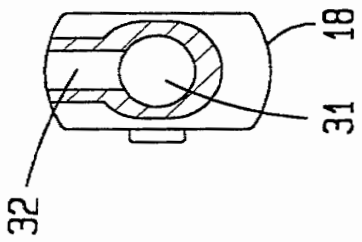


Fig. 7



NJOY Exhibit 1002.1456

Nummer: DE 196 19 536 A1
Int. Cl.[6]: B 65 D 83/06
Offenlegungstag: 30. Oktober 1997

Fig. 10

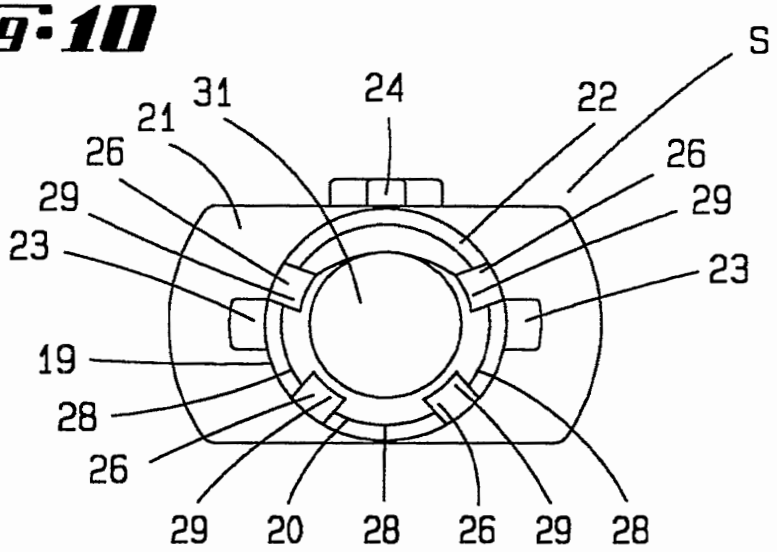
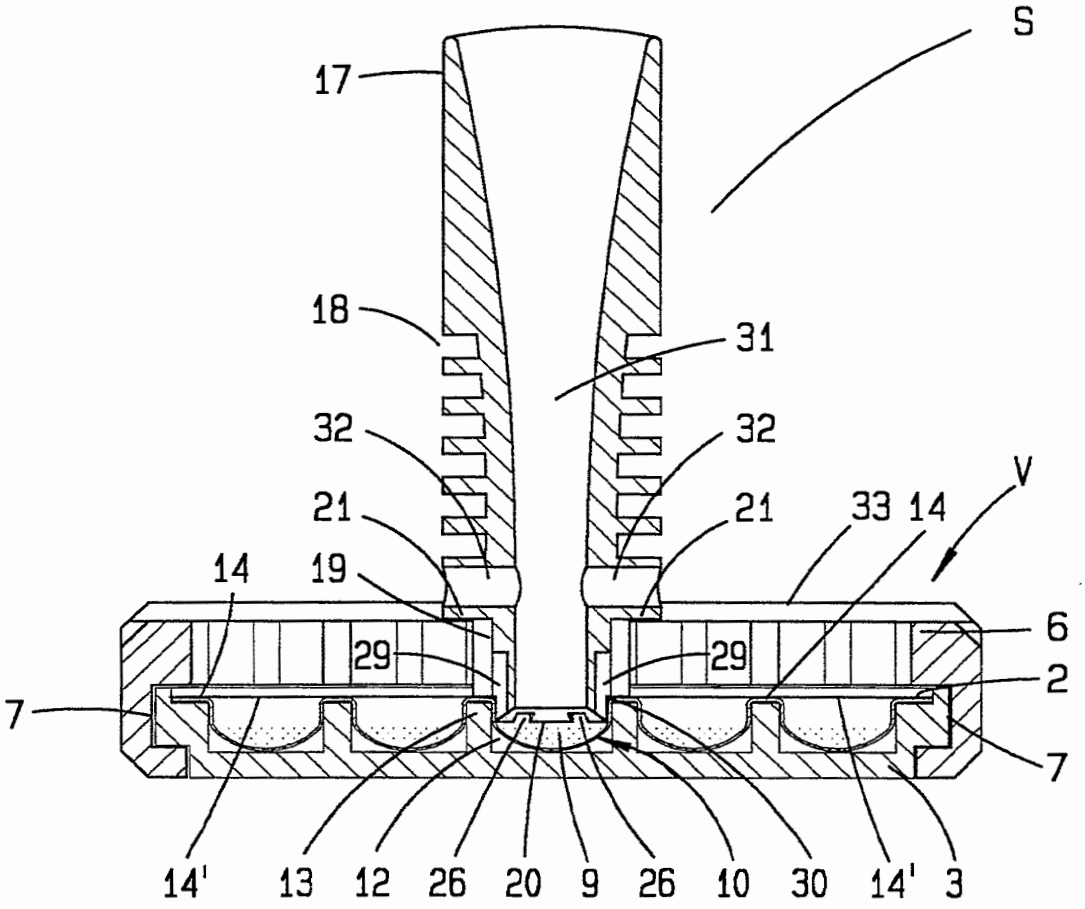


Fig. 11



NJOY Exhibit 1002.1457

Nummer: DE 196 19 536 A1
Int. Cl.[6]: B 65 D 83/06
Offenlegungstag: 30. Oktober 1997

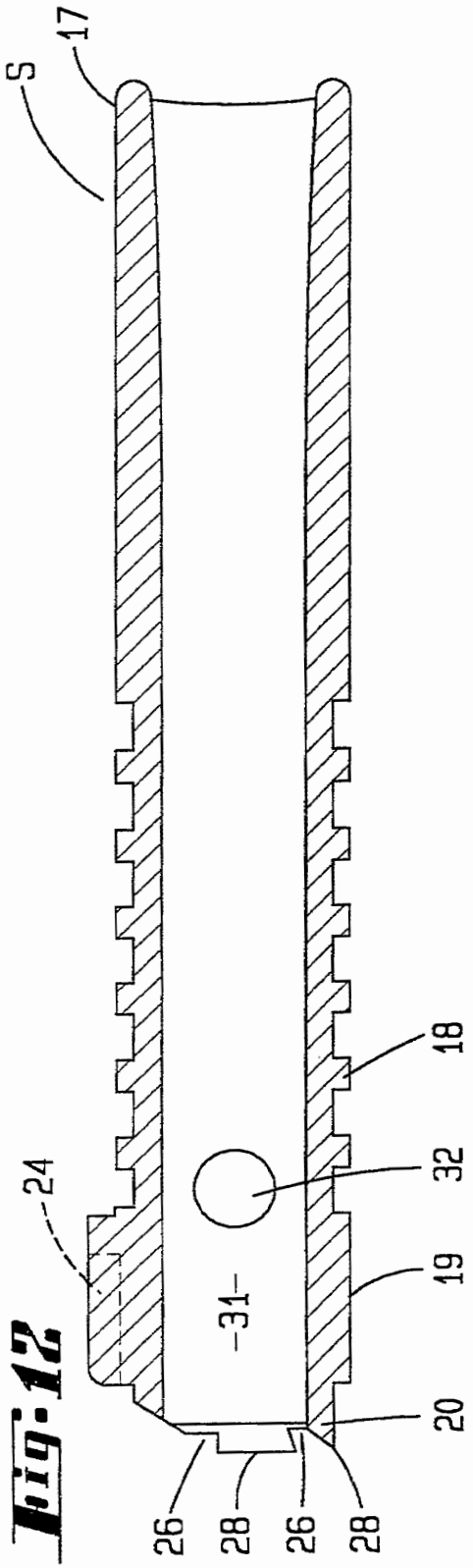


Fig. 12

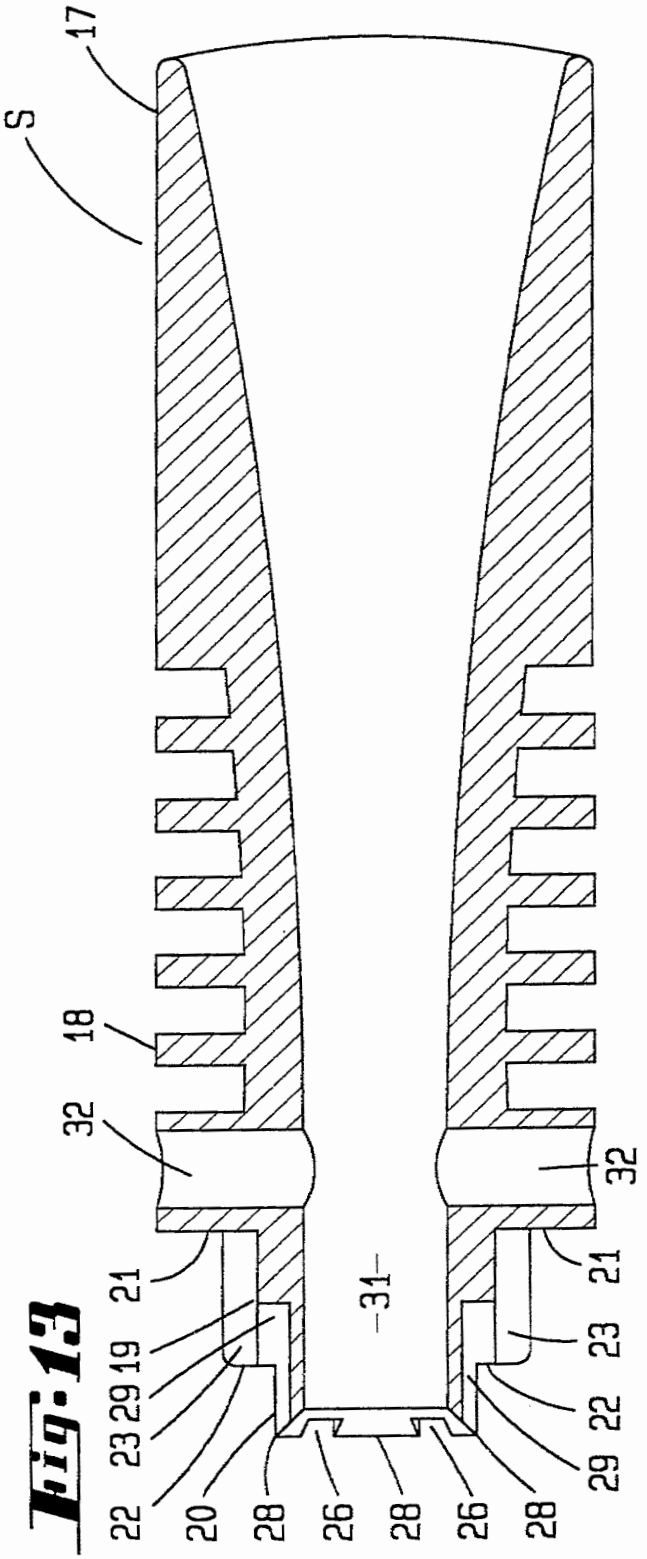
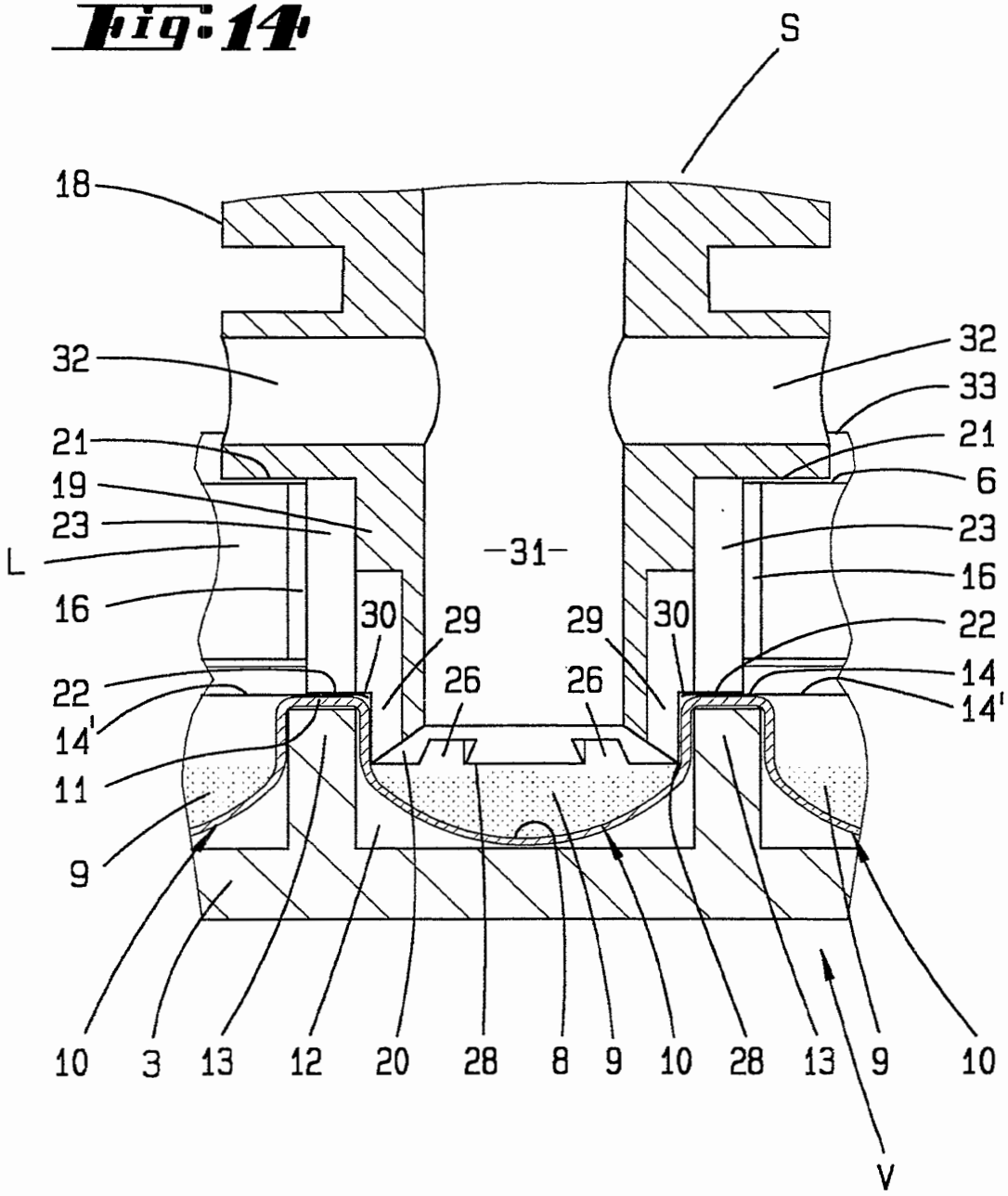


Fig. 13

NJOY Exhibit 1002.1458

Nummer: DE 196 19 536 A1
Int. Cl.[6]: B 65 D 83/06
Offenlegungstag: 30. Oktober 1997

Fig. 14



NJOY Exhibit 1002.1459

Nummer: DE 196 19 536 A1
Int. Cl.[6]: B 65 D 83/06
Offenlegungstag: 30. Oktober 1997

Fig. 15

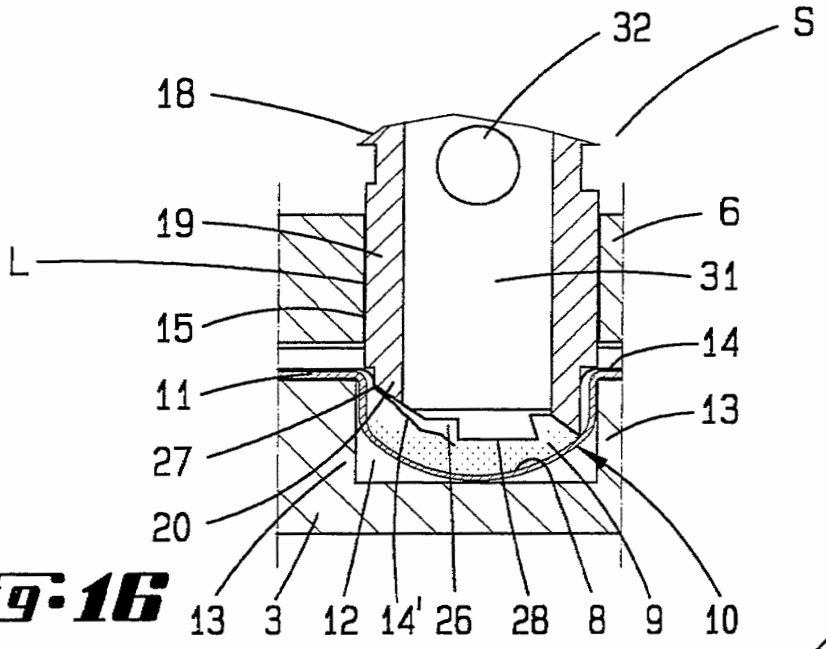
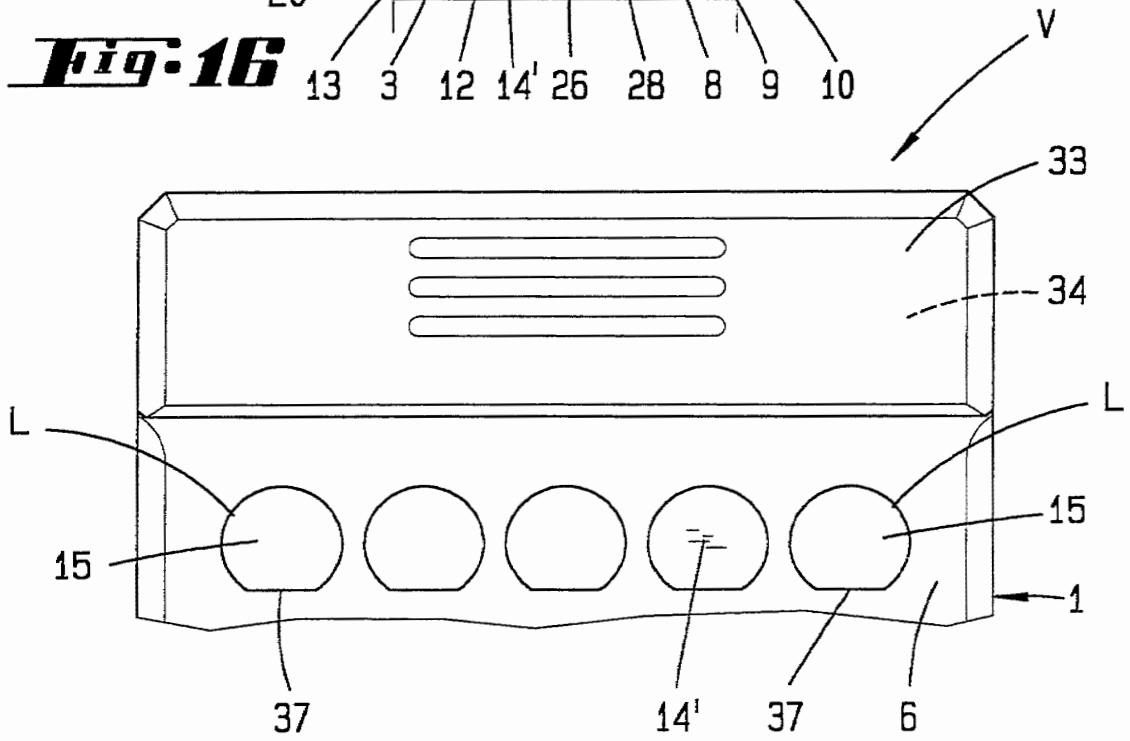


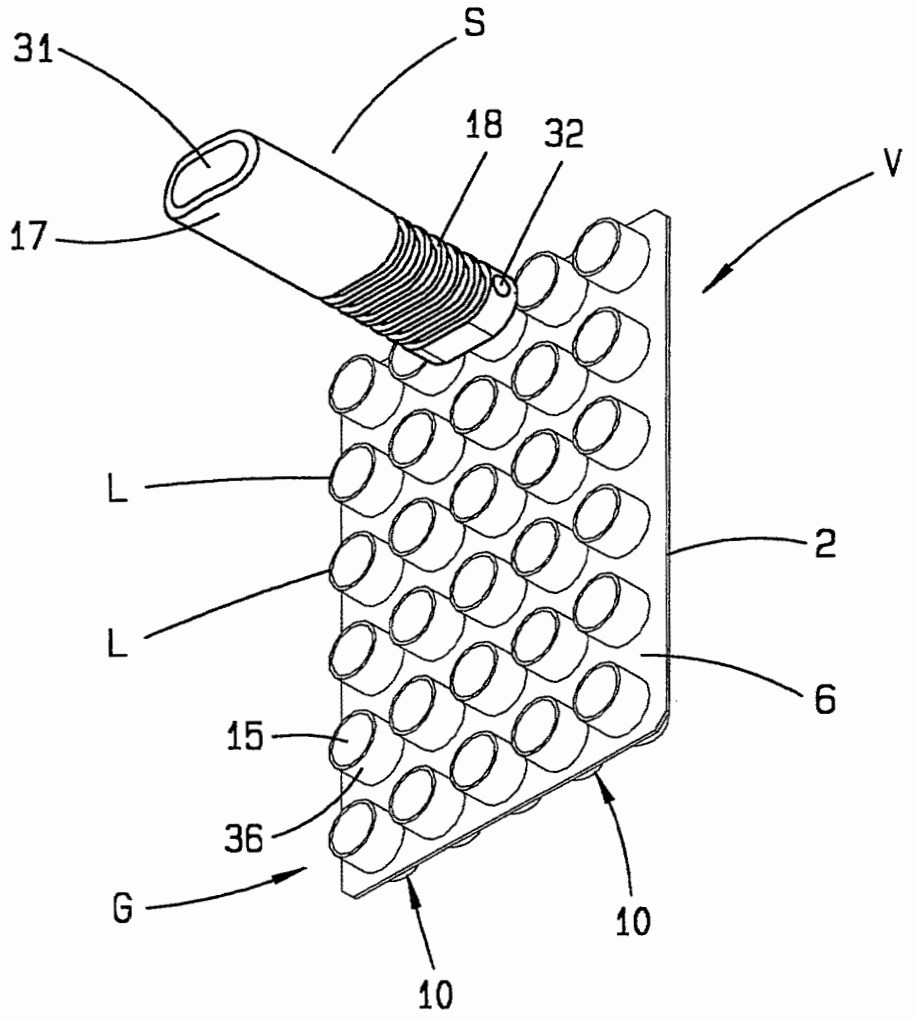
Fig. 16



NJOY Exhibit 1002.1460

Nummer: DE 196 19 536 A1
Int. Cl.[6]: B 65 D 83/06
Offenlegungstag: 30. Oktober 1997

Fig. 17



NJOY Exhibit 1002.1461

Nummer: DE 196 19 536 A1
Int. Cl.[6]: B 65 D 83/06
Offenlegungstag: 30. Oktober 1997

Fig. 18

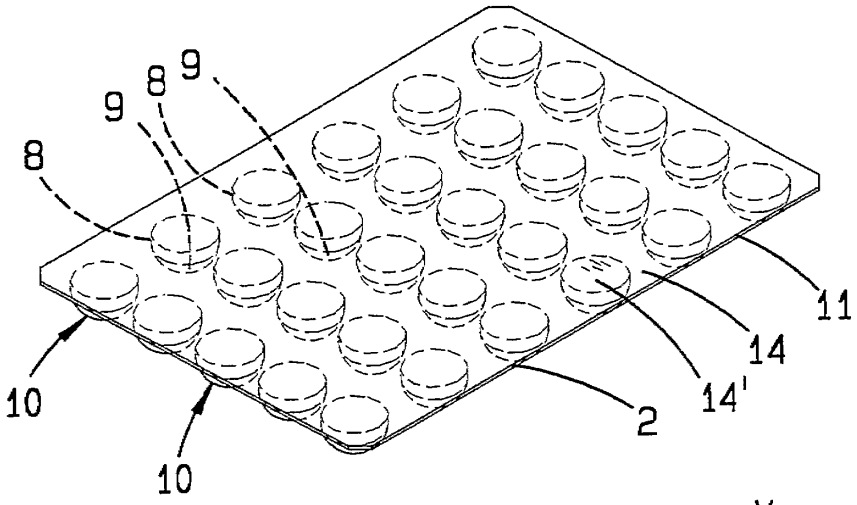
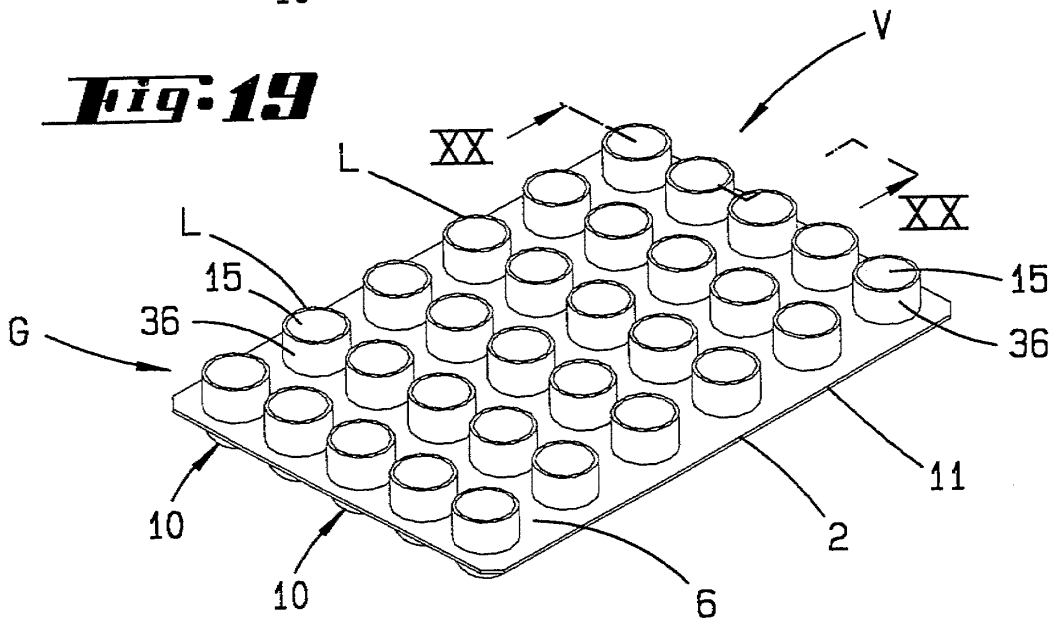


Fig. 19



NJOY Exhibit 1002.1462

Nummer: DE 196 19 536 A1
Int. Cl.[6]: B 65 D 83/06
Offenlegungstag: 30. Oktober 1997

Fig. 20

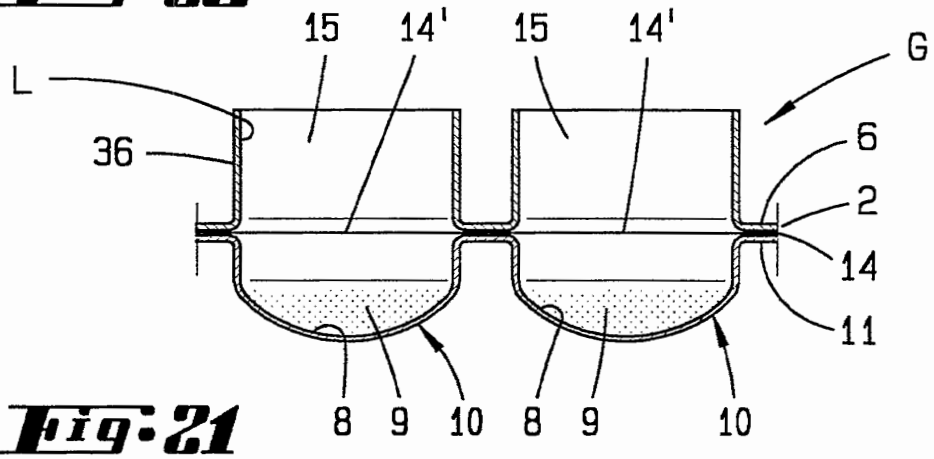


Fig. 21

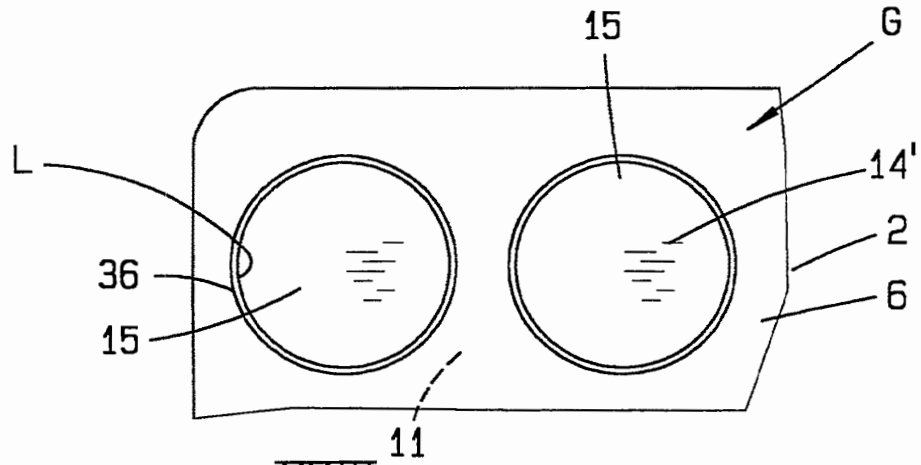


Fig. 22

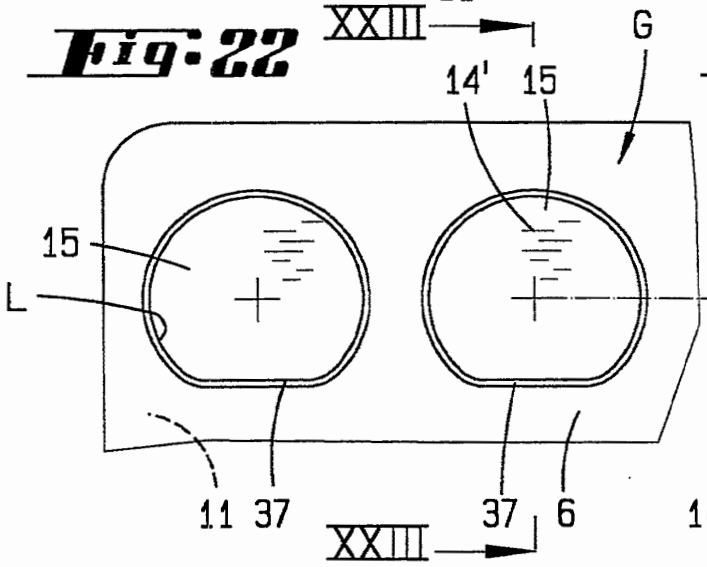
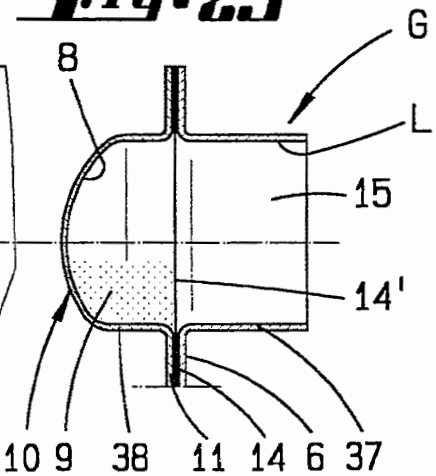


Fig. 23



NJOY Exhibit 1002.1463

Nummer: DE 196 19 536 A1
Int. Cl.[6]: B 65 D 83/06
Offenlegungstag: 30. Oktober 1997

Fig. 24

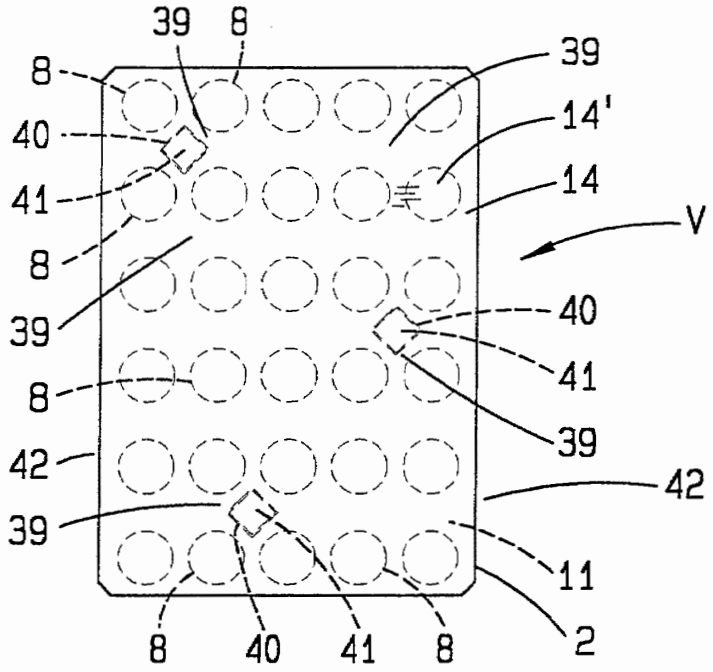


Fig. 25

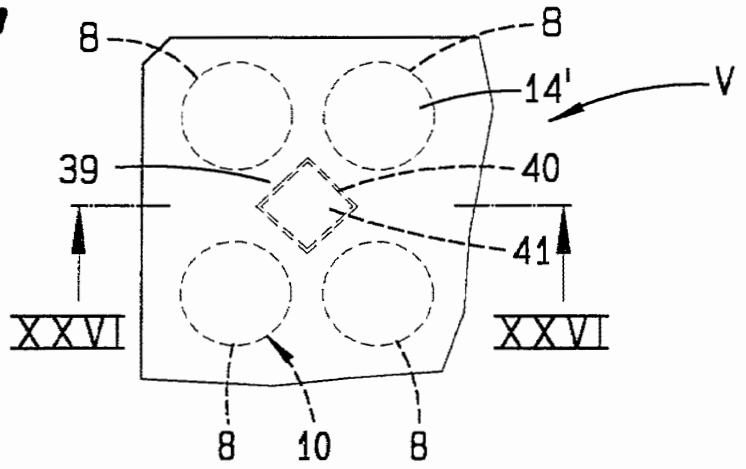
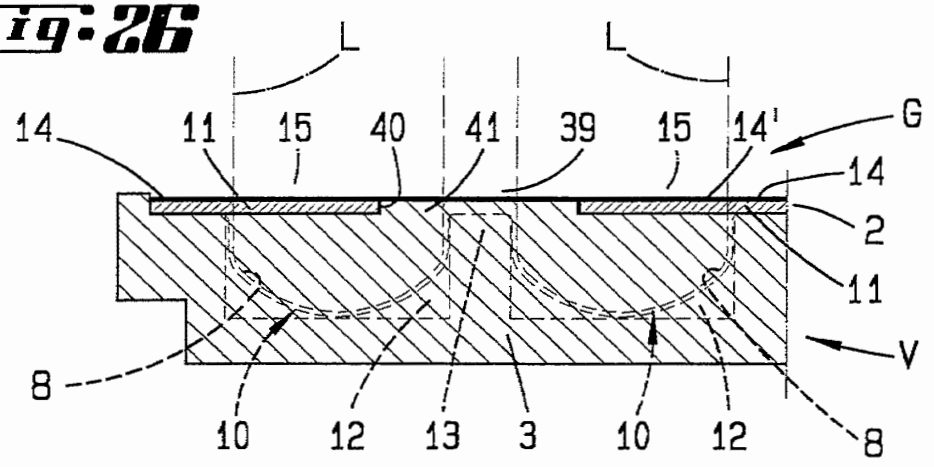


Fig. 26

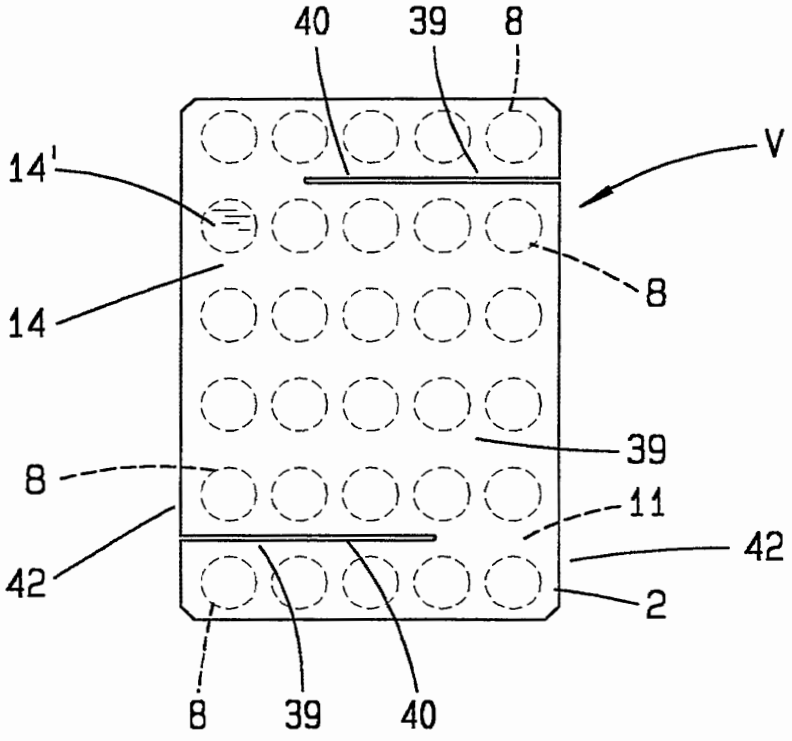


702 044/291

NJOY Exhibit 1002.1464

Nummer: DE 196 19 536 A1
Int. Cl.[6]: B 65 D 83/06
Offenlegungstag: 30. Oktober 1997

Fig. 27



NJOY Exhibit 1002.1465

Nummer: DE 196 19 536 A1
Int. Cl.[6]: B 65 D 83/06
Offenlegungstag: 30. Oktober 1997

Fig. 28

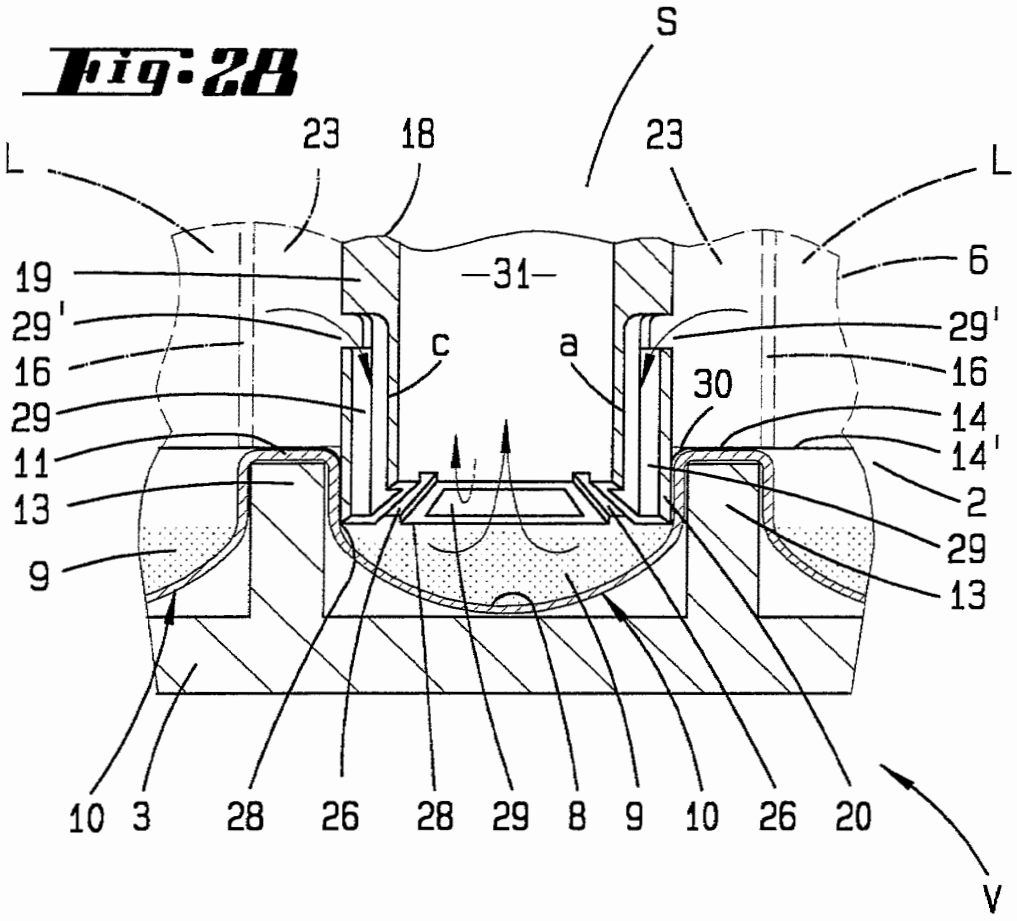
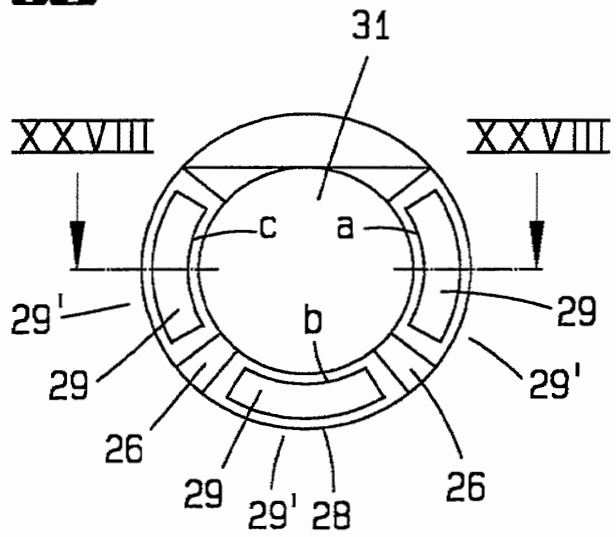


Fig. 29



NJOY Exhibit 1002.1466

Espacenet

Bibliographic data: DE102006004484 (A1) — 2007-08-09

Re-usable part for smoke-free cigarette, has filament preheated by attaching filter, where filament is brought to operating temperature, when pulling on entire construction of cigarette

Inventor(s): SCHMIDT KARSTEN [DE]; BAECKSTROEM MATS [DE]; MELCHIOR-LEHMANN MONIKA [DE] ± (SCHMIDT, KARSTEN, ; BAECKSTROEM, MATS, ; MELCHIOR-LEHMANN, MONIKA)

Applicant(s): SCHMIDT KARSTEN [DE] ± (SCHMIDT, KARSTEN)

Classification: **- international:** ***A24D1/18***
- cooperative: **A24F47/008**

Application number: DE20061004484 20060129

Priority number(s): DE20061004484 20060129

Abstract of DE102006004484 (A1)

The part has a storage battery (11), a filter sensor, an air flow sensor (13), a filament (14), timing, vent holes and charging contact, where the filament is preheated by attaching a filter. The filament is brought to the operating temperature, when pulling on an entire construction of the cigarette. The air flow sensor detects the pulling of the smoker and bringing of the filament to the operating temperature, in such a manner that the desired effect of heating of the airflow occurs for releasing contents of active depots in filter.

NJOY Exhibit 1002.1467

(19) Bundesrepublik Deutschland
Deutsches Patent- und Markenamt

(10) **DE 10 2006 004 484 A1** 2007.08.09

(12) # Offenlegungsschrift

(21) Aktenzeichen: **10 2006 004 484.3**
(22) Anmeldetag: **29.01.2006**
(43) Offenlegungstag: **09.08.2007**

(51) Int Cl.[8]: ***A24D 1/18*** (2006.01)

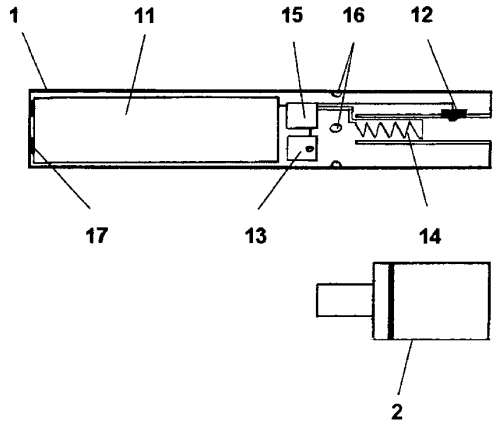
(71) Anmelder:
Schmidt, Karsten, 14471 Potsdam, DE

(72) Erfinder:
Schmidt, Karsten, 14471 Potsdam, DE;
Bäckström, Mats, 12435 Berlin, DE;
Melchior-Lehmann, Monika, 12305 Berlin, DE

Die folgenden Angaben sind den vom Anmelder eingereichten Unterlagen entnommen

(54) Bezeichnung: **Technische Lösung zum Betreiben von rauchfreien Zigaretten**

(57) Zusammenfassung: Die Erfindung beschreibt verschiedene Lösungswege zur technischen Ausgestaltung des wiederverwendbaren Teils einer rauchfreien Zigarette nach Patent DE10321379. In diesem befinden sich unter anderem ein Akku (11), ein Glühfaden (14), ein Luftstromsensor (13) und ein Filtersensor (12), der das Vorheizen des Glühfadens (14) veranlasst, sobald ein Filter (2) eingesteckt wird. Der Luftstromsensor (13) detektiert das Ziehen des Rauchers an der Zigarettennachbildung und bringt den Glühfaden auf Betriebstemperatur, so dass der gewünschte Effekt des Aufheizens des Luftstroms zur Freisetzung der Inhaltsstoffe des Wirkstoffdepots im Filter (2) eintritt.



NJOY Exhibit 1002.1468

Beschreibung

[0001] Die hier dargestellte technische Lösung beschreibt einen alternativen Weg zur Umsetzung der gewünschten Eigenschaften einer rauchfreien Zigarette, wie sie in der Patentanmeldung WO 2004098324 (DE 10321379) beschrieben wird.

[0002] Der Lösungsansatz obigen Bezugspatents beruht auf einem wiederverwendbaren Teil (Patentanspruch 1), der als Wärmespeicher zur Erwärmung der durch den Raucher inhalierten Luft dienen soll. Dem Wärmespeicher selbst wird Wärme entweder wie in Patentanspruch 2 oder wie in Patentanspruch 5 beschrieben zugeführt.

[0003] Der Wärmespeicher soll die notwendige Wärme für 1...3 Minuten vorhalten, die benötigt wird, um die vom Raucher inhaliert Luft zu erwärmen.

[0004] Die spezifische Wärmekapazität der Luft beträgt 1,01 $kJ \cdot kg^{-1}$ grd^{-1}.

[0005] Mit einem Zigarettenzug nimmt der Raucher etwa 300ml Luft auf.

[0006] Wird diese Luftmenge von z.B. 20°C auf 70°C (bei dem sich das Nikotin aus dem Depot löst) erwärmt, speichern 300ml Luft eine Wärmemenge von ca. 20J.

[0007] Geht man von mindestens 5 Zigarettenzügen aus, die ein Raucher für das Rauchen einer Zigarette benötigt, so muss der Luftmenge von 1500ml eine Energiemenge von ca. 100J zugeführt werden, die ohne größeren technischen Aufwand in einem zigarettengroßen Wärmespeicher vorgehalten werden kann.

[0008] Bei der Erfindung wurde jedoch nicht bedacht, dass Luft eine extrem schlechte Wärmeleitfähigkeit besitzt, d.h. der Energieaufwand um ein vielfaches höher ist, um der Luft die notwendige Energiemenge zuzuführen.

[0009] Die spezifische Wärmleitfähigkeit eines Stoffes schlägt sich in der spezifischen Wärmeleitzahl wieder.

[0010] Diese beträgt für Luft 0,025 W/mK, für Kupfer 402 W/mK.

[0011] D.h. die Energiemenge muss um 4 Zehnerpotenzen höher als die des hier benannten Metalls sein, um den Widerstand auszugleichen, den die Luft der Erwärmung durch einem anderen Stoff entgegensetzt.

[0012] Dies ist auch der Grund dafür, warum die Luft, die durch eine echte Zigarette strömt, überhaupt eingeatmet werden kann, obwohl die Gluttemperatur zwischen 700°C und 1000°C beträgt.

[0013] Setzt man voraus, dass man eine Temperatur von mindestens 700°C erzeugen muss, um mindestens 1500ml Luft auf „Betriebstemperatur" zu bringen, so müsste man den Wärmespeicher auf mehrere 1000°C aufheizen, damit dieser für 1...3 Minuten genügend Wärmeenergie vorrätig hat, um insgesamt 1500ml Luft auf 70°C zu erwärmen.

[0014] Eine gleichmäßige Wärmeabgabe, wie unter Absatz 4. des Bezugspatents erläutert, erscheint unter Verwendung eines Wärmespeichers im wiederverwendbaren Teil einer rauchfreien Zigarette nicht realisierbar.

[0015] Die im Folgenden beschriebene Alternativlösung A lehnt sich möglichst nah an der Funktionsfähigkeit einer echten Zigarette an.

[0016] D.h. der wiederverwendbare Teil einer rauchfreien Zigarette (**1**) Abb. I dient nicht als Wärmespeicher sondern beherbergt einen Akku (**11**), einen Filtersensor (**12**), einen Luftstromsensor (**13**), einen Glühfaden (**14**), eine Zeitsteuerung (**15**) und Luftlöcher (**16**). Eine aufwendige Gestaltung von Luftströmungskanälen oder die Anbringung einer aufgedampften rückstrahlenden Beschichtung sind nicht erforderlich.

[0017] Der Glühfaden (**14**) befindet sich unmittelbar vor dem auswechselbaren Filter (**2**), so dass die durch den Glühfaden zu erzeugende Temperatur und damit der Energieverbrauch geringer ausfällt, als dies am Ende der Zigarette der Fall wäre. Wird der Filter (**2**) in den wiederverwendbaren Teil der Zigarette (**1**) eingesteckt, registriert dies der Filtersensor (**12**) und schaltet den Glühfaden (**14**) zu, der damit zum Vorglühen gebracht wird. Diese Funktion ist vergleichbar mit der Glut einer Zigarette ohne Inhalation und dient einem schnelleren Erreichen der Arbeitstemperatur des Glühfadens bei der Inhalation. Erst beim Zigarettenzug, der eine Luftströmung erzeugt und vom Luftstromsensor (**13**) erfasst wird, wird der Glühfaden (**14**) auf Betriebstemperatur gebracht. Dies spart zum Einen Energie und verhindert zum Anderen die bei echten Zigaretten bekannten Gefährdungen durch Überhitzung/Verbrennungen.

[0018] Vergisst der Raucher nach Nutzung der Zigarette den Filter (**2**) zu entfernen, übernimmt die Zeitsteuerung (**15**) die Trennung des Stromkreises, z.B. nach 3 Minuten.

[0019] Der Filtersensor (**12**) ist als normaler elektromechanischer Kontakt auslegbar.

[0020] Als Luftstromsensor (**13**) ist ein herkömmlicher Luftdrucksensor verwendbar, der auf einen

NJOY Exhibit 1002.1469

plötzlichen Druckabfall innerhalb des wiederverwendbaren Teils der Zigarette (**1**) reagiert.

[0021] Akkus (**11**) in Li-Ion-Technologie haben eine Leistungsdichte von bis zu 350Wh/l und können in individuellen Bauformen gefertigt werden. Sie kommen heute mit sehr kleinen Abmessungen z.B. in Bluetooth-Headsets zum Einsatz.

[0022] Geht man davon aus, dass man 2/3 des Volumens des wiederverwendbaren Teils der Zigarette (**1**) für den Akku (**11**) zur Verfügung hat, so entspricht dies einem Volumen von etwa 2ml und damit einer theoretischen Kapazität von 0,2Ah bei einer Nennspannung von 3,6V.

[0023] Verwendet man einen wenige µm dicke Glühfaden, so lassen sich bei 3,6V mit weniger als 100mA Stromverbrauch Glühtemperaturen von 1000°C und mehr erreichen.

[0024] Die Akkukapazität reicht somit für einen mehrfachen Zigarettengebrauch (mehrere Filter), wenn man von einer durchschnittlichen Nutzungsdauer von 3 Minuten pro Zigarette (Filter) ausgeht.

[0025] Ist die Kapazität des Akkus (**11**) erschöpft, kann er über ein externes Ladegerät an den Ladekontakten (**17**) wieder aufgeladen werden. Die notwendige Ladeintelligenz steckt im Ladegerät.

[0026] Die nun beschriebene Alternativlösung B zeigt eine weitere Möglichkeit, die im Bezugspatent unter Verzicht des Anspruches auf Schaffung des beim Inhalieren entstehenden Wärmegefühls gesteckten Ziele zu erreichen.

[0027] Dies erfolgt ohne den Umweg der Erwärmung der Luft auf etwa 70°C, bei der die Inhaltsstoffe des Wirkstoffdepots gelöst werden, in dem das Wirkstoffdepot im Filter direkt erwärmt wird. Hat das Wirkstoffdepot die Arbeitstemperatur erreicht, so reißt der durch den Raucher erzeugte Luftstrom die Inhaltsstoffe mit sich, die dann von ihm inhaliert werden.

[0028] Die Zigarette besteht wiederum aus einem wiederverwendbaren Teil (**3**) Abb. II und einem austauschbaren Filter mit Wirkstoffdepot (**4**). Der wiederverwendbare Teil (**3**) beherbergt einen Akku (**31**), Ladekontakte (**32**), eine Zeitsteuerung (**33**), Luftlöcher (**34**) und zwei elektrische Filterkontakte (**35**).

[0029] Diese elektrischen Filterkontakte (**35**) stellen eine elektrische Verbindung zum Filter mit Wirkstoffdepot (**4**) her. In diesem ist ein elektrisches Heizelement (**41**) eingebaut, welches über die elektrischen Filterkontakte (**42**) mit den elektrischen Filterkontakten (**35**) des wiederverwendbaren Teils (**3**) verbunden wird. Nach Anstecken des Filters mit Wirkstoffdepot (**4**) wird dieses auf Betriebstemperatur gebracht.

[0030] Vergisst der Raucher nach Nutzung der Zigarette den Filter (**4**) zu entfernen, übernimmt die Zeitsteuerung (**33**) die Trennung des Stromkreises, z.B. nach 3 Minuten.

[0031] Ist die Kapazität des Akkus (**31**) erschöpft, kann er über ein externes Ladegerät an den Ladekontakten (**32**) wieder aufgeladen werden. Die notwendige Ladeintelligenz steckt im Ladegerät.

[0032] Aufgrund der geringeren Arbeitstemperatur des Heizelements (**41**) sinkt der Energieverbrauch und die Nutungsdauer bis zur nächsten Ladung des Akkus (**31**) erhöht sich.

[0033] Möchte man die Nachteile einer kontaktbehafteten Wärmeerzeugung im Wirkstoffdepot des Filters vermeiden, kann folgende Bauform gewählt werden.

[0034] Die Zigarette besteht wiederum aus einem wiederverwendbaren Teil (**5**) Abb. III und einem austauschbaren Filter mit Wirkstoffdepot (**6**). Der wiederverwendbare Teil (**5**) beherbergt einen Akku (**51**), Ladekontakte (**52**), eine Zeitsteuerung (**53**), Luftlöcher (**54**), eine elektronische Schwingungserzeugungseinheit (**55**), eine Spule (**56**) und einen Filtersensor (**57**).

[0035] Den Wirkstoffen des Wirkstoffdepots (**61**) im Filters (**6**) wird feines Metallpulver, vornehmlich eisenhaltig, beigemengt. Dieses kann das Wirkstoffdepot nicht verlassen.

[0036] Wird der Filter (**6**) in den wiederverwendbaren Teil der Zigarette (**5**) eingesteckt, registriert dies der Filtersensor (**57**) und schaltet die Schwingungserzeugungseinheit (**55**) zu. Die erzeugte niederfrequente Schwingung wird an die Spule (**56**) geleitet und ruft durch die in dem Metallpulver induzierten Wirbelströme eine Erwärmung des Metallpulvers und damit des gesamten Wirkstoffdepots hervor. Die erzeugte Temperatur lässt sich durch die Auswahl der Größe, Form und Materialbeschaffenheit des beigemengten Metalls sowie durch die zugeführte Energie steuern.

[0037] Wird der auswechselbare Filter (**6**) entnommen, so trennt der Filtersensor (**57**) den Stromkreis zur elektronischen Schwingungserzeugungseinheit (**55**).

[0038] Vergisst der Raucher dies nach Nutzung der Zigarette, übernimmt die Zeitsteuerung (**53**) die Trennung des Stromkreises, z.B. nach 3 Minuten.

[0039] Diese Methode ist besonders energieeffizient, da die Leistungsübertragung durch Induktion etwa um das 1.000fache effektiver ist, als die Leistungsübertragung durch Berührung mit einer Heiz-

quelle.

Patentansprüche

1. Wiederverwendbarer Teil für eine rauchfreie Zigarette, **dadurch gekennzeichnet**, dass dieser einen Akku (**11**), einen Filtersensor (**12**), einen Luftstromsensor (**13**), einen Glühfaden (**14**), eine Zeitsteuerung (**15**), Luftlöcher (**16**) und Ladekontakte (**17**) enthält, bei der durch Anstecken eines Filters der Glühfaden vorgeheizt wird und beim Ziehen an der Gesamtkonstruktion der Zigarette der Glühfaden auf Arbeitstemperatur gebracht wird.

2. Wiederverwendbarer Teil für eine rauchfreie Zigarette, dadurch gekennzeichnet, dass dieser einen Akku (**31**), Ladekontakte (**32**), eine Zeitsteuerung (**33**), Luftlöcher (**34**) und zwei elektrische Filterkontakte (**35**) enthält sowie ein Filter mit Wirkstoffdepot (**4**), dadurch gekennzeichnet, dass dieser ein elektrisches Heizelement (**41**) und elektrische Filterkontakte (**42**) enthält, so dass durch Zusammenstecken beider Teile ein elektrischer Kontakt hergestellt und das Heizelement und somit der Wirkstoff auf Arbeitstemperatur gebracht wird.

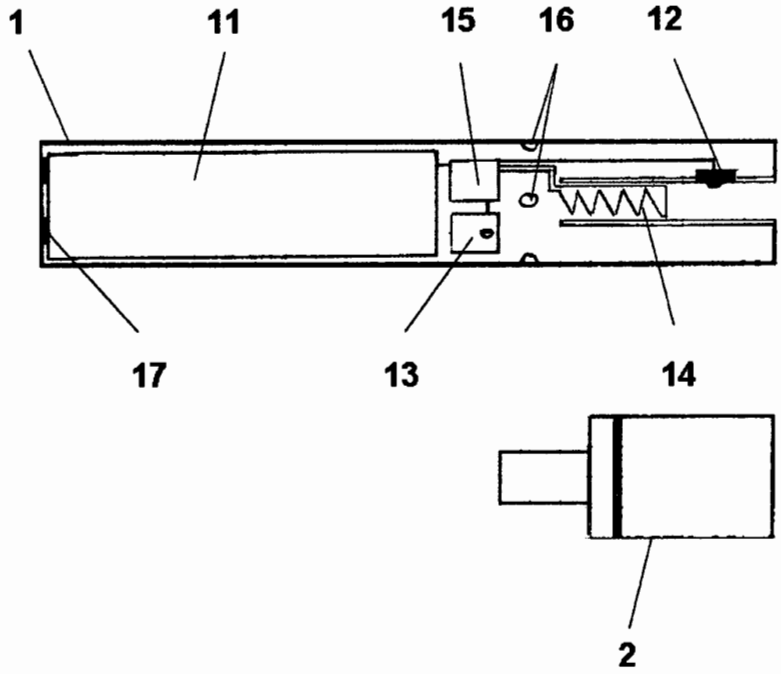
3. Wiederverwendbarer Teil für eine rauchfreie Zigarette, dadurch gekennzeichnet, dass dieser einen Akku (**51**), Ladekontakte (**52**), eine Zeitsteuerung (**53**), Luftlöcher (**54**), eine elektronische Schwingungserzeugungseinheit (**55**), eine Spule (**56**) und eine Filtersensor (**57**) enthält sowie ein Filter mit Wirkstoffdepot, dadurch gekennzeichnet, dass diesem feines Metallpulver beigemengt ist, so dass bei Anstecken des Filters eine niederfrequente Spannung erzeugt wird, die – übertragen durch die Spule (**56**) – Wirbelstromverluste in dem beigemengten Metallpulver hervorruft und somit den Wirkstoff im Wirkstoffdepot (**61**) des Filters (**6**) auf Betriebstemperatur bringt.

Es folgen 3 Blatt Zeichnungen

NJOY Exhibit 1002.1471

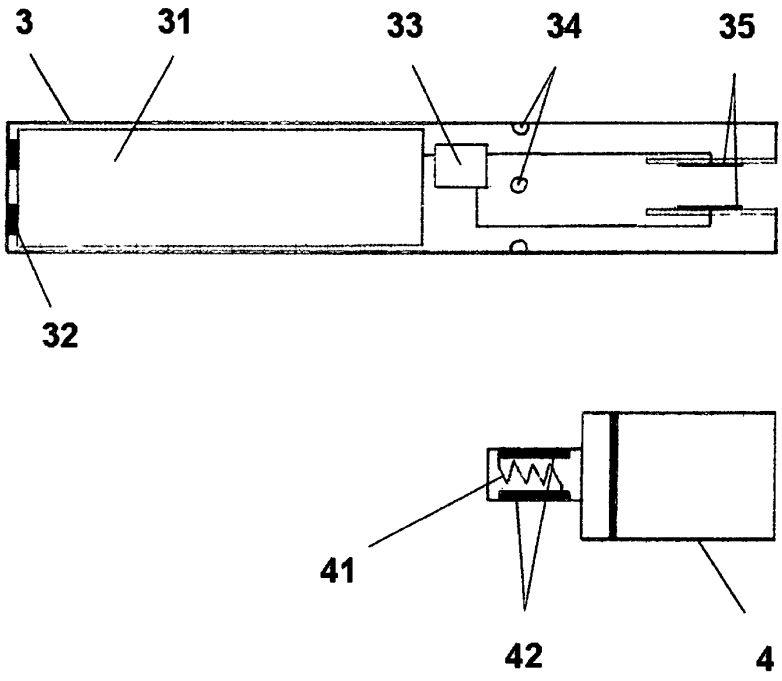
Anhängende Zeichnungen

Abbildung I



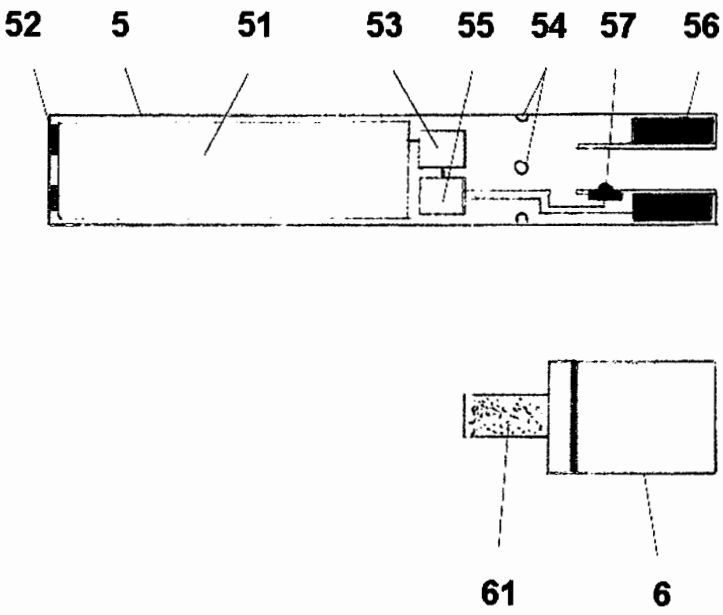
NJOY Exhibit 1002.1472

Abbildung II



NJOY Exhibit 1002.1473

Abbildung III



NJOY Exhibit 1002.1474

Espacenet

Bibliographic data: DE102008046932 (A1) — 2009-05-20

Electrical plug-in connector housing for machine i.e. industrial robot, has cylindrical connection part including axially open radial recess, and cover part fastened to cylindrical wall part and axially closing wall part

Inventor(s): DAGCI ALI-ILKER [DE]; KARABULUT GUENALTAY [DE]; MUELLER SVEN [DE]; SKLORZ GEORG [DE]; WEINBERGER JAKOB [DE] ± (DAGCI, ALI-ILKER, ; KARABULUT, GUENALTAY, ; MUELLER, SVEN, ; SKLORZ, GEORG, ; WEINBERGER, JAKOB)

Applicant(s): DAIMLER AG [DE] ± (DAIMLER AG)

Classification: **- international:** ***H01R13/502; H01R13/56***
- cooperative: **H01R13/512**; **H01R13/567**; **H01R13/625**

Application number: DE20081046932 20080912

Priority number(s): DE20081046932 20080912

Abstract of DE102008046932 (A1)

The housing (5) has a cylindrical connection part (7) with which the housing is fastened to an electrical connection point (3) i.e. socket, of a machine (4) i.e. industrial robot. A cylindrical wall part (8) is fastened or arranged at the part. The part has an axially open radial recess at a side turned away from the part. A cover part (9) is fastened to the wall part, and axially closes the wall part. The cover part has a cylindrical collar overlapping the wall part, where the collar has an axially open radial recess that is aligned with the recess of the wall part.

NJOY Exhibit 1002.1475

(19) Bundesrepublik Deutschland
Deutsches Patent- und Markenamt

(10) **DE 10 2008 046 932 A1** 2009.05.20

(12) # Offenlegungsschrift

(21) Aktenzeichen: **10 2008 046 932.7**
(22) Anmeldetag: **12.09.2008**
(43) Offenlegungstag: **20.05.2009**

(51) Int Cl.[8]: ***H01R 13/502*** (2006.01)
H01R 13/56 (2006.01)

Mit Einverständnis des Anmelders offengelegte Anmeldung gemäß § 31 Abs. 2 Ziffer 1 PatG

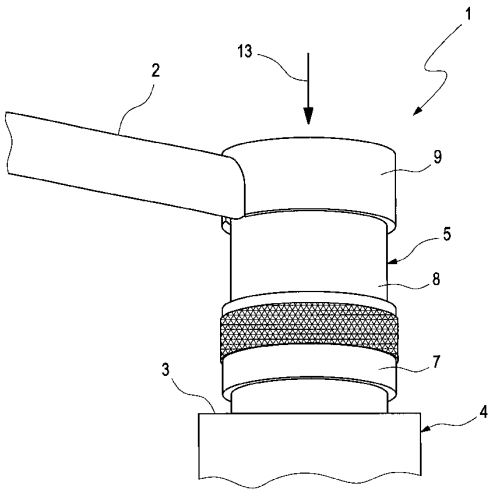
(71) Anmelder:
Daimler AG, 70327 Stuttgart, DE

(72) Erfinder:
Dagci, Ali-Ilker, 71067 Sindelfingen, DE;
Karabulut, Günaltay, 71272 Renningen, DE;
Mueller, Sven, 72141 Walddorfhäslach, DE; Sklorz, Georg, 71134 Aidlingen, DE; Weinberger, Jakob, 72622 Nürtingen, DE

Die folgenden Angaben sind den vom Anmelder eingereichten Unterlagen entnommen

(54) Bezeichnung: **Gehäuse für eine elektrische Steckverbindung**

(57) Hauptanspruch: Gehäuse für eine einen mehradrigen elektrischen Stecker (6) aufweisende Steckverbindung (1), insbesondere an einer Maschine (4),
– mit einem zylindrischen Verbindungsteil (7), mit dem das Gehäuse (5) an einer elektrischen Anschlussstelle (3), insbesondere einer Maschine (4), befestigbar ist,
– mit einem zylindrischen Wandteil (8), das am Verbindungsteil (7) angeordnet oder befestigt ist und das an einer vom Verbindungsteil (7) abgewandten Seite zumindest eine axial offene radiale Aussparung (14) aufweist,
– mit einem Deckelteil (9), das am Wandteil (8) befestigt ist und das das Wandteil (8) axial verschließt.



NJOY Exhibit 1002.1476

Beschreibung

[0001] Die Erfindung betrifft ein Gehäuse für eine einen mehradrigen elektrischen Stecker aufweisende Steckverbindung, insbesondere an einer Maschine.

[0002] Um elektrische Signale sowie Ströme übertragen zu können, ist es üblich, entsprechende elektrische Leitungen oder Kabel mit Hilfe von Steckverbindungen an Maschinen und dergleichen anzubringen. Die Maschinen weisen hierzu geeignete elektrische Anschlussstellen auf, mit denen die Steckverbindungen gekoppelt werden können. Diese Steckverbindungen können bei bestimmten Maschinen oder Einbausituationen relativ hohen Belastungen ausgesetzt sein. Beispielsweise kann über eine solche Steckverbindung ein Arbeitskopf eines Industrieroboters mit Steuersignalen und dergleichen versorgt werden. Da der Arbeitskopf, insbesondere bei einer Serienfertigung, mitunter hohen Beschleunigungen ausgesetzt ist, kann es zu entsprechend hohen Belastungen der elektrischen Leitungen im Bereich der Steckverbindung kommen. Konventionelle Steckverbindungen, bei denen ein Kabel koaxial zur Steckrichtung der Steckverbindung herangeführt wird, sind dadurch erhöhtem Verschleiß ausgesetzt. Die Beschädigung eines elektrischen Kabels führt zu einem Ausfall des Arbeitskopfs und somit des Roboters. Während der Reparatur steht im zugehörigen Abschnitt die Fertigung still, was extrem teuer ist.

[0003] Die vorliegende Erfindung beschäftigt sich mit dem Problem, für eine Steckverbindung der eingangs genannten Art eine verbesserte Ausführungsform anzugeben, die sich insbesondere dadurch auszeichnet, dass die Gefahr einer Beschädigung eines elektrischen Kabels bzw. einer elektrischen Leitung, die mit Hilfe der Steckverbindung mit entsprechenden elektrischen Anschlüssen einer Maschine kontaktiert werden soll, reduziert ist.

[0004] Dieses Problem wird erfindungsgemäß durch den Gegenstand des unabhängigen Anspruchs gelöst. Vorteilhafte Ausführungsformen sind Gegenstand der abhängigen Ansprüche.

[0005] Die Erfindung beruht auf dem allgemeinen Gedanken, für die Steckverbindung ein Gehäuse vorzusehen, das es ermöglicht, das gefährdete Kabel bzw. die gefährdete Leitung bezüglich einer Steckrichtung der Steckverbindung radial zuzuführen. Im Gehäuse kann dann die Umlenkung des Kabels bzw. der Leitung in die Steckrichtung erfolgen, wobei der Umlenkbereich von gegebenenfalls wirksamen Beschleunigungen entlastet ist. Es hat sich gezeigt, dass durch die Verwendung eines derartigen Gehäuses die Gefahr einer Beschädigung des Kabels erheblich reduziert ist, zumindest dann, wenn das Gehäuse für eine Steckverbindung an einem Arbeitskopf eines Industrieroboters verwendet wird.

[0006] Das Gehäuse besitzt zu diesem Zweck ein zylindrisches Verbindungsteil, mit dem das Gehäuse an einer elektrischen Anschlussstelle befestigt werden kann, beispielsweise mittels eines Bajonettverschlusses. Ferner weist das Gehäuse ein zylindrisches Wandteil auf, das am Verbindungsteil lose angeordnet sein kann oder daran befestigt sein kann. Dieses Wandteil besitzt an einer vom Verbindungsteil abgewandten Seite zumindest eine radiale Aussparung, die axial offen ist. Durch diese im Profil U-förmige Aussparung kann das jeweilige Kabel durch das Wandteil radial hindurchgeführt werden. Schließlich umfasst das Gehäuse noch ein Deckelteil, das so am Wandteil befestigt werden kann, dass das Deckelteil das Wandteil axial verschließt. Hierdurch wird zwangsläufig auch die wenigstens eine radiale Aussparung an ihrer axial offenen Seite verschlossen, wodurch das durch besagte Aussparung hindurchgeführte Kabel verliersicher am Gehäuse bzw. an dem durch das Wandteil und das Deckelteil gebildete Gehäuseteil gesichert ist.

[0007] Weitere wichtige Merkmale und Vorteile der Erfindung ergeben sich aus den Unteransprüchen, aus den Zeichnungen und aus der zugehörigen Figurenbeschreibung anhand der Zeichnungen.

[0008] Es versteht sich, dass die vorstehend genannten und die nachstehend noch zu erläuternden Merkmale nicht nur in der jeweils angegebenen Kombination, sondern auch in anderen Kombinationen oder in Alleinstellung verwendbar sind, ohne den Rahmen der vorliegenden Erfindung zu verlassen.

[0009] Bevorzugte Ausführungsbeispiele der Erfindung sind in den Zeichnungen dargestellt und werden in der nachfolgenden Beschreibung näher erläutert, wobei sich gleiche Bezugszeichen auf gleiche oder ähnliche oder funktional gleiche Bauteile beziehen.

[0010] Es zeigen, jeweils schematisch

[0011] Fig. 1 eine stark vereinfachte Seitenansicht einer Steckverbindung,

[0012] Fig. 2 eine auseinander gezogene Darstellung eines Gehäuses der Steckverbindung aus Fig. 1.

[0013] Entsprechend Fig. 1 umfasst eine Steckverbindung **1**, mit deren Hilfe ein mehradriges elektrisches Kabel **2** mit entsprechenden, hier nicht dargestellten elektrischen Anschlüssen einer elektrischen Anschlussstelle **3** einer nur teilweise dargestellten Maschine **4** elektrisch leitend verbunden werden kann, ein Gehäuse **5**. Die Steckverbindung **1** umfasst dabei außerdem einen in Fig. 2 mit unterbrochener Linie angedeuteten mehradrigen elektrischen Stecker **6**, der am Ende des Kabels **2** angebracht ist und

NJOY Exhibit 1002.1477

entsprechende elektrische Kontakte aufweist, die mit den einzelnen Adern des mehradrigen Kabels **2** verbunden sind. Bei der Maschine **4** handelt es sich grundsätzlich um eine beliebige Maschine, die zur Übermittlung elektrischer Signale und/oder Ströme mit dem Kabel **2** verbunden ist. Die Steckverbindung **1** ermöglicht dabei eine einfach montierbare und demontierbare Verbindung, welche die elektrische Kontaktierung zwischen den Kontakten des Steckers **6** und entsprechenden Kontaktstellen der Anschlussstelle **3** sicherstellt.

[0014] Das Gehäuse **5** weist im Wesentlichen drei Komponenten auf, nämlich ein zylindrisches Verbindungsteil **7**, ein zylindrisches Wandteil **8** und ein Deckelteil **9**. Mit dem Verbindungsteil **7** kann das Gehäuse **5** an der Anschlussstelle **3** befestigt werden. Beispielsweise kann das Verbindungsteil **7** in seinem Inneren einen Sockel **10** aufweisen, der an einer der Anschlussstelle **3** zugewandten Seite **11** als Stecker ausgestaltet ist, der komplementär zur Anschlussstelle **3** gebildet ist. Im Inneren des Verbindungsteils **7** kann dieser Sockel **10** an einer von der Anschlussstelle **11** abgewandten, hier nicht sichtbaren Seite als Buchse ausgestaltet sein, die komplementär zu einer dem Verbindungsteil **7** zugewandten Seite **12** des Steckers **6** ausgebildet ist. In der Folge kann zum einen der Sockel **10** entsprechend einer in Fig. 1 durch einen Pfeil angedeuteten Steckrichtung **13** in die als Buchse ausgestaltete Anschlussstelle **3** eingesteckt werden. Zum anderen kann der Stecker **6** in den Sockel **10** entsprechend der Steckrichtung **13** eingesteckt werden. Das Verbindungsteil **7** kann relativ zum Sockel **10** drehbar angeordnet sein. Das Verbindungsteil **7** kann dann nach Art einer Überwurfmutter mit einem entsprechenden Gewindeabschnitt der Anschlussstelle **3** verschraubt werden. Ebenso ist es möglich, das Verbindungsteil **7** über einen Bajonettverschluss mit einem entsprechenden, komplementär geformten Abschnitt der Anschlussstelle **3** zu verbinden.

[0015] Das Wandteil **8** ist an einer von der Anschlussstelle **3** abgewandten Seite am Verbindungsteil **7** angeordnet. Dabei ist das Wandteil **8** in das Verbindungsteil **7** axial eingesteckt. Grundsätzlich kann das Wandteil **8** bezüglich des Verbindungsteils **7** lose angeordnet sein. Bevorzugt ist jedoch eine gewisse Fixierung. Beispielsweise kann das Wandteil **8** am Sockel **10** fixiert sein. Beispielsweise kann hierzu das Wandteil **8** das Sockelteil **10** axial übergreifen und, zum Beispiel mittels eines O-Rings, durch Reibschluss oder Kraftschluss daran fixiert sein. Insbesondere erfolgt die Verbindung zwischen Wandteil **8** und Verbindungsteil **7**, zu dem der Sockel **10** gehört, derart, dass der zylindrische Körper des Verbindungsteils **7** relativ zum Wandteil **8** verdrehbar ist. Im Unterschied dazu können das Wandteil **8** und der Sockel **10** drehfest aneinander fixiert sein.

[0016] Das Wandteil **8** weist an einer vom Verbindungsteil **7** abgewandten Seite zumindest eine radiale Aussparung **14** auf. Besagte Aussparung **14** ist so angeordnet, dass sie axial offen ist. Dementsprechend besitzt die Aussparung **14** ein U-förmiges Querschnittsprofil. Im gezeigten bevorzugten Beispiel besitzt das Wandteil **8** genau vier derartige Aussparungen **14**, die in Umfangsrichtung jeweils um 90° voneinander beabstandet angeordnet sind.

[0017] Das Deckelteil **9** kann auf geeignete Weise am Wandteil **8** befestigt werden. Bevorzugt werden hierzu Befestigungsschrauben **15** verwendet, um das Deckelteil **9** mit dem Wandteil **8** zu verschrauben. Hierzu weist das Deckelteil **9** entsprechende, hier nicht erkennbare Durchgangsöffnungen auf, die außerdem angesenkt sein können. Die Schrauben **15** sind hier exemplarisch als Senkkopfschrauben gestaltet. Das Wandteil **8** weist entsprechende, hier nicht gezeigte Gewindeöffnungen zum Einschrauben der Befestigungsschrauben **15** auf. Beispielsweise sind vier Gewindeöffnungen vorgesehen, die jeweils um 90° zueinander in Umfangsrichtung versetzt angeordnet sind und dabei jeweils zwischen zwei benachbarten Aussparungen **14** positioniert sind. Dementsprechend sind auch genau vier Befestigungsschrauben **15** vorgesehen.

[0018] Das Deckelteil **9** ist so geformt, dass es das beidseitig offene, hohlzylindrische Wandteil **8** an der vom Verbindungsteil **7** abgewandten Seite axial verschließt. Im bevorzugten Beispiel ist das Deckelteil **9** mit einem zylindrischen Kragen **16** ausgestattet, der im montierten Zustand das Wandteil **8** außen in axialer Richtung übergreift. Dieser Kragen **16** weist zumindest eine radiale Aussparung **17** auf, die im montierten Zustand mit einer der Aussparungen **14** des Wandteils **18** fluchtet. Auch diese Aussparung **17** des Deckelteils **9** ist an einer dem Wandteil **8** zugewandten Seite axial offen. Im Beispiel ist nur eine einzige Aussparung **17** im Kragen **16** des Deckelteils **9** vorgesehen. Es ist klar, dass auch mehrere derartige Aussparungen **17** vorgesehen sein können. Insbesondere kann die Anzahl und Anordnung der Aussparungen **17** des Deckelteils **9** gleich der Anzahl und Anordnung der Aussparungen **14** des Wandteils **8** gewählt sein.

[0019] Vor dem Montieren des Deckelteils **9** wird der Stecker **6** durch das Wandteil **8** durchgesteckt. Das Kabel **2** wird durch eine der Aussparungen **14** des Wandteils **8** durchgeführt. Beim Montieren des Deckelteils **9** senkt sich der Kragen **16** über den die Aussparungen **14** aufweisenden Axialabschnitt des Wandteils **8**. Das Deckelteil **9** ist dabei hinsichtlich seiner Drehlager so positioniert, dass seine Aussparung **17** über das Kabel **2** abgesenkt wird. Nach der Befestigung des Deckelteils **9** ist das Kabel **2** durch die Berandungen der zueinander fluchtenden Aussparungen **14**, **17** zwischen Wandteil **8** und Deckelteil

NJOY Exhibit 1002.1478

9 fixiert. Die übrigen Aussparungen **14** des Wandteils **8** sind durch den Kragen **16** vollständig verschlossen bzw. überdeckt.

[0020] Das durch Wandteil **8** und Deckelteil **9** gebildete Gehäuseteil kann durch die Steckverbindung zwischen Stecker **6** und dem Sockel **10** hinreichend am Verbindungsteil **7** fixiert sein. Grundsätzlich kann eine zusätzliche Fixierung zwischen Wandteil **8** und Verbindungsteil **7**, insbesondere zwischen Wandteil **8** und Sockel **10** vorgesehen sein.

[0021] Durch Bereitstellen mehrerer Aussparungen **14** am Wandteil **8** kann das Kabel **2** in unterschiedlichen Richtungen aus dem Gehäuse **5** herausgeführt werden. Im Unterschied dazu gibt es für den Stecker **6** regelmäßig nur eine relative Drehlage bezüglich des Sockels **10**, in welcher eine ordnungsgemäße Kontaktierung möglich ist. Somit kann das Gehäuse **5** an unterschiedliche Einbausituationen adaptiert werden. Die Befestigungsstellen des Deckelteils **9** sind rotationssymmetrisch positioniert, so dass das Deckelteil **9** mit der einzigen Aussparung **17** zu allen Aussparungen **14** des Wandteils **8** fluchtend montiert werden kann.

Patentansprüche

1. Gehäuse für eine einen mehradrigen elektrischen Stecker (**6**) aufweisende Steckverbindung (**1**), insbesondere an einer Maschine (**4**),
– mit einem zylindrischen Verbindungsteil (**7**), mit dem das Gehäuse (**5**) an einer elektrischen Anschlussstelle (**3**), insbesondere einer Maschine (**4**), befestigbar ist,
– mit einem zylindrischen Wandteil (**8**), das am Verbindungsteil (**7**) angeordnet oder befestigt ist und das an einer vom Verbindungsteil (**7**) abgewandten Seite zumindest eine axial offene radiale Aussparung (**14**) aufweist,
– mit einem Deckelteil (**9**), das am Wandteil (**8**) befestigt ist und das das Wandteil (**8**) axial verschließt.

2. Gehäuse nach Anspruch 1, dadurch gekennzeichnet, dass das Deckelteil (**9**) einen das Wandteil (**8**) übergreifenden, zylindrischen Kragen (**16**) aufweist, der eine axial offene radiale Aussparung (**17**) aufweist, die mit der Aussparung (**14**) des Wandteils (**8**) fluchtet.

Es folgen 2 Blatt Zeichnungen

NJOY Exhibit 1002.1479

Anhängende Zeichnungen

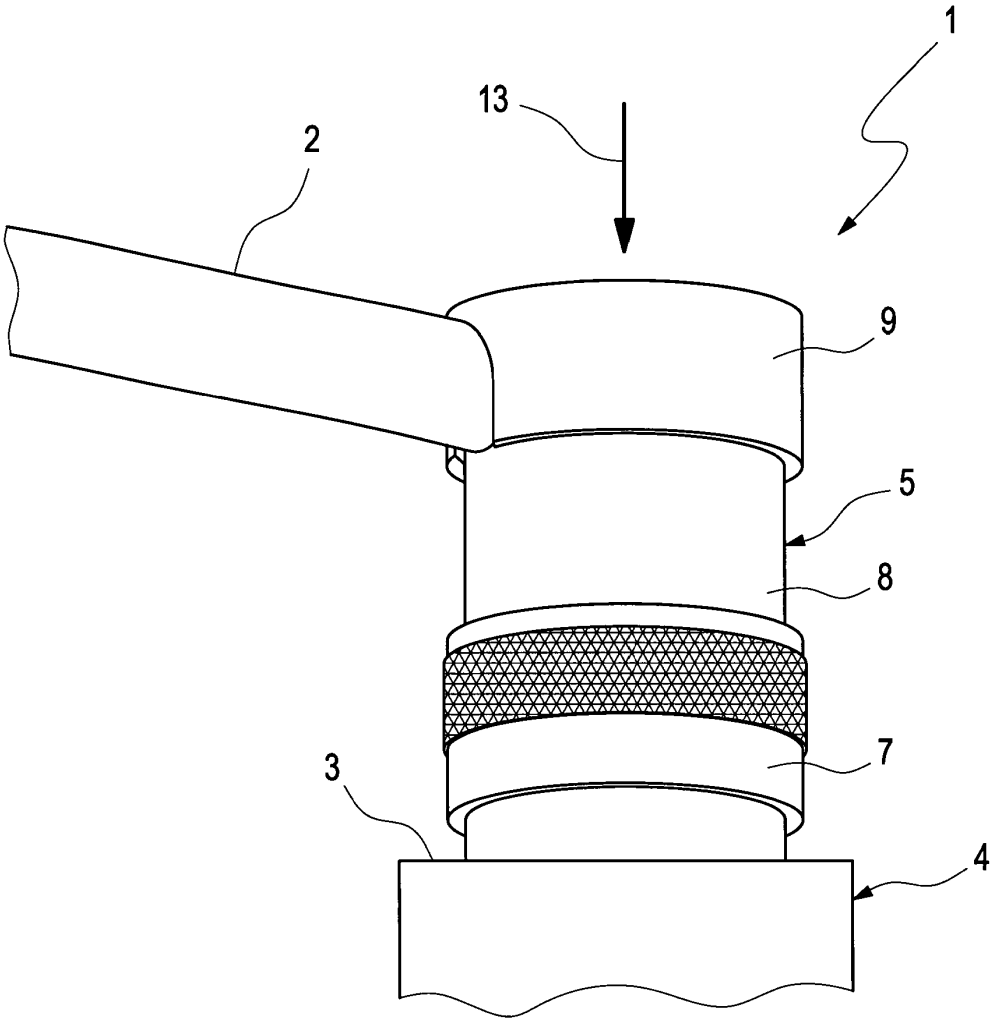


Fig. 1

NJOY Exhibit 1002.1480

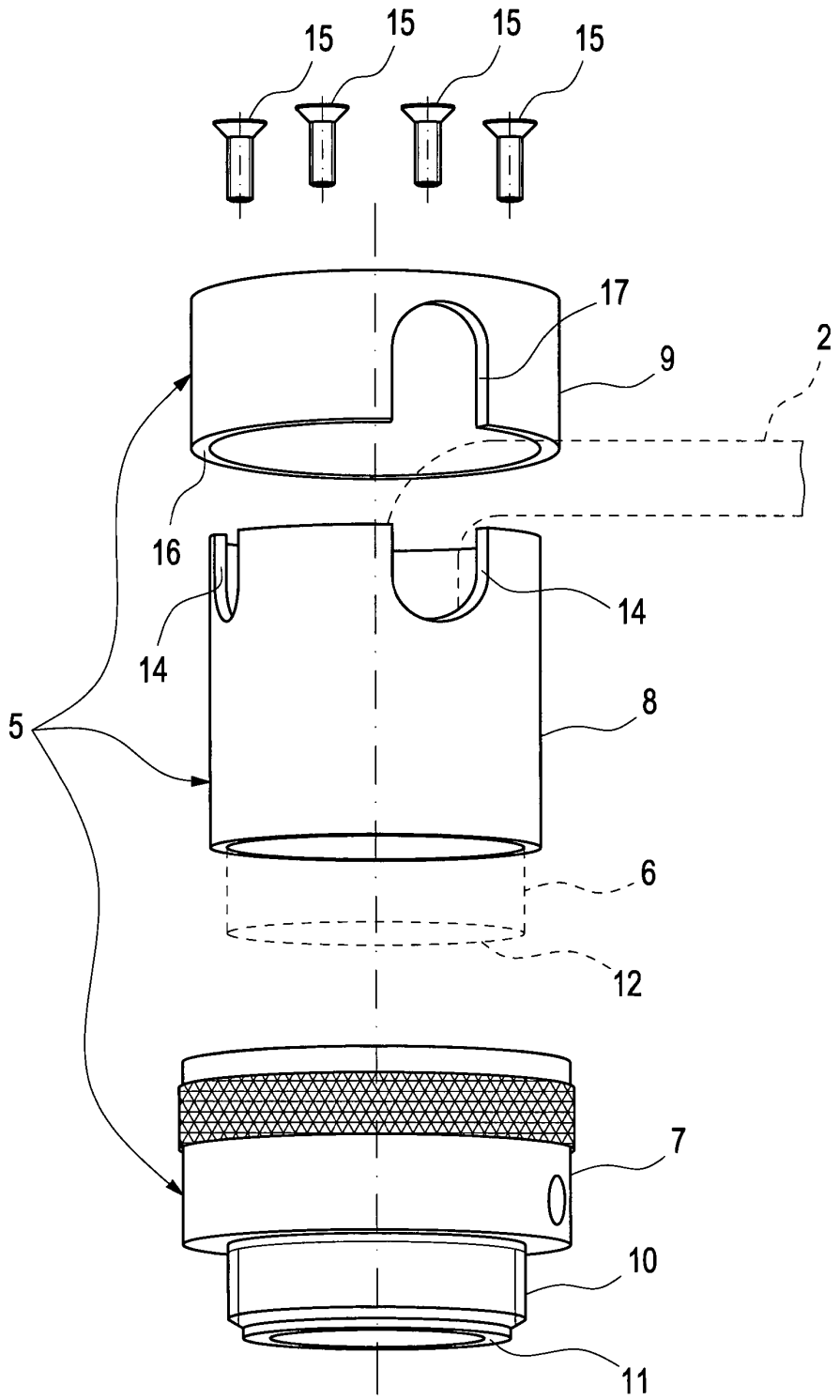


Fig. 2

NJOY Exhibit 1002.1481

Registered / Enregistré 04/02/2015

No 002626416-0001

OHIM – OFFICE FOR HARMONIZATION IN THE INTERNAL MARKET
TRADE MARKS AND DESIGNS

CERTIFICATE OF REGISTRATION

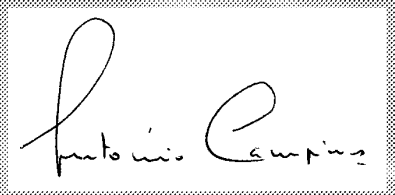
This Certificate of Registration is hereby issued for the Registered Community Design identified below. The corresponding entries have been recorded in the Register of Community Designs.

OHMI – OFFICE DE L'HARMONISATION DANS LE MARCHÉ INTÉRIEUR
MARQUES, DESSINS ET MODÈLES

CERTIFICAT D'ENREGISTREMENT

Le présent Certificat d'Enregistrement est émis pour le Dessin ou Modèle Communautaire enregistré spécifié ci-dessous. Les inscriptions afférentes ont été portées au Registre des Dessins ou Modèles Communautaires.

The President / Le Président



António Campinos

NJOY Exhibit 1002.1482

(21) 002626416-0001
(25) EN - FR
(22) 04/02/2015
(15) 04/02/2015
(45) 20/03/2015
(11) 002626416-0001
(72) Adam BOWEN
James MONSEES
Steven CHRISTENSEN
(73) Ploom, Inc.
660 Alabama Street, 2nd Floor
San Francisco CA 94110
ESTADOS UNIDOS (DE AMÉRICA)
(74) AVIDITY IP LIMITED
Broers Building
Hauser Forum
21 J J Thomson Ave
Cambridge CB3 0FA
REINO UNIDO
(51) 27 - 99
(54) BG - Аксесоари за пушачи

ES - Accesorios para fumadores

CS - Kuřácké potřeby

DA - Tilbehør for rygere

DE - Raucherzubehör

ET - Suitsetaja tarbed

EL - Εξαρτήματα για καπνιστές

EN - Smokers' accessories

FR - Accessoires pour fumeurs

IT - Accessori per incensi

LV - Smēķēšanas piederumi

LT - Aksesuarai rūkaliams

HR - Dodaci za pušače

HU - A dohányzás kellékei

MT - Aċċessorji għal min ipejjep

NL - Rookaccessoires

PL - Akcesoria dla palaczy

PT - Acessórios para fumadores

RO - Accesorii pentru fumători

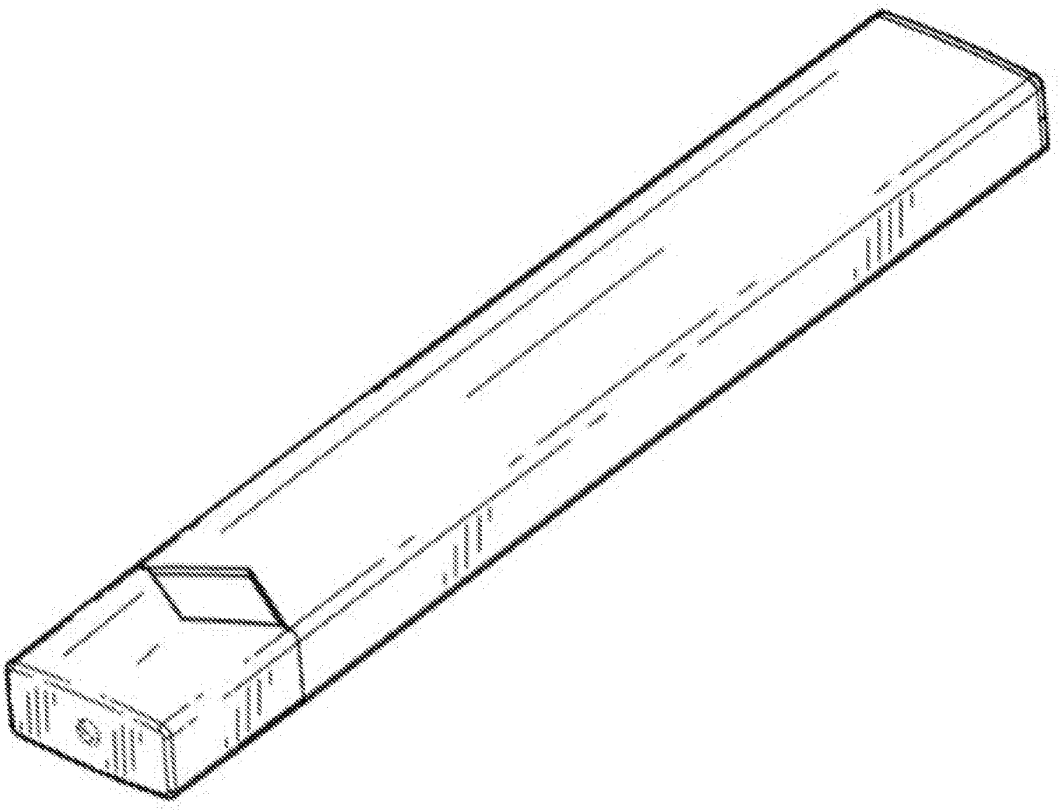
SK - Potreby pre fajčiarov

SL - Dodatki za kadilce

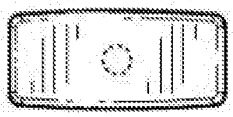
FI - Tupakoitsijan tarvikkeet

SV - Tillbehör för rökare

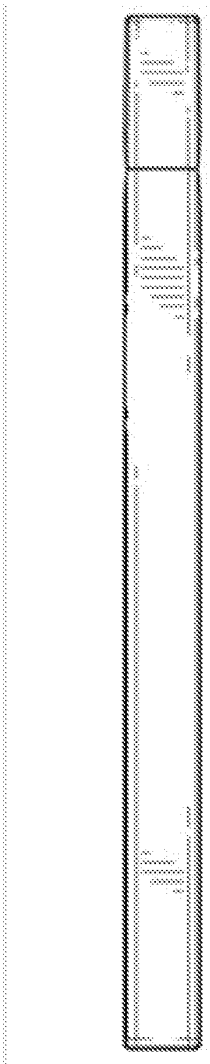
(30) US - 11/08/2014 - 29/499,018
(55)



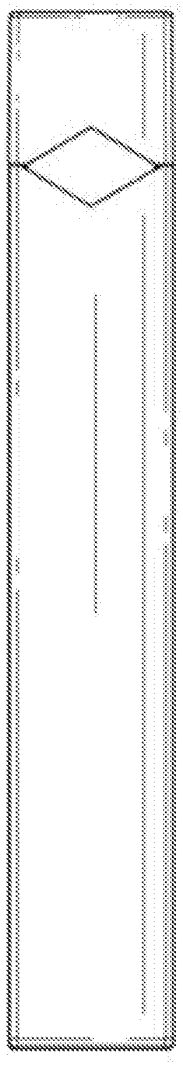
0001.1



0001.2

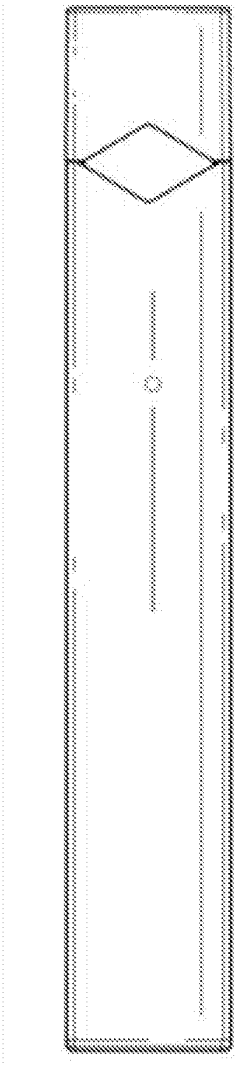


0001.3

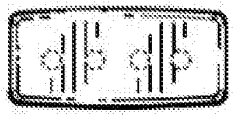


0001.4

0001.5



0001.6



0001.7

Registered / Enregistré 04/02/2015

No 002626416-0002

OHIM – OFFICE FOR HARMONIZATION IN THE INTERNAL MARKET
TRADE MARKS AND DESIGNS

CERTIFICATE OF REGISTRATION

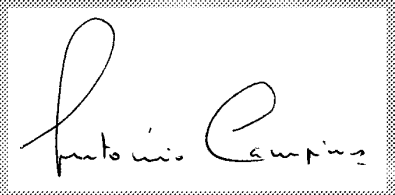
This Certificate of Registration is hereby issued for the Registered Community Design identified below. The corresponding entries have been recorded in the Register of Community Designs.

OHMI – OFFICE DE L'HARMONISATION DANS LE MARCHÉ INTÉRIEUR
MARQUES, DESSINS ET MODÈLES

CERTIFICAT D'ENREGISTREMENT

Le présent Certificat d'Enregistrement est émis pour le Dessin ou Modèle Communautaire enregistré spécifié ci-dessous. Les inscriptions afférentes ont été portées au Registre des Dessins ou Modèles Communautaires.

The President / Le Président



António Campinos

NJOY Exhibit 1002.1489

(21) 002626416-0002
(25) EN - FR
(22) 04/02/2015
(15) 04/02/2015
(45) 20/03/2015
(11) 002626416-0002
(72) Adam BOWEN
James MONSEES
Steven CHRISTENSEN
(73) Ploom, Inc.
660 Alabama Street, 2nd Floor
San Francisco CA 94110
ESTADOS UNIDOS (DE AMÉRICA)
(74) AVIDITY IP LIMITED
Broers Building
Hauser Forum
21 J J Thomson Ave
Cambridge CB3 0FA
REINO UNIDO
(51) 27 - 99
(54) BG - Аксесоари за пушачи

ES - Accesorios para fumadores

CS - Kuřácké potřeby

DA - Tilbehør for rygere

DE - Raucherzubehör

ET - Suitsetaja tarbed

EL - Εξαρτήματα για καπνιστές

EN - Smokers' accessories

FR - Accessoires pour fumeurs

IT - Accessori per incensi

LV - Smēķēšanas piederumi

LT - Aksesuarai rūkaliams

HR - Dodaci za pušače

HU - A dohányzás kellékei

MT - Aċċessorji għal min ipejjep

NL - Rookaccessoires

PL - Akcesoria dla palaczy

PT - Acessórios para fumadores

RO - Accesorii pentru fumători

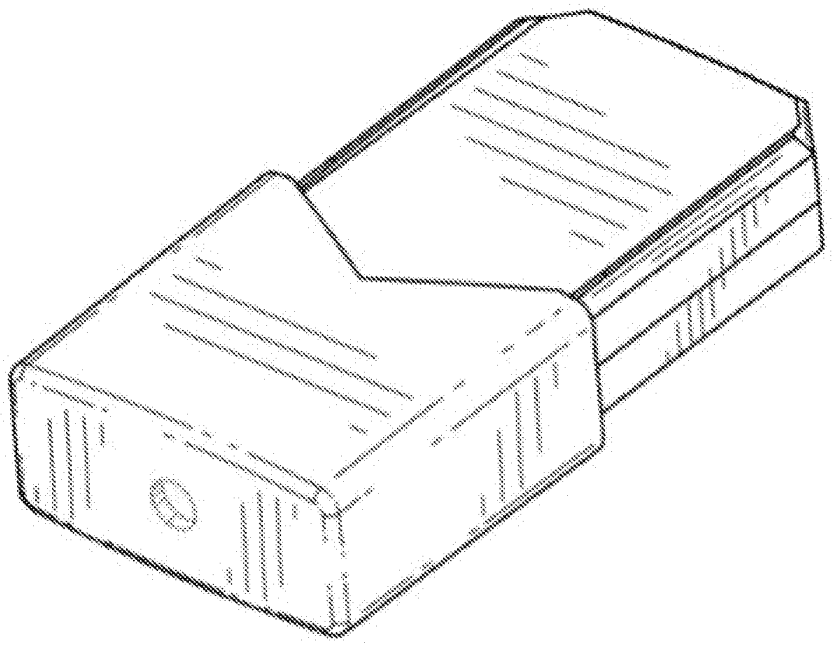
SK - Potreby pre fajčiarov

SL - Dodatki za kadilce

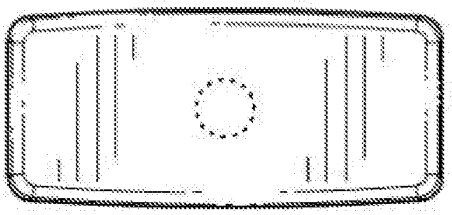
FI - Tupakoitsijan tarvikkeet

SV - Tillbehör för rökare

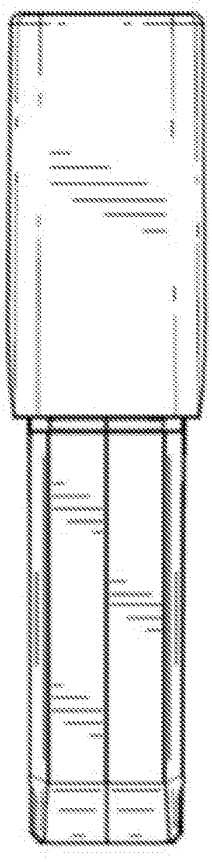
(30) US - 11/08/2014 - 29/499,021
(55)



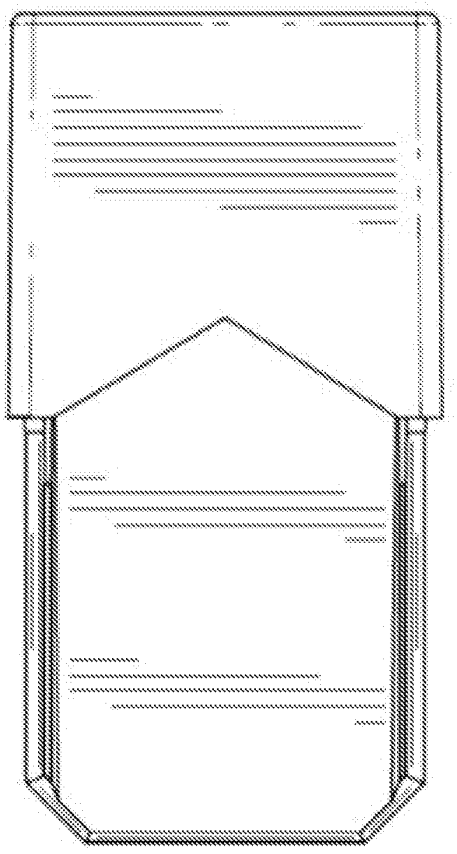
0002.1



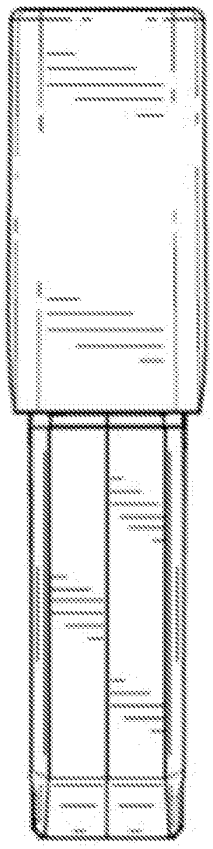
0002.2



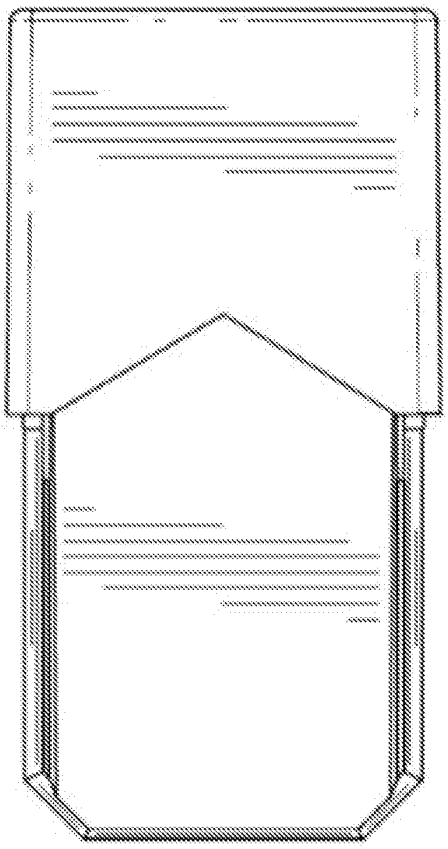
0002.3



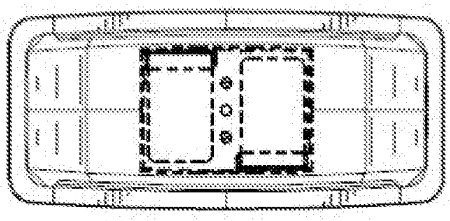
0002.4



0002.5



0002.6



0002.7

Espacenet

Bibliographic data: EP0762258 (A2) — 1997-03-12

Circuit for driving a heating resistor

Inventor(s): HOG NORBERT DIPL-ING [DE] ± (HOG, NORBERT, DIPL.-ING)

Applicant(s): BOSCH GMBH ROBERT [DE] ± (ROBERT BOSCH GMBH)

Classification: - international: ***G01N27/12; G05D23/24;*** (IPC1-7): G01N27/12; G05D23/24; H05B1/02
- cooperative: **G01N27/122; G05D23/1912; G05D23/24**

Application number: EP19960111433 19960716 Global Dossier

Priority number (s): DE1995131786 19950830

Also published as: EP0762258 (A3) DE19531786 (A1)

Abstract of EP0762258 (A2)

A switching circuit for operational direction of the heat resistors in vehicle air quality monitors positions the heat resistor (RH) in a voltage divider (22) connected to a temperature-dependent actual-value voltage (U3). The resistor's sensitivity to pollutants such as carbon monoxide in the air may be increased by heating. Automatic opening of an air valve then admits fresh air into the vehicle cabin. This use of a voltage divider gives controlled and measured direction of the heat resistor. The ratio between the resistor's heating time and cooling time can be optimised so that the sensor element is used with maximum economy.

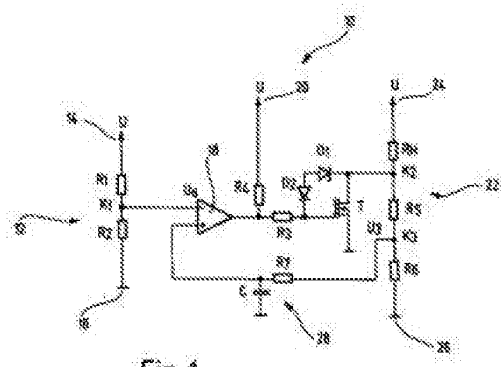


Fig.1

NJOY Exhibit 1002.1496

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 762 258 A2

(12) EUROPÄISCHE PATENTANMELDUNG

(43) Veröffentlichungstag:
12.03.1997 Patentblatt 1997/11

(51) Int. Cl.[6]: **G05D 23/24**, G01N 27/12, H05B 1/02

(21) Anmeldenummer: **96111433.7**

(22) Anmeldetag: **16.07.1996**

(84) Benannte Vertragsstaaten:
DE FR GB IT

(30) Priorität: **30.08.1995 DE 19531786**

(71) Anmelder: **ROBERT BOSCH GMBH**
70442 Stuttgart (DE)

(72) Erfinder: **Hog, Norbert, Dipl.-Ing.**
77815 Buehl (DE)

(54) Schaltungsanordnung zum Ansteuern eines Heizwiderstandes

(57) Die Erfindung betrifft eine Schaltungsanordnung zum Ansteuern eines Heizwiderstandes, insbesondere eines Luftgütesensors.

Es ist vorgesehen, daß der Heizwiderstand (R_H) in einen Spannungsteiler (22) geschaltet ist, und eine sich am Spannungsteiler (22) einstellende temperaturabhängige Istwert-Spannung (U3) zur geregelten getakteten Ansteuerung des Heizwiderstandes (R_H) ausgenutzt wird.

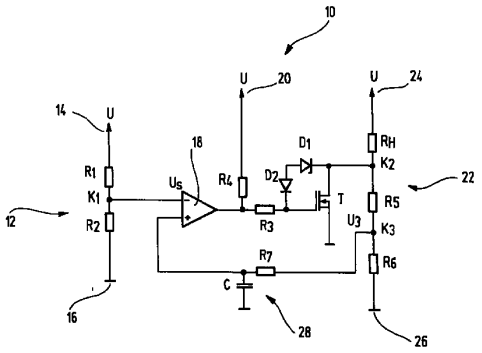


Fig. 1

EP 0 762 258 A2

Printed by Rank Xerox (UK) Business Services
2.13.16/3.4

NJOY Exhibit 1002.1497

Beschreibung

Die Erfindung betrifft eine Schaltungsanordnung zum Ansteuern eines Heizwiderstandes, insbesondere eines Luftgütesensors.

Stand der Technik

Es ist bekannt, in vielen Bereichen der Technik sogenannte Luftgütesensoren einzusetzen, die in Abhängigkeit einer bestimmten Konzentration an Schadstoffen in der Luft ein Ausgangssignal bereitstellen, das zur Auslösung verschiedener Funktionen eingesetzt werden kann. So werden beispielsweise in Kraftfahrzeugen Luftgütesensoren eingesetzt, um beim Ansteigen einer Kohlenmonoxid-Konzentration oder Stickoxid-Konzentration eine Lüfterklappe des Kraftfahrzeugs umzuschalten, so daß in der Fahrzeugkabine die Lüftung von Frischluftzufuhr auf Umluft umgeschaltet wird.

Bekannterweise besitzen die Luftgütesensoren einen Widerstand, der seinen Widerstandswert in Abhängigkeit der Konzentration der Schadstoffe ändert. Um die Empfindlichkeit dieser konzentrationsabhängigen Widerstände zu erhöhen, ist es bekannt, diese zu beheizen. Durch die Beheizung der Sensorwiderstände kann schon eine geringfügige Änderung einer Schadstoffkonzentration detektiert werden. Zum Heizen der Sensorwiderstände ist es bekannt, diesen einen Heizwiderstand zuzuordnen, der mit einer Heizspannung beaufschlagbar ist. Um das Sensorelement auf eine bestimmte Temperatur zu halten, ist es bekannt, diesen einen Temperatursensor zuzuordnen, der die Ein- beziehungsweise Ausschaltung der Heizspannung auslöst. Darüber hinaus ist es bekannt, den Heizwiderstand über eine Zeitsteuerung für eine fest vorgegebene Zeit abwechselnd mit der Heizspannung zu beaufschlagen. In beiden Fällen ist die Ansteuerung des Heizwiderstandes mit einem relativ hohen Schaltungsaufwand verbunden.

Vorteile der Erfindung

Die erfindungsgemäße Schaltungsanordnung mit den im Anspruch 1 genannten Merkmalen bietet demgegenüber den Vorteil, mit einem sehr geringen Schaltungsaufwand eine effektive Ansteuerung eines Heizwiderstandes zu realisieren. Dadurch, daß der Heizwiderstand in einem Spannungsteiler geschaltet ist und eine sich an diesem Spannungsteiler einstellende temperaturabhängige Istwert-Spannung zur geregelten getakteten Ansteuerung des Heizwiderstandes ausgenutzt wird, ist es vorteilhaft möglich, ein Tastverhältnis der Heizspannungstaktung in Abhängigkeit der tatsächlichen Ist-Situation zu regeln. Das Tastverhältnis zwischen Heizzeit und Abkühlzeit kann so optimiert werden, um die zur Verfügung stehende Meßzeit des Sensorelementes maximal auszunutzen. Die Aufheizzeit des Heizwiderstandes kann hierbei im Verhältnis zur Abkühlzeit des Heizwiderstandes verringert werden. Das Verhältnis von Aufheizzeit zu Abkühlzeit wird mittels der geregelten getakteten Ansteuerung während des bestimmungsgemäßen Einsatzes des Heizwiderstandes in vorteilhafter Weise den tatsächlichen Gegebenheiten laufend angepaßt.

Vorteilhafte Ausgestaltungen der Erfindung ergeben sich aus den in den Unteransprüchen genannten Merkmalen.

Zeichnung

Die Erfindung wird nachfolgend in Ausführungsbeispielen anhand der zugehörigen Zeichnungen näher erläutert. Es zeigen:

- Figur 1 eine Schaltungsanordnung zum Ansteuern eines Heizwiderstandes;
- Figur 2 eine erste Kennlinie der Schaltungsanordnung gemaß Figur 1;
- Figur 3 eine zweite Kennlinie der Schaltungsanordnung gemäß Figur 1 und
- Figur 4 eine Schaltungsanordnung zum Ansteuern eines Heizwiderstandes in einer zweiten Ausführungsvariante.

Beschreibung der Ausführungsbeispiele

In der Figur 1 ist eine allgemein mit 10 bezeichnete Schaltungsanordnung zum Ansteuern eines Heizwiderstandes R_H gezeigt. Die Schaltungsanordnung 10 weist einen ersten Spannungsteiler 12 auf, der aus einer Reihenschaltung der Widerstände R1 und R2 besteht. Der Spannungsteiler 12 ist zwischen den Anschlußklemmen 14 beziehungsweise 16 einer Gleichspannungsquelle geschaltet. Ein zwischen den Widerständen R1 und R2 liegender Knoten K1 ist mit dem invertierenden Eingang eines Komparators 18 verbunden. Der Ausgang des Komparators 18 ist über einen Widerstand R3 mit dem Gate eines MOSFET-Transistors T verbunden. Der MOSFET-Transistor T ist hier als n-Kanaltransistor ausgeführt. Der Ausgang des Komparators 18 ist weiterhin über einen Widerstand R4 mit einer Anschlußklemme 20 verbunden, an der das Betriebsspannungspotential der Anschlußklemmen 14 anliegt. Der Heizwiderstand R_H ist Bestandteil eines zweiten Spannungsteilers 22, der aus der Reihenschaltung der Widerstände R_H sowie R5 und R6 besteht. Ein zwischen dem Heizwiderstand R_H und dem Widerstand R5 liegender Knoten K2 ist mit dem Drain-Anschluß des Transistors T verbunden. Der Source-Anschluß des Transistors T liegt an Ground. Die Reihenschaltung der Widerstände RH, R5 und R6 ist mit ihren äußeren Anschlußklemmen 24 und 26 ebenfalls mit einer Gleichspannungsquelle verbunden. An den Anschlußklemmen 14 und 24 liegt ein gleiches Spannungspotential

NJOY Exhibit 1002.1498

an. Ein zwischen den Widerständen R5 und R6 liegender Knoten K3 ist über ein RC-Glied 28, das aus einem Widerstand R7 und einer Kapazität C besteht, mit dem nicht invertierenden Eingang des Komparators 18 verbunden. Dem Transistor T sind weiterhin Dioden D1 und D2 als Schutzdioden zugeordnet.

Die in Figur 1 gezeigte Schaltungsanordnung 10 übt folgende Funktion aus:

Bei zwischen den Anschlußklemmen 14 und 16 anliegender Betriebsspannung U wird über den Spannungsteiler 12 eine Sollwertspannung U_S eingestellt, die am invertierenden Eingang des Komparators 18 anliegt und somit dessen Schaltschwelle festlegt. Der Spannungsteiler 22 der Widerstände R_H, R5 und R6 liegt ebenfalls an der Betriebsspannung U, so daß sich aufgrund der Größe der Widerstände R_H, R5 und R6 an den Knotenpunkten K2 und K3 bestimmte Spannungswerte einstellen. Da der Heizwiderstand R_H einen Widerstand mit positivem Temperaturkoeffizienten aufweist, das heißt, dieser mit steigender Temperatur seinen Widerstandswert erhöht, beispielsweise von 5 Ω bei Raumtemperatur auf ca. 12 Ω bei 300 °C, bildet der Heizwiderstand R_H mit der Reihenschaltung der Widerstände R5 und R6 einen Spannungsteiler, wobei der Spannungswert am Knoten K2 entsprechend des sich einstellenden Widerstandswertes des Heizwiderstandes des R_H floatet. Bei nicht eingeschaltetem Heizwiderstand R_H besitzt dieser ein definiertes Widerstandsverhältnis zu der Reihenschaltung der Widerstände R5 und R6, so daß aufgrund der bekannten Größe der Widerstände R5 und R6 über diese eine definierte Spannung abfällt. Aufgrund des von den Widerständen R5 und R6 gebildeten festen Spannungsteilers liegt an dem Knoten K3 eine Spannung U3 an, die von den Widerstandsverhältnissen des gesamten Spannungsteilers 22 abhängig ist. Die Spannung U3 liegt über das RC-Glied 28 am nicht invertierenden Eingang des Komparators 18 an und bildet somit eine Istwert-Spannung für den Komparator 18.

Durch die Aufteilung des zwischen dem Knotenpunkt K2 und der Anschlußklemme 26 liegenden Widerstandes auf die Reihenschaltung der Widerstände R5 und R6 ist es vorteilhaft möglich, eine sich beim - noch zu erläuternden - Einschalten des Heizwiderstandes R_H ergebende Verlustleistung auf zwei Widerstände zu verteilen, die preiswerter sind als ein entsprechend größerer Widerstand. Darüber hinaus ist es zur Ansteuerung des Komparators 18 notwendig, eine Spannung U3 als Istwert-Spannung bereitzustellen, die innerhalb des Common-Mode-Range des Komparators 18 liegt. Da der Widerstand des Heizwiderstandes R_H relativ niederohmig ist, liegt die über der Reihenschaltung der Widerstände R5 und R6 abfallende Spannung knapp unterhalb der Betriebsspannung U, jedoch noch nicht im Arbeitsbereich des Komparators 18. Mittels der Reihenschaltung der Widerstände R5 und R6 wird diese Spannung nunmehr in einen Wert aufgeteilt, der vom Komparator 18 problemlos verarbeitet werden kann.

Überschreitet nunmehr die Istwert-Spannung U3 die Schaltschwelle des Komparators 18, wird am Ausgang des Komparators 18 ein digitales Schaltsignal bereitgestellt, das über die Widerstände R4 und R3 das Gate des Transistors T mit der Betriebsspannung U verbindet oder von dieser trennt. Der Widerstand R3 dient hierbei als Strombegrenzungswiderstand. Wird der Transistor T über den Komparator 18 eingeschaltet, wird der Heizwiderstand R_H über den Knoten K2 und den Transistor T direkt an die Betriebsspannung U gelegt. Somit ergibt sich, daß ein Einschalten des Heizwiderstandes R_H über die Istwert-Spannung U3 geregelt wird. Entsprechend der sich einstellenden Istwert-Spannung U3 ergibt sich eine geregelte Taktung der Ansteuerung des Heizwiderstandes R_H, das heißt, das Festlegen der Aufheizzeit und der Abkühlzeit des Heizwiderstandes R_H.

Anhand der in den Figuren 2 und 3 dargestellten Kennlinien der Spannung U über der Zeit t wird das Regelverhalten der Schaltungsanordnung 10 verdeutlicht. Figur 2 zeigt die Kennlinie für einen kalten Heizwiderstand R_H. Die obere Kennlinie stellt die sich am Knotenpunkt K3 einstellende Istwert-Spannung U3 dar. Weiterhin ist mit U_S die sich aufgrund der Sollwert-Spannung U_S ergebende Schaltschwelle des Komparators 18 aufgetragen. Der Schaltschwelle U_S ist eine untere Schwellwertspannung U_{SU} und eine obere Schwellwertspannung U_{SO} zugeordnet, die sich aus der Kennlinie des Komparators 18 ergeben. Wird die Schaltungsanordnung 10 mit der Betriebsspannung U verbunden, fällt über den Widerstand R6 die Istwert-Spannung U3 ab. Der Kondensator C des RC-Gliedes 28 lädt sich nunmehr auf die Istwert-Spannung U3 auf. Die Steilheit des Anstieges der Istwert-Spannung U3 an dem Kondensator C richtet sich nach der Zeitkonstante T des RC-Gliedes 28. Entsprechend der mit der Linie 30 eingetragenen Tangente würde demnach der Kondensator C nach dem Ablauf der Zeitspanne T die Istwert-Spannung U3 erreichen, das heißt, auf diese aufgeladen sein. Entsprechend der gewählten Zeitkonstante T des RC-Gliedes 28 wird das Aufladen des Kondensators C entsprechend schneller oder langsamer erfolgen.

Nachdem jedoch die Spannung U_3 am Kondensator C die obere Schwellwertspannung U_{SO} erreicht, schaltet der Komparator 18 den Transistor T und damit den Heizwiderstand R_H ein. Ab diesem Zeitpunkt will der Kondensator C sich entsprechend der mit 32 eingezeichneten Linie auf einen Spannungswert von 0 Volt entladen. Da die Spannungsdifferenz zwischen der Schwellspannung U_S des Komparators 18 und dem Nullpunkt größer ist als die Spannungsdifferenz zwischen der Schwellspannung U_S und der Istwert-Spannung U3, ist die Steilheit der Linie 32 größer, das heißt, die Spannung am Kondensator C fällt schneller ab, so daß die Schwellspannung U_S des Komparators 18 schneller von der oberen Schwellwertspannung U_{SO} auf die untere Schwellwertspannung U_{SU} abfällt, als sie von der unteren Schwellwertspannung U_{SU} auf die obere Schwellwertspannung U_{SO} ansteigt. Mit Erreichen der unteren Schwellwertspannung U_{SU} wird der

NJOY Exhibit 1002.1499

am Ausgang des Komparators 18 anliegende Ansteuerimpuls für den Transistor T zurückgenommen, so daß der Transistor T ausschaltet. Das RC-Glied 28 gewährleistet also, daß die Istwert-Spannung U3 während der Zeit, in der der Heizwiderstand R_H über den Transistor T eingeschaltet ist, und der Knotenpunkt K3 ein Potential von 0 Volt aufweist, trotzdem kurzfristig stabil am nicht invertierenden Eingang des Komparators 18 anliegt und während dieser Zeit am Ausgang des Komparators 18 das Ansteuersignal für den Transistor T "high" ist. Über die Zeitkonstante T des RC-Gliedes 28 kann somit das Verhältnis von Aufheizzeit zu Abkühlzeit für den Heizwiderstand R_H eingestellt werden.

Anhand der in Figur 3 dargestellten Kennlinie für eine warme Heizung wird deutlich, daß sich die Istwert-Spannung U3 gegenüber der Istwert-Spannung U3 bei einer kalten Heizung verringert. Dies ergibt sich aufgrund der Tatsache, daß der Heizwiderstand R_H der Bestandteil des Spannungsteilers 22 ist, im warmen Zustand aufgrund seines positiven Temperaturkoeffizienten einen höheren Widerstand besitzt, so daß die Einstellung des Spannungsteilers 22 sich in der Art ändert, daß die Istwert-Spannung U3 sinkt. Hieraus resultiert, daß die Spannungsdifferenz zwischen der Istwert-Spannung U3 und der Schwellspannung U_S des Komparators 18 geringer ausfällt. Aufgrund der feststehenden Zeitkonstante T des RC-Gliedes 28 wird somit die Steilheit der Linie 30, die das Aufladen des Kondensators C von der unteren Schwellwertspannung U_{SU} zu der oberen Schwellwertspannung U_{SO} charakterisiert, flacher. Da die Zeitspanne des Anstieges der am nichtinvertierenden Eingang des Komparators 18 anliegenden Istwert-Spannung U3 von der unteren Schwellwertspannung U_{SU} bis zum Erreichen der oberen Schwellwertspannung U_{SO} die Abkühlzeit des Heizwiderstandes R_H ergibt, erhöht sich diese gegenüber einer kalten Heizung. Nachdem die Istwert-Spannung U3 am nicht invertierenden Eingang des Komparators 18 die obere Schwellwertspannung U_{SO} erreicht hat, wird über den Transistor T der Heizwiderstand R_H zugeschaltet, während sich gleichzeitig der Kondensator C auf eine Spannung von 0 Volt entladen will. Aufgrund der gleichgebliebenen Spannungsdifferenz zwischen der Schwellspannung U_S des Komparators 18 und dem Nullwert, hat sich an der Steilheit der Linie 32, die das Entladen des Kondensators C entsprechend der Zeitkonstante T des RC-Gliedes 28 symbolisiert, nichts geändert. Hierdurch wird erreicht, daß die Aufheizzeit des Heizwiderstandes R_H gegenüber der kalten Heizung bei der warnen Heizung annähernd gleich bleibt, während sich das Verhältnis der Aufheizzeit zu der Abkühlzeit bei einer warmen Heizung verringert.

In der Figur 4 ist eine bevorzugte Verschaltung der in den Figuren 1 bis 3 erläuterten Schaltungsanordnung 10 gezeigt. Da bekanntermaßen die Luftgütesensoren zwei Sensorelemente aufweisen, von denen eines beispielsweise die Kohlenmonoxid-Konzentration und das andere beispielsweise die Stickoxid-Konzentration der Luft detektiert, und beide Sensorwiderstände zum Erhöhen ihrer Empfindlichkeit beheizt werden, kann durch eine einfache Spiegelung der Schaltungsanordnung 10 zu dem Spannungsteiler 12 das heißt, diesem ist eine weitere mit der Schaltungsanordnung 10 identische Schaltungsanordnung 10' zugeordnet, ein geregeltes getaktetes Ansteuern der Heizwiderstände R_H beziehungsweise $R_{H'}$ erfolgen. Die Sollwertspannung U_S für beide Schaltungsanordnungen 10 beziehungsweise 10' wird hier über den Spannungsteiler 12 eingestellt. Somit ergibt sich ein einfacher Aufbau für eine duale Heizungsregelung.

Der in den Figuren 1 bis 4 gezeigte Schaltungsaufbau ist lediglich beispielhaft. So ist es selbstverständlich möglich, anstelle eines MOSFET-Transistors T als Schaltmittel auch Bipolar-Transistoren einzusetzen. Die weiteren Schaltungsbestandteile können ebenfalls durch andere geeignete Schaltungen ersetzt werden, die ein geregeltes getaktetes Ansteuern der Heizwiderstände R_H beziehungsweise $R_{H'}$ gestatten.

Patentansprüche

1. Schaltungsanordnung zum Ansteuern eines Heizwiderstandes, insbesondere eines Luftgütesensors, **dadurch gekennzeichnet**, daß der Heizwiderstand (R_H) in einen Spannungsteiler (22) geschaltet ist, und eine sich am Spannungsteiler (22) einstellende temperaturabhängige Istwert-Spannung (U3) zur geregelten getakteten Ansteuerung des Heizwiderstandes (R_H) ausgenutzt wird.

2. Schaltungsanordnung nach Anspruch 1, **dadurch gekennzeichnet**, daß die Istwert-Spannung (U3) an einem Knotenpunkt (K3) des Spannungsteilers (22) abgegriffen und über einen Komparator (18) mit einer Sollwertspannung (U_S) verglichen wird und der Komparator (18) ein Ansteuersignal für ein Schaltmittel zum Ansteuern des Heizwiderstandes (R_H) bereitstellt.

3. Schaltungsanordnung nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet**, daß der Knotenpunkt (K3) über ein RC-Glied (28) mit bekannter konstanter Zeitkonstante (T) mit dem nicht invertierenden Eingang des Komparators (18) verbunden ist.

4. Schaltungsanordnung nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet**, daß der invertierende Eingang des Komparators (18) mit einem eine Sollwertspannung (U_S) bereitstellenden Spannungsteiler (12) verbunden ist.

5. Schaltungsanordnung nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet**, daß sich die Frequenz des Taktreglers durch Änderung der Ein- und Auschaltzeiten selbst einstellt (Freilaufender Oszillator).

NJOY Exhibit 1002.1500

6. Schaltungsanordnung nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet**, daß der Spannungsteiler (22) aus einer Reihenschaltung des Heizwiderstandes (R_H) und von Widerständen (R5, R6) besteht, wobei der Knoten (K3) zwischen den Widerständen (R5, R6) liegt.

7. Schaltungsanordnung nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet**, daß zur Ausbildung einer dualen Heizungsregelung für zwei Heizwiderstände (R_H, R_H') eine zur Schaltungsanordnung (10) identische Schaltungsanordnung (10') an den Spannungsteiler (12) zur gemeinsamen Bereitstellung einer Sollwertspannung (U_S) geschaltet ist.

NJOY Exhibit 1002.1501

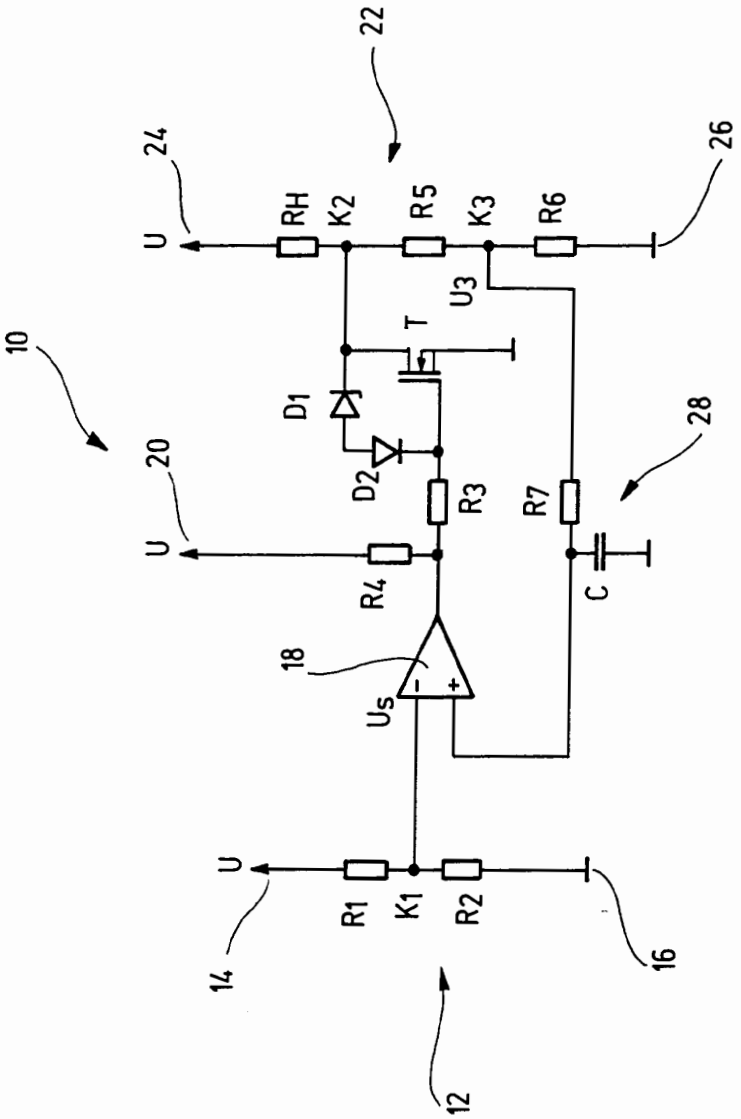


Fig. 1

NJOY Exhibit 1002.1502

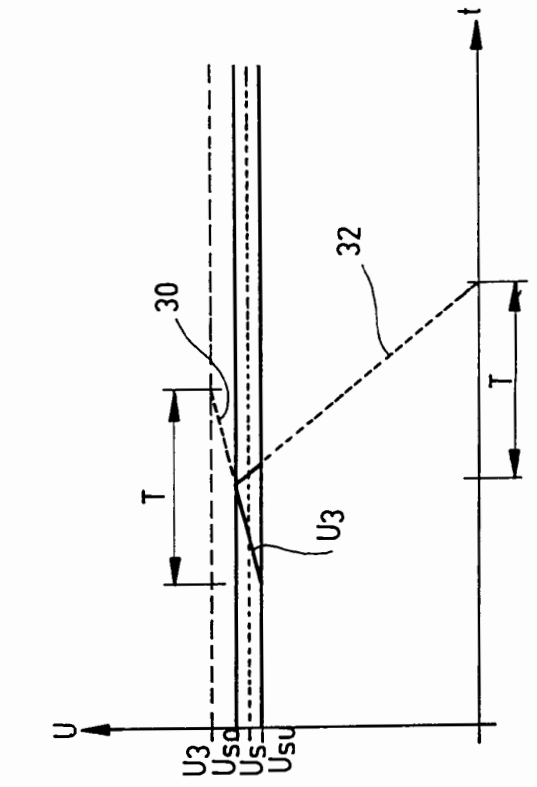


Fig. 3

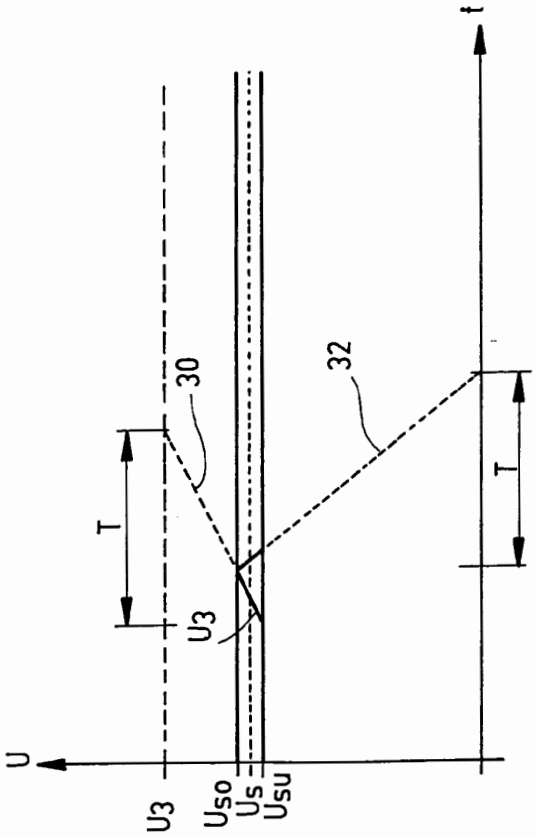


Fig. 2

NJOY Exhibit 1002.1503

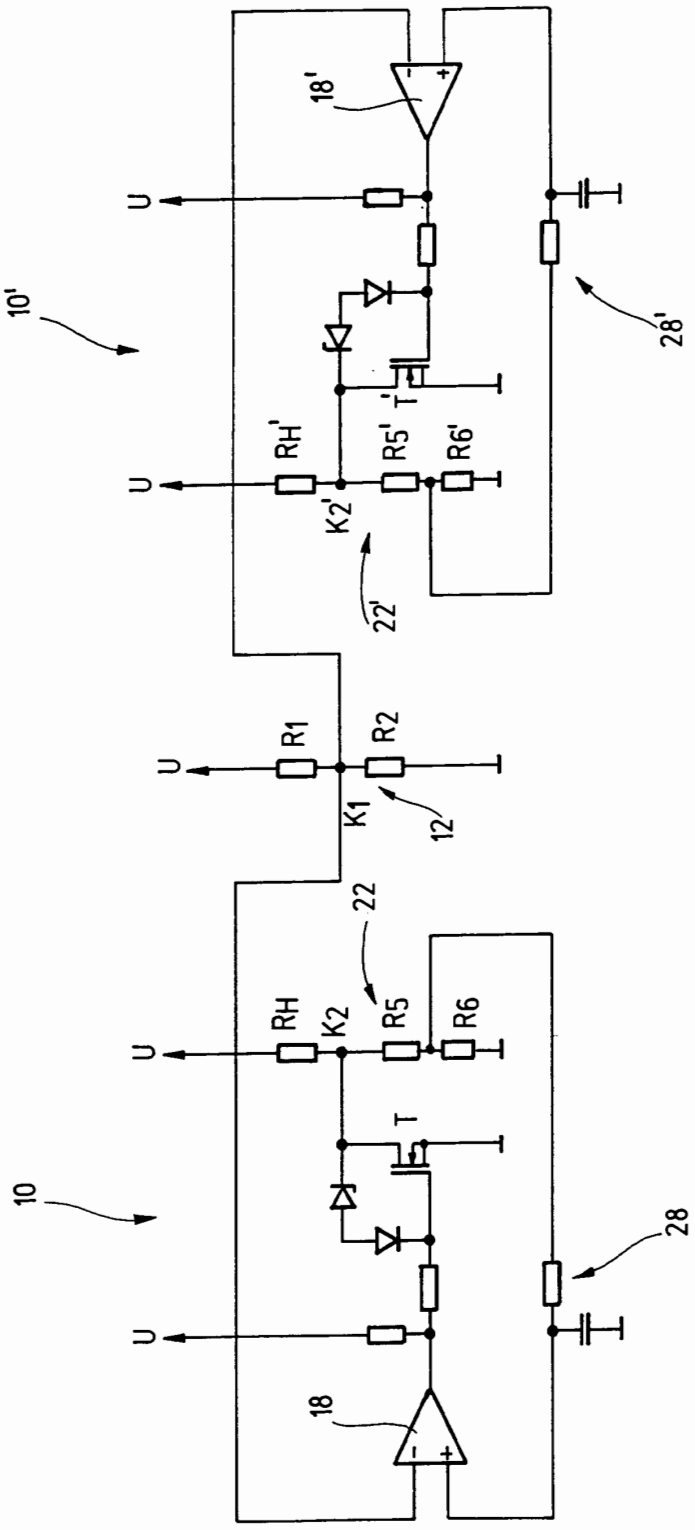


Fig. 4

NJOY Exhibit 1002.1504

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 845 220 A1

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 158(3) EPC

(43) Date of publication:
03.06.1998 Bulletin 1998/23

(21) Application number: **97925295.4**

(22) Date of filing: **09.06.1997**

(51) Int. Cl.[6]: **A24F 47/00**
// A61M15/06

(86) International application number:
PCT/JP97/01953

(87) International publication number:
WO 97/48293 (24.12.1997 Gazette 1997/55)

(84) Designated Contracting States:
DE FR GB

(30) Priority: **17.06.1996 JP 155636/96**

(71) Applicant: **Japan Tobacco Inc.**
Minato-Ku Tokyo 105 (JP)

(72) Inventors:
- **SUSA, Masayuki-Japan Tobacco Inc.**
Tokyo 130 (JP)
- **TAKEUCHI, Manabu-Japan Tobacco Inc.**
Tokyo 130 (JP)
- **KOBAYASHI, T.-Japan Tobacco Inc. Engin. R+D Center**
Kanagawa-ken 254 (JP)
- **SASAKI, Hiroshi-Japan Tobacco Inc. Eng. R+DCenterD**
Kanagawa-ken254 n (JP)
- **BANDAI, Takeshi-Japan Tobacco Inc. Eng. R+DCenterD**
Kanagawa-ken254 n (JP)

(74) Representative:
Ruffles, Graham Keith
MARKS & CLERK,
57-60 Lincoln's Inn Fields
London WC2A 3LS (GB)

(54) FLAVOR PRODUCING ARTICLE

(57) A flavor generation article (10) has a casing (12) constituted by first and second portions (12a, 12b) that are detachably connected to each other. A gas flow path (26) is formed in the casing first portion (12a) to extend from an air intake port (24) to reach a suction port (22). The first portion (12a) incorporates a material container (32) of a liquid material (36) containing a flavor substance. A discharge port (35) of the material container (32) is arranged in the gas flow path (26), and a ceramic heater (42) is disposed to oppose it. The liquid material (36) is supplied from the discharge port (35) onto the ceramic heater (42) and is heated, so that it is gasified in the gas flow path (26). The casing second portion (12b) incorporates a control circuit (72) and a power supply (62).

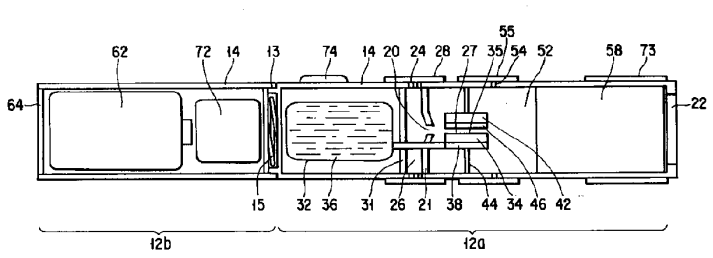


FIG. 1

EP 0 845 220 A1

NJOY Exhibit 1002.1505

Description

Technical Field

The present invention relates to a flavor generation article employed for enjoying inhalation of a flavor and simulated smoking and, more particularly, to a flavor generation article used for generating the flavor as an inhalation target by heating a liquid material with an electric heater.

Background Art

A simulated smoking article employed for enjoying the flavor and smoke of tobacco without burning tobacco is already known, and various types of simulated smoking articles have been proposed.

Jpn. Pat. Appln. KOKAI Publication No. 3-232481 discloses a typical concept of a conventional simulated smoking article. The article of this reference uses, e.g., a rod-like solid material. When the solid material is heated by a heating element, an inhalation target, e.g., a flavor, is generated. The drawbacks of the article of this type are as follows. When the solid material is continuously heated, the material is largely wasted. Inversely, when the solid material is heated in accordance with inhalation of the user, a large time lag occurs between the start of inhalation (one puffing operation) of the user and generation of the flavor.

As an example of an article that copes with the above drawbacks, Jpn. Pat. Appln. KOKAI Publication No. 3-277265 discloses a flavor emitting article having a solid material divided into a large number of portions. In the article of this reference, the respective portions of the solid material are sequentially heated in units of puffing operations of the user to generate an inhalation target, e.g., a flavor or the like. The drawback of this article is that the solid material and a heating element constitute an integral flavor generation medium. Therefore, when the material is consumed, the heating element must be exchanged or disposed of together with the material, which is not preferable both in terms of economy and environment.

Jpn. Pat. Appln. KOKAI Publication No. 5-212100 discloses an example of a mechanism that detects one puffing operation of the user. In the article of this reference, the driving operation of a heating element for heating the flavor material is controlled by a signal obtained from the motion of the lips of the user.

U.S.P. No. 4,945,931 discloses a simulated smoking article using a pressurized aerosol container. In the article of this reference, the puffing operation of the user swings the vanes to mechanically open the outlet port of the container, and the aerosol is emitted. As a modification, this reference also discloses an article in which a heating element for heating aerosol cooled by the heat of evaporation is disposed in the outlet port of the container. The drawback of this reference is as follows. Since the pressurized aerosol is closed in the container with a valve which is opened/closed merely by the puffing operation of the user, once the valve is opened, a large amount of aerosol leaks undesirably. More specifically, in the article of this reference, a predetermined amount of aerosol appropriate for one puffing operation cannot be continuously emitted, and rather all of the pressurized flavor gas may undesirably be emitted until a puffing operation is complete twice or three times.

Disclosure of Invention

The present invention has been made in view of the above problems, and has as its object to provide a flavor generation article in which waste of a flavor material does not occur easily and the timing of one puffing operation of the user and that of generation of a flavor can be matched easily.

According to the first aspect of the present invention, there is provided a flavor generation article characterized by comprising:

a casing having an air intake port for taking in air therein and a suction port through which a user inhales a flavor, and forming a gas flow path between the intake port and the suction port;
a material container for storing a liquid material which contains at least a flavor substance and having a discharge port for the material, the material container being mounted on the casing;
discharge driving means for discharging the material from the container through the discharge port in the form of a liquid drop;
gasifying means disposed in the gas flow path to receive the liquid drop of the material discharged from the container and gasify the material by electrically heating the liquid drop; and
a power supply for supplying electric energy to the gasifying means.

According to the second aspect of the present invention, there is provided a flavor generation article in the first aspect, characterized by further comprising a sensor for detecting an inhaling operation of the user and control means for controlling, based on a signal from the sensor, the discharge driving means so as to discharge the material from the container.

According to the third aspect of the present invention, there is provided a flavor generation article in the second aspect, characterized in that the sensor comprises a pressure-sensitive sensor mounted on the casing around the suction port.

According to the fourth aspect of the present invention, there is provided a flavor generation article in the second or third aspect, characterized in that the control means controls the gasifying means based on the signal from the sensor so that the gasifying means generates heat.

NJOY Exhibit 1002.1506

According to the fifth aspect of the present invention, there is provided a flavor generation article in the fourth aspect, characterized in that the control means controls the gasifying means and the discharge driving means so as to preheat the gasifying means prior to discharge of the material.

According to the sixth aspect of the present invention, there is provided a flavor generation article in the first aspect, characterized in that the power supply is disposed in the casing.

According to the seventh aspect of the present invention, there is provided a flavor generation article in the sixth aspect, characterized in that the casing is constituted by first and second portions that are electrically connected to each other through a cable, the gas flow path, the container, the discharge driving means, and the gasifying means being disposed in the first portion, and the power supply being disposed in the second portion.

According to the eighth aspect of the present invention, there is provided a flavor generation article in the seventh aspect, characterized in that the first and second portions of the casing are detachably connected to each other through a connecting portion.

According to the ninth aspect of the present invention, there is provided a flavor generation article in the first aspect, characterized by further comprising an operation lever for manually operating the discharge driving means.

According to the 10th aspect of the present invention, there is provided a flavor generation article in any one of first to ninth aspects, characterized in that the gasifying means comprises a porous layer, and the liquid drop of the material is supplied onto the porous layer.

According to the 11th aspect of the present invention, there is provided a flavor generation article in any one of the first to 10th aspects, characterized in that the gasifying means is arranged to oppose the discharge port, and a throttle hole for directing air flowing from the air intake port toward a gap between the discharge port and the gasifying means is disposed in the gas flow path.

According to the 12th aspect of the present invention, there is provided a flavor generation article in any one of first to 11th aspects, characterized in that the casing is formed with an outer air inlet hole to supply an outer air into the gas flow path between the gasifying means and the suction port.

According to the 13th aspect of the present invention, there is provided a flavor generation article in any one of first to 12th aspects, characterized by further comprising a formed body of a solid material containing at least a flavor substance and disposed in the gas flow path so as to be located between the gasifying means and the suction port.

According to the 14th aspect of the present invention, there is provided a flavor generation article in the 13th aspect, characterized by further comprising heating means for heating the formed body.

According to the present invention, a flavor generation article can be provided in which waste of a flavor material does not occur easily and the timing of one puffing operation of the user and that of generation of a flavor can be matched easily. In particular, when the discharge driving means is controlled based on a signal from a sensor that detects the inhaling operation of the user, not only waste of the material is eliminated, but also a stable flavor can constantly be provided. When the casing is divided into a portion incorporating a power supply and a portion to be held by the mouth such that the two portions are detachable from each other, the flavor generation article can be used more conveniently.

Brief Description of Drawings

FIG. 1 is a schematic view showing a flavor generation article according to an embodiment of the present invention;

FIG. 2 is a plan view showing the discharge head of the flavor generation article shown in FIG. 1;

FIG. 3 is an enlarged schematic view showing the discharge head and discharge drive portion taken along the line III - III of FIG. 2;

FIG. 4 is a diagram showing the control system of the flavor generation article shown in FIG. 1;

FIG. 5 is a view showing the state of use of the flavor generation article shown in FIG. 1;

FIG. 6 is a graph showing an example of operation timing of energization of the ceramic heater and that of actuation of the discharge drive portion, of the flavor generation article shown in FIG. 1;

FIG. 7 is a graph showing another example of operation timing of energization of the ceramic heater and that of actuation of the discharge drive portion, of the flavor generation article shown in FIG. 1;

FIG. 8 is a schematic view showing a flavor generation article according to another embodiment of the present invention;

FIG. 9 is a schematic view showing a flavor generation article according to still another embodiment of the present invention,.

FIG. 10 is a schematic view showing a flavor generation article according to still another embodiment of the present invention;

FIG. 11 is a schematic view showing a flavor generation article according to still another embodiment of the present invention;

FIG. 12 is a schematic view showing a flavor generation article according to still another embodiment of the present invention;

FIG. 13 is a schematic view showing a flavor generation article according to still another embodiment of the present invention;

FIG. 14 is a schematic view showing a flavor gener-

NJOY Exhibit 1002.1507

ation article according to still another embodiment of the present invention;

FIG. 15 is a schematic view showing a flavor generation article according to still another embodiment of the present invention; and

FIG. 16 is a schematic view showing a flavor generation article according to still another embodiment of the present invention.

Best Mode of Carrying Out the Invention

FIG. 1 is a schematic view showing a flavor generation article according to an embodiment of the present invention.

A flavor generation article 10 has a cylindrical casing 12 having such an outer diameter that the user can hold the casing 12 in his mouth. The casing 12 comprises a first portion 12a to be held by the user's mouth, and a second portion 12b for incorporating a power supply and the like. The two portions 12a and 12b are detachably connected to each other through a connecting portion 13 formed on a casing main body 14. The two portions 12a and 12b are electrically connected to each other through a cable 15 stored in a space formed in the casing main body 14 to correspond to the connecting portion 13. As the connecting portion 13, a known structure, e.g., a screw or a fitting pair, can be employed. The main body 14 of the casing 12 is made of a material, e.g., a plastic, metallic, ceramic, or wooden material.

A suction port 22 through which the user inhales the flavor is formed in the end portion of the first portion 12a of the casing 12. In contrast to this, a plurality of air intake ports 24 for taking in air into the casing 12 are formed in the intermediate portion of the first portion 12a. A gas flow path 26 is defined in the casing 12 between the air intake ports 24 and the suction port 22. The air intake ports 24 can be formed to have an open area corresponding to a predetermined air intake amount. As shown in FIG. 1, an adjusting ring 28 having a plurality of openings can be disposed on the casing 12 around the air intake ports 24. In this case, the amount of air flowing into the casing 12 can be adjusted by adjusting the position of the adjusting ring 28 with respect to the air intake ports 24.

A throttle plate 21 having a throttle hole 20 at its center is disposed in the casing 12 to be located in the gas flow path 26. The throttle hole 20 serves to regulate air from the air intake ports 24 to flow along the surface of a ceramic heater 42 (to be described later).

A material container 32 for storing a liquid material 36 for generating a flavor or the like to be inhaled by the user is detachably fixed in a space which is deep in the first portion 12a of the case and partitioned from the gas flow path 26 by a wall 31. The material container 32 stores the liquid material 36 in an amount corresponding to the discharge amount of a plurality of puffing operations of the user.

The material container 32 can be mounted on the outer side of the casing main body 14. In this case, the head portion of the material container 32 may be inserted in the casing main body 14, or only discharge ports 35 (to be described later) may be inserted in the casing main body 14.

The liquid material 36 contains at least a flavor substance. For example, if the liquid material 36 is an article used for enjoying only the flavor, e.g., menthol or caffeine, it can be a material that generates only the flavor. Also, in order to add smoke to the flavor, the liquid material 36 can contain a material which generates aerosol when heated. As the material that generates aerosol, alcohols, saccharide, or water, or a mixture of at least two of these components can be used. The alcohols used in this case are, e.g., glycerin or propylene glycol, or their mixture.

More specifically, the liquid material 36 can contain an extracted material and/or the constituent components of various types of natural materials in accordance with the application purpose. For example, if this article is used as a simulated smoking article, a tobacco component, e.g., a tobacco extracted component or a tobacco smoke condensate component, may be contained in the liquid material 36.

The material container 32 is formed with a discharge head 34 having the plurality of discharge ports 35 for discharging the liquid material 36 in a transverse direction of the casing 12. The discharge head 34 is arranged to be located closer to the suction port 22 than the throttle hole 20. A discharge drive portion 38 is disposed adjacent to the discharge ports 35 to discharge the liquid material 36 from the material container 32 through the discharge ports 35. The discharge head 34 and the discharge drive portion 38 comprise a liquid discharge mechanism (having the same principle as that of the method shown in Jpn. Pat. Appln. KOKOKU Publication No. 53-45698 and U.S.P. No. 3,596,275) utilizing a piezoelectric element.

For example, as shown in FIG. 2, 10 discharge ports 35 are arranged for two rows, leading to a total of 20 discharge ports 35 in a region with a width W of about 2 mm and a length L of about 5 mm of the upper surface of the discharge head 34. The center of arrangement of the discharge ports 35 almost coincides with the center of the ceramic heater 42 (to be described later).

FIG. 3 is an enlarged schematic view showing the discharge head 34 and discharge drive portion 38 taken along the line III - III of FIG. 2. More specifically, FIG. 3 shows a section corresponding to one row of the discharge ports 35. A section corresponding to the other row of the discharge ports 35 and the section shown in FIG. 3 are horizontally symmetrical.

As shown in FIG. 3, a frame 134 constituted by a plurality of components is stacked on a wiring board 132 to form recessed portions and holes to be filled with the liquid material 36. The recessed portions formed by the

NJOY Exhibit 1002.1508

frame 134, excluding the plurality of discharge ports 35, are covered with a film 136. A liquid reservoir 146 is formed under the discharge ports 35 to temporarily store the liquid material 36. The bottom plate of the liquid reservoir 146 is constituted by an electrode 138 that serves as a vibration plate.

The liquid material 36 from the material container 32 is supplied first through a narrow flow path 142, and flows from a plurality of suction holes 144, having a smaller diameter than that of the discharge ports 35, to reach the liquid reservoir 146. Under the control of a control circuit 72, when the electrode 138 is operated to vibrate, the liquid material 36 is selectively discharged through the discharge ports 35 having a low resistance against the flow. The discharged liquid material 36 is supplied onto the ceramic heater 42 as a liquid drop LD.

Other than this, as the discharge mechanism of the liquid material 36, a known printer ink discharge mechanism can be modified and employed, e.g., a method disclosed in Jpn. Pat. Appln. KOKOKU Publication No. 61-59911 and the like wherein the process liquid is injected by bubbles generated by heating it, or a method disclosed in U.S.P. No. 3,060,429 and the like wherein the particles of the process liquid are electrified to perform electric field control. Alternatively, a discharge mechanism in which a liquid material 36 is a pressurized liquid and is controlled by opening/closing a valve disposed in a discharge ports 35 may be employed.

The ceramic heater 42 is disposed in the gas flow path 26 to oppose the discharge ports 35. The ceramic heater 42 is fixed on the inner surface of the casing main body 14 through a support member 44. A gap 27 between the discharge ports 35 of the discharge head 34 and the ceramic heater 42 is set such that air from the throttle hole 20 can flow through it. Accordingly, air from the air intake ports 24 is directed by the throttle hole 20 to the gap 27 between the discharge ports 35 and ceramic heater 42.

A material corresponding to one puffing operation, which is driven by the discharge drive portion 38 and emitted from the discharge ports 35 is supplied onto the ceramic heater 42 in the form of a liquid splash or liquid drop. The ceramic heater 42 is constituted by a ceramic plate and a coated resistance heater on the ceramic plate, and is accordingly an integral member of a catch pan for receiving the splash of the material and a heating means for heating the catch pan. However, the catch pan and the heating means can be disposed as separate components.

A liquid-absorbing porous layer 46 having a thickness of 0.01 mm to 2.0 mm, e.g., an activated carbon layer having a thickness of about 0.5 mm, is formed on a surface of the ceramic heater 42 that receives the liquid splash of the material, i.e., a surface of the ceramic heater 42 that serves as the catch pan. The porous layer 46 not only protects the surface of the ceramic heater 42 but also relaxes heat conduction from the ceramic heater 42, thereby stabilizing gasification of the splash of the material. The porous layer 46 can be formed of an organic compound, e.g., natural cellulose, a cellulose derivative, or an aramid resin, or an inorganic compound, e.g., carbon (including activated carbon), alumina, or silicon carbide. The porous layer 46 can have an arbitrary shape. For example, the compound mentioned above may be formed as a formed body in advance, e.g., a film, a sheet, a plate, fabric, or unwoven fabric, and be used as the porous layer 46. Alternatively, the porous layer 46 may be formed by directly applying the powder of the component mentioned above on the ceramic heater 42.

A cooling chamber 52 is formed between the ceramic heater 42 and the suction port 22 to constitute part of the gas flow path 26. Outer air inlet holes 54 are formed in the side wall of the casing main body 14 defining the cooling chamber. The gas heated by the ceramic heater 42 and containing a flavor is mixed with the outer air and cooled in the cooling chamber 52, and reaches the suction port 22. The outer air inlet holes 54 can be formed to have an open area corresponding to a predetermined air inlet amount. As shown in FIG. 1, an adjusting ring 55 having a plurality of openings can be disposed on the casing 12 around the outer air inlet holes 54. In this case, the amount of outer air flowing into the cooling chamber 52 can be adjusted by adjusting the position of the adjusting ring 55 with respect to the outer air inlet holes 54.

A filter 58 is disposed in the gas flow path 26 between the cooling chamber 52 and suction port 22 to cover the suction port 22. When the filter 58 is disposed, the pressure loss can be adjusted so that the flavor component can be inhaled with an appropriate pressure. The filter 58 can be made of a normal tobacco filter material made of cellulose acetate, pulp, or the like.

A power supply 62 is detachably fixed in the second portion 12b of the casing 12. The power supply 62 is used to supply electric energy to the discharge drive portion 38, the ceramic heater 42, and the control circuit 72 (to be described later). The power supply 62 can be mounted in and removed from the casing main body 14 by opening/closing a cap 64 that closes the rear opening of the casing main body 14. The power supply 62 is preferably a DC power supply, e.g., a commercially available dry cell or rechargeable cell. However, the power supply 62 can be an AC power supply. The power supply 62 can be mounted on the outer side of the casing main body 14, or can be provided separately and connected to the casing main body 14 with a wire.

The control circuit 72 for controlling the driving operation of the discharge drive portion 38 and the ceramic heater 42 is arranged between the power supply 62 and material container 32. As shown in FIG. 4, the control circuit 72 has a signal processing circuit 72a, a drive circuit 72b, and a power circuit 72c. The signal processing circuit 72a is connected to a sensor 73 for detecting the inhaling operation of the user and a manual ON/OFF switch 74. The drive circuit 72b is con-

NJOY Exhibit 1002.1509

nected to the discharge drive portion 38 and the ceramic heater 42. The power circuit 72c is connected to the power supply 62.

The sensor 73 for detecting the inhaling operation of the user is disposed around the casing main body 14 to be adjacent to the suction port 22. The sensor 73 has the same principle as that of a general strain type pressure-sensitive sensor for detecting a change in resistance or capacitance, a piezoelectric electromotive force, or the like, and generates an electrical signal upon detection of a pressure with which the user holds the casing 12 in his mouth. Alternatively, as the sensor 73, a swing vane type sensor (to be described later), a contact type sensor, a lip sensor disclosed in Jpn. Pat. Appln. KOKAI Publication No. 5-212100, or the like can be used.

Upon reception of a signal from the manual ON/OFF switch 74, or based on a signal from the sensor 73, the control circuit 72 starts the discharge drive portion 38 and the ceramic heater 42 at a timing to match the inhaling operation of the user, so that the liquid material is discharged and gasified. For example, signal processing of the control circuit 72 and the way of control of the control circuit 72 can be known as analog control or two-position control, or their combination.

The manual ON/OFF switch 74 is disposed on the side surface of the first portion 12a of the casing 12. When this article is not in use, the switch 74 may be manually switched to the OFF state, thereby forcibly stopping the discharge drive portion 38 and the heater 42. The manual switch 74 has the same mechanism as that of a general compact push switch, e.g., a micro limit switch having an electric contact.

When this article is in use, i.e., while the switch 74 is set in the ON state, the heater 42 may be kept heated. In this case, the control circuit 72 need only control the operation of the discharge drive portion 38 that controls discharge of the liquid material.

How the flavor generation article 10 shown in FIG. 1 is operated will be described.

When the user performs simulated smoking or inhales the flavor by using the flavor generation article 10 shown in FIG. 1, first, the user turns on the manual switch 74, holds the first portion 12a of the casing 12 with his mouth, and performs an inhaling operation through the suction port 22. By this operation, the sensor 73 outputs an inhaling operation signal to the control circuit 72. Accordingly energization of the ceramic heater 42 is started under the control of the control circuit 72. Simultaneously, or with a lapse of a predetermined period after the start of energization, the discharge drive portion 38 is actuated.

The liquid material 36 is then discharged from the discharge ports 35 and gasified as it is heated by the ceramic heater 42. As the user performs an inhaling operation, the gasified material is mixed with main suction air which has been taken in from the air intake ports 24, passed through the throttle hole 20, and guided to a portion between the discharge ports 35 and ceramic heater 42, and is guided to the suction port 22.

Energization of the ceramic heater 42 and actuation of the discharge drive portion 38 are performed, e.g., at the operation timings shown in FIG. 6 or 7. FIG. 6 shows a case wherein, in response to a signal from the sensor 73, the ceramic heater 42 is energized and heated and the liquid material 36 is discharged simultaneously. FIG. 7 shows a case wherein, in response to a signal from the sensor 73, the ceramic heater 42 is energized and preheated in advance, and with a lapse of a predetermined period of time, i.e., when the heater temperature has increased to a certain degree, the liquid material 36 is discharged.

If necessary, the amount of main suction air taken in from the air intake ports 24 and the amount of inlet air supplied from the outer air inlet holes 54 can be changed by adjusting the adjusting rings 28 and 60 during inhalation. Then, the taste of air containing the flavor and reaching the suction port 22 can be changed, so that the user can perform simulated smoking or inhalation of the flavor in accordance with the taste of his inhalation feeling.

As described above, the casing 12 has a structure in which the first portion 12a storing the liquid material 36, the discharge head 34, the ceramic heater 42, and the like, and the second portion 12b storing the control circuit 72, the power supply 62, and the like are detachably connected to each other through the connecting portion 13. The first and second portions 12a and 12b are electrically connected to each other through the cable 15. Therefore, this flavor generation article 10 may be used with its first and second portions 12a and 12b being integrally connected to each other through the connecting portion 13, or may be used with its first and second portions 12a and 12b being separated from each other, as shown in FIG. 5. In the state shown in FIG. 5, since the first and second portions 12a and 12b can be separated within a range allowed by the cable 15, for example, the user can place the second portion 12b in his pocket and hold only the first portion 12a in his mouth. Alternatively, the second portion 12b separated from the first portion 12a may be connected to an existing power supply, i.e., may be installed.

Several experiments using the flavor generation article 10 shown in FIG. 1 will be described.

First, as the flavor substance, some natural peppermint oil was used, and as the aerosol generation material to add smoke to the flavor, glycerin was used. Water was added to the natural peppermint oil and glycerin, thereby preparing a plurality of liquid materials 36 in which the water to glycerin concentration ratio changed in a range of about 2 : 98 to about 90 : 10. Aerosol containing a flavor substance obtained by heating each liquid material 36 was inhaled, by using the flavor generation article shown in FIG. 1, with a standard smoking condition of one cycle for about one minute in which 35 cc to 50 cc of aerosol were inhaled in one

NJOY Exhibit 1002.1510

inhaling operation for about 2 seconds with an interval of about 58 seconds.

As a result, when a liquid material having a water to glycerin concentration ratio of 50 : 50 and prepared by adding some natural peppermint oil was employed as the liquid material 36, sufficiently high discharge stability was ensured, and physical satisfaction and requirement for a visually observed smoke amount upon inhalation were achieved to a certain degree. Therefore, in the following experiments, this liquid material was used as the liquid material 36. In the following experiments as well, inhalation was performed with the standard smoking condition of one cycle for about one minute in which 35 cc to 50 cc of aerosol were inhaled in one inhaling operation for about 2 seconds with an interval of about 58 seconds, and a discharge speed of about 2.5 mg/second was employed.

With this condition, the operation timings shown in FIGS. 6 and 7 were compared. First, at the timing shown in FIG. 6, the heater was heated from room temperature to about 400°C within 2 seconds. In this case, the liquid material 36 accumulated on the heater surface while the heater increased to the temperature that enabled gasification was gasified at once, and was condensed near the discharge ports 35 because of rapid expansion or flied in the form of a liquid drop because of bumping, thus decreasing the yield. Subsequently, the heater was preheated to about 140°C to 220°C during the preheat time at the timing shown in FIG. 7, and was thereafter heated to 420°C to 440°C within 2 seconds. In this case, the liquid material 36 was effectively gasified in an interlocked manner with discharge.

The inhalation time of the user should correspond to a time period between the start and end of energization of the heater and discharge in FIG. 6, and should correspond to a time period between the start and end of energization of the heater, including the preheat time, in FIG. 7. Accordingly, the preheat time is preferably set within a range of about 0.1 second to 1 second in the standard smoking time, so that the user will not feel discomfort during inhalation, and it is required that the preheat time is not so high.

For example, when the heater was preheated to about 400°C with a preheat time of 2 seconds, the material discharged after that was rapidly gasified and expanded. Then, the proportion of the material that was condensed near the discharge ports 35 increased, inversely decreasing the yield. Also, since the inhalation operation was allowed with the lapse of 2 seconds after the user held the sensor 73 of the suction port 22 in his mouth, a time lag occurred to make the user feel discomfort. In this experiment, with the operation timings shown in FIG. 7, preheat from room temperature to 140°C spent a preheat time of about 0.5 second, and preheat to 220°C spent a preheat time of about 1 second.

When the surface of the ceramic heater 42 had no porous layer 46 but was flat, a phenomenon in which the liquid material 36 was not easily caught by the heater surface but was bounded was observed. In this case, at either timings shown in FIG. 6 or 7, the yield tended to decrease.

Regarding the main inhalation air which flowed through the throttle hole 20 and passed through the gap 27, the higher the flow velocity to a certain degree, the better the gasification efficiency of the liquid material. Concerning this, under the standard smoking condition of 35 cc to 50 cc per inhalation for 2 seconds, a desired result was obtained when the position of the throttle hole 20 was within about 30 mm from the center of the gap 27 and the velocity of air passing through the throttle hole 20 was equal to or higher than about 6 m/second. This corresponds to the sectional area of the opening of the throttle hole 20 of about 3 mm^2 or less. However, it is nonsense to decrease the sectional area of the opening (to increase the flow velocity) to such a degree that it becomes impossible for the user to perform inhalation with his mouth. Considering the above respects, the lower limit of the sectional area of the opening of the throttle hole 20 is supposed to be preferably about 0.6 mm^2.

The size of the gap 27, i.e., the vertical distance between the discharge ports 35 and ceramic heater 42 also influenced the gasification efficiency of the liquid material 36. In order to suppress a decrease in yield caused by condensation of the gas near the discharge ports 35, the ceramic heater 42 and discharge ports 35 must oppose each other through a distance equal to or larger than about 2 mm.

Several flavor generation articles according to other embodiments of the present invention will be described. In the drawings indicating these embodiments, portions that are common to the preceding drawings are denoted by the same reference numerals, and a detailed description thereof will be omitted.

FIG. 8 is a schematic view showing a flavor generation article according to another embodiment of the present invention.

The flavor generation article of this embodiment is similar to the flavor generation article shown in FIG. 1, but the orientation of discharge ports 35 of a discharge head 34 is different from that of the structure shown in FIG. 1 by 90° , so that the discharge ports 35 may be directed to a suction port 22. Accordingly, a ceramic heater 42 opposing the discharge ports 35 is set such that its direction is different from that of the structure shown in FIG. 1 by 90° . Since the discharge head 34 is arranged in a throttle hole 20, the substantial opening of the throttle hole 20 that serves as a gas flow path 26 is regulated by the size of both the throttle hole 20 and discharge head 34.

FIG. 9 is a schematic view showing a flavor generation article according to still another embodiment of the present invention.

The characteristic feature of the flavor generation article of this embodiment resides in that, first, a casing

NJOY Exhibit 1002.1511

12 cannot be separated into first and second portions 12a and 12b (see FIG. 1), and a liquid material 36, a discharge head 34, a ceramic heater 42, a power supply 62, a control unit 72, and the like are incorporated in one casing main body 14. However, a mouthpiece 16 is detachably mounted on the casing main body 14 through a connecting portion 18, and a suction port 22 is formed in the mouthpiece 16. The mouthpiece 16 is made of a material, e.g., a plastic or wood. As the connecting portion 18, a known structure, e.g., a screw or a fitting pair can be employed. In place of the mouthpiece 16, a filter may be inserted in the casing main body 14 and served for use.

The discharge head 34 provided to a material container 32 has one discharge port 35 which is oriented to discharge the liquid material 36 toward the suction port 22. Accordingly, the ceramic heater 42 opposing the discharge port 35 is oriented in the same direction as that of the structure shown in FIG. 8. No throttle plate 21 (see FIG. 1) is disposed in a gas flow path 26. Air that has flowed into the article flows on the ceramic heater 42 because it is regulated by a support member 44 supporting the ceramic heater 42.

FIG. 10 is a schematic view showing a flavor generation article according to still another embodiment of the present invention.

The flavor generation article of this embodiment is similar to the flavor generation article shown in FIG. 9 but is largely different from it in that its material container 32 is manually operated to discharge. For this reason, the material container 32 is connected to an operation lever 76 projecting outside a casing main body 14. When the lever 76 is depressed, a material corresponding to one puffing operation is emitted from a discharge port 35, and is supplied onto a ceramic heater 42 in the form of a liquid splash or liquid drop. A control circuit 72 receives a signal indicating a depressing operation of the lever 76, and supplies power to the ceramic heater 42 based on this signal to heat it, thereby gasifying the material splash. In fine, the lever 76 serves as both the discharge drive portion 38 for the flavor generation article and the sensor 73 for detecting the inhaling operation of the user that are shown in FIG. 1.

In the flavor generation article shown in FIG. 10, the material container 32 is also connected to an injection port 82 for replenishing the material container 32 with a liquid material 36. The end portion of the injection port 82 is exposed outside the casing main body 14, and the liquid material can be injected and replenished to the material container 32 through this end portion. As described above, the material container 32 has a capacity sufficient for storing the liquid material 36 in an amount corresponding to the total discharge amount of a plurality of puffing operations of the user. However, if the material can be replenished, the material container 32 need not be exchanged, but this flavor generation article can be used further continuously.

In order to observe the remaining amount in the material container 32, a transparent inspection window 84 is formed in the side wall of the casing main body 14 to correspond to the material container 32. Accordingly, in this case, the material container 32 itself is also a transparent or translucent container. When the remaining amount of the liquid material 36 in the material container 32 is monitored through the inspection window 84, the user can know the timing at which the container should be replenished with the material.

In place of the arrangement shown in FIG. 10, a combination of an electric remaining amount detection means and an electric display means can be used to monitor the remaining amount in the material container 32. An example of the electric remaining amount detection means includes a means for detecting a change in conductivity of the material container 32, and an example of the electric display means includes a means for using a light-emitting diode disposed on the outer surface of the casing main body 14. As the mechanism for monitoring the remaining amount in the material container 32, a method that optically detects the remaining amount by using a prism may also be employed.

In the flavor generation article shown in FIG. 10, furthermore, a power supply 62 is stored in a power supply holder 66 which is detachably mounted on the casing main body 14 through a connecting portion 68. As the connecting portion 68, a known structure, e.g., a screw or a fitting pair, can be employed. When the power supply holder 66 having a length corresponding to the size of the power supply 62 is used, exchange of the power supply 62 is facilitated, and repair and exchange of members in the casing main body 14 are also facilitated.

FIG. 11 is a schematic view showing a flavor generation article according to still another embodiment of the present invention.

The flavor generation article of this embodiment is similar to the flavor generation article shown in FIG. 10 but is different from it in that a discharge operation lever 76 is connected to an atomizer 86 provided to a discharge port 35. The atomizer 86 can supply a material corresponding to one puffing operation onto a ceramic heater 42 in the form of a liquid splash or liquid drop.

In the flavor generation article shown in FIG. 11, a filler 56 is disposed in a cooling chamber 52. When the filler 56 is disposed, the cooling effect of the gasified flavor component can be promoted, and the pressure loss can be adjusted so that the flavor component can be inhaled with an appropriate pressure. As the filler 56, for example, a fiber formed body made of cellulose acetate or pulp, or a particulate matter, e.g., glass or aluminum particles, can be used.

FIG. 12 is a schematic view showing a flavor generation article according to still another embodiment of the present invention.

The characteristic feature of the flavor generation article of this embodiment resides in that a formed body

NJOY Exhibit 1002.1512

92 of a solid material that generates a flavor or the like to be inhaled by the user is detachably disposed in a gas flow path 26 between a ceramic heater 42 and a cooling chamber 52.

The formed body 92 of the solid material can contain an extracted material and/or the constituent components of various types of natural materials in accordance with the application purpose. As the flavor material to be contained by the formed body 92, for example, menthol, caffeine, or a tobacco component, e.g., a tobacco extracted component or a tobacco smoke condensate component can be employed.

If the formed body 92 of the solid material has such a size that no gap is formed between it and the inner surface of a casing main body 14, a formed body 92 having good air permeability is used as the formed body 92. In this case, the gas flow path 26 between air intake ports 24 and a suction port 22 is formed to extend through the formed body 92. On the other hand, if the size of the formed body 92 is set such that a gap is formed between the formed body 92 and the inner surface of the casing main body 14, a formed body 92 having poor or no air permeability can be used. In this case, the gas flow path 26 between the air intake ports 24 and suction port 22 is formed to extend through the gap between the formed body 92 and the inner surface of the casing main body 14.

FIG. 13 is a schematic view showing a flavor generation article according to still another embodiment of the present invention.

The flavor generation article of this embodiment is different from the flavor generation article shown in FIG. 12 in that a coil heater 94 for heating a formed body 92 is disposed around the formed body 92. The heater for heating the formed body 92 may be arranged in a hole formed in the formed body 92.

The coil heater 94, together with a ceramic heater 42, can be controlled by a control circuit 72 so that power is supplied to them in accordance with the inhaling operation of the user. When the formed body 92 has a large heat capacity, however, even if power is supplied to the coil heater 94 in accordance with the start of the inhaling operation of the user, generation of the flavor may be retarded considerably. In such a case, the coil heater 94 may be kept heated when this article is in use, i.e., while a switch 74 is set in the ON state.

The formed body 92 has such a size that a sufficiently large gap is formed between it and the inner surface of a casing main body 14. Accordingly, the major portion of a gas flow path 26 between air intake ports 24 and a suction port 22 extends through this gap.

FIG. 14 is a schematic view showing a flavor generation article according to still another embodiment of the present invention.

The characteristic feature of the flavor generation article according to this embodiment resides in that a swing vane type sensor is used to detect the inhaling operation of the user. More specifically, a swing vane 102 is disposed in a gas flow path 26 between a ceramic heater 42 and a cooling chamber 52. An orifice 112 having an opening 114 opposing the vane 102 is disposed in the gas flow path 26 between the ceramic heater 42 and the vane 102. The vane 102 is integrally connected to a conductive lever 104 which serves as the switch lever of the sensor circuit. An electric contact 108 of the sensor circuit is disposed on the inner surface of a casing main body 14 to oppose the conductive lever 104.

The vane 102 and lever 104 are integrally, swingably, and axially supported on a support 106 on the inner surface of the casing main body 14, and is biased counterclockwise in FIG. 14 by a spring incorporated in the support 106. Accordingly, in an ordinary state, the vane 102 abuts against the orifice 112, and the lever 104 and contact 108 are not in contact with each other. However, when the user starts an inhaling operation, the gas flow, the flow velocity of which is increased by the orifice 112, pivots the vane 102 clockwise in FIG. 14, so that the lever 104 and contact 108 come into contact with each other. The inhaling operation signal of the user which is detected in this manner by the swing vane type sensor is transmitted to a control circuit 72. Based on this detection signal, a discharge drive portion 38 and the ceramic heater 42 can be controlled.

FIG. 15 is a schematic view showing a flavor generation article according to still another embodiment of the present invention.

The characteristic feature of the flavor generation article according to this embodiment resides in that a contact sensor is used in order to detect the inhaling operation of the user. More specifically, electric contacts 122 and 124 each made of an annular conductive plate are disposed at the center and the suction port-side end portion, respectively, of the outer surface of a casing 12. The electric contacts 122 and 124 constitute the switch of a sensor circuit. When the electric contacts 122 and 124 are connected to each other through a conductor, the sensor generates a detection signal. This state occurs when, e.g., two conditions that the user holds the electric contact 122 at the center with his hand and holds the suction port-side electric contact 124 in his mouth are satisfied simultaneously. The inhaling operation signal of the user which is detected by the contact sensor in this manner is transmitted to a control circuit 72. A discharge drive portion 38 and a ceramic heater 42 can be controlled based on this detection signal.

FIG. 16 is a schematic view showing a flavor generation article according to still another embodiment of the present invention.

The flavor generation article of this embodiment has discharge ports 35 of a discharge head 34 that are oriented in the same direction as that of the flavor generation article shown in FIG. 1, and a ceramic heater 42 opposing the discharge ports 35. However, a casing 12 cannot be separated into first and second portions 12a and 12b (see FIG. 1), and a liquid material 36, the dis-

NJOY Exhibit 1002.1513

charge head 34, the ceramic heater 42, a power supply 62, a control unit 72, and the like are incorporated in one casing main body 14.

Although no throttle plate 21 (see FIG. 1) is disposed in a gas flow path 26, a support member 44 of the ceramic heater 42 is formed to have a slit only at its central portion corresponding to the discharge head 34. Accordingly, air flowing through air intake ports 26 entirely passes through the gap between the discharge port 35 and the ceramic heater 42.

The characteristic features of the respective portions of the present invention have been described divisionally by way of several embodiments in order to facilitate understanding of the present invention. These characteristic features can be appropriately combined in accordance with the object. More specifically, the present invention can be practiced in various embodiments other than those shown in the drawings within the spirit and scope of the invention.

Claims

1. A flavor generation article characterized by comprising:

   a casing having an air intake port for taking in air therein and a suction port through which a user inhales a flavor, and forming a gas flow path between said intake port and said suction port;
   a material container for storing a liquid material which contains at least a flavor substance and having a discharge port for said material, said material container being mounted on said casing;
   discharge driving means for discharging said material from said container through said discharge port in the form of a liquid drop;
   gasifying means disposed in said gas flow path to receive the liquid drop of said material discharged from said container and gasify said material by electrically heating the liquid drop; and
   a power supply for supplying electric energy to said gasifying means.

2. A flavor generation article according to claim 1, characterized by further comprising a sensor for detecting an inhaling operation of the user and control means for controlling, based on a signal from said sensor, said discharge driving means so as to discharge said material from said container.

3. A flavor generation article according to claim 2, characterized in that said sensor comprises a pressure-sensitive sensor mounted on said casing around said suction port.

4. A flavor generation article according to claim 2 or 3, characterized in that said control means controls said gasifying means based on the signal from said sensor so that said gasifying means generates heat.

5. A flavor generation article according to claim 4, characterized in that said control means controls said gasifying means and said discharge driving means so as to preheat said gasifying means prior to discharge of said material.

6. A flavor generation article according to claim 1, characterized in that said power supply is disposed in said casing.

7. A flavor generation article according to claim 6, characterized in that said casing is constituted by first and second portions that are electrically connected to each other through a cable, said gas flow path, said container, said discharge driving means, and said gasifying means being disposed in said first portion, and said power supply being disposed in said second portion.

8. A flavor generation article according to claim 7, characterized in that said first and second portions of said casing are detachably connected to each other through a connecting portion.

9. A flavor generation article according to claim 1, characterized by further comprising an operation lever for manually operating said discharge driving means.

10. A flavor generation article according to any one of claims 1 to 9, characterized in that said gasifying means comprises a porous layer, and the liquid drop of said material is supplied onto said porous layer.

11. A flavor generation article according to any one of claims 1 to 10, characterized in that said gasifying means is arranged to oppose said discharge port, and a throttle hole for directing air flowing from said air intake port toward a gap between said discharge port and said gasifying means is disposed in said gas flow path.

12. A flavor generation article according to any one of claims 1 to 11, characterized in that said casing is formed with an outer air inlet hole in order to supply an outer air into said gas flow path between said gasifying means and said suction port.

13. A flavor generation article according to any one of claims 1 to 12, characterized by further comprising a formed body of a solid material containing at least

NJOY Exhibit 1002.1514

a flavour substance and disposed in said gas flow path so as to be located between said gasifying means and said suction port.

14. A flavor generation article according to claim 13, characterized by further comprising heating means for heating said formed body.

NJOY Exhibit 1002.1515

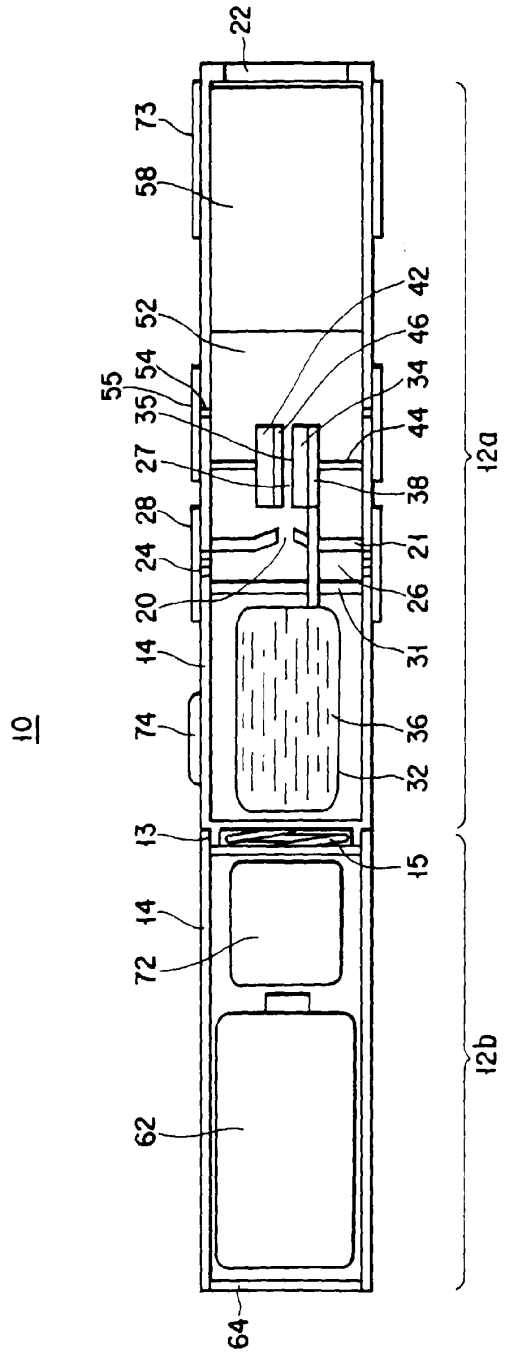


FIG. 1

NJOY Exhibit 1002.1516

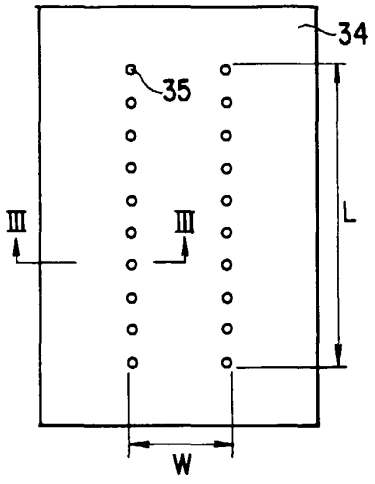


FIG. 2

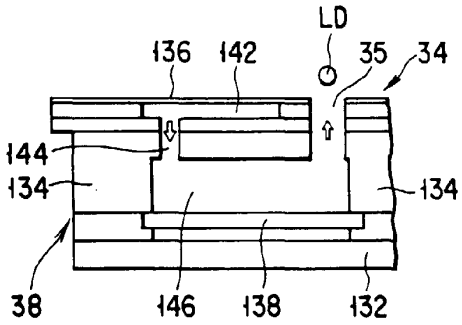


FIG. 3

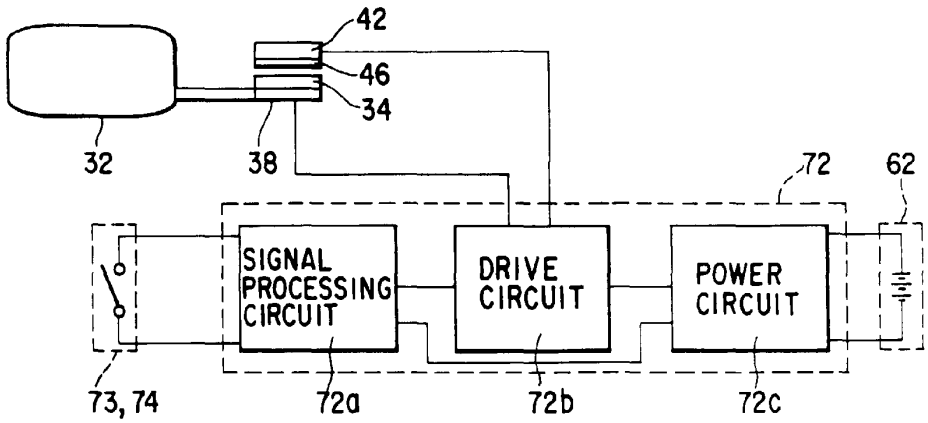


FIG. 4

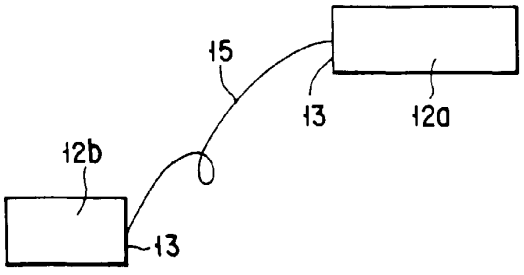


FIG. 5

NJOY Exhibit 1002.1517

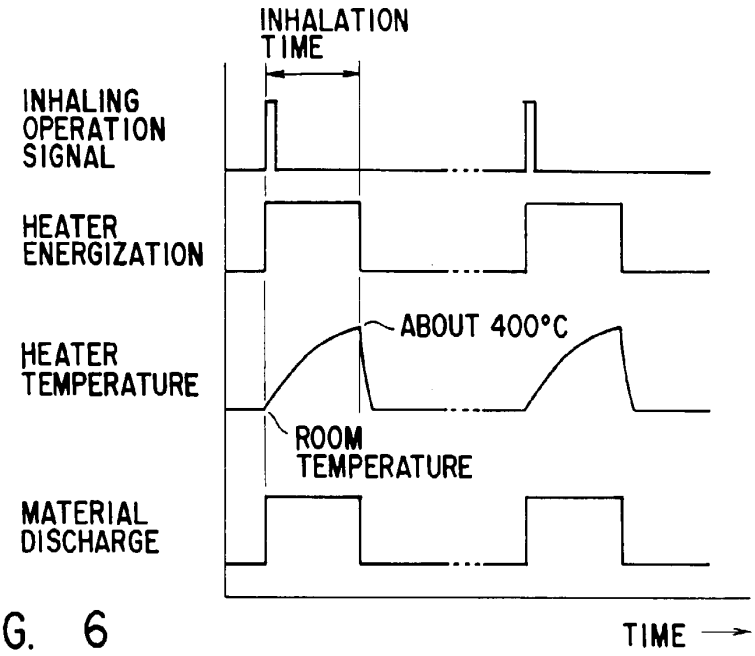


FIG. 6

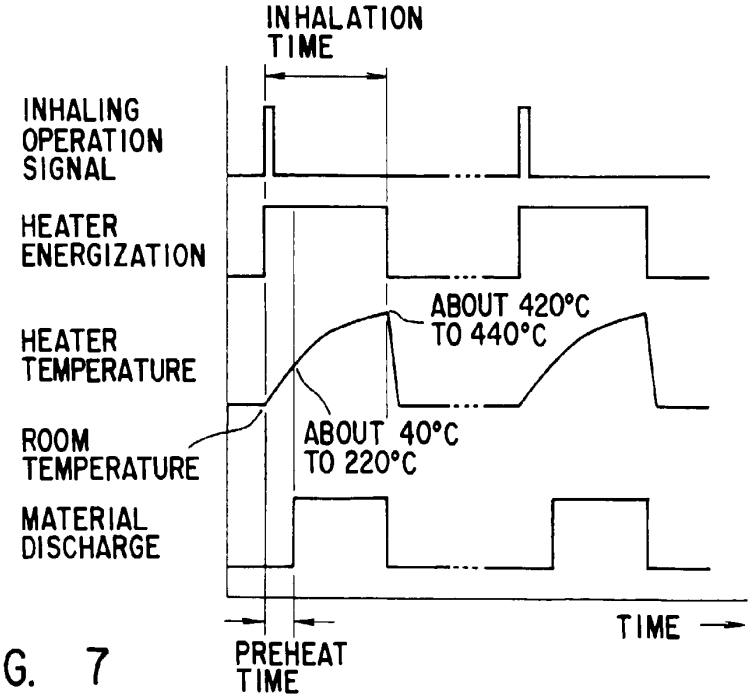


FIG. 7

NJOY Exhibit 1002.1518

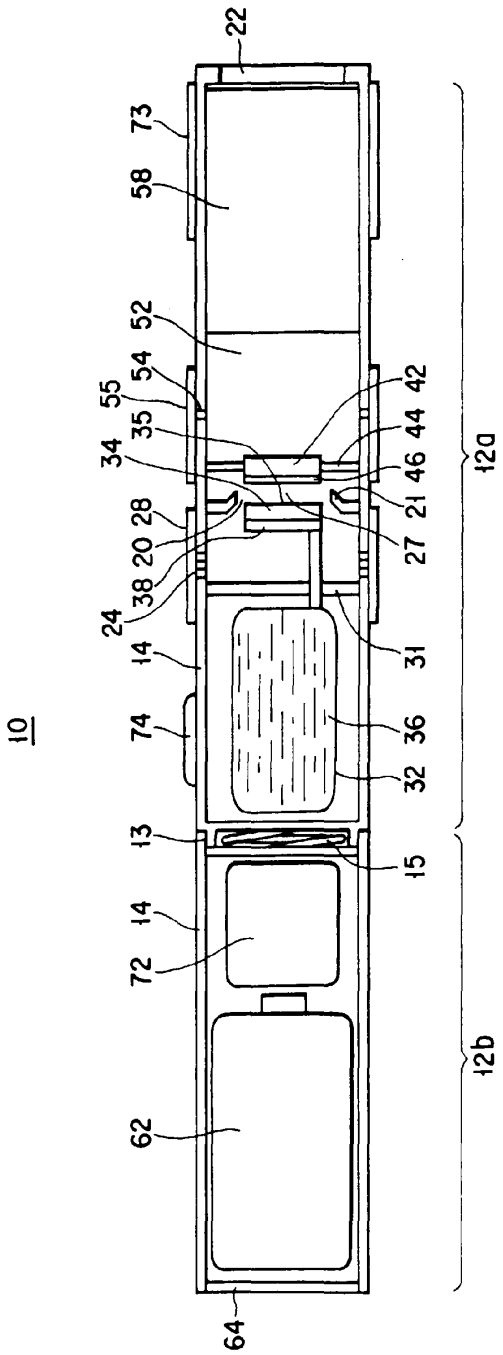


FIG. 8

NJOY Exhibit 1002.1519

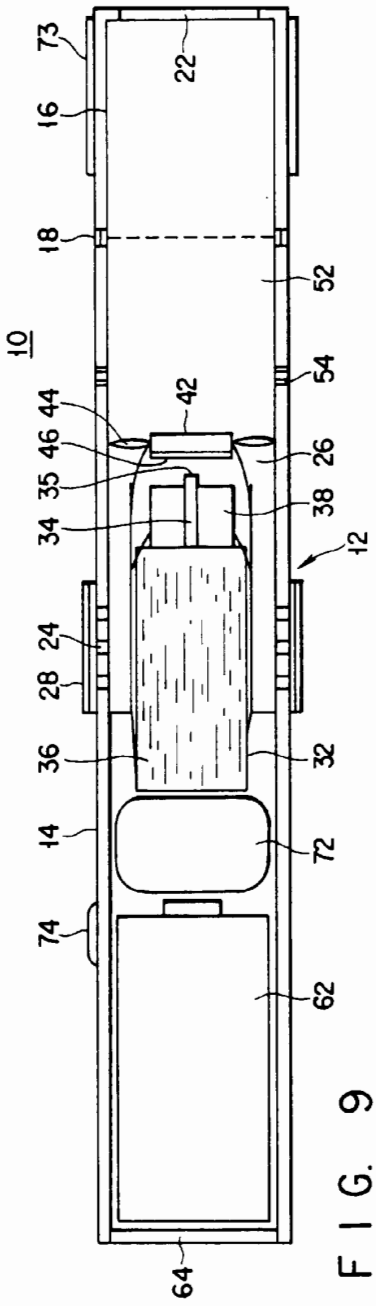


FIG. 9

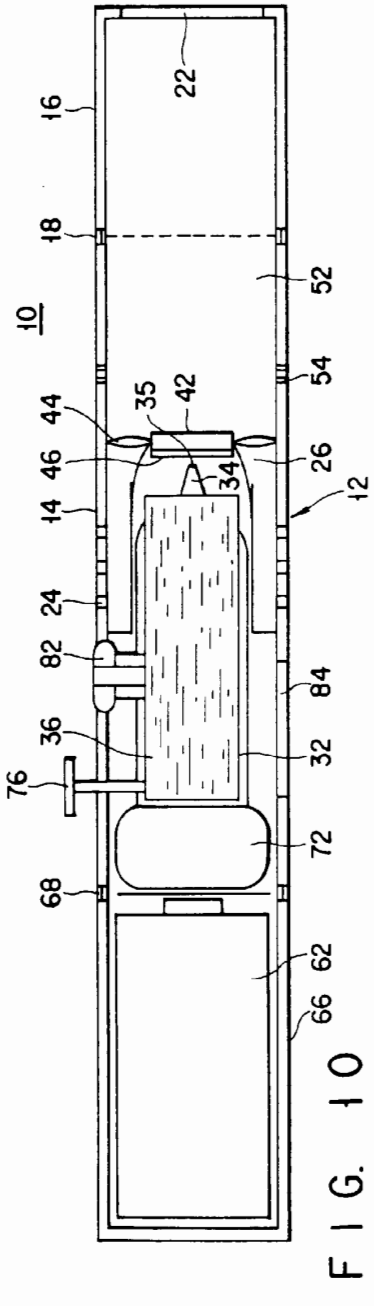


FIG. 10

NJOY Exhibit 1002.1520

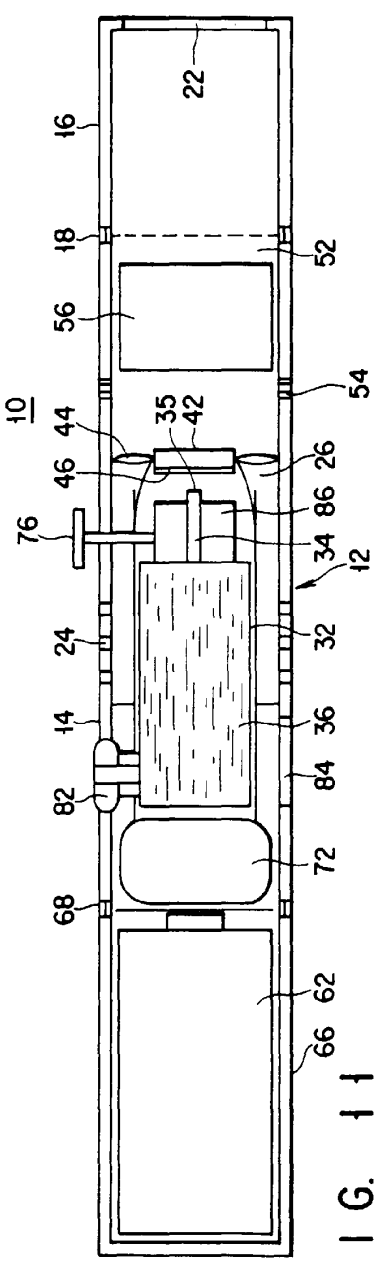


FIG. 11

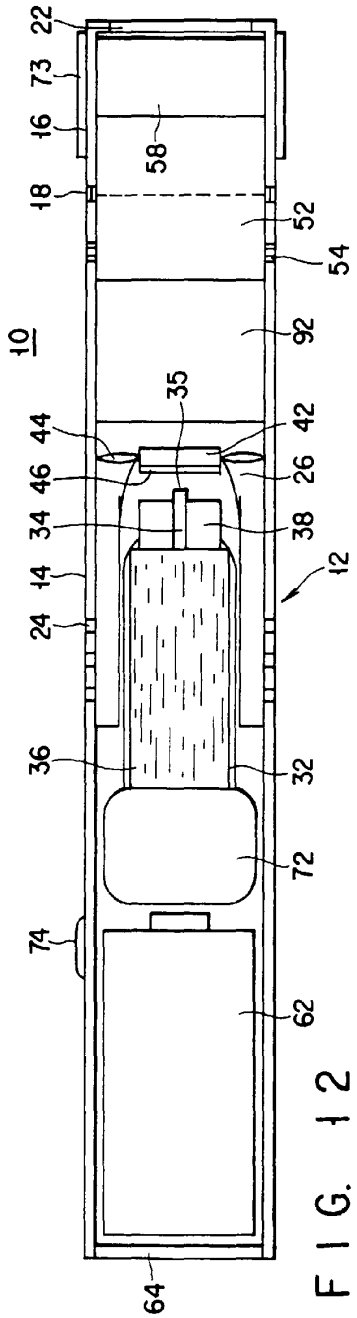


FIG. 12

NJOY Exhibit 1002.1521

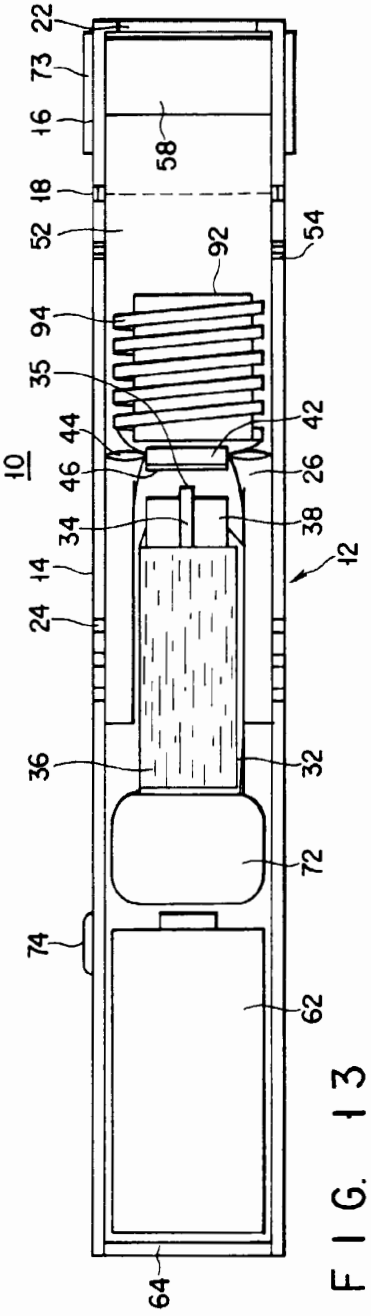


FIG. 13

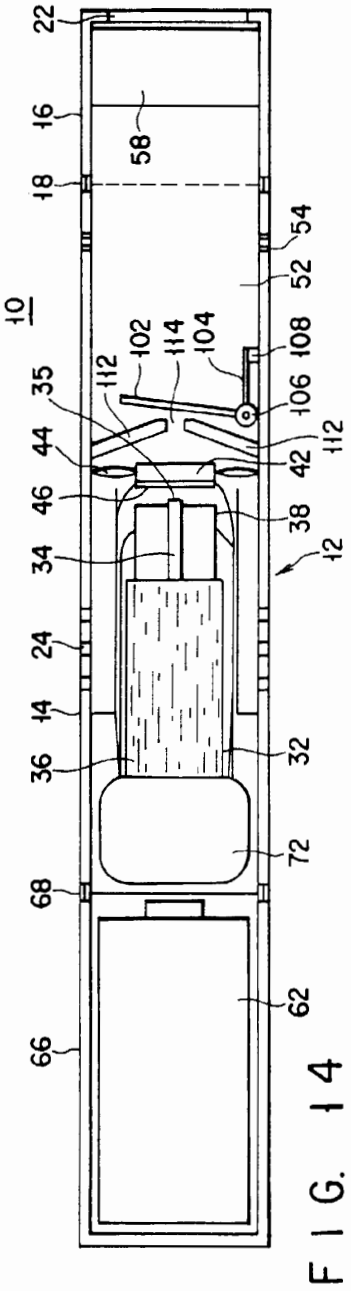


FIG. 14

NJOY Exhibit 1002.1522

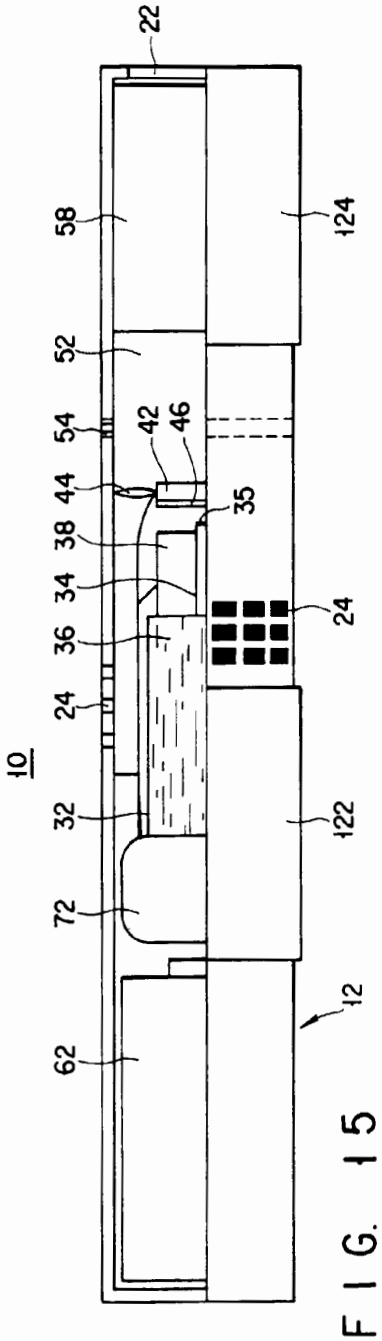


FIG. 15

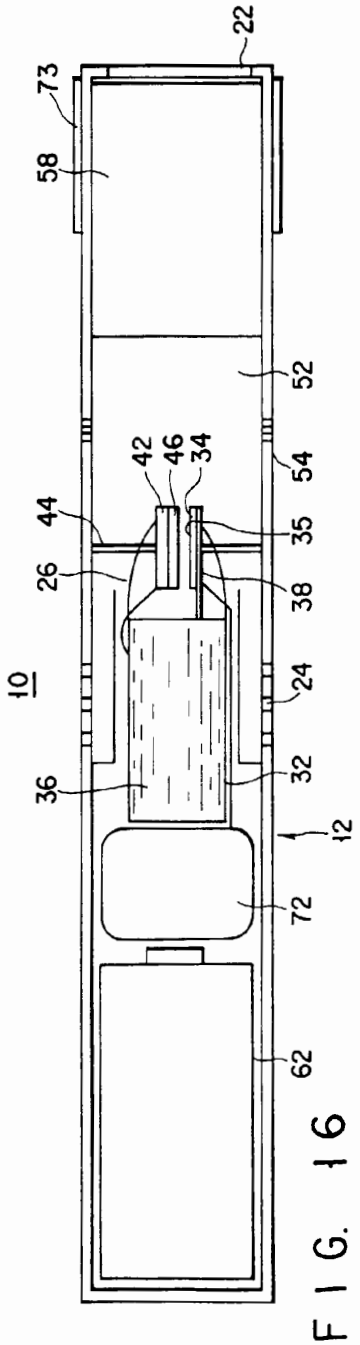


FIG. 16

NJOY Exhibit 1002.1523

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP97/01953

A. CLASSIFICATION OF SUBJECT MATTER
Int. Cl^6 A24F47/00 // A61M15/06
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
Int. Cl^6 A24F47/00, A61M15/06

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP, 48-8231, B1 (Kikuo Takeda), March 12, 1973 (12. 03. 73)(Family: none)	1 - 14
A	US, 4303083, A (Robert P. Burruss, Jr.), December 1, 1981 (01. 12. 81)(Family: none)	1 - 14
A	US, 4735217, A (The Procter & Gamble Co.), April 5, 1988 (05. 04. 88)(Family: none)	1 - 14
A	US, 4846199, A (The Regents of the University of California), July 11, 1989 (11. 07. 89) & US, 4945928, A & US, 5316759, A	1 - 14
A	JP, 2-124081, A (R.J. Reynolds Tobacco co.), May 11, 1990 (11. 05. 90) & US, 4922901, A & US, 4947875, A & EP, 358114, A2	1 - 14
A	JP, 2-124082, A (R.J. Reynolds Tobacco Co.), May 11, 1990 (11. 05. 90),	1 - 14

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
July 30, 1997 (30. 07. 97)	August 12, 1997 (12. 08. 97)
Name and mailing address of the ISA/ Japanese Patent Office	Authorized officer
Facsimile No.	Telephone No.

Form PCT/ISA/210 (second sheet) (July 1992)

NJOY Exhibit 1002.1524

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP97/01953

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	& US, 4947874, A & EP, 358002, A2	

Form PCT/ISA/210 (continuation of second sheet) (July 1992)

NJOY Exhibit 1002.1525

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 093 936 A1

(12) EUROPEAN PATENT APPLICATION

published in accordance with Art. 158(3) EPC

(43) Date of publication:
25.04.2001 Bulletin 2001/17

(21) Application number: **99922525.3**

(22) Date of filing: **27.05.1999**

(51) Int. Cl.[7]: **B43K 8/03**, B43K 7/02, B43K 5/02

(86) International application number:
PCT/JP99/02804

(87) International publication number:
WO 99/61258 (02.12.1999 Gazette 1999/48)

(84) Designated Contracting States:
DE FR

(30) Priority: **27.05.1998 JP 14625298**
23.10.1998 JP 30286298
27.11.1998 JP 33797298

(71) Applicant:
Mitsubishi Pencil Kabushiki Kaisha
Shinagawa-ku, Tokyo 140-8537 (JP)

(72) Inventor: **KOYAMA, Takao**
Ashikaga-shi, Tochigi 326-0143 (JP)

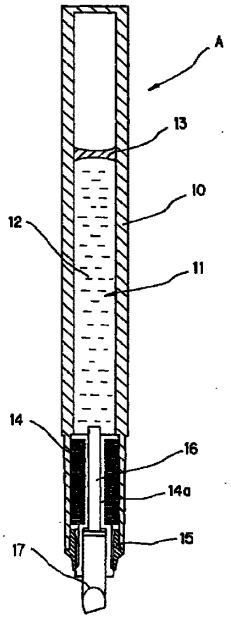
(74) Representative:
Luderschmidt, Schüler & Partner GbR
Patentanwälte,
John-F.-Kennedy-Strasse 4
65189 Wiesbaden (DE)

(54) WRITING INSTRUMENT

(57) Provided is a writing instrument having an ink tank part for storing ink, wherein an ink 11 contained in the ink tank part 31 comprises an ink component 12 and a layer-separative component 13 which separates to be a layer from the ink component 12; both of a specific gravity and a surface tension of the layer-separative component 13 are smaller than those of the ink component 12; and the ink 11 can freely move in the ink tank part 10.

This provides a writing instrument and a liquid applicator which are excellent in visibility of an ink-remaining amount.

FIG. 1



EP 1 093 936 A1

NJOY Exhibit 1002.1526

Description

Technical Field

[0001] The present invention relates to a writing instrument having an ink tank part for storing ink, more specifically to a writing instrument of a free ink type in which a ink contained in an ink tank part is directly fed to a pen tip or a writing instrument equipped with an ink tank part of a cartridge type for storing ink and a liquid applicator equipped with a tank part of a cartridge type for storing coating liquid, wherein visibility of an ink-remaining amount or a coating liquid-remaining amount is excellent.

Background Art

[0002] In general, it can be given as one of the characteristics of a writing instrument of a free ink type that an ink-remaining amount can be observed (visibility). That is, in a free ink type writing instrument, an ink is filled in an ink tank which is a holder part, and the ink freely moves in the ink tank; and when the pen tip is turned downward, the ink-remaining amount can be observed through a visible part of the holder part.

[0003] At present, polypropylene which is excellent in transparency and solvent resistance and which has a good moldability is used for a holder part of a writing instrument of a free ink type since the visibility can be secured. Known as a method for improving this visibility is a method in which an ink-repellence property is improved by making a rib-like projection or by providing surface treatment such as fluorine treatment and silicone treatment on the inside of the holder part.

[0004] However, the preceding method in which an ink-repellence property is improved by a rib-like projection involves the problem that the process becomes complicated by needing a complicated die shape. Further, even those which are improved in ink-repellence property by the rib-like projection described above or which are subjected to surface treatment such as fluorine treatment and silicone treatment are still unsatisfactory in visibility. In particular, a free ink type writing instrument filled with an ink of a dark color such as black and blue is inferior in ink-repellence property and still has a problem in visibility, and the existing state is that no ones which are excellent in visibility are available as a matter of fact.

[0005] On the other hand, known in Japanese Utility Model Publication no. 53902/1991 discloses a transparent or translucent ink reservoir of a writing instrument, in which the material thereof comprises polyethylene or polypropylene and a water-based ink is used and in which a greasy back leaking preventive (ink follower) incompatible with the water-based ink is disposed on an end of the water-based ink, wherein the above back leaking preventive comprises polybutene so that the water-based ink is less liable to be wet than the back leaking preventive against the ink reservoir in order to allow the water-based ink to come into contact with the back leaking preventive convexly at a central part of a contact face between the water-based ink and the back leaking preventive; and the water-based ink has less wetting against the ink reservoir than polybutene has.

[0006] However, an object and a technical concept described in this official gazette reside in an ink reservoir of a writing instrument, wherein a greasy back leaking preventive comprising polybutene which is incompatible with a water-based ink is filled in contact with the ink so that the ink does not leak from the ink reservoir; a boundary line between the ink and the back leaking preventive moves smoothly depending on a discharge amount of the ink in writing; the boundary line can always be observed from the outside of the ink reservoir; and the ink amount contained in the ink reservoir can certainly be observed. The writing instrument is different in view of object and constitution from a free ink type writing instrument having a structure in which an ink freely moves in a holder part doubling as an ink tank which is one embodiment of the present invention and in which the ink-remaining amount therein can be observed via a visible part of the holder part when turning the pen tip downward. Accordingly, the preceding greasy back leaking preventive comprising polybutene can not be applied to the ink comprising the above constitution.

[0007] Also, a lot of wring instruments in which a cartridge type is employed for an ink tank part for storing ink have so far been known (for example, Japanese Utility Model Application Laid-Open No 42070/1981).

[0008] In this writing instrument in which a cartridge type is employed for an ink tank part, when repeatedly used, writing is continued until the ink contained in the ink tank part is completely consumed and the drawn lines become blurred, and then the cartridge is exchanged with new one.

[0009] However, often brought about is the problem that even if exchanged with a new cartridge and used for writing, the ink discharge amount from the original pen tip is notably reduced to bring about a reduction in intensity of the drawn lines, so that the pen can not be used, and the existing situation is that satisfactory solving measures against this problem have not yet been proposed.

[0010] The cause of the problem described above is inferred to originate in that complete consumption of the ink allows the air to create a space in a pen feed which serves as a pen tip and coagulation of a pigment in the space part brings about clogging and that even if a new cartridge is installed, an ink discharge amount passing through the ink feed

NJOY Exhibit 1002.1527

is markedly controlled, so that the drawn line intensity is notably reduced.

[0011] Also, a liquid applicator in which a cartridge type is employed for a tank part storing coating liquid such as manicure liquid has the same problem as described above.

[0012] In view of the preceding problems of conventional writing instruments and liquid applicators of a free ink type and a cartridge type, the present invention is intended to solve these problems, and an object thereof is to provide a writing instrument of a free ink type or a liquid applicator which is excellent in visibility of an ink-remaining amount or a coating liquid-remaining amount, and to provide a writing instrument and a liquid applicator in which the time of exchange for an ink cartridge can surely be visually found and in which the original ink discharge amount can be maintained as it is even when exchanged with a new ink cartridge.

Disclosure of the Invention

[0013] Intensive investigations of the conventional respective problems described above continued by the present inventors have resulted in finding that a writing instrument and a liquid applicator which meet the object described above can be obtained by filling a component having specific physical properties in addition to an ink component or a coating liquid component stored in an ink tank part, and hence the present invention has been completed.

[0014] That is, the present invention comprises the following items (1) to (7):

(1) A writing instrument having an ink tank part for storing ink, wherein the ink contained in the ink tank part comprises an ink component and a layer-separative component which separates to be a layer from the above ink component; both of a specific gravity and a surface tension of the above layer-separative component are smaller than those of the ink component; and the ink can freely move in the ink tank.

(2) The writing instrument as described in the above item (1), wherein the writing instrument described above is of a free ink type and equipped with a visible part for observing an ink-remaining amount in a holder part doubling as the ink tank part.

(3) The writing instrument as described in the above item (1), wherein the writing instrument described above is equipped with an ink tank part of a cartridge type for storing ink.

(4) The writing instrument as described in the above item (2), wherein the layer-separative component has a surface tension smaller than that of the visible part for observing an ink-remaining amount in the holder part doubling as the ink tank part.

(5) The writing instrument as described in any one of the above items (1) to (4), wherein the layer-separative component has a viscosity of 10000 mPa • s or less at 25°C.

(6) The writing instrument as described in any of the above items (1) to (6), wherein the ink component has a viscosity of 100 mPa • s or less at 25°C.

(7) A liquid applicator equipped with a tank part of a cartridge type for storing coating liquid, wherein the coating liquid contained in the tank part comprises a coating liquid component and a layer-separative component which separates to be a layer from the above coating liquid component; both of a specific gravity and a surface tension of the above layer-separative component are smaller than those of the coating liquid component; and the coating liquid can freely move in the tank.

[0015] In the present invention, a "writing instrument of a free ink type" means a writing instrument which has an ink tank for directly storing the ink without absorbing in a sliver and in which installed is an ink reservoir (collector member) for temporarily storing the ink pressed out from the ink tank when the air contained in the ink tank is expanded by a rise in the temperature so as to prevent the ink from blobbing from the pen tip or the air hole.

Brief Description of the Drawings

[0016]

Fig. 1 is an explanatory sectional view showing one example of an embodiment in which the free ink type writing instrument of the present invention is applied to a marking pen.

Fig. 2 (a) is an explanatory sectional view showing one example of an embodiment in which the free ink type writing instrument of the present is applied to a ball point pen, and (b) is an explanatory plan view showing the ink tank of (a).

Fig. 3 (a) and (b) are schematic explanatory drawings for schematically explaining the writing instrument of the present invention.

Fig. 4 is a cross section showing one example of the liquid applicator of the present invention in an exploded view.

Fig. 5 is a cross section showing a state in which the liquid applicator of Fig. 4 is set.

NJOY Exhibit 1002.1528

Fig. 6 is a cross section showing the writing instrument used in Example 7 and Comparative Example 7.

Best Mode for Carrying Out the Invention

[0017] Every and each embodiment of the present invention shall be explained below in detail with reference to attached drawings in order to explain the present invention in more details.

[0018] Fig. 1 and Fig. 2 are the embodiments of the writing instrument of a free ink type, Fig. 3 is the embodiment of the writing instrument equipped with an ink tank part of a cartridge type, and Fig. 4 and Fig. 5 are the embodiments of the liquid applicator equipped with a coating liquid tank part of a cartridge type.

[0019] Fig. 1 is one example of an embodiment in which the writing instrument of a free ink type is applied to a marking pen.

[0020] As shown in Fig. 1, the free ink type writing instrument A of the embodiment of the present invention is characterized in that an ink 11 contained in an ink tank part 10 which is a holder part comprises an ink component 12 and a layer-separative component 13 which separates to be a layer from the above ink component 12 and both of a specific gravity and a surface tension of the layer-separative component 13 are smaller than those of the ink component 12 and that the ink 11 can freely move in the ink tank part 10.

[0021] The numeral 14 in Fig. 1 is a collector member; 15 is a holder member; 16 is a feed; and 17 is a pen feed which serves as a pen tip. The ink is fed from the ink tank 10 into the pen feed 17 via the feed 16 having an ink passage disposed in a central hole 14a of the collector member 14.

[0022] In the present invention, the layer-separative component 13 is used for elevating visibility of a visible part in the holder part 10 doubling as the ink tank and shall not specifically be restricted as long as it satisfies conditions that the layer-separative component 13 has a smaller surface tension than that of the ink component 12 contained in the ink 11 and separate to be a layer without mixing with the ink component 12 and that it has a specific gravity smaller than that of the ink component 12.

[0023] This layer-separative component 13 separates to be a layer without mixing with the ink component 12 and exerts no adverse effects on the physical properties of the ink component 12.

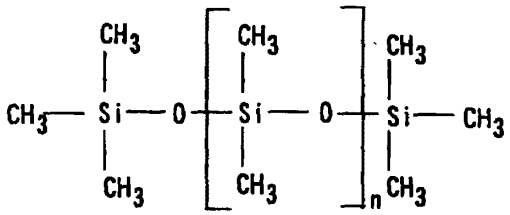
[0024] Even when the layer-separative component 13 has a surface tension larger than that of the visible part (in the present embodiment, the whole holder part serves as the visible part) in the holder part 10 doubling as the ink tank, it becomes easy to observe the ink remaining amount which is the object of the present invention, but the layer-separative component 13 has preferably a surface tension than smaller that of the visible part (the whole holder part becomes the visible part) for observing the ink-remaining amount in the holder part 10 doubling as the ink tank. This layer-separative component makes it easier to observe the ink-remaining amount.

[0025] The layer-separative component 13 used in the present invention includes, for example, linear silicone oil having a dimethylsiloxane bond as a principal skeleton, cyclic silicone oil, modified silicone oil in which a part of the methyl group is modified with other functional groups (organic groups such as an amino group, an epoxy group, a carboxyl group, a carbinol group, a methacryl group, a mercapto group, an alkyl group, a higher fatty acid ester group, a higher alkoxy group, a fluorine group and a methylstyryl group) or a mixture obtained by mixing two or more kinds of hydrocarbon base liquid substances.

[0026] To be specific, capable of being used are linear silicone oil represented by the following formula (I), cyclic silicone oil represented by the following formula (II), modified silicone oil in which organic groups are introduced into side chains or both ends, or single end, side chains and both ends of polysiloxanes represented by the following formulas (III) to (VI) [amino-modified silicone oil, epoxy-modified silicone oil, carboxyl-modified silicone oil, carbinol-modified silicone oil, methacryl-modified silicone oil, mercapto-modified silicone oil, phenol-modified silicone oil, silicone oil modified with a reactive group at single end (single end carbinol-modified silicone oil, single end epoxy-modified silicone oil and single end methacryl-modified silicone oil), different functional groups-modified silicone oil (epoxy group/polyether group-modified silicone oil, amino group/polyether group-modified silicone oil and amino group/alkoxy group-modified silicone oil), polyether-modified silicone oil, methylstyryl-modified silicone oil, alkyl-modified silicone oil, higher fatty acid ester-modified silicone oil, hydrophilic group-modified silicone oil, higher alkoxy-modified silicone oil, higher fatty acid-modified silicone oil and fluorine-modified silicone oil], mineral oils (60, 100, 150, 300 and 500 neutral oils and bright stocks), synthetic oils such as poly-α-olefins (ethylene-propylene copolymers, polybutene, 1-octene oligomers and their hydrogenated compounds), alkylbenzene, alkylnaphthalene, polyalkylene glycols (polyethylene glycol and polypropylene glycol), diesters (di-2-ehtylhexyl sebacate, diisooctyl adipate, dioctyl adipate, dioctyl sebacate, diisododecyl adipate and dibutyl adipate), polyol esters [trimethylolpropane ester, neopentyl glycol dipelargonate, pentaerythritol tetrapelargonate, di(isooctyl) azelate, bis(2,2-dimethyloctyl) azelate and bis(2,2-dimethylpentyl) 2,2,8,8-tetraethylazelate], phosphoric acid esters (tricresyl phosphate and the like), silanes (didodecyldioctylsilane and the like), silicic acid esters [hexa(2-ethylbutoxy)disiloxane and the like], polyphenyl ethers [m-bis-(m-phenoxyphenoxy)benzene and bis(m-phenoxyphenyl)ether], fluorocarbons (chlorofluorocarbon and the like) and neopentylpolyol esters, castor oil, squalene, higher fatty acids (oleic acid, lauric acid, linoleic acid and linolenic acid), isostearic acid, isostearyl alcohol, branched

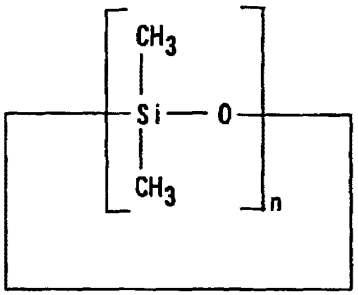
NJOY Exhibit 1002.1529

higher alcohols, polyglycerin esters, abocado oil, almond oil, olive oil, sesame oil, sasanqua oil, safflower oil, tsubaki oil, corn oil, rape oil, cottonseed oil, peanut oil, palm oil, coconut oil, vaseline, pristane, zamene, gazsen, polyetherester, squalane and mixtures of two or more kinds of hydrocarbon base oils such as liquid paraffin. Safety of use thereof has been confirmed.



(I)

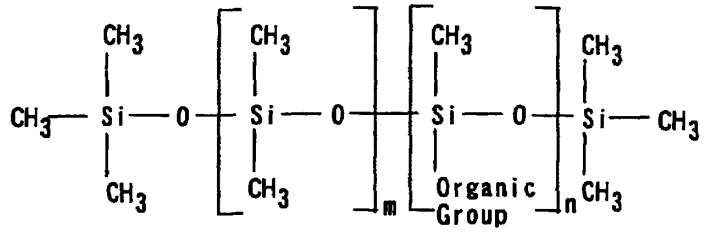
[n in the formula (I) is an integer of 0 to 2500]



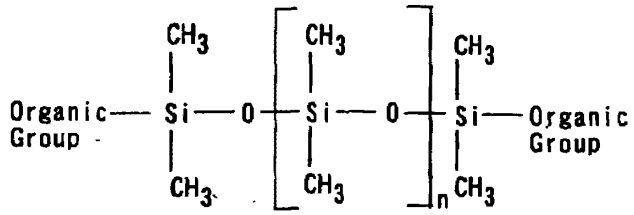
(II)

[n in the formula (II) is an integer of 3 to 6]

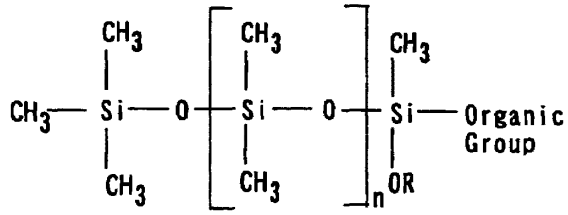
NJOY Exhibit 1002.1530



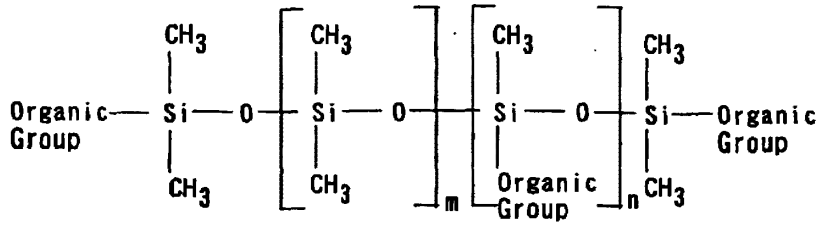
(III)



(IV)



(V)



(VI)

[0027] m and n described in the preceding formulas (III) to (VI) are integers of 0 or more, and m and n which are suitably settled are used respectively but restricted to those falling in a range where they function as the layer-separative component.

[0028] In particular, given as the preferred layer-separative component 13 are volatile ones considering that when the above layer-separative component 13 is discharged from the pen feed 17 of the free ink type writing instrument A (when it is lastly discharged after having consumed the ink component 12 contained in the ink tank 10 by writing), it

NJOY Exhibit 1002.1531

does not stain a paper surface and not remain there. It includes, for example, volatile linear silicone oil [in the case where n is 5 to 30 in the formula (I)] and volatile cyclic silicone oil (in the case where n is 3 to 4 in the formula (II)].

[0029] In the present invention, when the layer-separative component 13 has a surface tension larger than that of the ink component 12 contained in the ink 11, the layer-separative component can not be present between the ink tank member surface and the ink component, so that clear drain can not be carried out. Also, when the layer-separative component 13 has a specific gravity larger than that of the ink component 12, the layer-separative component 13 passes the pen feed through the feed and stays at the pen tip or is discharged on a writing surface in writing (normal writing with the pen tip turned downward), so that normal drawn lines can not be obtained in a certain case. Accordingly, it is not preferred.

[0030] Also, the layer-separative component 13 has a viscosity of 10000 mPa • s or less, preferably 1000 mPa • s or less and more preferably 30 mPa • s or less at 25°C.

[0031] If the viscosity exceeds 10000 mPa • s, it takes time to observe the ink-remaining amount, and it is difficult to observe the ink-remaining amount.

[0032] A use amount of the layer-separative component is 0.01 to 50 %, preferably 0.1 to 20 % and more preferably 1 to 10 % based on the content volume of the ink tank.

[0033] If the amount of the layer-separative component is less than 0.01 %, there is a spot where it can not be present between the ink tank member surface and the ink component, so that fine clear drain can not be carried out. On the other hand, if the amount of the layer-separative component exceeds 50 %, the layer-separative component comes out to a pen feed side through the feed in writing with the pen tip turned horizontal, and normal drawn lines can not be obtained in a certain case.

[0034] The ink component 12 of the present invention shall not specifically be restricted as long as it allows the layer-separative component 13 to separate to be a layer and functions as an ink component for a writing instrument. Capable of being used are, for example, so-called normal water-based inks and oil-based inks used for writing instruments prepared by dissolving or dispersing colorants comprising dyes and/or pigments, resins, dispersants, preservatives and other additives for a writing instrument in liquid obtained by mixing at least one of water, (purified water and ion-exchanged water) and organic solvents (1-methoxy-2-propanol, 1-ethoxy-2-propanol, benzyl alcohol, ethanol, ethylene glycol, carbitol, cellosolve, glycerin, diethylene glycol stearate, propylene glycol, 1-propanol, 2-propanol, 1-butanol, 2-butanol and t-butyl alcohol).

[0035] The ink component has a viscosity of 100 mPa • s or less, preferably 50 mPa • s or less and more preferably 10 mPa • s or less at 25°C.

[0036] If the ink component has a viscosity exceeding 100 mPa • s, brought about are the problems that not only movement thereof in the ink tank is deteriorated and it is difficult to observe the ink-remaining amount but also the ink followability in writing is notably degraded.

[0037] A material for the holder part which is the ink tank doubling as the visible part includes thermoplastic plastics which are transparent and can be injection-molded. To be specific, given as the examples thereof are polypropylene, polyethylene, polyethylene terephthalate, polystyrene, polyetherimide, polycarbonate, polysulfone, acrylonitrile-acrylate-styrene copolymers, acrylonitrile-styrene copolymers, butadiene-styrene-methacrylate terpolymers, ethylene-vinyl chloride copolymers, ethylene- vinyl alcohol copolymers, polymethylpentene and polyethersulfone.

[0038] Preferably selected are thermoplastic plastics which have a large surface tension against the ink component contained in the ink and the layer-separative component and which are not dissolved in the ink.

[0039] An inner surface of the visible part of the holder part which is the ink tank doubling as the visible part may be subjected to surface treatment with a fluororesin or a silicone resin to further improve the visibility.

[0040] In the free ink type writing instrument A of the embodiment of the present invention, the layer-separative component 13 having the characteristics described above allows the ink to be repelled in short time without remaining the ink component 12 in the ink tank 10 which is the visible part, and makes the visibility of the ink-remaining amount excellent very much.

[0041] Further, the free ink type writing instrument having excellent visibility of an ink-remaining amount is obtained just by charging the ink tank 10 with the ink 11 comprising the ink component 12 and the layer-separative component 13 having the characteristics described above, and the intended free ink type writing instrument can be produced without going through a conventional step of making a rib-like projection for improving visibility of an ink-remaining amount in an ink tank. Accordingly, the free ink type writing instrument which is excellent in productivity as well as in cost can be provided.

[0042] Fig. 2 (a) and (b) are explanatory drawings showing an embodiment in which the free ink type writing instrument is applied to a ball point pen.

[0043] The free ink type writing instrument B of the present invention is characterized in that an ink 21 contained in an ink tank part 20 which is a holder part comprises an ink component 22 and a layer-separative component 23 which separates to be a layer from the ink component 22 and both of a specific gravity and a surface tension of the above layer-separative component 23 are smaller than those of the ink component 22 and that the ink component 22 can

NJOY Exhibit 1002.1532

freely move in the holder part 20 doubling as the ink tank.

[0044] The layer-separative component 23 has a surface tension smaller than that of a visible part 20a for observing an ink-remaining amount in the holder part 20 doubling as the ink tank.

[0045] A coated film such as a coating film and a metal-deposited film is provided on the surface of the ink tank 20 excluding the visible part 20a described above to make the part opaque and invisible. Various ones described in details in the embodiment of the marking pen described above can be used for the ink tank 20 which is the holder part, the ink component 22 and the layer-separative component 23.

[0046] The numeral 24 in Fig. 2 is a collector member; 25 is a holder member; 26 is a feed comprising a leading feed 26a and an inner feed 26b; and 27 is a pen tip comprising a ball point tip. The ink 21 is derived from the ink tank 20 into the pen tip 27 via the feed 26 which comprises the leading feed 26a and the inner feed 26b and which is disposed in a central hole 24a of the collector member 24 and provided an ink passage.

[0047] In the free ink type writing instrument B of the embodiment of the present invention, the visible part 20a (another visible part having the same structure on a reverse side or an opposite side) is formed in a part of the ink tank 20. Even if this visible part 20a is a part of the ink tank 20, the layer-separative component 23 having the characteristics described above allows the ink to be repelled in short time without allowing the ink component to remain on the surface of the visible part 20a, and therefore it improves a clear drain property and makes the visibility of the ink-remaining amount excellent very much.

[0048] In particular, in the case that a visible part is formed in a part of an ink tank, even if an ink tank provided with a rib-like projection, a conventional free ink type writing instrument filled with an ink having a dark color such as black and blue is inferior in the ink-repellence property, and had a problem on the visibility thereof. In the present invention, however, even in the free ink type writing instrument filled with an ink having a dark color such as black and blue, the ink is repelled in short time without allowing the ink component to remain on the surface of the visible part 20a, and the visibility of the ink-remaining amount becomes excellent very much.

[0049] The free ink type writing instrument in the present invention shall not be restricted to the marking pen and the ball point pen of the embodiments described above and can be applied to a brush pen, a fountain pen, a felt type pen and an applicator for cosmetics.

[0050] Also, the free ink type writing instruments of the embodiments described above are characterized by the ink filled into the ink tank which comprises the ink component and the layer-separative component having the characteristics described above, and therefore a structure of a free ink type writing instrument shall not specifically be restricted excluding this constitution.

[0051] The free ink type writing instrument of the embodiment in the present invention is constituted as described above. The ink contained in the ink tank part comprises the ink component and the layer-separative component which separates to be a layer from the above ink component; both of a specific gravity and a surface tension of the above layer-separative component are smaller than those of the ink component; and the ink can freely move in the ink tank, so that the ink is repelled in short time without allowing the ink component to remain on the surface of the holder part, and the visibility of the ink-remaining amount becomes excellent very much.

[0052] If the layer-separative component has a surface tension smaller than that of the holder part (visible part) doubling as the ink tank, the visibility of the ink-remaining amount becomes excellent very much.

[0053] Further, the free ink type writing instrument having the excellent visibility of an ink remaining amount is obtained just by charging the ink tank with the ink comprising the ink component and the layer-separative component having the characteristics described above, and the free ink type writing instrument which is excellent in an aspect of productivity as well as cost is provided.

[0054] Fig. 3 is a schematic explanatory drawing for schematically explaining a writing instrument equipped with an ink tank of a cartridge type.

[0055] The cartridge type writing instrument C of the embodiment of the present invention is characterized, as shown in Fig. 3 (a), in that a writing instrument body 30 which is a holder is equipped with an ink tank part 31 of a detachable cartridge type and an ink 32 contained in the ink tank part 31 comprises an ink component 33 and a layer-separative component 34 which separate to be a layer from the ink component 33 and that both of a specific gravity and a surface tension of the layer-separative component 34 are smaller than those of the ink component 33 and the ink 32 can freely move in the ink tank 31.

[0056] A pen tip 35 comprising a pen feed is installed on a tip part of the writing instrument body 30.

[0057] The ink component 33 stored in the ink tank 31 described above shall not specifically be restricted and includes various components shown in the embodiment of the marking pen described above. The examples thereof include water-based inks comprising colorants comprising dyes and/or pigments, water, organic solvents and the like. Conventionally known additives such as a pH controlling agent, a dispersant, a preservative, a rust preventive and an auxiliary aye can suitably be added, if necessary, to these ink components.

[0058] Both of a specific gravity and a surface tension of the layer-separative component 34 stored in the ink tank part 31 together with the ink component 33 have to be smaller than those of the ink component 33, and the ink 32 has

NJOY Exhibit 1002.1533

to freely move in the ink tank part 31. Even if the ink component 33 is completely consumed by writing and the drawn line intensity is notably reduced, some amounts of the layer-separative component 34 has to still remain in the ink tank part 31.

[0059] The layer-separative component 34 requiring such as amount shall not specifically be restricted as long as it has the characteristics that both of a specific gravity and a surface tension thereof are smaller than those of the ink component 33 and that the ink can freely move in the ink tank part and includes, for example, various layer-separative components having the characteristics shown in the embodiment of the marking pen described above.

[0060] In this embodiment, materials to be used, sizes and forms of the pen tip part 35 and the ink tank part 31 of a cartridge type storing the ink 32 which comprises the ink component 33 and the layer-separative component 34 having the characteristics described above shall not specifically be restricted, and those shown in the embodiment of the marking pen described above can be used therefor. For example, a fiber bundle which is integrated with a pen tip, a synthetic resin-made pen tip having continuous pores and a small tube pen tip can suitably be used for the pen tip 35.

[0061] The writing instrument C of this embodiment thus constructed is so constituted that the ink 32 contained in the ink tank part 31 comprises the ink component 33 and the layer-separative component 34 which separates to be a layer from the ink component 33, and both of a specific gravity and a surface tension of the layer-separative component 34 are smaller than those of the ink component 33 and that the ink 32 can freely move in the ink tank 31, and therefore even if the ink component 33 contained in the ink tank part 31 is completely consumed by writing and the drawn line intensity is markedly reduced, the layer-separative component 34 is still contained, as shown in Fig. 3 (b), in the ink tank part 31, and the pen tip 35 is filled with the layer-separative component 34.

[0062] Accordingly, when the layer-separative component 34 is discharged from the pen tip 35, that is, when the drawn lines are written with the layer-separative component 34 in place of the ink component 33, the ink contained in the ink tank part 31 is completely consumed, which notifies (sign) the time to exchange the ink tank 31.

[0063] In this embodiment, even if the ink tank part 31 is exchanged with new one, a space is not formed in the pen tip part 35 by air or clogging is not caused in the space part by coagulation of a pigment contained in the ink component. Accordingly, the original ink discharge amount can be maintained as it is, and the original drawn line intensity can be maintained. Further, in this embodiment, the ink tank part 31 can repeatedly be exchanged until the pen tip part 35 itself is damaged to thereby bring about inferior writing. If the pen tip part 35 is a cartridge type, it can be exchanged together with the ink tank part 31 and used.

[0064] Fig. 4 and Fig. 5 are cross sections showing one example of the embodiment of the liquid applicator.

[0065] The liquid applicator D of this embodiment is composed of an applicator body 40 having an opened rear end, a tank part 50 of a cartridge type and a cylindrical plug 60. A coating liquid (not illustrated) stored in the tank part 50 described above comprises a coating liquid component such as a manicure liquid and a layer-separative component which separates to be a layer from the coating liquid component. Both of a specific gravity and a surface tension of the layer-separative component are smaller than those of the coating liquid component, and the coating liquid can freely move in the tank part 50. The numeral 45 is a cap.

[0066] In setting this liquid applicator D, the plug 60 is inserted, as shown in Fig. 4 and Fig. 5, to the rear end side of the tank part 50 of a cartridge type. In this case, a front end aperture part 67 of the plug 60 comes into contact with a stage part 54 of the tank part 50 of a cartridge type, and insertion of the plug 60 is stopped.

[0067] In this inserted state, the plug 60 is inserted into the inside of the applicator body 40 from the rear end aperture side thereof. This allows a concave engaging part 65 of the plug 60 to be engaged and fixed with a convex engaging part 42 of the applicator body 40 with narrowing a width of slits 64 while keeping a suitable gap between the peripheral face part having each slit 64 and the convex engaging part 42. At the same time, an aperture of an inner front axis 53 of the tank part 50 of a cartridge type is inserted into a pipe member 43 of the applicator body 40, and setting is completed.

[0068] Next, a way of using the liquid applicator D thus set shall be explained.

[0069] The tank part 50 of a cartridge type freely slides, as shown in Fig. 5, in an axis direction to the pipe part 43, and when the rear end of the tank part 50 is pressed forward, a valve part 52 of the tank part 50 is opened, and the coating liquid contained in the tank part 50 flows into the pipe member 43 through the valve part 52 and is fed into a brush member 41a.

[0070] When the rear end of the tank part 50 is released from pressing, the tank part 50 goes back against the pipe member 43 by virtue of a valve spring 52a built in the valve body 52 to shut the valve body 52. At the same time, in order to prevent the valve part 52 from falling from the pipe member 43 with the tank part 50 sliding to a plug 60 side at the time of pressing (knocking) the tank part 50 or applying careless force to it, the tank part 50 touches with the front end aperture part 67 of the plug 60 at the stage part 54 and stops.

[0071] In the liquid applicator D of this embodiment, a prescribed amount of the coating liquid is fed into the brush member 41a and used by repeating the pressing operation described above.

[0072] The coating liquid component stored in the tank described above shall not specifically be restricted and includes, for example, a liquid cosmetic such as a manicure liquid, a liquid detergent and a liquid chemical.

NJOY Exhibit 1002.1534

[0073] Both of a specific gravity and a surface tension of the layer-separative component stored in the tank part 50 together with the coating liquid component have to be smaller than those of the coating liquid component, and the coating liquid has to freely move in the tank. Further, even if the coating liquid component is completely consumed by coating and the coating density is notably reduced, some amounts of the layer-separative component has to still remain in the ink tank part 50.

[0074] The layer-separative component requiring such an amount shall not specifically be restricted as long as it has the characteristics that both of a specific gravity and a surface tension thereof are smaller than those of the coating liquid component and that the coating liquid can freely move in the ink tank part and includes, for example, various layer-separative components having the characteristics shown in the embodiment of the marking pen described above. The liquid applicator D of this embodiment thus constituted has the same working effects as those of the writing instrument C. When the layer-separative component is discharged from the brush member 41a, that is, when the coated lines are coated with the layer-separative component having the characteristic described above in place of the coating liquid component, the coating liquid contained in the tank part 50 is completely consumed, which notifies (sign) the time to exchange the tank part 50.

[0075] The preceding tank part 50 of a cartridge type can easily be exchanged by detaching the plug 60 from the applicator body 40 with releasing engagement thereof, then detaching the tank part 50 and setting a new tank according to the setting way described above.

[0076] In the writing instrument or the liquid applicator thus constituted each equipped with the ink tank part of a cartridge type for storing the preceding ink or coating liquid, the ink or the coating liquid stored in the tank part comprises the ink component or the coating liquid component such as a manicure liquid and the layer-separative component which separates to be a layer from the above ink component or coating liquid component. Both of a specific gravity and a surface tension of the layer-separative component are smaller than those of the ink component or the coating liquid component, and the ink or the coating liquid can freely move in the tank part, whereby the intended observation of the remaining amount of the ink or the coating liquid can simply and easily be achieved. Constitution other than that of the layer-separative component having the characteristic described above which is stored in the ink tank part shall not specifically be restricted.

[0077] The writing instrument of the embodiment described above which is equipped with the ink tank part of a cartridge type includes, for example, a felt tip pen, a ball point pen, a marking pen such as a marker for underlining and a fountain pen which are equipped with the ink tank parts of a cartridge type, and the embodiment can further be applied to a liquid applicator for various uses which is equipped with a tank part of a cartridge type storing a coating liquid.

Examples

[0078] Next, the present invention shall be explained in further details with reference to examples and comparative examples, but the present invention shall not be restricted to the examples described below.

[0079] Examples 1 to 7 and Comparative Examples 1 to 5 are examples and comparative examples for free ink type writing instruments, and Example 8 and Comparative Example 6 are an example and a comparative example for writing instruments equipped with an ink tank of a cartridge type.

Example 1

[0080] Used was an ink tank with a content volume of 2.0 cc shown in Fig. 1, which had a smooth surface having no form of a rib in a visible part of an inside of the ink tank.

[0081] Polypropylene (PP) having a surface tension of 32 dyn/cm (at 25°C) was used for the material thereof.

NJOY Exhibit 1002.1535

Ink composition:

[0082]

(1) Ink component composition	(% by weight)
Purified water	55.0
Propylene glycol	17.0
Glycerin	5.0
Preservative (1,2-benzisothiazoline-3-one)	0.3
Resin (acryl base emulsion)	7.0
Dispersant (styrene-acryl base dispersion resin)	0.7
Carbon black	15.0
Surface tension	35 dyn/cm (at 25°C)
Specific gravity	1.07 (at 25°C)
Viscosity	4.5 mPa • s (at 25°C)
(2) Decamethylcyclopentasiloxane (KF995: manufactured by Shin-Etsu Chemical Co., Ltd.) was used for a layer-separative component.	
Surface tension	17.8 dyn/cm (at 25°C)
Specific gravity	0.956 (at 25°C)
Viscosity	3.8 mPa • s (at 25°C)

[0083] The ink tank was charged with 1.5 cc of the ink component described above and 0.1 cc of the layer-separative component so that the visible part was completely covered with the ink component. This was assembled into such a writing instrument as shown in Fig. 1 to carry out a test of visibility according to the following method (test of visibility).

[0084] With respect to the test method of visibility, the pen tip is turned downward to cover the visible part with the ink component. Then, the pen tip is turned upward so that the ink component stays in a lower position than the visible part.

[0085] In this case, determined was time spent until the ink was repelled in the visible part and the ink-remaining amount could be observed, whereby the performance of the visibility was evaluated. The result thereof is shown in the following Table 1.

Example 2

[0086] Used was an ink tank with a content volume of 2.0 cc shown in Fig. 1, which had a smooth surface having no form of a rib in a visible part of an inside of the ink tank.

[0087] Polypropylene (PP) having a surface tension of 32 dyn/cm (at 25°C) was used for the material thereof.

NJOY Exhibit 1002.1536

Ink composition:

[0088]

(1) Ink component composition	(% by weight)
Propylene glycol monomethyl ether	80.0
Resin (alkylphenol resin)	7.0
Dye (black)	13.0
Surface tension	24 dyn/cm (at 25°C)
Specific gravity	0.950 (at 25°C)
Viscosity	4.7 mPa • s (at 25°C)
(2) Dimethylsilicone oil (KF96-10: manufactured by Shin-Etsu Chemical Co., Ltd.) was used for a layer-separative component.	
Surface tension	20.0 dyn/cm (at 25°C)
Specific gravity	0.940 (at 25°C)
Viscosity	9.4 mPa • s (at 25°C)

[0089] The ink tank was charged with 1.5 cc of the ink component described above and 0.1 cc of the layer-separative component so that the visible part was completely covered with the ink component. This was assembled into such a writing instrument as shown in Fig. 1 to carry out the test of visibility according to the same method as in Example 1 described above. The result thereof is shown in the following Table 1.

Example 3

[0090] Used was an ink tank with a content volume of 2.0 cc shown in Fig. 2, which had a smooth surface having no form of a rib in a visible part of an inside of the ink tank.

[0091] Polypropylene (PP) having a surface tension of 32 dyn/cm (at 25°C) was used for the material thereof.

NJOY Exhibit 1002.1537

Ink composition:

[0092]

(1) Ink component composition	(% by weight)
Purified water	55.0
Propylene glycol	17.0
Glycerin	5.0
Preservative (1,2-benzisothiazoline-3-one)	0.3
Resin (acryl base emulsion)	7.0
Dispersant (styrene-acryl base dispersion resin)	0.7
Carbon black	15.0
Surface tension	35 dyn/cm (at 25°C)
Specific gravity	1.07 (at 25°C)
Viscosity	4.5 mPa • s (at 25°C)
(2) α-Olefin oligomer (hydrocarbon oil, SHF-20: manufactured by Mobil Sekiyu K.K.) was used for a layer-separative component.	
Surface tension	27.2 dyn/cm (at 25°C)
Specific gravity	0.80 (at 25°C)
Viscosity	6.5 mPa • s (at 25°C)

[0093] The ink tank was charged with 1.5 cc of the ink component described above and 0.1 cc of the layer-separative component so that the visible part was completely covered with the color component. This was assembled into such a writing instrument as shown in Fig. 2 to carry out the test of visibility according to the same method as in Example 1 described above. The result thereof is shown in the following Table 1.

Example 4

[0094] Used was an ink tank with a content volume of 2.0 cc shown in Fig. 1, which had a smooth surface having no form of a rib in a visible part of an inside of the ink tank.

[0095] Polypropylene (PP) having a surface tension of 32 dyn/cm (at 25°C) was used for the material thereof.

NJOY Exhibit 1002.1538

Ink composition:

[0096]

(1) Ink component composition	(% by weight)
Purified water	55.0
Propylene glycol	17.0
Glycerin	5.0
Preservative (1,2-benzisothiazoline-3-one)	0.3
Resin (acryl base emulsion)	7.0
Dispersant (styrene-acryl base dispersion resin)	0.7
Carbon black	15.0
Surface tension	35 dyn/cm (at 25°C)
Specific gravity	1.07 (at 25°C)
Viscosity	4.5 mPa • s (at 25°C)
(2) Layer-separative component composition	(% by weight)
α-Olefin oligomer (hydrocarbon oil, SHF-20: manufactured by Mobil Sekiyu K.K.)	98.0
Dimethylsilicone oil (KF96-10000: manufactured by Shin-Etsu Chemical Co., Ltd.)	2.0
Surface tension	22.0 dyn/cm (at 25°C)
Specific gravity	0.805 (at 25°C)
Viscosity	6.0 mPa • s (at 25°C)

[0097] The ink tank was charged with 1.5 cc of the ink component described above and 0.1 cc of the layer-separative component comprising the two components described above so that the visible part was completely covered with the ink component. This was assembled into such a writing instrument as shown in Fig. 1 to carry out the test of visibility according to the same method as in Example 1 described above. The result thereof is shown in the following Table 1.

Example 5

[0098] Used was an ink tank with a content volume of 2.0 cc shown in Fig. 1, which had a smooth surface having no form of a rib in a visible part of an inside of the ink tank.

[0099] Polypropylene (PP) having a surface tension of 32 dyn/cm (at 25°C) was used for the material thereof.

NJOY Exhibit 1002.1539

Ink composition:

[0100]

(1) Ink component composition	(% by weight)
Propylene glycol monomethyl ether	80.0
Resin (alkylphenol resin)	7.0
Dye (black)	13.0
Surface tension	24 dyn/cm (at 25°C)
Specific gravity	0.950 (at 25°C)
Viscosity	4.7 mPa • s (at 25°C)
(2) Layer-separative component composition	(% by weight)
Liquid paraffin (first class reagent, manufactured by Wako Pure Chemical Industries, Ltd.)	99.0
Dimethylsilicone oil (KF96-50000: manufactured by Shin-Etsu Chemical Co., Ltd.)	1.0
Surface tension	21.9 dyn/cm (at 25°C)
Specific gravity	0.900 (at 25°C)
Viscosity	110 mPa • s (at 25°C)

[0101] The ink tank was charged with 1.5 cc of the ink component described above and 0.1 cc of the layer-separative component comprising the two components described above so that the visible part was completely covered with the ink component. This was assembled into such a writing instrument as shown in Fig. 1 to carry out the test of visibility according to the same method as in Example 1 described above. The result thereof is shown in the following Table 1.

Example 6

[0102] Used was an ink tank with a content volume of 2.0 cc shown in Fig. 1, which had a smooth surface having no form of a rib in a visible part of an inside of the ink tank.

[0103] Polypropylene (PP) which did not contain an antioxidant, a light degradation preventive and an antistatic agent and which had a surface tension of 28 dyn/cm (at 25°C) was used for the material thereof.

NJOY Exhibit 1002.1540

Ink composition:

[0104]

(1) Ink component composition	(% by weight)
Purified water	55.0
Propylene glycol	17.0
Glycerin	5.0
Preservative (1,2-benzisothiazoline-3-one)	0.3
Resin (acryl base emulsion)	7.0
Dispersant (styrene-acryl base dispersion resin)	0.7
Carbon black	15.0
Surface tension	35 dyn/cm (at 25°C)
Specific gravity	1.07 (at 25°C)
Viscosity	4.5 mPa • s (at 25°C)
(2) Liquid paraffin 100 % by weight (first class reagent, manufactured by Wako Pure Chemical Industries, Ltd.) was used for a layer-separative component.	
Surface tension	30.5 dyn/cm (at 25°C)
Specific gravity	0.870 (at 25°C)
Viscosity	105 mPa • s (at 25°C)

[0105] The ink tank was charged with 1.5 cc of the ink component described above and 0.1 cc of the layer-separative component so that the visible part was completely covered with the color component. This was assembled into such a writing instrument as shown in Fig. 1 to carry out the test of visibility according to the same method as in Example 1 described above. The result thereof is shown in the following Table 1.

Comparative Example 1

[0106] In Example 1 described above, a writing instrument excluding the layer-separative component was assembled to carry out the test of visibility according to the same method as in Example 1 described above. The result thereof is shown in the following Table 1.

Comparative Example 2

[0107] In Example 2 described above, a writing instrument excluding the layer-separative component was assembled to carry out the test of visibility according to the same method as in Example 1 described above. The result thereof is shown in the following Table 1.

Comparative Example 3

[0108] In Example 3 described above, a writing instrument excluding the layer-separative component was assembled to carry out the test of visibility according to the same method as in Example 1 described above. The result thereof is shown in the following Table 1.

Comparative Example 4

[0109] Used was an ink tank with a content volume of 2.0 cc shown in Fig. 1, which had a smooth surface having no form of a rib in a visible part of an inside of the ink tank.

NJOY Exhibit 1002.1541

[0110] Used for the material thereof was polypropylene (PP) in which a fluororesin (fluorine base coating agent: Fluorad FC-722, manufactured by Sumitomo 3M Limited) was coated on the surface of the visible part of the inside of the ink tank and which had a surface tension of 12 dyn/cm (at 25°C).

[0111] The same ink composition as in Example 3 was used. That is, the surface tension was 35 dyn/cm (at 25°C); the specific gravity was 1.07 (at 25°C); and the viscosity was 4.5 mPa • s (at 25°C).

[0112] The ink tank was charged with 1.5 cc of the ink component described above so that the visible part was completely covered with the color component. This was assembled into such a writing instrument as shown in Fig. 1 to carry out the test of visibility according to the same method as in Example 1 described above. The result thereof is shown in the following Table 1.

Comparative Example 5

[0113] Used was an ink tank with a content volume of 2.0 cc shown in Fig. 1, which had a smooth surface having no form of a rib in a visible part of an inside of the ink tank.

[0114] Used for the material thereof was polypropylene (PP) in which a fluororesin (fluorine base coating agent: Fluorad FC-722, manufactured by Sumitomo 3M Limited) was coated on the surface of the visible part of the inside of the ink tank and which had a surface tension of 12 dyn/cm (at 25°C).

[0115] The same ink composition as in Example 2 was used. That is, the surface tension was 24 dyn/cm (at 25°C); the specific gravity was 0.950 (at 25°C); and the viscosity was 4.7 mPa • s (at 25°C).

[0116] The ink tank was charged with 1.5 cc of the ink component described above so that the visible part was completely covered with the color component. This was assembled into such a writing instrument as shown in Fig. 1 to carry out the test of visibility according to the same method as in Example 1 described above. The result thereof is shown in the following Table 1.

Comparative Example 6

[0117] In Example 6 described above, a writing instrument excluding the layer-separative component was assembled to carry out the test of visibility according to the same method as in Example 1 described above. The result thereof is shown in the following Table 1.

NJOY Exhibit 1002.1542

Table 1

	Time spent until ink-remaining amount can be observed
Example 1	one second or shorter
Example 2	one second or shorter
Example 3	one second or shorter
Example 4	one second or shorter
Example 5	3 seconds or shorter
Example 6	5 seconds or shorter
Comparative Example 1	5 minutes or longer
Comparative Example 2	20 minutes or longer
Comparative Example 3	5 minutes or longer
Comparative Example 4	5 minutes or longer*1
Comparative Example 5	20 minutes or longer*1
Comparative Example 6	one minute or longer

*1: in both cases, the time was 5 seconds or shorter in the beginning, but the coating film was peeled off from the inner wall face of the ink tank with the passage of time, and the effect was lost, which resulted in requiring each time described above until the ink-remaining amount could be observed.

[0118] As apparent from the results shown in Table 1, it has been found that the free ink type writing instruments containing the layer-separative components prepared in Examples 1 to 6 of the present invention are excellent very much in visibility of an ink-remaining amount as compared with the free ink type writing instruments containing no layer-separative components prepared in Comparative Examples 1 to 6.

[0119] Individually observing the examples, in Examples 1 to 6, the ink contained in the ink tank comprises the ink component and the layer-separative component which separates to be a layer from the ink component; both of a specific gravity and a surface tension of the layer-separative component are smaller than those of the ink component; and the ink can freely move in the ink tank. Accordingly, it can be found that the ink is excellent very much in visibility of an ink-remaining amount. Further continuing the annalysis, in Examples 1 to 5, the layer-separative components have a surface tension smaller than that of the visible part for observing the ink-remaining amount of the holder part doubling as the ink tank, and in Example 6, the layer-separative component has a surface tension larger than that of the visible part for observing the ink-remaining amount of the holder part doubling as the ink tank. It can be found that the object of the present invention has been achieved in all these cases.

[0120] In contrast with this, Comparative Examples 1 to 6 relate to the free ink type writing instruments containing no layer-separative components. Particularly in Comparative Examples 4 and 5, the fluororesin was coated on the surface of the visible part of the inside of the ink tank. In these case, the time until the ink-remaining amount can be observed was 5 seconds or shorter in the beginning, but the coating film was peeled off from the inner wall surface of the ink tank with the passage of time (after left standing for 5 days), and the effect was lost. After all, required were 5 minutes or longer in the case of Comparative Example 4 and 20 minutes or longer in the case of Comparative Example 5.

Example 7 and Comparative Example 7

[0121] A water-based ink (specific gravity: 1.07/25°C) having the following composition was used as an ink component in Example 7.

NJOY Exhibit 1002.1543

Ink component composition:

[0122]

Color resin emulsion toner (yellow) (color emulsion particle size: 0.5 μm)	50.0 % by weight
Purified water	29.5 % by weight
Glycerin	20.0 % by weight
Preservative	0.5 % by weight
Surface tension	35 dyn/cm (at 25°C)
Specific gravity	1.07 (at 25°C)
Viscosity	5 mPa • s (at 25°C)

Layer-separative component:

[0123]

Decamethylcyclopentasiloxane (KF995: manufactured by Shin-Etsu Chemical Co., Ltd.) was used.	
Surface tension	17.8 dyn/cm (at 25°C)
Specific gravity	0.956 (at 25°C)
Viscosity	3.8 mPa • s (at 25°C)

[0124] In Comparative Example 7, the same ink as in Example 7 was used, except that silicone oil was not added, and a test was carried out according to the following method.

[0125] A writing instrument shown in Fig. 6 was used for this test. The writing instrument E is equipped with an ink tank 70 doubling as a holder which is a cartridge part, and the ink tank 70 is detachably installed to a main body 71 via a connecting part 72. An ink 73 stored in the ink tank 70 is derived into a pen feed 75 via a feed 74. The numeral 76 is a collector member.

Test method:

[0126] The ink tank part 70 of a cartridge type was charged with 2.0 cc of the ink component and 0.2 cc of the layer-separative component each having the composition described above, respectively, and writing was carried out until the ink contained in the ink tank part 70 was completely consumed and the drawn line was blurred. Then, the cartridge was exchanged with a new ink tank cartridge filled with the ink component and the layer-separative component having the compositions described above, and writing was carried out again to visually observe the drawn line intensity and compare it with the original intensity. This operation was repeated 5 times.

[0127] Observing the results of the test described above, in the case where the layer-separative component prepared in Example 7 was filled together with the ink component, a reduction in the drawn line intensity was not observed at all even after the ink tank cartridge was exchanged 5 times. In contrast with this, in the case where the layer-separative component was not filled together with the ink component in Comparative Example 7, a reduction in the drawn line intensity was already observed from second exchange, and a marked reduction in the intensity was brought about as a number of times for exchange of the ink tank cartridge was increased.

Industrial Applicability

[0128] As described above, according to the present invention, there are provided a free ink type writing instrument

NJOY Exhibit 1002.1544

and a writing instrument equipped with an ink tank part of a cartridge type which are excellent in visibility of an ink-remaining amount.

[0129] Further, according to the writing instrument of the present invention, layer-separative component in which both of a specific gravity and a surface tension are smaller than those of the ink component and which separates to be a layer from the ink component is just stored in the ink tank part together with a conventional ink component, and therefore the writing instrument which is excellent in productivity and profitability is provided.

[0130] Further, in the writing instrument equipped with an ink tank part of a cartridge type, it has become possible to exchange any number of times a cartridge in the ink tank part, and even after the ink component is completely consumed, the state that the layer-separative component is filled in the inside of the pen tip such as the pen feed can be maintained. Further, when the ink component is completely consumed, the drawn line is written with the liquid of the layer-separative component in place of the ink component, and therefore the time for exchange of the ink tank part can surely be visually observed.

[0131] Further, according to the liquid applicator of the present invention, the time for exchange of the tank part of a cartridge type can surely be visually observed, and the original discharge amount of the coating liquid can be maintained as it is even after exchanged with a new tank part.

Claims

1. A writing instrument having an ink tank part for storing ink, wherein an ink contained in the ink tank part comprises an ink component and a layer-separative component which separates to be a layer from said ink component; both of a specific gravity and a surface tension of said layer-separative component are smaller than those of the ink component; and the ink can freely move in the ink tank part.

2. The writing instrument as described in claim 1, wherein the writing instrument is of a free ink type and equipped with a visible part for observing an ink-remaining amount in a holder part doubling as the ink tank part.

3. The writing instrument as described in claim 1, wherein the writing instrument is equipped with an ink tank part of a cartridge type for storing ink.

4. The writing instrument as described in claim 2, wherein the layer-separative component has a surface tension smaller than that of the visible part for observing an ink-remaining amount in the holder part doubling as the ink tank part.

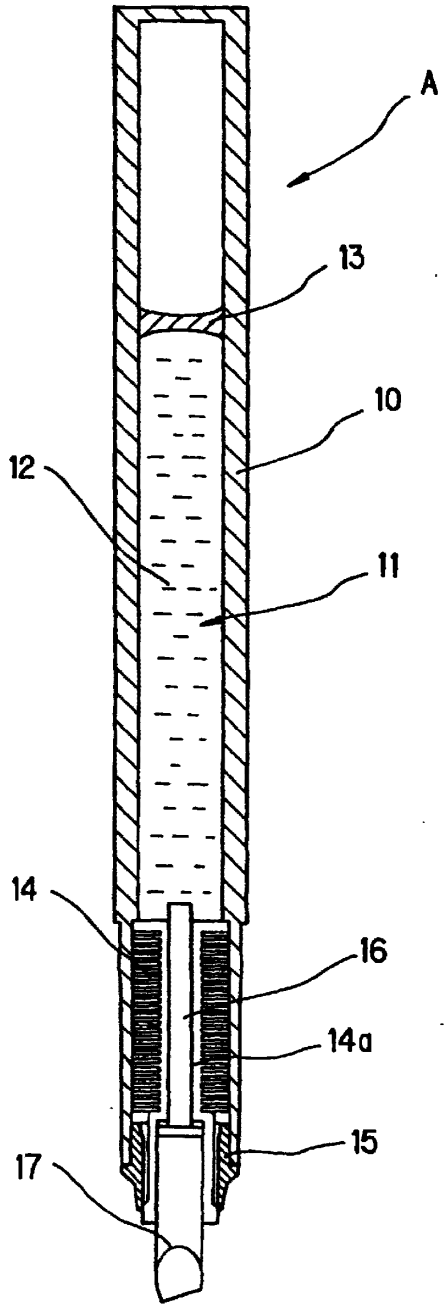
5. The writing instrument as described in any one of claims 1 to 4, wherein the layer-separative component has a viscosity of 10000 mPa • s or less at 25°C.

6. The writing instrument as described in any one of claims 1 to 5, wherein the ink component has a viscosity of 100 mPa • s or less at 25°C.

7. A liquid applicator equipped with a tank part of a cartridge type for storing coating liquid, wherein a coating liquid contained in the tank part comprises a coating liquid component and a layer-separative component which separates to be a layer from the coating liquid component; both of a specific gravity and a surface tension of the layer-separative component are smaller than those of the coating liquid component; and the coating liquid can freely move in the tank.

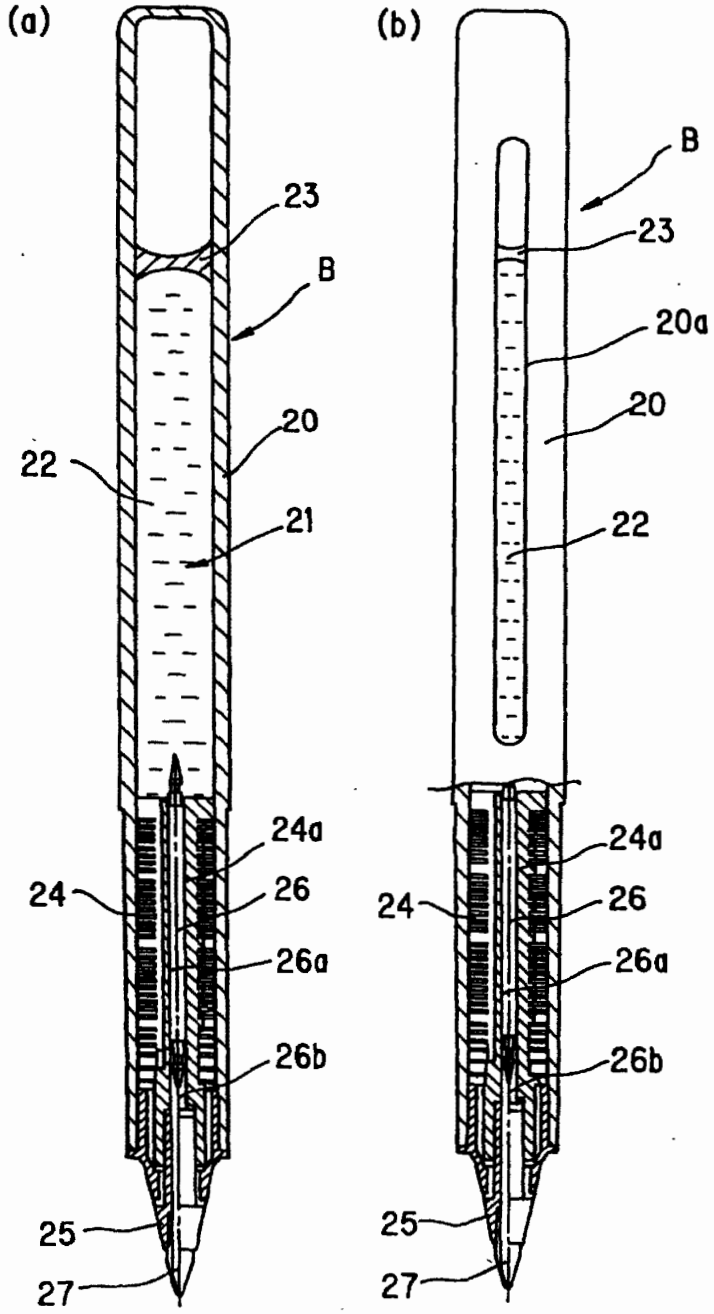
NJOY Exhibit 1002.1545

FIG. 1



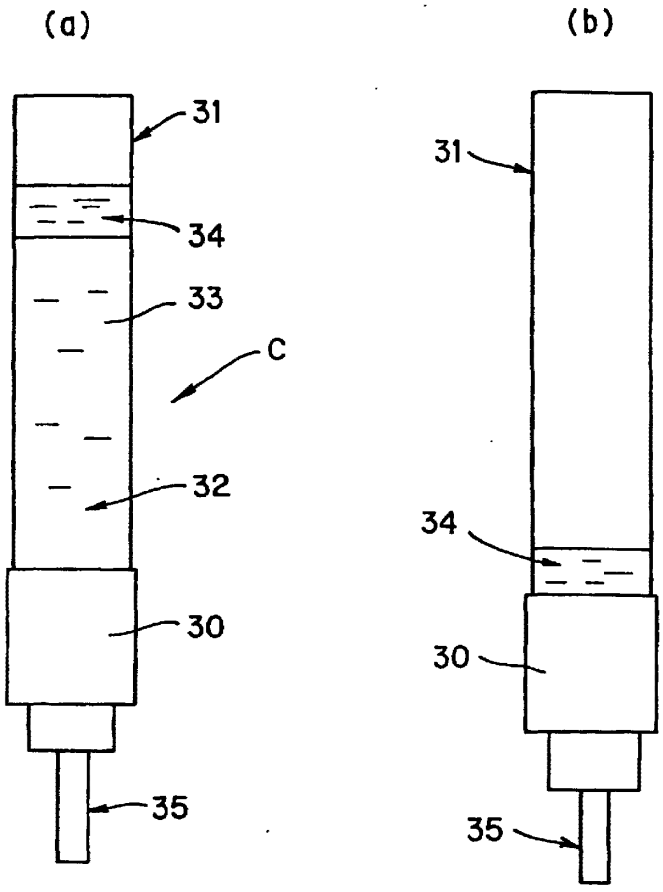
NJOY Exhibit 1002.1546

FIG. 2



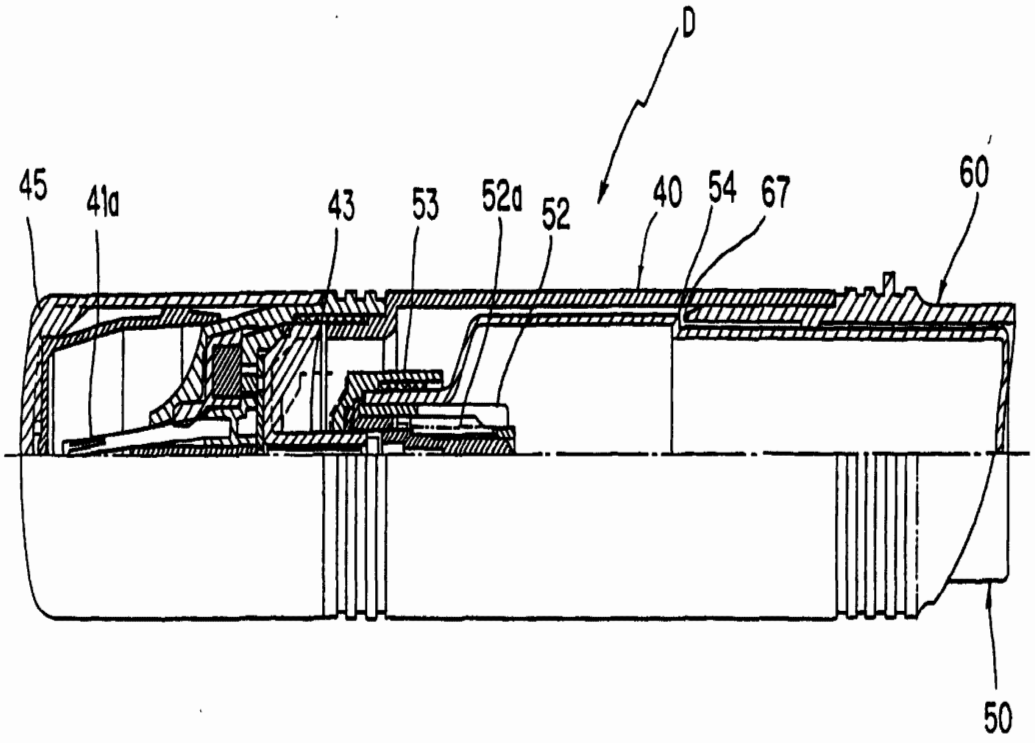
NJOY Exhibit 1002.1547

FIG. 3



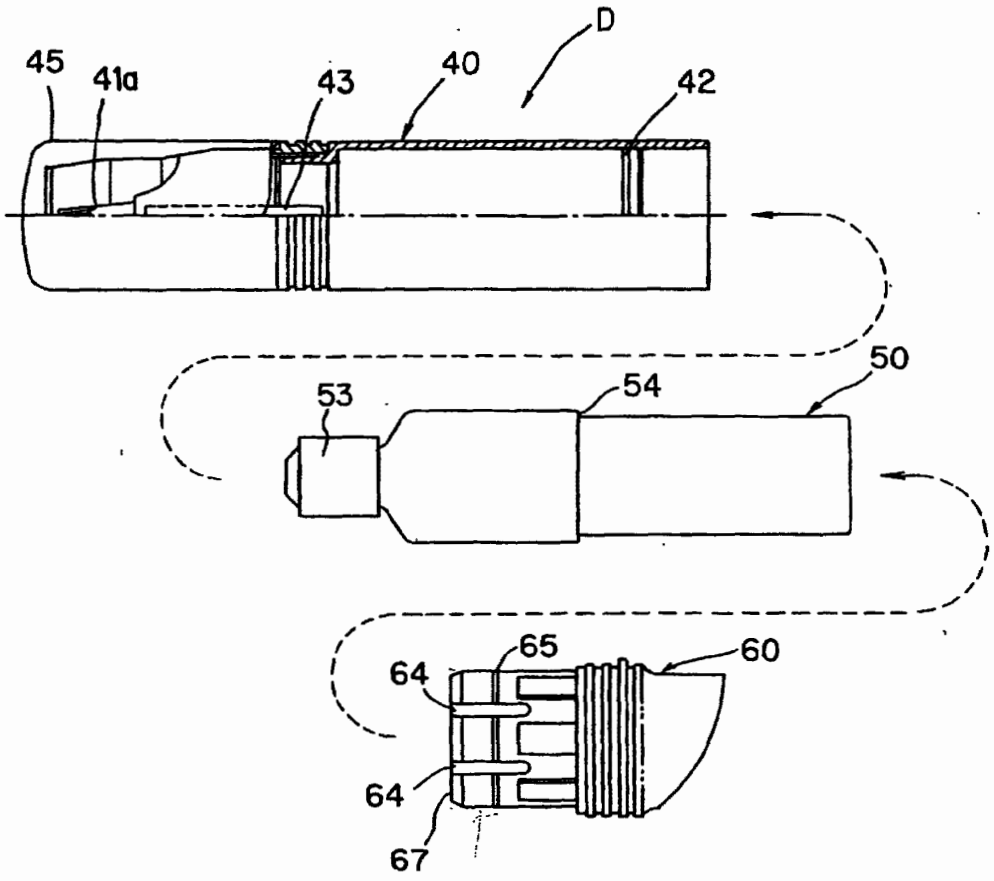
NJOY Exhibit 1002.1548

FIG. 4



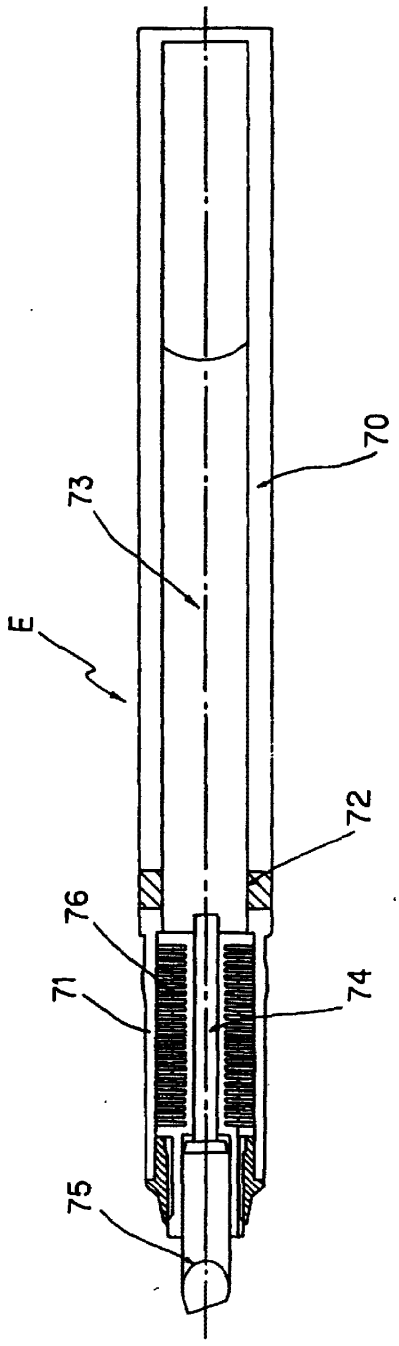
NJOY Exhibit 1002.1549

FIG. 5



NJOY Exhibit 1002.1550

FIG. 6



NJOY Exhibit 1002.1551

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP99/02804

A. CLASSIFICATION OF SUBJECT MATTER
Int.Cl[6] B43K8/03, 7/02, 5/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
Int.Cl[6] B43K5/00-8/18

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Jitsuyo Shinan Koho 1922-1996 Toroku Jitsuyo Shinan Koho 1994-1999
Kokai Jitsuyo Shinan Koho 1971-1999 Jitsuyo Shinan Toroku Koho 1996-1999

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 57-16119 (Laid-open No. 58-120085) (Mitsubishi Pencil Co., Ltd.), 16 August, 1983 (16. 08. 83), Full text ; Figs. 1, 2	1, 5
A	Full text ; Figs. 1, 2 (Family: none)	2-4, 6, 7
A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 59-55665 (Laid-open No. 60-166585) (Maruzen Co., Ltd.), 5 November, 1985 (05. 11. 85), Full text ; Figs. 1, 3 (Family: none)	1-7

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
23 August, 1999 (23. 08. 99)	31 August, 1999 (31. 08. 99)
Name and mailing address of the ISA/ Japanese Patent Office	Authorized officer
Facsimile No.	Telephone No.

Form PCT/ISA/210 (second sheet) (July 1992)

NJOY Exhibit 1002.1552

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 736 177 A1

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 158(3) EPC

(43) Date of publication:
27.12.2006 Bulletin 2006/52

(21) Application number: **04724027.0**

(22) Date of filing: **29.03.2004**

(51) Int Cl.:
A61L 9/02 *(2006.01)* ***A61L 9/12*** *(2006.01)*

(86) International application number:
PCT/ES2004/000139

(87) International publication number:
WO 2005/092399 (06.10.2005 Gazette 2005/40)

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LU MC NL PL PT RO SE SI SK TR

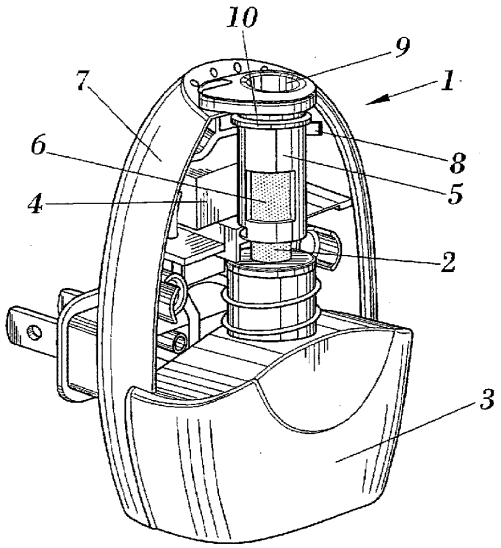
(71) Applicant: **Zobele Espana, S.A.**
08290 Cerdanyola del Vallés (ES)

(72) Inventors:
- **Caserta, Andrea,**
  c/o Parc Tecnologic del Valles
  08290 Cerdanyola del Valles (ES)
- **Garcia Fabrega, R.,**
  c/o Parc Tecnologic del Valles
  08290 Cerdanyola del Valles (ES)

(74) Representative: **Carpintero Lopez, Francisco et al**
Herrero & Asociados, S.L.,
Alcalá, 35
28014 Madrid (ES)

(54) METHOD AND DEVICE FOR THE EVAPORATION OF VOLATILE SUBSTANCES

(57) The present invention refers to a method and a device to evaporate volatile substances such as aromatic substances and/or insecticides, in which these are evaporated using electrical heating means that heat a wick impregnated with the substance to be evaporated. The invention permits the evaporation of the substance efficiently by optimizing the use of heat energy generated by electrical heating devices. The invention comprises a rotating pipe with at least one opening with a portion of wick inserted in the said pipe and depending on the position of the said pipe relative to the heating means the amount of heat flow transmitted to the wick is regulated and, consequently, the degree of evaporation of the substance.



(a)

EP 1 736 177 A1

Printed by Jouve, 75001 PARIS (FR)

NJOY Exhibit 1002.1553

Description

OBJECT OF THE INVENTION

[0001] The present invention is related with a method and a device for the evaporation of volatile substances such as aromatic substances and/or insecticides, in which the evaporation is done by electrical heating means that raise the temperature of a wick impregnated with the substance to be evaporated.

[0002] In the present invention the degree of evaporation of the volatile substance can also be controlled.

BACKGROUND OF THE INVENTION

[0003] Devices to evaporate volatile substances in a liquid state are well known that consist of a wick of which one end is in contact with a volatile substance in a bottle, such that the substance rises by capillarity through the wick, which is made of a porous material, until this becomes totally impregnated.

[0004] Conventionally, these devices include heating means, such as PTC electrical resistances, aimed at heating the upper portion of the wick that facilitates evaporation of the substance that dissipates to the exterior of the device in the form of vapor.

[0005] Some of these pieces of equipment are fitted with devices that permit the degree of evaporation of the product to be controlled, which are generally based on modifying the intensity at which the wick is heated. The need to control the degree of evaporation tends to complicate the design and manufacture of the device since several interconnecting parts are required, making the manufacturing process more expensive, which is a key factor in these products since the low production costs are the key to their profitability.

[0006] Some known devices of this kind use heating means with a toroidal configuration such that one end of the wick is lodged in the central orifice, permitting uniform heating of the whole perimeter of the wick in the area of influence of the heating element. Although this toroidal shape of the heating element is effective from an operative perspective, the device as a whole increases in width and, therefore, size and this is undesirable from manufacturing and sales' perspectives.

[0007] Some examples of this type of device can be found in the patents US-4.739.928, EP-1.270.022, US-6.659.301.

DESCRIPTION OF THE INVENTION

[0008] The present invention refers to a method and a device for the evaporation of volatile substances that optimally exploits the heat energy generated.

[0009] In addition to the afore-mentioned advantages, with the said invention the user can control at will the degree of evaporation of the substance and achieves this using a single element that maximally simplifies the manufacturing process and the cost of the product.

[0010] Therefore, one of the aspects of the invention refers to a device for the evaporation of volatile substances that includes a wick through which the said substance travels upwards by capillarity, which is influenced by heating means that facilitate this evaporation. The device has a pipe with open ends that contains part of the wick, with a space around the wick between this and the sides of the tube. The pipe has at least one opening in the side that controls the degree of exposure of the wick to the focus of heat produced by the heating means.

[0011] In this way, part of the heat generated by the heating means passes to the chamber inside the pipe that contains part of the wick. The pipe reduces the volume of space surrounding the wick, thus less heat energy is required to obtain the degree of evaporation desired. This reduced volume facilitates a "chimney effect", i.e. an increased rate of release of the evaporated fragrance, which causes increased diffusion of the product.

[0012] The invention incorporates means that enable the user to control the degree of evaporation of the substance by controlling the degree of influence of heat on the wick.

[0013] Another aspect of the invention refers to a method to evaporate volatile substances that includes putting a wick impregnated with the volatile substance to be evaporated, under the influence of a heat source that consists in inserting part of the wick into a small-volumed chamber and introducing hot air into the chamber. Reduced volume refers to a chamber with a volume slightly larger than that of the portion of wick inside it, such that there is a narrow space around the wick between this and the sides of the pipe through which the hot air can rise.

[0014] This chamber is defined by tubular pipe, open at both ends, which has at least one lateral opening such that in the method of the invention hot air produced by the heating source is introduced through this lateral opening of the pipe and spreads throughout the interior of the chamber remaining in close proximity to the wick while it rises up through the pipe.

[0015] In the method, the amount of hot air introduced in the chamber can be controlled in order to modify the degree of evaporation.

[0016] In a preferred option of the method, the amount of air is controlled by moving the position of the pipe relative to the heat source so that the opening faces the heat source to a greater or lesser degree thus resulting in a greater or lesser transfer of radiation and convection to the inside of the pipe and to the surface of the wick exposed to the heat.

DESCRIPTION OF THE DRAWINGS

[0017] Complementary to the description given here this is accompanied, as an integral part of this description, by a set of diagrams, of an illustrative and not restrictive nature, aimed at helping to clarify the characteristics of

NJOY Exhibit 1002.1554

the invention in accordance with an example of a practical application of the said invention. The said diagrams represent the following:

Figure 1.- Figure 1a shows a view, in perspective, of the evaporation device without the front part of its casing, in which the pipe is in the position corresponding to minimum evaporation, while figure 1 b shows a similar representation of the previous figure but in which the pipe is in the position corresponding to maximum evaporation.

Figure 2.- Figure 2a shows a side view of the evaporation device without the front part of its casing, in which the pipe is in the maximum evaporation position while figure 2 b shows a similar representation to that of the previous figure but in which the pipe is in the minimum evaporation position. In both figures, the heat generated by the heating means is represented by three black arrows.

Figure 3- shows a figure, in perspective, of the wick, the pipe in which it is inserted and the heating means, where the direction of heat radiated is represented by arrows.

Figure 4.- shows a similar figure to the previous one showing a frontal view of the same parts. The figure reveals an improved exit of the convective flow (a smaller cross-sectional area results in increased exit speed and, therefore, greater range).

Figure 5 .- shows both views of the evaporation device, in perspective, with its graduated evaporation scale of which Figure 5 a shows the device in the maximum evaporation position and figure 5b the device in the minimum evaporation position.

PREFERABLE EMBODIMENT OF THE INVENTION

[0018] In the light of the figures described it can be observed how in one of the possible embodiments of the invention, device (1) includes a wick (2) the lower end of which is submerged inside a bottle (3) that contains the substance to be evaporated in a liquid state, which impregnates the whole wick (2). The heating means (4) comprised for example of a cemented resistance are located near the upper part of the wick (2) heating the said region.

[0019] The device (1) of the invention comprises a cylindrical pipe (5) which contains a portion of the wick (2).

[0020] The pipe (5) has an opening (6) in the side, and is fitted into a casing (7) that forms part of the device (1), on which it can rotate in one plane, i.e. it is free to rotate on its axis but cannot be displaced vertically. The resistor (4) is firmly attached to the casing (7), thus rotation of the pipe (5) changes the position of the opening (6) relative to the resistance (4) and, therefore, changes the heat flow transmitted to the wick in the pipe (5).

[0021] In another preferable embodiment (not represented here), the device can have two small resistanceresistors (4) situated at each side of the pipe (5) which, in turn, would have two openings, which could reduce even further the dimensions of the device and produce a more uniform heating of the wick since the hot air would affect opposite sides of the device.

[0022] The resistors used are flat in order to occupy the smallest possible space inside the casing (7), as can be seen in Figure 2. This same Figure 2 shows how the resistanceresistor (4) is located in the same plane, i.e. at the same height as the opening (6), so that the heat generated by it reaches the wick (2) more directly and more heat enters the pipe (5). In the different positions of the pipe (5), the position and distance of the opening (6) are modified (6) relative to the resistor (4), which, in turn, alters the surface of the wick that directly receives the heat from the resistor (4).

[0023] In this way, two extreme positions are established in the pipe position (5), these are limited by the contact of a flange (8) attached to the pipe (5), with catches to limit rotation of the pipe on the inside of the casing (7). Therefore, a first minimum evaporation end position is defined, as can be observed in figures 1 a and figure 2 b, in which the opening (6) is not facing the resistor (4) and, therefore, the entrance of hot air through the opening (6) is minimal or practically nil.

[0024] In a second extreme position of maximum evaporation, represented in figures 1 b and 2 a, the entire length of the opening (6) is opposite the resistor (4), thus the intake of hot air into the pipe (5) through the opening (6) is maximum.

[0025] Figure 3 shows how the hot air that enters the pipe (5), is distributed radially around the length of the wick (2) as it rises through the perimetric space (11), until it leaves the pipe as shown in Figure 4.

[0026] The upper end of the pipe (5) emerges from the upper end of the casing (1) forming an annular protuberance (9) facilitating manual handling by the user. For this purpose, the pipe (5) has a lip on its perimeter (10) that overlaps an internal part of the casing (1), which can be found between this lip (10) and the annular protuberance (9), preventing displacement of the pipe (5) vertically but permitting it to rotate.

[0027] In the light of this description and set of figures, an expert in the art can understand that the description of the invention corresponds to preferential embodiments but that multiple variations can be introduced that would not be outside the scope of the invention as this appears in the claims.

Claims

1. Device for the evaporation of volatile substances that includes a wick through which said substance travels upwards by capillarity, which is influenced by heating

NJOY Exhibit 1002.1555

means that facilitate evaporation of the said substance, **characterized in that** it comprises a pipe with open ends which contains part of the wick wherein a space is defined between the wick and the pipe, and **in that** the said pipe has at least one lateral opening that permits the flow of heat from said heating means to influence the wick.

2. Device according to claim 1 **characterized in that** the heating means and the pipe can move relative to each other so that the degree of interposition between the wick and the heating means can be modified and, consequently, the amount of heat that influences the wick is varied.

3. Device according to claims 1 or 2 **characterized in that** the heating means are fixed and the pipe can rotate in one plane.

4. Device according to any of the previous claims **characterized in that** the heating means comprise, at least, in an electrical resistor located close to the wick.

5. Device according to any of the previous claims **characterized in that** the heating means comprise two resistances positioned diametrically to the pipe and **in that** the said pipe has two lateral openings.

6. Device according to claim 4 or 5 **characterized in that** the resistor or resistors form at least one flat surface.

7. Device according to any of claims 4 to 6 **characterized in that** the resistance or resistances are of prismatic rectangular shape.

8. Device according to any of the previous claims **characterized in that** the heating means and the opening or openings of the pipe are in the same plane, such that part of the wick can face the heating means through these openings.

9. Device according to any of claims 2 to 8 **characterized in that** in the rotational displacement of the pipe, a first extreme minimum evaporation position is defined in which the opening is not facing the heating means and a second extreme maximum evaporation position in which the opening faces these heating means.

10. Device according to any of the previous claims **characterized in that** it comprises a casing and **in that** the heating means and the pipe are supported by the said casing.

11. Device according to claim 10 **characterized in that** the upper end of the pipe juts out of the top of the casing forming an annular protuberance that facilitates its manual movement relative to the casing.

12. Device according to either of claims 10 or 11 **characterized in that** the pipe has a perimetric lip and **in that** part of the casing is located between the said perimetric lip and the annular protuberance, preventing vertical displacement of the pipe but permitting this to rotate.

13. Device according to any of the previous claims **characterized in that** the pipe is cylindrical.

14. Device according to any of the previous claims **characterized in that** the volatile substance is an aromatic substance and/or an insecticide.

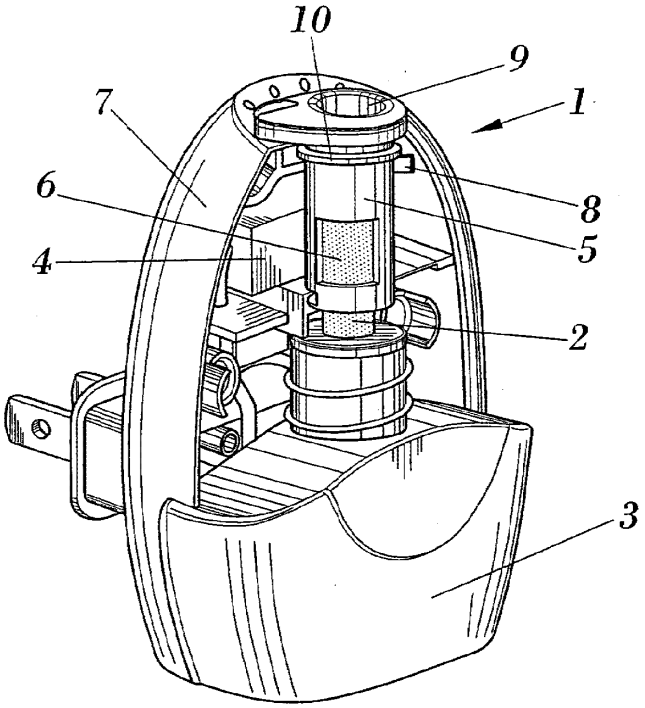
15. Method of evaporation of volatile substances that includes applying a heat source to a volatile substance to be evaporated **characterized in that** it comprises enclosing a portion of the wick in a small volumed chamber and introducing hot air into the said chamber.

16. Method according to claim 15 **characterized in that** the chamber is formed of a tubular pipe with open ends and **in that** the air is introduced through a side opening in the said pipe.

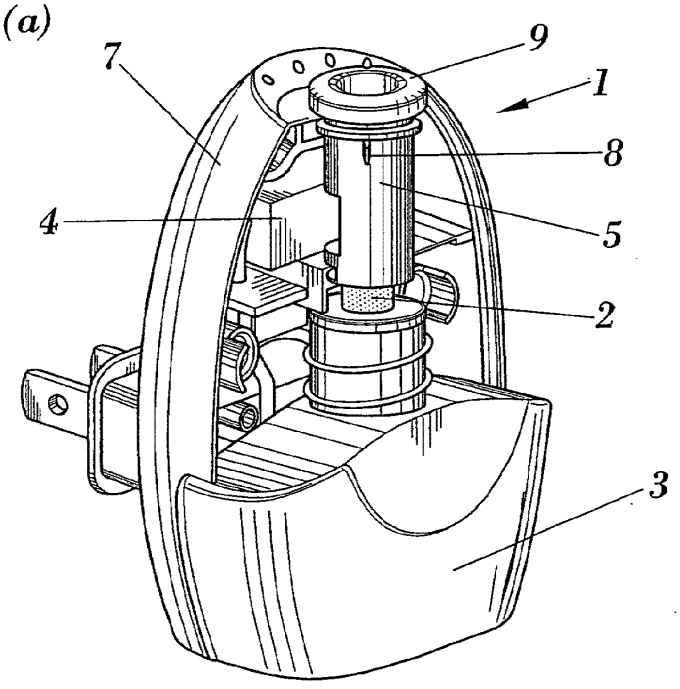
17. Method according to claims 15 or 16 **characterized in that** the amount of hot air introduced into the said chamber is regulated.

18. Method according to claim 17 **characterized in that** the amount of air entering is controlled by displacement of the pipe relative to the heat source by modifying the distance between them.

NJOY Exhibit 1002.1556



(a)



(b)

FIG. 1

NJOY Exhibit 1002.1557

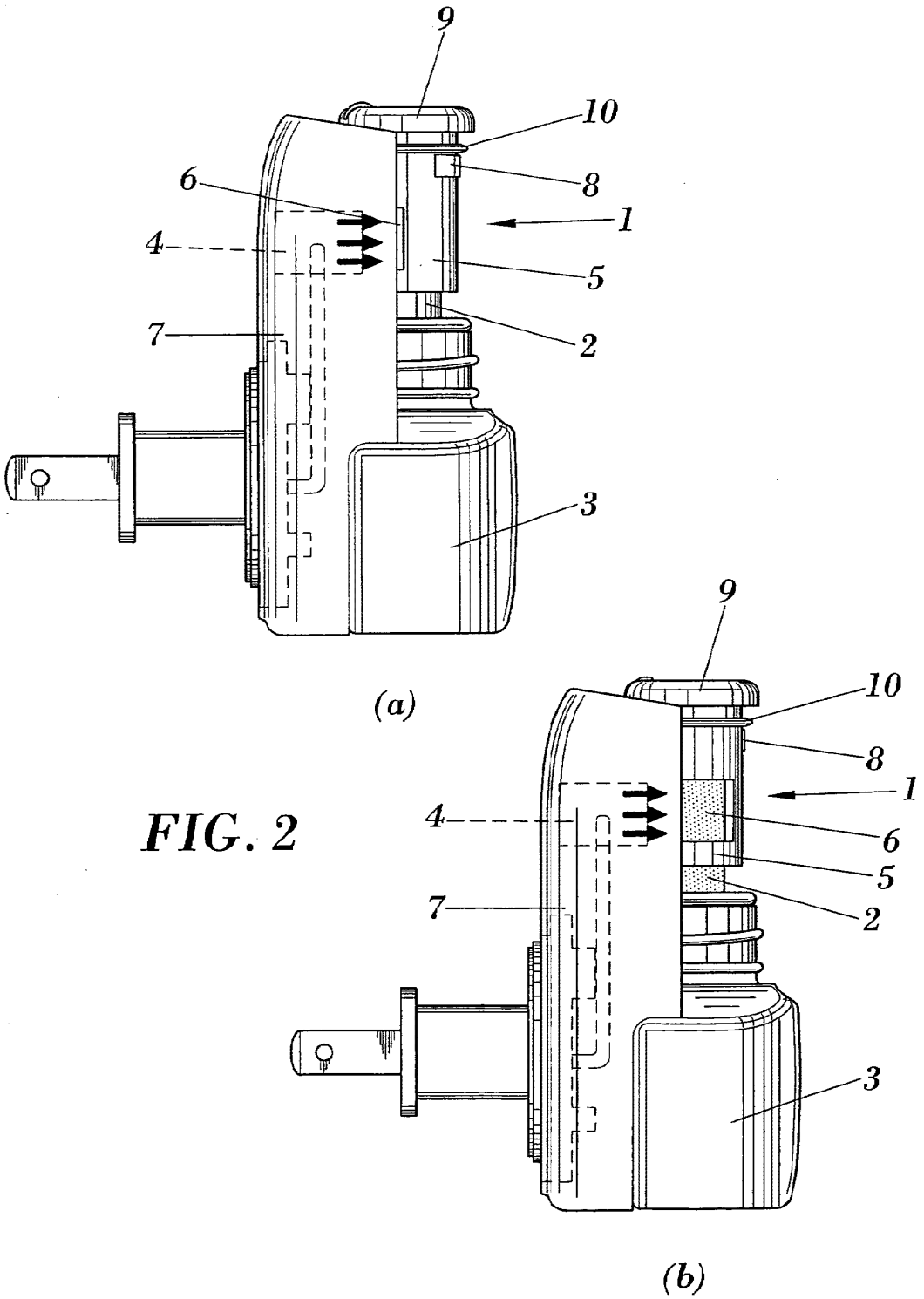


FIG. 2

NJOY Exhibit 1002.1558

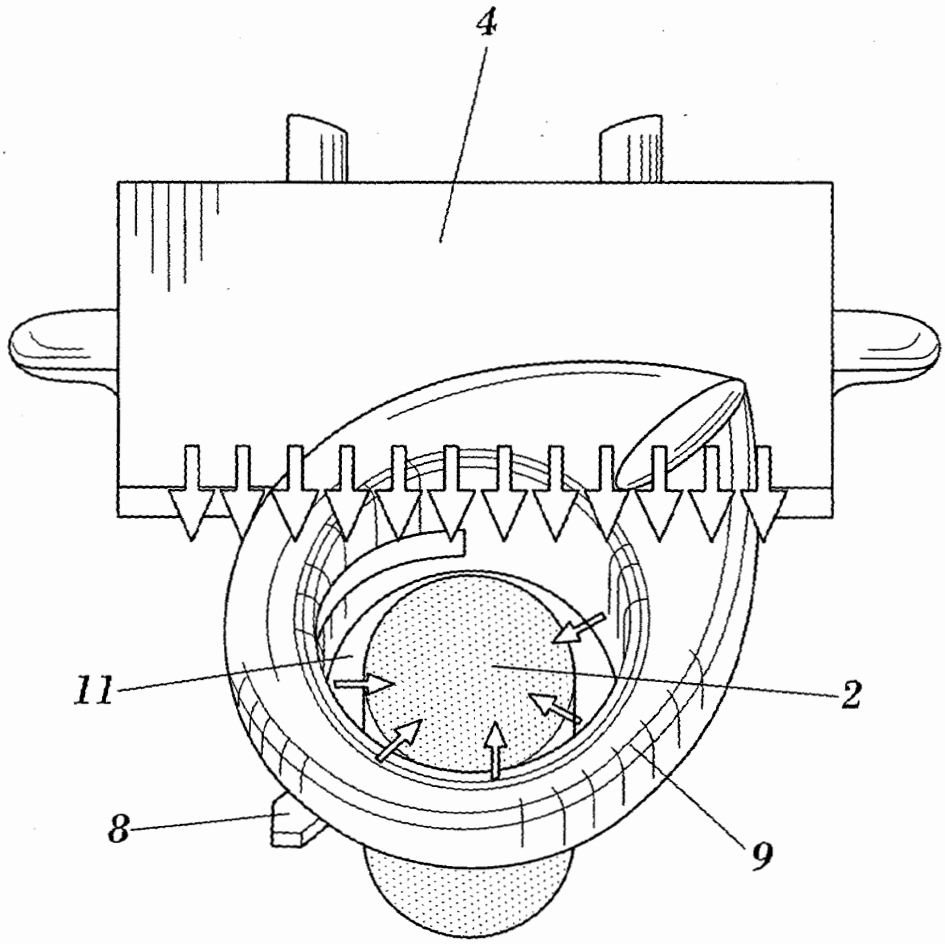


FIG. 3

NJOY Exhibit 1002.1559

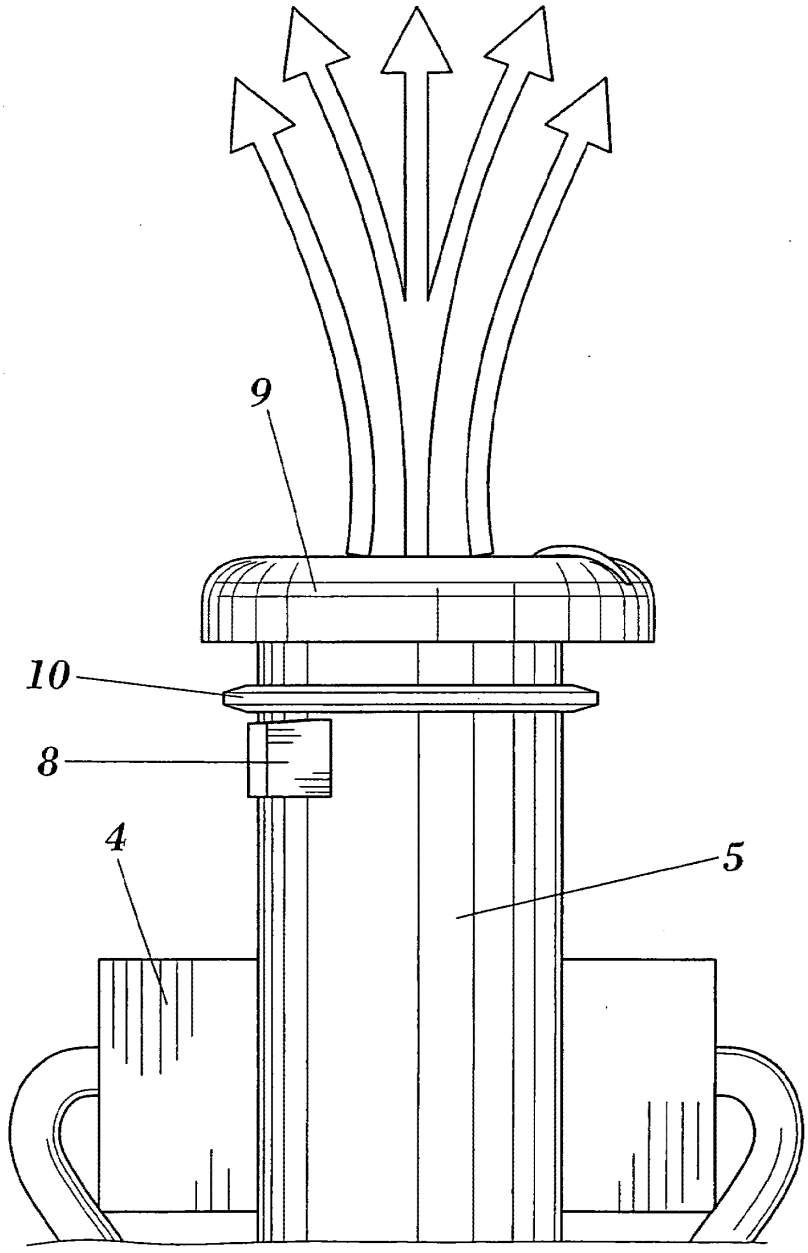


FIG. 4

NJOY Exhibit 1002.1560

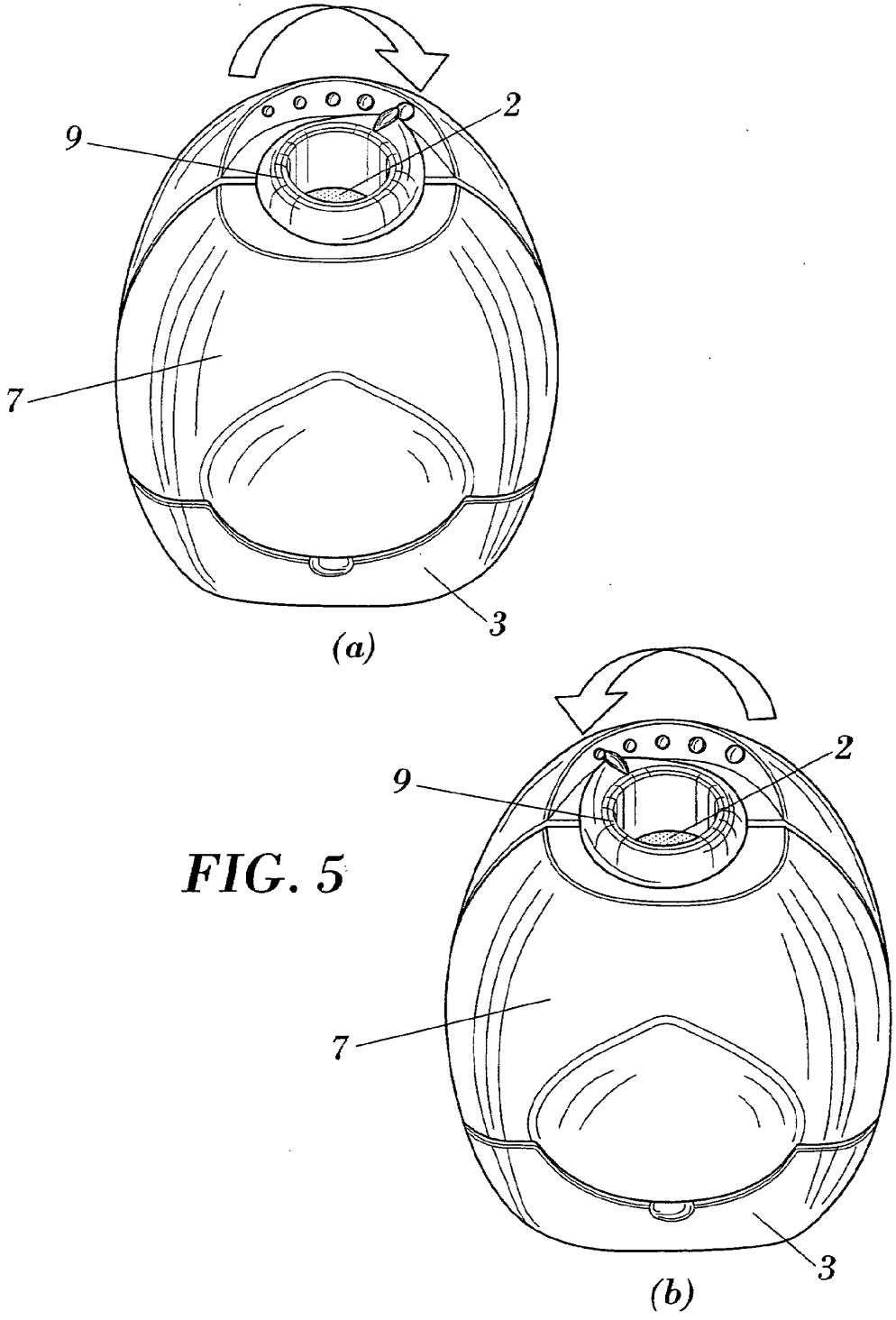


FIG. 5

NJOY Exhibit 1002.1561

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ ES 2004/000139

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 A61L9/02; 9/12

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7 A61L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CIBEPAT, EPODOC, ESP@CENET

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	ES2185490 (Ureig Technologies, S.A.); 16.04.2003; col. 2, lín. 1-10; col. 3, lín. 14-23; col. 4, lín. 50-59; col. 5, lín. 10-39; col. 6, lín. 42-47.	1-13; 15-18
X	ES2137111 (DBK España, S.A.); 01.12.1999; col. 1, lín. 60-69; col. 2, lín. 4-45; col. 4; fig. 1 y 2.	1-13; 15-18
X	US4968487 (Yamamoto et al.); 06.11.1990; col. 11, lín. 23-69; col. 12 y col. 13, lín. 1-33.	1-13; 15-18
X	EP0942648 (ZOBELE HOLDING S.p.A.); 22.09.1999; **The whole document**	1-13; 15-18

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
24 May 2004 (24.05.2004)	11 JUN 2004 11.06.2004
Name and mailing address of the ISA/ S.P.T.O.	Authorized officer
Facsimile No.	Telephone No.

Form PCT/ISA/210 (second sheet) (July 1992)

NJOY Exhibit 1002.1562

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ ES 2004/000139

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☒ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
La reivindicación nº 14 no satisface el requisito de unidad de invención con el resto de reivindicaciones. Caracteriza un dispositivo por las características técnicas de un producto que no forma parte de aquél.

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

Form PCT/ISA/210 (continuation of first sheet (1)) (July 1992)

NJOY Exhibit 1002.1563

INTERNATIONAL SEARCH REPORT
Information on patent family members

International Application No
PCT/ ES 2004/000139

Patent document cited in search report	Publication date	Patent familiy member(s)	Publication date
ES 2185490 A	16.04.2003	EP 1270022 A	02.01.2003
		EP 20020013690	20.06.2002
ES 2137111 AB	01.12.1999	WO 9858692 A	30.12.1998
		EP 0991438 A	12.04.2000
		EP 19980939572	23.06.1998
		CN 1261289 T	26.07.2000
		BR 9810330 A	05.09.2000
		US 6278840 B	21.08.2001
		JP 2002501391 T	15.01.2002
		JP 3481636 B	22.12.2003
		CN 1140298 C	03.03.2004
US 4968487 A	06.11.1990	GB 2194442 AB	09.03.1988
		AU 7743787 A	17.03.1988
		JP 63063330 A	19.03.1988
		JP 6036704 B	18.05.1994
		JP 1913102 C	09.03.1995
		JP 63048475 U	01.04.1988
		JP 63074440 A	04.04.1988
		BR 8704524 A	26.04.1988
		FR 2606595 AB	20.05.1988
		DE 3737272 AC	01.06.1988
		JP 63085084 U	03.06.1988
		CN 87107947 A	31.08.1988
		CN 1024739 B	01.06.1994
		JP 63165182 U	27.10.1988
		ES 2005930 A	01.04.1989
		AU 594495 B	08.03.1990
		IT 1228951 B	10.07.1991
		HK 74691 A	27.09.1991
		KR 9506287 B	13.06.1995
EP 0942648 AB	22.09.1999	WO 9819526 A	14.05.1998
		AU 6999898 A	29.05.1998
		EP 19970948897	06.11.1997
		BR 9712746 A	19.10.1999
		KR 2000053103 A	25.08.2000
		AU 730517 B	08.03.2001
		IT 240993 Y	20.04.2001
		AT 211883 T	15.02.2002
		DE 69709676 D	21.02.2002
		PT 942648 T	31.07.2002
		ES 2172021 T	16.09.2002
		DE 69709676 T	02.10.2002

Form PCT/ISA/210 (patent family annex) (July 1992)

NJOY Exhibit 1002.1564

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 4739928 A **[0007]**
- EP 1270022 A **[0007]**
- US 6659301 B **[0007]**

NJOY Exhibit 1002.1565

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 113 178 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
04.11.2009 Bulletin 2009/45

(51) Int Cl.:
A24F 47/00 *(2006.01)*

(21) Application number: **08251579.2**

(22) Date of filing: **30.04.2008**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT RO SE SI SK TR
Designated Extension States:
AL BA MK RS

(71) Applicant: **Philip Morris Products S.A.**
2000 Neuchâtel (CH)

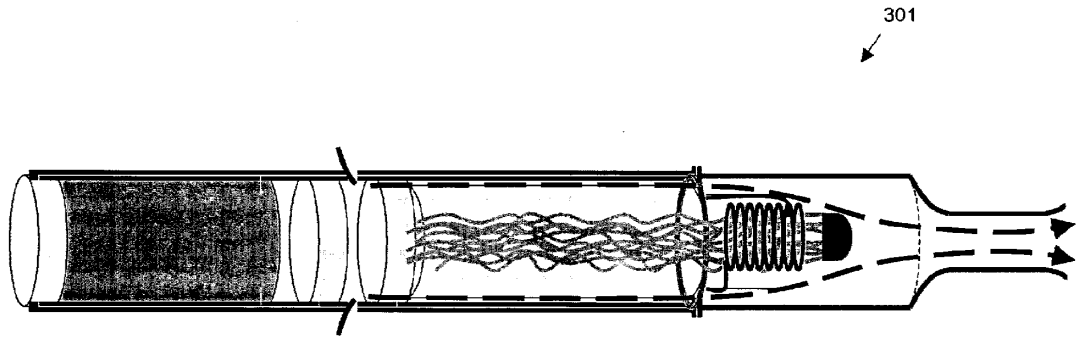
(72) Inventor: **The designation of the inventor has not yet been filed**

(74) Representative: **Bradford, Victoria Sophie**
Reddie & Grose
16 Theobalds Road
London
WC1X 8PL (GB)

(54) An electrically heated smoking system having a liquid storage portion

(57) There is provided an electrically heated smoking system comprising a shell (101) and a replaceable mouthpiece (201). The shell (101) comprises an electric power supply (103) and electric circuitry (105). The mouthpiece (201) comprises a liquid storage portion (203) and a capillary wick (207) having a first end (207a) and a second end (207b). The first end (207a) of the wick extends into the liquid storage portion for contact with liquid (205) therein. The mouthpiece also comprises a heating element (209) for heating the second end (207b) of the capillary wick, an air outlet (211), and an aerosol forming chamber (213) between the second end (207b) of the capillary wick and the air outlet (211). When the shell (101) and mouthpiece (201) are engaged, the heating element (209) is in electrical connection with the power supply (103) via the circuitry (105), and a flow route for air is defined from at least one air inlet (115) to the air outlet (211) via the aerosol forming chamber (213). In use, liquid (205) is transferred from the liquid storage portion (203) towards the heating element (209) by capillary action in the wick (207). Liquid at the second end of the capillary wick is vaporised by the heating element (209). The supersaturated vapour created, is mixed and carried in the air flow from the at least one air inlet (115) to the aerosol forming chamber (213). In the aerosol forming chamber (213), the vapour condenses to form an aerosol, which is carried towards the air outlet (211) into the mouth of a user.

Fig. 3



EP 2 113 178 A1

Printed by Jouve, 75001 PARIS (FR)

NJOY Exhibit 1002.1566

Description

[0001] The present invention relates to an electrically heated smoking system for receiving an aerosol-forming substrate. In particular, the present invention relates to an electrically heated smoking system for receiving an aerosol-forming substrate, in which the aerosol-forming substrate is a liquid.

[0002] A number of prior art documents, for example US-A-5 060 671, US-A-5 388 594, US-A-5 505 214, US-A-5 591 368, WO-A-2004/043175, EP-A-0 358 002 and WO-A-2007/131449, disclose electrically operated smoking systems, having a number of advantages. One advantage is that they significantly reduce sidestream smoke, while permitting the smoker to selectively suspend and reinitiate smoking.

[0003] Other prior art documents, such as EP-A-0 295 122, EP-A-1 618 803 and EP-A-1 736 065, disclose electrical smoking systems which use a liquid as the aerosol-forming substrate. The liquid may be contained in a cartridge which is receivable in a housing. A power supply, such as a battery, is provided, connected to a heater to heat the liquid substrate during a puff, to form the aerosol which is provided to the smoker.

[0004] The electrically heated smoking systems of the prior art, including those described above, do have a number of advantages, but there is still room for improvement. It is therefore an object of the invention to provide an improved electrically heated smoking system.

[0005] According to a first aspect of the invention, there is provided an electrically heated smoking system comprising a shell and a replaceable mouthpiece, the shell comprising an electric power supply and electric circuitry; the mouthpiece comprising a liquid storage portion, a capillary wick having a first end and a second end, the first end extending into the liquid storage portion for contact with liquid therein, at least one heating element for heating the second end of the capillary wick, an air outlet, and an aerosol forming chamber between the second end of the capillary wick and the air outlet; wherein, when the shell and mouthpiece are engaged, the at least one heating element is in electrical connection with the power supply via the circuitry, and a flow route for air is defined from at least one air inlet to the air outlet via the aerosol forming chamber.

[0006] The at least one air inlet may be provided in the shell or in the mouthpiece. In use, liquid is transferred from the liquid storage portion towards the heating element by capillary action in the capillary wick. When the heating element is activated, the liquid at the second end of the capillary wick is vaporised by the heating element to form a supersaturated vapour. The supersaturated vapour is mixed and carried in the air flow from the at least one air inlet to the aerosol forming chamber. In the aerosol forming chamber, the vapour condenses to form an aerosol, which is carried towards the air outlet into the mouth of a user.

[0007] The electrically heated smoking system according to the invention provides a number of advantages. Firstly, because the replaceable mouthpiece contains the at least one heating element, the liquid storage portion and the wick, all elements which are potentially in contact with the liquid are changed when the mouthpiece is replaced. There will be no cross-contamination in the shell between different mouthpieces, for example ones using different liquids. In addition, the liquid in the liquid storage portion is protected from oxygen (because oxygen cannot generally enter the liquid storage portion via the capillary wick) and, in some embodiments light, so that the risk of degradation of the liquid is significantly reduced. Therefore, a high level of hygiene can be maintained. Secondly, the mouthpiece structure means that there is a low risk of leakage from the liquid storage portion, which is not the case for many of the electrically heated smoking systems of the prior art. This prevents wastage of the liquid, but also makes it difficult for an unauthorised user to access the liquid by dismantling the mouthpiece. Also, if the mouthpiece is replaced at suitable intervals, there is little chance of the heating element becoming clogged with liquid. Finally, using a capillary wick extending between the liquid and the heating element, allows the structure of the mouthpiece to be relatively simple. There is preferably only one capillary mechanism in the system.

[0008] The at least one heating element may comprise a single heating element. Alternatively, the at least one heating element may comprise more than one heating element, for example two, three, four, five, six or more heating elements. The heating element or heating elements may be arranged appropriately so as to most effectively vaporise liquid at the second end of the capillary wick.

[0009] The at least one heating element preferably comprises an electrically resistive material. Suitable electrically resistive materials include but are not limited to: semiconductors such as doped ceramics, electrically "conductive" ceramics (such as, for example, molybdenum disilicide), carbon, graphite, metals, metal alloys and composite materials made of a ceramic material and a metallic material. Such composite materials may comprise doped or undoped ceramics. Examples of suitable doped ceramics include doped silicon carbides. Examples of suitable metals include titanium, zirconium, tantalum and metals from the platinum group. Examples of suitable metal alloys include stainless steel, nickel-, cobalt-, chromium-, aluminium-titanium- zirconium-, hafnium-, niobium-, molybdenum-, tantalum-, tungsten-, tin-, gallium-, manganese- and iron-containing alloys, and super-alloys based on nickel, iron, cobalt, stainless steel, Timetal and iron-manganese-aluminium based alloys. In composite materials, the electrically resistive material may optionally be embedded in, encapsulated or coated with an insulating material or vice-versa, depending on the kinetics of energy transfer and the external physicochemical properties required. Examples of suitable composite heating elements are disclosed in US-A-5 498 855, WO-A-03/095688 and US-A-5 514 630.

NJOY Exhibit 1002.1567

[0010] The at least one heating element may take any suitable form. For example, the at least one heating element may take the form of a heating blade, such as those described in US-A-5 388 594, US-A-5 591 368 and US-A-5 505 214. Alternatively, the at least one heating element may take the form of a casing or substrate having different electro-conductive portions, as described in EP-A-1 128 741, or an electrically resistive metallic tube, as described in WO-A-2007/066374. Alternatively, the at least one heating element may be a disk (end) heater or a combination of a disk heater with heating needles or rods. Alternatively, the at least one heating element may take the form of a metallic etched foil insulated between two layers of an inert material. In that case, the inert material may comprise Kapton, all-polyimide or mica foil. Alternatively, the at least one heating element may take the form of a sheet of material, which may be rolled around the second end of the capillary wick. The sheet may be made from any suitable material, for example an iron-aluminium based alloy, an iron-manganese-aluminium base alloy or Timetal. The sheet may be rectangular in shape, or may have a patterned shape which may form a coil-like structure when rolled around the second end of the capillary wick. Other alternatives include a heating wire or filament, for example a Ni-Cr, platinum, tungsten or alloy wire, such as those described in EP-A-1 736 065, or a heating plate.

[0011] In a preferred embodiment, the at least one heating element comprises a coil of wire surrounding the second end of the capillary wick. In that embodiment, preferably the wire is a metal wire. Even more preferably, the wire is a metal alloy wire. The heating element may completely or partially encircle the second end of the capillary wick.

[0012] The at least one heating element may heat the liquid at the second end of the capillary wick by means of conduction. The heating element may be at least partially in contact with the second end of the wick. Alternatively, heat from the heating element may be conducted to the liquid by means of a heat conductive element. Alternatively, the at least one heating element may transfer heat to the incoming ambient air that is drawn through the electrically heated smoking system during use, which in turn heats the liquid by convection. The ambient air may be heated before passing through the system. Alternatively, the ambient air may be first drawn through the second end of the wick and then heated, as described in WO-A-2007/078273.

[0013] Preferably, the electric circuitry comprises a sensor to detect air flow indicative of a user taking a puff. The sensor may be an electro-mechanical device. Alternatively, the sensor may be any of: a mechanical device, an optical device, an opto-mechanical device and a micro electro mechanical systems (MEMS) based sensor. In that case, preferably, the electric circuitry is arranged to provide an electric current pulse to the at least one heating element when the sensor senses a user taking a puff. Preferably, the time-period of the electric current pulse is pre-set, depending on the amount of liquid desired to be vaporised. The electric circuitry is preferably programmable for this purpose.

[0014] Alternatively, the electric circuitry may comprise a manually operable switch for a user to initiate a puff. In that case, preferably, the electric circuitry is arranged to provide an electric current pulse to the at least one heating element when the user initiates a puff. The time-period of the electric current pulse is preferably pre-set depending on the amount of liquid desired to be vaporised. The electric circuitry is preferably programmable for this purpose.

[0015] Preferably, the at least one air inlet is in the shell. Alternatively, the at least one air inlet may be in the mouthpiece. In one embodiment, the at least one air inlet comprises two air inlets. Alternatively, there may be three, four, five or more air inlets. Preferably, if there is more than one air inlet, the air inlets are spaced around the shell or around the mouthpiece. In a preferred embodiment, the electric circuitry comprises a sensor to detect air flow indicative of a user taking a puff, and the at least one inlet is in the shell, upstream of the sensor.

[0016] Preferably, the electric power supply comprises a cell contained in the shell. The electric power supply may be a Lithium-ion battery or one of its variants, for example a Lithium-ion polymer battery. Alternatively, the power supply may be a Nickel-metal hydride battery or a Nickel cadmium battery or a fuel cell. In that case, preferably, the electrically heated smoking system is usable by a smoker until the energy in the power cell is used up.

[0017] Alternatively, the electric power supply may comprise circuitry chargeable by an external charging portion. In that case, preferably the circuitry, when charged, provides power for a pre-determined number of puffs, after which the circuitry must be re-connected to the external charging portion. An example of suitable circuitry is one or more capacitors or rechargeable batteries.

[0018] Preferably, the shell further comprises a puff indicator for indicating when the heating element is activated. In the embodiment in which the electric circuitry comprises a sensor to detect air flow indicative of a user taking a puff, the indicator may be activated when the sensor senses air flow indicative of the user taking a puff. In the embodiment in which the electric circuitry comprises a manually operable switch, the indicator may be activated by the switch.

[0019] Preferably, the shell and mouthpiece are arranged to releasably lock together when engaged.

[0020] Preferably, the liquid storage portion is not refillable. Thus, when the liquid in the liquid storage portion has been used up, the entire mouthpiece is replaced. Alternatively, the liquid storage portion may be refillable. In that case, the mouthpiece may be replaced after a certain number of refills of the liquid storage portion. Preferably, the liquid storage portion is arranged to hold liquid for a pre-determined number of puffs.

[0021] The liquid has physical properties, including vis-

NJOY Exhibit 1002.1568

cosity, which allow the liquid to be transported through the capillary wick by capillary action. The liquid has a boiling point suitable for use in the electrically heated smoking system: if the boiling point is too high, the heating element will not be able to vaporise liquid at the second end of the capillary wick, but, if the boiling point is too low, the liquid may vaporise even without the heating element being activated. The liquid preferably comprises a tobacco-containing material comprising volatile tobacco flavour compounds which are released from the liquid upon heating. Alternatively, or in addition, the liquid may comprise a non-tobacco material. The liquid may include water, solvents, ethanol, plant extracts and natural or artificial flavours. Preferably, the liquid further comprises an aerosol former. Examples of suitable aerosol formers are glycerine and propylene glycol. Additional examples of potentially suitable aerosol formers are described in EP-A-0 277 519 and US-A-5 396 911.

[0022] The liquid storage portion is preferably a container. For example, the container may be a container such as that described in EP-A-0 893 071. Preferably, the liquid storage portion does not include any porous materials, so that there is only a single capillary mechanism (the capillary wick) in the electrically heated smoking system. This keeps the structure of the mouthpiece simple and the entire system low-maintenance. Preferably, the container is opaque, thereby limiting degradation of the liquid by light.

[0023] The electrically heated smoking system may further comprise an atomiser including the at least one heating element. In addition to the heating element, the atomiser may include one or more electromechanical elements such as piezoelectric elements. Additionally or alternatively, the atomiser may also include elements that use electrostatic, electromagnetic or pneumatic effects.

[0024] The capillary wick may have a fibrous or spongy structure. For example, the capillary wick may comprise a plurality of fibres or threads, generally aligned in the longitudinal direction of the smoking system, or sponge-like material formed into a rod shape along the longitudinal direction of the smoking system. The structure of the wick forms a plurality of small bores or tubes, through which the liquid can be transported from the liquid storage portion to the heating element, by capillary action. The capillary wick may comprise any suitable material or combination of materials. Examples of suitable materials are ceramic- or graphite-based materials in the form of fibres or sintered powders. The capillary wick may have any suitable capillarity and porosity so as to be used with different liquid physical properties such as density, viscosity, surface tension and vapour pressure.

[0025] The shell may comprise any suitable material or combination of materials. Examples of suitable materials include metals, alloys, plastics or composite materials containing one or more of those materials. Preferably, the material is light and non-brittle.

[0026] The mouthpiece may comprise any suitable material or combination of materials. Examples of suitable materials include thermoplastics that are suitable for food or pharmaceutical applications, for example polypropylene, polyetheretherketone (PEEK) and polyethylene.

[0027] Preferably, the electrically heated smoking system is portable. The electrically heated smoking system may have a size comparable to a conventional cigar or cigarette.

[0028] According to a second aspect of the invention, there is provided a mouthpiece for engaging with a shell to form an electrically heated smoking system, the shell having an electric power supply and electric circuitry, the mouthpiece comprising: a liquid storage portion; a capillary wick having a first end and a second end, the first end extending into the liquid storage portion for contact with liquid therein; at least one heating element for heating the second end of the capillary wick; an air outlet; and an aerosol forming chamber between the second end of the capillary wick and the air outlet, wherein, when the shell and mouthpiece are engaged, the at least one heating element is in electrical connection with the power supply via the circuitry, and a flow route for air is defined from at least one air inlet to the air outlet via the aerosol forming chamber.

[0029] In a preferred embodiment, the at least one heating element comprises a coil of wire surrounding the second end of the capillary wick. In that embodiment, preferably the wire is a metal alloy wire.

[0030] According to the invention, there is also provided a shell arranged to engage with the mouthpiece of the second aspect of the invention.

[0031] According to a third aspect of the invention, there is provided a shell for engaging with a mouthpiece to form an electrically heated smoking system, the mouthpiece having a liquid storage portion, a capillary wick having a first end and a second end, the first end extending into the liquid storage portion for contact with liquid therein, at least one heating element for heating the second end of the capillary wick, an air outlet, and an aerosol forming chamber between the second end of the capillary wick and the air outlet, the shell comprising: an electric power supply; and electric circuitry, wherein, when the shell and mouthpiece are engaged, the at least one heating element is in electrical connection with the power supply via the circuitry, and a flow route for air is defined from at least one air inlet to the air outlet via the aerosol forming chamber.

[0032] Preferably, the electric circuitry comprises a sensor to detect air flow indicative of a user taking a puff.

[0033] Preferably, the shell further comprises the at least one air inlet.

[0034] According to the invention, there is also provided a mouthpiece arranged to engage with the shell of the third aspect of the invention.

[0035] Features described in relation to one aspect of the invention may also be applicable to another aspect of the invention.

[0036] The invention will be further described, by way

NJOY Exhibit 1002.1569

of example only, with reference to the accompanying drawings, in which:

Figure 1 shows a shell of an electrically heated smoking system according to an embodiment of the invention;

Figure 2 shows a mouthpiece of an electrically heated smoking system according to an embodiment of the invention; and

Figure 3 shows a constructed electrically heated smoking system, comprising the shell of Figure 1 and the mouthpiece of Figure 2.

[0037] Figure 1 shows a shell of an electrically heated smoking system according to one embodiment of the invention. The shell 101 comprises an electric power supply in the form of battery 103, electric circuitry in the form of circuitry 105 and puff detection system 107, a puff indicator 109, electrical connections 111, electrical contacts 113, air inlets 115 and a lock mechanism 117. The shell 101 is designed to engage with the mouthpiece 201 of Figure 2.

[0038] Figure 2 shows a mouthpiece of an electrically heated smoking system according to one embodiment of the invention. The mouthpiece 201 comprises a liquid storage portion in the form of cartridge 203 containing liquid 205, a capillary wick 207, a heating element in the form of heating coil 209, an air outlet 211 and an aerosol forming chamber 213. The first end 207a of the capillary wick 207 extends into the cartridge 203 and the second end 207b of the capillary wick 207 is surrounded by the heating coil 209. The mouthpiece also includes a cap 215 to protect the second end 207b of the capillary wick 207 and an insulation ring 217. The mouthpiece 201 is designed to engage with the shell 101 of Figure 1.

[0039] Figure 3 shows the shell 101 of Figure 1 engaged with the mouthpiece 201 of Figure 2 to form an electrically heated smoking system 301 arranged to supply aerosol to a user on demand. The shell 101 and mouthpiece 201 are releasably locked together by lock mechanism 117. Ends of the heating coil 209 are in contact with the electrical contacts 113 on the shell. Operation of the system 301 is as follows.

[0040] Liquid 205 is transferred from the cartridge 203 from the first end 207a of the wick 207 to the second end 207b of the wick by capillary action. When the user draws on the device at the air outlet 211, ambient air is drawn through air inlets 115. In this embodiment, the puff detection system 107 senses the puff and activates the heating coil 209 and switches on the puff indicator 109. The battery 103 supplies a pulse of energy to the heating coil 209 to heat the second end 207b of the wick 207. The liquid in the second end 207b of the wick 207 is vaporised by the heating coil 209 to create a supersaturated vapour. At the same time, the liquid being vaporised is replaced by further liquid moving towards the second end 207b of wick by capillary action. (This is sometimes referred to as "pumping action".) The supersaturated vapour created is mixed with and carried in the air flow from the air inlets 115 towards the aerosol forming chamber 213. In the aerosol forming chamber 213, the vapour condenses to form an inhalable aerosol, which is carried towards the outlet 211 and into the mouth of a user.

[0041] In this embodiment, the circuitry 105 and the puff detection system 107 are programmable. The circuitry 105 and puff detection system 107 can be used to manage the device operation. In this embodiment, when the puff detection system 107 senses the user taking a puff, the battery supplies a current pulse of a pre-determined time to the heating coil 209. The pre-determined time for the current pulse will depend on the amount of liquid required for a single puff, and the time taken for that amount of liquid to be vaporised. That will, in turn, depend on the properties of the liquid, the heating coil and the capillary wick. The pre-determined time may be between 0.5 and 3 seconds.

[0042] In this embodiment, the cartridge 203 in the mouthpiece is sized so as to contain sufficient liquid for a pre-determined number of puffs. After that pre-determined number of puffs, the cartridge could be refilled, but preferably the entire mouthpiece is replaced. The pre-determined number of puffs is ideally between 200 and 2000 puffs and this will depend on the desired size of the cartridge, mouthpiece and entire device, and the properties of the liquid being used. The cartridge 203 can be made from any suitable material. Examples include glass and plastic polymers such as PET or others used in the pharmaceutical or food industries. The material should be chosen so as to avoid leakage, breakage or abuse, as far as possible.

[0043] In the embodiment shown in Figures 1 to 3, when the shell and mouthpiece are engaged, the cartridge 203 is positioned upstream of the second end 207b of the wick and the heating coil 209. Thus, ambient air is drawn through air inlets 115 and passes around the cartridge 203 before reaching the second end 207b of the wick and the heating coil 209. However, in an alternative embodiment, the mouthpiece may be structured such that, when the shell and mouthpiece are engaged, the cartridge is positioned downstream of the second end of the wick and the heating coil. In that embodiment, the ambient air will be drawn through the air inlets, then the vapour or aerosol will pass around the cartridge on the way to the air outlet.

[0044] The capillary wick can be made from a variety of porous or capillary materials and preferably has a known, pre-defined capillarity. Examples include ceramic- or graphite-based materials in the form of fibres or sintered powders. Wicks of different porosities can be used to accommodate different liquid physical properties such as density, viscosity, surface tension and vapour pressure. The wick must be suitable so that the required amount of liquid can be delivered to the heating coil.

[0045] The mouthpiece and shell are sized and shaped so as to engage with one another, so as to produce a suitably sized electrically heated smoking system which

NJOY Exhibit 1002.1570

can be used by a smoker. The components of the mouthpiece and shell, including the power supply, circuitry, liquid storage portion, wick, heating element and aerosol forming chamber are appropriately sized and shaped for the system design. The system is preferably portable and may have a size similar to that of a conventional cigar or cigarette.

[0046] The system of the invention allows the control of particle concentration (mg/l or mg/puff volume) in the aerosol, the average particle size in the aerosol and the distribution (range) of particle sizes in the aerosol. These may be controlled by varying one or more of: the aerosol former formulation in the liquid, the energy transfer (thermal power per unit of surface area) at the heating element, the design of the aerosol forming chamber and the operating temperature. The energy transfer will depend on a number of factors including the materials used for the heating element and the wick, the diameter of the wick, the design of the heating element including, if the heating element is a coil, the length, diameter and pitch (distance between spirals) of the coil, and the power applied to the heating element.

[0047] The operating temperature should be controlled to ensure that, as far as possible, no undesirable degradations of the aerosol former or formers and the flavouring material occur. This can be achieved, for example, by controlling the temperature of the heater if the heater is made from a suitable metal or alloy, using the variation in conductivity, or by controlling the amount of energy delivered to the heater. A preferred operating temperature at the heating element is in the range of 100 to 300 °Celsius. The arrangement shown in the Figures can operate within this temperature range, and may also provide a rapid response time (time between the user puffing on the system and the aerosol entering the user's mouth from the air outlet - this may be referred to as "time to puff') of between 10 and 500 ms.

Claims

1. An electrically heated smoking system comprising a shell and a replaceable mouthpiece, the shell comprising an electric power supply and electric circuitry; the mouthpiece comprising a liquid storage portion, a capillary wick having a first end and a second end, the first end extending into the liquid storage portion for contact with liquid therein, at least one heating element for heating the second end of the capillary wick, an air outlet, and an aerosol forming chamber between the second end of the capillary wick and the air outlet;
wherein, when the shell and mouthpiece are engaged, the at least one heating element is in electrical connection with the power supply via the circuitry, and a flow route for air is defined from at least one air inlet to the air outlet via the aerosol forming chamber.

2. An electrically heated smoking system according to claim 1, wherein the at least one heating element comprises a coil of wire surrounding the second end of the capillary wick.

3. An electrically heated smoking system according to claim 1 or claim 2, wherein the electric circuitry comprises a sensor to detect air flow indicative of a user taking a puff.

4. An electrically heated smoking system according to any preceding claim wherein the at least one air inlet is in the shell.

5. A mouthpiece for engaging with a shell to form an electrically heated smoking system, the shell having an electric power supply and electric circuitry, the mouthpiece comprising:

a liquid storage portion;
a capillary wick having a first end and a second end, the first end extending into the liquid storage portion for contact with liquid therein;
at least one heating element for heating the second end of the capillary wick;
an air outlet; and
an aerosol forming chamber between the second end of the capillary wick and the air outlet,

wherein, when the shell and mouthpiece are engaged, the at least one heating element is in electrical connection with the power supply via the circuitry, and a flow route for air is defined from at least one air inlet to the air outlet via the aerosol forming chamber.

6. A mouthpiece according to claim 5, wherein the at least one heating element comprises a coil of wire surrounding the second end of the capillary wick.

7. A shell arranged to engage with the mouthpiece of claim 5 or claim 6.

8. A shell for engaging with a mouthpiece to form an electrically heated smoking system, the mouthpiece having a liquid storage portion, a capillary wick having a first end and a second end, the first end extending into the liquid storage portion for contact with liquid therein, at least one heating element for heating the second end of the capillary wick, an air outlet, and an aerosol forming chamber between the second end of the capillary wick and the air outlet, the shell comprising:

an electric power supply; and
electric circuitry,

wherein, when the shell and mouthpiece are en-

NJOY Exhibit 1002.1571

gaged, the at least one heating element is in electrical connection with the power supply via the circuitry, and a flow route for air is defined from at least one air inlet to the air outlet via the aerosol forming chamber.

9. A shell according to claim 8, wherein the electric circuitry comprises a sensor to detect air flow indicative of a user taking a puff.

10. A shell according to claim 8 or claim 9, further comprising the at least one air inlet.

11. A mouthpiece arranged to engage with the shell of any of claims 8 to 10.

NJOY Exhibit 1002.1572

Fig. 1

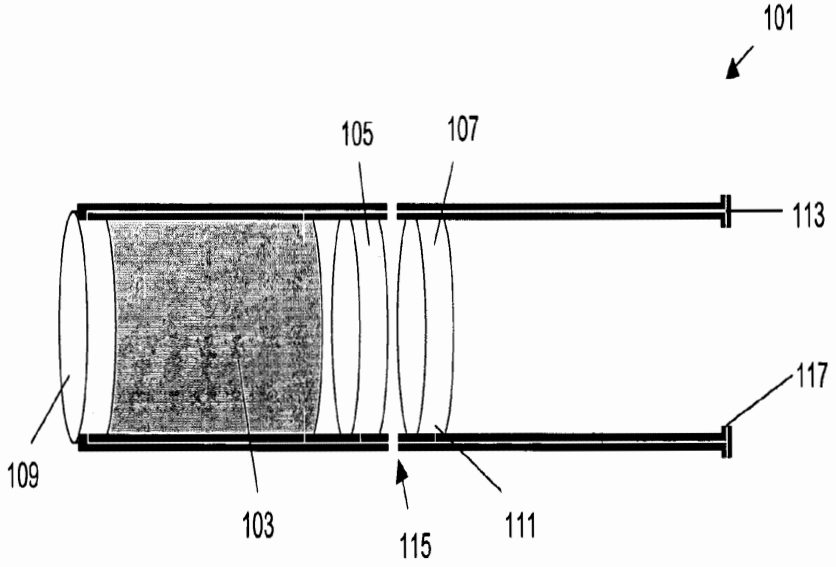
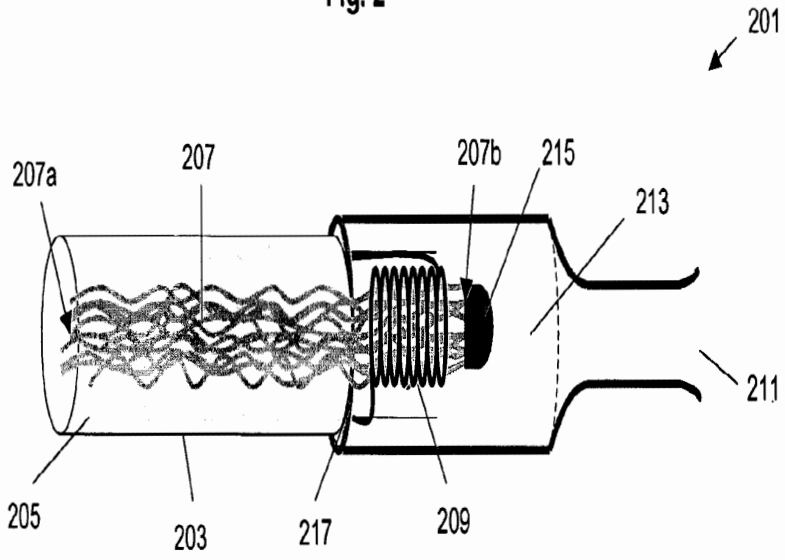


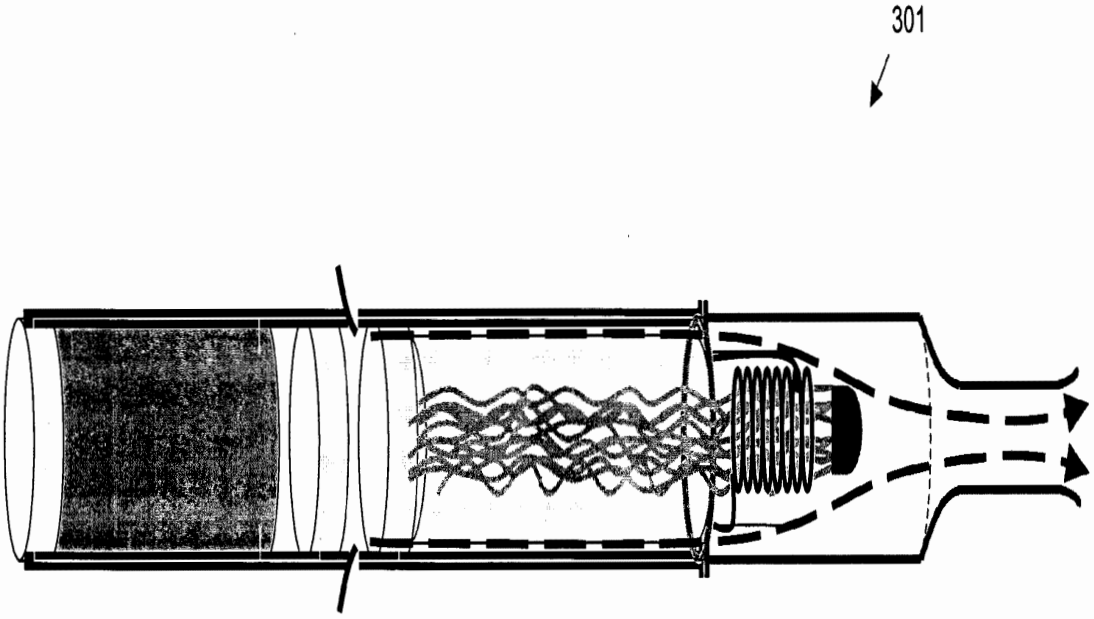
Fig. 2



EP 2 113 178 A1

NJOY Exhibit 1002.1573

Fig. 3



NJOY Exhibit 1002.1574

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 08 25 1579

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2 057 353 A (WHITTEMORE C L) 13 October 1936 (1936-10-13) * column 1, line 18 - column 2, line 34; figures *	1-11	INV. A24F47/00
A	EP 0 845 220 A (JAPAN TOBACCO INC [JP]) 3 June 1998 (1998-06-03)	1-7	
X	* column 5, line 15 - column 6, line 39; figures *	8-11	
A	EP 0 430 566 A (PHILIP MORRIS [US] PHILIP MORRIS PROD [US]) 5 June 1991 (1991-06-05)	1-7	
X	* column 3, line 55 - column 5, line 10; figures 1,2 *	8-11	
A	EP 0 430 559 A (PHILIP MORRIS [US] PHILIP MORRIS PROD [US]) 5 June 1991 (1991-06-05)	1,5	
X	* column 3, line 57 - column 4, line 14; figure 2 * * column 7, line 14 - line 15 *	8-11	
A	US 4 083 372 A (BODEN ROBERT) 11 April 1978 (1978-04-11) * the whole document *	5	TECHNICAL FIELDS SEARCHED (IPC) A24F A61M
D,A	EP 0 893 071 A (JAPAN TOBACCO INC [JP]) 27 January 1999 (1999-01-27) * the whole document *	1,5,8,11	
A	US 2007/267031 A1 (HON LIK [CN]) 22 November 2007 (2007-11-22) * paragraph [0028] - paragraph [0029]; figures *	1,5,8,11	
A	WO 2007/141668 A (PHILIP MORRIS PROD [CH]) 13 December 2007 (2007-12-13) * the whole document *	1,5,8,11	

-/--

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	14 October 2008	Marzano Monterosso

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

NJOY Exhibit 1002.1575

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 08 25 1579

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	WO 2007/098337 A (BRENNEISE JAKE [US]) 30 August 2007 (2007-08-30) * the whole document * -----	1,5,8,11	
			TECHNICAL FIELDS SEARCHED (IPC)

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	14 October 2008	Marzano Monterosso

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

NJOY Exhibit 1002.1576

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 08 25 1579

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

14-10-2008

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
US 2057353	A		NONE		
EP 0845220	A	03-06-1998	CN	1196660 A	21-10-1998
			DE	69724559 D1	09-10-2003
			DE	69724559 T2	15-07-2004
			WO	9748293 A1	24-12-1997
			JP	3325028 B2	17-09-2002
EP 0430566	A	05-06-1991	AT	120931 T	15-04-1995
			AU	642448 B2	21-10-1993
			AU	6762290 A	06-06-1991
			CA	2031227 A1	02-06-1991
			DE	69018577 D1	18-05-1995
			DE	69018577 T2	30-11-1995
			DK	430566 T3	14-08-1995
			ES	2071045 T3	16-06-1995
			JP	3258657 B2	18-02-2002
			JP	3277265 A	09-12-1991
			NO	905151 A	03-06-1991
			TR	25309 A	01-01-1993
			US	5060671 A	29-10-1991
EP 0430559	A	05-06-1991	AT	118992 T	15-03-1995
			AU	646415 B2	24-02-1994
			AU	6762090 A	06-06-1991
			CA	2031225 A1	02-06-1991
			DE	69017371 D1	06-04-1995
			DE	69017371 T2	12-10-1995
			DK	430559 T3	01-05-1995
			ES	2069027 T3	01-05-1995
			JP	3232481 A	16-10-1991
			JP	3392138 B2	31-03-2003
			NO	905150 A	03-06-1991
			TR	25316 A	01-01-1993
			US	5144962 A	08-09-1992
US 4083372	A	11-04-1978	NONE		
EP 0893071	A	27-01-1999	CN	1205849 A	27-01-1999
			DE	69804385 D1	02-05-2002
			DE	69804385 T2	07-11-2002
			TW	386021 B	01-04-2000
			US	6155268 A	05-12-2000
US 2007267031	A1	22-11-2007	CN	1683244 A	19-10-2005

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

NJOY Exhibit 1002.1577

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 08 25 1579

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

14-10-2008

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2007141668 A	13-12-2007	US 2008022999 A1	31-01-2008
WO 2007098337 A	30-08-2007	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

NJOY Exhibit 1002.1578

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 5060671 A **[0002]**
- US 5388594 A **[0002] [0010]**
- US 5505214 A **[0002] [0010]**
- US 5591368 A **[0002] [0010]**
- WO 2004043175 A **[0002]**
- EP 0358002 A **[0002]**
- WO 2007131449 A **[0002]**
- EP 0295122 A **[0003]**
- EP 1618803 A **[0003]**
- EP 1736065 A **[0003] [0010]**
- US 5498855 A **[0009]**
- WO 03095688 A **[0009]**
- US 5514630 A **[0009]**
- EP 1128741 A **[0010]**
- WO 2007066374 A **[0010]**
- WO 2007078273 A **[0012]**
- EP 0277519 A **[0021]**
- US 5396911 A **[0021]**
- EP 0893071 A **[0022]**

NJOY Exhibit 1002.1579

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 399 636 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
28.12.2011 Bulletin 2011/52

(51) Int Cl.:
A61M 11/04 *(2006.01)* ***A61M 15/06*** *(2006.01)*
A24F 47/00 *(2006.01)*

(21) Application number: **10251135.9**

(22) Date of filing: **23.06.2010**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR
Designated Extension States:
BA ME RS

(71) Applicant: **Philip Morris Products S.A.**
2003 Neuchâtel (CH)

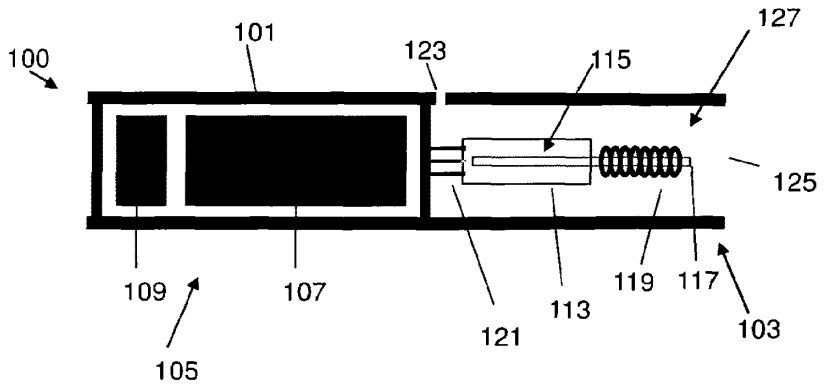
(72) Inventors:
- **Thorens, Michel**
  1510 Moudon (CH)
- **Flick, Jean-Marc**
  1405 Pomy (CH)
- **Cochand, Olivier Yves**
  2056 Dombresson (CH)
- **Dubief, Flavien**
  2000 Neutchatel (CH)

(74) Representative: **Millburn, Julie Elizabeth**
Reddie & Grose
16 Theobalds Road
London
WC1X 8PL (GB)

(54) An improved aerosol generator and liquid storage portion for use with the aerosol generator

(57) A liquid storage portion (113) comprising an electrical component (504, 505, 804, 904, 905, 906, 907, 1301, 1401) for distinguishing the storage portion (113) from other liquid storage portions is disclosed. The liquid storage portion (113) is configured for use in an aerosol generating system (100) having means for determining (309) an electrical characteristic of the electrical component and means for distinguishing (309) the liquid storage portion (113) from other liquid storage portions based on the determined electrical characteristic of the electrical component.

Figure 1



EP 2 399 636 A1

NJOY Exhibit 1002.1580

Description

[0001] The present invention relates to an aerosol generator and to a smoking system. The aerosol generator or smoking system may have a liquid storage portion. More particularly, this invention relates to a liquid storage portion for use with an aerosol generator or a smoking system.

[0002] WO-A-2007/078273 discloses a smoking utensil. A liquid is stored in a container which communicates with a heater vaporiser, powered by a supply, via a series of small apertures. The liquid can be fed into the container via a one-way valve. In use, the heater is activated by the mouth of the user to switch on the battery power supply. Suction on a mouthpiece by the user causes air to be drawn through the apertures in the container, over the heater vaporiser, into the mouthpiece and subsequently into the mouth of a user.

[0003] One disadvantage of such a proposed smoking utensil is that there is no way to determine that the liquid fed into the container is suitable for use with the smoking utensil. In other words, there is no way of determining whether the liquid fed into the container it is suitable for vaporization by the heater in an appropriate manner.

[0004] It is therefore an object of the present invention to overcome this disadvantage and other disadvantages of the prior art.

[0005] According to a first aspect of the present invention, there is provided a liquid storage portion comprising an electrical component for distinguishing the storage portion from other liquid storage portions, the liquid storage portion being configured for use in an aerosol generating system having means for determining an electrical characteristic of the electrical component and means for distinguishing the liquid storage portion from other liquid storage portions based on the determined electrical characteristic of the electrical component.

[0006] The electrical component may be located on the exterior of the liquid storage portion or within the liquid storage portion.

[0007] The liquid storage portion may further comprise one or more further electrical components the components preferably being connected in series or parallel with each other.

[0008] The electrical component or components may comprise one or more resistors or one or more radio frequency identification microchips or one or more microchip memories.

[0009] The liquid storage portion may further comprise a plurality of electrical contacts for electrical connection to one or more of the electrical component or components.

[0010] The electrical contacts may be arranged in a substantially straight line or in a substantially triangular array or in a substantially square or in a substantially rectangular array.

[0011] The liquid storage portion may further comprise a heating element. Preferably, the heating element is integral to the liquid storage portion.

[0012] In this way, when the liquid storage portion is removed from the aerosol generating system, both the liquid storage portion and the heating element are removed. Then both the liquid storage portion and the heating element which has been removed from the aerosol generating system may be replaced or substituted with another liquid storage portion and heating element.

[0013] The material of the heating element may be chosen so that, in use, it heats up more than the electrical contacts or other electrically conductive portions of the liquid storage portion.

[0014] The heating element may be electrically connected at a first end to a first end of a first electrically conductive portion. The heating element may be electrically connected at a second end to a first end of a further electrically conductive portion.

[0015] The first electrically conductive portion may be electrically connected at a second end to an electrical contact. The second electrically conductive portion may be electrically connected at a second end to an electrical contact.

[0016] Usually the means for determining an electrical characteristic of the electrical component is a processor or controller. Further, the means for distinguishing one liquid storage portion from other liquid storage portions based on a determined characteristic of an electrical component is also usually a processor or controller, but a combination of resistors, transistors and other switches may be used.

[0017] Electrical components which may be used with embodiments of the invention are one or more resistors, capacitors, inductors, diodes, transistors, memory chips.

[0018] The electrical characteristic which may be determined by the processor are for example, the resistance, capacitance, inductance, break down voltage, switching speed or amplification, or in the case of a memory chips, the values stored in the memory.

[0019] According to a second aspect of the present invention, there is provided an aerosol generating system comprising the liquid storage portion according to the first aspect of the present invention.

[0020] According to a third aspect of the present invention, there is provided an aerosol generating system for receiving a liquid storage portion configured for use with the aerosol generating system, the system comprising: means for determining an electrical characteristic of an electrical component associated with the liquid storage portion; and means for distinguishing the liquid storage portion from other liquid storage portions for use with the aerosol generating system based on the determined electrical characteristic of the electrical component associated with the liquid storage portion.

[0021] Preferably, the system further comprises transmission means arranged to transmit signals between the determining means and the electronic component.

[0022] The transmission means may be electrical one or more electrical connectors or electrical conductive por-

NJOY Exhibit 1002.1581

tions for transmitting electrical signals between the distinguishing means and the electrical component. Alternatively, the transmission means may comprise a radio frequency identification antenna. The antenna may be electrically connected to a radio frequency identification reader or chip on the aerosol generating system. The transmission means may also comprise an antenna associated with a liquid storage portion. The liquid storage portion antenna may be electrically connected to a radio frequency identification chip also associated with the liquid storage portion.

[0023] Preferably, the system comprises a housing for at least partially receiving the liquid storage portion. Preferably, the system further comprises means for detecting the presence of the liquid storage portion in the housing.

[0024] The means for determining an electrical characteristic of the electrical component may further comprise one or more further electrical components. The one or more further components may be arranged in series with the one or more components associated with the liquid storage portion. The further electrical components on the aerosol generating system may be electrical resistors.

[0025] The aerosol generating system may further comprise one or more electrical contacts for electrical connection to the one or more of the further electrical component or components of the aerosol generating system. The aerosol generating system may further comprise one or more electrically conductive potions for electrically connecting the further electrical components or electrical contacts to the determining means and the distinguishing means.

[0026] The aerosol generating system may further comprise a memory for storing a look-up table, the look-up table comprising data representing one or more electrical characteristics of one or more electrical components, each characteristic associated with data identifying a liquid storage portion.

[0027] The aerosol generating system may further comprise a means for searching the look-up table.

[0028] The aerosol generating system may further comprise a means for determining a type of liquid storage portion by searching the look-up table for data identifying the type of liquid storage portion associated with data representing an electrical characteristic of the electronic component which matches data representing the determined characteristic of the electrical component.

[0029] The aerosol generating system may further comprise a heating element.

[0030] The aerosol generating system may further comprise a means for controlling one or more operational parameters of the heating element. The control means may control one or more of the operational parameters of the heating element in dependence upon the determined electrical characteristic of the electrical component or components associated with the liquid storage portion.

[0031] The control means may be arranged to supply electrical energy to the heating element in dependence upon the determined value of the electrical component or components associated with the liquid storage portion.

[0032] According to a fourth aspect of the present invention, there is provided a liquid storage portion comprising a 3-dimensional object for distinguishing the storage portion from other liquid storage portions, the liquid storage portion being configured for use in an aerosol generating system having means for determining a characteristic of the 3-dimensional object and means for distinguishing the liquid storage portion from other liquid storage portions based on the determined characteristic of the 3-dimensional object.

[0033] According to a fifth aspect of the present invention, there is provided an aerosol generating system for receiving a liquid storage portion configured for use with the aerosol generating system, the system comprising: means for determining a characteristic of a 3-dimensional object associated with the liquid storage portion; and means for distinguishing the liquid storage portion from other liquid storage portions for use with the aerosol generating system based on the determined characteristic of the 3-dimensinoal object associated with the liquid storage portion.

[0034] The three dimensional object may comprise one or more bump, protrusions or recesses and the like. The characteristics of the 3-dimensional object may a spatial characteristic of the 3-dimensional object. The characteristic may be the position of the bump, protrusion or recess on the liquid storage portion, the height of a bump or protrusion from the surface of the liquid storage portion, the width of a bump or protrusion from the surface of the liquid storage portion, the depth of a trough or recess in the liquid storage portion. Further, if the 3-dimensional object comprises a plurality of protrusions or recesses, then the relative spacing of the protrusions or recesses may be determined as a characteristic of the 3-dimensional object.

[0035] Alternatively, the 3-dimensional object may be engraved or etched into the liquid storage portion. The 3-dimensional object may also be attached to the liquid storage portion by adhesive or other suitable means.

[0036] According to a sixth aspect of the present invention, there is provided a method for distinguishing between types of liquid storage portion used with an aerosol generating system, the method comprising the steps of: determining an electrical characteristic of an electrical component associated with the liquid storage portion; distinguishing the liquid storage portion from other liquid storage portions for use with the aerosol generating system based on the determined electrical characteristic of the electrical component associated with the liquid storage portion.

[0037] Preferably, the method further comprises the step of comparing the determined electrical characteristic to a look-up table of electrical characteristics of one or more electrical components, each electrical characteristic associated with an identifier of a liquid storage

NJOY Exhibit 1002.1582

portion. Preferably, the type of liquid storage portion inserted into the aerosol generating system is determined in dependence upon the result of the determination.

[0038] The step of determining the electrical characteristic may comprise the steps of: measuring a current flow through a resistor; measuring a voltage across the resistor; and determining the resistance value of the resistor from the determined voltage and current values.

[0039] The type of liquid storage portion may be determined as a liquid storage portion identifier which is associated with the electrical characteristic stored in the database which corresponds to the determined characteristic value of the electrical component.

[0040] The method may further comprise a step of searching the look-up table or a further look-up table for one or more operational parameters of a heating element which are associated with an electrical characteristic which correspond to the determined characteristic value of the electrical component.

[0041] The method may further comprise the step of energizing the heating element according to one or more of the operational parameters which correspond to the determined characteristic value of the electrical component.

[0042] The method may further comprise the step of energizing the heating element according to one or more of the operational parameters which correspond to the determined characteristic value of the electrical component.

[0043] The method may further comprise the step of energizing the heating element in proportion to the determined characteristic value of the electrical component.

[0044] The step of determining an electrical characteristic of an electrical component may be repeated a plurality of times For example, if the liquid storage portion comprises 4 resistors, then the step of determining the electrical characteristic is repeated 4 times.

[0045] Preferably, a heating element is energized according to one or more of the operational parameters, the value of each operation parameter applied to the heating element being proportional to the determined electrical characteristic of one or the components.

[0046] Preferably, one the characteristic value of one electrical component determines the value of one operational parameter applied to the heating element.

[0047] Preferably, the step of determining the electrical characteristic comprises the steps of: interrogating a chip; receiving a signal from the chip, the signal comprising electrical characteristic data of the chip; and determining the type of liquid storage portion from the received electrical characteristic data.

[0048] The chip may be a radio frequency identification chip which is interrogated by energizing it with a radio-frequency signal. The signal received from the chip may be a radio frequency signal.

[0049] Alternatively, the chip may be an electrically erasable programmable read only memory which is interrogated by wired electrical connection to a processor or controller. The signal may be received from the chip by a wired electrical connection.

[0050] The data may comprise a liquid storage portion identifier and optionally one or more operational parameters of the heating element which the system may use to energize the heating element.

[0051] Preferably, the electrical contacts may be made out of an electrically conductive material with low resistivity, such as copper, silver or gold.

[0052] The electrically conductive means may be an electrically conductive material with low resistivity, such as copper, silver or gold. This minimises energy loss in this portion of the smoking system.

[0053] According to a seventh aspect of the present invention, there is provided a method for distinguishing between types of liquid storage portion used with an aerosol generating system, the method comprising the steps of determining a characteristic of a 3-dimensional object associated with the liquid storage portion distinguishing the liquid storage portion from other liquid storage portions for use with the aerosol generating system based on the determined characteristic of the e3-dimensional object associated with the liquid storage portion (113). When the liquid storage portion is new, it is filled with a suitable liquid for producing an aerosol. In use, the aerosol generating system uses liquid contained or held within the liquid storage portion to produce the aerosol. The aerosol generating system uses the liquid contained in the liquid storage portion until the liquid storage portion is empty or substantially empty. Therefore, the liquid storage portion may contain some liquid or may be empty so that no liquid is contained within the liquid storage portion.

[0054] In use, when the heater is activated, liquid provided by the liquid storage portion is vaporized by the heater to form a supersaturated vapour. The supersaturated vapour is mixed with and carried in the air flow from the at least one air inlet. During the flow, the vapour condenses to form an aerosol in the chamber, and the aerosol is carried towards the air outlet into the mouth of a user. In this specification, the upstream and downstream relative positions are described in relation to the direction of air flow as it is drawn from the air inlet to the air outlet.

[0055] The liquid may be provided by at least one portion of a capillary wick.

[0056] Alternatively or in addition to a heating element, the aerosol generating system may comprise an atomiser to create the aerosol. The atomiser may include one or more electromechanical elements such as piezoelectric elements. Additionally or alternatively, the atomiser may also include elements that use electrostatic, electromagnetic or pneumatic effects.

[0057] The smoking system according to embodiments of the invention provides a number of advantages.

[0058] The liquid has physical properties, for example a boiling point suitable for use in the smoking system: if the boiling point is too high, the at least one heater will not be able to vaporize liquid in the capillary wick, but, if the boiling point is too low, the liquid may vaporize even

NJOY Exhibit 1002.1583

without the at least one heater being activated. The liquid preferably comprises a tobacco-containing material comprising volatile tobacco flavour compounds which are released from the liquid upon heating. Alternatively, or in addition, the liquid may comprise a non-tobacco material. The liquid may include water, solvents, ethanol, plant extracts and natural or artificial flavours. Preferably, the liquid further comprises an aerosol former. Examples of suitable aerosol formers are glycerine and propylene glycol.

[0059] Further, as known to those skilled in the art, an aerosol is a suspension of solid particles or liquid droplets in a gas, such as air. The aerosol may be a suspension of solid particles and liquid droplets in a gas, such as air.

[0060] In a preferred embodiment of the invention, the smoking system comprises a liquid storage portion. Preferably, the capillary wick is arranged to be in contact with liquid in the liquid storage portion. In that case, in use, liquid is transferred from the liquid storage portion towards the heater by capillary action in the capillary wick. In one embodiment, the capillary wick has a first end and a second end, the first end extending into the liquid storage portion for contact with liquid therein and the at least one heater being arranged to heat liquid in the second end. When the heater is activated, the liquid at the second end of the capillary wick is vaporized by the heater to form the supersaturated vapour.

[0061] Using a capillary wick extending between the liquid and the heater, allows the structure of the system to be relatively simple. The liquid has physical properties, including viscosity, which allow the liquid to be transported through the capillary wick by capillary action caused by surface tension of the liquid.

[0062] The liquid storage portion is preferably a container. Preferably, the liquid storage portion does not include any porous materials, so that there is only a single capillary mechanism, the capillary wick, in the smoking system. This keeps the structure of the smoking system simple and the entire system low-maintenance. Preferably, the container is opaque, thereby limiting degradation of the liquid by light. The liquid storage portion may not be refillable. Thus, when the liquid in the liquid storage portion has been used up, the liquid storage portion is replaced. Alternatively, the liquid storage portion may be refillable. In that case, the liquid storage portion may be replaced after a certain number of refills of the liquid storage portion. Preferably, the liquid storage portion is arranged to hold liquid for a pre-determined number of puffs.

[0063] The capillary wick may have a fibrous or spongy structure. For example, the capillary wick may comprise a plurality of fibres or threads. The fibres or threads may be generally aligned in the longitudinal direction of the smoking system. Alternatively, the capillary wick may comprise sponge-like material formed into a rod shape. The rod shape may extend along the longitudinal direction of the smoking system. The structure of the wick forms a plurality of small bores or tubes, through which the liquid can be transported to the heater, by capillary action. The capillary wick may comprise any suitable material or combination of materials. Examples of suitable materials are ceramic- or graphite-based materials in the form of fibres or sintered powders. The capillary wick may have any suitable capillarity and porosity so as to be used with liquids of different physical properties such as density, viscosity, surface tension and vapour pressure. The capillary properties of the wick, combined with the properties of the liquid, ensure that the wick is always wet in the heating area.

[0064] Preferably, the smoking system comprises an elongate housing and the longitudinal axis of the capillary wick and the longitudinal axis of the housing are substantially parallel.

[0065] The at least one heater may comprise a single heating element. Alternatively, the at least one heater may comprise more than one heating element, for example two, three, four, five, six or more heating elements. The heating element or heating elements may be arranged appropriately so as to most effectively vaporize liquid in the capillary wick.

[0066] The at least one heater preferably comprises an electrical heating element. The at least one heater preferably comprises an electrically resistive material. Suitable electrically resistive materials include but are not limited to: semiconductors such as doped ceramics, electrically conductive ceramics such as molybdenum disilicide, carbon, graphite, metals, metal alloys and composite materials made of a ceramic material and a metallic material. Such composite materials may comprise doped or undoped ceramics. Examples of suitable doped ceramics include doped silicon carbides. Examples of suitable metals include titanium, zirconium, tantalum and metals from the platinum group. Examples of suitable metal alloys include stainless steel-, Constantan-, nickel-, cobalt-, chromium-, aluminium- titanium- zirconium-, hafnium-, niobium-, molybdenum-, tantalum-, tungsten-, tin-, gallium-, manganese- and iron-containing alloys, and super-alloys based on nickel, iron, cobalt, stainless steel, Timetal® and iron-manganese-aluminium based alloys. Timetal® is a registered trade mark of Titanium Metals Corporation, 1999 Broadway Suite 4300, Denver Colorado. In composite materials, the electrically resistive material may optionally be embedded in, encapsulated or coated with an insulating material or vice-versa, depending on the kinetics of energy transfer and the external physicochemical properties required.

[0067] The at least one heater may take any suitable form. For example, the at least one heater may take the form of a coiled heating element. For example, the heater may take the form of a wire wound coiled heating element. The coil of wire at least partially surrounds the wick. Other alternatives include a heating wire or filament, for example a Ni-Cr, platinum, tungsten or alloy wire.

[0068] In that embodiment, preferably the wire is a metal wire. Even more preferably, the wire is a metal alloy wire. The coil may extend fully or partially along the length

NJOY Exhibit 1002.1584

of the capillary wick. The coil may extend fully or partially around the circumference of the capillary wick. In a preferred embodiment, the coil is in contact with the capillary wick.

[0069] Alternatively, the at least one heater may take the form of a casing or substrate having different electro-conductive portions, or an electrically resistive metallic tube. Alternatively, the at least one heater may be a disk or end heater or a combination of a disk heater with heating needles or rods. Alternatively, the at least one heater may take the form of a metallic etched foil insulated between two layers of an inert material. In that case, the inert material may comprise Kapton®, all-polyimide or mica foil. Kapton® is a registered trade mark of E.I. du Pont de Nemours and Company, 1007 Market Street, Wilmington, Delaware 19898, United States of America.

[0070] Alternatively, the at least one heater may take the form of a sheet of material, which may be rolled around at least a portion of the capillary wick. Alternatively, the at least one heater may take the form of an etched foil folded around at least a portion of the capillary wick. The etched foil may comprise a metal sheet cut by a laser or by electro-chemical process. The sheet may be made from any suitable material, for example an iron-aluminium based alloy, an iron-manganese-aluminium base alloy or Timetal®. The sheet may be rectangular in shape, or may have a patterned shape which may form a coil-like structure when rolled around the capillary wick.

[0071] The at least one heater may heat the liquid in the capillary wick by means of conduction or convection or conduction and convection. Alternatively, heat from the heater may be conducted to the liquid by means of a heat conductive element. Alternatively, the at least one heater may transfer heat to the incoming ambient air that is drawn through the smoking system during use, which in turn heats the liquid by convection. The ambient air may be heated before passing through the system. Alternatively, the ambient air may be first drawn through the wick and then heated.

[0072] In one embodiment, the aerosol generating system is a smoking system. Preferably, the aerosol generating system or the smoking system is an electrically heated aerosol generating system or electrically heated smoking system. In that embodiment, the smoking system may further comprise an electric power supply. Preferably, the electric power supply comprises a cell contained in a housing. The electric power supply may be a Lithium-ion battery or one of its variants, for example a Lithium-ion polymer battery. Alternatively, the power supply may be a Nickel-metal hydride battery, a Nickel cadmium battery, a Lithium-maganese battery, a Lithium-cobalt battery or a fuel cell. In that case, preferably, the electrically heated smoking system is usable by a smoker until the energy in the power cell is used up. Alternatively, the electric power supply may comprise circuitry chargeable by an external charging portion. In that case, preferably the circuitry, when charged, provides power for a pre-determined number of puffs, after which the circuitry must be reconnected to the external charging portion. An example of suitable circuitry is one or more capacitors or rechargeable batteries.

[0073] If the smoking system is an electrically heated smoking system, the smoking system may further comprise electric circuitry. In one embodiment, the electric circuitry comprises a sensor to detect air flow indicative of a user taking a puff. The sensor may be an electromechanical device. Alternatively, the sensor may be any of: a mechanical device, an optical device, an opto-mechanical device, a micro electro mechanical systems (MEMS) based sensor and an acoustic sensor. In that case, preferably, the electric circuitry is arranged to provide an electric current pulse to the at least one heater when the sensor senses a user taking a puff. Preferably, the time-period of the electric current pulse is pre-set, depending on the amount of liquid desired to be vaporized. The electric circuitry is preferably programmable for this purpose.

[0074] Alternatively, the electric circuitry may comprise a manually operable switch for a user to initiate a puff. The time-period of the electric current pulse is preferably pre-set depending on the amount of liquid desired to be vaporized. The electric circuitry is preferably programmable for this purpose.

[0075] In one embodiment, the at least one air inlet comprises two air inlets. Alternatively, there may be three, four, five or more air inlets. Preferably, if there is more than one air inlet, the air inlets are spaced around the housing. In a preferred embodiment, the electric circuitry comprises a sensor to detect air flow indicative of a user taking a puff, and the at least one air inlet upstream of the sensor.

[0076] Preferably, the smoking system further comprises a puff indicator for indicating when the at least one heater is activated. In the embodiment in which the electric circuitry comprises a sensor to detect air flow indicative of a user taking a puff, the indicator may be activated when the sensor senses air flow indicative of the user taking a puff. In the embodiment in which the electric circuitry comprises a manually operable switch, the indicator may be activated by the switch.

[0077] The electrically heated smoking system may further comprise an atomiser including the at least one heater. In addition to a heating element, the atomiser may include one or more electromechanical elements such as piezoelectric elements. Additionally or alternatively, the atomiser may also include elements that use electrostatic, electromagnetic or pneumatic effects.

[0078] Preferably, the smoking system comprises a housing. The housing may comprise a shell and a mouthpiece. In that case, all the components may be contained in either the shell or the mouthpiece. In the case of an electrically heated smoking system, preferably, the electric power supply and the electric circuitry are contained in the shell. Preferably, the liquid storage portion, the capillary wick, the at least one heater and the air outlet are contained in the mouthpiece. The at least one air inlet

NJOY Exhibit 1002.1585

may be provided in either the shell or the mouthpiece. Preferably, the mouthpiece is replaceable. Having a shell and a separate mouthpiece provides a number of advantages. Firstly, if the replaceable mouthpiece contains the at least one heater, the liquid storage portion and the wick, all elements which are potentially in contact with the liquid are changed when the mouthpiece is replaced. There will be no cross-contamination in the shell between different mouthpieces, for example ones using different liquids. Also, if the mouthpiece is replaced at suitable intervals, clogging of the heater with liquid is avoided. Preferably, the shell and mouthpiece are arranged to releasably lock together when engaged.

[0079] The housing may comprise any suitable material or combination of materials. Examples of suitable materials include metals, alloys, plastics or composite materials containing one or more of those materials, or thermoplastics that are suitable for food or pharmaceutical applications, for example polypropylene, polyetheretherketone (PEEK) and polyethylene. Preferably, the material is light and non-brittle.

[0080] Preferably, the smoking system is portable. The smoking system may have a size comparable to a conventional cigar or cigarette. The smoking system may have a total length between approximately 30 mm and 130 mm. The smoking system may have an external diameter between approximately 5 mm and approximately 13 mm.

[0081] Features described in relation to one aspect of the invention may also be applicable to another aspect of the invention.

[0082] The invention will be further described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 shows an aerosol generator according to an embodiment of the invention having a liquid storage portion;

Figure 2 shows an enlarged portion of the aerosol generator of Figure 1;

Figure 3 shows a detailed sectional view of liquid storage portion embodying the invention;

Figure 4 shows a detailed sectional view of an the aerosol generator of Figure 2 with a liquid storage portion inserted into the aerosol generator;

Figure 5 shows a sectional view of a liquid storage portion embodying the invention;;

Figure 6 is a sectional view of another liquid storage portion embodying the invention;

Figure 7 is a schematic circuit diagram showing the wiring of components of one aerosol generator embodying the invention

Figure 8 is a flow chart of the main steps performed by an embodiment of the invention when detecting the presence of liquid storage portion;

Figure 9 is a flow chart of the mains steps performed by an embodiment of the invention when determining the type of liquid storage portion inserted into the aerosol generating system;

Figure 10 is a schematic circuit diagram showing the wiring of components of another aerosol generator embodying the invention;

Figure 11 is a schematic circuit diagram showing the wiring of components of a further aerosol generator embodying the invention;

Figure 12 is a sectional view of a further liquid storage portion embodying the invention;

Figure 13 is a schematic diagram of selected components of an aerosol generating system embodying the invention in which data is stored on a RFID chip; and

Figure 14 is a schematic diagram of selected components of an aerosol generating system embodying the invention in which data is stored on memory.

[0083] In the drawings, like features are given like reference numbers. Note that Figures 1 to 14 are schematic in nature. In particular, the components shown are not to scale either individually or relative to one another.

[0084] Referring now to Figure 1, this shows one example of an aerosol generating system having a liquid storage portion 113. The aerosol generating system 100 may be a smoking system having a liquid storage portion 113. The aerosol generating system 100 of Figure 1 is an electrically heated aerosol generating system 100 and comprises a housing 101 having a mouthpiece end 103 and a body end 105. In the body end 105, there is provided an electric power supply in the form of a battery 107 and electric circuitry in the form of circuitry 109 and a puff detection system, not shown. In the mouthpiece end 103, there is provided a liquid storage portion or cartridge 113 containing liquid 115, a capillary wick 117 and a heating element in the form of a heating coil 119. A first end of the capillary wick 117 extends into the cartridge 113 and a second end of the capillary wick 117 is at least partially surrounded by the heating coil 119. The heating element 119 may be in close proximity to the capillary wick 117. The heating coil 119 is connected to the electric circuitry via connections 121. The housing 101 also includes an air inlet 123, an air outlet 125 at the mouthpiece end and a chamber in the form of aerosol forming chamber 127.

[0085] In use, operation is as follows. Liquid 115 is transferred by capillary action from the cartridge 113 from one end of the wick 117 which extends from the cartridge to another end of the wick 117 which is surrounded by the heating coil 119. When a user draws on the device at the air outlet 125, ambient air is drawn through air inlet 123. In the arrangement shown in Figure 1, the puff detection system senses a puff and activates the heating coil 119. The battery 107 supplies electrical energy to the heating coil 119 to heat the end of the wick 117 surrounded by the heating coil. The liquid in that end of the wick 117 is vaporized by the heating coil 119 to create a supersaturated vapour. At the same time, the vaporized liquid is replaced by further liquid which is conveyed along

NJOY Exhibit 1002.1586

the wick 117 by capillary action. This process is sometimes referred to as pumping action. The supersaturated vapour created is mixed with and carried in the air flow from the air inlet 123. In the aerosol forming chamber 127, the vapour condenses to form an inhalable aerosol, which is carried towards the outlet 125 and into the mouth of the user.

[0086] In the embodiment shown in Figure 1, the circuitry 109 and the puff detection system are preferably programmable. The circuitry 109 and puff detection system can be used to manage the device operation. This, in conjunction with the physical design of the electrically heated smoking system, can assist with control of the particle size in the aerosol.

[0087] The capillary wick can be made from a variety of porous or capillary materials and preferably has a known, pre-defined capillarity. Examples include ceramic- or graphite-based materials in the form of fibres or sintered powders. Wicks of different porosities can be used to accommodate different liquid physical properties such as density, viscosity, surface tension and vapour pressure. The capillary properties of the wick should be chosen so that the required amount of liquid can be delivered to portion of the wick adjacent to, or in contact with the heating coil.

[0088] Figure 1 shows an example of an aerosol generating system which may be used with the present invention. Many other examples are usable with the invention, however. For example, the aerosol generating system need not be electrically operated. Furthermore, a puff detection system need not be provided. Instead, the system may be manually operated, for example, the user may operate a switch to supply electrical energy to the coil when a puff is taken. The housing may also comprise a separable shell and mouthpiece. The overall shape and size of the housing may also be altered from that shown in Figure 1.

[0089] Referring now to Figure 2, this shows an enlarged portion of the aerosol generating system 100 of Figure 1, with the liquid storage portion 113 removed. Three electrical connectors 211, 213, 215 are provided. The electrical connectors are attached, either directly or indirectly to the housing 101. As explained in further detail below, the electrical connectors provide electrical signals to the liquid storage portion 113. The electrical connectors shown Figure 2 are mounted in a holder 209. This maintains the relative positions of the connectors, although the holder is optional.

[0090] A first electrically conductive element 201 is electrically connected at a first end to a first end of the first electrical connector 211. A second electrically conductive element 203 is electrically connected at a first end to a first end of the second electrical connector 213. A third electrically conductive element 205 is electrically connected at a first end to a first end of the third electrical connector 215. As described in further detail with reference to Figure 7 below, the electrically conductive elements 201, 203, 205 are electrically connected to the electronic circuitry 109, not shown in Figure 2. The electrically conductive elements 201, 203, 205 and electrical connectors 211, 213, 215 allow electrical signals to pass between the circuitry 109 and liquid storage portion 113. Further, the electrically conductive elements 201, 203, 205 are electrically connected to a controller or processor 309 which may be mounted in circuitry 109, not shown in Figure 2, as well as to a power source 107.

[0091] The electrical connectors 211, 213, 215 and electrically conductive elements 201, 203, 205 may be directly mounted on or within the housing 101, without the need for a holder 209.

[0092] Further, the electrical connectors 211, 213, 215 may be directly electrically connected to the controller or processor 309 and power source 107, without the need for electrically conductive elements 201, 203, 205.

[0093] As explained in further detail below, the processor 309 determines whether a liquid storage portion 113 is present in the system 100. The processor 309 may also determine what type of liquid storage portion is present in the system. The controller or processor 309 also controls when electrical power is provided to the coil 119, and this will be explained in further detail below with reference to Figure 7.

[0094] Referring now to Figure 3, this shows a detailed section taken through a liquid storage portion 113 according to an embodiment of the invention. The liquid storage portion 113 comprises first, second and third electrical contacts 221 or 421, 223 or 423, 225 or 425 at a first end of the liquid storage portion. The first, second and third electrical contacts 221 or 421, 223 or 423, 225 or 425 are physically mounted on the liquid storage portion 113. The first electrical contact 221 or 421 is electrically connected to a first end of a first electrically conductive portion 231. The second electrical contact 223 or 423 is electrically connected to a first end of a second electrically conductive portion 233. A second end of the first electrically conductive portion 231 is electrically connected to a first end of the heating element 119. A second end of the second electrically conductive portion 233 is electrically connected to a second end of the heating element 119. The electrical contacts 221 or 421, 223 or 423 and electrically conductive portions 231, 233 allow electrical energy to be supplied to the heating element 119 from a battery or other power source, not shown in Figure 2. The battery or power source 107 is usually mounted on or within the aerosol generating system 100.

[0095] A liquid storage portion identification subsystem 229 is mounted on or within the liquid storage portion 113. The subsystem may be mounted on the exterior of the liquid storage portion 113 to keep the subsystem and liquid contained within the liquid storage portion 113 separate. The subsystem 229 allows the aerosol generating system 100 to detect when a liquid storage portion 113 is present in the housing 101 of the aerosol generating system 100. Further, the subsystem 229 also allows the aerosol generating system 100 to distinguish between different types of liquid storage portions 113 inserted into

NJOY Exhibit 1002.1587

the aerosol generating system 100. The subsystem 229 is described in further detail below.

[0096] The subsystem 229 is electrically connected to a first end of a third electrically conductive portion 235. The second end of the third electrically conductive portion 235 is electrically connected to a third electrical contact 225, 425 on the liquid storage portion 113.

[0097] The subsystem 229 is also electrically connected to the electrically conductive portion 231 with a fourth electrically conductive portion 230, and the purpose of this connection is described below with reference to Figure 7 below.

[0098] The electrically conductive portions 201, 203, 205, 230, 231, 233, 235, may be electrically conductive wire, such as a metallic wire, for example copper wire. Further, the electrically conductive portion may be a conductor of low resistivity, such as copper, or silver, or gold.

[0099] In the embodiment shown in Figure 3, there are 3 electrical contacts 221, 223, 225, mounted on the liquid storage portion. Further, as previously described, 3 electrical contacts 211, 213, 215, are also provided on the aerosol generating system 100. The electrical contacts 211, 213, 215, 221, 223, 225 may be made out of an electrical conductor. The conductor may have a low resistivity. The conductor may be copper, silver or gold.

[0100] When a liquid storage portion is inserted into the aerosol generating system, electrical contacts 221, 223 on the liquid storage portion and two electrical contacts 211, 213 on the aerosol generating system 100 allow electrical energy to be transmitted to the heating element 119. Further, an electrical contact 225 on the liquid storage portion 113 and an electrical contact 215 on the aerosol generating system 100 allow electrical signals to be exchanged between the liquid storage portion 113 and the aerosol generating system 100. This allows a controller 309, not shown in Figure 2, to detect whether a liquid storage portion 113 has been inserted into the aerosol generating system 100. It also allows the controller 309 to distinguish between different types of liquid storage portions 113. This is described in further detail below.

[0101] Figure 4 shows the liquid storage portion 113 of Figure 3 inserted into the aerosol generating system 100 of Figure 2. The electrical contacts 221 or 421, 223 or 423, 225 or 425, on the liquid storage portion 113 are arranged so that they contact corresponding electrical contacts 211, 213, 215, on the aerosol generating system 100 when the liquid storage portion 113 is inserted into the aerosol generating system 100. Furthermore, the cartridge or liquid storage portion 113 shown in Figure 4 is contained within the housing 101 of the aerosol generating system 100, however other configurations in which the liquid storage portion 113 is not contained within the housing 101 are possible. In the embodiment shown in Figure 4, the liquid storage portion 113 is replaceable.

[0102] As previously described, the electrical contacts 211, 213, 215 are attached to the aerosol generating system 100 to prevent relative movement of the housing 101 and the electrical contacts 211, 213, 215. Further, the electrical contacts 221, 223, 225 are attached to the to the liquid storage portion 113. When the liquid storage portion 113 is removed from the aerosol generating system 100, for example by pulling the liquid storage portion 113 and housing 101 in substantially opposite directions such that the liquid storage portion 113 moves away from the aerosol generating system 100, the electrical connection between contacts 221 or 421, 223 or 423, 225 or 425 on the liquid storage portion 113 and the electrical contacts 211, 213, 215 on the aerosol generating system is broken. Conversely, when the liquid storage portion 113 is inserted in to the aerosol generating system 100, for example by pushing the liquid storage portion 113 and housing 101 in substantially opposite directions such that the liquid storage portion 113 moves towards the aerosol generating system 100, the electrical connection between contacts 221 or 421, 223 or 423, 225 or 425 on the liquid storage portion 113 and the electrical contacts 211, 213, 215 on the aerosol generating system 100 is made. Therefore, the electrical connection between the liquid storage portion 113 and the aerosol generating is only made when a liquid storage portion 113 is inserted into the aerosol generating system 100.

[0103] The liquid storage portion 113, wick 117, heating element 119, contacts 221, 223, 225, 421, 423, 425 and electrically conductive portions 230, 231, 233, 235, and subsystem 229 may form a single unit which is disposable. The unit may also be replaceable.

[0104] Figures 5 and 6 show two alternative arrangements of the electrical contacts 221, 223, 225, 421, 423, 425 on the liquid storage portion 113.

[0105] In one embodiment shown in Figure 5, the electrical contacts 221, 223, 225 on the liquid storage portion are arranged in a row or substantially straight line. Figure 5 is a section through line 1-1 in Figure 4 of the drawings.

[0106] Figure 5 shows that the two electrical contacts 221, 223 which are furthest away from the longitudinal axis of symmetry of the liquid storage portion, shown by a dot marked 2 in Figure 5, are the electrical contacts which provide electrical energy to the heating element 119. The electrical contact 225 which is closest to the longitudinal axis of symmetry of the aerosol generating system is the electrical contact which provides the electrical signals to the liquid storage portion recognition subsystem 229.

[0107] The electrical contacts mounted on the aerosol generating system are arranged in a similar arrangement to the electrical contacts mounted on the liquid storage portion 113, shown in Figure 5. Therefore, the corresponding electrical contacts 211, 213, 215 on the aerosol generating system 100 are also arranged in a row or substantially straight line. In this embodiment, each electrical contact 211, 213, 215 is equidistant from its neighbouring contact.

[0108] Further, the two electrical contacts 211, 213 on the aerosol generating system 100 which are furthest away from the longitudinal axis of symmetry of the aer-

NJOY Exhibit 1002.1588

osol generating system 100, shown by a dotted line marked 2-2 in Figure 4, are the electrical contacts which provide electrical energy to the heating element 119. The electrical contact 215 which is closest to the longitudinal axis of symmetry of the aerosol generating system 100 is the electrical contact which provides the electrical signals to the liquid storage portion recognition subsystem 209.

[0109] In a further embodiment, the position of the electrical contacts 421, 423, 425 on the liquid storage portion 113 are in the form of a substantially triangular lattice. The upper two contacts 421, 423 shown in Figure 6 are electrical contacts which transmit electrical energy to the heating element 119, while the lower contact 425 transmits the electrical signals to the liquid storage portion recognition subsystem 229. In this embodiment, the spacing of the centre of each contact 421, 423, 425, from the central axis of symmetry, shown by the dot marked 3 in Figure 6, may be equal to each other or equidistant.

[0110] In this embodiment, the electrical contacts mounted on the aerosol generating system are arranged in a similar arrangement to the electrical contacts mounted on the liquid storage portion 113 shown in Figure 6. The position of the electrical contacts 211, 213, 215 mounted on the aerosol generating system are also in the form of a substantially triangular lattice. The contacts 211, 213 shown in Figure 4 which are furthest away from the longitudinal axis of symmetry shown by the dotted line marked 2-2 in Figure 4 are electrical contacts which transmit electrical energy to the heating element 119, while the contact 215 closest to the longitudinal axis of symmetry shown by the dotted line marked 2-2 transmits the electrical signals to the liquid storage portion recognition subsystem 229. In this embodiment, the spacing of the centre of each contact 211, 213, 215 from the central axis of symmetry, shown by the dashed line shown 2-2 in Figure 4 may be equal to each other or equidistant.

[0111] Figure 7 shows an electrical circuit diagram of an embodiment of the invention. In Figure 7, the electrical contacts 211, 213, 215, 221, 223, 225, 421, 423, 425, also shown in Figures 2 to 6 are represented by solid dark circles.

[0112] Further, the components enclosed by the dashed line enclosure shown in Figure 7 are components which are located on or in the liquid storage portion 113. The components located outside the dashed line enclosure are components which are located on or in the aerosol generating system 100. Therefore, Figure 7 shows the situation where a liquid storage portion is inserted 113 aerosol generating system 100.

[0113] Therefore, the components within the enclosure may be replaced each time a liquid storage portion 113 is removed from the aerosol generating system 100 and replaced with a new liquid storage portion 113. The components outside the dashed line, as well as the aerosol generating system 100 itself may be reused a number of times with replacement liquid storage portions 113.

[0114] The electrical circuitry of Figure 7 may be divided into 2 separate parts, each of which has a separate function which may be used on its own or in conjunction with one or more of the other parts or other embodiments of the invention.

[0115] One part of the electrical circuitry is a liquid storage portion identification part, and this part comprises two electrical resistors, 504 and 505. Although the resistors 504, 505 shown in Figure 7 are connected in series, other configurations are possible, such as parallel connection. Alternatively, a single electrical resistor may be used.

[0116] In addition, embodiments of the invention may also use one or more other electrical components such as one or more capacitors, one or more inductors, one or more diodes or one or more transistors and the like, alternatively or in addition to the resistors 504, 505. This is described in further detail with reference to Figures 10 and 11 below.

[0117] In Figure 7, a first terminal of a first resistor 504 is electrically connected to a first terminal of the power source V+ via electrical contacts 211, 221, 421. A second terminal of a first resistor 504 is electrically connected to a first terminal of a second resistor 505. The second resistor 505 is electrically connected in series with the first resistor 504. A second terminal of the second resistor 505 is connected to a controller or processor 309 via electrical contacts 215, 225, 425.

[0118] When the liquid storage portion is inserted in to the aerosol generating system, the electrical contacts 221 or 421, 223 or 423, 225 or 425 on the liquid storage portion 113 come in to physical contact with the electrical contacts 211, 213, 215 on the aerosol generating system 100. The controller or processor 309 then detects that an electrical circuit has been made because an electrical current can flow through resistors 504, 505. This is because an electrical circuit is made between one terminal of the battery via the resistors 504, 505, and through the controller to the other terminal of the battery which is also connected to the controller. The controller 309 is also electrically connected to a negative terminal, V- of a battery or other power source via an electrically conductive element to complete the electrical circuit.

[0119] The detailed steps performed by an embodiment of the invention to detect the presence of a liquid storage portion 113 are shown in Figure 8.

[0120] At step 601, the aerosol generating device is switched on. At step 603, the controller applies a voltage or potential difference across contacts 211 and 215. Because the resistors 504, 505 are electrically connected to the contacts 225, 425 and contacts 221, 421, the same voltage is also applied across the resistors 504 and 505 assuming that the voltage drop across the contacts is negligible.

[0121] At step 605, the controller measures the current flow, if any, flowing through the resistors. At step 607, the controller determines whether the current is greater than a predetermined threshold current. If the measured

NJOY Exhibit 1002.1589

current is greater than a predetermined value, then the controller determines that a liquid storage portion is present, and allows the heater to be energised at step 609.

[0122] By detecting this current, the processor determines that a liquid storage portion 113 has been inserted into the aerosol generating system 100. This is advantageous since the aerosol generating system 100 may be de-activated or switched of unless a liquid storage portion is inserted into the aerosol generating system 100. This saves power and also increases the safety of the system.

[0123] Preferably, the aerosol generating system 100 further comprises a puff detector, although this is not shown in Figure 7. The puff detector may be electrically connected to the controller such that the puff detector feeds an electrical signal into the processor or controller 309 which is indicative of when a user takes a puff. The controller 309 may be arranged to only energise the heater if a puff is detected and if the current flow through the resistors 504, 505 is greater than a predetermined threshold current.

[0124] Alternatively, the system may be manually operated. For example, the user may operate a switch to supply electrical energy to the heating element 119 when a puff is taken. In this case, the controller 309 may be arranged to only energise the heater if the user closes a switch and if the current flow through the resistors 504, 505 is greater than a predetermined threshold current.

[0125] In one embodiment, the controller 309 is able to distinguish between different liquid storage portions 113 inserted in to the aerosol generating system 100.

[0126] As will be known to those skilled in the art, the voltage drop V across a resistor of resistance R is proportional to the product of the resistance R and the current *I* flowing through the resistor. By measuring the magnitude or size of the electrical current passing through the resistors 504, 505 for a given potential difference applied across these resistors, the controller 309 is able to determine the value of the sum of the resistances 504, 505 using the relationship $R = V/I$. The detailed steps performed by an embodiment of the invention in determining the type of liquid storage portion 113 are shown in Figure 9. Steps 601, 603, and 605 are the same as those described with reference to Figure 8, and so will not be described again.

[0127] At step 707, the controller 309 uses the value of the potential difference applied across the resistors 504 and 505 as well as the measured current flowing through the resistors 504 and 505 to determine the value of the sum of the resistances 504, 505, as previously described.

[0128] Having determined the value of the sum of the resistors associated with the liquid storage portion, the controller 309 determines the liquid storage portion type from the determined resistance value by searching a look-up table using the determined resistance value.

[0129] The look-up table may comprise one or more different resistance values, each resistance value associated with an identifier of a liquid storage portion 113 which can be used with the aerosol generating system. The identifier may be indicative of the type of liquid 115 contained within the liquid storage portion 113.

[0130] The controller 309 determines the type of liquid storage portion 113 as the liquid storage portion identifier stored in the look-up table which is associated with the resistance value stored in the look-up table which is closest in value to the liquid storage portion resistance value determined by the controller 309, at step 709. The look-up table may be stored in a read only memory (ROM) incorporated into the processor or may be stored in a separate memory store.

[0131] Therefore the controller 309 is able to distinguish between different types of liquid storage portion 113 inserted into the aerosol generating system 100 in dependence on the determined electrical characteristic or value of the electrical component associated with the liquid storage portion 113.

[0132] Preferably, the look-up table may further comprise data representing one or more resistance values, each resistance value further associated with parameters representing a different energy profile to be applied to the heating element 119. Each resistance value is associated with a different liquid storage portion 113 identifier. This means that the aerosol generating system 100 can be configured to deliver a constant amount, for example volume or mass of aerosol to the user even when liquid storage portions 113 containing different liquids are inserted into the aerosol generating system 100.

[0133] For example, a particular liquid contained within one liquid storage portion 113 may require more energy to vaporise it than a different liquid contained within another liquid storage portion 113. By associating a resistance value or a particular liquid storage portion identifier with a heating profile stored in a look-up table, a constant amount of aerosol can be delivered to the user independent of the type of liquid stored in the liquid storage portion 113.

[0134] The controller may perform this additional optional step, shown as step 711 in Figure 9.

[0135] At step 713, the controller then applies a particular energy profile to heater 119 in dependence on the determined liquid storage portion type or identifier or independence on the determined characteristic resistance value. For example, the resistance values stored in the look-up table may be associated with an optimal voltage and current required by the heating coil to deliver to the user a particular quantity of aerosol for a particular liquid formula. In one embodiment, the liquid may comprise nicotine. The heat of vaporization of this particular liquid formula is different to the heat of vaporization required to vaporize a liquid not containing nicotine.

[0136] Therefore, the value of one or more electrical components associated with each liquid storage portion allows the controller 309 to determine the liquid storage portion identifier, and hence the type of liquid contained within the liquid storage portion 113. It also allows the

NJOY Exhibit 1002.1590

controller 309 to deliver the appropriate heating profile to the heating element 119 based on the values stored in the look-up table which are associated with a particular value of electrical component.

[0137] The second portion of the electrical circuitry shown in Figure 7 is a heater circuit part, and this also shows the case when the liquid storage portion 113 is inserted into the aerosol generating system 100. The heater circuit comprises the heating element 119, one end of which is electrically connected via contacts 211 or 221, 421 to one terminal V+ of the power source. The other end of the heating element 119is electrically connected via contacts 213 or 223, 423 to a terminal of a transistor 555 or other switch having three terminals. The collector terminal of transistor 555 may be connected to the heating element, although other configurations are possible. The base terminal of the transistor 555 is electrically connected to the controller 309, while the emitter terminal of the transistor is electrically connected to the other V- terminal of the power source.

[0138] The energy supplied to the heating element 119 is controlled by the current being applied by the controller 309 to the base terminal of the transistor 555. This controls the amount of current flowing from one terminal of the battery via terminals 211 or 221, 421 through the heating coil 119 and through the collector and emitter terminals of transistor 555 via terminals 213 or 223, 423, to the other terminal of the battery.

[0139] In the electrical circuitry shown in Figure 7, one of the terminals of the battery may be a positive electrical voltage, V+, while the other terminal may be a negative electrical voltage, V-. However, this need not be the case, and it is sufficient for there to be a potential difference between the two battery terminals. Alternatively, the battery may be any current source such as a capacitor or other power supply.

[0140] Figure 10 shows an electrical circuit diagram of an aerosol generating system 100 according an alternative embodiment of the invention. In this embodiment, features in common with the embodiment shown in Figure 5, have been given like reference numerals. For the sake of clarity, the heating element 119 and transistor 555 have not been included in the circuit diagram of Figure 10. Once again, the features enclosed within the dashed line are components which are located on or within the liquid storage portion part 113. Figure 10 also shows the case when a liquid storage portion 113 is inserted into the aerosol generating system 100.

[0141] The embodiment shown in Figure 10 has 2 electrical contacts 221, 225 or 421, 425 located on or in the liquid storage portion part 113. A resistor 804 or other electrical component is mounted on or in the liquid storage portion 113. A first terminal of resistor 804 is electrically connected to electrical contact 225, 425 on the liquid storage portion 113. A second terminal of resistor 804 is electrically connected to contact 221, 421 on the liquid storage portion 113. As shown in Figure 10, when the liquid storage portion 113 is inserted into the aerosol generating system 100, electrical contact 221 or 421 comes in to contact with electrical contact 211 mounted on the aerosol generating system. Similarly, electrical contact 225 or 425 comes in to contact with electrical contact 215 when the liquid storage portion 113 is inserted into the aerosol generating system 100.

[0142] The electrical contacts 211, 215, 221, 225, 421, 425 allow electrical signals to pass between the liquid storage portion 113 and the rest of the aerosol generating system 100, whilst also allowing the liquid storage portion 113 to be removed and replaced with a new liquid storage portion 113, once the liquid within the storage portion 113 has been depleted.

[0143] One electrical contact 211 on the aerosol generating system 100 is electrically connected by an electrically conductive wire or other conductive means to a positive terminal of a battery or power supply means, V+. This electrical contact 211 is also electrically connected to one input of the micro controller, 309.

[0144] Further, electrical contact 215 is mounted on or in the aerosol generating system 100 and is connected by an electrically conductive means such as a wire to a first terminal of a resistor, 834. The electrical contact 215 is also electrically connected to an input of a micro controller 309, such as an analogue to digital converter input of a micro controller 309, via an amplifier 806.

[0145] A second terminal of resistor 834 is electrically connected to a first terminal of a transistor 855. A second terminal of transistor 855 is electrically connected to a digital output of micro controller 309. A third terminal of transistor 855 is electrically connected to a negative terminal V- of a power supply, battery, capacitor or other means for supplying electrical energy 107. Finally, the micro controller 309 is also electrically connected to the negative terminal V-of the power supply by an electrically conductive means.

[0146] The amplifier 806 is used to amplify the signal of the voltage across resistor 834 of value R734, V834, if this voltage amplitude is sufficiently small. Therefore, the value *R804* of resistor 804 may be determined from the values of V+ and voltage across resistor 834, V834, according to the following equation, provided the value R834 of resistor 834 and the gain, A, of the amplifier are known:

$$R804 = R834(A\frac{V+}{VADC} - 1)$$

where VADC is the voltage at the ADC input of the micro controller 309. VADC is equal to the voltage V834 multiplied by the gain of the amplifier, A.

[0147] In use, the aerosol generating system according to this embodiment performs the following steps to determine the identifier or type of liquid storage portion 113. First, when the aerosol generating system power is switched on, the digital output of the micro controller 309

NJOY Exhibit 1002.1591

is set to a high level. The transistor 855, which may be a complimentary metal oxide semiconductor (CMOS) transistor is activated which makes electrical current flow through resistors 804 and 832.

[0148] In some applications, the voltage amplitude of voltage V834 is sufficiently large that an amplifier 806 is not needed. In this case, the value of resistor R804 may be determined from the values of the V+ and the voltage, V834, across resistor 834 is known according to the following equation:

$$R804 = R834(\frac{V+}{V834} - 1)$$

[0149] Then, in both cases, the voltage across resistor 834 is input into an analog to digital conversion input of the microcontroller 309. The controller determines the value *R804* of resistor 804 using one of the above equations. Then, the thus determined resistance value is then compared to a set of resistance values stored in a memory such as a read only memory. The microcontroller 309 then determines if the determined resistance value corresponds to or matches a resistance value located in a memory space of the memory. If the values match, then a stored heating element profile, which is associated with the resistance value in the memory matching the determined resistance value is used to energize the heating element 119.

[0150] In other words, the aerosol generating system 100 determines the value R804 of resistor 804. It then compares this value to a database of resistor values. Each resistor value is associated with a different heating profile. The processor then selects the heating profile associated with the resistor value in the database which corresponds to, or matches the determined value of resistor 804. The heating profile may be defined by a number of different operational parameters for the heating element.

[0151] Figure 11 shows an electrical circuit diagram of an aerosol generating system 100 according yet a further embodiment of the invention. This diagram shows the case when a liquid storage portion 113 is inserted into the aerosol generating system 100.

[0152] In this embodiment, 4 separate resistors 904, 905, 906, 907 or other electrical components are located on or in the liquid storage portion 113. A first terminal of each resistor is electrically connected to electrical contact 921. When the liquid storage portion according to this embodiment is inserted into the aerosol generating system 100, electrical contact 921 comes into electrical contact with a contact 911 mounted on or in the aerosol generating system 100. Contact 911 is electrically connected both to a positive voltage V+ of a power supply means 107 and to a micro controller 309.

[0153] A second terminal of each resistor 904, 905, 906, 907 is electrically connected to connectors 924, 925, 926, 927. Each second terminal of each resistor is electrically connected to one of the connectors 924, 925, 926, 927. Each second terminal of each resistor 904, 905, 906, 907 is electrically connected to a different connector 924, 925, 926, 927. That is to say, each second terminal of each resistor 904, 905, 906, 907 is electrically connected only to one of the connectors 924, 925, 926, 927.

[0154] Further, four electrical contacts 914, 915, 916, 917 are provided on the aerosol generating system 100 embodying the circuit diagram of Figure 11. Four resistors 934 935, 936, 937, are provided in the circuitry. A first terminal of each of the resistors 934, 935, 936, 937 on the aerosol generating system is electrically connected to connectors 914, 915, 916, 917 on the aerosol generating system. Each first terminal of each resistor 934, 935, 936, 937 is electrically connected to one of the connectors 914, 915, 916, 917. Each first terminal of each resistor 934, 935, 936, 937 is electrically connected to a different connector 914, 915, 916, 917 on the aerosol generating system 100. That is to say, each first terminal of each resistor 934, 935, 936, 937 is electrically connected to only one of the connectors 914, 915, 916, 917.

[0155] Further, each first terminal of each resistor 934, 935, 936, 937 is separately electrically connected to a controller 309.

[0156] Each second terminal of each resistor 934, 935, 936, 937 is electrically connected to one terminal of transistor or switch 955 having 3 terminals. Each second resistor terminal is connected to the same transistor terminal. A second terminal of transistor 955 is electrically connected to a digital output of controller 309. A third terminal of transistor 955 is electrically connected to a negative voltage supply V-. The controller 309 is also electrically connected to the negative voltage supply V-.

[0157] When the liquid storage portion according to this embodiment is inserted into an aerosol generation system, electrical contact is made between connector 924 on the liquid storage portion 113 and connector 914 on the aerosol generating system 100. Similarly, electrical contact is made between connector 925 on the liquid storage portion 113 and connector 915 on the aerosol generating system 100, while electrical contact is made between connector 926 on the liquid storage portion and connector 916 on the aerosol generating system, and electrical contact is made between connector 927 on the liquid storage portion 113 and connector 917 on the aerosol generating system 100.

[0158] As previously described with reference to Figure 10 above, the value of the resistors 904, 905, 906, 907 can be determined using the following equation:

$$R90X = R93X(\frac{V+}{VR93X} - 1)$$

Where X = 4, 5, 6, 7.

[0159] The processor 309 determines the value of

NJOY Exhibit 1002.1592

each of the resistors 904, 905, 906, 907 using this equation, in a similar manner as previously described with reference to Figure 10. For example, the controller may determine that the resistors (904, 905, 906, 907) have values of (1kΩ, 2kΩ, 5kΩ, 10kΩ). This is referred to a resistor network code of (1, 2, 5, 10). With this configuration, the resistor network code is used to deliver a heating profile and the consumable type to the microcontroller. Therefore it does not require comparing the determined resistor values to stored resistor values associated with a heating profile.

[0160] The analog signals present at the analog to digital conversion ports are directly used to generate the heating profile. In this way the determined value of each of the resistors 904, 905, 906, 907 is used as a direct input to calculate the appropriate heating profile characteristics. The heating profile may be defined by a number of different operational parameters for the heating element. For example, the processor 309 uses the determined value of each resistor 904, 905, 906, 907 to directly calculate the value of each operational parameter which the processor applies to the heating element. This has the advantage that a look-up table is not required to determine what heating profile should be applied to a particular liquid storage portion since the processor 309 determines the values to be applied to the heating element based on the determined resistor values.

[0161] Figure 12 shows a liquid storage portion 113 according to the embodiment of the invention described with reference to Figure 11.

[0162] In this embodiment, the electrical contacts 921, 923, 924, 925, 926, 927 on the liquid storage portion 113 are arranged in a substantially rectangular or square lattice.

[0163] Figure 12 shows that the two electrical contacts 921, 923 which are closest to the central longitudinal axis of symmetry of the liquid storage portion, shown by a dot marked 12 in Figure 12, are the electrical contacts which provide electrical energy to the heating element 119. The electrical contacts 924, 925, 926, 927, which are furthest away from the longitudinal axis of symmetry of the aerosol generating system 100 are the electrical contacts which provides the electrical signals to the liquid storage portion recognition subsystem 229.

[0164] In this embodiment, the electrical contacts mounted on the aerosol generating system are arranged in a similar arrangement to the electrical contacts mounted on the liquid storage portion, shown in Figure 12, and so will not be described again in further detail.

[0165] Figure 13 is a schematic diagram of selected components of a further aerosol generating system embodying the invention.

[0166] A radio frequency identification (RFID) chip 1301 is located on or within the liquid storage portion. The chip may comprise an antenna 1307 electrically coupled to the chip. The chip 1301 and antenna 1307 may be incorporated into a single tag which may be applied by adhesive or other means to the liquid storage portion. The chip contains a flash memory or an Electrically Erasable Programmable Read Only Memory (EEPROM) in which data such as one or more of a liquid former identification i.e. the liquid contained within the liquid storage portion 113, a cartridge serial number, and a heating profile for the liquid former.

[0167] The aerosol generating system according to this embodiment comprises an interrogator 1303 and an antenna 1305 electrically coupled to the interrogator. The interrogator 1303 and antenna 1305 may be integrated into a single processor 309 for controlling operation of the aerosol generating system 100. Alternatively the interrogator 1303 and antenna 1305 may be separate from the processor 309.

[0168] When the aerosol generating system 100 is switched on, the interrogator 1303, located on or within the aerosol generating system 100 energizes the RFID chip 1301 via antenna 1307 with a radio frequency (RF) signal emitted from the antenna 1305.

[0169] The data from the chip are then transmitted by frequency modulation emitted from the antenna 1307 located on the chip 1301 to the interrogator 1303 via the antenna 1305.

[0170] If the interrogator 1303 receives data, then the data may be stored in a memory.

[0171] The data received from the chip 1301 may comprise a liquid storage portion identifier and optionally one or more operational parameters of the heating element which the system may use to energize the heating element, or an identifier of the type of liquid contained within the liquid storage portion. The liquid storage portion identifier may be a unique identifier.

[0172] In use, the controller 309 may examine the data to determine the liquid storage portion type being used with the aerosol generating system. Therefore, the controller can distinguish between different liquid storage portions.

[0173] The controller 309 may apply a particular energy profile to heater 119 in dependence on the determined liquid storage portion type or identifier. For example, the data received by the system 100 may be optimal heating element operating parameters to deliver to the user a particular quantity of aerosol for a particular liquid formula. For example, in one embodiment, the liquid may comprise nicotine. The heat of vaporization of this particular liquid formula is different to the heat of vaporization required to vaporize a liquid not containing nicotine.

[0174] Therefore, the data encoded in a chip 1301 associated with each liquid storage portion 113 allows the controller 309 to determine the liquid storage portion identifier, and hence the type of liquid contained within the liquid storage portion 113. It also allows the controller 309 to deliver the appropriate heating profile to the heating element 119 based on the data received from the chip associated with each liquid storage portion 113.

[0175] Figure 14 shows a schematic diagram of selected components of an aerosol generating system 100 embodying the invention. Data such as data identifying

NJOY Exhibit 1002.1593

a liquid storage portion 113 is stored on a memory on or in the liquid storage portion.

[0176] In the embodiment shown in Figure 14, data is transferred between a controller 309 and memory 1401 using an 12C bus although other data transmission protocols are possible.

[0177] The memory 1401 is powered by electrically connecting the memory 1401 with an electrically conductive portion to one terminal of a power supply, such as a positive voltage, V+.The memory is also electrically connected with an electrically conductive portion to another terminal of a power supply, such as a negative voltage, V-.

[0178] The memory is also electrically connected to the controller 309 via a clock line, SCL, so synchronise data transfer over the data line. The memory is further electrically connected to the controller 309 via a data line, SDA, which allows data to be transferred between the memory 1401 and the controller 309.

[0179] The data stored on the memory 1401 may comprise information enabling the system 100 to distinguish between different liquid storage portions. The data may comprise operational parameters for the heating element of the smoking system which have been optimised for the particular liquid contained within the liquid storage portion 113. The data is encoded on a Programmable Read Only Memory or Flash Memory located on or in the liquid storage portion.

[0180] The data for a particular liquid storage portion, such as a heating profile, product identification or liquid storage portion identifier are stored in a flash or Erasable Programmable Read Only Memory (EPROM) memory 1401 located on or within the liquid storage portion 1301

[0181] When the aerosol generating system is switched on, the microcontroller 309 interrogates the memory 1401 via a serial communication bus using an 12C communication protocol or another serial data transfer protocol. If the data stored in cartridge present the correct format or the correct information is present, the data stored in the memory will then further be used when the aerosol generating device is used.

[0182] This embodiment has the advantage that only 2 physical connections with the device, shown as solid dark circles in figure 14, in addition to the two power connections shown in solid dark circles in Figure 14 are required for supplying electrical power to the memory 1401.

[0183] Therefore, the data encoded in the memory 1401 associated with each liquid storage portion allows the controller 309 to receive data from the memory 1401 and determine the liquid storage portion identifier, and hence the type of liquid contained within the liquid storage portion 113. It also allows the controller 309 to deliver the appropriate heating profile to the heating element 119 based on the data received from the memory 1401 associated with each liquid storage portion. The heating profile may be defined by a number of different operational parameters for the heating element.

[0184] In a further embodiment, not shown in the drawings, a 3-dimensional shape including one or more bumps, protuberances, hollows, or furrows may be formed in the liquid storage portion, or attached to the exterior or other surface of the liquid storage portion 113.

[0185] The aerosol generating system 100 includes one or more switches which are engaged by the 3-dimensional shape comprising one or more bumps on the liquid storage portion.

[0186] In this way, the particular position on the liquid storage of the bumps, protuberances, hollows, or furrows or hollows may determine whether one or more of the switches is activated.

[0187] The position of the bumps or hollows on the liquid storage portion therefore allows information about the liquid storage portion to be encoded into or onto the liquid storage portion in the form of a 3-dimensional shape. Therefore, the 3-dimentionsal shape associated with each liquid storage portion allows the controller 309 to determine the liquid storage portion identifier, and hence the type of liquid contained within the liquid storage portion 113. It also allows the controller 309 to deliver the appropriate heating profiled to the heating element based on the date decoded from the shape associated with each liquid storage portion 113.

[0188] A number of embodiments have been described and it should be understood that features described in relation to one embodiment may also apply to another embodiment, where appropriate. The scope of the present invention is defined with reference to the following claims.

Claims

1. A liquid storage portion (113) comprising an electrical component (504, 505, 804, 904, 905, 906, 907, 1301, 1401) for distinguishing the storage portion (113) from other liquid storage portions, the liquid storage portion (113) being configured for use in an aerosol generating system (100) having means for determining (309) an electrical characteristic of the electrical component (504, 505, 804, 904, 905, 906, 907, 1301, 1401) and means for distinguishing (309) the liquid storage portion from other liquid storage portions based on the determined electrical characteristic of the electrical component.

2. A liquid storage portion (113) according to claim 1 further comprising one or more further electrical components (505, 905, 906, 907) the components preferably being connected in series or parallel with each other.

3. A liquid storage portion (113) according to any preceding claim in which the electrical component or components comprises one or more resistors (504, 505, 804, 904, 905, 906, 907) or one or more radio frequency identification microchips (1301) or one or

NJOY Exhibit 1002.1594

more microchip memories (1401).

4. A liquid storage portion (113) according to any preceding claim further comprising one or more electrical contacts (221, 223, 225, 421, 423, 425, 921, 923, 924, 925, 926, 927) for electrical connection to one or more of the electrical component or components (504, 505, 804, 904, 905, 906, 907, 1301, 1401).

5. A liquid storage portion (113) according to claim 4 in which the electrical contacts (221, 223, 225, 421, 423, 425, 921, 923, 925, 926, 927) are arranged in a substantially straight line or in a substantially triangular array or in a substantially square array or a substantially rectangular array.

6. A liquid storage portion (113) according to any preceding claim further comprising a heating element (119), the heating element (119) preferably being integral to the liquid storage portion (113).

7. An aerosol generating system (100) for receiving a liquid storage portion (113) configured for use with the aerosol generating system (100), the system comprising:

means for determining (309) an electrical characteristic of an electrical component (504, 505, 804, 904, 905, 906, 907, 1301, 1401) associated with the liquid storage portion (113); and
means for distinguishing (309) the liquid storage portion (114) from other liquid storage portions for use with the aerosol generating system (100) based on the determined electrical characteristic of the electrical component associated with the liquid storage portion (113).

8. An aerosol generating system according to claim 7 further comprising transmission means (201, 203, 205, 211, 213, 215, 221, 421, 223, 423, 224, 425, 230, 235, 1305,1307) arranged to transmit signals between the determining means (309) and the electrical component (504, 505, 804, 904, 905, 906, 907, 1301, 1401).

9. An aerosol generating system (100) according to claim 8 in which the determining means (309) further comprises one or more further electrical components (834, 934, 935, 936, 937).

10. An aerosol generating system (100) according to any one of claims 7 to 9 further comprising a memory for storing a look-up table, the look-up table comprising data representing one or more electrical characteristics of one or more electrical components, each electrical characteristic associated with data identifying a liquid storage portion (113).

11. An aerosol generating system (100) according to claim 10 further comprising a means (309) for searching the look-up table.

12. A liquid storage portion (113) comprising a 3-dimensional object for distinguishing the storage portion (113) from other liquid storage portions, the liquid storage portion (113) being configured for use in an aerosol generating system (100) having means for determining (309) a characteristic of the 3-dimensional object and means for distinguishing (309) the liquid storage portion from other liquid storage portions based on the determined characteristic of the 3-dimensional object.

13. An aerosol generating system (100) for receiving a liquid storage portion configured for use with the aerosol generating system (100), the system comprising:

means for determining (309) a characteristic of a 3-dimensional object associated with the liquid storage portion (113); and
means for distinguishing (309) the liquid storage portion (113) from other liquid storage portions for use with the aerosol generating system (100) based on the determined characteristic of the 3-dimensinoal object associated with the liquid storage portion (113).

14. A method for distinguishing between types of liquid storage portion used with an aerosol generating system (100), the method comprising the steps of:

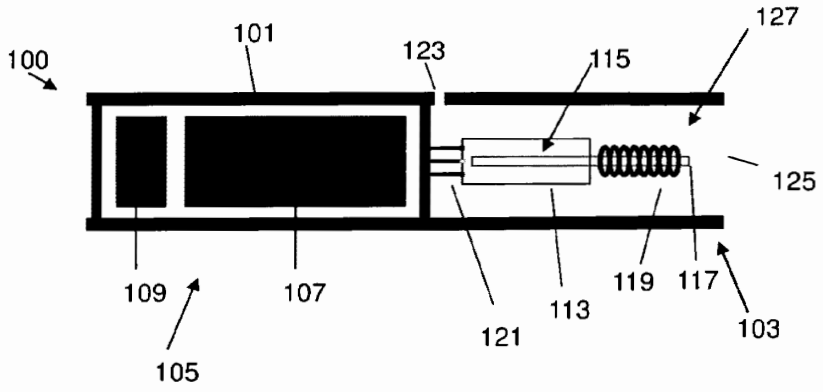
determining (309) an electrical characteristic of an electrical component (504, 505, 804, 904, 905, 906, 907, 1301, 1401) associated with the liquid storage portion (113);
distinguishing (309) the liquid storage portion (114) from other liquid storage portions for use with the aerosol generating system (100) based on the determined electrical characteristic of the electrical component associated with the liquid storage portion (113).

15. A method for distinguishing between types of liquid storage portion used with an aerosol generating system (100), the method comprising the steps of:

determining (309) a characteristic of a 3-dimensional object associated with the liquid storage portion (113);
distinguishing (309) the liquid storage portion (114) from other liquid storage portions for use with the aerosol generating system (100) based on the determined characteristic of the e3-dimensional object associated with the liquid storage portion (113).

NJOY Exhibit 1002.1595

Figure 1



NJOY Exhibit 1002.1596

Figure 2

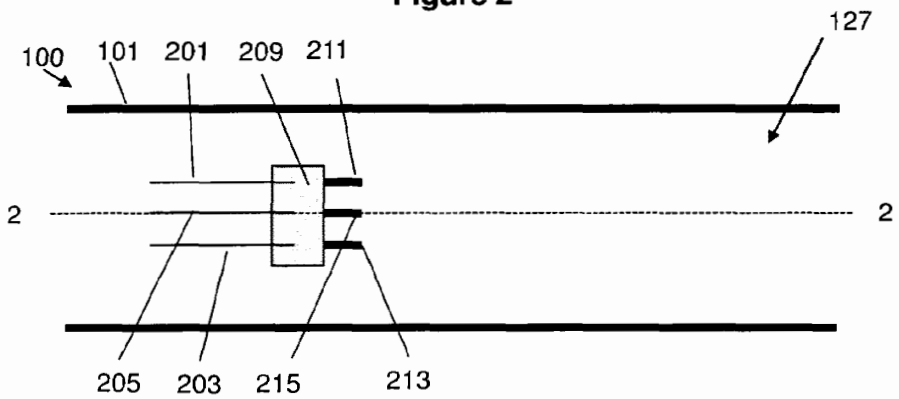
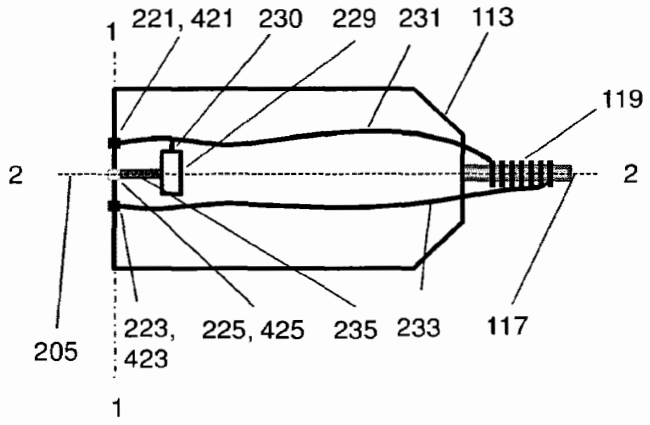


Figure 3



NJOY Exhibit 1002.1597

Figure 4

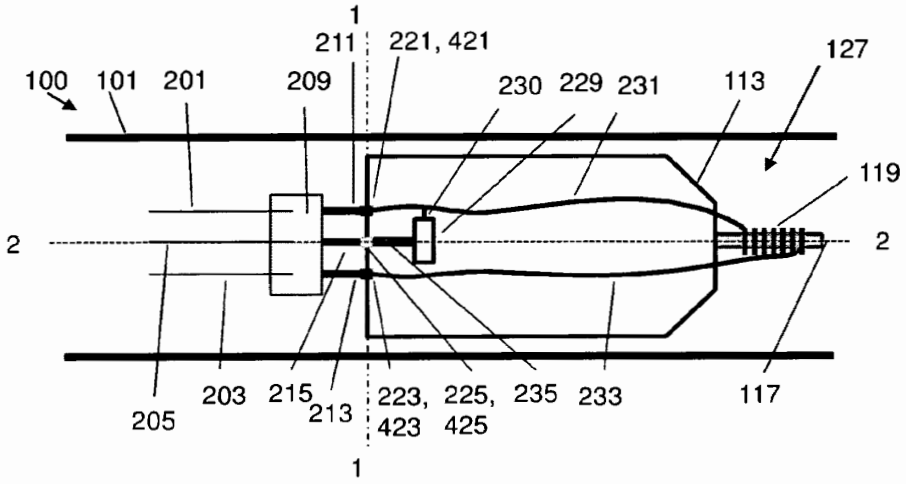


Figure 5

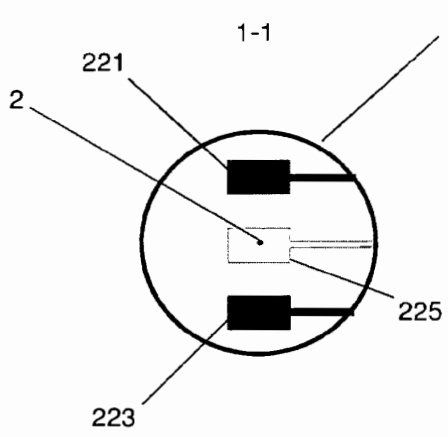
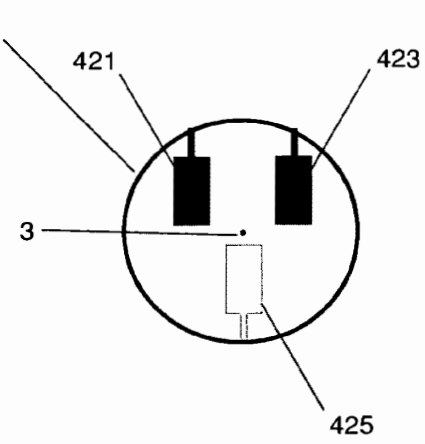
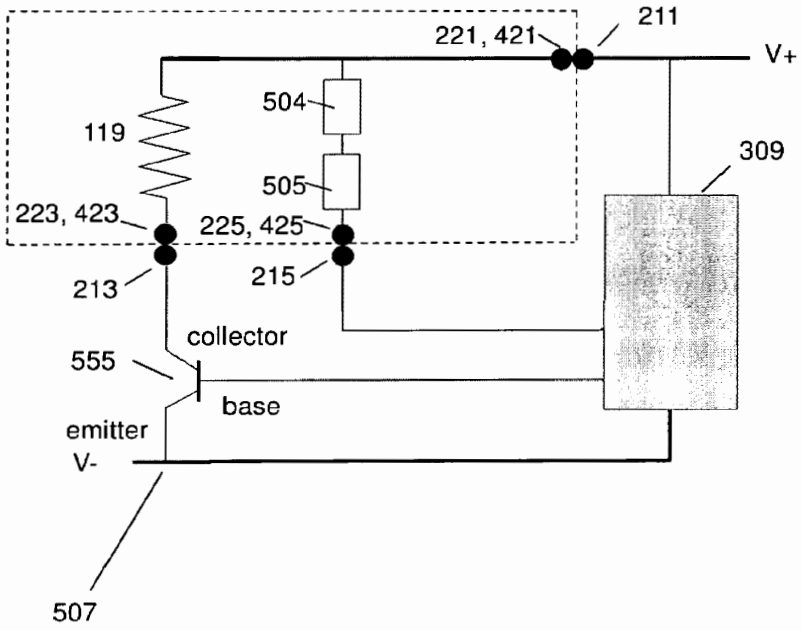


Figure 6



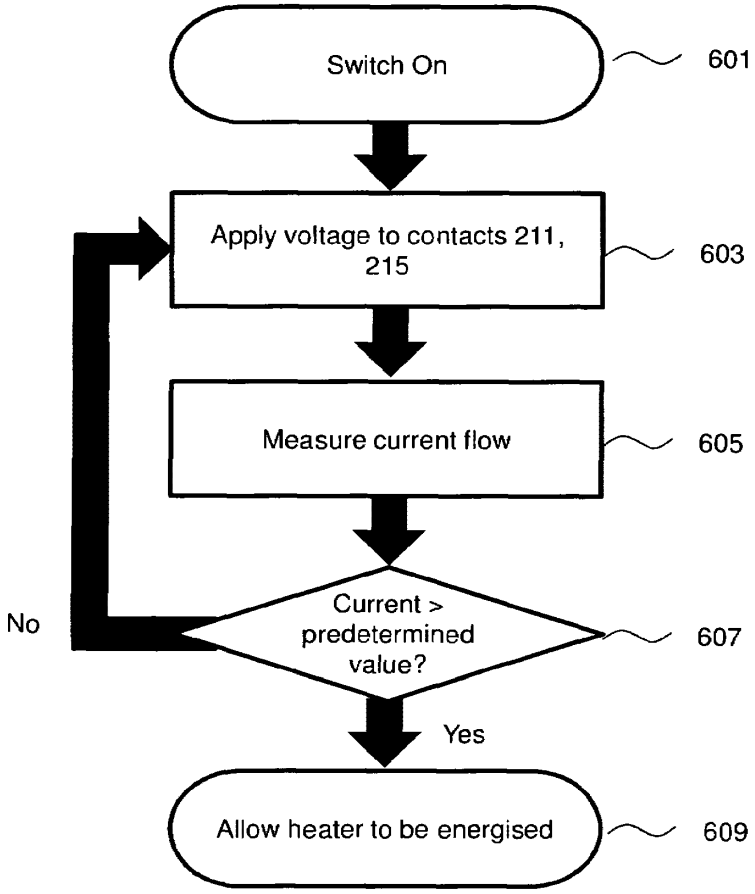
NJOY Exhibit 1002.1598

Figure 7



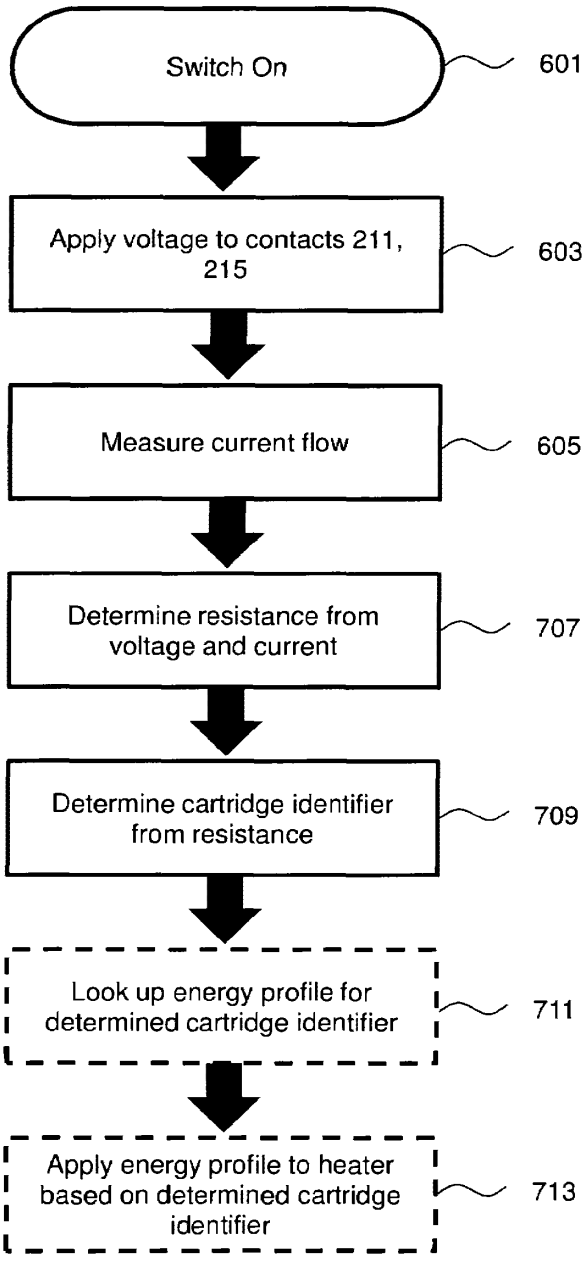
NJOY Exhibit 1002.1599

Figure 8



NJOY Exhibit 1002.1600

Figure 9



NJOY Exhibit 1002.1601

Figure 10

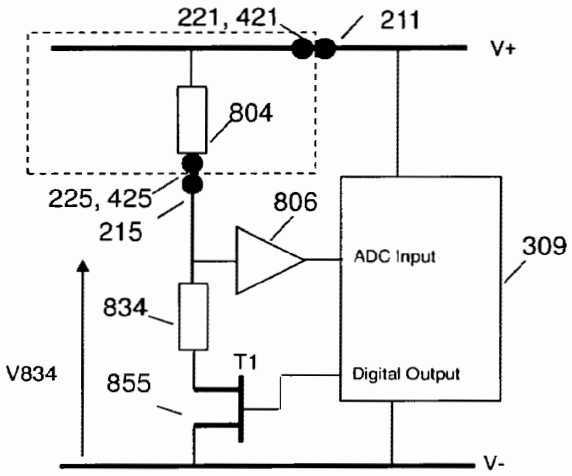
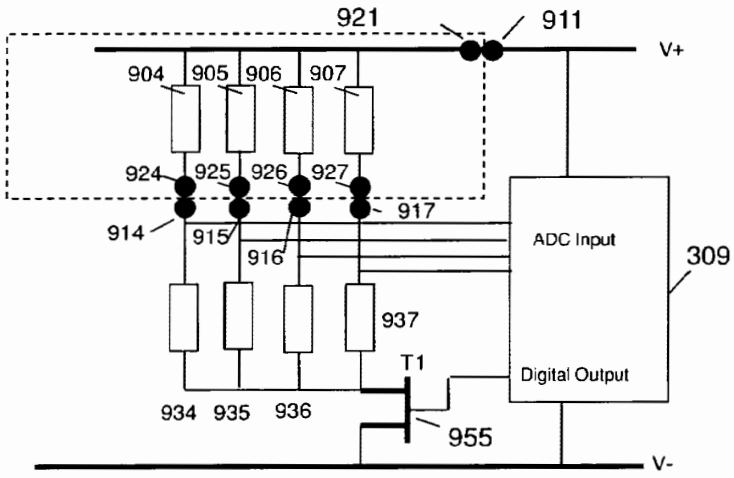


Figure 11



NJOY Exhibit 1002.1602

Figure 12

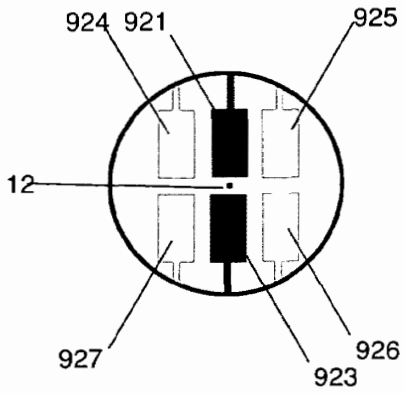
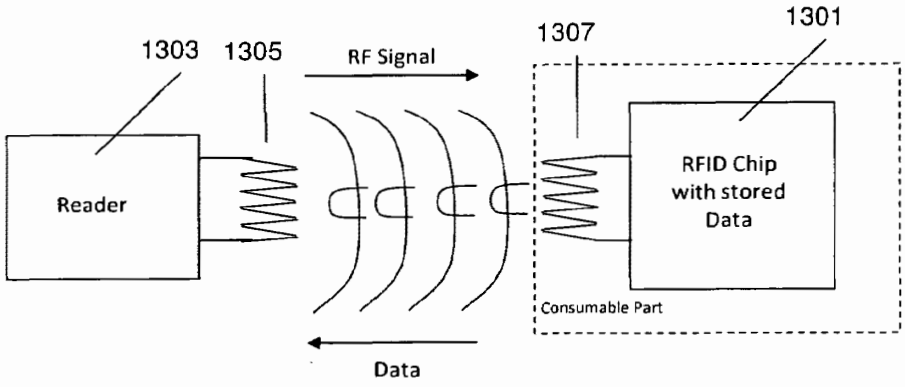
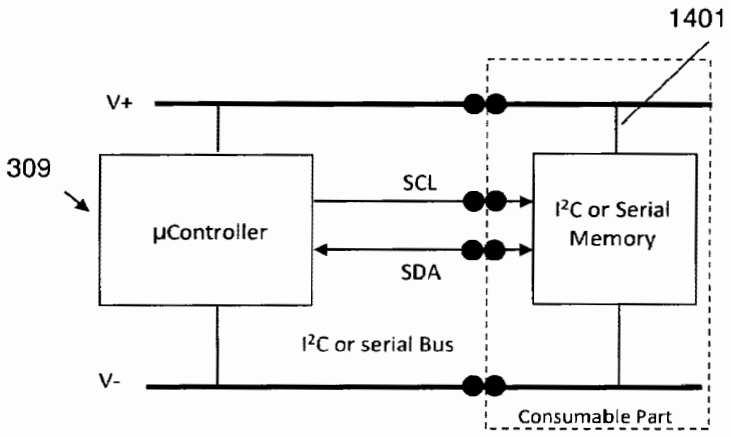


Figure 13



NJOY Exhibit 1002.1603

Figure 14



NJOY Exhibit 1002.1604

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 10 25 1135

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y	EP 1 772 166 A1 (CANON KK [JP]) 11 April 2007 (2007-04-11) * paragraph [0040] - paragraph [0041] *	1-4,7-9, 14 5,6,10, 11	INV. A61M11/04 A61M15/06 A24F47/00
Y	US 2009/095287 A1 (EMARLOU HAMID [US]) 16 April 2009 (2009-04-16) * paragraph [0029] - paragraph [0031] *	6	
Y	WO 2005/025654 A1 (INJET DIGITAL AEROSOLS LTD [AU]; REINHOLD OLAF [US]; LACKEY ROBERT P [) 24 March 2005 (2005-03-24) * page 43, line 12 - page 43, line 18 *	10,11	
Y	US 2006/118612 A1 (CHRISTOFFERSEN LASSE W [DK] ET AL CHRISTOFFERSEN LASSE WENGEL [DK] ET) 8 June 2006 (2006-06-08) * paragraph [0025]; figures * * paragraph [0030] * * paragraph [0116] * * paragraph [0117] *	5	
			TECHNICAL FIELDS SEARCHED (IPC)
A,D	WO 2007/078273 A1 (AUGITE INC [US]; LIU ZHEN [CN]) 12 July 2007 (2007-07-12) * abstract; figures *	1-11,14	A61M A24F
X	WO 03/059424 A1 (AEROGEN INC [US]) 24 July 2003 (2003-07-24) * figures 2,5-6 * * page 14, line 1 - page 14, line 15 *	12,13,15	
A	WO 2006/084543 A1 (PARI GMBH [DE]; BORGSCHULTE MARKUS [DE]; ACHTZEHNER WOLFGANG [DE]) 17 August 2006 (2006-08-17) * figure 2 * * paragraph [0031] *	12,13,15	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	17 May 2011	Valfort, Cyril

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

NJOY Exhibit 1002.1605

Europäisches Patentamt
European Patent Office
Office européen des brevets

Application Number
EP 10 25 1135

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☒ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).

NJOY Exhibit 1002.1606

Europäisches Patentamt
European Patent Office
Office européen des brevets

LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 10 25 1135

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-11, 14

A liquid storage portion comprising an electrical component, an aerosol generating system for receiving a liquid storage portion and the coresponding method.

---

2. claims: 12, 13, 15

A liquid storage portion comprising a 3-dimensional object for distinguishing the storage portion, an aerosol generating system and corresponding method.

NJOY Exhibit 1002.1607

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 10 25 1135

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

17-05-2011

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1772166 A1	11-04-2007	CN 1943810 A	11-04-2007
		JP 2007097787 A	19-04-2007
		US 2007076067 A1	05-04-2007
US 2009095287 A1	16-04-2009	NONE	
WO 2005025654 A1	24-03-2005	AU 2003260166 A1	06-04-2005
		EP 1670531 A1	21-06-2006
		JP 2007505644 T	15-03-2007
US 2006118612 A1	08-06-2006	AT 402688 T	15-08-2008
		EP 1608305 A1	28-12-2005
WO 2007078273 A1	12-07-2007	NONE	
WO 03059424 A1	24-07-2003	AU 2003203043 A1	30-07-2003
		EP 1474196 A1	10-11-2004
		JP 2005514991 T	26-05-2005
		JP 2006150093 A	15-06-2006
		US 2003140921 A1	31-07-2003
		US 2008060641 A1	13-03-2008
		US 2005172954 A1	11-08-2005
WO 2006084543 A1	17-08-2006	DE 102005006372 A1	24-08-2006
		EP 1850897 A1	07-11-2007
		US 2009120431 A1	14-05-2009

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

NJOY Exhibit 1002.1608

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- WO 2007078273 A **[0002]**

NJOY Exhibit 1002.1609

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 609 821 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
03.07.2013 Bulletin 2013/27

(51) Int Cl.:
A24F 47/00 *(2006.01)*

(21) Application number: **11196235.3**

(22) Date of filing: **30.12.2011**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(71) Applicant: **Philip Morris Products S.A.**
2000 Neuchâtel (CH)

(72) Inventors:
- **Plojoux, Julien**
  1205 Geneva (CH)
- **Greim, Olivier**
  1423 Villars-Burquin (CH)

(74) Representative: **Bates, Alan Douglas Henry**
Reddie & Grose LLP
16 Theobalds Road
London
WC1X 8PL (GB)

(54) Method and apparatus for cleaning a heating element of aerosol-generating device

(57) A method of using an aerosol-generating device (10) comprises the steps of, bringing a heating element (90) of the aerosol-generating device into contact with an aerosol-forming substrate (30), raising the temperature of the heating element (90) to a first temperature to heat the aerosol-forming substrate (30) sufficiently to form an aerosol, removing the heating element from contact with the aerosol-forming substrate and heating the heating element to a second temperature, higher than the first temperature, to thermally liberate organic materials adhered to or deposited on the heating element.

An embodiment of an aerosol-generating device (10) comprises a heating element (90) coupled to a controller (19) for heating the heating element to the first temperature and to the second temperature.

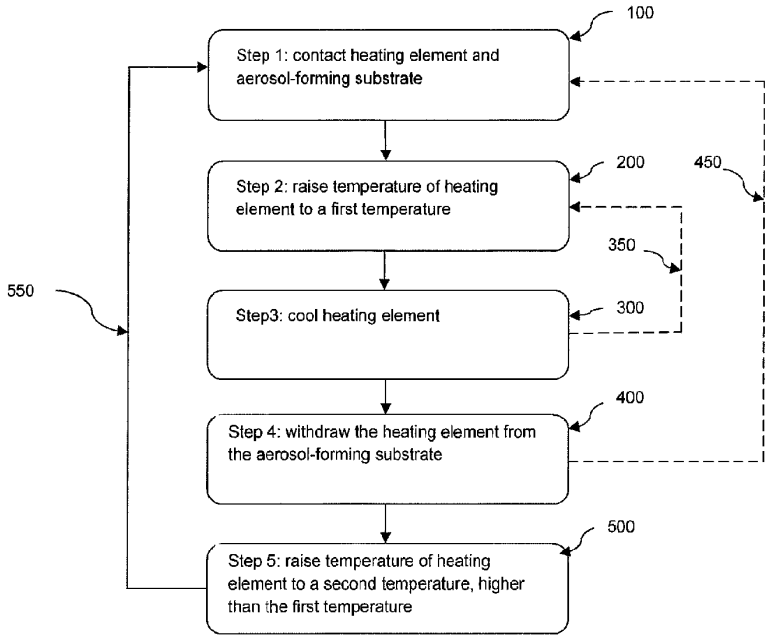


Figure 4

EP 2 609 821 A1

NJOY Exhibit 1002.1610

Description

[0001] The present specification relates to a method of using an aerosol-generating device having a reusable heating element and to an aerosol-generating device comprising a heating element for use in the consumption of a smoking article.

[0002] Smoking articles in which an aerosol-forming substrate, such as a tobacco containing substrate, is heated rather than combusted are known in the art. The aim of such heated smoking articles is to reduce known harmful smoke constituents produced by the combustion and pyrolytic degradation of tobacco in conventional cigarettes. Typically in such heated smoking articles, an aerosol is generated by the transfer of heat from a heat source to a physically separate aerosol-forming substrate or material, which may be located within, around or downstream of the heat source. During smoking, volatile compounds are released from the aerosol-forming substrate by heat transfer from the heat source and entrained in air drawn through the smoking article. As the released compounds cool, they condense to form an aerosol that is inhaled by the consumer.

[0003] A number of prior art documents disclose aerosol-generating devices for consuming or smoking heated smoking articles. Such devices include, for example, heated smoking systems and electrically heated smoking systems. One advantage of these systems is that they significantly reduce sidestream smoke, while permitting the smoker to selectively suspend and reinitiate smoking. An example of a heated smoking system is disclosed in U.S. Patent No. 5,144,962, which includes in one embodiment a flavour-generating medium in contact with a heater. When the medium is exhausted, both it and the heater are replaced. An aerosol-generating device where a smoking article can be replaced without the need to remove the heating element is desirable.

[0004] Typically, smoking articles for use with aerosol-generating devices comprise an aerosol-forming substrate that is assembled, often with other elements or components, in the form of a rod. Typically, such a rod is configured in shape and size to be inserted into an aerosol-generating device that comprises a heating element for heating the aerosol-forming substrate.

[0005] Other aerosol-generating devices, such as the electrical lighter disclosed in U.S. Patent No. 5,878,752, use a sleeve, e.g., ceramic or metal, surrounds the heater fixture, and a resistive heating element is in thermal proximity with the sleeve. In conjunction with the sleeve-type heater, a cleaning element is optionally inserted into the cigarette receptacle of the electrical lighter or placed at the exit thereof to absorb, attract and/or catalytically break down the thermally liberated condensates. In such systems, the cigarette heater fixture may be defined by blades that concentrically surround an inserted cigarette.

[0006] In contrast to such systems, direct contact between a heating element, for example an electrically actuated heating element, and the aerosol-forming substrate may provide an efficient means for heating the aerosol-forming substrate to form an inhalable aerosol. In such a device configuration, heat from a heating element may be conveyed almost instantaneously to at least a portion of the aerosol-forming substrate when the heating element is actuated, and this may facilitate the rapid generation of an aerosol. Furthermore, the overall heating energy required to generate an aerosol may be lower than would be the case in a system where the aerosol-forming substrate does not directly contact a heating element and initial heating of the substrate occurs by convection or radiation. Where a heating element is in direct contact with an aerosol-forming substrate, the initial heating of portions of the substrate that are in contact with the heating element will be effected by conduction.

[0007] The present specification provides a method of using an aerosol-generating device, an aerosol-generating device, and a kit comprising an aerosol-generating device as set out in this specification. Various embodiments are set out in this specification.

[0008] Thus, in one aspect the present specification may provide a method of using an aerosol-generating device that has a reusable heating element for heating an aerosol-forming substrate. The method comprises the steps of bringing the heating element into direct contact with the aerosol-forming substrate and raising the temperature of the heating element to a first temperature to heat the aerosol-forming substrate such that an aerosol is formed. The method then provides the steps of removing or withdrawing the heating element from contact with the aerosol-forming substrate and raising the temperature of the heating element to a second temperature sufficient to thermally liberate organic materials deposited on the heating element. The second temperature is a higher temperature than the first temperature. The thermal liberation may occur by a pyrolysis or carbonisation reaction.

[0009] The aerosol-forming substrate may be a solid aerosol-forming substrate. Alternatively, the aerosol-forming substrate may comprise both solid and liquid components. The aerosol-forming substrate may comprise a tobacco-containing material containing volatile tobacco flavour compounds, which are released from the substrate upon heating. Alternatively, the aerosol-forming substrate may comprise a non-tobacco material. The aerosol-forming substrate may further comprise an aerosol former. Examples of suitable aerosol formers are glycerine and propylene glycol.

[0010] If the aerosol-forming substrate is a solid aerosol-forming substrate, the solid aerosol-forming substrate may comprise, for example, one or more of: powder, granules, pellets, shreds, spaghettis, strips or sheets containing one or more of: herb leaf, tobacco leaf, fragments of tobacco ribs, reconstituted tobacco, processed tobacco, homogenised tobacco, extruded tobacco and expanded tobacco. The solid aerosol-forming substrate may be in loose form, or may be provided in a suitable container or cartridge. For example, the aerosol-forming

NJOY Exhibit 1002.1611

material of the substrate may be contained within a paper or wrap and have the form of a plug. Where an aerosol-forming substrate is in the form of a plug, the entire plug including any wrapping paper is considered to be the aerosol-forming substrate.

[0011] Optionally, the solid aerosol-forming substrate may contain additional tobacco or non-tobacco volatile flavour compounds, to be released upon heating of the substrate. The solid aerosol-forming substrate may also contain capsules that, for example, include the additional tobacco or non-tobacco volatile flavour compounds and such capsules may melt during heating of the solid aerosol-forming substrate.

[0012] Optionally, the solid aerosol-forming substrate may be provided on or embedded in a thermally stable carrier. The carrier may take the form of powder, granules, pellets, shreds, spaghettis, strips or sheets. The solid aerosol-forming substrate may be deposited on the surface of the carrier in the form of, for example, a sheet, foam, gel or slurry. The solid aerosol-forming substrate may be deposited on the entire surface of the carrier, or alternatively, may be deposited in a pattern in order to provide a non-uniform flavour delivery during use.

[0013] In preferred embodiments, the aerosol-forming substrate is contained in a smoking article, for example a rod-shaped smoking article such as a cigarette. The smoking article is preferably of suitable size and shape to engage with the aerosol-generating device so as to bring the aerosol-forming substrate into contact with the heating element of the device. For example, the smoking article may have a total length between approximately 30 mm and approximately 100 mm. The smoking article may have an external diameter between approximately 5 mm and approximately 12 mm.

[0014] The terms upstream and downstream may be used to describe relative positions of elements or components of the smoking article. For simplicity, the terms "upstream" and "downstream" as used herein refer to a relative position along the rod of the smoking article with reference to the direction in which the aerosol is drawn through the rod.

[0015] The heating element may conveniently be shaped as a needle, pin, rod, or blade that may be inserted into a smoking article in order to contact the aerosol-forming substrate. The aerosol-generating device may comprise more than one heating element and in the following description reference to a heating element means one or more heating elements.

[0016] The temperature of the heating element can be raised to both the first temperature and to the second temperature. The temperature may be raised by any suitable method. For example, the temperature may be raised by conduction caused by contact with another heat source. The temperature may be raised by inductive heating caused by a fluctuating electromagnetic field. The temperature may be raised by resistive heating caused by passing an electric current through a conductive wire or resistive track. In one embodiment, the track may have a resistance between 0.5 and 5 ohms.

[0017] Preferably the heating element comprises a rigid electrically insulating substrate with an electrically conductive track or wire disposed on its surface. Preferably the size and shape of the electrically insulating substrate allow it to be inserted directly into an aerosol-forming substrate. If the electrically insulating substrate is not sufficiently rigid, the heating element may comprise a further reinforcement means. A current may be passed through the track or wire to heat the heating element and the aerosol-forming substrate.

[0018] It is preferable that the aerosol-generating device further comprises electronic circuitry arranged to control the supply of current to the heating element to control the temperature. The aerosol-generating device may also comprise means for sensing the temperature of the heating element. This may enable the electronic circuitry or control circuitry to raise the temperature of the heating element to both the first temperature and the second temperature. It is preferred that the first temperature is a temperature high enough to cause the evolution of volatile compounds from the aerosol-forming substrate and, thus, the formation of an aerosol. It is preferred that the first temperature is not high enough to burn the aerosol-forming substrate.

[0019] Preferably the first temperature is lower than about 375 degrees centigrade. For example the first temperature may be between 80 degrees centigrade and 375 degrees centigrade, for example between 100 degrees centigrade and 350 degrees centigrade. The length of time that the heating element is held at the first temperature may be fixed. For example, the first temperature may be maintained for a period of greater than 2 seconds, for example between 2 seconds and 10 seconds. The length of time that the heating element is held at the first temperature may be a variable. For example, the aerosol-generating device may comprise a sensor that determines when a user is drawing on the smoking article and the time may be controlled by the length of time that the user draws on the smoking article.

[0020] During a period in which the heating element is in contact with the aerosol-forming substrate, the heating element undergoes a thermal cycle during which it is heated to the first temperature and then cooled. The heating element is preferably cooler than the first temperature when it is removed from contact with the aerosol-forming substrate. During contact, particles of the aerosol-forming substrate may adhere to a surface of the heating element. Furthermore, volatile compounds and aerosol evolved by the heat from the heating element may become deposited on a surface of the heating element. Particles and compounds adhered to and deposited on the heating element may prevent the heating element from functioning in an optimal manner. These particles and compounds may also break down during use of the aerosol-generating device and impart unpleasant or bitter flavours to a user. For these reasons it is desirable to clean the heating element periodically.

NJOY Exhibit 1002.1612

[0021] It is preferred that the second temperature is a temperature high enough to thermally liberate organic compounds that are in contact with the heating element. The organic compounds may be any particles or compounds adhered to or deposited on a surface of the heating element during a period of contact between the heating element and a substrate.

[0022] Thermal liberation of organic compounds may occur by pyrolysis. Pyrolysis is a process in which chemical compounds decompose due to the action of heat. Organic compounds generally pyrolyse to form organic vapours and liquids, which in the present specification may migrate away from the heating element leaving it in a cleaned state.

[0023] It is preferred that organic materials deposited on the heating element are thermally liberated by raising the temperature of the heating element to about 430 degrees centigrade or greater. For example, the temperature may be raised to greater than 475 degrees centigrade or greater than 550 degrees centigrade. The temperature may be raised to higher temperatures such as greater than 600 degrees centigrade or greater than 800 degrees centigrade.

[0024] It is preferable that the heating element is held at the second temperature for a period of time to effect thermal liberation of organic compounds. For example, the heating element may be held at the second temperature for more than 5 seconds. Preferably, the heating element is held at the second temperature for a period of between 5 seconds and 60 seconds, for example between 10 seconds and 30 seconds.

[0025] Smoking articles for use with aerosol-generating devices comprise an amount of an aerosol-forming substrate. The aerosol-forming substrate may be consumed entirely during a single thermal cycle of the heating element. In one such an embodiment, the heater will be constantly on and the temperature will be regulated by the amount of energy provided to the heating element during operation. This may be the case, for example, if the heating element is maintained at the first temperature for the duration of the consumption of the smoking article. Alternatively, the heating element is repeatedly pulsed through thermal cycles to the first temperature and back. These pulses may occur simultaneously with periods when a user is drawing on the smoking article. A portion of aerosol is generated each time the temperature reaches the first temperature and aerosol generation ceases each time the heating element cools again. When no further aerosol is generated the smoking article has been consumed. Thus, there may be more than 5 or more than 10 or more than 15 thermal cycles in which the heating element is raised to the first temperature and then cooled before the smoking article is consumed.

[0026] A user may remove a consumed smoking article and replace it with a fresh, unconsumed, smoking article without performing the step of raising the temperature of the heating element to the second temperature. In other words, the user may consume more than one article before performing a cleaning step to thermally liberate organic materials from the heating element.

[0027] Thus, the temperature of the heating element may be raised to the first temperature a plurality of times before the step of raising the heating element to the second temperature is carried out.

[0028] The step of raising the temperature of the heating element to the second temperature to thermally liberate organic materials adhered to or deposited on the heating element may be termed a cleaning step.

[0029] The cleaning step may be actuated manually by a user. For example, a user may decide that the heating element needs to be cleaned and actuate a cleaning cycle in which the heating element is raised to the second temperature for a predetermined period of time. Actuation may be effected by pressing a button on the aerosol-generating device. Preferably, the cleaning cycle is terminated automatically after a predetermined or preprogrammed thermal cycle.

[0030] The aerosol-generating device may comprise a sensing means to determine whether or not a smoking article is engaged with the aerosol-generating device. If a smoking article is engaged, preferably the aerosol-generating means comprises control means, for example control software that acts to prevent the heating element being heated to the second temperature, thereby preventing the cleaning cycle from being actuated while a smoking article is engaged with the aerosol-generating device.

[0031] The cleaning step may be actuated automatically. For example, the aerosol-generating device may comprise means for detecting when the heating element is removed from contact with the aerosol-generating substrate, for example when a smoking article is removed from the device. When such an event is detected the heating element may automatically be cycled through a cleaning regime in which the heating element is heated to the second temperature for a period of time.

[0032] Control means associated with the aerosol-generating device may record the number of smoking articles consumed by a user and automatically trigger a cleaning cycle after a predetermined number of smoking articles have been consumed.

[0033] In some embodiments, an aerosol-generating device may comprise a battery to provide energy for heating the heating element. It may be advantageous if the aerosol-generating device is associated with a docking station for re-charging the battery and for other functions. It may be advantageous that a cleaning cycle is triggered when the aerosol-generating device is docked in a docking station. The docking station may be able to supply more power to the heating element than the aerosol-generating device, and the second temperature may, therefore, be higher. A higher second temperature may result in a more efficient or faster cleaning process.

[0034] In one aspect the specification may provide an aerosol-generating device comprising a heating element coupled to a controller. The controller is programmed to

NJOY Exhibit 1002.1613

actuate the heating element through a first thermal cycle in which the temperature of the heating element is raised to a first temperature lower than about 400 degrees centigrade in order to produce an average temperature of 375 degrees centigrade over the heating element surface and a maximum temperature anywhere on the surface, i.e., a maximum localized temperature, of 420 degrees centigrade. This allows an aerosol to be formed from an aerosol-forming substrate disposed in proximity to the heating element without burning the aerosol-forming substrate. The controller is further programmed to actuate the heating element through a second thermal cycle in which the temperature of the heating element is raised to a second temperature higher than about 430 degrees centigrade in order to thermally liberate organic material deposited on the heating element.

[0035] Preferably the first temperature is greater than 80 degrees centigrade. For example the first temperature may be between 80 degrees centigrade and 375 degrees centigrade, or between 100 degrees centigrade and 350 degrees centigrade.

[0036] The aerosol-generating device may be any device for performing a method described above. For example, the aerosol-generating device may be any device comprising a controller programmed to perform a method described above or defined in the claims.

[0037] The controller may be housed by the aerosol-generating device. Alternatively the controller may be housed within a docking station that is couplable to the aerosol-generating device and thereby to the heating element of the aerosol-generating device.

[0038] In one aspect the specification may provide a kit comprising an aerosol-generating device suitable for receiving a smoking article and comprising a heating element, the kit further comprising instructions to clean the heating element by thermally liberating organic material adhered to or deposited on the heating element. The instructions may describe how to thermally liberate organic material, for example by heating. The instructions may describe how a user should activate an automatic cleaning cycle programmed into the aerosol-generating device.

[0039] A kit may comprise a docking station that is couplable to the aerosol-generating device. The instructions may describe how a user should activate an automatic cleaning cycle programmed into the docking station.

[0040] A kit may further comprise one or more smoking articles. A kit may include instructions to carry out any method described above or defined in the claims.

[0041] Features described in relation to one aspect of the specification may also be applicable to other embodiments discussed herein.

Exemplary embodiments

[0042] Exemplary embodiments will now be described with reference to the figures, in which;

Figure 1 is a schematic cross-sectional diagram of a first embodiment of an aerosol-generating device engaged with a smoking article;

Figure 2 is a schematic diagram illustrating a heating element of the first embodiment of an aerosol-generating device;

Figure 3A is an illustration showing a heating element of the first embodiment of an aerosol-generating device with a surface that has been soiled with organic components;

Figure 3B is an illustration showing the heating element of figure 3A after the organic components have been thermally liberated;

Figure 4 is a flow diagram illustrating a first embodiment of a method;

Figure 5 is a block diagram illustrating the configuration of an aerosol-generating device; and

Figure 6 is a flow diagram illustrating a second embodiment of a method.

Figure 1 illustrates a portion of an aerosol-generating device 10 according to a first embodiment. The aerosol-generating device 10 is engaged with a smoking article 20 for consumption of the smoking article 20 by a user.

[0043] The smoking article 20 comprises four elements, an aerosol-forming substrate 30, a hollow tube 40, a transfer section 50, and a mouthpiece filter 60. These four elements are arranged sequentially and in coaxial alignment and are assembled by a cigarette paper 70 to form a rod 21. The rod has a mouth-end 22, which a user inserts into his or her mouth during use, and a distal end 23 located at the opposite end of the rod to the mouth end 22. Elements located between the mouth-end 22 and the distal end 23 can be described as being upstream of the mouth-end or, alternatively, downstream of the distal end.

[0044] When assembled, the rod 21 is 45 millimetres long and has a diameter of 7.2 millimetres.

[0045] The aerosol-forming substrate 30 is located upstream of the hollow tube 40 and extends to the distal end 23 of the rod 21. The aerosol-forming substrate comprises a bundle of crimped cast-leaf tobacco wrapped in a filter paper (not shown) to form a plug. The cast-leaf tobacco includes additives, including glycerine as an aerosol-forming additive.

[0046] The hollow tube 40 is located immediately downstream of the aerosol-forming substrate 30 and is formed from a tube of cellulose acetate. The tube 40 defines an aperture having a diameter of 3 millimetre. One function of the hollow tube 40 is to locate the aero-

NJOY Exhibit 1002.1614

sol-forming substrate 30 towards the distal end 23 of the rod 21 so that it can be contacted with a heating element. The hollow tube 40 acts to prevent the aerosol-generating substrate 30 from being forced along the rod towards the mouth-end 22 when a heating element is inserted into the aerosol-forming substrate 30.

[0047] The transfer section 50 comprises a thin-walled tube of 18 millimetres in length. The transfer section 50 allows volatile substances released from the aerosol-forming substrate 30 to pass along the rod 21 towards the mouth end 22. The volatile substances may cool within the transfer section to form an aerosol.

[0048] The mouthpiece filter 60 is a conventional mouthpiece filter formed from cellulose acetate, and having a length of 7.5 millimetres.

[0049] The four elements identified above are assembled by being tightly wrapped within a cigarette paper 70. The paper in this specific embodiment is a standard cigarette paper having standard properties or classification. The paper in this specific embodiment is a conventional cigarette paper. For example, the paper may be a porous material with a non-isotropic structure comprising cellulose fibers (crisscross s of fibers, interlinked by H-bonds), fillers and combustion agents. The filler agent may be CaCO3 and the burning agents can be one or more of the following: K/Na citrate, Na acetate, MAP (mono-ammonium phosphate), DSP (di-sodium phosphate). The final composition per squared meter may be approximately 25 g fiber + 10 g Calcium carbonate, + 0.2 g burning additive. The porosity of the paper may be between 0 to 120 coresta. The interface between the paper and each of the elements locates the elements and defines the rod 15 of the smoking article 1.

[0050] The interface between the paper and each of the elements locates the elements and defines the rod 21 of the smoking article 20. Although the specific embodiment described above and illustrated in figure 1 has five elements assembled in a cigarette paper, it will now be clear to one of ordinary skill in the art that a smoking article according to the embodiments discussed here may have additional elements and these elements may be assembled in an alternative cigarette wrapper or equivalent. Likewise, a smoking article according to the invention may have fewer elements. Moreover, if will now be apparent to one of ordinary skill in the art that various dimensions for the elements discussed in relation to the various embodiments discussed here are merely exemplary, and that suitable, alternative dimensions for the various elements may be chosen without deviating from the spirit of the embodiments discussed herein.

[0051] The aerosol-generating device 10 comprises a sheath 12 for receiving the smoking article 20 for consumption. A heating element 90 is located within the sheath 12 and positioned to engage with the distal end 23 of the smoking article. The heating element 90 is shaped in the form of a blade terminating in a point 91.

[0052] As the smoking article 20 is pushed into the sheath 12 the point 91 of the heating element 90 engages with the aerosol-forming substrate 30. By applying a force to the smoking article, the heating element 90 penetrates into the aerosol-forming substrate 30. Once properly located, further penetration is prevented as the distal end 23 of the smoking article 20 abuts an end wall 17 of the sheath 12, which acts as a stop.

[0053] When the smoking article 20 is properly engaged with the aerosol-generating device 10, the heating element 90 has been inserted into the aerosol-forming substrate 30.

[0054] Figure 2 illustrates a heating element 90 as comprised in the aerosol-generating device 10 of figure 1 in greater detail. The heating element 90 is substantially blade-shaped. That is, the heating element has a length that in use extends along the longitudinal axis of a smoking article engaged with the heating element, a width and a thickness. The width is greater than the thickness. The heating element 90 terminates in a point or spike 91 for penetrating a smoking article 20. The heating element comprises an electrically insulating substrate 92, which defines the shape of the heating element 90. The electrically insulating material may be, for example, alumina (Al_2O_3), stabilized zirconia (ZrO_2). It will now be apparent to one of ordinary skill in the art that the electrically insulating material may be any suitable electrically insulating material and that many ceramic materials are suitable for use as the electrically insulating substrate.

[0055] Tracks 93 of an electrically conductive material are plated on a surface of the insulating substrate 92. The tracks 93 are formed from a thin layer of platinum. Any suitable conductive material may be used for the tracks, and the list of suitable materials includes many metals, including gold, that are well known to the skilled person. One end of the tracks 93 is coupled to a power supply by a first contact 94, and the other end of the tracks 93 is coupled to a power supply by a second contact 95. When a current is passed through the tracks 93, resistive heating occurs. This heats the entire heating element 90 and the surrounding environment. When a current passing through the tracks 93 of the heating element 90 is switched off, there is no resistive heating and the temperature of the heating element 90 is swiftly lowered.

[0056] Heater element 90 also includes collar 96. The collar 96 may be formed of a suitable material that allows for conduction of electricity, so long as the design of the collar 96 is also selected to minimize resistive heating. In one embodiment, when the tracks 93 are formed of platinum or a platinum alloy, the collar 96 may be formed of gold or silver, or an alloy including either. Because of the difference in the electrical resistivity of the collar 96 material, less heat is generated over the collar area and the collar 96 sees a lower average temperature than the portion of heater element 90 including tracks 96. In another embodiment, the collar 96 may be formed of an insulating material, such as a ceramic or other appropriate insulator.

[0057] Collar 96 provides a cold zone as compared to

NJOY Exhibit 1002.1615

the average surface temperature of the portion of heater element 90 that includes tracks 93. For example, the average temperature of the cold zone may be greater than 50 degrees centigrade cooler than the average surface temperature of the portion of heater element 90 including the tracks 93 during operation. Including the collar 96 may provide a number of benefits including that it reduces the temperature seen by any on-board electronics. In addition, collar 96 protects against the melting or degradation of various portions of device 10, when materials such as plastic are used in the device. The collar also reduces condensation at the distal end of the device because such aerosol is cooled as it passes over the collar 96. This reduction of condensation seen by electronics (not show) and contacts 94 and 95 included in the device 10 helps protect such elements.

[0058] The aerosol-generating device 10 comprises a power supply and electronics (not shown) that allow the heating element 90 to be actuated. Such actuation may be manually operated or may occur automatically in response to a user drawing on the smoking article. When the heating element is actuated, the aerosol-forming substrate is warmed and volatile substances are generated or evolved. As a user draws on the mouth end of the smoking article 20, air is drawn into the smoking article and the volatile substances condense to form an inhalable aerosol. This aerosol passes through the mouth-end 22 of the smoking article and into the user's mouth.

[0059] In a specific embodiment (schematically illustrated in figure 5) an aerosol-generating device comprises a processor or controller 19 coupled to a heating element 90 to control heating of the heating element. The controller 19 is programmed to actuate the heating element through a first thermal cycle in which the temperature of the heating element is raised to a first temperature of 375 degrees centigrade. This allows the formation of an aerosol from an aerosol-forming substrate disposed in proximity to the heating element. The controller is further programmed to actuate the heating element through a second thermal cycle in which the temperature of the heating element is raised to a second temperature of 550 degrees centigrade for a period of 30 seconds. This allows organic material deposited on the heating element to decompose or pyrolyse.

[0060] A specific embodiment of a method of using an aerosol-generating device will now be described with reference to figures 1 and 4. Figure 4 is a flow diagram setting out the steps carried out in an embodiment of the inventive method.

[0061] Step 1 - (Reference numeral 100 in figure 4): A heating element 90 of an aerosol-generating device 10 is brought into contact with an aerosol-forming substrate 30 contained within a smoking article 20. In order to achieve this, the smoking article 20 is inserted into a sheath 12 of the aerosol-generating device 10. A heating element 90 is located within the sheath 12, and projects from a bottom surface 17 of the sheath 12 such that it may be inserted into any smoking article that is received in the sheath. As the smoking article 20 is slid into the sheath 12, a tip or point 91 of the heating element 90 contacts a distal end 23 of the smoking article. Further movement of the smoking article towards the bottom end 17 of the sheath causes the heating element 90 to penetrate into an aerosol-forming substrate located at the distal end 23 of the smoking article 20. Once the smoking article has been fully inserted into the sheath, the distal end 23 of the smoking article abuts the bottom surface 17 of the sheath 12 and the heating element has reached maximum penetration.

[0062] Step 2: (Reference numeral 200) As the user draws or puffs on a mouth end 22 of the smoking article 20, sensors in the aerosol-generating device 10 may detect this event. In the event of detecting a user puffing or drawing, a controller 19 sends instructions that activate the heating element to heat to a first temperature. A current is passed through conductive tracks 93 disposed on the heating element, which results in resistive heating of the heating element. The first temperature is 375 degrees centigrade, which is sufficient to liberate volatile compounds from the aerosol-forming substrate 20. These volatile compounds condense to form an inhalable aerosol, which is drawn through the smoking article and into a user's mouth. Alternatively, a continuous heating may be used during operation of device 10 and detection of a user puffing or drawing may be used to trigger heating to compensate for any temperature drop of heater element 90 during the user puffing or drawing.

[0063] Step 3: (Reference numeral 300) When the user stops drawing or ends his puff on the mouth end 22 of the smoking article 20, sensors in the aerosol-generating device detect this event. The controller 19 sends instructions to switch off the current passing through the heating element 90. This stops the resistive heating of the tracks 93, and the temperature of the heating element is swiftly lowered. As the temperature is lowered, aerosol stops being generated. Alternatively, during the continuous heating discussed above, the controller 19 may instead simply reduce the amount of energy seen during the user puffing or drawing, based on a desired set point temperature.

[0064] If the aerosol-forming substrate 30 still contains volatile compounds, the user may take another puff on the smoking article 20 and repeat step 2 (indicated by arrow 350 in figure 4). Steps 2 and 3 may be repeated as often as necessary to consume the smoking article.

[0065] Step 4: (Reference numeral 400) When the user has finished with the smoking article 20, for example when no more aerosol is generated on heating the aerosol-forming substrate 30, the smoking article 20 is removed from the sheath 12 of the aerosol-generating apparatus 10. This means that the heating element 90 is removed from contact with the aerosol-forming substrate 30. Almost inevitably, the heating element 90 will have become soiled with some deposits or residues derived from the aerosol-forming substrate 30. Such deposits may impair performance of the heating element. For ex-

NJOY Exhibit 1002.1616

ample, deposits on the heating element may inhibit thermal transfer between the heating element and the aerosol-forming substrate. Deposits on a heating element may also inhibit temperature sensing when the heating element is utilized to sense temperature. Deposits on a heating element may also generate bitter compounds on repeated heating, which may impair the flavour of aerosols generated when consuming subsequent smoking articles.

[0066] If a user feels that the deposits on the heating element are at a sufficiently low level, he may decide to consume a further smoking article. In this case, steps 1 to 4 may be repeated. This is indicated by the arrow 450 in figure 4.

[0067] Step 5: (Reference numeral 500) If a user believes that the heating element is in need of cleaning, he then presses a button (not shown) on the aerosol-generating device 10 that causes the controller to activate a cleaning cycle. During the heating cycle, current is passed through the tracks 93 of the heating element 90 to raise the temperature of the heating element to a second temperature. This second temperature is 550 degrees centigrade, a temperature at which deposits on the heating element can thermally degrade or pyrolyse. The heating element 90 is held at a temperature of 550 degrees centigrade for a period of 30 seconds to thermally liberate the organic compounds deposited on the heating element 90.

[0068] Figure 3A illustrates a portion of an aerosol-generating device. This figure illustrates a heating element 90 after use of the device to consume a smoking article. That is, figure 3A illustrates a heating element 90 of an aerosol-generating device after step 4 of the method described above. It can be seen that the heating element 90 is coated in organic deposits, which appear to be black in figure 3A.

[0069] Figure 3B illustrates the same heating element as illustrated in figure 3A after the performance of a cleaning cycle as described by step 5 above. That is, the heating element 90 of figure 3A has been heated to a temperature of 550 degrees centigrade and held at that temperature for a period of 30 seconds. It can be seen that the black deposits visible in figure 3A have been removed and the heating element has been cleaned. In Figure 3B, the heating element now has a shiny appearance where the organic deposits have been removed.

[0070] After cleaning, the aerosol-generating device is ready for use. Steps 1 to 5 may be repeated. This is indicated by the arrow 550 in figure 4.

[0071] In the embodiment of a method described above, the step of heating the heating element to a first temperature to produce an aerosol occurred when the device detected a user taking a puff. In other embodiments, a user may manually activate the heating element to produce an aerosol.

[0072] In the embodiment of a method described above, the step of initiating a cleaning cycle was manually activated. In other embodiments, a cleaning cycle may be automatically triggered every time a smoking article is removed from the aerosol-generating device.

[0073] The aerosol-generating device 10 may be used in conjunction with a docking station (not illustrated). A docking station may be used, for example, to recharge batteries used to power the aerosol-generating device. Figure 6 illustrates an embodiment of a method that may be used when the aerosol-generating device coupled to a docking station.

[0074] Steps 1 to 4 are the same as described above in relation to figure 4. Figure 6 uses the same reference numerals for steps that are the same as previously described.

[0075] Step 5: (Reference numeral 600) The aerosol-generating device 10 is coupled to a docking station (not shown) for receiving the device.

[0076] Step 6: (Reference numeral 700) When the aerosol-generating device 10 is detected, a controller activates a cleaning cycle. During the heating cycle, current is passed through tracks 93 of the heating element 90 to raise the temperature of the heating element to a second temperature. This second temperature is 550 degrees centigrade, a temperature at which deposits on the heating element can thermally degrade or pyrolyse. The heating element 90 is held at a temperature of 550 degrees centigrade for a period of 30 seconds to thermally liberate the organic compounds deposited on the heating element 90. In one embodiment, the controller may be triggered from a signal from the docking station indicating that the device has not been cleaned after a predetermined number of uses, e.g., the user has contacted the heating element 90 with 10 or more times without performing a cleaning cycle. The controller 19 may then force the user to perform a cleaning cycle. For example, the user may be prohibited from activating heater element 90 unless a cleaning cycle is first performed. Controller 19 itself may contain instructions for locking the device 10 or the docking station may maintain information regarding use and provide the locking and unlocking instructions to the controller 19.

[0077] Step 7: (Reference numeral 800) The aerosol-generating device is removed from the docking station. The aerosol-generating device is ready for use. Steps 1 to 7 may be repeated. This is indicated by the arrow 850 in figure 6.

[0078] The exemplary embodiments described above illustrate but do not limit the invention. In view of the above discussed exemplary embodiments, other embodiments consistent with the above exemplary embodiments will now be apparent to one of ordinary skill in the art.

Claims

1. A method of using an aerosol-generating device (10) having a reusable heating element (90), comprising the steps of,
   bringing the heating element (90) into contact with

NJOY Exhibit 1002.1617

an aerosol-forming substrate (30), raising the temperature of the heating element (90) to a first temperature to heat the aerosol-forming substrate (30) sufficiently for an aerosol to be formed,
removing the heating element (90) from contact with the aerosol-forming substrate (30), and
raising the temperature of the heating element (90) to a second temperature, higher than the first temperature, to thermally liberate organic materials adhered to or deposited on the heating element (90).

2. A method of using an aerosol-generating device (10) according to claim 1 in which the organic materials deposited on the heating element (90) are thermally liberated by raising the temperature of the heating element (90) to a second temperature of greater than about 430 degrees centigrade.

3. A method of using an aerosol-generating device (10) according to claim 1 or 2 in which the heating element (90) is held at the second temperature for a period of between 5 seconds and 60 seconds.

4. A method of using an aerosol-generating device (10) according to any preceding claim in which the aerosol-forming substrate (30) comprises tobacco.

5. A method of using an aerosol-generating device (10) according to any preceding claim in which an aerosol is formed as a result of heating the heating element (90) to an average first temperature of between 80 degrees centigrade and 375 degrees centigrade with a maximum localized temperature of 420 degrees centigrade while in contact with the aerosol-forming substrate (30).

6. A method of using an aerosol-generating device (10) according to any preceding claim in which the step of raising the temperature of the heating element (90) to a first temperature to heat the aerosol-forming substrate (30) sufficiently to form an aerosol is performed two or more times prior to the step of raising the temperature of the heating element (90) to a second temperature, higher than the first temperature, to thermally liberate organic materials adhered to or deposited on the heating element (90).

7. A method of using an aerosol-generating device (10) according to any preceding claim in which the step of raising the temperature of the heating element (90) to a second temperature, higher than the first temperature, to thermally liberate organic materials adhered to or deposited on the heating element, occurs automatically when the aerosol-forming substance (30) is removed from contact with the heating element (90).

8. A method of using an aerosol-generating device (10) according to any of claims 1 to 6 in which the step of raising the temperature of the heating element to a second temperature, higher than the first temperature, to thermally liberate organic materials adhered to or deposited on the heating element, occurs in response to a trigger actuated by a user.

9. A method of using an aerosol-generating device according to any of claims 1 to 6 in which the aerosol-generating device (10) is couplable to a docking station, in which the step of raising the temperature of the heating element (90) to a second temperature, higher than the first temperature, to thermally liberate organic materials adhered to or deposited on the heating element occurs when the aerosol-generating device (10) is coupled to the docking station.

10. An aerosol-generating device (10) comprising a heating element (90) coupled to a controller (19),
in which the controller (19) is programmed to actuate the heating element (90) through a first thermal cycle in which the temperature of the heating element is raised to a first temperature lower than about 375 degrees centigrade to form an aerosol from an aerosol-forming substrate (30) disposed in proximity to the heating element (90), and
in which the controller (19) is programmed to actuate the heating element (90) through a second thermal cycle in which the temperature of the heating element (90) is raised to a second temperature higher than about 430 degrees centigrade to thermally liberate organic material adhered to or deposited on the heating element (90).

11. An aerosol-generating device (10) according to claim 10 in which the average first temperature is between 80 degrees centigrade and 375 degrees centigrade with a maximum localized temperature of 420 degrees centigrade.

12. An aerosol-generating device (10) for performing a method as defined in any of claims 1 to 9.

13. A kit comprising an aerosol-generating device (10) for receiving a smoking article (20) and instructions to clean a heating element (90) of the aerosol-generating device (10) by heating the heating element (90) to a temperature sufficient to thermally liberate organic material adhered to or deposited on the heating element (90).

14. A kit according to claim 13 further comprising one or more smoking articles (20).

15. A kit according to claim 14 comprising instructions to perform a method as defined in any of claim 1 to 9.

NJOY Exhibit 1002.1618

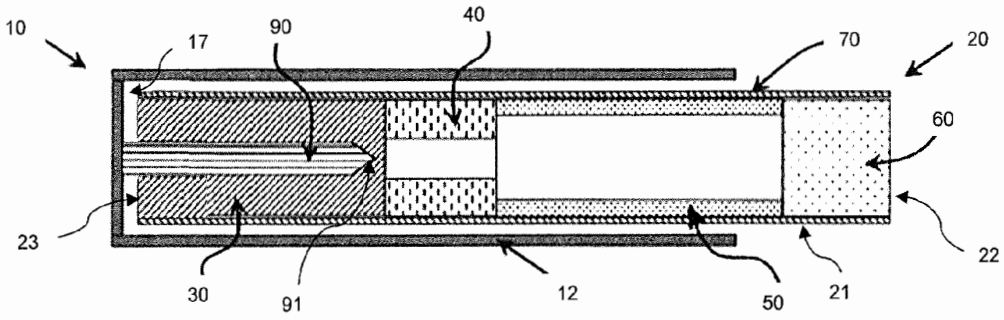


Figure 1

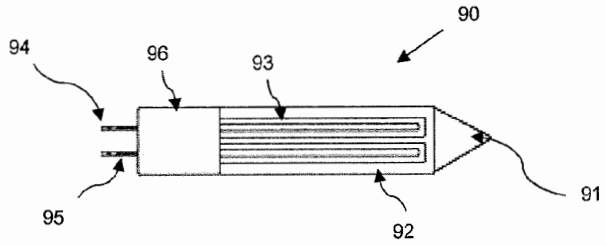


Figure 2

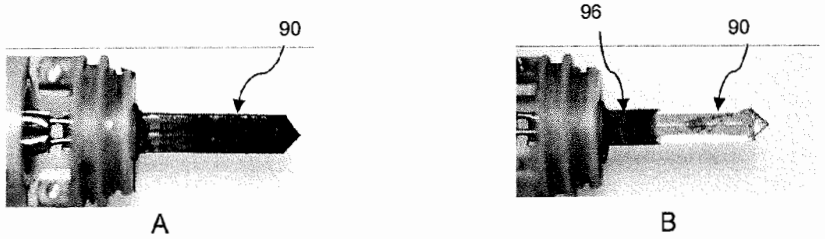


Figure 3

NJOY Exhibit 1002.1619

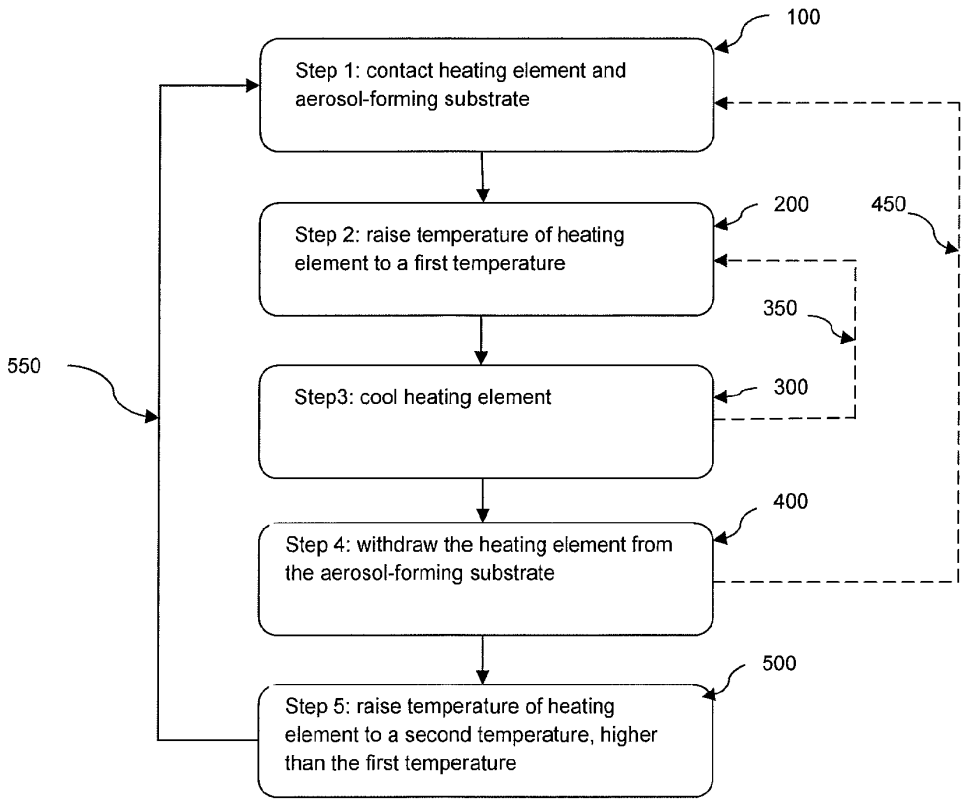


Figure 4

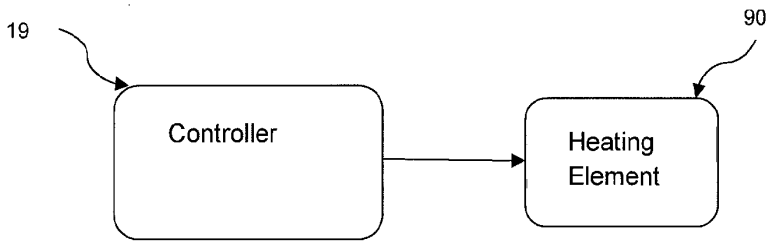


Figure 5

NJOY Exhibit 1002.1620

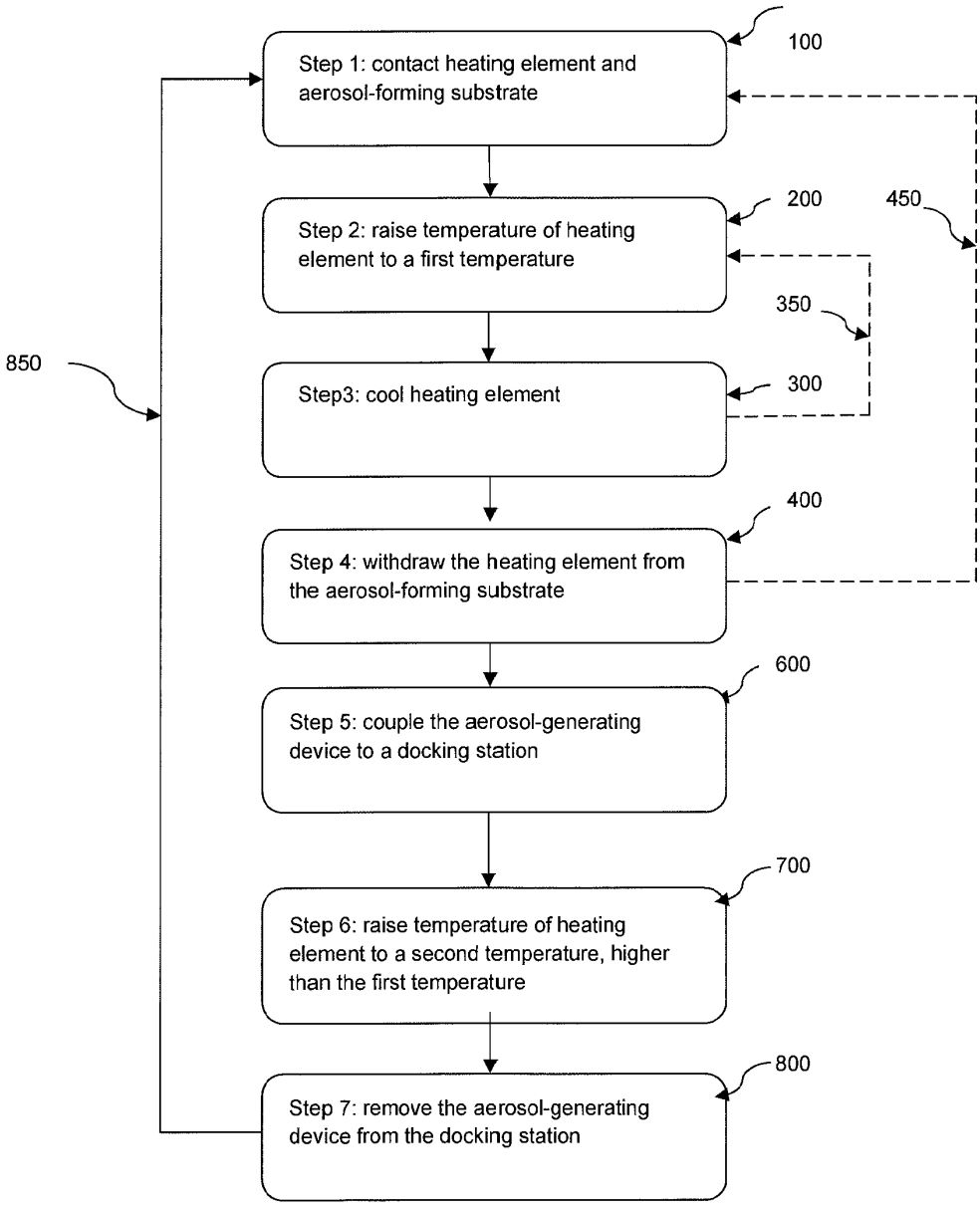


Figure 6

NJOY Exhibit 1002.1621

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 11 19 6235

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y A	US 5 249 586 A (MORGAN CONSTANCE H [US] ET AL) 5 October 1993 (1993-10-05) * column 2, lines 17-33 * * column 4, lines 56-59 * * column 5, lines 6-25, 47-53 * * figures 1-4 * -----	13-15 1-6,8-12 7	INV. A24F47/00
X,D Y	US 5 878 752 A (ADAMS JOHN M [US] ET AL) 9 March 1999 (1999-03-09) * column 3, line 42 - column 4, line 55 * * column 7, lines 10-12 * * column 8, lines 24-40,64-65 * * column 11, lines 33-37,66 - column 12, line 4 * * column 20, line 43 - column 21, line 56 * -----	13-15 1-6,8-12	
Y	WO 2007/042941 A2 (PHILIP MORRIS PROD [CH]) 19 April 2007 (2007-04-19) * the whole document * -----	5	
X A	EP 2 201 850 A1 (PHILIP MORRIS PROD [CH]) 30 June 2010 (2010-06-30) * paragraphs [0008], [0025], [0041], [0045] * -----	13-15 1,10,12	TECHNICAL FIELDS SEARCHED (IPC) A24F
A	EP 2 253 233 A1 (PHILIP MORRIS PROD [CH]) 24 November 2010 (2010-11-24) * abstract; figures * -----	1-15	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	23 May 2012	Kock, Søren

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

1

EPO FORM 1503 03.82 (P04C01)

NJOY Exhibit 1002.1622

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 11 19 6235

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

23-05-2012

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5249586 A	05-10-1993	NONE	
US 5878752 A	09-03-1999	AU 716026 B2	17-02-2000
		AU 5357298 A	22-06-1998
		BR 9707310 A	23-11-1999
		CN 1209731 A	03-03-1999
		CN 1491598 A	28-04-2004
		DE 69722928 D1	24-07-2003
		DE 69722928 T2	19-05-2004
		EP 0897271 A1	24-02-1999
		ES 2202653 T3	01-04-2004
		HK 1016037 A1	24-12-2003
		ID 20420 A	10-12-1998
		PL 328233 A1	18-01-1999
		US 5878752 A	09-03-1999
		WO 9823171 A1	04-06-1998
WO 2007042941 A2	19-04-2007	AT 490699 T	15-12-2010
		AU 2006300818 A1	19-04-2007
		BR PI0616628 A2	28-06-2011
		CA 2622481 A1	19-04-2007
		CN 101277623 A	01-10-2008
		DK 1942754 T3	14-03-2011
		EA 200800994 A1	29-08-2008
		EP 1942754 A2	16-07-2008
		HK 1115010 A1	21-04-2011
		JP 2009509523 A	12-03-2009
		KR 20080059227 A	26-06-2008
		PT 1942754 E	05-01-2011
		SI 1942754 T1	28-02-2011
		US 2007102013 A1	10-05-2007
		WO 2007042941 A2	19-04-2007
EP 2201850 A1	30-06-2010	AR 075320 A1	23-03-2011
		AU 2009332645 A1	07-07-2011
		CA 2748219 A1	01-07-2010
		CN 102264251 A	30-11-2011
		CO 6390090 A2	29-02-2012
		EP 2201850 A1	30-06-2010
		EP 2378905 A1	26-10-2011
		KR 20110096548 A	30-08-2011
		SG 172779 A1	29-08-2011
		TW 201029590 A	16-08-2010
		US 2010163063 A1	01-07-2010
		WO 2010073122 A1	01-07-2010

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

NJOY Exhibit 1002.1623

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 11 19 6235

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

23-05-2012

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 2253233 A1	24-11-2010	AU 2010251453 A1	12-01-2012
		CA 2762919 A1	25-11-2010
		CN 102438470 A	02-05-2012
		EP 2253233 A1	24-11-2010
		EP 2432339 A1	28-03-2012
		SG 176001 A1	29-12-2011
		US 2010313901 A1	16-12-2010
		WO 2010133342 A1	25-11-2010

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

NJOY Exhibit 1002.1624

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 5144962 A **[0003]**
- US 5878752 A **[0005]**

NJOY Exhibit 1002.1625

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 614 731 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
17.07.2013 Bulletin 2013/29

(51) Int Cl.:
A24F 47/00 *(2006.01)*

(21) Application number: **12151002.8**

(22) Date of filing: **12.01.2012**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(71) Applicant: **Shenzhen First Union Technology Co., Ltd.**
Shenzhen Guangdong (CN)

(72) Inventors:
- **Li, Yonghai**
  Shenzhen Guangdong (CN)
- **Xu, Zhongli**
  Shenzhen Guangdong (CN)

(74) Representative: **Chaillot, Geneviève et al**
Cabinet Chaillot
16-20 Avenue de l'Agent Sarre
B.P. 74
92703 Colombes Cedex (FR)

(54) An atomizer for electronic cigarette

(57) The invention relates to an atomizer for electronic cigarette comprising a mouth-piece, an atomization shell and a thread bushing. The atomization shell is a hollow pipe with its first end connected to the mouth-piece and its second end sealed by a sealing sleeve and the thread bushing. An aerosol passage is provided inside the atomization shell from its first end. The aerosol passage has one end in communication with an orifice provided on the mouth-piece and another end communicating with the sealing sleeve. The sealing sleeve is muff-coupled to the thread bushing. The atomization shell further has a first intermediary piece therein which extends into the sealing sleeve for introducing tobacco liquid stored in the atomization shell into the sealing sleeve. And an electric heating element is provided between the sealing sleeve and the thread bushing. The electric heating element, upon powered, heats up the tobacco liquid immerged in the first intermediary piece to make it atomized quickly and the atomized tobacco liquid flows through the aerosol passage and is discharged through the mouth-piece to human mouth. This atomizer adopts sealing sleeve and the atomization shell to form a storage room which improves the tobacco liquid reservation capability of the electronic cigarette and simplify the manufacturing of the cigarette. Further, because the electric heating element according to the present invention is not connected in the atomizer through a welding procedure, this kind atomizer is much better for environmental protection.

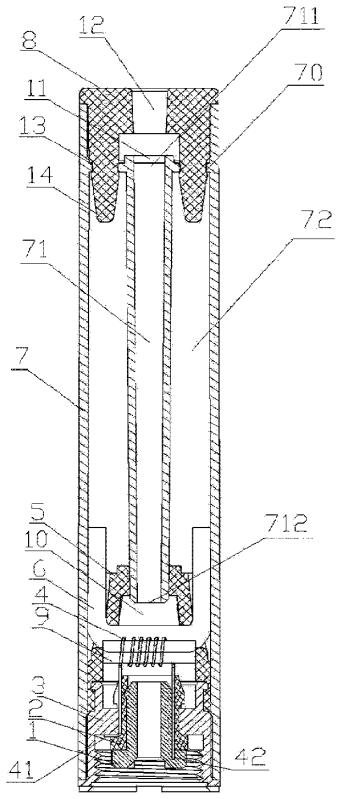


FIG6

EP 2 614 731 A1

NJOY Exhibit 1002.1626

Description

Technical Field

[0001] The present invention relates to an electronic cigarette, in particular to an atomizer for electronic cigarette which is easy to be produced and assembled, with a bigger room for storing tobacco liquid, and can be used for longer time.

Background Art

[0002] Cigarette is popular in the world, especially amongst men. However, tar in the cigarette is known harmful to human health, in which tens of ingredients are carcinogenic substances. Moreover, passive smoking can be more harmful to non-smokers. Therefore, smoking is prohibited in many public places. However, it remains extremely difficult for a smoker to quit smoking. Therefore, many cigarette substitutes have been proposed, among which the most common one is noncombustible electronic atomization cigarette which is free of tar.

[0003] Presently, almost all electronic cigarettes are made in integral structure. The electronic cigarette has a power supply at its front end of and an atomizer at its rear end. While the atomizer of the cigarette is powered by the power supply, an LED lamp of the power supply device is also lightened to simulate a burnt cigarette. A conventional atomizer comprises a glass fiber tube, a glass fiber core, a radiation core, a cotton cloth, and cellucotton. The radiation core located in the interior of the glass fiber tube is wound around the glass fiber core. The cotton cloth wraps the outer wall of the glass fiber tube and presses the exposed end of the glass fiber core in between the cotton cloth and the glass fiber tube. The cotton cloth is wrapped by the cellucotton. An annular room for storing the tobacco liquid is formed between the cotton cloth and the cellucotton. Two wires are welded on the radiation core and drawn through the glass fiber tube to the electrodes of the power supply. An electronic cigarette with such an atomizer is complicated in production and a room therein for storing tobacco oil is very small.

Summary of the Invention

[0004] It is therefore an object of the present invention to provide an atomizer for electronic cigarette which is easy to make and assemble, with a bigger room for storing tobacco liquid, and able to be used for longer time.

[0005] To achieve this object, the present invention provides an atomizer for electronic cigarette comprising a mouth-piece, an atomization shell and a thread bushing, wherein

the atomization shell is a hollow pipe with its first end connected to the mouth-piece and its second end sealed by a sealing sleeve and the thread bushing, an aerosol passage being provided inside the atomization shell from its first end, the sealing sleeve being mounted on the thread bushing, the atomization shell further having a first intermediary piece therein which extends into the sealing sleeve for introducing tobacco liquid stored in the atomization shell into the sealing sleeve, and an electric heating element being provided between the sealing sleeve and the thread bushing, and wherein the electric heating element, upon powered through the thread bushing electrically connected to a battery, heats up the tobacco liquid immerged in the first intermediary piece to make it atomized, the atomized tobacco liquid flowing through the aerosol passage and being discharged through the mouth-piece.

[0006] Preferably, the aerosol passage has a first end communicated with an orifice arranged in the mouth-piece and a second end communicated with the sealing sleeve. The atomization shell has a closed portion at its first end with at least two injection openings being provided on the closed end surface surrounding the aerosol passage. The mouth-piece is provided with silicone plugs for blocking the injection openings.

[0007] Preferably, the sealing sleeve is a hollow cylinder with its one end closed and another end opened. A through hole is provided at the center of the closed end of the cylinder for introducing the first intermediary piece into the sealing sleeve. A duct is arranged on the closed end of the sealing sleeve aside of the center of the closed end and the duct is communicated into the sealing sleeve and formed with the sealing sleeve in one piece.

[0008] Preferably, the atomization shell has a closed portion at its first end with an inlet and an outlet being provided on the closed end surface thereof. The inlet is blocked by a stopper and the outlet is communicated with the first end of the aerosol passage. The second end of the aerosol passage is muff coupled to the duct.

[0009] Preferably, a tobacco liquid storage room is defined by the outer sidewall of the aerosol passage, the inner wall of the atomization shell and the sealing sleeve.

[0010] Preferably, the sealing sleeve is a hollow cylinder with its one end closed and another end opened. A through hole is provided at the center of the closed end of the cylinder. The second end of the aerosol passage is connected into the through hole. The sealing sleeve has apertures which are provided at the opposing positions on the outer wall of the sealing sleeve and communicated with the hollow interior of the cylinder. The sealing sleeve also has longitudinal grooves provided on the outer wall of the sealing sleeve at the upside of the apertures. The first intermediary piece is placed into the longitudinal grooves on the outer wall of the sealing sleeve and extends through the apertures to form a shape of U.

[0011] Preferably, an electrode ring is clamped in the thread bushing and an insulation ring is interposed between the thread bushing and the electrode ring for electrically isolating the electrode ring connected to the anode of the battery from the thread bushing connected to the cathode of the battery.

NJOY Exhibit 1002.1627

[0012] Preferably, the electric heating element is solenoid-shaped with its one end clamped between the thread bushing and the insulation ring and another end clamped between the insulation ring and the electrode ring. And a second intermediary piece is inserted inside the solenoid-shaped electric heating element.

[0013] Preferably, the electric heating element is ring-shaped. The second end of the intermediary piece passes through the through hole provided at the center of the closed end of the cylinder and is clamped in the ring-shaped electric heating element. The first end of intermediary piece is placed in the tobacco liquid storage room for absorbing tobacco liquid.

[0014] Preferably, the first and the second intermediary piece are pressed to each other through coupling of the sealing sleeve and the thread bushing.

In the atomizer for electronic cigarette according to the present invention, an oil transmission mechanism is used to lead tobacco liquid onto the heating element, while an annular room for storing tobacco liquid is defined by a sealing sleeve and an aerosol passage within the atomization shell. Thus, it improves the capability of storing tobacco liquid. Moreover, the atomizer for electronic cigarette according to the present invention does not use tar absorbing cotton, etc. which greatly simplifies manufacture of the electronic cigarette product. Further, because the electric heating element according to the present invention is not connected in the atomizer through a welding procedure, this kind atomizer is much better for environmental protection.

Description of the Drawings

[0015]

Fig. 1 is a breakdown schematic diagram of an atomizer according to the first embodiment of the present invention;

Fig. 2 is a breakdown schematic diagram of an atomizer according to the second embodiment of the present invention;

Fig. 3 is a schematic diagram illustrating the connection between the sealing sleeve and an intermediary piece according to an embodiment of the present invention;

Fig. 4 is a schematic diagram of thread bushing according to an embodiment of the present invention;

Fig. 5 is a schematic diagram illustrating the connection between the sealing sleeve and the thread bushing according to an embodiment of the present invention;

Fig. 6 is a cross-section diagram of an atomizer according to an embodiment of the present invention;

Fig. 7 is a cross-section diagram of an atomizer according to the second embodiment of the present invention;

Fig. 8 is a breakdown schematic diagram of an atomizer according to the third embodiment of the present invention; and

Fig. 9 is a cross-section diagram of an atomizer according to the third embodiment of the present invention.

Detailed Description of the Invention

[0016] The present invention is further described with reference to the accompanied drawings.

[0017] As shown in Figs. 1, 3, 4, 5 and 6, in an embodiment an atomizer for an electronic cigarette comprises a mouth-piece 8, an atomization shell 7 and a thread bushing 3.

[0018] Thread bushing 3 can be an inner thread bushing as shown in Fig. 1, or an external thread bushing as shown in Fig. 2, which is connected to the cathode of the battery. In case of an external thread bushing, an air inlet 15 is provided at one end of thread bushing 3 close to the thread, with the other end being a fixing part for sealing and connecting to a second end of the atomization shell 7. An electrode ring 1 is clamping connected at one end with the inside wall of thread bushing 3 and connected at the other end to the anode of the battery. An insulation ring 2 is provided between the electrode ring 1 and the thread bushing 3 to electrically isolate the electrode ring 1 from the thread bushing 3.

[0019] The atomization shell 7 is a hollow tube with a sealing sleeve 5 which is a hollow cylinder fixed therein. As shown in Figs. 3, 5 and 6, two opposite holes 51 are provided at the sidewall 50 of the sealing sleeve 5 and are communicated with the hollow interior of the sealing sleeve 5. A longitudinal groove 52 is provided at the upper side of each hole of the sealing sleeve 5. The sealing sleeve 5 is coupled with the thread bushing 3. A first intermediary piece 6 extends through a hole 51 in the sidewall 50 of the sealing sleeve 5 and the axes of the sealing sleeve 5 to the opposite hole in the sidewall 50 of the sealing sleeve 5. In this way, both the ends of the first intermediary piece 6 are positioned in the longitudinal grooves 52 of the inner wall of the sealing sleeve 5 and extend over the upper portion of the closing end 53 of the sealing sleeve 5, thus reducing the occupation of the first intermediary piece 6 in the atomization shell 7. In this case the first intermediary piece 6 is "U" shaped. A through hole 10 for passing through smoke is formed at the closing end 53 of the sealing sleeve 5 along the axes thereof. An aerosol passage 71 is provided closing to a first end 70 within the atomization shell 7. A first end 711 of the aerosol passage 71 is communicated with the orifice 12 of the mouth-piece 8. A second end 712 of the aerosol passage 71 is communicated with the through hole 10 of the sealing sleeve 5. Thus, a closed ring-shaped tobacco liquid storage room is formed by the outer sidewall of the aerosol passage 71, the inner sidewall 72 of the atomization shell 7 and the sealing sleeve 5.

[0020] The opening end of the sealing sleeve 5 is muff-coupled to a threadless end of the thread bushing 3. The external diameter of the opening end is matched with the

NJOY Exhibit 1002.1628

inner diameter of the atomization shell 7 so as to prevent tobacco liquid from flowing out.

[0021] An electric heating element 4 is provided between the sealing sleeve 5 and the thread bushing 3. The heating element 4 may be a solenoid heating elements. A second intermediary piece 9 is provided to extend through the solenoid coil of the electric heating element 4. One end 41 of the electric heating element 4 is inserted and clamped in between the thread bushing 3 and the insulation ring 2. The other end 42 of the electric heating element 4 is inserted and clamped in between the insulation ring 2 and the electrode ring 1. In this way, the electric heating element 4 is powered through the thread bushing 3 connected to the cathode of the battery and the electrode ring 1 connected to the anode of the batter.

[0022] Then, The opening end of the sealing sleeve 5 is muff-coupled to a threadless end of the thread bushing 3 to make the first intermediary piece 6 abut against the second intermediary piece 9 so that both the intermediary pieces are pressed tightly together. In an embodiment of the invention, the intermediary pieces may use those materials being capable of transporting liquid, such as glass fiber, cotton thread or the like. Thus, the first intermediary piece 6 can transmit the tobacco liquid from the tobacco liquid storage room to the second intermediary piece 9. The tobacco liquid in the second intermediary piece 9 is atomized by the electric heating element 4, enters the aerosol passage 71 through the through hole 10 of the sealing sleeve 5, and is finally inhaled by a smoker.

[0023] The mouth-piece 8 is also muff-coupled with the first end 70 of the atomization shell 7. An orifice 12 communicating with the first end 711 of the aerosol passage 71 is provided at the mouth piece 8. The interior of the first end 70 of the atomization shell 7 is closed. Two injection openings 13 are provided opposite to each other around the aerosol passage 71 at the closed end surface of the interior of the first end of the atomization shell 7. Two silicone plugs 14 are provided correspondingly at the mouth-piece 8 for plug in the injection openings 13. Thus, after the tobacco liquid in the tobacco liquid storage room exhausts, the electronic cigarette can be refilled with the tobacco liquid by removing the mouth-piece 8 and injecting the tobacco liquid into the injection openings 13. The mouth-piece 8 is put back after the tobacco liquid is finished so that the electronic cigarette can be used again. There is no limitation on the number of the injection openings 13, whilst in the present embodiment two injection openings 13 are used. In this arrangement, when the tobacco liquid is injected through one opening 13, air in the tobacco liquid storage room can be discharged from the other opening 13.

[0024] Fig. 7 shows an atomizer according to the second embodiment of the invention. As shown in Fig. 7, in this embodiment, no liquid injection opening 13 is provided at the closed end surface of the interior of the first end of the atomization shell 7, and no silicone plug 14 is provided, either. The atomizer is thus disposable, which does not permit refilling after exhaustion of the tobacco liquid in the tobacco liquid storage room. As another embodiment, the second intermediary piece 9 can be omitted. In this embodiment, the first intermediary piece 6 is led through the hole at the opposite side of the sealing sleeve 5, then stretches out from the bottom of the sealing sleeve 5 to surround the electric heating element 4, and finally is pulled back to its initial position to connect to the electrode of the battery. In this way, the atomization function of the electronic cigarette can also be realized.

[0025] Fig. 8 and Fig. 9 indicate an atomizer according to the third embodiment of the present invention. As shown in Fig. 8 and 9, in this embodiment, the atomization shell 7 is a hollow pipe with a sealing sleeve 5 in the shape of hollow cylinder arranged inside the pipe. The sealing sleeve 5 has a closed end and an opened end. A through hole 10 for introducing tobacco liquid into interior of the sealing sleeve 5 is formed at the center of the closing end 53 of the sealing sleeve 5. A duct 16 is arranged on the closed end of the sealing sleeve aside of the center of the closed end 53. This duct 16 is communicated into the sealing sleeve 5 and formed with the sealing sleeve 5 in one piece. The duct 16 is provided such that its outer side wall is aligned longitudinally with side wall of the sealing sleeve 5. The sealing sleeve is muff-coupled to the thread bushing. In this embodiment, one end of the first intermediary piece 6 passes through the through hole 10 at the center of the closing end 53 of the sealing sleeve 5 and is clamped in the electric heating element 4 which is a ring-shaped element in the embodiment. Another end of the first intermediary piece 6 is placed in the tobacco liquid storage room for absorbing tobacco liquid. The atomization shell 7 has a closed portion at its first end with an inlet 13 and an outlet 17 being provided on the closed end surface thereof. The inlet 13 is blocked by a stopper 18 and the outlet 17 is communicated with the first end of the aerosol passage 71. And the second end of the aerosol passage 71 is muff-coupled to the duct 16. In this way, a room 72 for storing tobacco liquid is defined by the outer sidewall of the aerosol passage 71, the inner wall of the atomization shell 7 and the sealing sleeve 5. When the tobacco liquid exhausts, the stopper 18 blocked at the inlet 13 can be removed in order to refill the tobacco liquid.

[0026] Although the details of the invention have been described in view of the above illustration, various modifications and variations may be made without departing from the spirit and scope of the invention. It is intended that the scope of the invention is defined by the following claims and their equivalents.

Claims

1. An atomizer for electronic cigarette comprising a mouth-piece, an atomization shell and a thread bushing, wherein
   the atomization shell is a hollow pipe with its first end connected to the mouth-piece and its second end

NJOY Exhibit 1002.1629

sealed by a sealing sleeve and the thread bushing, an aerosol passage being provided inside the atomization shell from its first end, the sealing sleeve being mounted on the thread bushing, the atomization shell further having a first intermediary piece therein which extends into the sealing sleeve for introducing tobacco liquid stored in the atomization shell into the sealing sleeve, and an electric heating element being provided between the sealing sleeve and the thread bushing, and
wherein the electric heating element, upon powered through the thread bushing electrically connected to a battery, heats up the tobacco liquid immerged in the first intermediary piece to make it atomized, the atomized tobacco liquid flowing through the aerosol passage and being discharged through the mouthpiece.

2. The atomizer for electronic cigarette according to claim 1, wherein the aerosol passage has a first end communicated with an orifice arranged in the mouthpiece and a second end communicated with the sealing sleeve, wherein the atomization shell has a closed portion at its first end with at least two injection openings being provided on the closed end surface surrounding the aerosol passage and the mouthpiece is provided with silicone plugs for blocking the injection openings.

3. The atomizer for electronic cigarette according to claim 1, wherein the sealing sleeve is a hollow cylinder with its one end closed and another end opened, a through hole being provided at the center of the closed end of the cylinder for introducing the first intermediary piece into the sealing sleeve, a duct being arranged on the closed end of the sealing sleeve aside of the center of the closed end, the duct being communicated into the sealing sleeve and formed with the sealing sleeve in one piece.

4. The atomizer for electronic cigarette according to claim 3, wherein the atomization shell has a closed portion at its first end with an inlet and an outlet being provided on the closed end surface thereof, the inlet being blocked by a stopper and the outlet being communicated with the first end of the aerosol passage, and the second end of the aerosol passage being muff-coupled to the duct.

5. The atomizer for electronic cigarette according to any of claims 1-4, wherein a tobacco liquid storage room is defined by the outer sidewall of the aerosol passage, the inner wall of the atomization shell and the sealing sleeve.

6. The atomizer for electronic cigarette according to claim 1, wherein the sealing sleeve is a hollow cylinder with its one end closed and another end opened, a through hole being provided at the center of the closed end of the cylinder, the second end of the aerosol passage being connected into the through hole, the sealing sleeve having apertures which are provided at the opposing positions on the outer wall of the sealing sleeve and communicated with the hollow interior of the cylinder, the sealing sleeve also having longitudinal grooves provided on the outer wall of the sealing sleeve at the upside of the apertures, and the first intermediary piece being placed into the longitudinal grooves on the outer wall of the sealing sleeve and extending through the apertures to form a shape of U.

7. The atomizer for electronic cigarette according to claim 1, wherein an electrode ring is clamped in the thread bushing and an insulation ring is interposed between the thread bushing and the electrode ring for electrically isolating the electrode ring connected to the anode of the battery from the thread bushing connected to the cathode of the battery.

8. The atomizer for electronic cigarette according to claim 7, wherein the electric heating element is solenoid-shaped with its one end clamped between the thread bushing and the insulation ring and another end clamped between the insulation ring and the electrode ring, and a second intermediary piece is inserted inside the solenoid-shaped electric heating element.

9. The atomizer for electronic cigarette according to claim 5, wherein the electric heating element is ring-shaped, the second end of the intermediary piece passing through the through hole provided at the center of the closed end of the cylinder and clamped in the ring-shaped electric heating element, and the first end of intermediary piece being placed in the tobacco liquid storage room for absorbing tobacco liquid.

10. The atomizer for electronic cigarette according to claim 8, wherein the first and the second intermediary piece are pressed to each other through coupling of the sealing sleeve and the thread bushing.

NJOY Exhibit 1002.1630

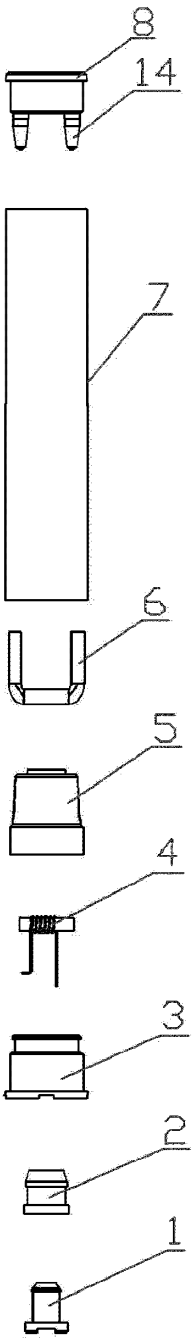


FIG1

NJOY Exhibit 1002.1631

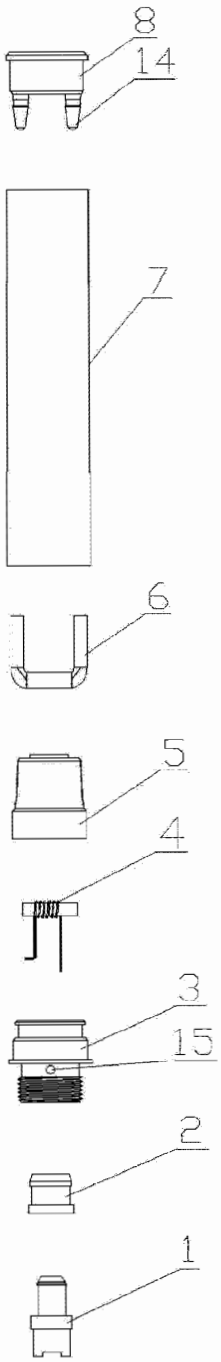


FIG2

NJOY Exhibit 1002.1632

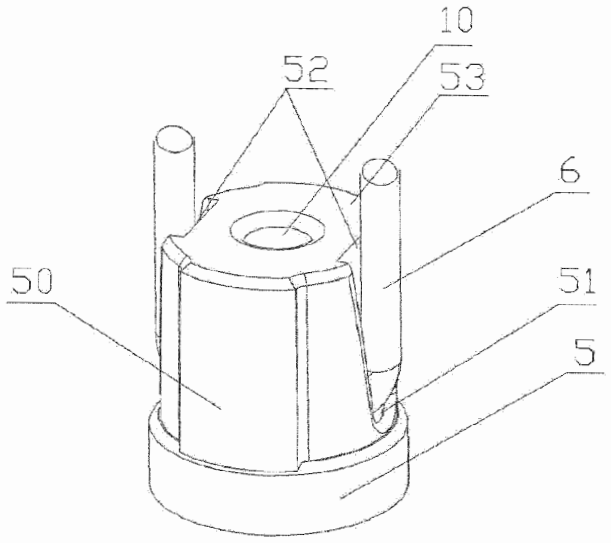


FIG3

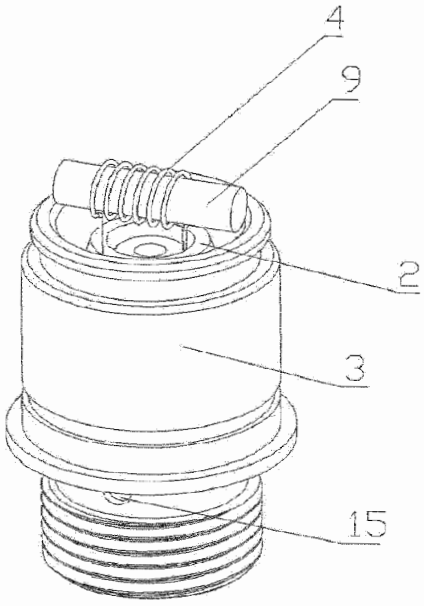


FIG4

NJOY Exhibit 1002.1633

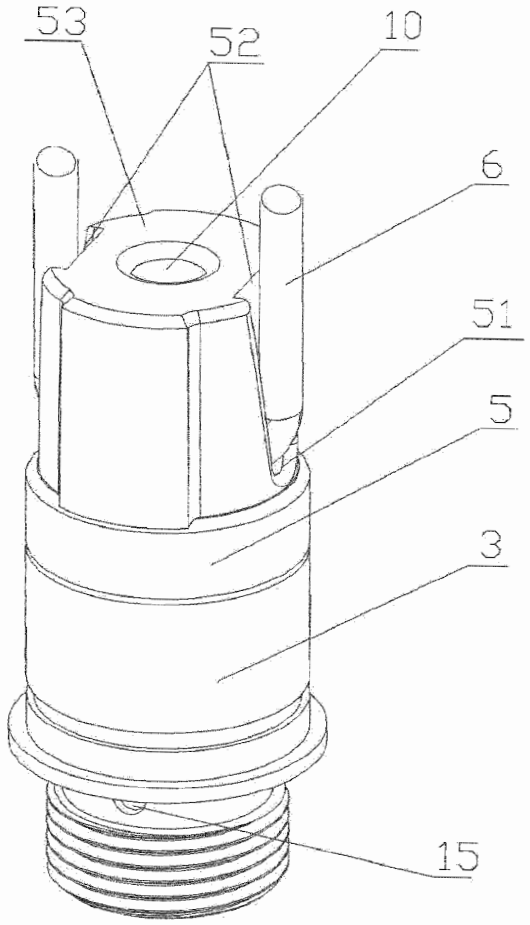


FIG5

NJOY Exhibit 1002.1634

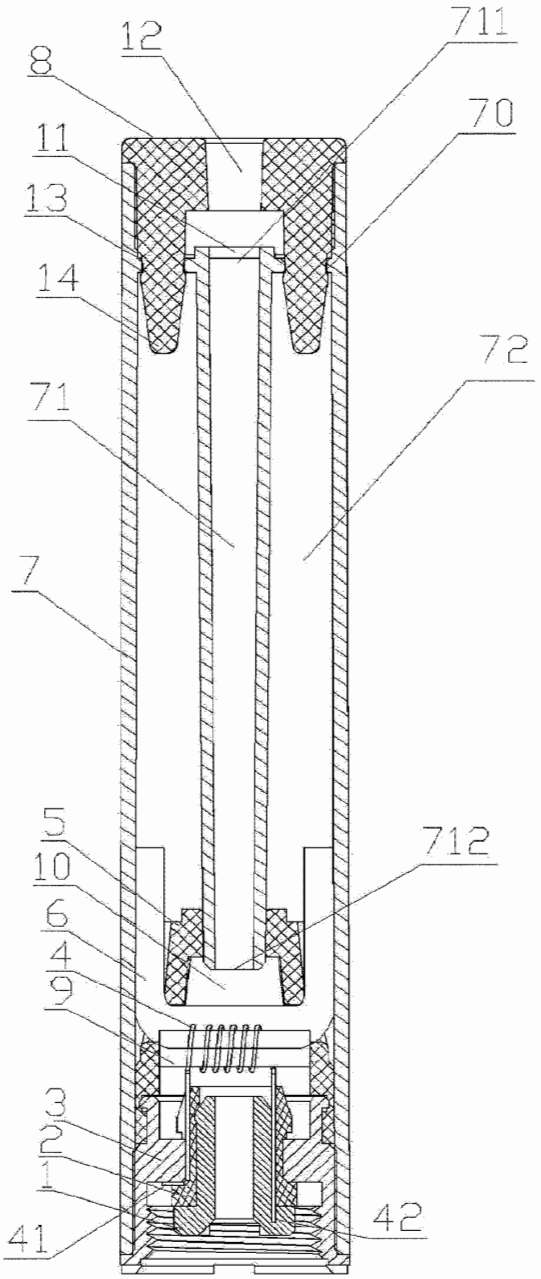


FIG6

NJOY Exhibit 1002.1635

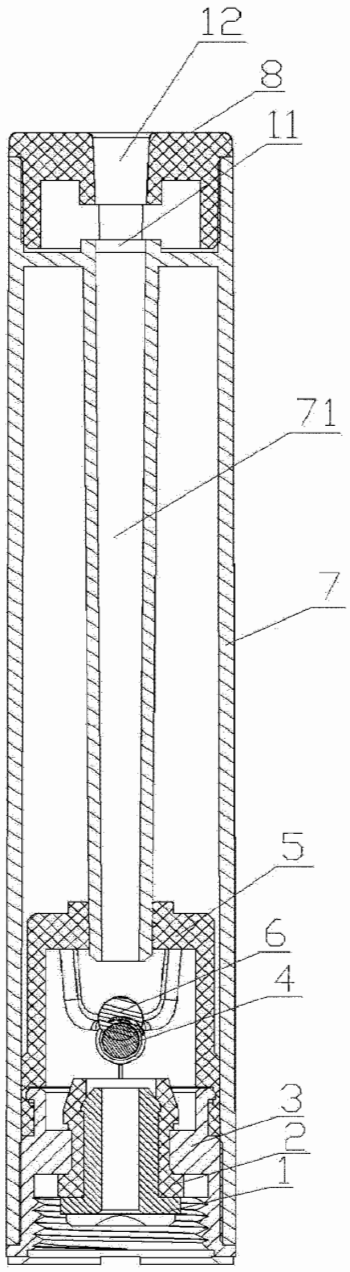


FIG7

NJOY Exhibit 1002.1636

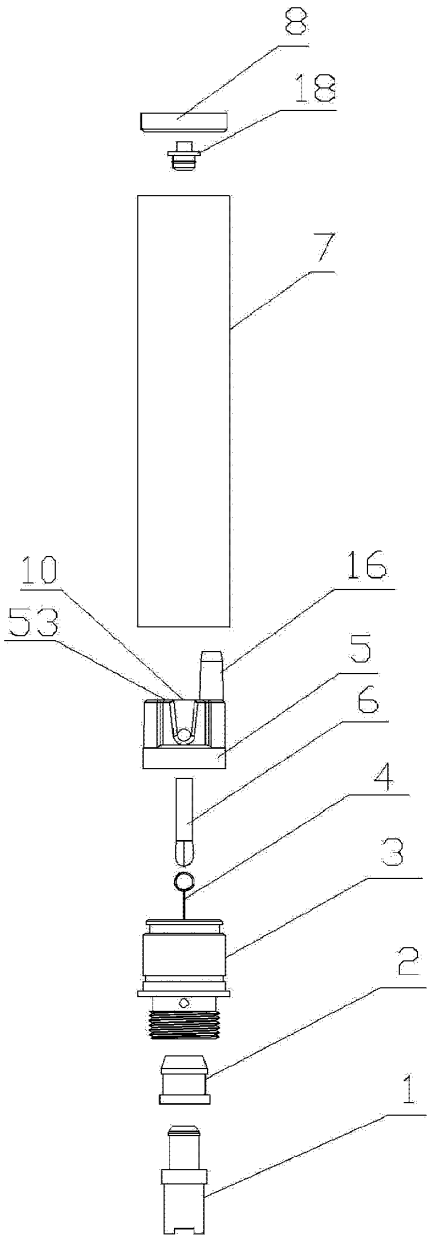


FIG8

NJOY Exhibit 1002.1637

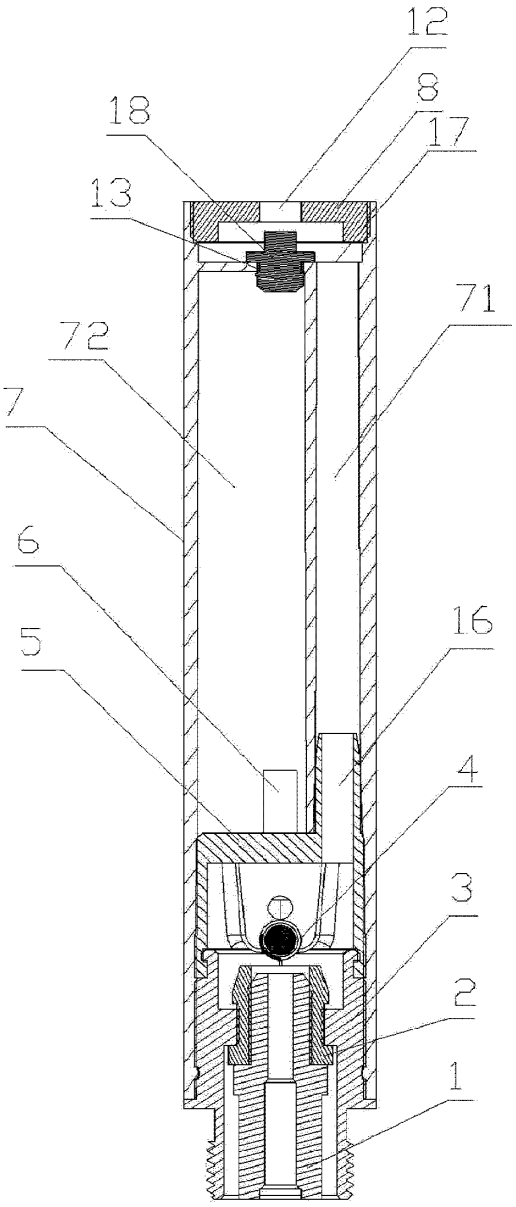


FIG9

NJOY Exhibit 1002.1638

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 12 15 1002

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2011/065754 A2 (EBACO CO LTD [KR]; CHO YEO-CHAN [KR]) 3 June 2011 (2011-06-03) * abstract; figures 1,9,10,11 *	1-10	INV. A24F47/00
A	US 2011/036346 A1 (COHEN SCOTT A [US] ET AL) 17 February 2011 (2011-02-17) * paragraphs [0018], [0026] - [0027]; figures 1,2,8 *	1-10	
A	CA 2 641 869 A1 (XIA HAO RAN [CN]) 6 May 2010 (2010-05-06) * page 62, line 21 - page 8, line 20; figures 1,2,4 *	1-10	
A	US 2011/011396 A1 (FANG XIAOLIN [CN]) 20 January 2011 (2011-01-20) * paragraphs [0014], [0015]; figures 1,3 *	1-10	
A	US 2011/303231 A1 (LI YONGHAI [CN] ET AL) 15 December 2011 (2011-12-15) * paragraphs [0020] - [0022]; figures *	1-10	TECHNICAL FIELDS SEARCHED (IPC) A24F A61M

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	4 July 2012	Kock, Søren

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

NJOY Exhibit 1002.1639

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 12 15 1002

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

04-07-2012

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2011065754 A2	03-06-2011	NONE	
US 2011036346 A1	17-02-2011	NONE	
CA 2641869 A1	06-05-2010	NONE	
US 2011011396 A1	20-01-2011	CN 101606758 A US 2011011396 A1	23-12-2009 20-01-2011
US 2011303231 A1	15-12-2011	CN 201830900 U US 2011303231 A1	18-05-2011 15-12-2011

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

NJOY Exhibit 1002.1640

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Veröffentlichungsnummer:
(11) Publication number: **EP 2 654 471 A0**
(11) Numéro de publication:

Internationale Anmeldung veröffentlicht durch die Weltorganisation für geistiges Eigentum unter der Nummer:

WO 2012/085205 (Art. 153(3) EPÜ).

International application published by the World Intellectual Property Organization under number:

WO 2012/085205 (Art. 153(3) EPC).

Demande internationale publiée par l'Organisation Mondiale de la Propriété Intellectuelle sous le numéro:

WO 2012/085205 (art. 153(3) CBE).

NJOY Exhibit 1002.1641

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
28 June 2012 (28.06.2012)

WIPO | PCT

(10) International Publication Number
WO 2012/085205 A1

(51) International Patent Classification:
A24F 47/00 (2006.01) *A61L 9/03* (2006.01)

(21) International Application Number:
PCT/EP2011/073793

(22) International Filing Date:
22 December 2011 (22.12.2011)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10252236.4 24 December 2010 (24.12.2010) EP

(71) Applicant *(for all designated States except US)*: **PHILIP MORRIS PRODUCTS SA** [CH/CH]; Quai Jeanrenaud 3, CH-2000 Neuchatel (CH).

(72) Inventor; and

(75) Inventor/Applicant *(for US only)*: **FLICK, Jean-Marc** [FR/CH]; Rue de la Poste 3, CH-1405 Pomy (CH).

(74) Agent: **PONDER, William**; REDDIE & GROSE LLP, Patent Attorney, 16 Theobalds Road, London, Greater London WX1C 8PL (GB).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

(54) **Title**: AEROSOL GENERATING SYSTEM WITH MEANS FOR DISABLING CONSUMABLE

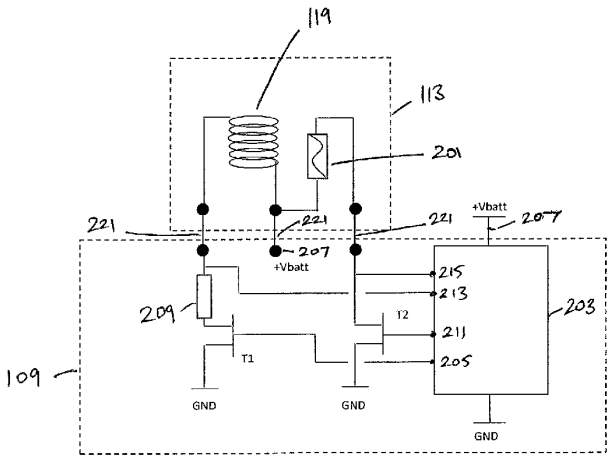


Figure 2

(57) **Abstract**: There is provided an aerosol generating system comprising: a storage portion for storing an aerosol-forming substrate, an aerosol generating element for generating an aerosol from the aerosol-forming substrate, control circuitry in communication with the storage portion, and disabling means within the storage portion for rendering the storage portion inoperable in the aerosol generating system in response to a disable signal from the control circuitry. There is also provided a method in an aerosol generating system comprising a storage portion for storing aerosol-forming substrate, an aerosol generating element for generating an aerosol from the aerosol-forming substrate, control circuitry in communication with the storage portion and disabling means within the storage portion configured to render the storage portion inoperable in the aerosol generating system in response to a disable signal from the control circuitry, the method comprising: sending a disable signal from the control circuitry to the disabling means following a determination that an amount of the aerosol-substrate in the storage portion is below a threshold level or following a determination of a malfunction in the system.

WO 2012/085205 A1

NJOY Exhibit 1002.1642

AEROSOL GENERATING SYSTEM WITH MEANS FOR DISABLING CONSUMABLE

The present invention relates to an aerosol generating system. In particular, the present invention relates to an aerosol generating system in which the aerosol-forming substrate is liquid and is contained in a liquid storage portion.

WO 2007/078273 discloses an electric smoking utensil. A liquid is stored in a container which communicates with a heater vaporiser, powered by a battery supply, via a series of small apertures. The heater is in the form of a spirally wound electric heater mounted on an electrically insulating support. In use, the heater is activated by the mouth of a user to switch on the battery power supply. Suction on a mouthpiece by the user causes air to be drawn through holes in the container, over the heater vaporiser, into the mouthpiece and subsequently into the mouth of a user.

The aerosol generating systems of the prior art, including the smoking system referred to above, do have a number of advantages, but there is still opportunity for improvement in the design, particularly concerning the handling of the liquid storage portion.

According to a first aspect of the invention, there is provided an aerosol generating system comprising:

a storage portion containing an aerosol-forming substrate;

an aerosol generating element for generating an aerosol from the aerosol-forming substrate;

control circuitry in communication with the storage portion or the aerosol generating element; and

disabling means for rendering the storage portion inoperable in the aerosol generating system in response to a disable signal from the control circuitry.

Preferably, the disabling means is part of the storage portion. Preferably the aerosol generating system is an electrically operated system. The aerosol generating element is preferably electrically operated. Preferably, the storage portion is separable from a main body of the aerosol generating system, and the control circuitry is arranged in the main body of the aerosol generating system.

NJOY Exhibit 1002.1643

It is advantageous to be able to automatically disable the storage portion for several reasons. If the storage portion is empty or nearly empty, or if there is a system malfunction, the system may not produce aerosol with the desired characteristics, for example, aerosol particle size or chemical composition. In addition, if the liquid storage portion is empty or nearly empty, disabling the storage portion is a means to inform the user the aerosol-forming substrate needs to be replaced. Also, automatically disabling the storage portion may be used to prevent, or at least make more difficult, the reuse of the storage portion refilled with inferior, inappropriate or even harmful substrate materials.

The aerosol generating system preferably further comprises a main body and the storage portion forms or is part of a consumable cartridge configured to couple to the main body. It is advantageous to be able to disable a consumable cartridge but to maintain a main body as a reusable part. The main body may include the more expensive components such as control circuitry and a user interface,

Preferably, the disabling means is an electrical component that is configured to be switched or damaged by the disable signal. Preferably, the component is an electrical fuse that can be blown by a sufficiently high current signal. Preferably the disable signal is a current sufficient to blow the fuse. However, other electrical components may be used such as a switch or transistor. However, other means for disabling the storage portion may be used. For example, the control circuitry may be configured to optically check the storage portion before the aerosol generating element can be activated and the disabling means may be an electrochromic material, or a thermochromic ink on the storage portion that is heated by a heater in response to a disable signal.

Alternatively, in cases where the storage portion is recognized or identified using logic circuitry (e.g. electric, electromagnetic or optic) by means of a unique identifier, the same circuitry can be used to write an 'invalidate bit' (flag bit) into the memory of that circuitry by which the storage portion is "disabled" and thus can not be used with the underlying aerosol generating system. However, in cases where the storage portion comprises such logic circuitry, the invalidate bit can even be stored on the storage portion itself, thus preventing its further use with another aerosol generating system.

NJOY Exhibit 1002.1644

The control circuitry is preferably configured to determine or estimate when an amount of aerosol-forming substrate in the storage portion is below a threshold amount, and to issue the disable signal when the amount of aerosol-forming substrate in the storage portion is determined or estimated to be below the threshold amount. The control circuitry may determine the amount of substrate in the storage portion by direct measurement, indirect measurement or by calculation. For example, the system may include means to directly measure the mass of the storage portion, such as balance. The control circuitry may be configured to calculate the mass of substrate consumed by monitoring the use of the system. For example, the control circuitry may calculate substrate consumption based on a number of times the aerosol generating element has been activated. Alternatively, the control circuitry may use a change in the behaviour of the system indicative of the storage portion becoming empty to estimate the amount of substrate remaining in the storage portion.

The threshold amount of liquid aerosol-forming substrate in the liquid storage portion may be an absolute amount or a relative amount, e.g. a percentage value.

If the amount of liquid aerosol-forming substrate has decreased, for example if the liquid storage portion is empty or nearly empty, insufficient liquid aerosol-forming substrate may be supplied to the aerosol generating element. In the case of a heater being used as the aerosol generating element, this may result in the temperature of the heater increasing. Thus, the temperature of the heater, as sensed by the temperature sensor may allow the electric circuitry to determine that the amount of liquid aerosol-forming substrate in the liquid storage portion has decreased to a predetermined threshold.

The control circuitry is preferably configured to issue the disable signal when the control circuitry has detected a malfunction in the system. For example, if a heater is used to generate aerosol, a temperature sensor may be used to detect any overheating of the heater or substrate. The temperature sensor is coupled to the control circuitry and the control circuitry issues a disable signal if the temperature sensed by the temperature sensor exceeds a first temperature threshold. This is advantageous as it allows the system to prevent the generation of undesirable or harmful aerosol constituents.

The aerosol-forming substrate preferably has physical properties, for

NJOY Exhibit 1002.1645

example a boiling point, suitable for use in the aerosol generating system. The aerosol-forming substrate is preferably a liquid. The liquid preferably comprises a tobacco-containing material comprising volatile tobacco flavour compounds which are released from the liquid upon heating. Alternatively, or in addition, the liquid may comprise a non-tobacco material. The liquid may include water, solvents, ethanol, plant extracts and natural or artificial flavours. Preferably, the liquid further comprises an aerosol former. Examples of suitable aerosol formers are glycerine and propylene glycol.

Preferably the storage portion is configured such that the substrate in the storage portion is protected from ambient air and, in some embodiments light, so that the risk of degradation of the substrate is significantly reduced. Moreover, a high level of hygiene can be maintained.

The aerosol generating element is preferably a heater configured to heat the substrate. However, other aerosol generating elements can be used, such as a vibrating transducer.

The heater is preferably an electric heater. The electric heater may comprise a single electric heating element. Alternatively, the electric heater may comprise more than one heating element, for example two, or three, or four, or five, or six or more heating elements. The heating element or heating elements may be arranged appropriately so as to most effectively heat the liquid aerosol-forming substrate.

Preferably, the control circuitry is configured to issue a disable signal in response to a temperature or resistance measurement. More preferably, the control circuitry is configured to issue a disable signal in response to a determination that the temperature or resistance of a heating element has exceeded a predetermined threshold.

The electric heating element (or elements) preferably comprises an electrically resistive material. Suitable electrically resistive materials include but are not limited to: semiconductors such as doped ceramics, electrically "conductive" ceramics (such as, for example, molybdenum disilicide), carbon, graphite, metals, metal alloys and composite materials made of a ceramic material and a metallic material. Such composite materials may comprise doped or undoped ceramics. Examples of suitable doped ceramics include doped silicon carbides. Examples of suitable metals include titanium, zirconium, tantalum and metals from the platinum group. Examples of suitable

NJOY Exhibit 1002.1646

metal alloys include stainless steel, Constantan, nickel-, cobalt-, chromium-, aluminium- titanium- zirconium-, hafnium-, niobium-, molybdenum-, tantalum-, tungsten-, tin-, gallium-, manganese- and iron-containing alloys, and super-alloys based on nickel, iron, cobalt, stainless steel, Timetal®, iron-aluminium based alloys and iron-manganese-aluminium based alloys. Timetal® is a registered trade mark of Titanium Metals Corporation. In composite materials, the electrically resistive material may optionally be embedded in, encapsulated or coated with an insulating material or vice-versa, depending on the kinetics of energy transfer and the external physicochemical properties required. The heating element may comprise a metallic etched foil insulated between two layers of an inert material. In that case, the inert material may comprise Kapton®, all-polyimide or mica foil. Kapton® is a registered trade mark of E.I. du Pont de Nemours and Company.

The electric heating element may take any suitable form. For example, the at least one electric heating element may take the form of a heating blade. Alternatively, the at least one electric heating element may take the form of a casing or substrate having different electro-conductive portions, or an electrically resistive metallic tube. The storage portion may incorporate a disposable heating element. Alternatively, one or more heating needles or rods that run through the aerosol-forming substrate may also be suitable. Alternatively, the electric heating element may comprise a flexible sheet of material. Other alternatives include a heating wire or filament, for example a Ni-Cr, platinum, tungsten or alloy wire, or a heating plate. Optionally, the heating element may be deposited in or on a rigid carrier material.

The heating element may comprise a heat sink, or heat reservoir comprising a material capable of absorbing and storing heat and subsequently releasing the heat over time to heat the aerosol-forming substrate. The heat sink may be formed of any suitable material, such as a suitable metal or ceramic material. Preferably, the material has a high heat capacity (sensible heat storage material), or is a material capable of absorbing and subsequently releasing heat via a reversible process, such as a high temperature phase change. Suitable sensible heat storage materials include silica gel, alumina, carbon, glass mat, glass fibre, minerals, a metal or alloy such as aluminium, silver or lead, and a cellulose material such as paper. Other suitable materials which release heat via a reversible phase change include paraffin, sodium

NJOY Exhibit 1002.1647

acetate, naphthalene, wax, polyethylene oxide, a metal, metal salt, a mixture of eutectic salts or an alloy.

The heat sink or heat reservoir may be arranged such that it is directly in contact with the aerosol-forming substrate and can transfer the stored heat directly to the substrate. Alternatively, the heat stored in the heat sink or heat reservoir may be transferred to the aerosol-forming substrate by means of a heat conductor, such as a metallic tube.

The heater may heat the liquid aerosol-forming substrate by means of conduction. The heater may be at least partially in contact with the substrate. Alternatively, the heat from the heater may be conducted to the substrate by means of a heat conductive element.

Alternatively, the heater may transfer heat to the incoming ambient air that is drawn through the electrically operated aerosol generating system during use, which in turn heats the aerosol-forming substrate by convection. The ambient air may be heated before passing through the aerosol-forming substrate. Alternatively, the ambient air may be first drawn through the substrate and then heated.

Preferably, the aerosol forming substrate is a liquid at room temperature and the aerosol generating system further comprises a capillary wick for conveying the liquid aerosol-forming substrate from the storage portion to the aerosol generating element.

Preferably, the capillary wick is arranged to be in contact with liquid in the storage portion. Preferably, the capillary wick extends into the storage portion. In that case, in use, liquid is transferred from the storage portion to the electric heater (or other aerosol generating element) by capillary action in the capillary wick. In one embodiment, the capillary wick has a first end and a second end, the first end extending into the storage portion for contact with liquid therein and an electric heater being arranged to heat liquid in the second end. When the heater is activated, the liquid at the second end of the capillary wick is vaporized by the at least one heating element of the heater to form the supersaturated vapour. The supersaturated vapour is mixed with and carried in the air flow. During the flow, the vapour condenses to form the aerosol and the aerosol is carried towards the mouth of a user. The liquid aerosol-forming substrate has physical properties, including viscosity, which allow the liquid to be transported through the capillary wick by capillary action.

NJOY Exhibit 1002.1648

The capillary wick may have a fibrous or spongy structure. The capillary wick preferably comprises a bundle of capillaries. For example, the capillary wick may comprise a plurality of fibres or threads or other fine bore tubes. The fibres or threads may be generally aligned in the longitudinal direction of the aerosol generating system. Alternatively, the capillary wick may comprise sponge-like or foam-like material formed into a rod shape. The rod shape may extend along the longitudinal direction of the aerosol generating system. The structure of the wick forms a plurality of small bores or tubes, through which the liquid can be transported by capillary action. The capillary wick may comprise any suitable material or combination of materials. Examples of suitable materials are capillary materials, for example a sponge or foam material, ceramic- or graphite-based materials in the form of fibres or sintered powders, foamed metal or plastics material, a fibrous material, for example made of spinned or extruded fibres, such as cellulose acetate, polyester, or bonded polyolefin, polyethylene, terylene or polypropylene fibres, nylon fibres or ceramic. The capillary wick may have any suitable capillarity and porosity so as to be used with different liquid physical properties. The liquid has physical properties, including but not limited to viscosity, surface tension, density, thermal conductivity, boiling point and vapour pressure, which allow the liquid to be transported through the capillary device by capillary action.

Preferably, the aerosol generating element is in the form of a heating wire or filament encircling, and optionally supporting, the capillary wick. The capillary properties of the wick, combined with the properties of the liquid substrate, ensure that, during normal use when there is plenty of aerosol-forming substrate, the wick is always wet in the heating area.

The aerosol generating system may comprise a user display. In that case, the indication may comprise an indication on the user display. Alternatively, the indication may comprise an audible indication, or any other suitable type of indication for a user.

The aerosol generating system may further comprise an electric power supply. Preferably, the aerosol generating system comprises a housing. Preferably, the housing is elongate. If the aerosol generating includes a capillary wick, in use the longitudinal axis of the capillary wick and the longitudinal axis of the housing may be substantially parallel. The housing may comprise a shell and a mouthpiece. In that case, all the components may be

NJOY Exhibit 1002.1649

contained in either the shell or the mouthpiece. In a preferred embodiment, the housing includes a removable consumable cartridge comprising the storage portion, the capillary wick and the heater. In that embodiment, those parts of the aerosol generating system may be removable from the housing as a single component.

The housing may comprise any suitable material or combination of materials. Examples of suitable materials include metals, alloys, plastics or composite materials containing one or more of those materials, or thermoplastics that are suitable for food or pharmaceutical applications, for example polypropylene, polyetheretherketone (PEEK) and polyethylene. Preferably, the material is light and non-brittle.

Preferably, the aerosol generating system is portable. The aerosol generating system may be a smoking system and may have a size comparable to a conventional cigar or cigarette. The smoking system may have a total length between approximately 30 mm and approximately 100 mm. The smoking system may have an external diameter between approximately 5 mm and approximately 13 mm.

Preferably, the electrically operated aerosol generating system is an electrically heated smoking system.

In a second aspect, the invention provides a cartridge for use in an aerosol generating system, the cartridge comprising

an aerosol forming substrate; and

disabling means for rendering the cartridge inoperable in the aerosol generating system, the disabling means configured to be activated by a signal from the aerosol generating system.

The aerosol forming substrate and disabling means may take any of the forms described in relation to the first aspect of the invention. The cartridge may include a storage portion for storing the aerosol-forming substrate and may include a capillary wick as described in relation to the first aspect of the invention. The cartridge may further include an aerosol generating element as described in relation to the first aspect of the invention. The cartridge may further include one or more of control circuitry, a power supply and a user interface as described in relation to the first aspect of the invention.

In a third aspect, the invention provides an aerosol generating device for use with a consumable cartridge, the consumable cartridge containing an

NJOY Exhibit 1002.1650

aerosol-forming substrate and a disabling means configured to render the cartridge inoperable in the aerosol generating device in response to a disable signal, the aerosol generating system comprising:

control circuitry configured to issue a disable signal to the disabling means when the amount of aerosol-forming substrate in the storage portion is determined or estimated to be below a threshold amount or when a malfunction is detected.

The control circuitry may be configured as described in relation to the first aspect of the invention. The aerosol generating device may further include an aerosol generating element as described in relation to the first aspect of the invention. The cartridge may further include one or more of a power supply and a user interface as described in relation to the first aspect of the invention.

According to a fourth aspect of the invention, there is provided a method in an aerosol generating system comprising a storage portion for storing aerosol-forming substrate, an aerosol generating element for generating an aerosol from the aerosol-forming substrate, control circuitry in communication with the storage portion and disabling means associated with the storage portion for rendering the storage portion inoperable in the aerosol generating system in response to a disable signal from the control circuitry, the method comprising:

sending a disable signal from the control circuitry to the disabling means following a determination that an amount of the aerosol-substrate in the storage portion is below a threshold level or following a determination of a malfunction in the system .

According to a fifth aspect of the invention, there is provided electric circuitry for an aerosol generating system, the electric circuitry being arranged to perform the method of the second aspect of the invention.

According to a sixth aspect of the invention, there is provided a computer program which, when run on programmable electric circuitry for an aerosol generating system, causes the programmable electric circuitry to perform the method of the second aspect of the invention.

Features described in relation to the aerosol generating system of the invention may also be applicable to the method of the invention. And, features described in relation to the method of the invention may also be applicable to the aerosol generating system of the invention.

NJOY Exhibit 1002.1651

The invention will be further described, by way of example only, with reference to the accompanying drawings, of which:

Figure 1 shows one example of an electrically operated aerosol generating system having a liquid storage portion; and

Figure 2 is a schematic illustration of a disabling mechanism suitable for use in a system as shown in Figure 1.

Figure 1 shows one example of an electrically operated aerosol generating system having a liquid storage portion. In Figure 1, the system is a smoking system. The smoking system 100 of Figure 1 comprises a housing 101 having a mouthpiece end 103 and a body end 105. In the body end, there is provided an electric power supply in the form of battery 107 and electric control circuitry 109. A puff detection system 111 is also provided in cooperation with the electric control circuitry 109. In the mouthpiece end, there is provided a liquid storage portion in the form of cartridge 113 containing liquid 115, a capillary wick 117 and a heater 119. Note that the heater is only shown schematically in Figure 1. In the exemplary embodiment shown in Figure 1, one end of capillary wick 117 extends into cartridge 113 and the other end of capillary wick 117 is surrounded by the heater 119. The heater is connected to the electric control circuitry via connections 121, which may pass along the outside of cartridge 113 (not shown in Figure 1). The housing 101 also includes an air inlet 123, an air outlet 125 at the mouthpiece end, and an aerosol-forming chamber 127.

In use, operation is as follows. Liquid 115 is conveyed by capillary action from the cartridge 113 from the end of the wick 117 which extends into the cartridge to the other end of the wick which is surrounded by heater 119. When a user draws on the aerosol generating system at the air outlet 125, ambient air is drawn through air inlet 123. In the arrangement shown in Figure 1, the puff detection system 111 senses the puff and activates the heater 119. The battery 107 supplies electrical energy to the heater 119 to heat the end of the wick 117 surrounded by the heater. The liquid in that end of the wick 117 is vaporized by the heater 119 to create a supersaturated vapour. At the same time, the liquid being vaporized is replaced by further liquid moving along the wick 117 by capillary action. (This is sometimes referred to as “pumping action”.) The supersaturated vapour created is mixed with and carried in the air flow from the air inlet 123. In the aerosol-forming chamber 127, the vapour

NJOY Exhibit 1002.1652

condenses to form an inhalable aerosol, which is carried towards the outlet 125 and into the mouth of the user.

In the embodiment shown in Figure 1, the electric control circuitry 109 and puff detection system 111 are preferably programmable. The electric control circuitry 109 and puff detection system 111 can be used to manage operation of the aerosol generating system. This assists with control of the particle size in the aerosol.

Figure 1 shows one example of an electrically operated aerosol generating system according to the present invention. Many other examples are possible, however. In addition, note that Figure 1 is schematic in nature. In particular, the components shown are not to scale either individually or relative to one another. The aerosol generating system needs to include or receive an aerosol-forming substrate. The aerosol generating system requires some sort of aerosol generating element, such as a heater or vibrating transducer, for generating aerosol from the aerosol-forming substrate. Finally, the aerosol generating system requires control circuitry for disabling the system. This will be described below with reference to Figure 2. For example, the system need not be a smoking system. A puff detection system need not be provided. Instead, the system could operate by manual activation, for example the user operating a switch when a puff is taken. For example, the overall shape and size of the housing could be altered. Moreover, the system may not include a capillary wick.

However, in a preferred embodiment, the system does include a capillary wick for conveying liquid substrate from a storage portion to at least one heating element. The capillary wick can be made from a variety of porous or capillary materials and preferably has a known, pre-defined capillarity. Examples include ceramic- or graphite-based materials in the form of fibres or sintered powders. Wicks of different porosities can be used to accommodate different liquid physical properties such as density, viscosity, surface tension and vapour pressure. The wick must be suitable so that the required amount of liquid can be delivered to the heater. Preferably, the heater comprises at least one heating wire or filament extending around the capillary wick.

The aerosol generating system of the invention includes control circuitry that is operable to disable the cartridge 113. This may be done for several reasons. In a preferred embodiment the control circuitry is configured for

NJOY Exhibit 1002.1653

determining an amount of aerosol-forming substrate in the storage portion. When the liquid storage portion is determined to be empty or nearly empty, the control circuitry 109 disables the cartridge 113. This is primarily because if the storage portion is nearly empty, insufficient liquid aerosol-forming substrate may be supplied to the heater. This may mean that the aerosol created and inhaled by the user does not have the desired properties, for example, aerosol particle size. This may result in a poor experience for the user. In addition, it is advantageous to provide a mechanism whereby the user can be informed that the liquid storage portion is empty or nearly empty. Then the user can prepare to replace storage portion. Disabling empty cartridges also provides for user safety. There is a danger that cartridges could be refilled with inferior and possibly dangerous substances. But by disabling the cartridges in a permanent manner they cannot be refilled and reused.

Figure 2 illustrates one embodiment of a disabling system that can be employed in a system as described with reference to Figure 1. The disabling system of Figure 2 has two parts. One part is held in the consumable cartridge 113 and the other part is held in the control circuitry 109. An electrical fuse 201 is located in the consumable. A connection port of three contacts 221 is used for interfacing the consumable storage portion 113 and the main body of the device 101. The consumable part contains the heater element 119. The power supplied to the heating element 119, which is in the form of a modulated signal, is controlled by the digital output 205 on the microcontroller 203 and via the transistor T1. The positive battery electrode 207 is connected to the other leg of the heating element 119 and the electrical fuse 201.

In the embodiment shown in Figure 2 a determination that the cartridge 113 is nearly empty is made by monitoring the temperature of the heating element 119. If the cartridge is nearly empty, insufficient liquid aerosol-forming substrate is supplied to the heater through the wick. This results in the temperature of the heater increasing, as less energy is used to vaporize vaporising the substrate. Thus, the temperature of the heater allows the control circuitry to determine that the amount of liquid aerosol-forming substrate in the liquid storage portion has decreased to a predetermined threshold. Once the critical temperature is reached, the consumable is disabled to avoid a consumable violation by the consumer like the refilling of the cartridge. Disabling also provides the consumer with an indication that the consumable

NJOY Exhibit 1002.1654

needs to be replaced. Disabling the consumable also prevents the generation of harmful constituents formed by an excess of heat.

The measurement of the temperature of the heating element is based on the calculation of the current passing through the resistance 209. This is determined from the signal to input 213 and on the voltage of the battery converted into digital values via two analogue inputs on the microcontroller. As the temperature of the heating element increases, so does its resistance. The relationship between resistance and temperature for the heating element can be programmed or stored in the microcontroller. When the microcontroller determines that the critical temperature has been reached, the microcontroller activates digital output 211 connected to the transistor T2, which blows the electrical fuse 201. After this operation each time the user draws on the device, the microcontroller 203 checks the validity of the fuse 201 via a consumable enable line 215 and if the connection is lost then the device will not operate. When the consumable is replaced by a new one, with an intact fuse, the system returns to normal operating mode.

It should be apparent that other means to disable the cartridge are possible and other circuit configurations possible when using a fuse or other switchable or breakable electronic component. For example a dedicated temperature sensor may be connected to the microcontroller positioned to detect the temperature of the heater element.

The control circuitry may be configured to advise the user when the control circuitry has determined that the amount of liquid in the liquid storage portion has decreased to a first threshold, and the cartridge disabled when the control circuitry has determined that the amount of liquid in the liquid storage portion has decreased to a second threshold. For example, if the aerosol generating system includes a user display, it may be indicated on the user display that the liquid storage portion is empty or nearly empty and an estimate of the number of remaining puffs before disabling will occur may be provided. Alternatively or additionally, an audible sound may indicate to the user that the liquid storage portion is empty or nearly empty. Alternative methods of indicating to the user that the liquid storage portion is empty or nearly empty are, of course, possible. An advantage of advising the user is that the user is then able to prepare to replace the liquid storage portion.

NJOY Exhibit 1002.1655

The present invention provides a system and method for rendering a consumable cartridge inoperable in an aerosol generating system. This has safety benefits as well as providing benefits in terms of user experience and convenience. Although one particular embodiment has been described, there are a number of ways of disabling the consumable cartridge and a number of conditions under which the disabling means may be activated that fall within the scope of the invention.

NJOY Exhibit 1002.1656

CLAIMS

1. An aerosol generating system comprising:

a storage portion for storing an aerosol-forming substrate;

an aerosol generating element for generating an aerosol from the aerosol-forming substrate;

a control circuitry in communication with the storage portion or the aerosol generating element; and

disabling means for rendering the storage portion inoperable in the aerosol generating system in response to a disable signal from the control circuitry,

wherein the control circuitry is configured to determine or estimate when an amount of aerosol-forming substrate in the storage portion is below a threshold amount, and to issue the disable signal when the amount of aerosol-forming substrate in the storage portion is determined or estimated to be below the threshold amount.

2. An aerosol generating system according to claim 1, further comprising a main body, wherein the storage portion is a consumable cartridge configured to couple to the main body.

3. An aerosol generating system according to claim 2, wherein the control circuitry is arranged in the main body of the aerosol generating system.

4. An aerosol generating system according to claim 1, 2 or 3, wherein the disabling means is a component that is configured to be switched or damaged by the disable signal.

5. An aerosol generating system according to claim 4, wherein the component is an electrical fuse.

6. An aerosol generating system according to claim 4, wherein the component is an electrical switch or digital information interacting with the control circuitry and representing an enable/disable state for the storage portion.

NJOY Exhibit 1002.1657

7. An aerosol generating system according to any preceding claim, wherein the control circuitry is configured to issue the disable signal when the control circuitry has detected a malfunction in the aerosol generating system.

8. An aerosol generating system according to any preceding claim, wherein aerosol generating element for generating an aerosol from the aerosol-forming substrate is a heater configured to heat the substrate.

9. An aerosol generating system according to any preceding claim, wherein the aerosol generating system is an electrically operated smoking system.

10. A cartridge for use in an aerosol generating system, the cartridge comprising

an aerosol forming substrate; and

disabling means for rendering the cartridge inoperable in the aerosol generating system, the disabling means configured to be activated by a signal from the aerosol generating system.

11. A cartridge according to claim 10, wherein the disabling means is an electrical component that is configured to be switched or damaged by the signal.

12. An aerosol generating device for use with a consumable cartridge containing an aerosol-forming substrate and a disabling means configured to render the cartridge inoperable in the aerosol generating device in response to a disable signal, the aerosol generating system comprising:

control circuitry configured to issue a disable signal to the disabling means when the amount of aerosol-forming substrate in the storage portion is determined or estimated to be below a threshold amount or when a malfunction is detected.

NJOY Exhibit 1002.1658

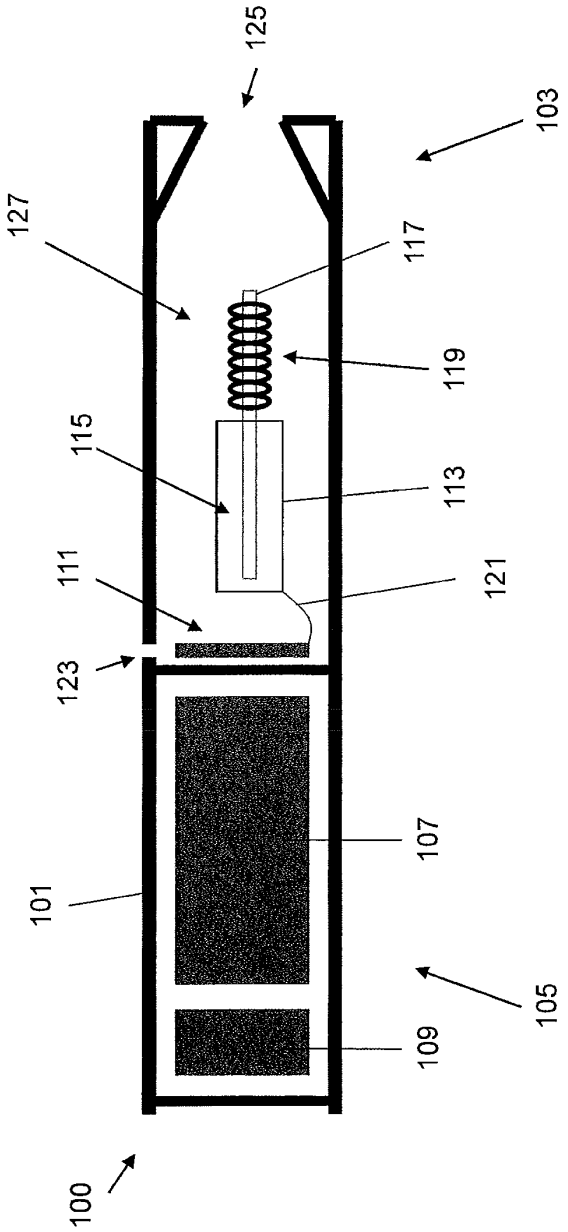
13. An aerosol generating device according to claim 12, wherein the control circuitry is configured to determine or estimate when an amount of aerosol-forming substrate in the storage portion is below the threshold amount.

14. A method in an aerosol generating system comprising a storage portion for storing aerosol-forming substrate, an aerosol generating element for generating an aerosol from the aerosol-forming substrate, control circuitry in communication with the storage portion and disabling means associated with the storage portion configured to render the storage portion inoperable in the aerosol generating system in response to a disable signal from the control circuitry, the method comprising:

sending a disable signal from the control circuitry to the disabling means following a determination that an amount of the aerosol-substrate in the storage portion is below a threshold level or following a determination of a malfunction in the system .

NJOY Exhibit 1002.1659

Figure 1



NJOY Exhibit 1002.1660

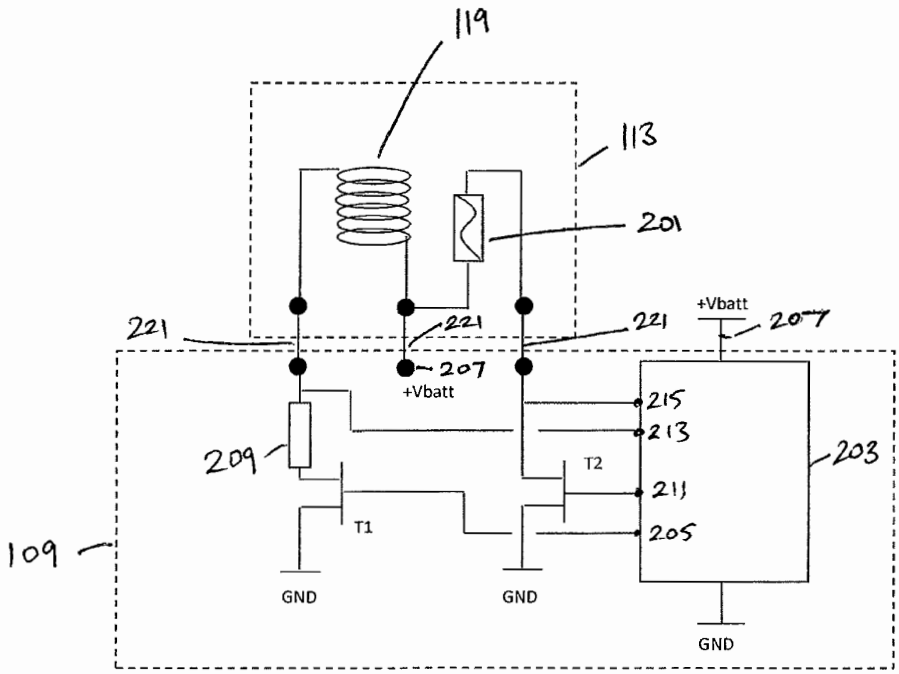

119
113
201
221
221
221
+Vbatt
207
207
+Vbatt
215
213
209
T2
203
211
T1
205
109
GND
GND
GND

Figure 2

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2011/073793

A. CLASSIFICATION OF SUBJECT MATTER
INV. A24F47/00 A61L9/03
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A24F A61L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2002/105099 A1 (WARREN JACQUELINE M COLE [US] COLE WARREN JACQUELINE M [US]) 8 August 2002 (2002-08-08) paragraphs [0001], [0014] - [0019]; figures 1,2	1-4,6, 12-14
A	EP 0 358 002 A2 (REYNOLDS TOBACCO CO R [US]) 14 March 1990 (1990-03-14) column 1, lines 3-7 column 4, line 45 - column 6, line 37 column 12, lines 18-34 figures 1,9,10	1-14
A	EP 0 485 134 A2 (STEINER CO INC [US]) 13 May 1992 (1992-05-13) column 1, line 36 - column 2, line 2 column 10, line 29 - column 12, line 36 figures	1,10,12, 14

-/--

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
20 April 2012	27/04/2012

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Kock, Søren

NJOY Exhibit 1002.1662

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2011/073793

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2007/074734 A1 (BRAUNSHTEYN MICHAEL S [US] ET AL) 5 April 2007 (2007-04-05) paragraphs [0011] - [0014], [0026] - [0029]; figures	1-14

NJOY Exhibit 1002.1663

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2011/073793

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2002105099 A1	08-08-2002	NONE	
EP 0358002 A2	14-03-1990	CN 1045691 A	03-10-1990
		DK 442589 A	09-03-1990
		EP 0358002 A2	14-03-1990
		FI 894224 A	09-03-1990
		JP 2124082 A	11-05-1990
		NO 893590 A	09-03-1990
		US 4947874 A	14-08-1990
EP 0485134 A2	13-05-1992	AT 141169 T	15-08-1996
		CA 2044780 A1	06-05-1992
		DE 69121357 D1	19-09-1996
		DE 69121357 T2	12-12-1996
		EP 0485134 A2	13-05-1992
		ES 2090258 T3	16-10-1996
		JP 4282164 A	07-10-1992
		US 5126078 A	30-06-1992
US 2007074734 A1	05-04-2007	AT 457136 T	15-02-2010
		AU 2006298495 A1	12-04-2007
		BR PI0616797 A2	28-06-2011
		CA 2622543 A1	12-04-2007
		CN 101277622 A	01-10-2008
		EA 200800999 A1	29-08-2008
		EP 1947965 A2	30-07-2008
		ES 2340072 T3	28-05-2010
		HK 1115009 A1	30-04-2010
		JP 2009509521 A	12-03-2009
		KR 20080059567 A	30-06-2008
		MY 143490 A	31-05-2011
		PT 1947965 E	10-05-2010
		US 2007074734 A1	05-04-2007
		WO 2007039794 A2	12-04-2007

NJOY Exhibit 1002.1664

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Veröffentlichungsnummer:
(11) Publication number: **EP 3 000 245 A0**
(11) Numéro de publication:

Internationale Anmeldung veröffentlicht durch die Weltorganisation für geistiges Eigentum unter der Nummer:

WO 2014/195805 (Art. 153(3) EPÜ).

International application published by the World Intellectual Property Organization under number:

WO 2014/195805 (Art. 153(3) EPC).

Demande internationale publiée par l'Organisation Mondiale de la Propriété Intellectuelle sous le numéro:

WO 2014/195805 (art. 153(3) CBE).

NJOY Exhibit 1002.1665

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
11 December 2014 (11.12.2014)

WIPO | PCT

(10) International Publication Number
WO 2014/195805 A2

(51) International Patent Classification: Not classified

(21) International Application Number:
PCT/IB2014/001913

(22) International Filing Date:
20 May 2014 (20.05.2014)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
13/898,094 20 May 2013 (20.05.2013) US

(71) Applicant: **SIS RESOURCES, LTD.** [IL/IL]; P.O. Box 674, 99000 Beith Shemesh (IL).

(72) Inventors: **JUSTER, Bernard**; 5 Halotem Alley, Apt. #74, 42943 Netanya (IL). **LEVITZ, Robert**; 2 Nachal Tamar Street, Ramat Bet, 99643 Shemesh (IL). **LEVY, Dorron**; 12 Ken Kayemet Street, 53237 Givatayim (IL).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— *without international search report and to be republished upon receipt of that report (Rule 48.2(g))*

WO 2014/195805 A2

(54) Title: APPLICATION DEVELOPMENT FOR A NETWORK WITH AN ELECTRONIC CIGARETTE

(57) Abstract: An electronic cigarette ("e-Cig") may include a controller for providing various operations within an e-Cig. Enhancements for the controller may provide for improved operations and control for the e-Cig with a consumer device, such as a smartphone. Applications on the smartphone may be developed for improving the operations and the control of the e-Cig, as well as making use of data communicated from the e-Cig. Applications may be developed for controlling smoke properties, monitoring operations, adjusting settings, receiving product notifications, or compiling/analyzing data from the e- Cig. Applications may also provide other capabilities that may not be unique to an e-Cig, but may incorporate capabilities of the e-Cig, including entertainment, medical, or gaming applications.

NJOY Exhibit 1002.1666

APPLICATION DEVELOPMENT FOR A NETWORK WITH AN ELECTRONIC CIGARETTE

INVENTORS:
Bernard Juster
Robert Levitz
Dorron Levy

BACKGROUND

[0002] Smoking may be an activity with certain social implications. For example, social factors may influence the decision to start smoking or may be one reason for smoking in groups (from couples to people who go out to smoke together, to parties etc.). The social benefits of smoking without certain of the downsides may be achieved with an electronic cigarette ("e-cigarette" or "e-Cig"). An e-Cig is a device that emulates tobacco cigarette smoking, by producing smoke replacement that may be similar in its physical sensation, general appearance, and sometimes flavor (i.e., with tobacco fragrance, menthol taste, added nicotine etc.). The device may use heat, ultrasonic energy, or other means to atomize/vaporize a liquid (for example based on propylene glycol, or glycerin, for example including taste and fragrance ingredients) solution into an aerosol mist. The

NJOY Exhibit 1002.1667

atomization may be similar to nebulizer or humidifier vaporizing solutions for inhalation. The generated mist may be sensed similar to cigarette smoke. Because it is electronic, an e-Cig may provide opportunities for increased options, communication, and control.

BRIEF DESCRIPTION OF THE DRAWINGS

[0003] The system and method may be better understood with reference to the following drawings and description. Non-limiting and non-exhaustive embodiments are described with reference to the following drawings. The components in the drawings are not necessarily to scale, emphasis instead being placed upon illustrating the principles of the invention. In the drawings, like referenced numerals designate corresponding parts throughout the different views.

[0004] Figure 1 is a diagram of an electronic cigarette;

[0005] Figure 2 is a diagram of an atomizer;

[0006] Figure 3 is a flow diagram of the electronic cigarette smoking process;

[0007] Figure 4 is a flow diagram of components for the electronic cigarette;

[0008] Figure 5 is an alternative diagram of an electronic cigarette with multiple e-Liquids;

[0009] Figure 6 is an alternative diagram of components in an electronic cigarette;

[0010] Figure 7 is a network diagram with an electronic cigarette;

[0011] Figure 8 is another network diagram with an electronic cigarette illustrating local and network communications;

[0012] Figure 9 is a diagram illustrating local communication examples;

[0013] Figure 10 is another network diagram with an electronic cigarette illustrating image acquisition;

[0014] Figure 11 is another exemplary electronic cigarette;

[0015] Figure 12 is a diagram illustrating communications interface examples;

[0016] Figure 13 is a diagram illustrating exemplary controller components;

[0017] Figure 14 is a flow chart for cigarette operation;

[0018] Figure 15 is a flow chart for smoking control;

NJOY Exhibit 1002.1668

[0019] Figure 16 illustrates an enhanced controller as part of a mount piece for regular cigarettes;

[0020] Figure 17 illustrates a flow diagram for the mount piece;

[0021] Figure 18 is a network diagram of electronic cigarette communications; and

[0022] Figure 19 is a network diagram with an application development component.

DETAILED DESCRIPTION

[0023] Subject matter will now be described more fully hereinafter with reference to the accompanying drawings, which form a part hereof, and which show, by way of illustration, specific example embodiments. Subject matter may, however, be embodied in a variety of different forms and, therefore, covered or claimed subject matter is intended to be construed as not being limited to any example embodiments set forth herein; example embodiments are provided merely to be illustrative. Likewise, a reasonably broad scope for claimed or covered subject matter is intended. Among other things, for example, subject matter may be embodied as methods, devices, components, or systems. Accordingly, embodiments may, for example, take the form of hardware, software, firmware or any combination thereof (other than software per se). The following detailed description is, therefore, not intended to be taken in a limiting sense.

[0024] Throughout the specification and claims, terms may have nuanced meanings suggested or implied in context beyond an explicitly stated meaning. Likewise, the phrase "in one embodiment" as used herein does not necessarily refer to the same embodiment and the phrase "in another embodiment" as used herein does not necessarily refer to a different embodiment. It is intended, for example, that claimed subject matter include combinations of example embodiments in whole or in part.

[0025] In general, terminology may be understood at least in part from usage in context. For example, terms, such as "and", "or", or "and/or," as used herein may include a variety of meanings that may depend at least in part upon the context in which such terms are used. Typically, "or" if used to associate a list, such as A, B or C, is intended to mean A, B, and C, here used in the inclusive sense, as well as A, B or C, here used in the

NJOY Exhibit 1002.1669

exclusive sense. In addition, the term "one or more" as used herein, depending at least in part upon context, may be used to describe any feature, structure, or characteristic in a singular sense or may be used to describe combinations of features, structures or characteristics in a plural sense. Similarly, terms, such as "a," "an," or "the," again, may be understood to convey a singular usage or to convey a plural usage, depending at least in part upon context. In addition, the term "based on" may be understood as not necessarily intended to convey an exclusive set of factors and may, instead, allow for existence of additional factors not necessarily expressly described, again, depending at least in part on context.

[0026] By way of introduction, an electronic cigarette ("e-Cig") may include a controller for providing various operations within an e-Cig. Enhancements for the controller may provide for improved operations and control for the e-Cig. In one embodiment, there may be a communications capability which may be separate from or part of the controller. The communications may allow for the e-Cig to communicate with a consumer device, such as a computer, smartphone or tablet. The consumer may then control smoke properties, monitor operations, adjust settings, and/or receive product notifications or offers through the consumer device's communication with the e-Cig. Control may also be enabled for automatic services, such as messaging from commercial parties, by servers, by local area network ("LAN")-located entities, such as a smart phone application, and/or by other persons (e.g. friends, supporters or social networks) that may be located locally or over a wide area network ("WAN") such as the Internet. Other possible applications may include smoking cessation support, by professionals or peers (also my involve and incorporate other Nicotine Replacement Therapies (NRT), such as nicotine patches; competitions and challenges, for example of knowledge or taste recognition; related products marketing and sales, for example coffee or candy. The communications may enable connections to various websites on the Internet for usage tracking or social networking. Although commonly referred to as a smoker throughout, a user of an e-Cig may also be referred to as a vapor and the act of "smoking" may be referred to as vaping. Likewise, a non-electronic cigarette may be referred to as a

NJOY Exhibit 1002.1670

"regular" or "standard" cigarette, but should be understood to include non-electronic cigarettes. Although mist generation (or atomization) may be described interchangeably with vaporization, the concepts are distinct. The use of the term vaporization, vapor, or vaping should be understood to include the mist generation or atomization process.

[0027] Other systems, methods, features and advantages will be, or will become, apparent to one with skill in the art upon examination of the following figures and detailed description. It is intended that all such additional systems, methods, features and advantages be included within this description, be within the scope of the invention, and be protected by the following claims. Nothing in this section should be taken as a limitation on those claims. Further aspects and advantages are discussed below.

[0028] Figure 1 is a diagram of an electronic cigarette. The "smoke" produced by an e-Cig is a created by turning a liquid (e-Liquid 110) into mist and some vapor with an atomizer 112. The e-liquid 110 may have a high viscosity at room temperature to enable longer shelf life and reduce leakages; however, this high viscosity may reduce the atomization rate. The atomizer 112 is further described below with respect to Figure 2. The e-Liquid 110 is atomized via air flow 108, generated by the inhalation of the user (i.e. the smoker or consumer or vapor), which produces a pressure difference that removes e-Liquid droplets from the e-Liquid 110. In one embodiment, the e-Liquid 110 may be soaked in a wick. In order to reduce the e-Liquid viscosity, to a level enabling atomization, external heat may be applied through a heating element 111 as further described below. In this embodiment, local viscosity reduction via heating, while inhalation occurs, enables e-Liquid atomization in the inhalation-generated flow of air 108. The e-Liquid 110 may be heated via an electric current flowing through the heating element 111 and may then be atomized and evaporated through the e-Cig and may contain tastes and aromas that create a smoking sensation.

[0029] The controller 102 may be activated due to air flow 108 (from the inhaled air) passing a flow sensor 104. The sensor 104 may be activated by the pressure drop across the sensor and may directly switch the battery 106 power on, or be used as an input for the controller 102 that then switches the battery 106 current on. Although illustrated as

NJOY Exhibit 1002.1671

separate from the e-Cig, the controller 102 may be a part of the e-Cig (e.g. along with the battery 106). The enhancements to the controller 102 are further described below with respect to Figures 7-13, and include external communications from a communications chip. The communications described below may allow for increased control of properties of the sensor 104, battery 106, air flow 108, e-Liquid 110 or atomizer 112. In particular, the controller 102 may be configured for external communication to other computing devices and/or networks.

[0030] In one alternative embodiment, the battery 106 may be a separate/removable assembly. The battery 106 may include one or more electronic chips controlling and communicating from it. It may receive cartomizers. Conversely, a disposable e-Cig may include the battery 106 as a single unit. In another alternative embodiment, the battery 106 keeps a trickle current on. The trickle current may keep the communication link alive, while main current for the heating element 111 is only activated by the flow sensor 104.

[0031] Figure 2 is a diagram of the atomizer 112. The inhaled air 202 is passed through the atomizer 112. A heating element 206 (which may be separate from the atomizer 112 in alternate embodiments) supplies heat to the E-liquid 110, which reduces viscosity 208. Due to the heating element 206, the e-Liquid 110 viscosity over temperature profile may be designed in a way such that when heated its viscosity will be reduced to a level where atomization may be effective (with the pressure shear forces and velocities that can be created with inhalation activity). The heating element 206 may be powered through a power supply 204. The low viscosity e-liquid and the inhaled air 202 result in the smoke 210. The smoke 210 is not a traditional smoke, but is instead a combination of aerosol, warmed air and vapors, and may be referred to as a vapor.

[0032] The atomization may be the process that makes an aerosol. When a gas is injected under pressure difference through a tube with a narrowing cross-section, it speeds up, generating a pressure drop at the narrowest point due to Bernoulli's principle and creates Venturi's effect. The narrowing cross-section may enable pressure reduction in that the narrowing results in a velocity increase and pressure drop. The reduced pressure,

NJOY Exhibit 1002.1672

due to the pressure difference between the two points, sucks up a liquid from a reservoir through a narrow tube or tubes into the moving gas flow, and projects it forward as a fine spray of droplets. When liquid is moved through wick capillaries a pressure difference may be effective in creating shear forces. The generated microscopic droplets are then sucked in to the mouth and upper respiratory tract. Droplet size can be influenced by the internal structure of the e-Cig, and its working conditions, including liquid properties, liquid temperature while atomized, heating energy, flow local macro and micro structure, inhalation force, etc. The e-Liquid 110 may be purchased and interchangeable within the e-Cig for adding flavor to the smoke 210.

[0033] Figure 3 is a flow diagram of the electronic cigarette smoking process. The inhaled air 302 passes through a flow sensor 304. The e-Cig power source is a battery (or other power source, e.g. other electrical sources) which may be a part of the e-Cig that provides a current supply 306. The current supply 306 may be triggered by the controller which may be activated due to air flow 302 passing a flow sensitive switch or flow sensor 304. This sensor can switch the battery power or may be an input for the controller. When controller is activated it enables power to a heating resistance element (e.g. heating element 206). In one embodiment, the heating element 206 may be a heating coil. The power may be controlled using Pulse Width Modulation ("PWM") signaling. E-Liquid may be located in a container where a capillary device such as wick leads it to a place where inhaled air 302 have flow conditions that enable creation of pressure drop and/or shear forces that will enable aerosol creation. Heating of the e-Liquid in the wick by a coil or heating element may reduce viscosity 310 of the e-Liquid and enable aerosol creation through evaporation 312. The aerosol creation may result in a smoke feeling for a user. The resultant smoke/vapor 210 may include warm air, aerosol, and vapors 314. In one embodiment, the e-Liquid may flow through the coil, which may be wrapped around a wick in the e-Cig. The inhaled air flows across the wick such that the inhaled air flow may induce turbulent flow. A local air vortex may enable high pressure drops and shear forces that create aerosol from at least part of the e-Liquid soaked in the wick.

NJOY Exhibit 1002.1673

[0034] Figure 4 is a flow diagram of components for the electronic cigarette. Figures 1 and 3 illustrate exemplary e-Cig components and processes for smoke creation. Figure 4 illustrates a simplified embodiment of certain components. Inhaled air 402 passes through a flow sensor 404, which may notify a controller 406 of the presence of the inhaled air 402. The controller 406 may signal a current supply 408 which begins the smoke creation mechanism 410. As discussed above, the smoke creation mechanism 410 may include an atomizer and/or heating element for creating the aerosol. Figure 4 illustrates how the e-Cig is activated upon sensing the inhaled air. This basically "turns on" the e-Cig for creating the aerosol for the user to engage in the smoking process. When the power supply is not enabled, atomization and vaping is prevented.

[0035] Figure 5 is an alternative diagram of an electronic cigarette with multiple e-Liquid containers. The e-Cig in Figure 5 may be similar to or the same as the e-Cig in Figure 1 except it includes multiple e-Liquids. The e-Cig may include a first e-liquid 110 as with Figure 1, but also includes a second e-Liquid 510. The aerosol or smoke from the two e-Liquids may be combined to enhance or modify the flavor produced with just a single e-Liquid. In one embodiment, an e-Liquid with nicotine may be combined with an e-Liquid that is nicotine free. The controller may determine which e-Liquid is utilized for vaping. In one embodiment, the user may interact with the controller to switch between the e-Liquids. Alternatively, the controller may automatically select the e-Liquid based on usage patterns or may switch between the e-Liquids during inhalation.

[0036] The e-Liquids may be sensed by constant resistance measurement of the heating element when the cartomizer is removed or disconnection occurs. Likewise, when another cartomizer is assembled it may be sensed and restricted until it is confirmed with the controller (e.g. by a smartphone as discussed below).

[0037] Figure 6 is an alternative diagram of components in an e-Cig. The e-Cig may be the e-Cig illustrated in Figures 1 or 5. Figure 7 below includes a further description of additional components of an e-Cig. Figure 6 illustrates the flow of different functions of the e-Cig. In this embodiment, the e-Cig power source is a battery 606 which is part of the e-Cig. The battery 606 may be lithium-ion in one example. The controller 602 may

NJOY Exhibit 1002.1674

be activated due to air flow (from the inhaled air) passing a flow-sensitive switch or flow sensor 604. The sensor 604 may be activated by a pressure drop across the sensor. This sensor 604 may directly switch the battery 606 power on, or be used as an input for the controller 602, that then switches the battery 606 current on. This process is further described above with respect to Figures 1-3. The controller 602, when activated, enables, in a specific embodiment, a Pulse Width Modulation ("PWM") control over the heating coil 608 power. Heating of the liquid by the heating coil 608 reduces viscosity of the e-Liquid which may enable atomization 610.

[0038] In parallel the controller 602 may power up a light emitting diode ("LED") 612 light source at the e-Cig tip. The LED 602 light may imitate the cigarette light. In one embodiment, the light color may be changed to distinguish it from regular (non-electronic) cigarettes. For example, the LED may be green. The light may mimic the brightness of the fire/burn of a non-electronic cigarette. In other words, the lighting is different, for example turned on, for while receiving inhaled air. Accordingly, there may be an analog or digital electrical circuit that enables the light to increase and/or cease gradually. This setup may be translated to electrical circuits in more than a single way (for example the pressure switch can switch the power to the controller or only enable a signal to be transmitted to the controller). The e-Cig LED or light at its tip may be changed according to ambient illumination. For example, the light power may be reduced when driving at night or may be modified based on location. For example, the color may change when smoking indoors or in a restaurant. The change may be controlled by the smartphone, utilizing its various sensors.

[0039] Figure 7 is a network diagram including an e-Cig 701. Figure 7 illustrates a consumer device 702 and user device 703 that are coupled with a network 704. The consumer device 702 may be directly (or locally) coupled with the e-Cig 701. Through the network, an e-Cig server 706 may store (in database 708) and communicate information to/from the e-Cig 701. Herein, the phrase "coupled with" is defined to mean directly connected to or indirectly connected through one or more intermediate components. Such intermediate components may include both hardware and software

NJOY Exhibit 1002.1675

based components. Variations in the arrangement and type of the components may be made without departing from the spirit or scope of the claims as set forth herein. Additional, different or fewer components may be provided.

[0040] The e-Cig 701 may be similar to or the same as the e-Cigs illustrated in Figures 1 and 5. As described below, the e-Cig 701 may communicate with a consumer device, such as a smartphone 702. A smartphone is merely one example of a device that may communicate directly/locally with the e-Cig 701 and connect with the network 704. Other devices may include a desktop computer or a portable device, such as a cellular telephone, a display pager, a radio frequency (RF) device, an infrared (IR) device, a Personal Digital Assistant (PDA), a handheld computer, a tablet computer, a laptop computer, a set top box, a wearable computer (e.g. glasses or watch), an integrated device or any computing device combining various features, such as features of the forgoing devices, or the like. However, the device will be labeled throughout this disclosure as a smartphone for simplicity. The smartphone 702 may also be referred to as a host or host device, while the e-Cig is the client or client device.

[0041] The smartphone 702 may also be referred to as a client device and may include a computing device capable of sending or receiving signals, such as via a wired or a wireless network (e.g. the network 704, which may be the Internet). The smartphone 702 communicates directly with the e-Cig 701 through local communication mechanisms, such as those illustrated in Figure 12. This communication with a smartphone 702 enables a user to have increased interaction and control of the e-Cig 701. Exemplary information communicated with the smartphone 702 is shown in Figure 9.

[0042] The smartphone 702 may include or may execute a variety of operating systems, including a personal computer operating system, such as a Windows, iOS or Linux, or a mobile operating system, such as iOS, Android, or Windows Mobile, or the like. The smartphone 702 may include or may execute a variety of possible applications, such as a client software application enabling communication with other devices, such as communicating one or more messages, such as via email, short message service (SMS), or multimedia message service (MMS), including via a network, such as a social network,

NJOY Exhibit 1002.1676

including, for example, Facebook, LinkedIn, Twitter, Flickr, WhatsApp, or Google+, to provide only a few possible examples. The smartphone 702 may also include or execute an application to communicate content, such as, for example, textual content, multimedia content, binary files, numerical data, or the like. The smartphone 702 may also include or execute an application to perform a variety of possible tasks, such as browsing, searching, playing various forms of content, including locally stored or streamed video, or games (such as fantasy sports leagues, or competitions such as e-Cig smokers competing on location-based assignments or any other games/activities involving community use). The foregoing is provided to illustrate that claimed subject matter is intended to include a wide range of possible features or capabilities. As described below, the smartphone 702 communicates with the e-Cig 701 and communicates over the network 704. Although not illustrated, the e-Cig 701 may communicate with other e-Cigs or multiple smartphones. In one embodiment, a couple may each have e-Cigs that can communicate with one another and that can communicate with each other's smartphones. This communication by the e-Cig may be through the network 704 in one embodiment. As further discussed below, the smartphone 702 may augments -Cig data with data from its own sensors, such as GPS, accelerometers, clocks, environmental parameters, microphone, and camera.

[0043] In one embodiment, the e-Cig 701 may include a controller 720, memory 718, software 716, and/or a communications interface 714. In alternative embodiments, the memory 718, software 716, and/or a communications interface 714 may be considered to be part of the controller 720. Alternatively, the memory 718 and/or software 716 may not be part of the e-Cig 701, rather the smartphone 702 will utilize its memory 718 (e.g. internal memory or external memory such as memory cards) and/or software 716 for the functions described below. In other words, functions performed by the smartphone 702 may be performed by the e-Cig 701 in certain circumstances, and functions performed by the e-Cig 701 may be performed by the smartphone 702 in other circumstances.

[0044] The communications interface 714 may communicate with the smartphone 702. In one embodiment, the communications interface 714 includes a communication chip as illustrated in Figures 8 and 11. The communications interface 714 may include

NJOY Exhibit 1002.1677

local/direct communication with the smartphone 702 using any of the interface mechanisms illustrated in Figure 12.

[0045] The controller 720 in the e-Cig 701 may include a central processing unit (CPU), a digital signal processor (DSP) or other type of processing device. The controller 720 may be one or more general processors, digital signal processors, application specific integrated circuits, field programmable gate arrays, servers, networks, digital circuits, analog circuits, combinations thereof, or other now known or later developed devices for analyzing and processing data. The controller 720 may operate in conjunction with software or firmware (e.g. software 716), such as code generated manually (i.e., programmed). The controller 720 may be coupled with a memory 718, or the memory 718 may be a separate component or embedded within the controller 720. The software 716 may be stored in the memory 718. The memory 718 may include, but is not limited to, computer readable storage media such as various types of volatile and non-volatile storage media, including random access memory, read-only memory, programmable read-only memory, electrically programmable read-only memory, electrically erasable read-only memory, flash memory, magnetic tape or disk, optical media and the like. The memory 718 may include a random access memory for the controller 720. Alternatively, the memory 718 may be separate from the controller 720, such as a cache memory of a processor, the system memory, or other memory. The memory 718 may be an external storage device or database for storing recorded ad or user data. The memory 718 is operable to store instructions executable by the controller 720.

[0046] The functions, acts or tasks illustrated in the figures or described herein may be performed by the programmed processor executing the instructions stored in the memory 718. The functions, acts or tasks are independent of the particular type of instruction set, storage media, processor or processing strategy and may be performed by software, hardware, integrated circuits, firm-ware, micro-code and the like, operating alone or in combination. Likewise, processing strategies may include multiprocessing, multitasking, parallel processing and the like. The controller 720 is configured to execute the software 716. The software 716 may include instructions for analyzing, monitoring, and tracking

NJOY Exhibit 1002.1678

e-Cig 701 data and communicating with the smartphone 702. The present disclosure contemplates a computer-readable medium that includes instructions or receives and executes instructions responsive to a propagated signal, so that a device connected to a network can communicate voice, video, audio, images, location, GPS information, accelerometer data, environmental sensors or any other data over a network.

[0047] The network (e.g. the network 704) may couple devices so that communications may be exchanged, such as between a server and a client device or other types of devices, including between wireless devices coupled via a wireless network, for example. A network may also include mass storage, such as network attached storage (NAS), a storage area network (SAN), or other forms of computer or machine readable media, for example. A network may include the Internet, one or more local area networks (LANs), one or more wide area networks (WANs), wire-line type connections, wireless type connections, or any combination thereof. Likewise, sub-networks, such as may employ differing architectures or may be compliant or compatible with differing protocols, may interoperate within a larger network. Various types of devices may, for example, be made available to provide an interoperable capability for differing architectures or protocols. As one illustrative example, a router may provide a link between otherwise separate and independent LANs. A communication link or channel may include, for example, analog telephone lines, such as a twisted wire pair, a coaxial cable, full or fractional digital lines including T1, T2, T3, or T4 type lines, Integrated Services Digital Networks (ISDNs), Digital Subscriber Lines (DSLs), wireless links including satellite links, or other communication links or channels, such as may be known to those skilled in the art. Furthermore, a computing device or other related electronic devices may be remotely coupled to a network, such as via a telephone line or link, for example.

[0048] A wireless network may couple client devices (e.g. the smartphone 702 or user device 703) with a network. A wireless network may employ stand-alone ad-hoc networks, mesh networks, Wireless LAN (WLAN) networks, cellular networks, or the like. A wireless network may further include a system of terminals, gateways, routers, or

NJOY Exhibit 1002.1679

the like coupled by wireless radio links, or the like, which may move freely, randomly or organize themselves arbitrarily, such that network topology may change, at times even rapidly. A wireless network may further employ a plurality of network access technologies, including Long Term Evolution (LTE), WLAN, Wireless Router (WR) mesh, or 2nd, 3rd, or 4th generation (2G, 3G, or 4G) cellular technology, or the like. Network access technologies may enable wide area coverage for devices, such as client devices with varying degrees of mobility, for example. For example, a network may enable RF or wireless type communication via one or more network access technologies, such as Global System for Mobile communication (GSM), Universal Mobile Telecommunications System (UMTS), General Packet Radio Services (GPRS), Enhanced Data GSM Environment (EDGE), 3GPP Long Term Evolution (LTE), LTE Advanced, Wideband Code Division Multiple Access (WCDMA), Bluetooth, 802.11b/g/n, or the like. A wireless network may include virtually any type of wireless communication mechanism by which signals may be communicated between devices, such as a client device or a computing device, between or within a network, or the like.

[0049] Signal packets communicated via a network, such as a network of participating digital communication networks, may be compatible with or compliant with one or more protocols. Signaling formats or protocols employed may include, for example, TCP/IP, UDP, DECnet, NetBEUI, IPX, Appletalk, or the like. Versions of the Internet Protocol (IP) may include IPv4 or IPv6. The Internet refers to a decentralized global network of networks. The Internet includes local area networks (LANs), wide area networks (WANs), wireless networks, or long haul public networks that, for example, allow signal packets to be communicated between LANs. Signal packets may be communicated between nodes of a network, such as, for example, to one or more sites employing a local network address. A signal packet may, for example, be communicated over the Internet from a user site via an access node coupled to the Internet. Likewise, a signal packet may be forwarded via network nodes to a target site coupled to the network via a network access node, for example. A signal packet communicated via the Internet may, for

NJOY Exhibit 1002.1680

example, be routed via a path of gateways, servers, etc. that may route the signal packet in accordance with a target address and availability of a network path to the target address.

[0050] In one embodiment, the connection between the smartphone 702 and the e-Cig 701 is a direct/local connection (not through an external network such as the Internet), but alternative embodiments may allow for other connections between the smartphone 702 and the e-Cig 701. For example, the e-Cig 701 may communicate through the network 704 with or without the smartphone 702. Likewise, the e-Cig 701 may allow connections with more than one device (e.g. smartphone 702 and user device 703) that may be direct/local connections or connections through the network 704. Although not illustrated in Figure 7, the communications mechanisms for the network 704 may apply to the connection between the smartphone 702 and the e-Cig 701.

[0051] In an alternative embodiment, there may be a wireless or wired charger or charging device that connects the e-Cig 701 and provides power for charging the battery. The smartphone 702 may act as a charger for the e-Cig 701 in one embodiment. Alternatively, the charger for the e-Cig 701 may be a separate device from the smartphone 702. For example, the charging device may be another computer (e.g. universal serial bus (USB)) that communicates with the e-Cig 701. There may be mutual charging between the smartphone and the e-Cig. In particular, the smartphone may provide a charge for the e-Cig and/or the e-Cig may provide a charge to the smartphone. An external charging device may charge both the smartphone and e-Cig, simultaneously or separately. The charging may be wired or wireless.

[0052] The e-Cig server 706 may be a server (e.g. web server) that provides the smartphone 702 with pages or information (e.g. through an app) that are requested over the network 704, such as by a user of the smartphone 702. In particular, the operator 710 may provide or collect information through the e-Cig server 706 when requested for or by the smartphone 702. The e-Cig server 706 may be operated by an operator 710 that maintains and oversees the operation of the e-Cig server 706. The e-Cig server 706 may be able to track information and provide offers stored in its database 708. The e-Cig database 708 may be coupled with the e-Cig server 706 and may store the

NJOY Exhibit 1002.1681

information/data that is provided by the e-Cig server 706 to the e-Cig 701. Alternatively, tracking metrics and other properties/parameters of the e-Cig 701 may be communicated through the e-Cig server 706 for storage in the e-Cig database 708. The e-Cig server 706 may allow for individual or group communication with e-Cig users. For example, the e-Cig server 706 may communicate with a subset of users (e.g. to notify of an event, such as a group smoking party) or may be used for remote deactivations (e.g. if a defective batch is found).

[0053] The application ("app") that is provided by the smartphone 702 for interacting with the e-Cig 701 may include a variety of interfaces. In one embodiment, the app may include a rendering of the e-Cig that may illustrate the components of the e-Cig. The status of those components may be displayed on the app interface (e.g. battery level, e-Liquid level, LED color etc.). Accordingly, the app may be used for checking on the functionality of the e-Cig. In an alternative embodiment, this may allow the user to also light the e-Cig for a simulated smoke. The simulated smoke may be achieved through augmented reality. For example, augmented reality glasses may be used for enabling creation of smoke from the e-Cig when it is held by hand or on camera of the glasses. The smartphone 702 may include a number of apps for communicating and interacting with the e-Cig 701, some of which may be developed by third party developer's using the application developer's tools described below.

[0054] The operator 710 of the e-Cig server 706 may include the manufacturer of the e-Cig or may be another third party company may monitor and facilitate the communications between the smartphone 702 and the e-Cig 701. In one embodiment, the e-Cig server 706 may provide an application (i.e. an "app") that is run on the smartphone 702 that implements the communication features discussed herein. In particular, the smartphone app may provide a user interface for all information stored in the e-Cig 701, the smartphone 702, and the database 708. The UI of the app displays that information and allows a user to modify any parameters for the e-Cig 701. Further, through the app, the enhanced controller of the e-Cig 701 may allow for the communication and interaction between the smartphone 702 and the e-Cig 701.

NJOY Exhibit 1002.1682

Additional apps may be provided from the e-Cig server 706 which may be developed byt the operator 710 or by a third party developer using application developer tools.

[0055] The e-Cig server 706 may be one or more computing devices which may be capable of sending or receiving signals over the network 704, or may be capable of processing or storing signals, such as in memory as physical memory states, and may, therefore, operate as a server. Thus, devices capable of operating as a server may include, as examples, dedicated rack-mounted servers, desktop computers, laptop computers, set top boxes, integrated devices combining various features, such as two or more features of the foregoing devices, or the like. Servers may vary widely in configuration or capabilities, but generally a server may include one or more central processing units and memory. A server may also include one or more mass storage devices, one or more power supplies, one or more wired or wireless network interfaces, one or more input/output interfaces, or one or more operating systems, such as Windows Server, Mac OS X, Unix, Linux, FreeBSD, or the like.

[0056] In addition, the e-Cig server 706 may be or may be part of a content server. A content server may include a device that includes a configuration to provide content via a network to another device (e.g. smartphone 702). A content server may, for example, host a site, such as a social networking site, examples of which may include, without limitation, Flicker, Twitter, Facebook, LinkedIn, or a personal user site (such as a blog, vlog, online dating site, etc.). A content server may also host a variety of other sites, including, but not limited to business sites, educational sites, dictionary sites, encyclopedia sites, wikis, financial sites, government sites, etc. A content server may further provide a variety of services that include, but are not limited to, web services, third-party services, audio services, video services, email services, instant messaging (IM) services, SMS services, MMS services, FTP services, voice over IP (VOIP) services, calendaring services, photo services, or the like. Examples of content may include text, images, audio, video, or the like, which may be processed in the form of physical signals, such as electrical signals, for example, or may be stored in memory, as physical states, for example. Examples of devices that may operate as a content server include desktop

NJOY Exhibit 1002.1683

computers, multiprocessor systems, microprocessor-type or programmable consumer electronics, etc. As described herein, the e-Cig server 706 may host information (e.g. a website) that is used for interfacing with the smartphone 702 and the e-Cig 701. In one embodiment, the user device 703 may view a web page provided by the e-Cig server 706 to see information about the e-Cig 701 and to monitor/track/control the e-Cig 701 depending on the access settings for the e-Cig 701.

[0057] The user device 703 (other than the smartphone 702) may interact with the smartphone 702 and/or the e-Cig 701. The other user device 703 may not have a direct/local connection with the e-Cig 701 as with the smartphone 702, but it may be coupled with the smartphone 702 and/or e-Cig 701 through the network 704 in one embodiment. The examples and operation of the user device 703 may be the same as that discussed above with respect to the smartphone 702. In one example, a user may modify settings of the e-Cig 701 from a laptop computer. For example, social networking may be used for a user who wishes to limit usage and another user (e.g. user device 703 from the user's social network) may be given remote control of the amount and/or frequency that the e-Cig 701 can be used for.

[0058] Figure 8 is another network diagram with an electronic cigarette illustrating local communication 804. The communications interface 714 in Figure 7 may be used to provide instructions via a communication chip 802 or communications port (e.g. from the smartphone 702 or the user device 703) that is part of the controller or the e-Cig 801. The communication chip or port may be created in software or may be a physical connection in hardware and may be configured to connect with the smartphone 702 and/or the network 704. The connection with the smartphone 702 may be considered a local or direct communication 804 because the smartphone may need to be in proximity of the e-Cig 801 for the connection. The connection may be wired (e.g. USB cable) or wireless using a variety of wireless connection mechanisms as illustrated in Figure 12. In alternative embodiments, the connection between the communication chip 802 and the smartphone 702 may be through other mechanisms such as those discussed above with respect to the network 704.

NJOY Exhibit 1002.1684

[0059] The local communication 804 may be two-way communication between the smartphone 702 and the communication chip 802. The information that is transmitted is further described with respect to Figure 9. Figure 9 is a diagram illustrating local communication 804 examples. The local communications 804 may include security information 902. There may be a passcode, password, facial recognition, or other identifier that is required to establish a connection between the e-Cig 801 and the smartphone 702. RFID or other communication mechanisms may also be used for the security information 902. Alternatively, the e-Cig may detect a presence of the previously connected smartphone (or vice-versa) for re-establishing communications. In particular, the e-Cig 801 may be configured to only communicate with authorized smartphones. Each e-Cig may have its own password or security key that are required at the smartphone for establishing communication. The e-Cig may be locked to a specific user, thus helping to prevent misuse by unauthorized users such as minors. This locking may be through a connection with a particular smartphone. In other words, if the e-Cig is not near the smartphone, then it is disabled, inoperable or limited to a certain number or rate of puffs.

[0060] The local communication 804 may include usage patterns 904 or usage restrictions 906. In one example, the smartphone can be used for tracking the usage patterns of the e-Cig. The time and duration of smoking may be recorded and tracked. The user may be able to establish self-imposed restrictions on their smoking. For example, a user may restrict usage to five times daily and no smoking allowed between certain times. In another example, the user may use different e-Liquids (e.g. by selection from Figure 5) to reduce a Nicotine level according to a certain plan by parting each inhalation between the e-Liquids. In another example, a user may puff slower in the mornings, so the temperature may be increased, leading to potentially smaller droplets. This pattern recognition may be utilized to tailor the e-Cig to the user and react to the user's patterns. Other parameters that may be adjusted automatically based on usage patterns or otherwise updated by the smartphone include current, voltage, temperature, power, e-Liquid selection/replacement, droplet size, viscosity, or airflow resistance. The airflow resistance may be through a selectable orifice (e.g. a rotating disc with several

NJOY Exhibit 1002.1685

holes of various sizes in it) that may be placed in the airflow track. The usage patterns that are recorded may also include the type of e-Liquids that are used. Accordingly, there may be offers 912 made to the smartphone for a refill of a popular e-Liquid or a recommendation based on the user's usage pattern. In one embodiment, the smartphone app may allow for the manual or automatic reordering of a particular taste when an e-Liquid is running out. The smartphone app may follow up the history of usage of each cartomizer, and prevent usage if for example it counts the number of puffs and, for example taking into account the length of puffs, it determines that the cartomizer is about to be depleted and thus avoiding the burnt taste. Exemplary methods of knowing that the cartomizer is depleted may include follow up of temperatures, knowing the time and puffs numbers that the specific user had before each replacement of cartomizers, and more. In many of these applications the identification of a specific cartomizer is utilized, for example via bar-code, QR code or RFID tag. When liquid is finished the higher temperature may create a burned taste that can be avoided by monitoring the liquid level. Another example may limit a number of puffs according to the cartomizer, according to batch of production, or according to information received from the company through the e-Cig server about limiting the number of puffs.

[0061] The local communication 804 may include desired settings 908 or device status 910. The desired settings 908 may be similar to usage restrictions, but may include default settings relating to the generation of the aerosol. For example, increased temperature of the heating coil results in a different vapor. Additional settings may include vapor, droplet size, nicotine content, taste, and/or degree of liquid depletion or aging of the e-Cig's cartomizer. The local communication may further include complementary information from a smartphone that may be retrieved from the smartphone sensors, GPS, accelerometers, microphone, or other features of the smartphone. This information may be used for supplementing the usage of the e-Cig (e.g. the location that a user prefers). Accelerometer measurements may also be used for monitoring the handling of an e-Cig. An e-Cig may be sensitive to handling (for example accelerations), so the e-Cig acceleration history may be monitored, recorded, and analyzed

NJOY Exhibit 1002.1686

to sense if an acceleration threshold has been reached, or to sense e-Cig lifetime duration influence. This may also assist in error or defect identification. A malfunctioning e-Cig may be determined to be caused by poor handling. The smartphone microphone may also be used for defect or error detection to listen to the e-Cig for a potential problem. For example, a gurgle or other noise may indicate a current or future problem.

[0062] The user may be able to configure the generation of the smoke using the smartphone. The device status 910 may include information about the components of the e-Cig. For example, if there is a component that is malfunctioning (e.g. the battery needs recharging or the LED is out), the smartphone may be notified. Likewise, updates to the e-Cig (e.g. controller or firmware updates) may be transmitted from the smartphone. The smartphone may further be configured to both locate and identify a particular e-Cig. It may also recognize whether a particular e-Liquid is a match for the cartomizer and vice-versa.

[0063] Although not shown in Figure 9, the communications with the e-Cig may include social networking communications that may include accessing social connections over a network such as the Internet. In one embodiment, the e-Cig server 706 may maintain (e.g. in its database 708) a network of e-Cig users. Each user's smartphone allows for social interactions between that network of users. A user may receive notifications about the activity of others in that user's social network. The users in the social network may be selected by the user using the smartphone or may be automatically identified based e-Cig usage and/or geography. For example, a user that is smoking at a particular location may alert other users so that others can join. This notification may be automated through the smartphone application and the e-Cig server. Likewise, other users' interests/preferences/usage patterns may be shared within the social network. If there is a user with a similar usage pattern or preferences (e.g. e-Liquid type), that user's preferences may be communicated to similar users for identifying new settings, locations for smoking, and/or products (e.g. e-Liquid).

[0064] As described, the enhanced communications of the e-Cig may include real-time social interaction. In one embodiment, the communication by the e-Cig may be through

NJOY Exhibit 1002.1687

emails, text messages, photos, videos, or social network websites (e.g. FACEBOOK, TWITTER, LINKEDIN, etc.). The e-Cig may communicate information to a user's social circle. The communications may be controlled by the user. Commercial utilization of the communications may include on-line social marketing, sales, lead-generation, location-based offerings, market research and other applications. For example, communication offering a particular E-liquid may be made to the user such as when the current e-Liquid is running low, or when a new product is being offered that may be appealing to the user. The user may allow for a social network to be notified of which e-liquid is being used and how often. This communication may be used along with global positioning system ("GPS") technologies to encourage social smoking. For example, two users (with GPS activated) may be in the same area and can be notified of their proximity. There may also be a notification of smoking preferences (e.g. e-Liquid type/taste, smoking times/lengths) to help join the users. In addition, to social connections, the enhanced communications may also be through businesses that may be notified of local smokers and can then provide discounts/sales for those smokers to shop and/or smoke at that business. For example, a user may be notified when they are close to such a business and offered a discount or coupon. In other words, the e-Cig provides functionality for connecting to individuals (social networking) or businesses. Enabling technologies, such as wire-line and wireless (e.g. Wi-Fi or cellular) networking, photography (such as smartphone-embedded cameras with automated on-line capabilities), location-aware technologies (such as GPS) and many more may improve the online social interaction.

[0065] The social interaction provided through this enhanced communication may encourage social smoking, commercialize co-offerings to smokers, support smoking cessation, encourage grouping via brand, taste, habits and other possibly identity-related criteria, etc. For example, when an e-Cig smoker is smoking, her smartphone may be aware of the fact that she is smoking, and is posting this fact (with her prior approval) on a website enabling special offers, combined with her location (with her prior approval) and her speed (indicating she is walking). The smartphone application/app can present a special, targeted offer to the smoker, suggesting a discounted deal for coffee in a nearby

NJOY Exhibit 1002.1688

coffee place, to go well with her e-Cig. A unique smoking-related offering can be made given to the fact that many smokers like to smoke while consuming coffee, as one example.

[0066] The application or app described herein may further be used for taste testing and combination exchanges. The e-Cig combined with the smartphone may test the response to tastes (either new or incumbent) or to taste combinations. The smartphone may transmit the data to the e-Cig server, where the aggregated data could be used for development, marketing, and product offerings. Accordingly, users would be providing feedback for future development.

[0067] When the user listens to music on the smartphone and smokes, the sound may be subtly changed based on the e-Cig usage. For example, during the puff the music may be subtly modified to compensate for the changes in the respiratory system in the head during the inhale. This change in sound may enhance the experience of smoking.

[0068] With smartphones and other devices that have input technologies that involve for example gestures, the LED at the e-Cig tip may be modulated to transfer data or commands to the device. The lighted tip may be used as a remote pen, under the proper command from the e-Cig for input or signaling purposes. Likewise, the e-Cig may be used as standard for length for smartphone photography.

[0069] Figure 10 is another network diagram with an electronic cigarette illustrating image acquisition. In particular, the e-Cig 1000 may include an identifier code 1002, such as a 1-D or 2-D bar code (e.g. QR code) that can be scanned by the smartphone. In particular, the identifier code 1002 may be part of a removable portion 1001 of the e-Cig 1000. In one example of an e-Cig's connection with a device's camera, a scanned QR code or other bar may be scanned that is used for communicating information about an e-Cig. For example, a product code could be scanned and the consumer device can notify the user whether the product is compatible with the e-Cig. Additional communication (other than the identifier code 1002) may also be used for identifying a cigarette. The e-Cig may include a passive form of communication as shown in Figure 10. There may be a camera-readable label that can also be attached to other related devices such as Nicotine-

NJOY Exhibit 1002.1689

Replacement-Therapy (NRT) devices like stickers. The communication chip functionality discussed above is an active form of communication.

[0070] The identifier code 1002 may enable identification of the cartomizer(s) type and taste(s) (e.g. via a QR-code or bar-code on the cartomizer). The identifier code may be read and identified by a smartphone camera and specific application software. In alternative embodiments, the identifier code may communicate with a RFID tag in the cartomizer and/or an NFC chip in the e-Cig and/or in the smartphone, combined with the proper software/application. External software programs, such as smartphone applications, web-sites, data-bases etc. (for example the e-Cig database) may be aware of a specific user's usage patterns and tastes. The ability to be specific about the special flavor of the e-Cig enables personalized offers to be most effective. To enable higher security the controller may not enable vaping until the identifier code is identified together with other communication and/or a password on the smartphone.

[0071] In one embodiment, the e-Cig 1000 may include a removable portion 1001 and an immoveable or permanent portion 1003. The immoveable or permanent (non-removable) portion 1003 may include a battery and controller, while the removable portion 1001 includes an e-Liquid and atomizer (e.g. cartomizer) that may be replaced. Different portions of the e-Cig 1000 may be part of either of the portions 1001, 1003. The LED may be installed in the cartomizer to enable a higher level of security.

[0072] Figure 11 is another exemplary e-Cig 1101. The e-Cig 1101 illustrates an organization of the components that were previously discussed. The e-Cig 1101 may include a controller 1102, a communications interface 1104, a heating element 1106, and an LED 1108. Functionality provided by the controller 1102 is discussed with respect to Figure 13. Exemplary communication mechanisms used by the communications interface 1104 are discussed with respect to Figure 12. In one embodiment, the e-Liquid container (not shown) may include the heating element and an atomizer and may be referred to as a cartomizer. The cartomizer may be replaceable and removal of the cartomizer may be detected by the e-Cig. The LED 1108 may be ignited with inhaling and may be dimmed slowly after inhaling is finished to imitate the cooling tip of a non-electric cigarette when

NJOY Exhibit 1002.1690

inhaling is ceased. The LED may further be modulated to send specific indications to the user, such as a blinking pattern to indicate low power or dwindling cartomizer e-Liquid.

[0073] Figure 12 is a diagram illustrating communications interface 1104 examples. The e-Cig 1101 may communicate through a communications interface 1104 using near field communication ("NFC") 1202, radio frequency identification ("RFID") 1204, Wi-Fi 1206 (e.g. Wi-Fi Direct), Bluetooth 1208, and/or ZigBee. The communications interface 1104 may be implemented through a small-size communication chip embedded on the e-Cig. Exemplary chips may include but are not limited to a Bluetooth chip, such as Parani BCD 210 or Texas Instruments (TI) CC2650 Bluetooth Single-Chip Solution. These Bluetooth chips can be activated as slaves to a server, with the Bluetooth chip in the smartphone acting as the master. Another exemplary chip is an NFC -enabled chip (such as Qualcomm's QCA1990), that allows for NFC communication, or even enhanced Wi-Fi or Bluetooth communication where NFC is used for link setup. NFC may also be used to read an e-Cig or cartomizer identifier (as RFID device). Another exemplary communication chip may include a Wi-Fi-enabled chip, such as TI's SimpleLink family's CC3000 , that can hook the e-Cig to Wi-Fi networks with full capability. An additional possibility may be a SIM card on board of the e-Cig, following the growing trend of cellular-enabled M2M (Machine to Machine) nano-SIM card, creating a cellular e-Cig that communicates directly to a network over 3G/4G cellular networks. Alternatively, there may be a wired connection (e.g. universal serial bus ("USB")) rather than a wireless connection. Alternative forms of communication may be used to establish two-way communication between an e-Cig and a smartphone.

[0074] Figure 13 is a diagram illustrating exemplary controller 1102 components. As discussed, the controller for the e-Cig is enhanced with additional capabilities including communication abilities. Figure 13 illustrates exemplary components that may be a part of the controller 1102 or may be separate components coupled with the controller 1102. A clock 1302 may be used for enhancing the controller of the e-Cig to be able to control parameters of any sub-unit. For example, an initial inhalation (starting a puff) may start the clock 1302 which is then used for measuring puff length and other usage patterns.

NJOY Exhibit 1002.1691

The clock 1302 may enable a reliable report about the puffs made by the user which can then provide measurements of puff duration and intensity (rate per unit of time). This may be further usage pattern information that may enable more accurate social connections and targeted marketing. For example if the rate of puffs is increased there may be a situation where a nicotine craving is close and some parameters in e-Cig have to be changed. The clock 1302 may be synchronized with the smartphone when communication starts. The clock 1302 may provide a "time stamp" for every puff. These "time stamps" will be kept in memory of the e-Cig or smartphone and may be sent to the e-Cig server and database for storage.

[0075] The controller 1102 may include charging circuitry 1304 and a pulse width modulation ("PWM") unit 1306 for controlling the heating element and supplying a certain amount of controlled power. Alternatively, the PWM 1306 may enable battery 1308 activation. The charging of the battery 1308 may occur through an external charger or the smartphone. There may also be input/output ("I/O") 1310 circuitry for connections to/from the controller 1102. The power supply may be constant over time when a pressure difference switch is activated (e.g. when inhalation creates a pressure difference that passes a certain level). This may be accomplished with the PWM 1306 power supply.

[0076] In another embodiment, the controller may disable or reduce the power supplied to the heating element if an internal counter indicates that the user's smoke rate is higher than is allowed or when an allowed number of puffs has been reached, or when the number of puffs that indicates a spent cartomizer is reached. The user may utilize the app on the smartphone to set limits for frequency and duration that are communicated and enforced automatically by the e-Cig. It may include the ability to read from internal memory parameters and to change power supply mode or timing according to these parameters to the heating element. The controller CPU may be able to write to internal memory data about power supported by PWM power supply to heating elements. The controller may be able to analyze this data and to modify power supply to enable controlling for example voltage, amperage or any dependence between both.

NJOY Exhibit 1002.1692

[0077] The controller may further be configured to provide the ability to monitor and analyze any power consumption of any subunit, for example the power consumption of heating element. It may include the ability not to activate any unit at certain circumstances. For example, the heating element may warm the wick while disabling vaping.

[0078] The controller may be configured to idle with low power consumption when no inhalation or communication occurs. In one embodiment, the idle state may enable supply power to internal clock and an option to keep two-way communication in receive mode. The e-Cig may be in an idle state unless a particular action, such as vaping, cartridge replacement, movement, or a wake up call from the smartphone occurs. The smartphone app may be on receive mode unless it receives a wake up communication from the e-Cig. To enable idle state when the internal battery is finished the controller may have internal rechargeable battery with proper circuitry to load and unload it from a main power supply.

[0079] Figure 14 is a flow chart for an algorithm for cigarette operation. Although not shown in Figure 11, the e-Cig may include a memory as in Figure 7. In particular, the controller may include or be coupled with a memory module. The memory module may have read only and read/write parts. The memory module may be implemented in a single module or in two or more different modules. The memory may be non-volatile in one embodiment. Volatile implementations of the memory may utilize the smartphone for memory storage and retrieval. The e-Cig controller may be able to read all memory parts and write in the part where read/write is allowed. For the use of subsystem parameters the read only parameters may include default value, allowable values, and allowable limits.

[0080] The memory may store usage parameters (e.g. smoking length, frequency, puff length, droplet size, airflow, temperature, etc.) that may be monitored and controlled. The memory may be large enough to hold all information about a single puff, including time, duration and power consumption data. In addition it may include data about the temperature, power consumption and any other parameter from any sub-unit of the e-Cig. The user may use an app on the smartphone to set certain limits for certain parameters (i.e. input values). The input value 1402 is provided and the algorithm may check whether

NJOY Exhibit 1002.1693

value is within range 1406 and look for other restrictions such as integer conformity. The memory stores the maximum/minimum values 1404. If the value is not restricted in 1408, a new input value is received 1410. If the input value is not within range 1406 or is restricted 1408, the parameter will not be changed and an error message is transmitted 1412.

[0081] An example of this is the selection of an atomizer, when there are two atomizers (e.g. Figure 5). Value one and two (atomizers one, two) are both legal and limit the range of legal values. Another example is inputting the parameters 0-1 to the PWM of the first atomizer. The lower limit is 0, the upper limit is 1 but only numbers and all values between are allowable. Therefor the value 0.015 is allowable and 1.05 is not allowable. The suggested algorithm may be in the e-Cig controller and/or in the smartphone application. Any change in parameters that are monitored by the e-Cig may result in a change in any sub-unit's behavior.

[0082] Figure 15 is a flow chart for smoking control. In one embodiment, the user may interface with the e-Cig through the smartphone app to set limits on smoking 1502. The limit may be referred to as a violation that is detected 1506 after detecting any smoking event 1504. When a violation occurs, the e-Cig and/or smartphone can respond to the violation 1508. In one embodiment, the response may include a notification sent to a social network 1510. The notification may be through an email, text message, instant message, or through the smartphone app that connects with the e-Cigs. In response to the violation 1512, the e-Cig may also: 1) disable power; 2) modify other parameters; 3) reduce nicotine; 4) activate delay after puff; and/or 5) reduce power. This information may then be used to update the database 1514.

[0083] Figure 16 illustrates an enhanced controller as part of a mount piece for regular cigarettes. In particular, the e-Cig features and the enhanced controller 1606 may be part of a mount 1604 structure that is utilized with a regular (non-electronic) cigarette 1601. The embodiments for the e-Cig described herein may be applied in a mouthpiece structure (a/k/a mount piece 1604) that holds regular cigarettes 1601. The mount piece 1601 receives the cigarette 1601 and the controller 1606 may provide any of the features

NJOY Exhibit 1002.1694

discussed herein with respect to an e-Cig. For example, the enhanced controller 1606 that is a part of the e-Cig may provide the same or similar features for the standard cigarette 1601as for an electronic cigarette as described. In particular, the control, tracking, social networking, and other features may be applied to the standard cigarette 1601 and may include communications, such as the communication with a smartphone 1602. The mount piece 1604 illustrates the air flow 1608 from the standard cigarette 1601 that can be monitored, measured, analyzed and communicated by the controller 1606.

[0084] Figure 17 illustrates a flow diagram for the mount piece 1704. Inhaled air through the standard cigarette 1701 provides inhaled air with smoke to the mount piece 1704. A flow sensor 1708 may determine the presence of the air (e.g. to start up the device). The flow sensor 1708 may signal the controller 1702 to begin operations. The battery 1706 provides power to the flow sensor 1708 and/or the controller 1702. The mount piece 1704 includes all the electronic components and a mount for receiving and coupling with the standard cigarette 1701. The controller 1702 may include any of the functions of the controller(s) discussed for the e-Cig.

[0085] Figure 18 is a network diagram of electronic cigarette communications. In particular, Figure 18 is an alternate view of the communications network for communications to/from an electronic cigarette discussed herein. The network 1801 may be provided by an e-Cig server (e.g. the e-Cig server 708 in Figure 7). A user 1802 of an e-Cig 1803 may have a mobile app that is part of the smartphone 1804 for connecting with the network 1801. A social network 1806 of friends, family, or other users may connect through the network 1801 for communicating with one another and sharing e-Cig related information. Other devices 1808 may access certain (non-private or authorized to be shared) information from the network 1801. Data from the network 1801 may be used for research and/or clinical trials 1812.

[0086] Healthcare professionals 1814 may also be connected with the network 1801. For medical purposes, information may be collected through the network 1801 (e.g. by the e-Cig server) for one or more users. The users may be grouped (e.g. by amount, frequency, or duration of usage). Puff data (e.g. inhalation duration, frequency) may be

NJOY Exhibit 1002.1695

collected and used to monitor for changes. For example, a change in puff data may be used for notifying a user of a potential illness (e.g. having a cold, pulmonary diseases status, distress). The smartphone linkage may be then be used for identifying and retrieving appropriate medical information (websites) for the particular potential problem. In another embodiment, the e-Cig may be used for the transfer/inhalation of a medical material (medicine) with supervision or monitoring by the smartphone. For example, an e-Cig may be used as a replacement for current inhalators for various medical applications. Future smartphones may include scent sensing devices (e.g. nanotechnology-based). The scent detection may be used with the e-Cig for various uses, including monitoring operation (based on scent) of the e-Cig. Materials may be introduced that create some designed response in case of illness.

[0087] There may be access to the network 1801 from other custom or third-party services/applications 1810. There may be an app for the smartphone 1804 provided by the e-Cig server provider or e-Cig manufacturer, but other (third-party) applications may also receive (potentially limited) access to the network 1801.

[0088] Figure 19 illustrates a network with an application development component 1902. The software 716 may include applications ("apps") that operate on the smartphone 702. The apps may be downloaded from the network 704. The smartphone 702 and/or user device 703 may access the application developer server 1902 over a network such as the network 704. The application developer server 1902 may be connected with an applications database 1904 for storing application development tools and/or application software. In one embodiment, the application developer server 1902 may be part of the E-Cig server 706 and the applications database 1904 may be a part of the E-Cig database 708.

[0089] The application developer server 1902 may provide data, software, settings, functions, and information (which may be referred to as a software development kit ("SDK")) to an application developer to allow for development of an application that is associated with the e-Cig 701. The SDK may be an application development platform that is open to the developer community. In particular, this SDK is related to e-Cigs and

NJOY Exhibit 1002.1696

e-Cig applications. The developer's kit may further include all data, software, and functions that a developer might need to develop an e-Cig related application, and the toolkit may be referred to as a software package or application programming interface ("API"). The developer may be a software coder that writes software that runs on the smartphone 702 or user device 703 for performing any one of a number of functions or services related to the e-Cig 701 or the e-Cig server 706. In particular, the applications that are developed may include any of the capabilities and communications described with respect to Figure 9.

[0090] The apps that are developed may be specific to the software or operating system of a particular device. For example, Apple operates the iTunes app store, and there are additional application or app stores for Android devices, Windows mobile devices, Blackberry devices, Facebook devices, and Java devices. There may be separate developer's kit for the different devices (hardware) or interfaces (software), or the developer's kit may be universal for more than one device. The apps may be installed through the app store for a particular device. In one embodiment, the third party developer may pay a fee (e.g. per download, percent of the app cost, or based on the data/functionality required) or may display an advertisement for the e-Cig operator 710. Alternatively, the app may be free and the third party developer pays nothing to the e-Cig operator 710. The app store may require separate fees, such as a portion of revenue received based on displayed advertisements.

[0091] The e-Cig's 701 internal management, communication infrastructure, and host infrastructure is opened for developers through the SDK. As described herein, any listing of potential applications and the information/data/functions from the e-Cig that may be provided through the SDK are merely exemplary and additional applications and additional e-Cig features may be utilized. For example, a device management application may utilize the following capabilities of the e-Cig: 1) host communications; 2) cartomizer percent usage; 3) statistical data and usage patterns (e.g. number of puffs, average puff length, etc.); and 4) battery state. The data provided to or analyzed by the apps may further include automatic smoking intricate logs, including puffs, time, location, with

NJOY Exhibit 1002.1697

whom, for fun, smoking cessation help etc. These logs may be used to detect patterns in the smoking habits (e.g. different puffs in the morning, in meetings, etc.), and modifying the e-Cig characteristics accordingly.

[0092] As described above, the communications of the e-Cig may be used for any number of social applications. In addition, the application development may also include social aspects. There may be developer forums or networks that are used for connections between developers. As described, the SDK may be provided through the Internet, such as at *http://developer.greensmoke.com* in one embodiment.

[0093] Exemplary applications may relate to smoking experience, smoking device management, smoking usage pattern feedback (e.g. mood feedback, smoking enhancement, health monitoring, etc.), social, fun applications (gaming, courting etc.), and/or visual communication (e.g. e-Cig LED). Additional exemplary applications may include cessation services. Cessation may be a value-added service to NRT (e.g., pharmaceutical company publishes the app). Additional social examples include dating. For example, when two people with matching profiles are in the same location their LEDs may blink in a certain fashion. There may be an e-Cig Messenger for creating a "C2C" (cigarette-to-cigarette) language. The C2C messaging language may be referred to as "Smoke Signals" and provides communications between e-Cigs. An app may detect that a cartomizer is about to run out and may find closest retail outlet, or a nearby "friend" may get an alert and offers to provide a new cartridge. Game apps may include trivia or contests (e.g. who smokes the longest puff). In one embodiment, the usage of the e-Cig may be an input for the game (e.g. one long puff versus two short puffs). There may be apps specific to a smoker's interests, including sports teams, music, movies, or television.

[0094] A "computer-readable medium," "machine readable medium," "propagated-signal" medium, and/or "signal-bearing medium" may comprise any device that includes, stores, communicates, propagates, or transports software for use by or in connection with an instruction executable system, apparatus, or device. The machine-readable medium may selectively be, but not limited to, an electronic, magnetic, optical, electromagnetic, infrared, or semiconductor system, apparatus, device, or propagation medium. A non-

NJOY Exhibit 1002.1698

exhaustive list of examples of a machine-readable medium would include: an electrical connection "electronic" having one or more wires, a portable magnetic or optical disk, a volatile memory such as a Random Access Memory "RAM", a Read-Only Memory "ROM", an Erasable Programmable Read-Only Memory (EPROM or Flash memory), or an optical fiber. A machine-readable medium may also include a tangible medium upon which software is printed, as the software may be electronically stored as an image or in another format (e.g., through an optical scan), then compiled, and/or interpreted or otherwise processed. The processed medium may then be stored in a computer and/or machine memory.

[0095] In an alternative embodiment, dedicated hardware implementations, such as application specific integrated circuits, programmable logic arrays and other hardware devices, can be constructed to implement one or more of the methods described herein. Applications that may include the apparatus and systems of various embodiments can broadly include a variety of electronic and computer systems. One or more embodiments described herein may implement functions using two or more specific interconnected hardware modules or devices with related control and data signals that can be communicated between and through the modules, or as portions of an application-specific integrated circuit. Accordingly, the present system encompasses software, firmware, and hardware implementations.

[0096] The illustrations of the embodiments described herein are intended to provide a general understanding of the structure of the various embodiments. The illustrations are not intended to serve as a complete description of all of the elements and features of apparatus and systems that utilize the structures or methods described herein. Many other embodiments may be apparent to those of skill in the art upon reviewing the disclosure. Other embodiments may be utilized and derived from the disclosure, such that structural and logical substitutions and changes may be made without departing from the scope of the disclosure. Additionally, the illustrations are merely representational and may not be drawn to scale. Certain proportions within the illustrations may be exaggerated, while

NJOY Exhibit 1002.1699

other proportions may be minimized. Accordingly, the disclosure and the figures are to be regarded as illustrative rather than restrictive.

NJOY Exhibit 1002.1700

WE CLAIM:

1. A communications system comprising:

an electronic cigarette comprising a communications interface for communicating with a computing device, wherein the computing device is coupled with a network;

an applications development server coupled with the network and configured to provide access to information from a plurality of users of electronic cigarettes.

2. The system of claim 1 wherein the applications development server provides the information from a plurality of users of electronic cigarettes to application developers for development of applications run on the computing device.

3. The system of claim 2 wherein the applications developers access an application developer's toolkit over the network from the applications development server.

4. The system of claim 3 wherein the application developer's toolkit provides settings, data, and communications protocols for communicating with and receiving data for the electronic cigarette and other electronic cigarettes.

5. The system of claim 2 wherein the applications are stored on the computing device.

6. The system of claim 5 wherein the applications utilize the information from a plurality of users of electronic cigarettes.

7. The system of claim 6 wherein the information comprise a usage pattern, wherein the usage pattern information further comprises a frequency, amount, liquid type, and/or time of usage.

8. The system of claim 5 further comprising:

a database that stores the information from the users of electronic cigarettes.

NJOY Exhibit 1002.1701

9. The system of claim 8 wherein the applications access the information from the database.

10. The system of claim 8 wherein the database is coupled with another server that receives the information from the electronic cigarettes.

11. The system of claim 1 wherein the electronic cigarette comprises:

a controller configured to monitor or control operations of the electronic cigarette; and

a communications interface coupled with the controller and configured to allow communication with a computing device.

12. The system of claim 11 wherein the electronic cigarette further comprises:

an atomizer for generating a vapor;

a liquid container for providing a liquid that is used for flavoring the vapor; and

a heating element that heats the liquid as part of a vaporization process where the vapor is generated by the atomizer.

13. The system of claim 12 wherein the applications development server provides the information from a plurality of users of electronic cigarettes to application developers for development of applications run on the computing device, and further wherein the applications monitor or control at least one of the generation of the vapor, the heating of the liquid, or an amount of the liquid.

14. The system of claim 1wherein the computing device comprises a mobile computing device such as a cellular phone or a tablet that communicates with the electronic cigarette.

NJOY Exhibit 1002.1702

15. A method for application development with a network including electronic cigarettes comprising:

accessing application tools from a server over the network that provides data, instructions, or communications associated with the electronic cigarettes; and

providing an application developed using the application tools, wherein the application runs on a computing device that is operative to communicate with one or more of the electronic cigarettes.

16. The method of claim 15 wherein the communications comprises communication protocols that allow the application to communicate with the electronic cigarettes.

17. The method of claim 16 wherein the application receives usage data from the electronic cigarette.

18. The method of claim 15 wherein the application is configured to control the electronic cigarette.

19. The method of claim 15 wherein the application is configured to allow a user of the electronic cigarette to interact with other users of electronic cigarettes.

NJOY Exhibit 1002.1703

Figure 1

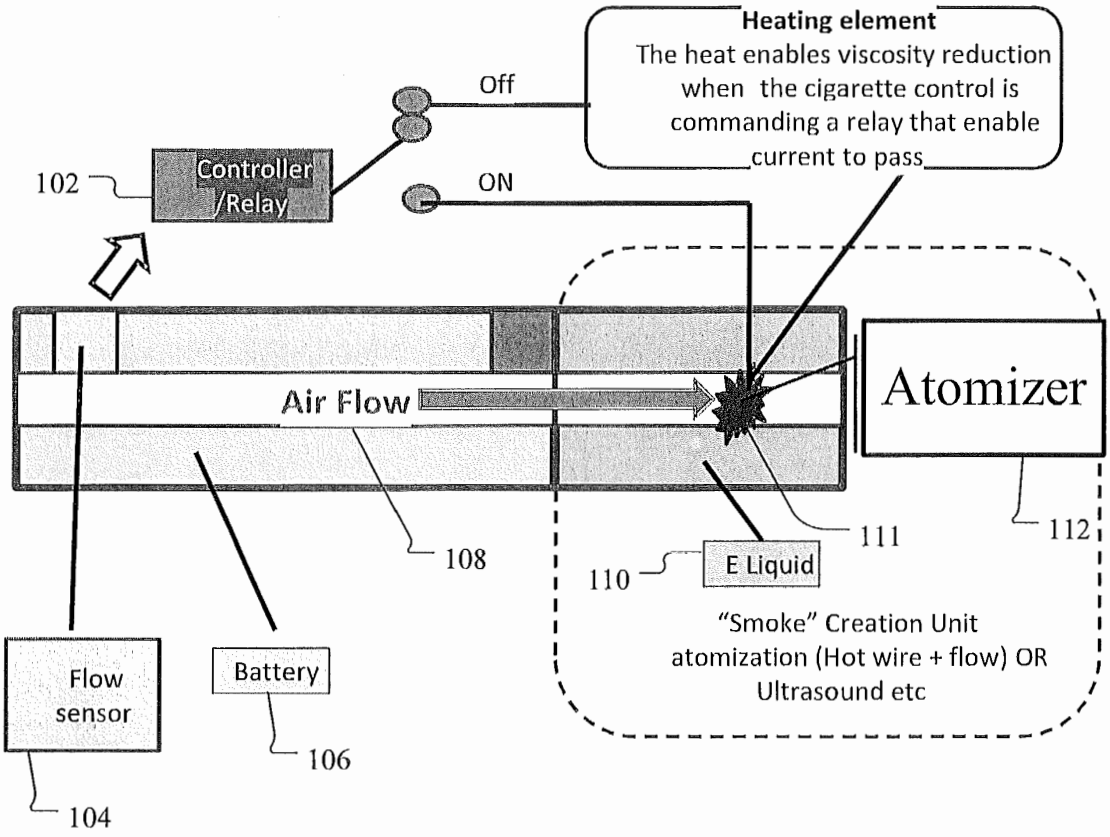
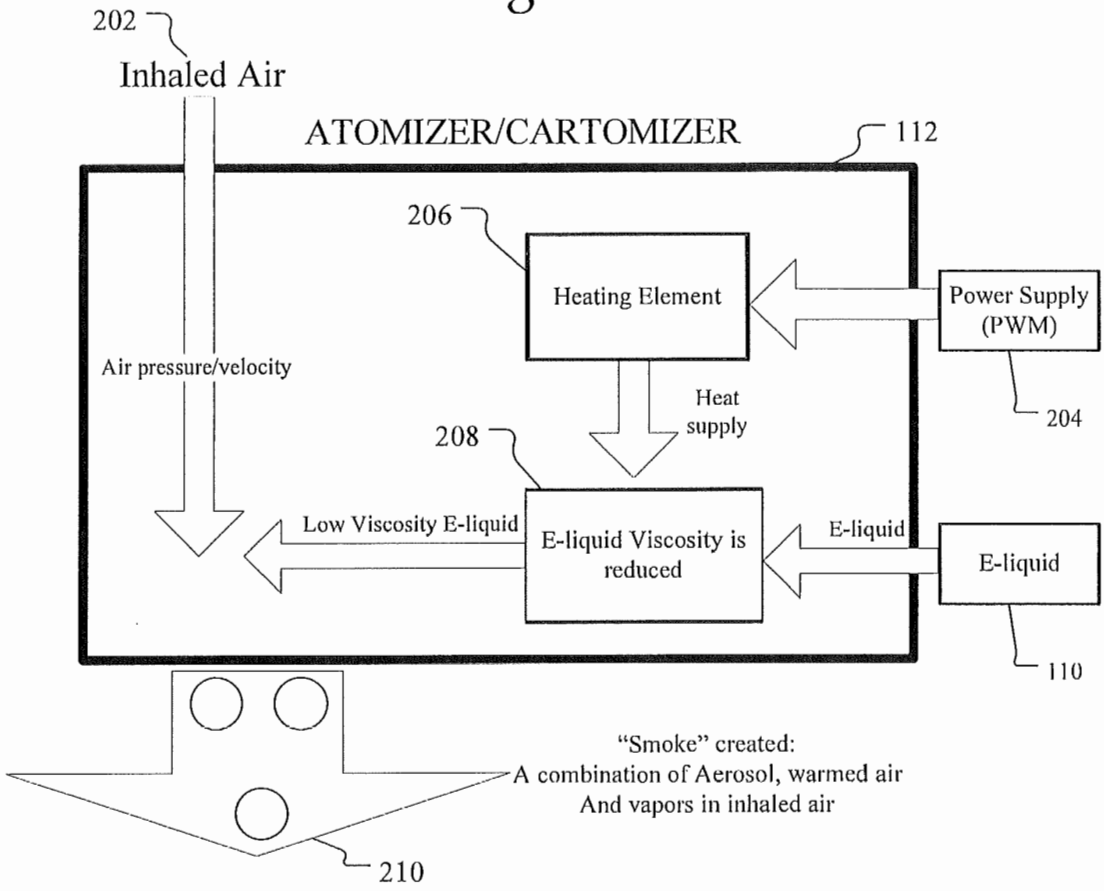
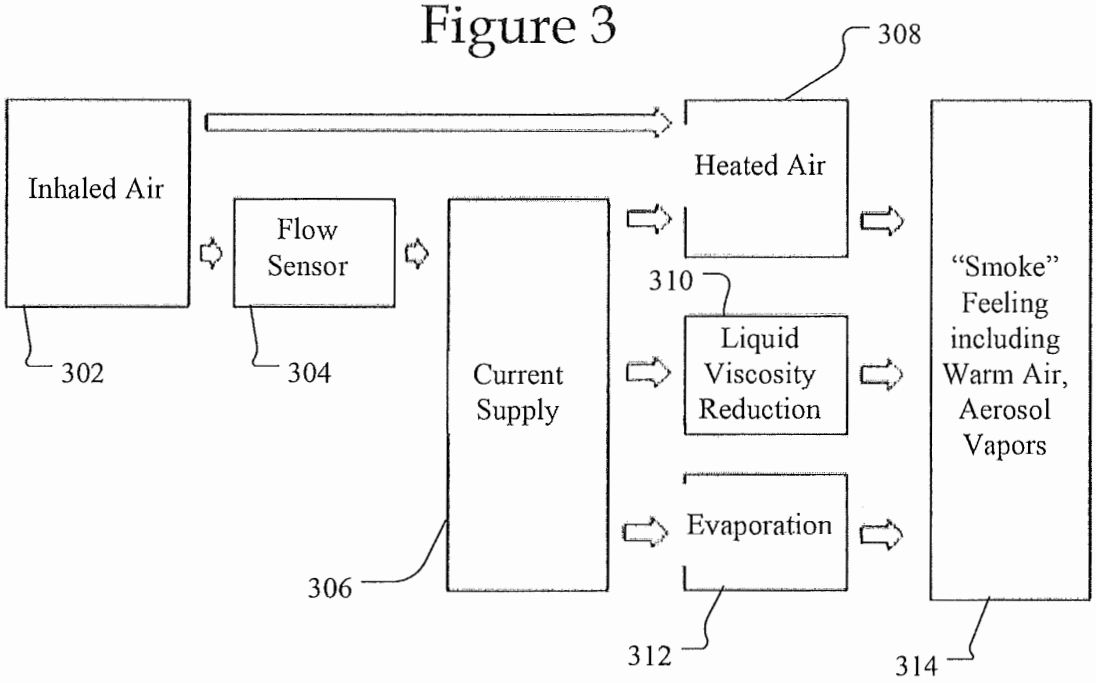

Heating element
The heat enables viscosity reduction when the cigarette control is commanding a relay that enable current to pass
Off
ON
102
Controller /Relay
Air Flow
Atomizer
108
111
112
110
E Liquid
"Smoke" Creation Unit
atomization (Hot wire + flow) OR
Ultrasound etc
Flow sensor
Battery
106
104

Figure 2



NJOY Exhibit 1002.1705

Figure 3



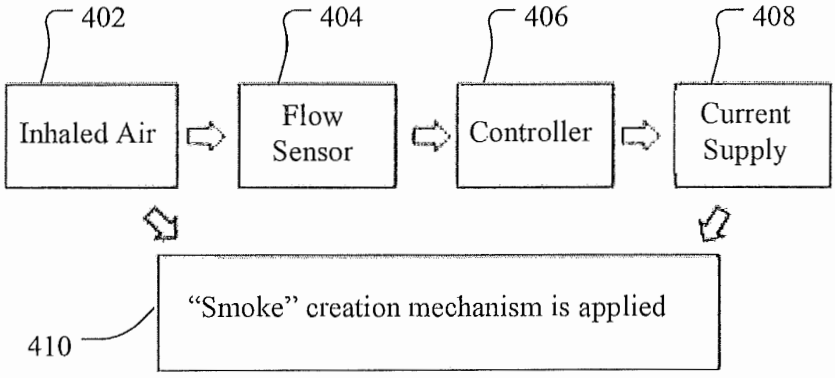
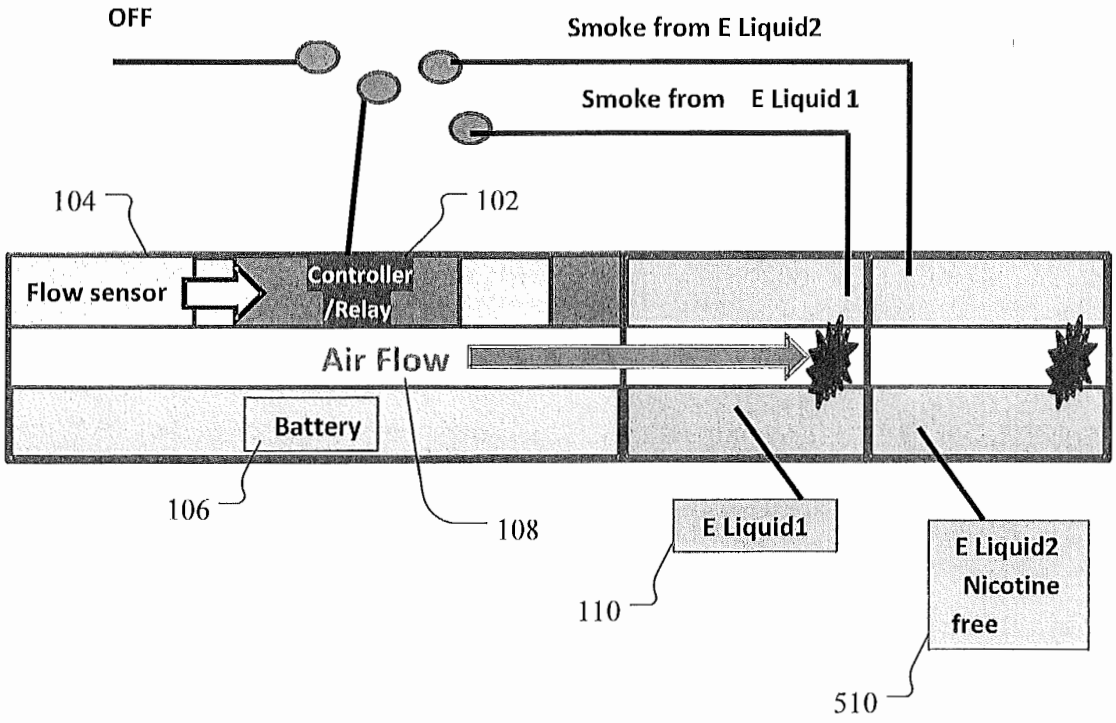


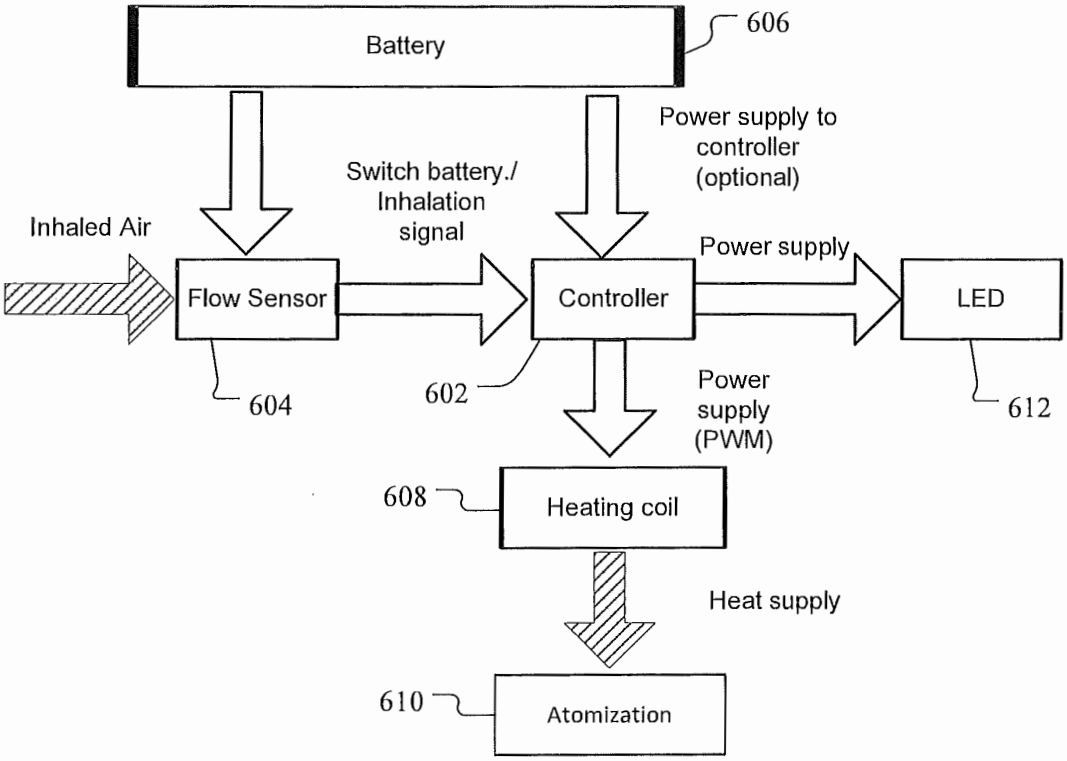
Figure 4

Figure 5



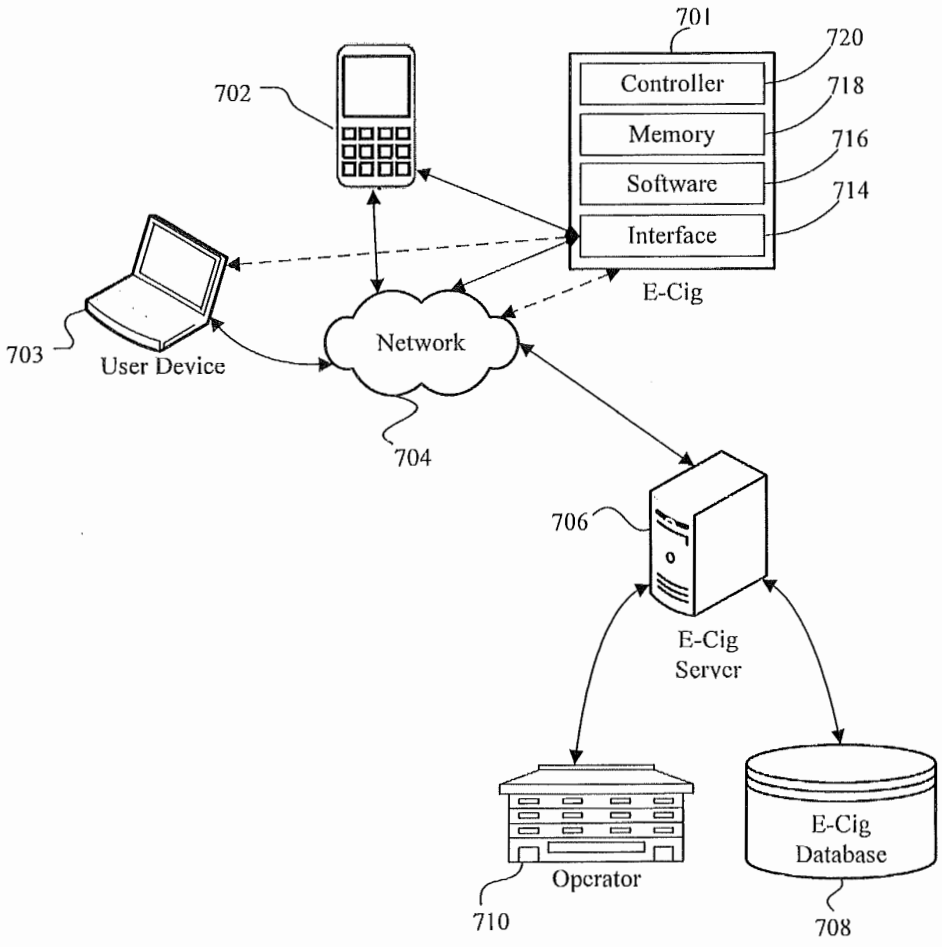
NJOY Exhibit 1002.1707

Figure 6



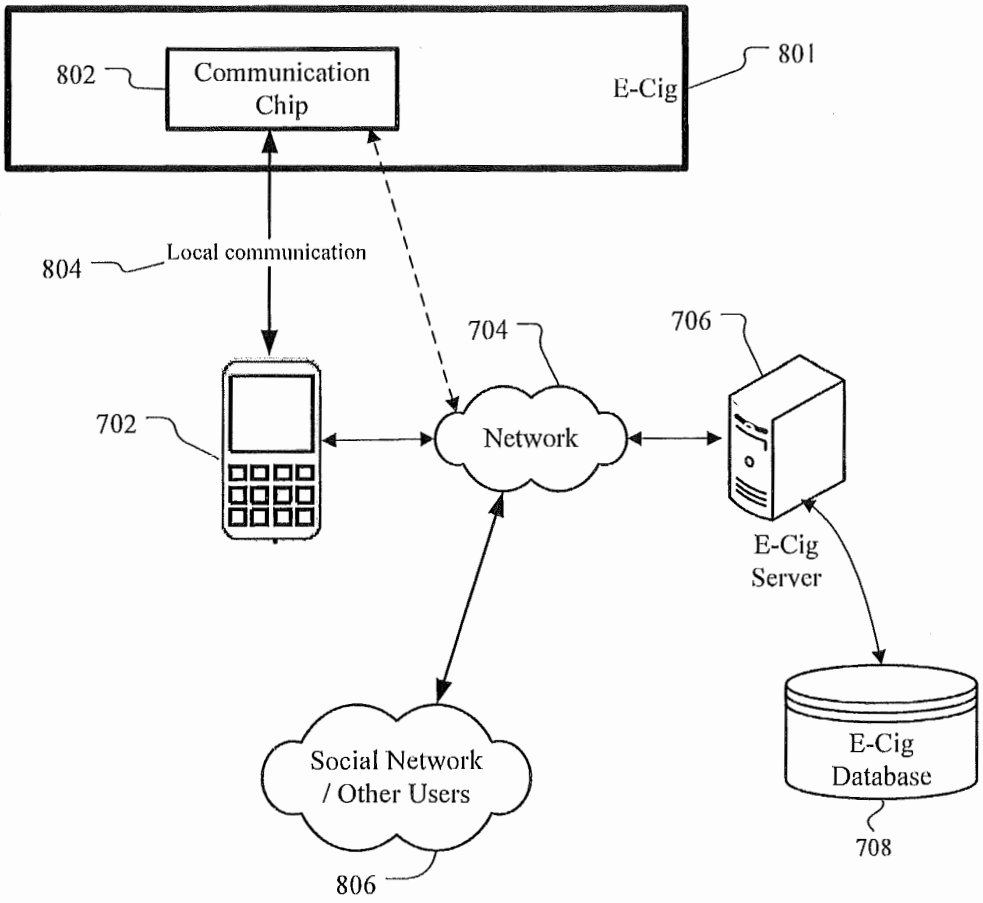
NJOY Exhibit 1002.1708

Figure 7



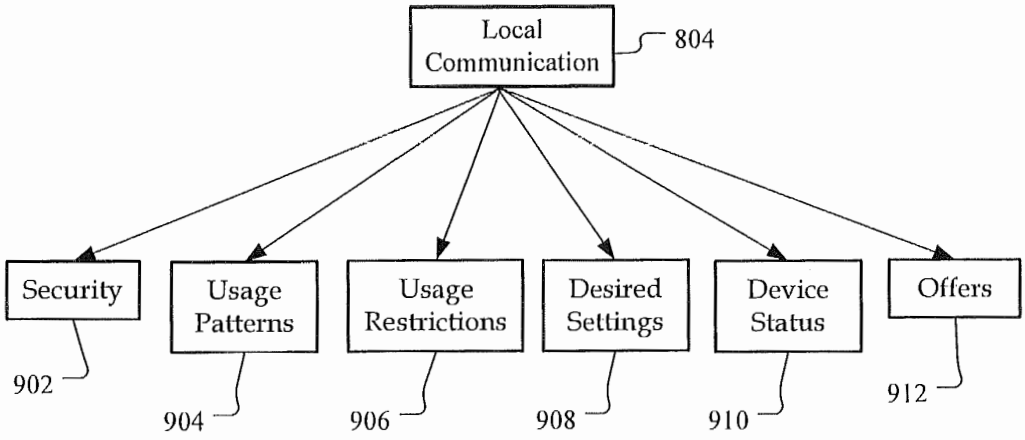
NJOY Exhibit 1002.1709

Figure 8



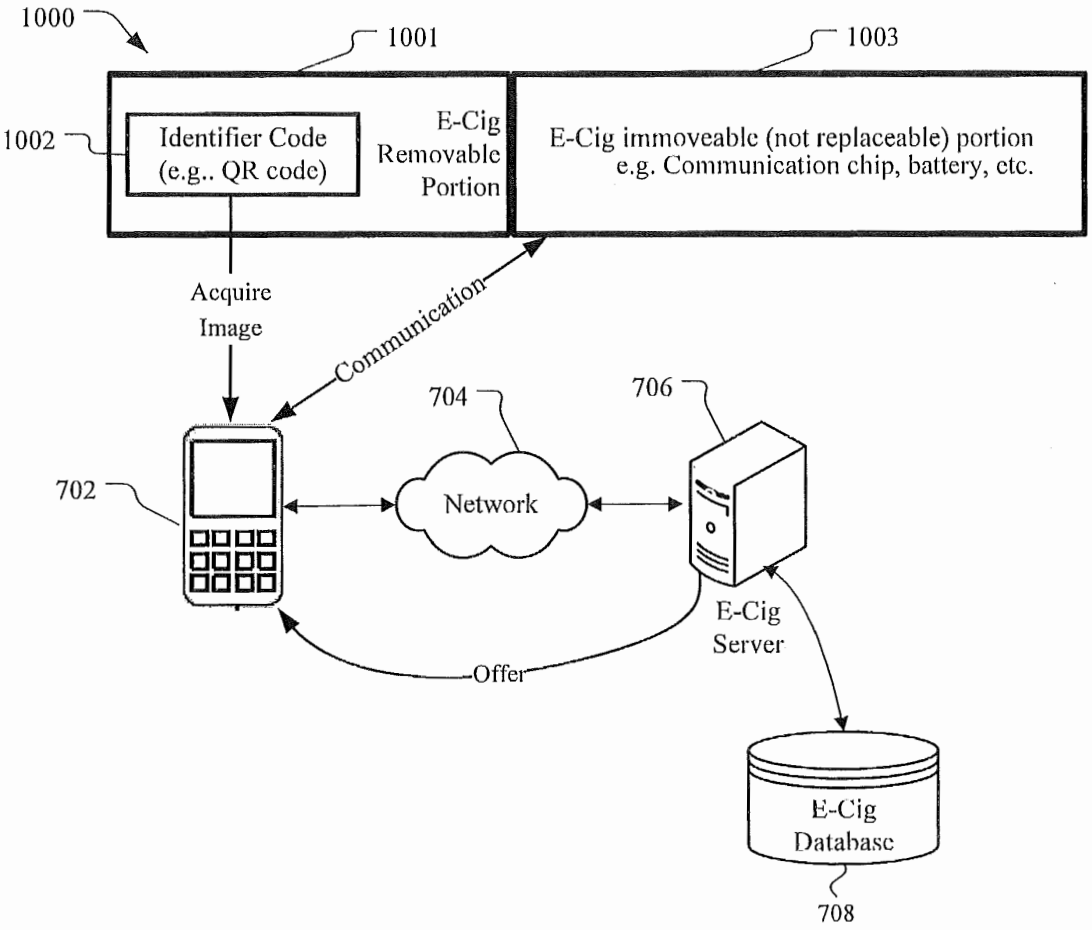
NJOY Exhibit 1002.1710

Figure 9



NJOY Exhibit 1002.1711

Figure 10



NJOY Exhibit 1002.1712

Figure 11

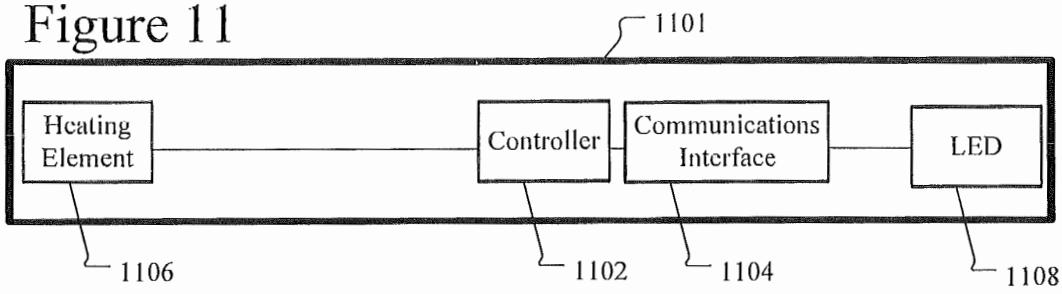


Figure 12

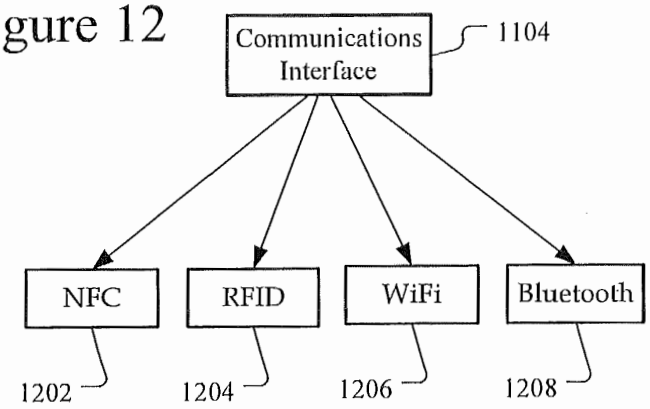
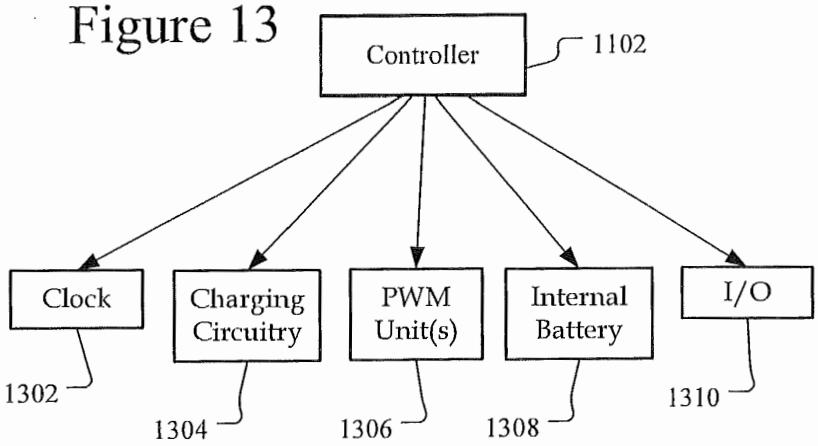
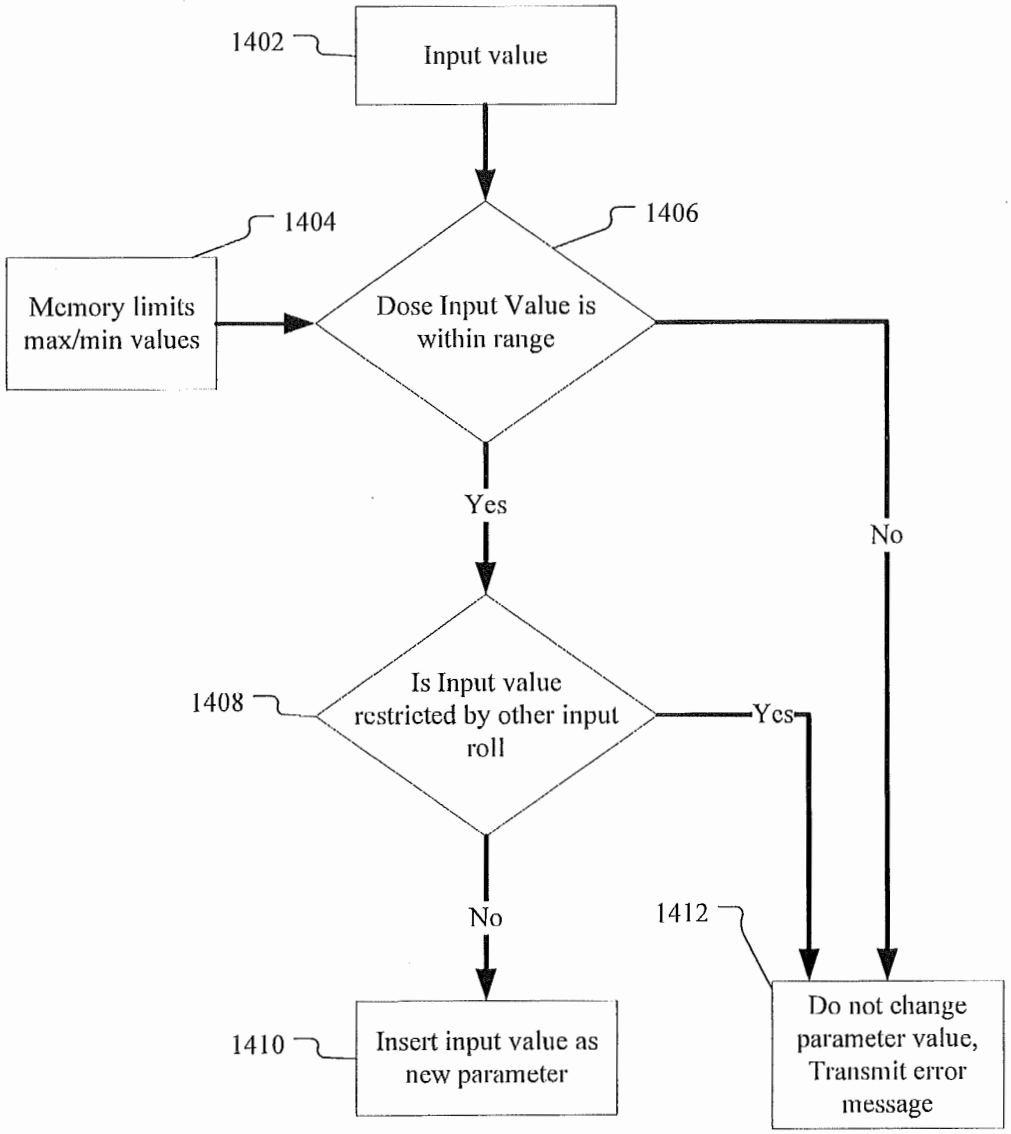


Figure 13



NJOY Exhibit 1002.1713

Figure 14



NJOY Exhibit 1002.1714

Figure 15

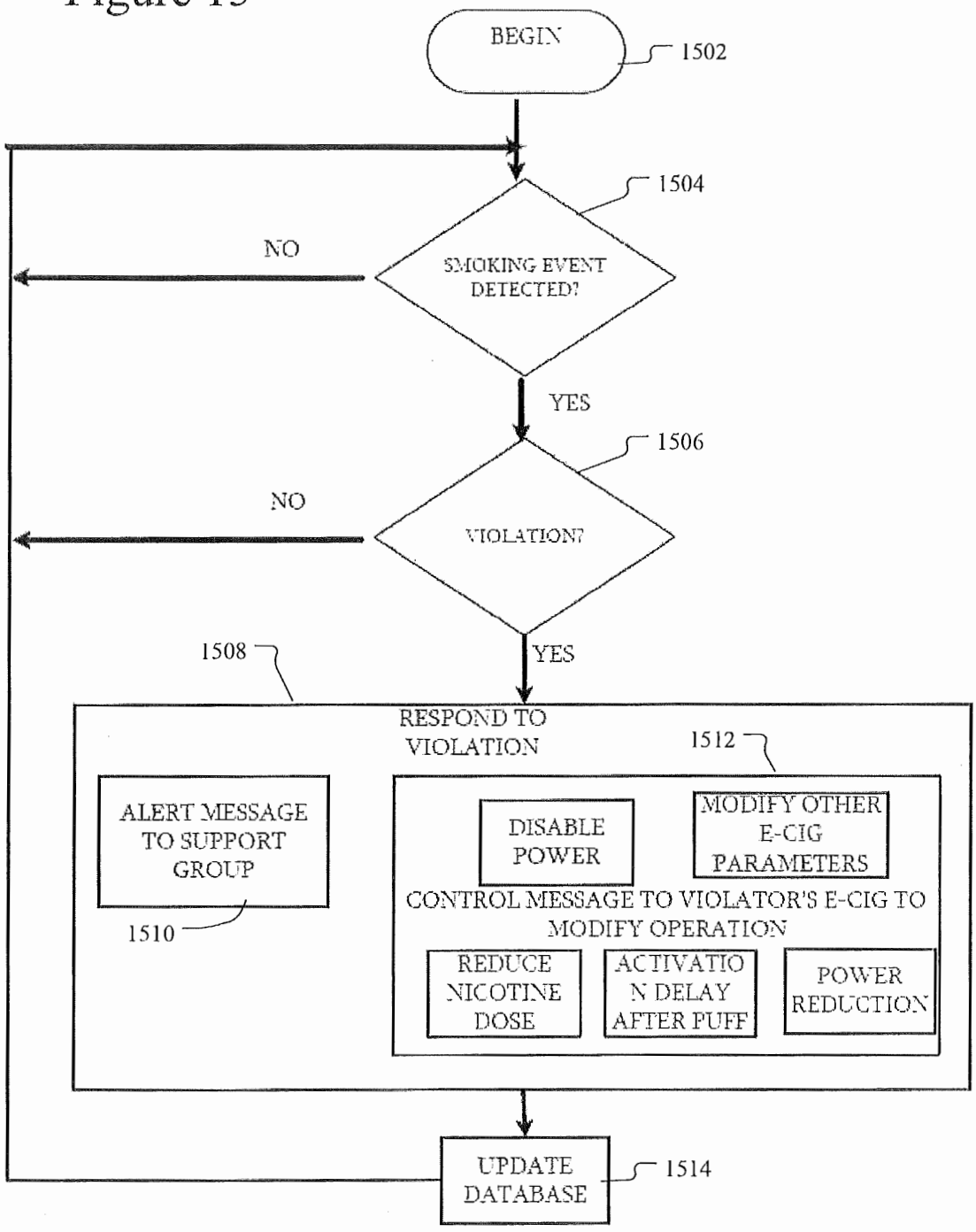
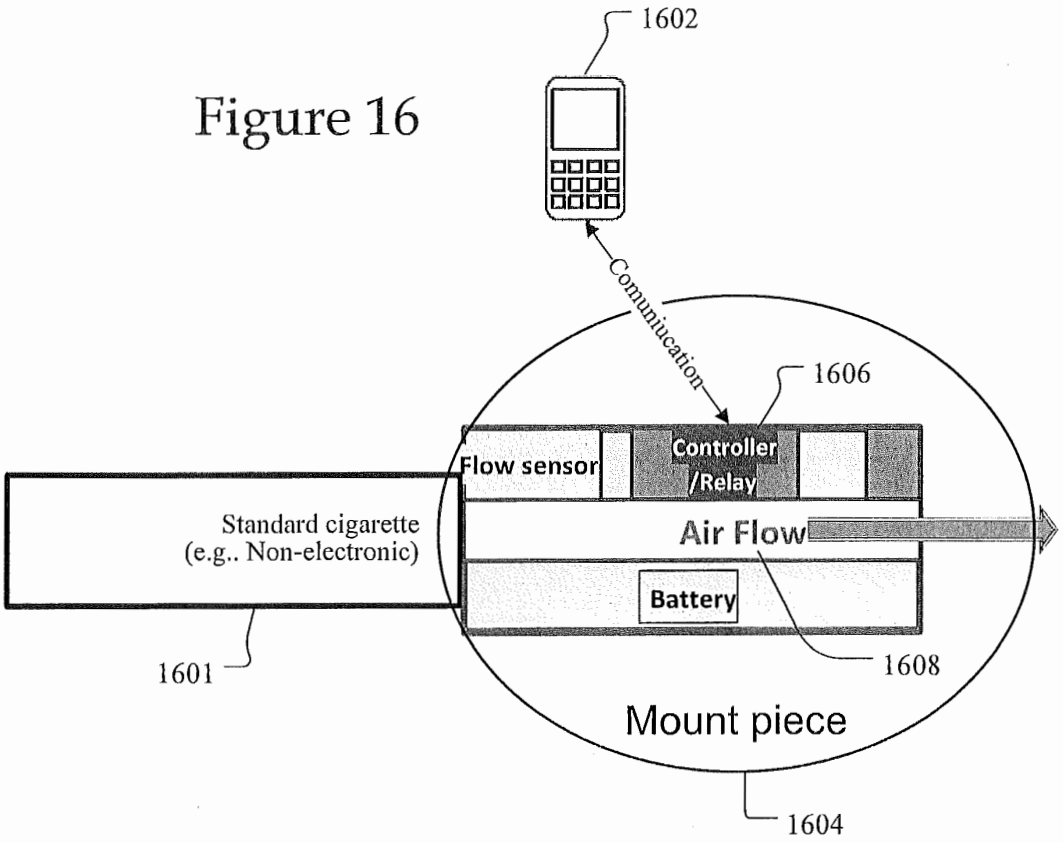
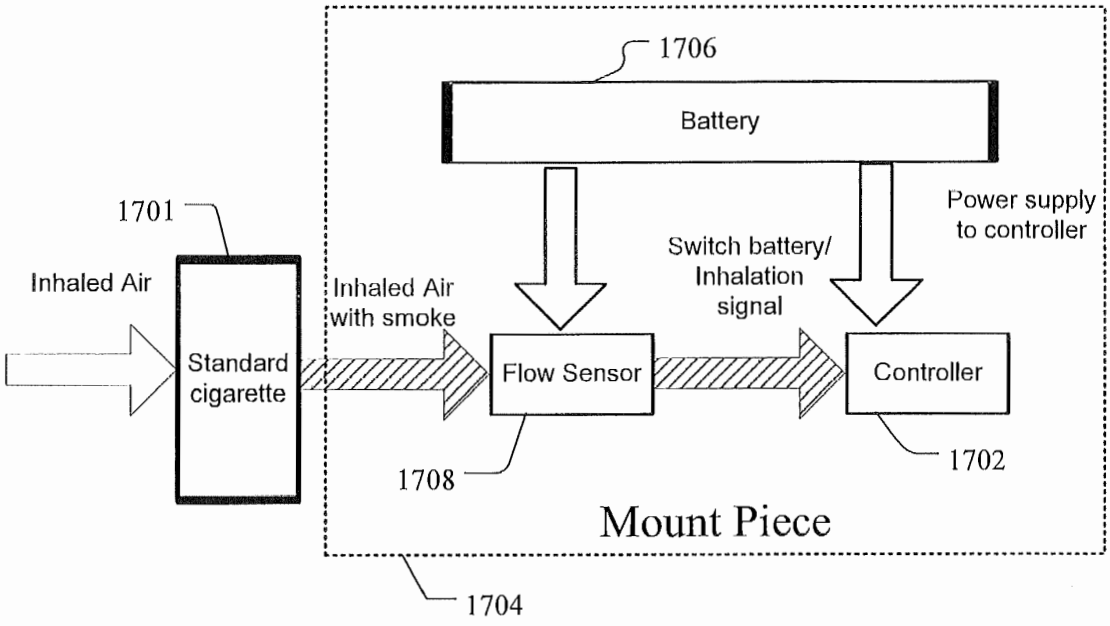

BEGIN
1502
1504
SMOKING EVENT DETECTED?
NO
YES
1506
VIOLATION?
NO
YES
1508
RESPOND TO VIOLATION
1512
ALERT MESSAGE TO SUPPORT GROUP
1510
DISABLE POWER
MODIFY OTHER E-CIG PARAMETERS
CONTROL MESSAGE TO VIOLATOR'S E-CIG TO MODIFY OPERATION
REDUCE NICOTINE DOSE
ACTIVATIO N DELAY AFTER PUFF
POWER REDUCTION
UPDATE DATABASE
1514

Figure 16



NJOY Exhibit 1002.1716

Figure 17



NJOY Exhibit 1002.1717

Figure 18

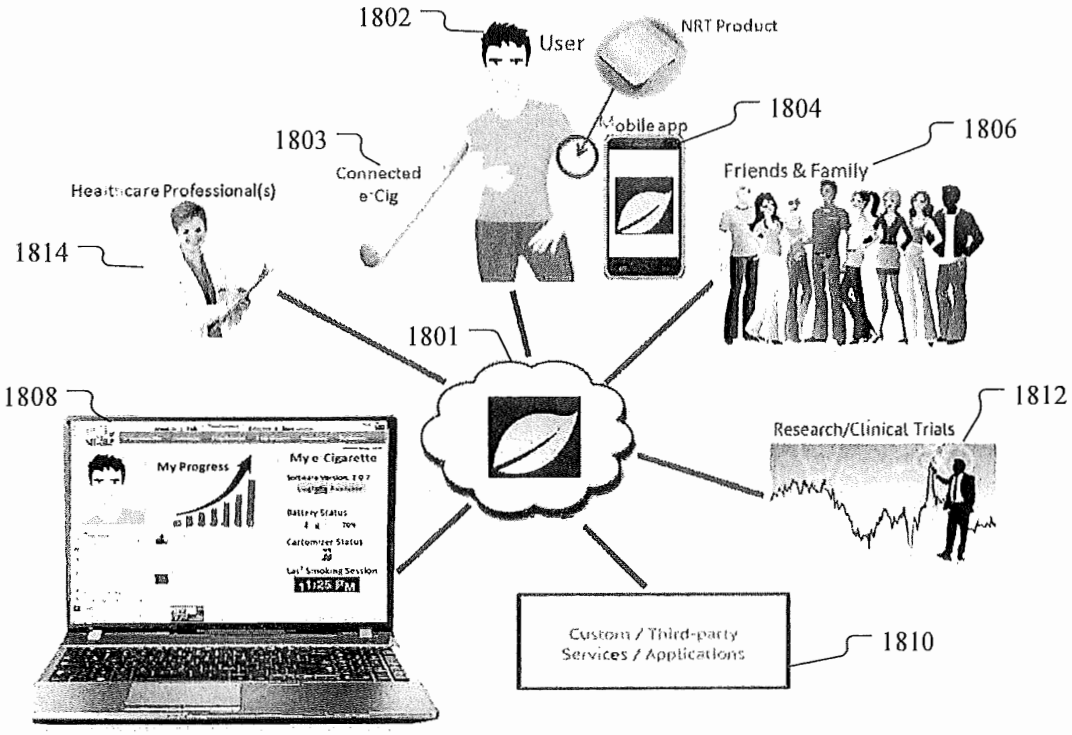
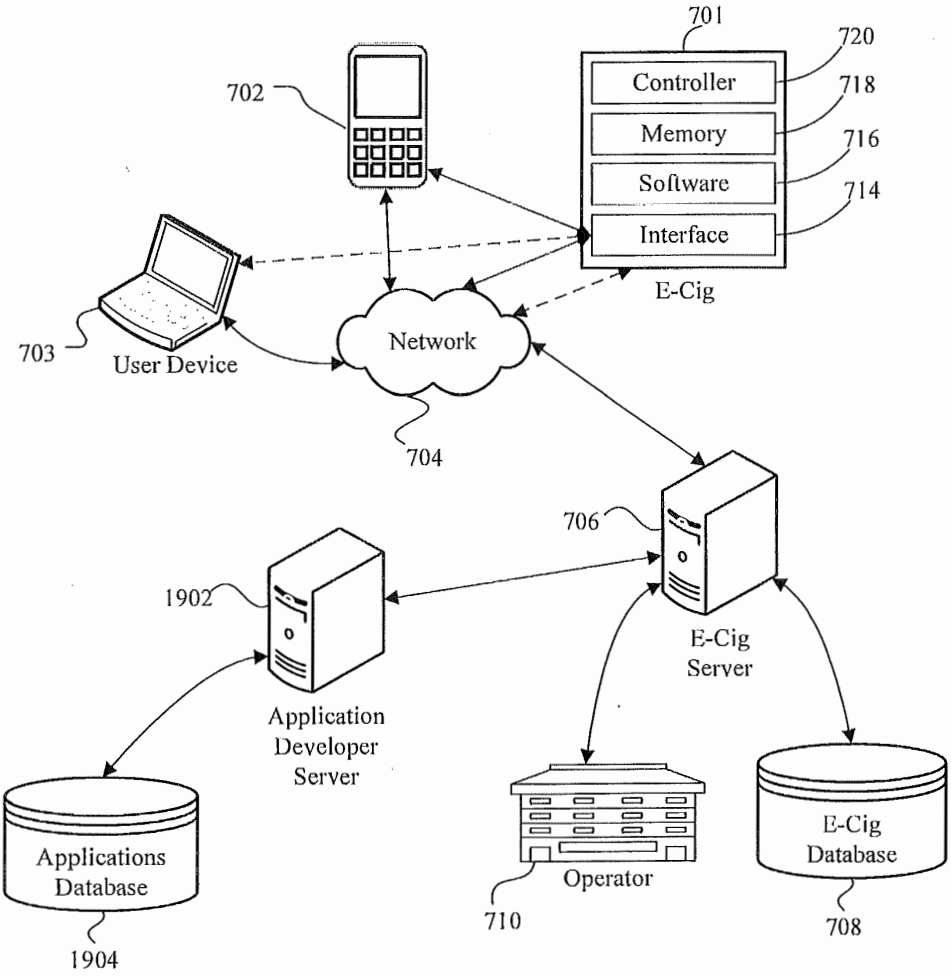

1802
User
NRT Product
1803
Connected e-Cig
1804
Mobile app
1806
Friends & Family
Healthcare Professional(s)
1814
1801
1808
My Progress
My e-Cigarette
Battery Status
Cartomizer Status
Last Smoking Session
11:25 PM
1812
Research/Clinical Trials
Custom / Third-party Services / Applications
1810

Figure 19



NJOY Exhibit 1002.1719

(12) UK Patent Application (19) GB (11) 2 264 237 (13) A

(43) Date of A publication 25.08.1993

(21) Application No 9202469.4

(22) Date of filing 05.02.1992

(71) Applicant
Robert Edward Newell
21 The Glen (Off Village Way), Pinner, Middlesex, HA5 5AX, United Kingdom

(72) Inventor
Robert Edward Newell

(74) Agent and/or Address for Service
Robert Edward Newell
21 The Glen (Off Village Way), Pinner, Middlesex, HA5 5AX, United Kingdom

(51) INT CL[5]
A61M 15/00

(52) UK CL (Edition L)
A5T TBD
A5B BZ

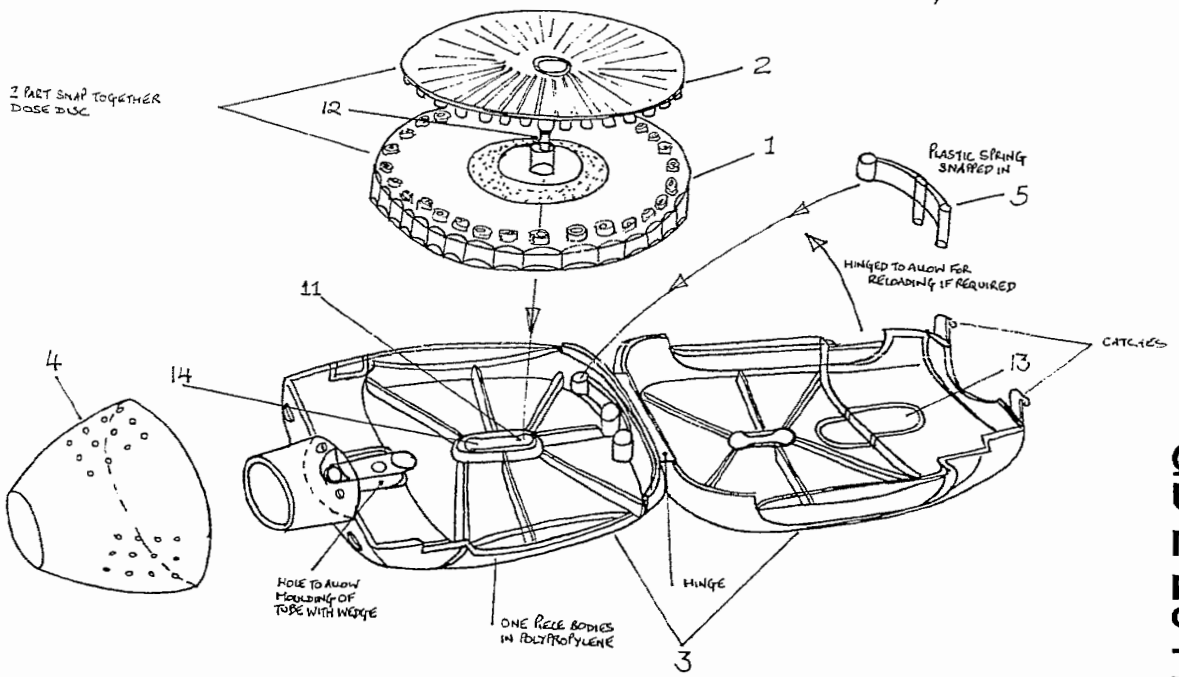
(56) Documents cited
GB 2246299 A GB 2178965 A GB 2129691 A
GB 1562732 A GB 1387954 A WO 82/01470 A1

(58) Field of search
UK CL (Edition K) A5B, A5T TBD, B8C CA
INT CL[5] A61J, A61M
Online databases: WPI

(54) An inhaler

(57) A powder inhaler for use in the treatment of medical problems of the air passages, lungs or bronchial conditions, such as bronchial asthma comprises an openable casing 3 having a mouthpiece and containing a replaceable magazine disc 1, 2 provided with a plurality of recesses or cups, each holding a dose of powder and being individually closed by a discrete closure element which can be opened and then reclosed. The disc may be indexed around to present a closed cap adjacent a projection 16 at the mouthpiece and then moved in the casing transverse to its rotational axis so that the projection removes the closure element. A ring (15, Fig 4) is provided in the top casing portion to assist reclosure of the closure element after inhalation.

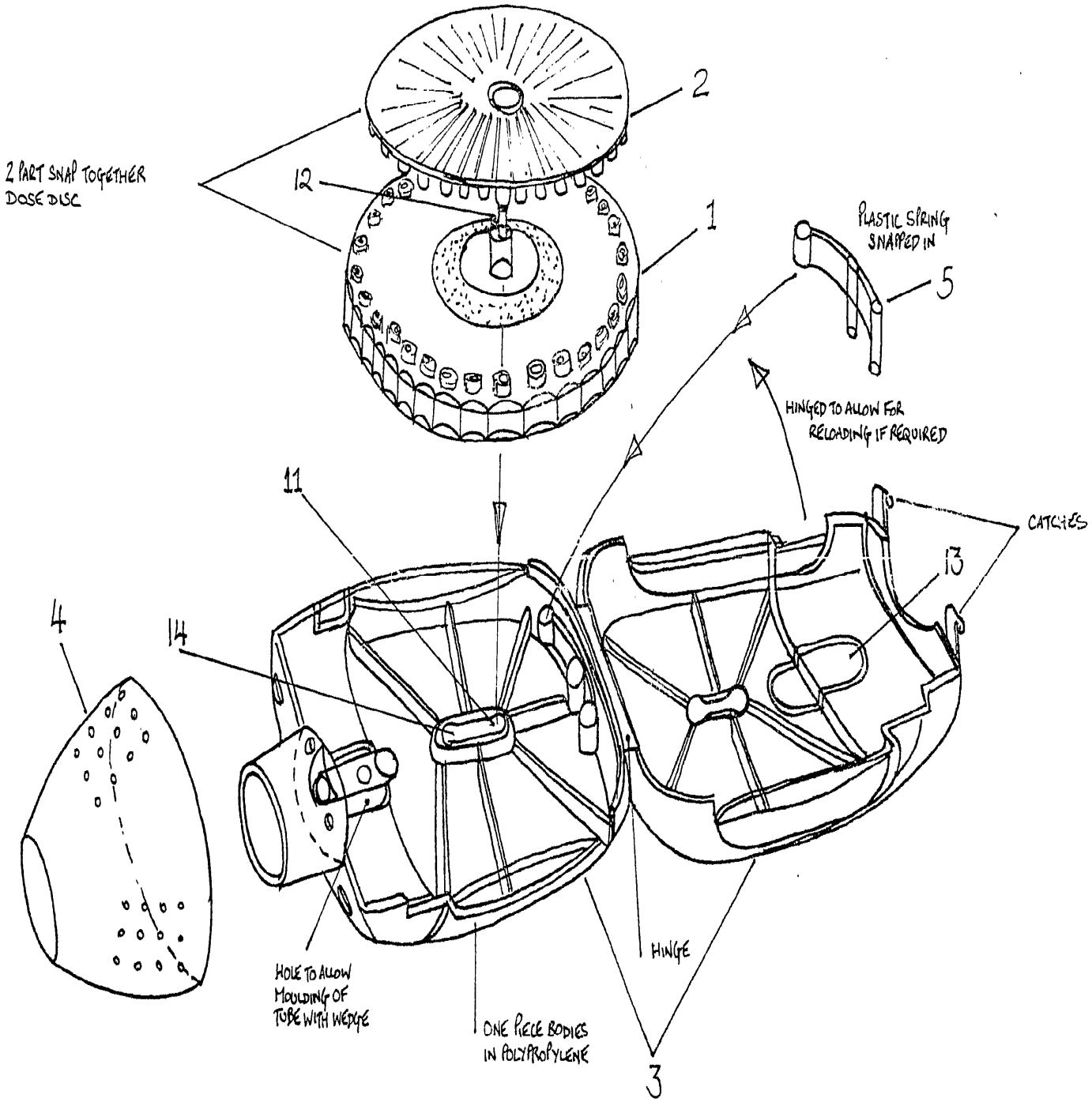
FIG.(1)



GB 2 264 237 A

NJOY Exhibit 1002.1720

FIG. (1)

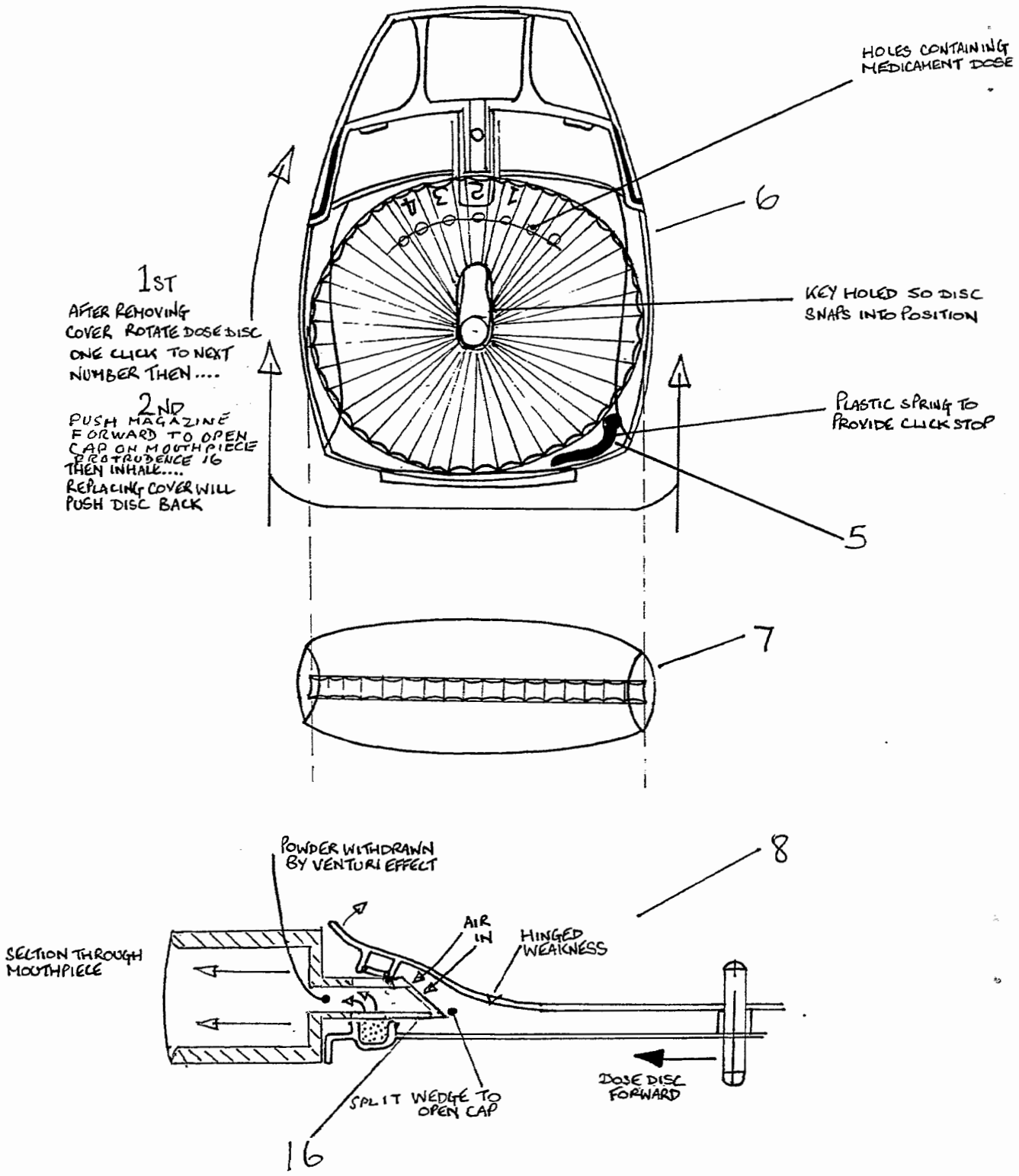


(4)

NJOY Exhibit 1002.1721

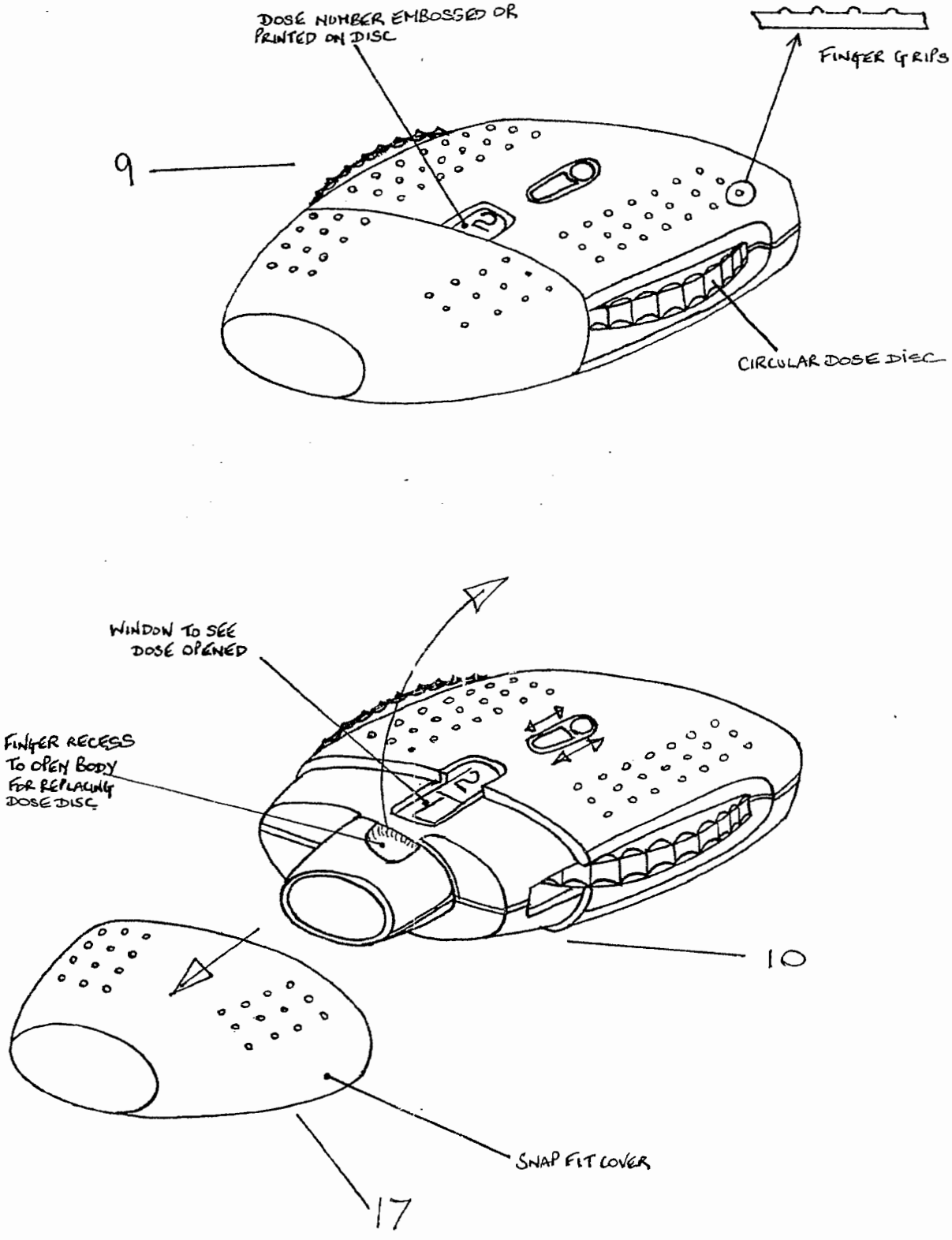
2/4

FIG. (2)



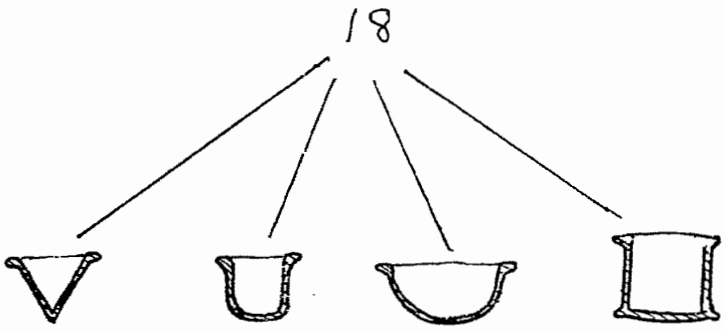
NJOY Exhibit 1002.1722

FIG(S) 3(4)

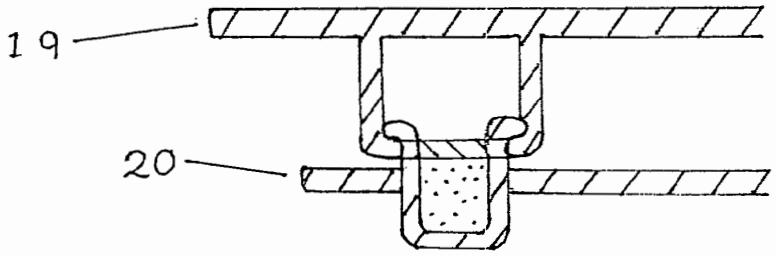


NJOY Exhibit 1002.1723

FIG. (4.)

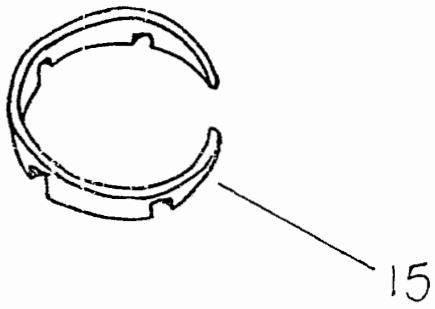


ALTERNATIVE CUP SHAPES



SECTIONAL VIEW OF DOSE DISC - REF. FIG. 1. NO'S: 1 AND 2

CAP FITTING OVER POWDERCAP.



NJOY Exhibit 1002.1724

2264237

TITLE

A magazined device for inhalation of powdered medication to and by patients.

GENERAL BACKGROUND

Devices and systems exist whereby powder for inhalation is enclosed in a gelatine or metal capsule and each capsule is loaded into the device individually each time treatment is required. The capsule is usually broken, cut, pierced, or parted by the device prior to treatment.

Problems can arise with the said capsules e.g. the gelatine or metal breaking into particles which may be inhaled by the patient. Also, gelatine being relatively unstable and fragile, aluminium, also being delicate, both require further packaging for protection to avoid environmental degradation of the product. Also by the very nature of gelatine source a stability problem may also arise.

NJOY Exhibit 1002.1725

TECHNICAL FEATURES

According to the present invention there is provided a plastic or metal disc with a plurality of holes or recesses, or cups, around the periphery of the disc. Each hole or recess contains one dose of the medicament. Ideally, there would be sufficient dosage for one week to one month's treatment, but it can be less or more. Each dose is capped off or sealed off to protect the product and maintain product security. The capped circular disc, also known as a magazine is thenplaced in a dispensing device which enables the doses of powder to be used individually as required by the patient. A specific embodiment will now be described by way of example and with reference to the accompanying drawings:-

FIGURE (1)

Shows in perspective the device with the circular disc 1 showing the recesses or cups to hold the medicament and the individual caps 2 joined at the centre. The case 3 which holds the filled and capped disc (magazine).

The cap 4 which covers the mouthpiece and relocates the capped disc.

The spring 5 which locates each dose when the disc is rotated.

FIGURE (2)

Illustrates rear end view of device 7.

Shows sketch of mouthpiece operation opening cap from powdered dose 8 cup or recess.

FIGURE (3)

Shows the device assembled 9.

Illustrates the cap removed 10.

Referring to the drawing as figure (1), this shows a circular plastic disc with the plurality of holes, cups or recesses each to hold a dose of powder to the exclusion of air 1. Each dose is closed by the caps shown as 2. The closed disc is then located into recess 11 located by pivot 12. The plastic spring 5 is then located in position in the base of the case and preferably located at the first dose to be used. The top of the case is then closed, sealing in the medicament magazine prior to use.

Also shown is the slot in top 13 and bottom 14 of case, which allows magazine containing the doses to be moved forward and

NJOY Exhibit 1002.1726

back prior and after inhalation. Also shown is the cap 4 which is included to keep mouthpiece clean and to return dose disc after use. It should be noted that the dose disc and caps are collectively known as the magazine. The magazine is rotated by hand to the next dose prior to inhalation. The magazine is pushed forward by hand, the action of which removes the cap from the required dose. This is shown on Figure (2), as is also the principle by which the powder is inhaled by a venturi effect by the patient. Also shown is a weakness to the hinge 8 to facilitate removal of the cap from the medicament dose container.

5 shows the plastic spring which provides a click stop for each dose when the magazine is rotated. The dose numbers are either embossed or printed on the magazine to ideally decrease when rotated, e.g. 100, 99, 98 etc. This will show how many doses are left. In order to rotate the dose magazine it is shown in Figure (3). the magazine protrudes from the case 3 on both sides enabling the dose magazine to be pushed forward when required. Or rotated as required.

FIGURE (4)

Illustrates alternative cup shapes 18 which hold required doses.

19 and 20 demonstrate cap on cup principle.

15 indicates ring to be clipped into top of case 3 to assist in closing of cap onto cup after inhalation.

NJOY Exhibit 1002.1727

CLAIMS

1. A device for administering medicaments in solid finely divided powder form to patients, comprising a magazine containing a plurality of medicament doses each dose individually closed, and an actuating case with mouthpiece to hold magazine.

2. A device according to claim 1. whereby the magazine disc is of a circular shape, individual doses being situated around the periphery of said magazine as 1. and 2. on Figure (1).

3. The magazine is rotatable mounted within case 3 being indexed to the next dose.

4. The magazine is movable in a longitudinal position to open cap against mouthpiece protrudcence 16 for required dose 8.

5. The magazine is movable in a longitudinal position to close cap, reverse of claim 4.

6. A device whereby the required dose in magazine is locked in position by plastic spring 5 on Figure (2).

7. A device whereby the magazine when located within the device is rotatable within the device 10 on Figure (3).

8. A device whereby the cap can be replaced on the device and the dose magazine is moved back by the cap 17 into its original position.

9. A device whereby the shape of the dose cup or recess is influential in promoting a venturi effect 18. Figure (4) shows shape varience.

10..A device whereby a circular separate or integral moulding 15 is included in moulding to assist closing of dose cap.

NJOY Exhibit 1002.1728

Patents Act 1977
Examiner's report to the Comptroller under Section 17 (The Search Report)

Application number
9202469.4

Relevant Technical fields

(i) UK Cl (Edition K) A5T TBD; A5B; B8C CA

(ii) Int CL (Edition 5) A61M ; A61J

Search Examiner
J A WALLIS

Databases (see over)

(i) UK Patent Office

(ii) ONLINE DATABASES: WPI

Date of Search
29 APRIL 1992

Documents considered relevant following a search in respect of claims 1 AT LEAST

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB 2246299 A (GLAXO ETC) Whole document pertinent	1-3 at least
X	GB 2178965 A (GLAXO ETC) Whole document pertinent	1-3,6,7,9 at least
X	GB 2129691 A (GLAXO ETC) Whole document pertinent	1-3 at least
X	GB 1562732 (ALLEN ETC) Eg lines 119, page 2 - line 7 and page 3	1-3 at least
X	GB 1387954 (MILES ETC) Eg. lines 17-26, page 3	1-3 at least
X	WO 82/01470 A1 (RIKER ETC) Eg. magazines and doses 11	1-3 at least

SF2(p)

up - c:\wp51\doc99\fil000518

NJOY Exhibit 1002.1729

Category	Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family, corresponding document.

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).

Published 1993 at The Patent Office, Concept House, Cardiff Road, Newport, Gwent NP9 1RH. Further copies may be obtained from Sales Branch, Unit 6, Nine Mile Point, Cwmfelinfach, Cross Keys, Newport, NP1 7HZ. Printed by Multiplex techniques ltd, St Mary Cray, Kent.

NJOY Exhibit 1002.1730

(12) UK Patent Application (19) GB (11) 2 266 466 (13) A

(43) Date of A publication 03.11.1993

(21) Application No 9207690.0

(22) Date of filing 08.04.1992

(51) INT CL[5]
A61M 15/00

(52) UK CL (Edition L)
A5T TBE TED T102 T11X
F1R RDC

(56) Documents cited
None

(58) Field of search
UK CL (Edition K) A5T TBC TBD TBE TED
INT CL[5] A61M

(71) Applicant
Bespak Plc

(Incorporated in the United Kingdom)

Bergen Way, North Lynn Industrial Estate,
King's Lynn, Norfolk, PE30 2JJ, United Kingdom

(72) Inventors
Wamadeva Balachandran
Adam Karbownik
Paul Barnes

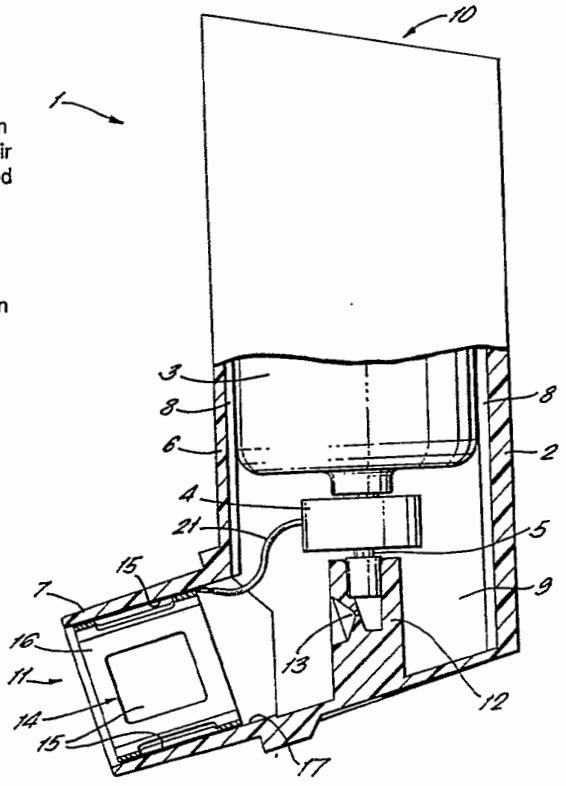
(74) Agent and/or Address for Service
Boult Wade Tennant
27 Furnival Street, London, EC4A 1PQ,
United Kingdom

(54) Inhalation apparatus

(57) An inhaler 1 has a housing 2 defining a passageway 9 for inhaled air. An aerosol dispenser 3 is arranged to be responsive to an electrical actuating signal to dispense into the passageway a substance to be inhaled. A sensor 14 produces the actuation signal in response to inhalation and comprises a membrane 15 of a polymeric piezoelectric material, such as PVDF, arranged to produce a signal voltage in response to flexure. A support member 16 holds the membrane in position relative to the housing at a location such that the membrane flexes in response to a change of air pressure in the passageway. The inhaler is primarily intended for medical dispensing of inhaled substances.

As shown in Fig. 1, the membrane 15 normally lies in contact with a side wall 17 defining the passageway 9. In another embodiment, (Fig. 4), the membrane (54) is bonded to and flexes with an elastomeric diaphragm (53) exposed on one side to ambient air and on the other to air within the passageway.

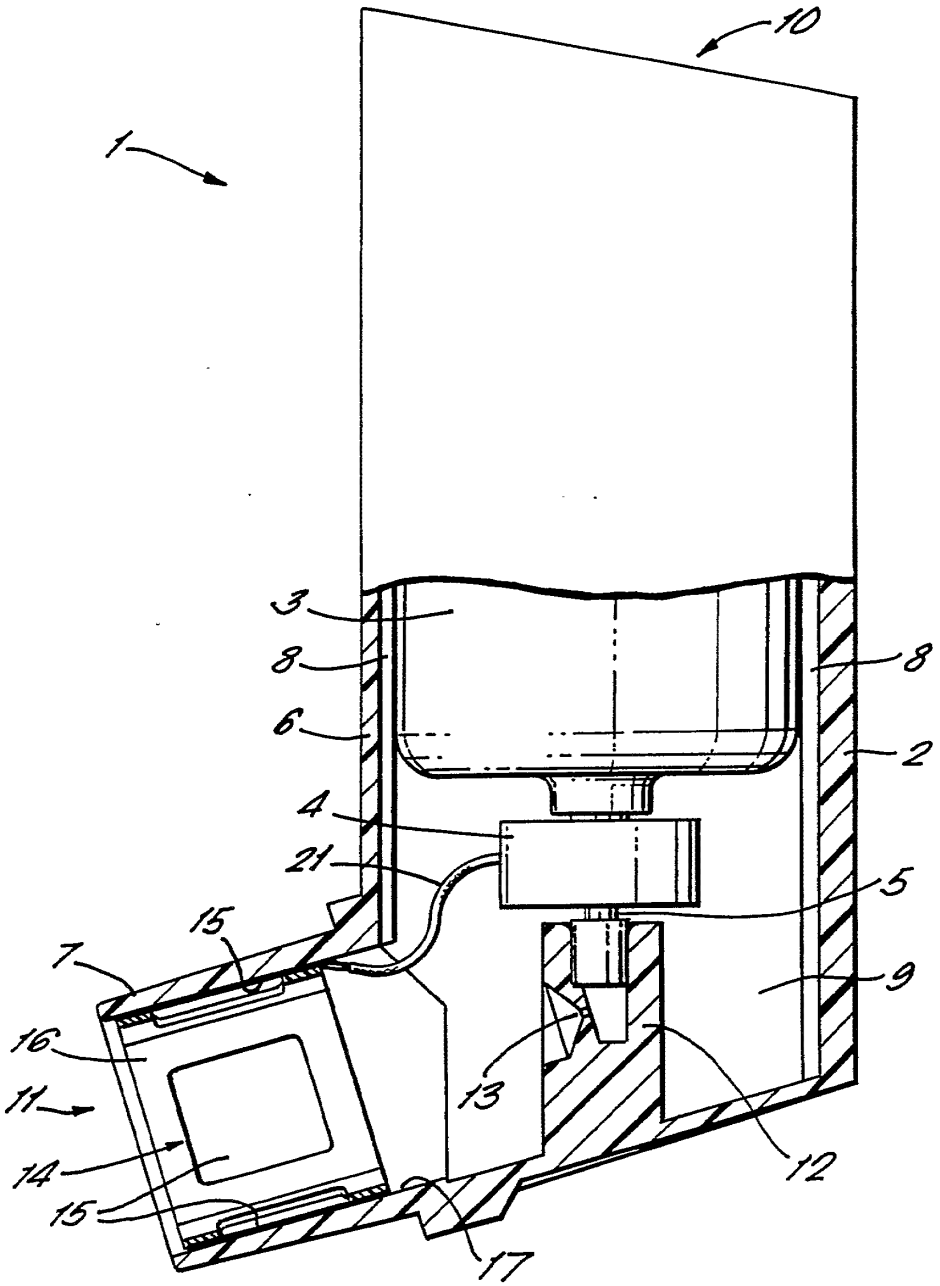
FIG. 1.



GB 2 266 466 A

NJOY Exhibit 1002.1731

FIG. 1.



NJOY Exhibit 1002.1732

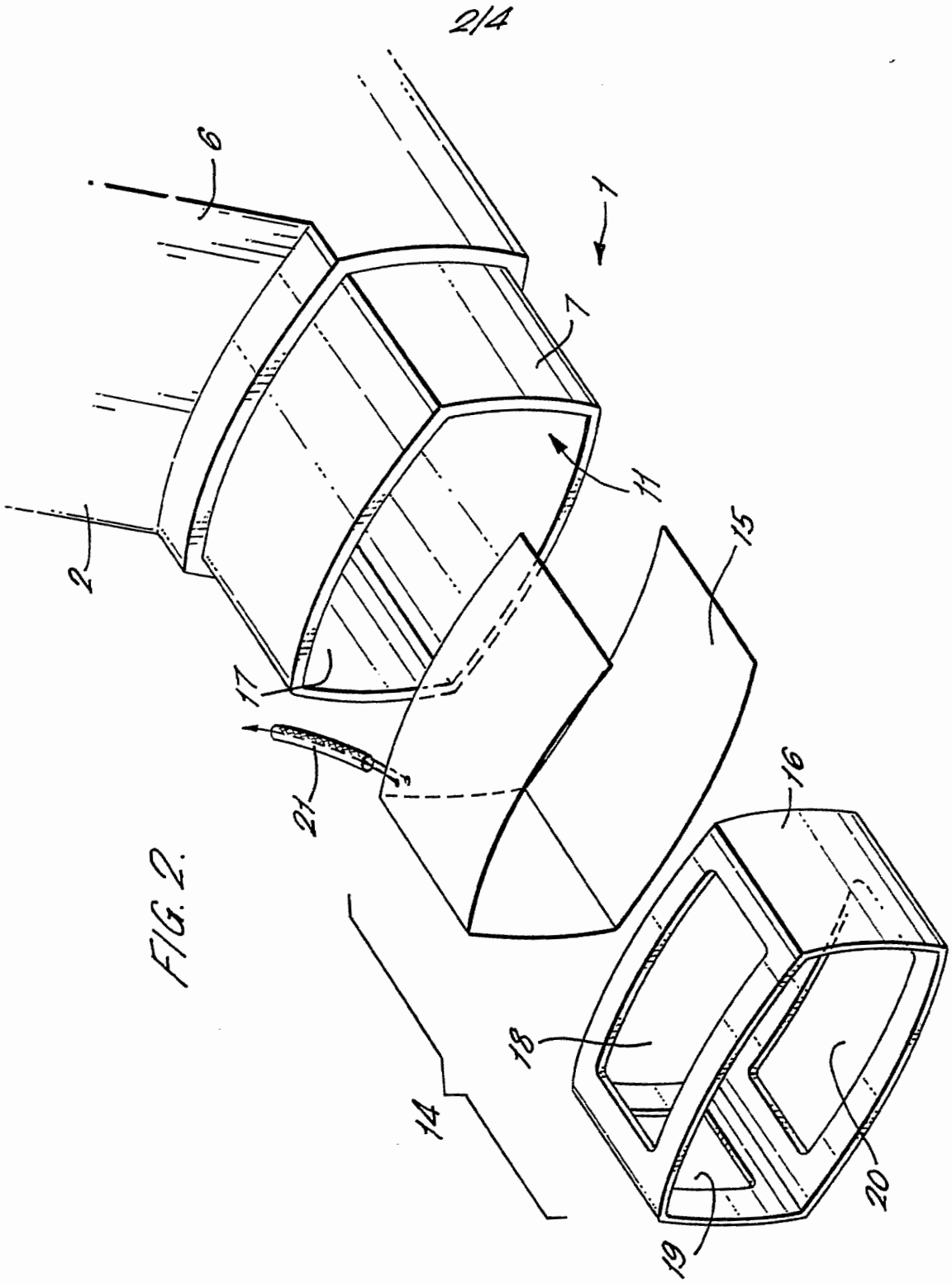
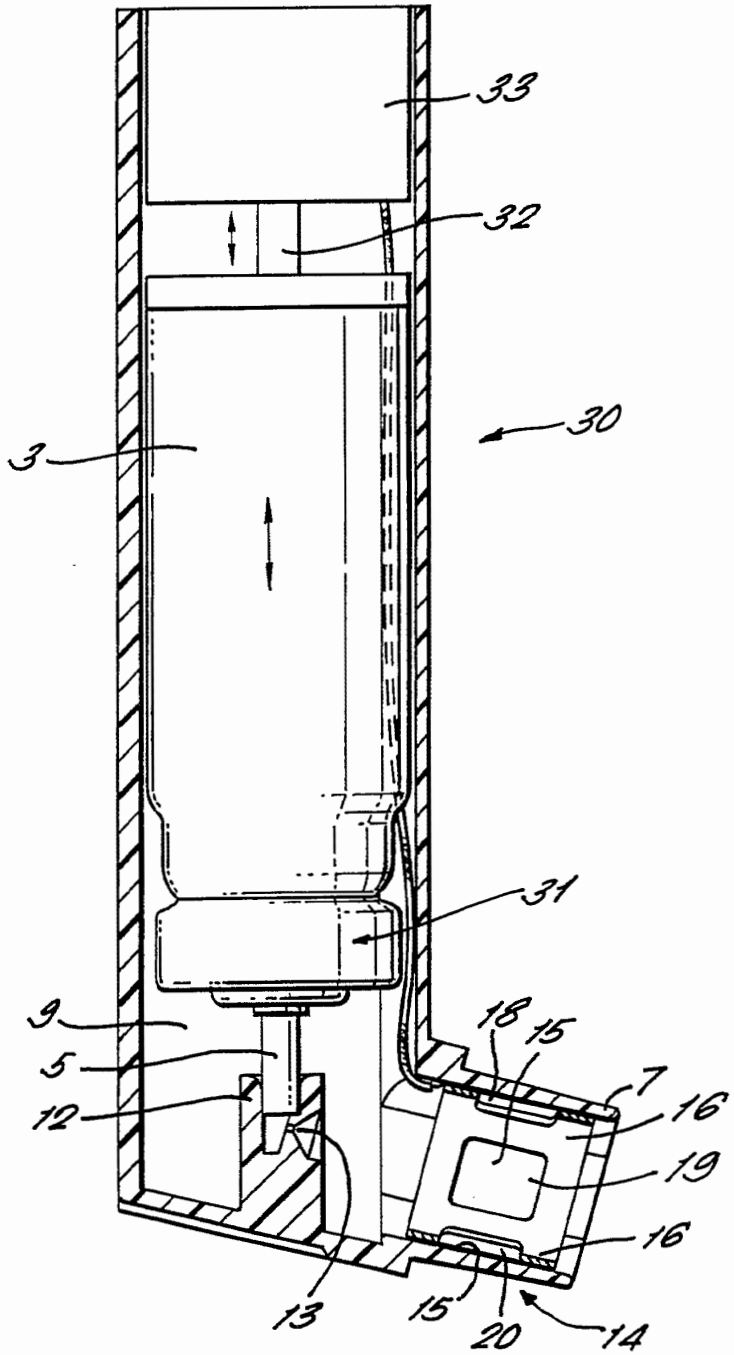


FIG. 2.

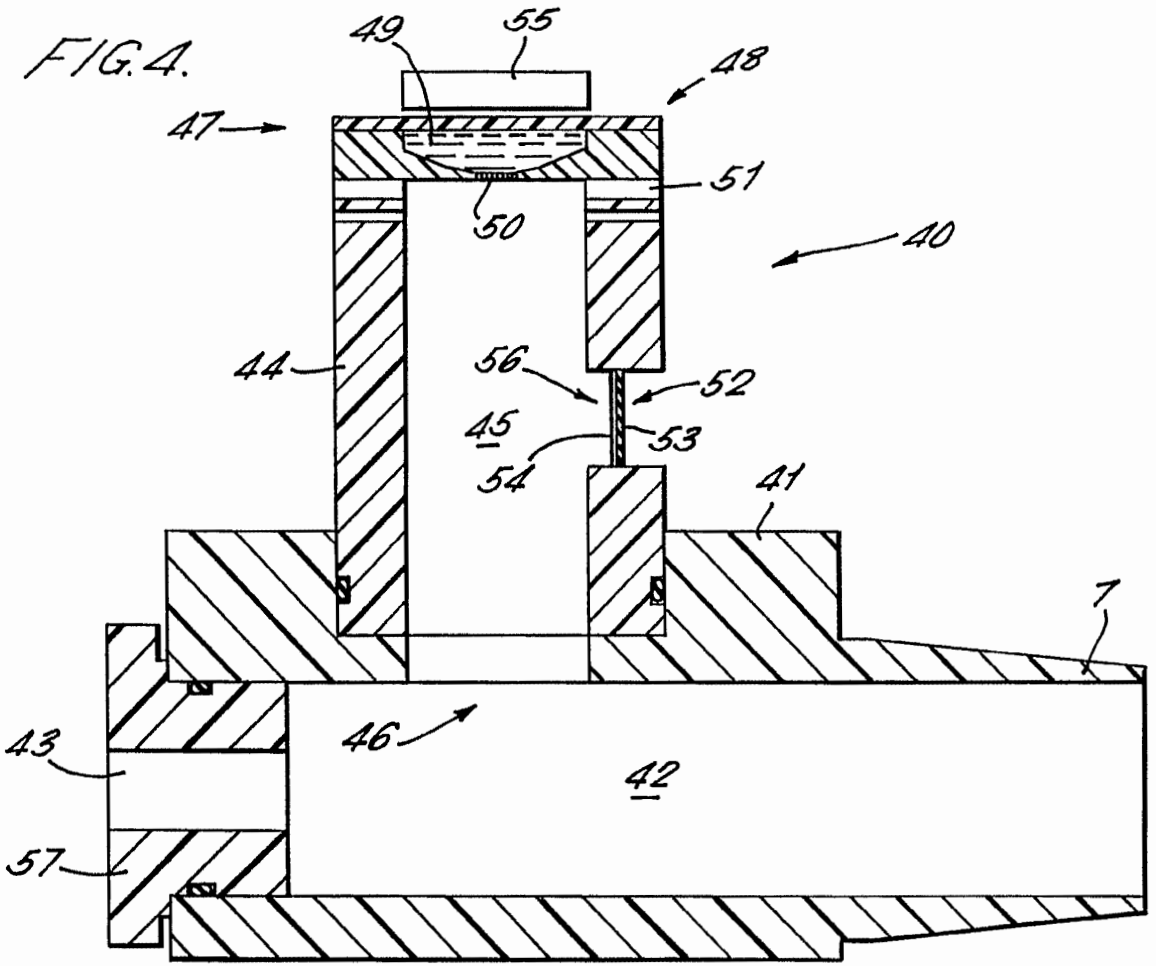
NJOY Exhibit 1002.1733

FIG. 3.



NJOY Exhibit 1002.1734

FIG. 4.



NJOY Exhibit 1002.1735

2266466

"INHALATION APPARATUS"

This invention relates to inhalation apparatus for dispensing inhaled substances and in particular but not exclusively to dispensing of medicinal products in aerosol form from a pressurised dispensing container.

It is known to provide a sensor in an inhalation apparatus to detect inhalation by a user in order to synchronise with inhalation the release into the inhaled air flow of a substance to be inhaled. It is for example important in the administration of aerosol products for the relief of asthma that the timing of the dispensing operation should be carefully controlled to ensure maximum deposition of the substance in the user's lungs.

It is known from WO87/04354 to provide an electrically operated dispensing means responsive to a signal generated by a sensor which is responsive to the flow of air through a passageway. A hinged flap cooperates with a reed contact to make electrical contact and generate an actuating signal for the dispensing means.

According to the present invention there is disclosed inhalation apparatus for dispensing inhaled substances comprising a housing defining a passageway for inhaled air, a dispensing means operable in response to an electrical actuating signal to dispense into the passageway a substance to be inhaled, and a sensor operable to produce the actuation signal in response to inhalation wherein the sensor comprises a membrane of piezoelectric material and support means supporting the membrane relative to the housing at a location such that the membrane flexes in response to a change of air pressure in the passageway to thereby generate the

NJOY Exhibit 1002.1736

actuation signal.

An advantage of such apparatus is that it provides a sensor of simple construction and which is relatively easy to assemble with the housing. A further advantage is that the sensor generates an actuation signal by piezoelectric action which does not require the sensor to be energised from an external electrical source.

Preferably the membrane comprises a flexible polymeric piezoelectric material such as polyvinylidene fluoride (PVDF).

Conveniently the support means comprises a support member cooperating with the housing to clamp a clamped portion of the membrane in fixed relationship with the housing, the clamped portion being peripheral to at least one unclamped portion which is flexible in response to pressure change in the passageway.

Preferably the membrane overlays a portion of a side wall defining the passageway.

The member may alternatively be mounted on a resilient diaphragm for flexure in unison with the diaphragm, the diaphragm being located such that one side of the diaphragm is exposed to ambient air pressure and the other side of the diaphragm is exposed to air within the passageway.

Preferred embodiments of the present invention will now be described by way of example only and with reference to the accompanying drawings of which:-

Figure 1 is a part sectioned elevation of an inhalation apparatus;

Figure 2 is an exploded perspective view of the apparatus of Figure 1;

Figure 3 is a part sectioned elevation of an alternative apparatus; and

Figure 4 is a sectioned elevation of a further

NJOY Exhibit 1002.1737

alternative apparatus.

Apparatus 1 of Figure 1 comprises a generally tubular housing 2 receiving a cylindrical pressurised dispensing container 3. The container 3 has an electrically operated outlet valve 4 which is operable to release a metered dose of a medicinal product through a valve stem 5 in response to an electrical actuating signal.

The housing 2 consists of a main tubular portion 6 which receives the container 3 and a mouthpiece 7 projecting laterally from the lower end of the main tubular portion. The main tubular portion 6 includes circumferentially spaced ribs 8 which project inwardly so as to space the container 3 from the housing 2 to allow air to flow around the container 3. An air passageway 9 is defined by the housing 2 and extends from an open end 10 of the housing, through the main tubular portion 6 and through the mouthpiece 7 to an outlet 11.

The valve stem 5 is received in a nozzle fitting 12 having a nozzle opening 13 arranged to direct an aerosol spray from discharge through the valve in a direction towards the outlet 11.

A sensor 14 is located in the mouthpiece 7 and comprises a piezoelectric membrane 15 which is held by a support member 16 so as to normally lie in contact with an annular side wall portion 17 of the mouthpiece 7.

As shown more clearly in Figure 2 the support member 16 is generally tubular in shape and fits snugly within the mouthpiece 7. The support member 16 is provided with cut-outs 18, 19 and 20 through which corresponding unclamped portions of the membrane 15 are exposed, each exposed portion of the membrane being surrounded by an annular clamped portion which is overlaid by the support member 16

NJOY Exhibit 1002.1738

and clamped in contact with the side wall portion 17.

The membrane 15 is a film of PVDF (polyvinylidene fluoride) material upon which are formed sensor electrodes (not shown) in known manner to provide an electrical output signal responsive to flexure of the film.

An output lead 21 connects the membrane to the valve 4 which includes suitable circuitry to actuate the valve in response to an actuating signal.

In use a user inhales air through the mouthpiece 7 resulting in a drop of air pressure within the mouthpiece. Air flows through the housing 2 from the open end 10 to the outlet 11. The presence of the container 3 in the main tubular portion 6 results in the passageway 9 being constricted adjacent to the open end 10 which tends to enhance the drop in pressure of the air within the mouthpiece 7.

In response to the drop of air pressure within the mouthpiece 7 the membrane 15 flexes such that exposed portions of the membrane 15 bow into the cut-outs 18, 19 and 20 and this flexure of the membrane results in an actuating signal being generated by piezoelectric action in the membrane and transmitted via output lead 21 to the valve 4.

The valve 4 is actuated by the actuating signal and releases a measured dose of medicament into the nozzle fitting 12 from which it is dispensed as an aerosol spray through the nozzle opening 13 into the mouthpiece 7 so as to be entrained in the air flow and hence inhaled by the user.

When the inhalation ceases the membrane relaxes to its rest position in which it lies in contact with the side wall portion 17. During this relaxation of the membrane a signal of opposite polarity is generated by the membrane. The circuitry of the

NJOY Exhibit 1002.1739

valve 4 is arranged to not respond to a signal of this reverse polarity.

An alternative apparatus 30 is shown in Figure 3 and is described using corresponding reference numerals to those of Figure 1 where appropriate for corresponding elements.

The alternative apparatus 30 has a pressurised dispensing container 3 having a conventional mechanical valve 31 which is actuated by depression of a valve stem 5 relative to the container. The valve stem 5 is received in a fixed nozzle fitting 12 and the container is moved towards and away from the nozzle fitting by a solenoid operated plunger 32. The plunger 32 is driven by an electrical actuator 33 which is connected to a sensor 14 which corresponds to the sensor 14 of the apparatus of Figures 1 and 2. Sensor 14 is similarly located in a mouthpiece 7 of housing 2.

In use a user inhales air through the mouthpiece 7 and air is drawn through a passageway 9 defined by housing 2. Air pressure within the mouthpiece is decreased by the inhalation so that the membrane 15 flexes so as to bow into the cut-outs 18, 19, and 20 of the support member 16. An actuating signal is transmitted to the actuator 33 resulting in the plunger 32 being moved by solenoid action so as to translate the container 3 towards the nozzle fitting 12. The valve 31 operates to release a medicinal product through the stem 5 which is atomised and injected into the air flow by the nozzle opening 13.

A further alternative apparatus 40 is shown in Figure 4 and will be described using corresponding reference numerals to those of previous Figures where appropriate for corresponding elements.

Apparatus 40 has a housing 41 with a mouthpiece

NJOY Exhibit 1002.1740

7 communicating via a tubular duct 42 with an inlet opening 43 arranged such that the inlet opening and mouthpiece 7 are at opposite ends of the tubular duct.

The housing 41 includes a side arm 44 defining a second duct 45 communicating with the first duct 42 at a T-junction 46.

The side arm 44 has an outer end 47 at which is located a piezoelectric atomiser 48 of a type in which liquid from a liquid reservoir 49 is dispensed through a perforate membrane 50 in response to high frequency vibration of the membrane 50 by a piezoelectric element 51.

A side port 52 is formed in the side arm 44 intermediate the T-junction 46 and the atomiser 48 and the side port is closed by an elastomeric diaphragm 53. A piezeoelectric membrane 54 of PVDF material is bonded to the diaphragm 53 so as to flex in unison with the diaphragm. The membrane 54 is provided with suitable electrodes (not shown) for sensing piezoelectrically induced voltages resulting from flexure of the membrane and which are connected to an electronic control unit 55 which is operable to actuate the atomiser 48. The membrane 54 and diaphragm 53 constitute a sensor 56 which is responsive to pressure change in the second duct 45.

The inlet opening 43 is defined by an annular formation 57 which provides a constriction to the flow of air through the duct 42.

In use a user inhales air through the mouthpiece 7 and an air flow is established through the duct 42 from the restricted inlet opening 43. A pressure drop established within the duct 42 is communicated to the second duct 45 resulting in inward flexure of the diaphragm 53 and with it the membrane 54. The sensor 56 produces by piezoelectric action an actuating signal transmitted

NJOY Exhibit 1002.1741

to the control unit 55 resulting in the atomiser 48 being actuated. A mist of liquid is dispensed from the reservoir 49 through the perforate membrane 50 into the second duct 45 and is drawn into the duct 42 from whence it is inhaled through the mouthpiece 7.

On completion of inhalation the pressure within the ducts 42 and 45 is restored to atmospheric pressure and the diaphragm 53 relaxes to its rest position. During this relaxation a signal of opposite polarity is generated by the sensor 56. The control unit 55 is arranged not to respond to reverse polarity signals.

NJOY Exhibit 1002.1742

CLAIMS:

1. Inhalation apparatus for dispensing inhaled substances comprising a housing defining a passageway for inhaled air, a dispensing means operable in response to an electrical actuating signal to dispense into the passageway a substance to be inhaled, and a sensor operable to produce the actuation signal in response to inhalation wherein the sensor comprises a membrane of piezoelectric material and support means supporting the membrane relative to the housing at a location such that the membrane flexes in response to a change of air pressure in the passageway to thereby generate the actuation signal.

2. Inhalation apparatus as claimed in claim 1 wherein the membrane comprises a polymeric piezoelectric material.

3. Inhalation apparatus as claimed in claim 2 wherein the piezoelectric material is polyvinylidene fluoride.

4. Inhalation apparatus as claimed in any preceding claim wherein the support means comprises a support member cooperating with the housing to clamp a clamped portion of the membrane in fixed relationship with the housing, the clamped portion being peripheral to at least one unclamped portion which is flexible in response to pressure change in the passageway.

5. Inhalation apparatus as claimed in claim 4 wherein the membrane overlays a portion of a side wall defining the passageway.

NJOY Exhibit 1002.1743

6. Inhalation apparatus as claimed in any of claims 1 to 4 wherein the member is mounted on a resilient diaphragm for flexure in unison with the diaphragm, the diaphragm being located such that one side of the diaphragm is exposed to ambient air pressure and the other side of the diaphragm is exposed to air within the passageway.

7. Inhalation apparatus substantially as hereinbefore described with reference to and as shown in any of the accompanying drawings.

NJOY Exhibit 1002.1744

Patents Act 1977
Examiner's report to the Comptroller under Section 17 (The Search Report)

Application number

9207690.0

Relevant Technical fields

(i) UK Cl (Edition K) A5T TBE, TBC, TBD, TED

(ii) Int CL (Edition) A61M

Search Examiner

J A WALLIS

Databases (see over)

(i) UK Patent Office

(ii)

Date of Search

22 MAY 1992

Documents considered relevant following a search in respect of claims ALL

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
	NONE	

ldt - c:\wp51\doc99\fil000403

NJOY Exhibit 1002.1745

Category	Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family, corresponding document.

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).

Published 1993 at The Patent Office, Concept House, Cardiff Road, Newport, Gwent NP9 1RH. Further copies may be obtained from Sales Branch, Unit 6, Nine Mile Point, Cwmfelinfach, Cross Keys, Newport, NP1 7HZ. Printed by Multiplex techniques ltd, St Mary Cray, Kent.

NJOY Exhibit 1002.1746

(12) UK Patent Application (19) GB (11) 2504074 (13) A

(43) Date of A Publication 22.01.2014

(21) Application No: 1212599.3

(22) Date of Filing: 16.07.2012

(51) INT CL:
A24F 47/00 (2006.01)

(56) Documents Cited:
EP 2340729 A1 US 20100006113 A1

(58) Field of Search:
INT CL A24F, A61M
Other: Online: EPODOC, WPI

(71) Applicant(s):
Nicoventures Holdings Limited
(Incorporated in the United Kingdom)
4 Temple Place, London, WC2R 2PG, United Kingdom

(72) Inventor(s):
Christopher Lord

(74) Agent and/or Address for Service:
D Young & Co LLP
120 Holborn, LONDON, EC1N 2DY, United Kingdom

(54) Title of the Invention: **Electronic cigarette**
Abstract Title: **Electronic cigarette**

(57) An electronic cigarette comprises a power cell (8, figs 2 & 3) and a vaporiser (10, figs 2 & 3), where the vaporiser comprises a heating element 16 and a heating element support 18, wherein a gap 20 is provided between the heating element 16 and the heating element support 18. The gap may be provided in a number of different ways. As shown, the gap may be in the form of one or more channels 20 in the surface of the heating element support 18. Alternatively, the surface of the heating element support 18 may be pitted, with the gaps being provided by the heating element being coiled over the pitted areas (fig 6). The gap or gaps may be provided by coiling the heating element 16 over heating elements having various cross-sections (figs 11-22). In a further alternative embodiment, the heating element support 18 may be a planar member with openings (22, figs 23 &24) over or through which the heating element 16 passes. The heating element support 18 may be porous, e.g. a porous ceramic.

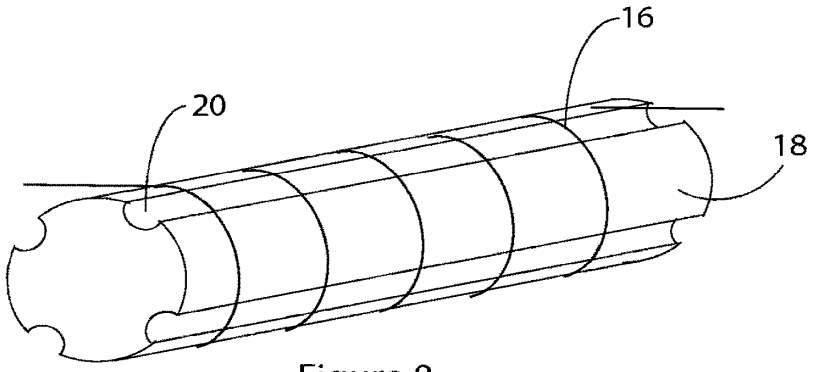


Figure 8

GB 2504074 A

NJOY Exhibit 1002.1747

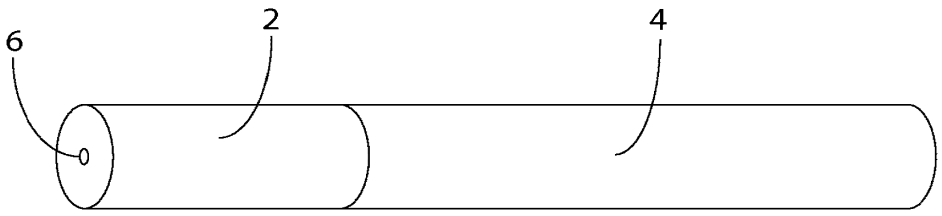


Figure 1

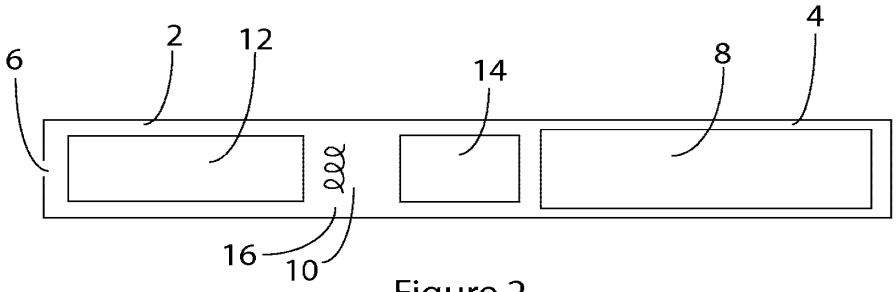


Figure 2

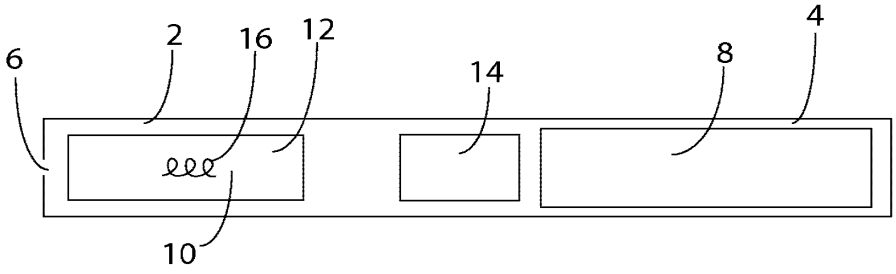


Figure 3

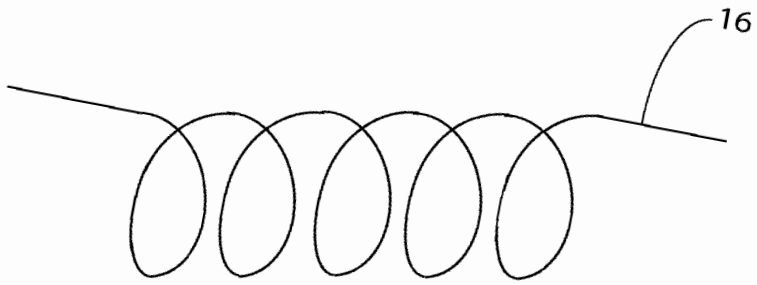


Figure 4

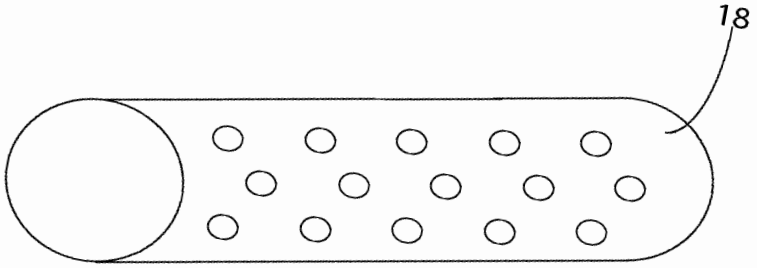


Figure 5

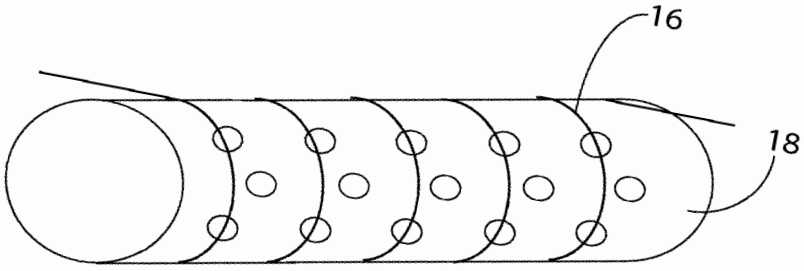


Figure 6

NJOY Exhibit 1002.1749

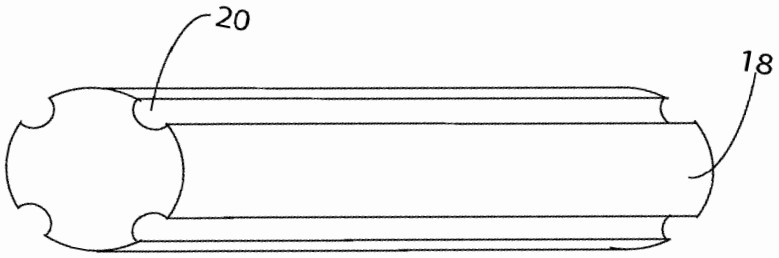


Figure 7

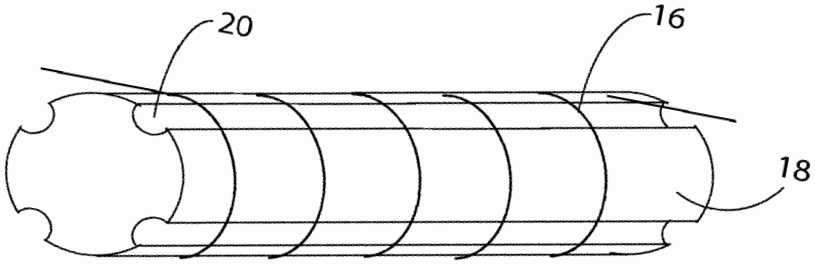


Figure 8

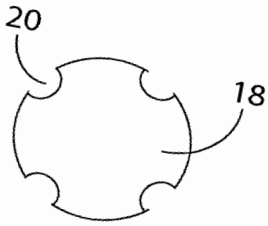


Figure 9

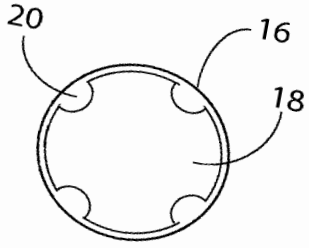


Figure 10

NJOY Exhibit 1002.1750

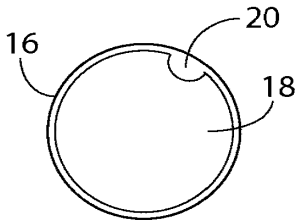


Figure 11

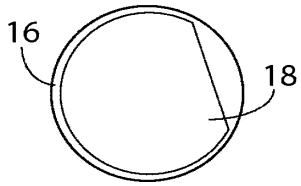


Figure 12

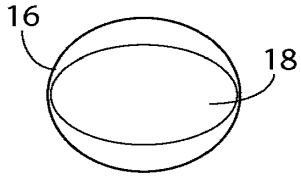


Figure 13

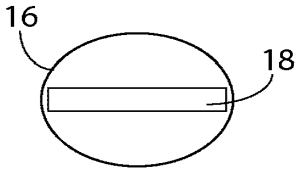


Figure 14

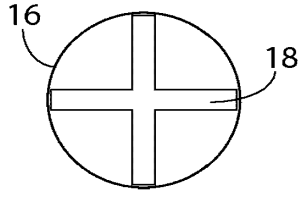


Figure 15

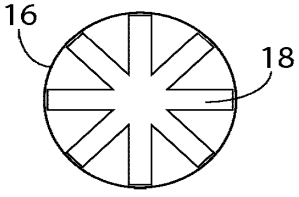


Figure 16

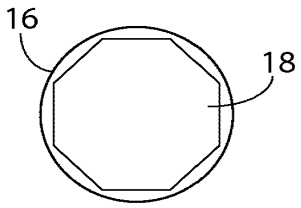


Figure 17

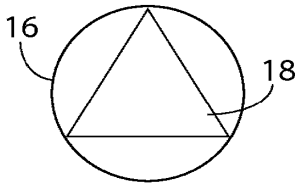


Figure 18

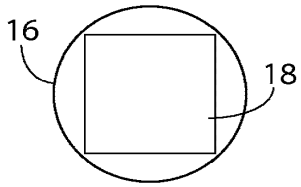


Figure 19

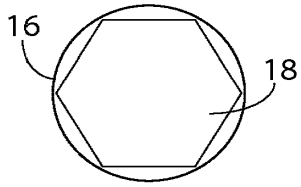


Figure 20

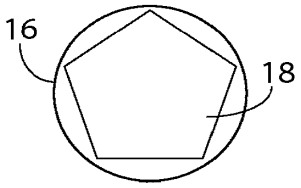


Figure 21

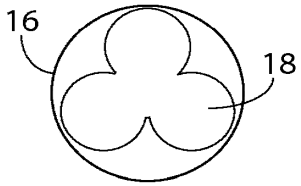


Figure 22

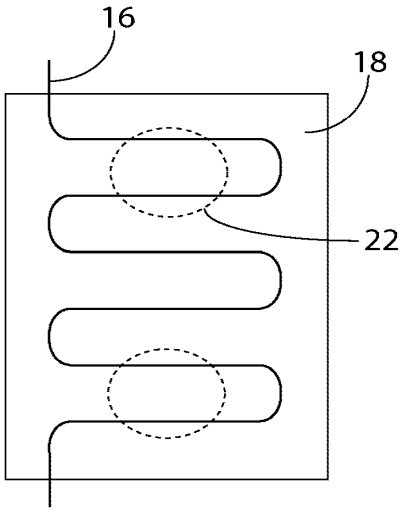


Figure 23

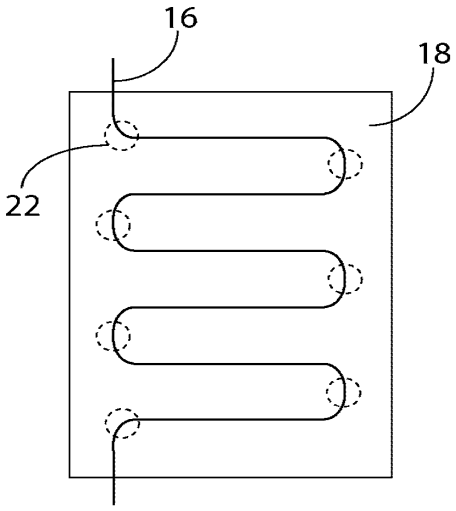


Figure 24

Electronic Cigarette

Field of the Invention

The present invention relates to electronic cigarettes. More particularly, but not exclusively, the present invention concerns electronic cigarettes comprising a vaporiser.

Background of the Invention

It is well known that smoking tobacco is bad for your health and reduces your life expectancy. Smokers have an increased chance of developing lung cancer, suffering from chronic obstructive pulmonary disease and having heart attacks. However, smokers can find it difficult to quit smoking because they are addicted to the nicotine found in tobacco. A number of smoking cessation techniques have been developed to help people quit, including the use of Nicotine Replacement Therapy (NRT) to introduce nicotine into the body in a form other than tobacco. NRT products include nicotine gums, nicotine patches and electronic cigarettes.

Electronic cigarettes are popular because they replicate the smoking habit. These devices are typically cigarette-sized and function by allowing a user to inhale a nicotine vapour from a liquid store by applying a suction force to a mouthpiece. Some electronic smoking devices have an airflow sensor that activates when a user applies the suction force and causes a heater coil to heat up and vaporise the liquid.

Summary of the Invention

In a first aspect of the present invention there is provided an electronic cigarette comprising a power cell and a vaporiser, where the vaporiser comprises a heating element and a heating

element support, wherein a gap is provided between the heating element and the heating element support.

Having a separate heating element and support allows a finer heating element to be constructed. This is advantageous because a finer heating element can be more efficiently heated. Providing a gap between the heating element and the heating element support allows liquid to be gathered and stored in the gap region for vaporisation. The gap can also act to wick liquid onto the heating element. Also, providing a gap between the heating element and support means that a greater surface area of the heating element is exposed thereby giving a greater surface area for heating and vaporisation.

Suitably, the heating element is on the outside of the heating element support.

Suitably, the heating element support comprises a support outer surface and the gap is provided between the heating element and the support outer surface.

Suitably, the heating element and heating element support form a heating rod. Suitably, the heating element support is a rigid support. Suitably, the heating element support is solid.

This has the advantage that a rigid or solid support enables a more fragile, more efficient heating element to be used. The combination of the support and the heating element provides a more robust heating rod.

Suitably, the heating element support is porous. Suitably, the heating element support comprises a porous ceramic material.

Having a porous support enables liquid to be stored in the porous support. Thus the liquid can be easily transferred to the heating element in contact with the support for

vaporisation by the heating element. Also, the gap between the heating element and the support allows for wicking of liquid both from the porous support onto the heating element and into the porous support for storage.

Suitably, the heating element is formed around the heating element support. Suitably, the heating element is a heating coil. Suitably, the heating coil is coiled around the heating element support. Suitably, the heating coil is a wire coil. Suitably, the gap is between a coil turn and the heating element support. Suitably, gaps are between coil turns and the heating element support.

Having a heating element that wraps around the support provides a more sturdy construction. The support also facilitates the creation of a coil by enabling wire to be wrapped around the support. By providing a gap between a coil turn and the support, liquid can be wicked into the gap and held in the gap for vaporisation. In particular, liquid can be wicked by the spaces between coil turns and into the gap between a coil turn and the support.

Suitably, the vaporiser further comprises a vaporisation cavity configured such that in use the vaporisation cavity is a negative pressure cavity. Suitably, at least part of the heating element is inside the vaporisation cavity. Suitably, the electronic cigarette comprises a mouthpiece section and the vaporiser is part of the mouthpiece section.

By having the heating element in the vaporisation cavity, which in turn is a negative pressure cavity when a user inhales through the electronic cigarette, the liquid is directly vaporised and inhaled by the user.

Suitably, the heating element support is elongated in a lengthwise direction. Suitably, the heating element support has

a side channel running lengthwise along the support. Suitably, the heating element support comprises two or more side channels running lengthwise along the support. Suitably, the side channels are distributed substantially evenly around the heating element support.

A channel in the support provides a natural gap between the support and the heating element. This is particularly the case when the heating element is a coil wound around the support. The channel therefore provides the necessary gap to wick and store liquid. The area of the heating element exposed is also increased along the channel leading to increased vaporisation in this region.

Suitably, the heating element support is non-cylindrical. Suitably, the heating element support is cylinder-like but non-cylindrical. Suitably, the heating element support has a non-circular cross-section. Suitably, the heating element support has a pitted surface.

Since a coil is naturally cylindrical when formed sue to the rigidity of the wire, a non-cylindrical support has the advantage that there will naturally be gaps between the coil and the support. These gaps lead to increased wicking, liquid storage and vaporisation. A cylinder-like support with a pitted surface provides gaps between the support and the coil in the pit regions. Cross-sections are sections perpendicular to the elongated lengthwise direction.

Alternatively, the cross-sectional shape of the heating element support is a polygon. Suitably, the cross-sectional shape of the heating element support has 3 sides. Suitably, the cross-sectional shape of the heating element support has 4 sides. Suitably, the cross-sectional shape of the heating element support has 5 sides. Suitably, the cross-sectional shape of the

NJOY Exhibit 1002.1757

heating element support has 6 sides. Suitably, the cross-sectional shape of the heating element support has 8 sides.

Alternatively, the cross-sectional shape of the heating element support is a flat rectangle. Alternatively, the cross-sectional shape of the heating element support is an ellipse. Alternatively, the cross-sectional shape of the heating element support is equivalent to three overlapping circles joined together.

Alternatively, the cross-sectional shape of the heating element support is a cross. Suitably, the cross-sectional shape of the heating element support is a cross having 4 arms. Suitably, the cross-sectional shape of the heating element support is a cross having 8 arms.

Again, these various shapes of support provide natural gaps between the support and a heating element coil that is wound around the support. These gaps lead to increased wicking, liquid storage and vaporisation.

Alternatively, the heating element support is a flat planar substrate. Suitably, the heating element is on one surface of the heating element support. Alternatively, the heating element is threaded in and out of the heating element support. Alternatively, the heating element is wrapped around the heating element support. Suitably, the heating element support comprises a substrate having holes.

Brief Description of the Drawings

For a better understanding of the invention, and to show how example embodiments may be carried into effect, reference will now be made to the accompanying drawings in which:

Figure 1 is a side perspective view of an electronic cigarette;

NJOY Exhibit 1002.1758

Figure 2 is a cross-sectional view of an electronic cigarette having a perpendicular coil;

Figure 3 is a cross-sectional view of an electronic cigarette having a parallel coil;

Figure 4 is a side perspective view of a heating element coil;

Figure 5 is a side perspective view of a cylindrical heating element support having a pitted surface;

Figure 6 is a side perspective view of a heating element coil and heating element support having a pitted surface;

Figure 7 is a side perspective view of a heating element support having channels;

Figure 8 is a side perspective view of a heating element coil and heating element support having channels;

Figure 9 is an end view of the heating element support of Figure 7;

Figure 10 is an end view of the heating element coil and support of Figure 8;

Figure 11 is an end view of a coil and a heating element support having a channel;

Figure 12 is an end view of a coil and a heating element support having a circular segment cross-section;

Figure 13 is an end view of a coil and a heating element support having an oval cross-section;

Figure 14 is an end view of a coil and a heating element support having a flat rectangular cross-section;

Figure 15 is an end view of a coil and a heating element support having a 4 arm cross, cross-section;

Figure 16 is an end view of a coil and a heating element support having an 8 arm cross, cross-section;

Figure 17 is an end view of a coil and a heating element support having an octagonal cross-section;

Figure 18 is an end view of a coil and a heating element support having a triangular cross-section;

Figure 19 is an end view of a coil and a heating element support having a square cross-section;

NJOY Exhibit 1002.1759

Figure 20 is an end view of a coil and a heating element support having a hexagonal cross-section;

Figure 21 is an end view of a coil and a heating element support having a pentagonal cross-section;

Figure 22 is an end view of a coil and a heating element support having cross-sectional shape of three circles joined together;

Figure 23 is a front view of a heating element support substrate and heating element; and

Figure 24 is a front view of a heating element support substrate and with a threaded heating element.

Description of the Preferred Embodiments

Referring to Figures 1 to 3 there is a shown an electronic cigarette comprising a mouthpiece 2 section and a cigarette body 4 section. The electronic cigarette is shaped like a conventional cigarette having a cylindrical shape. The mouthpiece 2 has an air outlet 6 and the electronic cigarette is operated when a user places the electronic cigarette in their mouth and inhales, drawing air through the air outlet 6.

Figures 2 and 3 show an internal arrangement, the electronic cigarette having a power cell 8, a vaporiser 10, a liquid store 12 and a control circuit 14. The liquid store is situated within the mouthpiece 2 section. The control circuit 14 has an airflow sensor and is connected to the power cell 8 and the vaporiser 10. In use, when air is drawn through the air outlet 6 the airflow sensor on the control circuit 14 is activated causing power to be delivered to the vaporiser 10 which in turn vaporises liquid from the liquid store 12.

The vaporiser 10 has a heating element 16, in this example a wire coil, which is the part that heats up to vaporise liquid in contact with it. Liquid is vaporised in a vaporisation

cavity and the coil 16 is situated within this vaporisation cavity.

In the example shown in Figure 2, the coil 16 lies outside of the liquid store 12 where the coil 16 is mounted perpendicular to the longitudinal axis of the cigarette. A wicking element is used to wick liquid from the liquid store 12 to the heating element in order to vaporise the liquid. In use, the vaporised liquid travels down the side of the liquid store 12 and out of the air outlet 6 to be inhaled by the user.

In the example shown in Figure 3, the coil 16 lies within the liquid store 12 area and the coil 16 is mounted parallel to the longitudinal axis of the cigarette. Liquid is wicked directly onto the coil 16 for vaporisation, and vaporised liquid travels down an airway channel within the liquid store 12 and out of the air outlet 6 to be inhaled by the user.

Figures 4 to 6 show an example arrangement with a coil 16 supported by a heating element support 18. Figure 4 shows the coil 16, Figure 5 shows the heating element support 18 and the Figure 6 shows the coil 16 wound around the heating element support 18.

The heating element support 18 is substantially cylindrical in shape and the coil 16 is wound around the cylinder such that the coil 16 is in contact with the cylinder. The heating element support 18 has a pitted surface, such that depressions are formed on the surface. A gap is formed between the heating element support 18 and the coil 16 in a location where the coil 16 overlaps a depression in the surface.

In use, the heating element support 18 provides support to the coil 16. The gaps between the coil 16 and the heating element support 18 provide a means for wicking liquid by capillary action, provide an area for liquid to be stored prior to

vaporisation, and expose the coil 16 in the pitted areas for increased vaporisation in these areas.

Other examples will be described below where a gap or gaps are provided between the coil 16 and heating element support 18. These gaps provide the advantages already described.

Figures 7 to 10 show a different example of a heating element support 18. Here, the heating element support 18 is substantially cylindrical in shape and has channels 20 running along its length. Each channel 20 is a depression in the surface of the heating element support 18 running along the length. Four channels 20 are spaced evenly around the heating element support 18.

As shown in Figure 8 and Figure 10, when the coil 16 is wound around the heating element support 18, gaps are provided between the channels 20 and the coil sections overlapping the channels 20.

Figures 11 to 22 each show an example of an elongated heating element support 18 with a coil 16 wound around and a gap or gaps provided between the coil 16 and the heating element support 18. Each example has a different cross-sectional shape as will be described.

In the example shown in Figure 11, the heating element support 18 is substantially cylindrical with a single channel 20 running along its length. Thus the cross-sectional shape of the heating element support 18 is a circle with a small indent for the channel 20. Gaps are provided between the overlap of the coil 16 and the channel 20 areas.

In the example shown in Figure 12, the heating element support 18 has a cross-sectional shape being a major segment of a circle. This corresponds to an almost cylindrical shape with

flat face running along the length of the heating element support 18. The coil 16 is wound around the heating element support 18 but the coil wire rigidity prevents the coil from following the shape of the heating element support 18 in the flat region. Thus a gap is provided between the heating element support 18 and the coil 16 in the area of the flat region.

In the example shown in Figure 13, the heating element support 18 has a cross-sectional shape being an ellipse. The coil 16 is wound around the heating element support 18 but the coil wire rigidity causes the coil 16 to form a more rounded shape than the ellipse, thereby providing gaps between the heating element support 18 and the coil 16.

In the example shown in Figure 14, the heating element support 18 is a flat bar having a cross-sectional shape being a flat rectangle. The coil 16 is wound around the heating element support 18 but the coil wire rigidity causes the coil 16 to form a more rounded shape than the rectangle, thereby providing gaps between the heating element support 18 and the coil 16.

In the example shown in Figure 15, the heating element support 18 has a cross-sectional shape being a 4-arm cross, where the arms are spaced evenly apart. The coil 16 is wound around the heating element support 18 and gaps are provided between adjacent arm sections and the coil 16.

In the example shown in Figure 16, the heating element support 18 has a cross-sectional shape being an 8-arm cross, where the arms are spaced evenly apart. The coil 16 is wound around the heating element support 18 and gaps are provided between adjacent arm sections and the coil 16.

Figures 17 to 21 show examples where the heating element support 18 has a cross-sectional shape being a regular polygon. Each of these has a different number of sides, Figure 17 is an

octagon, Figure 18 is a triangle, Figure 19 is a square, Figure 20 is a hexagon and Figure 21 is a pentagon. The coil 16 is wound around the heating element support 18 and is in contact with the heating element support 18 at the edges of the support corresponding to the corners of the cross-sectional shapes. In this way, polygons with more sides have more contact with the coil 16 and provide a greater number of smaller gaps between the coil 16 and the heating element support 18. This enables a cross-sectional shape to be selected that gives an optimum amount of contact between the heating element support 18 and the coil 16, and optimum gap formation.

In the example shown in Figure 22, the heating element support 18 has a cross-sectional shape corresponding to three overlapping circles joined together. The coil 16 is wound around the heating element support 18 and gaps are provided between adjacent circle sections and the coil 16.

In Figure 23, a different type of heating element support 18 and heating element 16 is shown. The heating element support 18 is a substantially flat substrate and the heating element 16 is arranged on the surface of the substrate in a zig-zag configuration to maximize the length of the heating element 16 for a given surface area of substrate. The heating element support 18 has substrate apertures 22 and gaps are formed between the heating element support 18 and the heating element 16 when the heating element 16 overlaps these substrate apertures 22.

Figure 24 shows an example similar to that shown in Figure 23. A heating element support 18 is a flat substrate comprising substrate apertures 22 and a zig-zag heating element 16. In this example, the substrate apertures 22 are located at the turning points of the zig-zag heating element 16 and the heating element 16 wire is threaded in and out of the substrate apertures 22 on respective turns such that the heating element

NJOY Exhibit 1002.1764

lies of both surfaces of the flat substrate. Gaps are provided between the heating element 16 and the substrate at the substrate aperture 22 locations.

Although examples have been shown and described it will be appreciated by those skilled in the art that various changes and modifications might be made without departing from the scope of the invention. The heating element is not restricted to being a coil and could be another wire form such as a zig-zag shape. Where channels are provided in the heating element support, a number other than one or four could be used. The heating element support could be made from a porous material such as porous ceramic to allow liquid storage within the support. The electronic cigarette is not restricted to the sequence of components described and other sequences could be used such as the control circuit being in the tip of the device or the liquid store being in the cigarette body rather than the mouthpiece. The vaporiser could form part of the mouthpiece or alternatively part of the cigarette body. Where the heating element support is a substrate, the heating element could be wrapped around the substrate.

Claims

1. An electronic cigarette comprising a power cell and a vaporiser, where the vaporiser comprises a heating element and a heating element support, wherein a gap is provided between the heating element and the heating element support.

2. The electronic cigarette of claim 1, wherein the heating element is on the outside of the heating element support.

3. The electronic cigarette of claim 1 or claim 2, wherein the heating element support comprises a support outer surface and the gap is provided between the heating element and the support outer surface.

4. The electronic cigarette of any preceding claim, wherein the heating element and heating element support form a heating rod.

5. The electronic cigarette of any preceding claim, wherein the heating element support is a rigid support.

6. The electronic cigarette of any preceding claim, wherein the heating element support is solid.

7. The electronic cigarette of any preceding claim, wherein the heating element support is porous.

8. The electronic cigarette of any preceding claim, wherein the heating element support comprises a porous ceramic material.

9. The electronic cigarette of any preceding claim, wherein the heating element is formed around the heating element support.

10. The electronic cigarette of any preceding claim, wherein the heating element is a heating coil.

11. The electronic cigarette of claim 10, wherein the heating coil is coiled around the heating element support.

12. The electronic cigarette of claim 10 or claim 11, wherein the heating coil is a wire coil.

13. The electronic cigarette of any one of claims 10 to 12, wherein the gap is between a coil turn and the heating element support.

14. The electronic cigarette of any one of claims 10 to 13, wherein gaps are between coil turns and the heating element support.

15. The electronic cigarette of any preceding claim, wherein the vaporiser further comprises a vaporisation cavity configured such that in use the vaporisation cavity is a negative pressure cavity.

16. The electronic cigarette of claim 15, wherein at least part of the heating element is inside the vaporisation cavity.

17. The electronic cigarette of any preceding claim, wherein the electronic cigarette comprises a mouthpiece section and the vaporiser is part of the mouthpiece section.

18. The electronic cigarette of any preceding claim, wherein the heating element support is elongated in a lengthwise direction.

19. The electronic cigarette of any preceding claim, wherein the heating element support has a side channel running lengthwise along the support.

20. The electronic cigarette of any preceding claim, wherein the heating element support comprises two or more side channels running lengthwise along the support.

21. The electronic cigarette of claim 20, wherein the side channels are distributed substantially evenly around heating element.

22. The electronic cigarette of any preceding claim, wherein the heating element support is non-cylindrical.

23. The electronic cigarette of any preceding claim, wherein the heating element support is cylinder-like but non-cylindrical.

24. The electronic cigarette of any preceding claim, wherein the heating element support has a non-circular cross-section.

25. The electronic cigarette of any preceding claim, wherein the heating element support has a pitted surface.

26. The electronic cigarette of any preceding claim, wherein the cross-sectional shape of the heating element support is a polygon.

27. The electronic cigarette of any preceding claim, wherein the cross-sectional shape of the heating element support has 3 sides.

28. The electronic cigarette of any preceding claim, wherein the cross-sectional shape of the heating element support has 4 sides.

29. The electronic cigarette of any preceding claim, wherein the cross-sectional shape of the heating element support has 5 sides.

30. The electronic cigarette of any preceding claim, wherein the cross-sectional shape of the heating element support has 6 sides.

31. The electronic cigarette of any preceding claim, wherein the cross-sectional shape of the heating element support has 8 sides.

32. The electronic cigarette of any one of claims 1 to 25, wherein the cross-sectional shape of the heating element support is flat rectangle.

33. The electronic cigarette of any one of claims 1 to 25, wherein the cross-sectional shape of the heating element support is an ellipse.

34. The electronic cigarette of any one of claims 1 to 25, wherein the cross-sectional shape of the heating element support is equivalent to three overlapping circles joined together.

35. The electronic cigarette of any one of claims 1 to 25, wherein the cross-sectional shape of the heating element support is a cross.

36. The electronic cigarette of any one of claims 1 to 25, wherein the cross-sectional shape of the heating element support is a cross having 4 arms.

37. The electronic cigarette of any one of claims 1 to 25, wherein the cross-sectional shape of the heating element support is a cross having 8 arms.

38. The electronic cigarette of any one or claims 1 to 25, wherein the heating element support is a flat planar substrate.

39. The electronic cigarette of claim 38, wherein the heating element is on one surface of the heating element support.

40. The electronic cigarette of claim 38, wherein the heating element is threaded in and out of the heating element support.

41. The electronic cigarette of claim 38, wherein the heating element is wrapped around the heating element support

42. The electronic cigarette of any one of claims 38 to 41, wherein the heating element support comprises a substrate having holes.

43. An electronic cigarette, substantially as described herein with reference to the accompanying drawings.

Application No:	GB1212599.3	**Examiner:**	Dr Steven Chadwell
Claims searched:	1-43	**Date of search:**	13 November 2012

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1-19, 22-24, 38, 39, 41	EP 2340729 A1 (PHILIP MORRIS) see whole document
X	1, 5, 6, 10, 12-18	US 2010/006113 A1 (URTSEV et al) see whole document, especially figures 3-6

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^{X} :

Worldwide search of patent documents classified in the following areas of the IPC

A24F; A61M

The following online and other databases have been used in the preparation of this search report

EPODOC, WPI

International Classification:

Subclass	Subgroup	Valid From
A24F	0047/00	01/01/2006

NJOY Exhibit 1002.1771

Comparative Design 12:

[11] Grant Announcement No: JPD1144098 [45] Date of Grant Announcement: June 17, 2002

[22] Filing date: September 5, 2001 [21] Filing No.: JPD2001-26085 Classification No.: 22-99; 27-99

[72] Designer(s): Charles T. Higgins [30] Priority: Document No.: JPD1144098

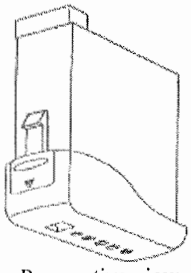
[73] Patentee: Phillip Morris Products Inc. Address: 3601 Commerce Road Richmond, Virginia (US) 23234

[74] Patent agency: Agent: Mitsuo Adachi

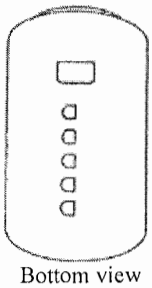
[57] Brief description:

[54] Title of Product using the Design: Battery for Smoking Set

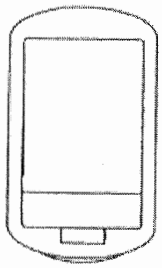
Note: 1. Part of the Bibliographic Data is not shown owing to limitations of space.
2. The views are not shown to scale for the sake of illustrative clarity.



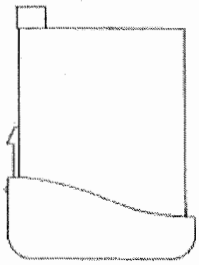
Perspective view



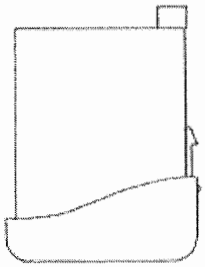
Bottom view



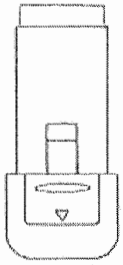
Plan view



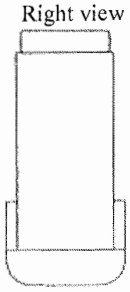
Right view



Left view



Front view



Back view

NJOY Exhibit 1002.1772

Comparative Design 8:

[11] Grant Announcement No: KR30-0825216 [45] Date of Grant Announcement: November 16, 2015

[22] Filing date: March 27, 2015 [21] Filing No.: KR30-2015-0015688 Classification No.: 27-99

[72] Designer(s): SHIN, Jong-Soo [30] Priority: Document No.: KR30-0825216

[73] Patentee: SHIN, Jong-Soo Address: (Futaidong…) Jinhuxiangpei Apartment Building 209-202, Street 21, Daxin Road 74, Hongde District, Qingzhou, Zhongqingbeidao

[74] Patent agency: Agent: Kim Hyun Soo

[57] Brief description:

1. The material is a metal and synthetic resin material.
2. This design is designed to be a case which wraps the outer side of the electronic cigarette.
3. Draw 1.1 is a schematic diagram of the overall form of the design.
4. Draw 1.2 represents a front view of the design.
5. Draw 1.3 represents a back view of the design.
6. Draw …

[54] Title of Product using the Design: Electronic Cigarette Case

Note: 1. Part of the Bibliographic Data is not shown owing to limitations of space.

2. The views are not shown to scale for the sake of illustrative clarity.

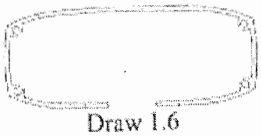
Draw 1.1

Draw 1.2

Draw 1.3

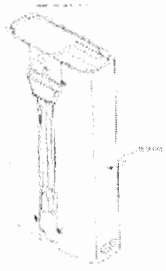
Draw 1.4

Draw 1.5



Draw 1.6

Draw 1.7



Reference Fig. 1.1

Reference Fig. 1.2

NJOY Exhibit 1002.1773

Espacenet

Bibliographic data: KR101011453 (B1) — 2011-01-28

ELECTRONIC CIGARETTE

Inventor(s): SJN JONG SU [KR] ± (SJN, JONG SU)

Applicant(s): SJN JONG SU [KR] ± (SJN, JONG SU)

Classification: - international: ***A24D1/14; A24F47/00; A61M15/06***
- cooperative: **A24F47/008**; **A61M15/06**; A24B15/16; A24D1/14; A61M15/06 more

Application number: KR20100093061 20100927 Global Dossier

Priority number(s): KR20100093061 20100927

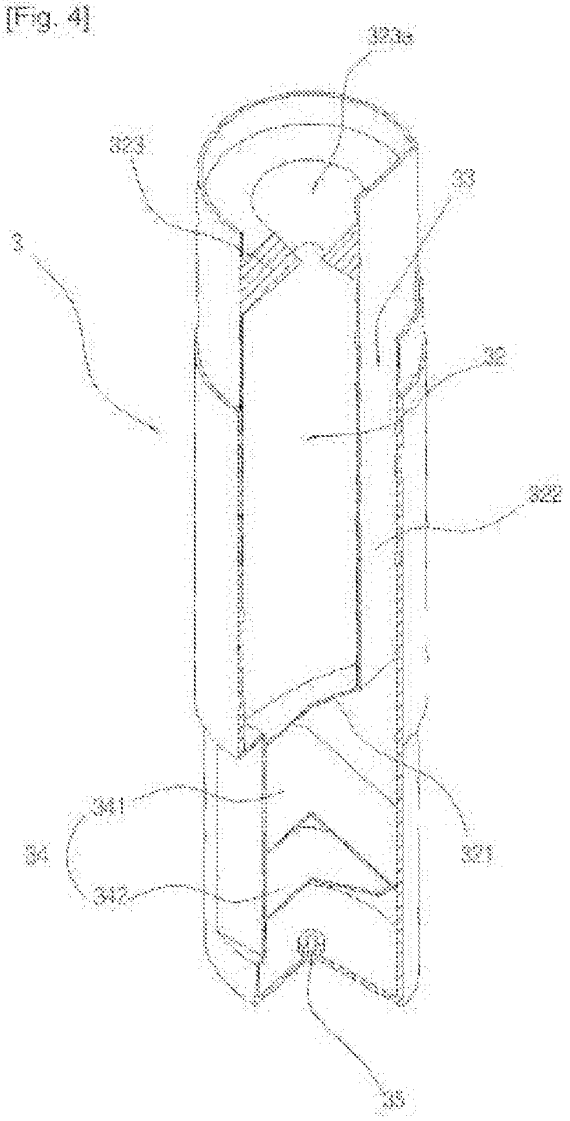
Also published as: WO2012043941 (A1)

Abstract of KR101011453 (B1)

PURPOSE: An electronic cigarette is provided, which prevents an electronic cigarette user from feeling unpleasant by separating liquid component from smoke.
CONSTITUTION: An electronic cigarette comprises a cartridge which stores solution and discharges smoke to the outside. The cartridge includes: a solution storage unit(32) which is formed in the inner surface and stores solution; a flow path(33) in which smoke flows; a liquid separation unit(34) eliminating liquid component contained in the smoke flown through the flow path; and an exhaust groove(35) which discharges the smoke in which the liquid component is removed from the liquid separation unit to the outside.

NJOY Exhibit 1002.1774

[Fig. 4]



NJOY Exhibit 1002.1775

(19) 대한민국특허청(KR)
(12) 등록특허공보(B1)

(45) 공고일자 2011년01월28일
(11) 등록번호 10-1011453
(24) 등록일자 2011년01월21일

(51) Int. Cl.
A24F 47/00 (2006.01) *A24D 1/14* (2006.01)
A61M 15/06 (2006.01)
(21) 출원번호 10-2010-0093061
(22) 출원일자 2010년09월27일
심사청구일자 2010년09월27일
(56) 선행기술조사문헌
KR1020070022640 A*
*는 심사관에 의하여 인용된 문헌

(73) 특허권자
신종수
충북 청주시 흥덕구 봉명동 2752 봉명아이파크아파트 110동 606호
(72) 발명자
신종수
충북 청주시 흥덕구 봉명동 2752 봉명아이파크아파트 110동 606호
(74) 대리인
김현수

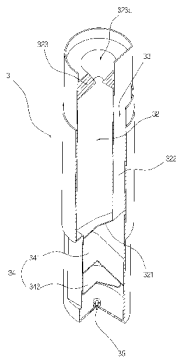
전체 청구항 수 : 총 8 항 심사관 : 조성호

(54) 전자담배

(57) 요 약

본 발명은 전자담배에 대한 것으로, 더욱 상세하게는 용액을 저장하며 연기를 외부로 배출하는 카트리지를 포함하는 전자담배에 있어서, 상기 카트리지는 내면 일측에 형성되어 용액을 저장하는 용액저장부와 상기 용액저장부에 저장된 용액이 기화장치를 거치면서 형성된 연기가 유입되는 유입로와 상기 유입로를 통해 유입된 연기에 포함되어 있는 액체성분을 제거하는 액체분리부와 상기 액체분리부에서 액체성분이 제거된 연기를 외부로 배출하는 배기홈을 포함하여, 비산되는 연기와 함께 흡입된 액체성분을 효과적으로 분리하여 배출되는 연기에는 액체성분이 포함되지 않도록 하여 전자담배의 사용자가 불쾌감을 느끼지 않도록 할 수 있는 전자담배를 제공하고자 한다.

대 표 도 - 도4



NJOY Exhibit 1002.1776

특허청구의 범위

청구항 1

용액을 저장하며 연기를 외부로 배출하는 카트리지를 포함하는 전자담배에 있어서,

상기 카트리지는 내면 일측에 형성되어 용액을 저장하는 용액저장부와, 상기 용액저장부에 저장된 용액이 기화장치를 거치면서 형성된 연기가 유입되는 유입로와, 상기 유입로를 통해 유입된 연기에 포함되어 있는 액체성분을 제거하는 액체분리부와, 상기 액체분리부에서 액체성분이 제거된 연기를 외부로 배출하는 배기홈을 포함하며,

상기 액체분리부는 상기 유입로의 하측에 위치하며 상기 카트리지 내면 일측에서 돌출되어 대향되는 방향으로 일정 길이 연장되는 상부판과, 상기 상부판의 하측에 위치하며 상기 상부판이 돌출되는 일측과 대향되는 타측에서 돌출되어 상기 상부판이 돌출되는 일측 방향으로 일정 길이 연장되는 하부판을 포함하며,

상기 액체분리부는 상기 유입로를 통해 유입된 연기와 액체성분과 부딪혀 와류를 생성하고 속도를 감소시켜 액체성분이 상기 액체분리부에 맺히게 되어 포집되는 것을 특징으로 하는 전자담배.

청구항 2

삭제

청구항 3

제1항에 있어서,

상기 상부판과 하부판은 각각 말단으로 갈수록 상측 방향을 향해 경사지는 형태를 가지는 것을 특징으로 하는 전자담배.

청구항 4

제3항에 있어서, 상기 용액저장부는

하면이 상기 카트리지 내면에 접촉하는 일측에서 대향되는 타측으로 갈수록 상측 방향을 향해 경사지는 형태를 가지는 것을 특징으로 하는 전자담배.

청구항 5

제1항에 있어서,

상기 용액저장부는 상면을 덮는 덮개를 추가로 포함하며, 상기 덮개는 상하관통되어 형성되며 상면의 직경이 하면의 직경보다 큰 절두원추형상을 가지는 수용홈을 포함하는 것을 특징으로 하는 전자담배.

청구항 6

제1항에 있어서,

상기 액체분리부는 상기 하부판의 말단에 연결되는 포집체를 추가로 포함하며, 상기 포집체는 그 내부에 하나 이상의 다면부재를 포함하는 것을 특징으로 하는 전자담배.

청구항 7

제6항에 있어서, 상기 다면부재는

망으로 이루어진 입체형상으로 형성됨으로써 연기가 내부로 통과하면서 접촉되는 면적을 최대화할 수 있는 것을 특징으로 하는 전자담배.

청구항 8

제1항에 있어서,

NJOY Exhibit 1002.1777

상기 상부판과 하부판은 각각 파형 형상으로 형성됨으로써 연기와의 접촉면적을 넓힐 수 있는 것을 특징으로 하는 전자담배.

청구항 9

제1항에 있어서, 상기 상부판은

상기 상부판의 말단에 위치하며 다소의 공극을 포함하는 다공부재를 포함하는 것을 특징으로 하는 전자담배.

명 세 서

기 술 분 야

[0001] 본 발명은 전자담배에 대한 것으로, 더욱 상세하게는 용액을 저장하며 연기를 외부로 배출하는 카트리지를 포함하는 전자담배에 있어서, 상기 카트리지는 내면 일측에 형성되어 용액을 저장하는 용액저장부와 상기 용액저장부에 저장된 용액이 기화장치를 거치면서 형성된 연기가 유입되는 유입로와 상기 유입로를 통해 유입된 연기에 포함되어 있는 액체성분을 제거하는 액체분리부와 상기 액체분리부에서 액체성분이 제거된 연기를 외부로 배출하는 배기홈을 포함하여, 비산되는 연기와 함께 흡입된 액체성분을 효과적으로 분리하여 배출되는 연기에는 액체성분이 포함되지 않도록 하여 전자담배의 사용자가 불쾌감을 느끼지 않도록 할 수 있는 전자담배를 제공하고자 한다.

배 경 기 술

[0002] 전자담배란 궐련, 엽궐련, 파이프 담배 등의 흡연식 담배의 대안으로 개발된 제품으로, 일반 흡연식 담배와 유사한 형태를 가지고 상기 전자담배의 흡입시 내부에 저장된 용액이 가열되거나 초음파 진동 등의 방식을 통해 기화되어 연기 형태로 외부로 배출되게 된다. 상기 전자담배는 흡연식 담배를 피우는 것과 유사한 효과를 내기 위해 상기 전자담배의 흡입시 담배가 타는 듯한 모습을 형상화한 불빛이 발생하기도 한다.

[0003] 상기 흡연식 담배의 연기에는 타르, 니트로아민, 탄화수소, 일산화탄소 등의 인체에 유해한 성분들이 많이 포함되어 있어, 흡연자의 건강을 해칠 뿐만 아니라 주변 사람들에도 간접흡연으로 인해 피해를 주게 된다. 또한, 상기 흡연식 담배의 연기는 특유의 냄새가 나서 흡연자나 주변 사람들에게 불쾌감을 주기도 한다. 따라서, 전 세계적으로 행정규제상 흡연을 할 수 있는 장소가 제한되고, 금연을 촉진시키기 위한 각종 정책이 시행되고 있다.

[0004] 하지만, 흡연자들은 담배에 포함된 니코틴에 중독되어 쉽게 담배를 끊을 수 없는 것이 현실이다. 또한, 종래의 금연 또는 담배 대용품들은 흡연자의 욕구를 충족시키지 못하고 있는 실정이다. 이에 따라 개발된 것이 전자담배인데, 상기 전자담배는 니코틴 등을 포함한 용액을 기화시켜 연기를 생성하므로 흡연욕구를 충족시킬 수 있을 뿐만 아니라, 일반 흡연식 담배와 달리 타르 등의 유해물질을 배출하지 않고 불쾌한 냄새가 나지 않는 장점이 있다.

[0005] 그러나, 상기 전자담배는 많은 장점에도 불구하고, 전자담배의 흡입시 충분히 기화되지 않은 액체상태의 용액이 함께 배출되어, 흡연자의 입 안에 유입되어 흡연자에게 불쾌감을 주는 문제점이 있다.

[0006] 따라서, 전자담배의 장점을 살리면서도 배출되는 연기에 액체상태의 용액이 함께 배출되지 않도록 하는 전자담배의 필요성이 증대되고 있다.

발명의 내용

해결하려는 과제

[0007] 본 발명은 상기와 같은 문제점을 해결하기 위해 안출된 것으로,

[0008] 본 발명은 전자담배에서 배출되는 연기에 액체성분이 포함되지 않도록 하여 전자담배의 사용자가 불쾌함을 느끼지 않도록 할 수 있는 전자담배를 제공하는데 그 목적이 있다.

[0009] 또한, 본 발명은 카트리지 내로 유입된 연기가 액체분리부를 거친 후에 외부로 배출되도록 하여 상기 연기에서 효과적으로 액체성분을 제거할 수 있는 전자담배를 제공하는데 그 목적이 있다.

[0010] 또한, 본 발명은 용액저장부의 하면이 경사지도록 형성되어 상기 액체분리부에서 분리된 액체성분을 효과적으로 기화장치로 배출할 수 있는 전자담배를 제공하는데 그 목적이 있다.

NJOY Exhibit 1002.1778

[0011] 또한, 본 발명은 용액저장부를 덮는 덮개는 절두원추형상을 가지는 수용홈을 포함하여, 용액저장부에 저장된 용액이 쉽게 외부로 흘러내리는 것을 방지할 수 있는 전자담배를 제공하는데 그 목적이 있다.

[0012] 또한, 본 발명은 유입되는 연기와의 접촉면적을 최대화하여 비산되는 연기에 포함되어 작은 크기의 액체성분까지도 효과적으로 분리할 수 있는 전자담배를 제공하는데 그 목적이 있다.

과제의 해결 수단

[0013] 본 발명은 앞서 본 목적을 달성하기 위해서 다음과 같은 구성을 가진 실시예에 의해서 구현된다.

[0014] 본 발명의 일 실시예에 따르면, 본 발명에 따른 전자담배는 용액을 저장하며 연기를 외부로 배출하는 카트리지를 포함하는 전자담배에 있어서, 상기 카트리지는 내면 일측에 형성되어 용액을 저장하는 용액저장부와, 상기 용액저장부에 저장된 용액이 기화장치를 거치면서 형성된 연기가 유입되는 유입로와, 상기 유입로를 통해 유입된 연기에 포함되어 있는 액체성분을 제거하는 액체분리부와, 상기 액체분리부에서 액체성분이 제거된 연기를 외부로 배출하는 배기홈을 포함하며, 상기 액체분리부는 상기 유입로를 통해 유입된 연기와 액체성분과 부딪혀 와류를 생성하고 속도를 감소시켜 액체성분이 상기 액체분리부에 맺히게 되어 포집되는 것을 특징으로 한다.

[0015] 본 발명의 다른 실시예에 따르면, 본 발명에 따른 전자담배에 있어서 상기 액체분리부는 상기 유입로의 하측에 위치하며 상기 카트리지 내면 일측에서 돌출되어 대향되는 방향으로 일정 길이 연장되는 상부판과, 상기 상부판의 하측에 위치하며 상기 상부판이 돌출되는 일측과 대향되는 타측에서 돌출되어 상기 상부판이 돌출되는 일측 방향으로 일정 길이 연장되는 하부판을 포함하는 것을 특징으로 한다.

[0016] 본 발명의 또 다른 실시예에 따르면, 본 발명에 따른 전자담배에 있어서 상기 상부판과 하부판은 각각 말단으로 갈수록 상측을 향해 경사지는 형태를 가지는 것을 특징으로 한다.

[0017] 본 발명의 또 다른 실시예에 따르면, 본 발명에 따른 전자담배에 있어서 상기 용액저장부는 하면이 상기 카트리지 내면에 접촉하는 일측에서 대향되는 타측으로 갈수록 상측을 향해 경사지는 형태를 가지는 것을 특징으로 한다.

[0018] 본 발명의 또 다른 실시예에 따르면, 본 발명에 따른 전자담배에 있어서 상기 용액저장부는 상면을 덮는 덮개를 추가로 포함하며, 상기 덮개는 상하관통되어 형성되며 상측의 직경이 하측의 직경보다 큰 절두원추형상을 가지는 수용홈을 포함하는 것을 특징으로 한다.

[0019] 본 발명의 또 다른 실시예에 따르면, 본 발명에 따른 전자담배에 있어서 상기 액체분리부는 상기 하부판의 말단에 연결되는 포집체를 추가로 포함하며, 상기 포집체는 그 내부에 하나 이상의 다면부재를 포함하는 것을 특징으로 한다.

[0020] 본 발명의 또 다른 실시예에 따르면, 본 발명에 따른 전자담배에 있어서 상기 다면부재는 망으로 이루어진 입체형상으로 형성됨으로써 연기가 내부로 통과하면서 접촉되는 면적을 최대화할 수 있는 것을 특징으로 한다.

[0021] 본 발명의 또 다른 실시예에 따르면, 본 발명에 따른 전자담배에 있어서 상기 상부판과 하부판은 각각 파형 형상으로 형성됨으로써 연기와의 접촉면적을 넓힐 수 있는 것을 특징으로 한다.

[0022] 본 발명의 또 다른 실시예에 따르면, 본 발명에 따른 전자담배에 있어서 상기 상부판은 상기 상부판의 말단에 위치하며 다소의 공극을 포함하는 다공부재를 포함하는 것을 특징으로 한다.

발명의 효과

[0023] 본 발명은 앞서 본 실시예와 하기에 설명할 구성과 결합, 사용관계에 의해 다음과 같은 효과를 얻을 수 있다.

[0024] 본 발명은 전자담배에서 배출되는 연기에 액체성분이 포함되지 않도록 하여 전자담배의 사용자가 불쾌함을 느끼지 않도록 할 수 있는 특징이 있다.

[0025] 또한, 본 발명은 카트리지 내로 유입된 연기가 액체분리부를 거친 후에 외부로 배출되도록 하여 상기 연기에서 효과적으로 액체성분을 제거할 수 있는 효과가 있다.

[0026] 또한, 본 발명은 용액저장부의 하면이 경사지도록 형성되어 상기 액체분리부에서 분리된 액체성분을 효과적으로 기화장치로 배출할 수 있는 효과가 있다.

[0027] 또한, 본 발명은 용액저장부를 덮는 덮개는 절두원추형상을 가지는 수용홈을 포함하여, 용액저장부에 저장된 용

NJOY Exhibit 1002.1779

액이 쉽게 외부로 흘러내리는 것을 방지할 수 있는 효과가 있다.

[0028] 또한, 본 발명은 유입되는 연기와의 접촉면적을 최대화하여 비산되는 연기에 포함되어 작은 크기의 액체성분까지도 효과적으로 분리할 수 있는 전자담배를 제공하는데 그 목적이 있다.

도면의 간단한 설명

[0029] 도 1은 본 발명의 일 실시예에 따른 전자담배의 사시도.

도 2는 본 발명의 일 실시예에 따른 전자담배의 분해사시도.

도 3은 본 발명의 일 실시예에 따른 전자담배를 개략적으로 표현한 단면도.

도 4는 본 발명의 일 실시예에 따른 전자담배에 사용되는 카트리지의 부분절단 사시도.

도 5는 본 발명의 일 실시예에 따른 전자담배의 요부를 표현한 단면도.

도 6은 본 발명의 다른 실시예에 따른 전자담배에 사용되는 카트리지의 부분절단 사시도.

도 7은 본 발명의 다른 실시예에 따른 전자담배에 사용되는 다면부재의 사시도.

도 8은 본 발명의 다른 실시예에 따른 전자담배의 요부를 표현한 단면도.

발명을 실시하기 위한 구체적인 내용

[0030] 이하에서는 본 발명에 따른 전자담배를 첨부된 도면을 참조하여 상세히 설명한다. 도면들 중 동일한 구성요소들은 가능한 한 어느 곳에서든지 동일한 부호들로 나타내고 있음에 유의해야 한다. 또한 본 발명의 요지를 불필요하게 흐릴 수 있는 공지 기능 및 구성에 대한 상세한 설명은 생략한다. 특별한 정의가 없는 한 본 명세서의 모든 용어는 본 발명이 속하는 기술분야의 통상의 지식을 가진 기술자가 이해하는 당해 용어의 일반적 의미와 동일하고 단약 본 명세서에 사용된 용어의 의미와 충돌하는 경우에는 본 명세서에 사용된 정의에 따른다.

[0031] 도 1은 본 발명의 일 실시예에 따른 전자담배의 사시도이고, 도 2는 본 발명의 일 실시예에 따른 전자담배의 분해사시도이고, 도 3은 본 발명의 일 실시예에 따른 전자담배를 개략적으로 표현한 단면도이고, 도 4는 본 발명의 일 실시예에 따른 전자담배에 사용되는 카트리지의 부분절단 사시도이고, 도 5는 본 발명의 일 실시예에 따른 전자담배의 요부를 표현한 단면도이고, 도 6은 본 발명의 다른 실시예에 따른 전자담배에 사용되는 카트리지의 부분절단 사시도이고, 도 7은 본 발명의 다른 실시예에 따른 전자담배에 사용되는 다면부재의 사시도이고, 도 8은 본 발명의 다른 실시예에 따른 전자담배의 요부를 표현한 단면도이다.

[0032] 도 1 내지 5를 참조하면, 본 발명의 일 실시예에 따른 전자담배는 상기 전자담배에 전원을 공급하며 빛을 발생시키는 전원장치(1)와, 상기 전원장치(1) 하단에 결합하여 카트리지(3)에 저장된 용액을 공급받아 기화시켜 연기를 생성하는 기화장치(2)와, 상기 기화장치(2) 하단에 결합하여 용액을 저장하며 상기 기화장치(2)에서 생성된 연기를 외부로 배출하는 카트리지(3) 등의 구성을 포함한다.

[0033] 먼저 본 발명의 일 실시예에 따른 전자담배의 전체적인 구성 간의 결합관계를 살펴보면, 상기 전원장치(1)의 외측면 하단에는 나사선(11)이 형성되고, 상기 기화장치(2)의 내측면 상단에는 전원장치(1)의 나사선(11)에 대응되는 나사선(21)이 형성되어, 상기 전원장치(1)와 기화장치(2)는 나사결합한다. 상기 전원장치(1)와 기화장치(2)에 형성된 나사선(11, 21)은 도체로 이루어져 상기 전원장치(1)와 기화장치(2)를 전기적으로도 연결시킨다. 상기 카트리지(3)의 외측면 상단이 상기 기화장치(2)의 내측면 하단에 삽입되어, 상기 기화장치(2)와 카트리지(3)는 결합하며, 상기 기화장치(2)의 용액수집부(221)는 끝단은 상기 카트리지(3)의 수용홈(323a)에 위치하여 섬유부재(36)와 접촉하게 된다.

[0034] 상기 전원장치(1)는 상기 전자담배에 전원을 공급하며 빛을 발생시키는 구성으로, 일정형상을 가지며 바람직하게는 내부가 관통된 원통형의 형상을 가진다. 상기 전원장치(1)는 투광창(12), 발광소자(13), 전지(14), 회로부

NJOY Exhibit 1002.1780

(15), 스위치(16), 공기유입공(17) 등의 구성을 포함한다.

[0035] 상기 투광창(12)은 상기 전원장치(1)의 상단에 부착되어 상기 발광소재에서 발산되는 빛을 외부로 배출하는 창으로, 예컨대, 폴리카보네이트 수지로 이루어진 판이 사용될 수 있다. 상기 발광소자(13)는 상기 전원장치(1)의 내부에 위치하여 후술할 전지(14)로부터 전원을 공급받아 빛을 생성하는 구성으로, 예컨대, 엘이디 소자가 사용될 수 있다. 상기 전자담배 사용시 발광소재에서 생성된 담배가 타는 듯한 모습을 형상화한 빛이 상기 투광창(12)을 통해 외부로 발산되므로, 상기 전자담배의 사용자는 실제 담배를 흡연할 때와 같은 느낌을 가지게 된다. 상기 전지(14)는 상기 전원장치(1)의 내부에 위치하여 상기 전자담배에 전원을 공급하는 구성으로, 상기 발광소자(13) 및 기화장치(2)의 기화부(22)에 전원을 공급한다. 상기 전지(14)는 충전이 가능한 리튬폴리머 전지 등이 사용될 수 있다. 상기 회로부(15)는 전원장치(1)의 내부에 위치하여 상기 전자담배의 전기적인 작동을 제어하는 부분으로, 상기 발광소자(13) 및 기화부(22)를 작동시킨다. 상기 스위치(16)는 상기 전원장치(1)의 내부에 위치하여 공기의 유동에 따라 온/오프되며, 예컨대, 유압스위치가 사용될 수 있다. 상기 전원장치(1) 내로 공기가 유입되면 상기 스위치(16)는 온되어 전원이 회로부(15)에 전달되고, 상기 회로부(15)는 상기 발광소자(13)와 기화부(22)를 구동시킨다. 상기 공기유입공(17)은 일측면에 형성된 통공으로, 상기 전자담배의 사용자가 흡입시 외부공기가 상기 공기유입공(17)을 통해 내부로 유입되게 된다.

[0036] 상기 기화장치(2)는 상기 전원장치(1)의 작동지시에 의해 상기 카트리지(3)에 저장된 용액을 공급받아 기화시켜 연기를 생성하는 구성으로, 일정형상을 가지며 바람직하게는 내부가 관통된 원통형상을 가지며, 기화부(22) 등의 구성을 포함한다.

[0037] 상기 기화부(22)는 상기 기화장치(2) 내에 위치하여 상기 카트리지(3)에 저장된 용액을 공급받아 연기를 생성하는 구성으로, 용액수집부(221)와 가열코일(222) 등의 구성을 포함한다. 상기 용액수집부(221)는 끝단이 상기 카트리지(3) 수용홈(323a)에 위치하여 수용홈(323a)에 놓여 진 섬유부재(36)와 접촉하여 용액을 흡입하는 구성으로, 예컨대, 폴리에스터 포말, 스테인레스 섬유 포말 등으로 제조될 수 있다. 상기 가열코일(222)은 상기 용액수집부(221)에 일측에 연결되어 상기 용액수집부(221)를 통에 스며든 용액을 가열하여 기상상태로 변환하여 연기를 발생시킨다.

[0038] 상기 카트리지(3)를 설명함에 있어, 본 발명에서는 배기홈(35)이 위치하는 방향을 상기 카트리지(3)의 하측 방향으로 표현하고, 덮개(323)가 위치하는 방향을 상기 카트리지(3)의 상측 방향으로 표현하기로 한다.

[0039] 상기 카트리지(3)는 용액을 저장하며 상기 기화장치(2)에서 생성된 연기를 외부로 배출하는 구성으로, 일정형상을 가지며 바람직하게는 하면이 막혀진 원통형의 형상을 가진다. 상기 카트리지(3)는 하단에는 상하로 압착된 형태를 가지는 압착부(31)가 형성되어, 흡연자가 상기 전자담배를 입에 물기 쉽게 하도록 할 수 있다. 상기 카트리지(3)는 내면 일측에 형성되어 용액을 저장하는 용액저장부(32)와, 상기 용액저장부(32)에 저장된 용액이 기화장치(2)를 거치면서 형성된 연기가 유입되는 유입로(33)와, 상기 유입로(33)를 통해 유입된 연기에 포함되어 있는 액체성분을 제거하는 액체분리부(34)와, 상기 액체분리부(34)에서 액체성분이 제거된 연기를 외부로 배출하는 배기홈(35) 등의 구성을 포함한다.

[0040] 상기 용액저장부(32)는 상기 카트리지(3) 내면 일측에 형성되어 전자담배에 사용되는 용액을 저장하는 구성으로, 일정한 입체적 형상을 가지며 바람직하게는 상기 카트리지(3)의 내면 일측에서 돌출되어 하면(321)을 형성하고 상기 하면(321)의 끝단에서 상측 방향으로 절곡되어 측면(322)을 형성하는 입체적 형상을 가질 수 있다. 상기 하면(321)은 끝단으로 갈수록 상측 방향으로 경사지는 형태를 가지도록 형성되어, 후술할 수용공간(S)에 분리되어 있는 액체성분을 기화장치(2)로 손쉽게 배출할 수 있도록 한다. 상기 수용공간(S)에 액체성분이 분리되는 원리 및 분리된 액체성분은 기화장치(2) 및 용액저장부(32)로 배출되는 원리는 하기에서 자세히 설명하기로 한다.

[0041] 상기 용액저장부(32)는 상면을 덮는 덮개(323)를 포함하며, 상기 덮개(323)는 후술할 섬유부재(36)가 놓여지는 수용홈(323a)이 형성된다. 상기 수용홈(323a)은 상기 덮개(323)를 상하관통하여 형성되며, 절두원추 형상을 가지며 상면이 하면보다 직경이 넓은 형상이다. 유체 역학 기본 방정식 중에 연속 방정식에 의하면 단면적과 속도의 곱은 일정하므로 상면보다 직경이 작은 하면의 속도는 상면보다 크게 된다. 또한, 베르누이 방정식에 의해 상면이 하면보다 속도가 느리므로 압력은 상면이 하면보다 크며, 유체는 고압에서 저압으로 흐르는 성질을 가지

NJOY Exhibit 1002.1781

고 있기 때문에 상기 수용홈(323a)에 위치하는 솜 등으로 이루어진 섬유부재(36)에 적셔진 용액은 압력차에 의해 수용홈(323a) 외부로 쉽게 배출되지 않는다. 상기 용액저장부(32)에 저장되는 용액은 니코틴 액 등을 포함하여 다양한 맛과 향이 나는 기호성 용액이 사용될 수 있다.

[0042] 상기 유입로(33)는 상기 용액저장부(32)에 저장된 용액이 기화장치(2)를 거치면서 형성된 연기가 유입되는 통로로, 상기 용액저장부(32)가 카트리지(3) 내면 일측에 형성됨에 따라 상기 용액저장부(32)의 측면(332)과 상기 카트리지(3) 내면에 사이에 형성된다.

[0043] 상기 액체분리부(34)는 상기 유입로(33)의 하측에 위치하여 상기 유입로(33)를 통해 유입된 연기에 포함되어 있는 액체성분을 제거하는 구성으로, 상부판(341)과 하부판(342)을 포함한다. 상기 유입로(33)에는 연기뿐만 아니라 상기 용액저장부(32)에 저장된 용액의 일부가 기화되지 않은 상태로 흡입압력에 의해 함께 유입될 수 있고, 상기 용액저장부(32)에 저장된 용액이 상기 기화부(22)로 이동하여 기화되는 과정에서 완전히 기화되지 않은 작은 크기의 액체 상태의 용액이 함께 유입될 수 있다. 본원 발명 전체에 걸쳐 상기 연기에 포함되어 있는 액체상태의 용액들을 액체성분이라 칭하기로 한다.

[0044] 상기 상부판(341)은 상기 유입로(33)의 하측에 위치하며 상기 유입로(33)를 둘러쌓는 카트리지(3) 내면에서 돌출되어 대향되는 방향으로 일정 길이 연장되며, 끝단으로 갈수록 상측 방향으로 기울어지는 형태를 가진 판으로, 상기 상부판(341)에는 상기 유입로(33)로부터 유입되는 연기가 부딪히게 된다. 상기 유입로(33)로부터 유입된 연기는 상기 상부판(341)에 부딪혀 상기 카트리지(3) 내면과 상기 상부판(341) 사이에 형성되는 제1이격틈(h1) 방향으로 향하게 되면서 와류가 발생하고 압력과 속도의 손실이 발생하게 된다.

[0045] 상기 하부판(342)은 상기 상부판(341)의 하측에 위치하며 상기 상부판(341)이 돌출되는 일측과 대향되는 타측에서 돌출되어 상기 상부판(341)이 돌출되는 일측 방향으로 일정 길이 연장되며, 끝단을 갈수록 상측 방향으로 기울어지는 형태를 가진 판으로, 상기 제1이격틈(h1)을 통해 유입된 연기와 부딪히게 된다. 상기 제1이격틈(h1)으로부터 유입된 연기는 상기 하부판(342)에 부딪혀 상기 카트리지(3) 내면과 상기 하부판(342) 사이에 형성되는 제2이격틈(h2)방향으로 향하게 되면서 와류가 발생하고 압력과 속도의 손실이 발생하게 된다. 상기 액체분리부(34)에서 유입되는 연기에 포함되어 있는 액체성분을 제거하는 원리는 하기에서 자세히 설명하기로 한다.

[0046] 상기 배기홈(35)은 상기 카트리지(3) 하면에 천공되어 형성되는 구멍으로, 상기 전자담배의 사용자가 흡입하는 경우 상기 액체분리부(34)를 거쳐 액체성분이 제거된 연기를 외부로 배출하게 된다.

[0047] 상기와 같은 구성을 포함하는 전자담배에 있어서 작동원리를 도 1 내지 5를 참조하여 설명하면, 사용자가 도 1과 같이 결합된 전자담배를 입에 물고 흡입하면 상기 전자담배의 내부의 압력은 급속히 낮아지게 되고 공기유입공(17)을 통해 외부공기가 유입되어 공기 유동을 발생시켜 스위치(16)를 온시키게 된다. 상기 스위치(16)가 연결되므로 상기 발광소자(13)와 가열부는 회로부(15)의 작동지시에 의해 구동하게 된다. 상기 가열부가 구동하므로 용액저장부(32), 섬유부재(36), 용액수집부(221)를 차례로 거친 용액은 가열코일(222)에 의해 가열되어 기체상태로 변환되어 연기가 생성되게 된다.

[0048] 상기 기화장치(2)에 생성된 연기는 흡입압력에 의해 상기 유입로(33)를 통해 유입되어 액체분리부(34)와 배기홈(35)을 차례로 거쳐 외부로 배출되게 된다. 다만, 상기 유입로(33)를 통해 유입되는 연기에는 상기에서 살펴본 바와 같이 액체성분이 포함되어 있는 데, 상기 액체분리부(34)를 거치는 과정에서 액체성분이 제거되어 기체 상태의 연기만이 배기홈(35)을 통해 배출되게 된다. 상기 액체분리부(34)가 연기에 포함되어 있는 액체성분을 제거하는 원리를 살펴보면, 먼저 상기 유입로(33)를 통해 유입된 연기는 상부판(341)에 부딪힌 후 제1이격틈(h1)을 통해 배출되게 되는데, 상기 연기가 상부판(341)에 부딪히게 되면서 와류가 발생하고 압력과 속도가 감소하게 된다. 상기 연기는 와류가 발생하여 상기 상부판(341)과 여러 번 부딪혀 접촉면적이 크게 되고, 압력과 속도가 감소하여 상기 상부판(341)에 접촉하는 시간이 길게 되어, 이때 연기에 포함되어 있는 액체성분의 일부는 상기 상부판(341)에 맺히게 되고 중력에 의해 상부판(341)을 타고 내려 제1이격틈(h1)을 통과하여 상기 카트리지(3) 내면과 상기 하부판(342)의 상면에 의해 형성되는 수용공간(S)에 위치하게 된다. 상기 제1이격틈(h1)을 통해 유입된 연기는 하부판(342)에 부딪힌 후 제2이격틈(h2)을 통해 배출되게 되는데, 상기 연기가 하부판(342)에 부딪히게 되면서 와류가 발생하고 압력과 속도가 감소하게 된다. 상기 연기는 와류가 발생하여 상기 하부판(342)과 여러 번 부딪혀 접촉면적이 크게 되고, 압력과 속도가 감소하여 상기 하부판(342)에 접촉하는 시간이 길게 되어, 이때 연기에 포함되어 있는 작은 크기의 액체성분은 상기 하부판(342)에 맺히게 되고 중력에 의해 하측으로 떨어져 수용공간(S)에 모이게 된다. 상기 액체분리부(34)로 유입된 연기는 상기 상부판(341)과 하부판

NJOY Exhibit 1002.1782

(342)을 차례로 거치면서 이중으로 액체성분이 분리되어, 상기 배기홈(35)을 통해 배출되는 연기에 포함되는 액체성분을 최소화할 수 있다. 따라서, 상기 전자담배의 사용자는 기체상태의 연기만 흡입할 수 있어, 쾌적한 사용감을 느끼게 된다.

[0049] 상기 수용공간(S)에 분리된 액체성분은 상기 전자담배의 사용 후 상기 카트리지(3) 말단 부분을 들면 상기 제1이격틈(h1)을 통과하고 경사진 하면(321)을 따라 상기 유입로(33)를 통해 상기 액체수집부와 섬유부재(36) 방향으로 흘러 내려 분리된 액체성분을 효과적으로 제거하고 재활용할 수 있다.

[0050] 본 발명의 다른 실시예에 따른 전자담배에 사용되는 카트리지(4)를 도 6 내지 8을 참조하여 설명하면, 상기 카트리지(4)는 용액저장부(42), 유입로(43), 액체분리부(44), 배기홈(45) 등의 구성을 포함한다. 이하에서는 도 1 내지 5를 참조하여 설명한 카트리지(3)와 차이가 있는 액체분리분에 대해서 설명하기로 한다.

[0051]

[0052] 상기 액체분리부(44)는 상기 유입로(43)의 하측에 위치하여 상기 유입로(43)를 통해 유입된 연기에 포함되어 있는 액체성분을 제거하는 구성으로, 상부판(441), 하부판(442), 포집체(443) 등을 포함한다.

[0053] 상기 상부판(441)은 상기 유입로(43)의 하측에 위치하며 상기 유입로(43)를 둘러쌓는 카트리지(4) 내면에서 돌출되어 대향되는 방향으로 일정 길이 연장되며, 끝단으로 갈수록 상측 방향으로 기울어지는 형태를 가진 판으로, 상기 상부판(441)에는 상기 유입로(43)로부터 유입되는 연기가 부딪히게 된다. 상기 상부판(441)은 유입되는 연기와의 접촉면적을 최대한 확보하도록 하고, 연기의 흐름을 원활하게 유도하기 위하여 파형 형태를 가지는 것이 바람직하다. 상기 연기는 상기 상부판(441)에 부딪혀 상기 카트리지(4) 내면과 상기 상부판(441) 사이에 형성되는 제1이격틈(h3) 방향으로 향하게 되면서 와류가 발생하고 압력과 속도의 손실이 발생하게 된다. 상기 상부판(441)은 그 말단에 다수의 공극을 포함하는 다공부재(4411)를 포함할 수 있다.

[0054] 상기 다공부재(4411)는 상기 상부판(441)의 말단에 위치하며, 다수의 공극을 포함하는 형태로 이들 공극이 서로 연통되어 망 형태를 가지며 액체성분이 이들 공극 사이로 스며들 수 있게 액체성분의 흡수율을 높인 것으로, 상기 다공부재(4411)를 통과하는 연기에 포함된 액체성분과 상기 상부판(441)에 맺힌 액체성분이 상기 상부판(441)을 타고 흐르게 되면서 상기 다공부재(4411)에 흡수된다. 상기 다공부재(4411)에 흡수된 액체성분은 점점 응집되고 액체 방울이 되어 하중이 증가함에 따라 자유낙하게 한다. 다수의 공극을 가진 재료라면 모두 상기 다공부재(4411)로 사용될 수 있으며, 상기 다공부재(4411)의 바람직한 실시예로는 액체성분을 흡수할 수 있는 스폰지 등과 같은 것이 사용될 수 있다.

[0055] 상기 하부판(442)은 상기 상부판(441)의 하측에 위치하며 상기 상부판(441)이 돌출되는 일측과 대향되는 타측에서 돌출되어 상기 상부판(441)이 돌출되는 일측 방향으로 일정 길이 연장되며, 끝단을 갈수록 상측 방향으로 기울어지는 형태를 가진 판으로, 상기 제1이격틈(h3)을 통해 유입된 연기와 부딪히게 된다. 상기 하부판(442)은 유입되는 연기와의 접촉면적을 최대한 확보하도록 하고, 연기의 흐름을 원활하게 유도하기 위하여 파형 형태를 가지는 것이 바람직하다. 상기 연기는 상기 하부판(442)에 부딪혀 상기 카트리지(4) 내면과 상기 하부판(442) 사이에 형성되는 제2이격틈(h4) 방향으로 향하게 되면서 와류가 발생하고 압력과 속도의 손실이 발생하게 된다.

[0056] 상기 포집체(443)는 상기 하부판(442)의 말단에 위치하여 연기에 포함되어 있는 액체성분을 최종적으로 분리하기 위한 부분으로, 상기 하부판(442)의 말단에서 상기 상부판(441)의 하면까지 연장되어 형성되며, 그 형상은 연기가 통과할 수 있도록 망 형상으로 형성되는 것이 바람직하다. 상기 포집체(443) 내부에는 통과하는 연기와의 접촉되는 면적을 증가시키기 위해 하나 이상의 다면부재(4431)가 포함될 수 있다.

[0057] 상기 다면부재(4431)는 상기 포집체(443) 내를 통과하는 연기와의 접촉면적을 증가시키기 위해 상기 포집체(443) 사이에 포함되는 부재로, 바람직하게는 망으로 이루어진 입체형상으로 형성됨으로써 연기가 내부로 통과하면서 접촉되는 면적을 최대화할 수 있다. 도 7을 참조하면, 상기 다면부재(4431)는 겉면과 내부가 망으로 형성되고 내부가 채워지지 않은 구 형상의 입체로 형성될 수 있는데, 이 경우 상기 다면부재(4431)를 통과하는 연기는 상기 다면부재(4431)의 겉면의 망을 지나 내부를 통과하여 다시 겉면의 망을 지나게 되므로 그만큼 접촉되는 면적이 증가하게 되고 압력과 속도가 감소하게 되어 연기에 포함된 액체성분이 상기 다면부재(4431) 내지는 포집체(443)에 맺히게 되고 이것이 응집되면 자유 낙하하여 수용공간(S)에 모이게 된다.

[0058] 상기와 같은 구성을 포함하는 액체분리부(44)는 상부판(441)과 하부판(442)에 의해서 연기에 포함되어 있는 액체성분을 분리할 수 있을 뿐만 아니라, 다공부재(4411)와 접촉부재를 통해서도 연기에 포함되어 있는 액체성분

NJOY Exhibit 1002.1783

을 분리할 수 있어 연기 포함되어 있는 액체성분의 제거효율을 극대화할 수 있는 특징이 있다.

[0059] 이상에서, 출원인은 본 발명의 바람직한 실시예들을 설명하였지만, 이와 같은 실시예들은 본 발명의 기술적 사상을 구현하는 일 실시예일 뿐이며 본 발명에 속하는 것으로 해석되어야 한다.

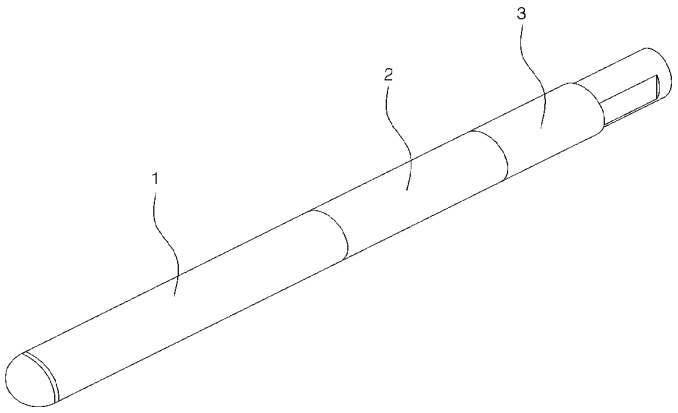
부호의 설명

[0060]

1: 전원장치	11: 나사선	12: 투광창
13: 발광소자	14: 전지	15: 회로부
16: 스위치	17: 공기유입공	
2: 기화장치	21: 나사선	22: 기화부
221: 용액수집부	222: 가열코일	
3,4: 카트리지	31, 41: 압착부	32, 42: 용액저장부
33,43: 유입로	34, 44: 액체분리부	35, 45: 배기홈
36, 46: 섬유부재	321, 421: 하면	322, 422: 측면
323, 423: 덮개	323a, 423a: 수용홀	341,441: 상부판
342,442: 하부판	443: 포집체	4411: 다공부재
4431: 다면부재		

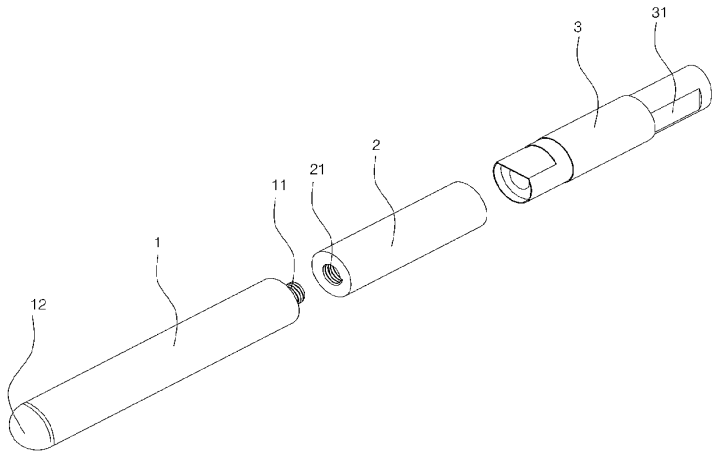
도면

도면1

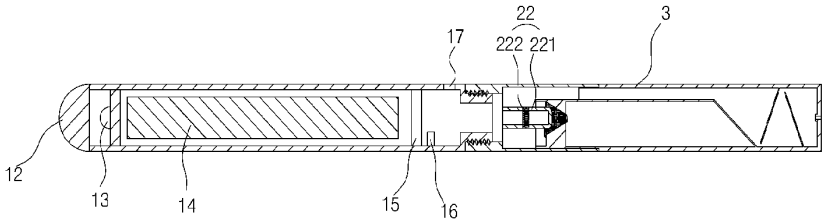


NJOY Exhibit 1002.1784

도면2

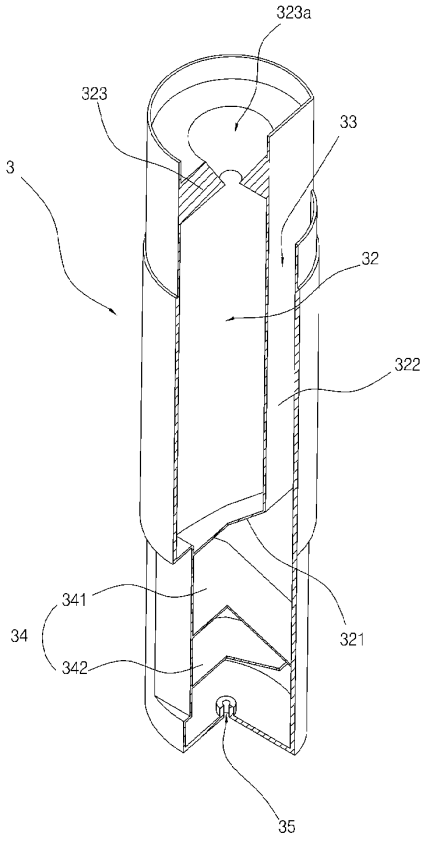


도면3

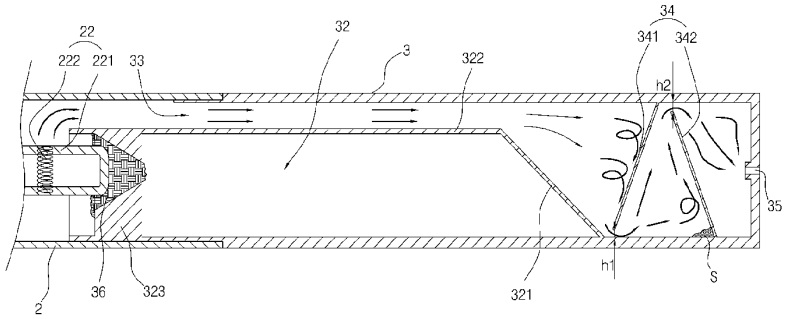


NJOY Exhibit 1002.1785

도면4

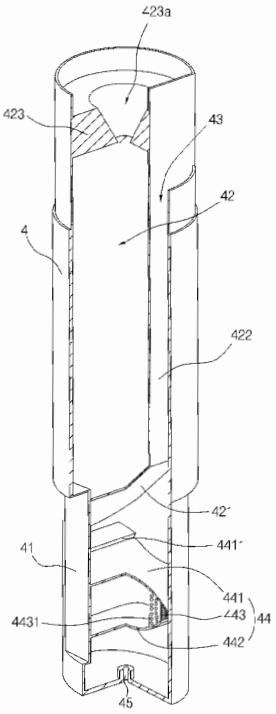


도면5

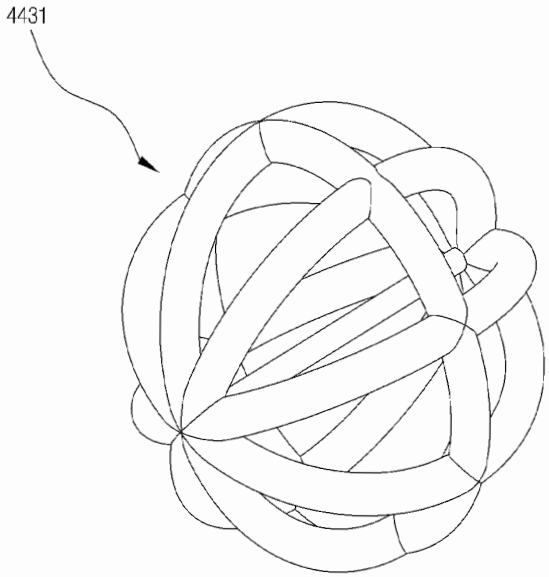


NJOY Exhibit 1002.1786

도면6

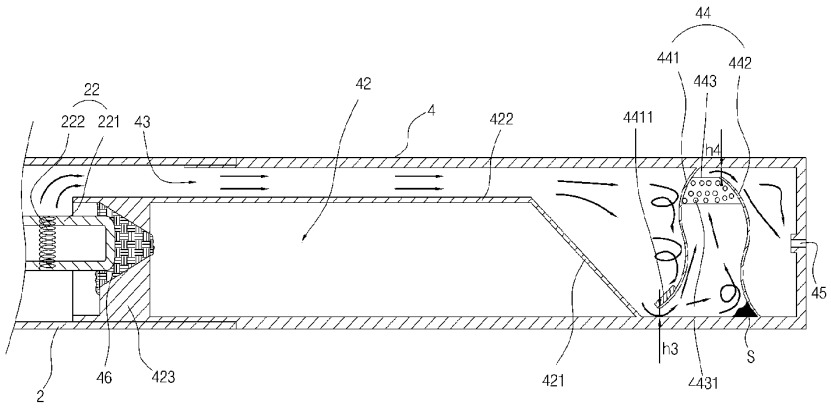


도면7



NJOY Exhibit 1002.1787

도면8



NJOY Exhibit 1002.1788

Patent Translate
Powered by EPO and Google

Notice

This translation is machine-generated. It cannot be guaranteed that it is intelligible, accurate, complete, reliable or fit for specific purposes. Critical decisions, such as commercially relevant or financial decisions, should not be based on machine-translation output.

ABSTRACT KR20120008751

Electronic cigarette is started. The electronic cigarette includes a suction cap for sucking cigarette smoke into the mouth of the user, a cigarette liquid cartridge connected to the suction cap for storing the cigarette liquid, a case surrounding the cigarette solution cartridge, And a battery unit connected to a lower end of the atomizer and supplying electricity to the heating member, wherein a cigarette liquid is supplied to the bottom of the cigarette liquid cartridge, And a liquid guiding member provided inside the liquid discharging pipe, and the tobacco liquid is discharged to the absorbing member through the space between the liquid discharging pipe and the liquid guiding member.

NJOY Exhibit 1002.1789

(19) 대한민국특허청(KR)
(12) 공개실용신안공보(U)

(11) 공개번호 20-2012-0008751
(43) 공개일자 2012년12월24일

(51) 국제특허분류(Int. Cl.)
A24F 47/00 (2006.01) *A24D 1/14* (2006.01)
A61M 15/06 (2006.01)
(21) 출원번호 20-2011-0005214
(22) 출원일자 2011년06월13일
심사청구일자 2011년06월13일

(71) 출원인
이영찬
경기도 고양시 일산구 일산동 25-50
이성언
서울특별시 강서구 강서로47마길 71, 1동 905호 (내발산동, 청솔수아파트)
(72) 고안자
이영찬
경기도 고양시 일산구 일산동 25-50
이성언
서울특별시 강서구 강서로47마길 71, 1동 905호 (내발산동, 청솔수아파트)
(74) 대리인
정창수

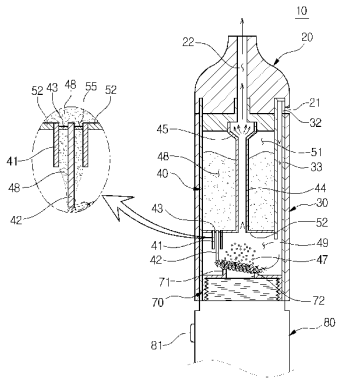
전체 청구항 수 : 총 6 항

(54) 고안의 명칭 **전자담배**

(57) 요 약

전자담배가 개시된다. 개시된 전자담배는 사용자가 입에 대고 담배연기를 흡입하는 흡입캡, 상기 흡입캡과 연결되며 담배액을 저장하는 담배액카트리지, 상기 담배액카트리지를 감싸는 케이스, 상기 담배액 카트리지의 하부에 연결되며 흡수부재 및 상기 흡수부재와 접촉된 발열부재를 구비한 무화기 및, 상기 무화기의 하단에 연결되어 상기 발열부재에 전기를 공급하는 배터리유닛을 포함하며, 상기 담배액카트리지의 저면에는 담배액이 공급되는 액배출파이프와, 상기 액배출파이프의 내부에 설치된 액유도부재를 포함하며, 상기 담배액이 상기 액배출파이프와 상기 액유도부재 사이를 통해 상기 흡수부재로 배출되는 것을 특징으로 한다.

대 표 도 - 도2



NJOY Exhibit 1002.1790