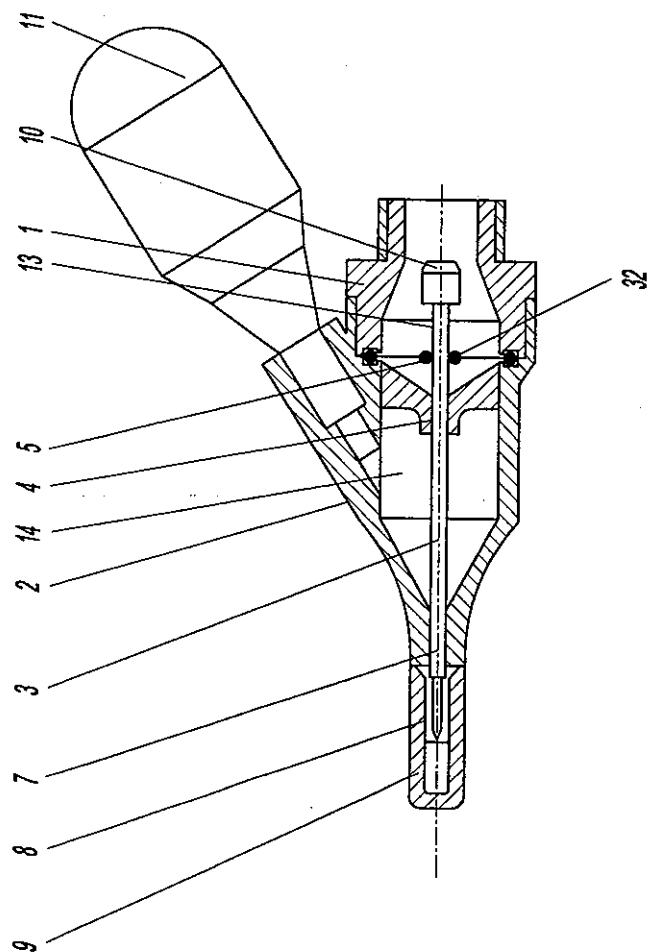
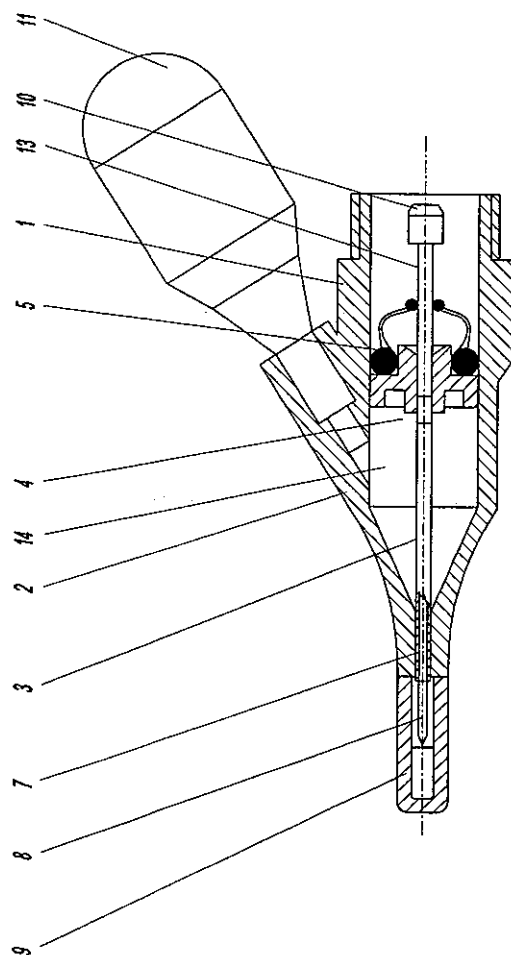


FIG. 2





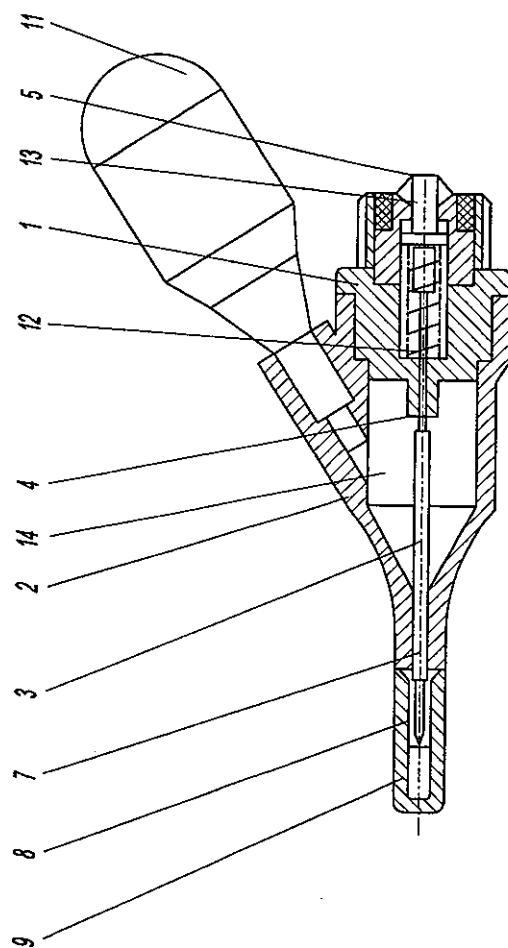


FIG. 5

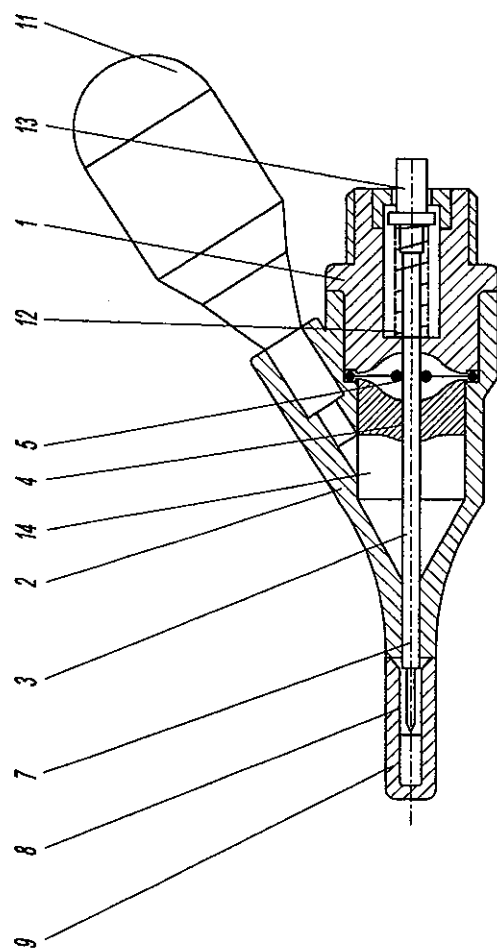


FIG. 6

PART B—ISSUE FEE TRANSMITTAL

Send mail this form, together with applicable fees, to:

Box ISSUE FEE
Assistant Commissioner for Patents
Washington, D.C. 20231

DEC 26 2001

MAILING INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE. Blocks 1 through 4 should be completed where appropriate. All other correspondence including the Issue Fee Receipt, the Patent, advance orders and applications for maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Legibly mark-up with any corrections or use Block 1)

****CORRECTED COPY****

QM12/1108

RANDOLPH A. SMITH
SMITH PATENT OFFICE
1901 PENNSYLVANIA AVE. N.W.
SUITE 200
WASHINGTON DC 20006

Note: The certificate of mailing below can only be used for domestic mailings of the Issue Fee Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing.

Certificate of Mailing

I hereby certify that this Issue Fee Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Box Issue Fee address above on the date indicated below.

(Depositor's name)

(Signature)

(Date)

APPLICATION NO.	FILING DATE	TOTAL CLAIMS	EXAMINER AND GROUP ART UNIT	DATE MAILED
09/671,650	09/28/00	030	SHAKERI, H	3723 11/08/01
First Named Applicant: ADLER, 35 USC 154(b) term ext. = 0 Days.				

TITLE OF INVENTION: INK APPLICATION DEVICE FOR TATTOOING OR FOR MAKING PERMANENT MAKE-UP

ATTY'S DOCKET NO.	CLASS-SUBCLASS	BATCH NO.	APPLN. TYPE	SMALL ENTITY	FEE DUE	DATE DUE
1	0075/002001	081-009.220	M61 UTILITY	YES	\$640.00	02/08/02

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363). Use of PTO form(s) and Customer Number are recommended, but not required.

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47) attached.

2. For printing on the patent front page, list (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1. Smith Patent Office

2. _____

3. _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)
PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. Inclusion of assignee data is only appropriate when an assignment has been previously submitted to the PTO or is being submitted under separate cover. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

Medium - TECH Medizingerate GmbH

(B) RESIDENCE (CITY & STATE OR COUNTRY)

Berlin, Germany

Please check the appropriate assignee category indicated below (will not be printed on the patent)

- ☐ Individual ☒ corporation or other private group entity ☐ government

4a. The following fees are enclosed (make check payable to Commissioner of Patents and Trademarks):

- ☒ Issue Fee
☐ Advance Order - # of Copies _____

4b. The following fees or deficiency in these fees should be charged to:

- DEPOSIT ACCOUNT NUMBER 19-2586
(ENCLOSE AN EXTRA COPY OF THIS FORM)
☒ Issue Fee
☐ Advance Order - # of Copies _____

The COMMISSIONER OF PATENTS AND TRADEMARKS IS requested to apply the Issue Fee to the application identified above.

(Authorized Signature)

Randolph A. Smith

Reg. No. 32

(Date) 12/26/01

NOTE: The Issue Fee will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the Patent and Trademark Office.

Burden Hour Statement: This form is estimated to take 0.2 hours to complete. Time will vary depending on the needs of the individual case. Any comments on the amount of time required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, D.C. 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND FEES AND THIS FORM TO: Box Issue Fee, Assistant Commissioner for Patents, Washington D.C. 20231

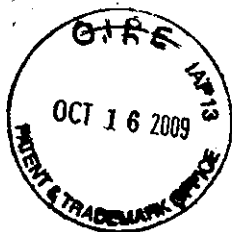
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

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01 FC1242 640.00 CH

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Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE



Certificate
OCT 20 2009
of Correction

ATTORNEY DOCKET NO. 0075/002001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

U.S. Patent No.: 6,345,533

Date of Patent: February 12, 2002

Applicants: Frank ADLER et al.

Art Unit: 3723

Serial No.: 09/671,650

Examiner: Shakeri, H.

Filed : September 28, 2000

Title : INK APPLICATION DEVICE FOR TATTOOING OR FOR
MAKING PERMANENT MAKE-UP

ATTENTION: CERTIFICATE OF CORRECTIONS BRANCH

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

REQUEST FOR EXPEDITED ISSUANCE OF CERTIFICATE OF CORRECTION

Sir:

In reviewing the above-identified patent, two printing errors were discovered therein requiring expedited correction in order to conform to the Official Record in the application.

The errors noted are set forth on the attached copy of Form PTO/SB/44 (09-07) in the manner required by the Commissioner's Notice.

These errors were caused through the fault of the U.S. Patent and Trademark Office as shown and discussed below and clearly disclosed in the records of the Office.

Attached to this request are the specific pages which relate to these errors. These pages attached are:

1) Examiner's Amendment (page 2) attached to the Notice of Allowability dated September 26, 2001.

2) Pages 23, 27 and 28 from the Amendment under 37 CFR 1.111 and Submission of Proposed Drawing Changes filed September 4, 2001.

Upon reviewing the patent it was noted that an omission was made in the twelfth line of claim 1, column 5. Specifically, the phrase "the needle the diaphragm" should read -- the needle, the diaphragm --.

Also, it was noted that an omission was made in the ninth line of claim 27, column 8. Specifically, the phrase "the needle the diaphragm in the housing so that the needle, the bearing element" should read -- the needle in the housing so that the needle, the diaphragm, the bearing element --.

These errors occurred when the Examiner's Amendment was entered by the USPTO prior to granting the patent. Specifically, the Examiner's Amendment includes 5 changes. As seen on the enclosed copy of the Examiner's Amendment, applicants have indicated by an arrow that the second and fifth changes were not correctly entered.

For the change to claim 1, line 11, "the diaphragm," was supposed to be inserted after "the needle,". However, in the change made, one comma "," was left out. Therefore, applicants respectfully request that the phrase "the needle the diaphragm" be changed to read -- the needle, the diaphragm --.

For the change to claim 31, line 8 (which is now been renumbered to claim 27), the phrase "the diaphragm," should have been inserted after "the needle," in line 8. However, instead in the change made, the "the diaphragm" (without a comma) was inserted after "the needle" (without a comma) instead of "the diaphragm," (with a comma) after "the needle," (with a comma). Therefore, applicants respectfully request that the phrase "the needle the diaphragm in the housing so that the needle, the bearing element" should read -- the needle in the housing so that the needle, the diaphragm, the bearing element --.

It is submitted that no fee is necessary for this request, as this error was incurred by the U.S. Patent and Trademark Office (USPTO). If the USPTO determines that it is necessary to charge the Certificate of Correction fee, the USPTO staff person in charge of this issue should contact the undersigned to discuss

REQUEST FOR EXPEDITED ISSUANCE OF CERTIFICATE OF CORRECTION
U.S. Patent No.: 6,345,553
Page 4


obtaining authorization to charge this fee to our Deposit
Account.

Accordingly, applicants respectfully request the USPTO to
expedite issuance of the Certificate of Correction for this
patent.

If there are any questions regarding this application,
please telephone the undersigned at the telephone number listed
below.

Respectfully submitted,

Date: October 15, 2009



Randolph A. Smith
Reg. No. 32,548

SMITH PATENT OFFICE
1901 Pennsylvania Ave., N.W.
Suite 901
Washington, DC 20006
Telephone: 202/530-5900
Facsimile: 202/530-5902
Adler101509

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Smith on Tuesday September 25, 2001.

The application has been amended as follows:

In amended claim 1, line 9, after "needle drive" insert --through a resilient diaphragm--.

In amended claim 1, line 11, after "the needle," insert --the diaphragm,--.

In amended claim 30, line 2, change "a" to --the--.

In amended claim 31, line 7, after "needle drive" insert --through a resilient diaphragm--.


In amended claim 31, line 8, after "the needle," insert --the diaphragm,--.

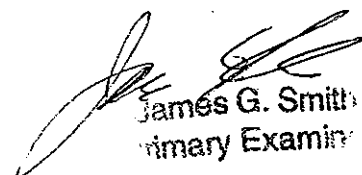
2. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Hadi Shakeri at (703) 308-6279. The examiner can normally be reached on Monday-Thursday, 7:30 AM to 6:00 PM.

Unofficial documents may be faxed to the Examiner at (703) 746-3279.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist at (703) 308-1148.

HS


September 19, 2001


James G. Smith
Primary Examiner

Amendment under 37 CFR 1.111 and
Submission of Proposed Drawing Changes
Serial No.: 09/671,650
September 4, 2001

-- 1. (Amended) An ink application device for tattooing or for making permanent make-up, comprising:

a basic module having a handle and an integrated needle drive; and

a sterilized disposable module having a housing that includes a needle disposed therein, a needle nozzle disposed on one end of the sterilized disposable module, [and] another end of the sterilized disposable module having a portion that is connectable to the integrated needle drive, and a bearing element disposed inside the housing and supporting the needle in the housing so that the needle, the bearing element and the housing form a unit that is detachable from the basic module, whereby all components of the device that could be infected by the bodily fluids of a user are integrated into the sterilized disposable module. --

-- 5. (Amended) An ink application device for tattooing or for making permanent make-up as claimed in claim 1, further comprising a separate ink module attachable to an opening in the disposable module for filling [the] an ink tank, the separate ink

Amendment under 37 CFR 1.111 and
Submission of Proposed Drawing Changes
Serial No.: 09/671,650
September 4, 2001

-- 28. (Amended) An ink application device for tattooing or for making permanent make-up as claimed in claim [27] 25, wherein the needle shaft has a magnetic material at one end that is magnetically connectable with a magnetic counter piece disposed in the basic module.

29. (Amended) An ink application device for tattooing or for making permanent make-up as claimed in claim [27] 25, wherein the diaphragm is disposed between [the] a magnetic material and [the] a magnetic counter piece so that a magnetic connection is indirectly made through the diaphragm.

30. (Amended) An ink application device for tattooing or for making permanent make-up as claimed in claim 1, wherein [the] a diaphragm is made of a medically compatible, elastomeric material.

31. (Amended) A sterilized disposable module for an ink application device for tattooing or for making permanent make-up, the module having a housing that includes a needle disposed

Amendment under 37 CFR 1.111 and
Submission of Proposed Drawing Changes
Serial No.: 09/671,650
September 4, 2001

therein, a needle nozzle disposed on one end of the sterilized disposable module, [and] another end of the sterilized disposable module having a portion that is connectable to an integrated needle drive, and a bearing element disposed inside the housing and supporting the needle in the housing so that the needle, the bearing element and the housing form a unit that is attachable to an ink application device. --

-- 34. (Amended) A sterilized disposable module [as claimed in claim 31, further comprising] for an ink application device for tattooing or for making permanent make-up, the module having a housing that includes a needle disposed therein, a needle nozzle disposed on one end of the sterilized disposable module, another end of the sterilized disposable module having a portion that is connectable to an integrated needle drive, and a resilient diaphragm disposed between a front housing part and a rear housing part. --

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 6,345,553
APPLICATION NO.: 09/671,650
ISSUE DATE : February 12, 2002
INVENTOR(S) : Adler et al.

Page 1 of 1

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 5

In claim 1, lines 12-13, "the needle the diaphragm," should read -- the needle, the diaphragm, --.

Column 8

In claim 27, lines 8-10, "the needle the diaphragm in the housing so that the needle, the bearing element" should read -- the needle in the housing so that the needle, the diaphragm, the bearing element --.

MAILING ADDRESS OF SENDER (Please do not use customer number below):

Smith Patent Office
1901 Pennsylvania Ave., N.W. Suite 901
Washington DC, 20006

This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1.0 hour to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Attention Certificate of Corrections Branch, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 6,345,553 *B1*
APPLICATION NO.: 09/671,650
ISSUE DATE : February 12, 2002
INVENTOR(S) : Adler et al.

Page 1 of 1

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

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In claim 1, lines 12-13, "the needle the diaphragm," should read -- the needle, the diaphragm, --.

Column 8

In claim 27, lines 8-10, "the needle the diaphragm in the housing so that the needle, the bearing element" should read -- the needle in the housing so that the needle, the diaphragm, the bearing element --.

MAILING ADDRESS OF SENDER (Please do not use customer number below):

Smith Patent Office
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This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1.0 hour to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Attention Certificate of Corrections Branch, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 6,345,553 B1
APPLICATION NO. : 09/671650
DATED : February 12, 2002
INVENTOR(S) : Adler et al.

Page 1 of 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 5

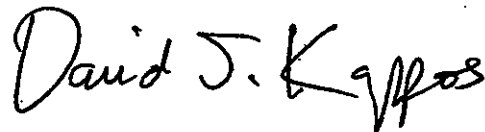
In claim 1, lines 12-13, "the needle the diaphragm," should read -- the needle, the diaphragm, --.

Column 8

In claim 27, lines 8-10, "the needle the diaphragm in the housing so that the needle, the bearing element" should read -- the needle in the housing so that the needle, the diaphragm, the bearing element --.

Signed and Sealed this

Seventeenth Day of November, 2009

A handwritten signature in black ink that reads "David J. Kappos". The signature is written in a cursive, flowing style.

David J. Kappos
Director of the United States Patent and Trademark Office

Patent Number InformationApplication Number: **09/485665** [Order This File Assignments](#)Examiner Number: **75479 / KWOK, HELEN**Filing or 371(c) Date: **04/21/2000** eDanGroup Art Unit: **2856**Effective Date: **04/21/2000**Class/Subclass:
073/504.120Application Received: **04/21/2000**Lost Case: **NO**Patent Number: **6345533**

Interference Number:

Issue Date: **02/12/2002**Unmatched Petition: **NO**Date of Abandonment: **00/00/0000**L&R Code: Secrecy
Code: **1**Attorney Docket Number: **MAT-7908US**Third Level Review: **NO** Secrecy Order: **NO**Status: **150 / PATENTED CASE**Status Date: **01/25/2002**Confirmation Number: **2133**Oral Hearing: **NO**Title of Invention: **ANGULAR RATE SENSOR**

Bar Code	PALM Location	Location Date	Charge to Loc	Charge to Name	Employee Name	Location
09485665	9200	02/08/2002	No Charge to Location	No Charge to Name	BELLO,NATASHA	

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Bib Data Sheet

CONFIRMATION NO. 8414

SERIAL NUMBER 09/671,650	FILING DATE 09/28/2000 RULE	CLASS 081	GROUP ART UNIT 3723	ATTORNEY DOCKET NO. 0075/002001
APPLICANTS Frank Adler, Berlin, GERMANY; Walter Lisec, Berlin, GERMANY; Gerhard Turk, Berlin, GERMANY;				
** CONTINUING DATA *****				
** FOREIGN APPLICATIONS ***** GERMANY 299 19 199.0 10/22/1999				
IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** SMALL ENTITY ** ** 11/15/2000				
Foreign Priority claimed <input type="checkbox"/> yes <input type="checkbox"/> no 35 USC 119 (a-d) conditions met <input type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> Met after Allowance		STATE OR COUNTRY GERMANY	SHEETS DRAWING 6	TOTAL CLAIMS 34
Verified and Acknowledged Examiner's Signature _____ Initials _____				INDEPENDENT CLAIMS 2
ADDRESS RANDOLPH A. SMITH SMITH PATENT OFFICE 1901 PENNSYLVANIA AVE. N.W SUITE 200 WASHINGTON ,DC 20006				
TITLE Ink application device for tattooing or for making permanent make-up				
FILING FEE RECEIVED 511	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:		<input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees (Filing) <input type="checkbox"/> 1.17 Fees (Processing Ext. of time) <input type="checkbox"/> 1.18 Fees (Issue) <input type="checkbox"/> Other _____ <input type="checkbox"/> Credit	

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DETAIL

CONTENTS:

SC/SN: 09/671650

FILDT: 09/28/00

PATNO:

PUBNO:

F671650

ISSDT: 00/00/00

PUBDT: 00/00/00

ABNDT: 00/00/00

PGPUB CL/SC:

APPL: ADLER

ET AL

LOC: 3712 LOC DT: 02/15/01

BATNO:

CHG-LOC: 3723

IE TEAM: 00

ISSNO: 00

CHGTO-NAME: NO NAME FOUND

TOT ACT: 00 STATUS: 030 STADT: 12/22/00

RESP CD:

START DT:

DUE DT:

EXMR NO/NAME: 76962 THOMPSON, MICHAEL M

DOCKET DATE: 12/22/00

ATTY DOCK #: 0075/002001 LOST N LOST DT 00/00/00

APPLN TYPE: 2 TYPE SM ENT: 3 UNMAT PET: N

CURR-CL/SC: 604/506.000 FOR PRIOR CL: N PET FAQM:

TITLE OF INVENTION: UNAVAIL FOR ACTION: N PP UNAVAIL: 0

INK APPLICATION DEVICE FOR TATTOOING OR FOR MAKING PERMANENT MAKE-UP

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NAT FORM 02-23-01

PATENT APPLICATION FEE DETERMINATION RECORD

Effective December 29, 1999

Application or Docket Number

09/671650

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)
FOR	NUMBER FILED	NUMBER EXTRA
BASIC FEE		
TOTAL CLAIMS	34 minus 20=	* 14
INDEPENDENT CLAIMS	2 minus 3=	*
MULTIPLE DEPENDENT CLAIM PRESENT		N

* If the difference in column 1 is less than zero, enter "0" in column 2

CLAIMS AS AMENDED - PART II

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total	*	Minus	**
Independent	*	Minus	***
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM			

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total	*	Minus	**
Independent	*	Minus	***
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM			

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT C	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total	*	Minus	**
Independent	*	Minus	***
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM			

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20."

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3."

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

SMALL ENTITY TYPE ☒ OR

OTHER THAN SMALL ENTITY

RATE	FEE
	345.00
X\$ 9=	126-
X39=	0
+130=	0
TOTAL	471-

RATE	FEE
	690.00
X\$18=	
X78=	
+260=	
TOTAL	

SMALL ENTITY OR

OTHER THAN SMALL ENTITY

RATE	ADDITIONAL FEE
X\$ 9=	
X39=	
+130=	
TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE
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X78=	
+260=	
TOTAL ADDIT. FEE	

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X39=	
+130=	
TOTAL ADDIT. FEE	

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RATE	ADDITIONAL FEE
X\$18=	
X78=	
+260=	
TOTAL ADDIT. FEE	

SMITH PATENT OFFICE
1901 Pennsylvania Ave., N.W.
Suite 200
Washington, DC 20006
(202) 530-5900 (phone)
(202) 530-5902 (fax)

September 28, 2000

BOX PATENT APPLICATION

Assistant Commissioner for Patents
Washington, DC 20231

Presented for filing is a new original patent application of:

Applicants : Frank ADLER
Walter LISEC
Gerhard TÜRK
Title : AN INK APPLICATION DEVICE FOR TATTOOING OR
FOR MAKING PERMANENT MAKE-UP
Attorney Docket No.: 0075/002001

Enclosed are the following papers, including all those required for a filing date under 37 CFR 1.53(b):

Specification	12 Pages
Claims	8 Pages
Abstract	1 Page
Drawings	6 Pages
Declaration	3 Pages
Small Entity Statement	2 Pages

Basic filing fee (Utility - Small Entity)	345.00
Total Claims in excess of 20 times \$9.00	126.00
Independent claims in excess of 3 times \$39.00	0.00
Multiple dependent claims	0.00
Total filing fee:	\$ 471.00

A check for the filing fee is enclosed. It is believed that this fee covers all of the required fees for this application, however, if any additional fees are required please charge these required fees to Deposit Account No. 19-2586, referencing attorney docket number 0075/002001. A duplicate copy of this transmittal letter is attached.

Applicants respectfully claim priority under 35 USC 119 to German Patent Application No. DE 299 19 199.0, filed on October 22, 1999. The certified copy of this application is enclosed.

An Information Disclosure Statement, PTO-1449 and a copy of cited references are also enclosed.

If this application is found to be INCOMPLETE, or if any addition fee is required, or if it appears that a telephone conference would helpfully advance prosecution, please telephone the undersigned at 202-530-5900.

1c925 U.S. PTO
09/671650
09/28/00

Transmittal Letter

Applicants: Frank Adler et al.

Title: AN INK APPLICATION DEVICE FOR TATTOOING OR
FOR MAKING PERMANENT MAKE-UP

Page 2

Kindly acknowledge receipt of this application by returning the enclosed postcard.

Please recognize the following address as the corresponding address:
Customer Number 22893.



22893

PATENT TRADEMARK OFFICE

Respectfully submitted,

A handwritten signature in dark ink, appearing to read "Randolph A. Smith". The signature is fluid and cursive, with a large initial "R".

Randolph A. Smith

Reg. No. 32,548

RAS:ms
Enclosures
Adler092800

(use as many sheets as necessary)

Sheet 1 of 1

Application Number	filed concurrently
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Filing Date	filed concurrently
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Applicants	Frank ADLER Walter LISEC Gerhard TÜRK
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Group Art Unit

Examiner Name

Attorney Docket Number	0075/002001
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U.S. PATENT DOCUMENTS

[illegible]

FOREIGN PATENT DOCUMENTS

[illegible]

EXAMINER

DATE CONSIDERED

04/26/01

*Examiner: Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered.
Include copy of this form with next communication to applicant.

¹Unique citation designation number. ²Applicant is to place a check mark here if English language Translation is attached. ³Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible.

⁶Applicant is to place a check mark here if English language Translation is attached.



UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/671,650 09/28/00 ADLER

0075/002001

EXAMINER

QM12/1108

RANDOLPH A. SMITH
SMITH PATENT OFFICE
1901 PENNSYLVANIA AVE. N.W
SUITE 200
WASHINGTON DC 20006

SHAKER, H. PAPER NUMBER

3723
DATE MAILED:

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

THE PATENT TERM ADJUSTMENT TO DATE IS 00 DAYS. IF THE PATENT ISSUE FEE IS PAID ON THE DATE THAT IS THREE MONTHS AFTER THE MAILING DATE OF THIS NOTICE AND THE PATENT ISSUES ON THE TUESDAY BEFORE THE DATE THAT IS 28 WEEKS (SIX AND A HALF MONTHS) AFTER THE MAILING DATE OF THIS NOTICE, THE TERM ADJUSTMENT WILL BE 00 DAYS.

Notice of Allowability

Application No.

09/671,650

Examiner

Hadi Shakeri

Applicant(s)

ADLER ET AL.

Art Unit

3723

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Amendment 'a' filed on 9/4/01.
2. ☒ The allowed claim(s) is/are 1-7, 9-15, 17-25 and 28-34.
3. ☐ The drawings filed on _____ are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some* c) ☐ None of the:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

5. ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- (a) ☐ The translation of the foreign language provisional application has been received.
6. ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application. **THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

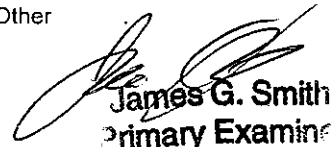
7. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
8. ☒ CORRECTED DRAWINGS must be submitted.
- (a) ☒ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☒ to Paper No. 04.
- (b) ☒ including changes required by the proposed drawing correction filed 04 September 2001, which has been approved by the Examiner.
- (c) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No. _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the top margin (not the back) of each sheet. The drawings should be filed as a separate paper with a transmittal letter addressed to the Official Draftsperson.

9. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- 1 ☐ Notice of References Cited (PTO-892)
- 3 ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 5 ☐ Information Disclosure Statements (PTO-1449), Paper No. _____.
- 7 ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
- 2 ☐ Notice of Informal Patent Application (PTO-152)
- 4 ☒ Interview Summary (PTO-413), Paper No. 07.
- 6 ☒ Examiner's Amendment/Comment
- 8 ☐ Examiner's Statement of Reasons for Allowance
- 9 ☐ Other


James G. Smith
Primary Examiner

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Smith on Tuesday September 25, 2001.

The application has been amended as follows:

In amended claim 1, line 9, after "needle drive" insert --through a resilient diaphragm--.

In amended claim 1, line 11, after "the needle," insert --the diaphragm,--.

In amended claim 30, line 2, change "a" to --the--.

In amended claim 31, line 7, after "needle drive" insert --through a resilient diaphragm--.

In amended claim 31, line 8, after "the needle," insert --the diaphragm,--.

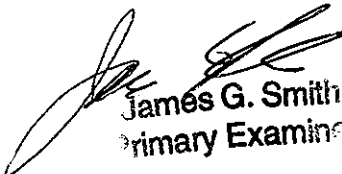
2. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Hadi Shakeri at (703) 308-6279. The examiner can normally be reached on Monday-Thursday, 7:30 AM to 6:00 PM.

Unofficial documents may be faxed to the Examiner at (703) 746-3279.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist at (703) 308-1148.

HS

September 19, 2001


James G. Smith
Primary Examiner

Interview Summary	Application No.	Applicant(s)	
	09/871,850	ADLER ET AL.	
	Examiner	Art Unit	
	Hadi Shakeri	3723	

All participants (applicant, applicant's representative, PTO personnel):

(1) Hadi Shakeri (3) _____

(2) Mr. Smith (4) _____

Date of Interview: 25 September 2001.

Type: a) ☒ Telephonic b) ☐ Video Conference
c) ☐ Personal (copy given to: 1) ☐ applicant 2) ☐ applicant's representative]

Exhibit shown or demonstration conducted: d) ☐ Yes e) ☒ No.

If Yes, brief description: _____.

Claim(s) discussed: 1 and 31.

Identification of prior art discussed: Chou.

Agreement with respect to the claims f) ☒ was reached. g) ☐ was not reached. h) ☐ N/A.

Substance of interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: See Examiner's Amendment.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

i) ☒ It is not necessary for applicant to provide a separate record of the substance of the interview (if box is checked).

Unless the paragraph above has been checked, THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN ONE MONTH FROM THIS INTERVIEW DATE TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

Examiner Note: You must sign this form unless it is an Attachment to a signed Office action.

Examiner's signature, if required

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record

A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.

All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiner's Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:

- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case unless both applicant and examiner agree that the examiner will record same. Where the examiner agrees to record the substance of the interview, or when it is adequately recorded on the Form or in an attachment to the Form, the examiner should check the appropriate box at the bottom of the Form which informs the applicant that the submission of a separate record of the substance of the interview as a supplement to the Form is not required.

It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

- 1) A brief description of the nature of any exhibit shown or any demonstration conducted,
- 2) an identification of the claims discussed,
- 3) an identification of the specific prior art discussed,
- 4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
- 5) a brief identification of the general thrust of the principal arguments presented to the examiner.
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
- 6) a general indication of any other pertinent matters discussed, and
- 7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.



UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office

NOTICE OF ALLOWANCE AND ISSUE FEE DUE

022893

0N32/0926

SMITH PATENT OFFICE
1901 PENNSYLVANIA AVENUE, N.W.
SUITE 200
WASHINGTON DC 20006

APPLICATION NO.	FILING DATE	TOTAL CLAIMS	EXAMINER AND GROUP ART UNIT	DATE MAILED
09/671,650	09/28/00	3	SHAKERI, H 3723	09/26/01
First Named Applicant	ADLER, 35 USC 154(b) term ext. = 0 Days.			

TITLE OF INVENTION INK APPLICATION DEVICE FOR TATTOOING OR FOR MAKING PERMANENT MAKE-UP

ATTY'S DOCKET NO.	CLASS-SUBCLASS	BATCH NO.	APPLN. TYPE	SMALL ENTITY	FEE DUE	DATE DUE
1 0075/002001	081-009.220	M61	UTILITY	YES	\$620.00	12/26/01

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED.

THE ISSUE FEE MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED.

HOW TO RESPOND TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

- A. If the status is changed, pay twice the amount of the FEE DUE shown above and notify the Patent and Trademark Office of the change in status, or
- B. If the status is the same, pay the FEE DUE shown above.

If the SMALL ENTITY is shown as NO:

- A. Pay FEE DUE shown above, or
- B. File verified statement of Small Entity Status before, or with, payment of 1/2 the FEE DUE shown above.

II. Part B-Issue Fee Transmittal should be completed and returned to the Patent and Trademark Office (PTO) with your ISSUE FEE. Even if the ISSUE FEE has already been paid by charge to deposit account, Part B Issue Fee Transmittal should be completed and returned. If you are charging the ISSUE FEE to your deposit account, section "4b" of Part B-Issue Fee Transmittal should be completed and an extra copy of the form should be submitted.

III. All communications regarding this application must give application number and batch number. Please direct all communications prior to issuance to Box ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.



US00634553B1

(12) **United States Patent**
Adler et al.

(10) Patent No.: **US 6,345,553 B1**
(45) Date of Patent: **Feb. 12, 2002**

(54) **INK APPLICATION DEVICE FOR
TATTOOING OR FOR MAKING
PERMANENT MAKE-UP**

(75) Inventors: **Frank Adler; Walter Lisec; Gerhard
Türk, all of Berlin (DE)**

(73) Assignee: **Medium - TECH Medizingeräte
GmbH, Berlin (DE)**

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/671,650**

(22) Filed: **Sep. 28, 2000**

(30) Foreign Application Priority Data

Oct. 22, 1999 (DE) 299 19 199

(51) Int. Cl.⁷ **B43K 5/00**

(52) U.S. Cl. **81/9.22; 81/438; 30/362;
606/186**

(58) Field of Search **81/9.22, 438; 30/362;
606/186, 169**

(56) **References Cited**

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GB 1 587 519 * 4/1981 81/9.22

* cited by examiner

Primary Examiner—James G. Smith

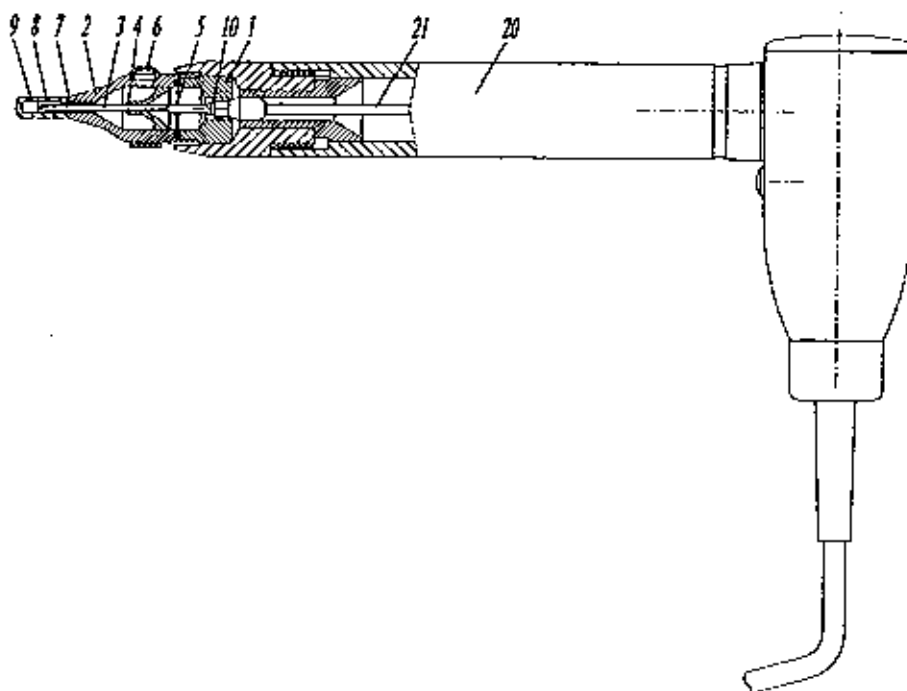
Assistant Examiner—Hadi Shakeri

(74) Attorney, Agent, or Firm—Smith Patent Office

(57) **ABSTRACT**

An ink application device for tattooing or for making permanent make-up includes a handle, a needle drive, a needle, a needle nozzle and a protective cap. The device further includes at least two modules releasably connected to one another. One of the modules is formed as a reusable base module with an integrated needle drive, and the other module is a sterilized disposable module in which all components of the manual device capable of being infected by bodily fluids of a customer are integrated. The device can be constructively divided into two or three separate modules: a basic module, a disposable or hygienic module and an optional ink module. The basic module corresponds to the handle that includes the needle drive and is designed such that the hygienic module can be safely attached and connected to the integrated needle drive.

30 Claims, 6 Drawing Sheets



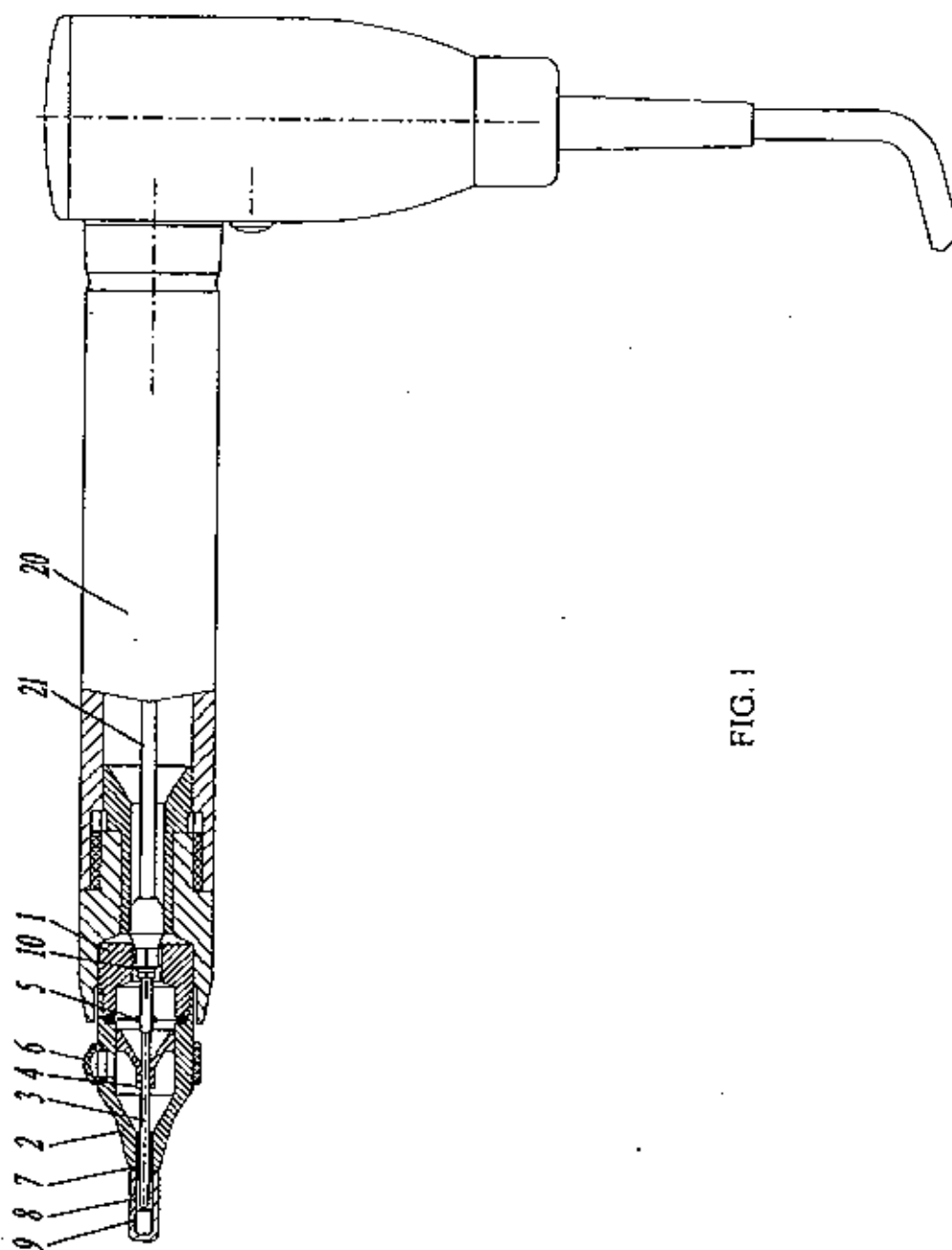


FIG. 1

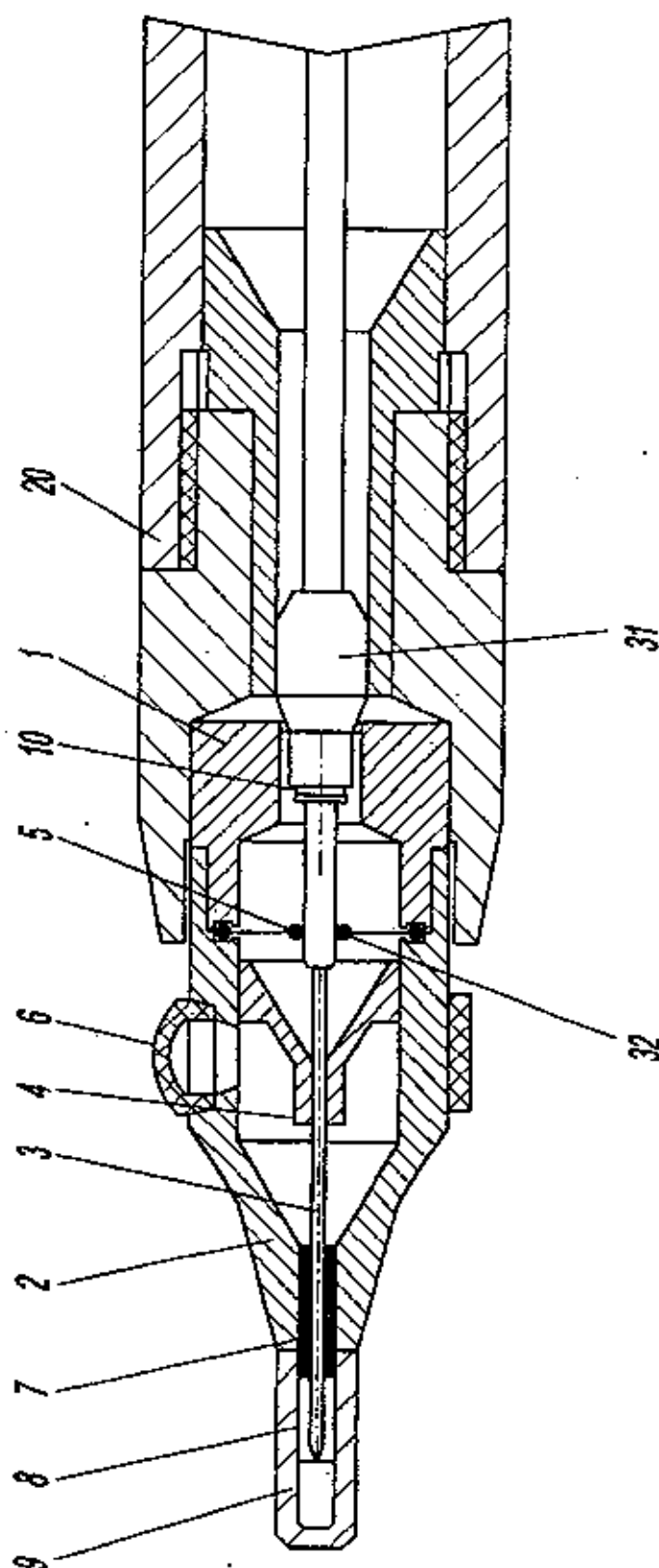
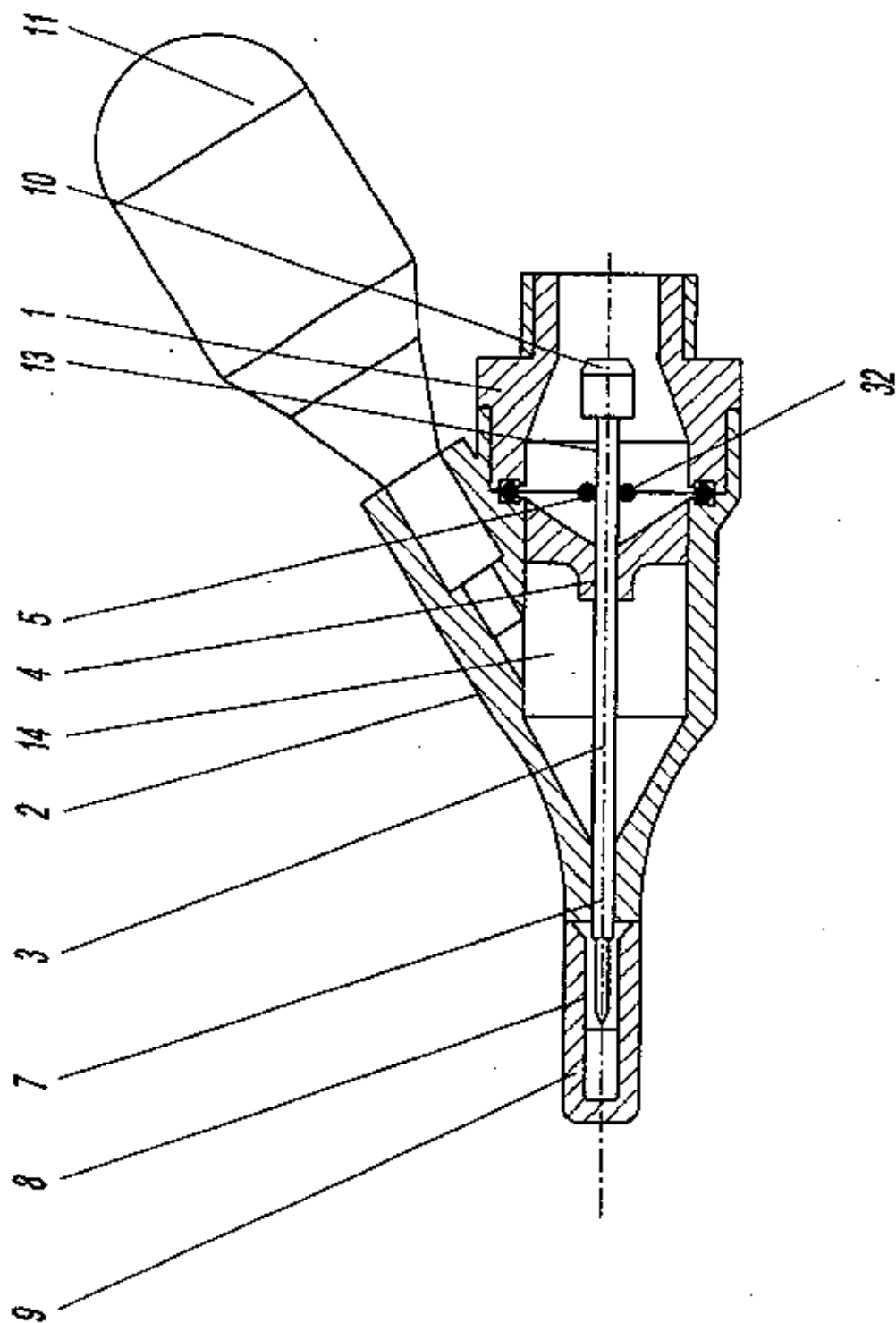


FIG. 2



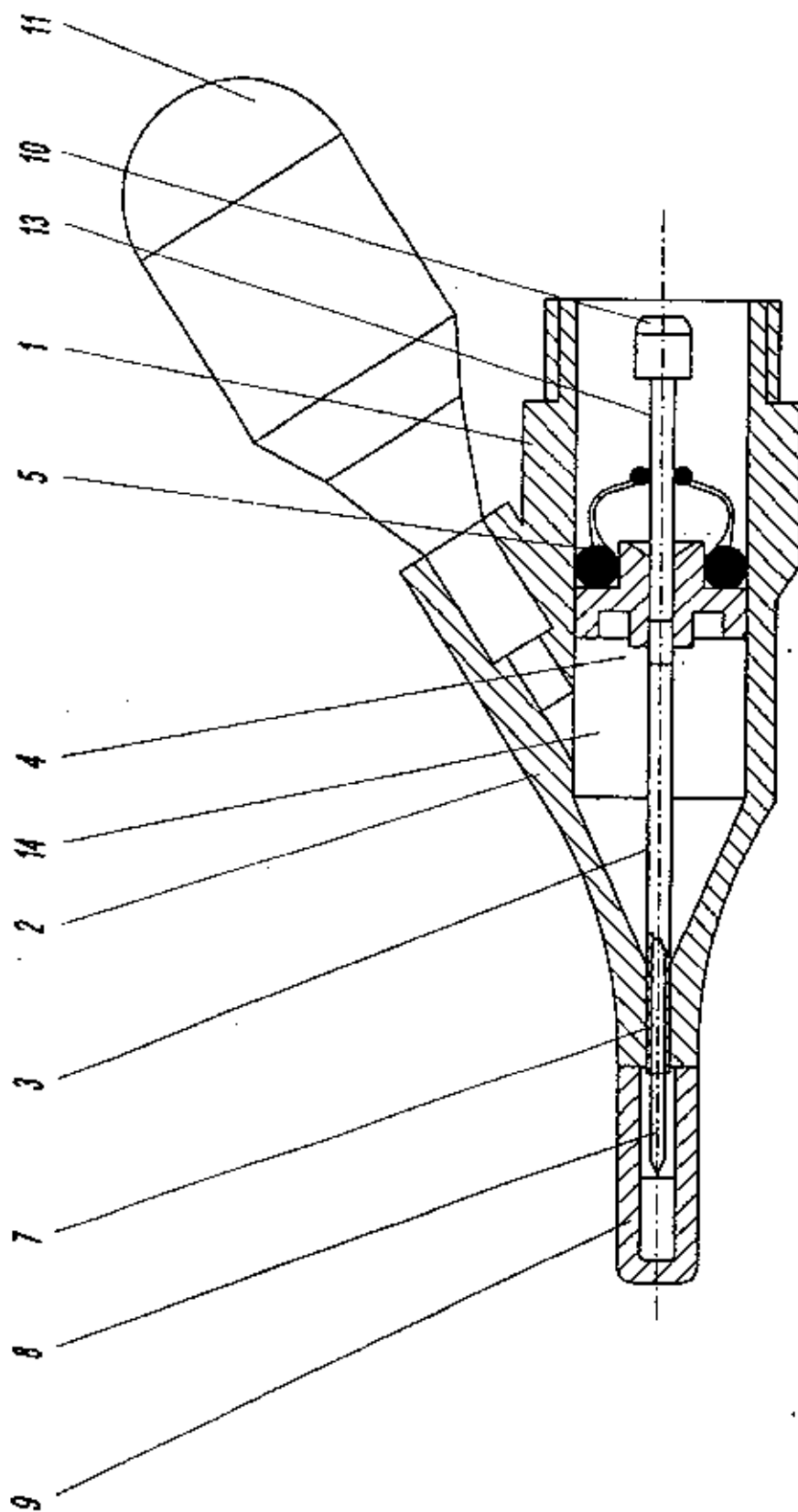


FIG. 4

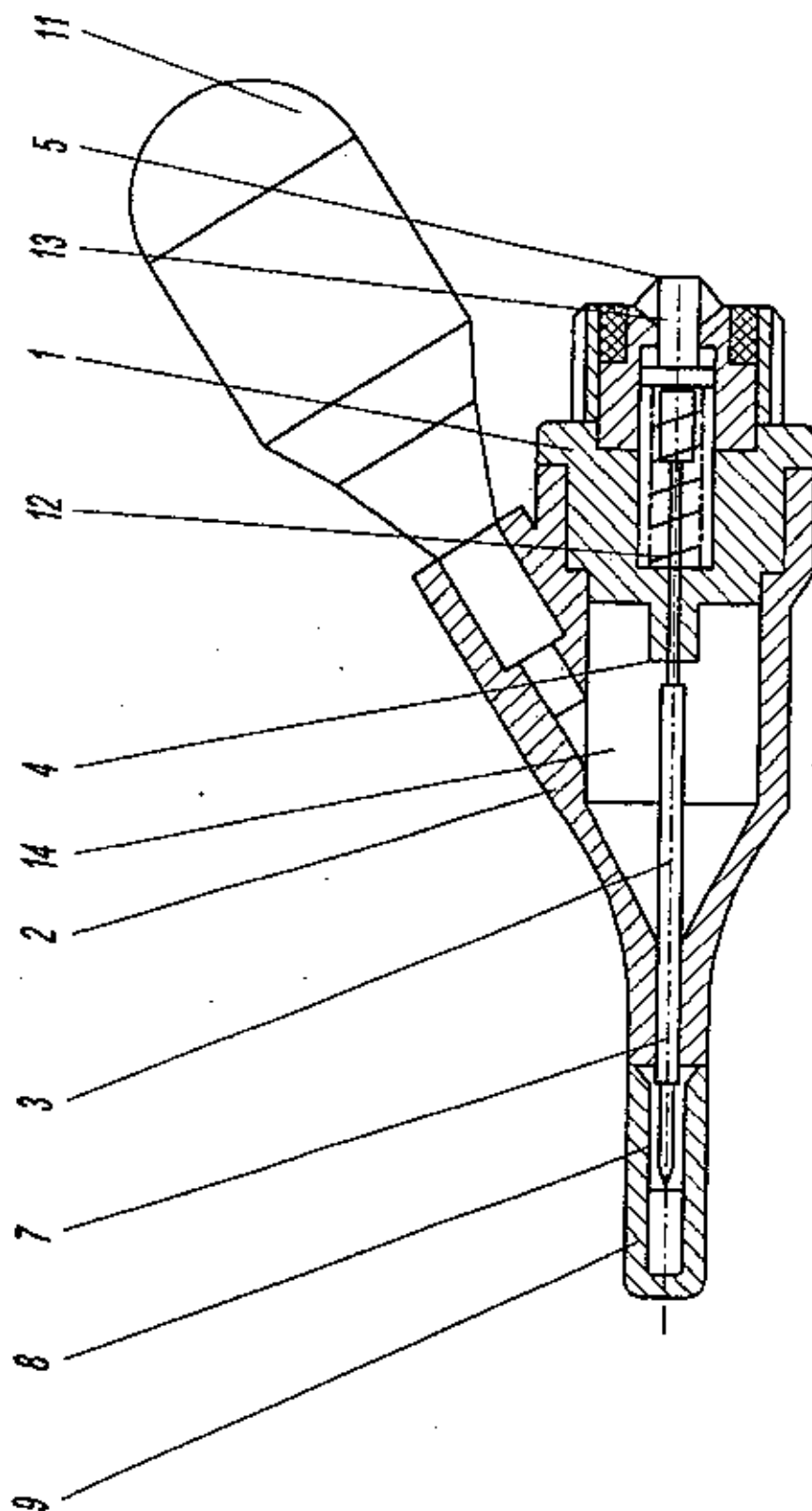


FIG. 5

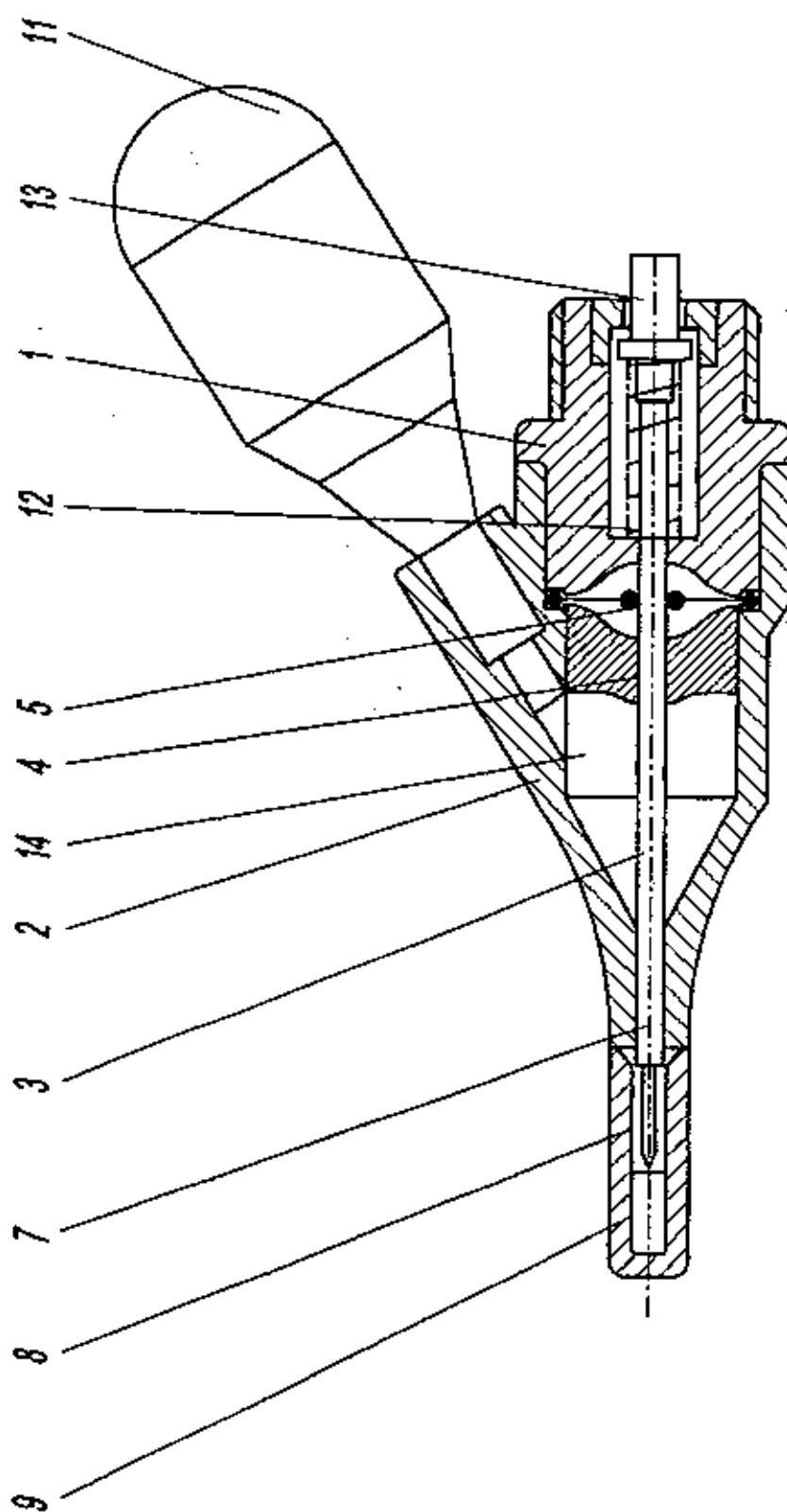


FIG. 6

1

INK APPLICATION DEVICE FOR TATTOOING OR FOR MAKING PERMANENT MAKE-UP

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to an ink application device for tattooing or for making permanent make-up that can apply tattoos or other permanent make-up. In particular, this invention relates to a permanent make-up ink application device for ensuring sterility when treating customers.

2. Discussion of the Related Art

The spreading of highly infectious bacterial or viral infectious diseases such as AIDS and hepatitis, which are transmitted by bodily fluids, places substantial pressure on cosmeticians with respect to the hygienic handling of the tools and ink containers when applying permanent make-up (PMU) and tattoos. In everyday practice, these concerns are not easy to address.

It is particularly problematic in the practice of applying permanent make-up and tattoos because these measures are so invasive. In particular, the customer's skin is pierced by the method, and blood or blood serum may issue from the treated portion of the skin. Moreover, the parts of the device that come into direct contact with the customer, in particular, the needles and needle nozzles, are contaminated by the customer's bodily fluids. In order to avoid known diseases transmitted by bodily fluids, such as AIDS and hepatitis, these parts of the device must be sterile before treatment and are to be regarded as potentially infectious after treatment. Therefore, they must be disposed of accordingly.

Thus, it is common practice that certain parts of the PMU or tattoo device, such as needles, are disposable articles. Other parts can be used several times and thus must be carefully cleaned and sterilized after use. Before use, these parts must be taken out of the sterile packaging in which they are stored and then they are mounted in or at the PMU or manual tattoo device. This requires a substantial amount of time and money and further requires great care from the users to ensure that all parts are sterile when the device is used on customers.

When applying tattoos or permanent make-up, ink to be introduced into the skin is typically taken from large ink reservoir containers, usually large ink bottles. Then the ink is either directly applied onto the customer's skin or it is injected by means of syringes, dropper pipettes or similar tools into a PMU or tattoo pen by means of which the tattoo is applied. The amount of ink in the ink bottles is significantly larger than the quantity required for one customer. One bottle is therefore used for a multitude of tattoos and make-up applications or for multiple customers.

This practice poses health risks for customers because of the danger that bodily fluids, such as blood or serum issuing from the injured skin of a customer when piercing, "carving-in" or contacting the skin while applying the ink, contact the filling aids used for transferring the ink out of the reservoir ink bottles. As a result, the bodily fluids may spread into the reservoir bottle thereby losing the sterility of the bottle. Under these circumstances, several customers can be contaminated by infectious diseases if the same ink and the same filling aid are used.

The prolonged storage of the ink in the relatively large reservoir container and the permanent extraction of small amounts for treating customers can, despite all precautionary measures, cause the contamination of the ink with dust

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particles, germs and bacteria and may lead to an infection in the customer. The sterility of the ink can therefore not always be reliably ensured despite careful hygienic measures. Moreover, an economic handling of the relatively expensive ink is not possible with this method.

SUMMARY OF THE INVENTION

An object of the invention is to eliminate the above-mentioned disadvantages and to reliably ensure the sterility of a device and the ink for each customer, each tattoo and each permanent make-up in a simple manner.

According to the invention, the object is solved by an ink application device for tattooing or for making permanent make-up, comprising a handle, a needle drive, a needle, a needle nozzle and a protective cap, and at least two modules releasably connected to one another, wherein one of the modules is formed as a reusable base module with an integrated needle drive, and the other module is a sterilized disposable module in which all components of the manual device capable of being infected by bodily fluids of a customer are integrated.

The ink application device is constructively divided into two or three separate modules: a basic module, a disposable or hygienic module and an optional ink module, e.g. an ink cartridge, wherein the basic module corresponds to the handle which includes the drive and is designated such that the hygienic module can be safely attached and connected to the drive.

When using a disposable module which includes all parts that can potentially be infected during treatment by the customer's bodily fluids, the exchange of single parts of the manual device, such as the needle or needle nozzles and the sterilization of the remaining parts that may have contacted the bodily fluid, becomes superfluous before the next use of the manual device on another customer. The disposable module is removed from the basic module after the treatment and is disposed of in the usual manner. Then, it is necessary for the subsequent treatment to plug a new disposable module onto the basic module to make the device ready to operate for the next customer. Since the disposable module is taken from a sterile package directly before use, its sterility is ensured without the need for special hygienic measures by the user or hygienic conditions in the treatment environment.

The connection between the basic module and the disposable module can be established and released in a simple manner so that the device can also be simply and safely used even by less experienced users.

Since the ink tank is filled before the sterilization process or after removal from the sterile packaging by means of a sterilized ink cartridge with an ink quantity sufficient for one treatment, the contamination or infection of the ink is effectively prevented, and the required sterility during treatment is ensured.

The ink quantity of approximately 0.5 to 2.0 ml provided according to preferred embodiments is usually sufficient for one tattoo or PMU. If further ink is required for larger tattoo applications, the empty ink cartridge can easily be replaced by a new, sterile cartridge without the risk of contamination or infection.

An ink container can, for instance, be used as an ink cartridge as disclosed in the German Utility Model No. 299 16 971, which is incorporated herein by reference.

A sealing diaphragm provided, according to the preferred embodiments, between the basic and disposable module

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ensures that no ink leaks from the ink tank of the disposable module and enters the basic module. This ensures that the reusable basic module is not exposed to bodily fluids and can be reused without having to be sterilized. In addition, the diaphragm also prevents the penetration of impurities, germs or bacteria which may adhere to the basic module, into the sterile disposable module.

The manual device according to the invention achieves the special hygienic conditions necessary for applying tattoos or PMUs with simple handling procedures to ensure sterility of the elements contacting the customer's skin.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other objects and features of the present invention will be clearly understood from the following description with respect to the preferred embodiments thereof when considered in conjunction with the accompanying drawings, in which:

FIG. 1 shows a cross sectional view of a disposable module according to the invention which is already filled with ink and which is closed, storable and ready to operate;

FIG. 2 shows a partial cross sectional view of the disposable module of FIG. 1;

FIG. 3 shows a partial cross sectional view of an embodiment of an empty disposable module formed according to the invention with an attached ink cartridge;

FIG. 4 shows a partial cross sectional view of another embodiment of an empty disposable module formed according to the invention;

FIG. 5 shows a partial cross sectional view of yet another embodiment of an empty disposable module formed according to the invention; and

FIG. 6 shows a partial cross sectional view of a further embodiment of an empty disposable module formed according to the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIGS. 1 and 2 show an embodiment of a disposable or hygienic module formed according to the invention. A basic module 20 is formed as a conventional handle. The basic module 20 comprises a drive 21 for a needle 3, which is adapted in accordance with the constructive design of a needle shaft 13.

The disposable module is provided with a housing comprising a rear housing part 1 and a front housing part 2, and a protective cap 9 which tightly locks the element towards the front when it is not in use. The disposable module of the present example is comprised of parts made of a medically compatible plastic material. In an alternative embodiment, it can also be formed as one piece. The manufacturer places the module in a sterile package, and it is suitable for long-term storage.

A thermoplastic injection needle 3 is supported within the element by a sealing and bearing element 4 and by a bearing sleeve 7. The bearing dimensions are proportioned so that simple and normal operation of the needle 3 is ensured, and the needle movement through the bearing 4 transports the ink. Moreover, the sleeve 7 ensures movement with little friction.

An ink tank 14 is closed by a collar 6 and is filled with ink. The size of the ink tank 14 preferably corresponds to an ink quantity of approximately 0.5 to 2.0 ml, since this ink quantity is usually sufficient for one treatment. Different ink quantities are of course also possible.

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The ink is preferably introduced before sterilization and packaging of the disposable module, and the element is closed by the collar 6. In this manner, the sterility of the element and of the ink is ensured. The element is packaged in a storable manner. After removal from the sterile packaging, it is immediately ready to operate, and it only has to be connected to the basic module formed as a handle with the needle drive.

The leaking of ink towards the back into the basic module, which is not shown, is prevented because the bearing 4 is dimensioned to have in a tight fit, and the needle shaft 13 is closed by a diaphragm 5, that is made of a resilient material. The diaphragm 5 has a substantially centrally arranged opening for the needle 3, and the opening is provided with a sealing bead or lip 32. The sealing bead or lip 32 is disposed around the needle shaft. The resiliency of the diaphragm 5 enables movement of the needle 3 within a required stroke interval. The slidable seat of the sealing bead or lip 32 of the diaphragm 5 on the needle shaft 13 allows relief of the diaphragm in the rest position. The diaphragm 5 is preferably made of a medically compatible, rubber-like materials, which are generally known in medical technology.

A magnet 10 attached at the distal end of the needle shaft 13 secures a non-positive connection of the needle 3 with the drive (not shown) in the basic module when the disposable module is connected to the basic module. The drive is provided at the opposite end of the needle shaft 13 with a corresponding magnetic counter piece 31 to realize the magnetic coupling. The magnetic material may be soft iron or reinforced or non-reinforced sinter ceramics.

FIGS. 3 and 4 show further embodiments of the disposable or hygienic module according to the invention. This embodiment differs from the one shown in FIGS. 1 and 2 in that the ink filling of the element is performed by plugging on a sterile ink cartridge 11. As shown in FIG. 4, a specially formed diaphragm 5 supports its resilient movement with the needle 3.

Instead of the ink cartridge 11, a micro dosing pump (not shown) can also supply the ink from a corresponding ink container into the ink tank 14. The ink is preferably discharged automatically from the ink module 11 or from the micro dosing pump into the ink tank 14. Preferably 5 to 30 ml per needle stroke are dosed. Manual operation of the ink module 11 is also possible. The ink is transported by the movement of the needle 3 through a needle nozzle 8 during operation of the manual device.

In a further embodiment, which is not shown, the needle shaft 13 can be formed cylindrically at its distal end so that it engages a clamping device provided in the basic module, preferably with a collet chuck to establish the drive connection for the needle 3.

As an alternative, the diaphragm can also be formed without an opening for the needle 3 and fully close the disposable module in the direction of the basic module. In this case, an indirect connection between the elements of the magnetic coupling with an interposed diaphragm 5 is established.

In a further embodiment, the needle shaft 13 can be formed as a pressure absorber at its distal end. The needle shaft 13 can be driven forward directly through the opening of the diaphragm 5 or indirectly through the closed diaphragm 5 by a pressure taper not connected to the needle shaft. It can then be moved back by a return spring 12.

Further examples of embodiments of the element are shown in FIGS. 5 and 6. In both alternatives, the needles are moved by means of a return spring 12 located in a rear

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portion of the device. In FIG. 5, a closed form diaphragm 5 is shown, with the needle shaft 13 being formed as a pressure absorber abutting the inner side of the diaphragm that is the side facing the disposable module. On the opposite side of the diaphragm 5 (i.e., the side facing the basic module), a tappet, which is not shown, holds the needle shaft end against the force of the return spring 12 to drive the needle 3. The return movement of the needle 3 is then performed by the force of the return spring 12.

In the embodiment of FIG. 5, the disposable module is sealed in the direction of the basic module by a closed diaphragm 5. In the embodiment of FIG. 6, the diaphragm 5 is provided with an opening.

It is to be understood that although the present invention has been described with regard to preferred embodiments thereof, various other embodiments and variants may occur to those skilled in the art, which are within the scope and spirit of the invention, and such other embodiments and variants are intended to be covered by the following claims.

What is claimed is:

1. An ink application device for tattooing or for making permanent make-up, comprising:

a basic module having a handle and an integrated needle drive; and

a sterilized disposable module having a housing that includes a needle disposed therein, a needle nozzle disposed on one end of the sterilized disposable module, another end of the sterilized disposable module having a portion that is connectable to the integrated needle drive through a resilient diaphragm, and a bearing element disposed inside the housing and supporting the needle in the housing so that the needle, the diaphragm, the bearing element and the housing form a unit that is detachable from the basic module, whereby all components of the device that could be infected by the bodily fluids of a user are integrated into the sterilized disposable module.

2. An ink application device for tattooing or for making permanent make-up as claimed in claim 1, wherein the sterilized disposable module includes an ink tank.

3. An ink application device for tattooing or for making permanent make-up as claimed in claim 2, wherein the ink tank has a volume sufficient for one application of ink.

4. An ink application device for tattooing or for making permanent make-up as claimed in claim 2, wherein the needle is disposed at least partially in said ink tank so that during operation of the device, needle movement transports ink through the ink nozzle.

5. An ink application device for tattooing or for making permanent make-up as claimed in claim 1, further comprising a separate ink module attachable to an opening in the disposable module for filling an ink tank, the separate ink module having a quantity of sterile ink sufficient for one application.

6. An ink application device for tattooing or for making permanent make-up as claimed in claim 5, wherein the ink tank has a volume sufficient to receive approximately 0.5 to 2.0 ml of ink.

7. An ink application device for tattooing or for making permanent make-up as claimed in claim 5, wherein the separate ink module is an ink cartridge.

8. An ink application device for tattooing or for making permanent make-up as claimed in claim 5, wherein the separate ink module includes an outlet for discharging ink with each needle stroke.

9. An ink application device for tattooing or for making permanent make-up as claimed in claim 5, wherein the

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separate ink module includes an outlet for discharging ink into the ink tank.

10. An ink application device for tattooing or for making permanent make-up comprising:

a basic module having a handle and an integrated needle drive;

a sterilized disposable module having a needle disposed therein, a needle nozzle disposed on one end of the sterilized disposable module, and another end of the sterilized disposable module having a portion that is connectable to the integrated needle drive, whereby all components of the device that could be infected by the bodily fluids of a user are integrated into the sterilized disposable module; and

a resilient diaphragm disposed between an ink tank and the basic module so as to prevent ink from passing from the ink tank to the basic module.

11. An ink application device for tattooing or for making permanent make-up as claimed in claim 10, wherein the diaphragm is made of a medically compatible, elastomeric material.

12. An ink application device for tattooing or for making permanent make-up as claimed in claim 10, further comprising a needle shaft attached at one end of the needle, wherein the diaphragm has a sealing lip disposed around the needle shaft and the sealing lip guides the needle shaft.

13. An ink application device for tattooing or for making permanent make-up as claimed in claim 10, wherein the portion that is connectable to the integrated needle drive is the needle shaft.

14. An ink application device for tattooing or for making permanent make-up as claimed in claim 13, wherein the needle shaft is cylindrical.

15. An ink application device for tattooing or for making permanent make-up as claimed in claim 13, wherein the needle shaft has a magnetic material at one end that is magnetically connectable with a magnetic counter piece disposed in the basic module.

16. An ink application device for tattooing or for making permanent make-up as claimed in claim 15, wherein the magnetic material includes at least one of a soft iron, a reinforced sintered ceramic and a non-reinforced sintered ceramic.

17. An ink application device for tattooing or for making permanent make-up as claimed in claim 15, wherein the diaphragm is disposed between the magnetic material and the magnetic counter piece so that a magnetic connection is indirectly made through the diaphragm.

18. An ink application device for tattooing or for making permanent make-up as claimed in claim 10, wherein the diaphragm is devoid of any openings so that it completely closes off the ink tank from the basic module.

19. An ink application device for tattooing or for making permanent make-up as claimed in claim 18, wherein the diaphragm is disposed between a magnetic material and a magnetic counter piece so that a magnetic connection is indirectly made through the diaphragm.

20. An ink application device for tattooing or for making permanent make-up as claimed in claim 18, wherein the sterilized disposable module further comprises a return spring contacting a portion of at least one of the needle and the needle shaft.

21. An ink application device for tattooing or for making permanent make-up as claimed in claim 10, wherein the sterilized disposable module further comprises a return spring contacting a portion of at least one of the needle and the needle shaft.

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22. An ink application device for tattooing or for making permanent make-up as claimed in claim 1, wherein said sterilized disposable module further comprises a needle shaft that is connectable to the integrated needle drive.

23. An ink application device for tattooing or for making permanent make-up as claimed in claim 22, wherein the needle shaft is cylindrical.

24. An ink application device for tattooing or for making permanent make-up as claimed in claim 23, wherein the needle shaft has a magnetic material at one end that is magnetically connectable with a magnetic counter piece disposed in the basic module.

25. An ink application device for tattooing or for making permanent make-up as claimed in claim 23, wherein the diaphragm is disposed between a magnetic material and a magnetic counter piece so that a magnetic connection is indirectly made through the diaphragm.

26. An ink application device for tattooing or for making permanent make-up as claimed in claim 1, wherein the diaphragm is made of a medically compatible, elastomeric material.

27. A sterilized disposable module for an ink application device for tattooing or for making permanent make-up, the module having a housing that includes a needle disposed therein, a needle nozzle disposed on one end of the sterilized

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disposable module, another end of the sterilized disposable module having a portion that is connectable to an integrated needle drive through a resilient diaphragm, and a bearing element disposed inside the housing and supporting the needle the diaphragm in the housing so that the needle, the bearing element and the housing form a unit that is attachable to an ink application device.

28. A sterilized disposable module as claimed in claim 27, further comprising a needle shaft attached at one end of the needle.

29. A sterilized disposable module as claimed in claim 28, wherein the needle shaft has a magnetic material at one end for magnetically connecting the needle shaft with a magnetic counter piece disposed in a basic module.

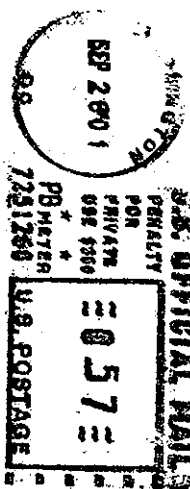
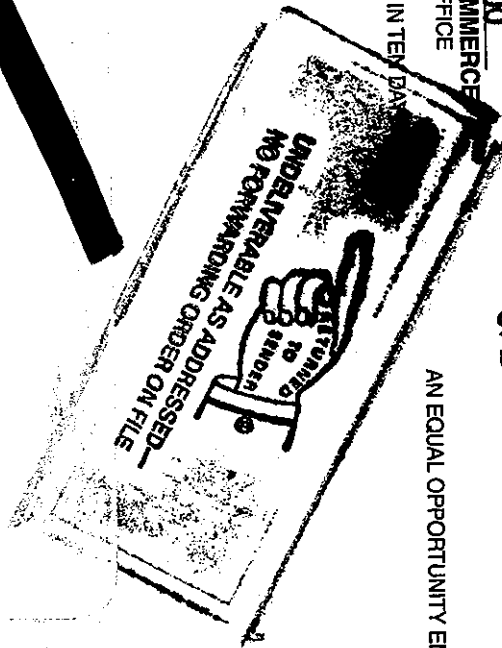
30. A sterilized disposable module for an ink application device for tattooing or for making permanent make-up, the module having a housing that includes a needle disposed therein, a needle nozzle disposed on one end of the sterilized disposable module, another end of the sterilized disposable module having a portion that is connectable to an integrated needle drive, and a resilient diaphragm disposed between a front housing part and a rear housing part.

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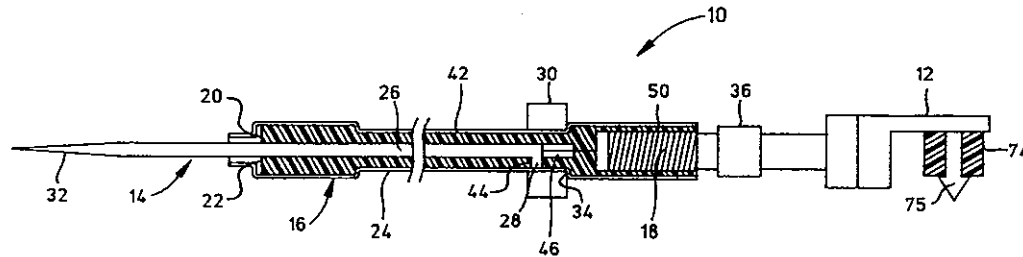
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United States Patent [19]**Chou**[11] **Patent Number:** **5,586,473**[45] **Date of Patent:** ***Dec. 24, 1996****[54] INTEGRATED NEEDLE FOR PERMANENT PIGMENT APPLICATOR**[75] **Inventor:** Kuei C. Chou, Taipei, Taiwan[73] **Assignee:** Mei-Chi-Na Beauty International, Inc., Irvine, Calif.[*] **Notice:** The portion of the term of this patent subsequent to Jul. 26, 2013, has been disclaimed.[21] **Appl. No.:** 277,677[22] **Filed:** Jul. 20, 1994[51] **Int. Cl.⁶** B43K 5/00[52] **U.S. Cl.** 81/9.22; 606/186[58] **Field of Search** 81/9.22; 606/186, 606/185**[56] References Cited****U.S. PATENT DOCUMENTS**

4,914,988 4/1990 Chang 87/9.22

Primary Examiner—James G. Smith*Attorney, Agent, or Firm*—Baker, Maxham, Jester & Meador**[57] ABSTRACT**

An integrated needle for use with a permanent pigment applicator device having a fixed needle coupler that is coupled to a needle drive mechanism includes an elongated needle shaft with a fastening head and an attachment piece having an elongated coupling member that is detachably coupled to the needle coupler. The needle is received in a needle chamber of the attachment piece and is securely held in place around the needle fastening head. The integrated needle can be attached to the drive mechanism simply by grasping the attachment piece and coupling it to the needle coupler of the drive mechanism. After each use, the integrated needle can be disposed of and a fresh integrated needle can be attached. In this way, the needle does not have to be handled when it is attached to the applicator device and the needle coupler can be easily removed and thoroughly cleaned in an autoclave.

22 Claims, 6 Drawing Sheets

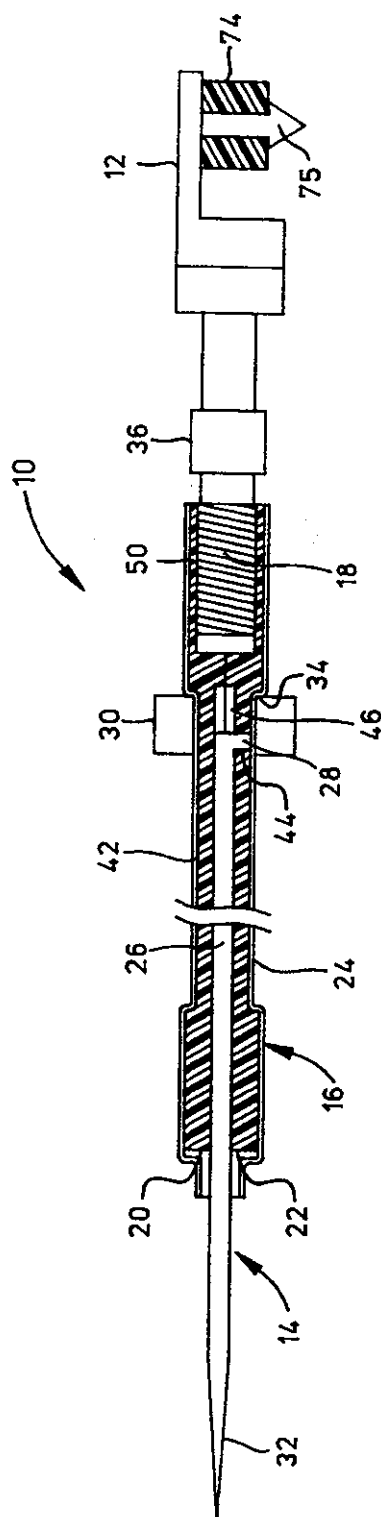


FIG. 1

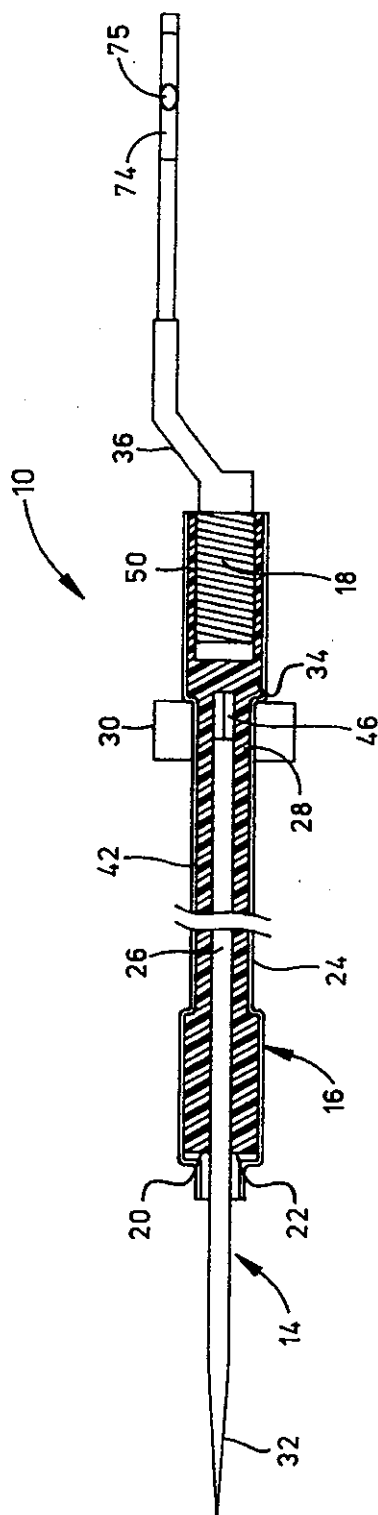


FIG. 2

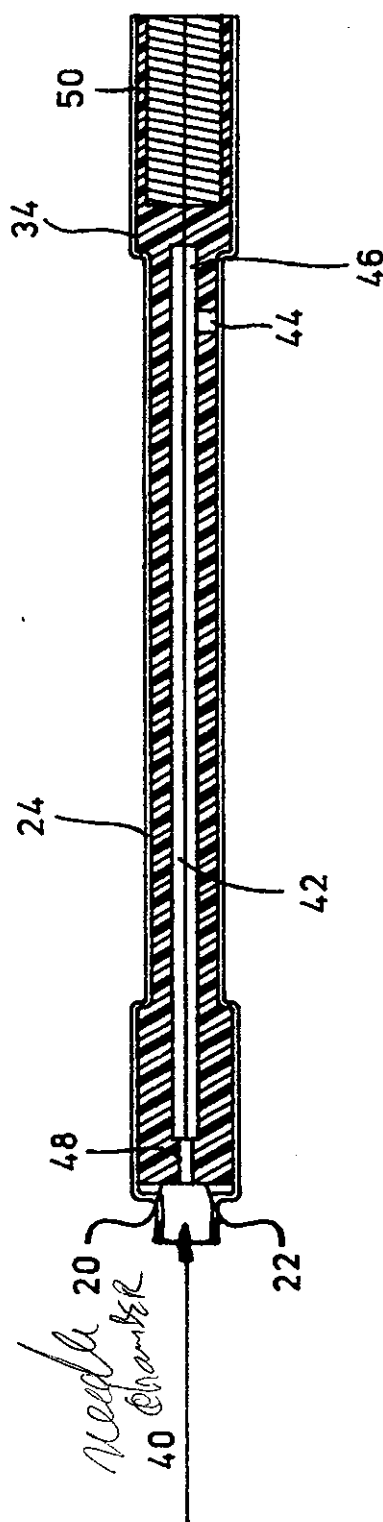


FIG. 3

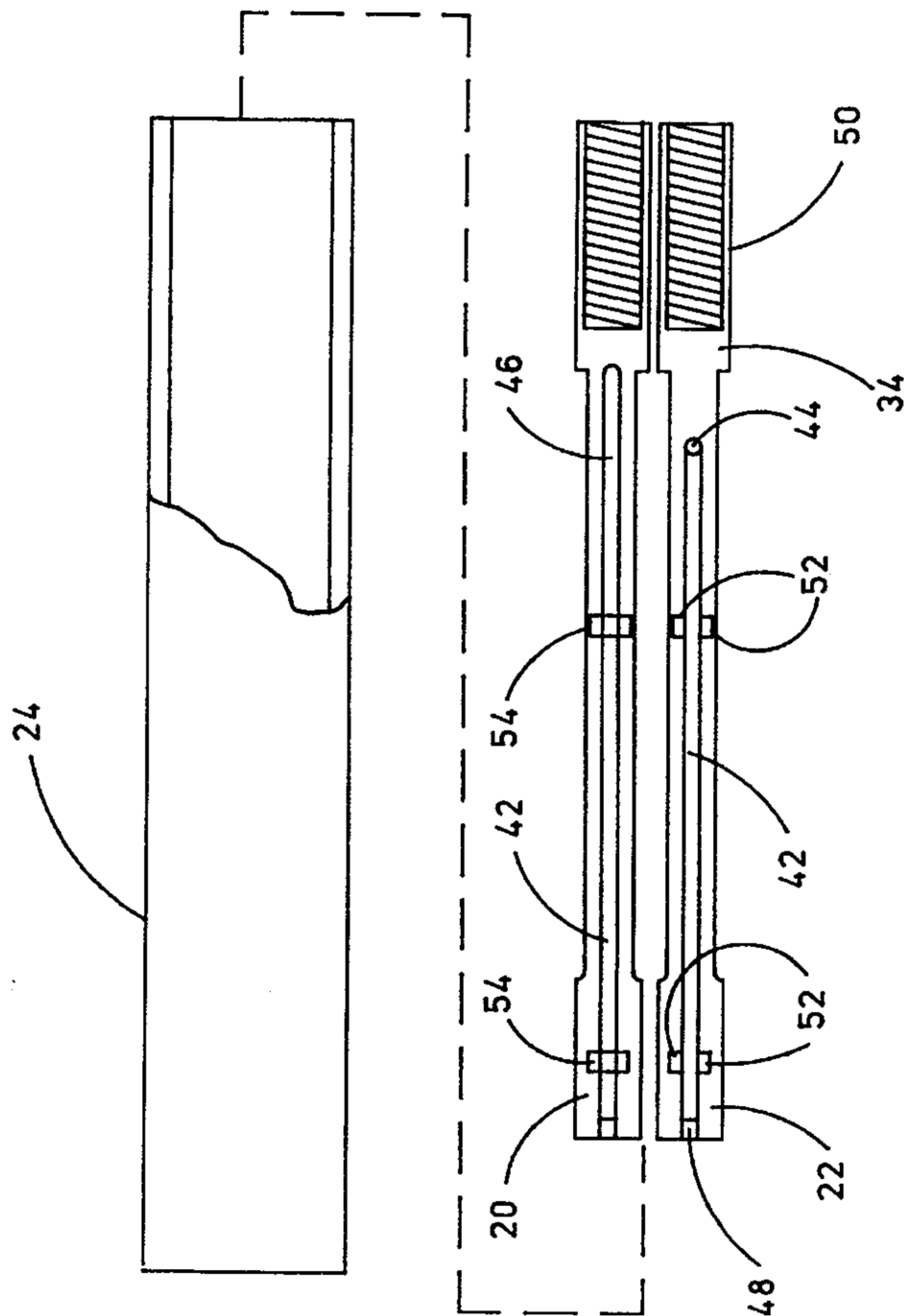


FIG. 4

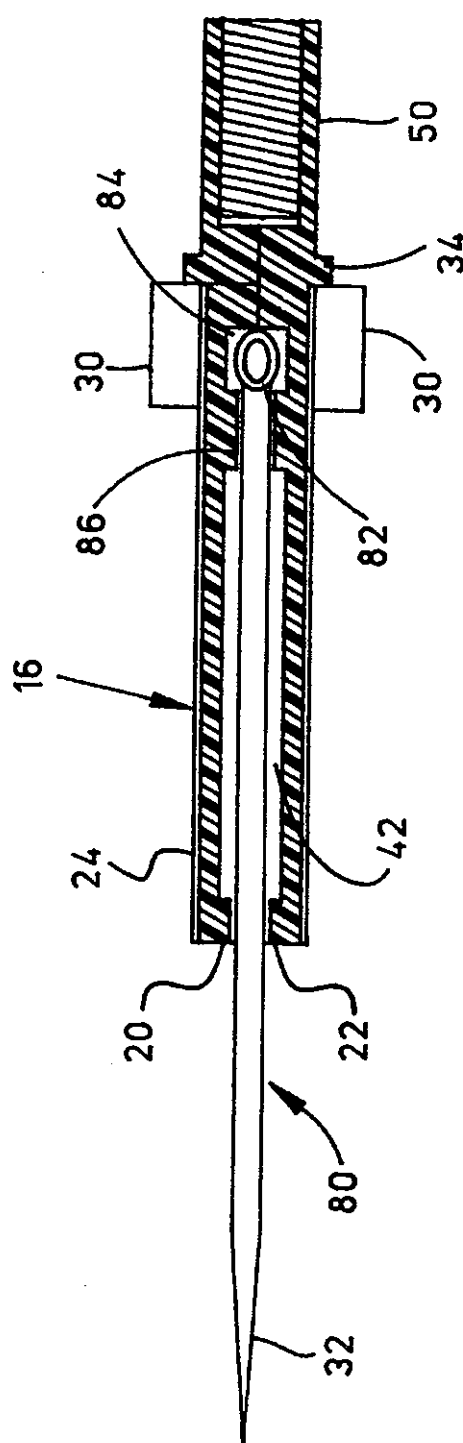


FIG. 6

INTEGRATED NEEDLE FOR PERMANENT PIGMENT APPLICATOR

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to the application of permanent pigment to the skin of a person and, more particularly, to devices for applying permanent pigment with a tattoo needle.

2. Description of the Related Art

Permanent pigment can be applied to the skin of a person using an applicator device and a needle with a pigment supply to provide a permanent coloration, commonly referred to as a tattoo. The applicator device generally includes a body containing a drive mechanism to which the needle is coupled. The drive mechanism can be a motor or other electromagnetic device. The needle includes a sharp pointed end and is moved along its longitudinal axis in a reciprocating motion by the drive mechanism so as to superficially puncture the skin and deposit the pigment, which is then retained permanently under the skin. Thus, the tattoo procedure exposes the needle to the tissues and blood supply of the person's body.

The needle typically is detachably coupled to the drive mechanism by a needle coupling rod that is, in turn, fixed to the drive mechanism. The coupling rod typically has a threaded end with an axial opening that receives the head of the needle. A fastening nut is tightened down over the needle and coupling rod to clamp the needle to the rod. Although the needle can be discarded after each use, usually the coupling rod is securely attached to the drive mechanism and is not accessible without virtually complete disassembly of the applicator device. It is possible for the coupling rod to come into contact with fluids and contaminants, including tissues and blood supply of different persons, as the applicator device is used on different persons. Because it cannot be readily detached from the drive mechanism, the coupling rod cannot be cleaned using acceptable sanitizing procedures, such as autoclaving. As a result, the coupling rod can contaminate a clean needle. In addition, because the fastening nut must be slipped over the needle and tightened down over the coupling rod, the needle can become contaminated merely from being handled during attachment. See, for example, U.S. Pat. No. 4,914,988 to Chang entitled Eyebrow Tattooing Machine issued Apr. 10, 1990.

It is known to provide a needle coupler between the needle and the applicator device drive mechanism. Rather than being directly attached to a drive mechanism, the needle is inserted into the needle coupler, which in turn is attached to the drive mechanism. The needle coupler holds the needle in place with a friction fit. Such an arrangement permits the drive parts that come into direct contact with the needle to be cleaned using acceptable sanitizing procedures or to be disposed of. The needle itself, however, still must be handled during attachment, providing an opportunity for contamination. In addition, inserting needles into the needle coupler can, over time, reduce the secureness of the friction fit. The needle coupler must then be replaced.

From the discussion above, it should be apparent that there is a need for an integrated needle that can be easily decoupled from a permanent pigment applicator device and that can be easily removed during normal operation and cleaned, such as in an autoclave, or disposed of, without reducing needle secureness. The present invention satisfies this need.

SUMMARY OF THE INVENTION

In accordance with the invention, an integrated needle for use with a permanent pigment applicator device having a fixed needle coupler that is coupled to a needle drive mechanism includes an elongated needle shaft with a fastening head and an attachment piece that receives the needle shaft and includes an elongated coupling member that is detachably coupled to the needle coupler. When the permanent pigment applicator device is to be used, an integrated needle can be attached to the drive mechanism simply by grasping the attachment piece and coupling it to the needle coupler of the drive mechanism. After each use, the integrated needle can be disposed of and a fresh integrated needle can be attached. In this way, the needle does not have to be handled when it is attached to the applicator device and the needle coupler can be easily removed and thoroughly cleaned in an autoclave.

In one aspect of the invention, the attachment piece of the integrated needle is internally threaded such that it can be screwed onto a threaded post of the applicator device needle coupler. This permits the integrated needle to be easily removed after use and disposed of or cleaned using commonly accepted sanitizing methods, such as an autoclave or similar device. The attachment piece preferably includes a needle chamber that receives a needle shaft and completely surrounds the fastening head portion of the needle shaft so that the needle shaft itself does not need to be handled when it is attached and detached from the applicator device. This helps reduce the chance of needle contamination during the attachment process.

In another aspect of the invention, the attachment piece comprises first and second cylindrical halves that are clamped over the needle shaft to hold it in fixed position relative to the needle chamber. The fastening head of the needle shaft may comprise a hooked end that fits into the needle chamber of the attachment piece and is thereby positively engaged with the attachment piece against longitudinal movement. Alternatively, the fastening head of the needle shaft may comprise a bulbous end that similarly fits into a needle chamber and is held in place against longitudinal movement by an internal collar of the needle chamber. In either case, the needle shaft is positively engaged with the attachment piece and is held securely in place while the applicator device reciprocates the needle shaft so as to effectuate the pigment application procedure.

Other features and advantages of the present invention should be apparent from the following description of the preferred embodiments, which illustrate, by way of example, the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a sectional view of an integrated needle constructed in accordance with the present invention.

FIG. 2 is a sectional view of the integrated needle illustrated in FIG. 1, rotated along its longitudinal axis.

FIG. 3 is a sectional view of the attachment piece illustrated in FIG. 1 with the needle removed.

FIG. 4 is a side view of the attachment piece illustrated in FIG. 3 with the sleeve removed.

FIG. 5 is a partial sectional view showing an applicator device with the integrated needle of the present invention.

FIG. 6 is a sectional view of a second embodiment of an integrated needle constructed in accordance with the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIGS. 1 and 2 show an integrated needle 10 constructed in accordance with the present invention coupled to a needle coupler 12 of a permanent pigment applicator device (which is illustrated in greater detail in FIG. 4). The integrated needle comprises an assembly including a needle 14 and an attachment piece 16. The integrated needle can be attached to the applicator device by grasping the attachment piece 16 and screwing it onto a threaded post 18 of the needle coupler. The attachment piece comprises two half-cylinder split sections 20, 22 that, when held together by an outer sleeve 24, clamp around the needle to provide positive engagement and prevent longitudinal movement. In this way, the needle 14 does not need to be directly handled when it is attached to the needle coupler of the applicator device and is held securely against separation or ejection from the needle coupler. The needle coupler also can be easily detached from the applicator device, enabling it to be thoroughly cleaned, such as through use of an autoclave.

In the preferred embodiment, the needle 14 includes a needle shaft portion 26 and a hooked head portion 28. The needle shaft is clamped between the cylindrical portions 20 and 22 by the outer sleeve 24 and therefore is held securely in place relative to the attachment piece 16. A foam ring 30 can be placed around the outer circumference of the attachment piece. The foam ring helps to reduce travel of the pigment, or ink, upward from the tip 32 of the needle and reduces vibration of the needle, as described further below. For proper positioning of the foam ring 30, the attachment piece 16 is provided with an outer flange 34 that provides a resting surface against which the foam ring can be placed.

FIG. 2 is a view of the integrated needle 10 after it has been rotated approximately 90° about its longitudinal axis as compared with its position in FIG. 1. FIGS. 1 and 2 together show that the needle coupler 12 includes a dog-leg portion 36 that enables the needle coupler itself to be easily coupled and uncoupled from a drive mechanism of an applicator device. A needle coupler suitable for the present invention is described, for example, in greater detail in U.S. patent application Ser. No. 08/097,936 filed Jul. 26, 1993 and entitled "Permanent Pigment Applicator Having a Detachable Needle Coupler", by the present inventor, which is incorporated herein by this reference. FIGS. 1 and 2 also show respective views of the hooked head portion 28 of the needle 14.

FIG. 3 is a side sectional view of the attachment piece 16 after it has been detached from the needle coupler 12 and the needle 14 has been removed. FIG. 3 shows that the attachment piece is comprised of the split sections 20 and 22 such that the split sections form a generally cylindrical needle chamber 40 that receives the needle 14. The needle chamber includes a shaft recess 42 and a lateral head recess 44. An extended portion 46 of the needle chamber permits some extra room to accommodate manufacturing variations in the length or type of needles with which the attachment piece 16 can be used. The head recess is adapted to receive the hooked end 28 of the needle and thereby hold the needle against longitudinal movement.

More particularly, the hooked end 28 of the needle 14 is held securely in the lateral recess 44 such that separation of the needle from the assembly cannot occur without shearing off the hooked end from the needle shaft. The diameter of the hooked end is selected to ensure that no shearing off occurs during normal operation or handling. In this way, the head recess 44 and the hooked end 28 of the needle 14 provide

positive engagement of the needle with the attachment piece and prevent relative movement between the needle and needle coupler during operation. This type of positive engagement reduces the likelihood of needle separation or ejection during operation. A collar 48 is formed at the open end of the needle chamber. The collar fits sufficiently close around the needle shaft 26 to assist in holding the needle against movement in the needle chamber and reducing vibration.

FIGS. 1-3 show that the split sections 20, 22 are clamped around the needle shaft 26 by the outer sleeve 24, which is slipped over the split sections and thereby compresses the split sections together. The compressing of the split sections provides the positive engagement of the hooked end 28 with the head recess 44. For easier assembly, the outer sleeve is preferably constructed from a heat-shrinkable material. As known to those skilled in the art, heat-shrinkable materials change in size and pliability depending on their temperature or immersion in a solution. For example, a heat-shrinkable material at room temperature may undergo size and pliability reduction when hot air is applied to the material or when the material is removed from a solution and the solution is allowed to evaporate. FIG. 3 shows that the outer sleeve 24 extends slightly from the split sections past the internal collar 48. This provides an extra measure of security to keep the sections clamped tightly around the needle shaft.

FIG. 3 also shows that the attachment piece 16 includes a coupling member portion 50 that is internally threaded. The threads of the coupling member portion can be screwed over the threaded post 18 of the applicator device needle coupler 12. The attachment piece 16 preferably is constructed from a plastic material that provides sufficient rigidity and durability to securely hold the needle during use. The foam ring 30 can be constructed of a foam plastic. Rather than being threaded, the coupling member and applicator coupler 12 can be fit together with a snap fit. Other coupling schemes will occur to those skilled in the art.

FIG. 4 shows the attachment piece 16 with the split sections 20, 22 opened and the outer sleeve 24 removed. FIG. 4 shows the split sections after they have been rotated away from the clamped position to show the internal construction, including the needle chamber 40 and the flange 34 and coupling member 50. When the integrated needle 10 is to be assembled, the needle 14 is placed within the needle chamber such that the hooked end rests in the lateral head recess, the split sections are closed together, and the outer sleeve 24 is slipped over the split sections. When the outer sleeve undergoes its size and pliability change as part of the heat-shrink process, the outer sleeve compresses the two split sections together, thereby clamping them around the needle and securely holding the needle against longitudinal movement. This improves the action of the needle during the tattoo procedure and reduces the likelihood of needle separation or ejection from the attachment piece.

FIG. 4 also shows that the split sections 20, 22 include raised prongs 52 projecting from one split section, straddling the needle chamber 40, that are received into recesses 54 of the opposite split section. Together, the prongs and recesses increase stability of the needle and reduce vibration and movement of the needle 14 within the attachment piece 16.

FIG. 5 shows the internal assembly of a permanent pigment applicator device 60. The applicator device includes a body portion 62 and a grip section 64, which is slidably and detachably attached to a flange 66 of the body by an interference or friction fit. Within the body 62 is a conventional drive mechanism 68, such as an electric motor.

The drive mechanism rotates a shaft 70 that in turn causes a rocker arm 72 to reciprocate about a pivot pin 74. For reduced cost and lighter weight, the rocker can be constructed of a plastic material. Other suitable drive arrangements will occur to those skilled in the art.

The particular drive mechanism of the preferred embodiment is described in greater detail in the above-referenced Ser. No. '936 U.S. patent application entitled "Permanent Pigment Applicator Having a Detachable Needle Coupler". The rocker arm 72 is pivotally coupled to the needle coupler 12 by a coupling pin 75 of the needle coupler. As described in the above-referenced patent application, the coupling pin is adapted to be coupled to the rocker arm by an interference fit so that it can be removed, if desired, from the drive mechanism in a relatively easy manner. FIG. 5 also shows that the grip section 64 includes a collar 76 and a detachable needle cup 78 that provides support to the needle 14 during its reciprocal motion and can be filled with pigment or ink. In this regard, the sponge 30 helps reduce migration of ink up the needle toward the applicator device, thereby reducing the likelihood of contamination. The sponge also moves with the needle within the grip section and provides a stabilizing mass that reduces vibration of the needle during the tattoo procedure.

FIG. 6 shows an alternative embodiment of a needle and attachment piece constructed in accordance with the present invention. As with the embodiment described above, the attachment piece 16 includes two split sections 20 and 22 that form a needle chamber when clamped together. In the FIG. 6 embodiment, however, the needle 80 does not have a hooked end, but, rather, has an enlarged bulbous end 82. The bulbous end is sized to fit within a head recess 84 of the needle chamber. An internal collar 86 formed by the split sections is then clamped around the needle just below the bulbous end by the outer sleeve 24 to provide positive engagement of the needle with the attachment piece. In this way, the bulbous end 82 is held securely against longitudinal movement such that separation of the needle from the assembly cannot occur without shearing off the bulbous end from the needle shaft. The diameter of the bulbous end is selected to ensure that no shearing off occurs during normal operation or handling. As with the prior embodiment described above, such a construction reduces the likelihood of needle separation or ejection from the attachment piece. The integrated needle can be attached and detached to the needle coupler 12 as described above.

Thus, an integrated needle constructed in accordance with the present invention provides a needle that can be attached and detached easily without direct handling of the needle and with reduced risk of contamination. The integrated needle includes an attachment piece that holds the needle shaft securely against longitudinal movement and ejection, thereby improving the ease with which the tattoo procedure can be carried out. The integrated needle conveniently includes a foam ring that reduces migration of pigment up the needle to the applicator device and increases stability of the needle during the tattoo procedure.

The present invention has been described above in terms of presently preferred embodiments so that an understanding of the present invention can be conveyed. There are, however, many configurations for permanent pigment applicator devices and associated needles not specifically described herein but with which the present invention is applicable. The present invention should therefore not be seen as limited to the particular embodiments described herein, but rather, it should be understood that the present invention has wide applicability with respect to applicator devices and needles

generally. All modifications, variations, or equivalent arrangements that are within the scope of the attached claims should therefore be considered to be within the scope of the invention.

I claim:

1. An integrated needle for use with a permanent pigment applicator device having a needle coupler that is coupled to a needle drive mechanism, the integrated needle comprising:
 - a needle having an elongated shaft portion and a head at a top end; and
 - an attachment piece that receives the needle and is detachably and coaxially coupled to the needle coupler for detachment after each use, wherein the attachment piece includes a head recess that holds the needle head, thereby preventing longitudinal movement of the needle head in the needle chamber;
 - wherein the head of the needle is hooked and the head recess is adapted to receive the hooked head of the needle and hold the needle head against longitudinal movement.
2. An integrated needle for use with a permanent pigment applicator device having a needle coupler that is coupled to a needle drive mechanism, the integrated needle comprising:
 - a needle having an elongated shaft portion and a head at a top end; and
 - an attachment piece that receives the needle and is detachably and coaxially coupled to the needle coupler for detachment after each use, wherein the attachment piece includes a head recess that holds the needle head, thereby preventing longitudinal movement of the needle head in the needle chamber; wherein:
 - the head of the needle is a bulbous shape and the head recess includes a collar that clamps the needle shaft portion just below the needle head, thereby preventing longitudinal movement of the needle head in the needle chamber.
3. An integrated needle for use with a permanent pigment applicator device having a needle coupler that is coupled to a needle drive mechanism, the integrated needle comprising:
 - a needle having an elongated shaft portion and a head at a top end; and
 - an attachment piece that receives the needle and is detachably and coaxially coupled to the needle coupler for detachment after each use, wherein the attachment piece includes a head recess that holds the needle head, thereby preventing longitudinal movement of the needle head in the needle chamber;
 - wherein the attachment piece is formed from split sections and the split sections are clamped around the needle shaft portion by the force of an outer sleeve that is slipped over the split sections and compresses the split sections together; and
 - wherein the attachment piece includes a foam ring that fits around the outer circumference of the split sections.
4. An integrated needle as defined in claim 3, wherein the attachment piece further includes an outer flange against which the foam ring rests.
5. An integrated needle for use with a permanent pigment applicator device having a needle coupler that is coupled to a needle drive mechanism, the integrated needle comprising:
 - a needle having an elongated shaft portion and a head at a top end; and
 - an attachment piece that receives the needle and is detachably and coaxially coupled to the needle coupler for detachment after each use, wherein the attachment

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piece includes a head recess that holds the needle head, thereby preventing longitudinal movement of the needle head in the needle chamber;

wherein the attachment piece is formed from split sections and the split sections are clamped around the needle shaft portion by the force of an outer sleeve that is slipped over the split sections and compresses the split sections together; and

wherein the outer sleeve is constructed from a heat shrinkable material.

6. An integrated needle for use with a permanent pigment applicator device having a needle coupler that is coupled to a needle drive mechanism, the integrated needle comprising:

a needle having an elongated shaft portion and a head at a top end; and

an attachment piece that receives the needle and is detachably and coaxially coupled to the needle coupler for detachment after each use, wherein the attachment piece includes a head recess that holds the needle head, thereby preventing longitudinal movement of the needle head in the needle chamber; wherein:

the attachment piece is formed from split sections and the split sections are clamped around the needle shaft portion by the force of an outer sleeve that is slipped over the split sections and compresses the split sections together;

the attachment piece includes a coupling member having a recess that detachably receives the needle coupler; and

the coupling member recess is threaded and receives a threaded post of the needle coupler.

7. An integrated needle for use with a permanent pigment applicator device having a needle coupler, the integrated needle comprising:

a needle having a shaft and a head; and

attachment means for receiving the needle and securely holding the head of the needle against longitudinal movement relative to the needle coupler and for detachably coupling to the needle coupler of the permanent pigment applicator device coaxially for detachment after each use, the attachment means comprising:

split sections that form a generally cylindrical needle chamber that receives the needle and can be closed around the needle shaft;

an outer sleeve that fits around the split sections and clamps them tightly around the needle head; and

an elongated coupling member that is detachably coupled to the permanent pigment applicator device; wherein:

the needle head is hooked at one end; and

the needle chamber of the attachment means includes a head recess adapted to receive the hooked head of the needle and hold the needle head against relative longitudinal movement.

8. An integrated needle as defined in claim 7, wherein:

the needle chamber includes an internal collar that is clamped around the needle shaft by the force of the outer sleeve when the outer sleeve is slipped over the split sections and thereby compresses the split sections together.

9. An integrated needle as defined in claim 8, wherein:

the coupling member of the attachment means includes a recess that detachably receives a post of the needle coupler.

10. An integrated needle as defined in claim 9, wherein:

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the coupling member recess is internally threaded and the needle coupler post is externally threaded such that the coupling member recess receives the threaded post and thereby is coupled to the needle coupler.

11. An integrated needle for use with a permanent pigment applicator device having a needle coupler, the integrated needle comprising:

a needle having a shaft and a head; and

attachment means for receiving the needle and securely holding the head of the needle against longitudinal movement relative to the needle coupler and for detachably coupling to the needle coupler of the permanent pigment applicator device coaxially for detachment after each use;

wherein the attachment means comprises:

split sections that form a generally cylindrical needle chamber that receives the needle and can be closed around the needle shaft;

an outer sleeve that fits around the split sections and clamps them tightly around the needle head; and

an elongated coupling member that is detachably coupled to the permanent pigment applicator device; wherein:

the needle head has a bulbous shape; and

the needle chamber of the attachment means includes a shaft recess and a head recess separated by an internal collar that clamps around the needle shaft just below the needle head and thereby holds the needle head so as to prevent longitudinal movement of the needle head in the needle chamber.

12. A permanent pigment applicator device comprising:

a body portion;

a drive mechanism contained substantially within the body portion;

an integrated needle including a needle having a shaft and a head, and an attachment piece that receives the needle and includes a head recess that holds the needle head, thereby preventing longitudinal movement of the needle head, the integrated needle being adapted for replacement after each application of permanent pigment and for axial coupling; and

a needle coupler that is detachably coupled to the integrated needle and detachably and axially coupled to the drive mechanism;

wherein the attachment piece comprises:

a generally cylindrical needle chamber that receives the needle head; and

an elongated coupling member that is detachably coupled to the needle coupler; and wherein:

the needle head is hooked at one end; and

the needle chamber of the attachment piece includes a head recess that receives the hooked head of the needle and holds the needle head against longitudinal movement.

13. A permanent pigment applicator device comprising:

a body portion;

a drive mechanism contained substantially within the body portion;

an integrated needle including a needle having a shaft and a head, and an attachment piece that receives the needle and includes a head recess that holds the needle head, thereby preventing longitudinal movement of the needle head, the integrated needle being adapted for replacement after each application of permanent pigment and for axial coupling; and

- a needle coupler that is detachably coupled to the integrated needle and detachably and axially coupled to the drive mechanism;
- wherein the attachment piece comprises:
- a generally cylindrical needle chamber that receives the needle head; and
 - an elongated coupling member that is detachably coupled to the needle coupler; and wherein:
- the needle head has a bulbous shape at one end; and
- the needle chamber of the attachment piece includes a shaft recess and a head recess separated by an internal collar that clamps around the needle shaft just below the needle head and holds the needle head in the needle chamber, thereby preventing longitudinal movement of the needle head in the needle chamber.
14. A permanent pigment applicator device comprising:
- a body portion;
 - a drive mechanism contained substantially within the body portion;
 - an integrated needle including a needle having a shaft and a head, and an attachment piece that receives the needle and includes a head recess that holds the needle head, thereby preventing longitudinal movement of the needle head, the integrated needle being adapted for replacement after each application of permanent pigment and for axial coupling; and
 - a needle coupler that is detachably coupled to the integrated needle and detachably and axially coupled to the drive mechanism;
- wherein the attachment piece comprises:
- a generally cylindrical needle chamber that receives the needle head; and
 - an elongated coupling member that is detachably coupled to the needle coupler; and
- wherein the attachment piece includes a foam ring that fits around the outer circumference of the split sections and supplies pigment to the needle shaft.
15. A permanent pigment applicator device as defined in claim 14, wherein:
- the attachment piece is formed from split sections and the internal collar is clamped around the needle shaft by the force of an outer sleeve that is slipped over the split sections and thereby compresses the split sections together.
16. A permanent pigment applicator device as defined in claim 15, wherein:
- the attachment piece includes a recess that detachably receives a post of the needle coupler.
17. A permanent pigment applicator device comprising:
- a body portion;
 - a drive mechanism contained substantially within the body portion;

- an integrated needle including a needle having a shaft and a head, and an attachment piece that receives the needle and includes a head recess that holds the needle head, thereby preventing longitudinal movement of the needle head, the integrated needle being adapted for replacement after each application of permanent pigment and for axial coupling; and
- a needle coupler that is detachably coupled to the integrated needle and detachably and axially coupled to the drive mechanism;
- wherein the attachment piece includes a recess that detachably receives a post of the needle coupler; and
- wherein the attachment piece recess is internally threaded and the needle coupler post is externally threaded such that the attachment piece recess receives the threaded post and thereby is coupled to the needle coupler.
18. A permanent pigment applicator device comprising:
- a body portion;
 - a drive mechanism contained substantially within the body;
 - an integrated needle including a needle having a shaft and a head, and an attachment piece that receives the needle and includes a head recess that holds the needle head, thereby preventing longitudinal movement of the needle head, the integrated needle being adapted for replacement after each application of permanent pigment and for axial coupling; and
 - a needle coupler that is detachably coupled to the integrated needle and detachably and axially coupled to the drive mechanism;
- wherein the needle coupler includes a coupling pin that is received by the drive mechanism and thereby detachably couples the needle coupler to the drive mechanism.
19. A permanent pigment applicator device as defined in claim 18, wherein the coupling pin is received in an eye of the drive mechanism to define a pivot axis and includes an enlarged end that provides an interference fit between the coupling pin and the drive mechanism so that the needle coupler is releasably held in engagement with the drive mechanism and can pivot about the pivot axis without disengaging from the drive mechanism.
20. A permanent pigment applicator device as defined in claim 19, wherein the drive mechanism includes a rocker assembly having a rocker that is pivotally supported by a rocker pin and contains the pin-receiving eye.
21. A permanent pigment applicator device as defined in claim 20, wherein the axis of the rocker pin is parallel to the axis of the needle coupler coupling pin.
22. A permanent pigment applicator device as defined in claim 21, wherein the rocker assembly is constructed from a plastic material.

* * * * *



①9 BUNDESREPUBLIK
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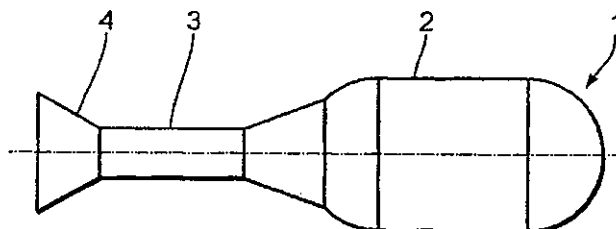
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⑤4 Farbbehälter für Tattoo- und Permanent-Make-up-Farbe

⑤1 Farbbehälter für Tattoo- oder Permanent-Make-up-Farbe, gekennzeichnet durch einen Behälterkörper (2) aus einem sterilisierbaren, weichen Kunststoffmaterial mit einem für eine einzige Tattoo- oder Permanent-Make-up-Behandlung geeigneten Füllvolumen, und einen an den Behälterkörper (2) anschließenden, durch einen Einmalverschluß (4) dicht verschlossenen Pipettierhals (3).



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Farbbehälter für Tattoo- und Permanent-Make-up-Farbe

Die vorliegende Erfindung betrifft einen Farbbehälter, genauer gesagt, eine Farbpatrone oder Farbkartusche, für Tattoo- und/oder Permanent-Make-up-Farbe.

In der gegenwärtigen Praxis wird beim Aufbringen von Tattoo's oder Permanent-Make-up (MPU) die in die Haut einzutragende Farbe aus großen Farbvorratsbehältern, im allgemeinen großen Farbflaschen, entnommen und entweder direkt auf die Haut des Kunden aufgetragen oder mittels Spritzen, Tropfpipetten oder ähnlichen Hilfsmitteln in einen PMU- oder Tätowier-Stift eingefüllt, mit dessen Hilfe dann die Tätowierung aufgetragen wird. Die Füllmenge der Farbflaschen ist dabei bedeutend größer als die für einen Kunden benötigte Farbmenge. Eine Flasche wird daher für mehrere Tattoo's/Make up's bzw. mehrere Kunden verwendet.

Diese Verfahrensweise birgt gesundheitliche Risiken für die Kunden in sich. Beim Aufbringen von Tattoo's und Permanent-Make-up's werden Verzierungen in Form des gewünschten Musters durch Einstechen, Einritzen oder Einschlagen der Haut und Aufbringen der Farbe ausgeführt. Dabei wird die Haut des Kunden verletzt, so daß Blut oder Serum austreten kann. Dabei besteht die Gefahr, daß diese Körperflüssigkeit an die zum Umfüllen der Farbe aus den Vorratsfarbflaschen

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verwendeten Füllhilfsmittel kommt und in die Vorratsflasche verschleppt wird, so daß deren Sterilität verloren geht. Unter diesen Umständen können durch die Verwendung der gleichen Farbe und des gleichen Füllhilfsmittels bei mehreren Kunden Krankheiten wie Hepatitis oder AIDS übertragen werden.

Aber auch allein die längere Aufbewahrung der Farbe in dem relativ großen Vorratsbehälter und die ständige Entnahme kleinerer Mengen zur Behandlung der Kunden kann trotz aller Vorsichtsmaßnahmen die Verunreinigung der Farbe mit allen möglichen Schmutzteilen, Keimen und Bakterien verursachen und eine Hautinfektion oder ähnliches beim Kunden nach sich ziehen. Die Sterilität der Farbe kann somit trotz sorgfältiger hygienischer Maßnahmen nicht immer zuverlässig gewährleistet werden.

Die Erfindung hat sich deshalb die Aufgabe gestellt, die oben genannten Nachteile zu beseitigen und die Sterilität der Farbe für jeden Kunden, jedes Tattoo und jedes Permanent-Make up stets zuverlässig zu gewährleisten.

Die Aufgabe wird erfindungsgemäß dadurch gelöst, daß ein Farbbehälter zur Anwendung kommt, der nur jeweils soviel Farbe enthält, wie für eine Behandlung benötigt wird. Der erfindungsgemäße Farbbehälter ist gekennzeichnet durch einen Behälterkörper aus einem sterilisierbaren, weichen Kunststoffmaterial und einen an den Behälterkörper anschließenden, durch einen Einmalverschluß dicht verschlossenen Pipettierhals.

Die Farbbehälter können mit verschiedenen Füllvolumina hergestellt werden, vorzugsweise in den Größen von etwa 0,1 bis 10 ml. Vorzugsweise hat der Behälterkörper eine bauchige Form, um sein Entleeren zu erleichtern. Nach dem Befüllen werden die Behälter durch thermisches oder Ultraschallschweißen oder durch Verschmelzen des Pipettierhalses verschlossen.

Das Material für die Farbbehälter ist vorzugsweise ein thermoplastisches, bioverträgliches Kunststoffmaterial, das relativ weich und elastisch ist, so daß der Behälter manuell durch Ausdrücken entleert und die Farbe direkt auf die Haut des Kunden aufgetragen oder in den Farbbehälter eines Tätowier- oder PMU-Stiftes gefüllt werden kann.

In einer weiteren vorteilhaften Ausgestaltung der Erfindung ist der Farbbehälter so

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ausgebildet, daß er nach dem Öffnen formschlüssig mit einem Tätowier- oder PMU-Stift verbunden werden kann, so daß die Farbe direkt in den Farbbehälter des Stiftes abgegeben wird. Der Pipettierhals ist zu diesem Zweck derart geformt, daß er in eine entsprechende Aufnahme am Gehäuse eines Tätowier- oder PMU-Stiftes paßt oder auf einen Füllstutzen des Stiftes aufgesteckt werden kann. In einer weiteren vorteilhaften Ausgestaltung der Erfindung wird der Farbbehälter durch den Tätowier- oder PMU-Stift geöffnet und/oder entleert, beispielsweise durch Aufstechen des Einmalverschlusses beim Einstecken in die Aufnahme oder Aufstecken auf den Füllstutzen des Tätowier- oder PMU-Stiftes. Der Behälter wird so aufgesteckt, daß die Farbe von selbst in den Farbbehälter des Stiftes fließt.

In einer weiteren vorteilhaften Ausgestaltung der Erfindung werden die Farbbehälter nach dem Befüllen und Verschließen medizinisch sterilisierbar verpackt, in dieser Verpackung vorzugsweise durch Strahlung sterilisiert, verkauft, versandt und aufbewahrt.

Die Erfindung wird nachfolgend anhand von Ausführungsbeispielen erläutert. Die Figuren zeigen:

- Fig. 1 einen erfindungsgemäßen Farbbehälter;
- Fig. 2 eine Tattoo-Nadeldüse mit Farbbehälter beim manuellen Befüllen;
- Fig. 3 eine PMU-Nadeldüse mit Farbbehälter beim manuellen Befüllen;
- Fig. 4 einen PMU-Stift beim selbsttätigen Befüllen.

Figur 1 zeigt eine mögliche Ausführungsform der erfindungsgemäßen Farbpatrone oder -kartusche. Die Farbpatrone 1 besteht aus einem bauchigen Patronenkörper 2 mit daran angeformtem Pipettierhals 3, der mit einem dicht schließenden Einmal-Verschluß 4 verschlossen ist. Die Farbpatrone 1 ist aus einem weichen, elastischen, vorzugsweise thermoplastischen, bioverträglichen Kunststoffmaterial hergestellt. Durch Zusammendrücken des bauchigen Patronenkörpers 2 kann die Farbpatrone 1 manuell entleert werden. Die Farbe kann dann aus der Patrone 1 entweder direkt auf die Haut des Kunden aufgetragen werden oder aber, wie es in den Figuren 2 und 3 dargestellt ist, in eine Tattoo- oder PMU-Nadeldüse 5 bzw. 6 gefüllt werden, mit deren Hilfe die Tätowierfarbe auf die Haut des Kunden aufgetragen wird.

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In Fig. 4 ist die Spitze 7 eines PMU-Stiftes mit aufgesteckter Schutzkappe 8 dargestellt, die außerdem eine Aufnahme 9 für den Pipettierhals 3 der Farbpatrone 1 zum Befüllen des PMU-Stiftes aufweist, in der der Pipettierhals 3 der Farbpatrone 1 formschlüssig aufgenommen ist. Im vorliegenden Beispiel ist ein Füllstutzen 10 vorgesehen, auf den der Pipettierhals 3 der Farbpatrone 1 aufgesteckt wird. Der Einmalverschluß 4 kann entweder vor dem Aufstecken entfernt oder durch den Füllstutzen 10 geöffnet werden, beispielsweise durch Aufstechen.

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Schutzansprüche

1. Farbbehälter für Tattoo- oder Permanent-Make-up-Farbe, gekennzeichnet durch einen Behälterkörper (2) aus einem sterilisierbaren, weichen Kunststoffmaterial mit einem für eine einzige Tattoo- oder Permanent-Make-up-Behandlung geeigneten Füllvolumen, und einen an den Behälterkörper (2) anschließenden, durch einen Einmalverschluß (4) dicht verschlossenen Pipettierhals (3).
2. Farbbehälter nach Anspruch 1, dadurch gekennzeichnet, daß der Behälter (1) aus einem weichen, thermoplastischen, bioverträglichen Kunststoffmaterial besteht.
3. Farbbehälter nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß der Behälterkörper (2) bauchig ausgebildet ist und der Behälter (1) Füllvolumen von 0,1 bis 10 ml besitzt.
4. Farbbehälter nach einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß der Behälter (1) nach dem Befüllen durch thermisches oder Ultraschallschweißen oder durch Verschmelzen des Pipettierhalses (3) verschlossen ist.
5. Farbbehälter nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß der Pipettierhals (3) und/oder der Einmalverschluß (4) so ausgebildet ist, daß der Behälter formschlüssig mit einem Tätowier- oder Permanent-Make-up-Stift verbindbar ist.
6. Farbbehälter nach Anspruch 5, dadurch gekennzeichnet, daß der Pipettierhals (3) und/oder Einmalverschluß (4) so ausgebildet ist, daß der Behälter durch den Tätowier- oder Permanent-Make-up-Stift zu öffnen und/oder zu entleeren ist.
7. Farbbehälter nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß der Behälter durch Abtrennen eines Teiles des Pipettierhalses (3) zu öffnen ist.

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8. Farbbehälter nach einem oder mehreren der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß der Behälter nach dem Befüllen und Verschließen medizinisch sterilisierbar verpackt und in dieser Verpackung sterilisiert und bis zum Gebrauch aufbewahrt wird.

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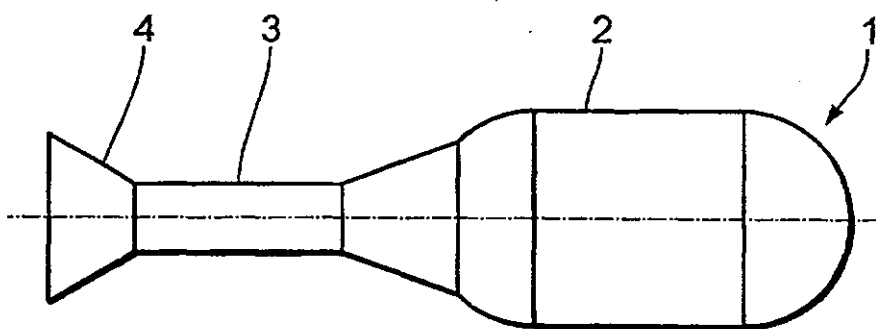


Fig. 1

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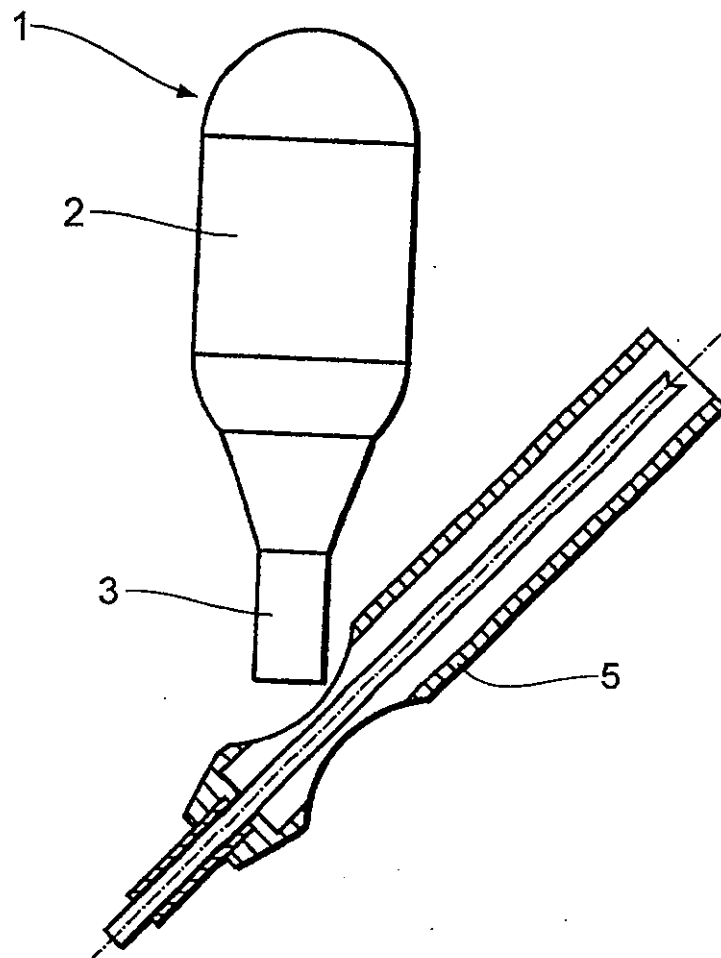


Fig. 2

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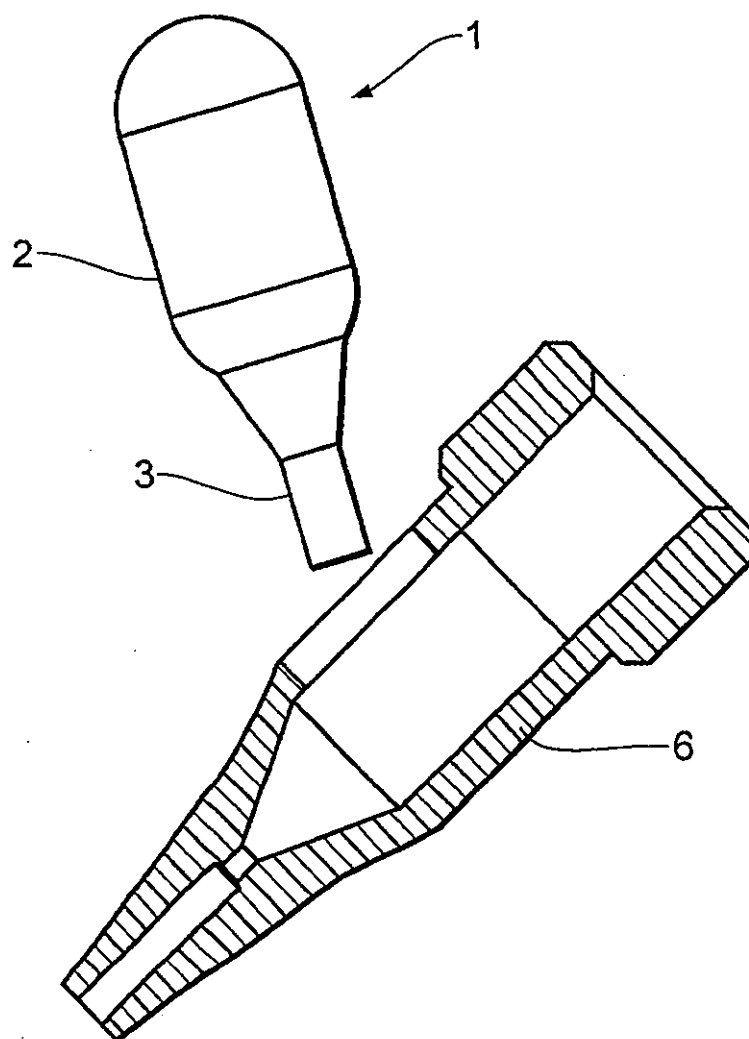


Fig. 3

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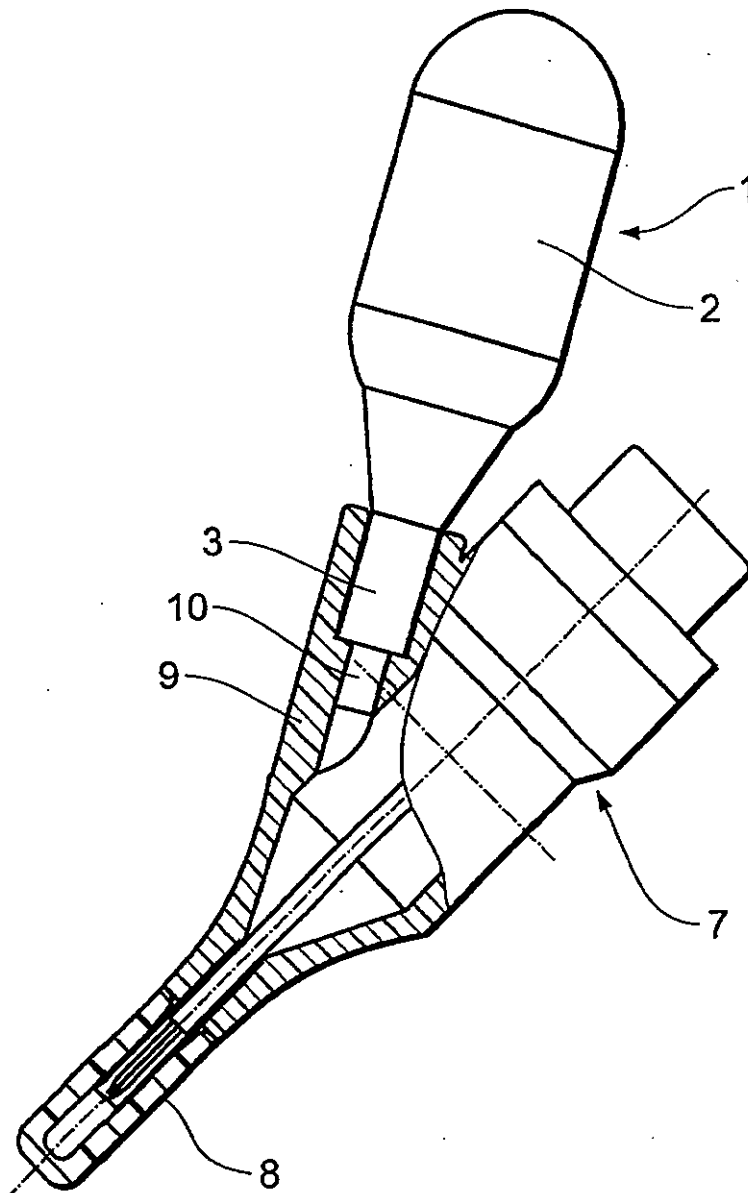


Fig. 4

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United States Patent [19]

Sarath et al.

[11] Patent Number: 4,798,582

[45] Date of Patent: Jan. 17, 1989

[54] NEEDLE CARTRIDGE

[75] Inventors: Alan Sarath, Teaneck, N.J.; James A. Mawhirt, Brooklyn, N.Y.

[73] Assignee: Permark Corp. c/o Sci/Med Advances Corp., Teaneck, N.J.

[21] Appl. No.: 113,947

[22] Filed: Oct. 27, 1987

[51] Int. Cl.⁴ B43K 5/00; A61F 2/64

[52] U.S. Cl. 604/47; 604/48;

[58] Field of Search 604/47, 48, 173;
128/316, 329 R, 333; 81/9.22

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Primary Examiner—Allen M. Ostrager

Attorney, Agent, or Firm—Schweitzer & Cornman

[57] ABSTRACT

A needle cartridge for a surgical operating pen or tattooing instrument, said cartridge having a reservoir filled with liquid pigment adapted to be discharged into the skin through a unique tri-needle assembly.

6 Claims, 2 Drawing Sheets

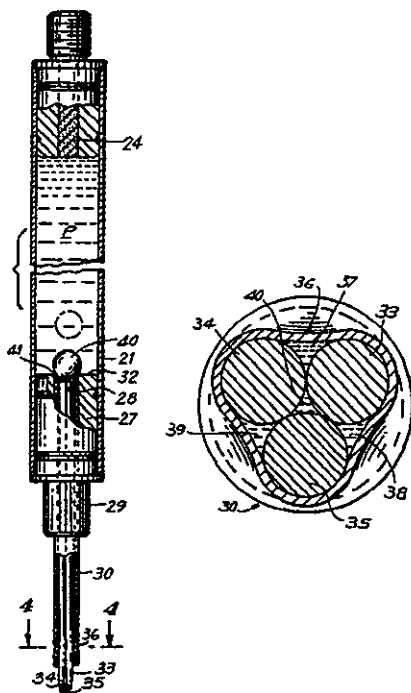


FIG. 1

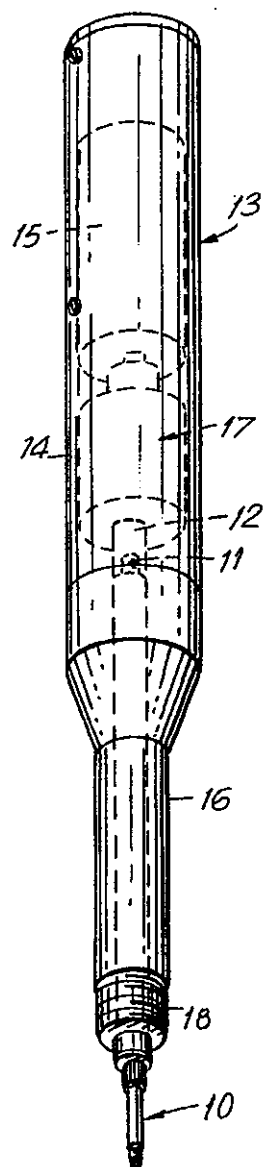
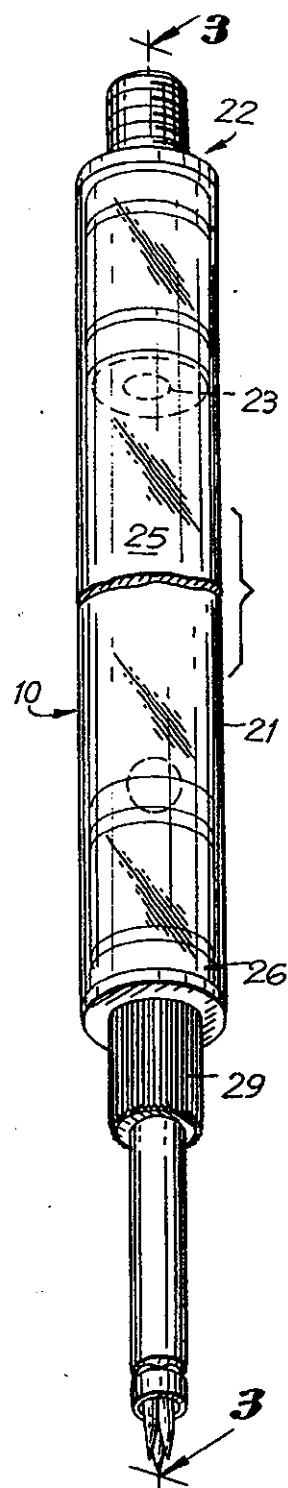


FIG. 2



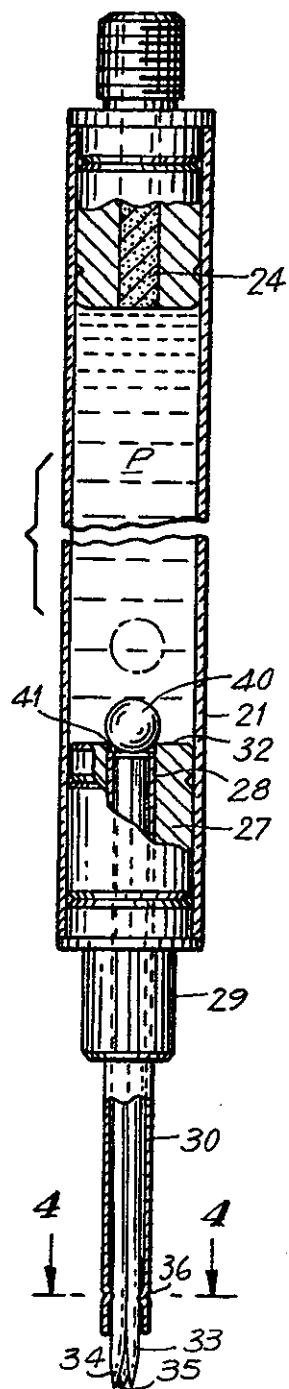


FIG. 3

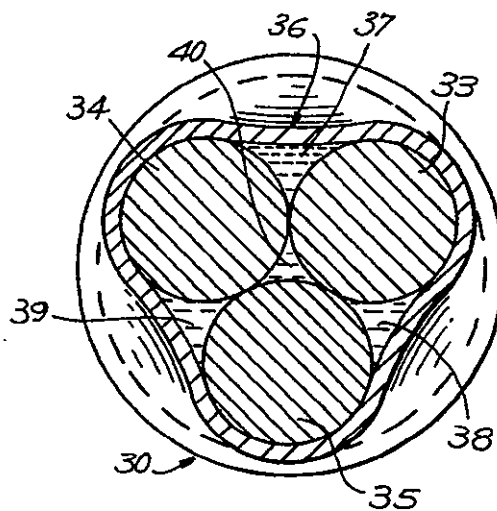


FIG. 4

NEEDLE CARTRIDGE

BACKGROUND OF THE INVENTION

The present invention is directed to improvements in surgical operating instruments of the type employed heretofore in cosmetic surgery, namely, the cosmetic surgery of the type in which tattooing procedures are employed to apply eyeliner to the edges of an eyelid by implanting a pigment solution along the edge of the eyelid and/or lash line, in eyebrow replacement or enhancement; and/or in corneal tattooing. In addition, instruments of this general type have been used by dermatologists for pigmentation at graft edges, for pigmentation in connection with hair transplants; as well as for pigmentation in connection with surgical reconstruction following mastectomy. Still further, instruments of this type may be used by physicians in connection with outlining tumors for chemo surgery, for marking oral tumors prior to radiation therapy or chemotherapy, as well as in connection with marking insertion sites of lumbar puncture needles.

The patent literature is replete with electrical tattooing machines. Representative of the prior art are U.S. Pat. Nos. 4,204,438; 4,159,659; 4,031,783; 4,508,106; and 4,644,952.

SUMMARY OF THE PRESENT INVENTION

Surgical tattooing instrumentation, as well as general tattooing instrumentation, heretofore involved the use of needles, either singular or in an array, mounted in pens or instruments which may be hand held for dipping of the exposed needles into an appropriate pigment solution which is to be applied sub-dermally to the skin of the subject. In accordance with the principles of the present invention, the pigment solution is delivered to the needles by new and improved cartridge in which the pigment solution is contained for continuous delivery from within the instrument to the exposed needle points.

More specifically, the exposed needles of the new cartridge are advantageously and uniquely arrayed in a triangular contiguous relationship with the centers of the abutting needles forming an equilateral triangle and with the outer peripheries of the needles being held together by an enveloping delivery tube which is permanently crimped about the needles. The interstices between the needles themselves and the walls of the delivery tube form four discrete passages for the flow of pigment solution from the cartridge reservoir to the exposed surface of the needles for delivery to the skin sites being punctured by the needles.

As a further specific aspect of the invention, the delivery tube which houses and supports the needles extends from its upper end in the pigment reservoir to the needle tips for providing communication between the reservoir and the operating points of the needles. The upper end of the delivery tube is selectively closed or valved by a steel ball which prohibits flow from the reservoir to the needles when the ball is seated in the exposed upper end of the delivery tube and which permits flow of pigment to the needles when it is unseated. As a still further aspect of the invention, the reciprocation of the new cartridge by the tattooing instrument moves the steel ball from its seated position to open a "delivery valve" and also provides a positive mixing

action of the pigment solution contained in the reservoir through the reciprocating movement of the ball.

For a more complete understanding of the present invention and its attendant advantages, reference should be made to the accompanying drawings taken in conjunction with the following detailed description of the invention.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front elevational view of a new and improved operating instrument mounting the new and improved cartridge of the present invention;

FIG. 2 is an enlarged perspective view of the new needle cartridge of the present invention;

FIG. 3 is a cross-sectional view of the needle taken along line 3--3 of FIG. 2; and

FIG. 4 is an enlarged cross-sectional view taken along line 413 4 of FIG. 3, showing the fluid delivery passage configured in accordance with the principles of the present invention.

DETAILED DESCRIPTION OF THE PRESENT INVENTION

Referring initially to FIG. 1, the needle cartridge 10 of the present invention is adapted to be mounted by a threaded screw connection 11 to the drive shaft 12 of an electrical tattooing instrument 13 of the general construction shown in U.S. Pat. No. 4,644,952, the disclosure of which is incorporated by reference herein. Such an instrument 13 includes an elongated housing 14 in which an electric motor 15 is disposed for powering a reciprocating shaft assembly 16 through an associated rotating cam assembly 17, the mechanical details for which may be discerned from the aforementioned U.S. Pat. No. 4,644,952. The new and improved needle assembly 10 of the present invention may be used with any reciprocating tattooing instrument or tattooing pen which is suitably modified or otherwise constructed to accept, by an appropriate threaded connection such as disclosed in FIG. 1, or otherwise by a suitable mechanical equivalent, the new and improved cartridge 10. The surgical operating instrument/tattooing pen illustrated in FIG. 1 also may be provided with a suitable nose cone (not shown) such as illustrated in the above-identified U.S. Pat. No. 4,644,952, which nose cone may be mounted over the exposed needle assembly 10 to leave only the tips of the needles projecting therethrough. The thread 18 shown in FIG. 1 will accommodate the threaded mounting of such a nose cone on the free end of the instrument.

Referring now to FIG. 2, the needle cartridge 10 of the present invention generally comprises an elongated, transparent, cylindrical reservoir tube 11 advantageously fabricated from transparent thermoplastic material to permit the viewing of the color and supply of pigmented tattooing solution housed therein. The upper end of the needle cartridge assembly is closed off by an end cap 22 which includes an orifice 23 extending completely therethrough. The orifice 23 is filled with a suitable porous filter medium 24 (see FIG. 3) to provide an air vent to the internal pigment reservoir 25 formed in the tube 21 between the upper cap 22 and a bottom cap 26. The bottom cap 26 includes a lug portion 27 which is fitted snugly within the lower end of the tube 21 and also includes an orifice 28 extending completely therethrough. Projecting downwardly from the bottom end of the tube 21 and forming a part of the end cap 26 is a straight knurled gripping portion 29 which may be

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used by a surgeon to hold the instrument at its lower end when a nose cap, such as described hereinabove, is not employed.

In accordance with the principles of the present invention, a steel delivery tube 30 extends through the end cap 26 to a point slightly below the innermost surface 32 of the end cap 26. The tube 30 houses and supports therein three elongated surgical steel needles 33, 34, 35 which are held together in contiguous relationship with their centers forming an equilateral triangle by crimped wall portions 36 which are deformed inwardly and intimately about the array of needles by an appropriate cold working/crimping process.

FIG. 4 illustrates the aforementioned interrelationship of the needles 33, 34, 35 banded by the crimped wall portion 36 in a manner whereby fluid delivery passages 37, 38, 39 and 40 are formed through the cooperation of the walls of the delivery tube 30 and the outer surfaces of the needles 33, 34, 35.

In accordance with the principles of the invention, a steel ball 40 is disposed within the reservoir 25 for seating in the opening 41 formed at the upper edge of the orifice 28 and at the surface 32, as best shown in FIG. 3. The ball 40, when seated in the orifice 41, closes off the reservoir 25 from the delivery tube 30 and establishes a delivery valve. However, when the motor 15 is energized to reciprocate the shaft 12 and thereby reciprocate the cartridge 10, the ball 40 is displaced and reciprocated along with the cartridge assembly, thereby opening the delivery tube 30 to communication with the pigment in the reservoir 25, as well as moving the steel ball 40 within the reservoir to provide a positive mixing of the pigment solution P ordinarily contained within the cartridge.

Advantageously, the delivery tubing 30 may be formed of hypodermic steel tubing having a diameter of 0.250 inches (outer) and 2.20 inches (inner); the needles may be No. 12 Sharps having a 0.014 inch diameter, the points of which needles as shown in the drawings are in a common plane.

It should be understood, of course, that the specific form of the invention herein illustrated and described is intended to be representative only, as certain changes may be made therein without departing from the clear teaching of the disclosure. Accordingly, reference should be made to the following appended claims in determining the full scope of the invention.

What is claimed is:

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1. A needle cartridge assembly for a surgical operating pen or tattooing instrument, comprising

(a) elongated cylindrical tube means;

(b) an upper end cap means generally closing the top end of said tube means;

(c) adapter means associated with said upper end cap means for mounting said needle cartridge within an operating instrument; said adapter means including an orific for air flow;

(d) a lower plug means closing the bottom end of said tube means and forming a pigment reservoir;

(e) liquid pigment filling said reservoir;

(f) a thin cylindrical discharge tube passing through said lower plug means;

(g) a tri-needle assembly comprising elongated tattooing needles supported in and projecting outwardly from said discharge tube;

(h) a steel ball adapted to be seated in a first mode upon the upper end of said discharge tube to prevent flow of pigment from said reservoir to said needle assembly and adapted to be displaced and moved within said reservoir in a second operating mode;

(i) a portion of said delivery tube proximate to its bottom end being crimped about and into contact with the outer surfaces of said needles thereby retaining said needles in intimate contiguous contact and cooperating therewith to define four discrete passages for pigment flow.

2. The cartridge of claim 1, in which said cylindrical tube means is fabricated of transparent plastic material.

3. The cartridge of claim 1, further characterized in that

(a) said lower plug means has an elongated cylindrical gripping surface projecting downwardly from said tube means;

(b) said projecting gripping surface is provided with a straight knurl.

4. The cartridge of claim 1, in which said adapter means is a threaded connector adapted for association with a reciprocating drive mechanism.

5. The cartridge of claim 1, in which said needles are approximately 0.014 inch in diameter and have sharpened tips disposed on a common plane.

6. The cartridge of claim 1, in which

(a) an air vent is formed in said upper end cap means.

(b) a filter means is disposed in said air vent.

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United States Patent [19]

Angres

[11] Patent Number: 4,508,106

[45] Date of Patent: Apr. 2, 1985

[54] MICROSURGICAL METHOD FOR APPLYING PERMANENT EYELID LINER

[75] Inventor: Giora G. Angres, North Las Vegas, Nev.

[73] Assignee: Angres Clinic, Ltd., North Las Vegas, Nev.

[21] Appl. No.: 545,114

[22] Filed: Oct. 24, 1983

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 454,146, Feb. 14, 1983, abandoned.

[51] Int. Cl.³ A61B 17/00

[52] U.S. Cl. 128/1 R; 128/303 R; 81/9.22; 132/88.7

[58] Field of Search 128/316, 76.5, 303 R, 128/1 R, 355; 604/22, 46, 47, 290, 294, 310; 81/9.22; 132/88.7; 427/1, 2

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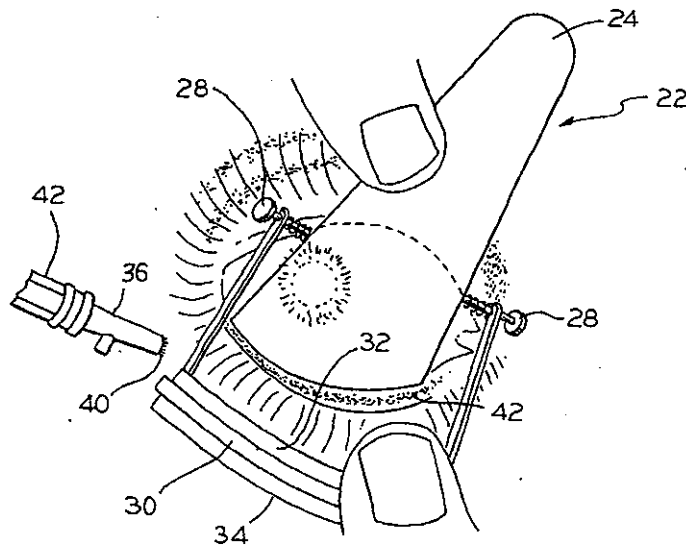
Primary Examiner—Michael H. Thaler

Attorney, Agent, or Firm—Laff, Whitesel, Conte & Saret

[57] ABSTRACT

A method and apparatus for applying a permanent or semi-permanent cosmetic eye liner to the edge of an eye lid by implanting a pigment solution by surgical procedure along the edge of the eye lid and/or the lash line. The eye lid is anesthetized and stabilized, and a series of needles coated with a pigment solution is inserted into the edge of the eye lid to implant the pigment solution into the dermal and/or epidermal layer of skin beneath the eye lid edge. A guide mechanism is provided to guide the implantation of pigment solution in the proper, pre-selected location.

7 Claims, 12 Drawing Figures



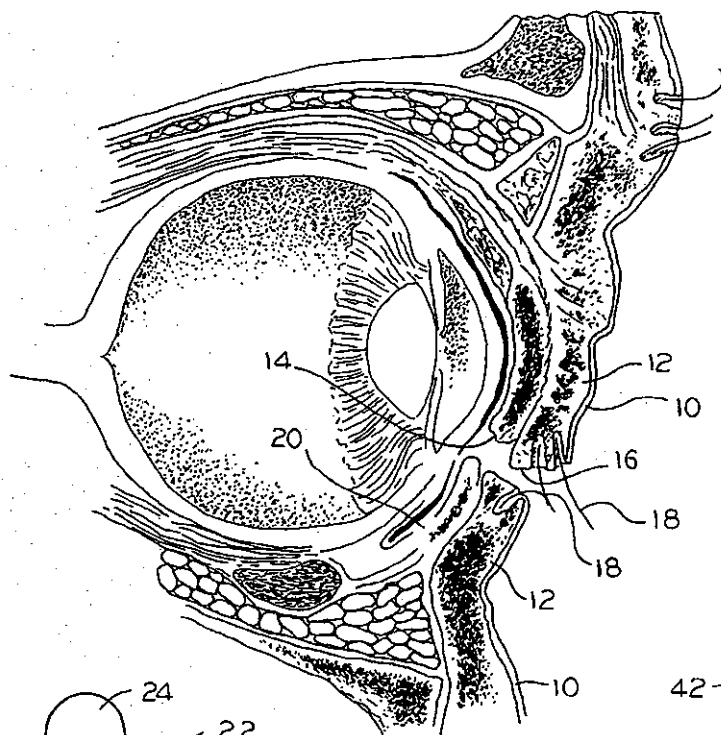


FIG. 1

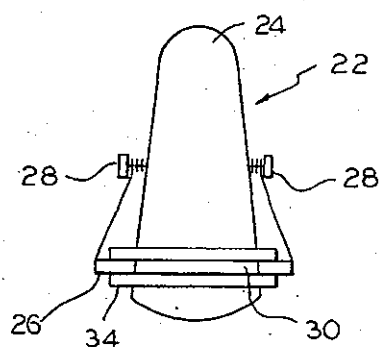


FIG. 2

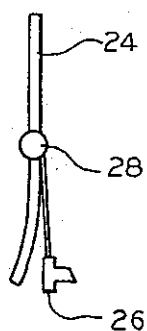


FIG. 3

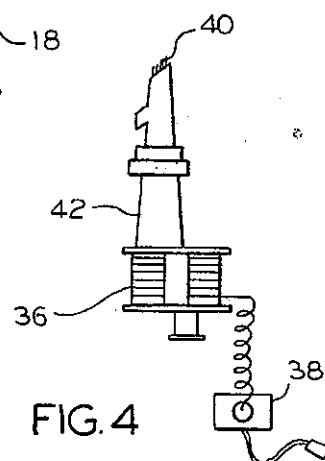


FIG. 4

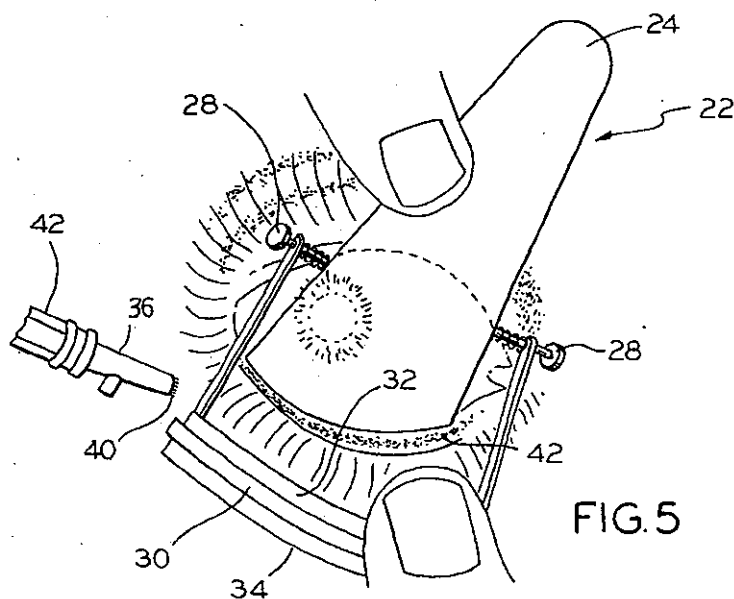


FIG. 5

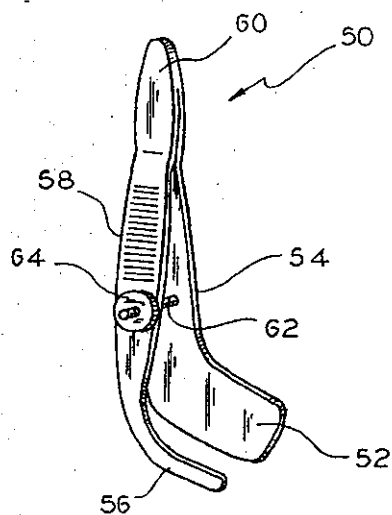


FIG. 6

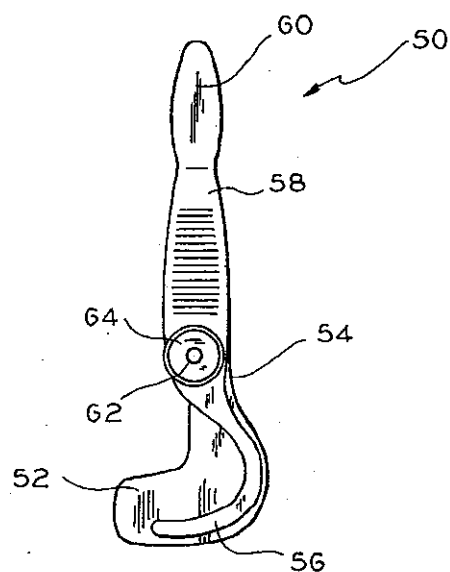
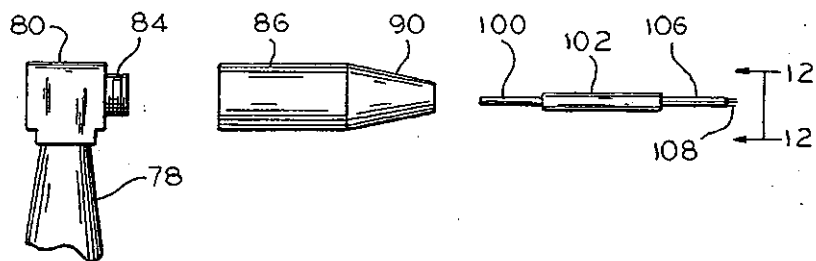
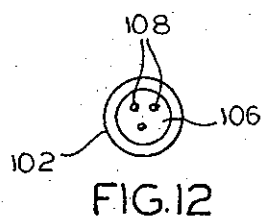
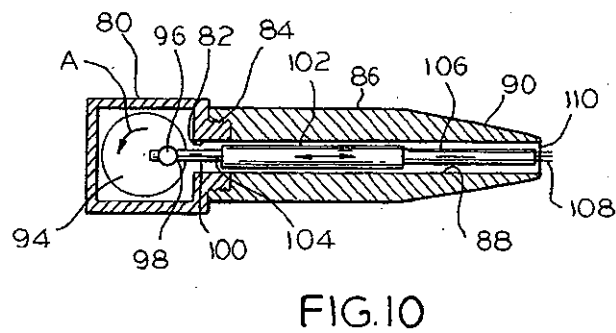
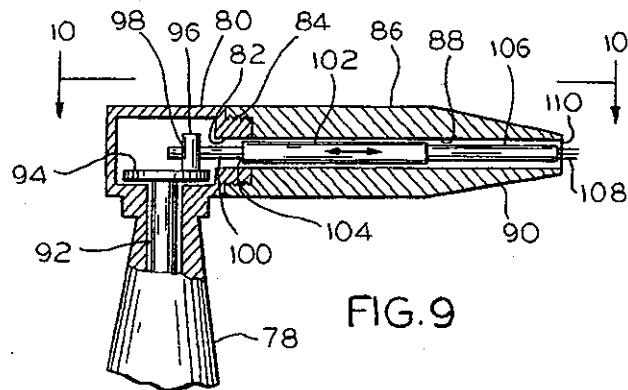
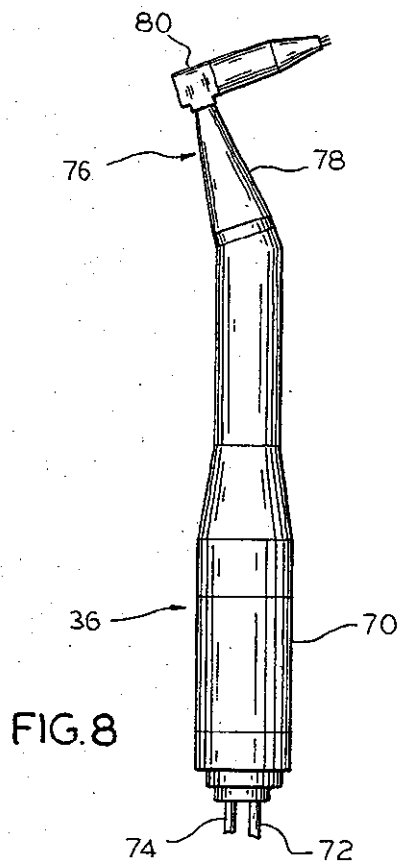


FIG. 7



MICROSURGICAL METHOD FOR APPLYING PERMANENT EYELID LINER

This is a continuation-in-part of Ser. No. 454,146, 5
filed Feb. 14, 1983, now abandoned.

The present invention relates generally to a method
and apparatus to apply a permanent cosmetic eye lid
liner, and in particular to a novel method and apparatus
for safely injecting a coloring medium into the edges of 10
the eye lid to produce a cosmetic enhancement of the
eye area.

BACKGROUND OF THE INVENTION

The eye-lids are thin curtains of skin, conjunctiva, 15
and striated and smooth muscle that contain a plate of
fibrous tissue known as the tarsus. The lids function in
distributing tears over the anterior surface of the eye
and in limiting the amount of light entering the eye.
Thus, the primary function of the lid is to protect the 20
eyeball.

Since ancient times, the eyes have also been a signifi-
cant means of attraction between the genders. Enhance-
ment of the eye by framing the lids with exotic paint or
coloring has been known to every culture since the days 25
of Cleopatra, and pencil and liquid eye liners and mas-
cara form an important part of today's cosmetic market.
Practically every woman enhances the outline of her
eye before going out socially or otherwise.

However, up to now, certain women could not wear 30
eye liner because of several reasons. Some women have
visual impairments such as cataracts or the like and
cannot see well enough to apply eye liner using conven-
tional means without taking a chance that the sharp
edge of an application instrument will pierce the eye. 35
Yet other women may have physical handicaps affect-
ing their hands which prevent them from applying eye
liner with a steady stroke. In some instances, a wearer of
contact lenses cannot wear conventional eye make-up.

Thus, there are numerous women whose physical 40
appearance and emotional well being suffer because of
their lack of the ability to enhance their appearance by
using normal eye liner make-up. Therefore, an object of
the present invention is to provide a procedure and
apparatus for cosmetic surgery to enhance the appear- 45
ance of the eyes by surgically implanting color pig-
ments under the skin layers of the lash line or lid margin
of the eyes.

Another object of the present invention is to provide 50
an apparatus for simultaneously holding the eye lid in
place and acting as a guide for the implantation of col-
ored pigments beneath the skin of the lash line or lid
margin.

Still another object of the present invention is to 55
provide a procedure for implanting color pigments
beneath the skin of the lash line or lid margin, which
procedure is performed under a microscope to provide
greater safety and efficiency in the implantation pro-
cess.

Yet another object of the present invention is to pro- 60
vide a procedure for permanently implanting colored
pigments into the dermal and/or epidermal layer of the
lash line or lid margin, which includes methods of appli-
cation that prevent smearing or smudging of the eye
liner, and which avoids discomfort to the patient to 65
whom the procedure is being applied.

A further object of the present invention is to provide
a permanent and/or semi-permanent eye liner to the

dermal and/or epidermal layer of the skin, whereby
additional colored pencil or liquid eye liner can be ap-
plied directly to the skin surface over the permanent eye
liner.

Another object of the present invention is to provide
an apparatus for implanting colored pigments into the
dermal and/or epidermal layer of the eyelash line or lid
margin, which apparatus includes a novel reciprocating
needle structure in combination with an enveloping
cone which surrounds and protects the needle structure,
ensures the proper degree of penetration of the needle
structure into the skin, and stores pigment solution adja-
cent the needle structure by means of capillary action.

These and other objects and features accomplished
by the present invention will be better understood with
reference to the following summary of the invention,
drawings, and detailed description of a preferred em-
bodiment thereof.

SUMMARY OF THE INVENTION

A method is provided for applying a permanent cos-
metic liner to the edge of an eye lid comprising the steps
of anesthetizing the portion of the eye lid in the area
adjacent the edge of the lid, stabilizing the portion of
the eye lid to which the permanent liner is to be applied,
and penetrating the skin with pigment solution along a
line defining the intended location of the eye liner and
into the deep layers of the skin and/or lid margins and
lash line.

The apparatus for penetrating the skin with pigment
solution comprises a unique reciprocating needle struc-
ture in combination with an enveloping cone structure
which protects the needles, ensures proper penetration,
and stores pigment solution.

Also, apparatus is provided to stretch and stabilize
the eye lid in preparation for a surgical procedure in
which a permanent eye liner is implanted in the edge of
the eye lid. The apparatus consists of an eye protector
element and a guide element, whereby a device for
implanting a pigment solution follows the guide element
to ensure that the pigment is implanted in the proper
pre-selected location of the eye lid.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 illustrates in cross section a typical eye and lid
construction, showing the approximate position in the
dermal layer of the lids where the colored pigments are
implanted by the disclosed procedure;

FIG. 2 is a plan view of an embodiment of a novel
combination eye protector and guide device used in
association with the procedure forming part of the pres-
ent invention;

FIG. 3 is a side view of the combination eye protec-
tor and guide device illustrated in FIG. 2;

FIG. 4 is a detail view of the guide portion of the
device shown in FIG. 2, illustrating a pigment applica-
tion apparatus inserted through said guide;

FIG. 5 is a schematic illustration of the procedure of
the present invention being applied to an eye lid, using
the combination eye protector and guide of FIG. 2;

FIG. 6 is a plan view of a second embodiment of a
combination guide device used in association with the
present invention; and

FIG. 7 is a side view of the device illustrated in FIG.
6.

FIG. 8 is a plan view of the reciprocating drive mech-
anism, needle and cone structure for implanting pig-

ment into the skin in accordance with the teachings of the present invention;

FIG. 9 is a schematic detail view of the reciprocating drive mechanism for the needle structure, the needle structure per se, and the protective cone which envelops the needle structure;

FIG. 10 is a schematic top detail view of the structure shown in FIG. 9, taken along the line 10—10;

FIG. 11 is an exploded view of the reciprocating drive head, cone, and needle structure illustrated in FIG. 9; and

FIG. 12 is an end view of the needle structure of the present invention, taken along the line 12—12 in FIG. 11.

DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. 1 is a schematic cross section of the eyelid and anterior orbit. Both the upper and lower eyelids have an epidermal layer 10 and a dermal layer 12 immediately beneath the epidermal layer 10. A tarsal portion 14 is located beneath the dermal layer 12 of both the upper and lower lid, and ends adjacent the lid margins 16. The tarsal portion 14 of each lid is involved in reflex blinking. Both upper and lower lid margins 16 contain a line of pores through which lashes 18 extend. The line of these lashes extending laterally across each lid margin 16 is known as the lash line. The lid margins 16 contain the mucocutaneous junction of skin 10 and conjunc-

tion 20 called the gray line. The present invention relates to dermography, which is the process of drawing on the skin, and more particularly on the inner and/or outer lid margins, such as along the lash line or gray line. In describing the present invention, first the method of applying a permanent eye liner to the lash line or gray line will be described.

The patient is first prepared and draped for normal outpatient surgical procedures. Next, an akinesia or local anesthetic is applied to immobilize the lid and to relax the tarsal muscle 14 thereby preventing blinking during the surgical procedure. Any intradermal anesthetic can be used, such as solutions of novocaine, xylocaine, or the like. In the preferred embodiment, an anesthetic solution is used comprising 2 cc 2% xylocaine, epinephrine, and hyaluronidase. The epinephrine functions to constrict the blood vessels to decrease the possibility of bleeding. The hyaluronidase functions as a spreading factor to aid in spreading the local anesthetic faster and more evenly through the lid tissue by opening the dermal tissue under the skin. This permits a smaller needle to be used for implantation; and allows for a lesser degree of skin penetration.

The anesthetic solution is injected by a needle in or around the eye lid area. In the preferred embodiment, a 27 gauge needle was used to make an interdermal wheal 1 mm on the outside of the lateral or outside angle of the upper and lower lid. After the needle has been removed, the skin is massaged for a few minutes to allow skin edema or thickening to settle.

Next, a sterile tipped marking pen is used to mark and delineate the site on the lid margins where the implantation is to be applied, according to the patient's specifications. The eye lid is held in position such that the margin to be implanted is exposed to the application process. A lubricant such as decadron 1% ophthalmic ointment is applied topically to the site to be implanted. The lid is adequately stretched and stabilized, either by hand or by using a device such as one of the two combination

eye protector and guide devices illustrated in FIGS. 2-7.

A series of applicator needles are next coated with a pigment solution to be inserted beneath the skin of the margin of the eyelid. In the preferred embodiment, a tattoo-like applicator may be used, calibrated to penetrate only a short distance into the skin, such as 1/54th of an inch. This ensures that the pigment solution is inserted into the dermal, and not the epidermal, layer of tissue. An even 1.5 mm line is next drawn with a nasal to temporal motion across the eye lid, or temporal to nasal, or a combination of both.

The same procedure is then applied to the fellow lid of the same eye, and then the same procedures are applied to the upper and lower lids of the other eye. An antiseptic ointment is then placed on the lids to aid in the prevention of swelling and secondary infection.

In the preferred embodiment, the above procedures were accomplished under a microscope. However, as the operator gains additional skill through experience in performing the above-described process, the use of a microscope may not be necessary.

Part of the procedure stated above requires stretching and stabilizing the eyelid during injection of the pigment solution. FIGS. 2-5 illustrate a first embodiment of a combination eye protector and guide device which is adapted to stretch and stabilize the skin, as well as protect the eye and assist in guiding the implantation needle. The device is generally designated by the numeral 22, and comprises an eye protective element 24 pivotally connected to a lid guide element 26 by means of adjustable screws 28. The guide 28 has a slit portion 30 extending from one side to the other, with shield or screen elements 32, 34 extending above and below the lengthwise extent of slit portion 30. The relative position of guide 26 relative to eye protective element 24 can be stabilized by tightening screws 28.

FIG. 4 illustrates an implanting device 36 controlled by a reostat 38, and having a series of implantation needles 40 extending from a body portion 42. Needles 40 are adapted to extend through slit 30 of guide 26, and contact the eye lid for implantation of the pigment as described above.

FIG. 5 is a schematic illustration of the device 22 placed adjacent an eye lid which is about to be implanted with pigmentation by means of implanting device 36. The lower edge of eye protective element 24 is placed inside the gray line 42 of an eye lid to stretch the lid and at the same time provide a protective screen over the eye. Shield elements 32, 34 are pressed against the eye lid, which extends the lid and exposes the proper area to be implanted. Screws 28 are tightened so that guide 26 and protective element 24 form a single, rigid entity. Next, needles 40 are extended into slit 30 of guide 26, and the needles are moved laterally along the length of slit 30 until the appropriate length of eye lid is impregnated. Guide 26 is set such that the implanted pigmentation extends along the eye lid margin or along the lash line. After completion of the implantation process, screws 28 are loosened, and the device 22 is removed from the eye.

FIGS. 6 and 7 disclose a second embodiment of a guide device that can be used in association with the above-described process. The device is generally designated by the numeral 50 and has a tweezer-like configuration having a flat skin pressing element 52 forming the end of a first arm 54, and a curved guide bar 56 forming the end of a second arm 58. The opposite ends of each

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arm 54, 58 are joined together in a spring-like connection 60. A threaded shaft 62 extends from arm 54 to an aperture in arm 58, and a thumb wheel 64 engages threaded shaft 62 to form a means for adjusting and fixing the distance between pressing element 52 and guide bar 56.

When used, device 50 is held adjacent the eye lid such that element 52 presses against the eye lid and stretches the lid to expose the area to be implanted. Thumb wheel 64 is then rotated to properly locate guide bar 56 relative to element 52. Next, implanting device 36 is moved into position adjacent the area to be implanted, using guide bar 56 as a means to stabilize and control the lateral movement of implanting device 36 and needles 40. The procedure set forth above is then continued.

FIGS. 8-12 disclose a preferred embodiment of the implanting device 36 illustrated in FIG. 4. Referring first to FIG. 8, device 36 includes a hollow handle 70 which is adapted to be manually gripped. In this embodiment, the device 36 is pneumatically controlled, and air inlet and outlet passages 72, 74 are provided to operate an air-driven motor (not shown) in handle 70. Other types of power drive means may be utilized if desired. Opposite air passages 72, 74, handle 70 includes an operating head portion 76 which is angled from the center line of handle 70 for ease of handling. However, the angled configuration of head portion 76 is a matter of choice, and can be modified as the user sees fit.

Head portion 76 includes a hollow stem 78 to which is attached a hollow housing element 80. As best seen in FIG. 9, housing element 80 includes an aperture 82 leading from one side thereof, and a threaded circular flange 84 around aperture 82. A hollow cone element 86 having threads at one end corresponding to the threads on flange 84, is removably attached to flange 84 and housing element 80. Cone element 86 includes hollow portion 88 extending along its length, and a tapered outer end 90.

Inside hollow stem 78 is a rotating shaft 92 which is driven by the air driven motor (not shown) inside handle 70. The end of shaft 92 extends into housing element 80 and is attached to circular plate 94. A connecting pin 96 is located off-center on plate 94, and includes an aperture 98 therethrough. Extending through aperture 98 at one end and through aperture 82 at the other end is a connecting rod 100 which is fixed in aperture 98 and is flexibly attached to a needle structure connecting piece 102 at pivot point 104, for purposes to be described.

The opposite end of mounting piece 102 includes a needle mount member 106 which is removably but firmly attached to connecting piece 102. A series of needles 108 project from the end of needle mount member 106, and extends slightly beyond the opening 110 at the end of cone element 86 when plate 94 and connecting pin 96 are in the position shown in FIGS. 9 and 10.

In the preferred embodiment, needles 108 comprise three needle elements firmly held to the circular end of mount member 106, as best seen in FIG. 12. The use of three needles in the array shown in FIG. 12 has proven to provide excellent results, however, other needle arrays may be utilized without departing from the spirit of the invention.

The operation of the device illustrated in FIGS. 8-12 is commenced by actuating air through inlet 72 to drive the air motor in handle 70 and rotate shaft 92 and circular plate 94 in the direction shown by arrow A in FIG. 10. As pin 96 rotates with plate 94, connecting rod 100 moves back and forth through aperture 82 thereby imparting relatively rapid reciprocal motion to needle

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mount member 106 and needles 108. Connecting rod 100 is also subject to slight side-to-side motion as the rotating motion of shaft 92 is converted to reciprocal motion by pin 96, and pivot connection 104 accommodates this side-to-side motion.

When using the device illustrated in FIGS. 8-12, the operator, who is preferably a trained and licensed physician, dips the end 90 of cone 86 in an aqueous pigment solution. Preferably, cone 86 is dipped into the solution far enough to allow the aqueous solution to enter hollow portion 88 of the cone where the fluid is retained by capillary action. Obviously, needles 108 are also immersed in the aqueous solution, which is held in the space between the needles 108 also by capillary action. Thus, the liquid pigment storage capacity of the subject implement is increased by virtue of this double capillary effect.

After dipping the cone into the aqueous pigment solution, the end of cone 86 comprising needles 108 is held adjacent the eyelid, which has been properly stretched and stabilized according to the method and apparatus described above in conjunction with FIGS. 2-5. Air is supplied to the reciprocating motor drive in handle 70, and needles 108 are reciprocally driven rapidly and with a relatively short stroke. The distance between the tip of end 90 of cone element 86 and the outer end of needles 108 is calibrated to penetrate the skin a preselected desired amount, such as 1/54th of an inch, as stated above. The handle 70 is then drawn across the eyelids as mentioned previously.

The foregoing detailed description has been given for clearness of understanding only and no unnecessary limitations are to be understood therefrom. Modifications of the present invention may be made by those skilled in the art without departing from the spirit of the invention.

I claim:

1. A method of applying a permanent cosmetic liner to the edge of an eye lid comprising the steps of anesthetizing the portion of the eye lid in the area adjacent the edge of said eye lid; stabilizing the portion of the eye lid to which said liner is to be applied; penetrating the skin with pigment solution along a line on the eye lid defining the intended location of said liner.

2. The method of claim 1 wherein the step of penetrating the skin with pigment solution is performed under a microscope.

3. The method of claim 1 wherein said step of anesthetizing said eye lid immobilizes said eye lid, relaxes the tarsal muscle of the eye to prevent blinking during application of said pigment solution, and anesthetizes the eye lid area.

4. The method of claim 1 wherein said step of anesthetizing said eye lid consists of injecting a solution of 2 cc 2% xylocaine, epinephrine and hyalurondaze around the eye lid area.

5. The method of claim 1 including the additional step of marking the site on the portion of the eye lid where the penetration of the skin is to take place subsequent to the step of stabilizing said portion of the eye lid.

6. The method of claim 1 including the step of lubricating the portion of the eye lid to be penetrated prior to the step of penetrating said portion of said eye lid.

7. The method of claim 1 wherein the step of penetrating the skin with pigment solution comprises coating a series of applicator needles with said pigment solution and inserting said coated needle into said portion of said eye lid to an extent whereby said pigment solution is applied to the dermal or epidermal layer of said eye lid.

* * * * *



US005472449A

United States Patent [19]**Chou**[11] **Patent Number:** **5,472,449**[45] **Date of Patent:** **Dec. 5, 1995**[54] **PERMANENT PIGMENT APPLICATOR
HAVING A DETACHABLE NEEDLE
COUPLER**[76] **Inventor:** **Kuei C. Chou**, 1555-B McGaw Ave.,
Irvine, Calif. 92714[21] **Appl. No.:** **97,936**[22] **Filed:** **Jul. 26, 1993**[51] **Int. Cl.⁵** **B43K 5/06; A61B 17/20**[52] **U.S. Cl.** **606/186; 81/9.22**[58] **Field of Search** **606/185, 186;
604/181, 187; 81/9.22**[56] **References Cited****U.S. PATENT DOCUMENTS**

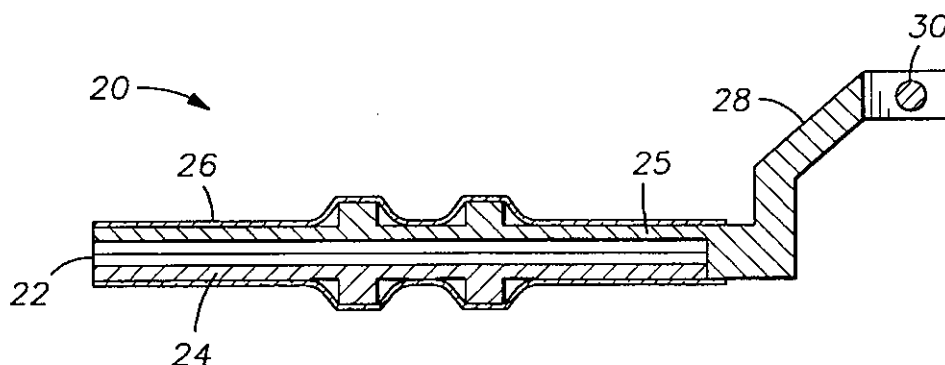
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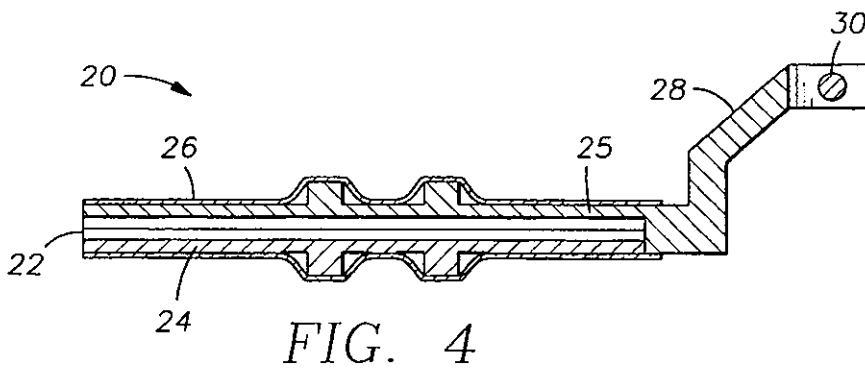
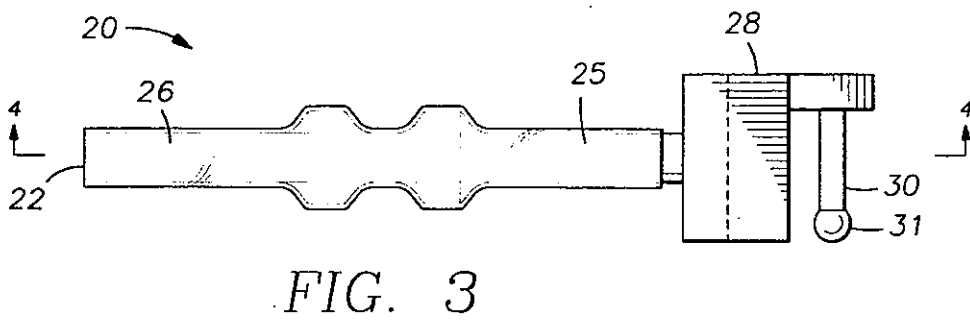
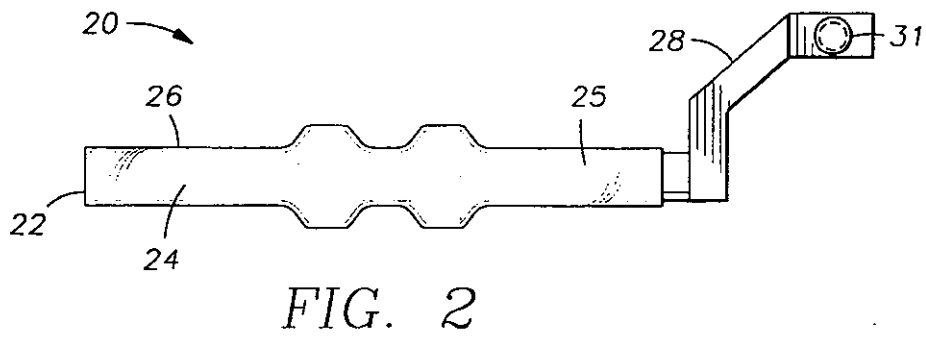
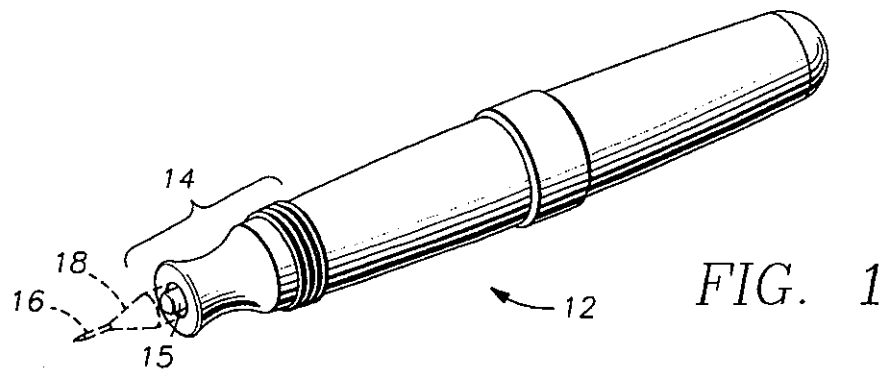
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Primary Examiner—Stephen C. Pellegrino*Assistant Examiner*—Nancy Mulcare*Attorney, Agent, or Firm*—Baker, Maxham, Jester & Meador[57] **ABSTRACT**

A device for applying permanent pigment, such as in a tattooing procedure, which has a disposable needle coupler which couples the needle to the device. The device has a housing which is structured to allow easy user access to the internal parts that are likely to be exposed to contamination from the tattooing procedure. The needle coupler is structured to allow easy manipulation to detach it from or attach it to the device without require the use or tools. The pigment applicator device may be a manual device or an electro-mechanically driven device. In the latter, the needle coupler is detachably coupled to a drive mechanism for actuating reciprocal axial movement of the needle via the needle coupler. The drive mechanism may include a cam for translating a rotational motion into a reciprocal axial motion of the needle coupler.

6 Claims, 2 Drawing Sheets



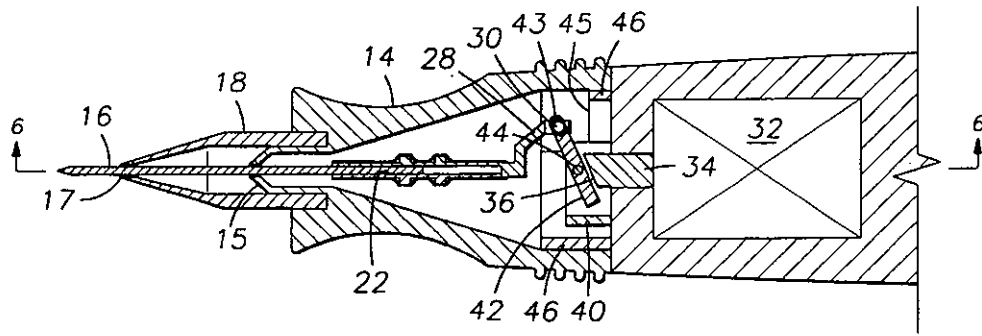


FIG. 5

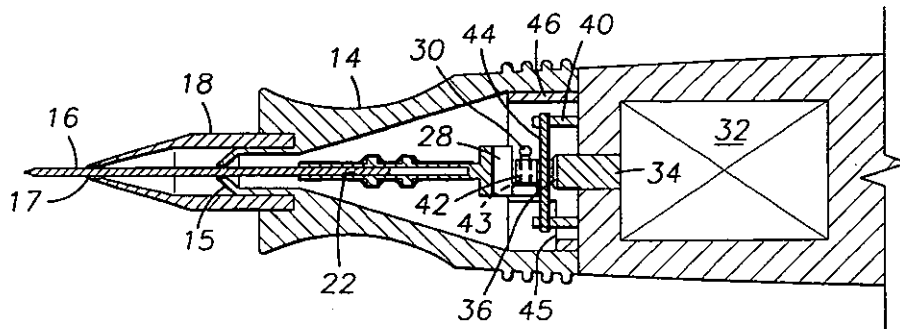


FIG. 6

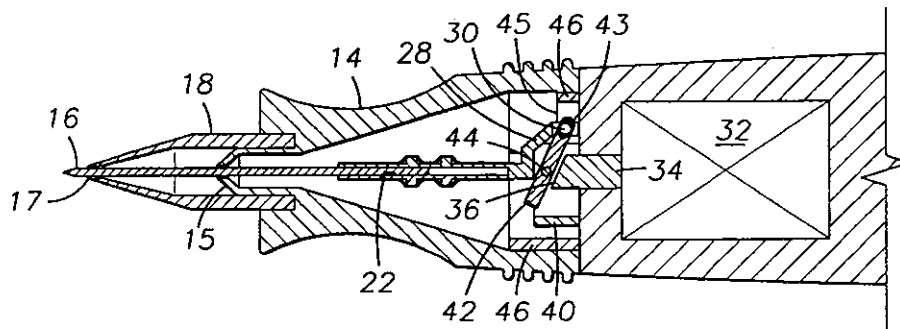


FIG. 7

PERMANENT PIGMENT APPLICATOR HAVING A DETACHABLE NEEDLE COUPLER

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to devices for applying permanent pigment to the skin of a person.

2. Description of Related Art

The marking of a tattoo on a person's skin involves using a needle point applicator to insert color pigments under the skin. The applicator generally includes a handle shaped for a convenient grip by a user's hand, and a metal needle having a sharp pointed tip extending from one end of the handle. The color pigment is applied to the skin by superficially puncturing the skin, and moving the needle in an axial reciprocal motion in and out of the skin to urge the color pigment to just under the skin where the pigment is retained permanently. This procedure inevitably involves exposure of the needle to blood in the body tissues.

In one type of electro-mechanical tattooing device, the needle is typically supported by the device in a manner to allow it to move axially relative to the device housing/handle. A needle drive mechanism, which can be a motor or other electromagnetic device, actuates the needle in an axial reciprocal manner while the housing is held steady by the user. The needle is detachably coupled to the drive mechanism via a needle coupler within the housing which is not accessible by the user. While the needle is discarded after each use, the needle coupler being an integral part of the device, however, remains attached to the device. It has been experienced that blood from the tattooing procedure can contaminate the needle coupler in the housing which is not accessible by the user for cleaning.

The growing concern of infectious diseases, such as "AIDS" transmitted by blood contaminated with HIV, dictates that special attention must be given to decontaminate between uses on different persons the parts of the applicator device that are exposed to blood from the tattooing procedure. Even if the internal parts of the device such as the needle coupler is accessible by the user, the prior integral construction, however, is not suitable for autoclaving or other types of reliable and acceptable decontamination procedures for blood contamination. Mere wiping off the parts is not acceptable by today's health standards.

SUMMARY OF THE INVENTION

The present invention is directed to a device for applying permanent pigment, such as in a tattooing procedure, which has a disposable needle coupler which couples the needle to the device. The device has a housing which is structured to allow easy user access to the internal parts that are likely to be exposed to contamination from the tattooing procedure. The needle coupler is structured to allow easy manipulation to detach it from or attach it to the device without require the use of tools.

The pigment applicator device may be a manual device or an electro-mechanically driven device. In the latter, the needle coupler is detachably coupled to a drive mechanism for actuating reciprocal axial movement of the needle via the needle coupler. The drive mechanism may include a cam for translating a rotational motion into a reciprocal axial motion of the needle coupler.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a pigment applicator device in accordance with one embodiment of the present invention.

FIG. 2 is a side view of the needle coupler in accordance with one embodiment of the present invention.

FIG. 3 is a top view of the needle coupler of FIG. 2.

FIG. 4 is a sectional view taken along line 4-4 in FIG. 1.

FIG. 5 is an axial sectional view of the device of FIG. 1.

FIG. 6 is a sectional view taken along line 6-6 in FIG. 5 showing coupling of the needle coupler to the rocker (details of the surrounding components are omitted for clarity).

FIG. 7 is an axial sectional view of the device showing the retracted position of the needle coupler.

DESCRIPTION OF ILLUSTRATED EMBODIMENTS

The following description is of the best presently contemplated mode of carrying out the invention. This description is made for the purpose of illustrating the general principles of the invention and should not be taken in a limiting sense. The scope of the invention is best determined by reference to the appended claims.

FIG. 1 illustrates a pigment applicator device 10 in accordance with one embodiment of the present invention. In this particular embodiment, the device 10 includes an electro-mechanical means for actuating an applicator needle 16. It is understood that manual applicator device can also make use of the concept of the present invention without departing from the scope and spirit of the present invention as defined by the claims. The housing 12 of the device 10 is generally shaped like a fountain pen which provide a comfortable grip for the user. Specifically, the housing 12 includes a detachable finger grip section 14. The particular shape and size of the device housing may differ depending on the grip desired and the internal components of the device. A pigment applicator needle 16 is supported on the end of the grip section 14 by a needle support 18. The needle 16 is coupled to the device 10 by a detachable needle coupler 20 (hidden from view in FIG. 1, see FIGS. 2-7). Details of the mechanical construction of the device 10 and the interactive functions of the various parts are more apparent by reference to FIGS. 2-7 and the accompanying description below.

Referring to FIGS. 2-4, details of the detachable needle coupler 20 in accordance with one embodiment of the present invention are described. The needle coupler has a generally cylindrical needle chamber 22 defined by two split sections 24 and 25 which are held together by a sleeve 26. The needle chamber 22 is sized to frictionally receive the metal needle 16 so that the needle 16 moves in unison with the chamber 22 during actuation of the needle coupler 20 as described below. The split sections 24 and 25 and sleeve 26 create a clamping action for a slightly oversized needle. The split section 25 is connected to an anchor section 28 shaped as shown in the figures. At the end of this anchor section 28 is a coupling pin 30 which axis is perpendicular to the axis of the needle chamber 22. This pin 30 has a slightly enlarged rounded end 31 and is for coupling to a rocker 42 (see FIG. 5).

Referring now to FIGS. 5-7, the internal assembly of the device 10 is shown in detail. The grip section 14 is slidably

and detachably attached to a flange 46 of the housing by interference or friction. The flange 46 has a slot 45 on one side large enough for the anchor section 28 of the needle coupler 20 to pass through it (this will become apparent later with the description below). Within the housing 12 is a suitable conventional drive such as a d.c. motor and associated drive collectively and schematically represented as structure 32. The specific type of drive can be selected according to ordinary skill in the art to meet the intended functions disclosed herein. Power for the drive 32 may be supplied by an external power supply (not shown), build-in rechargeable battery (not shown) or alkaline battery (not shown).

The drive 32 rotates a shaft 34 which has a terminating flat cam surface 36 at an angle to the shaft axis. A rocker assembly 40 surrounds the shaft 34. The rocker assembly 40 includes a rocker 42 which is pivotally supported on a pivot pin 44 and at a point along the line of the axis of the shaft 34. The rocker 42 has an eye 43 at one end which axis is aligned parallel to the axis of the pivot pin 44. As the shaft 44 rotates, the cam surface 36 rocks the rocker 42 in a reciprocal motion in the axial direction of the shaft 34 and about the pivot pin 44.

The coupling pin 30 of the needle coupler 20 is pivotally coupled to the eye 43 of the rocker 42. Specifically, the coupling pin 30 is sized to freely rotate in the eye 43. However, the rounded end 31 of the coupling pin 30 is sized to provide an interference fit to allow the coupling pin 30 to be inserted into or withdrawn from the eye 43 by applying a moderate force using the user's finger, but prevents the coupling pin 30 from loosening from the eye 43 during normal operation of the device. The needle coupler 20 extends inside of the grip section 14.

To use the device 10, the needle coupler 20 is first attached to the rocker assembly 40 by inserting the coupling pin 30 through the eye 43. The slot 45 in the flange 46 allows room for the sideways movement of the anchor section 28 of the needle coupler 20 when inserting the coupling pin 30 into the eye 43. The grip section 14 is then attached to the flange 46. The needle support 18 is attached to the stub 15 at the end of the grip section 14. The needle 16 is inserted through the clearance hole 17 in the needle support 18 and into the needle chamber 22. When power is turned on, the shaft 34 rotates and the cam surface 36 rocks the rocker 42 reciprocally in the axial direction of the shaft 34. The reciprocal rocking motion of the needle coupler 20 causes axial reciprocal motion of the needle 16 relative to the grip section 14 and needle support 18. FIG. 5 shows the needle 16 in its extreme extended position and FIG. 7 shows the needle 16 in its extreme retracted position. The needle support 18 and needle chamber 22 provide support to the thin needle 16 during its reciprocal axial motion. The perpendicular direction of the axis of the coupling pin 30 with respect to the direction of the axial reciprocal motion ensures positive coupling of the needle coupler 20 to the rocker 42, which prevents slippage of the needle coupler 20 with respect to the rocker 42 during repeated reciprocal axial motion.

After completing the tattooing procedure, the needle 16 and the grip section 14 are removed. The needle coupler can be removed from the rocker 42 by pulling the coupling pin 30 against the interference fit between the rounded end 31 and the eye 43. The slot 45 in the flange 46 allows room for the sideways movement of the anchor section 28 of the needle coupler 20 when withdrawing the coupling pin 30 from the eye 43.

It can be seen that the operations of attaching and detach-

ing of the needle coupler do not require the use of any tool (e.g. a screw driver). A pair of tweezers may be desirable for handling a contaminated needle coupler, but it is not required for the purpose of making the physical attachment or detachment of the needle coupler to the rocker assembly.

By making the grip section 14 detachable from the rest of the housing 12 and the needle coupler 20 detachable from the drive mechanism, these parts when contaminated by blood from the tattooing procedure can be discarded or decontaminated by appropriate procedures. If meant to be disposable, the grip section 14 and the needle coupler 20 may be made of plastic to reduce their cost. These parts may be made of a material suitable for autoclaving or other acceptable decontamination procedure if they are to be reused.

While the invention has been described with respect to the embodiments in accordance therewith, it will be apparent to those skilled in the art that various modifications and improvements may be made without departing from the scope and spirit of the invention. Accordingly, it is to be understood that the invention is not to be limited by the specific illustrated embodiments, but only by the scope of the appended claims.

I claim:

1. A pigment applicator device comprising:

a body portion;

a drive mechanism contained substantially within the body portion;

a needle;

a needle coupler having a needle chamber that receives the needle and an anchor section that detachably couples the needle coupler to the drive mechanism, wherein:

the anchor section can be decoupled from the drive mechanism during normal operation; the needle chamber comprises a generally cylindrical portion; and the needle chamber is formed from split sections clamped together by a sleeve.

2. A pigment applicator device as defined in claim 1, wherein the split sections comprise two half-cylinders.

3. A pigment applicator device comprising:

a body portion;

a drive mechanism contained substantially within the body portion;

a needle;

a needle coupler having a needle chamber that receives the needle and an anchor section that detachably couples the needle coupler to the drive mechanism, wherein:

the anchor section can be decoupled from the drive mechanism during normal operation; the anchor section includes a coupling pin that is received by the drive mechanism and thereby detachably couples the anchor section to the drive mechanism with an interference fit; and

the coupling pin is received in an eye of the drive mechanism to define a pivot axis and includes an enlarged end that provides an interference fit between the coupling pin and the drive mechanism so that the needle coupler is releasably held in engagement with the drive mechanism and can pivot about the pivot axis without disengaging from the drive mechanism.

4. A pigment applicator device as defined in claim 3, wherein the drive mechanism includes a rocker assembly having a rocker that is pivotally supported by a rocker pin

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and contains the pin-receiving eye.

5. A pigment applicator device as defined in claim 4, wherein the axis of the rocker pin is parallel to the axis of the needle coupler coupling pin.

6

6. A pigment applicator device as defined in claim 5, wherein the rocker is constructed from a plastic material.

* * * * *

United States Patent [19]

Beuchat

[11] Patent Number: **4,671,277**

[45] Date of Patent: **Jun. 9, 1987**

[54] PIGMENT DISPENSER AND RESERVOIR FOR A PIGMENTATION SYSTEM

[75] Inventor: Charles Beuchat, Irvine, Calif.

[73] Assignee: CooperVision, Inc., Palo Alto, Calif.

[21] Appl. No.: 770,215

[22] Filed: Aug. 28, 1985

[51] Int. Cl.⁴ A61D 1/00

[52] U.S. Cl. 128/316; 81/9.22

[58] Field of Search 81/9.22; 128/316;
132/88.5, 88.7

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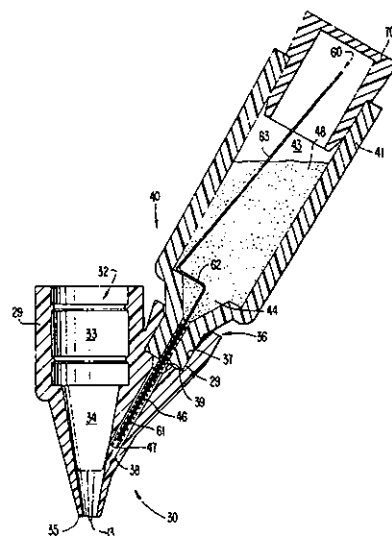
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Primary Examiner—Carroll B. Dority, Jr.
Attorney, Agent, or Firm—Vorys, Sater, Seymour and Pease

[57] ABSTRACT

A device for controlling the dispensing of pigments suspended in solution for reciprocating needles that penetrate the skin. For use in an apparatus of the type which includes a tip assembly, including a needle secured to a reciprocating driven by a motor, an adapter member is disclosed having a generally axially aligned chamber, a portion of which is manually secured to the tip assembly. The adapter member also defines an inclined chamber for receiving a pigment-containing reservoir member with a transfer tube. A weighted wire has a portion located within the transfer tube. The wire includes a second portion which resides within the reservoir member so that when the reservoir member with its pigment solution and wire is inserted into the adapter member, reciprocation of the tip assembly causes the wire to agitate the pigment suspension while controlling flow of the pigment-containing solution to the lower portion of the axially aligned chamber in the adapter member, and hence to the needle.

16 Claims, 3 Drawing Figures



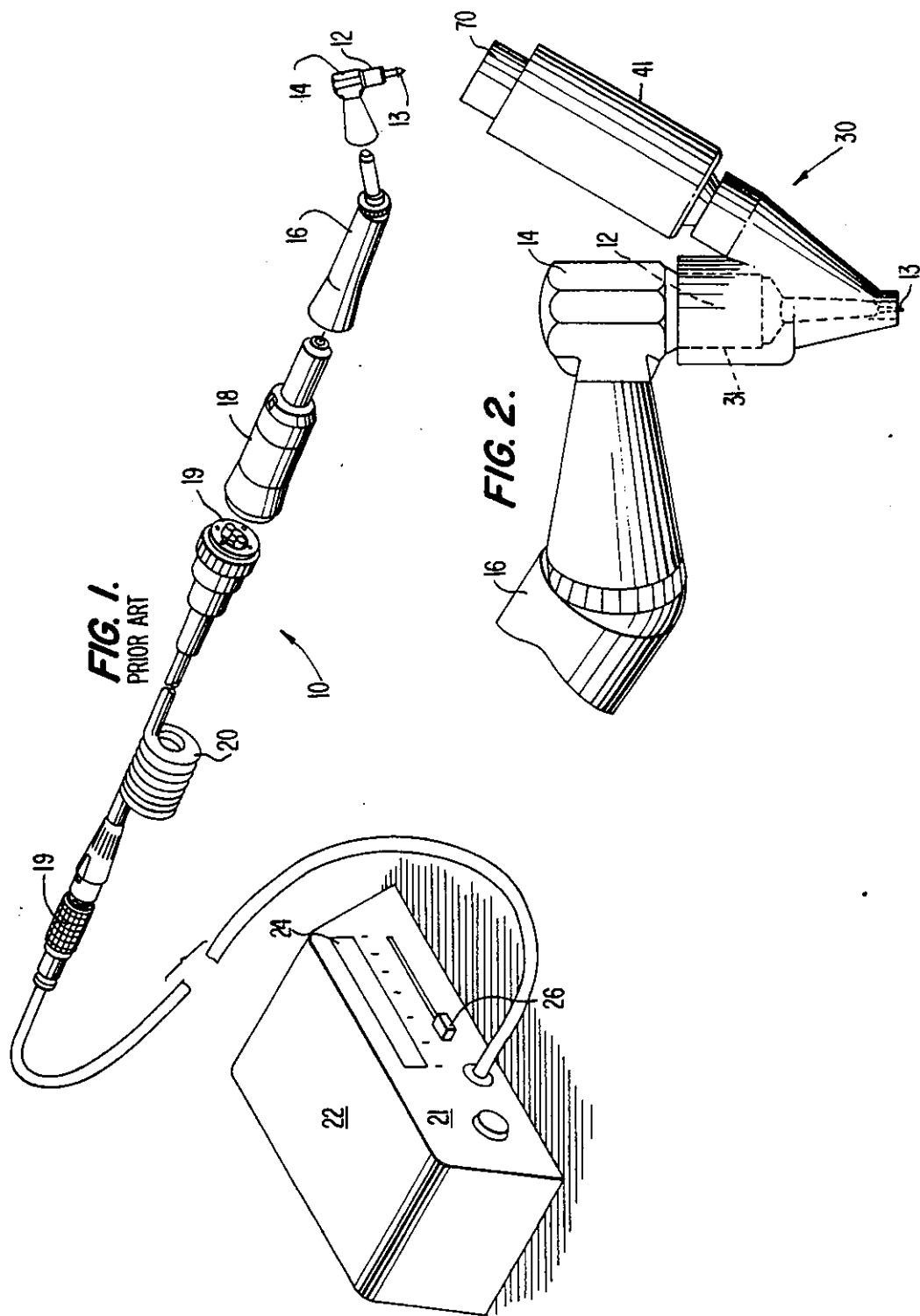
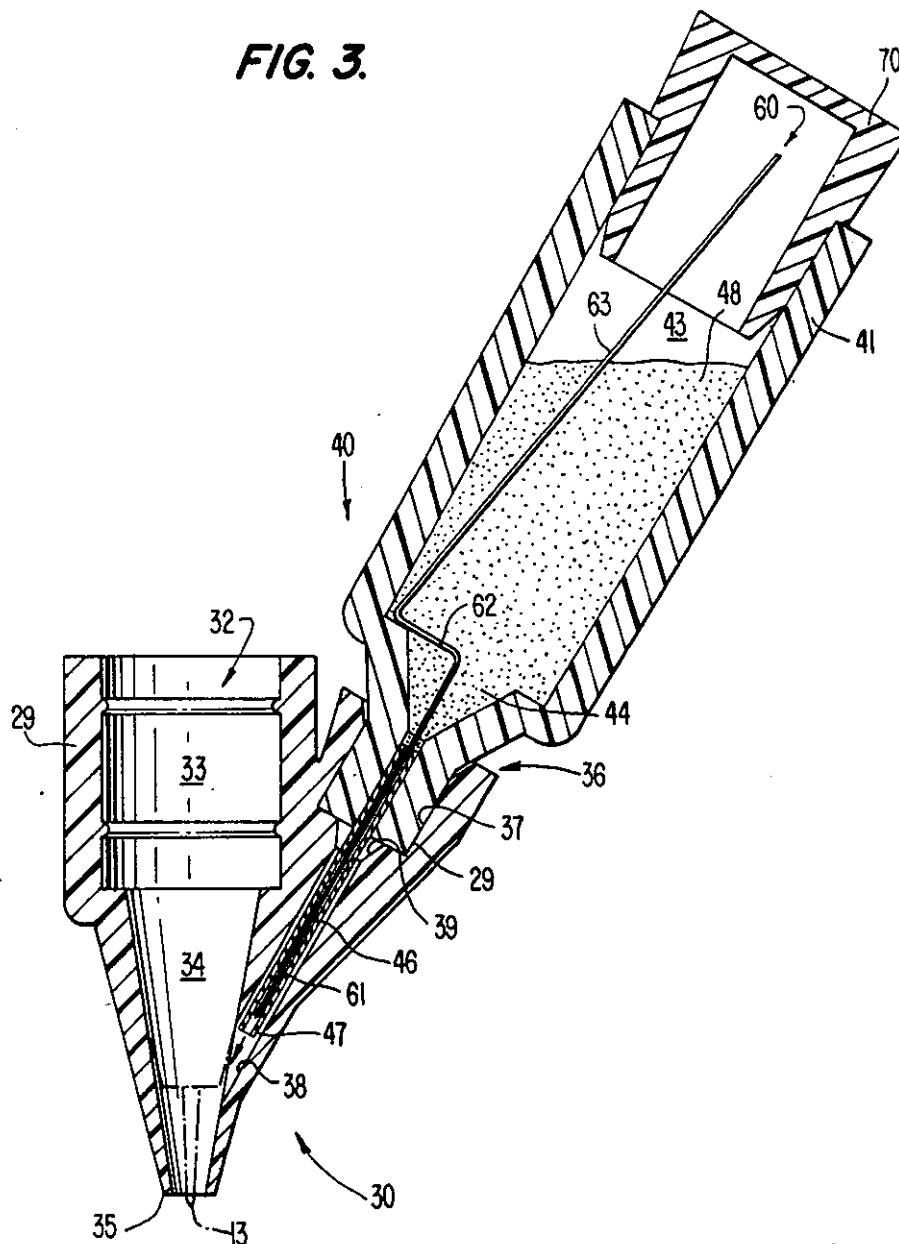


FIG. 3.



PIGMENT DISPENSER AND RESERVOIR FOR A PIGMENTATION SYSTEM

BACKGROUND OF THE INVENTION

This invention relates to an automatic pigment dispenser for controlling the dispensing of pigment suspended in solution to the reciprocating needles that penetrate the skin, particularly adapted for a device used for implanting a pigment in the skin. More particularly, this invention relates to a reservoir for dispensing pigment through a transfer tube containing a vibrating wire to prevent clogging of the transfer tube. Still more particularly, this invention relates to a disposable adapter for attachment to a head of a pigment-implanting unit, wherein the adapter houses the pigment reservoir and transfer tube in an angled relationship with the axis of the reciprocating needle to control the dispensing of pigment to the needle.

A method and apparatus are known for applying sterile pigment in the superficial dermis along the edge of the eye lid and the lash line. Such a procedure has, among other advantages, reduced the potential for an allergic reaction to the application of cosmetics to the area of the eye, assisted the handicapped in applying cosmetics, and reduced irritation and infection which might develop from eye makeup flaking into the eye of contact lens wearers.

Such a method and apparatus for applying pigment in the area of the eye is described in U.S. Pat. No. 4,508,106 to Giora G. Angres. There, a method is described for applying a cosmetic liner to the edge of an eye lid using the steps of anesthetizing the portion of the eye lid in the area adjacent the lid, stabilizing the portion of the eye lid to which the permanent liner is to be applied, and penetrating the skin to a predetermined depth in the dermis with a pigment suspension along the line defining the intended location of the eye liner and into the deep layers of the skin and/or lid margins and lash line. An apparatus is also described for penetrating the skin with a pigment suspension having a reciprocating needle structure in combination with an enveloping cone structure which protects the needles, insures proper penetration, and stores the pigment suspension.

Such an apparatus of the type described is available which includes one or a plurality of needles which project from the end of a needle mount member to extend slightly beyond an opening at the end of a hollow cone element connected to the head of the instrument. The end of the cone is dipped in an aqueous pigment suspension to permit the solution to enter the hollow portion of the cone where the suspension is retained by capillary action. The needle or needles are also immersed in the aqueous suspension which is retained in the space between the needles by capillary action. After dipping the cone in the aqueous pigment suspension, the needles are reciprocally driven with a short stroke to penetrate the skin to a predetermined limited depth to apply the pigment thereto.

Such a procedure for retaining the pigment for application to the needle is cumbersome and requires the operator to remove the excess pigment before starting an implantation procedure. When the excess is wiped away from the needles, at least some of the excess pigment accumulated within the cone is also wiped away by capillary action and thus lost, requiring repetitive immersion during the procedure to replenish the pigment supply. This technique thus also risks dulling the

needles. In addition, the procedure is somewhat untidy and time consuming.

Accordingly, it is an overall object of this invention to provide for the controlled application of a pigment suspension directly to the reciprocating needles in such an apparatus.

An automatic pigment dispensing feature is provided on an available micropigmentation system which includes a cavity surrounding the reciprocating needle. The cavity is filled with pigment. However, such a solution has not been entirely satisfactory because of difficulties encountered in supplying a controlled amount of pigment to the reciprocating needle assembly. In effect, that solution results in providing the pigment suspension at one time rather than controlling the dispensing of the pigment suspension to the reciprocating needle assembly during the application procedure. Moreover, the storing of the relatively viscous pigment suspended in an aqueous medium is difficult in that structure because of its tendency to clog, and because of that tendency of the pigment to settle from its suspension.

Accordingly, it is a continuing problem in the art to provide a method and apparatus for controlling the dispensing of a pigment suspension to the reciprocating needles that penetrate the skin in the procedure of the type described.

It is an additional object of this invention to provide a reservoir for containing and dispensing pigment to a reciprocating needle in such a procedure wherein the reservoir includes a simple and effective means for preventing clogging of the transfer tube while continually agitating the relatively viscous pigment solution during an implantation procedure.

It is still an additional object of this invention to provide such a method and apparatus which are readily adaptable to converting an existing apparatus and instrument in the field.

It is another object of this invention to provide a reservoir for use in such controlled dispensing wherein the reservoir contains sufficient pigment to perform the entire procedure without requiring the operator to stop and refill the reservoir with additional aqueous pigment.

These and other objects of the invention will become apparent from the detailed description of the invention which follows.

SUMMARY OF THE INVENTION

Directed to achieving the foregoing objects and overcoming the problems with the prior art apparatus for applying a pigment solution to the skin, the apparatus according to the invention comprises an adapter member which is readily fitted to the head of an available device of the type which includes a disposable tip assembly used to place the pigment into the dermis. Such a device includes a tip assembly, a reciprocating head, a hand held drive unit, a motor, and an extensible cord secured to a console for controlling the reciprocation of the tip assembly. The adapter member thus comprises a first chamber which, when the adapter member is connected to the head of such unit, is generally axially aligned with the axis of the tip assembly and fits thereon so that the tip of the needle or needles used in the procedure extends below the lowermost surface of the axially aligned first chamber a predetermined distance, such as 1/16 of an inch, to control penetration of the needles

into the dermis. Preferably, the axially aligned first chamber has two portions, the upper portion being generally circular in cross section to be comfortably slip fitted onto the lower portion of the head of the unit, and the lower portion being generally conically shaped for receiving metered pigment from the transfer tube of the reservoir.

The body of the adapter member also includes an inclined chamber for receiving a pigment reservoir therein at an angle to the axis of reciprocation of the needle. The reservoir comprises a pigment-receiving outer chamber for receiving pigment therein and a cap, thus terminating at its lower portion in a conical transfer section leading to a transfer tube having a predetermined diameter. A wire is manually fixed in the transfer tube so that operation of the unit causes a slight reciprocation of the wire thus agitating the aqueous pigment solution in the pigment-receiving chamber in the reservoir. The diameter of the transfer tube is selected to permit, in cooperation with the diameter of the wire therein, a sufficient clearance between the wire and the inside diameter of the transfer tube to permit metered dispensing of the aqueous pigment solution as a function of its viscosity through capillary action. Preferably, the pigment reservoir assembly is press fitted into the obliquely inclined chamber in the adapter member so that the transfer tube extends significantly toward the intersection of the lower conical portion of the adapter member.

A method of using such a device with a pigmentation unit is also described which comprises the steps of providing a reservoir adapter member which is structurally adapted to be press fitted to the head of the unit, securing the reservoir adapter member to the unit, providing a separate pigment reservoir having a pigment chamber and a transfer tube in communication therewith, inserting a wire having a predetermined shape into the pigment reservoir so that a portion of the wire extends within the transfer tube, inserting an aqueous pigment solution into the pigment reservoir, closing the reservoir with a cap to secure the pigment solution therein, inserting the reservoir with its pigment solution into the obliquely inclined chamber of the reservoir adapter secured to the head of the unit, and performing the pigmentation procedure on a patient.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 is a pictorial illustration of the components of a prior art apparatus for applying a pigment solution by a surgical procedure to the dermis of a patient;

FIG. 2 is a pictorial illustration, partially in phantom, showing the adapter member according to the invention secured to the head of the unit of FIG. 1 and having the pigment reservoir in place; and

FIG. 3 is a cross sectional view of the combination of the adapter and reservoir shown in FIG. 2 and further showing the wire extending into the transfer tube of the pigment reservoir.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

FIG. 1 shows a representative embodiment of a prior art system implanting pigment in the dermis of a patient according to procedures known to the prior art. The system is designated generally by the reference numeral 10. The system 10 includes a disposable tip assembly 12, used to place the pigment into the dermis by reciprocating

ing a needle or a plurality of needles 13 secured to a reciprocating head 14 which can be easily removed for cleaning. The adapter member and the controlled pigment dispenser according to the invention are attached to the reciprocating head 14, as will be discussed in connection with FIGS. 2 and 3. The reciprocating head 14 is attached to a hand-held drive unit 16 formed with a gripping shape to permit the operator, usually a physician, to practice the procedure. The shape of the drive unit is designed to insure maximum manual control. The drive unit 16 is connected to a motor 18 electrically connected to an extensible flexible cord 20 with plug connectors 19 which plug the motor 18 to the face 21 of a console unit 22. Reference may be made to the Angres U.S. Pat. No. 4,308,106, which is incorporated by reference, for a workable example of the details of the components of the system 10 shown in FIG. 1 and a description of the prior art procedure. The console 22 includes the appropriate wiring and power connections, including a pulse rate display 24 for displaying the pulse rate of reciprocation of the tip assembly 12. A control member 26 sets the maximum pulse rate, by varying voltage, which is delivered to the handpiece, comprising the tip assembly 12, the reciprocating head 14, the drive unit 16, and the motor 18. Preferably, the console 22 is connected to a foot switch (not shown) which linearly controls the pulse rate of the handpiece tip 12.

In use, the handpiece assembly 10, but without the tip assembly 12, is connected to the front of the console 22. The disposable tip assembly 12 is removed from a sterile package and threaded tightly into the reciprocating head 14. A needle or plurality of needles 13 with a protective cover attached is pressed into the tip assembly 12 and the protective cover removed from the needle 13 so that the excursion rate of the needle can be observed for accuracy. Thereafter, the pigmentation procedure is performed whereupon the unit may be disassembled.

As shown in FIGS. 2 and 3, the adapter member according to the invention is designated generally by the reference numeral 30. The adapter member 30 is sized and constructed to be slip-fitted to securely engage at its inside diameter the outer periphery of the downwardly-extending surface 31 of the disposable tip assembly 14. The adapter member 30 defines an axially oriented chamber designated generally by the reference numeral 32 positioned in a one-piece body 29 of the adapter member 30. When in place, the axis of the chamber 32 is axially aligned with the axis of reciprocation of the tip assembly 12 to which the needle 13 is secured and reciprocates with the tip assembly during the implant procedure. Preferably, the body 33 of the adapter member 30 is made from a suitable plastic material, such as polypropylene, by a suitable process such as molding. The chamber 32 is defined by a first or upper portion 33 which is generally circular in cross section for mating with the corresponding downwardly extending surface of the tip assembly 12 in a snug, secure relationship. The chamber 32 further defines a lower or second portion 34 which is generally conically shaped for receiving therein the lower portion of the tip assembly 12 and the needle 13 extending from the lowermost end 35 thereof by a predetermined distance to limit the depth of penetration for introduction of the pigment into the dermis. The chamber 32 is thus structurally adapted to be retrofitted on units of the type shown in FIG. 1. Alternatively, the tip assembly 12 could also be

molded to integrally form therein the member 30 with the features described.

The body 29 of the adapter member 30 further defines an obliquely inclined chamber 36 having an outer chamber portion 37 which communicates with an inner chamber portion 38 which terminates at its lower end in the wall of the chamber 34 of the axially aligned chamber 32. The outer chamber portion 37 is defined by a circular cross section and a predetermined length terminating gradually by a transition portion 39 with the lower chamber portion 38 which is generally tubular in shape.

A pigment reservoir 40, provided as a separate piece, includes a body 41 acting as a pigment reservoir with an outer chamber 43 defined by a circular cross section and a conically shaped inner chamber 44 terminating at its lower end in an opening 46 for receiving a transfer tube 47 in a press-fit relationship. Together, the chambers 43 and 44 and the transfer tube 47 define a reservoir for storing and containing a supply of aqueous pigment solution and metering the aqueous pigment suspension, as will be further described, into the chambers 38 and 34 to wet the needle 13 to perform the pigmentation procedure.

In order to control the dispensing of the aqueous but viscous pigment suspension 48 from the reservoir 40 to the chamber 34 through the tube 47, a shaped, weighted wire 60, preferably made from stainless steel, is inserted so that a linear portion 61 is contained within the tube 47. A radially extending portion 62 terminates in an obliquely inclined portion 63 so that the wire 60 is preferably bent according to the contours shown in FIG. 3. With the pigment reservoir 40 inserted into the chamber 36 in the adapter member 30, reciprocation of the needle during the procedure causes the wire 60 to vibrate slightly thus preventing clogging of the aqueous pigment suspension in the transfer tube while continuously agitating the pigment suspension.

The diameter of the transfer tube 47 is determined so that the annular cross section defined by the inside diameter of the transfer tube 47 and the outside diameter of linear portion 61 of the wire 60 are sized relative to the viscosity of the aqueous pigment suspension to permit the pigment suspension to be metered through the transfer tube in the obliquely inclined chambers 38 at a controlled rate to wet the needle 13. By way of specific example, a wire 60 of 0.010" diameter in a tube 47 having a 0.023 I.D. has proven satisfactory for a conventional pigment solution. Thus, a controlled amount of pigment is provided to the reciprocating needle 13. The dimension of the chamber 34 is such to retain the pigment solution by a capillary action to wet the needle 13. By way of completeness of the disclosure, a preferable pigment comprises iron oxide suspended in isopropyl alcohol.

The device according to the invention eliminates the need for an operator to dip a needle or needles 13 into a bowl of pigment solution and then remove the excess before starting the operation, and also eliminates much of the excess pigment that accumulates inside the protective cone of the prior art when an operator tips the needles too far into the pigment.

A cap member 70 is provided to close the upper portion of the chamber containing the pigment solution.

In use, the adapter member 30 is removed from a sterile package and is slid over the tip assembly 12 so that the surface 31 mates securely with the inner surface of the upper axially aligned chamber 32 in a

press-fitted relationship to secure the adapter member 30 to the tip assembly. The reservoir member 40, which is provided as a separate unit with the transfer tube 47 secured thereto, is removed from a sterile package and is filled to a predetermined extent according to the procedure with a supply of aqueous pigment solution. The stainless steel wire 60 is then inserted into the reservoir so that the portion 61 extends within the transfer tube 47 and the reservoir 40 is closed by the cap 70. Alternatively, the wire 60 may be inserted prior to filling the reservoir 40 with a pigment solution. Then, the closed reservoir container 40 containing the metering tube 47 with the agitating wire 60 therein is inserted into the obliquely aligned chamber 36 on the adapter member 30 to form the structure shown in FIG. 3 and the aqueous pigment solution meters down the transfer tube 47 and the transfer conduit 38 and then to the tip assembly 12 to the conical chamber 34 then to wet the needle 13 by capillary action.

Preferably, the angle of inclination of the obliquely inclined chamber 36, and thus the angle of inclination of the reservoir 40 relative to the vertically aligned tip assembly, is approximately 45 degrees.

After the procedure is completed, the reservoir may be removed and discarded. Alternatively, both the adapter member 30 and the reservoir member 40 may be removed and discarded.

Preferably, the adapter member 30, the reservoir 40 with the tip 47, the cap 70, and the wire 60 are provided as a part of a sterile disposable pack provided to the practitioner of the process of pigmentation described.

This invention may be embodied in other specific forms without departing from its spirit or essential characteristics. The present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the claims rather than by the foregoing description, and all changes which come within the meaning and range of the equivalents of the claims are therefore intended to be embraced therein.

What is claimed is:

1. For use with an apparatus of the type which comprises a tip member for placing pigment in the dermis of a patient by reciprocating a needle, an adapter member comprising:

a housing defining an axially aligned chamber and an inclined chamber, said inclined chamber having a lower portion which communicates with a lower portion of said axially aligned chamber for receiving pigment solution therein,

said axially aligned chamber defining an upper portion structurally adapted to be secured to a portion of said tip member so that the needle projects from the lowermost portion of the axially aligned chamber a predetermined distance, said inclined chamber being structurally adapted to replaceably receive in a first portion thereof a reservoir member containing a pigment suspension therein, said reservoir member including means cooperating with the lower portion of said inclined chamber and said lower portion of said axially aligned chamber for transferring and metering said pigment suspension from the lower portion of said inclined chamber to the lower portion of said axially aligned chamber to wet said needle with a controlled quantity of said pigment suspension,

said means including control means cooperating with a transfer tube to control the rate of metering of

said pigment suspension from said pigment-receiving outer chamber and for agitating said pigment suspension when said needle is reciprocated.

2. The apparatus as set forth in claim 1, wherein the angle of inclination of said inclined chamber relative to said axially aligned chamber is about 45 degrees.

3. The apparatus as set forth in claim 1 wherein said reservoir member defines an outer chamber for receiving said pigment suspension therein; and said transferring and metering means includes a transfer tube having a predetermined inside diameter for transferring and metering said pigment suspension from said outer chamber of said reservoir member through an inner portion of said inclined chamber to the lower portion in said body of said adapter member.

4. The apparatus as set forth in claim 3 further including a cap for closing said pigment-receiving outer chamber of said reservoir member when said pigment suspension has been provided therein.

5. In combination:

means for implanting pigment in the dermis of a patient comprising a needle secured to a tip assembly which in turn is secured to a reciprocating head attached to a drive unit for reciprocating said needle to implant pigment in the dermis of a patient during an implantation procedure;

an adapter member secured to a portion of said tip assembly and defining therein an axially oriented first chamber for receiving therein said tip assembly and said needle so that said needle protrudes from the lower surface of said adapter member a predetermined distance to control the depth of implantation in said dermis;

said adapter member further defining an obliquely inclined chamber for receiving therein a reservoir member having means for transferring an aqueous pigment suspension in said reservoir member to said axially aligned first chamber to wet said needle with said aqueous solution;

a reservoir member secured in said obliquely inclined chamber for controlling dispensing a pigment solution from said reservoir member by a metering means to said axially aligned chamber at a controlled rate; and

means for agitating the aqueous pigment suspension within said reservoir member during said procedure.

6. The combination as set forth in claim 5, wherein said metering means includes a transfer tube connected to a pigment-receiving chamber in said reservoir member and extending toward a lower portion of said axially aligned chamber.

7. The combination as set forth in claim 6, wherein agitating means cooperate with said transfer tube and said pigment-receiving chamber in said reservoir member.

8. The combination as set forth in claim 7, wherein said agitating means is a weighted wire having a linear portion axially-extending in a portion of said transfer tube and another portion located in said pigment-receiving chamber in said reservoir member.

9. The apparatus as set forth in claim 8, wherein the annular space defined by the inside diameter of said transfer tube and the outside diameter of said wire is sized to meter said pigment suspension from said pigment-receiving outer chamber of said reservoir member to said needle during an implantation procedure.

10. In combination:

a reservoir member, at least a portion of which is structurally adapted to be securely received in a complementary opening in a tip member of an apparatus for placing pigment in the dermis of a patient by reciprocating a needle, said reservoir member defining an outer chamber for receiving a pigment suspension therein;

a transfer tube communicating with said pigment-receiving chamber of said reservoir and sized for metering and transferring pigment therefrom; and means cooperating with said transfer tube and said reservoir member for agitating the pigment suspension in said outer chamber, said agitating means being operative when said tip member is reciprocated, said agitating means comprising a wire extending substantially through said transfer tube and said pigment receiving chamber and being free to move laterally therein, wherein the annular space defined by the inside diameter of said transfer tube and the outside diameter of said wire are sized to meter said pigment solution from said pigment-receiving outer chamber of said reservoir member to said needle during an implantation procedure.

11. A method of controlling the dispensing of a pigment suspension to a needle in a device of the type comprising a reciprocating tip member for placing pigment in the dermis of a patient by reciprocating a needle, comprising the steps of:

placing an adapter member on said tip member, said adapter member cooperating, when so placed, with said needle to control the penetration of said dermis, and defining a pigment receiving chamber in the region of said needle;

providing a reservoir having a supply of pigment suspension in a chamber therein, said reservoir having a transfer tube for causing a controlled dispensing of said pigment from said chamber;

fixing said reservoir in a complementary chamber of the adapter member, said complementary chamber defining a fluid passage communicating with the region of said needle in said adapter member, so that said transfer tube is inserted in said passage; and

agitating said suspension with an agitating member while reciprocating said needle to inhibit clogging of said transfer tube.

12. The method as set forth in claim 11, wherein the step of agitating is carried out by placing a shaped wire in said pigment receiving chamber so that a portion of said wire is located in said transfer tube, and another portion of said wire is located in said reservoir.

13. For use with an apparatus of the type which comprises a tip member for placing pigment in the dermis of a patient by reciprocating a needle, an adapter member comprising:

a housing defining an axially aligned chamber and an inclined chamber, said inclined chamber having a lower portion which communicates with a lower portion of said axially aligned chamber for receiving pigment solution therein.

said axially aligned chamber defining an upper portion structurally adapted to be secured to a portion of said tip member so that the needle projects from the lowermost portion of the axially aligned chamber a predetermined distance, said inclined chamber being structurally adapted to replaceably receive in a first portion thereof a reservoir member containing a pigment suspension therein and coop-

erating therewith to transfer said pigment suspension from the lower portion of said inclined chamber to the lower portion of said axially aligned chamber to wet said needle with said pigment suspension;

- a reservoir member defining an outer chamber for receiving said pigment suspending therein, said reservoir member including control means cooperating with a transfer tube to control the rate of metering of said pigment suspension from said pigment-receiving outer chamber and for agitating said pigment suspension when said needle is reciprocated, said control means including a wire having a first portion inserted in said transfer tube and a second inclined portion located in said outer chamber of said reservoir member, said transfer tube having a predetermined inside diameter for transferring said pigment suspension from said

outer chamber of said reservoir member through an inner portion of said inclined chamber to the lower portion in said body of said adapter member.

14. The apparatus as set forth in claim 13, wherein the annular space defined by the inside diameter of said transfer tube and the outside diameter of said wire is sized to meter said pigment solution from said pigment-receiving outer chamber of said reservoir member to said needle during an implantation procedure.

15. The apparatus as set forth in claim 13 further including a cap for closing said pigment-receiving outer chamber of said reservoir member when said pigment suspension has been provided therein.

16. The apparatus as set forth in claim 13, wherein the angle of inclination of said inclined chamber relative to said axially aligned chamber is about 45 degrees.

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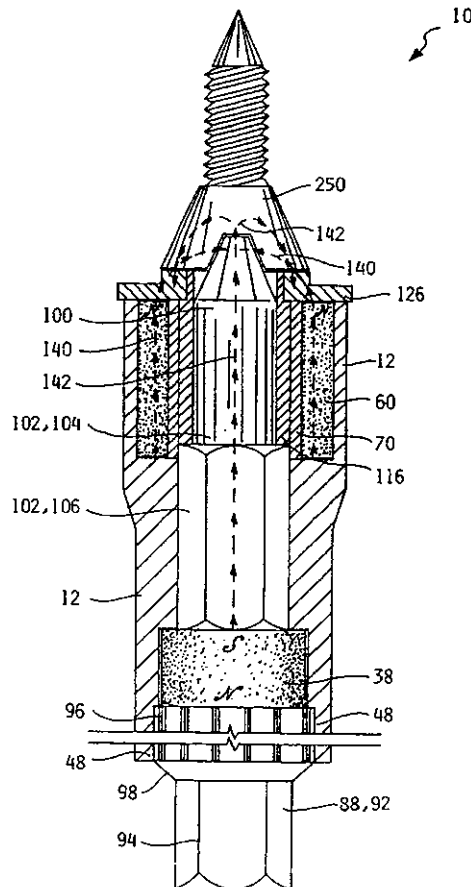
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**United States Patent** [19]**Hillinger**[11] **Patent Number:** 5,724,873[45] **Date of Patent:** Mar. 10, 1998**[54] COMPOSITE MAGNETIC-FIELD
SCREWDRIVER****[76] Inventor:** George Hillinger, 129 N. LeDoux Rd.,
Beverly Hills, Calif. 90211**[21] Appl. No.:** 679,236**[22] Filed:** Jul. 12, 1996**[51] Int. Cl.⁶** B25B 23/12**[52] U.S. Cl.** 81/451; 81/125; 81/438**[58] Field of Search** 81/125, 451, 438**[56] References Cited****U.S. PATENT DOCUMENTS**

2,838,082	6/1958	Lange	81/438
3,007,504	11/1961	Clark	81/125
5,012,708	5/1991	Martindell	81/438

Primary Examiner—Timothy V. Eley*Assistant Examiner*—Lee Wilson*Attorney, Agent, or Firm*—Albert O. Cota**[57] ABSTRACT**

A composite magnetic-field screwdriver (10) that consists of two elements: a non magnetic-conductive housing (12) and a selectable, magnetic-conductive tool bit (100). The housing (12) includes a tool bit cavity (80) that accepts the tool bit (100) and a drill-chuck connector sleeve (48) into which is frictionally inserted a non magnetic-conductive drill chuck connector (88). The housing (12) includes an upper ring magnet (60) and a lower circular magnet (84). The two magnets operate in combination to produce a composite magnetic flux path. The composite magnetic flux path is activated only when a workpiece (250) is attached to a tool bit (100) that has been inserted into the tool bit cavity (80). The composite magnetic flux path results in a high-level gauss at the bit's upper section which allows the workpiece i.e., a screw to be firmly attached to the tool bit (100). In a second embodiment, a magnetic housing (150) is utilized that is designed to contain a single concentric dual magnet (174) in lieu of the two magnets of the preferred embodiment. The dual magnet (174) also produces a composite magnetic flux path that functions in a similar manner as described for the preferred embodiment.

17 Claims, 4 Drawing Sheets

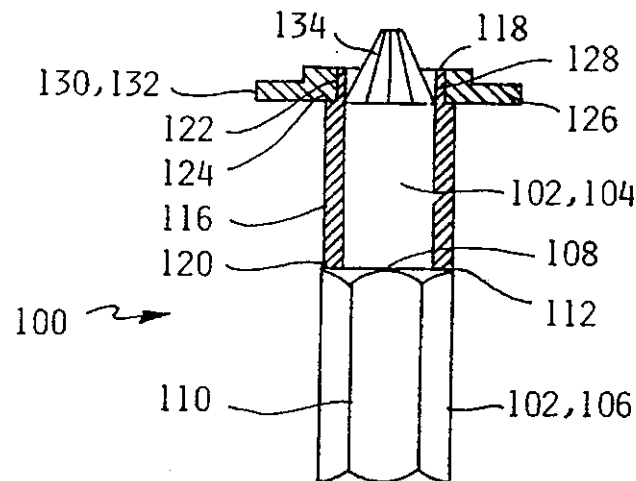


Fig. 2

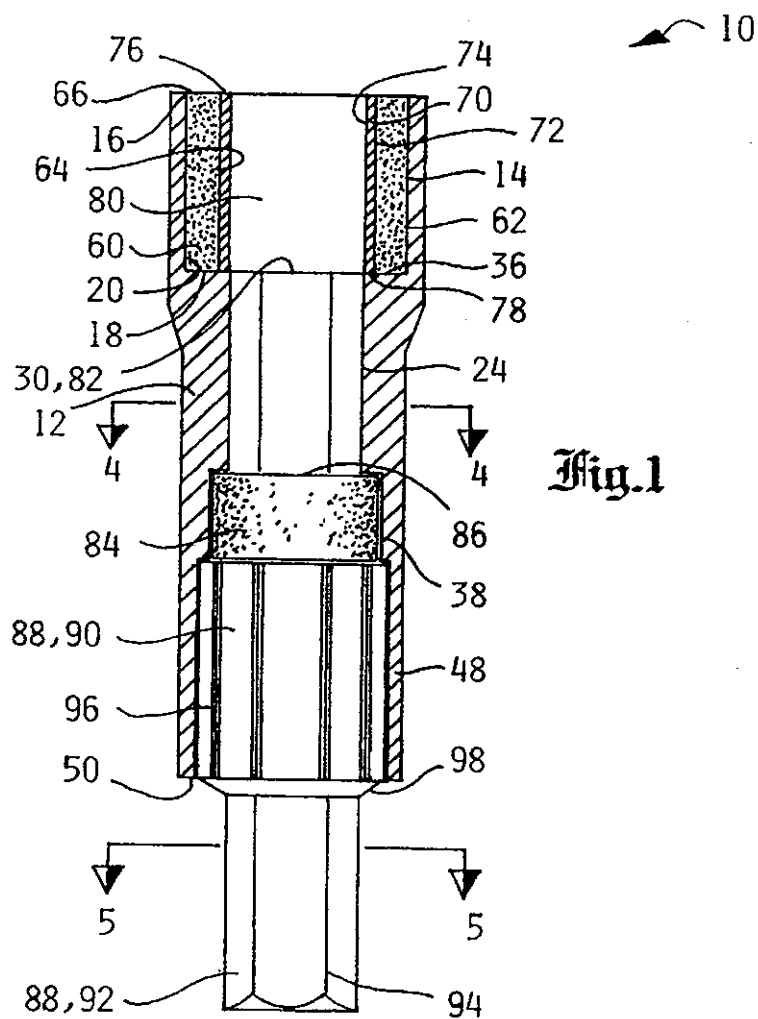


Fig. 1

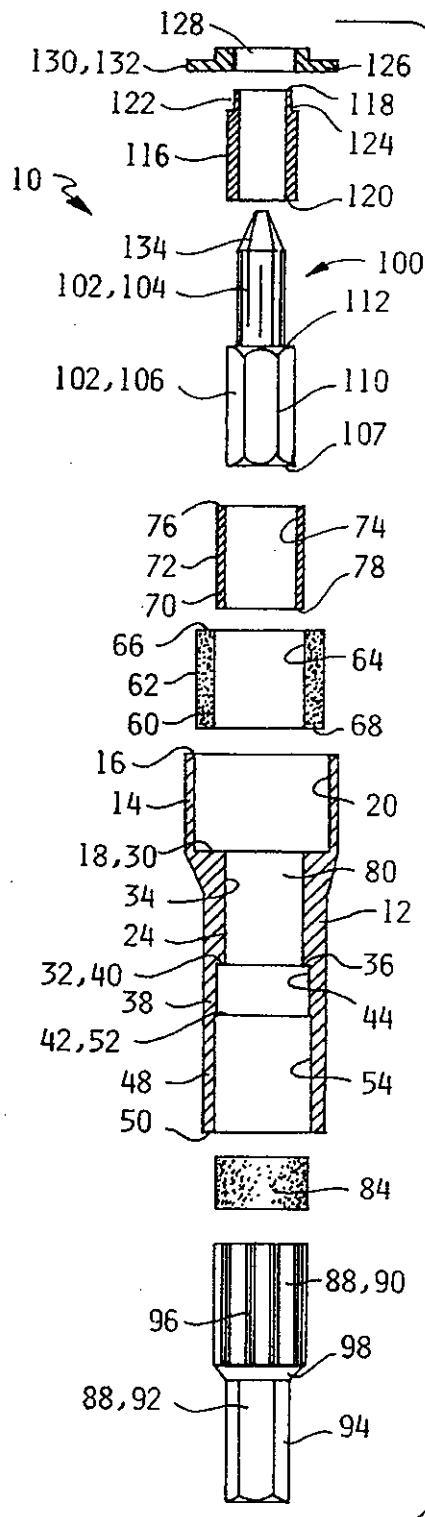


Fig. 3

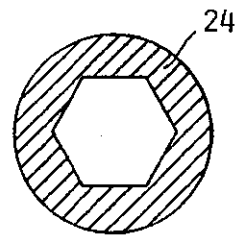


Fig. 4

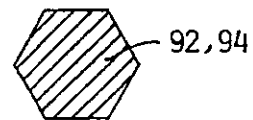


Fig. 5

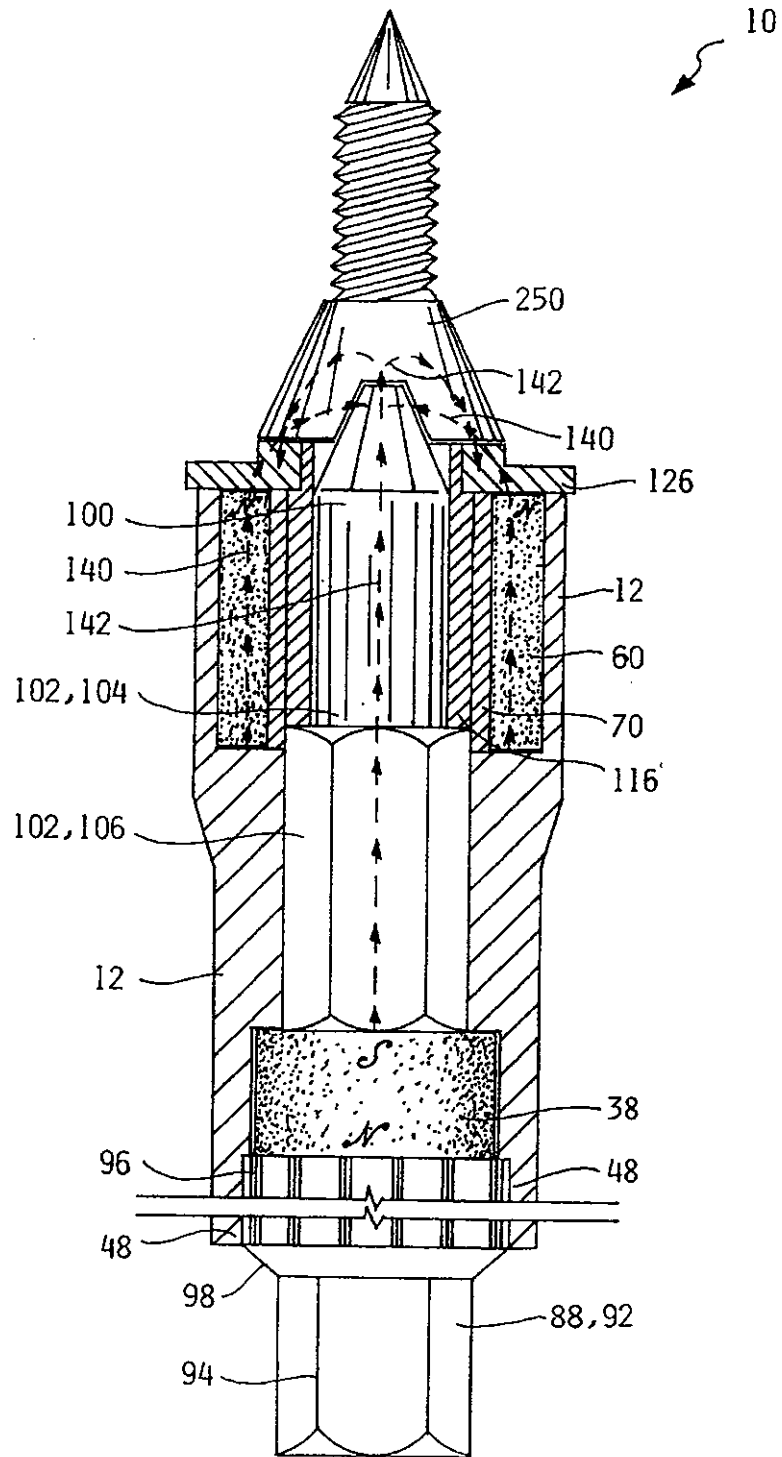


Fig. 6

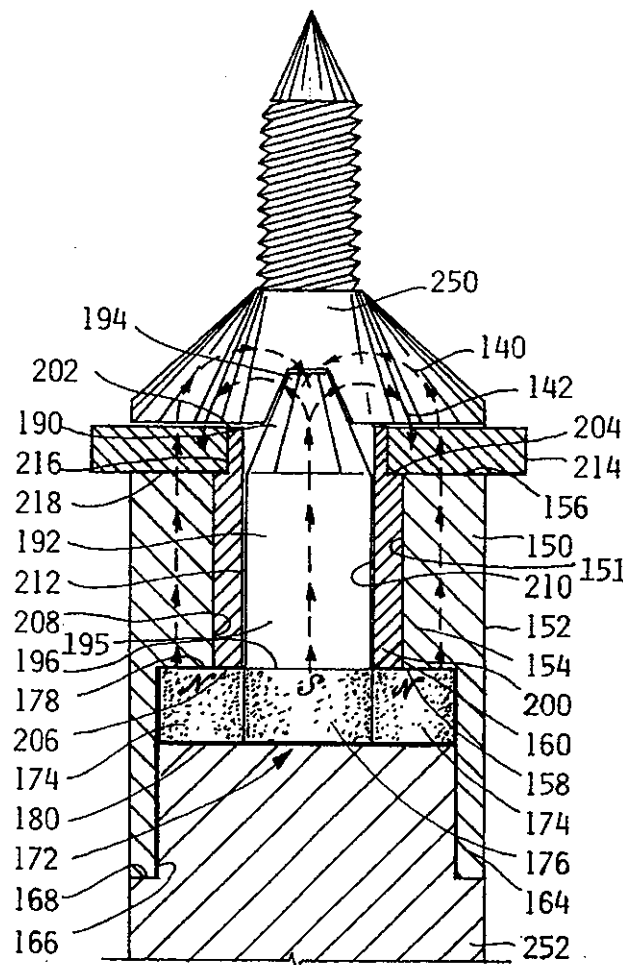


Fig. 7

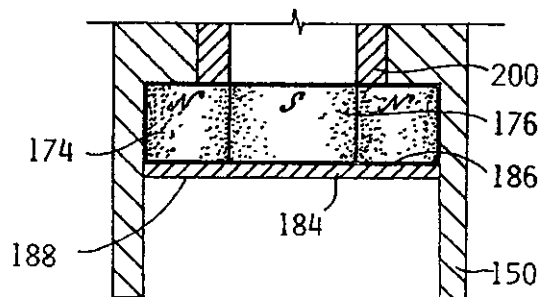


Fig. 10

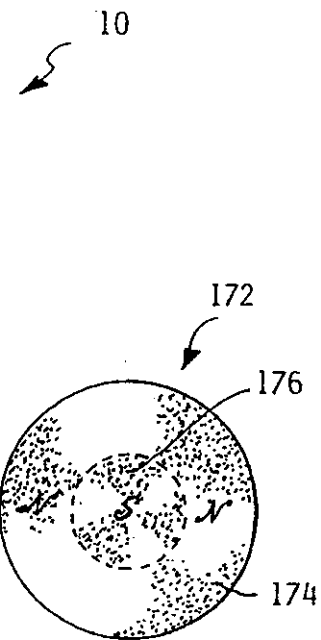


Fig. 8

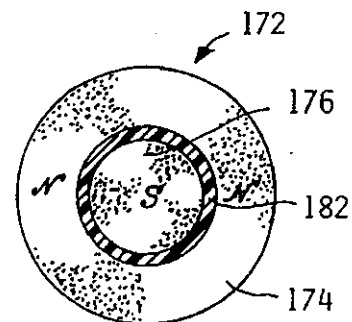


Fig. 9

COMPOSITE MAGNETIC-FIELD SCREWDRIVER

TECHNICAL FIELD

The invention pertains to the general field of magnetic screwdrivers. More particularly, the invention pertains to a magnetic screwdriver that produces a composite magnetic flux path that allows a high-level gauss to be applied to a workpiece attached to the screwdriver.

BACKGROUND ART

Manual screwdrivers, as well as electrical and pneumatic drills have tool tips attached which are universally utilized to insert and remove screws and the like through and from various types of materials. To perform this task, it is necessary to position and maintain, with one hand, the screw in a firm and generally perpendicular direction with respect to the surface of the material. The other hand is then utilized to rotate the manual screwdriver handle or to activate the electric or pneumatic drill after the tool bit tip has been inserted into the screw head opening.

In most situations, the depth of the screw head opening is relatively shallow. Thus, in many cases it is difficult to maintain contact between the screw head opening and the tip of the screwdriver or tool bit. Any slippage of this contact can cause:

- lost work time due to time lost to reinsert the screwdriver's tip or tool tip back into a screw slot,
- damage to the tool blade and/or edges of the screw slot due to tool slippage,
- injury to the hand holding the screw, and
- damage to surrounding machinery or loss of a screw if the screw is displaced and falls due to a slippage of a screwdriver tip or tool bit.

Prior art screwdrivers have attempted to solve the above problems by:

- a) mechanical means which places the screw in a sleeve into which, the screwdriver blade extends inward to interface with the screw slot. The sleeve must be sized to fit a specific screw size.
- b) mechanical means which places the screw between two or three blades of spring-like materials until the screwdriver blade interfaces with the screw. In this method, the size of screw heads that may be used is limited. In the above cases, the basic inconvenience is that the sleeve as well as the spring are designed to fit specific head dimensions. Thus the universality of the tool is limited.
- c) magnetic means that holds the screw on the screwdriver blade. Because of the relatively small area available to house a magnet, the gauss level of the magnet is relatively weak and generally insufficient to adequately hold a screw in place. Therefore, the second hand must be used to also hold the screw.

A search of the prior art did not disclose any patents that read directly on the claims of the instant invention. However the following U.S. Pat. Nos. are considered related:

U.S. Pat. No.	INVENTOR	ISSUED
3,392,767	Stillwagon, Jr.	16 July 1968
3,007,504	Clark	7 November 1961
2,838,082	Lange	10 June 1958
2,260,055	Reardon	21 October 1941

The U.S. Pat. No. 3,392,767 Stillwagon, Jr. patent discloses a permanent magnet driver for driving threaded fasteners

such as screws and nuts. The driver includes an annular band of magnetized rubber bonded barium ferrite disposed within or in surrounding relation to the driver. A portion of the driver forms one of the magnetic pole pieces and utilizes an annular sleeve, which surrounds the rubberized magnetic material, as the opposite pole piece.

The U.S. Pat. No. 3,007,504 Clark patent discloses a magnetic tool that is adapted to interchangeably receive a plurality of tool bits, sockets and the like. The tool is designed to drive screws and similar fasteners that are held in magnetic contact with the tool.

The U.S. Pat. No. 2,838,082 Lange patent discloses a magnetic driving tool which incorporates a permanent magnet and a tool bit. The tool includes a main body provided with a shank for driving and which encloses the permanent magnet. The body also supports the bit in a direct magnetic flux transmitting relation with the magnet, allowing the tool to attract screws or other fasteners that are to be driven by the tool bit.

The U.S. Pat. 2,260,055 Reardon patent discloses a magnetic tool having a head portion with a recess into which is inserted a permanent magnet. The magnet has one of its polar faces extending toward the open end of the recess to thus form a seat for magnetically holding a driving member. The magnet is further provided with a transverse slot for positioning a tool bit.

For background purposes and as indicative of the art to which the invention relates, reference may be made to the following remaining patents found in the search:

U.S. Pat. No.	INVENTOR	ISSUED
1,377,958	Andrews	10 May 1921
2,677,294	Clark	4 May 1954
2,714,829	Clark	9 August 1955
2,718,806	Clark	27 September 1955
2,806,396	Milner	17 September 1957
2,864,417	Sebolten	16 December 1958
3,731,722	Carr	8 May 1973

A review of the prior art patents did not disclose any patents that utilized a similar structural housing or tool bit as disclosed in the instant invention. Additionally, the prior art did not disclose any magnetic screwdrivers that employed two permanent magnets or a single, concentric dual ring magnet that function to produce a composite magnetic flux path. This composite flux path allows a high-level gauss to be channeled through magnetic-conductive materials and applied to the tip of the tool bit and the attached workpiece.

DISCLOSURE OF THE INVENTION

The disclosed invention is designed to provide a magnetic screwdriver having a housing that accepts a variety of tool bits. The housing, which is configured to fit into a standard drill chuck or a hand-held screwdriver, features a magnetic circuit that produce two magnetic flux paths. In the preferred embodiment two permanent magnets are used. While in a second embodiment, a single concentric dual ring magnet is used to produce the two magnetic flux paths. The two flux paths combine to produce a composite flux path that results a high-level gauss that is applied to a workpiece, such as a screw, when the workpiece is attached to the upper end of the tool bit. Prior to the attachment of the workpiece, which functions as a "magnetic connector", the composite flux path is inactive.

In its most generic design, the composite magnetic-field screwdriver is comprised of a housing and a magnetic-

conductive tool bit. The housing includes an upper sleeve into which is slidably inserted the tool bit, a lower sleeve into which is frictionally inserted a drill chuck connector or screwdriver shaft, and at least one magnet located within said housing. The at least one magnet has means for producing a composite magnetic flux path that is activated when said tool bit is inserted into the upper sleeve and a workpiece is attached to the tool bit. The composite magnetic flux path results in a high-level gauss that firmly holds the workpiece to the tool bit.

In its most basic preferred design, the composite magnetic-field screwdriver consists of the following:

- A. a non magnetic-conductive housing having:
 1. an upper sleeve, a lower magnet sleeve and a drill-chuck connector sleeve. The upper sleeve has an integral lower section that has a polygon shape,
 2. an upper ring magnet frictionally inserted into the upper sleeve,
 3. an upper non magnetic-conductive sleeve inserted into the upper ring magnet. The area inward from the non magnetic-conductive sleeve forms a drill bit cavity which continues downward into the polygon section of the upper sleeve,
 4. a circular magnet frictionally inserted into the lower magnet sleeve,
 5. a non magnetic-conductive drill chuck connector frictionally inserted into the drill-chuck connector sleeve, and
- B. a magnetic-conductive tool bit having a lower section dimensioned to slidably fit into the polygon shaped drill bit cavity. The tool bit includes a magnetic-conductive tool-bit gripping disc that functions in combination with a workpiece as the "magnetic connector" when the workpiece is attached to the tool bit, and the tool bit is inserted into the housing.

To increase the life of the invention all the non magnetic-conductive elements, such as the housing, are made of a non-conductive material such as stainless steel. Likewise, the magnetic-conductive elements, such as the tool bit gripping disc are made of a magnetic-conductive material such as stainless steel. The polygon shape of the upper sleeve's lower section, the drill-chuck connector, and the lower section of the bit body are preferably in a hexagon configuration. The ring and the circular permanent magnets are preferably Samarium Cobalt or Neodymium magnets. However, any equivalent-power magnet can be utilized.

In view of the above disclosure, it is the primary object of the invention to provide a magnetic screwdriver that utilizes two permanent magnets. The magnetic flux paths of the two magnets combine to produce a composite magnetic flux path that is channeled through magnetic-conductive materials and applied to a workpiece attached to the tool bit.

In addition to the primary object of the invention it is also an object to produce a magnetic screwdriver that:

- can be designed to accommodate various sizes of drill chucks and manual screwdrivers,
- can accept various configurations of tool bits,
- is maintenance free,
- utilizes a novel structural design which makes possible the use of high gauss magnets,
- can be adapted for either manual or machine operation,
- permits the flux of the two permanent magnets to be utilized in the most effective manner,
- protects the two permanent magnets from the deleterious effects of dropping the screwdriver on hard surfaces.

is compact, of simple and rugged construction, of long useful life and which may be manufactured and assembled in an economical manner.

These and other objects and advantages of the present invention will become apparent from the subsequent detailed description of the preferred embodiment and the appended claims taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an elevational-sectional view of the non magnetic-conductive housing and its associated elements.

FIG. 2 is an elevational-sectional view of the magnetic-conductive tool bit and its associated elements.

FIG. 3 is an elevational-exploded view of the composite magnetic-field screwdriver.

FIG. 4 is a sectional view taken along the lines 4-4 of FIG. 1 showing a polygon sleeve configured in a hexagon shape.

FIG. 5 is a partial sectional view, taken along the lines 5-5 of FIG. 1, showing the lower section of the drill chuck connector configured in a hexagon shape.

FIG. 6 is a partial elevational-sectional view showing the magnetic flow paths of the ring and circular magnet.

FIG. 7 is a partial elevational-sectional view of the second embodiment showing the magnetic housing with the magnetic-conductive tool bit. This figure also shows the magnetic flow paths of the concentric dual ring magnet.

FIG. 8 is a plan view of the concentric dual ring magnet.

FIG. 9 is a plan view of a concentric dual ring magnet that includes a magnetic insulating sleeve between the magnet's inner and outer sections wherein each of the sections have opposite magnetic poles.

FIG. 10 is a partial elevational-sectional view of the second embodiment showing a non-magnetic disc placed between the lower surface of the concentric dual magnet and an upper surface of a screwdriver shaft.

BEST MODE FOR CARRYING OUT THE INVENTION

The best mode for carrying out the composite magnetic-field screwdriver is presented in terms of a preferred embodiment and a second embodiment. Both embodiments employ a composite magnetic circuit that applies a maximum gauss level to a workpiece such as a screw, that is attached to a tool bit inserted into a housing of the invention.

The preferred embodiment of the composite magnetic-field screwdriver 10, as shown in FIGS. 1-6, is comprised of two major elements: a non magnetic-conductive housing 12 and a magnetic-conductive tool bit 100. The housing includes an upper, non magnetic-conductive sleeve 70, a non magnetic-conductive drill chuck connector 88 and two permanent magnets: a ring magnet 60 and a circular magnet 84.

The housing 12, as best shown in the exploded view of FIG. 3, is made of a non magnetic-conductive material such as stainless steel and includes four integral sleeves: an upper sleeve 14, a polygon sleeve 24, a lower magnet sleeve 38 and a drill chuck connector sleeve 48.

The upper sleeve 14 has an upper edge 16, a lower terminus 18 and an inner surface 20. The polygon sleeve 24, as the name implies, is in a polygon shape that preferably consists of a hexagon as shown in FIG. 4. However, other polygons such as a square or an octagon (not shown) may also be used. The polygon sleeve 24, has an upper terminus

30, a lower terminus 32, and an inner surface 34. The upper terminus 30 interfaces with the lower terminus 18 of the upper sleeve 16, and the inner surface 34 extends inwards from the vertical plane of the inner surface 20 of the upper sleeve that terminates in a magnet/sleeve ledge 36.

The lower magnet sleeve 38 includes an upper terminus 40, a lower terminus 42 and an inner surface 44. The upper terminus 40 interfaces with the lower terminus 32 of the polygon sleeve 24 and the inner surface 44 extends outward from the vertical plane of the inner surface 34 of the polygon sleeve 24.

The drill chuck connector sleeve 48 has a lower edge 50, an upper terminus 52 and an inner surface 54. The upper terminus 52 interfaces with the lower terminus 42 of the lower magnet sleeve 38. The inner surface 54 extends outward from the vertical plane of the inner surface 44 of the lower magnet sleeve 38.

The preferred embodiment of the invention features two permanent magnets, the ring magnet 60 and the circular magnet 84. The two magnets function in combination, to provide a high-level gauss to the workpiece, when the workpiece is attached to the tip of the tool bit 100 as described infra.

The ring magnet 60, as shown inserted into the housing 12 in FIG. 1, and separated in the exploded view of FIG. 3, has an outer surface 62, an inner surface 64, an upper surface 66 and a lower surface 68. The ring magnet 60 is frictionally inserted into the upper sleeve 14 with the magnet's outer surface 62 interfacing with the inner surface 20 of the sleeve 14. The upper surface 66 when inserted, as shown in FIG. 1, is in horizontal alignment with the upper edge 16 of the upper sleeve 14, and the lower surface 68 rests upon the magnet/sleeve ledge 36.

The ring magnet 60 is held in place and insulated by the upper non magnetic-conductive sleeve 70 which includes an outer surface 72, an inner surface 74, an upper edge 76 and a lower edge 78. As shown best in FIG. 3, the sleeve 70 is frictionally inserted into the ring magnet 60 with the outer surface 72 interfacing with the inner surface 64 of the ring magnet 60. When the sleeve 70 is inserted, the upper edge 76 is in horizontal alignment with the upper edge 66 of the ring magnet 60, as shown in FIG. 1, and the lower edge 78 rests on the magnet/sleeve ledge 36. Between the sleeve's 70 inner surface 74 is formed a tool bit cavity 80 that has a lower terminus 82 which interfaces with the upper terminus 30 of the polygon sleeve 24. In lieu of the sleeve 70, a non magnetic-conductive coating (not shown) may be applied to the inner surface 64 of the ring magnet 60.

The second magnet in the design of the composite magnetic-field screwdriver 10 is the circular magnet 84. This magnet is dimensioned to frictionally fit into and within the confines of the lower magnet sleeve 38 as shown in FIG. 1. Both the ring magnet 60 and circular magnet 84 are comprised of a high magnetic-power material such as Samarium Cobalt or Neodymium.

The final element of the housing 12 is the non magnetic-conductive drill-chuck connector 88. This connector includes an upper section 90 and a lower section 92. The upper section 90, as shown in FIG. 1, is dimensioned to frictionally fit into and within the confines of the drill-chuck connector sleeve 48. Preferably, the upper section 90 includes a plurality of serrations 96 as also shown in FIG. 1. The lower section 92 has a polygon shape 94 that extends outward from the lower edge 90 of the drill-chuck connector sleeve 48. Preferably the polygon shape is in a hexagon shape 94 as shown in FIG. 5. Also, to add structural integrity

to the interface between the upper section 90 and lower section 92, a reinforcing chamfer 98 is included as shown in FIG. 1.

Prior to inserting the drill-chuck connector 88, the ring magnet 60 and the circular magnet 84, an adhesive (not shown) may be applied to the contact surfaces. The adhesive aids in maintaining the structural integrity of the two respective interfacing elements.

The final element that comprises the composite magnetic-field screwdriver 10 is the tool bit 100 as shown assembled in FIG. 2 and in an exploded view in FIG. 3. The tool bit 100 includes a magnetic-conductive bit body 102, a non magnetic-conductive sleeve 116, and a magnetic-conductive tool-bit gripping disc 126. The body 102 has an upper section 104 integral with a lower section 106 further having a lower surface 107. The lower section 106 includes an upper terminus 108 having a polygon shape 110 dimensioned to slidably fit into the polygon sleeve 24 of the inventive screwdriver 10. The upper section 104 is round and has a diameter that is slidably less than the dimension of the polygon shaped lower section 106. This configuration allows a ledge 112 to be formed around the upper edge of the upper terminus 108, as shown best in FIG. 3.

The non magnetic-conductive sleeve 116 includes an upper edge 118, a lower edge 120, an upper section 122 and a ledge 124. The sleeve 116 has an inside diameter that is dimensioned to frictionally fit over the upper section 104 of the bit body 102. When so fitted, the sleeve's lower edge 120 is supported by the ledge 112 on the lower section 106 of the bit body 102. The upper section 122 further includes a ledge 124 that extends inward, as best shown in FIG. 3. The upper section 104 has a tip whose design consists of one of a variety of bit designs such as a Phillips head 134 or a flat blade head (not shown).

The magnetic-conductive tool bit gripping disc 126 has a center bore 128 and an outward edge 130 that extends beyond the vertical plane of the non magnetic-conductive housing 12. In the preferred embodiment, the disc 126 has a serrated edge 132 to facilitate the gripping of the disc when the tool bit 100 is being removed from housing 12. The bore 128 is dimensioned to frictionally fit into the upper section 122 and rests upon the inward extending ledge 124 of the sleeve 116, as shown in FIG. 2.

As previously stated, the composite magnetic-field screwdriver 10 functions in combination with the ring magnet 60 and the circular magnet 84. The two magnets produce a composite magnetic flux path consisting of a first magnetic flux path 140 and a second magnetic flux path 142, as shown in FIG. 6. The composite magnetic flux path is activated only when a workpiece 250 is inserted into the tip of the magnetic-conductive tool bit 100 which has previously been inserted into the tool bit cavity 80 with the lower surface 107 of the tool bit body 102 interfacing with the upper surface 86 of the circular magnet 84. When so inserted, the workpiece functions as a "magnetic connector" which allows the two magnetic flux path 140, 142 to combine and produce a high-level gauss at the tool bit tip and the gripping disc 126 which firmly holds the workpiece 250. The first magnetic flux path 140 is channeled, in sequence, from the ring magnet 60, the magnetic-conductive bit gripping disc 126, the workpiece 250 and the magnetic-conductive tool bit 100; the second magnetic flux path 142 is channeled, in sequence, from the circular magnet 84, the magnetic-conductive tool bit 100, the workpiece 250 and the magnetic-conductive bit gripping disc 126. Prior to the insertion of the workpiece, the tool bit as well the magnetic-conductive bit gripping disc

have magnetic power but do not have the composite magnetic power that can only be applied when both the ring magnet 60 and circular magnet 84 are in the composite magnetic circuit.

The second embodiment of the composite magnetic-field screwdriver 10, as shown in FIGS. 7, 8, 9 and 10, is comprised of two major elements: a magnetic housing 150 and a tool bit 190.

The housing 150, as shown in FIG. 7, is made of a magnetic material and includes an inner surface 151, an outer surface 152, an upper sleeve 154 and a lower sleeve 164. The upper sleeve 154 has an upper edge 156, a lower outward stepped edge 158 and an inner polygon shaped surface 160.

The lower surface 164 which is contiguous with the upper surface 154 has an inward surface 166 that extends downward from the lower outward stepped edge 158 of the upper sleeve and terminates at a lower edge 168.

The second embodiment utilizes a concentric dual permanent magnet 172, as shown in FIGS. 7 and 8, that includes an outer section 174, an inner section 176, an upper surface 178 and a lower surface 180. The magnet 172 is preferably constructed, as shown in FIG. 8, with the outer section 174 interfacing with the inner section 176. However, as shown in FIG. 9, a magnetic insulating sleeve 182 may be located between the outer section 174 and the inner section 176.

In either magnet design, the magnetic pole of the outer section 174 are opposite to those of the inner section 176 as shown in FIGS. 7-9. The magnet 172 is frictionally inserted into the lower sleeve 164 with the magnet's upper surface 178 pressed against the lower outward stepped edge 158 of the upper sleeve 154.

As shown in FIG. 10, the second embodiment of the screwdriver 10 may include a non-magnetic disc 184 that includes an upper surface 186 and a lower surface 188. The disc 184 is inserted into the lower sleeve 164 with its upper surface 186 interfacing with the lower surface 180 of the concentric dual magnet 172. The disc 184 aids in maintaining the magnet in place and functions as a non-magnetic buffer when the lower sleeve 164 is inserted over a serrated shaft 252 of a hand-held screwdriver.

The second element that comprises the composite magnetic field screwdriver 10 is the tool bit 190 which is shown inserted into the upper sleeve 154 in FIG. 7. The tool bit 190 consists of a magnetic-conductive bit body 192, a non magnetic-conductive sleeve 200, and a magnetic-conductive tool bit gripping disc 214.

The bit body 172 includes an upper section 194 integral with a lower section 195 further having a lower surface 196. The bit body 192 has an outer diameter dimensioned so that when the tool bit 190 is inserted into the upper sleeve 154, its lower surface 196 interfaces with the upper surface 178 of the inner section of the magnet 172.

The non magnetic-conductive sleeve 200 has an upper section 202 further having an outward facing ledge 204, a bottom edge 206, an outer polygon surface 208 and an inner longitudinally serrated surface 210 that is dimensioned to interlock with a complimentary serrated surface 212 on the bit body 192. The outer polygon surface 208 of the sleeve 200 is dimensioned to slidably fit into the inner polygon surface 160 of the magnetic housing 150.

The magnetic-conductive tool bit gripping disc 214 as also shown in FIG. 7, includes a center bore 216 and a lower surface 218. The center bore 216 is dimensioned to frictionally fit over and be attached to the ledge 204 on the non

magnetic conductive sleeve 200. The disc's lower surface 218 interfaces with the upper edge 156 of the upper sleeve 154 of the magnetic housing 150.

The concentric dual magnet 172 produces a composite magnetic flux path. The flux path is activated when a workpiece 250 is inserted over the upper end 194 of the tool bit 190 and the sleeve 200 which are inserted into the upper sleeve 154. The composite magnetic flux path results in a high-level gauss that firmly holds the workpiece 250 to the tool bit 190 and the gripping disc 214.

The composite magnetic flux path, as shown in FIG. 7, comprises a first magnetic flux path 140 and a second magnetic flux path 142. The first magnetic flux path 140 is channeled, in sequence, from the water section 174 of the concentric dual magnet 172, the magnetic housing 150, the magnetic-conductive bit gripping disc 214, the workpiece 250 and the magnetic-conductive tool bit 190. The second magnetic flux path 142 is channeled, in sequence, from the inner section 176 of the concentric dual magnet 172, the magnetic-conductive tool bit 190 and the workpiece 250 and the tool bit gripping disc 214.

While the invention has been described in complete detail and pictorially shown in the accompanying drawings it is not to be limited to such details, since many changes and modifications may be made in the invention without departing from the spirit and scope thereof. Hence, it is described to cover any and all modifications and forms which may come within the language and scope of the appended claims.

I claim:

1. A composite magnetic-field screwdriver comprising:

a) a non magnetic-conductive housing having:

- (1) an upper sleeve, a polygon sleeve, a lower magnet sleeve and a drill chuck connector sleeve,
- (2) a ring magnet having an outer surface and an inner surface, wherein said ring magnet is inserted into the upper sleeve with the outer surface of said ring magnet interfacing with the upper sleeve,
- (3) an upper non magnetic-conductive sleeve inserted into said upper ring magnet wherein the area inward from said non magnetic-conductive sleeve forms a drill bit cavity,
- (4) a circular magnet frictionally inserted into the lower magnet sleeve,
- (5) a non magnetic-conductive drill chuck connector frictionally inserted into the drill chuck connector sleeve, and

b) a magnetic-conductive tool bit comprising:

- (1) a magnetic-conductive bit body having an upper section integral with a lower section that further having a lower surface, wherein the upper and lower sections are dimensioned to slidably fit into the tool bit cavity and the polygon sleeve respectively, with the lower surface interfacing with said circular magnet,
- (2) a non magnetic-conductive sleeve having an upper edge and an inside diameter dimensioned to surround the upper section of said tool bit, and
- (3) a magnetic-conductive tool-bit gripping disc having a center bore dimensioned to fit over and be attached to the upper edge of said non magnetic-conductive sleeve.

2. The screwdriver as specified in claim 1 wherein said ring magnet functions in combination with said circular magnet to produce a composite magnetic flux path that is activated when said tool bit is inserted into the tool bit cavity and a workpiece is attached to aid tool bit, wherein the

composite magnetic flux path results in a high-level gauss that firmly holds the workpiece to said tool bit and said gripping disc.

3. The screwdriver as specified in claim 2 wherein the composite magnetic flux path comprises a first magnetic flux path and a second magnetic flux path, wherein the first magnetic flux path is channeled, in sequence, from said ring magnet, said magnetic-conductive tool-bit gripping disc, said workpiece and said magnetic-conductive tool bit, and wherein said second magnetic flux path is channeled, in sequence, from said circular magnet, said magnetic-conductive tool bit, said workpiece and said gripping disc.

4. The screwdriver as specified in claim 1 wherein said upper ring magnet and said circular magnet are comprised of a high magnetic-power material such as Samarium Cobalt or Neodymium.

5. The screwdriver as specified in claim 1 wherein said drill chuck connector has a lower section that is in a polygon shape.

6. A composite magnetic-field screwdriver comprising:

a) a non magnetic-conductive housing having:

(1) an upper sleeve having an upper edge, a lower terminus, and an inner surface.

(2) a polygon sleeve having an upper terminus, a lower terminus and an inner surface, wherein the upper terminus interfaces with the lower terminus of said upper sleeve and the inner surface extends inward from a vertical plane of the inner surface of said upper sleeve, to form a magnet/sleeve ledge.

(3) a lower magnet sleeve having an upper terminus, a lower terminus and an inner surface, wherein the upper terminus interfaces with the lower terminus of said polygon sleeve and the inner surface extends outward from the vertical plane of the inner surface of said polygon sleeve, and

(4) a drill-chuck connector sleeve having a lower edge, an upper terminus and an inner surface, wherein the upper terminus interfaces with the lower terminus of said lower magnet sleeve and the inner surface extends outward from the vertical plane of the inner surface of said lower magnet sleeve.

b) a ring magnet having an outer surface, an inner surface, an upper surface, and a lower surface, wherein said ring magnet is frictionally inserted into the upper sleeve with the outer surface interfacing with the inner surface of said upper sleeve, the upper surface in horizontal alignment with the upper surface of said upper sleeve and the lower surface resting on the magnet/sleeve ledge.

c) an upper non magnetic-conductive sleeve having an outer surface, an inner surface, an upper edge, and a lower edge, wherein said sleeve is frictionally inserted into said ring magnet, with the upper edge of said sleeve in horizontal alignment with the upper edge of said ring magnet and with the lower edge of said sleeve resting on the magnet/sleeve ledge and wherein between the inner surface of said sleeve is formed a tool-bit cavity.

d) a circular magnet dimensioned to frictionally fit into and within the confines of said lower magnet sleeve.

e) a non magnetic-conductive drill-chuck connector having an upper section and a lower section, wherein the upper section of said non magnetic-conductive drill-chuck connector is dimensioned to frictionally fit into and within the confines of said drill-chuck connector sleeve, and wherein the lower section has a polygon

shape that extends outward from the lower edge of said drill-chuck connector sleeve, and

f) a tool bit comprising:

(1) a magnetic-conductive bit body having an upper section and an integral lower section, wherein the lower section has a lower surface, an upper terminus and a polygon shape dimensioned to slidably fit sequentially into said tool bit cavity and said polygon sleeve with the lower surface of the tool bit body interfacing with the upper surface of said circular magnet and wherein the upper section of said bit body has a diameter that is less than the diameter of the lower section such that a ledge is formed around the upper edge of the upper terminus.

(2) a non magnetic-conductive sleeve having an upper edge, a lower edge, an upper section, and an inward extending ledge, wherein said sleeve is dimensioned to frictionally fit over the upper section of said bit body with the lower edge resting against the ledge on said lower section of said bit body, and

(3) a magnetic-conductive, tool-bit gripping disc having a center bore and outward edges that extend beyond the vertical plane of said non magnetic-conductive housing, wherein said bore is dimensioned to frictionally fit into the upper section of said non magnetic-conductive sleeve and rest upon the inward extending ledge on said non magnetic-conductive sleeve, wherein said ring magnet functions in combination with said circular magnet to produce a composite magnetic flux path that is activated when said tool bit is inserted into the tool bit cavity and a workpiece is attached to said tool bit, wherein the composite magnetic flux results in a high-level gauss that firmly holds the workpiece to said tool bit and said gripping disc.

7. The screwdriver as specified in claim 6 wherein the composite magnetic flux path comprises a first magnetic flux path and a second magnetic flux path, wherein the first magnetic flux path is channeled, in sequence, from said ring magnet, said magnetic-conductive bit gripping disc, said workpiece and said magnetic-conductive tool bit, and wherein said second magnetic flux path is channeled, in sequence, from said circular magnet, said magnetic-conductive tool bit and said workpiece.

8. The screwdriver as specified in claim 6 wherein said polygon sleeve is in a hexagon shape.

9. The screwdriver as specified in claim 6 wherein said upper ring magnet and said circular magnet are comprised of a high magnetic-power material such as Samarium Cobalt or Neodymium.

10. The screwdriver as specified in claim 6 wherein the polygon shape of said drill chuck connector is in a hexagon shape.

11. The screwdriver as specified in claim 6 wherein the upper section of said drill chuck connector further comprises a plurality of longitudinal serrations.

12. The screwdriver as specified in claim 6 wherein said upper non magnetic-conductive sleeve is made of stainless steel.

13. The screwdriver as specified in claim 6 wherein said circular bit-gripping disc further comprises a serrated edge.

14. A composite magnetic-field screwdriver comprising:

a) a magnetic housing having:

(1) an outer inner surface and an surface.

(2) an upper sleeve having an upper edge, a lower outward stepped edge, and an inner polygon shaped surface.

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- (3) a contiguous lower sleeve having an inward surface that extends downward from the lower outward stepped edge of the upper sleeve and terminates at a lower edge.
- (4) a concentric dual magnet having an outer section, an inner section, an upper surface and a lower surface, wherein the magnetic poles of the outer section are opposite to those of the inner section, wherein said magnet is frictionally inserted into the lower sleeve with the upper surface of the outer section said magnet pressed against the lower outward stepped edge of the upper sleeve.
- b) a tool bit comprising:
- (1) a magnetic-conductive bit body having an upper section integral with a lower section further having a lower surface, wherein said bit body has an outer diameter dimensioned, so that when said tool bit is inserted into the upper sleeve, the lower surface of said tool bit body interfaces with the upper surface of the inner section of said magnet.
- (2) a non magnetic-conductive sleeve having an upper section, further having an outward facing ledge, a bottom edge, an outer polygon surface and an inner longitudinally serrated surface dimensioned to interlock with a complimentary serrated surface on said bit body, wherein the outer polygon surface is dimensioned to slidably fit into the inner polygon surface on the upper sleeve of said magnetic housing, and
- (3) a magnetic-conductive tool bit gripping disc having a center bore and a lower surface, wherein the center bore is dimensioned to frictionally fit over and be attached to the ledge on said non magnetic-

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conductive sleeve and with its lower surface interfacing with the upper edge on the upper sleeve of said magnetic housing.

15. The screwdriver as specified in claim 14 wherein said composite dual-ring magnet produces a composite magnetic flux path that is activated when a workpiece is inserted into the upper end of said tool bit and said tool bit is inserted into said upper sleeve, wherein the composite magnetic flux path results in a high-level gauss that firmly holds the workpiece to said tool bit and said tool bit gripping disc.

16. The screwdriver as specified in claim 15 wherein the composite magnetic flux path comprises a first magnetic flux path and a second magnetic flux path, wherein the first magnetic flux path is channeled, in sequence, from the outer section of said concentric dual magnet, said magnetic housing, said magnetic-conductive bit gripping disc, said workpiece and said magnetic-conductive tool bit, and wherein said second magnetic flux path is channeled, in sequence, from the inner section of said concentric dual magnet, said magnetic-conductive tool bit, said workpiece and said tool bit gripping disc.

17. The screwdriver as specified in claim 14 further comprising a non-magnetic disc having an upper surface and a lower surface, wherein said non-magnetic disc is inserted into the lower sleeve with the upper surface of said non-magnetic disc interfacing with the lower surface of said concentric dual magnet wherein said disc aids in maintaining said magnet in place and functions as a buffer when the lower sleeve is inserted over a shaft of a hand-held screwdriver.

* * * * *



US005279552A

United States Patent [19]

Magnet

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[45] Date of Patent: Jan. 18, 1994

[54] INTRADERMAL INJECTION DEVICE

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[51] Int. Cl.⁵ B43K 5/00

[52] U.S. Cl. 604/47; 74/57; 81/9.22

[58] Field of Search 604/46, 47; 81/9.22; 74/57

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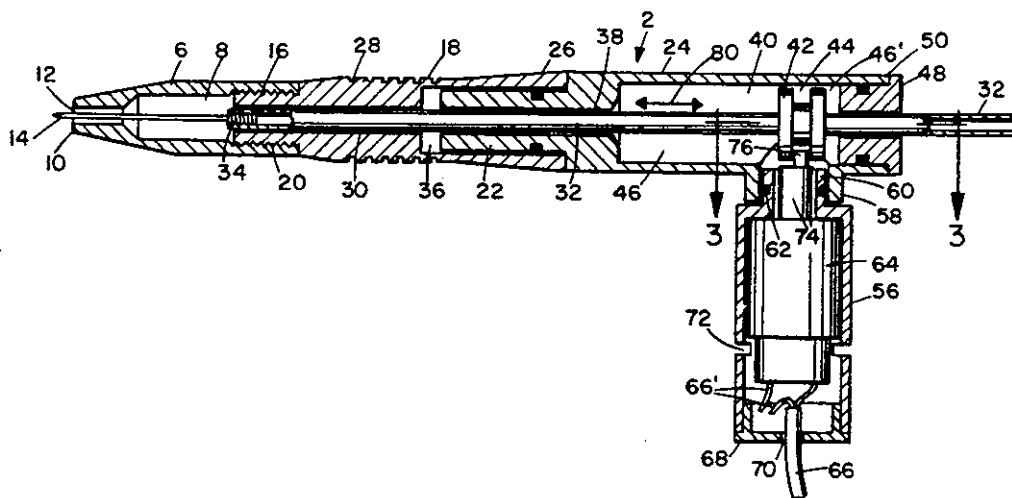
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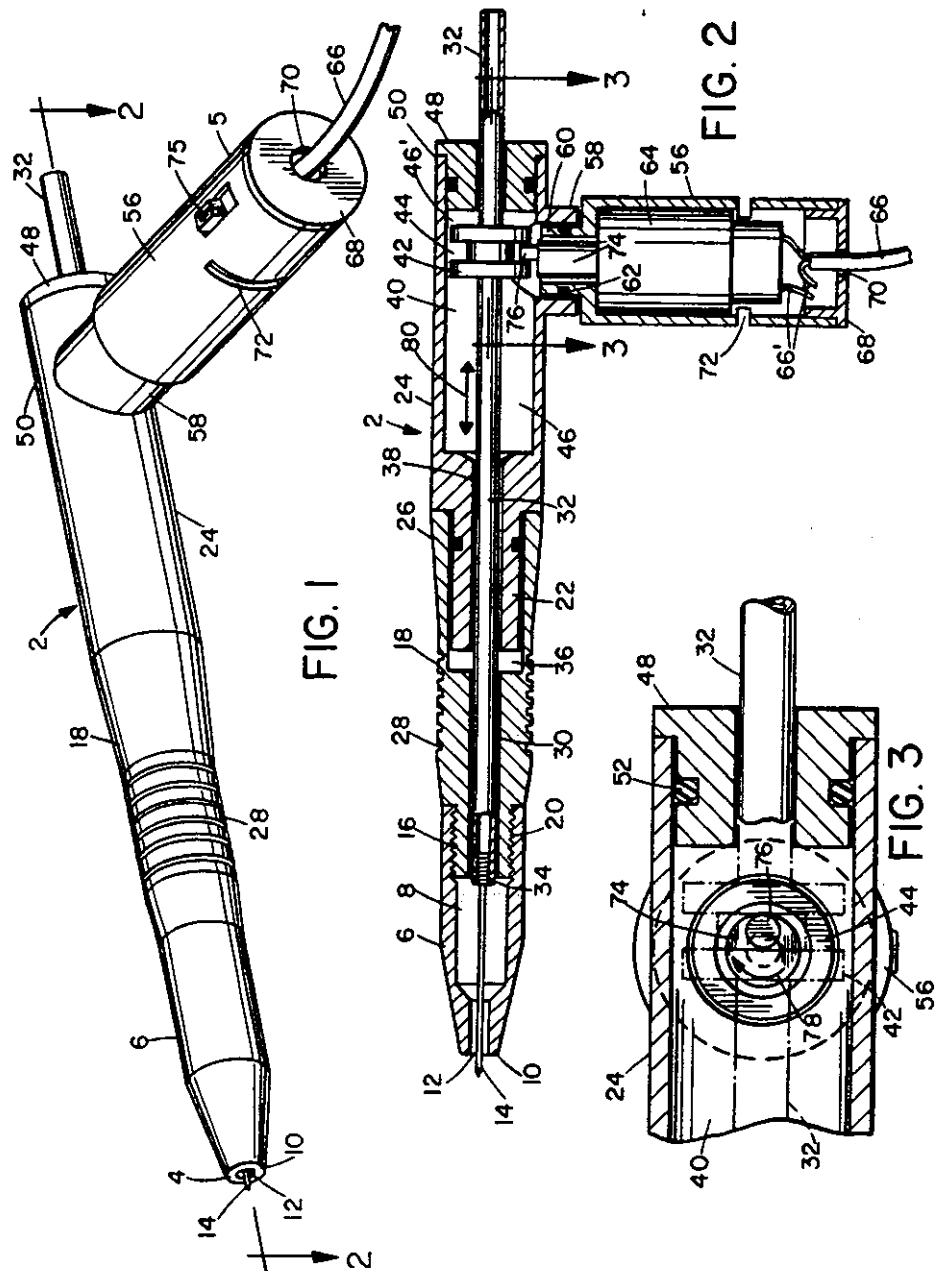
Primary Examiner—Paul J. Hirsch
 Attorney, Agent, or Firm—Brown, Martin, Haller & McClain

[57] ABSTRACT

An intradermal injection device is described which is placed against the skin of a patient and uses a reciprocating needle to inject ink, dye or similar fluid under the patient's skin, usually in a predetermined visible pattern. Unlike prior art devices of this type, however, the present device is readily disassemblable for rapid and thorough cleaning, since it is formed of a plurality of components which fit together through easily separable and cleanable couplings such as overlapping sealed (O-ring interference) fits or by threads. It also has a unique structure which avoids potential contamination of the drive components by having the drive mechanism offset at a substantial angle from the axis of the reciprocating needle and needle drive shaft and also by preferentially including internal fluid passage barriers such as fluid knock-out spaces. The device is preferably formed of metal such as aluminum or stainless steel, and may be electrically or fluid driven.

11 Claims, 2 Drawing Sheets





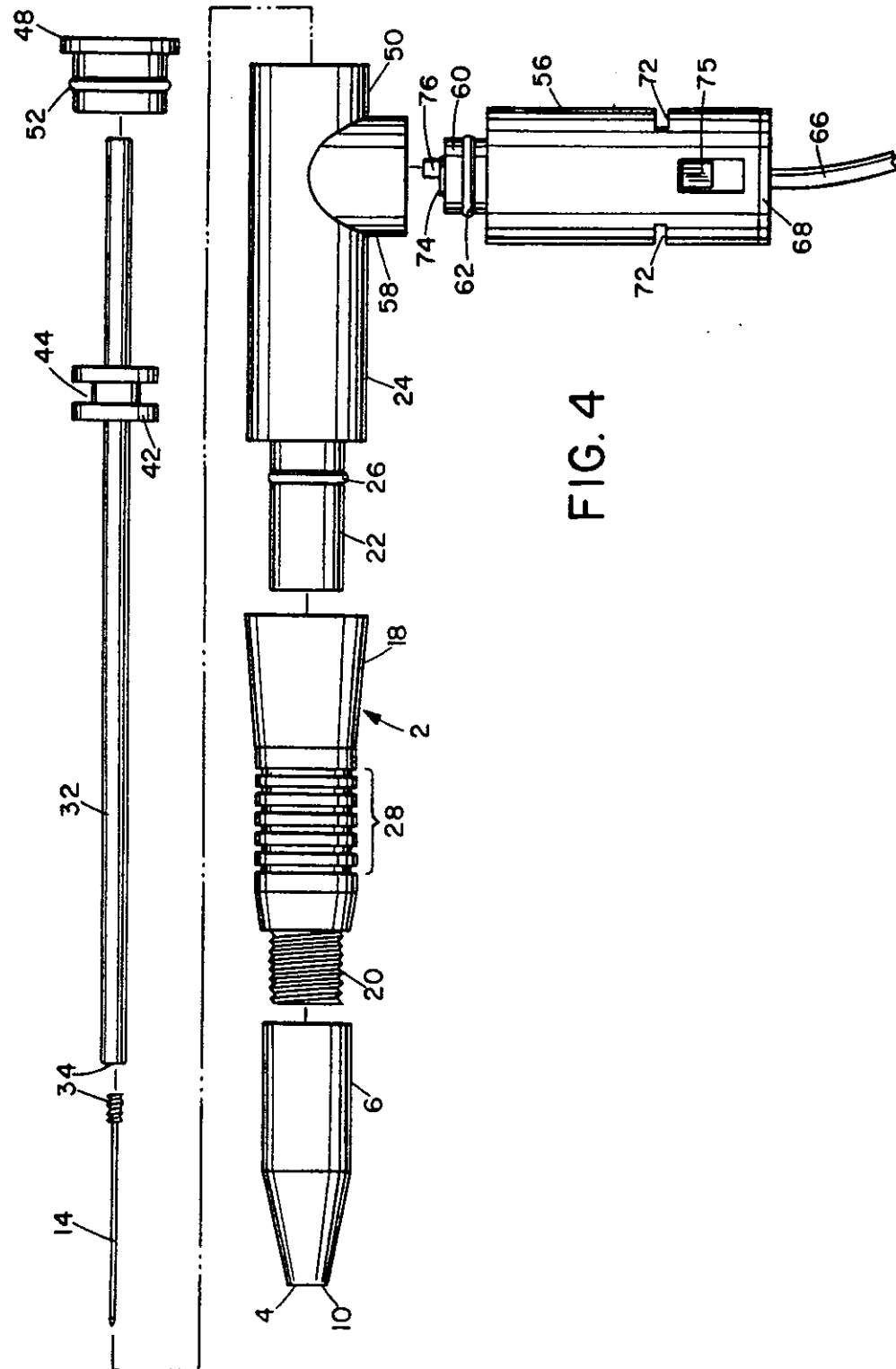


FIG. 4

INTRADERMAL INJECTION DEVICE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention herein relates to intradermal injection devices, sometimes referred to as tattooing devices.

2. Description of the Prior Art

There have been intradermal injection or surgical devices for many years. They are commonly used to create decorative tattoos on a person's skin or to form permanent eyelid liners to replace paint-on cosmetic eyelid liners. The devices inject ink, dye or other marking fluid (referred to hereafter collectively as "ink" for brevity) just under the skin surface, so that the ink is retained within the skin and the color of the ink and the design formed by the ink injection pattern is visible.

The devices normally comprise a skin-penetrating needle which has the capacity to retain some quantity of ink or dye, a mechanism to reciprocate the needle for repeated punctures of the skin to implant the ink under the skin in the desired pattern, and a pen-like housing for the device which the operator holds and uses to guide the device. There are also some sort of off-on switch and power source for the reciprocating drive mechanism. With some devices the operator repeatedly dips the needle into an ink pool to coat the needle, while other devices have built-in reservoirs for the ink from which the ink is fed continuous to the needle.

A number of different devices, particularly with different types of reciprocating needle drives, have been disclosed over the years, and many of them have become commercial products. Typical of well-known devices are those described in U.S. Pat. Nos. 2,840,076 (Robbins: 1976); 4,508,106 (Angres: 1985); 4,644,952 (Patipa et al.: 1987) and 4,798,582 (Sarath et al.: 1989).

All of these devices have one or more disadvantages, however. One of the most significant is their inability to be readily and easily cleaned after use. While cleaning has always been recognized as important, in the past it was not uncommon for some operators to perform relatively low-level cleaning between consecutive uses, with full and thorough cleaning performed only periodically, such as overnight. This was because thorough cleaning required complex and time-consuming disassembly, including removal and retention of small parts, and/or lengthy immersion of the device in cleaning solvents such as acetone or in ultrasonic cleaning devices. Alternatively, a practitioner would have a number of devices, and would use each one only once before disassembling it for a thorough cleaning. Commonly the used devices were collected during the day and then at the end of the day all were disassembled and subjected to overnight cleaning.

Past devices also were structured so that some parts could only be cleaned with difficulty, particularly the drive mechanism. In the prior art devices the drive mechanism was in a direct line with the needle, and the rapid reciprocation of the needle would cause ink, sweat and skin fluids to be drawn into the drive mechanism, from which they could be removed only with great difficulty. Autoclaving was not feasible, because of the thermal degradation of the electrical components of the drive mechanism and the fact that an autoclave sterilizes but does not clean objects, so the time-consuming and difficult disassembly and subsequent ultrasonic or solvent cleaning was normally required.

Contaminated ink pools and ink residue within the devices also posed cleaning problems. Because disassembly was difficult and often incomplete prior to cleaning, inks and ink residues could accumulate in cavities within the device and serve as sources of contamination and disease.

Transmittal of diseases from one patient to another has always been the most important concern about use of the intradermal injection devices. In the past various infections of the skin could be transmitted. Serious as these were, however, they were normally curable if treated promptly. More recently, however, the appearance of the AIDS virus and its tendency to be transmitted primarily through openings and lesions in the skin or other bodily surfaces have transformed the context in which intradermal injection devices are used. Now transmittal of the infectious AIDS virus will result not just in an illness or minor skin infection, but rather with the inevitable death of the infected person. No longer can devices of the prior art type, with their inability to be easily and thoroughly cleaned after even a single use, be tolerated.

In order to accomplish this, however, it will be necessary to make fundamental changes in the basic design of such devices, such that a unit can be readily disassembled, quickly and thoroughly cleaned, and readily reassembled. It is to this end that the present invention is directed.

SUMMARY OF THE INVENTION

The invention herein is an intradermal injection device (or tattooing device or intradermal surgical device) which is placed against the skin of a patient and uses a reciprocating needle to inject ink, dye or similar fluid under the patient's skin, usually in a predetermined visible pattern. Unlike prior art devices of this type, however, the present device is readily disassemblable for rapid and thorough cleaning, since it is formed of a plurality of components which fit together through easily separable and cleanable couplings such as overlapping sealed (O-ring interference) fits or by threads. It also has a unique structure which avoids potential contamination of the drive components by having the drive mechanism offset at a substantial angle from the axis of the reciprocating needle and needle drive shaft and also by preferentially including internal fluid passage barriers such as a fluid knock-out space.

The device is preferably formed of metal such as aluminum or stainless steel, and may be electrically or fluid driven.

In its broadest form, the invention is an intradermal injection device for injecting fluid under the skin of a patient, the device being easily disassemblable and readily cleanable, and comprising: an elongated body having distal and proximal ends; a shaft hole extending coaxially through the body; a drive shaft removably disposed for reciprocal motion within the shaft hole, and extending outwardly therefrom at least at the proximal end, the outward extension of the shaft having a cam follower mounted thereon; a cam removably engaging the cam follower to drive the cam follower in a reciprocating path co-axial of the body; a drive mechanism for the cam, the drive mechanism being at an angle to the axis of the shaft and body and removable from the body; and a needle removably mounted on the distal end of the drive shaft and extending through the reservoir and outwardly through the access hole, the needle being adapted carry to a quantity of the fluid on the

surface thereof; whereby upon reciprocation of the drive shaft by the cam the needle is caused to reciprocate and inject the carried fluid under the skin of a patient whose skin is in contact with the distal end of the device; and whereby upon completion of the injection the needle, drive shaft, drive mechanism and body can all be readily and rapidly separated from one another for expedient and thorough cleaning.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a complete unit of one embodiment of the device of this invention;

FIG. 2 is a sectional view taken on Line 2--2 of FIG. 1;

FIG. 3 is an enlarged sectional view taken on Line 3--3 of FIG. 2; and

FIG. 4 is an exploded side elevation view showing all of the components of the device separated for cleaning.

DETAILED DESCRIPTION AND PREFERRED EMBODIMENTS

The device of this invention overcomes the difficulties of the prior art devices by incorporating a structure which is readily disassemblable for cleaning and which removes key components from contact with potentially contaminated fluids, both inks and bodily fluids. Heretofore few devices had even one of these characteristics, and most had neither.

The device of this invention and its operation are most easily understood by reference to the drawings. The overall device 2 is best illustrated in FIGS. 1 and 4. Starting from the distal or patient-contact end 4 of the device 2, there is first a tip section 6 which has an internal chamber 8. A portion of the tip section 6 tapers toward a small tip 10 at the distal end 4 to enable the operator to follow the desired pattern more easily. The tapered end 10 has a hole 12 coaxial with the main part of the device and forming a passage from the outside of the device into the chamber 8, through which the distal end of the needle 14 passes. The proximal end of the tip section 6 has threads 16 to enable it to be joined to the next component, barrel 18.

It is possible that chamber 8 could serve as a reservoir in which a small supply of ink (not shown) is retained, for transfer to the needle 14. However, because of the tendency of inks to dry within the device, especially in the enclosed shaft or needle passages, in practice chamber 8 will find little use as a reservoir. More preferably, ink is transferred to the needle 14 by dipping the needle into a small separate external container of ink (not shown) so that the ink is adsorbed onto the surface of the needle 14. Chamber 8 then serves as a "knock-out" chamber to prevent any ink or bodily fluid which migrates up the needle 14 or is carried up through hole 12 by needle reciprocation or capillary action from passing any further into the device. The volume of the chamber 8 is not critical, as long as it is of significantly greater volume than capillary size, and will normally be on the order of about 1-2 milliliters. Smaller volumes may be used, but larger volumes are less desirable, since they enlarge the outer dimensions of the tip section 6 and make it more difficult to manipulate.

Barrel 18 is generally cylindrical, and is threaded at its distal end with threads 20 which mate with threads 16 of reservoir 6 to form a fluid impervious barrier. At its proximal end barrel 18 is hollow and forms an overlapping sealing fit with a coaxial extension 22 of reciprocation unit 24. A fluid-tight seal is formed by at least one

O-ring 26. The outer surface of barrel 18 may be knurled or grooved as at 28 to provide for more secure gripping by the operator. The exact form, length and dimensions of the tapers shown in the illustrated preferred embodiment are not critical, and can be varied to suit the size and exact shape of each variation of the device.

Barrel 18 also has a coaxial hole 30 penetrating completely through it, through which drive shaft 32 passes to connect to needle 14 through threaded joint 34. At the proximal end of hole 30 is a second "knock-out" space 36. This is a further safeguard to prevent ink or bodily fluid which gets past chamber 8 (or is in chamber 8, if chamber 8 is used as a reservoir) from passing on through hole 38 into the reciprocation chamber 40 and from there to the drive mechanism. Alternatively one could install a gasket surrounding shaft 32 at the proximal end of hole 30, but the gasket material would have to be selected such that it could sustain the constant flexing resulting from reciprocation of shaft 32 without degradation or loss of sealing function.

The reciprocation mechanism is housed in reciprocation unit 24. Unit 24 has an interior hollow chamber 40 through which drive shaft 32 passes. The extension 22 of unit 24 also has a coaxial hole 38 through which the shaft 32 continues as illustrated. Near the distal end of shaft 32 is cam block 42, which has a peripheral groove 44 which serves as the cam follower. Cam block 42 can be formed integrally with the shaft 32 or can be formed separately and then fixedly joined to shaft 32. The interior volume of the chamber 40 is sufficiently large to permit cam block 32 to reciprocate axially of the chamber 40. Additional volume of chamber 40 is desirable, as shown at 46 and 46', to lighten the device 2 and to facilitate removal of shaft 32 as described below.

The proximal end 50 of device 2 is closed by plug 48, which forms an overlapping sealing fit secured by O-ring 52. Plug 48 also has a coaxial hole 54 therethrough, to which the proximal end of shaft 32 protrudes. Hole 54 serves as an alignment bearing to maintain the coaxial alignment of shaft 32, in cooperation with hole 30 and to a lesser extent hole 38. Holes 12, 30, 38 and 54 also serve as air vents to allow the entire device to be assembled in a liquid-tight configuration without causing pressure build-up.

The drive mechanism is contained in housing 56, which is disposed perpendicularly to the main axis of the device 2 and shaft 32. The unit 24 has formed therein a perpendicular extension 58 into which a neck 60 formed at the inward end of housing 56 fits, where it is retained by O-ring 62.

Within housing 56 is rotary motor 64, here illustrated as a conventional electric motor. It could, however, be any other type of small rotary motor. Those skilled in the art will be familiar with the various motors commercially available and will be readily able to select from any of a number of quite suitable versions. Motor 64 receives electric power through wire pair 66, which will be plugged into a conventional electrical outlet (not shown). The outer end of housing 56 is closed by cap 68, through which wire pair 66 passes via hole 70. Hole 70 may be sealed by an elastic grommet (not shown) if desired. Vent slots 72 are formed in housing 56 to provide pressure relief when cap 68 closes the end of housing 56.

There will also be means to stop and start motor 64. In the illustrated embodiment this is shown as slide switch 75 mounted in the housing 56 and connecting the

ends 66, of one of the wires in pair 66. Alternately switch 75 could be an in-line switch mounted externally of the device 2 somewhere along wire pair 66, or a foot mounted switch controlled by the operator's foot, and into which wire pair 66 is plugged.

At the inward end of motor shaft 74 is eccentrically mounted cam 76. Cam 76 extends into groove 44 in cam block 42. As motor shaft 74 turns, cam 76 rotates in a circular path as indicated by arrow 78 in FIG. 3. Groove 44, acting as a cam follower, reciprocates axially within chamber 40, simultaneously reciprocating shaft 32 and connected needle 14 as indicated by double-headed arrow 80. As needle 14 reciprocates, it alternately moves into chamber 8 and picks up ink and then moves outwardly with the ink, punctures the patient's skin, and deposits the ink under the skin surface. Thus with each reciprocation, a quantity of ink is picked up on that portion of the surface of needle 14 which comes within the chamber 8. The surface of needle 14 is essentially completely covered with ink, and the reciprocation causes a continual flow of ink distally along the needle 14 and into the patient's skin.

It will be recognized that while an electric drive motor which plugs into a conventional outlet is preferred and is the simplest embodiment, one could also have other forms of drive mechanisms. One such could be a fluid drive motor, such as an air- or gas-driven motor, which would be operated by air or gas under pressure from a supply such as a portable air tank or fixed air pipe. This type of embodiment could be preferred where, for instance, consistent electric power sources are not available or where there is a hazard from a spark or short circuit. One might also use a water drive motor.

The ready facility of this device to be cleaned, and the ability of its structure to prevent penetration of much of the operation portion of the device by ink or bodily fluids is evident from the drawings, particularly FIG. 4. Tip section 6 is easily unscrewed from barrel 18 for emptying of residual ink or bodily fluid which has passed into chamber 8 and flushing out with a cleaner/disinfectant liquid. If chamber 8 is used as a reservoir, it can then be refilled with fresh ink from an uncontaminated supply. The remaining components - barrel 18, unit 24, housing 56 and caps 48 and 68, all disassemble by merely being pulled apart. Removal of housing 56 from extension 58 simultaneously removes cam 76 from groove 44, so that shaft 32 can be moved distally, for unthreading from needle 14. Needle 14 can then be removed for cleaning, while shaft 32 is withdrawn through the proximal end of the device after removal of cap 48. Disassembly and thorough cleaning of the improved device of the present invention are therefore much simpler, quicker and more efficient than has been possible with the prior art devices.

It will be seen that because of its offset location, the presence of the knock-out spaces 8 and 36, and the expanded shape of cam block 42, the drive mechanism within housing 56 cannot come into contact with ink or bodily fluids. Consequently the problems of prior art devices with in-line drive mechanisms relating to contamination of the drive mechanisms and the subsequently difficulty in cleaning those mechanisms, simply do not occur in the improved device of the present invention.

The device of the present invention may be made of any suitable material or combination of materials which will be structurally sound, resistant to inks and bodily

fluids and substantially non-porous. Preferably the principal components will be made of metal, such as aluminum or stainless steel, while the O-rings will be made of medically acceptable elastomers. Portions of the device may also be made of engineering plastics in some cases, but the drive shaft 32 and especially the needle 14 will essentially always be made of metal.

It will be evident that there are numerous embodiments of the device which, while not expressly described above, are clearly within the scope and spirit of the invention. The above description is therefore intended to be exemplary only, and the actual scope of the invention is to be determined solely from the appended claims.

I claim:

1. An intradermal injection device for injecting fluid under the skin of a patient, said device being easily disassemble-able and readily cleanable, and comprising:
 - a elongated body having distal and proximal ends;
 - a shaft hole extending coaxially through said body;
 - a drive shaft removably disposed for reciprocal motion within said shaft hole, and extending outwardly therefrom at least at said proximal end, the outward extension of said shaft having a cam follower mounted thereon;
 - a cam removably engaging said cam follower to drive said cam follower in a reciprocating path co-axial of said body;
 - a drive mechanism for said cam, said drive mechanism being at an angle to said axis of said shaft and body and removable from said body;
 - a hollow fluid reservoir for said fluid removably attached to the distal end of said body in a fluid-tight manner, said reservoir having an access hole to the outside thereof aligned co-axially of said shaft hole; and
 - a needle removably mounted on the distal end of said drive shaft and extending through said reservoir and outwardly through said access hole, said needle being adapted carry to a quantity of said fluid on a surface thereof;
- whereby upon reciprocation of said drive shaft by said cam said needle is caused to reciprocate and inject said carried fluid under the skin of a patient whose skin is in contact with the distal end of said device; and
- whereby upon completion of said injection said needle, drive shaft, drive mechanism and body can all be readily and rapidly separated from one another for expedient and thorough cleaning.
2. An intradermal injection device as in claim 1 further comprising means to retain the proximal end of said shaft in co-axial alignment.
3. An intradermal injection device as in claim 1 wherein said drive mechanism is aligned substantially perpendicular to said axis of said shaft and said body.
4. An intradermal injection device as in claim 1 wherein said drive mechanism comprises a motor with a rotary shaft.
5. An intradermal injection device as in claim 4 wherein said cam comprises an eccentrically mounted extension of said rotary shaft, and said cam follower comprised a collar on said drive shaft and having a peripheral groove into which said cam extends.
6. An intradermal injection device as in claim 4 wherein said motor is electrically driven.
7. An intradermal injection device as in claim 4 wherein said motor is fluid driven.

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8. An intradermal injection device as in claim 1 wherein said body is formed of a plurality of coaxial sections removably joined together in a fluid-tight manner.

9. An intradermal injection device as in claim 8 wherein there is an enclosed space between the adjacent ends of adjacent sections, said space serving to prevent fluid transfer between said sections.

10. An intradermal injection device as in claim 8

wherein said fluid-tight manner of joining at least one said coaxial section is an overlapping sealing arrangement with an adjacent section.

11. An intradermal injection device as in claim 10 wherein each said overlapping sealing arrangement includes an O-ring.

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United States Patent [19]**Piperato**[11] **Patent Number:** **4,862,772**[45] **Date of Patent:** **Sep. 5, 1989**[54] **TAMPERPROOF, SINGLE USE,
DISPOSABLE TATTOO EQUIPMENT**[76] **Inventor:** **Richard A. Piperato, 363 Portia St.,
South Amboy, N.J. 08879**[21] **Appl. No.:** **288,448**[22] **Filed:** **Dec. 22, 1988**[51] **Int. CL⁴** **A61B 17/20**[52] **U.S. CL.** **81/9.22; 206/363;
206/367; 604/110**[58] **Field of Search** **81/9.22, 9.2; 604/110,
604/111, 192, 263; 206/363, 367, 438**[56] **References Cited****U.S. PATENT DOCUMENTS**

464,801	12/1891	O'Reilly	81/9.22
473,207	4/1892	Carey	81/9.22
4,159,659	7/1979	Nightingale	81/9.22
4,170,234	10/1979	Graham	206/363
4,538,612	9/1985	Patrick, Jr.	206/363
4,582,060	4/1986	Bailey	81/9.22
4,592,744	6/1986	Jagger et al.	604/192
4,771,660	9/1988	Yacowitz	81/9.22

Primary Examiner—Roscoe V. Parker**Attorney, Agent, or Firm—Richard C. Litman**[57] **ABSTRACT**

A tattoo needle bar holder and needle bar assembly is fashioned so as to be economical to manufacture and therefore readily disposable in order to promote sanitary conditions in the tattoo industry. The needle bar holder is preferably formed from a plastic material in order to render it incapable of withstanding sterilization processes involving very high pressure and temperatures, which would render the holder incapable of further use. The material is preferably also stained by the inks normally used in the industry, thereby serving to alert persons of any prior use. The caps which seal the assembly prior to use are preferably formed to require the breakage of a frangible portion upon removal in order to prevent the reinstallation of the caps. The needle bar assembly is composed of several relatively simple components for ease of manufacture, and contains an eye and plastic or elastomer grommet at the upper end of the needle bar for precise attachment to the tattooing mechanism. The grommet is also of a material which would be damaged under conditions of extreme pressure and/or temperature, thereby rendering the needle bar assembly to which it is attached incapable of further use if sterilization is attempted.

8 Claims, 1 Drawing Sheet

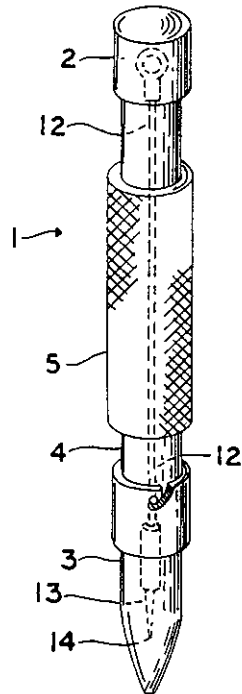


FIG. 1

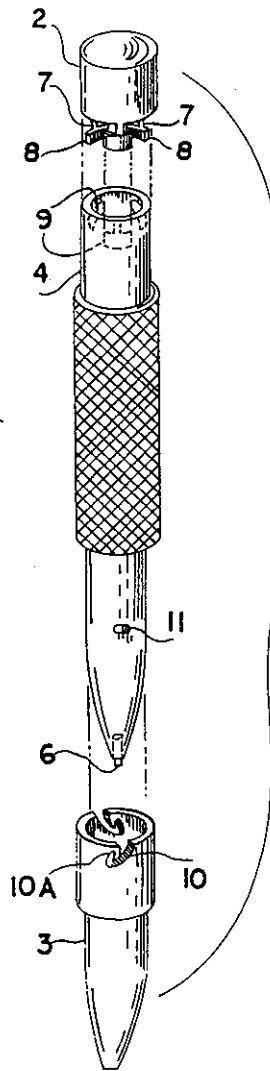


FIG. 2

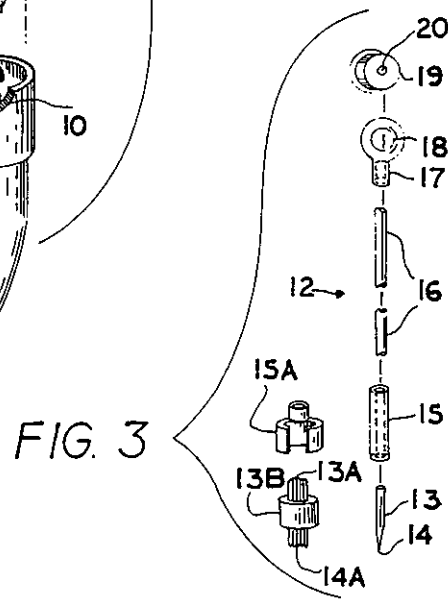


FIG. 3

TAMPERPROOF, SINGLE USE, DISPOSABLE TATTOO EQUIPMENT

FIELD OF THE INVENTION

This invention relates generally to improvements in the art of tattooing, and more specifically to disposable tattoo equipment intended for a single use combined with a sterile tamperproof container serving as a portion of the equipment.

BACKGROUND OF THE INVENTION

The art of tattooing has been known for a considerable period of time. Patents exist for tattooing apparatus predating this application by nearly a century; O'Reilly U.S. Patent No. 464,801 is an example. Only relatively recently, however, has it become recognized that tattooing may also be a source of disease through the use of unsterile equipment. The tattooing process has since become recognized as a vehicle for the spread of such diseases as serum hepatitis, and even more recently, acquired immune deficiency syndrome, or AIDS.

The tattooing industry has suffered as a result of such discoveries, and although the vast majority of the industry attempts to provide sterile equipment, such equipment is complex and therefore difficult to sterilize. No patents of which the inventor is aware directly address this problem. While present equipment may be disposed of after a single use, thereby precluding any problems involving sterilization, the present materials and construction of such equipment make such a practice prohibitively costly. The need arises for relatively economical tattooing equipment which is assured to be sterile prior to use by means of sealed containers and holders, and materials and construction of which require disposal after a single use.

DESCRIPTION OF THE RELATED ART

Needle bar holders and needle assemblies patterned similarly to the present invention have been disclosed in various patents. Nightingale U.S. Pat. No. 4,159,659 discloses an actuating mechanism as well as a needle bar holder much like that of the present invention. The holder, however, is made and intended for use primarily with the accompanying actuating mechanism, and further would be unsuited for manufacture from an economically disposable, non-metallic material due to the various provisions for threaded mechanical fasteners, such as set screws, which necessarily require a relatively hard material for durability. While claims are made for various types of needles, no improvement is claimed for securing the associated needle bar within the actuating mechanism.

Typically, the needle bars associated with such devices are similar to that disclosed in Yacowitz U.S. Patent No. 4,771,660. The needle bar disclosed in this patent contains a loop formed integrally of the same material as that of the remainder of the needle bar. Such a loop allows relatively loose tolerances and fails to provide any cushioning effect for the direct metal to metal contact of the needle bar loop and actuating mechanism.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide tattooing equipment which is economical to manufacture.

It is another object of the present invention to provide tattoo equipment which may be readily disposed of after a single use.

It is an additional object of the present invention to provide tattoo equipment at least a portion of which is of a material which causes it to be incapable of withstanding the heat and pressure normally associated with the sterilization process used for such equipment, and which therefore must be discarded.

It is a further object of the present invention to provide tattoo equipment which is completely sealed before use and which seals must be broken in order to be used, thereby making obvious the fact of prior use and alerting persons of the need for disposal.

Still another object of the present invention is to provide tattoo equipment which in combination with the above objects may make use of existing needle bars and needles currently manufactured, as well as those incorporated with the present invention.

An additional object of the present invention is to provide a needle holder which not only serves as a portion of the sterile container for the needle and needle bar, but is also readily adaptable to standard electrical actuating equipment.

Another object of the present invention is to provide improved tattoo needle bars and needles which are relatively simple and economical to manufacture.

With these and other objects in view which will more readily appear as the nature of the invention is better understood, the invention consists in the novel combinations and arrangement of parts hereinafter more fully described, illustrated and claimed with reference being made to the attached drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the needle holder and caps in their closed, sealed state.

FIG. 2 is an exploded perspective view of the assembly.

FIG. 3 is an exploded detail of a needle bar and typical needles.

Similar reference characters designate corresponding parts throughout the several figures of the drawings.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, the present invention will be understood to relate to an improvement in tattoo equipment, particularly relating to the sanitation of such equipment. FIG. 1 of the drawings discloses a sealed container 1, insuring that the needle 13 or 13a and needle bar assembly 12 enclosed therein remain in a sterile condition until container 1 is opened. Non-metallic components of container 1, which consist of upper cap 2, lower cap 3, and needle holder tube 4, are preferably formed of a plastic material for ease and economy of manufacture, which allows disposability of the apparatus after a single use. Components comprising container 1 may be formed of a material with a sufficiently low melting point so as to preclude sterilization by means of very high temperature and pressure, thus requiring its disposal and precluding more than a single use.

Upper cap 2 and lower cap 3 are mechanically or otherwise secured to needle holder tube 4, which serves as a portion of container 1 before caps 2 and 3 are removed. Following the removal of caps 2 and 3, needle holder tube 4 containing needle 13 or 13a and needle bar assembly 12 may be installed in a standard electrical

tattooing device, not shown, for use as the standard needle holder and grip for applying the tattoo.

Needle holder tube 4 is provided with various features to enable it to be suitable for such purpose. The portion 5 of tube 4 used as a grip during the application of a tattoo is knurled or otherwise roughened to provide a surface of relatively high friction coefficient, and a tubular tip 6, better shown in FIG. 2, is preferably formed of stainless steel for durability and sanitation. Such a tip 6 may be fashioned for different types of needles 13 or 13a used in the tattooing art. In general, tube 4 is formed in a size and shape suitable for use as a tattoo needle bar holder for the application of tattoos.

FIG. 2 also discloses further detail relative to the securing mechanism for upper and lower caps 2 and 3. Upper cap 2 contains a plurality of frangible extensions 7 with widened portions 8, which engage mating receptacles 9 within the upper portion of tube 4 upon assembly, thereby containing needle 13 or 13a and needle bar assembly 12 within tube 4. Lower cap 3 consists of a completely enclosed extension in order to fully protect needle tip 14 or 14a of the needle bar assembly 12 as the assembly 12 is enclosed within sealed container 1. Lower cap 3 is equipped with a plurality of slots 10 which are fashioned to engage pins 11 on the lower portion of tube 4, thus retaining needle bar assembly 12 securely within the assembled container 1 in a sanitary manner. Such slots 10 of cap 3 and pins 11 of holder 4 are preferably fashioned in such a way as to permanently damage pins 11, thereby causing cap 3 to be incapable of being reinstalled upon holder 4 and alerting potential users of the equipment of its prior use. This may be done by forming slots 10 with a relatively shallow slope so as to engage pins 11 gradually, and then forming upward portion 10a at the end of slot 10 to securely hold pins 11 of tube 4. In this way, cap 3 cannot be removed once installed without permanently damaging pins 11 and thereby precluding reassembly.

Needle bar assembly 12 shown in FIG. 3 comprises several components which upon assembly are installed within container 1. Needle 13 or 13a is preferably formed of stainless steel, as are all other metallic components of the device, and may be formed as a "liner" needle 13 with a single tip 14, or as a "shader" needle 13a comprising a plurality of relatively fine tips 14a. Such a plurality of needle tips 14a comprising a "shader" needle 13a may be retained as an assembly by means of a band 13b or like device. Needle 13 or 13a may then be secured to needle bar 16 by means of lower ferrule 15 in the case of "liner" needle 13, or ferrule 15a in the case of "shader" needle 13a.

Needle bar 16 is fitted with an upper ferrule 17 at its end opposite that of needles 13 or 13a. Upper ferrule 17 contains an eye 18 into which an elastomer grommet 19 may be inserted. Grommet 19 contains a smaller eye 20, and thus provides a relatively precise fit between needle bar 16 and upper ferrule 17 and the operating mechanism of a tattoo apparatus, not shown. Each of the metallic components of needle bar assembly 12 may be secured together by crimping, silver solder, or other means.

During manufacture each component of the invention is sterilized, and needle bar assembly 12 is placed within tube 4 in a manner allowing needle tip 14 or 14a to protrude from tubular tip 6, which is properly fashioned to accept either a "liner" needle 13 or a "shader" needle 13a. Needle bar assembly 12 is prevented from passing through tubular tip 6 due to the relatively large

diameter of ferrule 15 or 15a, and further protected in a sanitary manner by the installation of lower cap 3 which is assembled to tube 4 by means of pins 11 engaging slots 10 of lower cap 3 and becoming locked into place within portions 10a of slots 10. Upper cap 2 is fitted in place over upper ferrule 17 of needle assembly 12 contained within tube 4 by means of widened portions 8 of extensions 7 of upper cap 2 engaging mating receptacles 9 within tube 4. To further insure the sterility of the assembly it may of course be sealed within a container of plastic or other suitable material in a manner well known in the art.

In order to use the device, any packaging is of course removed and upper cap 2 is removed from tube 4 by breaking frangible extensions 7, thereby exposing eye 18 and grommet 19 of needle bar assembly 12. Holder 4 and eye 20 of grommet 19 of needle bar assembly 12 may then be assembled with a standard electrical tattoo mechanism, lower cap 3 removed, and the device is then ready for use.

After use, the relatively low cost of needle holder tube 4 in its preferred embodiment of plastic material allows the economical disposal of the device. Needle assembly 12, comprising relatively inexpensive parts rather than a few intricately machined components, is also economically disposable. Further, by forming such non-metallic parts as upper and lower caps 2 and 3, tube 4, and grommet 19 of a plastic or elastomer material of relatively low melting point, any attempt to sterilize the apparatus for further use will lead to damage to the above plastic or elastomer components thereby rendering them unusable for further use. In addition, the standard inks or dyes commonly used in the tattooing art will tend to stain the plastic materials used, thus providing obvious notice that the device has been used and should therefore be discarded.

It is to be understood that the present invention is not limited to the sole embodiment described above, but encompasses any and all embodiments within the scope of the following claims.

I claim:

1. A disposable tattoo needle assembly and needle bar holder comprising:
 - a tubular needle bar holder,
 - an upper and a lower cap sealing the upper and lower ends respectively of said holder, and
 - a tattoo needle assembly contained therein.
2. A disposable tattoo needle assembly and needle bar holder according to claim 1 wherein:
 - one or more of said protective caps are frangibly attached to said needle bar holder so as to cause permanent damage to said caps or said holder upon removal of said caps from said holder, thereby rendering said caps incapable of reinstallation upon said holder.
3. A disposable tattoo needle assembly and needle bar holder according to claim 1 wherein:
 - said needle bar holder is formed of a material incapable of withstanding the temperatures and pressures associated with sterilization methods such as autoclaving, which attempt at sterilization would render said holder incapable of further use.
4. A disposable tattoo needle assembly and needle bar holder according to claim 1 wherein:
 - said needle bar holder is formed of a material readily discolored by the inks and dyes commonly used in the tattoo industry, thereby providing notice of use after such use has occurred.

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5. A disposable tattoo needle assembly and needle bar holder according to claim 1 wherein;

said needle bar holder contains a tip fashioned to properly fit a given type of tattoo needle, depending upon the type of needle to be installed within said needle bar holder at the time of manufacture.

6. A disposable tattoo needle assembly and needle bar holder according to claim 1 wherein;

said assembly contains a needle bar formed of a length of round metallic rod, and

said needle bar contains a ferrule formed as a separate component attached to said needle bar.

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7. A disposable tattoo needle assembly and needle bar holder according to claim 6 wherein;

said ferrule contains an eye, and

said eye is fitted with a grommet, whereby said grommet may provide a precise fit to a tattoo apparatus actuating mechanism, thereby providing smooth operation of said needle bar.

8. A disposable tattoo needle assembly and needle bar holder according to claim 7 wherein;

said grommet is formed of a material incapable of withstanding the temperatures and pressures associated with sterilization methods such as autoclaving, which attempt at sterilization would render said grommet incapable of further use.

* * * * *

1 587 519

(21) Application No. 52456/76 (22) Filed 16 December 1976

(23) Complete Specification filed 16 December 1977

(44) Complete Specification published 8 April 1981

(51) INT. CL.³ B43K 5/00(52) Index at acceptance
D6P 106 ACD

(19)



(54) TATTOOING INSTRUMENT

(71) I, KEITH LANGLEY of 11, Greenhill Avenue, Barnsley, S. Yorks, England, British do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:

This invention relates to tattooing instruments.

Known tattooing instruments comprises a finger grip housing a needle which is vibrated or reciprocated with respect to the instrument e.g. by a small electric motor, the needle being dipped repeatedly into ink, paint, or dye of a desired colour, as the ink, paint, or dye, is used up during the tattooing operation. Normally several instruments are employed one for each colour.

According to an aspect of the present invention, a tattooing instrument comprises a nozzle through which a tattooing needle is adapted to pass, the nozzle having a reservoir, adapted in use to hold ink, paint, or dye to be transmitted to, and applied by, the needle which is reciprocated through a nozzle guide bore by means of a cranked drive shaft connected to an electric motor.

Thus, repeated dipping of the needle of an instrument into ink, paint, or dye during the tattooing operation is eliminated and the tattooist need stop only occasionally to refill the reservoir or need not stop at all depending on the capacity of the reservoir and the size of the area being tattooed.

In the drawings:

Fig. 1 is a front elevational view of a tattooing instrument according to the invention;

Fig. 2 is a side elevational view of the instrument of Fig. 1.

In detail, the tattooing instrument comprises a tubular finger grip (C), preferably knurled at its exterior, and may optionally include a collar (N). The grip (C), and a nozzle (D), being co-axial and a needle or needles and conrod (H)

being reciprocable along this common axis. 45

Preferably, the nozzle is provided with a lateral opening (E), for the introduction of paint, ink, or dye to the reservoir. A reservoir (K) in the nozzle (D), also terminates at a needle guiding bore (L), extended to the top of the nozzle (D), along which bore paint, ink, or dye is conveyed during reciprocation of the needle. 50

To the end of the grip is connected a motor support plate (S), which plate carries a housing for an electric motor (F). An output shaft (A), of the motor extending radially with respect to the axis of the grip and the needle bar-connecting rod being cranked at its end adjacent the motor, to fit onto a hole (T), in a motor end disc located externally of the motor housing, which hole is non co-axial with respect to the axis of rotation of the output shaft of the motor. 60

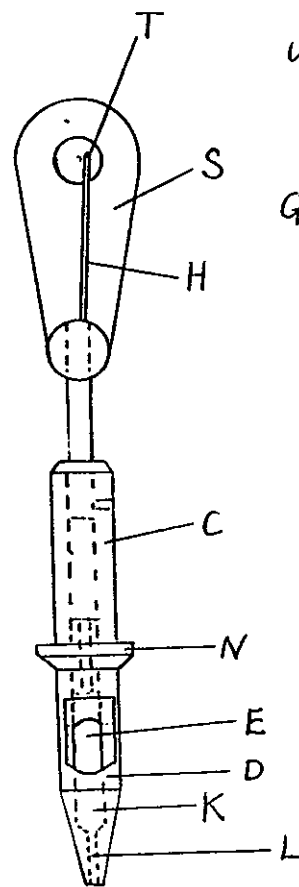
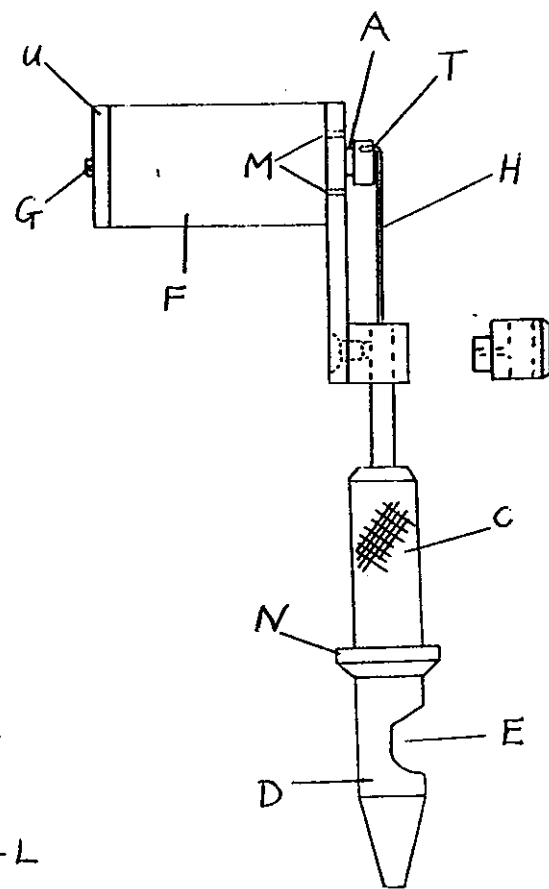
Preferably the motor housing (F), is cylindrical and preferably carries at one end one or two projecting spigots, which are a press fit into suitably dimensioned holes (M) in the support plate (S). Remote from the support plate, the motor housing is provided with an end cap (U), having a jack plug socket (G), by which the instrument may be connected to a source of electric power. 65

WHAT I CLAIM IS:

1. A tattooing instrument comprising a nozzle through which a tattooing needle is adapted to pass, the nozzle have a reservoir, adapted in use to hold ink, paint, or dye to be transmitted to, and applied by, the needle which is reciprocated through a nozzle guide bore by means of a cranked drive shaft connected to an electric motor. 75

2. A device as described in the specification and as in claim (1), and as substantially illustrated in the accompanying drawings. 80

KEITH LANGLEY

FIG 1FIG 2

United States Patent [19]
Patipa et al.

[11] **Patent Number:** 4,644,952
[45] **Date of Patent:** Feb. 24, 1987

[54] **SURGICAL OPERATING INSTRUMENT**

[75] **Inventors:** Michael Patipa, West Palm Beach;
Thomas A. McMillan, North Palm
Beach; Henry W. Mitchell, Palm
Beach Gardens, all of Fla.

[73] **Assignee:** Palm Beach Medical Engineering,
Inc., Teaneck, N.J.

[21] **Appl. No.:** 702,500

[22] **Filed:** Feb. 19, 1985

[51] **Int. Cl.** A61F 17/32

[52] **U.S. Cl.** 128/305; 128/303 R;
173/123

[58] **Field of Search** 128/303 R, 305;
173/123, 122, 116, 100, 95

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4,320,761	3/1982	Haddad	128/305

Primary Examiner—Robert Peshock

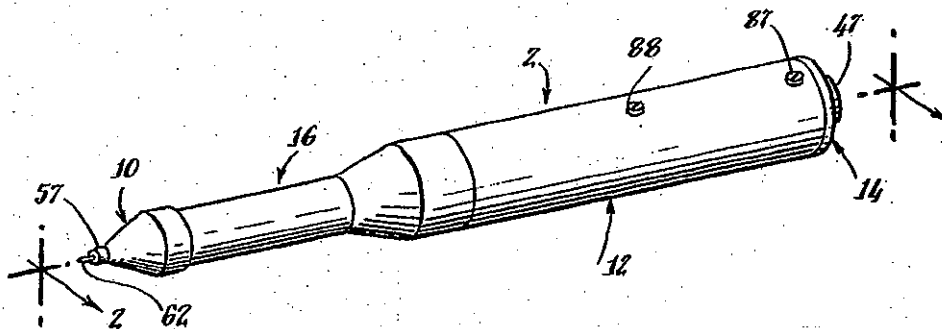
Assistant Examiner—J. Hakomaki

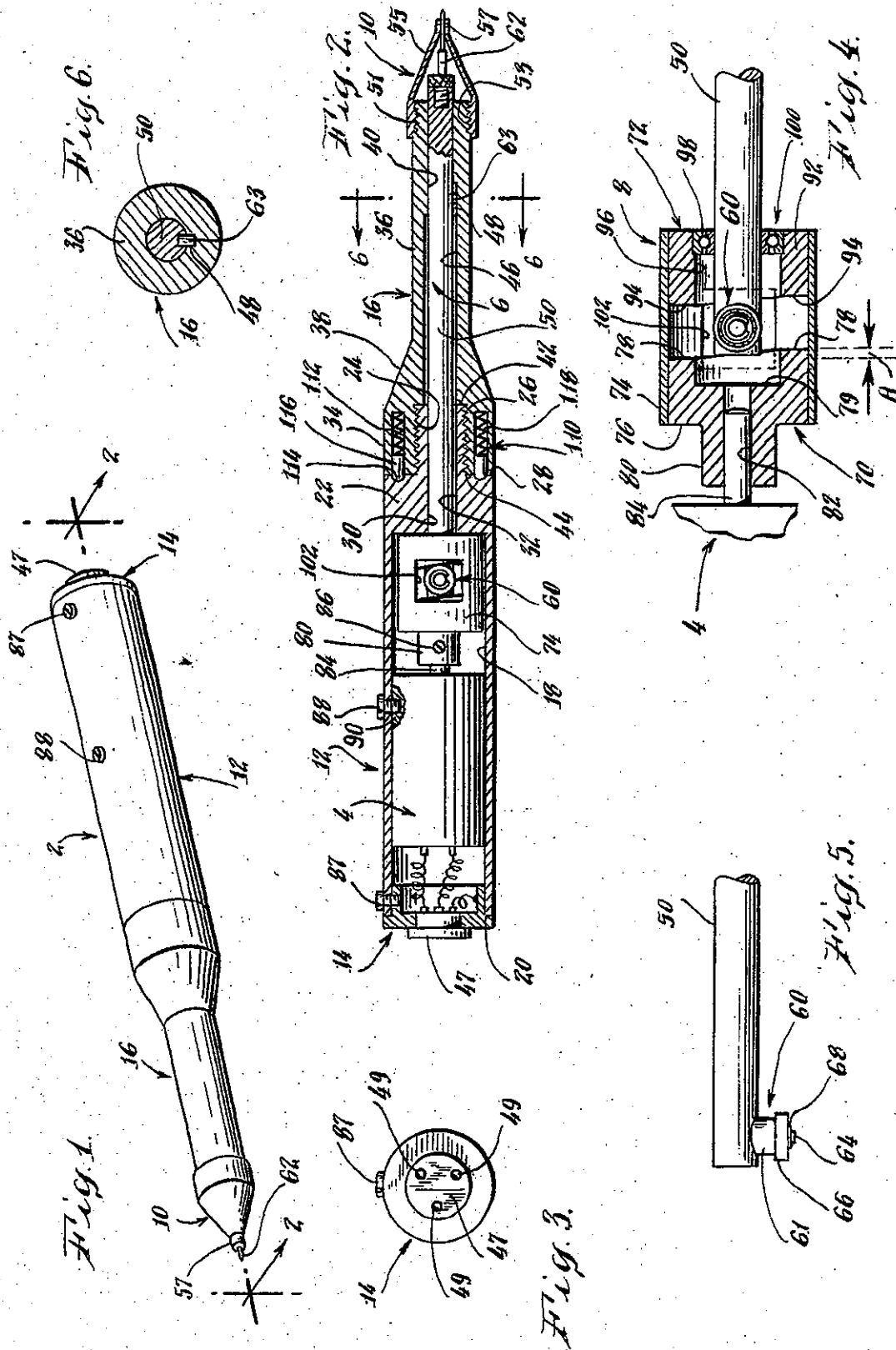
Attorney, Agent, or Firm—Mandeville & Schweitzer

[57] **ABSTRACT**

A compact surgical operating instrument, including an elongated cylindrical housing supporting a projecting shaft which is mounted for reciprocation by a coaxially arranged cam assembly rotated by a motor drive. The cam assembly includes two continuous, opposed, canted cam surfaces which positively and alternatively drive forwardly and rearwardly a cam follower mounted on the inner end of said shaft, thereby converting rotation of the cam assembly to reciprocal movement of said shaft without the use of return springs.

4 Claims, 6 Drawing Figures





SURGICAL OPERATING INSTRUMENT

TECHNICAL FIELD

This invention relates to an operating instrument having a mechanism for moving an operating device, such as a needle, with a reciprocating motion.

BACKGROUND ART

While operating instruments have been made in the past having a reciprocating shaft for reciprocal movement of a needle or tool, no disclosure was found having the construction of the present invention. Prior art uncovered is listed below: U.S. Pat. Nos. 464,801; 4,031,783; 4,204,438; and 4,246,902.

DISCLOSURE OF INVENTION

An object of the present invention is to provide an instrument having a new and improved mechanism for the reciprocation of an operating device, said mechanism providing cams for positive forward and rearward movement of a reciprocating shaft, without the use of a spring return in one direction.

Another object of the present invention is to provide a rotating cam assembly for transferring its rotative movement to reciprocal movement of an operating shaft; an operating shaft has a cam follower at one end positioned radially outwardly between two cam surfaces which reciprocate the operating shaft.

A further object of the present invention is to provide a cam assembly having two cam members spaced apart and fixed in a sleeve with two continuous cam surfaces facing each other; a bore extends through one cam member to place the end of a shaft therethrough; a short shaft extends radially from the end of said shaft with a cam follower mounted thereon to engage both continuous cam surfaces; rotation of the matching cam surfaces control reciprocal movement of the shaft.

Another object of the present invention is to provide for covering or uncovering a part of the operating device, or needle, during an operation to obtain a desired outward exposure of the operating device, or needle.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the surgical operating instrument;

FIG. 2 is a longitudinal cross-sectional view, taken along line 2—2 of FIG. 1, of the surgical operating instrument showing the electric motor, reciprocating shaft assembly and connecting rotating cam assembly;

FIG. 3 is a rear end view of the surgical operating instrument shown in FIG. 1;

FIG. 4 is an enlarged sectional view of the cam assembly, with the cooperating rear end of the reciprocating shaft assembly and drive shaft of the electric motor shown in full;

FIG. 5 is a view of the rear end of the reciprocating shaft assembly shown in FIG. 4; and

FIG. 6 is a view taken on the line 6—6 of FIG. 2 showing the key in the shaft in a keyway in a bore of the main housing.

BEST MODE FOR CARRYING OUT THE INVENTION

A surgical operating instrument according to the present invention is shown in FIG. 1. The surgical operating instrument comprises five main parts: (1) a main housing 2; (2) an electric motor 4; (3) a reciprocating

shaft assembly 6; (4) a rotating cam assembly 8; and (5) an operating needle cover 10.

The main housing 2 includes a center cylindrical section 12, a rearward end cap 14, and a forward reciprocating shaft support section 16. The center cylindrical section 12 has an inner longitudinal bore 18 extending from the rearward end, where it forms an open end 20, to a point adjacent the forward end, where an integral closed end 22 is formed. A cylindrical axial projection 24 of reduced diameter extends forwardly of the integral closed end 22 of the center cylindrical section 12, said cylindrical axial projection 24 having external threads 26 for a purpose to be hereinafter described. A forwardly facing annular surface 28 is formed on the outside of the integral closed end 22 between the external threads 26 and the outer edge of the center cylindrical section 12. An axial bore 30 extends through the integral closed end 22 and cylindrical axial projection 24, said axial bore 30 having a longitudinal keyway 32 along its entire length.

The forward reciprocating shaft support section 16 has a rearward short cylindrical surface 34 having the same diameter as the center cylindrical section 12, a forward elongated cylindrical surface 36 of reduced diameter, and a connecting conical surface 38. An opening 40 extends axially through the forward reciprocating shaft support section 16.

The rearward part of the opening 40 is enlarged at 42 and internally threaded to receive the external threads 26 of cylindrical axial projection 24. A rearwardly facing annular surface 44 is formed at the rearward end of the rearward short cylindrical surface 34. The rearwardly facing annular surface 44 will face forwardly facing annular surface 28 when external threads 26 of cylindrical axial projection 24 threadably engage the internally threaded forward part 42 of the opening 40. The cylindrical axial projection 24 is shorter than the forward part 42 of the opening 40 to permit the annular surface 44 to meet the annular surface 28.

The opening 40 extends from the rear end of enlarged forward part 42 having an elongated part 46 with a diameter which includes the depth of the longitudinal keyway 32 of axial bore 30, to a point about 2.54 cm (1 inch) from the forward end of the forward reciprocating shaft support 16. The opening 40 extends the remaining 2.54 cm (1 inch) having a diameter equal to the diameter of axial bore 30 and has a longitudinal keyway 48 extending about 0.635 cm ($\frac{1}{4}$ inch) from the rearward end of the elongated part 46, for a purpose to be hereinafter described.

The reciprocating shaft assembly 6 has a reciprocating shaft 50 with a cam follower mechanism 60 mounted on its rearward end, an operating needle 62 mounted on its forward end, and a pin 63 projecting from the side thereof adjacent the forward end forming a key. While operating needle 62 is shown threaded into the end of reciprocating shaft 50, it can be attached by other known means. It can be seen that the reciprocating shaft 50 when it is positioned in the center cylindrical section 12 and forwardly reciprocating shaft support section 16, has a sliding fit with axial bore 30 and the rear portion of the opening 40 which is formed having the diameter of axial bore 30. The pin, or key, 63 is positioned in the keyway 48 preventing rotation of the shaft 50. The cam follower mechanism 60 is located in the forward part of the inner longitudinal bore 18, and the forward end of the reciprocating shaft 50, with the operating needle 62,

is projecting from the forward end of the forward reciprocating shaft support section 16. The forward end of the reciprocating shaft support section 16 is externally threaded at 51 to receive internal threads 53 at the rearward end of the operating needle cover 10. The needle cover tapers forwardly and inwardly from the internal threads 53, as a conical member 55, to a point along the length of the operating needle 62, where a short cylindrical member 57 surrounds the needle 62 and acts as a guide, leaving a desired needle 62 projection. Cam follower mechanism 60 comprises a short shaft 61 extending 90° from the rear end of reciprocating shaft 50 with a projecting axle member 64 having a bearing 66 mounted thereon. A snap ring 68 holds the inner race of the bearing 66 on the axle member 64.

Rotating cam assembly 8, see FIG. 2, is formed having a rearward cam member 70 and forward cam member 72 fixedly mounted in a cage sleeve 74; cage sleeve 74 having a diameter smaller than the inner longitudinal bore 18 so that it can be positioned in the forward part thereof for rotation. While these three parts have been brazed together, they may be fixed by other means, or formed as an integral unit. The rearward cam member 70 has a short cylindrical portion 76 with its forward end comprising a cam face 78 around its outer portion extending inwardly at approximately 90° to the inner surface of cage sleeve 74, and a central bore 79. A rearward axial projection 80 extends from its rearward end and has a bore 82 therein extending to a large diameter bore 79 to receive a drive shaft 84 of the electric motor 4. A set screw 86 in the axial projection 80 screws into the drive shaft 84 of the electric motor 4 so that the electric motor 4 can rotate the rotating cam assembly 8. Electric motor 4 is fixedly positioned in the inner longitudinal bore 18 rearwardly of the rotating cam assembly 8. Set screws 88 extend through the center cylindrical section 12 into the housing 90 of the electric motor 4. Rearward end cap 14 fits in open end 20 of cylindrical section 12 and is held therein by a set screw 87. Located in an opening through the center of the end cap 14 is an electrical jack 47 having three openings 49 adapted to receive a three-prong plug from a power source, and earth ground, not shown. Two openings 49 have contacts connected to the motor 4 to power it, and one opening 49 is for the provision of a ground.

The forward cam member 72 has a short cylindrical portion 92 with its rearward end comprising a cam face 94 around its outer portion extending inwardly at approximately 90° to the inner surface of cage sleeve 74, and a large diameter bore 96 extending axially there-through to receive the rearward end of the reciprocating shaft 50. Large diameter bores 79 and 96 aid in assembly of the reciprocating shaft assembly 6 within the formed cam assembly 8. The forward end of the large bore 96 intersects a short larger diameter bore 98 in the forward surface of the short cylindrical portion 92 and forms an annular step where the bores 96 and 98 meet; the outer race of a bearing 100 being fixed in said annular step with the inner race being mounted for small sliding movement with reciprocating shaft 50. In assembly of the reciprocating shaft assembly 6, the inner race of bearing 100 can be placed over reciprocating shaft 50 before the pin 63 is fixed in place. The pin 63 is shown fixed in a hole reciprocating shaft 50 (see FIG. 6). An opening 102 is placed in each side of the cage sleeve 74 to aid in the spacing of the cam faces 78 and 94, when the cam members 70 and 72 are being fixed to the cage sleeve 74, and in assembly of the surgical oper-

ating instrument. Cam faces 78 and 94 are equally spaced from each other and spaced to permit a proper operating dimension for the outer periphery of the bearing 66 as the cam faces 78 and 94 actuate it.

The cam faces 78 and 94 form one continuous channel between them. This channel has a forward slant from a rearwardmost position (see top of FIG. 4) located towards the motor 4 (rearward part of operating instrument) to a diametrically opposed forwardmost position (see bottom of FIG. 4) located towards the operating needle 62 (forward part of operating instrument) and has a rearward slant back again to the rearwardmost position, with smooth transition between reversing forward and rearward slants. As the cam assembly 8 rotates the cam face 78, the portion of the cam face 78 from the rearwardmost position to the forwardmost position contacts cam follower mechanism 60 and moves the reciprocating shaft 50 forwardly the distance A between the rearwardmost position and forwardmost position (see FIG. 4); the portion of the cam face 94 from the forwardmost position to the rearwardmost position contacts cam follower mechanism 60 and moves the reciprocating shaft 50 rearwardly the distance A between the forwardmost position and rearwardmost position. The length of movement of the reciprocating shaft 50 can be changed by moving the location of the forwardmost position or rearwardmost position of the channel in a forward or rearward direction when forming the cam assembly 8. While one method of forming the cam assembly 8 has been disclosed, other methods can be used.

If it is desired to have the reciprocating shaft 50 move faster in one direction than the other, the relation of the rearwardmost position and forwardmost position around the continuous channel can be changed, making one slant, or ramp, longer than the other. If the forward slant, or ramp, is made short, the reciprocating shaft 50 will move forwardly faster than rearwardly, and if the rearward slant, or ramp, is made short, the reciprocating shaft 50 will move rearwardly faster than forwardly.

It can be seen that as the cylindrical section 12 is rotated in relation to the forward reciprocating shaft support section 16, the needle cover 55 will move along the operating needle 62, varying the amount of exposed needle. A mechanism 110 has been placed between the forwardly facing annular surface 28 and the cooperating rearwardly facing annular surface 44 to hold the cylindrical section 12 and the reciprocating shaft support section 16 in a desired rotated position to obtain a desired operating needle 62 exposure for an operation.

This mechanism 110 includes the location of four (4) cylindrical bores 112 equally spaced around the rearwardly facing annular surface 44 extending into the reciprocating shaft support section 16, and four (4) indentations, or shallow rounded dents, 114, equally spaced around the forwardly facing annular surface 28; said shallow dents 114 and cylindrical bores 112 being aligned at every one-quarter ($\frac{1}{4}$) turn of the cylindrical section 12 with respect to the reciprocating shaft support section 16. A pin 116, having a rounded end and a length of approximately one-third ($\frac{1}{3}$) of the depth of a cylindrical bore 112, is placed in each cylindrical bore 112, with a spring 118 being placed between each pin 116 and bottom of its cooperating cylindrical bore 112. Each spring 118 forces the rounded end of its pin 116 against the forwardly facing annular surface 28, and when the shallow rounded dents 114 are aligned with

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the cylindrical bores 112, the rounded end of each pin 116 is forced into a mating shallow rounded dent 114, holding the cylindrical section 12 and the reciprocating shaft support section 16 in that position.

We claim:

1. A compact surgical operating instrument comprising

- (a) a generally cylindrical elongated housing an axial bore therein;
- (b) a shaft mounted in said housing for limited axial reciprocable movement, the forward end of said shaft projecting outwardly through said bore;
- (c) a hollow cylindrical cam assembly mounted in said housing in coaxial relation with said shaft for rotation about said shaft;
- (d) drive housing for rotating said cam assembly;
- (e) the rearward end of said shaft being connected to said cam assembly;
- (f) said cam assembly having spaced, opposed forward and rearward continuous cam surfaces;
- (g) said forward cam surface having an opening therethrough;
- (h) the rearward end of said shaft extending through the opening of said forward cam surface;
- (i) cam follower means mounted on the rearward end of said shaft and being positioned between said facing cam surfaces;

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(j) said cam follower being displaced axially of said housing by said cam surfaces to convert rotating movement of said cam assembly to reciprocal movement of said shaft.

2. The operating instrument of claim 1, in which

- (a) said spaced cam surfaces are mounted in a cage sleeve;
- (b) one of said cam surfaces including center bore to receive said rearward end of said shaft therethrough;
- (c) said cam surface being disposed in oppositely canted, parallel planes which intersect the longitudinal axis of said shaft.

3. The surgical instrument of claim 1, in which

- (a) said cam follower is in the form of a roller bearing;
- (b) said bearing having an inner race fixed to said shaft;
- (c) said bearing having an outer rotatable surface mounted between said two cam surfaces;
- (d) one cam surface displacing said shaft in a first direction and
- (e) the other cam surface displacing said shaft in the opposite direction, thereby reciprocating said shaft.

4. The operating instrument of claim 3, in which

- (a) said cam surfaces are spaced a predetermined distance equal to the diameter of said roller bearing.

* * * * *

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PATENT APPLICATION



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CONTENTS

	Date Received (Incl. C. of M.) or Date Mailed	Date Received (Incl. C. of M.) or Date Mailed
1. Application _____ papers.		
2. <u>FDI</u>	<u>09-28-00</u>	
3. <u>FOREIGN PRIORITY</u>	<u>09-28-00</u>	
4. <u>Re (3)</u>	<u>5-3-00</u>	
5. <u>Est of Time</u>	<u>9-4-01</u>	
6. <u>Amot A</u>	<u>9-4-01</u>	
7. <u>Est of Time</u>	<u>9/26/01</u>	
8. <u>Re Issue Fee</u>	<u>1845.01</u>	
9. <u>Formal Drawings (6 sheets) set</u>	<u>12/26/01</u>	
10. <u>Reg for CGC</u>	<u>10-16-09</u>	
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Class	Sub.	Date	Exmr.
81	9.22 438	4/26/01 4/30/01	JJ JJ
30	362	4/30/01	JJ
606	186 169	5/1/01	JJ

Consulted with	Date	Exmr.
James Smith	04/26/01	JS
Doug WATTS E Mike TUDER	5/01/01	JS
Earl	4/26/01	JS

INTERFERENCE SEARCHED			
Class	Sub.	Date	Exmr.
Sec	Albuz	1/3 9/25/01	

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ISSUE SLIP STAPLE AREA (for additional cross references)

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FEE DETERMINATION	<i>RD</i>	<i>75816</i>	<i>10/14/00</i>
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FORMALITY REVIEW		<i>11622</i>	<i>11-15-00</i>
RESPONSE FORMALITY REVIEW			

INDEX OF CLAIMS

✓ Rejected N Non-elected
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 - (Through numeral)... Canceled A Appeal
 ÷ Restricted O Objected

Claim	Final	Original	Date
1	✓	✓	
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