

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

NU MARK LLC
The Petitioner

v.

Fontem Holdings 1 B.V.
Patent Owner

Case IPR. No. **Unassigned**
U.S. Patent No. 8,365,742
Title: AEROSOL ELECTRONIC CIGARETTE

**Petition for *Inter Partes* Review of U.S. Patent No. 8,365,742 Under
U.S.C §§ 311-319 and 37 C.F.R. §§ 42.1-.80, 42.100-.123**

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Exhibit List

<i>Exhibit #</i>	<i>Description</i>
Ex.1001	U.S. Patent No. 8,365,742 (“the 742 Patent”)
Ex.1002	Excerpts of the prosecution history for U.S. Patent No. 8,365,742
Ex.1003	Declaration of John M. Collins, Ph.D. (“Collins Decl.”)
Ex.1004	U.S. Patent No. 6,155,268 (“Takeuchi”)
Ex.1005	U.S. Patent No. 2,057,353 (“Whittemore”)
Ex.1006	U.S. Patent No. 4,947,874 (“Brooks”)
Ex.1007	Docket entry #65 from <i>Fontem Ventures, B.V., et al. v. NJOY, Inc., et al.</i> , 2:14-cv-01645 (C.D. Cal.) (“Rulings on Claim Construction”)
Ex.1008	U.S. Patent Application No. 2006/0093977 A1 (“Pellizzari I”)
Ex.1009	U.S. Patent No. 7,059,307 (“Pellizzari II”)
Ex.1010	U.S. Patent No. 5,894,841 (“Voges”)
Ex.1011	U.S. Patent No. 5,743,251 (“Howell”)
Ex.1012	U.S. Patent No. 2,461,664 (“Smith”)
Ex.1013	U.S. Patent No. 3,234,357 (“Eberhard”)
Ex.1014	U.S. Patent No. 5,745,985 (“Ghosh”)
Ex.1015	U.S. Patent No. 4,676,237 (“Wood”)
Ex.1016	U.S. Patent No. 4,945,448 (“Bremenour”)
Ex.1017	U.S. Patent No. 2,442,004 (“Hayward-Butt”)
Ex.1018	U.S. Patent No. 3,200,819 (“Gilbert”)
Ex.1019	U.S. Patent No. 6,501,052 (“Cox”)
Ex.1020	U.S. Patent No. 6,491,233 (“Nichols”)

1. INTRODUCTION

Nu Mark LLC (“Petitioner”), in accordance with 35 U.S.C. § 311-319 and 37 C.F.R. § 42.100, hereby requests *inter partes* review of claims 2 and 3 of United States Patent No. 8,365,742, titled “Aerosol Electronic Cigarette” (Ex.1001, “the 742 Patent”). According to USPTO records, the 742 Patent is assigned to Fontem Holdings 1 B.V. (“Fontem” or “Patent Owner”).

2. REQUIREMENTS FOR PETITION FOR *INTER PARTES* REVIEW

2.1. Grounds for Standing (37 C.F.R. § 42.104(a))

Petitioner certifies that the 742 Patent is available for *inter partes* review and that Petitioner is not barred or estopped from requesting *inter partes* review of the challenged claims of the 742 Patent on the grounds identified herein.

2.2. Notice of Lead and Backup Counsel and Service Information

Pursuant to 37 C.F.R. §§ 42.8(b)(3), 42.8(b)(4), and 42.10(a), Petitioner provides the following designation of Lead and Back-Up counsel.

Lead Counsel	Back-Up Counsel
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Pursuant to 37 C.F.R. § 42.10(b), a Power of Attorney for the Petitioner is attached.

2.3. Notice of Real-Parties-in-Interest (37 C.F.R. § 42.8(b)(1))

For purposes of 35 U.S.C. § 312(a)(2) and 37 C.F.R. § 42.8(b)(1) only, Petitioner, Nu Mark LLC, identifies the real-parties-in-interest as Nu Mark LLC and Altria Client Services LLC. Nu Mark LLC further discloses that it is an indirect wholly owned subsidiary of Altria Group, Inc., and states that under the governing standard Altria Group, Inc. is not a real-party-in-interest. *See* Patent Trial Practice Guide 77 Fed. Reg., Vol. 77, No. 157 (2012) at 48759-60. Altria Group, Inc. nevertheless agrees to be bound by any final written decision in these proceedings. *See* 35 U.S.C. § 315(e).

2.4. Notice of Related Matters (37 C.F.R. § 42.8(b)(2))

Fontem has asserted the 742 Patent and U.S. Patent Nos. 8,899,239 (“the 239 Patent”), 8,393,331 (“the 331 Patent”), 8,490,628 (“the 628 Patent”), 8,893,726 (“the 726 Patent”), 8,689,805 (“the 805 Patent”), 8,375,957 (“the 957 Patent”), and 8,863,752 (“the 752 Patent”) (collectively, “the Asserted Patents”), against Petitioner in a co-pending litigation, *Fontem Ventures B.V. et al vNU MARK LLC.*, 2:16-cv-02291 (C.D. Cal.) (“Co-Pending Litigation”). On June 22, 2016, Fontem filed a second complaint asserting U.S. Pat. Nos. 9,364,027, 9,326,549, 9,326,549, 9,326,550, 9,326,551, 9,339,062, 9,370,205, and 9,320,300, all of which are related to one or more of the Asserted Patents. *See Fontem Ventures B.V. et al v Nu Mark LLC.*, 2:16-cv-04537 (C.D. Cal.). Fontem has also asserted one or more of the Asserted Patents or patents related to the Asserted Patents in the following actions:

a. *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. NJOY, Inc.*, Civil Action No. 2:14-cv-1645 (C.D. Cal.);

b. *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. LOEC, Inc.*, Civil Action No. 2:14-cv-1648 (C.D. Cal.);

c. *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. CB Distributors, Inc. and DR Distributors, LLC*, Civil Action No. 2:14-cv-1649 (C.D. Cal.);

d. *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. Vapor Corp.*, Civil Action No. 2:14-cv-1650 (C.D. Cal.);

e. *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. FIN Branding Group, LLC and Victory Electronic Cigarettes Corporation*, Civil Action No. 2:14-cv-1651 GW (C.D. Cal.);

f. *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. Ballantyne Brands, LLC*, Civil Action No. 2:14-cv-1652 (C.D. Cal.);

g. *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. Spark Industries, LLC*, Civil Action No. 2:14-cv-1653 (C.D. Cal.);

h. *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. Logic Technology Development LLC*, Civil Action No. 2:14-cv-1654 (C.D. Cal.);

i. *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. VMR Products, LLC, dba V2Cigs*, Civil Action No. 2:14-cv-1655 (C.D. Cal.);

j. *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. NJOY, INC.*, Civil Action No. 2:14-cv-8144 (C.D. Cal.);

k. *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. LOEC, INC.*, Civil Action No. 2:14-cv-8149 (C.D. Cal.);

l. *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. CB Distributors, Inc., et al*, Civil Action No. 2:14-cv-8154 (C.D. Cal.);

m. *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. Vapor Corp.*, Civil Action No. 2:14-cv-8155 (C.D. Cal.);

n. *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. FIN Branding Group, LLC and Electronic Cigarettes International Group, Ltd.*, Civil Action No. 2:14-cv-8156 (C.D. Cal.);

o. *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. Ballantyne Brands, LLC*, Civil Action No. 2:14-cv-8157 (C.D. Cal.);

p. *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. Spark Industries, LLC*, Civil Action No. 2:14-cv-8158 (C.D. Cal.);

q. *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. Logic Technology Development LLC*, Civil Action No. 2:14-cv-8160 (C.D. Cal.);

r. *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. VMR Products, LLC, dba V2CIGS*, Civil Action No. 2:14-cv-8161 (C.D. Cal.);

s. *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. NJOY, INC.*, Civil Action No. 2:14-cv-9263 (C.D. Cal.);

t. *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. LOEC, INC.*, Civil Action No. 2:14-cv-9265 (C.D. Cal.);

u. *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. CB Distributors, Inc., and DR distributors, LLC, dba 21st Century Smoke, LLC*, Civil Action No. 2:14-cv-9266 (C.D. Cal.);

v. *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. Vapor Corp.*, Civil Action No. 2:14-cv-9267 (C.D. Cal.);

w. *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. FIN Branding Group, LLC and Electronic Cigarettes International Group, Ltd.*, Civil Action No. 2:14-cv-9268 (C.D. Cal.);

x. *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. Ballantyne Brands, LLC*, Civil Action No. 2:14-cv-9269 (C.D. Cal.);

y. *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. Spark Industries, LLC*, Civil Action No. 2:14-cv-9270 (C.D. Cal.);

z. *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. Logic Technology Development LLC*, Civil Action No. 2:14-cv-9271 (C.D. Cal.);

aa. *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. VMR Products, LLC, dba V2CIGS*, Civil Action No. 2:14-cv-9273 (C.D. Cal.);

bb. *Ruyan Investment (Holdings) Limited v. Sottera, Inc.*, Civil Action No. 2:12-cv-5454 (C.D. Cal.);

cc. *Ruyan Investment (Holdings) Limited v. LOEC, Inc.*, Civil Action No. 2:12-cv-5455 (C.D. Cal.);

dd. *Ruyan Investment (Holdings) Limited v. v. CB Distributors, Inc., an Illinois corporation and DR Distributors, LLC, dba 21st Century Smoke, LLC*, Civil Action No. 2:12-cv-5456 (C.D. Cal.);

ee. *Ruyan Investment (Holdings) Limited v. The Safe Cig, LLC*, Civil Action No. 2:12-cv-5462 (C.D. Cal.);

ff. *Ruyan Investment (Holdings) Limited v. Vapor Corp.*, Civil Action No. 2:12-cv-5466 (C.D. Cal.);

gg. *Ruyan Investment (Holdings) Limited v. Finiti Branding Group, LLC*, Civil Action No. 2:12-cv-5468 (C.D. Cal.);

hh. *Ruyan Investment (Holdings) Limited v. Barjan LLC*, Civil Action No. 2:12-cv-5470 (C.D. Cal.);

ii. *Ruyan Investment (Holdings) Limited v. Spark Industries, LLC*, Civil Action No. 2:12-cv-5472 (C.D. Cal.);

jj. *Ruyan Investment (Holdings) Limited v. Nicotek LLC*, Civil Action No. 2:14-cv-5477 (C.D. Cal.);

kk. *Ruyan Investment (Holdings) Limited v. Logic Technology Development LLC*, Civil Action No. 2:14-cv-5482 (C.D. Cal.);

ll. *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. R.J. Reynolds Vapor Company*, Civil Action No. 2:16-cv-2286 (C.D. Cal.);

mm. *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. R.J. Reynolds Vapor Company*, Civil Action No. 2:16-cv-3049 (C.D. Cal.);

nn. *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. R.J. Reynolds Vapor Company*, Civil Action No. 2:16-cv-04534 (C.D. Cal.).

In addition to this Petition, Petitioner is filing petitions for *inter partes* review of each asserted patent in the Co-Pending Litigation: Petition for *Inter Partes* Review of U.S. Patent No. 8,899,239, IPR2016-Unassigned (to be filed concurrently); Petition for *Inter Partes* Review of U.S. Patent No. 8,393,331, IPR2016-Unassigned (to be filed concurrently); Petitions 1 and 2 for *Inter Partes* Review of U.S. Patent No. 8,490,628, IPR2016-Unassigned (to be filed concurrently); Petitions 1 and 2 for *Inter Partes* Review of U.S. Patent No. 8,893,726 IPR2016-Unassigned (to be filed concurrently); IPR2016-Unassigned (to be filed concurrently); Petition for *Inter Partes* Review of U.S. Patent No. 8,689,805 IPR2016-Unassigned (to be filed concurrently); Petition for *Inter Partes* Review of U.S. Patent No. 8,375,957 IPR2016-Unassigned (to be filed concurrently); and Petition for *Inter Partes* Review of U.S. Patent No. 8,863,752, IPR2016-Unassigned (to be filed concurrently).

In addition to the *Inter Partes* review petitions above, Petitioner identifies the following related *Inter Partes* review proceedings and administrative matters:

- a. Petition for *Inter Partes* Review of U.S. Patent No. 8,375,957, Case No. IPR2015-00098, before the Patent Trial and Appeal Board at the U.S. Patent Office, filed October 21, 2014 by Petitioner Logic Technology Development, LLC;

b. Petition for *Inter Partes* Review of U.S. Patent No. 8,375,957, Case No. IPR2015-01513, before the Patent Trial and Appeal Board at the U.S. Patent Office, filed June 26, 2015 by Petitioner JT International S.A.;

c. Petition for *Inter Partes* Review of U.S. Patent No. 8,863,752, Case No. IPR2015-01604, before the Patent Trial and Appeal Board at the U.S. Patent Office, filed July 20, 2015 by Petitioner JT International S.A.;

d. Petition for *Inter Partes* Review of U.S. Patent No. 8,863,752, Case No. IPR2015-01301, before the Patent Trial and Appeal Board at the U.S. Patent Office, filed May 29, 2015 by NJOY, Inc.; CB Distributors, Inc.; DR Distributors, LLC; FIN Branding Group, LLC; Electronic Cigarettes International Group, Ltd. f/k/a Victory Electronic Cigarettes Corporation; and, Logic Technology Development LLC;

e. Petition for *Inter Partes* Review of U.S. Patent No. 8,490,628, Case No. IPR2014-01300, before the Patent Trial and Appeal Board at the U.S. Patent Office, filed August 15, 2014 by NJOY, Inc.;

f. Petition for *Inter Partes* Review of U.S. Patent No. 8,893,726, Case No. IPR2015-01302, before the Patent Trial and Appeal Board at the U.S. Patent Office, filed May 29, 2015 by NJOY, Inc.; CB Distributors, Inc.; DR Distributors, LLC; FIN Branding Group, LLC; Electronic Cigarettes International Group, Ltd.

f/k/a Victory Electronic Cigarettes Corporation; and, Logic Technology Development LLC;

g. Petition for *Inter Partes* Review of U.S. Patent No. 8,899,239, Case No. IPR2015-01304, before the Patent Trial and Appeal Board at the U.S. Patent Office, filed May 29, 2015 by NJOY, Inc.; CB Distributors, Inc.; DR Distributors, LLC; FIN Branding Group, LLC; Electronic Cigarettes International Group, Ltd. f/k/a Victory Electronic Cigarettes Corporation; and, Logic Technology Development LLC;

h. Petition for *Inter Partes* Review of U.S. Patent No. 8,365,742, Case No. IPR2015-01587, before the Patent Trial and Appeal Board at the U.S. Patent Office, filed July 14, 2015 by Petitioner JT International S.A.;

i. Petition for *Inter Partes* Review of U.S. Patent No. 8,365,742, Case No. IPR2015-00859, before the Patent Trial and Appeal Board at the U.S. Patent Office, filed March 10, 2015 by Petitioner VMR Products, LLC;

j. Petition for *Inter Partes* Review of U.S. Patent No. 8,689,805, Case No. IPR2014-01529, before the Patent Trial and Appeal Board at the U.S. Patent Office, filed September 22, 2014 by Petitioner CB Distributors, Inc. and DR Distributors, LLC;

k. Petition for *Inter Partes* Review of U.S. Patent No. 8,689,805, Case No. IPR2015-01578, before the Patent Trial and Appeal Board at the U.S. Patent Office, filed July 15, 2015 by Petitioner JT International S.A.;

l. Petition for *Inter Partes* Review of U.S. Patent No. 8,689,805, Case No. IPR2015-01027, before the Patent Trial and Appeal Board at the U.S. Patent Office, filed April 10, 2015 by Petitioner NJOY, Inc.;

m. Petition for *Inter Partes* Review of U.S. Patent No. 8,393,331, Case No. IPR2014-01289, before the Patent Trial and Appeal Board at the U.S. Patent Office, filed August 14, 2014 by NJOY, Inc.;

n. U.S. Patent No. 9,326,548 to Lik Hon, filed April 3, 2014 as U.S. Patent Application No. 14/244,376, which claims priority to the 742 Patent;

o. U.S. Publication No. 2013-0125906 A1 by Lik Hon, filed January 11, 2013 as U.S. Patent Application No. 13/740,011, which claims priority to the 742 Patent .

The 742 Patent was previously the subject of the following Petitions for *Inter Partes* Review, which are also listed above: Petition by JT International S.A. for *Inter Partes* Review of U.S. Patent No. 8,365,742, IPR2015-01587, which was dismissed by the Board due to settlement of the parties prior to a decision on whether to institute the proceedings; and Petition by VMR Products LLC for *Inter*

Partes Review of U.S. Patent No. 8,365,742, IPR2015-00859, for which the Board denied institution.

The 742 Patent claims priority to Chinese patent application CN200620090805U. The 742 Patent also claims priority to U.S. Patent Application No. 12/226,818, which was originally filed as PCT Application No. PCT/CN2007/001575.

2.5. Fee for *Inter Partes* Review

The Director is authorized to charge the fee specified by 37 C.F.R. § 42.15(a), and any other required fees, to Deposit Account No. 506499.

2.6. Proof of Service

Proof of service of this petition on the Patent Owner at the correspondence address of record for the 742 Patent is attached.

3. IDENTIFICATION OF CLAIMS BEING CHALLENGED (§ 42.104(B))

Ground #1: Claims 2 and 3 of the 742 Patent (“the challenged claims”) are invalid under (pre-AIA) 35 U.S.C. § 103 on the ground that they are rendered obvious by U.S. Patent No. 6,155,268 (“Takeuchi”) in view of U.S. Patent No. 2,057,353 (“Whittemore”). Takeuchi is attached as Ex.1004; Whittemore is attached as Ex.1005. Takeuchi was filed with the U.S. Patent and Trademark Office on July 23, 1998 and issued on December 5, 2000. Takeuchi is prior art under at least 35 U.S.C. § 102(a), (b). Whittemore was filed with the USPTO on

September 27, 1935 and issued on October 13, 1936. Whittemore is prior art under at least 35 U.S.C. § 102(a) and (b).

This ground is explained below and is supported by the Declaration of John M. Collins (Ex.1003, “Collins Decl.”).

Ground #2: The challenged claims are invalid under (pre-AIA) 35 U.S.C. § 103 on the ground that they are rendered obvious by U.S. Patent No. 4,947,874 (“Brooks”) in view of Takeuchi. Brooks is attached as Ex.1006. Brooks was filed with the U.S. Patent and Trademark Office on September 8, 1988 and issued on August 14, 1990. Brooks is prior art under at least 35 U.S.C. § 102(a) and (b).

Statement of Non-Redundancy: The grounds presented in the petition are not redundant. Ground #1, which is based on Takeuchi in view of Whittemore, relies upon a primary reference—Takeuchi—which was not considered by the Examiner during prosecution of the 742 Patent. Ground #2, which relies on Brooks as a primary reference, is not redundant of Ground #1 because Ground #2 modifies the Brooks device in a way that is different than the modification posited in Ground #1. In particular, while Ground #1 uses the Takeuchi device as a base device and modifies it by incorporating a coiled wire heater wound around a porous wick-like structure as taught in Whittemore, Ground #2 uses the Brooks device as a base device and modifies it by incorporating a liquid container within the device casing as taught in Takeuchi. Additionally, Brooks is not redundant of

Takeuchi because it expressly discloses heating elements that constitute metal wires, as well as resistance coils wound on an insulating material.

The grounds presented in this petition also are not redundant of the grounds previously denied by the Board in IPR2015-00859. In particular, the Board denied institution of grounds that combined Chinese Patent No. CN 2719043Y (“Hon”) with Whittemore, and European Patent No. EP 0 842 220 A1 (“Susa”) with Whittemore, finding that the petitioner in that matter had not articulated sufficient reasons that a person of ordinary skill in the art would have been motivated to make the proposed combinations and that the petitioner’s assertion of a desire to provide “more efficient, uniform heating” as a motivation to combine references consisted of unsupported conclusory statements. *See VMR Products LLC v. Fontem Holdings 1 B.V.*, Case No. IPR2015-00859, Paper 9 at pp.24-25, 30-31 (PTAB Sep. 16, 2015). As described herein, however, Petitioner’s proposed combination of Takeuchi with Whittemore (Ground #1) is not subject to the same objection, as the proposed combination involves a known technique in one device being used to improve similar devices in the same way—a rationale for obviousness that has been expressly endorsed by the Supreme Court. *See KSR Int’l. Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007); Ex.1003, ¶72. Further, Takeuchi expressly teaches the desirability of reducing the size, weight, and power consumption of its electronic cigarette, all of which are achieved by the proposed

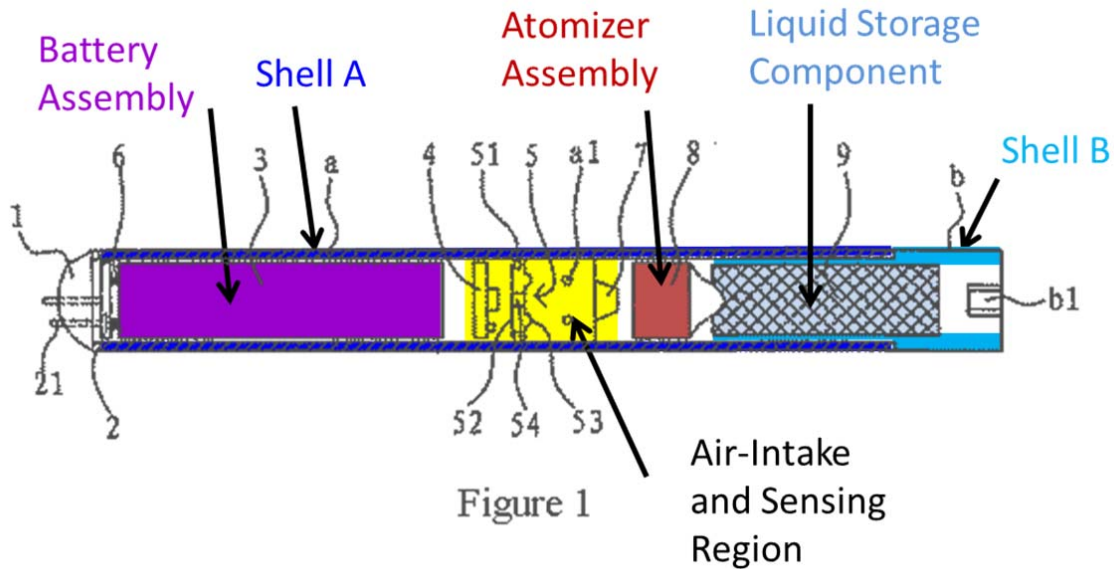
combination. Ex.1003, ¶73. Thus, Ground #1 also differs from the grounds rejected in IPR2015-00859 because the Board in that case held that the petitioner provided insufficient evidence that one of ordinary skill in the art would have wanted to provide the claimed benefit—more efficient, uniform heating—in the smoking devices taught in Hon and Susa.

4. OVERVIEW OF THE 742 PATENT

The 742 Patent was filed on April 5, 2011, and claims priority through U.S. Patent Application No. 12/226,818 (originally filed as PCT Application No. PCT/CN2007/001575) to a Chinese patent application which was filed on May 16, 2006. The 742 Patent, at a high level, describes an electronic cigarette that, when a person inhales on the cigarette, atomizes a nicotine liquid to provide the person an experience similar to that provided by a combustible cigarette. Ex.1003, ¶14. The 742 Patent does *not* purport to claim the broad concept of an electronic cigarette generally, and expressly acknowledges in the Background Art section the existence of “electronic cigarettes currently available on the market,” but notes that such products allegedly were complicated in structure, did not provide ideal aerosol effects, and lacked sufficient atomizing efficiency. Ex.1001. at 1:21-24.

The electronic cigarette proposed by the 742 Patent comprises two shells (labelled a and b in the figure below) with shell (a) containing a battery assembly, an air-intake and sensing region, and an atomizer assembly, and shell (b)

containing a liquid storage component. Ex.1003, ¶15. These components are depicted in Figure 1 of the 742 Patent:



Ex.1001, 742 Patent at Fig. 1 (annotated).

The electronic cigarette is activated by a person inhaling through the mouth piece (depicted in the figure on the right hand side). Inhalation creates a negative pressure in the device and air is drawn in through inlets (labelled a1 in Fig. 1) and through a valve (labelled 7 in Fig. 1). The negative pressure is detected by a sensor (labelled 5 in Fig. 1), which energizes the electric circuit on an electronic circuit board (labelled 4 in Fig. 1). Ex.1001 at 3:67-4:11. This causes the battery (labelled 3 in Fig. 1) to power the atomizer (labelled 8 in Fig. 1). The atomizer abuts a perforated liquid storage component (labelled 9 in Fig. 1). Ex.1003, ¶16.

As shown in Figs. 17 and 18 below, the atomizer includes a porous component 81 set on a frame 82. Ex.1001 at Figs. 17-18, 5:42-46. The porous component, which is in contact with the liquid supply, absorbs liquid from the liquid supply. *Id.* at Fig. 1, 3:63-67, 4:36-40, 5:49-52. A heating wire 83 is wound around a portion of the porous component that is aligned with a run-through hole 821 in the frame. *Id.* at Figs. 17-18, 5:42-49. The run-through hole enables air to be pulled past the heating wire. Ex.1003, ¶17.

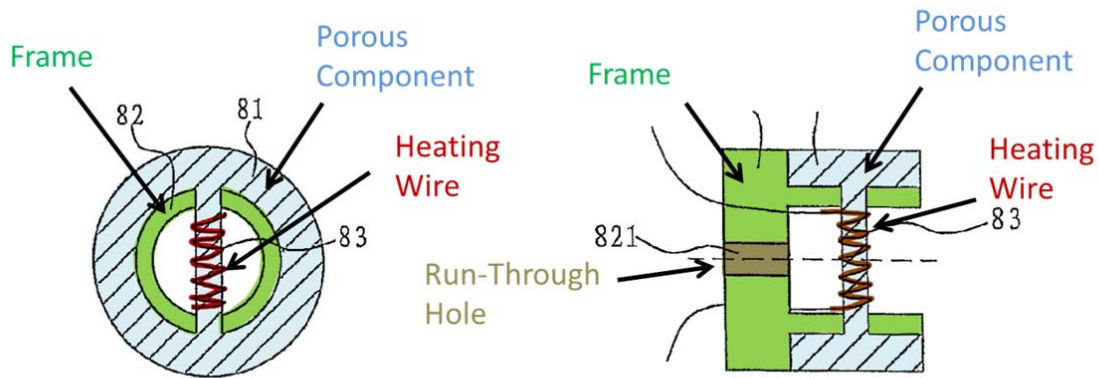


Figure 18

Figure 17

Ex.1001, 742 Patent at Figs. 17 and 18 (annotated).

When the person inhales, absorbed liquid in the porous component 81 is heated and atomized by the heating wire, becoming suspended in the airflow as an aerosol, which is then inhaled by the person through the air channel b1. Ex.1001 at 4:23-32; Ex.1003, ¶18.

5. PATENT PROSECUTION HISTORY

U.S. Application No. 13/079,937 (“the 937 Application”), which ultimately issued as the 742 Patent, is a division of U.S. Application No. 12/226,818, which was filed as PCT Application No. PCT/CN2007/001575. The PCT application claims priority to Chinese Patent Application No. CN 200620090805. The 937 Application was filed with 29 original claims, all of which were canceled by Preliminary Amendment on April 5, 2011 and replaced with new claim 30. Ex.1002, April 5, 2011 Preliminary Amendment at pp.2-3.

5.1. First Office Action and Response

On July 19, 2012, the Examiner rejected the sole claim, claim 30, under 35 U.S.C. § 112 as being indefinite. Ex.1002, July 19, 2012 Office Action, at p.7. Specifically, the Examiner found that the claim language “the said porous component is wound with heating wire in the part that is on the side in the axial direction of the run through hole ...,” was unclear as to the “part” and “side” being referenced. *Id.* Although the Examiner indicated that claim 30 would be allowable if the indefiniteness rejection were overcome, the Examiner also explicitly stated in the reasons for allowance in paragraph 4 of the Office Action that the closest prior art of record, CN2719043, differed from claim 30 in that it lacked the claimed combination, including “an atomizer, which includes a porous component and a

heating body; the said heating body is heating wire ... the heating wire is wound on the said porous component.” *Id.* at pp.7-8; Ex.1003, ¶19.

In response to the office action, Applicant amended claim 30 to replace the indefinite claim limitation with “the heating wire is wound on a part of the porous component that is substantially aligned with the run-through hole.” Ex.1002, August 3, 2012 Amendment and Remarks at pp.10, 12. Applicant also added new claims 31-32. *Id.* at pp.10-11. With respect to these new claims, Applicant argued that “claim 31 is similar to claim 30 and includes the elements of claim 30, but written with more common English usage” and that “claim 32 is similar to claims 30 and 31 but describes a heating wire wound on a part of the porous component substantially aligned with the run-through hole ... and with the porous component in contact with a liquid supply in the housing” *Id.* at p.12. Finally, Applicant argued that “claims 31 and 32 are believed to be allowable for the same reason that claim 30 is indicated to be allowable at paragraph 4 of the Office Action.” *Id.* at p.13; Ex.1003, ¶20.

Applicant also supplemented its response to the office action on August 7, 2012, providing a substitute specification with numerous substantive amendments. Ex.1002, August 7, 2012 Supplemental Response at pp.14-15; Ex.1003, ¶21.

5.2. Examiner Interview

Although the prosecution history does not show any additional rejections after the Applicant's August 7, 2012 supplemental response, an interview was held on August 14, 2012. The Examiner Interview Summary states that during the interview, the Examiner and Applicant's counsel discussed pending claims 30, 31, and 32 as well as the following prior art references: "Voges, U.S. Patent No. 6,196,218; Robinson, U.S. Patent No. 1,775,947; Counts, U.S. Patent No. 5,144,962; Brooks, U.S. Patent No. 4,947,875; Japan Tobacco, EP 0 845 220 B1; Hon Lik WO/2004/095955; and Hon Lik WO/2005/099494." Ex.1002, August 23, 2012 Interview Summary at p.51. According to the Summary, no agreement was reached. *Id.*; Ex.1003, ¶22.

5.3. Notice of Allowance

On November 14, 2012, the USPTO issued a notice of allowance. Ex.1002, November 14, 2012 Notice of Allowance at p.52. The 742 Patent issued on February 5, 2013, with claims 30, 31, and 32 of the 937 Application issuing as claims 1, 2, and 3, respectively. On July 2, 2013, the USPTO issued a certificate of correction. *Id.*, Certificate of Correction at p.53; Ex.1003, ¶23.

6. CLAIM CONSTRUCTION

6.1. Applicable Law

For a non-expired patent, a claim subject to *inter partes* review is interpreted according to the "broadest reasonable construction in light of the specification of

the patent in which it appears.” 37 C.F.R. § 42.100(b). Any ambiguity regarding the “broadest reasonable construction” of a claim term is resolved in favor of the broader construction absent amendment by the patent owner. Final Rule, 77 Fed. Reg. 48680, 48699 (Aug. 14, 2012).

6.2. Construction of Claim Terms

Petitioner respectfully submits that the following terms should be construed for this IPR:

6.2.1. “frame” (claims 2, 3)

The claim term “frame” is a limitation of both challenged claims. For the reasons discussed below, this term should be construed to mean “rigid structure.”

The Board determined in IPR2015-00859 that the broadest reasonable interpretation of “frame” in light of the 742 Patent specification is “rigid structure.” *VMR Prods. LLC v. Fontem Holdings I B.V.*, IPR2015-000859, Paper 9 at pp.7-8. In doing so, the Board observed that while the porous component of the atomizer is set on the frame in one embodiment of the 742 Patent, this single embodiment was not enough to limit “frame” to a structure that is designed to hold up another component, as suggested by Fontem in that proceeding. *Id.* The Board further found that “rigid structure” was consistent with the use of the term “frame” in the specification and the claims. *Id.* This same construction was also adopted by the United States District Court for the Central District of California in *Fontem*

Ventures, B.V., et al. v. NJOY, Inc. et al., Case 2:14-cv-01645-GW-MRW.

Ex.1007, Rulings on Claims Construction (DI-65) at p.8.

6.2.2. “substantially” (claims 2, 3)

The claim term “substantially” appears in both challenged claims. For the reasons discussed below, this term should be construed to mean “in significant part or extent.”

Although the term “substantially” is not expressly used or discussed in the specification, its meaning can be discerned by reference to the limitation of claim 3 that requires “a heating wire wound on a part of the porous component which is substantially aligned with the run-through hole.” Ex.1003, ¶30. The embodiment of the atomizer assembly corresponding to this limitation is depicted in Figure 18:

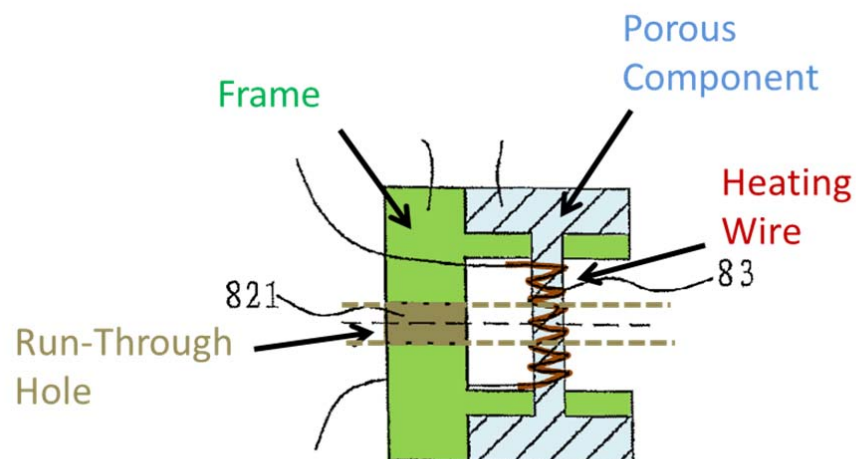


Figure 18

Ex.1001, 742 Patent at Fig. 18 (annotated)

As shown in the figure above, a relatively small, but significant, part of the porous component on which the heating wire is wound is aligned with the run-through hole. Nonetheless, a person of ordinary skill in the art reading the claims in light of the specification would have understood that this embodiment depicts the heating wire wound on a part of the porous component which is “substantially” aligned with the run-through hole, as recited in claim 3, because the part of the porous component on which the heating wire is wound is aligned with the run-through hole to a significant extent. Ex.1003, ¶31. Thus, the broadest reasonable interpretation of the term “substantially,” in view of the specification and claims, is “in significant part or extent.” *Id.*

6.2.3. “porous component” (claims 1, 2, 9, 10)

The Board in IPR2015-00859 construed “porous component” as recited in the claims of the 742 Patent to mean “a component of the atomizer assembly in the electronic cigarette that includes pores and is permeable to liquid, such as cigarette solution from the cigarette solution storage area.” Petitioner respectfully submits that the same construction should be applied for purposes of this Petition.

7. PERSON HAVING ORDINARY SKILL IN THE ART

A person of ordinary skill in the art with respect to the technology described in the 742 Patent would be a person with a Bachelor of Science degree in mechanical engineering, along with at least 3-5 years of experience in designing

and developing handheld devices with thermal management and fluid handling technologies. A higher level of education may substitute for a lesser amount of experience, and vice versa. Ex.1003, ¶25.

8. DESCRIPTION OF THE PRIOR ART

8.1. UNITED STATES PATENT NO. 6,155,268 (“Takeuchi”)

United States Patent No. 6,155,268 (“Takeuchi”) (Ex.1004) was filed on July 23, 1998 and issued on December 5, 2000. Takeuchi is directed to a “Flavor-Generating Device,” and names Japan Tobacco Inc. as the original assignee. Takeuchi is prior art to the 742 Patent under at least 35 U.S.C. § 102(a) and (b) because it issued more than one year before the filing of the earliest application to which the 742 Patent claims priority.

Takeuchi is directed to a flavor-generating device for enjoying simulated smoking by heating a liquid flavor source to generate flavor that is inhaled by a person. Ex.1004 at 1:4-9. Relevant to this request, and as discussed in greater detail below with respect to Ground #1, Takeuchi, like the claims of the 742 Patent, discloses an electronic device with a casing (*i.e.*, shell) having a power source (*i.e.*, battery assembly), an air intake and sensing region, a heater (*i.e.*, atomizer assembly), and a liquid container (*i.e.*, liquid storage component). Ex.1003, ¶51.

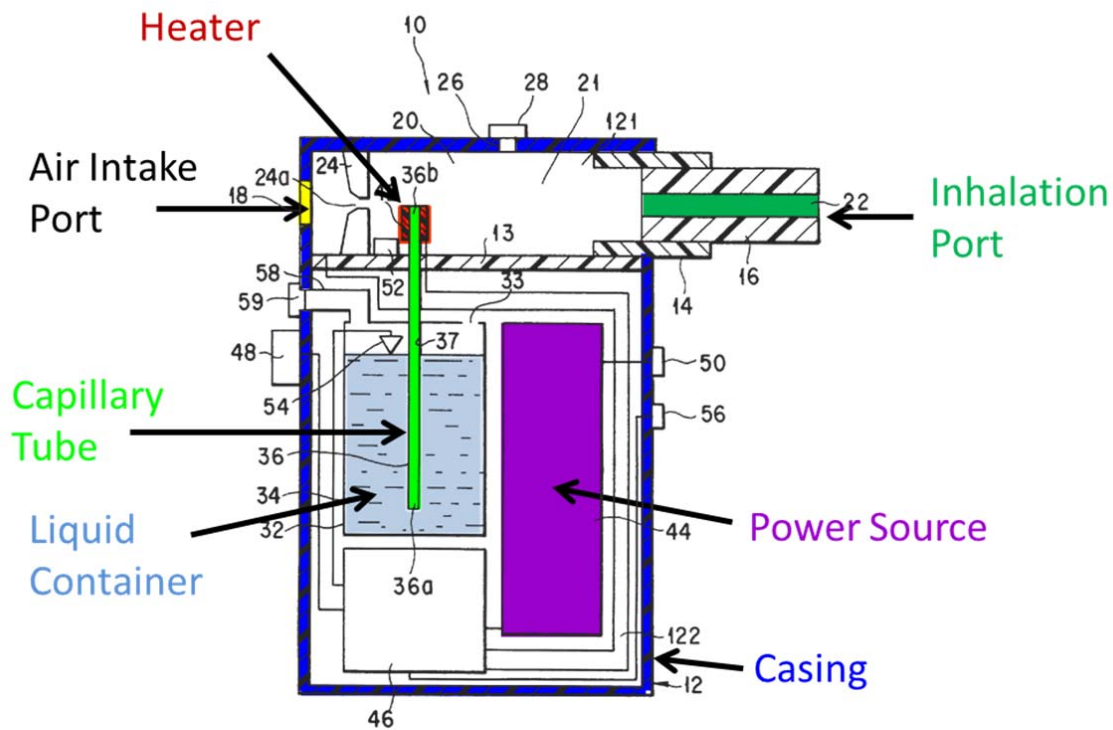


FIG. 1

Ex.1004, Takeuchi at Fig. 1 (annotated).

When a person inhales through the inhalation port 22, a sensor 52 detects the inhalation and signals the control circuit 46, which then controls the power source 44 to supply electric power to the heater 42. *Id.* at 7:45-56. Because liquid from the liquid container is already drawn to the outlet port 36b¹ of the capillary tube 36

¹ Certain portions of the specification in Takeuchi erroneously refer to the outlet port of the capillary tube using reference numeral “36a.” As shown in Figure 1,

by capillary action, the heater begins to vaporize the liquid. *Id.* at 7:57-63. The vaporized liquid mixes with air introduced through the air intake port 18 and squeeze hole 24a, and then is drawn to the inhalation port 22 by the person's inhalation. *Id.* at 8:5-10; Ex.1003, ¶52.

Takeuchi discloses that the liquid passageway 37 formed by the capillary tube 36 may consist of an "inter-communicating void or pore structure filled in an enclosure," such as open-cell foamed structure or bundled fibers. Ex.1004 at 3:36-50, 10:50-60; Fig. 14. In such embodiments, the liquid from the liquid container 32 is delivered to the outlet of the passageway by capillary force. *Id.* at 3:36-50. Further, the intercommunicating pore structure may protrude from the enclosure, allowing the heater to be provided on the protruded end of the intercommunicating pore structure. *Id.* at 10:59-63, Fig. 15; Ex.1003, ¶54. The capillary tube is supported by a rigid structure that includes the partition wall 13, squeeze plate 24, and the upper portion of the casing. Ex.1003 ¶54.

The only difference between Takeuchi and the electronic cigarette recited in the challenged claims is that Takeuchi does not expressly disclose that the heater comprises a heating wire wound around a porous component. However, as

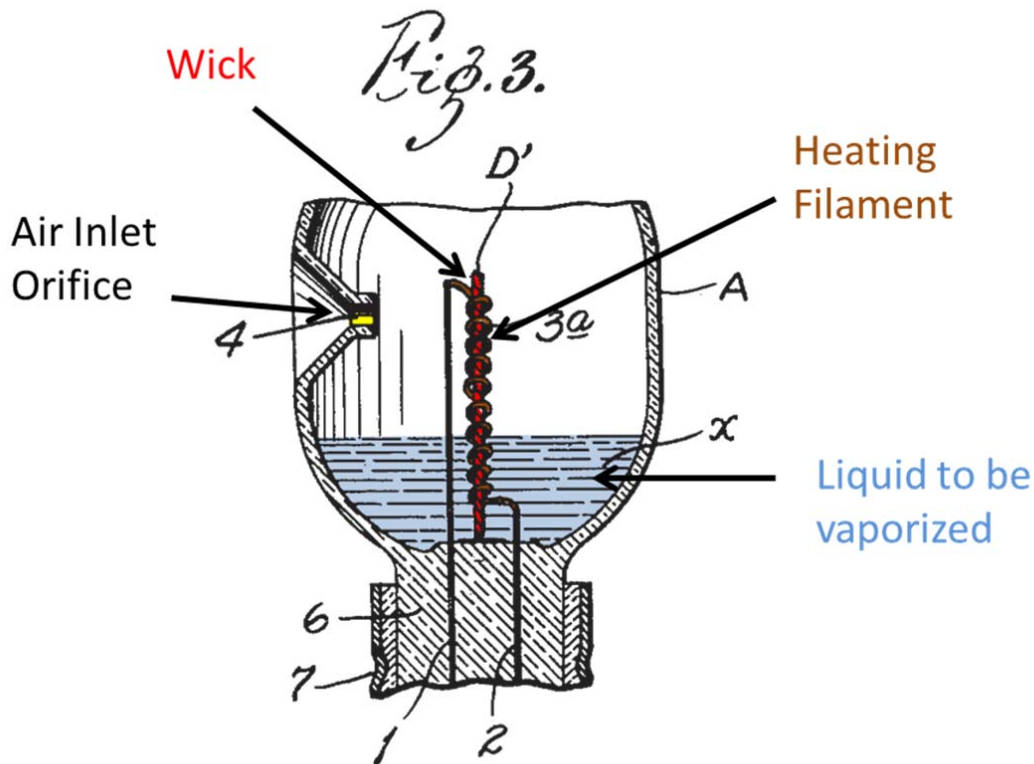
the correct reference numeral is 36b. For clarity, Petitioner uses 36b to refer to the upper/outlet end of the capillary tube, and 36a to refer to the lower end.

discussed in detail below, it would have been obvious to make this modification to Takeuchi based on the teachings of Whittemore. Ex.1003, ¶55.

8.2. UNITED STATES PATENT NO. 2,057,353 (“WHITTEMORE”)

U.S. Patent No. 2,057,353 (“Whittemore”) (Ex.1005) was filed September 27, 1935 and was issued on October 13, 1936. Whittemore is entitled “Vaporizing Unit for Therapeutic Apparatus.” Whittemore is prior art under at least 35 U.S.C. § 102(a) and (b) because it was published more than one year before the filing date of the earliest application to which the 742 Patent claims priority.

Whittemore discloses “vaporizing units for therapeutic apparatus” constructed such that the units “will function properly, even though the heating element is spaced a considerable distance above or away from the medicament from which the vapor is evolved.” Ex.1005 at 1:1-10. As shown below, the Whittemore device includes a reservoir of liquid *x* that is in contact with a wick D’, around which a heating element comprised of electrically conductive filament is wound. Ex.1003, ¶56.



Ex.1005, Whittemore at Fig. 3 (annotated).

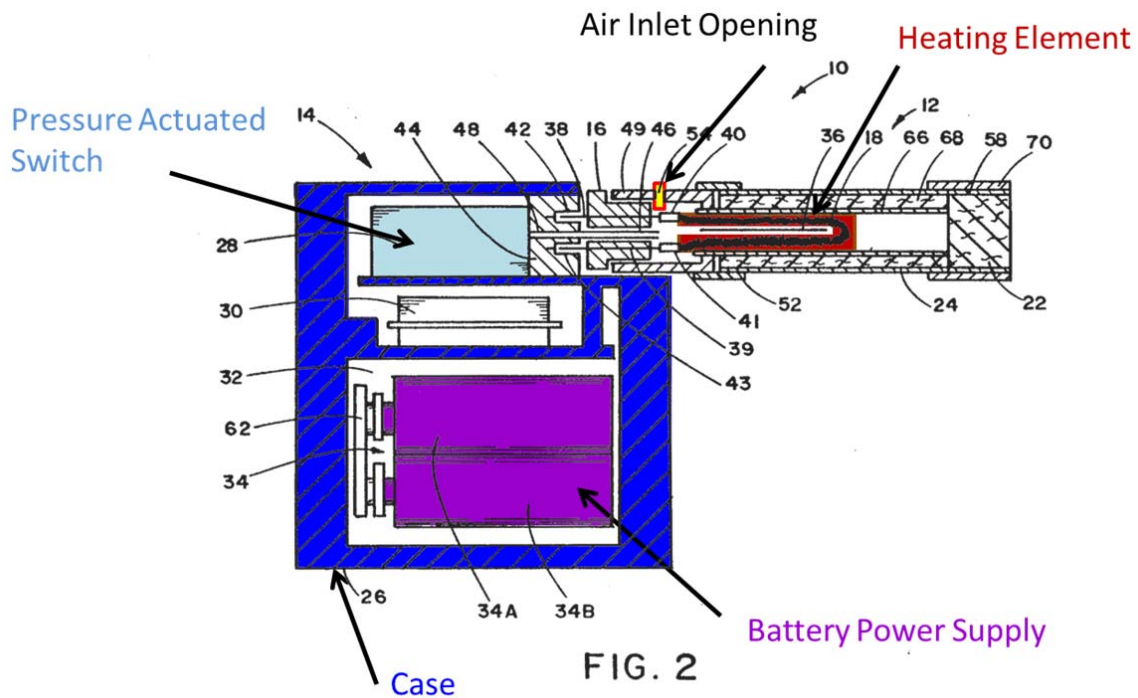
As further shown above, the heating element in Whittemore is wound around a portion of the wick that is substantially aligned with an air inlet orifice 4. Whittemore further teaches that the wick can be “made of any suitable material” that permits the liquid to be “carried by capillary action to a point where it will be vaporized by the heat from the filament,” including a thread or string. Ex.1005 at 1:50-2:10; Ex.1003, ¶57.

8.3. UNITED STATES PATENT NO. 4,947,874 (“BROOKS”)

U.S. Patent No. 4,947,874 (“Brooks”) (Ex.1006) was filed September 8, 1988 and was issued on August 14, 1990. Brooks is entitled “Smoking Articles Utilizing Electrical Energy” and names R. J. Reynolds Tobacco Company as the original assignee. Brooks is prior art under at least 35 U.S.C. § 102(a) and (b) because it was published more than one year before the filing date of the earliest application to which the 742 Patent claims priority.

Brooks is directed to smoking articles that “employ an electrical resistance heating element and an electrical power source to provide a tobacco-flavored smoke or aerosol and other sensations of smoking.” Ex.1006 at Abstract, 1:6-10; Ex.1003, ¶59.

Relevant to this request, and as discussed in greater detail below with respect to Ground #2, Brooks, like the 742 Patent, discloses an electronic device with a case (*i.e.*, shell) having a battery power supply (*i.e.*, battery assembly), air inlets, and a resistance heating element (*i.e.*, atomizer assembly). Ex.1003, ¶60.

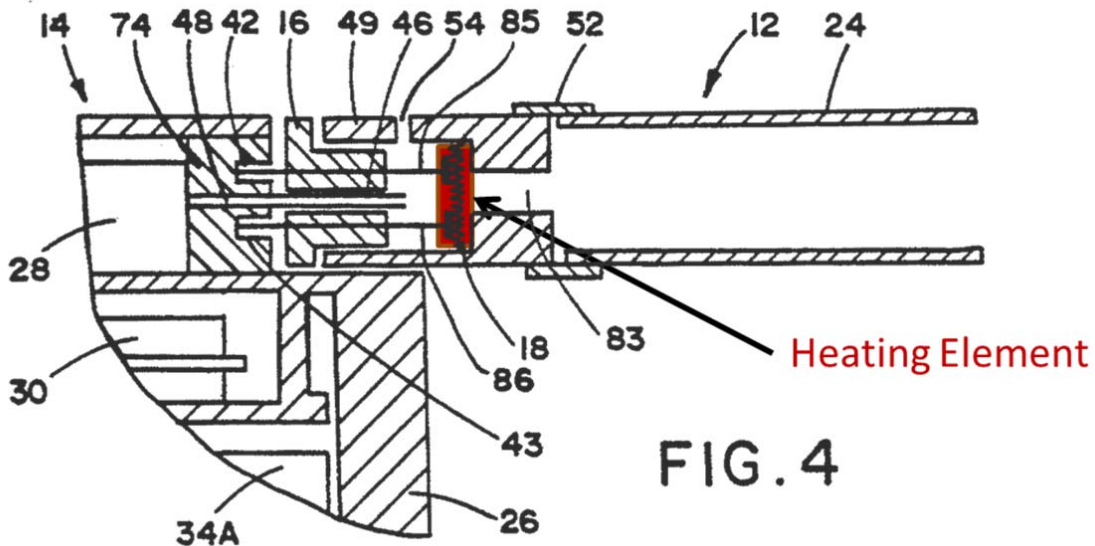


Ex.1006, Brooks at Fig. 2 (annotated).

When a person puffs on the mouth end of the device, air enters the device through the air inlet 54, creating a change in air pressure that actuates the pressure actuated switch 28 and powers the heating element 18. Ex.1006 at 10:34-58. As a result, the heating element heats and volatilizes an aerosol forming substance that is absorbed in the heating element. *Id.*; Ex.1003, ¶61.

Brooks discloses that the heating element 18 can include porous metal wires and porous substrates in intimate contact with resistance heating components, and the Background of the Invention section of Brooks discusses multiple prior art heating elements that included a heating coil wound around a wick or other heat

resisting material. *Id.* at 1:57-66, 7:65-8:3. In some embodiments of Brooks, the heating element is supported by the structure of the device. Ex.1003, ¶62.



Ex.1006, Brooks at Fig. 4 (annotated).

The main difference between Brooks and the 742 Patent is that in Brooks, the aerosol liquid is absorbed in the heating element itself or alternatively a nearby porous substrate, rather than provided from a large liquid source. As discussed above and in the discussion of Ground #2 below, however, this is provided by Takeuchi. Ex.1003, ¶63.

9. GROUND #1: CLAIMS 2 AND 3 OF THE 742 PATENT ARE UNPATENTABLE AS OBVIOUS OVER TAKEUCHI IN VIEW OF WHITEMORE

As explained below, claims 2 and 3 of the 742 Patent are unpatentable as obvious under 35 U.S.C. § 103 over Takeuchi in view of Whittemore. Takeuchi

discloses all the features of claims 2 and 3 except for a heating wire wound on a part of the porous component. Whittemore discloses such a heating wire wound on a porous component.

9.1. It would have been obvious to a person of ordinary skill in the art to combine Takeuchi with Whittemore

It would have been obvious to a person of ordinary skill in the art to combine Takeuchi with Whittemore, substituting the heating wire wound around a porous wick for the heater 42 disclosed in Takeuchi. Ex.1003, ¶¶64-74. Takeuchi and Whittemore both aim to vaporize a liquid solution that is in contact with a porous material that supplies liquid to the heater by capillary action. *Id.*, ¶65; Ex.1004 at 3:36-50, 7:57-63, 10:50-63; Ex.1005 at 1:50-2:10. In Takeuchi, the porous material is an inter-communicating void or pore structure filled in an enclosure, such as open-cell foamed structure or bundled fibers, contained in a capillary tube 36. Ex.1004 at 3:36-50, 10:50-63; Ex.1003, ¶65. The supplied liquid comes from the liquid container 32, in which the capillary tube 36 is immersed.

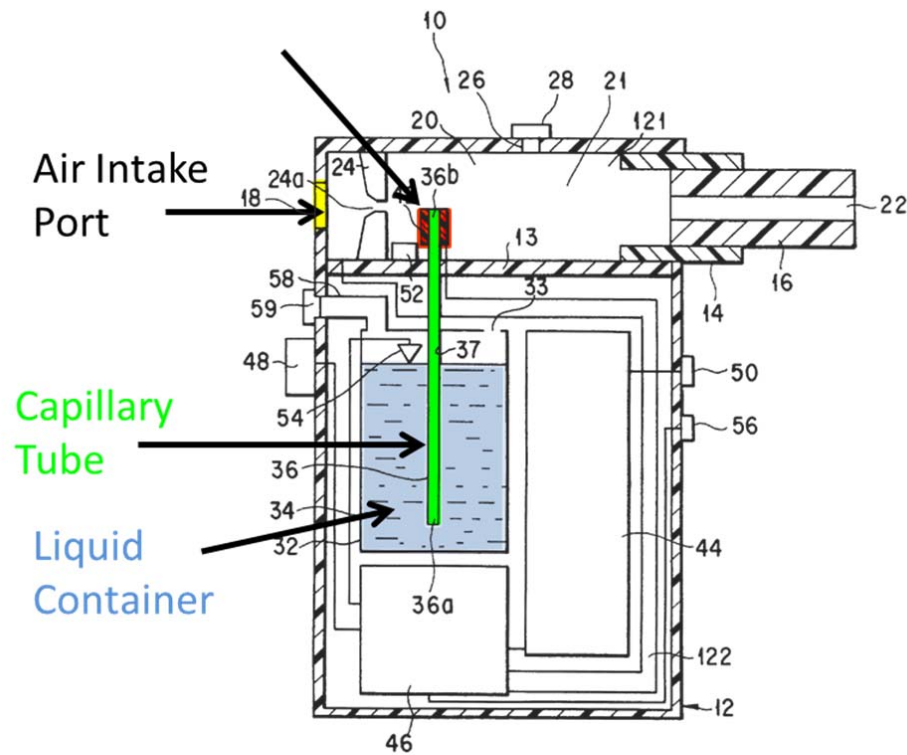


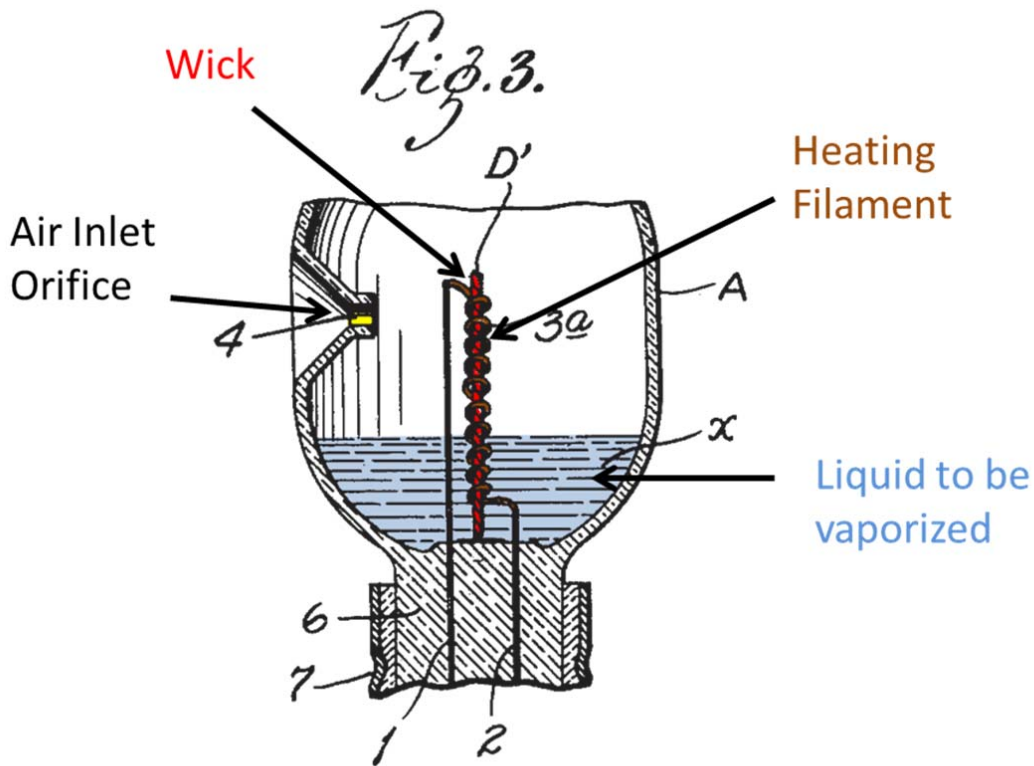
FIG. 1

Ex.1004, Takeuchi at Fig. 1 (annotated).

Takeuchi expressly teaches that the heater 42 may be provided on the protruded end of the intercommunicating pore structure in the capillary tube 36 Ex.1004 at 10:59-63, Figs. 1, 15; Ex.1003, ¶¶65-66. To the extent that Patent Owner raises any argument that the intercommunicating pore structure is not present in the capillary tube 36 embodied in Figure 1, Petitioner notes that Takeuchi expressly teaches that the intercommunicating pore structure embodiment may be in an enclosure “provided by *a tube*,” and that the heater

“may be arranged *as in FIG. 1*, 10, or 11.” Ex.1004 at 10:50-59; Ex.1003, ¶65. Thus, Takeuchi expressly teaches that the intercommunicating pore structure can be embodied in the capillary tube 36 of Figure 1. Further, Takeuchi discloses that in some embodiments, the heater can be a ring arranged around the outlet portion 36a of the capillary tube 36. Ex.1004 at Fig. 3, 8:19-26; Ex.1003, ¶65. Accordingly, Takeuchi discloses a heater wound around the porous material within the capillary tube, but does not expressly teach a *wire* wound around the porous material. Ex.1003, ¶66.

Like Takeuchi, Whittemore discloses a porous material, the wick D’, that supplies liquid from a liquid supply, the reservoir x. Ex.1005 at Fig. 3, 1:50-2:8, 2:26-34; Ex.1003, ¶67. Also like Takeuchi, Whittemore discloses a heater, the heating filament or element 3a, that is provided on one end of the wick D’. Ex.1003, ¶67. And in both Takeuchi and Whittemore, the portion of the wick or capillary tube on which the heater is placed is substantially aligned with an air intake or air inlet opening. *Id.*



Ex.1005, Whittemore at Fig. 3 (annotated).

As is shown by Whittemore, it would have been obvious to one of ordinary skill in the art that the heater 42 in Takeuchi could be embodied as a heating wire wound around the protruding end of the intercommunicating pore structure in the capillary tube 36. Ex.1003, ¶¶70-71. Accordingly, in view of Whittemore, it would have been obvious to one of ordinary skill in the art to modify Takeuchi to utilize such a heater. *Id.* Such a modification would have been a simple substitution of one known, equivalent element for another to obtain predictable results. *Id.*, ¶71. The prior art teaches that suitable heating elements for electrical

smoking devices may include “*metal wires* or films; carbon yarns, cloths, fibers, discs or strips; graphite cylinders, fabrics or paints; microporous high temperature polymers having moderate resistivities; *porous substrates in intimate contact with resistance heating components*; and the like.” Ex.1006 at 7:65-8:3; Ex.1003, ¶71. Thus, a person of ordinary skill in the art would have understood that the decision to use a resistive heating element made of metal wires and/or porous substrates in contact with resistance heating components was a simple matter of choosing from a finite number of identified, predictable solutions with a reasonable expectation of success. Ex.1003, ¶71. Takeuchi teaches all of the claimed features, in a device for vaporizing liquid to be inhaled by a person, except for a heating wire wound on a part of a porous component, though it does teach a heater provided on a part of a porous component. *Id.* Whittemore teaches the use of a heater provided on part of a porous component comprising a heating wire (filament or heating element 3a) wound around the porous component (wick D’). *Id.* Because both Takeuchi and Whittemore teach the use of heaters provided on a porous wick or tube in devices for vaporizing liquid to be inhaled by a person, it would have been obvious to one of ordinary skill in the art to substitute the heater comprising a heating wire wound on a part of the porous component from Whittemore for the heater in Takeuchi, to achieve the predictable result of vaporizing liquid from the liquid container that has been absorbed into the porous capillary tube. Ex.1005 at 1:50-2:8 (“said

medicament will be carried by capillary action to a point where it will be *vaporized* by the heat from the filament 3”); Ex.1004 at 7:48-8:4 (“If the heater 42 is turned on under this condition, the liquid flavor source 34 within the outlet port 36a is *instantly gasified* by the heat generated from the heater 42”); Ex.1003, ¶71.

Further, such a modification would have been a known technique in one device being used to improve similar devices in the same way. Ex.1003, ¶72. Takeuchi teaches all of the claimed features in a simulated smoking device, except for a heating wire wound on a part of a porous component. *Id.* Whittemore teaches the use, in a device for vaporizing liquid to be inhaled by a person, of a heater provided on part of a porous component comprising a heating wire (filament or heating element 3a) wound around the porous component (wick D’). *Id.* It would have been obvious to a person of ordinary skill in the art of liquid vaporization devices, as taught by Whittemore, to use a heater comprising a heating wire wound on a part of a porous component to vaporize the liquid in Takeuchi. *Id.* Using the known technique of a heating wire wound on a part of a porous wick as taught by Whittemore to improve a similar vaporization apparatus in the device of Takeuchi would have been obvious to one of ordinary skill in the art, as it improves the Takeuchi device in the same manner as the therapeutic vaporization device set forth in Whittemore. *Id.* In particular, Whittemore teaches that its wire coil heater provides the exact same function as would be required in

Takeuchi – namely, vaporization or gasification of a liquid source. Ex.1005 at 1:50-2:8 (“said medicament will be carried by capillary action to a point where it will be *vaporized* by the heat from the filament 3”); Ex.1004 at 7:48-8:4 (“If the heater 42 is turned on under this condition, the liquid flavor source 34 within the outlet port 36a is *instantly gasified* by the heat generated from the heater 42”); Ex.1003, ¶72. Thus, using the wire heater of Whittemore in the device of Takeuchi would have yielded the obvious and predictable result that liquid absorbed in the wick would be vaporized by the wire coil when power is applied. Ex.1003, ¶72.

Additionally, such a modification would have been obvious because Takeuchi recognizes the importance of constructing a device that is “small in size and light in weight.” Ex.1004 at 1:65-67; Ex.1003, ¶73. Takeuchi also expressly teaches the importance of providing a device “which can be driven with a low energy.” Ex.1004 at 11:11-12; Ex.1003, ¶73. Using the wound heating wire of Whittemore in the Takeuchi device achieves both of these objectives. A person of ordinary skill in the art would have recognized that by substituting a wire coil for a larger piece of metal, such as the “ring-shaped heater,” “plate-like heater,” and “rod-like heater” devices discussed in Takeuchi, the device is made more lightweight because it requires less metal material, thereby achieving Takeuchi’s stated goal of providing a small and light device. Ex.1003, ¶73. Similarly, a

person of ordinary skill in the art would have recognized that a wire coil reduces power consumption, because a thin coil of wire requires less energy to heat than a larger piece of metal such as a ring, plate, or rod. Ex.1003, ¶73. This modification therefore also achieves Takeuchi's stated goal of driving the device with low energy. *Id.*

Moreover, modifying Takeuchi to use Whittemore's heating wire wound on a portion of the pore structure in the capillary tube would not have negatively affected the operation of the Takeuchi device. In both Takeuchi and Whittemore, liquid is delivered from the liquid reservoir to the heater by the capillary action of the pore structure in the capillary tube or wick, respectively. Ex.1004 at 3:36-50, 10:50-63; Ex.1005 at 1:50-2:8, 2:26-34. Thus, this aspect of the operation remains unchanged in the proposed combination. Ex.1003, ¶74. Similarly, in both Takeuchi and Whittemore, the heater 42 (in Takeuchi) and heating wire 3a (in Whittemore) are heated by connection to a power source, such as the power source 44 in Takeuchi or the power supply C to which the conductors 1 and 2 of Whittemore connect. Ex.1004 at 7:45-56; Ex.1005 at Fig. 3, 2:26-34, 1:19-28, 1:39-49. Thus, this aspect of the operation also remains unchanged in the proposed combination. Ex.1003, ¶74. And in both Takeuchi and Whittemore, the liquid that has been absorbed by capillary action of the pore structure in the capillary tube 36 or wick D' is vaporized by the heat generated by the heater 42 or the heating wire

3a. Ex.1004 at 7:57-63; Ex.1005 at 1:19-28; Ex.1003, ¶74. Accordingly, modifying Takeuchi to use Whittemore’s heating wire wound on a portion of the porous capillary tube would not have adversely affected the operation of the Takeuchi device. Ex.1003, ¶74.

9.2. Claim 2 is obvious over Takeuchi in view of Whittemore

9.2.1. Claim 2: [2.P] An electronic cigarette, comprising:

To the extent that the preamble is a limitation, Takeuchi discloses an electronic cigarette. Specifically, Takeuchi discloses “a flavor-generating device for enjoying inhalation of flavor or *for enjoying simulated smoking*,” (Ex.1004 at 1:3-8), and states that the device can be “used as a simulated smoking article” by including “tobacco components such as tobacco extracts and a tobacco smoke condensate” in the liquid flavor source. *Id.* at 5:43-46. The device is powered by a power source that can be a dry battery, rechargeable battery, or an AC power source, and therefore the device is “electronic.” *Id.* at Fig. 1, 6:15-22. The electronic cigarette is illustrated at Figure 1 of Takeuchi.

9.2.2. [2.1] a battery assembly and an atomizer assembly within a housing with the battery assembly electrically connected to the atomizer assembly;

Takeuchi discloses that its device includes a power source 44 that supplies electric power, and that the power source 44 may be “a DC power source available on the market such as a primary battery (dry battery), or a secondary battery (rechargeable battery).” Ex.1004 at 6:12-17.

Takeuchi also discloses that the device includes an electric heater 42 that is connected to the upper end of a capillary tube 36. *Id.* at 5:47-6:12, 10:59-63. When powered by the power source 44, the electric heater 42 gasifies the liquid that has been absorbed into the capillary tube 36, converting the liquid into an aerosol or vapor that is inhaled by the person through the inhalation port 22. *Id.* at 7:45-8:10. Thus, the electric heater 42 and the capillary tube 36 together comprise an atomizer assembly that converts liquid into an aerosol or vapor.

Takeuchi discloses that the power source 44 is electrically connected to the electric heater 42 and capillary tube 36 through a control circuit 46, which controls a switch 48 that can independently turn the heater 42 on, as well as a sensor 52 that can start up the heater 42 by detecting the person's inhalation at the inhalation port 22. *Id.* at 6:23-29, 6:55-62, 7:48-56. Further, as shown in Figure 1, Takeuchi discloses electrical connections between the power source 44, the heater 42, and the control circuit 46.

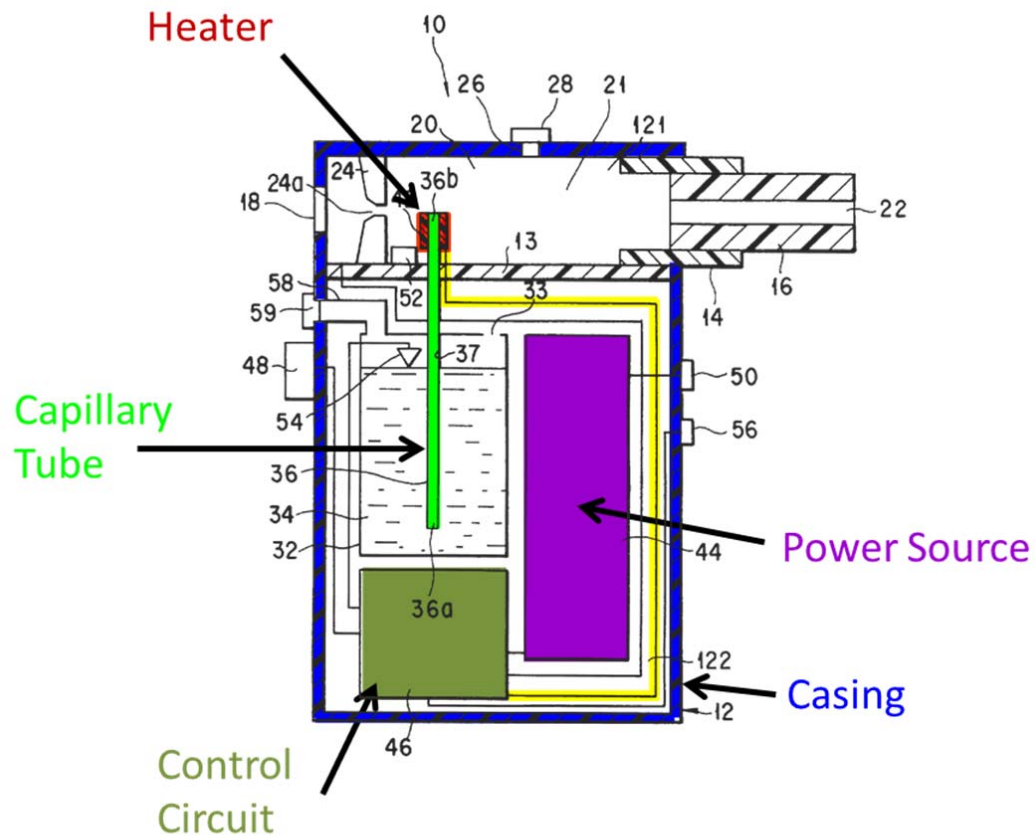
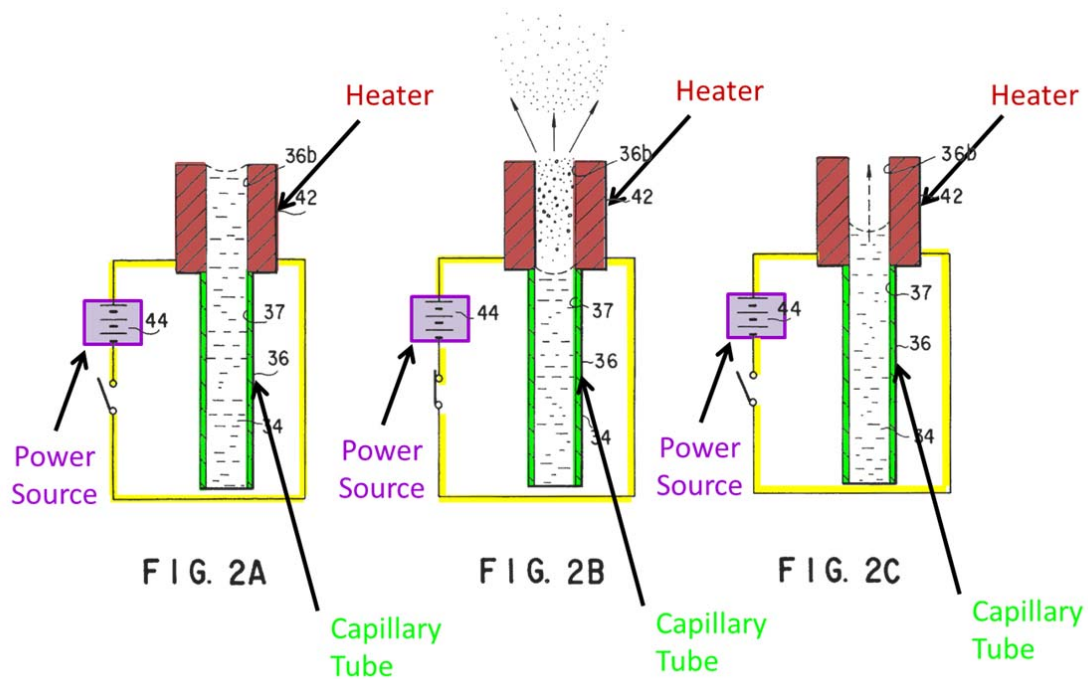


FIG. 1

Ex.1004, Takeuchi at Fig. 1 (annotated).

And, as shown in Figures 2A through 2C, the heater 42 has an electrical connection to power source 44:



Ex.1004, Takeuchi at Figs. 2A-2C (annotated).

Takeuchi further discloses that the device includes a casing 12 that can be made of plastic, metal, ceramic, or wood. Ex.1004 at 4:30-32, Fig. 1. As shown in Figure 1, below, the casing 12 contains the power source 44, the electric heater 42, and the capillary tube 36.

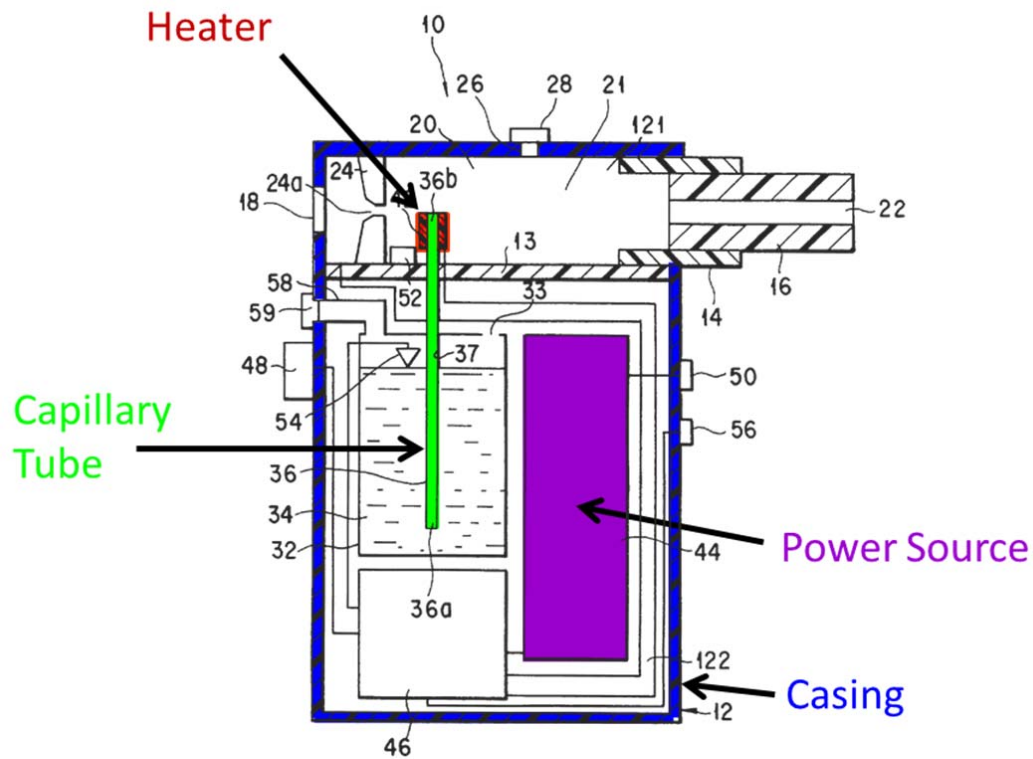


FIG. 1

Ex.1004, Takeuchi at Fig. 1 (annotated).

Additionally, Takeuchi expressly discloses that the lower chamber 122 of the casing 12 “is used as a housing for housing a liquid container 32, a power source 44 and a control circuit.” *Id.* at 4:36-38.

Accordingly, Takeuchi discloses a battery assembly (power source 44) and an atomizer assembly (electric heater 42 and capillary tube 36) within a housing (casing 12) with the battery assembly electrically connected to the atomizer assembly (through control circuit 46).

9.2.3. [2.2] a liquid storage component in the housing;

Takeuchi discloses a liquid container 32 that houses a liquid flavor source 34 within the lower chamber 122 of the casing 12. Ex.1004 at Abstract, 4:29-39, 5:28-39, Fig. 1.

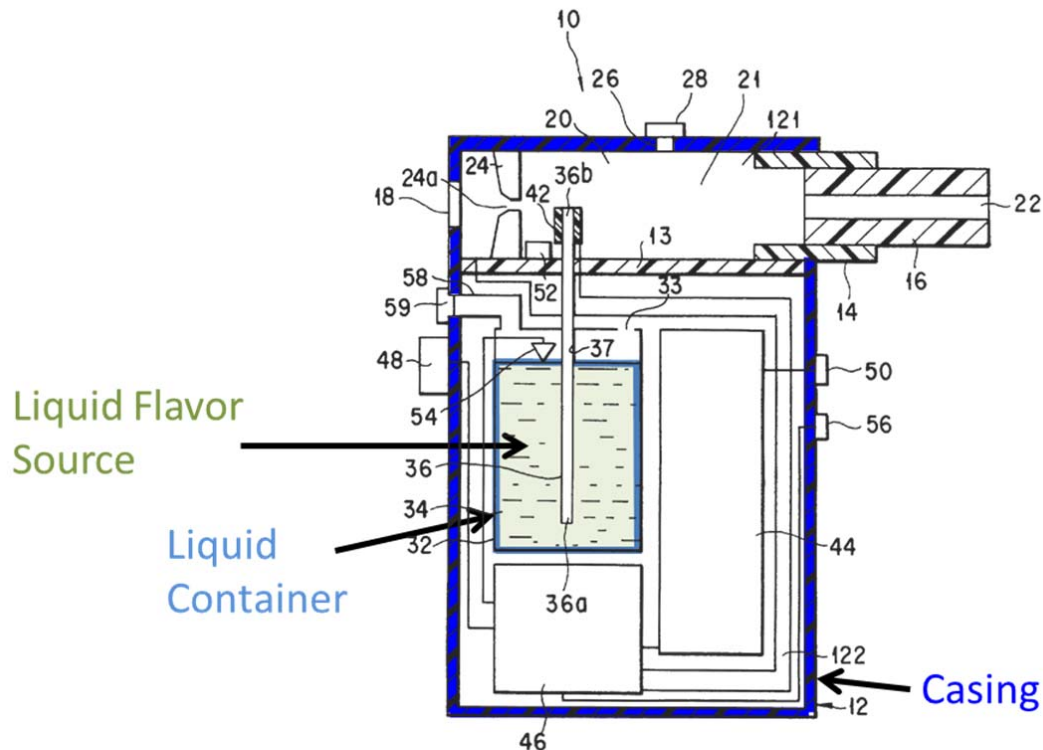


FIG. 1

Ex.1004, Takeuchi at Fig. 1 (annotated).

The capillary tube 36 is inserted into this liquid container, which has an opening that allows the inner pressure of the liquid container to be maintained at atmospheric pressure, enabling the liquid flavor source 34 stored within the liquid

container 32 to transfer through the capillary tube 36 by capillary force. *Id.* at 5:47-52, 5:58-62, Fig. 1.

Accordingly, Takeuchi discloses a liquid storage component (liquid container 32) in the housing (casing 12).

9.2.4. [2.3] with the housing having one or more through-air-inlets;

Takeuchi discloses that the casing 12 has an air intake port 18 and an outer air introduction hole 26. Ex.1004 at 4:48-5:20, 8:5-15. The air intake port 18 introduces air into the device to mix with the gasified flavor source, while the outer air introduction hole 26 permits outer air to be introduced into the interior volume 21 of the device. *Id.*

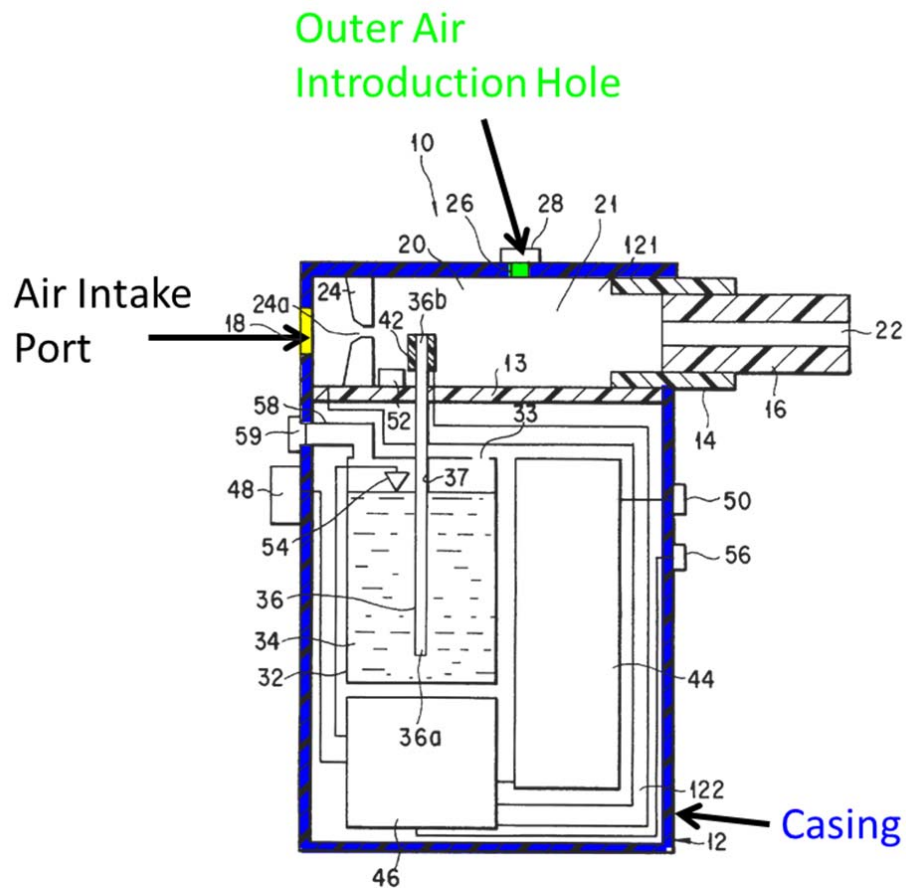


FIG. 1

Ex.1004, Takeuchi at Fig. 1 (annotated).

Accordingly, Takeuchi discloses that the housing (casing 12) has one or more through-air-inlets (the air intake port 18 and outer air introduction hole 26).

9.2.5. [2.4] the atomizer assembly including a porous component supported by a frame having a run-through hole;

Takeuchi discloses that the atomizer assembly (which includes the electric heater 42 and the capillary tube 36) includes the capillary tube 36, which creates a

liquid passageway 37 that may consist of an “inter-communicating void or pore structure filled in an enclosure,” such as open-cell foamed structure or bundled fibers. Ex.1004 at 3:36-50, 10:50-60, Fig. 14; Ex.1003 at A-16-18. In such embodiments, the liquid from the liquid container 32 is delivered to the outlet of the passageway by capillary force. Ex.1004 at 3:36-50. Further, the intercommunicating pore structure may protrude from the enclosure, allowing the heater to be provided on the protruded end of the intercommunicating pore structure. Ex.1004 at 10:59-63, Fig. 15; Ex.1003 at A-17-18. The capillary tube 36 is properly considered a part of the atomizer assembly because, as taught by Takeuchi, the gasification or vaporization of the liquid flavor source takes place at the outlet port 36b of the capillary tube, where the heater 42 is placed. Ex.1004 at 7:48-8:4; Ex.1003 at A-18-19. Additionally, Takeuchi expressly teaches that the capillary tube 36 is “inserted within the liquid container,” (*id.* at 5:47-49), and thus the capillary tube 36 is not a part of the liquid container but rather inserted into it. Ex.1003 at A-19. Accordingly, the intercommunicating pore structure within the capillary tube 36 is a “porous component” because it is a component of the atomizer assembly that includes pores and is permeable to liquid from the liquid container 32.

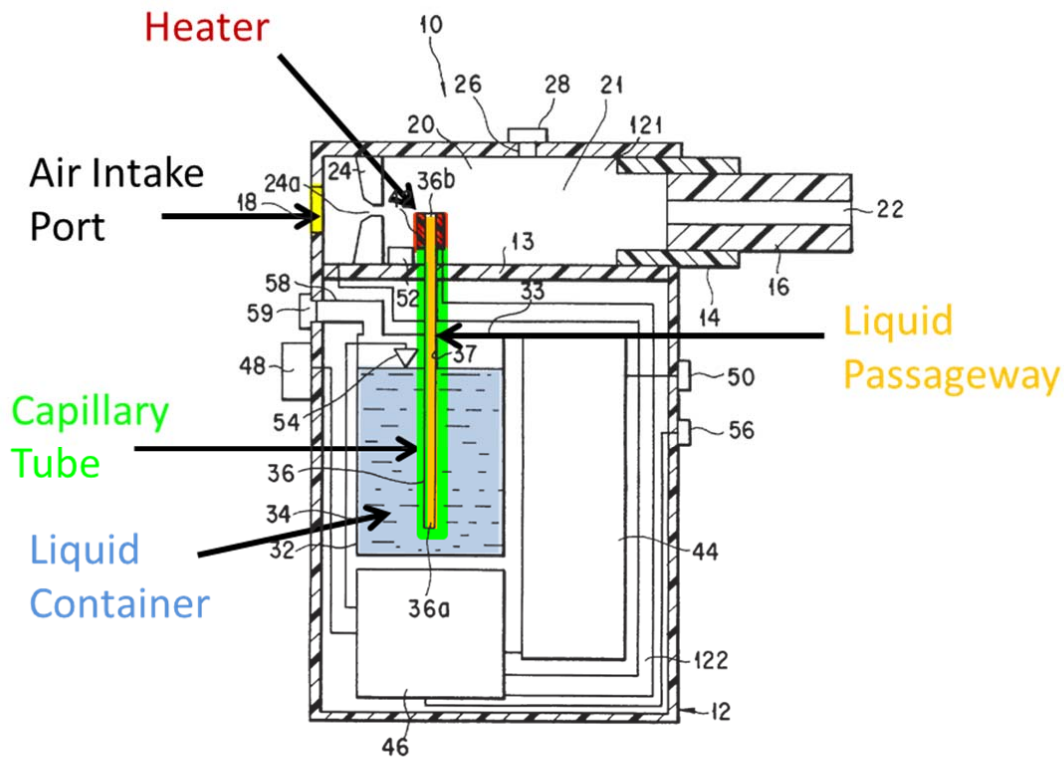


FIG. 1

Ex.1004, Takeuchi at Fig. 1 (annotated).

To the extent that Patent Owner raises any argument that the intercommunicating pore structure is not used in the capillary tube 36 embodied in Figure 1, Petitioner notes that Takeuchi expressly teaches that the intercommunicating pore structure embodiment may be in an enclosure “provided by *a tube*,” and that the heater “may be arranged *as in FIG. 1*, 10, or 11.” *Id.* at 10:50-59. Thus, Takeuchi expressly teaches that the intercommunicating pore

structure can be embodied in the capillary tube 36 of Figure 1. Ex.1003 at A-19-20.

Further, as shown in Figure 1, the capillary tube 36 is supported by a rigid structure (*i.e.*, a frame) consisting of at least the partition wall 13, a squeeze plate 24, and the upper portion of the casing 12. Ex.1003 at A-20-21.

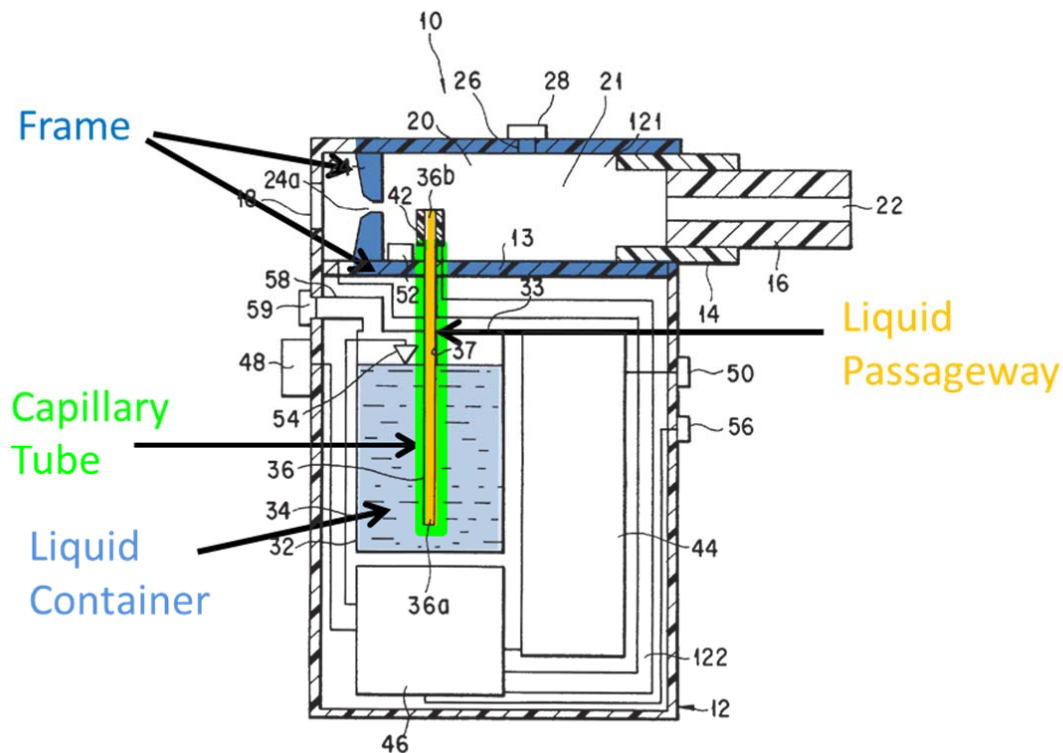


FIG. 1

Ex.1004, Takeuchi at Fig. 1 (annotated).

As shown in Figure 1 and expressly taught in Takeuchi, the capillary tube 36 is inserted through the partition wall 13 such that its lower end 36a is positioned in

the vicinity of the bottom of the liquid container 32, while its upper end portion protrudes into the upper chamber 121 of the casing 12 somewhat downstream of the squeeze plate 24. *Id.* at Fig. 1, 5:47-52, 6:4-7. Thus, the rigid structure formed by the partition wall 13 and squeeze plate 24 supports the capillary tube 36 by maintaining its position and preventing its bottom end from descending too far into the liquid container or its top end from slipping below the upper chamber 121 of the casing. Ex.1003 at A-20-22. At the very least a person of ordinary skill in the art would have recognized that the capillary tube 36 and heater 42 must be supported to maintain their position and that the obvious structure to support the capillary tube 36 and heater 42 would be the rigid structure comprising the partition wall 13, squeeze plate 24, and upper portion of the casing 12. *Id.* at A-22. Further, the liquid container 32 does not support the as the capillary tube 36 and heater 42, because Takeuchi describes capillary tube 36 as being “inserted” within the liquid container 32, and thus the liquid container 32 does not play a role in supporting or holding up the capillary tube 36. Ex.1004 at 5:47-52; Ex.1003 at A-22-23.

Takeuchi additionally discloses that the squeeze plate 24 has a squeeze hole 24a formed in its central portion, and that this hole is arranged within the gas passageway 20 and positioned close to the air intake port 18. Ex.1004 at 4:61-67,

8:5-10, Fig. 1. The squeeze hole regulates or directs air introduced from the intake port 18 toward the outlet portion 36b of the capillary tube 36. *Id.*

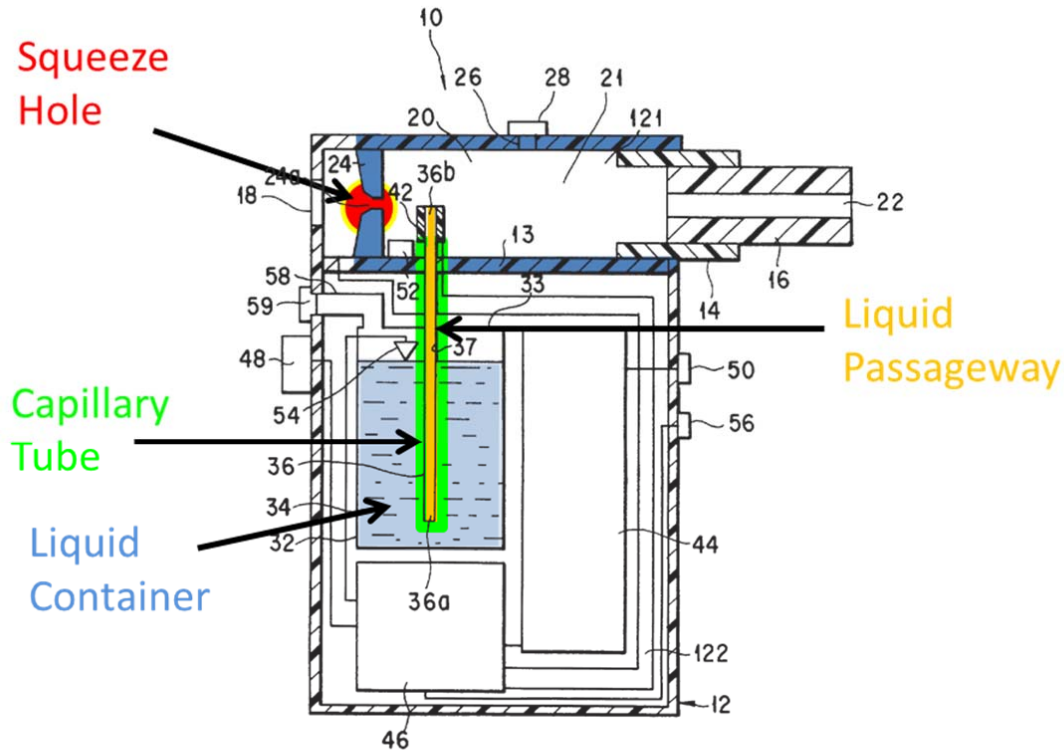


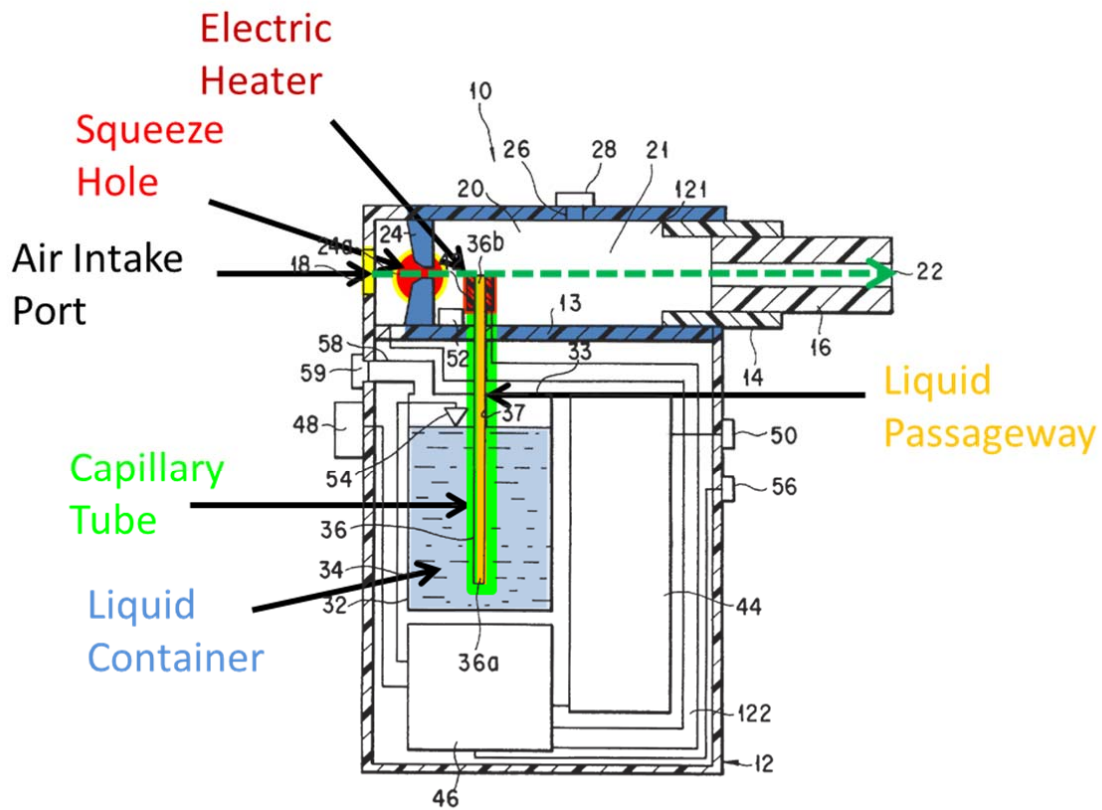
FIG. 1

Ex.1004, Takeuchi at Fig. 1 (annotated).

Accordingly, Takeuchi discloses that the atomizer assembly (electric heater 42 and capillary tube 36) includes a porous component (intercommunicating pore structure 302 within capillary tube 36) supported by a frame (the rigid structure formed by the partition wall 13, squeeze plate 24, and upper portion of the casing 12) having a run-through hole (squeeze hole 24a).

9.2.6. [2.5] a heating wire wound on a part of the porous component in the path of air flowing through the run-through hole; and

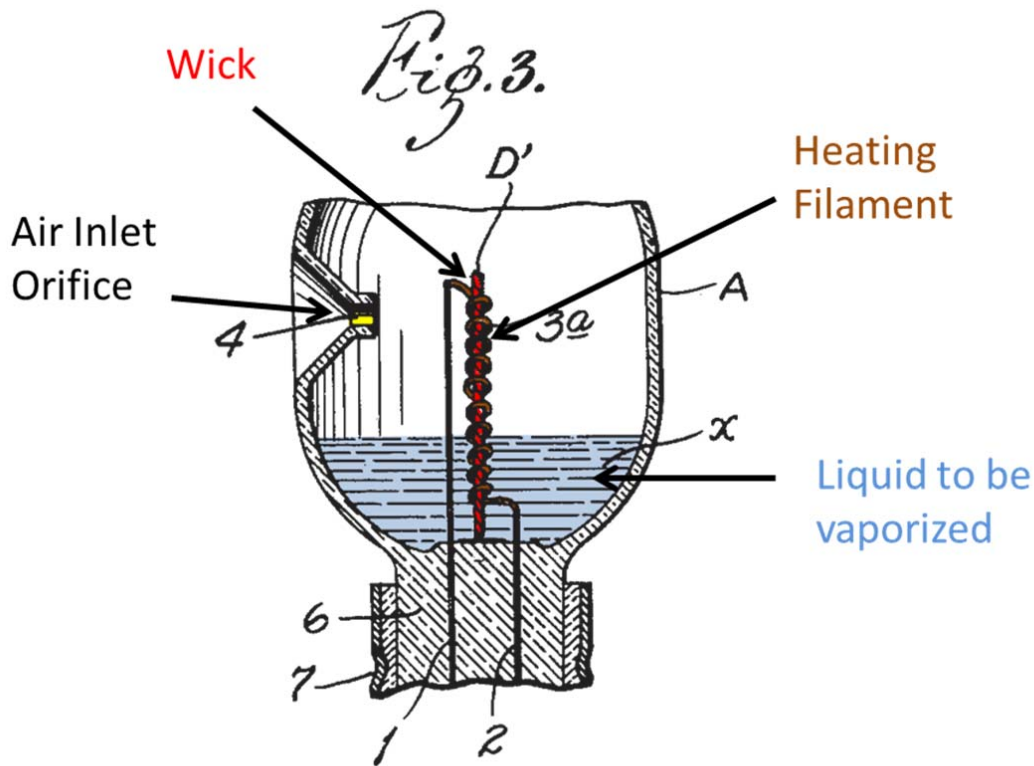
Takeuchi discloses an electric heater 42 provided on the upper protruding end of the intercommunicating pore structure of capillary tube 36. Ex.1004 at 6:4-12, 10:59-63, Figs. 1, 15. The electric heater is positioned in the path of the air introduced through the air intake port 18 and squeeze hole 24a, and the squeeze hole 24a acts to direct the air introduced from the intake port 18 selectively toward the outlet portion 36b of the capillary tube 36, where the electric heater is provided. *Id.* at 4:61-67, 8:5-10, Fig. 1.



Ex.1004, Takeuchi at Fig. 1 (annotated).

discloses a heater cylinder around the porous material protruding from the upper end of the capillary tube, but does not expressly teach a *wire* wound around the porous material. While Takeuchi does not expressly disclose that the electric heater 42 is a wire wound on the part of the porous component, this is provided by Whittemore, as discussed below. Ex.1003 at A-29; ¶¶64-74.

Whittemore discloses “vaporizing units for therapeutic apparatus” constructed such that the units “will function properly, even though the heating element is spaced a considerable distance above or away from the medicament from which the vapor is evolved.” Ex.1005 at 1:1-10. As shown below, the Whittemore device includes a reservoir of liquid *x* that is in contact with a wick *D'*, around which a heating element comprised of electrically conductive filament is wound:



Ex.1005, Whittemore at Fig. 3 (annotated).

As further shown above, the heating element in Whittemore is wound around a portion of the wick that is substantially aligned with an air inlet orifice 4. Whittemore further teaches that the wick can be “made of any suitable material” that permits the liquid to be “carried by capillary action to a point where it will be vaporized by the heat from the filament,” including a thread or string. Ex.1005 at 1:50-2:10.

As is shown by Whittemore, it would have been obvious to one of ordinary skill in the art that the heater 42 in Takeuchi could be embodied as a heating wire

wound around the protruding end of the intercommunicating pore structure in the capillary tube 32. Ex.1003, ¶¶64-74. Accordingly, in view of Whittemore, it would have been obvious to one of ordinary skill in the art to modify Takeuchi to utilize such a heater. *Id.* A person of ordinary skill in the art would have been motivated to combine the references in this way for the reasons discussed above in Section 9.1. *See also id.*

Accordingly, the combination of Takeuchi and Whittemore renders obvious a heating wire (the filament or heating element 3a of Whittemore) wound on a part of the porous component (the portion of the intercommunicating pore structure that protrudes from the capillary tube 36 of Takeuchi) in the path of air flowing (as indicated by the green arrow in the annotated Figure 1 of Takeuchi above) through the run-through hole (the squeeze hole 24a of Takeuchi).

9.2.7. [2.6] the porous component substantially surrounded by the liquid storage component.

Takeuchi discloses that the capillary tube 36 is inserted within the liquid container, such that its lower end 36a is positioned in the vicinity of the bottom of the liquid container 32. Ex.1004 at 5:47-52. As shown in Figure 1, the capillary tube 36 (and therefore the intercommunicating pore structure within it) is surrounded by the liquid container 32 to a significant extent (*i.e.*, substantially) Ex.1003 at A-32-33. That the capillary tube 36 and the intercommunicating pore structure within is surrounded by the liquid container to a significant extent is also

evidenced by Takeuchi's teaching that the capillary force within the capillary tube 36 is what allows the liquid in the liquid container to be transported to the heater. Ex.1004 at 3:36-4:23, 5:47-6:3. Thus, the immersion of the capillary tube 36 into the liquid container 32 is to a "significant extent" because it is critical to the functioning of the device. Ex.1003 at A-32-34.

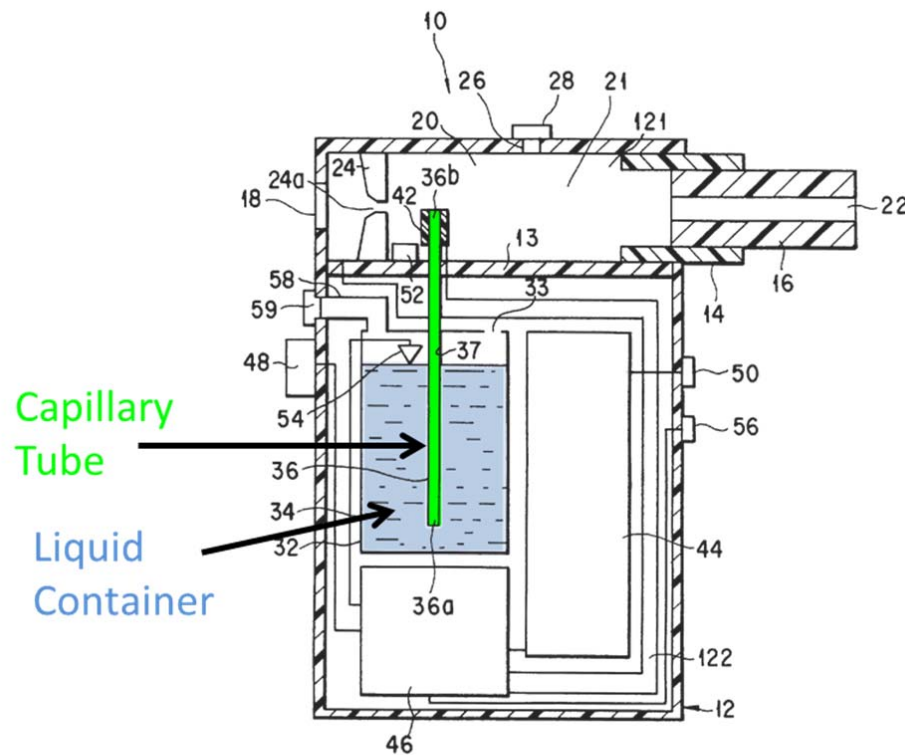


FIG. 1

Ex.1004, Takeuchi at Fig. 1 (annotated).

Accordingly, Takeuchi discloses that the porous component (the intercommunicating pore structure within capillary tube 36) is substantially surrounded by the liquid storage component (liquid container 32).

9.3. Claim 3 is obvious over Takeuchi in view of Whittemore

9.3.1. Claim 3: [3.P] An electronic cigarette comprising:

To the extent the preamble is a limitation, Takeuchi discloses an electronic cigarette for the same reasons discussed in Section 9.2.1 with respect to the identical preamble of claim 2.

9.3.2. [3.1] a battery assembly and an atomizer assembly within a housing with the battery assembly electrically connected to the atomizer assembly;

Takeuchi discloses this limitation for the same reasons discussed in Section 9.2.2. with respect to the identical limitation of claim 2.

9.3.3. [3.2] with the housing having one or more through-air-inlets and an outlet;

Takeuchi discloses that the casing 12 has an air intake port 18 and an outer air introduction hole 26. Ex.1004 at 4:48-5:20, 8:5-15. The air intake port 18 introduces air into the device to mix with the gasified flavor source, while the outer air introduction hole 26 permits outer air to be introduced into the cooling chamber 21 of the device. *Id.* Takeuchi also discloses that the casing 12 has an inhalation port 22, where the gas containing flavor that is formed by heating the liquid flavor source and mixing it with outer air from the air intake port 18 and outer air

introduction hole 26 flows after it has cooled. *Id.* at 5:1-11, 8:5-10. The gas leaves the device through inhalation port 22 and is inhaled by the person using mouth piece 16. *Id.* at 7:48-51.

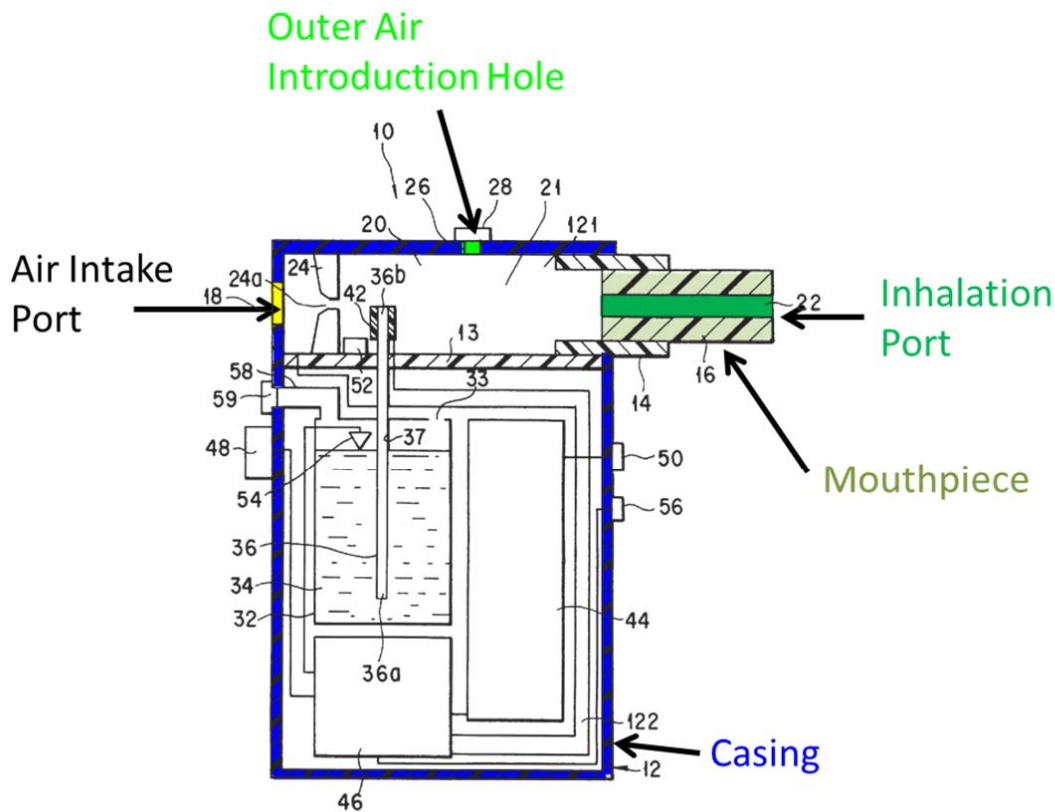


FIG. 1

Ex.1004, Takeuchi at Fig. 1 (annotated).

Accordingly, Takeuchi discloses that the housing (casing 12) has one or more through-air-inlets (the air intake port 18 and outer air introduction hole 26) and an outlet (inhalation port 22).

9.3.4. [3.3] the atomizer assembly includes a frame having a run through hole, and a porous component between the frame and the outlet;

Takeuchi discloses an assembly that includes the electric heater 42 and capillary tube 36, which creates a liquid passageway 37 that may consist of an “inter-communicating void or pore structure filled in an enclosure,” such as open-cell foamed structure or bundled fibers. Ex.1004 at 3:36-50, 10:50-60, Fig. 14; Ex.1003 at A-55-56. In such embodiments, the liquid from the liquid container 32 is delivered to the outlet of the passageway by capillary force. Ex.1004 at 3:36-50. Further, the intercommunicating pore structure may protrude from the enclosure, allowing the heater to be provided on the protruded end of the intercommunicating pore structure. *Id.* at 10:59-63, Fig. 15. The capillary tube 36 is properly considered a part of the atomizer assembly because, as taught by Takeuchi, the gasification or vaporization of the liquid flavor source takes place at the outlet port 36b of the capillary tube, where the heater 42 is placed. *Id.* at 7:48-8:4; Ex.1003 at A-57-58. Accordingly, the intercommunicating pore structure within the capillary tube 36 is a “porous component” because it is a component of the atomizer assembly that includes pores and is permeable to liquid from the liquid container 32.

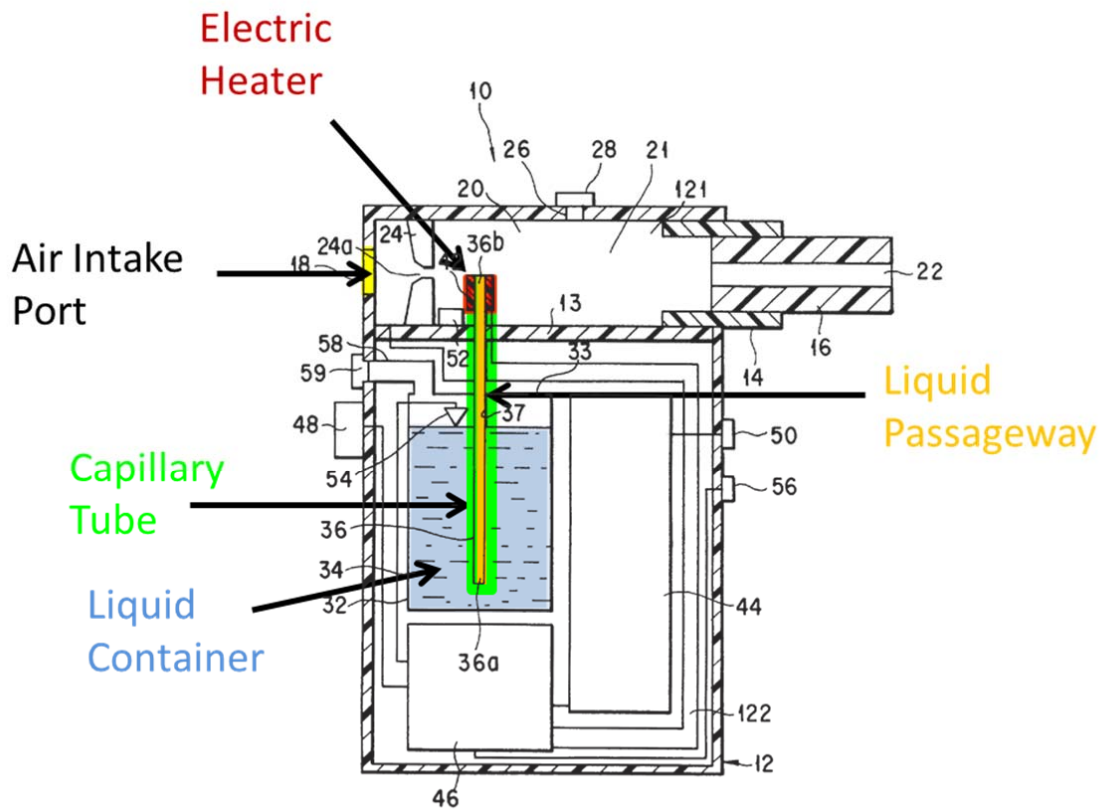


FIG. 1

Ex.1004, Takeuchi at Fig. 1 (annotated).

To the extent that Patent Owner raises any argument that the intercommunicating pore structure is not used in the capillary tube 36 embodied in Figure 1, Petitioner notes that Takeuchi expressly teaches that the intercommunicating pore structure embodiment may be in an enclosure “provided by *a tube*,” and that the heater “may be arranged *as in FIG. 1*, 10, or 11.” Ex.1004 at 10:50-59. Thus, Takeuchi expressly teaches that the intercommunicating pore

structure can be embodied in the capillary tube 36 of Figure 1. Ex.1003 at A-58-59.

Further, as shown in Figure 1, the capillary tube 36 (and therefore the intercommunicating pore structure within it) is supported by a rigid structure (*i.e.*, a frame) consisting of at least the partition wall 13, a squeeze plate 24, and the upper portion of the casing 12.

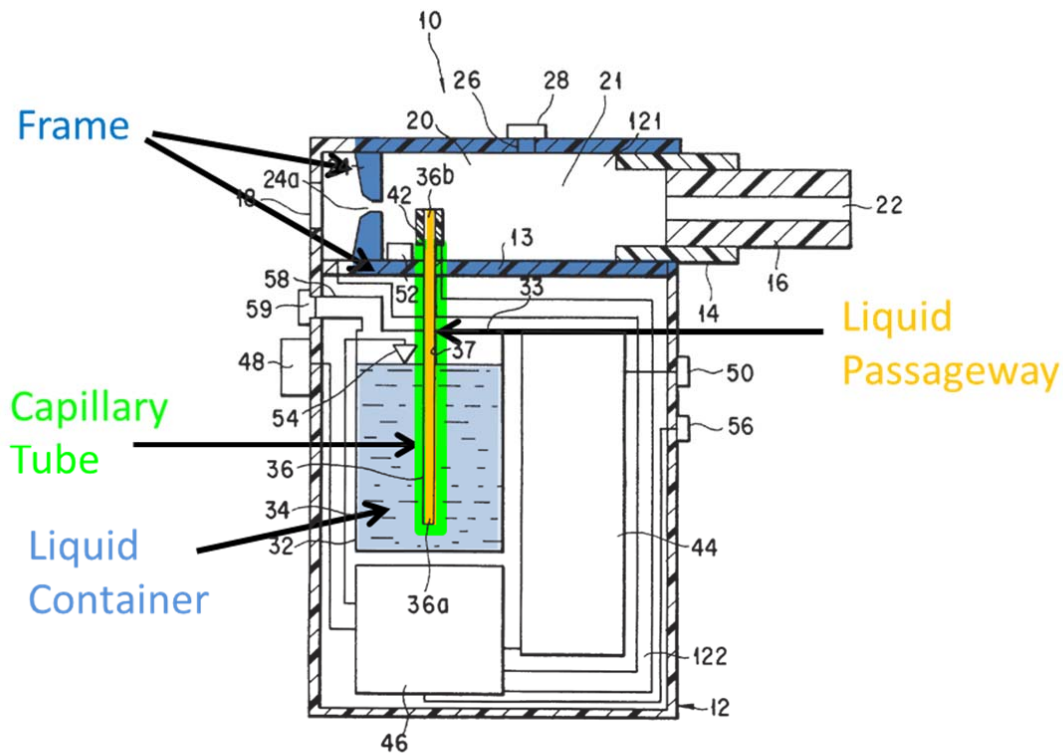


FIG. 1

Ex.1004, Takeuchi at Fig. 1 (annotated).

As shown in Figure 1 and expressly taught in Takeuchi, the capillary tube 36 is inserted through the partition wall 13 such that its lower end 36a is positioned in the vicinity of the bottom of the liquid container 32, while its upper end portion protrudes into the upper chamber 121 of the casing 12 somewhat downstream of the squeeze plate 24. Ex.1004 at Fig. 1, 5:47-52, 6:4-7. Thus, the rigid structure formed by the partition wall 13 and squeeze plate 24 supports the capillary tube 36 and the intercommunicating pore structure within by maintaining its position and preventing its bottom end from descending too far into the liquid container or its top end from slipping below the upper chamber 121 of the casing. Ex.1003 at A-52-54.

Takeuchi additionally discloses that the squeeze plate 24 has a squeeze hole 24a formed in its central portion, and that this hole is arranged within the gas passageway 20 and positioned close to the air intake port 18. Ex.1004 at 4:61-67, 8:5-10, Fig. 1. The squeeze hole regulates or directs air introduced from the intake port 18 toward the outlet portion 36b of the capillary tube 36. *Id.* Additionally, as shown in Figure 1 below, the protruded upper portion of the intercommunicating pore structure in capillary tube 36 is positioned between the squeeze plate and the inhalation port 22 of the device.

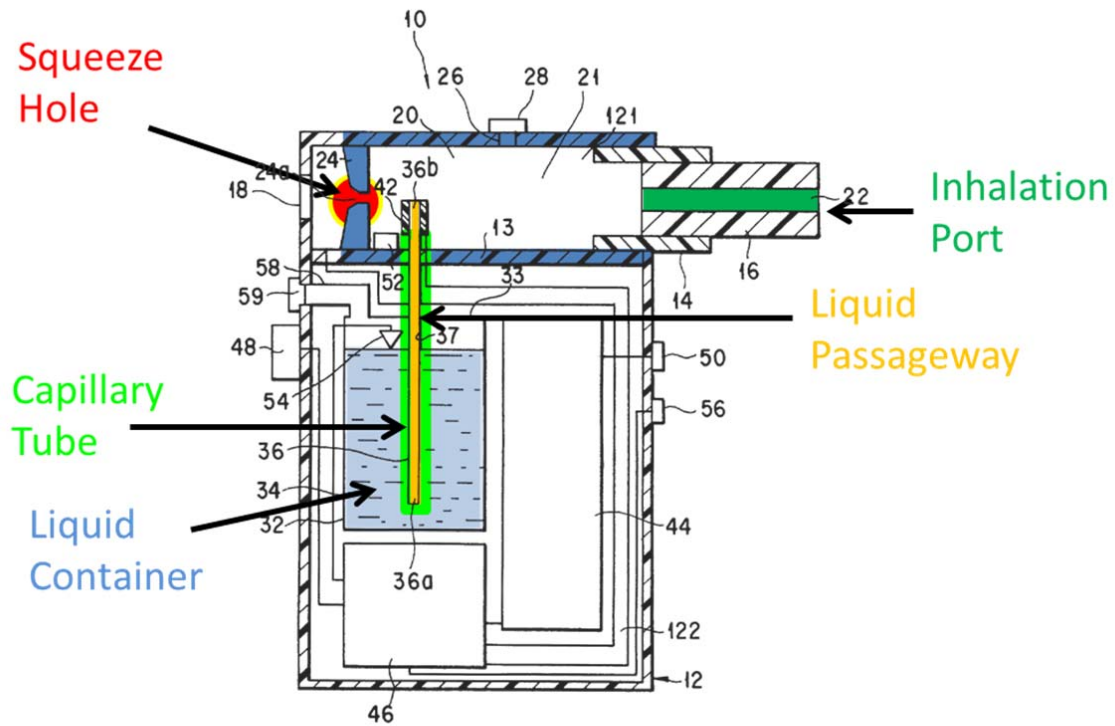


FIG. 1

Ex.1004, Takeuchi at Fig. 1 (annotated).

Accordingly, Takeuchi discloses that the atomizer assembly includes a frame (the rigid structure formed by the partition wall 13, squeeze plate 24, and the upper portion of casing 12) having a run through hole (squeeze hole 24a), and a porous component (the intercommunicating pore structure within capillary tube 36) between the frame and the outlet (inhalation port 22).

9.3.5. [3.4] a heating wire wound on a part of the porous component which is substantially aligned with the run-through hole; and

Takeuchi discloses an electric heater 42 provided on the upper protruding end of the intercommunicating pore structure of capillary tube 36. Ex.1004 at 6:4-12, 10:59-63, Figs. 1, 15. The electric heater is positioned in the path of the air introduced through the air intake port 18 and squeeze hole 24a, and the squeeze hole 24a acts to direct the air introduced from the intake port 18 selectively toward the outlet portion 36b of the capillary tube 36, where the electric heater is provided. *Id.* at 4:61-67, 8:5-10, Fig. 1.

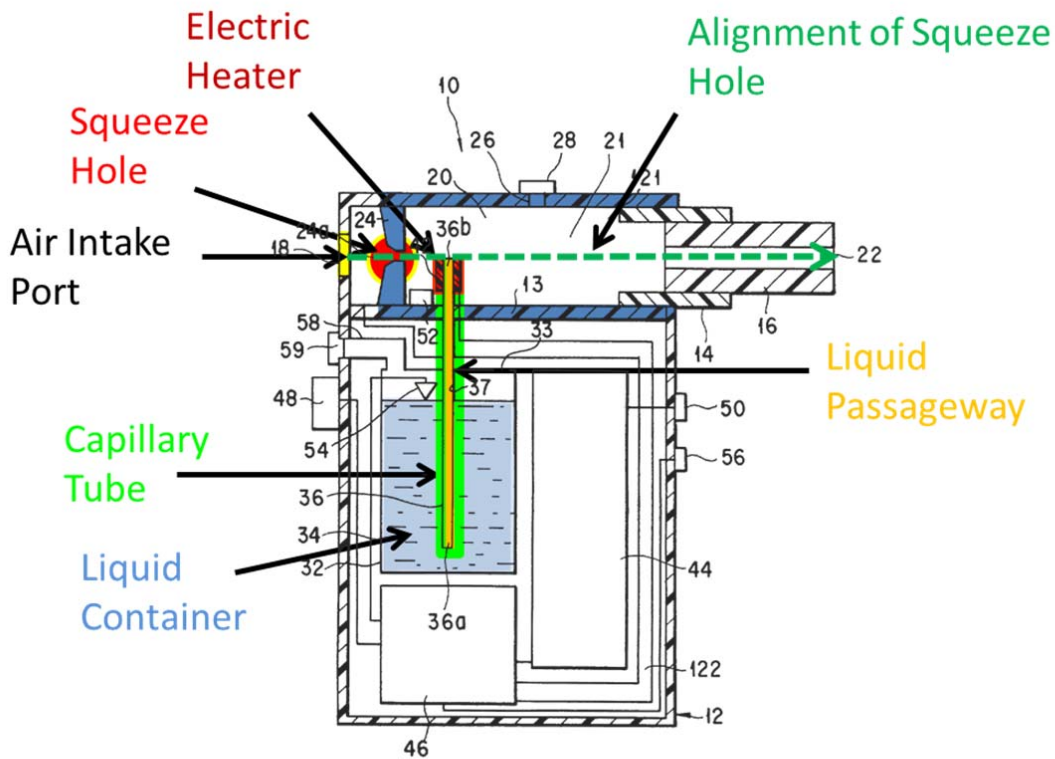


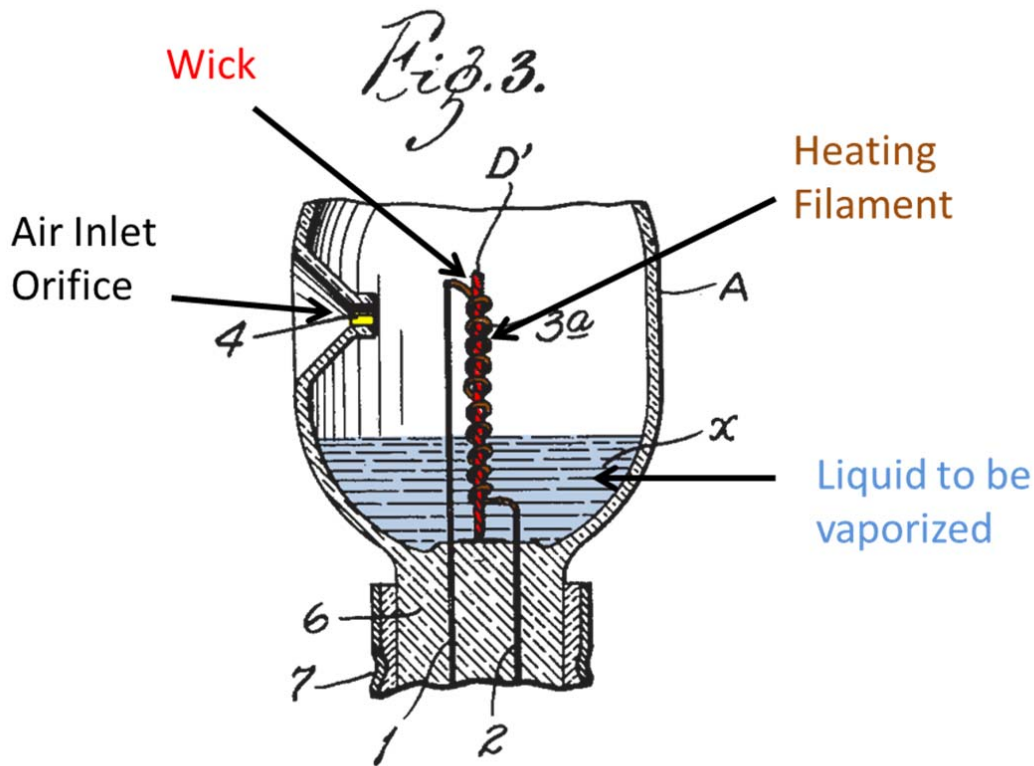
FIG. 1

Ex.1004, Takeuchi at Fig. 1 (annotated).

Accordingly, Takeuchi discloses an electric heater 42 on a part of the porous component (the protruding upper portion of intercommunicating pore structure within capillary tube 36) which is substantially aligned (shown by the dashed green line above) with the run-through hole (squeeze hole 24a). Further, Takeuchi discloses that in some embodiments, the heater can be a ring arranged around the outlet portion 36b of the capillary tube 36. *Id.* at Fig. 3, 8:19-26. Accordingly, Takeuchi discloses a heater around the porous material protruding from the upper

end of the capillary tube, but does not expressly teach a *wire* wound around the porous material. Ex.1003 at A-63-64. While Takeuchi does not expressly disclose that the electric heater 42 is a wire wound on the part of the porous component, this is provided by Whittemore, as discussed below. *Id.* at A-64; ¶¶64-74.

Whittemore discloses “vaporizing units for therapeutic apparatus” constructed such that the units “will function properly, even though the heating element is spaced a considerable distance above or away from the medicament from which the vapor is evolved.” Ex.1005 at 1:1-10. As shown below, the Whittemore device includes a reservoir of liquid *x* that is in contact with a wick D’, around which a heating element comprised of electrically conductive filament is wound:



Ex.1005, Whittemore at Fig. 3 (annotated).

As further shown above, the heating element in Whittemore is wound around a portion of the wick that is substantially aligned with an air inlet orifice 4. Whittemore further teaches that the wick can be “made of any suitable material” that permits the liquid to be “carried by capillary action to a point where it will be vaporized by the heat from the filament,” including a thread or string. Ex.1005 at 1:50-2:10.

As is shown by Whittemore, it would have been obvious to one of ordinary skill in the art that the heater 42 in Takeuchi could be embodied as a heating wire

wound around the protruding end of the intercommunicating pore structure in the capillary tube 32. Ex.1003 at A-66; ¶¶64-74. Accordingly, in view of Whittemore, it would have been obvious to one of ordinary skill in the art to modify Takeuchi to utilize such a heater. *Id.* A person of ordinary skill in the art would have been motivated to combine the references in this way for the reasons discussed in Section 9.1. *See also id.*

Accordingly, the combination of Takeuchi and Whittemore renders obvious a heating wire (the filament or heating element 3a of Whittemore) wound on a part of the porous component (the protruded upper portion of the intercommunicating pore structure in capillary tube 36 of Takeuchi) which is substantially aligned (as indicated by the dashed green line in the annotated Figure 1 of Takeuchi above) with the run-through hole (the squeeze hole 24a of Takeuchi).

9.3.6. [3.5] with the porous component in contact with a liquid supply in the housing.

Takeuchi discloses that the capillary tube 36 is inserted within the liquid container 32, such that its lower end 36a is positioned in the vicinity of the bottom of the liquid container 32, which houses a liquid flavor source 34. Ex.1004 at 5:28-52. As shown in Figure 1, the capillary tube 36 is therefore in contact with the liquid flavor source 34 contained in the liquid container 32. Because the liquid in the liquid container 32 is transported by the capillary force through the intercommunicating pore structure within the capillary tube 36, the

intercommunicating pore structure is therefore also in contact with the liquid flavor source 34 in the liquid container 32.

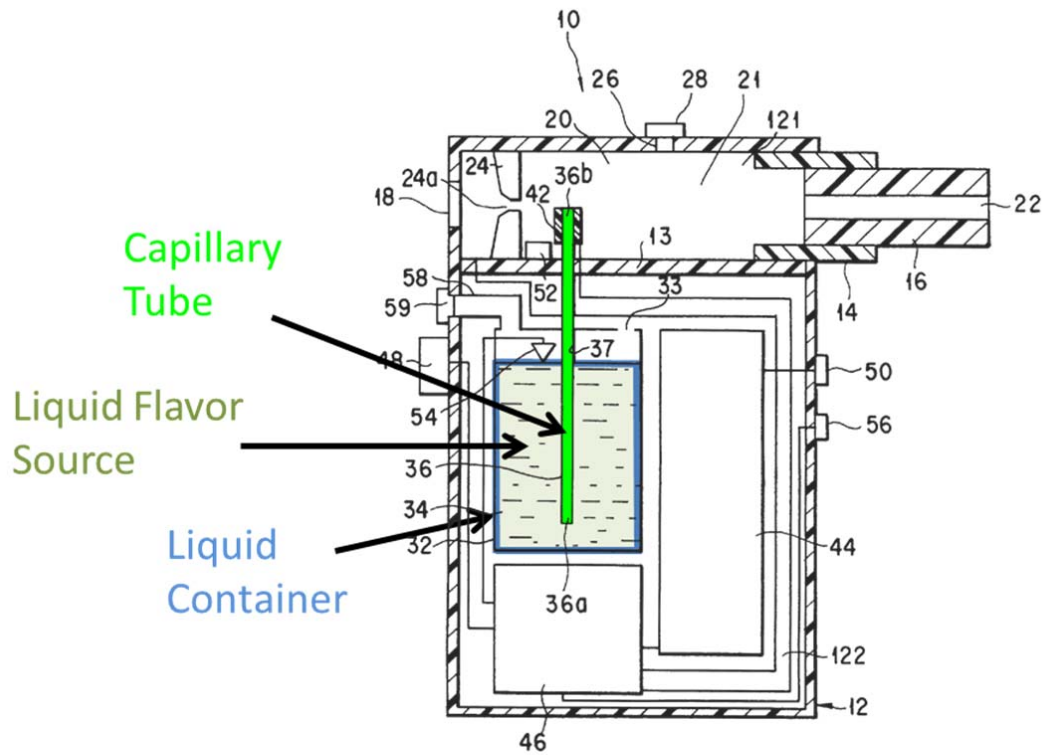


FIG. 1

Ex.1004, Takeuchi at Fig. 1 (annotated).

Accordingly, Takeuchi discloses that the porous component (the intercommunicating pore structure within capillary tube 36) is in contact with a liquid supply (liquid flavor source 34 stored in the liquid container 32) in the housing (casing 12).

10. GROUND #2: CLAIMS 2 AND 3 OF THE 742 PATENT ARE UNPATENTABLE AS OBVIOUS OVER BROOKS IN VIEW OF TAKEUCHI

As explained below, claims 2 and 3 of the 742 Patent are unpatentable as obvious under 35 U.S.C. § 103 over Brooks in view of Takeuchi.

10.1. It would have been obvious to a person of ordinary skill in the art to combine Brooks with Takeuchi

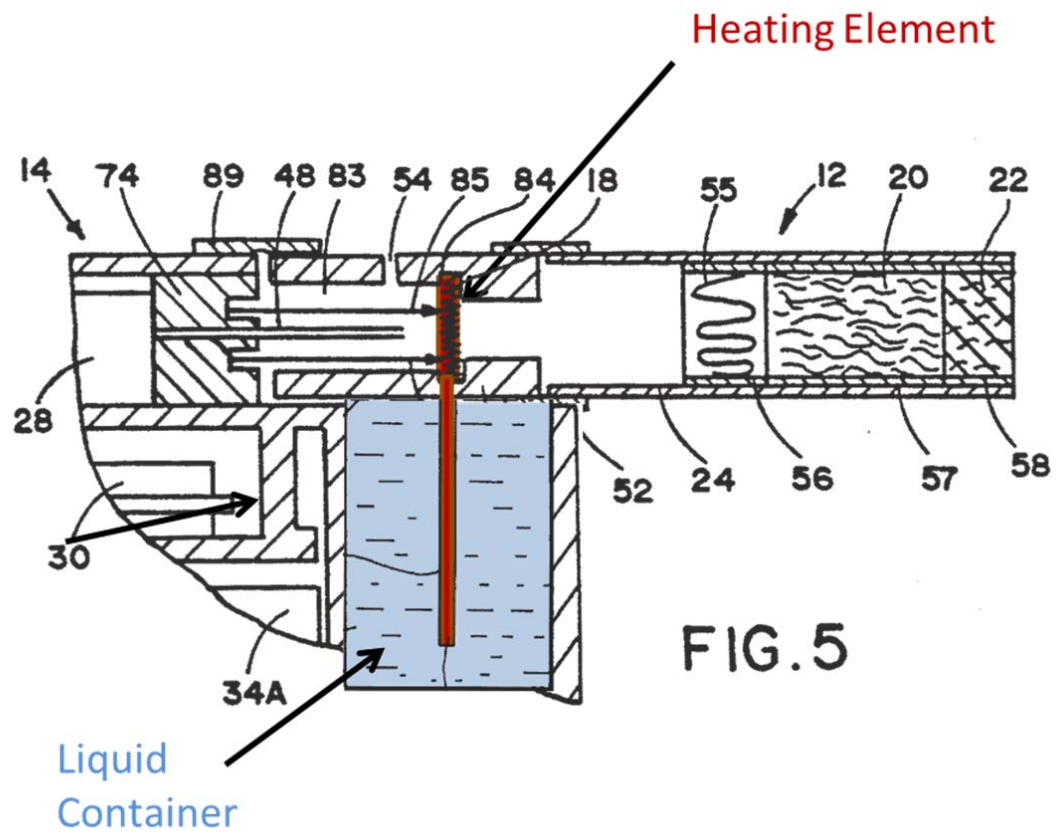
It would have been obvious to a person of ordinary skill in the art to combine Brooks with Takeuchi, incorporating the liquid container of Takeuchi such that it is in contact with a porous component of the heating element of Brooks. Ex.1003, ¶¶75-79. Brooks and Takeuchi are both directed to devices that use electrical power to produce flavored vapor or aerosol for inhalation by a person. Ex.1006 at Abstract, 1:6-10, 3:63-4:6; Ex.1004 at Abstract, 1:3-8, 7:45-8:15; Ex.1003, ¶76. In Brooks, the aerosol forming substance is absorbed in the heating component itself or alternative a nearby porous substrate, and as a result requires the person to periodically dispose of the cartridge that contains the heating element in order to replenish the device by installing a new cartridge. Ex.1006 at 4:7-31; Ex.1003, ¶76. Because of the limited amount of aerosol forming substance available in the cartridge, each cartridge is limited to a relatively small number of puffs – approximately 6 to 10, according to the disclosure of Brooks. Ex.1006 at 4:29-31, 10:66-11:5; Ex.1003, ¶76.

Takeuchi discloses devices in which a larger amount of aerosol forming substance can be stored in a liquid container. Ex.1004 at Figs. 1, 8, 12; Ex.1003, ¶77. The liquid is delivered to the heating element by a capillary tube or arrangement of two plates, with a porous intercommunicating pore structure within providing a liquid passageway. Ex.1004 at 5:47-52, 10:53-63. One of ordinary skill in the art would have recognized this configuration to be particularly advantageous because it reduces the frequency of replacing disposable cartridges; indeed, in at least one embodiment of Takeuchi, the liquid container is not even removed or replaced because the liquid container is refillable through a port in the device. *Id.* at 7:18-30; Ex.1003, ¶77. Takeuchi expressly teaches that this provides the advantage of allowing the device to be used continuously without replacing or exchanging the liquid container. Ex.1004 at 7:18-30; Ex.1003, ¶77. In contrast, Brooks teaches a device that requires frequently replacing the cartridge. Ex.1006 at 4:29-31, 10:66-11:5.

Based on the teachings of Takeuchi, one of ordinary skill in the art would have been motivated to modify Brooks to include a liquid container that delivers the aerosol forming substance to the heating element by contacting or surrounding a porous component of the heating element, as taught in Takeuchi. Ex.1003, ¶78. The motivation for such a modification comes from Takeuchi itself, which teaches that such a liquid container advantageously allows the device to be used for longer

periods of time without requiring the person to replace the container (or, in the case of the Brooks device, the disposable cartridge). Ex.1004 at 7:18-30; Ex.1003, ¶78.

As Dr. Collins explains, using a refillable liquid container also reduces waste. *Id.*



Ex.1006, Brooks at Fig. 5, modified to show the proposed obviousness combination.

This proposed modification would not have adversely affected the operation of the Brooks device. Ex.1003, ¶79. In Brooks, as discussed above, aerosol is formed by heating the resistance heating element, which vaporizes an aerosol forming substance that is absorbed in the porous material of the heater. Ex.1006 at

10:34-58. In the proposed combination, the device would continue to operate in this manner; the only difference is that the supply of aerosol forming substance absorbed in the porous material would be continuously replenished by the supply in the liquid container, rather than requiring the person to replace the cigarette cartridge after 6 to 10 puffs. Ex.1003, ¶79.

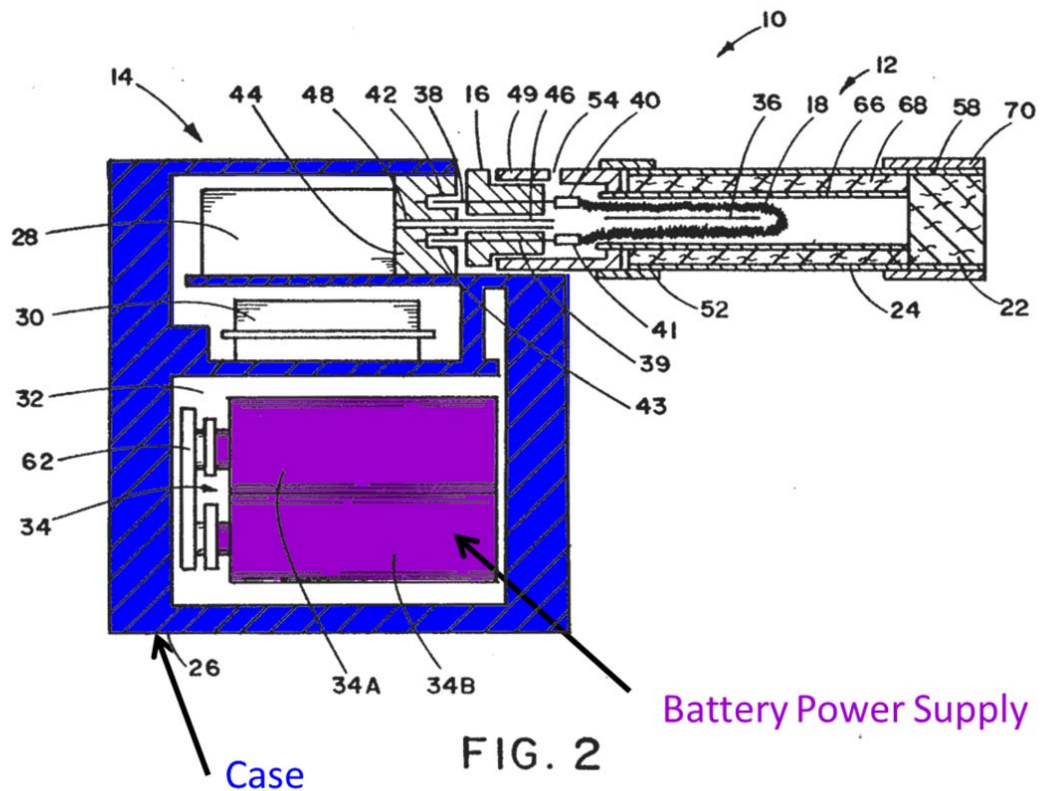
10.2. Claim 2 is obvious over Brooks In View of Takeuchi

10.2.1. Claim 2: [2.P] An electronic cigarette, comprising:

Brooks discloses an electronic cigarette. In particular, Brooks discloses “cigarettes and other smoking articles such as cigars, pipes, and the like, which employ an electrical resistance heating element and an electrical power source to produce a tobacco-flavored smoke or aerosol.” Ex.1006 at 1:6-10, *see also id.* at Title, Abstract.

10.2.2. [2.1] a battery assembly and an atomizer assembly within a housing with the battery assembly electrically connected to the atomizer assembly;

Brooks discloses a battery power supply 34, which comprises two batteries 34A and 34B. *Id.* at Figs. 1-3, 7:20-25. As shown in Figure 2, the battery power supply 34 is stored within a case 26 of the controller section 14 of the smoking article. *Id.* at Fig. 2, 7:20-25.



Ex.1006, Brooks at Fig. 2 (annotated).

Brooks also discloses a resistance heating element 18 comprising “a fibrous material having a high surface area and an adsorbant, porous, wettable character, in order to carry a suitable amount of aerosol forming substance for effective aerosol formation.” Ex.1006 at 7:26-33, *see also id.* at Figs. 1-6, 7:26-8:22, 11:42-65. Brooks further teaches a resistance heating element for vaporizing liquid. The resistance heating element 18 is contained in a disposable cigarette cartridge 12. Brooks teaches that the arrangement for resistance heating element 18 can take

several forms including those disclosed in Brooks at Figures 4-6, which depict a vertically orientated heating element:

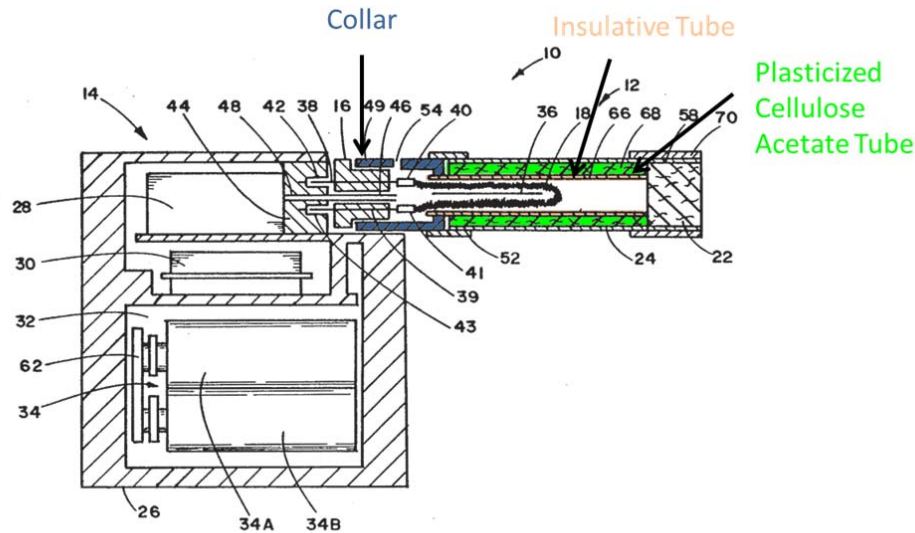


FIG. 2

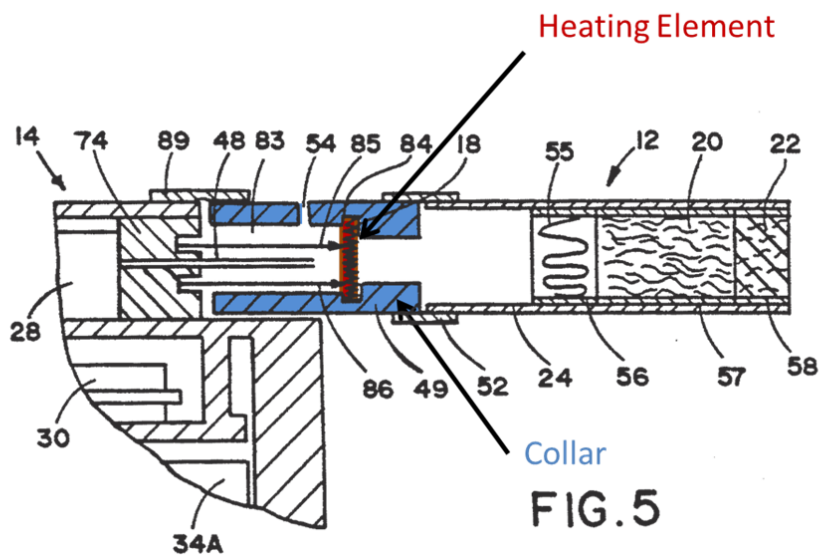


FIG. 5

Ex.1006, Brooks at Figs. 2 and 5 (annotated).

The resistance heating element 18 is contained in a disposable cigarette cartridge 12, which includes a collar 49 having the form of a thermoplastic tube

and an “insulative tube 66” which is “manufactured from a high temperature plastic such as a polyimide, a ceramic, a heat resistance cellulosic, an extruded tobacco material, an aluminum tube having a surface coating of aluminum oxide, or the like.” Ex.1006 at Fig. 2, 8:43-46, 11:6-19. The insulative tube 66 is further contained in a plasticized cellulose acetate tube 68, which is wrapped in a paper overwrap 24. *Id.* at 11:13-16.

The resistance heating element 18 has an electrical connection to the batteries 34A and 34B through a plug 16, which connects the cigarette cartridge 12 to the controller 14 and “provides electrical connection of the resistance heating element 18 with the switch 28, the control circuit 30 and the batteries 34A and 34B.” *Id.* at 10:34-38. When the resistance heating element 18 is exposed to electrical current, it increases in temperature to heat and volatilize the aerosol forming substance, which mixes with air to form an aerosol. *Id.* at 10:34-58. Thus, the resistance heating element 18 comprises an atomizer assembly.

Accordingly, Brooks discloses a battery assembly (battery power supply 34, comprising batteries 34A and 34B) and an atomizer assembly (comprising resistance heating element 18) within a housing (case 26 of the controller portion and collar 49, insulative tube 66, and plasticized cellulose acetate tube 68 of the cigarette cartridge portion), with the battery assembly (battery power supply 34)

electrically connected (through plug 16, switch 28, and control circuit 30) to the atomizer assembly (resistance heating element 18).

10.2.3. [2.2] a liquid storage component in the housing;

Takeuchi discloses a liquid container 32 that houses a liquid flavor source 34 within the lower chamber 122 of the casing 12. Ex.1004 at Abstract, 4:29-39, 5:28-39, Fig. 1. The capillary tube 36 is inserted into this liquid container, which has an opening that allows the inner pressure of the liquid container to be maintained at atmospheric pressure, enabling the liquid flavor source 34 stored within the liquid container 32 to transfer through the capillary tube 36 by capillary force. *Id.* at 5:47-52, 5:58-62, Fig. 1.

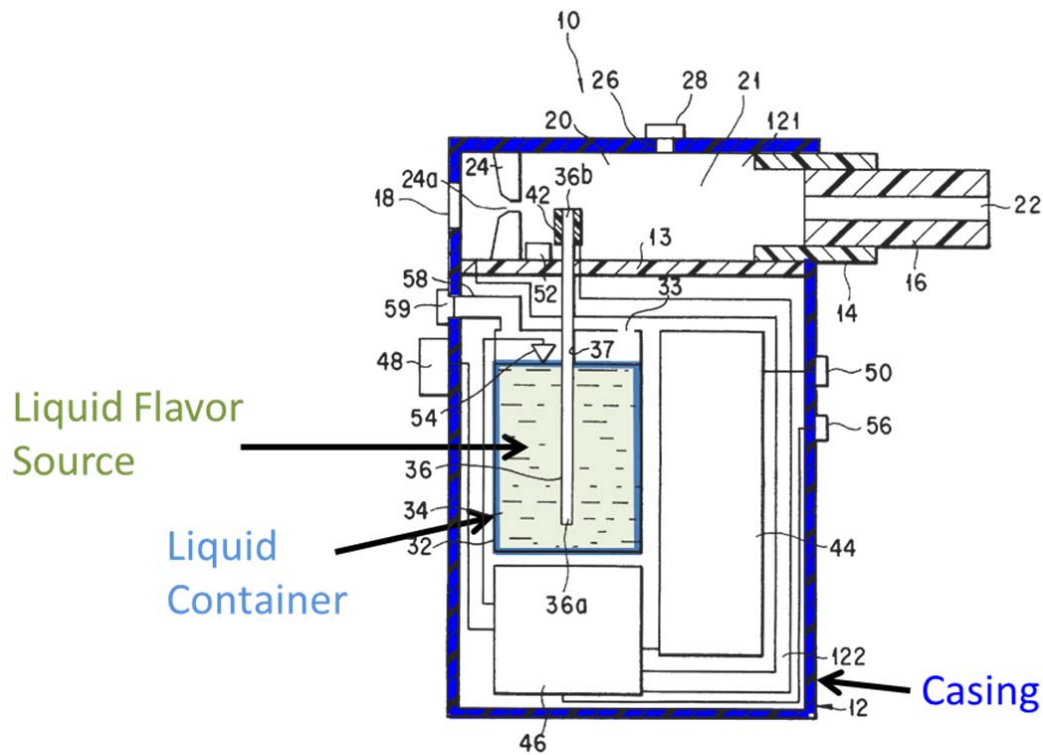


FIG. 1

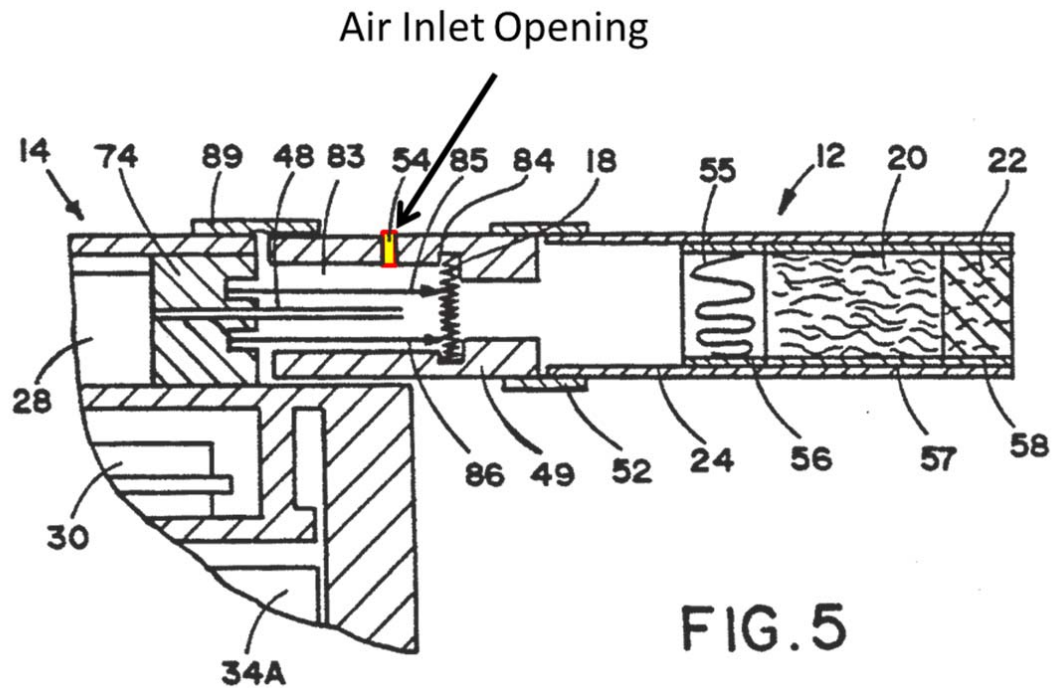
Ex.1004, Takeuchi at Fig. 1 (annotated).

It would have been obvious to a person of ordinary skill in the art to combine Brooks with Takeuchi, incorporating the liquid container of Takeuchi such that it is in contact with a porous component of the heating element of Brooks. Ex.1003, ¶¶74-79. A person of ordinary skill in the art would have been motivated to combine the references in this way for the reasons discussed above in Section 10.1. *See also id.*

Accordingly, the proposed combination of Brooks with Takeuchi includes a liquid storage component (liquid container 32 of Takeuchi) in the housing (comprising case 26, collar 49, insulative tube 66, and plasticized cellulose acetate tube 68 of Brooks, with the liquid container in the case 26 portion).

10.2.4. [2.3] with the housing having one or more through-air-inlets;

Brooks discloses that the collar 49 of the cigarette cartridge includes one or more peripheral air inlet openings 54 which provide a flow of ambient air through the cigarette during a draw. Ex.1006 at 8:43-57, Figs. 1-6.



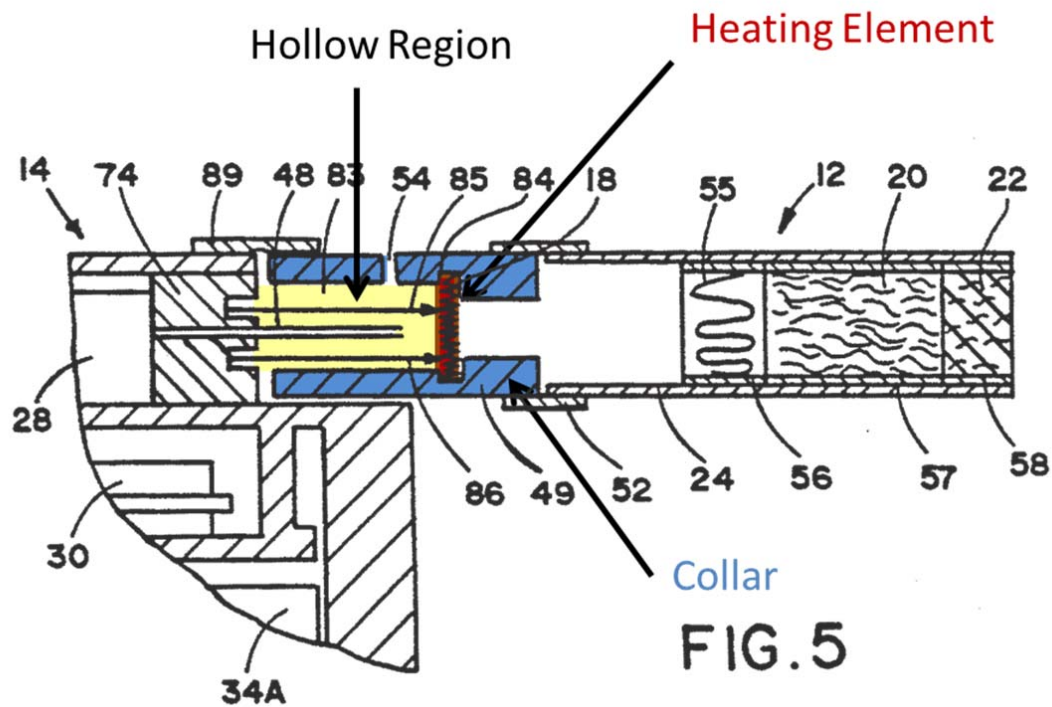
Ex.1006, Brooks at Fig. 5 (annotated).

Accordingly, Brooks discloses that the housing (comprising case 26, collar 49, insulative tube 66, and plasticized cellulose acetate tube 68) has one or more through-air-inlets (air inlet openings 54).

10.2.5. [2.4] the atomizer assembly including a porous component supported by a frame having a run-through hole;

Brooks discloses that the resistance heating element 18 comprises “a *fibrous material* having a high surface area and an adsorbant, *porous*, wettable character, in order to carry a suitable amount of aerosol forming substance for effective aerosol formation.” Ex.1006 at 7:26-30. Further, Brooks teaches that the resistance heating element 18 may comprise “*porous* metal wires or films” and “*porous substrates* in intimate contact with resistance heating components.” *Id.* at 7:65-8:3. Accordingly, the resistance heating element 18 of Brooks is a “porous component” because it is a component of the atomizer assembly, includes pores, and is permeable to the liquid aerosol forming substance. Ex.1003 at B-22.

In at least one embodiment, Brooks discloses that the resistance heating element 18 is held in place on the thermoplastic tubular collar 49 by a shoulder 84 formed on the collar. Ex.1006 at 11:54-59. Because the collar 49 is formed from thermoplastic tubing, it is a rigid structure. Ex.1003 at B-22-23. The rigid structure of the collar 49 includes a hollow region in the center that runs through the collar. *Id.* at B-24.



Ex.1006, Brooks at Fig. 5 (annotated).

Accordingly, Brooks discloses that the atomizer assembly (comprising at least resistance heating element 18) includes a porous component (porous substrate in intimate contact with resistance heating components) supported (held in place) by a frame (collar 49, including the shoulder 84) having a run-through hole (the opening highlighted above in yellow).

10.2.6. [2.5] a heating wire wound on a part of the porous component in the path of air flowing through the run-through hole; and

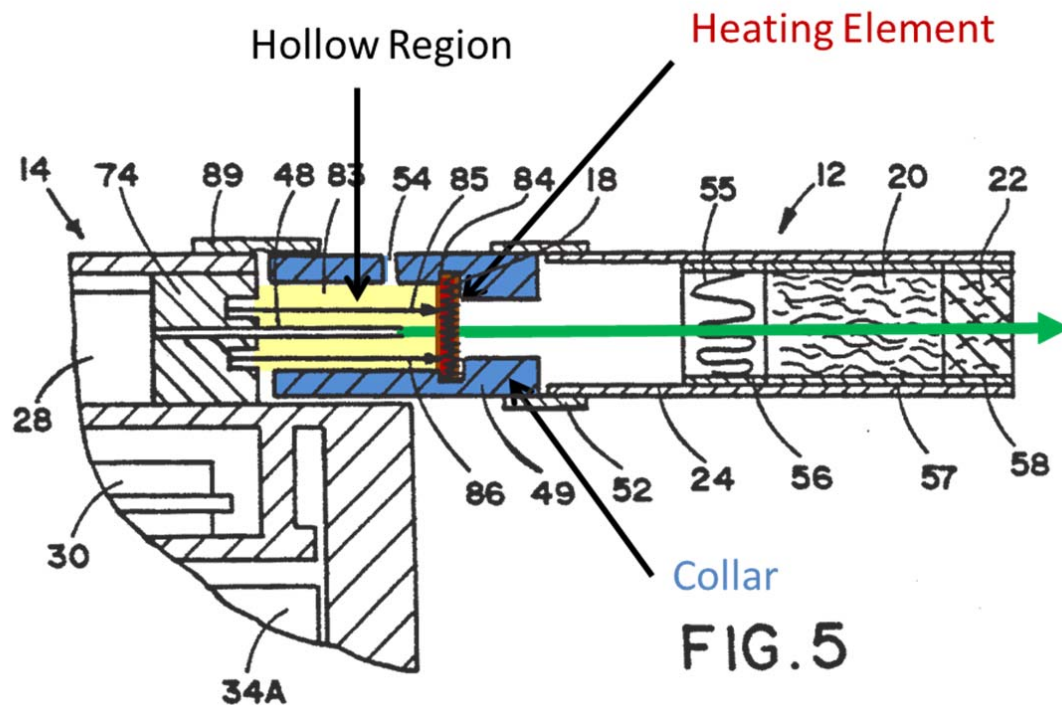
Brooks discloses that the resistance heating element 18 includes “*porous metal wires*,” and further that the resistance heating element 18 includes “*porous substrates* in intimate contact with resistance heating components.” Ex.1006 at

7:65-8:3. One of ordinary skill in the art would have understood that to be in “intimate contact” includes winding the wire around the porous substrate, because winding maximizes the contact between the wire and the substrate (*i.e.*, provides “intimate” contact) and provides for more efficient heat transfer between the wire and substrate. Ex.1003 at B-25-26. This is also reinforced by the Background of the Invention section of Brooks, which expressly recognizes resistance heating elements in which a coil is wound around a portion of a substrate and cites Whittemore, which as discussed above in connection with Ground #1, discloses a heating wire wound around a portion of a porous wick. Ex.1006 at 1:57-2:7; Ex.1003 at B-25-26. Thus, one of ordinary skill in the art would have understood that Brooks acknowledges and teaches that the prior art includes a resistance heating element that comprises a heating wire wound on a part of a porous substrate or component. Ex.1003 at B-26.

To the extent that Brooks does not disclose a heating element that comprises a heating wire wound on a part of a porous substrate or component, it would have been obvious based on the knowledge of a person of ordinary skill in the art to modify Brooks to include a heating wire wound on a part of a porous substrate or component. *Id.* at B-27-28. As discussed above, Brooks teaches that a suitable resistance heating component may be a metal wire. Ex.1006 at 7:65-66; Ex.1003 at B-27. Brooks further expressly teaches that the resistance heating component

(*i.e.*, metal wire) may be placed in intimate contact with a porous substrate. Ex.1006 at 8:1-2; Ex.1003 at B-27. Brooks also expressly directs one of skill in the art to references such as Whittemore and U.S. Patent No. 2,104,266 to McCormick, which demonstrate that heating coils wound around a portion of a porous material were well known to those of ordinary skill in the art and that the creation and use of such coils were within the abilities of one of skill in the art. Ex.1006 at 1:57-2:7; Ex.1003 at B-27-28. Thus, Brooks provides an express teaching, suggestion, or motivation to a person of ordinary skill in the art to modify the resistance heating element 18 such that it includes a metal wire wound around a portion of a porous substrate. Ex.1003 at B-28.

As shown in the figure below, Brooks discloses that the resistance heating element 18 is placed in the path of air flowing through the opening in the collar 49 that supports the resistance heating element 18.



Ex.1006, Brooks at Fig. 5 (annotated).

In particular, Brooks teaches that when the person puffs on the mouthend of the cigarette, ambient air enters the cigarette through air inlet 54, mixes with the volatilized aerosol forming substance, and then is drawn through to the mouthend filter 22, where it exits the cigarette and enters the mouth of the person. Ex.1006 at 10:34-53. This flow is denoted in the figure above by the green arrow. Ex.1003 at B-29-30.

Accordingly, Brooks discloses and/or renders obvious a heating wire (a metal wire as taught in Brooks) wound on a part of the porous component (a porous substrate in intimate contact with a resistance heating component as taught

in Brooks) in the path of air flowing through the run-through hole (illustrated by the green arrow in the figure above).

10.2.7. [2.6] the porous component substantially surrounded by the liquid storage component.

Takeuchi discloses that the capillary tube 36 is inserted within the liquid container, such that its lower end 36a is positioned in the vicinity of the bottom of the liquid container 32. Ex.1004 at 5:47-52. As shown in Figure 1, the capillary tube 36 is surrounded by the liquid container 32 to a significant extent (*i.e.*, substantially). Ex.1003 at B-31-36. That the capillary tube 36 and the intercommunicating pore structure within is surrounded by the liquid container to a significant extent is also evidenced by Takeuchi's teaching that the capillary force within the capillary tube 36 is what allows the liquid in the liquid container to be transported to the heater. Ex.1004 at 3: 3:36-4:23, 5:47-6:3; Ex.1003 at B-33-36. Thus, the immersion of the capillary tube 36 into the liquid container 32 is to a "significant extent" because it is critical to the functioning of the device. Ex.1003 at B-36.

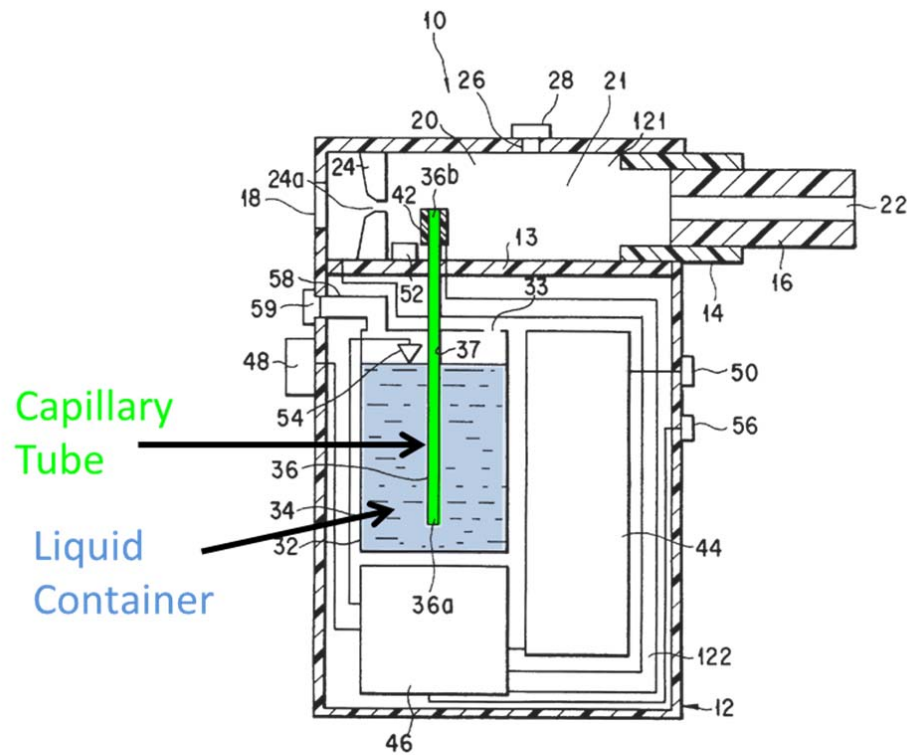


FIG. 1

Ex.1004, Takeuchi at Fig. 1 (annotated).

In the proposed combination of Brooks with Takeuchi, the porous substrate of the resistance heating element 18 taught in Brooks would be extended into the liquid container 32 of Takeuchi, in the same manner as Takeuchi teaches inserting its capillary tube 36 into the liquid container 32. Ex.1003 at B-36; ¶78. As discussed above in connection with element 2.2, it would have been obvious to a person of ordinary skill in the art to combine Brooks with Takeuchi, incorporating the liquid container of Takeuchi such that it is in contact with a porous component

of the heating element of Brooks. Ex.1003, ¶¶74-79. A person of ordinary skill in the art would have been motivated to combine the references for the reasons discussed above in Section 10.1. *See also id.*

Accordingly, the proposed combination of Brooks with Takeuchi includes a porous component (the porous substrate of the heater disclosed in Brooks) substantially surrounded by the liquid storage component (the liquid container 32 of Takeuchi).

10.3. Claim 3 is obvious over Brooks in view of Takeuchi

10.3.1. Claim 3: [3.P] An electronic cigarette comprising:

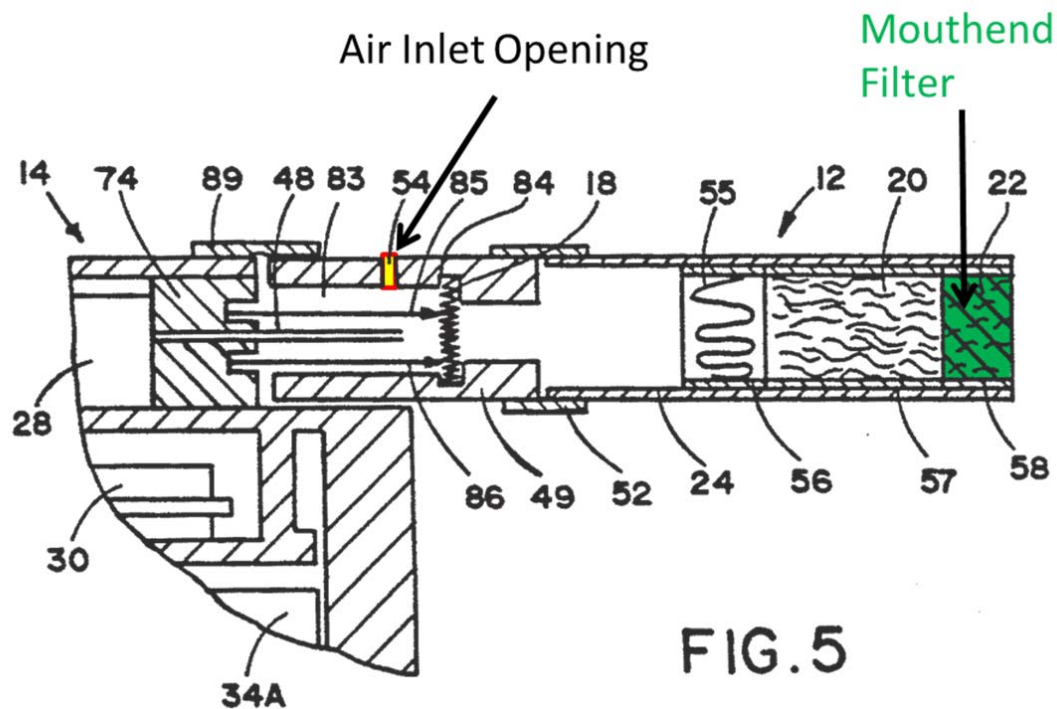
Brooks discloses an electronic cigarette for the same reasons discussed in Section 10.2.1. with respect to the identical preamble of claim 2.

10.3.2. [3.1] a battery assembly and an atomizer assembly within a housing with the battery assembly electrically connected to the atomizer assembly;

Brooks discloses this limitation for the same reasons discussed above in Section 10.2.2 with respect to the identical limitation in claim 2.

10.3.3. [3.2] with the housing having one or more through-air-inlets and an outlet;

Brooks discloses that the collar 49 of the cigarette cartridge includes one or more peripheral air inlet openings 54 which provide a flow of ambient air through the cigarette during a draw. Ex.1006 at 8:43-57, Figs. 1-6.



Ex.1006, Brooks at Fig. 5 (annotated).

Brooks also discloses that the cigarette includes a mouthend filter 22, from which the air exits the cigarette and enters the mouth of the person. *Id.* at 10:34-53.

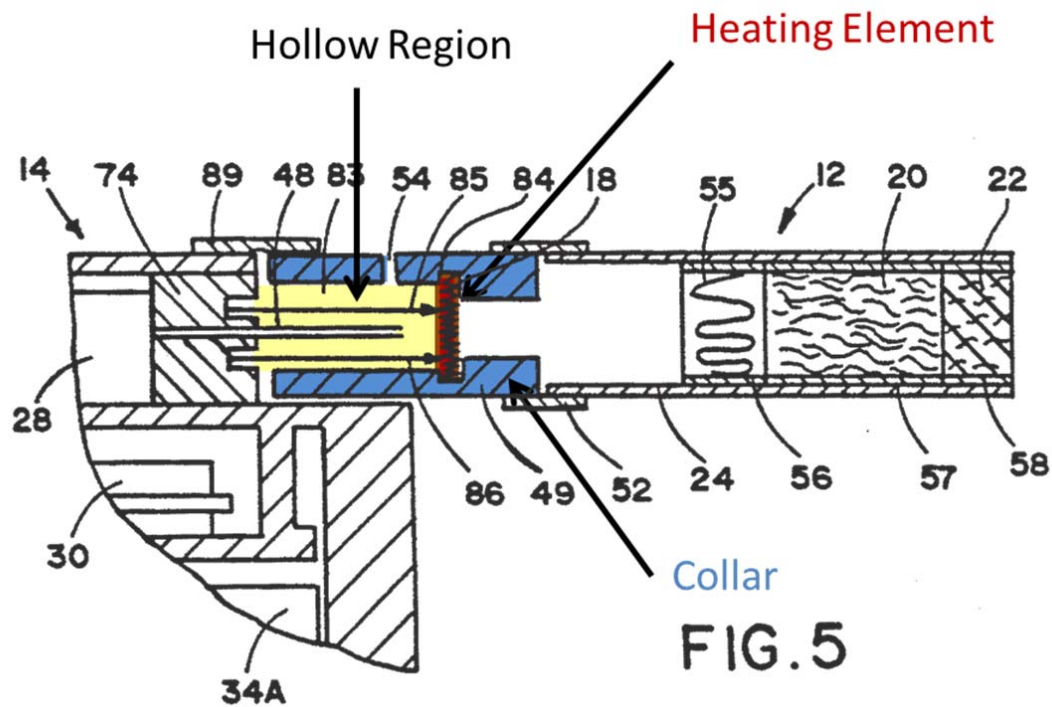
Accordingly, Brooks discloses that the housing (comprising case 26, collar 49, insulative tube 66, and plasticized cellulose acetate tube 68) has one or more through-air-inlets (air inlet openings 54) and an outlet (mouthend filter 22).

10.3.4. [3.3] the atomizer assembly includes a frame having a run through hole, and a porous component between the frame and the outlet;

Brooks discloses that the resistance heating element 18 comprises “a *fibrous material* having a high surface area and an adsorbant, *porous*, wettable character,

in order to carry a suitable amount of aerosol forming substance for effective aerosol formation.” *Id.* at 7:26-30. Further, Brooks teaches that the resistance heating element 18 may comprise “**porous** metal wires or films” and “**porous substrates** in intimate contact with resistance heating components.” *Id.* at 7:65-8:3. Accordingly, the resistance heating element 18 of Brooks is a “porous component” because it is a component of the atomizer assembly, includes pores, and is permeable to the liquid aerosol forming substance. Ex.1003 at B-56-57.

In at least one embodiment, Brooks discloses that the resistance heating element 18 is part of an assembly that includes a thermoplastic tubular collar 49 and a shoulder 84 formed on the collar, which holds the resistance heating element 18 in place. *Id.* at 11:54-59. Because the collar 49 is formed from thermoplastic tubing, it is a rigid structure. Ex.1003 at B-54-55. The rigid structure of the collar 49 includes a hollow region in the center that runs through the collar. *Id.* at B-55-56.



Ex.1006, Brooks at Fig. 5 (annotated).

As shown in the figure above, the resistance heating element 18 is held in place in the hollow region in the center of the collar (shaded in yellow), and the mouthend filter 22 from which air exits the cigarette, and as such is positioned between the collar and the mouthend filter. Ex.1003 at B-57-58.

Accordingly, Brooks discloses that the atomizer assembly includes a frame (thermoplastic tubular color 49 and shoulder 84) having a run through hole (the hollow region shown in yellow above), and a porous component (the porous substrate of the heating element 18) between the frame and the outlet (mouthend filter 22).

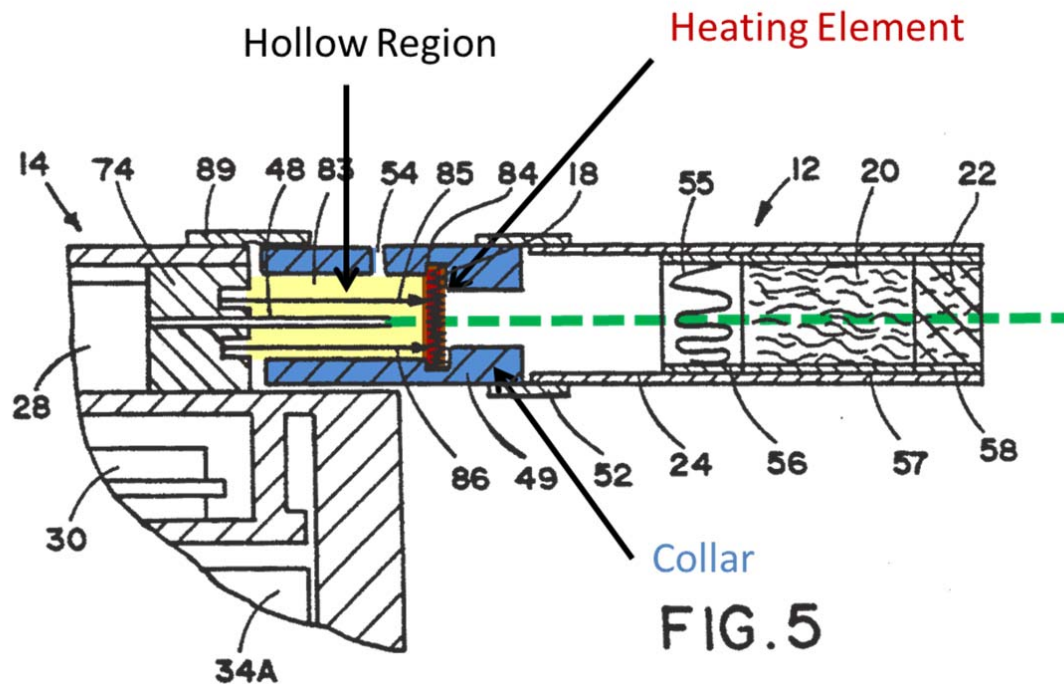
10.3.5. [3.4] a heating wire wound on a part of the porous component which is substantially aligned with the run-through hole; and

Brooks discloses that the resistance heating element 18 includes “*porous metal wires*,” and further that the resistance heating element 18 includes “*porous substrates* in intimate contact with resistance heating components.” Ex.1006 at 7:65-8:3. One of ordinary skill in the art would have understood that to be in “intimate contact” includes winding the wire around the porous substrate, because winding maximizes the contact between the wire and the substrate (*i.e.*, provides “intimate” contact) and provides for more efficient heat transfer between the wire and substrate. Ex.1003 at B-59-60. This is reinforced by the Background of the Invention section of Brooks, which expressly recognizes resistance heating elements in which a coil is wound around a portion of a substrate and cites Whittemore, which as discussed above in connection with Ground #1, discloses a heating wire wound around a portion of a porous wick. Ex.1006 at 1:57-2:7; Ex.1003 at B-59-60. Thus, one of ordinary skill in the art would have understood that Brooks acknowledges and teaches that the prior art includes a resistance heating element that comprises a heating wire wound on a part of a porous substrate or component (*i.e.* in intimate contact). Ex.1003 at B-60.

To the extent that Brooks does not disclose a heating element that comprises a heating wire wound on a part of a porous substrate or component, it would have

been obvious based on the knowledge of a person of ordinary skill in the art to modify Brooks to include a heating wire wound on a part of a porous substrate or component. *Id.* at B-60-62. As discussed above, Brooks teaches that a suitable resistance heating component may be a metal wire. Ex.1006 at 7:65-66; Ex.1003 at B-60-61. Brooks further expressly teaches that the resistance heating component (*i.e.*, metal wire) may be placed in intimate contact with a porous substrate. Ex.1006 at 8:1-2; Ex.1003 at B-61. Brooks also expressly directs one of skill in the art to references such as Whittemore and U.S. Patent No. 2,104,266 to McCormick, which demonstrate that heating coils wound around a portion of a porous material were well known to those of ordinary skill in the art and that the creation and use of such coils were within the abilities of one of skill in the art. Ex.1006 at 1:57-2:7; Ex.1003 at B-61-62. Thus, Brooks provides an express teaching, suggestion, or motivation to a person of ordinary skill in the art to modify the resistance heating element 18 such that it includes a metal wire wound around a portion of a porous substrate. Ex.1003 at B-62.

As shown in the figure below, Brooks discloses that the resistance heating element 18 is aligned with the hollow opening in the collar 49 that supports the resistance heating element 18.



Ex.1006, Brooks at Fig. 5 (annotated).

Accordingly, Brooks discloses and/or renders obvious a heating wire (a metal wire as taught in Brooks) wound on a part of the porous component (a porous substrate in intimate contact with a resistance heating component as taught in Brooks) which is substantially aligned with the run-through hole (the hollow portion of the collar 49, shown in yellow; alignment illustrated by the green dashed line in the figure above).

10.3.6. [3.5] with the porous component in contact with a liquid supply in the housing.

Takeuchi discloses that the capillary tube 36 is inserted within the liquid container, such that its lower end 36a is positioned in the vicinity of the bottom of

the liquid container 32. Ex.1004 at 5:47-52. Accordingly, the capillary tube 36 is in contact with the liquid supply in the liquid container 32. Because the liquid in the liquid container 32 is transported by the capillary force through the intercommunicating pore structure within the capillary tube 36, the intercommunicating pore structure is therefore also in contact with the liquid flavor source 34 in the liquid container 32. Ex.1003 at B-65.

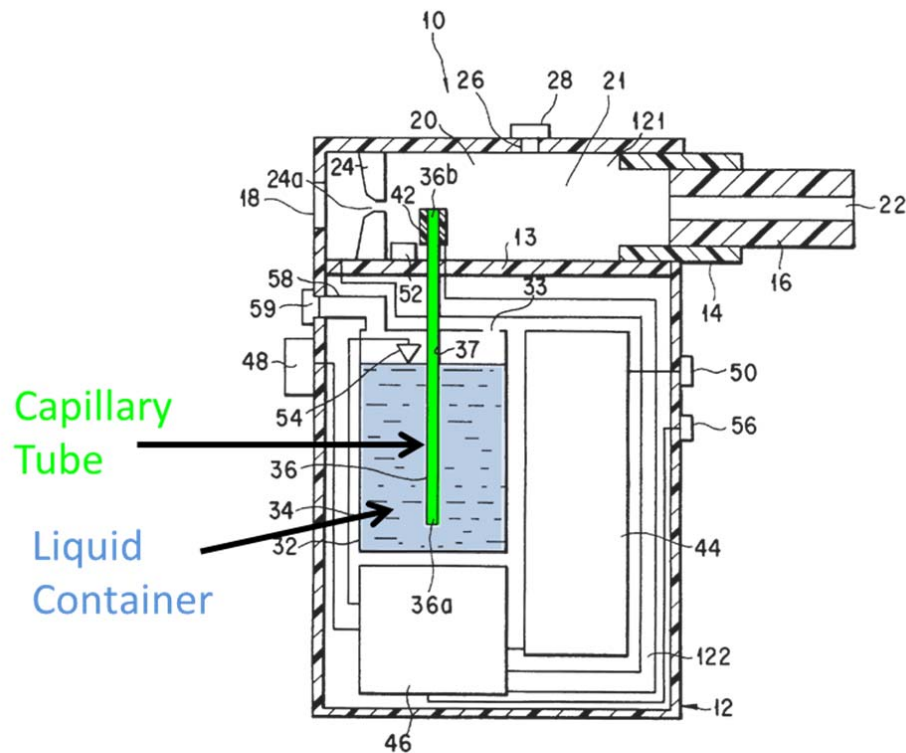


FIG. 1

Ex.1004, Takeuchi at Fig. 1 (annotated).

In the proposed combination of Brooks with Takeuchi, the porous substrate of the resistance heating element 18 taught in Brooks would be extended into the liquid container 32 of Takeuchi, in the same manner as Takeuchi teaches inserting its capillary tube 36 into the liquid container 32. Ex.1003 at B-67-68, ¶¶75, 78. It would have been obvious to a person of ordinary skill in the art to combine Brooks with Takeuchi, incorporating the liquid container of Takeuchi such that it is in contact with a porous component of the heating element of Brooks. Ex.1003 ¶¶75-79. A person of ordinary skill in the art would have been motivated to combine the references in this way for the reasons discussed above in Section 10.1. *See also id.*

Accordingly, the proposed combination of Brooks with Takeuchi includes a porous component (the porous substrate of the heater disclosed in Brooks) in contact with a liquid supply (the liquid in the liquid container 32 of Takeuchi) in the housing (the case 26 of Brooks).

11. CONCLUSION

For the reasons set forth above, *inter partes* review of claims 2 and 3 of the 742 Patent is requested.

Respectfully submitted,

Dated: June 28, 2016

By: /Elizabeth S. Weiswasser/

Elizabeth Stotland Weiswasser
Lead Counsel for Petitioner

Petition for *Inter Partes* Review of U.S. Pat. No. 8,365,742

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CERTIFICATE OF COMPLIANCE

The undersigned certifies that this brief complies with the type-volume limitations of 37 CFR § 42.24(a)(1)(i). This brief contains 13,372 words as calculated by the “Word Count” feature of Microsoft Word 2010, the word processing program used to create it.

The undersigned further certifies that this brief complies with the typeface requirements of 37 CFR § 42.6(a)(2)(ii) and typestyle requirements of 37 CFR § 42.6(a)(2)(iii). This brief has been prepared in a proportionally spaced typeface using Microsoft Word 2010 in Times New Roman 14 point font.

Dated: June 28, 2016

By: /Elizabeth S. Weiswasser/

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CERTIFICATE OF SERVICE

The undersigned certifies, in accordance with 37 C.F.R. § 42.105 and § 42.6(e), that service was made on the Patent Owner as detailed below.

<i>Date of service</i>	June 28, 2016
<i>Manner of service</i>	EXPRESS MAIL
<i>Documents served</i>	Petition for <i>Inter Partes</i> Review of U.S. Pat. No. 8,365,742 with Nu Mark's Exhibit List Power of Attorney Exhibits Ex.1001 through Ex.1020
<i>Persons served</i>	<u>Patent Owner's Address of Record:</u> Perkins Coie LLP - LOS General P.O. Box 1247 Seattle, WA 98111-1247

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