

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

R.J. Reynolds Vapor Company,

Petitioner

v.

Fontem Holdings 1 B.V.

Patent Owner

U.S. Patent No.: 9,370,205

Issue Date: June 21, 2016

Title: Electronic Cigarette

Inter Partes Review No.: IPR2017-01642

**PETITION FOR *INTER PARTES* REVIEW OF
U.S. PATENT NO. 9,370,205 PURSUANT TO
35 U.S.C. §§ 311-319 AND 37 C.F.R. § 42**

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EXHIBITS LIST

Exhibit No.	Description
Exhibit 1001:	U.S. Pat. No. 9,370,205 to Lik Hon
Exhibit 1002:	U.S. Pat. No. 4,947,874 to Brooks et al.
Exhibit 1003:	U.S. Pat. No. 2,057,353 to C. L. Whittemore, Jr.
Exhibit 1004:	Declaration of Dr. Robert Sturges
Exhibit 1005:	<i>Nu Mark, LLC v. Fontem Holdings 1 B.V.</i> , IPR2017-00257 (PTAB, filed November 11, 2016), Paper No. 10
Exhibit 1006:	U.S. Pat. Appl. No. 13/754,521 Filed January 30, 2012
Exhibit 1007:	Model No. MPL-502-V by Micro Pneumatic Logic, annotated image of pressure sensing port
Exhibit 1008:	Model No. MPL-502-V by Micro Pneumatic Logic, annotated image of pressure balancing port
Exhibit 1009:	MPL 502 Series Specifications, <i>Micro Pneumatic Logic, Inc.</i> , (March 11, 2006), http://www.pressureswitch.com/PDFs/0502STANDARD.A.pdf [https://web.archive.org/web/20060311132848/http://www.pressureswitch.com/PDFs/0502STANDARD.A.pdf]
Exhibit 1010:	MPL Pressure Switch Solutions, <i>Micro Pneumatic Logic, Inc.</i> , (March 11, 2006), http://www.pressureswitch.com/PDFs/2000_MPLBrochure.pdf [https://web.archive.org/web/20060311132419/http://www.pressureswitch.com/PDFs/2000_MPLBrochure.pdf]
Exhibit 1011:	<i>McGraw-Hill Dictionary of Scientific and Technical Terms</i> , McGraw-Hill Companies, Inc. (6th ed. 2003) (excerpt)
Exhibit 1012:	<i>Nu Mark, LLC v. Fontem Holdings 1 B.V.</i> , IPR2016-01642 (PTAB, filed August 18, 2016), Paper No. 7
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1013:	(PTAB, filed June 28, 2016), Paper No. 12
Exhibit 1014:	U.S. Pub. No. 2009/0126745 to Hon, which is the parent application publication of the 205 patent (Ex.1001)
Exhibit 1015:	U.S. Pat. No. 3,685,522 to Kleinhans
Exhibit 1016:	U.S. Pat. No. 4,637,407 to Bonanno et al.
Exhibit 1017:	U.S. Pat. No. 5,266,746 to Nishihara et al.
Exhibit 1018:	U.S. Pat. No. 4,968,263 to Silbernagel et al.
Exhibit 1019:	U.S. Pat. No. 2,461,664 to Smith
Exhibit 1020:	U.S. Pat. No. 3,234,357 to Seuthe
Exhibit 1021:	U.S. Pat. No. 5,743,251 to Howell et al.
Exhibit 1022:	Chinese Pat. No. 2719043Y to Lik Hon
Exhibit 1023:	Certified English translation of Chinese Pat. No. 2719043Y to Lik Hon
Exhibit 1024:	U.S. Pat. No. 6,598,607 to Adiga et al.
Exhibit 1025:	U.S. Pat. No. 4,793,365 to Sensabaugh, Jr. et al.
Exhibit 1026:	U.S. Pat. No. 5,203,355 to Clearman et al.
Exhibit 1027:	U.S. Pat. No. 2,472,282 to Burchett
Exhibit 1028:	U.S. Pat. No. 2,032,695 to Gimera at al.
Exhibit 1029:	U.S. Pat. No. 5,703,633 to Gehrer et al.

Exhibit 1030:	U.S. Pat. No. 6,885,814 to Saito et al.
Exhibit 1031:	U.S. Pat. No. 5,894,841 to Voges
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Exhibit 1033:	U.S. Pat. No. 6,311,561 to Bang et al.
Exhibit 1034:	U.S. Pat. No. 2,442,004 to Hayward-Butt
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Exhibit 1036:	U.S. Pat. No. 6,155,268 to Takeuchi
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1046:	IPR2016-01270 (PTAB, filed July 2, 2016), Paper No. 11
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Exhibit 1048:	European Pat. Pub. 0 501 419 to Patteri
Exhibit 1049:	<i>Merriam-Webster's Collegiate Dictionary</i> , Merriam-Webster, Inc. (11th ed. 2003)(excerpt)
Exhibit 1050:	Declaration of Kyle Yarberry
Exhibit 1051:	Record of purchase of MPL-502-V-G-Range-A sensor
Exhibit 1052:	U.S. Pat. No. 6,217,315 to Mifune et al.
Exhibit 1053:	MPL 500: Low Pressure Momentary Switches, http://www.pryde.com.au/Data_Sheets/Industrial/02/MPL/MPL_500_pg1.pdf (last visited June 26, 2017)
Exhibit 1054:	Model No. MPL-502-V, Range A, by Micro Pneumatic Logic, Inc., Ft. Lauderdale, FL
Exhibit 1055:	<i>NuMark, LLC v. Fontem Holdings 1 B.V.</i> , IPR2017-00257 (PTAB, filed December 9, 2016), Paper No. 10

I. INTRODUCTION

Pursuant to 35 U.S.C. §§ 311-319 and 37 C.F.R. § 42, R.J. Reynolds Vapor Company (“Petitioner”) requests *Inter Partes* Review (“IPR”) of claims 1-22 of U.S. Pat. No. 9,370,205 titled “Electronic Cigarette” (“205 patent,” Ex.1001), which is assigned to Fontem Holdings 1 B.V. (“Fontem” or “Patent Owner”).

This Petition demonstrates a reasonable likelihood that claims 1-22 of the 205 patent are unpatentable under 35 U.S.C. § 103 over the combination of U.S. Pat. No. 4,947,874 (“Brooks,” Ex.1002) and U.S. Pat. No. 2,057,353 (“Whittemore,” Ex.1003), and in further view of the knowledge possessed by those skilled in the art as demonstrated by the prior art references cited herein.

II. MANDATORY NOTICES UNDER 37 C.F.R. § 42.8

A. Real Party-in-Interest and Deposit Account

For purposes of 35 U.S.C. §312(a)(2) and 37 C.F.R. §42.8(b)(1) only, Petitioner, R.J. Reynolds Vapor Company, identifies the real parties-in-interest as R.J. Reynolds Vapor Company, R. J. Reynolds Tobacco Company, and RAI Services Company. Each of the foregoing entities is a direct or indirect wholly owned subsidiary of Reynolds American Inc. Although Petitioner does not believe that Reynolds American Inc. is a real party-in-interest (*see* Patent Trial Practice Guide 77 Fed. Reg., Vol. 77, No. 157 (2012) at 48759-60), Reynolds American Inc. and each of its other wholly owned subsidiaries (direct and indirect)

nevertheless agree to be bound by any final written decision in these proceedings to the same extent as a real party-in-interest. *See* 35 U.S.C. §315(e).

Petitioner authorizes the PTO to charge Deposit Account No. 23-1925 for the IPR Petition fees set in 37 C.F.R. §42.15(a), and authorizes payment of any additional fees to be charged to this Deposit Account.

B. Related Matters (37 C.F.R. §42.8(b)(2))

1. Related Matters

Petitioner is not aware of any reexamination certificates or pending prosecution concerning the 205 patent.

a. Related Litigations

Petitioner is a defendant in the following litigation involving the 205 patent: *Fontem Ventures B.V. et al. v. R.J. Reynolds Vapor Company*, No. 1:16-cv-01258 (M.D.N.C.) (prior No. 2:16-cv-04534 (C.D. Cal., filed June 22, 2016)). Claims 1-22 of the 205 patent have been asserted against the Petitioner.

The above-referenced action is one of four related patent infringement actions filed by the Patent Owner against the Petitioner. In a related action, *Fontem Ventures B.V. et al. v. R.J. Reynolds Vapor Company*, No. 1:16-cv-01255 (M.D.N.C.) (prior No. 2:16-cv-02286 (C.D. Cal., filed April 4, 2016)), the Patent Owner has asserted U.S. Patent Nos. 8,365,742; 8,490,628; 8,893,726; and 8,899,239. In another related action, *Fontem Ventures B.V. et al. v. R.J. Reynolds*

Vapor Company, No. 1:16-cv-1257 (M.D.N.C.) (prior No. 2:16-cv-04534 (C.D. Cal., filed June 22, 2016)), the Patent Owner has asserted U.S. Patent Nos. 9,326,548 and 9,326,549. In yet another related action, *Fontem Ventures B.V. et al. v. R.J. Reynolds Vapor Company*, No. 1:17-cv-175 (M.D.N.C., filed March 1, 2017), the Patent Owner has asserted U.S. Patent Nos. 8,375,957; 8,393,331; 8,863,752; 9,326,550; 9,326,551; 9,339,062; 9,364,027; and 9,456,632.

In addition to the petitions noted below with respect to the patents in the same family as the 205 patent, the current Petitioner has also filed petitions for IPR with respect to U.S. Patent Nos. 8,365,742; 8,490,628; 8,893,726; 8,899,239; 9,326,548; and 9,326,549.

The Patent Owner has also asserted the 205 patent as well as U.S. Patent No. 8,375,957, which is in the priority chain of the 205 patent, and U.S. Patent Nos. 8,863,752, 9,326,550, 9,326,551 and 9,339,062, which share priority claims with the 205 patent, in the following additional district court proceedings in which Petitioner was not and is not a party:

- a. *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. Nu Mark LLC*, No. 16-CV-1259 (M.D.N.C.) (prior No. 16-CV-4537 (C.D. Cal.));

- b.** *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. Nu Mark LLC*, No. 16-CV-1261 (M.D.N.C.) (prior No. 16-CV-2291) (C.D. Cal.);
- c.** *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. NJOY, Inc.*, No. 14-CV-1645 (C.D. Cal.);
- d.** *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. LOEC, Inc., dba blue cigs*, No. 14-CV-1648 (C.D. Cal.);
- e.** *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. CB Distributors, Inc. and DR Distributors, LLC, dba 21st Century Smoke, LLC*, No. 14-CV-1649 (C.D. Cal.);
- f.** *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. Vapor Corp.*, No. 14-CV-1650 (C.D. Cal.);
- g.** *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. Fin Branding Group, LLC and Victory Electronic Cigarettes Corporation*, No. 14-CV-1651 (C.D. Cal.);
- h.** *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. Ballantyne Brands, LLC*, No. 14-CV-1652 (C.D. Cal.);
- i.** *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. Spark Industries, LLC*, No. 14-CV-1653 (C.D. Cal.);

- j.** *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. Logic Technology Development LLC*, No. 14-CV-1654 (C.D. Cal.);
- k.** *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. VMR Products, LLC, dba V2CIGS*, No. 14-CV-1655 (C.D. Cal.);
- l.** *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. NJOY, Inc.*, No. 14-CV-8144 (C.D. Cal.);
- m.** *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. LOEC, Inc., dba blue cigs*, No. 14-CV-8149 (C.D. Cal.);
- n.** *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. CB Distributors, Inc. and DR Distributors, LLC, dba 21st Century Smoke, LLC*, No. 14-CV-8154 (C.D. Cal.);
- o.** *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. Vapor Corp.*, No. 14-CV-8155 (C.D. Cal.);
- p.** *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. Fin Branding Group, LLC and Victory Electronic Cigarettes International Group, Ltd.*, No. 14-CV-8156 (C.D. Cal.);
- q.** *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. Ballantyne Brands, LLC*, No. 14-CV-8157 (C.D. Cal.);
- r.** *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. Spark Industries, LLC*, No. 14-CV-8158 (C.D. Cal.);

- s. *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. Logic Technology Development LLC*, No. 14-CV-8160 (C.D. Cal.); and
- t. *Fontem Ventures B.V. and Fontem Holdings 1 B.V. v. VMR Products, LLC, dba V2CIGS*, No. 14-CV-8161 (C.D. Cal.).

b. Related Proceedings Before the Board

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, IPR2015-00098, PTAB, filed October 21, 2014 by Petitioner Logic Technology Development, LLC;
- b. Petition for *Inter Partes* Review of U.S. Patent No. 8,375,957, IPR2015-01513, PTAB, filed June 26, 2015 by Petitioner JT International S.A.;
- c. Petition for *Inter Partes* Review of U.S. Patent No. 8,863,752, IPR2015-01301, PTAB, filed May 29, 2015 by Petitioners 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;

- d.** Petition for *Inter Partes* Review of U.S. Patent No. 8,863,752,
IPR2015-01604, PTAB, filed July 20, 2015 by Petitioner JT
International S.A.;
- e.** Petition for *Inter Partes* Review of U.S. Patent No. 8,375,957,
IPR2016-01307, PTAB, filed June 28, 2016 by Petitioner Nu Mark
LLC;
- f.** Petition for *Inter Partes* Review of U.S. Patent No. 8,863,752,
IPR2016-01309, PTAB, filed June 28, 2016 by Petitioner Nu Mark
LLC;
- g.** Petition for *Inter Partes* Review of U.S. Patent No. 9,370,205,
IPR2016-01642, PTAB, filed August 18, 2016 by Petitioner Nu
Mark LLC;
- h.** Petition for *Inter Partes* Review of U.S. Patent No. 9,326,550,
IPR2016-01707, PTAB, filed August 31, 2016 by Petitioner Nu Mark
LLC;
- i.** Petition for *Inter Partes* Review of U.S. Patent No. 9,326,551,
IPR2016-01706, PTAB, filed August 31, 2016 by Petitioner Nu
Mark LLC;

- j. Petition for *Inter Partes* Review of U.S. Patent No. 9,339,062, IPR2016-01705, PTAB, filed August 31, 2016 by Petitioner Nu Mark LLC;
- k. Petition for *Inter Partes* Review of U.S. Patent No. 9,326,550, IPR2017-00205, PTAB, filed November 11, 2016 by Petitioner Nu Mark LLC;
- l. Petition for *Inter Partes* Review of U.S. Patent No. 9,339,062, IPR2017-00303, PTAB, filed November 18, 2016 by Petitioner Nu Mark LLC; and
- m. Petition for *Inter Partes* Review of U.S. Patent No. 9,370,205, IPR2017-01641, PTAB, filed June 23, 2017, by Petitioner R.J. Reynolds Vapor Company.

c. Related Proceedings Before the Board

A pending patent application claims the benefit of the 205 patent: U.S.

Patent Application No. 15/158,421, filed May 18, 2016.

C. Lead and Back-Up Counsel

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D. Service Information

Service of any documents via hand delivery, express mail or regular mail may be made to the lead and backup counsel at the postal mailing address above. Petitioner also consents to service by email at the above-designated email addresses.

E. Proof of Service

Proof of service of this Petition on the Patent Owner at the correspondence address of record for the 205 patent is attached.

III. GROUNDS FOR STANDING

As required by 37 C.F.R. §42.104(a), Petitioner certifies that the 205 patent is available for *inter partes* review and Petitioner is not barred or estopped from requesting review on the grounds herein.

IV. IDENTIFICATION OF CHALLENGE AND STATEMENT OF THE PRECISE RELIEF REQUESTED

Pursuant to 37 C.F.R. §42.104(b), the precise relief requested is that the Board review and find unpatentable claims 1-22 of the 205 patent.

Petitioner requests *inter partes* review and cancellation of claims 1-22 of the 205 patent pursuant to pre-AIA 35 U.S.C. §103 as set forth herein. Petitioner's detailed statement of the reasons for the relief requested is set forth below in the section titled "Statement of Reasons for the Relief Requested." In accordance with 37 C.F.R. §42.6(c), copies of the exhibits are filed herewith including the Declaration of Dr. Robert Sturges ("Sturges Decl.," Ex.1004).

Claims 1-22 of the 205 patent are unpatentable as obvious over the combination of Brooks (Ex.1002) in combination with Whittemore (Ex.1003), and, if necessary, in further view of the knowledge possessed by the person of ordinary skill in the art.

Statement of Non-Redundancy: The ground for invalidity set for in this petition has not been expressly considered either in another IPR or during prosecution of the 205 patent. The combination of Brooks and Whittemore was advanced in previous IPR2017-00257 filed by a different petitioner, but that IPR was terminated at the parties' request prior to issuance of an institution decision. Ex.1055. In addition, Petitioner filed IPR2017-01641 on June 23, 2017 contending that claims 1-22 are anticipated by WO2007/131450, because claims 1-22 are not

entitled to the effective filing date of the parent PCT application that published as WO2007/131450. In contrast, the present petition is based upon obviousness over the combination of Brooks and Whittemore – references that are prior art to the claims of the 205 patent even if those claims were entitled to their earliest effective filing date. Thus, unlike the grounds asserted in IPR2017-01641, the grounds presented in this petition do not hinge upon whether the claims of the 205 patent are entitled to an effective filing date earlier than that of the application from which they issued.

V. THRESHOLD REQUIREMENT FOR *INTER PARTES* REVIEW

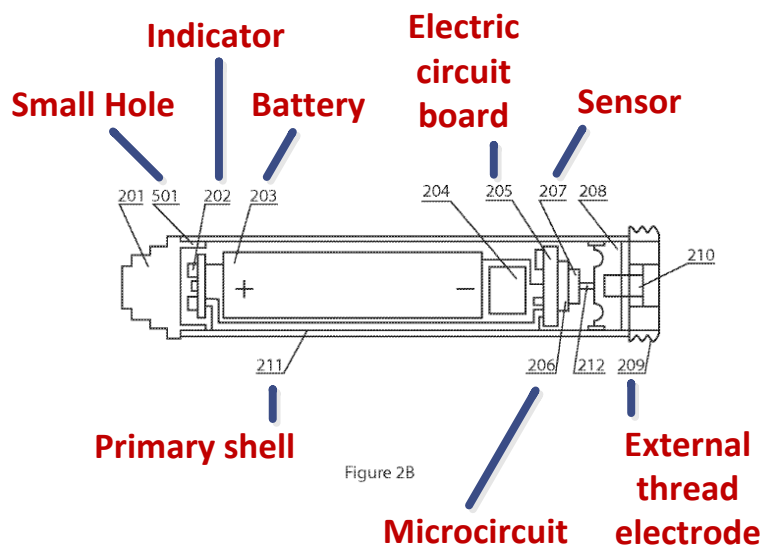
This petition meets the threshold requirement for *inter partes* review because it establishes “a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. §314(a).

VI. STATEMENT OF REASONS FOR THE RELIEF REQUESTED

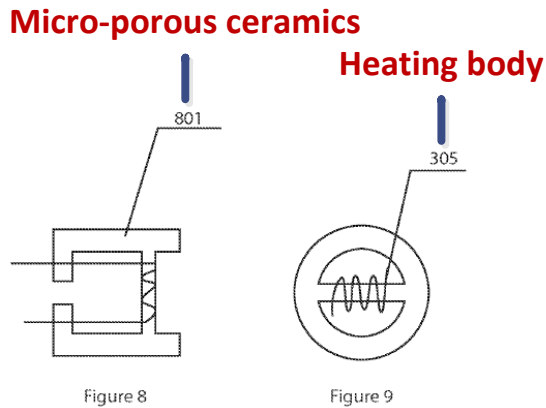
A. Background of the 205 Patent

The 205 patent generally describes a vaporizing device such as an electronic cigarette. As shown in Figs. 2-4, the electronic cigarette includes a battery assembly, an atomizer assembly and a cigarette bottle assembly, respectively. Ex.1001, 1:61-64. The battery assembly includes an indicator 202, lithium ion battery 203, MOSFET electric circuit board 205, sensor 207, external thread

electrode 209, a small hole 501, primary shell 211, and microcircuit 206 between MOSFET electric circuit board 205 and sensor 207. *Id.*, 2:4-12, 3:59-61; Fig. 2B. The atomizer assembly includes the internal thread electrode 302, atomizer 307 and the secondary shell 306. *Id.*, 2:32-34; Fig. 3. The cigarette bottle assembly includes the cigarette liquid bottle 401, fiber 402 and suction nozzle 403. *Id.*, 2:47-49; Fig. 4. The fiber 402 is “made of polypropylene fiber or nylon fiber to absorb cigarette liquid.” *Id.*, 3:39-40.



Ex.1001, Fig. 2B (Annotated)



B. Person Having Ordinary Skill in the Art (“PHOSITA”)

A PHOSITA for the 205 patent is a person with at least the equivalent of a Bachelor’s degree in electrical engineering, mechanical engineering, or biomedical engineering or related fields, along with at least 5 years of experience designing electromechanical devices, including those involving circuits, fluid mechanics and heat transfer. Ex.1004, ¶21.

C. Claim Construction

Pursuant to 37 C.F.R. §42.100(b), a claim in an unexpired patent is given its broadest reasonable construction in light of the specification in which it appears. *In re Cuozzo Speed Techs., LLC*, 793 F.3d 1268, 1278-79 (Fed. Cir. 2015), *aff’d* *Cuozzo Speed Techs. v. Lee*, 136 S. Ct. 2131, 579 U.S. ____ (2016). The only claim term requiring construction for purposes of this petition is the term “micro-controller unit.” Petitioner expressly reserves the right to offer different

constructions under the *Phillips* standard in district court. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005).

The term “micro-controller unit” appears in the independent claims of the 205 patent, but is not used or otherwise found in the written description of the 205 patent. Ex.1001, 4:44-6:45. Instead, the specification discloses a microcircuit 206. *Id.*, 4:25-35; Fig. 7. In order to encompass the embodiment disclosed in the 205 patent, the term “microcontroller unit” should be construed to encompass a microcircuit. Ex.1004, ¶¶27, 77; *See Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1583 (Fed. Cir. 1996) (finding that a claim interpretation that excludes a preferred embodiment is “rarely, if ever, correct”). Accordingly, the broadest reasonable construction of “micro-controller unit” is “a component of an electronic device that regulates a particular process or function.” *See* Ex.1011 at p. 5 (defining “microcontroller” as a “microcomputer, microprocessor, or other equipment used for precise process control in data handing, communication, and manufacturing”); Ex.1004 at ¶¶25-27, 77.

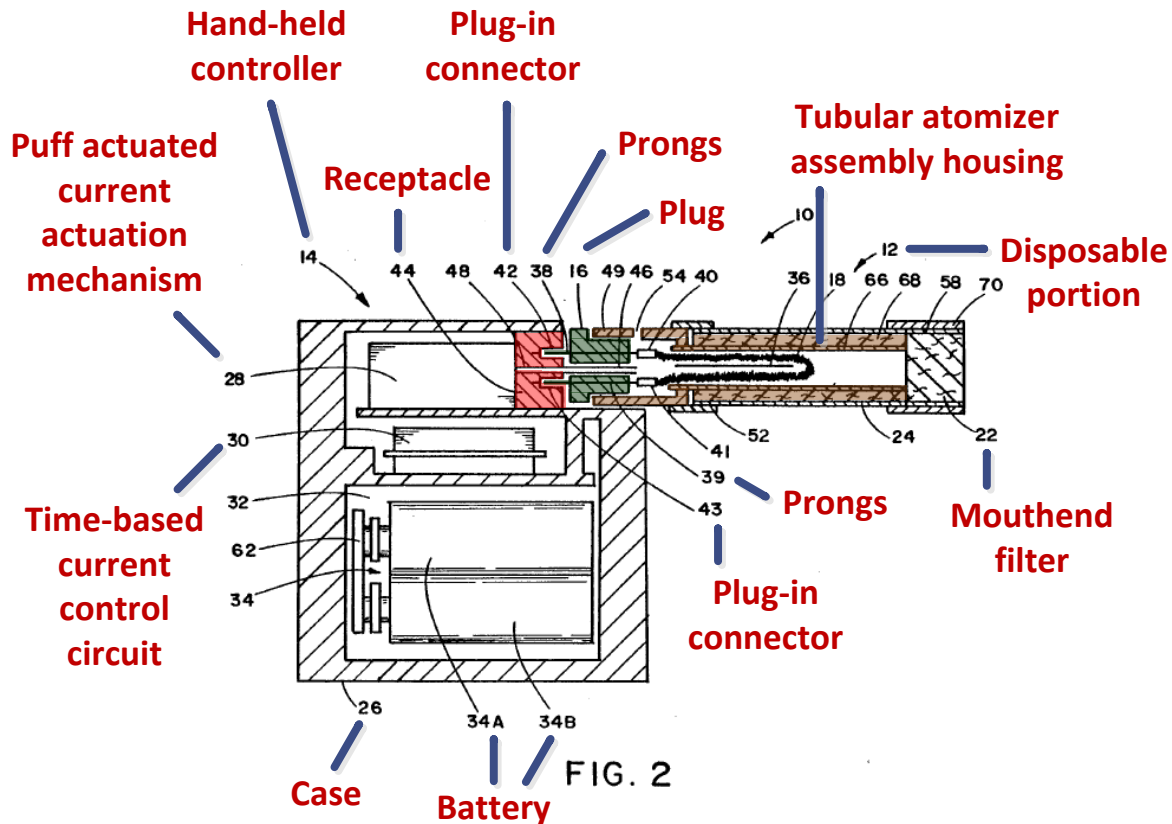
D. Description of the Prior Art

1. Brooks (Ex.1002)

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.1002,

1:6-10. The “Background of the Invention” discusses that many smoking articles and tobacco substitute smoking materials had been proposed in the past as alternatives to smoking products that burn tobacco, including alternatives that generate flavored vapor and/or visible aerosols. *Id.*, 1:19-34. These alternatives included smoking products, flavor generators and medicinal inhalers that utilized electrical energy to vaporize or heat a volatile material, or which otherwise attempted to provide the sensation of cigarette or pipe smoking without burning tobacco. *Id.*, 1:50-56. According to Brooks, “[p]referred smoking articles of the invention are capable of providing the user with the sensations of smoking (e.g., smoking, taste, feel, satisfaction, pleasure, and the like) by heating but not burning tobacco” *Id.*, 1:11-15; *see also* 3:63-4:2.

Brooks discloses a smoking article 10 that includes a hand-held controller 14 and cigarette (*e.g.*, a disposable portion) 12 (*see id.*, 4:7-12; 7:15-16) as shown in annotated Fig. 2:



Id., 7:15-16; Fig. 2. “The cigarette 12 includes electrical connection plug 16, resistance heating element 18 carrying an aerosol forming substance, a roll of tobacco 20, mouth end filter 22, and a resilient overwrap 24.” *Id.*, 7:17-20. The aerosol forming substance can be, for example, “a polyhydric alcohol, such as glycerin, propylene glycol, or a mixture thereof, water; a tobacco material such as tobacco aroma oil, a tobacco essence, a spray dried tobacco extract, a freeze dried tobacco extract, tobacco dust, or the like, in order to provide tobacco flavor; or a combination thereof. *Id.*, 8:8-14.

The smoking article also “includes one or more peripheral air inlet openings 54 which provide a flow of ambient air through the cigarette during draw. *Id.*,

8:43-52. “Alternatively, the air inlet can be positioned through the extreme inlet end of the cigarette or elsewhere through the periphery of the cigarette, such that drawn ambient air passing through the cigarette to the mouth of the user passes the resistance element.” *Id.*, 8:53-57.

The hand-held controller 14 includes “a case 26, a puff actuated current actuation mechanism 28 having the form of a pressure sensitive switch, a time-based current control circuit 30, and a chamber 32 into which battery power supply 34 (shown as batteries 34A and 34B) is inserted.” Ex.1002 at 7:20-25. The case 26 provides “a convenient and aesthetic holder for the user. The outer housing 26 can have a variety of shapes and can be manufactured from plastic, metal, or the like.” *Id.*, 9:37-41. In addition, the controller 14 has a receptacle 44 that “includes tube 48 which is inserted into passageway 46 of plug 16 to be in airflow communication with the internal region of the cigarette. The other end of tube 48 is in airflow communication with pressure sensing switch 28, so that changes in air pressure which occur within the cigarette during draw can be sensed by the switch.” *Id.* at 9:41-50. The control circuit 30 is connected to the puff actuated, differential pressure sensitive switch 28 as well as to batteries 34A and 34B. *Id.*, 9:51-55.

Thus, “[w]hen the user puffs on the mouthend of the cigarette, ambient air enters the cigarette through air inlet 54. The pressure actuated switch 28 responds

to a sensed change in air pressure within the cigarette during draw and permits current flow through the heating element 18. As a result, the heating element experiences an increase in temperature which in turn heats and volatilizes the aerosol forming substance. The volatilized aerosol forming substance mixes with the drawn air and forms an aerosol. The volatilized aerosol forming substance (in aerosol or vapor form) passes through the tobacco roll 20 where it elutes tobacco flavor from the tobacco, and exits the mouthend filter 22 into the mouth of the user.” *Id.* at 10:34-53.

Brooks discloses two embodiments for the configuration of the heating element 18. In a preferred embodiment, the heating element 18 “is impregnated with or otherwise carries the aerosol forming substance in order that the aerosol forming substance is in a heat exchange relationship with the electrical heating element.” *Id.* at 8:4-8.

In an alternative embodiment, the heating element is in “intimate contact” with a separate “porous substrate.” *Id.*, 8:1-3. That the heating element and the porous substrate are distinct components in the “intimate contact” embodiment is confirmed by the common sense notion that something cannot be in intimate contact with itself. Ex.1004 at ¶¶50-51, 63; *See also ICHL, LLC v. NEC Corp. of America*, No. 5:08CV65, No. 5:08CV175, No. 5:08CV177, 2010 WL 1609232, at

*9-10 (E.D. Tex. Apr. 20, 2010), *aff'd*, 455 Fed. Appx. 978 (Fed. Cir. 2011) (“in intimate contact” requires “the touching of two or more distinct parts”).

Additional disclosure in Brooks confirms that the “intimate contact” embodiment contemplates that the heating element and the porous substrate are two distinct components. According to Brooks, the aerosol forming substance can be located either “on the resistance heating element or elsewhere in the article.” Ex.1002, col. 6:45-52. The PHOSITA would have understood that the reference to “elsewhere in the article” includes, *inter alia*, locating the aerosol forming substance in the porous substrate that is in “intimate contact” with the heating element. Ex.1004, ¶51; *see also* Ex.1002 at 1:57-61 (citing Whittemore, Ex.1003), 2:7-10 (citing Gilbert, Ex.1035); Ex.1035 at 3:9-18.

This is further confirmed by the claims of Brooks. Claims 53, 104, and 131 require “an aerosol forming substance” without specifying the location of the substance or that it need otherwise be carried by the heating element. Ex.1002. Claims 57, 105 and 132, which depend from claims 53, 104 and 131, respectively, specify that the “aerosol forming substance is carried by the heating element prior to use.” *Id.*; *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1315 (Fed. Cir. 2005) (“[T]he presence of a dependent claim that adds a particular limitation gives rise to a presumption that the limitation in question is not present in the independent claim). Similarly, claims 1, 26 and 75 require an “aerosol forming substance

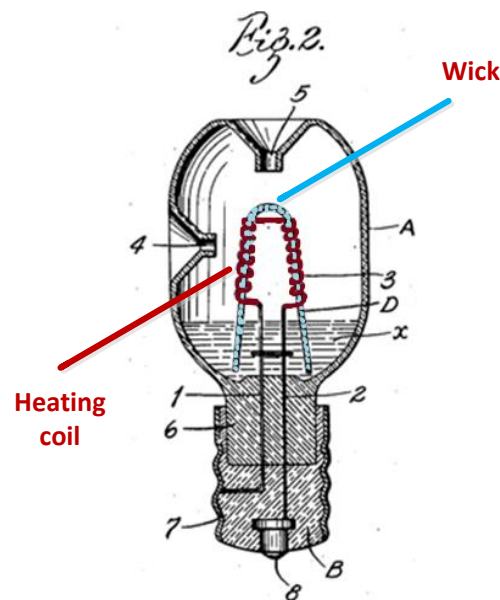
carried by the heating element prior to use.” Ex.1002. Thus, the claims are consistent with the specification. As the PHOSITA would have recognized, Brooks contemplates that the aerosol forming substance is carried by the heating element and/or elsewhere in the device, including on the porous component that is in “intimate contact” with the heating element. Ex. 1004, ¶¶51, 61-63.¹

¹ Petitioner acknowledges that in Petitioner’s previous petition with respect to U.S. Patent No. 8,893,726 (in which the Board declined to institute review) the Board determined that Petitioner had failed to adequately demonstrate the Brooks discloses a separate “intimate contact” embodiment for the heating element 18. As the Board stated, the Petitioner “has not sufficiently shown that Brooks’ use of ‘intimate contact’ for this embodiment is any different than its repeated description of heating element 18 as both holding and atomizing the liquid.” Ex.1045 at 5 (Decision Denying Petitioner’s Request for Rehearing); *see also* Ex.1046 at 10-13 (Decision Denying Institution of *Inter Partes* Review). Petitioner respectfully submits that a different conclusion is mandated by the more fully developed record in this IPR. For the reasons set forth above, and as further set forth in the accompanying declaration of Dr. Sturges, Petitioner has demonstrated that Brooks teaches two embodiments for the heating element configuration, one of which calls

Finally, Brooks discloses that preferred heating elements include carbon filament yarns, carbon felts, and activated carbon felts (*Id.*, 7:48-64), but also contemplates “other suitable heating elements” such as, *inter alia*, “porous metal wires or films; carbon yarns, cloths, and fibers.” *Id.* at 7:65-8:2.

2. Whittemore (Ex.1003)

Whittemore is prior art under 35 U.S.C. §102(b). Whittemore discloses a vaporizing unit, which is illustrated in annotated Fig. 2.



A vaporizing vessel A is “adapted to hold a liquid medicament x and provided with an electrically-operated heating means comprising two electrical conductors 1 and 2 and a filament or heating element 3 combined in such a way for a distinct heating element in “intimate contact” with a porous substrate.

Ex.1004, ¶¶49-51, 61-63

that when said conductors are energized by an electric current, the filament 3 will become heated.” Ex.1003 at 1:18-28. Whittemore’s heating element is in intimate contact with a portion of a wick, namely, the heating element 3 is coiled around a portion of wick D. The other portion of wick D extends beyond the heating element and into the liquid medicament x. According to Whittemore, the wick D is “made of any suitable material and combined with the heating element or filament 3 in such a way that a portion of said wick is always in contact or approximate contact with the heating element or filament 3, and a portion of said wick is always in contact with the medicament in the vaporizing vessel, whereby said medicament will be carried by capillary action to a point where it will be vaporized by the heat from the filament 3.” *Id.* at 1:54-2:8.

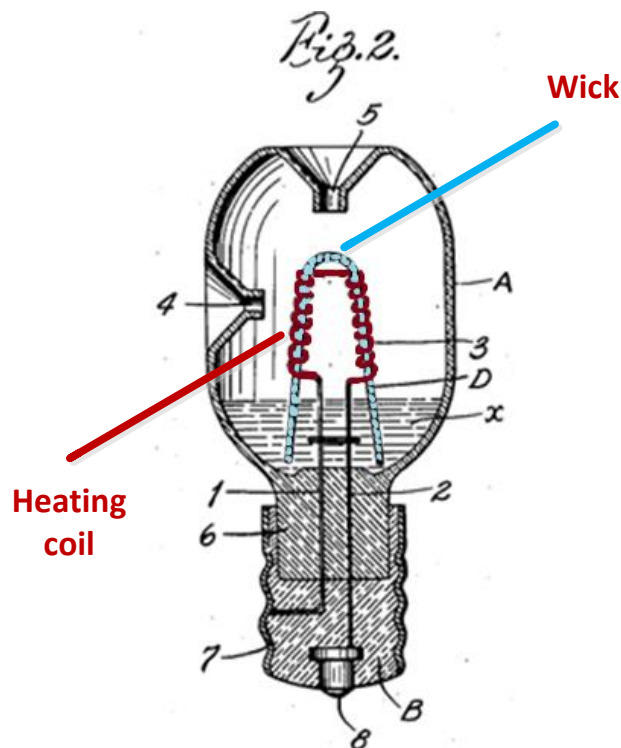
Whittemore also includes an air inlet orifice 4 and a vapor outlet 5. *Id.* at 1:31-33.

E. Claims 1-22 Are Unpatentable As Obvious Over Brooks In View Of Whittemore

The challenged claims are unpatentable as obvious under 35 U.S.C. §103 over Brooks in view of Whittemore. The combination of Brooks and Whittemore disclose all the features of the challenged claims. Brooks discloses all the claimed features with the arguable exception of a heater coil wound around a porous component. However, that teaching is provided by Whittemore.

Brooks discloses that its heating element can constitute a “metal wire,” and further discloses that the heating element can constitute a heating component in “intimate contact” with “porous substrates.” Ex.1002 at 7:65-8:3. One such “intimate contact” configuration is a heating wire coiled wound around a porous wick as taught by Whittemore. Ex.1004, ¶65. Indeed, Whittemore is cited in Brooks’ “Background of the Invention” section. Ex.1002 at. 1:57-61; Ex.1003, 1:50-2:25.

As noted above, Whittemore teaches a heating coil 3 wrapped around a wick D.



As Whittemore expressly states, wick D is a “porous wick.” Ex.1003 at 3:49-52.

Moreover, in view of Whittemore’s disclosure that wick D may be made of thread

or string (Ex.1003 at 2:8-10), Whittemore further discloses that the porous component includes a fiber material (the string or thread making up the wick D). Ex.1004, ¶91.

The PHOSITA would have understood that Whittemore's coiled heating wire/wick configuration was one of a finite number of predictable ways for arranging a resistance heating component in "intimate" contact with a porous substrate as taught by Brooks. Ex.1004, ¶63. First, as Whittemore itself and other prior art references demonstrate, winding a heating coil around a porous component to generate vapor is a technique that had been widely known in the art of electronic vaporizing devices for decades. Ex.1004, ¶¶63-65; Ex.1003 (Whittemore) at 1:53-2:18, Fig. 2 (disclosing a filament 3 wound around a wick D for vaporizing); Ex.1019 (US2,461,664 to Smith) at 20:36-40 (disclosing a heating element "compris[ing] loops of a coil of electrical resistance wire and the said capillary feeder comprises a stretch of wick passing axially through said coil of wire"); Ex.1020 (US3,234,357 to Seuthe) at 4:73-75 ("The wire 71 is advantageously coiled around a wick or mandrel 63 which is easily wetted.").

Indeed, Brooks itself confirms the conventional nature of heater coils by expressly identifying "coil" heaters and three references identified in its Background section. *See* Ex.1002 at 1:62-66 ("U.S. Pat. No. 2,104,266 to McCormick proposed an article having a pipe bowl or cigarette holder

configuration which included a resistance coil . . .”), 2:40-43 (“In supplemental West German Patent Application No. 2,704,218, Kovacs described a vacuum or draw-actuated switch to switch “on” the battery operated heating coil.”), 3:4-6 (“The article resembled a cigarette holder and reportedly included a battery operated heating coil to heat an untipped cigarette inserted therein.”). Adapting Brooks to include a coil wound around a porous component would have been nothing more than the application of known techniques (winding a heater coil around a porous component) to similar structure (Brooks’ heating component in “intimate contact” with a porous substrate). Ex.1004, ¶66.

Second, a PHOSITA would have been motivated to adapt Brooks to include a heating coil wound around a porous component as taught by Whittemore, because wire coils promote efficient heat transfer. Ex.1004, ¶¶37, 68-69; Ex.1021 (U.S. Patent No. 5,743,251 to Howell et al.) at 11:20-22 (“The wire was wrapped in a fashion that produced close, tight coils to insure good heat transfer to the tube.”); Ex.1020 at 4:75-5:2 (“In order to obtain a stronger heating effect, wire in the upper region is wound in a tighter coiled manner than the lower portion.”). The PHOSITA would have been motivated to adapt Brooks’ “intimate contact” embodiment as taught by Whittemore particularly in view of Brooks’ emphasis on the importance of rapid and efficient heating:

Preferred heating elements normally have low mass, low density, and moderate resistivity, and are thermally stable at the temperatures experienced during use. *Such heating elements heat and cool rapidly, and thus provide for the efficient use of energy.* Rapid heating of the element also provides almost immediate volatilization of the aerosol forming substance.

Ex.1002 at 7:34-40; Ex.1004, ¶¶37, 61, 68-69.

Accordingly, a PHOSITA would have found it obvious to adapt Brooks' heating component in "intimate contact" with a porous substrate by coiling a heating wire around the porous substrate as taught by Whittemore. The proposed modification would have had a predictable result – a heating component that efficiently vaporizes aerosol forming liquid located within the porous substrate.

Ex.1004, ¶¶66, 70.

Alternatively, even if Brooks' "intimate contact" embodiment does not teach a distinct heating element in intimate contact with a porous substrate (and it does), it nevertheless would have been obvious to substitute Whittemore's coiled heating wire/wick configuration for the heating element of Brooks. Ex.1004, ¶¶49-51, 61-65. The proposed combination is the simple substitution of one known element (Whittemore's coiled heating wire/wick) for another known element (Brooks'

heating element) to obtain predictable results (holding and atomizing aerosol forming liquid).

Specifically, Whittemore's heating wire coil/wick configuration and Brooks' heating element perform the same function; they hold and atomize aerosol forming liquid. Ex.1004, ¶¶61, 66-67. It would have been obvious to substitute Whittemore's heater coiled wrapped wick configuration for the porous heating element Brooks, because the proposed substitution is simply the substitution of one known element (Whittemore's heating wire coil/wick configuration) for another known element (Brooks' porous heating element 18) to obtain the predictable result of holding and atomizing liquid. *Id.* The substitution of one known element for another to obtain predictable results is a Supreme Court endorsed rationale that supports a conclusion of obviousness. *KSR Int'l v. Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007) (Where a "patent claims a structure already known in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result"); *See also* MPEP §2143 (I)(B).

The Patent Owner may argue that the proposed substitution of Whittemore's heater coil wrapped wick for Brooks' heating element would not necessarily lead to improved energy efficiency, or perhaps may diminish energy efficiency. But, even if that were true (and it's not), that does not make the proposed substitution

non-obvious. *See, e.g., In re Mouttet*, 686 F.3d 1322, 1334 (Fed. Cir. 2012) (a known system such as an arithmetic/logic unit “does not become patentable simply because it has been described as somewhat inferior to some other product for the same use.”)

Also, in other IPRs the Patent Owner has unjustly criticized other petitioners for failing to explain exactly how the proposed substitutions or modifications would be physically made. However, as the Board knows, there is no requirement that Petitioner illustrate how to physically combine the teachings of the art. *Id.* at 1332-33 (“It is well-established that a determination of obviousness based on teachings from multiple references does not require an actual, physical substitution of elements.”) (citations omitted). Rather, as the Federal Circuit notes, the test for obviousness “is what the combined teachings of the references would have suggested to those having ordinary skill in the art.” *Id.* at 1333.

1. Claim 1

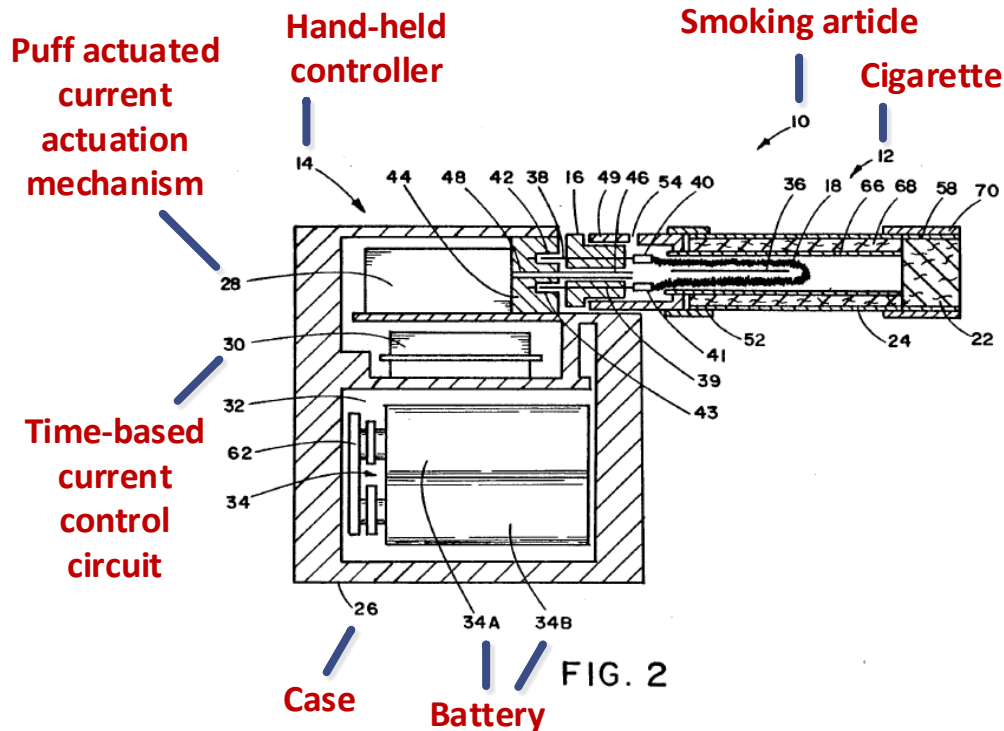
a. “A vaporizing device comprising”

To the extent that the preamble is considered a claim limitation, Brooks discloses a vaporizing device. Brooks is directed to “[s]moking 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.1002 at Abstract. Ex.1004, ¶¶72, 124.

- b. “a battery assembly comprising a battery, a sensor, an LED and a micro-controller unit electrically connected to a circuit board within a tubular battery assembly housing”**

Brooks discloses a battery assembly comprising a battery, a sensor, and LED and a micro-controller unit electrically connected to a circuit board within a tubular battery assembly housing. Specifically, Brooks discloses a device having two discrete components: (1) a reusable controller 14 that contains batteries and other electronic components and (2) a disposable portion 12 that includes the heating component and liquid. The controller 14 includes batteries 34A and 34B and thus constitutes “a battery assembly.” Ex.1002 at 7:15-25, *see also* Ex.1004, ¶¶73, 124. The controller 14 further comprises “a case 26 or outer housing” that houses batteries 34A and 34B and thus is “a battery assembly housing.” *Id.* at 9:37-41; Ex.1004, ¶¶73, 124.

Brooks discloses that controller 14 may be in the form of a hand-held unit. One embodiment of a hand-held controller 14 is illustrated in, *e.g.*, Fig. 2.



Brooks further discloses that the controller 14 can have a tubular shape such as a pipe or cigarette holder. Ex.1002, 4:46-49 (“The reusable controller can be *in the form of a pipe, a reusable cigarette holder*, or a hand-held unit or other portable form into which the disposable portion can be inserted.”). The PHOSITA would have readily understood that a “pipe” and “cigarette holder” are tubular shaped structures. A “pipe” refers to a narrow tube with a tubular-shaped bowl at one end. See Ex.1002 at Figs. 7 and 8. A cigarette holder is also a tubular shaped structure for receiving a cigarette. See e.g. Ex.1015 (Kleinhans) at 2:3-4 (“The new smoking device comprises *a tubular cigarette holder generally of conventional design*.”); Ex.1016 (Bonanno) at 2:27-43 (“Referring to FIG. 1, the invention is illustrated as embodied in a cigarette holder ... Mounted concentrically within the

outer sleeve 11 and spaced therefrom is a telescoping double-walled inner sleeve 14 comprising *a metal outer tubular portion 14a* formed with a spacing shoulder at its right hand end flange. Received within the outer portion 14a in a close sliding fit is *an inner tubular portion 14b ...*”); Ex.1004, ¶74.

The 205 patent also confirms that a cigarette holder is a tubular shaped structure. *See* Ex.1001 at 1:60-61. (“As shown in FIG. 1, an electronic cigarette *has an appearance similar to a cigarette inserted into the cigarette holder.*”) *Id.* at Figs. 1, 2; *see also* Ex.1014 (parent application publication of the 205 patent) at ¶ [0026], Fig. 1 (“As shown in Fig. 1, the *visual appearance of this invention is similar to a cigarette inserted into the cigarette holder*, and includes a battery assembly, an atomizer assembly and a cigarette bottle assembly.”); Ex.1004, ¶74. Thus, the patentee confirmed that the PHOSITA would have understood that a cigarette holder to be tubular. Accordingly, Brooks discloses a tubular “cigarette holder” or “pipe” shaped embodiment for controller 14.

Brooks discloses a sensor (“puff actuated current actuation mechanism 28” or “puff actuated switch 28”) within the tubular battery assembly housing (case 26). Ex.1002 at 7:20-25, 12:58-13:6, Fig. 2. Brooks discloses that the puff actuated switch 28 for sensing the difference in air pressure or airflow. *Id.* at 13:1-6, 10:42-45, 59-63, 12:47-57 (“A typical puff actuated switch includes a means for sensing the difference in air pressure in a region within the previously described

cigarette or disposable cartridge and an "on-off" switch responsive thereto.”). *Id.* at 17:46-50; Ex.1004, ¶¶75, 124.

As illustrated in Fig. 3 of Brooks, an LED (“light emitting diode 81”) is electrically connected to the electrical circuitry so that the LED emits light when the user takes a draw on the Brooks device. Ex.1002 at Fig. 3, 11:35-41 (“A light emitting diode 81 is positioned near the differential switch 28. The diode 81 is electrically connected to the electrical circuitry ... such that it emits light during draw. As such, the user has a visual means for identifying periods when current passes through the resistance heating element 18.”). Although the LED 81 is not expressly illustrated in Fig. 2, Brooks teaches that the LED 81 illustrated in Fig. 3 is nonetheless present, or certainly can be included, in the Fig. 2 embodiment. The primary difference between Figs. 2 and 3 embodiments of Brooks is the inclusion in Fig. 3 of flexible cord-like connector 72. *Id.* at 11:20-25 (“Referring to FIG. 3, the illustrated embodiment is generally similar to the embodiment of FIG. 2, except that the controller or power pack 14 includes a flexible, cord-like connector 72 [].”); Ex.1004, ¶¶76, 124.

Brooks also discloses a micro-controller unit consisting of a “time-based current control circuit 30.” Ex.1002 at 7:20-25, 13:7-61, Fig. 2. The time-based current regulating circuit “preferably includes a transistor 110, a timer 112, a comparator 114, and a capacitor 116.” *Id.* at 13:20-22; Fig. 9. “The timer means

for regulating (or interrupting) current flow after the initial time period includes timer 112, diodes 140, 141, resistors 143, 145, and capacitor 147.” *Id.* at 13:62-64; Fig. 9. Brooks discloses that “[t]his timer means generates a periodic digital wave having a preset on-off duty cycle, which is used to rapidly switch the current "on" and "off" at transistor 110 after the passage of the initial time period, to control the temperature range experienced by the resistance heating element.” *Id.* at 13:62-14:2, 10:42-58; *see also* 14:3-16:51, claims 161-202.

The time-based current control circuit disclosed in Brooks performs functions similar to those of the microcircuit 206 described in the 205 patent.² For example, Brooks’ time-based current regulating circuit “generates a periodic digital wave having a preset on-off duty cycle ... to control the temperature range experienced by the resistance heating element” and “control[s] the passage of current through the resistance element during periods of current actuation.” *Id.*,

² The 205 patent does not mention a “micro-controller unit” in the written description. Petitioner assumes, without conceding, that the “microcircuit (206) in the written description corresponds to the “micro-controller unit” recited in the claims. Petitioner expressly reserves the right to assert in other proceedings that the 205 patent specification does not provide adequate written description for the claimed “micro-controller unit.”

12:43-46; 13:62-14:2, 10:42-58; *see also* claims 97 (the time-based current regulating circuit “generat[es] a pulse train having a predetermined duty cycle,” and “enabl[es] and disable[es] current flow to the heating element in response to the pulse train from the timer means”), 104, 161-202. Accordingly, like the microcircuit 206 of the 205 patent, Brooks’ “time-based current regulating circuit 30” regulates the electricity flow through the device. Ex.1004, ¶¶77-79.

Brooks discloses that the battery (“batteries 34A and 34B”), the sensor (“puff actuated current actuation mechanism 28”) and the LED (“light emitting diode 81”) are electrically connected to the time-based current regulating circuit 30. Ex.1002 at 9:51-56 (“Controller 14 also preferably includes a control circuit 30, which is connected to a puff actuated, differential pressure sensitive switch 28 by electrically conductive wires (not shown), as well as to batteries 34A and 34B via battery terminal 62. The control circuit 30 preferably is time based.”), 11:35-41 (“A light emitting diode 81 [] is electrically connected to the electrical circuitry”), Figs. 9, 10.

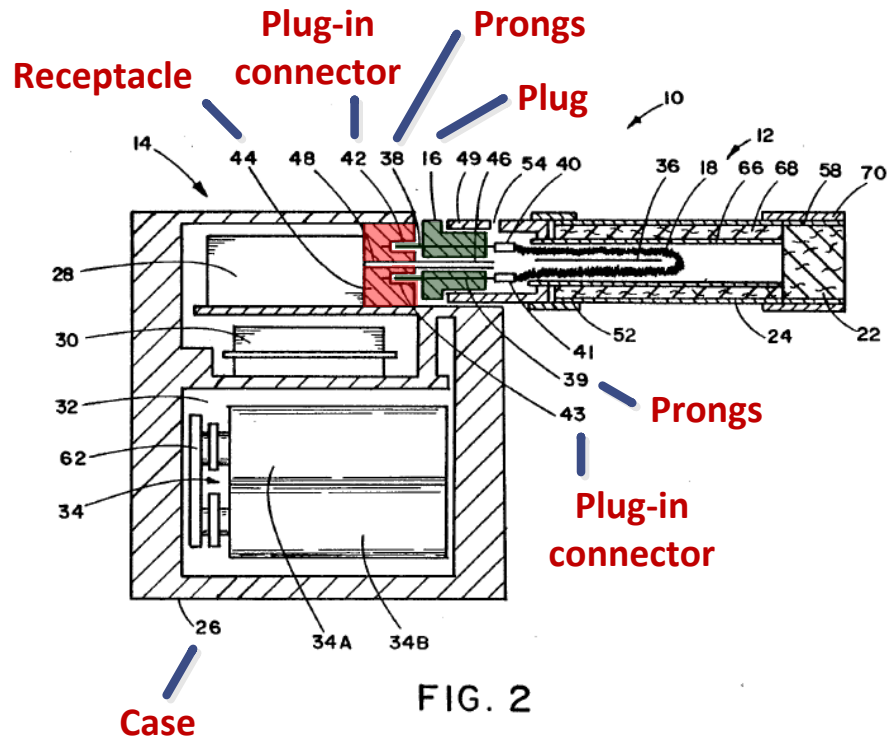
A PHOSITA would have understood that Brooks’ time based current control circuit 30 is housed upon and electrically linked via one or more circuit boards. *See* Ex.1002 at Figs. 9, 10; Ex.1004, ¶79. This is further confirmed by Brooks’ use of pin connectors for connecting cigarette 12 to controller 14. Ex.1002 at 13:31-51. As the PHOSITA would have readily understood, pin connectors were a well-

known means for linking electrical circuit components to a circuit board. Ex.1004, ¶¶51, 79; Ex.1017 (US5,266,746 to Nishihara et al.) at 1:20-25 (“In order to connect the semiconductor elements and devices mounted on the printed circuit board to an external circuit, there have been widely used connector pins of such a type that the printed circuit board is clamped by the pins at its peripheral portion from front and rear surfaces.”); Ex.1018 (US4,968,263 to Silbernagel et al.) at 1:14-17 (“Multi-pin electrical connectors are widely used for connecting circuit traces on printed circuit boards with other printed circuit boards or with a complementary connector.”).

In summary, Brooks discloses a battery assembly (controller 14) comprising a tubular battery assembly housing (case 26), a battery (batteries 34A and 34B), a sensor (“puff actuated current actuation mechanism 28), an LED (light emitting diode 81), and a micro-controller unit (the “timer means” including timer 112, diodes 140, 141, resistors 143, 145, and capacitor 147) electrically connected to a circuit board (control circuit 30) within the battery assembly housing (case 26). These elements (with the exception of LED 81) are expressly illustrated in Fig. 2 of Brooks. And, as discussed above, Brooks discloses that the controller may take a tubular form.

c. “a first electrode at an end of the battery assembly housing”

Brooks discloses a first electrode at an end of the battery assembly housing. Specifically, Brooks discloses a first electrode comprising plug-in connectors 42 and 43 of receptacle 44 located at an end of the battery assembly housing formed by case 26. Ex.1002 at 9:41-43 (“Controller 14 includes an insulative receptacle 44 which includes plug-in connectors 42, 43 for engagement with prongs 38, 39 of plug 16.”). Accordingly, plug-in connectors 42 and 43 of receptacle 44 and prongs 38, 39 of plug 16 constitute a first electrode and a second electrode, respectively. Ex.1004, ¶¶80, 124. Brooks discloses that disposable portion 12 can be detachably connected to the battery assembly housing through a plug connection that facilitates the flow of electricity and air. Ex.1002 at 10:34-40 (“the user inserts the plug 16 of the cigarette 12 into the receptacle 44 of the controller 14. Such action provides electrical connection of the resistance heating element 18 with the switch 28, the control circuit 30 and the batteries 34A and 34B. Such action also provides for airflow communication between the switch 28 and the inner portion of the cigarette.”).



Accordingly, Brooks discloses a first electrode (receptacle 44, comprising plug-in connectors 42 and 43) located at an end of the battery assembly housing (case 26).

d. “an atomizer assembly comprising an atomizer and a liquid supply in a tubular atomizer assembly housing”

Brooks discloses an atomizer assembly in the form of disposable cigarette or cartridge 12. Ex.1004, ¶¶81, 124; Ex.1002 at 4:7-12, 7:15-16; Fig. 2. The cigarette 12 includes an atomizer assembly housing in the form of tube 68 and collar 49, which houses an atomizer formed by heating element 18 and insulative tube 66. Ex.1004, ¶81; Ex.1002 at 8:43-36, 11:6-16; 17:28-35; Fig. 2.

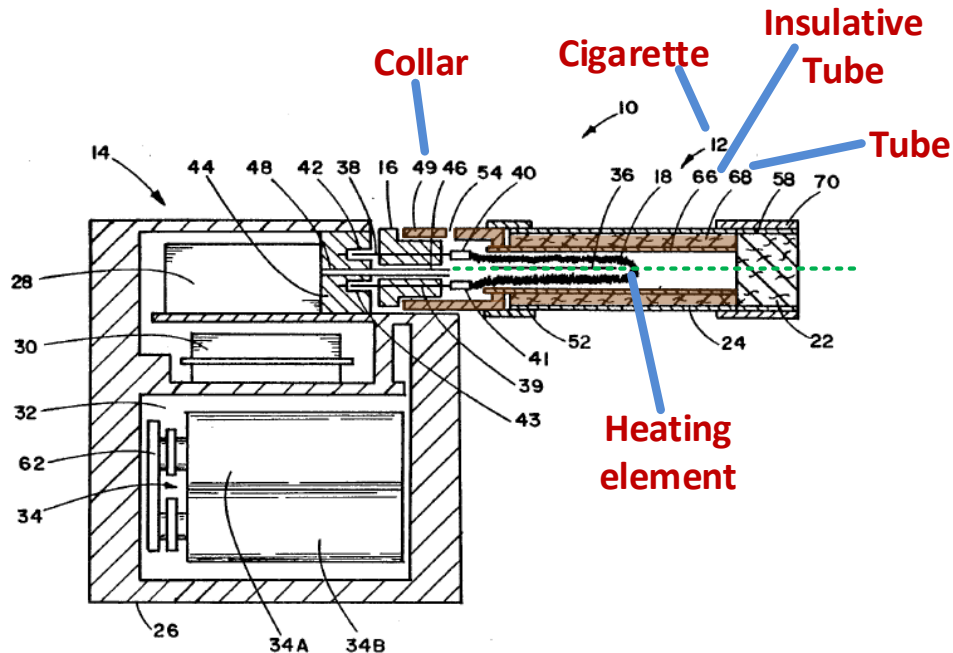


FIG. 2

Brooks also discloses a “liquid supply” in the atomizer assembly (disposable portion 12). Specifically, Brooks discloses at least two embodiments for storing and atomizing liquid within the atomizer assembly: (1) an embodiment where liquid is stored within a porous heating element, and (2) an embodiment where a resistance heating component is “in intimate contact” with a “porous substrate” (*i.e.* the heating element includes a heating resistance component that is distinct from the porous substrate that stores liquid). Ex.1002 at 7:65-8:3 (“Other suitable heating elements include *porous metal wires* or films, carbon yarns, clothes, 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), 6:45-52 (the aerosol forming

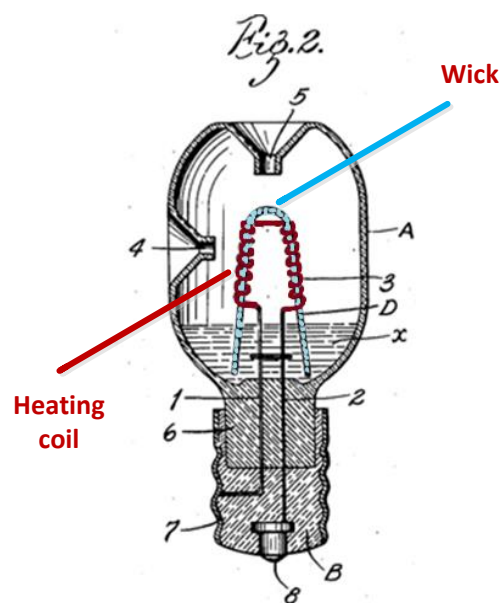
substance can be located “on the resistance heating element or elsewhere in the article.”). Ex.1004, ¶81.

Brooks further discloses that the heating element 18³ is preferably “impregnated with or otherwise carries the aerosol forming substance in order that the aerosol forming substance is in a heat exchange relationship with the electrical heating element.” *Id.* at 8:4-8, *see also* 7:26-33. Brooks’ “aerosol forming substance” is preferably a liquid. *Id.* at 4:22-29 (“Preferably, such porous heating elements are impregnated with liquid aerosol forming substances, such as glycerin, and with tobacco extracts. Such heating elements are particularly advantageous in that they are capable of holding and efficiently releasing relatively large quantities of liquid aerosol forming substances and tobacco flavor materials.”); *see also id.* at

³ Heating element 18 of Brooks to may comprise a heating component in “intimate contact” with a porous substrate inside an atomization chamber formed by insulative tube 66. Ex.1002 at 7:65-8:3, Fig. 2. A similar arrangement is disclosed in the 205 patent, which shows the “heating body” comprises both a porous material and a wire wound around the porous material inside an atomization chamber. Ex.1001 at 3:27-30 (“The heating body (305) is made of the micro-porous ceramics on which nickel-chromium alloy wire, iron-chromium alloy wire, platinum wire, or other electro thermal materials are wound.”), Fig. 8.

8:8-22, 17:6-9. Accordingly, Brooks discloses that the heating element and/or the porous substrate of the “intimate contact” embodiment are impregnated with liquid that is ultimately vaporized. Ex.1004, ¶83.

Alternatively, as discussed above, it would have been obvious to substitute Whittemore’s coiled heating wire/wick configuration for Brooks’ heating element. Whittemore describes a wick D made of thread or string that is surrounded by “coiled or looped portions” of a “filament 3” which acts as a heater when electric current is run through it. A portion of the wick D that extends beyond the heating coil transports liquid medicament via capillary action to the portion of the wick D where the medicament will be vaporized by the heat from filament 3. Ex.1003 at 1:53-2:18. Whittemore’s wick D is a liquid supply, and thus adapting Brooks’ heating element by substituting Whittemore’s coiled heating wire/wick configuration also meets the “liquid supply” limitation. Ex.1004, ¶¶82-83.



To the extent that this claim requires a “liquid supply” distinct from the porous component with a heater coil wound around it, it would have been obvious to a PHOSITA to add such a liquid supply to the Brooks device in view of a PHOSITA’s knowledge and experience, in order to improve the liquid storage capacity of the disposable portion 12 of the Brooks device. Specifically, Brooks discloses that each disposable cigarette or cartridge contains enough liquid for approximately 6-10 puffs. Ex.1002 at 4:29-31, 10:66-11:5. Brooks further states that the liquid storage structures of the disclosed device are “advantageous” because they are “capable of holding and efficiently releasing relatively large quantities of liquid aerosol forming substances.” Ex.1002 at 4:25-29. Accordingly, in view of Brooks’ own teaching that “holding...large quantities of liquid aerosol forming substances” is “advantageous,” a PHOSITA would have been motivated to improve upon the liquid storage structures disclosed in Brooks by improving their overall capacity to store liquid. Ex.1004, ¶83. This motivation from Brooks would have reinforced other motivations that would have likewise led the PHOSITA to increase liquid storage capacity, such as the avoidance of waste that would result from reducing the frequency of cartridge replacement and disposal. *Id.*

The PHOSITA would have been aware of many ways of improving liquid storage capacity that would have been obvious to implement in the Brooks device.

Id. One simple approach would be an extension of the porous substrate Brooks describes, such that a first section is wound with heater coil and a second section is impregnated with liquid but not in contact with the heater coil (*i.e.*, the porous material extends past the heating wire) as disclosed, for example, by Whittemore.

Id. As Dr. Sturges explains, this second section would act as a liquid reservoir for the first section because, as heat from the coil vaporized liquid in the first section proximate the coil, liquid impregnated within the second section would flow to the first section via capillary action. *Id.* The PHOSITA would have been familiar with the use of additional porous material as a means for holding liquid in this way since such methods have been in use in the art of vaporizing devices for decades as evidenced by Whittemore and other prior art references. For example, Hayward-Butt teaches a device in which a first section of porous material (a wick) supplies liquid to a second section of porous material (a fibrous absorbent) for volatilization. *See, e.g.*, Ex.1034 at 1:48-2:7 (“... the means for feeding the liquid to the chamber for the absorbent may conveniently consist of a wick, one end of which is embedded in fibrous absorbent...[t]he absorbent may consist of other fibrous material or of a coil of the wick itself.”). *See also* Ex.1004, ¶83.

Modifying Brooks’ substrate (as described in the “intimate contact” embodiment of the heating element 18) in this way, or, in the alternative, adapting Brooks to have the heating wire coil/wick configuration of Whittemore (which expressly

discloses a section of wick extending beyond the heating wire coil that stores and transports liquid medicament), would have been a simple modification that would predictably result in increased liquid storage capacity in the disposable cartridge or cigarette 12 of Brooks, and therefore would have reduced the frequency of removal and replacement. *Id.*

Dr. Sturges' opinion concerning the obviousness of adding additional liquid storage to Brooks is supported by the factual findings of a British tribunal evaluating the patentability over Brooks of European Pat No. 2 022 349 ("EP 349," Ex.1047), which is the European counterpart to U.S. Pat. No. 8,365,742 and which – on its face – claims the benefit of the same 2006 Chinese application to which the 205 patent claims priority. The British judge, after evaluating the parties' expert evidence, noted that even Patent Owner's expert "accepted that there was nothing clever about increasing the volume/capacity of the porous component in Brooks to make sure it held enough liquid for purpose [sic] and he accepted that an obvious way to do it was to wrap more of the component around the ends to provide a reservoir." Ex.1047, ¶148. Thus, for the reasons set forth above, it would have been obvious in view of Brooks, or Brooks in combination with Whittemore and the general knowledge within the art, to provide an additional liquid supply, including by extending the porous substrate that is in "intimate contact" with the heating element of Brooks, or adapting Brooks to include the

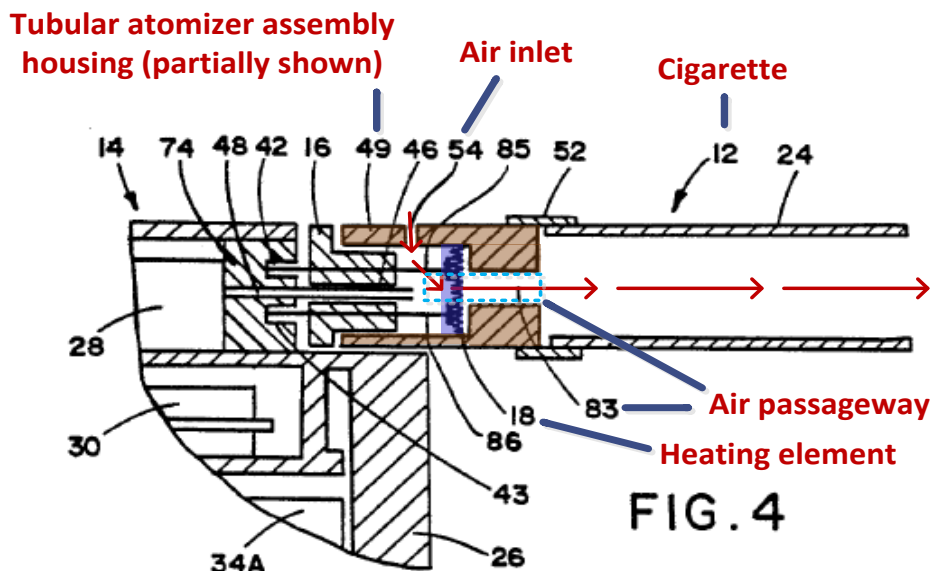
heating wire coil/wick configuration of Whittemore in which the wick extends beyond the heating coil, such that a reservoir for storing additional aerosol forming liquid is provided.

Accordingly, Brooks discloses an atomizer assembly (disposable portion 12) comprising an atomizer (including at least heating element 18 and insulative tube 66) and a liquid supply (which is contained within heating element 18, the porous substrate in “intimate contact” with the heating element and/or Brooks adapted as taught by Whittemore to have either a porous substrate or wick extending beyond the heating coil) in a tubular atomizer assembly housing (the combination of collar 49 and tube 68).

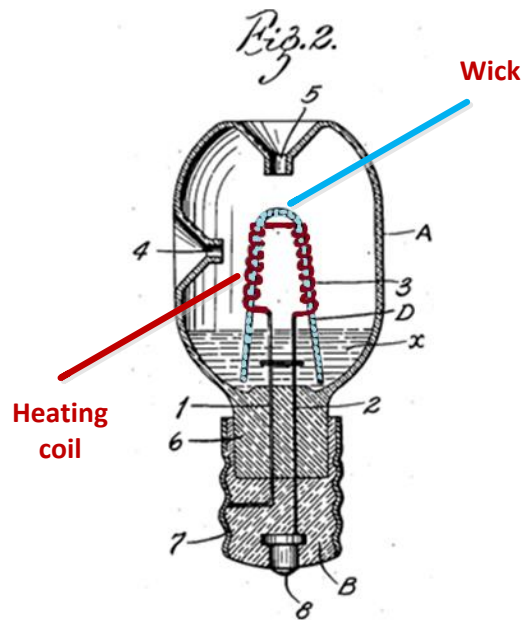
- e. **“with the atomizer including a heater wire coil wound around a porous body, with the heater wire coil and the porous body positioned perpendicular to a longitudinal axis of the tubular atomizer assembly housing”**

Brooks in view of Whittemore discloses an atomizer including a heating coil wound around a porous body and positioned perpendicular to a longitudinal axis of the tubular atomizer assembly housing. As discussed above, Brooks discloses that its heating element can constitute a “metal wire,” and discloses that the heating element can be in “intimate contact” with a porous substrate. Ex.1002 at 7:65-8:3. Brooks also discloses embodiments where either a portion of the heating element (annotated Fig. 2 below) or the entirety of the heating element (annotated Fig. 4) is

perpendicular to the longitudinal axis of the tubular atomizer assembly housing of cigarette or cartridge 12. *See e.g.*, Ex.1002 at 24:22-24 (“The disposable article of claim 35, wherein the heating element is positioned substantially perpendicular to the longitudinal axis of the air passageway.”). As discussed above, it would have been obvious to coil Brooks’ heating element around the porous substrate that is in “intimate contact” with the heating element of Brooks as taught by Whittemore. Ex.1004, ¶84.



Alternatively, as discussed above, it would have been obvious to substitute Whittemore’s coiled heating wire/wick configuration for Brooks’ heating element. Whittemore describes a wick D made of thread or string that is surrounded by “coiled or looped portions” of a “filament 3” which acts as a heater when electric current is run through it. Ex.1003 at 1:53-2:18; Ex.1004, ¶¶61, 66-70, 84.



Thus, for the reasons noted above, it would have been obvious to adapt Brooks' resistance heating component as taught by Whittemore. When Brooks is modified in this manner, the part of the porous substrate (or porous wick) on which the resistance heating component is wound is perpendicular to a longitudinal axis of the tubular atomizer assembly housing. Ex.1004, ¶¶84, 124.

Accordingly, Brooks in view of Whittemore discloses a heater coil (the heating component of heating element 18 in coil form as taught by Whittemore's filament 3) wound around a porous component – Brooks' porous substrate that is in "intimate contact" with heating element 18, or, in the alternative, Whittemore's heating wire coil/porous wick configuration substituted for Brooks' heating element 18 – with the heater coil and porous body positioned perpendicular to a

longitudinal axis of the tubular atomizer assembly housing in disposable cigarette or cartridge 12.

- f. **“the heater wire coil and the porous body in an airflow path through the tubular atomizer assembly housing leading to a suction nozzle wherein air passes across the heater wire coil and the porous body”**

Brooks, modified as taught by Whittemore, discloses a mouth end filter 22 (*i.e.*, “suction nozzle”) and an air inlet 54. Ex.1002 at 9:16-18, 10:40-53, 11:46-49; Figs. 1-2, 5-6; claims 10 (“The cigarette of claim 1, wherein the cigarette includes an air passageway at least partially therethrough, and the heating element comprises an air permeable heating element positioned in the passageway”). The “ambient air enters the cigarette through air inlet 54” and enters tube 66 and passes over the heating element 18 and “exits the mouthend filter 22 into the mouth of the user.” *Id.* at 10:40-53. Every figure in Brooks discloses that the heating element is in the airflow path. Ex.1002, Figs. 1-8. For example, as shown in annotated Fig. 2 below, the red dotted line illustrates an airflow path in the tubular atomizer assembly housing from the inlet (54), across the heating element 18, and out mouthend filter (22).

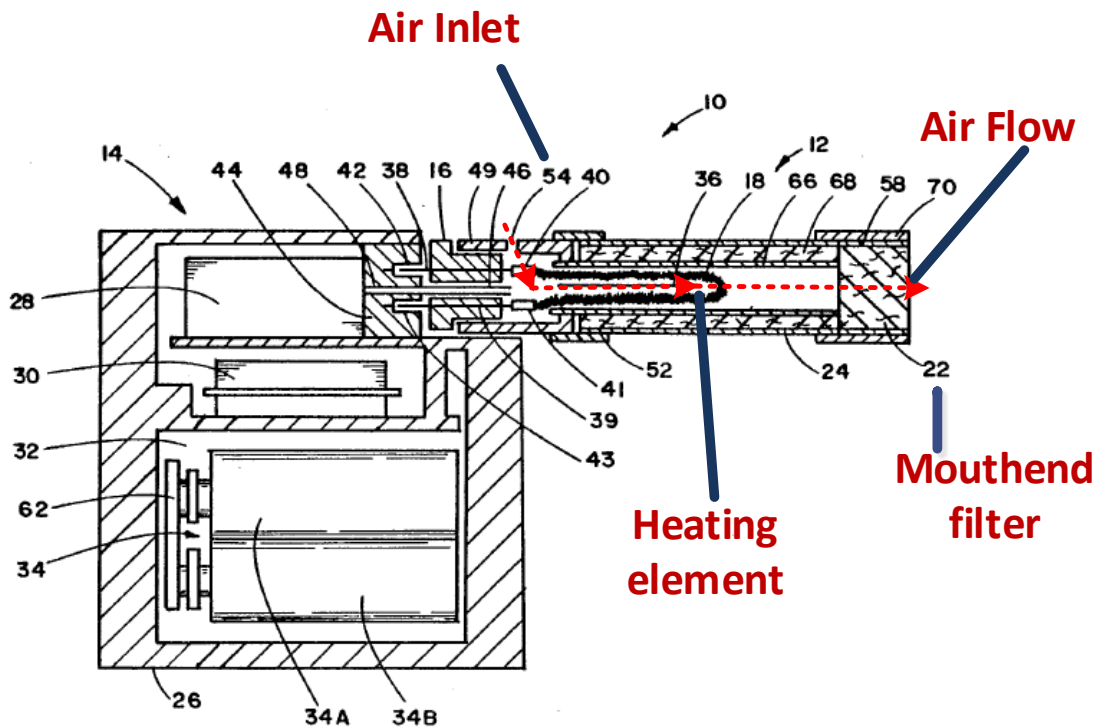


FIG. 2

Accordingly, because Brooks in view of Whittemore discloses that the heating element 18 can be a wire coil wound around a porous component in “intimate contact” with the heating element or, in the alternative, a heating coil wire/wick configuration substituted for heating element 18, Brooks as modified by Whittemore discloses a heater wire coil and porous body (either the porous substrate of the “intimate contact” embodiment of heating element 18 or Whittemore’s porous wick) in an airflow path through the tubular atomizer assembly housing leading to a suction nozzle (mouthend filter 22), with air passing across the heater wire coil and porous body. Ex.1004, ¶¶85, 124.

g. “a second electrode at an end of the atomizer assembly housing”

Brooks discloses a second electrode at an end of the atomizer assembly housing. Specifically, Brooks discloses that plug 16 (which includes prongs 38, 39) conducts electricity between the battery assembly (controller 14) and the heating element, and thus constitutes an electrode. Ex.1004, ¶86; Ex.1002 at 8:33-38 (“The plug 16 includes two electrical connector pins or prongs 38, 39 connected to the ends of heating element 18 via connectors 40, 41. The pins 38, 39 engage with electrical terminals 42, 43 located on electrical connection receptacle 44 of the controller 14.”); *see also* claim 1. Further, as shown in annotated Fig. 2 below, plug 16 is located at an end of the atomizer assembly housing (tube 68 and tubular collar 49 of disposable portion 12), opposite from the mouthend filter 22. Ex.1002 at Fig. 2.

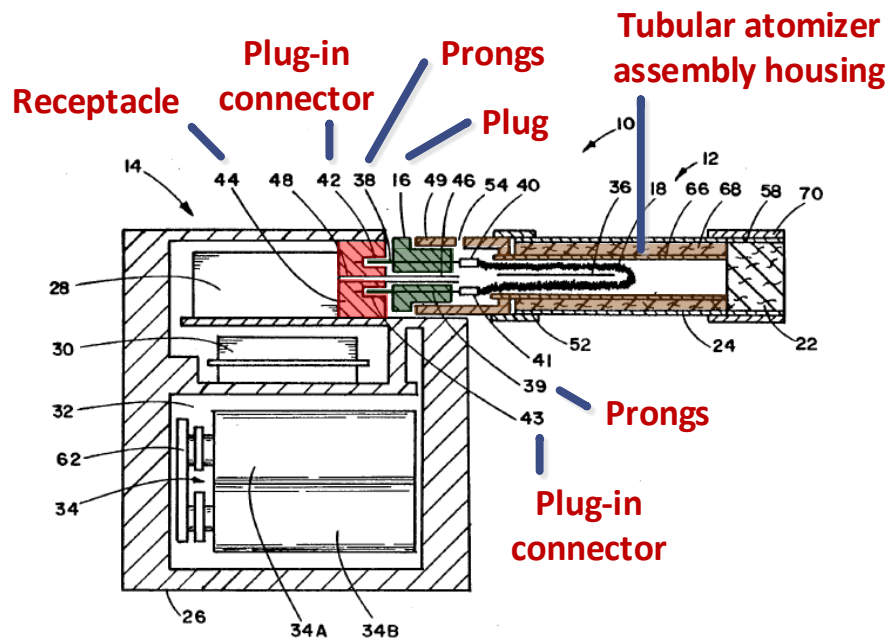


FIG. 2

Accordingly, Brooks discloses a second electrode (plug 16, including its constituent prongs 38, 39) at an end of the atomizer assembly housing (tube 68 and collar 49).

- h. “the battery assembly and the atomizer assembly electrically connected by engagement of the first electrode with the second electrode, and with electricity conducted from the battery to the heater wire coil through the first and second electrodes”**

Brooks discloses that the battery assembly and atomizer assembly are electrically connected by engagement of the first electrode with the second electrode from the battery. As illustrated in annotated Fig. 2 above, Brooks discloses that, when controller 14 and disposable portion 12 are connected via

receptacle 44 and plug 16, electricity is conducted from the batteries within controller 14 (the battery assembly) through the conducting terminals of receptacle 44 (at an end of the battery assembly) and corresponding prongs of plug 16 (at an end of the disposable portion 12, the atomizer assembly), to the heating element. Ex.1002 at 10:34-38 (“In use, the user inserts the plug 16 of the cigarette 12 into the receptacle 44 of the controller 14. Such action provides electrical connection of the resistance heating element 18 with the switch 28, the control circuit 30 and the batteries 34A and 34B”); 8:33 (“The plug 16 includes two electrical connector pins or prongs 38, 39 connected to ends of the heating element 18 via connectors 40, 41. The pins 38, 39 engage with electrical terminals 42, 43 located in electrical connection receptacle 44 of the controller 14”); *see also* Ex.1004, ¶¶87, 124.

Accordingly, Brooks discloses that the battery assembly (controller 14) and atomizer assembly (disposable portion 12) are electrically connected by engagement of the first electrode (receptacle 44) and the second electrode (plug 16), and this connection conducts electricity from the battery (batteries 34A-B) to the heater wire coil (the heating element 18 modified by Whittemore).

2. Claim 2: “The device of claim 1 with the atomizer further including a through hole aligned with the heater wire coil”

Brooks discloses the device of claim 1 as set forth above, and further discloses that the atomizer includes a through hole aligned with the heating

element. Specifically, as shown in annotated Fig. 2, a through hole is formed at the entry of insulative tube 66 and extends through the hollow interior of tube 66 portion of the atomizer. Ex.1004, ¶¶88, 124. The through hole is aligned with heating element 18. *Id.*

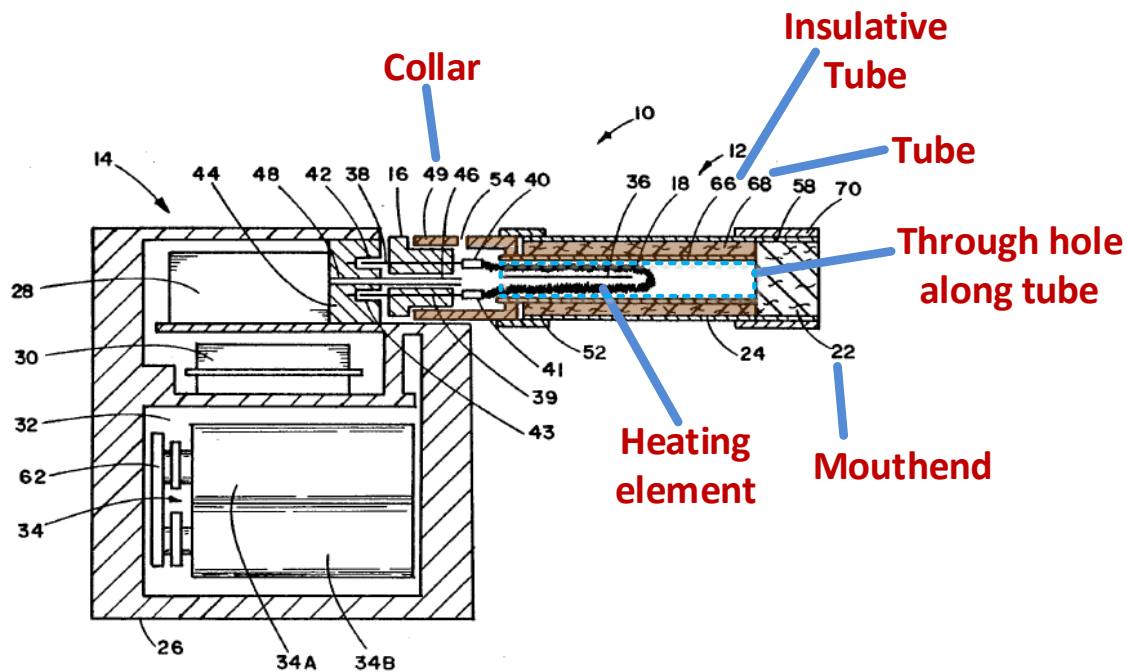
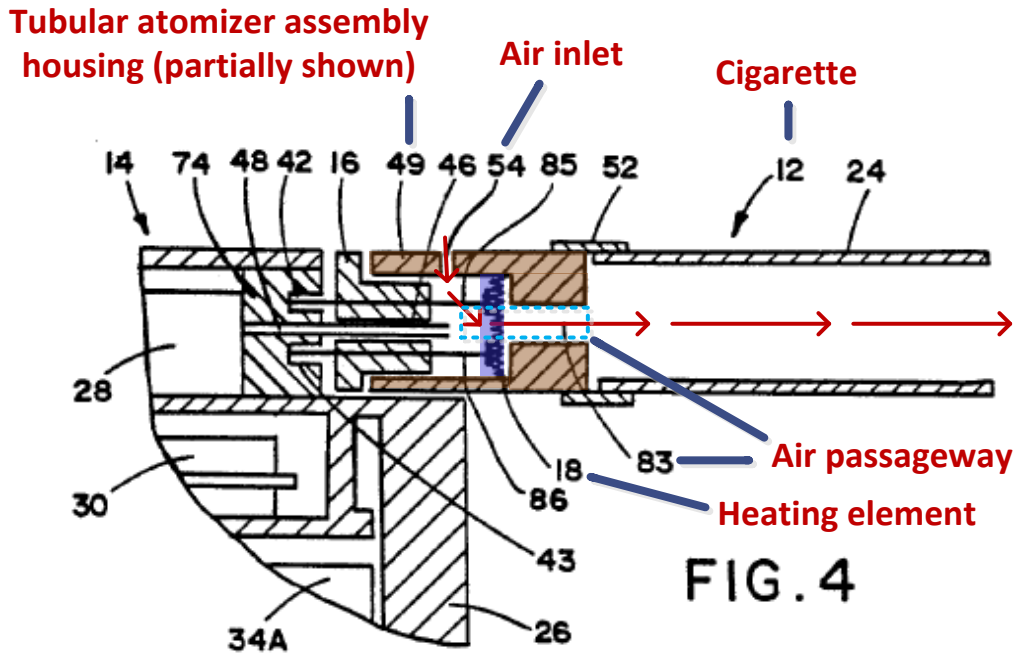


FIG. 2

Similarly, the embodiment of Brooks annotated Fig. 4 below illustrates a through hole formed by air passageway 83 within the atomizer. The air passageway 83 is aligned with the heating element 18. Ex.1002 at 11:42-49 (the heating element “is disposed across an air passageway 83 in tubular collar 49 so that drawn air entering the cigarette 12 through opening 54 passes through the heating element 18”); *see also* Ex.1004, ¶88.



Brooks discloses another through hole, namely the hole formed within hollow tube 48, which has one end in airflow communication with the internal region of the cigarette 12 and the opposite end in airflow communication with pressure sensing switch 28 so that changes in air pressure which occur within the cigarette during draw can be sensed by switch 28. Ex.1002 at 9:41-50. Tube 48 is present in all of the embodiments illustrated in Figs. 1-2 and 4-6, and is shown extending into the atomizer for sensing changes in air pressure. Moreover, and as Brooks discloses in Fig. 6, the tube 48 may optionally extend through the heating element 18. In any event, the hole formed within hollow tube 48 forms a through hole in the atomizer that is aligned with the heating element 18. Ex.1004, ¶88.

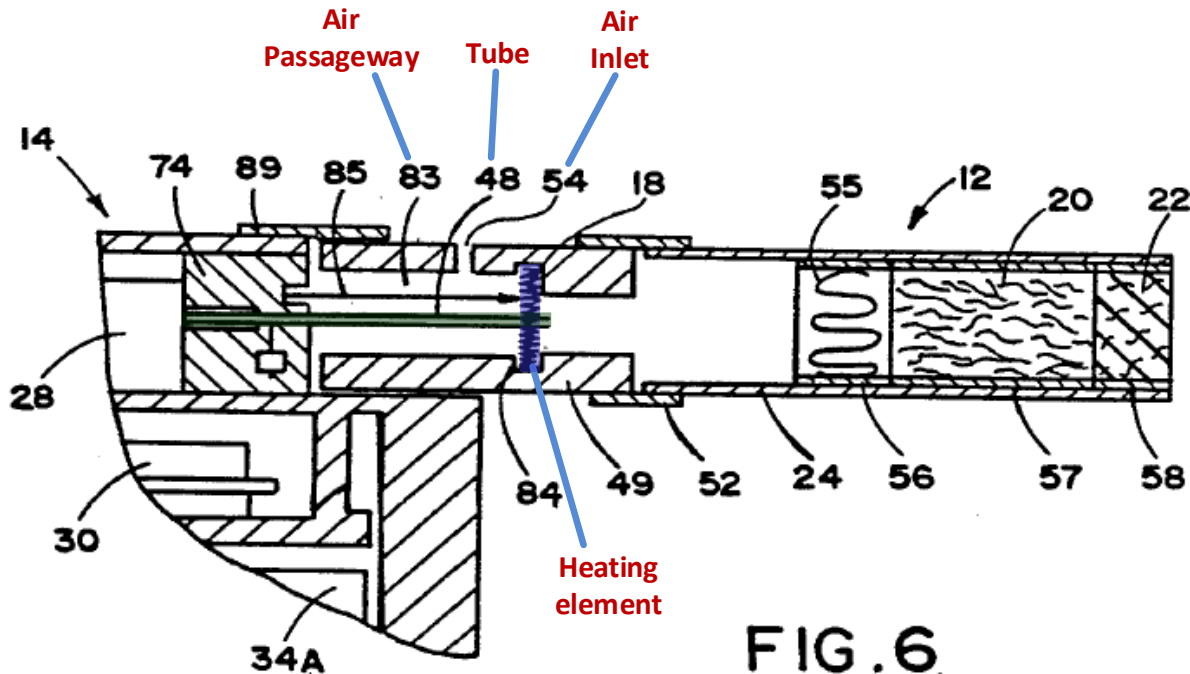


FIG. 6.

Accordingly, the combination of Brooks with Whittemore discloses an atomizer that further includes a through hole (the aperture created by hollow tube 66 as depicted in Fig. 2, air passage way 83 as depicted in Fig. 4, and/or the aperture created by tube 48 as depicted in Figs 1-2 and 4-6) aligned with a heater wire coil wrapped around a porous body.

3. Claim 3: “The device of claim 2 with the through hole centered between spaced apart wire leads of the heater wire coil”

Brooks in view of Whittemore discloses the device of claim 2 as set forth above, and Brooks further discloses or renders obvious the limitation that the through hole is centered between spaced apart wire leads of the heater wire coil.

Ex.1004, ¶124. First, and as illustrated in Figs 1-2 and 4-6, the through hole

formed by the aperture of tube 48 is centered between spaced part metal leads of the heater element, which for the reasons discussed above can be adapted to comprise a wire coil as taught by Whittemore and the other art of record. Ex.1002; *see also* Ex.1004, ¶89.

Pointing to Fig. 1A of Brooks, Patent Owner may argue that the through hole formed by tube 48 cannot be centered because it is offset from the longitudinal axis of plug 16. At a minimum it would have been obvious to a PHOSITA that the through hole, and similarly the electrical pins 38, 39, could be arranged in any particular manner. Ex.1004, ¶89. The relative arrangement of the through hole and the lead wires in plug 16 has no patentable significance, because the relative positioning has no material impact on the function of plug 16. *Id.* Claim limitations that do not distinguish the operation and performance of the purported invention over the prior art do not prevent a finding of obviousness. *See Gardner v. TEC Sys., Inc.*, 725 F.2d 1338, 1349 (Fed. Cir. 1984), *cert. denied*, 469 U.S. 830, 105 S. Ct. 116, 83 L.Ed.2d 60 (1984) (affirming obviousness determination because “the dimensional limitations did not specify a device which performed and operated any differently from the prior art”). As Brooks explains, tube 48 is present to provide “airflow communication with the internal region of the cigarette” and that “[a] needle-like tube 48 extends from switch 28 and extends through resilient overwrap 24 in order that changes in air pressure within the

cigarette during draw can be sensed by the switch.” Ex.1002 at 9:43-46, 11:25-29.

Whether tube 48 (which creates a through hole in the atomizer) is centered or not will not adversely affect the operation of the Brooks’ device. Ex.1004, ¶89.

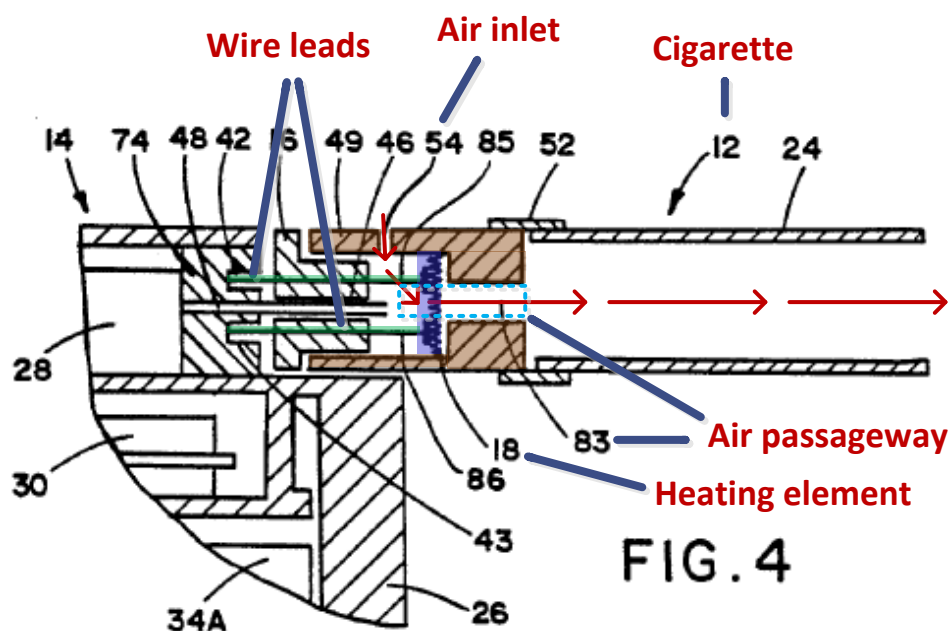
Accordingly, the PHOSITA would not be constrained to locating the through hole as illustrated in Fig. 1A, but would recognize that, as there are no limitations to the positioning of the through hole, the through hole could be centered between pins 38 and 39. *Id.*

Similarly, the physical location of the wire leads is not particularly important. The purpose of the wire leads is to electrically connect the heating element to the battery. *Id.* The wire leads can achieve this function regardless of how they are spaced or arranged relative to the through hole. *Id.* This is consistent with the fact that there is no patentable significance to the arrangement of the through hole with the wire leads. *See Gardner*, 725 F.2d 1338 at 1349.

It would have been well within the skill in the art to have centered the through hole between the electrical leads, and indeed almost every view of Brooks’ device depicts tube 48 vertically centered between the wire leads. Ex.1004, ¶89. It should also be noted that Brooks suggest that tube 48 can be used as one of the connecting pins. Ex.1002 at 11:66-12:2. There is no reason that the tube 48 could not be used for supporting both connecting pins (*e.g.*, lead wires run along the length of the tube 48) thus having a centered configuration. Ex.1004, ¶89. Such a

configuration would allow the tube 48 to, for example, support the lead wire(s) to prevent breakage, and thus it would have been obvious to a PHOSITA that the tube 48 could be centered rather than offset. *Id.* Limitations that do not distinguish the operation and performance of the prior art should not prevent a finding of obviousness.

Second, a through hole formed by air passageway 83 on the air inlet 54 side of the heating element 18 is centered between spaced apart wire leads of the heating element. Ex.1004, ¶¶88-89.



Finally, although the through hole formed by the aperture of tube 66 of the embodiment depicted in Fig. 2 of Brooks is not centered between the spaced apart wire leads for the resistance heater 18, slightly shifting the position of the heating element 18 (i.e., to the right so that a section of the wire leads are located within

tube 66 and the aperture of tube 66 is centered between spaced apart wire leads of the heating element) would have been merely a matter of design choice.

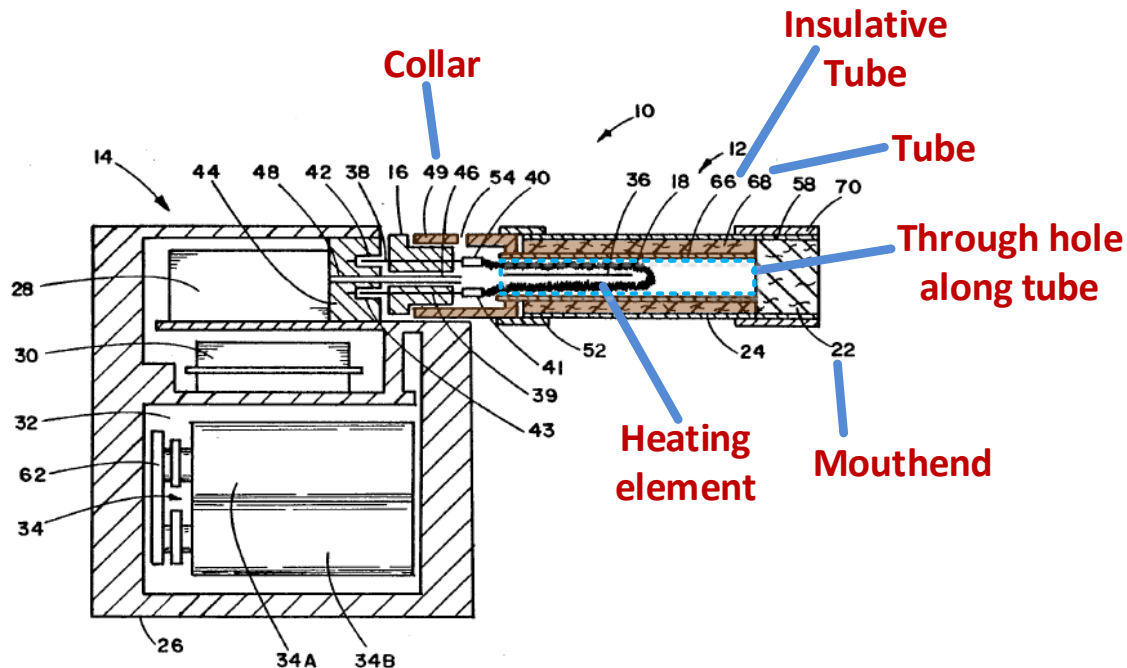


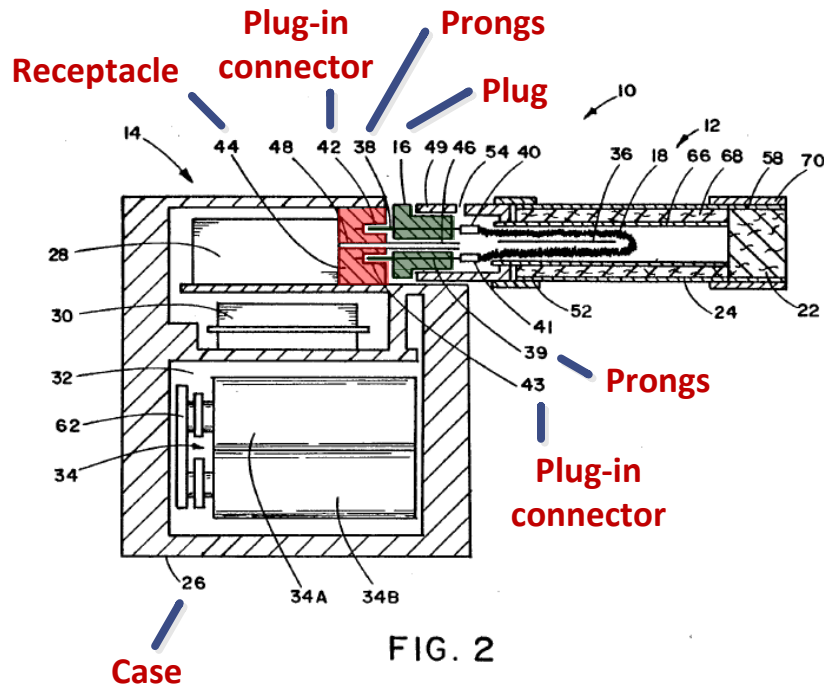
FIG. 2

In other words, and as noted above, there is nothing remarkable about the relative positioning of the wire leads and the through hole, and the PHOSITA would have understood that a slight shift in positioning of the wire leads relative to the aperture of tube 66 would have no effect on the design or operation of the embodiment illustrated in Fig. 2. Ex.1004, ¶188. See *Gardner*, 725 F.2d at 1349; *In re Japikse*, 181 F.2d 1019, 1031 (CCPA 1950) (affirming the Board’s holding that, “[a]s to that limitation it was held that there would be no invention in shifting the starting switch disclosed by Cannon to a different position since the operation of the device would not thereby be modified.”); *Ex parte Lepage*, decision of the

Patent Trial and Appeal Board, Patent Application No. 13/702,970, Appeal No. 2017-3943, Paper No. ____ (not available), 15 pages (May 15, 2017) (changing size of lid from that disclosed by the prior art is not patentable without evidence of how the change would impact performance.)

4. Claim 4: “The device of claim 3 with the airflow path further including an air inlet in a side wall of the tubular atomizer assembly housing at the second electrode”

Brooks discloses an airflow path that includes an air inlet in a side wall of the tubular atomizer assembly housing at the second electrode. Specifically, Brooks discloses an “air inlet 54” in the side wall of collar 49 located at plug 16 (*i.e.*, the second electrode) that provides airflow into the disposable portion 12 of the device. *See e.g.*, Ex.1002 at 8:50-52, 8:43-46, 8:54-55. 10:40-42; Ex.1004, ¶¶90, 124.



Notably, the positioning of the air inlet 54 with respect to plug 16 (the second electrode) that Brooks discloses is very similar to the 205 patent's depiction of the positioning of "air intake hole 502" on the atomizer assembly housing relative to the "internal screwthread electrode." *See e.g.*, Ex.1001 at 2:32-41, Figs. 3, 5a, 5b; *see also* Ex.1004, ¶90. Brooks further discloses that the air inlet may be located "elsewhere through the periphery of the cigarette." Ex.1002 at 8:54-55. As a result, Brooks discloses that the air inlet may be located "elsewhere through the periphery of the cigarette," which includes "at" the second electrode. Ex.1004, ¶90.

According, Brooks in view of Whittemore discloses that the airflow path includes an air inlet (air inlet 54) on a side wall of the tubular atomizer assembly housing (collar 49 and tube 68) at the second electrode (plug 16).

5. Claim 5: “The device of claim 3 further including fiber containing cigarette liquid in contact with the porous body”

Brooks discloses that its device includes a fiber containing liquid in contact with the porous body. As described above, Brooks in view of Whittemore discloses a wire coil wound around a porous substrate. *See* Section VI.E.1.e, *supra*. Brooks further discloses that the wire coil may include “carbon fiber yarn” where the carbon fiber is impregnated with glycerin (cigarette liquid). Ex.1002 at 18:36-40 (“Kynol Catalog No CFY-0204-2 carbon fiber yarn having a length of about 32 nm had a resistance of 18 ohms was used to prepare a heat generating electrical resistance element. The yard had 19 µl of glycerin applied thereto.”); *see also* Ex.1002 at 4:18-25, 7:65-8:3, 12:18-23; claims 8, 9, 16, 33, 34, 41, 58, 59, 60, 79, 109-12, 139-142; Ex.1004, ¶91.⁴ Thus, Brooks discloses fiber containing

⁴ In addition to Brooks, other prior art references recognize that heating wires could be made from carbon fiber. *See also* Ex.1048, Eur. Pat. Pub. 0501419, col. 2:19-36, 2:50-3:4; Ex.1030, US Pat. 6,885,814, Abstract, 1:43-54, 4:11-16, 8:49-54.

liquid (in the form of a specific type of heating wire), which is in contact with the porous body (the porous substrate of the heating element in “intimate contact” with the porous substrate embodiment of Brooks or, in the alternative, adapting Brooks to have a heating wire coil/wick configuration as taught by Whittemore).⁵

This limitation is also met by the combination of Brooks and Whittemore for additional, independent reasons. As noted above in Section VI.E.1.d, *supra*, it would have been obvious to add a distinct liquid supply to extend the useful life of Brooks disposable cartridge or cigarette 12. The liquid supply could take various forms, including by extending a portion of the porous substrate of Brooks’ “intimate contact” embodiment beyond the heating element 18 or, in the alternative, adapting Brooks with the configuration disclosed by Whittemore, where the wick extending beyond the heating wire coil is a liquid supply. In either

⁵ Because the coiled heating wire may be made from fiber containing cigarette liquid, the coiled heating wire satisfies both the “heater wire coil” and “fiber containing liquid” limitations of claim 5. *See Federal-Mogul World Wide, Inc. v. NJT Enterprises*, 2014 WL 6484989, *5-6 (E.D. Mich. 2014) (the same chrome piece in the accused product can satisfy two separate claim limitations), *citing Aspex Eyewear, Inc. v. Altair Eyewear, Inc.*, 288 F.App’x 697, 701–02 (Fed.Cir.2008).

case, the portion of Brooks' porous substrate or Whittemore's wick that extends beyond the coiled heating wire is a liquid supply that includes "fiber containing cigarette liquid." Ex.1004, ¶92. The extending portions of the substrate or wick are thus a "fiber containing liquid in contact with the porous body" consisting of the portion of the porous substrate or wick, respectively, that is wrapped in coiled heating wire. *Id.*

Whittemore also discloses a liquid reservoir for replenishing wick D at the portion of the wick that extends beyond the heating coil. In order to extend the useful life of Brooks' disposable cartridge 12, another obvious design option would have been to include a replenishing cigarette liquid reservoir as suggested by Whittemore, which is in contact with the porous body of the atomizer.

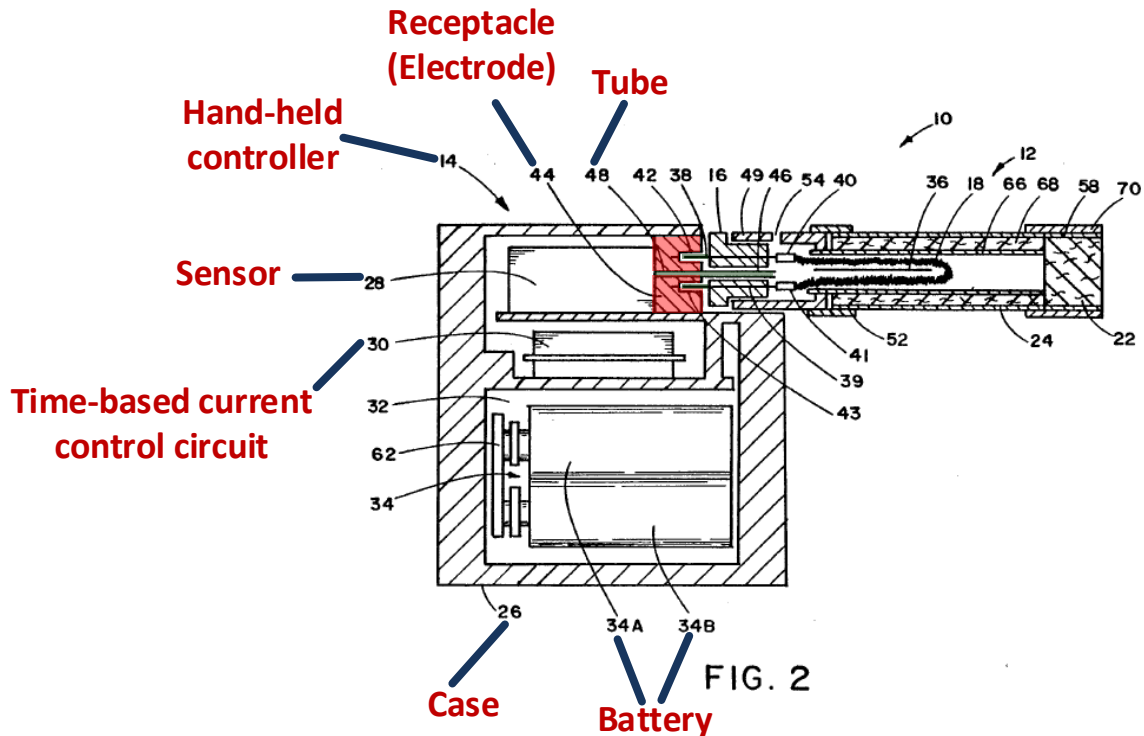
Ex.1004, ¶92. Moreover, it was well-known in the art to store replenishing cigarette liquid in fiber to prevent leakage and spillage. *Id.* For example, Chinese Pat. No. 2719043Y ("Hon 043," Ex.1022; English translation, Ex.1023) discloses an atomizer with a porous body 36 in contact with a fiber containing cigarette liquid contained within liquid-supplying bottle 11. Ex.1023 at p. 9, ll. 3-6, 11-13, 22-24; Fig. 1; p. 10, ll. 1-5 ("A solution storage porous body 28 is provided in the liquid-supplying bottle, and can be filled with polypropylene fiber, terylene fiber or nylon fiber []." *Id.* at p. 10, ll. 1-5. The liquid stored in the fiber containing cigarette liquid of porous body 28 is transported to the porous body 36 via

capillary action. *Id.* at p. 11, ll. 6-8. *See also* Ex.1024 (US6,598,607), 2:44-47; Ex.1025 (US4,793,365), col. 10:51-66; Ex.1026 (US5,203,355), 9:36-52; Ex.1027 (US2,472,282), 3:29-32; Ex.1028 (US2,032,695), 1:46-48. Ex.1004, ¶92.

Accordingly, the combination of Brooks and Whittemore, and if necessary in further view of Hon 043, disclose a fiber containing cigarette liquid in contact with a porous body.

6. Claim 6: “The device of claim 1 with the sensor in between a pressure balancing hole in the battery assembly housing and the first electrode”

Brooks discloses the device of claim 1 in view of Whittemore as set forth above, and renders obvious a “sensor in between a pressure balancing hole in the battery assembly housing and the first electrode” in view of the knowledge of the PHOSITA. Specifically, Brooks discloses a “sensor” (puff actuated switch 28) in the battery assembly housing (case 26) as set forth above with respect to claim 1. Brooks explains that the puff actuated switch is sensitive to the differential in air pressure between the interior of the “cigarette or disposable cartridge” 12 (*i.e.*, the atomizer assembly) and the remainder of the device caused by inhalation. *See, e.g.*, Ex.1002 at 12:51-57; 10-40-45; *see also* Ex.1004, ¶¶93-94.



Brooks confirms that differential pressure sensors were well-known in the art before the claimed priority date of the 205 patent. Ex.1002, 12:58-13:6 (Identifying numerous options including a “preferred puff actuated switch 28 is a pressure differential switch such as Model No. MPL-502-V, range A, from Micro Pneumatic Logic, Inc., Ft. Lauderdale, Fla.”), 17:46-48. It was also well-known that in order for such differential sensors to accurately detect differences in air pressure induced by particular external events such as inhalation, a mechanism for equalizing pressure on both sides of the sensor is necessary to compensate for pressure build-up in the housing. *See, e.g.*, European Pat. No. 1584910 to Tohyama et al. (Ex.1032) at ¶¶3-4 (describing “known” pressure sensors in which a “diaphragm is deformed by the pressure difference between the pressure of fluid

to be measured and the atmospheric pressure” but noting that “[s]ealing the main body case, however, brings about pressure change of the internal space of the main body case due to temperature change or diaphragm deformation, [with the result that] pressure applied to the atmospheric pressure receiving surface of the diaphragm becomes unequal to the atmospheric pressure resulting in a problem of measurement accuracy deterioration”); *see also* Ex.1004, ¶¶93-94.

It was likewise well-known in the art that one simple solution to this pressure build-up problem was to include one or more small holes in the housing for the sensor in order to expose it to ambient air and thus equalize the standby pressure on both sides of the sensor. *See* Ex.1004, ¶¶93-94; *see also* Ex.1032 at ¶5 (“In order to solve the above problem, there is a method that the main body case is not arranged to have sealed structure, but a vent is provided to communicate the internal space of the main body case with the atmosphere.”); Ex.1033 (US6,311,561 to Bang et al., filed Feb. 1, 1999 and published Nov. 6, 2001) at 8:11-15 (“With further reference to FIG. 5B, a vent hole 145 is provided through the circuit board 115 to expose one side of the sensor 18 to ambient. The vent hole 145 is a gage pressure port which allows the sensor 18 to measure sensed pressure relative to ambient.”). Indeed, and consistent with the above-referenced teachings of the prior art, the preferred puff actuated switch 28 of Brooks, Model No. MPL-502-V (Ex.1002, 12:58-61, 17:46-48) has a pressure sensing port (i.e., suction port)

and an equalization port (i.e., pressure balancing port). Ex.1004, ¶94; Ex.1007-1008 (annotated photographs of MPL-502-V); Ex.1009-1010.

Thus, and as Dr. Sturges explains, a PHOSITA would have known that that in order for the pressure sensor (*i.e.*, puff actuated switch 28) of Brooks to work properly it must have some mechanism for equalizing pressure on both sides of the sensor 28 to compensate for pressure build-up in the housing, which could easily be achieved with a pressure balancing hole in controller 14. Ex.1004, ¶94. An obvious and logical place to locate the pressure balancing hole would be on the side of the controller housing 14 where the pressure equalization port of the puff actuated switch 28 is located. *Id.* In the MPL-502-V, the equalization port is on one side of the pressure switch and the sensing port is on the other. Thus, the pressure balancing hole in Brooks logically would be placed on the side of the sensor opposite from the electrodes. Ex.1004, ¶94; *see also* Ex.1007-1010.

In any event, the physical location of the pressure balancing hole carries no patentability weight. As the Federal Circuit has noted, limitations that do not distinguish the operation and performance of the prior art should not prevent a finding of invalidity. *See Gardner*, 725 F.2d at 1349; *Japikse*, 181 F.2d at 1031. This is precisely the case here. The location of the pressure balancing hole relative to the first electrode has no bearing on the operation of the pressure balancing hole. Ex.1004, ¶93. A PHOSITA would have understood that the location of the

pressure balancing hole would be decided based on two considerations. The first consideration is its proximity to the relief port on the sensor. In other words, the pressure balancing hole should be positioned so that ambient air may enter the balancing hole and make its way to the relief port. The other consideration dictating the location of the pressure balancing hole is design convenience. In other words, the designer could place it anywhere that is convenient as long as it serves its purposes. Ex.1004, ¶¶93-94.

Further, such a modification to Brooks' battery casing would not only improve operation for the reasons stated above, it also would not have an adverse effect on the operation on the device because air would still be drawn across the heating element. Ex.1004, ¶94. That is, while the modification has air drawn in at the battery casing end as pressure balancing for the sensor, air would still also be drawn in through inlet 54 and across the heating element – which is all that Brooks is concerned with. Ex.1002 at 8:53-57 (. . . such that drawn ambient air passing through the cigarette to the mouth of the user passes the resistance element.) Importantly, adding an air inlet to the battery side of the device would have improved the operation of the device by exposing the sensor to ambient pressure and thus avoiding accuracy degradation resulting from gradual pressure build-up. Ex.1004, ¶94. This small, easily-made change (as taught by Tohyama, Ex.1032 and Bang, Ex.1033), addresses deficiencies well known to a PHOSITA when the

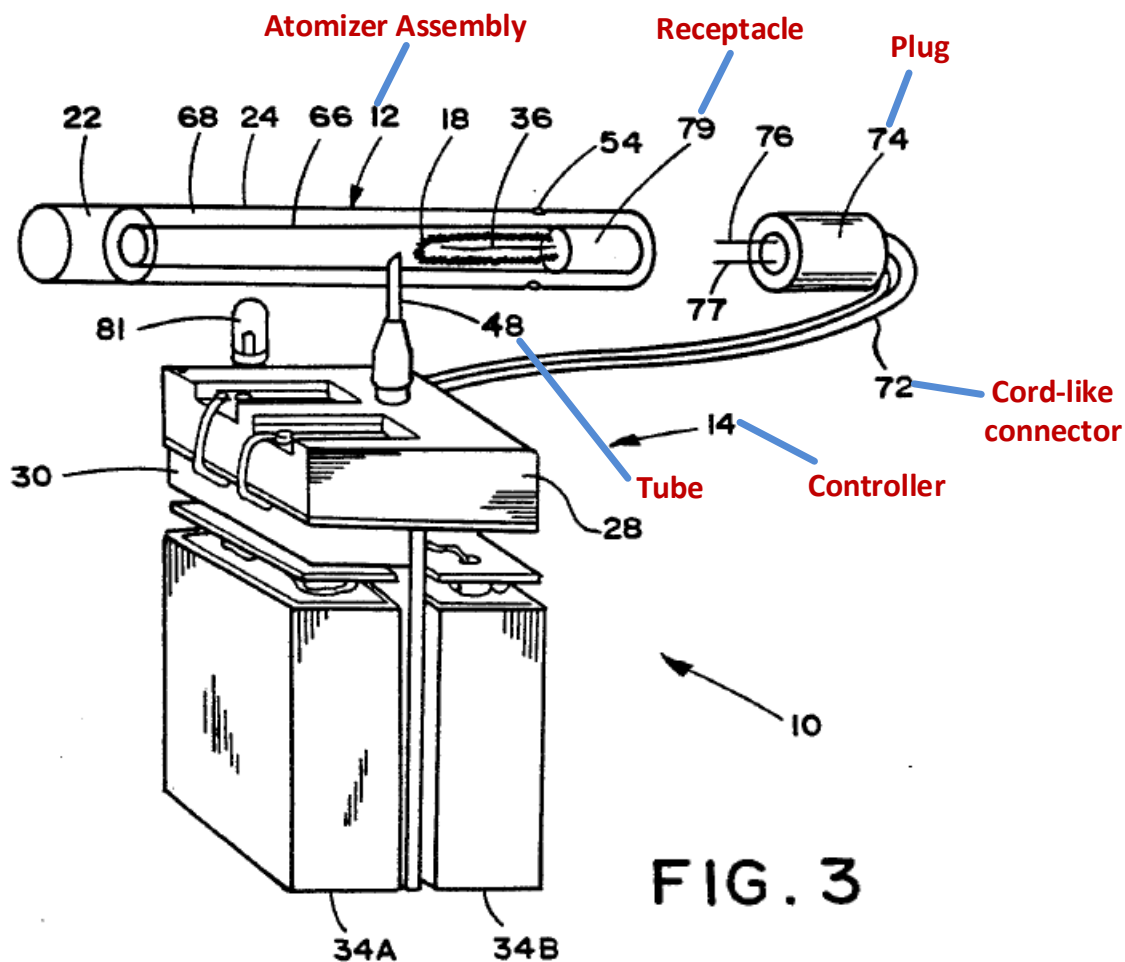
sensor is located in a compartment without access to the atmosphere. Ex.1004, ¶94.

Accordingly, it would have been obvious to include a pressure balancing hole in case 26 of controller 14 (the battery assembly housing) of the Brooks device in order to equalize the pressure and thus maintain the accuracy of the sensor throughout repeated use of the device. It would also have been obvious to place the sensor between the pressure balancing hole and the first electrode (receptacle 44) because doing so would be the most natural way to ensure balancing of the pressure on both sides of the sensor (the electrode side of the sensor in Brooks is already exposed to ambient air through tube 48, thus placing the hole on the electrode side would not address the pressure build-up problem). Ex.1004, ¶¶93-94.

7. Claim 7: “The device of claim 1 with the first electrode contacting the second electrode regardless of an angular orientation of the battery assembly relative to the atomizer assembly”

Brooks discloses an embodiment in which the first electrode contacts the second electrode regardless of the angular orientation of the battery assembly. Specifically, Brooks discloses an embodiment, otherwise similar to that depicted in Fig. 2 and described above, in which “the controller or power pack 14 includes a flexible, cord-like connector 72 which terminates in a plug 74 having prongs 76, 77 for electrical connection into a receptacle 79 at one end of cigarette 12.” Ex.1002

at 11:20-25. Tube 48 “can be incorporated into the cord-like connector 72 and extend into the cigarette through the receptacle 79,” in order to facilitate detection of changes in pressure due to inhalation. *Id.* at 11:29-31. According to Brooks, the “flexible, cord-like connector” of this embodiment, an example of which is depicted in Fig. 3, permits “the user to place the control pack in a shirt pocket or on a table, and hold the cigarette in a normal fashion, without holding the added weight of the control pack in his/her hands.” *Id.* at 11:31-35.



As Fig. 3 and the related description in Brooks makes clear, as a result of the flexible “cord-like” connection, plug 74 remains engaged with receptacle 79 regardless of the relative angular relationship between controller 14 and disposable portion 12. Ex.1004, ¶95. Accordingly Brooks discloses that the first electrode (in this embodiment, comprising at least plug 74, including the prongs that are part of the plug, and “cord-like connector 72”) contacts the second electrode (in this embodiment, receptacle 79) regardless of an angular orientation of the battery assembly (controller 14) relative to the atomizer assembly (disposable portion 12).⁶ Ex.1004, ¶95.

8. Claim 8: “The device of claim 1 with the first electrode contacting the second electrode with the battery assembly at any angular orientation relative to the atomizer assembly”

Brooks discloses that the first electrode contacts the second electrode with the battery assembly at “any angular orientation” relative to the atomizer assembly for the same reasons set forth above for claim 7. The slight differences in the language of claims 7 and 8 are insubstantial; both claims require that the first electrode contact the second electrode regardless of the angular relationship

⁶ Note that while Brooks states that the controller end may be tubular (*see* Ex.1002 at 4:46-49) it does not preclude the controller end from being attached to the disposable end by a cord, as depicted in Brooks at Fig. 3.

between two assemblies. Ex.1004, ¶96. Accordingly, Brooks discloses that the first electrode contacts the second electrode with the battery assembly at any angular orientation relative to the atomizer assembly, based upon the disclosures of Brooks set forth above with respect to claim 7.

9. Claim 9

a. “A vaporizing device”

To the extent that the preamble is considered a claim limitation, Brooks discloses a vaporizing device. Ex.1004, ¶¶97, 124. *See* claim 1 above at *supra* Section VI.E.1.a.

b. “a battery assembly comprising a battery, a sensor, an LED and a micro-controller unit within a tubular battery assembly housing”

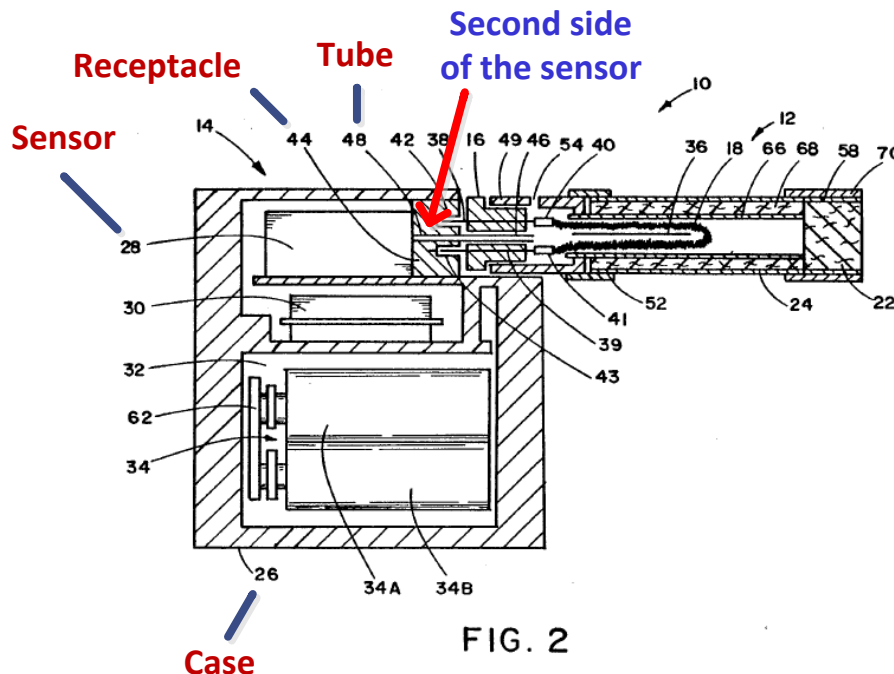
Brooks discloses this limitation. Ex.1004 at ¶¶98, 124. *See* claim 1 above at *supra* Section VI.E.1.b.

c. “having a pressure balancing hole on a first side of the sensor, and a first cavity in the tubular battery assembly housing on a second side of the sensor opposite from the first side of the sensor”

For the reasons discussed in claim 6 at *supra* Section VI.E.6, Brooks discloses “a pressure balancing hole on a first side of the sensor.” Ex.1004, ¶¶99, 124. The physical location of the pressure balancing hole relative to the sensor carries no patentability weight. *Id.* *See* claim 6 above at *supra* Section VI.E.6.

In addition, Brooks discloses “a first cavity in the tubular battery assembly housing on a second side of the sensor opposite from the first side of the sensor.” Specifically, Brooks discloses that receptacle 44 of controller 14 (the tubular battery assembly) “also includes tube 48 which is inserted into passageway 46 of plug 16 to be in airflow communication with the internal region of the cigarette.” Ex.1002 at 9:43-46. The hollow interior of tube 48 thus constitutes a “first cavity in the tubular battery assembly housing.” Ex.1004, ¶99.

As shown in the annotated Fig. 2 below, Brooks further discloses that the “first cavity” (*i.e.*, the hollow interior of tube 48) is on a second side of the sensor (pressure sensing switch 28), in order to provide the airflow communication necessary for the sensor to detect inhalation-induced changes in air pressure in the disposable portion. Ex.1002 at 9:46-50 (“The other end of tube 48 is in airflow communication with pressure sensing switch 28, so that changes in air pressure which occur within the cigarette during draw can be sensed by the switch.”); *see also* Ex.1004, ¶99.



Accordingly, Brooks discloses a pressure balancing hole on a first side of the sensor, and discloses a first cavity in the tubular battery assembly housing (the portion of tube 48 within case 26) on a second side of the sensor (pressure sensing switch 28) opposite from the first side of the sensor.

- d. **“an atomizer assembly comprising an atomizer and a second cavity in a tubular atomizer assembly housing, with the first cavity connecting into the second cavity”**

For the reasons discussed in claim 1 at *supra* Section VI.E.1.d, Brooks discloses “an atomizer assembly comprising an atomizer ... in a tubular atomizer assembly housing.” Ex.1004, ¶¶100, 124. Brooks further discloses “a second cavity in a tubular atomizer assembly housing.” Specifically, Brooks discloses that tube 48 of receptacle 44 slides into and through passageway 46 of plug 16, which is located within the atomizer assembly housing, when the controller and

disposable portions of the device are connected. *See*, e.g., Ex.1002 at 9:43-46 (“Receptacle 44 also includes tube 48 which is inserted into passageway 46 of plug 16 to be in airflow communication with the internal region of the cigarette.”); 8:38-40 (“Plug 16 also includes a passageway 46 through which tube 48 from pressure sensing switch 28 extends.”); *see also* Ex.1004, ¶100.

Accordingly, Brooks discloses an atomizer assembly comprising an atomizer and a second cavity (passageway 46) in a tubular atomizer assembly housing (collar 49 and tube 68), with the first cavity (tube 48) connecting the second cavity.

- e. **“the atomizer including a heater wire coil wound on a porous body, and the heater wire coil and the porous body perpendicular to a longitudinal axis of the tubular atomizer assembly housing”**

As discussed in claim 1 above at *supra* Section VI.E.1.e, the combination of Brooks and Whittemore discloses this limitation. Ex.1004, ¶101, 124.

- f. **“the heater wire coil and porous body in an airflow path through the tubular atomizer assembly housing wherein air flows across the wire coil and the porous body; and”**

As discussed in claim 1 above at *supra* Section VI.E.1.f, the combination of Brooks and Whittemore discloses this limitation. Ex.1004, ¶102, 124.

- g. **“the battery assembly and the atomizer assembly electrically connected via a first electrode at a first end of the battery assembly contacting a second electrode at a first end of the atomizer assembly with**

**the battery assembly at any angular orientation
relative to the atomizer assembly”**

As discussed in claims 1, 7, 8 above at *supra* Sections VI.E.1.c, VI.E.1.g, VI.E.1.h, VI.E.7, and VI.E.8, Brooks discloses this limitation. Ex.1004, ¶103, 124.

**10. Claim 10: “The vaporizing device of claim 9 with the
airflow path passing through a through hole in the
atomizer”**

As discussed in claims 2, 4 above at *supra* Sections VI.E.2 and VI.E.4, and illustrated in annotated Figs. 2, 4, and 6 below, Brooks discloses an airflow path (illustrated in red arrows) passing through a through hole in the atomizer (tube 66 in Fig. 2 and air passageway 83 or tube 48 in Figs. 4 and 6) in the atomizer. Ex.1002 at 9:43-36 (“tube 48 [] is inserted into passageway 46 of plug 16 to be in airflow communication with the internal region of the cigarette”), 5:68-6:4 (“This electrical communication means... preferably includes an air passageway used in conjunction with the preferred puff actuated current actuation means”), 11:25-31; Ex.1004, ¶104, 124.

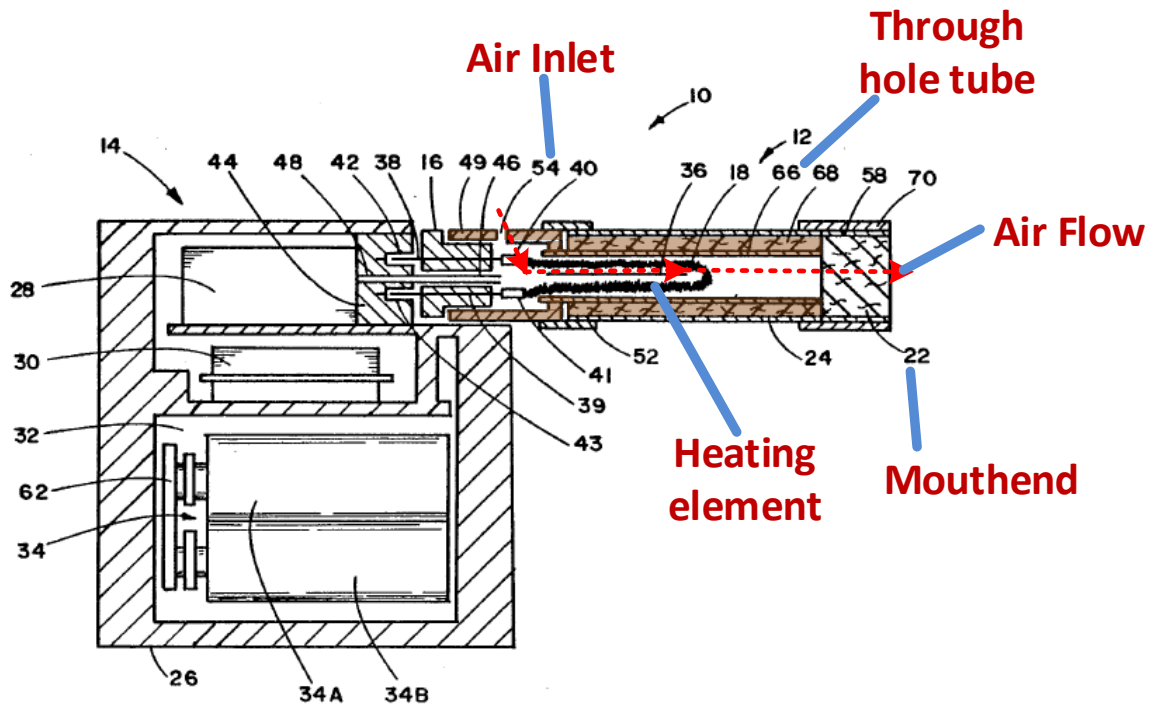


FIG. 2

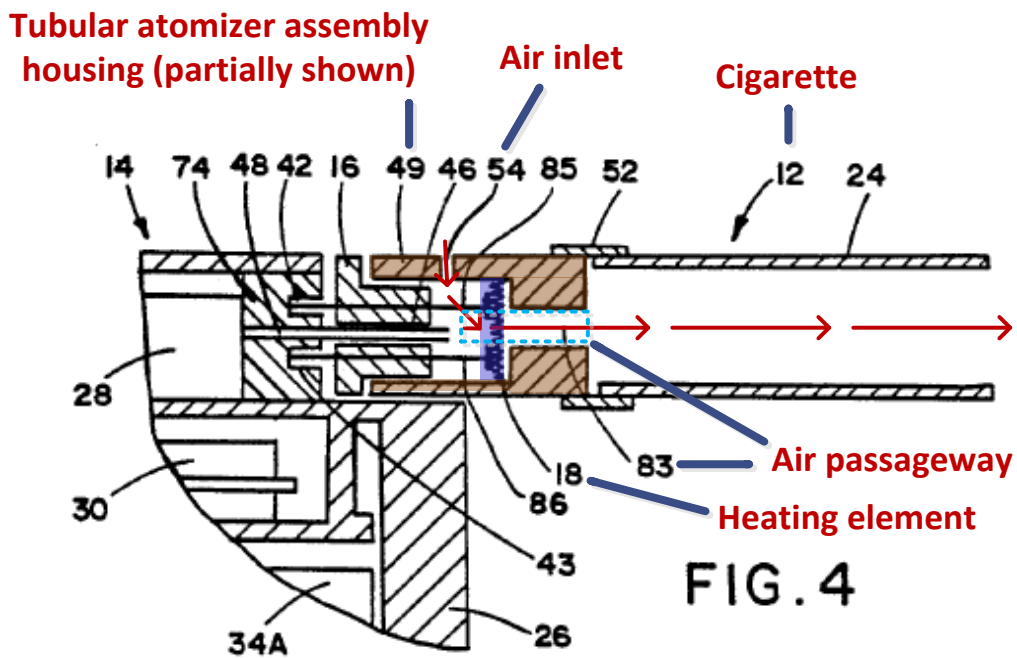
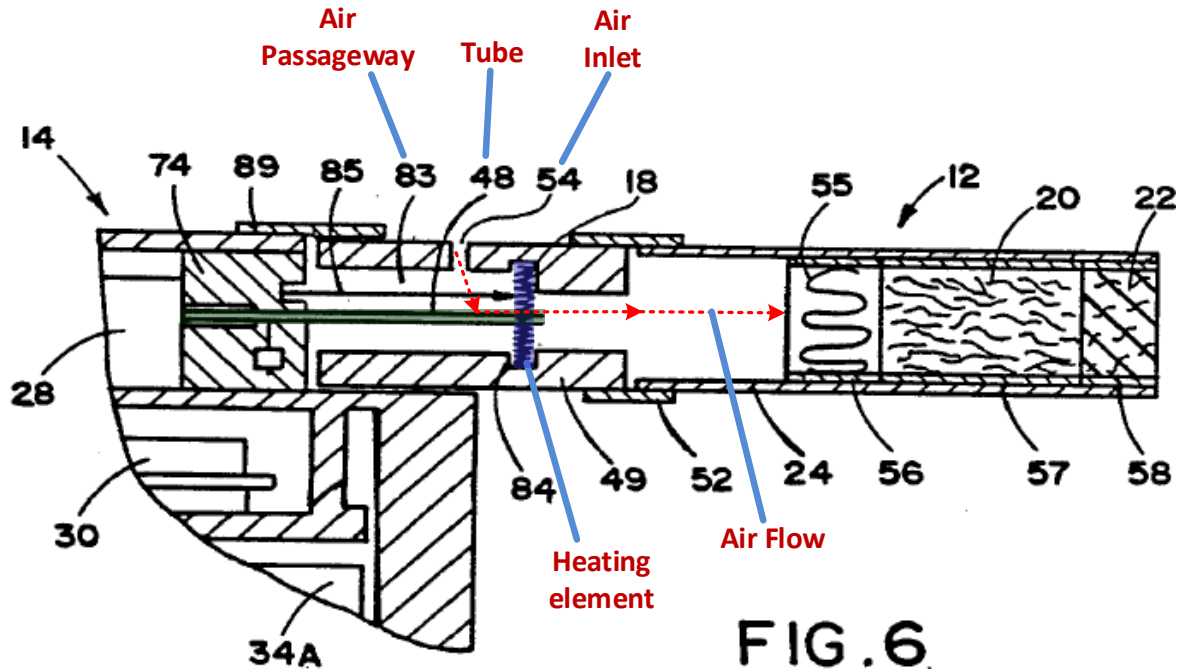


FIG. 4



Accordingly, Brooks discloses that the airflow path passes through through holes (tube 66, passageway 83, and/or tube 48 (i.e., air is drawn out of tube 48 when the user draws upon the device) in the atomizer.

11. Claim 11: “The device of claim 10 wherein the heater wire coil is on a central section of the porous body”

As discussed in claim 1 above at *supra* Section VI.E.1.e, the combination of Brooks with Whittemore discloses the heater wire coil wound on the porous body (porous substrate). Ex.1004, ¶105, 124. The PHOSITA would have recognized that the heating wire coil can be located on the central section (and other sections) of the porous body. *Id.* The PHOSITA would have also recognized a preference for putting the wire coil at a central section of the porous body because it centers the vaporization portion of the heating element in the airflow passageway and frees

the external portions of the porous substrate or wick so that they can be used as liquid reservoirs or provide a bridge for transporting liquid from a liquid reservoir to the vaporization portion. *Id.* Whittemore, for example, teaches a vaporization device having the heating wire on a central section of the porous material in the path of airflow through the device. Ex.1003, Figs 2 and 3, 1:53-2:8, 2:26-34, claim 3; *see also* Ex.1004, ¶105.

Accordingly, the combination of Brooks and Whittemore discloses a heater wire coil on one or more central sections of a porous substrate or wick.

12. Claim 12: “The device of claim 11 with the through hole between spaced apart wire leads of the heater wire coil”

As discussed in claim 3 above at *supra* Section VI.E.3, Brooks discloses this limitation. Ex.1004, ¶106, 124.

13. Claim 13: “The device of claim 12 with the airflow path further including an air inlet in a side wall of the tubular atomizer assembly housing adjacent to the second electrode”

As discussed in claim 4 above at *supra* Section VI.E.4, Brooks discloses this limitation. Ex.1004, ¶107, 124.

14. Claim 14: “The device of claim 12 further including fiber containing a cigarette liquid in contact with the atomizer”

As discussed in claim 5 above at *supra* Section VI.E.5, Brooks discloses this limitation. Ex.1004, ¶108, 124.

15. Claim 15: “The device of claim 12 wherein the porous body provides capillary action”

As discussed in claim 1 above at *supra* Section VI.E.1.e, the combination of Brooks and Whittemore discloses a liquid-impregnated porous substrate or wick (the porous body) in contact with a resistance heating component. Ex.1004, ¶109-110, 124. Whittemore expressly discloses that the wick moves the liquid through capillary action. Ex.1003 at 1:50-2:7. Indeed, a PHOSITA would have understood that the wick materials (thread, string, or strand) all identified in Whittemore would provide capillary action. *Id.* at 2:8-10, claim 11; Ex.1004, ¶¶109-110. Brooks also discloses heating element materials that may be a fiber, which a PHOSITA would understand provides capillary action. Ex.1002 at 7:26-30; Ex.1004, ¶¶109-110. Brooks further discloses that, when the device has been actuated by inhalation, heat generated by the flow of electricity through the heating component volatilizes the impregnated liquid to form aerosol or vapor, and that this process continues until the liquid is depleted to the point that the device user is dissatisfied with the production of aerosol/vapor, and replaces the disposable portion. *See, e.g.,* Ex.1002 at 10:45-68; Ex.1004, ¶¶109-110. A PHOSITA would

have understood that this disclosure in Brooks of depletion of liquid impregnated within a porous fiber material through repeated heat-induced vaporization inherently discloses that the porous material “provides capillary action.” Ex.1004, ¶¶109-110. This is because, as liquid in the portions of the porous fiber material closest to the heat source is vaporized, liquid impregnated within portions of the fiber material further from the heat source would necessarily move through minute holes in the fiber to areas of lower liquid concentration; in other words, the liquid would move via capillary action. *Id.* Accordingly, Brooks in combination with Whittemore discloses that the porous body (the porous substrate or wick) provides capillary action.

16. Claim 16

a. “A vaporizing device comprising”

To the extent that the preamble is considered a claim limitation, Brooks discloses a vaporizing device. Ex.1004, ¶111, 124. *See* claim 1 above at *supra* Section VI.E.1.a.

b. “a battery assembly comprising battery, a sensor, and a micro-controller unit electrically connected to a circuit board within a battery assembly housing, and a first electrode at a first end of the battery assembly housing”

As discussed in claim 1 above at *supra* Section VI.E.1.b-c, Brooks discloses this limitation. Ex.1004, ¶112, 124.

- c. **“an atomizer assembly comprising an atomizer and liquid absorbed in fiber material in a tubular atomizer assembly housing, and a second electrode at a first end of the atomizer assembly”**

As discussed in claims 1, 5 above at *supra* Sections VI.E.1.d, g and VI.E.5, Brooks in view of Whittemore discloses this limitation. Ex.1004, ¶113, 124.

- d. **“the atomizer including a porous body in physical contact with the fiber material”**

As discussed in claims 1, 5 above at *supra* Sections VI.E.1.e and VI.E.5, Brooks in view of Whittemore discloses this limitation. Ex.1004, ¶114, 124.

- e. **“the atomizer including a heater wire wound in a coil on a part of the porous body which is perpendicular to a longitudinal axis of the tubular atomizer assembly housing”**

As discussed in claim 1 above at *supra* Section VI.E.1.e, Brooks in view of Whittemore discloses this limitation. Ex.1004, ¶115, 124.

- f. **“an airflow path through a through hole of the atomizer located between spaced apart wire leads of the heater wire coil, and the heater wire coil and the porous body in the airflow path, wherein air flows across the wire and porous body”**

As discussed in claims 1, 2, 3 above at *supra* Sections VI.E.1.f, VI.E.2 and VI.E.3, Brooks in view of Whittemore discloses this limitation. Ex.1004, ¶116, 124.

- g. “the battery assembly electrically connected to the atomizer assembly via the first electrode contacting the second electrode”**

As discussed in claim 1 above at *supra* Section VI.E.1.h, Brooks discloses this limitation. Ex.1004, ¶117, 124.

- 17. Claim 17: “The device of claim 16 with the airflow path further including an air inlet in a side wall of tubular atomizer assembly housing adjacent to the first end of the tubular atomizer assembly housing”**

As discussed in claim 4 above at *supra* Section VI.E.4, Brooks discloses this limitation. Ex.1004, ¶118, 124.

- 18. Claim 18: “The device of claim 16 with the sensor in between a pressure balancing hole in the tubular battery assembly housing and the first electrode”**

As discussed in claim 6 above at *supra* Section VI.E.6, Brooks discloses this limitation. Ex.1004, ¶119, 124.

- 19. Claim 19: “The device of claim 16 with a central axis of the through hole bi-secting the heater wire coil”**

As discussed in claims 2, 3 above at *supra* Sections VI.E.2 and VI.E.3, Brooks discloses this limitation. Ex.1004, ¶120, 124.

- 20. Claim 20: “The device of claim 19 further including a first cavity in the battery assembly connecting into a second cavity in the atomizer assembly”**

As discussed in claim 9 above at *supra* Sections VI.E.1.b-c, Brooks discloses this limitation. Ex.1004, ¶121, 124.

21. Claim 21: “The device of claim 16 with the first electrode contacting the second electrode with the battery assembly at any angular orientation relative to the atomizer assembly”

As discussed in claims 7, 8 above at *supra* Sections VI.E.7 and VI.E.8, Brooks discloses this limitation. Ex.1004, ¶122, 124.

22. Claim 22: “The device of claim 21 wherein the porous body provides capillary action”

As discussed in claim 15 above at *supra* Section VI.E.15, Brooks in view of Whittemore discloses this limitation. Ex.1004, ¶123, 124.

VII. CONCLUSION

Petitioner has demonstrated a reasonable likelihood that claims 1-22 of the 205 patent are unpatentable as obvious in view of the combination of Brooks and Whittemore, and in further in view of the knowledge possessed by the PHOSITA as evidenced by the additional prior art identified herein. Petitioner therefore requests that the Board grant *inter partes* review for claims 1-22.

Dated: June 26, 2017

Respectfully submitted,

/s/Ralph J. Gabric

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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, excluding a table of contents, a table of authorities, mandatory notices under §42.8, a certificate of service or word count, contains 13,851 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 26, 2017

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CERTIFICATE OF SERVICE

Pursuant to 37 CFR §§ 42.6(e)(4)(i) *et seq.* and 42.105(b), the undersigned certifies that on June 26, 2017, a complete and entire copy of this Petition for *Inter Partes* Review, and all supporting exhibits, were served by EXPRESS MAIL® to the Patent Owner by serving the correspondent of record, as indicated below:

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