

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 9,326,549

Issue Date: May 3, 2016

Title: Electronic Cigarette

Inter Partes Review No. IPR2017- 01319

**PETITION FOR *INTER PARTES* REVIEW OF
U.S. PATENT NO. 9,326,549 PURSUANT TO
35 U.S.C. §§ 311-319 AND 37 C.F.R. § 42**

TABLE OF CONTENTS

	Page
I. INTRODUCTION	1
II. MANDATORY NOTICES UNDER 37 C.F.R. § 42.8(A)(1)	2
A. Real Party-in-Interest (§ 42.8(b)(1))	2
B. Related Matters (37 C.F.R. § 42.8(b)(2)).....	2
1. Related Litigations	2
2. Related Proceedings Before the Board	5
3. Pending Patent Applications	6
C. Lead and Back-Up Counsel.....	7
D. Service Information	8
III. IDENTIFICATION OF CHALLENGE AND STATEMENT OF THE PRECISE RELIEF REQUESTED (37 C.F.R. § 42.104 (B)).....	8
IV. THRESHOLD REQUIREMENT FOR <i>INTER PARTES</i> REVIEW	9
V. PERSON HAVING ORDINARY SKILL IN THE ART ("PHOSITA")	9
VI. CLAIM CONSTRUCTION	10
VII. DESCRIPTION OF THE PRIOR ART RELIED UPON	12
A. Chinese Patent Application Publication No. CN 1233436A ("Hongbin") (Exs. 1003/1004).....	12
B. U.S. Patent No. 2,057,353 to Whittemore ("Whittemore")	16
C. U.S. Patent No. 4,947,874 to Brooks ("Brooks")	18
VIII. CLAIM BY CLAIM EXPLANATION OF UNPATENTABILITY	21
A. Claim 12	21
1. 12.P: An electronic vaporizing device	21
2. 12.1: a cylindrical housing having a longitudinal axis, a first end and a second end.....	22

3.	12.2: an LED at a first end of the cylindrical housing	24
4.	12.3: an outlet at the second end of the cylindrical housing	27
5.	12.4: an air inlet for allowing air to flow into the cylindrical housing	29
6.	12.5: a battery, an electronic circuit board, a sensor, an atomizer, and a liquid-supply within the cylindrical housing	31
7.	12.6: wherein the liquid-supply includes a liquid and a fiber material	43
8.	12.7: with the liquid containing propylene glycol	48
9.	12.8: wherein the liquid supply is cylindrical and parallel to the longitudinal axis of the cylindrical housing	49
10.	12.9: the atomizer comprises a porous component, a hollow cylindrical chamber and a heating wire	52
11.	12.10: the porous component is in physical contact with the liquid in the liquid supply	55
12.	12.11: the hollow cylindrical chamber is co-axial with the cylindrical housing	57
13.	12.12: the heating wire extending across the cylindrical chamber of the atomizer perpendicular to the longitudinal axis of the cylindrical housing	59
14.	12.13: an air stream passage from the inlet through the cylindrical chamber of the atomizer to the outlet, and the heating wire positioned in the air stream passage	64
B.	Claim 13	67
1.	13.1: a separator in the cylindrical housing the electronic circuit board and the sensor on a first side of the separator, and with the atomizer and the liquid-supply on a second side of the separator, opposite from the first side	67

2.	13.2: the separator having a through hole from the first side to the second side	69
C.	Claim 17	71
1.	17.P: An electronic vaporizing device	71
2.	17.1: a cylindrical housing having a longitudinal axis, a first end and a second end	72
3.	17.2: an LED at the first end of the cylindrical housing	72
4.	17.3: an outlet at the second end of the cylindrical housing	72
5.	17.4: an air inlet for allowing air to flow into the cylindrical housing	72
6.	17.5: a battery, an electronic circuit board, a sensor, a porous component, and a liquid-supply within the cylindrical housing	72
7.	17.6: a heating wire positioned perpendicular to the longitudinal axis of the cylindrical housing	72
8.	17.7: an air passage between the inlet to the outlet, with the heating wire in the air passage and positioned for air to flow over the heating wire	75
9.	17.8: with the liquid-supply in physical contact with the porous component, to move liquid from the liquid-supply to the porous component	75
10.	17.9: wherein the liquid-supply is cylindrical and arranged parallel to the longitudinal axis of the cylindrical housing	77
D.	Claim 18: the porous component comprising a fiber material	77
E.	Claim 19: the battery and the liquid-supply co-axial with the longitudinal axis of the cylindrical housing	77
F.	Claim 21: the liquid-supply comprising propylene glycol	78
IX.	CONCLUSION	79

TABLE OF AUTHORITIES

CASES

<i>Cuozzo Speed Techs. v. Lee</i> , 579 U.S. ____ (2016)	10
<i>In re Cuozzo Speed Techs., LLC</i> , 793 F.3d 1268 (Fed. Cir. 2015)	10
<i>Omega Eng'g, Inc. v. Raytek Corp.</i> , 334 F.3d 1314 (Fed. Cir. 2003)	11
<i>Powell v. Home Depot U.S.A., Inc.</i> , 663 F.3d 1221 (Fed. Cir. 2011)	11

STATUTES

35 U.S.C. § 103	1, 8, 9
35 U.S.C. § 312	2
35 U.S.C. § 314	10
35 U.S.C. § 315	3
35 U.S.C. §§ 311-319	1

REGULATIONS

37 C.F.R. § 42	1, 2, 8, 10
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CONSTITUTIONAL PROVISIONS

Patent Trial Practice Guide 77 Fed. Reg., Vol. 77, No. 157 (2012)	2
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EXHIBITS LIST

Exhibit No.	Description
1001	U.S. Pat. No. 9,326,549
1002	Expert Declaration of Robert Sturges
1003	Chinese Patent Application Publication No. CN1233436A (“Hongbin”)
1004	Certified translation of Chinese Patent Application Publication No. CN1233436A (“Hongbin”)
1005	U.S. Patent No. 2,057,353 (“Whittemore”)
1006	U.S. Pat. No. 4,947,874 (“Brooks”)
1007	IPR2014-01300 Paper 8: Decision for <i>Inter Partes</i> Review Institution
1008	Plaintiff’s Preliminary Claim Constructions and Preliminary Identification of Intrinsic and Extrinsic Information
1009	U.S. Patent No. 6,598,607 (“Adiga”)
1010	U.S. Patent No. 4,793,365 (“Sensabaugh”)
1011	U.S. Patent No. 5,203,355 (“Clearman”)
1012	U.S. Patent No. 2,472,282 (“Burchett”)
1013	U.S. Patent No. 2,032,695 (“Gimera”)
1014	Certified translation of Chinese Patent Application Publication No. CN2293957 (“Zhao”)
1015	U.S. Pat. No. 5,743,251 (“Howell”)
1016	U.S. Pat. No. 1,514,682 (“Wilson”)
1017	U.S. Pat. No. 5,745,985 (“Ghosh”)
1018	U.S. Pat. No. 4,208,005 (“Nate”)
1019	U.S. Pat. No. 4,945,448 (“Bremenour”)
1020	Excerpts from James W. Dally, <i>Packaging of Electronic Systems: A Mechanical Engineering Approach</i> (1990) (“Dally”).
1021	European Patent No. EP0845220B1 (“Susa”)
1022	U.S. Pat. No. 6,155,268 (“Takeuchi”)

1023	U.S. Pat. No. 6,501,052 (“Cox”)
1024	U.S. Pat. No. 4,981,522 (“Nichols”)
1025	Excerpts from U.S. Pat. No. 9,326,549 File History
1026	Mark’s Standard Handbook for Mechanical Engineers, Eugene A. Avallone et al., published 1978, page 15-6.

I. INTRODUCTION

Pursuant to 35 U.S.C. §§ 311-319 and 37 C.F.R. § 42, R.J. Reynolds Vapor Company (“Petitioner”) respectfully requests review of claims 12-13, 17-19, and 21 of U.S. Pat. No. 9,326,549 to Lik Hon, titled “Electronic Cigarette” (“the ‘549 Patent,” Ex. 1001), which is currently assigned to Fontem Holdings 1 B.V. (“Patent Owner”). Petitioner authorizes the PTO to charge Deposit Account No. 23-1925 for the fees set in 37 C.F.R. § 42.15(a) for this Petition, and authorizes payment of any additional fees to be charged to this Deposit Account.

This Petition demonstrates a reasonable likelihood that claims 12-13, 17-19 and 21 of the ‘549 Patent are unpatentable. As explained herein, claims 12-13, 17-19 and 21 are obvious under § 103 based on Hongbin in view of Whittemore and Brooks because they merely comprise the simple substitution and/or combination of known elements to yield predictable results, they use known techniques to improve similar devices in the same way, or they apply known prior art techniques to a known device ready for improvement to yield predictable results.

Specifically, Hongbin discloses a vaporizing device that uses an excessive amount of electricity to heat liquid to form a vapor. Whittemore discloses a vaporizer that provides more efficient heating and Brooks discloses a circuit board with timers and other electronic components that allow for current regulation and heating element control. It would have been obvious to modify Hongbin with the known heating system from Whittemore (a wick and a wire) and the circuit board

in Brooks to achieve the predictable result of an electronic cigarette that provides efficient electricity and solves the electricity usage problem expressly recognized in Hongbin.

II. MANDATORY NOTICES UNDER 37 C.F.R. § 42.8(A)(1)

A. Real Party-in-Interest (§ 42.8(b)(1))

For purposes of 35 U.S.C. § 312(a)(2) and 37 C.F.R. § 42.8(b)(1) only, Petitioner, 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. R.J. Reynolds Vapor Company further discloses that it is a wholly owned, indirect 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 its 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).

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

1. Related Litigations

Petitioner is a defendant in the following litigation involving the '549 Patent and certain related patents:

Case Name	Filed
<i>Fontem Ventures BV et al v. R.J. Reynolds Vapor Company</i> , 1:16-cv-01255 (M.D.N.C.) (filed as 2:16-cv-2286 (C.D. Cal.))	April 4, 2016
<i>Fontem Ventures BV et al v. R.J. Reynolds Vapor Company</i> , 1:16-cv-01257 (M.D.N.C.) (filed as 2:16-cv-03049 (C.D. Cal.), consolidated with lead case 1:16-cv-01255 (M.D.N.C.))	May 3, 2016
<i>Fontem Ventures BV et al v. R.J. Reynolds Vapor Company</i> , 1:16-cv-01258 (M.D.N.C.) (filed as 2:16-cv-04534 (C.D. Cal.), consolidated with lead case 1:16-cv-01255 (M.D.N.C.))	June 22, 2016
<i>Fontem Ventures BV et al v. R.J. Reynolds Vapor Company</i> , 1:17-cv-00175 (M.D.N.C.)	Mar. 1, 2017

The Patent Owner has asserted the ‘549 Patent or certain related patents in the following terminated district court proceedings in which Reynolds was not and is not a party:

Case Name	Case Number	District	Filed
<i>Ruyan Investment Holdings Limited v. Smoking Everywhere, Inc. et al.</i>	2:11-cv-00367	C.D. Cal.	Jan. 12, 2011
<i>Ruyan Investment Holdings Limited v. Vapor Corp. et al.</i>	2:11-cv-06268	C.D. Cal.	Jul. 29, 2011
<i>Fontem Ventures BV et al. v. NJOY, Inc.</i>	2:14-cv-01645	C.D. Cal.	Mar. 5, 2014
<i>Fontem Ventures BV et al. v. LOEC, Inc. et al.</i>	2:14-cv-01648	C.D. Cal.	Mar. 5, 2014
<i>Fontem Ventures BV et al. v. CB Distributors, Inc. et al.</i>	2:14-cv-01649	C.D. Cal.	Mar. 5, 2014
<i>Fontem Ventures BV et al. v. Vapor Corp.</i>	2:14-cv-01650	C.D. Cal.	Mar. 5, 2014
<i>Fontem Ventures BV et al. v. FIN Branding Group, LLC et al.</i>	2:14-cv-01651	C.D. Cal.	Mar. 5, 2014
<i>Fontem Ventures BV et al. v. Ballantyne Brands, LLC</i>	2:14-cv-01652	C.D. Cal.	Mar. 5, 2014

Case Name	Case Number	District	Filed
<i>Fontem Ventures BV et al. v. Spark Industries, LLC</i>	2:14-cv-01653	C.D. Cal.	Mar. 5, 2014
<i>Fontem Ventures BV et al. v. Logic Technology Development LLC</i>	2:14-cv-01654	C.D. Cal.	Mar. 5, 2014
<i>Fontem Ventures BV et al. v. VMR Products, LLC</i>	2:14-cv-01655	C.D. Cal.	Mar. 5, 2014
<i>Fontem Ventures BV et al. v. NJOY, Inc. et al.</i>	2:14-cv-08144	C.D. Cal.	Oct. 21, 2014
<i>Fontem Ventures BV et al. v. LOEC, Inc. et al.</i>	2:14-cv-08149	C.D. Cal.	Oct. 21, 2014
<i>Fontem Ventures BV et al. v. CB Distributors, Inc. et al.</i>	2:14-cv-08154	C.D. Cal.	Oct. 21, 2014
<i>Fontem Ventures BV et al. v. Vapor Corp. et al.</i>	2:14-cv-08155	C.D. Cal.	Oct. 21, 2014
<i>Fontem Ventures BV et al. v. FIN Branding Group, LLC et al.</i>	2:14-cv-08156	C.D. Cal.	Oct. 21, 2014
<i>Fontem Ventures BV et al. v. Ballantyne Brands, LLC et al.</i>	2:14-cv-08157	C.D. Cal.	Oct. 21, 2014
<i>Fontem Ventures BV et al. v. Spark Industries, LLC et al.</i>	2:14-cv-08158	C.D. Cal.	Oct. 21, 2014
<i>Fontem Ventures BV et al. v. Logic Technology Development LLC et al.</i>	2:14-cv-08160	C.D. Cal.	Oct. 21, 2014
<i>Fontem Ventures BV et al. v. Nu Mark LLC</i>	1:16-cv-01261	M.D.N.C. (2-16-cv-02291 (C.D. Cal.))	April 4, 2016

Case Name	Case Number	District	Filed
<i>Fontem Ventures BV et al. v. Nu Mark LLC</i>	1:16-cv-01259	M.D.N.C. (2:16-cv-04537 (C.D. Cal.), consolidated with lead case 1:16-cv-01261)	Jun. 22, 2016

2. Related Proceedings Before the Board

The '549 Patent or certain related patents was (or is) also the subject of, or related to, the following IPR petitions:

Case Name	Case Number	Filed
<i>NJOY, Inc. v. Fontem Holdings 1 B.V.</i> (U.S. Patent No. 8,393,331)	IPR2014-01289	Aug. 14, 2014
<i>NJOY, Inc. v. Fontem Holdings 1 B.V.</i> (U.S. Pat. No. 8,893,726)	IPR2014-01300	Aug. 15, 2014
<i>NJOY, Inc. et al v. Fontem Holdings 1 B.V.</i> (U.S. Pat. No. 8,893,726)	IPR2015-01302	May 29, 2015
<i>NU MARK LLC v. Fontem Holdings 1 B.V.</i> (U.S. Pat. No. 8,893,726)	IPR2016-01288	Jun. 28, 2016
<i>NU MARK LLC v. Fontem Holdings 1 B.V.</i> (U.S. Pat. No. 8,893,726) (denied)	IPR2016-01283	Jun. 28, 2016
<i>NU MARK LLC v. Fontem Holdings 1 B.V.</i> (U.S. Pat. No. 8,893,726) (denied)	IPR2016-01285	Jun. 28, 2016
<i>NU MARK LLC v. Fontem Holdings 1 B.V.</i> (U.S. Pat. No. 8,893,726)	IPR2016-01297	Jun. 28, 2016
<i>NU MARK LLC v. Fontem Holdings 1 B.V.</i> (U.S. Pat. No. 8,393,331)	IPR2016-01299	Jun. 28, 2016

Case Name	Case Number	Filed
<i>R.J. Reynolds Vapor Company v. Fontem Holdings 1 B.V.</i> (U.S. Pat. No. 8,893,726) (denied)	IPR2016-01270	Jun. 28, 2016
<i>NU MARK LLC v. Fontem Holdings 1 B.V.</i> (U.S. Pat. No. 8,393,331)	IPR2016-01438	Jul. 14, 2016
<i>R.J. Reynolds Vapor Company v. Fontem Holdings 1 B.V.</i> (U.S. Pat. No. 8,490,628) (denied)	IPR2016-01527	Aug. 3, 2016
<i>NU MARK LLC v. Fontem Holdings 1 B.V.</i> (U.S. Pat. No. 9,326,549)	IPR2016-01664	Aug. 22, 2016
<i>R.J. Reynolds Vapor Company v. Fontem Holdings 1 B.V.</i> (U.S. Pat. No. 9,326,549) (denied)	IPR2016-01859	Sep. 23, 2016
<i>R.J. Reynolds Vapor Company v. Fontem Holdings 1 B.V.</i> (U.S. Pat. No. 8,893,726)	IPR2017-01117	Apr. 4, 2017
<i>R.J. Reynolds Vapor Company v. Fontem Holdings 1 B.V.</i> (U.S. Pat. No. 8,490,628)	IPR2017-01118	Apr. 4, 2017
<i>R.J. Reynolds Vapor Company v. Fontem Holdings 1 B.V.</i> (U.S. Pat. No. 8,490,628)	IPR2017-01119	Apr. 4, 2017
<i>R.J. Reynolds Vapor Company v. Fontem Holdings 1 B.V.</i> (U.S. Pat. No. 8,893,726)	IPR2017-01180	Apr. 4, 2017
<i>R.J. Reynolds Vapor Company v. Fontem Holdings 1 B.V.</i> (U.S. Pat. No. 9,326,549)	IPR2017-01318	May 1, 2017

3. Pending Patent Applications

The '549 Patent claims priority, through a series of priority claims, to U.S. Pat. Appl. No. 13/777,927 (issued as U.S. Pat. No. 8,893,726), to U.S. Pat. Appl. No. 13/560,789 (issued as U.S. Pat. No. 8,490,628), to U.S. Pat. Appl. No. 12/944,123 (issued as U.S. Pat. No. 8,393,331), U.S. Pat. Appl. No. 10/587,707 (issued as U.S. Pat. No. 7,832,410, Ex. 1004), International PCT Appl. No.

PCT/CN05/00337 (published as WO 2005/099494), and to foreign patent application CN 20040031182.0. Ex. 1001 at Col. 1, ll. 6-21. No patents purportedly claim the direct benefit of the '549 Patent filing date. The following pending patent applications also claim the benefit of other applications in the '549 Patent family:

Serial No.	Filed
U.S. Patent Application No. 14/719,061, which claims the benefit of a family member of the '549 Patent	May 21, 2015
U.S. Patent Application No. 14/719,923, which claims the benefit of a family member of the '549 Patent (Abandoned)	May 22, 2015
U.S. Patent Application No. 15/167,825, which claims the benefit of a family member of the '549 Patent	May 27, 2016

C. Lead and Back-Up Counsel

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D. Service Information

Please address all correspondence to the lead and backup counsel at the contact information above. Petitioner also consents to service by email at rgabric@brinksgilson.com, rmallin@brinksgilson.com and stimmerman@brinksgilson.com.

III. IDENTIFICATION OF CHALLENGE AND STATEMENT OF THE PRECISE RELIEF REQUESTED (37 C.F.R. § 42.104 (B))

Pursuant to 37 C.F.R. § 42.104(a), Petitioner certifies that the ‘549 Patent is available for IPR and that Petitioner is not barred or estopped from requesting IPR.

Petitioner requests review and cancellation of claims 12-13, 17-19 and 21 of the ‘549 Patent under 35 U.S.C. § 103. Petitioner’s detailed statement of the reasons for relief requested is set forth below in the section titled “Statement of Reasons for the Relief Requested.” Pursuant to 37 C.F.R. § 42.6(c), copies of the exhibits, including the declaration of Dr. Robert Sturges (Ex. 1002) are filed herewith.

Claims 12-13, 17-19 and 21 are unpatentable under 35 U.S.C. § 103 as obvious over Hongbin (Exs. 1003/1004) in combination with Whittemore (Ex. 1005) and Brooks (Ex. 1006).

Exhibit No.	Description	Publication Date	Prior Art Under 35 USC §
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Exhibit No.	Description	Publication Date	Prior Art Under 35 USC §
1003 1004	Chinese Patent Application Publication No. CN1233436A ("Hongbin")	Nov. 3, 1999	102(b)
1005	U.S. Pat. No. 2,057,353 ("Whittemore")	Oct. 13, 1936	102(b)
1006	U.S. Pat. No. 4,947,874 ("Brooks")	Aug. 14, 1990	102(b)

Statement of no redundancy:

This IPR petition is not redundant because it relies on a prior art combination which has not previously been considered or presented to the PTAB in an IPR petition or considered during prosecution.

IV. THRESHOLD REQUIREMENT FOR *INTER PARTES* REVIEW

This Petition meets the threshold requirement for *inter partes* review because it establishes that there is a reasonable likelihood that Petitioner will prevail with respect to at least one of the challenged claims. 35 U.S.C. § 314(a).

V. PERSON HAVING ORDINARY SKILL IN THE ART ("PHOSITA")

The PHOSITA for the '549 Patent at the time of the alleged invention would have had 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. 1002 at ¶¶21-22.

VI. 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*, 579 U.S. ____ (2016). Petitioner's construction of claim terms is not binding upon Petitioner in any other proceeding related to the '549 Patent, and Petitioner reserves the right to offer additional or alternative constructions under the *Phillips* standard applicable in the co-pending district court litigation.

"atomizer": This term was previously construed to mean "a part of the electronic cigarette that includes components that participate in facilitating atomization, *but not components included in other recited parts of the electronic cigarette, such as the liquid supply.*" Ex. 1007, at 9 (emphasis added). Petitioner adopts this definition for purposes of the BRI standard applicable to this IPR only, except for the negative limitation portion identified in italics, which is not supported by any intrinsic or extrinsic evidence. *See e.g. Omega Eng'g, Inc. v. Raytek Corp.*, 334 F.3d 1314, 1322-23 (Fed. Cir. 2003) (concluding that absent

“any express disclaimer or independent lexicography in the written description,” there is no basis in the patent specification for adding a negative limitation). There is nothing in the specification that describes this negative limitation or otherwise precludes any part of the “liquid supply” or any other structure from being part of the atomizer. *See e.g., Powell v. Home Depot U.S.A., Inc.*, 663 F.3d 1221, 1331-32 (Fed. Cir. 2011) (concluding that the same structure in the accused product can satisfy two distinct claim terms when the specification does not suggest that the claim terms require separate structures); and Ex. 1002 at ¶28. Thus, for purposes of this IPR only, Petitioner adopts the modified construction for “atomizer” as being “a part of the electronic cigarette that includes components that facilitate and participate in atomization.”

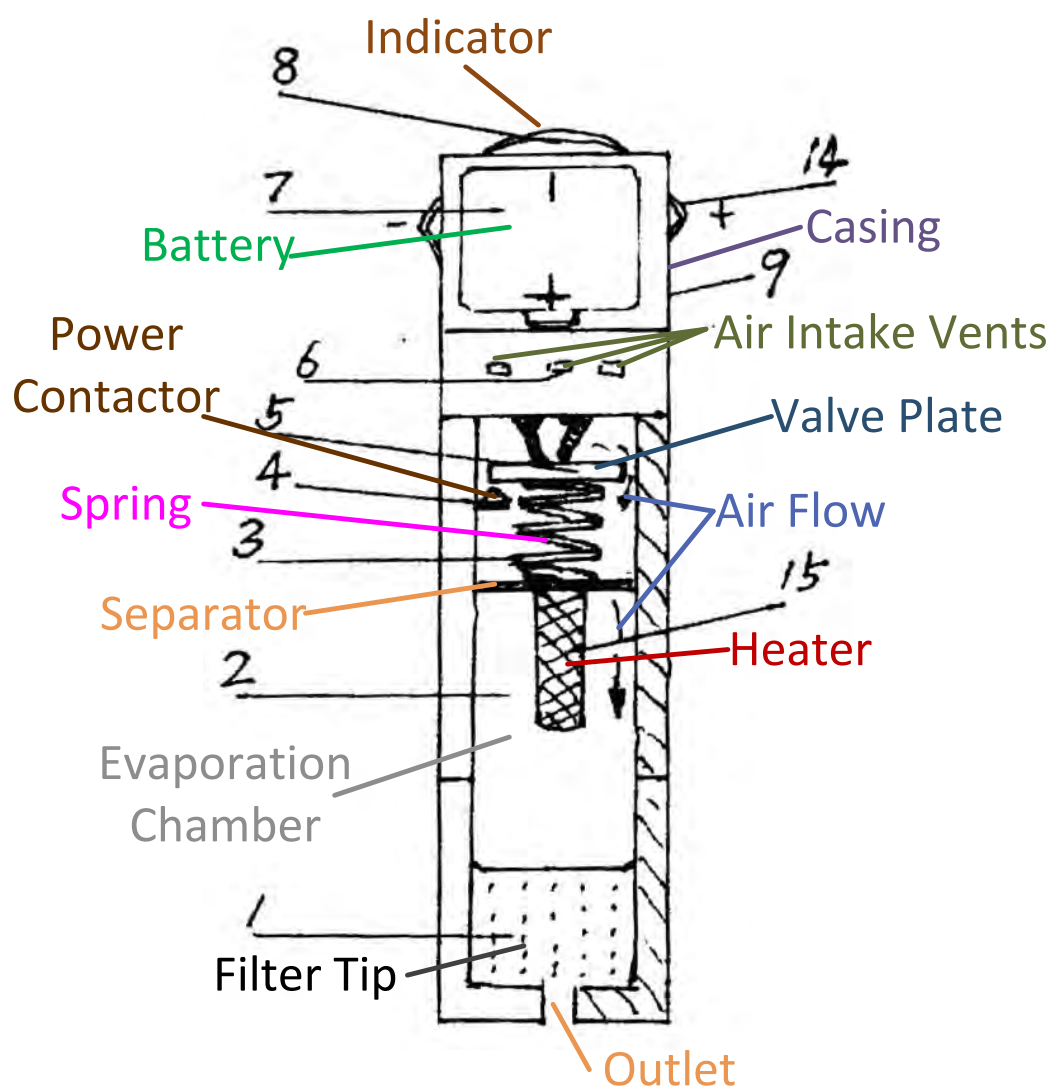
“separator”: During co-pending consolidated litigation 1:16-cv-01255 (Lead Case), the Patent Owner proposed that the term “separator” does not require construction or in the alternative, is “a component that separates.” Ex. 1008, p. 26. For purposes of this IPR only, Petitioner adopts Patent Owner’s proposed construction that a “separator” is “a component that separates.”

VII. DESCRIPTION OF THE PRIOR ART RELIED UPON

A. Chinese Patent Application Publication No. CN 1233436A (“Hongbin”) (Exs. 1003/1004)

Hongbin discloses an electronic liquid odor cigarette with an indicator 8 at one end connected to a battery 7, and that gives out light when a user inhales.

Ex.1004, p.1:18-19. The light at the tip makes the electronic cigarette “more real” and “more fun.” *Id.* at 1:17-18, 2:6-7.



With reference to annotated FIG. 1 above, the cigarette includes a filter tip 1 with an opening where the user inhales, an indicator 8 on the opposite end of the filter tip 1, smoking material evaporation chamber 2, suction control valve plate 5, spring 3, contactor 4, air intake vents 6, battery 7, external power supply 14, and electronic heater 15. Ex. 1004, p.2:10-12. There is also a separator that defines one end of the evaporation chamber and operates to separate the heater and liquid from the electronics. Ex.1002, ¶32. The separator includes a hole that allows air to flow through from the intake to the evaporation chamber as indicated by the airflow arrows and as described in Hongbin. Ex.1002, ¶32. The spring 3 pushes the suction control valve plate 5 toward the air vents 6 to disconnect the valve plate 5 from the power contactor 4. Ex. 1004, p.1:18. But “[w]hen the cigarette is smoked, the valve plate [5] is sucked away from air intake vents [6] to connect the power contactor [4].” *Id.*, p.1:18-19.

The suction control valve plate 5 is sensitive to airflow in that it detects and responds to airflow. *Id.*; Ex.1002, ¶¶33-34. This sensitivity allows the electronic cigarette to operate. *Id.* Specifically, the suction control valve plate 5 detects airflow based on a pressure difference created by the user inhaling. Well-known principles of science establish that airflow is most frequently measured based on pressure differential. *See Marks’ Standard Handbook for Mechanical Engineers*

(1978) at Sec. 16-16 (Ex.1026). That is exactly what occurs in Hongbin. Ex.1002, ¶33.

When the user inhales, a negative pressure develops within the casing 9 and a pressure differential develops on either side of the valve plate 5. Ex.1004, p.1:18-19; Ex.1002, ¶34. This pressure differential causes airflow that moves the valve plate 5 against the opposing force from the spring 3. *Id.* Moving the valve plate 5 enables the air to flow from the air intake vents 6, past the suction control valve plate 5, into the smoking material evaporation chamber 2, and through the filter tip 1 to the user as is shown by the airflow arrows within the body in FIG. 1. *Id.* This airflow is detected due to the pressure difference on either side of the valve plate 5, which reacts to the airflow by moving and making contact with the power contactor 4. *Id.* The suction control valve plate 5 contacting the power contactor 4 completes a circuit that allows the battery 7 to supply electricity to the electronic heater 15 to heat the smoking material to evaporate the liquid and causes the indicator 8 to illuminate. Ex. 1004, p.1:15-23; Ex.1002, ¶¶33-35.

A vaporizable liquid is loaded into the smoking material evaporation chamber 2. Ex. 1004, p.1:10-11. An electronic heater 15 is also located within the evaporation chamber 2. *Id.*, p.1:20-21. The heater 15 heats the liquid to promote evaporation within the smoking material evaporation chamber 2. *Id.*; Ex.1002, ¶36. Hongbin acknowledges that one problem with its electronic heater 15 is that

it consumes a lot of electricity. Ex. 1004, p.1:22. To help account for this problem, Hongbin provides an external power supply 14 on the outer casing 9 to provide a backup for the battery 7. *Id.*, p.1:22-23.

As Dr. Sturges explains, a PHOSITA would have understood that Hongbin's "vaporizable liquid cigarette," which is located in the smoking material evaporation chamber 2, must be stored in some way. Ex.1002, ¶37. There are two ways that the vaporizable liquid can be stored. *Id.* First, the liquid can be simply poured into the evaporation chamber 2. *Id.* However, a PHOSITA would have recognized that simply storing liquid in the chamber 2 could cause leakage out of the electronic cigarette or into other parts of the electronic cigarette that could cause it to malfunction. *Id.* For example, the liquid could soak through the filter tip 1 and leak out the open end of the filter tip where users place their lips to inhale. *Id.* Further, a user could suck the liquid through the filter tip 1 during use. *Id.* Additionally, because the air intake vents 6 are in fluid communication with the evaporation chamber 2 to enable air to flow through, the liquid could potentially make its way past the separator to the air intake vents 6 when opened. *Id.* Moreover, because the valve plate 5 and the power contactor 4 are in fluid communication with the evaporation chamber 2, if the liquid could make its way past the separator, it could short the control circuit by interfering with the connection between the suction control valve plate 5 and the power contactor 4.

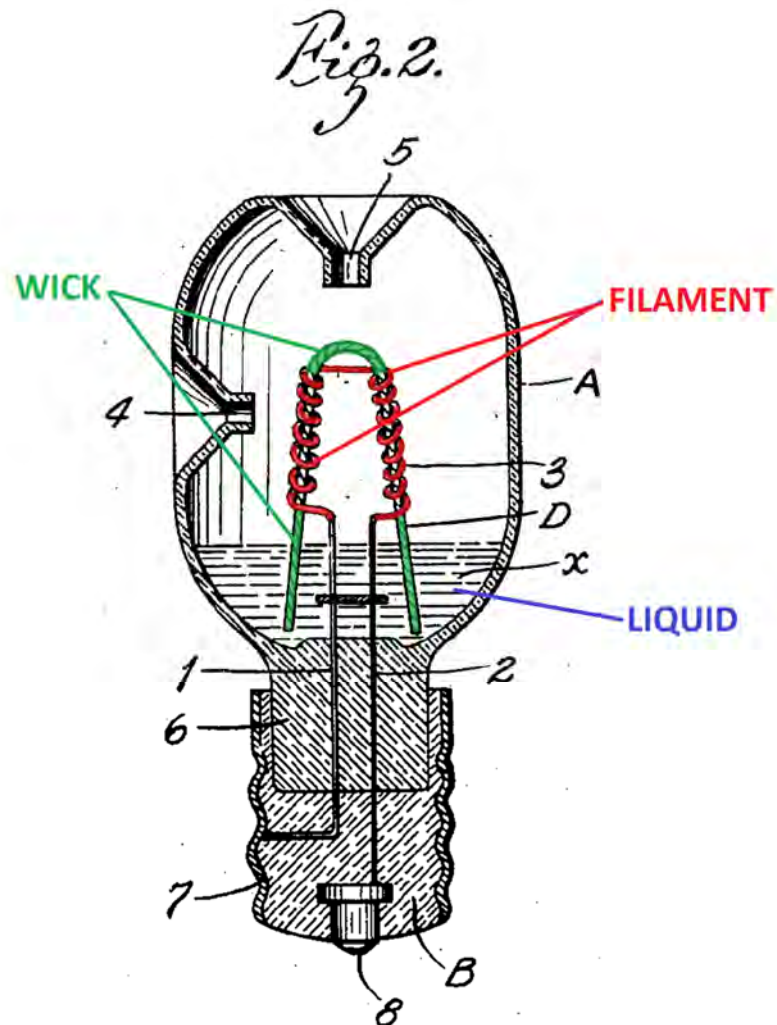
Id. Thus, a PHOSITA would have understood that the “vaporizable liquid cigarette” likely is not poured directly into the evaporation chamber. *Id.*

A PHOSITA would have understood that the second option for storing the “vaporizable liquid cigarette” is to use a container to hold the liquid in the evaporation chamber. Ex.1002, ¶38. Using a container would avoid the potential problems associated with simply pouring liquid into the evaporation chamber. *Id.* The container could be a vessel or an absorbent material such as a fiber that retains the liquid. *Id.* Using fiber as a container to retain a liquid in electronic cigarettes and other similar applications was well-known to a PHOSITA. *Id.*; *see also* Ex.1009 (U.S. Patent No. 6,598,607), col. 2:44-47; Ex.1010 (U.S. Patent No. 4,793,365), col. 10:51-66; Ex.1011 (U.S. Patent No. 5,203,355), col. 9:36-52; Ex.1012 (U.S. Patent No. 2,472,282), col. 3:29-32; and Ex.1013 (U.S. Patent No. 2,032,695), col. 1:46-48. A PHOSITA would have understood that using an absorbent material would be preferred over a vessel to hold the liquid because the absorbent material would allow for the airflow path through the absorbent material as shown in Fig. 1 and described in Hongbin. Ex. 1004, p.1:12-14, 1:18-19; Ex.1002, ¶38.

B. U.S. Patent No. 2,057,353 to Whittemore (“Whittemore”)

Whittemore discloses a vaporizing unit “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 that when said conductors are energized by an electric current, the filament 3 will become heated.” Ex.1006, p.1, 1:18-28.



The filament 3 may be “filament wires” or “electrical heating wires.” *Id.* at p.2, 2:18; col. 2:34-35. Whittemore discloses the heating wire wrapped around wick D but also explains that “wick D 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,

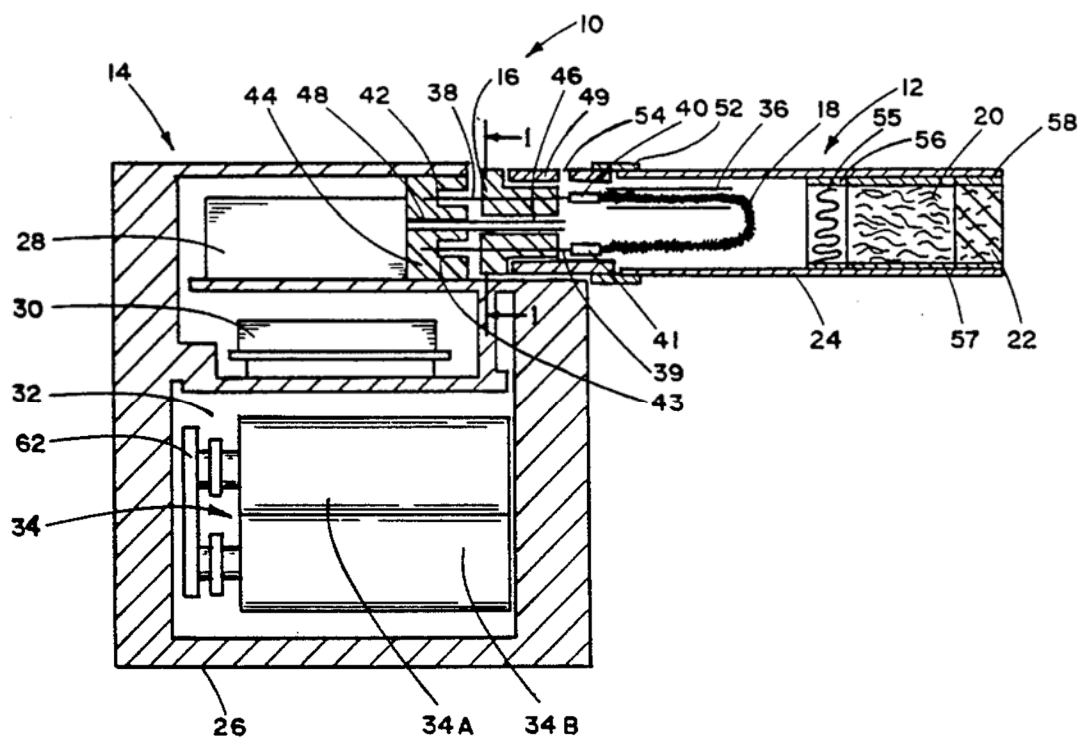
and a portion of said wick is always in contact with the medicament in the vaporizing vessel, whereby said medicament will be carried by capillary action to a point where it will be vaporized by the heat from the filament 3.” *Id.* at p.1, 1:54-2:8. The wick D consists of a thread, string, or strand of some suitable wick material. *Id.* at p. 1, 2:8-12.

Whittemore discloses that the purpose is to provide a vaporizing unit that functions “even though the heating element is spaced a considerable distance above or away from the medicament from which the vapor is evolved.” *Id.* at p.1, 1:5-10. Whittemore explains that “it is not necessary that the level of the medicament be maintained in close proximity to the heating element of the apparatus, but, on the contrary, the unit will operate properly so long as there is sufficient medicament in the vaporizing vessel A to engage or contact with a portion of the wick D.” *Id.* at p.2, 2:19-25.

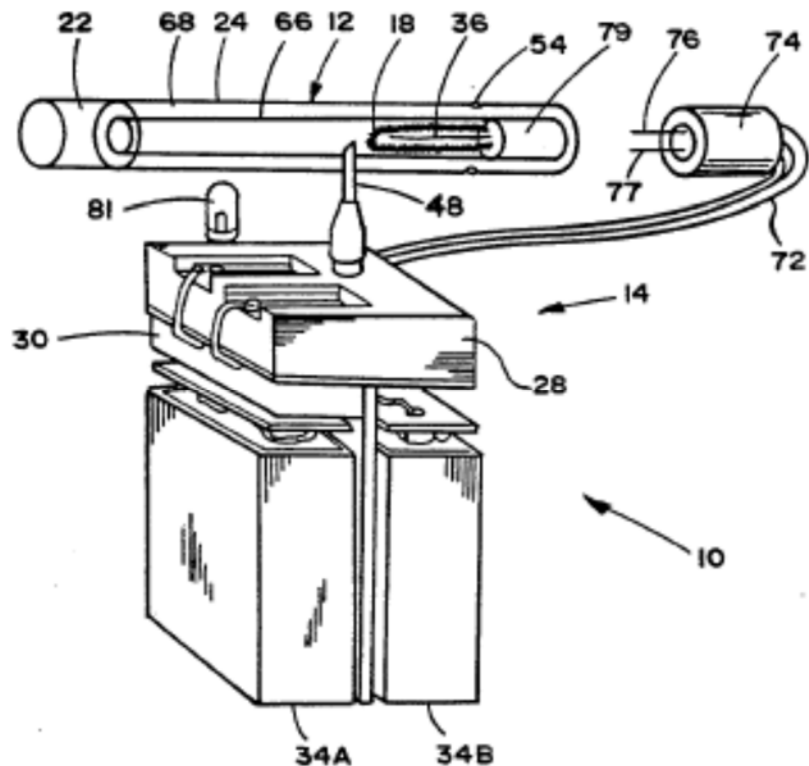
C. U.S. Patent No. 4,947,874 to Brooks (“Brooks”)

Brooks is titled “Smoking Articles Utilizing Electrical Energy.” Ex. 1006. Brooks “relates to cigarettes and other smoking articles such as cigars, pipes, and the like, which employ an electrical resistance heating element and an electrical power source to produce a tobacco-flavored smoke or aerosol.” Ex. 1006, 1:6-10. Propylene glycol is one of the proposed aerosol forming liquids for use in Brooks. *Id.*, 8:8-16.

Brooks discloses a smoking article 10 that includes a hand-held controller 14 and cigarette (e.g., a disposable portion) 12 (See *Id.* at 4:7-12; 7:15-16) as shown in FIGs. 1 and 3. Ex. 1006, FIG. 1:



Ex. 1006, FIG. 3:



Brooks describes that a light emitting diode (81) may be used in the smoking article for visually identifying heat generation periods. *Id.*, 11:35-41, 15:63-16:4, FIG. 3 (shown above). The LED is employed as part of a preferred circuit in FIG. 9 (shown below). *Id.*, 16:3-4. The preferred circuit also regulates the switching of current flow “to maintain the heating element within the desired temperature range.” *Id.*, 13:12-16, 14:60-63, 16:18-20. The circuit uses a series of timer chips, resistors, transistors and capacitors as shown in FIG. 9 below. *Id.*, 13:7-16:31.

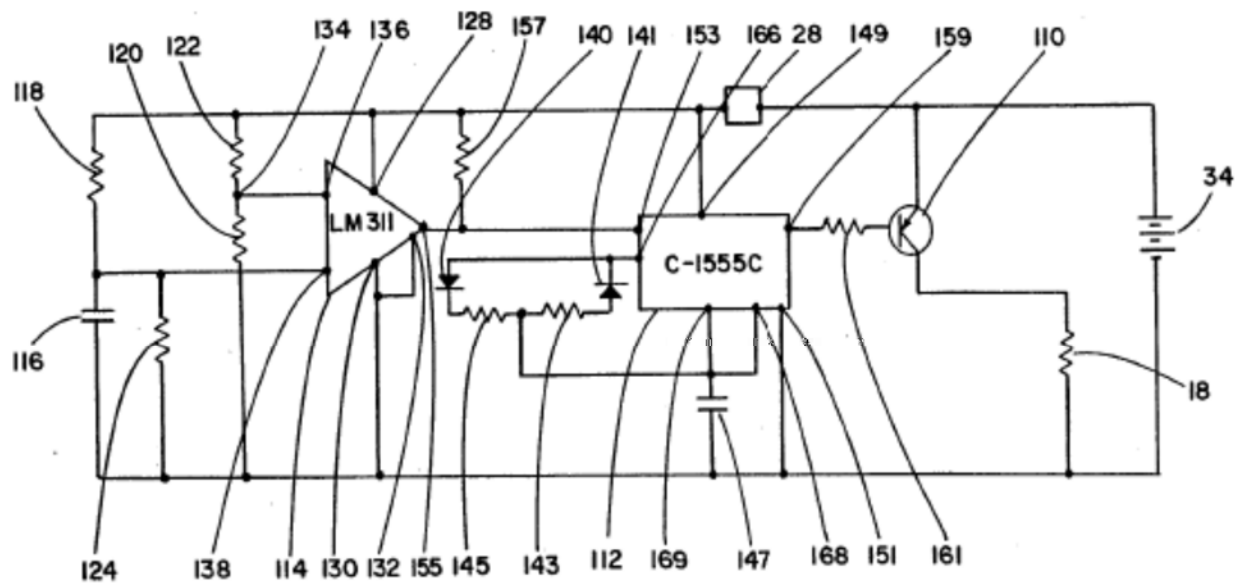


FIG. 9

VIII. CLAIM BY CLAIM EXPLANATION OF UNPATENTABILITY

A. Claim 12

1. 12.P: An electronic vaporizing device

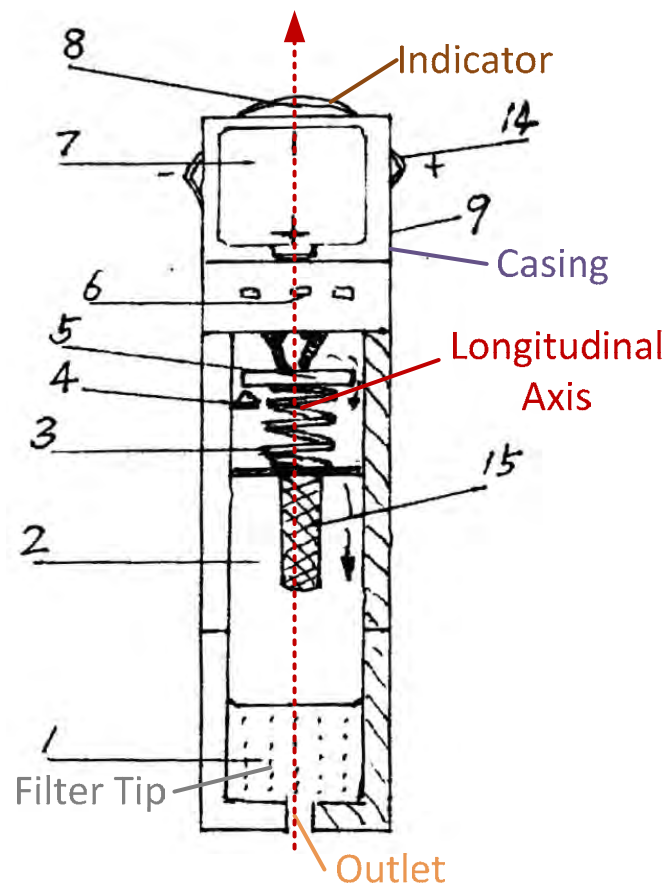
The preamble is not a claim limitation but even if it were, Hongbin discloses an electronic vaporizing device in the form of a liquid odor cigarette. Ex.1002, ¶47.

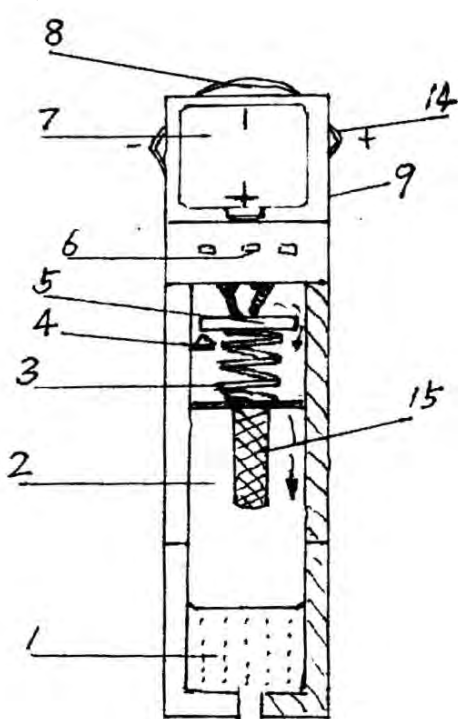
Claim 12.P	
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Claim 12.P	
An electronic vaporizing device comprising:	<p>“The liquid odor cigarette relates to a type of cigarette. It comprises a cigarette liquid and a cigarette holder. . . . The cigarette holder comprises an outer casing, a filter tip, a smoking material evaporation chamber, air intake vents, a valve plate, a power supply battery, an indicator, and an electronic heater.” Ex. 1004, Abstract.</p> <p>“The present invention is intended to design a liquid odor cigarette which is free of any poison, harm, or environment pollution.” Ex. 1004, 2:4-5.</p> <p>“In order to electrically heat the smoking material to promote evaporation. . .” Ex. 1004, 1:20.</p> <p>Ex. 1002, 47.</p>

2. 12.1: a cylindrical housing having a longitudinal axis, a first end and a second end

Hongbin includes a cylindrical housing (casing 9) with a longitudinal axis having a first end (indicator 8) and a second end (filter tip 1) as shown in annotated FIG. 1 below. A PHOSITA would have understood that the electronic cigarette in Hongbin is cylindrical. Ex. 1002, 48. FIGs. 1-2 are described as “cutaway views,” and the objective of Hongbin is to accurately mimic a traditional cigarette, which is cylindrical. *Id.*



Claim 12.1	
<p>a cylindrical housing having a longitudinal axis, a first end and a second end;</p>	<p>Ex. 1004, FIG. 1:</p>  <p>“The cigarette holder comprises an outer casing.” Ex. 1004, Abstract.</p> <p>“A filter tip 1 is set at one end of the outer casing 9 of the cigarette holder.” Ex. 1004, 1:9-10.</p> <p>“To increase the fun of smoking, an indicator 8 can be set at the other end of the outer casing of the cigarette holder.” Ex. 1004, 1:15.</p> <p>Ex. 1002, 48.</p>

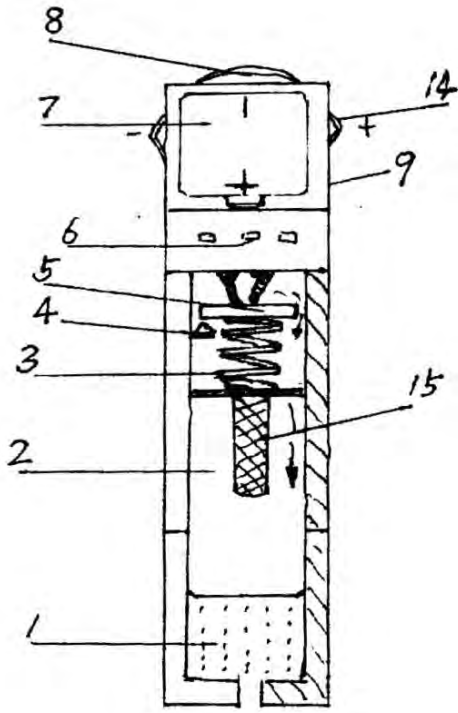
3. 12.2: an LED at a first end of the cylindrical housing

Hongbin includes a light source (indicator 8) located at a first end of the casing 9. Ex.1004, FIG. 2. The indicator 8 is electrically connected to the control circuit so that it is lit while the user is drawing. Ex.1004, 1:15-18. While Hongbin does not explicitly disclose that indicator 8 is an LED, LEDs were well known for

use in electronic cigarettes to indicate that a puff was being taken. Ex. 1014, p.1:22-23; Ex.1006, 11:35-41; 15:63-16:4 (illuminating an LED during a draw); Ex.1002, ¶49. For example, Brooks describes an LED “that emits light during draw.” Ex.1006, 11:35-41, 15:63-16:4. A PHOSITA would have understood that using an LED as opposed to another type of light source would merely be a simple substitution of one known element (a non-LED light source such as an incandescent light) for another known element (an LED light) to obtain the predictable result of lighting the end of the Hongbin device when a user inhales such as what is disclosed in Brooks. Ex. 1002, ¶49.

A PHOSITA also would have understood that Hongbin’s indicator 8 could be any conventional light source, including an LED as disclosed in Brooks, and that an LED with its long lifespan and low power consumption would be particularly appropriate for Hongbin’s device given Hongbin’s excessive electricity usage problem. Ex.1002, ¶50; Ex.1004, p.1:22-23. Thus, a PHOSITA would have had reason to use the LED from Brooks as the indicator light 8 of Hongbin to provide the known benefits by reducing consumption of energy as compared to using other light sources such as an incandescent light. Ex. 1002, 50.

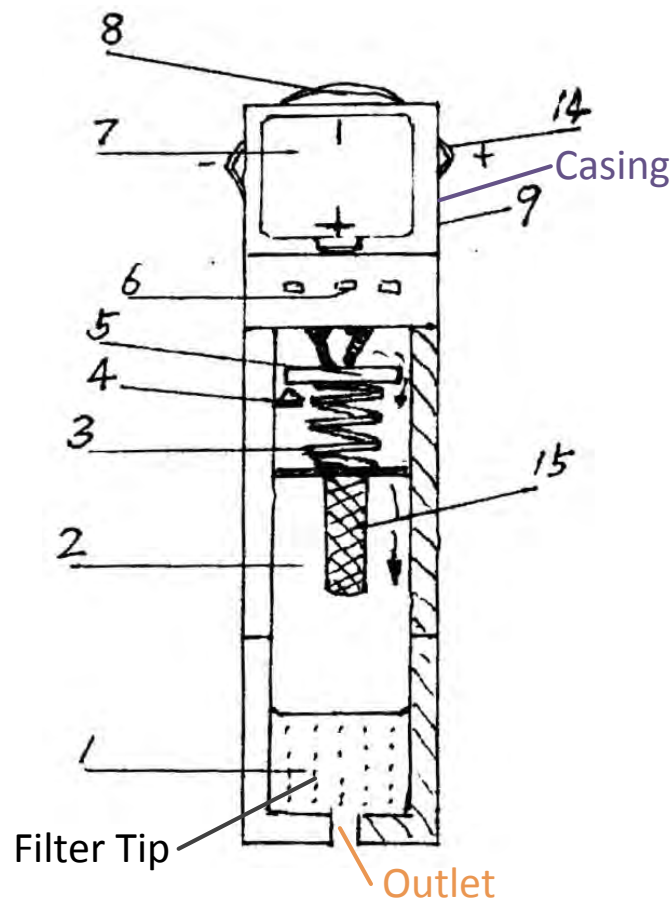
Claim 12.2	
an LED at a first end of the cylindrical housing;	“To increase the fun of smoking, an indicator 8 can be set at the other end of the outer casing of the cigarette holder, a power supply battery 7 is installed under the indicator....” Ex. 1004, 1:15-16.

Claim 12.2	
	<p data-bbox="548 218 1383 380">“When the cigarette is smoked, the valve plate is sucked away from air intake vents to connect the power contactor and the indicator gives out light.” Ex. 1004, 1:18-19.</p> <p data-bbox="548 428 808 464">Ex. 1004, FIG. 1:</p>  <p data-bbox="548 1241 1336 1535">“A light emitting diode 81 is positioned near differential switch 28. The diode 81 is electrically connected to the electrical circuitry such that it emits light during the draw. As such, the user has a visual means for identifying periods when current passes through the resistance heating element.” Ex. 1006, 11:35-41.</p> <p data-bbox="548 1583 1373 1873">“...light emitting diode 81 and resistor 192 can be employed. The light emitting diode 81 is connected in series with resistor 192. The series combination of diode 81 and resistor 192 is connected in parallel with the resistance element 18. The light emitting diode thus illuminates during draw, and the user then can have a visual means for identifying periods when current</p>

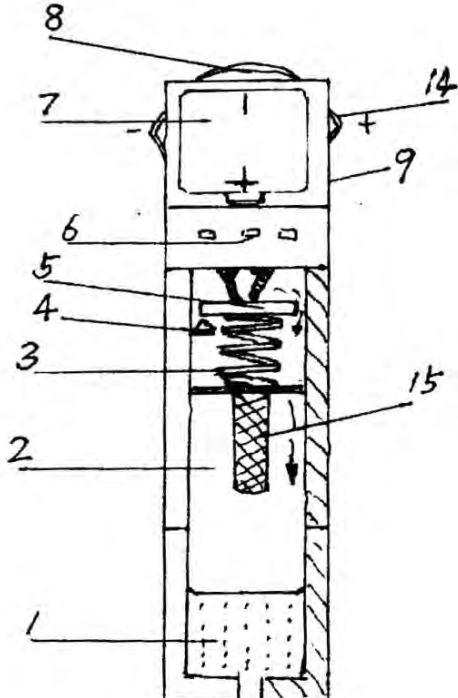
Claim 12.2	
	<p>passes through the resistance element for heat generation.”</p> <p>Ex. 1006, 15:63-16:3.</p> <p>Ex. 1002, 50.</p>

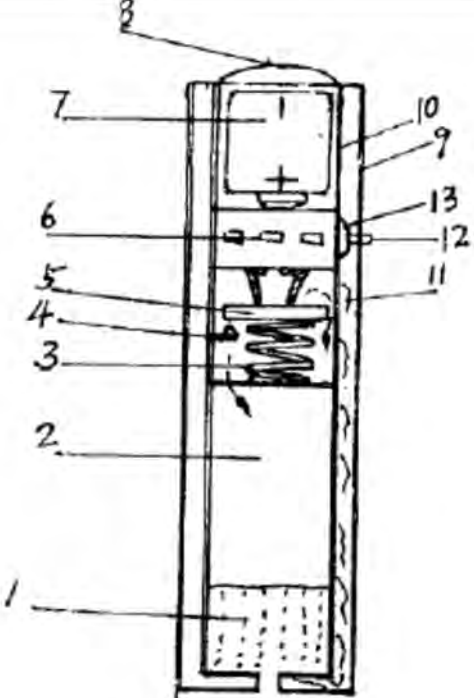
4. 12.3: an outlet at the second end of the cylindrical housing

Hongbin describes and shows an outlet (opening at the filter tip 1) at the second end of the cylindrical housing (outer casing 9) as shown in annotated FIG. 1.



Claim 12.3	
an outlet at the	“A filter tip 1 is set at one end of the outer casing 9 of

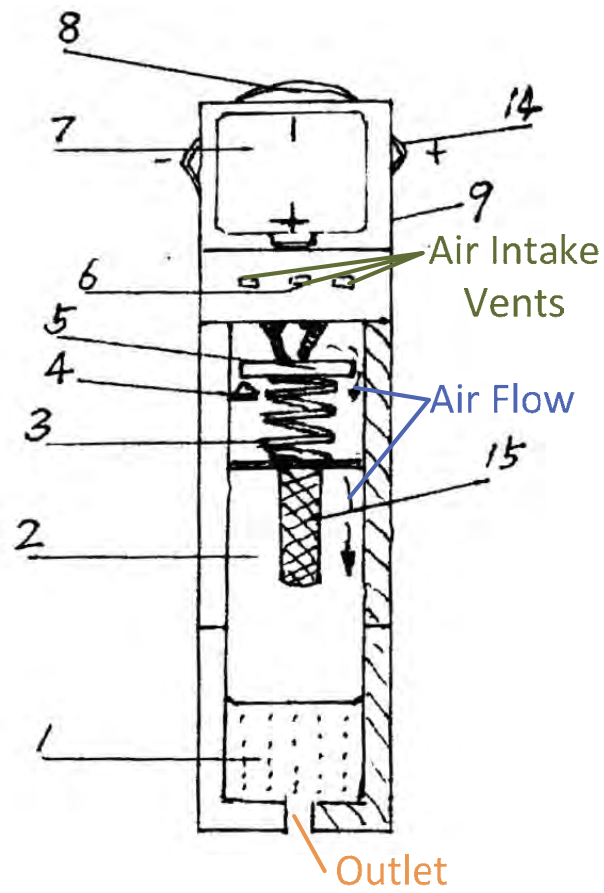
Claim 12.3	
<p>second end of the cylindrical housing;</p>	<p>the cigarette holder, a smoking material evaporation chamber 2 is set above the filter tip, the vaporizable liquid cigarette is loaded in the smoking material evaporation chamber.” Ex. 1004, 1:9-11.</p> <p>“When smoking, ... the gas which smells like cigarettes is sucked through the filter tip into the mouth.” Ex. 1004, 1:30-33.</p> <p>Ex. 1004, FIG. 1:</p>  <p>Ex. 1004, FIG. 2:</p>

Claim 12.3	
	 <p data-bbox="836 955 982 997">Figure 2</p> <p data-bbox="544 1039 755 1081">Ex. 1002, 51.</p>

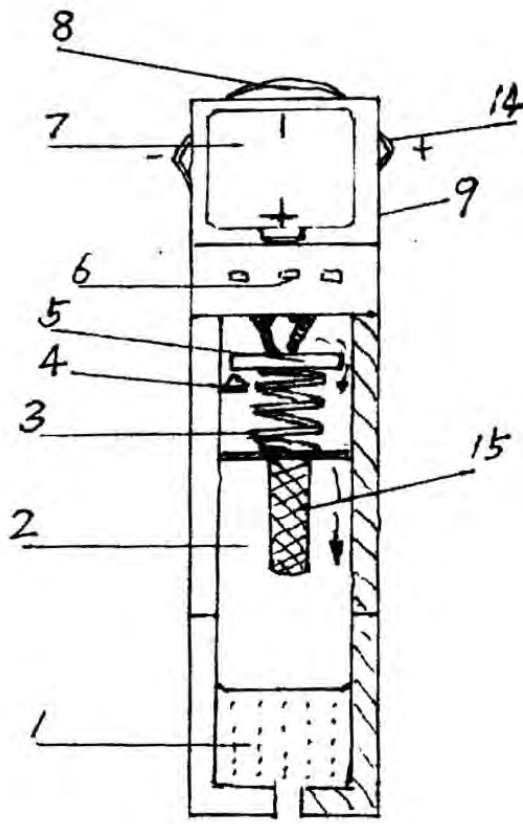
5. 12.4: an air inlet for allowing air to flow into the cylindrical housing

Hongbin describes an air inlet (air intake vents 6) that allows air to flow.

Hongbin FIG. 1 includes arrows showing a travel path of the air flowing past the valve plate and through the body of the cigarette as shown in the annotated version of FIG. 1:



Claim 12.4	
an air inlet for allowing air to flow into the cylindrical housing;	Ex. 1004, FIG. 1:

Claim 12.4	
	 <p>“The cigarette holder of the liquid odor cigarette is designed as follows: ... air intake vents 6 are set above the smoking material evaporation chamber, a suction control valve plate 5 and a spring 3 are set between the smoking material evaporation chamber and the air intake vents, the valve plate touches closely against the air intake vents to close the air intake vents when the cigarette is not smoked, and the valve plate is sucked away when the cigarette is smoked.” Ex. 1004, 1:9-14.</p> <p>Ex. 1002, ¶52.</p>

6. 12.5: a battery, an electronic circuit board, a sensor, an atomizer, and a liquid-supply within the cylindrical housing

Hongbin discloses a battery (battery 7), an airflow sensor (spring 3, power contactor 4, and suction control valve plate 5), an atomizer (including the

electronic heater 15) and a liquid supply (smoking material in evaporation chamber 2).

Battery:

Hongbin discloses a battery within the cylindrical housing as shown as power supply battery 7 in the casing 9 of FIG. 1. Ex. 1004, FIG. 1; Ex. 1002, ¶53.

Electronic circuit board:

Brooks discloses a preferred circuit shown in Fig 9 that, among other things, regulates the current flow to the heater during the puff in order to maintain the temperature of the heating element within the desired time range and controls the LED to identify when current is passing through the resistance heating element. Ex.1006, 13:7-51, 15:63-16:4. The preferred circuit is shown in Fig. 9 below:

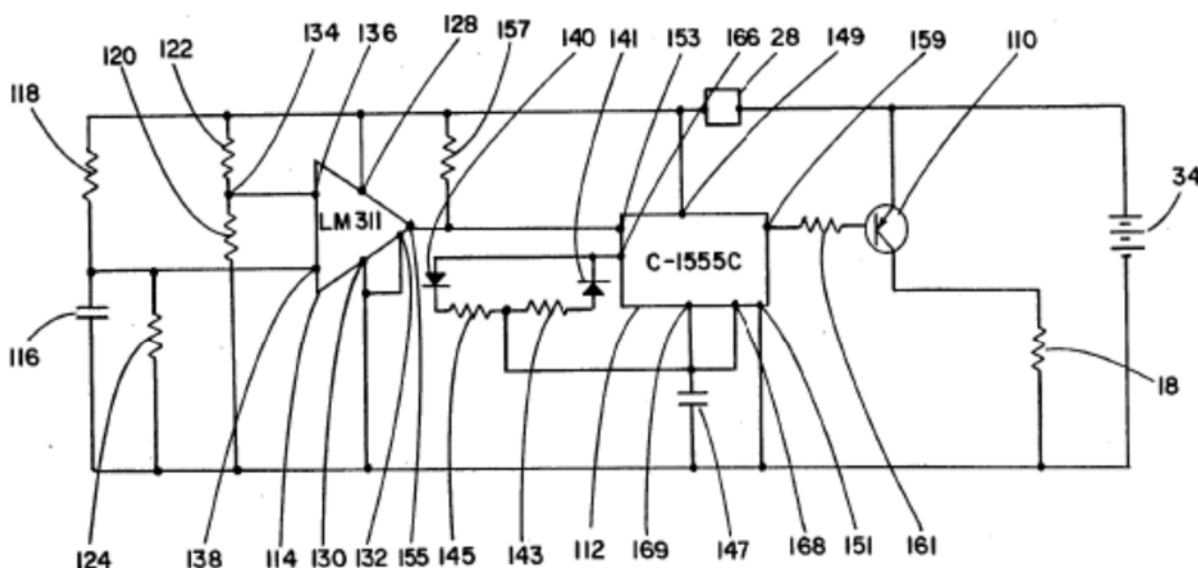


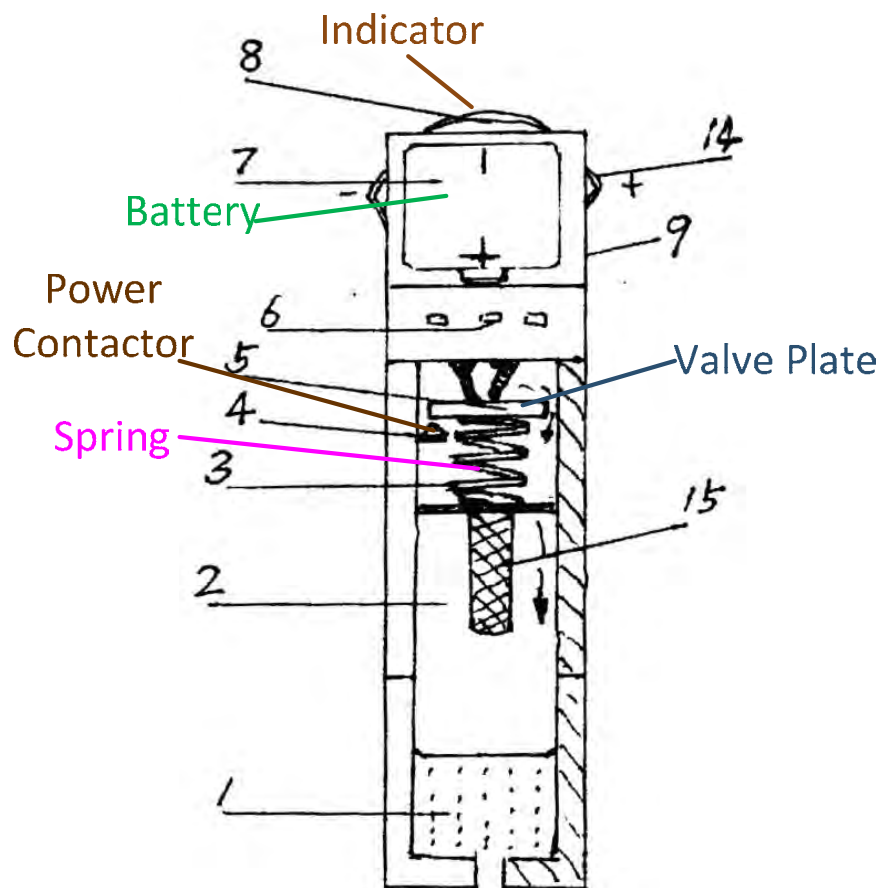
FIG. 9

The preferred circuit includes transistors, timers, resistors and capacitors. *See* Ex. 1006, 13:7-16:31. The timer is a chip with various pins. *Id.*, 14:3-9. A PHOSITA would have understood that the numerous circuit components shown in Fig. 9 are on a circuit board. Ex. 1002 at ¶55; *See also* Ex. 1017 (method of attaching a microchip to a circuit board); Ex. 1018 (method for mounting parts on circuit boards); Ex. 1019, Bremenour (a patent directed to a memory cartridge for a circuit board); and Ex. 1020 at 3-5, 129-134 (method of packaging electronic systems using circuit boards).

As Dr. Sturges explains, a PHOSITA would have known that using the known preferred control circuit in Brooks that regulates the current and maintains the heating element within the desired temperature range in the Hongbin electronic cigarette would have the predictable result of making the Hongbin electronic cigarette more energy efficient system and helping to solve the electricity use problem identified in Hongbin. Ex.1002, ¶54; Ex.1004, p.1:22-23 (stating that the electric heater uses too much electricity). Indeed, using the known preferred circuit from Brooks in the Hongbin electronic cigarette with an identified energy problem would yield the predictable result of helping to solve the energy problem. Ex.1002, ¶54.

Sensor:

Hongbin discloses a “control circuit” that includes the indicator 8, the heater 15, the valve plate 5, the power contactor 4, and all the wiring and interconnections electrically coupling the above elements. Ex.1004, p.1:15-23; Ex.1002, ¶57. As Dr. Sturges explains, the airflow sensor is the suction control valve plate 5 that responds to suction and controls whether the electronic cigarette is on or off. Ex.1002, ¶¶33-34, 57. The sensor described in Hongbin operates in the same manner as the sensors described in the ‘549 Patent. *See* Ex. 1001, 3:27-37, 4:25-34; Ex.1002, ¶57.

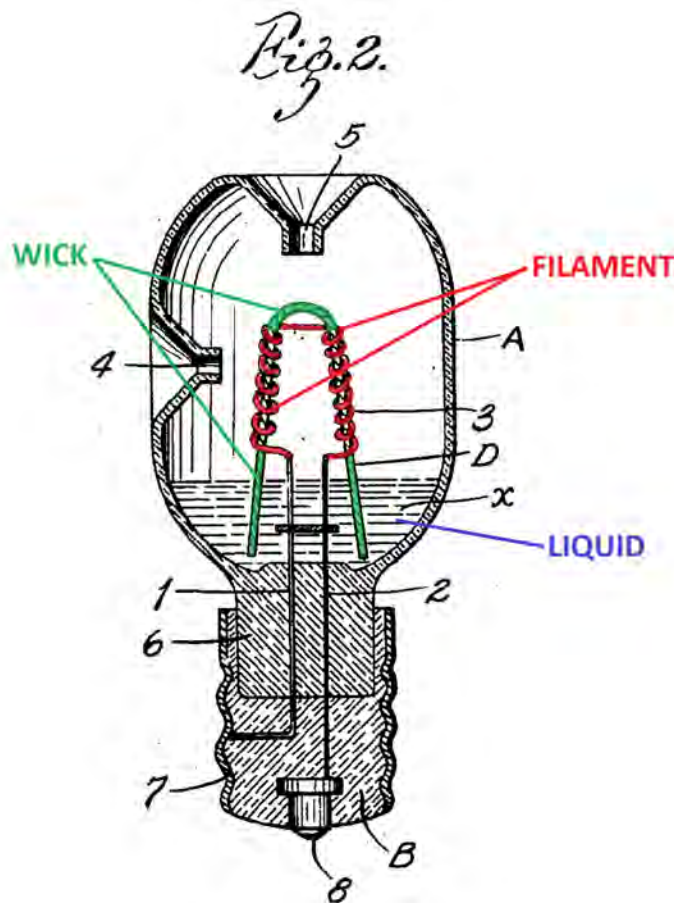


Atomizer:

Hongbin discloses an atomizer in the housing in the “smoking material evaporation chamber [2],” in which a liquid substance is vaporized and ultimately provided to a user for inhalation. Ex.1002, ¶58; Ex.1004, p.1:20-21 (“In order to electrically heat the smoking material to promote evaporation, an electronic heater 15 can be set in the smoking material evaporation chamber.”). However, Hongbin discloses that, in this arrangement, the heater 15 “consumes much electricity” [sic]. Ex.1004, p.1:22-23. Accordingly, Hongbin uses an external power supply 14 as a backup to the battery to account for the high electricity usage. *Id.*; Ex.1002, ¶58. As Dr. Sturges explains, a PHOSITA would have recognized that Hongbin’s heater 15 uses a high amount of electricity because it must heat all or most of the absorbent material or liquid located in the smoking material evaporation chamber 2 in order to vaporize the amount of liquid needed for a puff. Ex.1004, p.1:20; Ex.1002, ¶58. Such a configuration results in a power inefficiency as the heater 15 must heat a much larger volume of liquid and smoking material than is ultimately required to generate a puff of vapor. Ex.1002, ¶58. A PHOSITA would have recognized that the heating design, regardless of the reason for the inefficiency, could be improved to be more efficient. *Id.*

Accordingly, in order to improve the power efficiency of Hongbin, for example, to increase the life of the battery 7 and eliminate or reduce the need for a

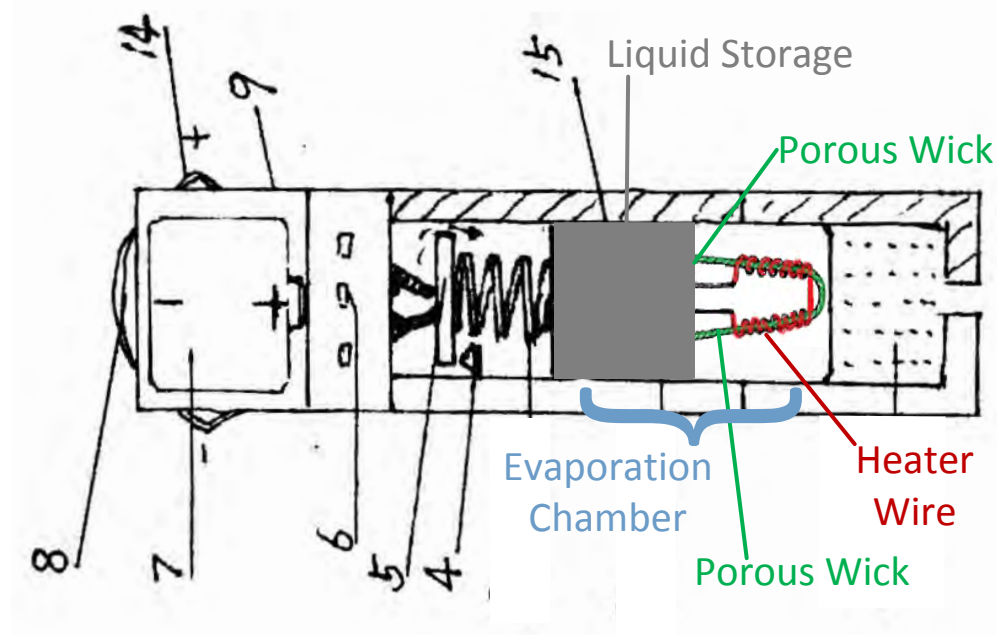
backup external power supply 14, a PHOSITA would look to other references utilizing more efficient means to vaporize the liquid. *Id.*, ¶59. Whittemore discloses one such efficient vaporization arrangement using a wick and heating wire configuration that is more efficient than Hongbin's configuration because the filament 3 is spaced away from the larger volume of liquid and only needs to heat the liquid located within the porous wick D as in FIG. 2 (below). Ex.1005, p.1, 2:19-25; Ex.1002, ¶59.



Whittemore's wick carries the liquid from the liquid reservoir to the heating element via capillary action. Ex.1005, p 1, 1:54-2:8; Ex.1002, ¶60. Once the

liquid comes in contact with the filament 3, the liquid is vaporized by the heat. *Id.* Because the liquid reservoir is spaced away from the filament 3 and only the portion of the liquid that contacts the filament 3 via the wick is heated to a vapor, Whittemore's configuration does not use extra power to heat the entirety of the volume of liquid to generate vapor. Ex.1002, ¶60. Instead, Whittemore's configuration directly heats only a smaller amount of liquid to generate the vapor. *Id.* Accordingly, Whittemore's teachings improve power efficiency. *Id.*

In an effort to improve the power efficiency of Hongbin, a PHOSITA would incorporate Whittemore's heating wire and wick into Hongbin's smoking material evaporation chamber 2. Ex.1002, ¶61. One possible example would be to place the wick into the liquid container's absorbent material as shown below:



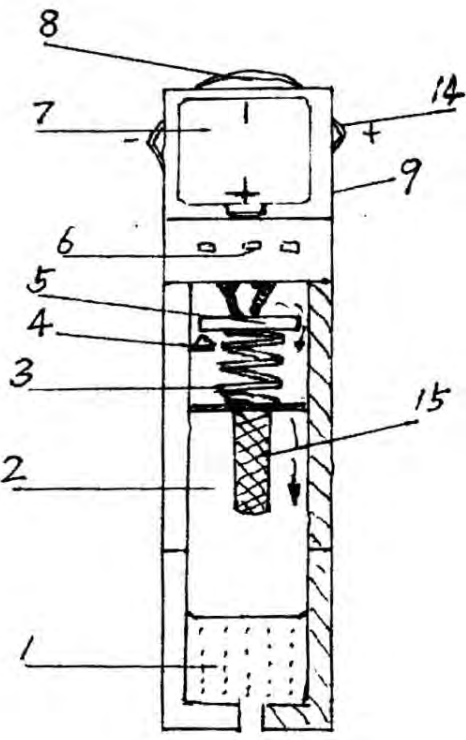
Id. By adding the wick and heating coil outside of the liquid container, the wick/coil heater only needs to heat a small amount of liquid to form a vapor, and uses much less energy when compared to the electronic heater 15 disclosed in Hongbin. Ex.1002, ¶62. Specifically, the wick would be in contact with the absorbent material and would carry the liquid toward the filament to be vaporized. Ex.1005, p 1, 1:3-8; Ex.1002, ¶62. Further, a PHOSITA would have understood that Whittemore's wick and wire heating arrangement provides efficient heating. Ex.1002, ¶¶62-63. For example, U.S. Pat. No. 5,743,25 to Howell expressly discloses a vaporizer that has a heating element using close, tight wire coils to ensure good heat transfer. Ex. 1015 at 11:20-22. Indeed, coils have been a known shape for heating elements in vaporizing devices for nearly a hundred years, as revealed by the disclosure of Wilson. *See e.g.*, Ex. 1016 at 1:99-103, 2:14-20, 2:75-85. As Dr. Sturges explains, substituting Whittemore's wick and coil for the electronic heating element 15 in Hongbin is nothing more than substituting one known prior art heating element for another known heating element to yield the predictable result of heating the liquid. Ex.1002, ¶¶62-63. *See also* MPEP § 2143 (exemplary rationale I.(B))

A PHOSITA would have recognized that Hongbin's excessive electrical use and heating inefficiency could be improved by using Whittemore's heating solution. Ex.1002, ¶¶62-63. A PHOSITA would have understood that using the

wick and wire from Whittemore would have been tantamount to applying a known technique (Whittemore's heating wire and wick) to Hongbin's known device, which was ready for improvement (excessive electrical usage) to achieve the predictable result of more efficient heating and reduced electrical use. Ex.1002, ¶¶62-63. *See also* MPEP § 2143 (exemplary rationale I.(D)). Further, a PHOSITA would have understood that using the wick and wire in Whittemore as opposed to the heater 15 in Hongbin would merely be a simple substitution of one known element (Whittemore's wick and wire) for another known element (Hongbin's heater 15) to obtain the predictable result of heating the liquid in the evaporation chamber when a user inhales. Ex. 1002, ¶63.

Liquid-supply:

As discussed in section VII.A, *supra*, the liquid may be stored either directly in the smoking material evaporation chamber 2 or in a container (such as a vessel or an absorbent material) located in the evaporation chamber 2. Ex.1004, p.1:10-11; Ex.1002, ¶¶30, 36-38, 65. A PHOSITA would have understood that the Hongbin evaporation chamber would likely contain a vessel or absorbent material for storing the liquid. *Id.* The liquid container is located in the evaporation chamber 2, which is within the cylindrical housing (casing 9). *Id.* In this manner, the electronic heater 15 heats the smoking material to vaporize the smoking liquid contained therein. Ex.1004, p.1:20-21; Ex.1002, ¶¶30, 36-38, 65

Claim 12.5	
<p>a battery, an electronic circuit board, a sensor, an atomizer, and a liquid-supply within the cylindrical housing,</p>	<p>Ex. 1004, FIG. 1:</p>  <p>“[A] power supply battery 7 is installed under the indicator, one electrode of the power is connected to the indicator and the other electrode is connected to the valve plate 5, a power contactor 4 is set under the valve plate, and the power contactor is connected to the indicator with a wire. Usually, the valve plate is disconnected from the power contactor. When the cigarette is smoked, the valve plate is sucked away from air intake vents to connect the power contactor and the indicator gives out light. Ex.1004, 1:15-19.</p> <p>“In order to electrically heat the smoking material to promote evaporation, an electronic heater 15 can be set in the smoking material evaporation chamber. One electrode of the electronic heater is connected to the power supply battery with a wire, and the other electrode is connected to the power contactor 4. Considering that the electronic heater consumes much electricity, an external power supply 14 can be set above the outer casing of the cigarette holder to provide a backup for the battery.” Ex.</p>

Claim 12.5

1004, 1:20-23.

“[A] suction control valve plate 5 and a spring 3 are set between the smoking material evaporation chamber and the air intake vents, the valve plate touches closely against the air intake vents to close the air intake vents when the cigarette is not smoked, and the valve plate is sucked away when the cigarette is smoked.” Ex. 1004, 1:12-14.

“The cigarette holder of the liquid odor cigarette is designed as follows: A filter tip 1 is set at one end of the outer casing 9 of the cigarette holder, a smoking material evaporation chamber 2 is set above the filter tip, the vaporizable liquid cigarette is loaded in the smoking material evaporation chamber.” Ex. 1004, 1:9-11.

Ex. 1006, FIG. 9:

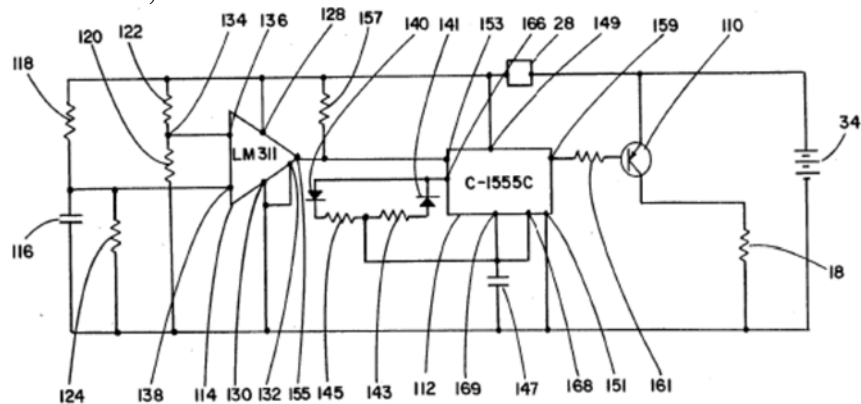


FIG. 9

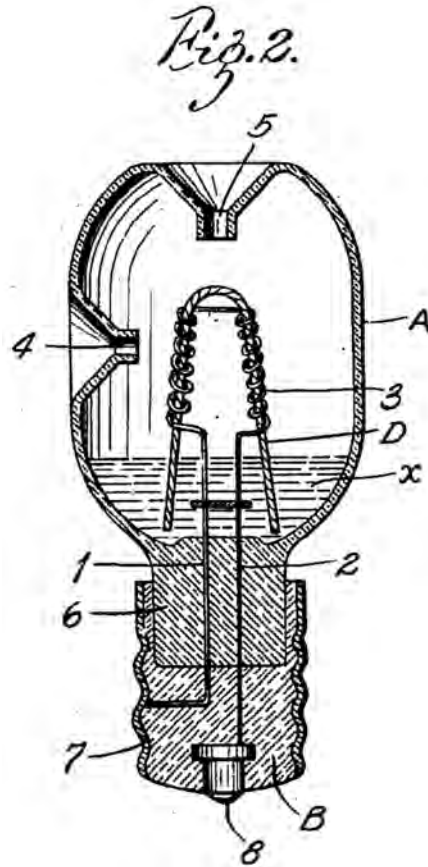
See Also Ex. 1006, 13:20-16:31.

“The current regulating circuit preferably is time based. Normally, such a circuit includes a means for permitting uninterrupted current flow through the heating element for an initial time period during draw, and a timer means for subsequently regulating current flow until draw is completed. Preferably, the subsequent regulation involves the rapid on-off switching of current flow (eg., on the order of about every 1 to 50 milliseconds) to

Claim 12.5

maintain the heating element within the desired temperature range. Alternatively, the subsequent regulation involves the modulation of current flow through the heating element to maintain the heating element within a desired temperature range.” Ex. 1006, 13:7-20.

Ex. 1005, FIG. 2:

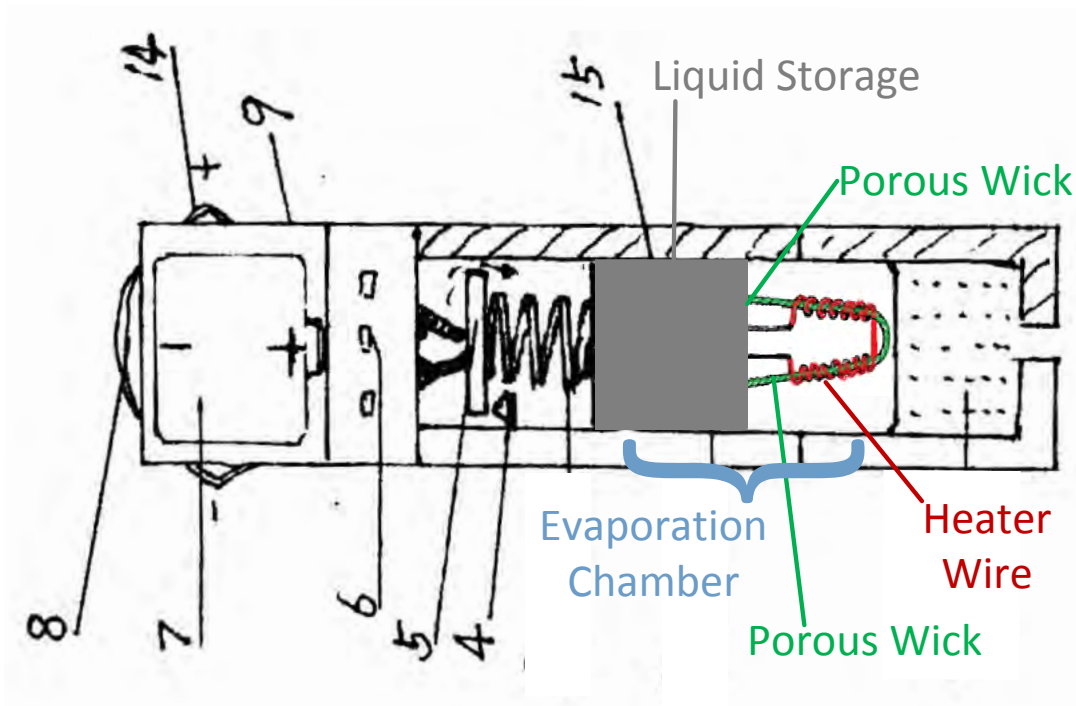


“[A] wick D made of any suitable material and combined with the heating element or filament a in such a way that a portion of said wick is always in contact or approximate contact with the heating element or filament 3, and a portion of said wick is always in contact with the medicament in the vaporizing 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.” Ex. 1005, p.1 1:54-2:8.

Claim 12.5	
	<p>“The object of my invention is to provide a vaporizing unit, of the kind mentioned, which is of such construction that it will function properly, even though the heating element is spaced a considerable distance above or away from the medicament from which the vapor is evolved.” Ex. 1005, p.1 1:5-10.</p> <p>“With such a unit it is not necessary that the level of the medicament be maintained in close 20 proximity to the heating element of the apparatus, but, on the contrary, the unit will operate properly so long as there is sufficient medicament in the vaporizing vessel A to engage or contact with a portion of the wick D.” Ex. 1005, p.1 2:19-25.</p> <p>Ex. 1002, ¶¶53-65.</p>

7. 12.6: wherein the liquid-supply includes a liquid and a fiber material

The combination of Whittemore with Hongbin discussed in section VII.A.6, *supra*, in which the evaporation chamber 2 of Hongbin with heater 15 is combined with the heater and wick of Whittemore as shown in the annotated version of FIG. 1 of Hongbin:



As discussed in section VII.A, *supra*, and as explained by Dr. Sturges, the liquid may be stored either directly in the smoking material evaporation chamber 2 or in a container (such as a vessel or an absorbent material) located in the evaporation chamber 2. Ex.1002, ¶¶30, 36-38, 65, 67. A PHOSITA would have understood that an absorbent material for storing the liquid in the evaporation chamber would be preferred to prevent spilling and for efficient heating. *Id.* . The use of fiber in electronic cigarettes and other related devices for storing liquid was well-known to a PHOSITA. Ex.1002, ¶¶38, 67. For example, U.S. Patent No. 6,598,607 (“Adiga”) discloses a non-combustible cigarette including a porous cartridge for storing a liquid. Ex. 1009, 2:44-47. Adiga discloses a porous cartridge made of porous media, such as carbon filter, cotton, or other fabric materials. *Id.* at 3:1-3. Similarly, U.S. Patent No. 4,793,365 (“Sensabaugh”) states

that it is well known to use thermally stable substrate materials as carriers for aerosol forming stances and that they release vapor upon heating. Ex. 1010, 10:51-66. Sensabaugh includes a list of nearly 20 exemplary porous materials, including carbon felts, fibers, and mats. *Id.* U.S. Patent No. 5,203,355 (“Clearman”) discloses cigarettes including a “cellulosic material” for containing a liquid and releasing the liquid during smoking. Ex. 1011, 9:36-52. Clearman includes a list of suitable materials, including fibrous materials such as cotton, rayon, and paper. *Id.* U.S. Patent No. 2,472,282 (“Burchett”) discloses a cigarette lighter with a “fuel chamber [that] may be filled with cotton or other absorbent material, as indicated at 44, in order to retain fuel which may be inserted into the chamber.” Ex. 1012, 3:29-32. U.S. Patent No. 2,032,695 (“Gimera”) discloses a cigarette lighter with a reservoir for fuel “which is carried by stuffing of saturated cotton waste.” Ex. 1013, 1:46-48; Ex. 1002, ¶¶38, 67.

A PHOSITA would have understood that Hongbin uses fiber as the container for holding the liquid for the reasons stated above, because there are a limited number of predictable solutions for storing the liquid (i.e., pouring the liquid in the chamber, using a vessel or using fiber) and using fiber is the simple substitution of one known method for liquid storage for other known methods (a vessel or pouring liquid in the chamber) that yields the predictable result of storing the liquid and allowing airflow (as shown by the air flow arrows in Hongbin). Ex.

1002, ¶¶37-38. A PHOSITA would have also recognized that using fiber as storage provides the additional benefit of reducing the possibility of leakage. Ex. 1002 at ¶¶38, 67. Finally, Whittemore also discloses that the liquid supply includes fiber by virtue of the fact that the porous wick is in the liquid supply. Specifically, Whittemore states that “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.” Ex. 1005, p.1 1:54-2:8.

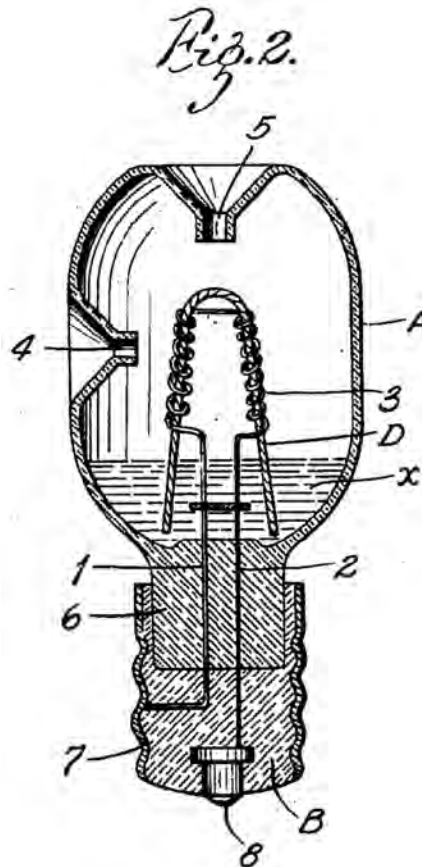
Claim 12.6	
<p>wherein the liquid-supply includes a liquid and a fiber material,</p>	<p>Ex. 1004, FIG. 1:</p> <p>“The cigarette holder of the liquid odor cigarette is designed as follows: A filter tip 1 is set at one end of the outer casing 9 of the cigarette holder, a smoking material evaporation chamber 2 is set above the filter</p>

Claim 12.6

tip, the vaporizable liquid cigarette is loaded in the smoking material evaporation chamber.” Ex. 1004, 1:9-11.

“In order to electrically heat the smoking material to promote evaporation, an electronic heater 15 can be set in the smoking material evaporation chamber. One electrode of the electronic heater is connected to the power supply battery with a wire, and the other electrode is connected to the power contactor 4. Considering that the electronic heater consumes much electricity, an external power supply 14 can be set above the outer casing of the cigarette holder to provide a backup for the battery.” Ex. 1004, 1:20-23.

Ex. 1005, FIG. 2:



“[A] wick D made of any suitable material and

Claim 12.6	
	<p>combined with the heating element or filament a 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. In the form of my invention shown in Figure 2, the wick D consists of a thread, string or strand of some suitable wick material” Ex. 1005, p.1 1:54-2:18.</p> <p>“With such a unit it is not necessary that the level of the medicament be maintained in close proximity to the heating element of the apparatus, but, on the contrary, the unit will operate properly so long as there is sufficient medicament in the vaporizing vessel A to engage or contact with a portion of the wick D.” Ex. 1005, p.1 2:19-25.</p> <p><i>See also</i> Ex. 1009, 2:44-47, 3:1-3; Ex. 1010, 10:51-66; Ex. 1011, 9:36-52; Ex. 1012, 3:29-32; and Ex. 1013, 1:46-48.</p> <p>Ex. 1002, ¶¶30, 36-38, 65, 67.</p>

8. 12.7: with the liquid containing propylene glycol

Hongbin describes a liquid containing propylene glycol by disclosing a liquid to be vaporized that includes “alcohol.” Ex. 1004, 1:7. Propylene glycol is merely one example of an alcohol that can be used as evidenced by at least Brooks, which describes that an aerosol forming substance may include “alcohols such as ... propylene glycol.” Ex. 1006, 6:49-55. A PHOSITA would have recognized that the alcohol used in Hongbin could include propylene glycol and that propylene

glycol was a common aerosol forming substance. Ex. 1002 at ¶68. For example, in addition to Brooks, Susa provides that “[t]he alcohols used in this case are, e.g., glycerin or propylene glycol, or their mixture.” Ex. 1021, 6:32-34. Takeuchi states “[t]he alcohols used in the present invention include, for example, glycerin, propylene glycol, and a mixture thereof.” Ex. 1022, 5:35-39. Cox describes its aerosol mass delivery is for propylene glycol. Ex. 1023, 12:11-16. Nichols U.S. Pat. No. 4,981,522 describes an aerosol precursor or flavoring agents in a solution of alcohol or propylene glycol. Ex. 1024, 6:31-35.

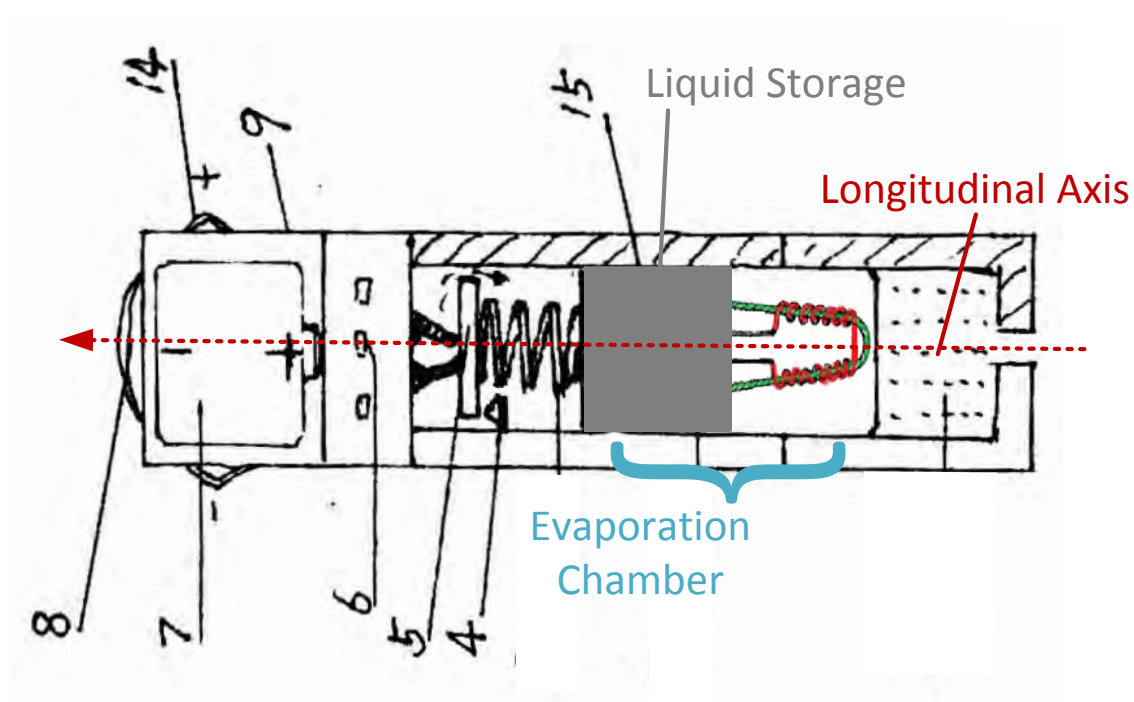
Claim 12.7	
with the liquid containing propylene glycol,	<p>The aerosol forming substance can be, for example, a polyhydric alcohol, such as glycerin, propylene glycol, or a mixture thereof; water; a tobacco material such as a tobacco aroma oil, a tobacco essence, a spray dried tobacco extract, a freeze dried tobacco extract, tobacco dust, or the like, in order to provide tobacco flavor; or a combination thereof. Ex. 1006 at 8:8-14.</p> <p>“A liquid odor cigarette relates to a type of cigarette, characterized in that 0.3 ml of pepper juice, 1 ml of carrot juice, 0.5 ml of ginger juice, 0.1 ml of wind medicated oil, and 0.1 ml of alcohol are mixed evenly.” Ex. 1004, Claim 6.</p> <p>Ex. 1002 at ¶68.</p>

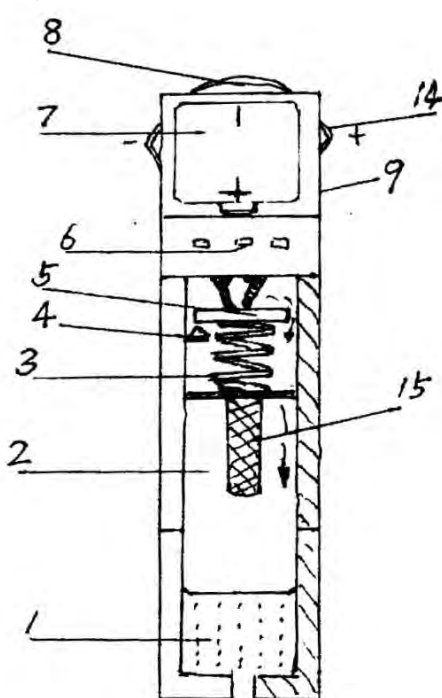
9. 12.8: wherein the liquid supply is cylindrical and parallel to the longitudinal axis of the cylindrical housing

As discussed in section VII.A, *supra*, and explained by Dr. Sturges, a PHOSITA would have understood that the liquid in Hongbin is stored in an

absorbent fiber, would be cylindrical as it is “loaded” in the evaporation chamber (2), and would be parallel to the longitudinal axis of the housing as shown in annotated Fig. 1 below. Ex.1002, ¶¶30, 36-38, 65, 67; Ex. 1004, 1:9-11.

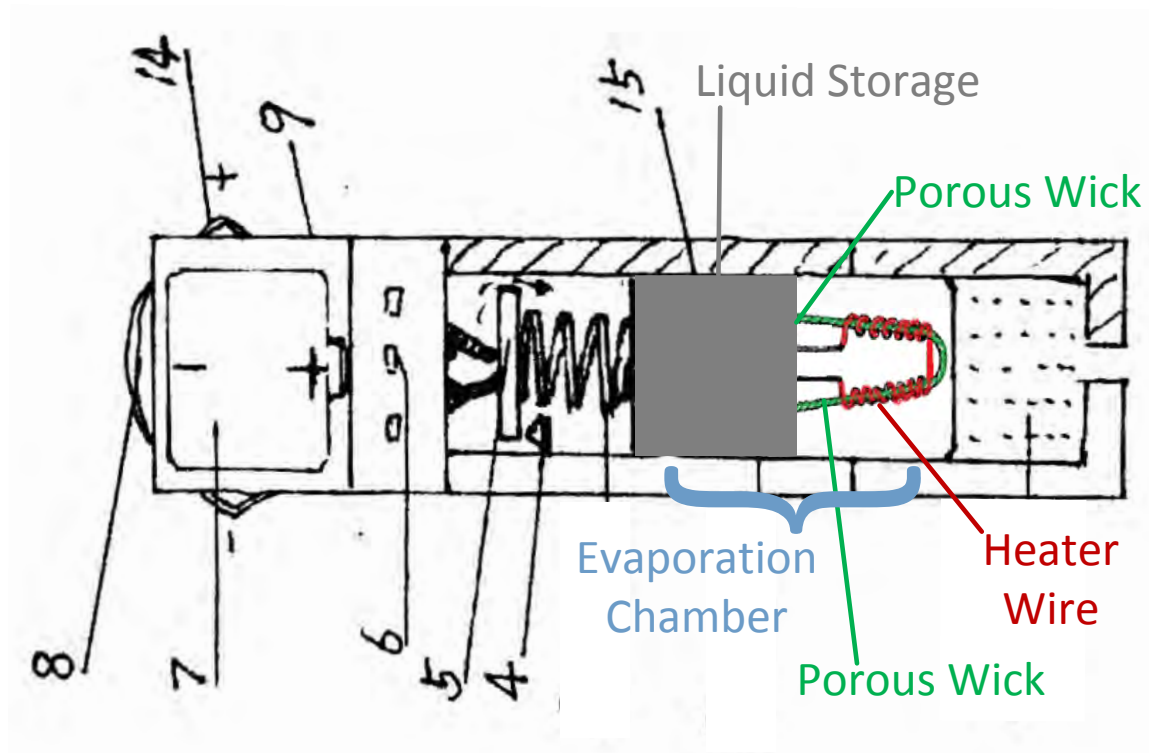
Specifically, a PHOSITA would have also known that the Hongbin device was cylindrical because it is expressly described as “a type of cigarette,” and cigarettes are known to be cylindrical. Ex. 1004, Abstract, Claim 1; Ex. 1002, ¶69. Thus, a PHOSITA would have immediately recognized that the liquid storage would also be cylindrical because as it is “loaded” in the evaporation chamber 2 which is cylindrical and inside the cylindrical Hongbin device. Ex. 1002, ¶69. The liquid storage would also be parallel to the longitudinal axis of the housing (as with the evaporation chamber 2) as shown in annotated Fig. 1 below.



Claim 12.8	
<p>wherein the liquid supply is cylindrical and parallel to the longitudinal axis of the cylindrical housing;</p>	<p>Ex. 1004, FIG. 1:</p>  <p>“The cigarette holder of the liquid odor cigarette is designed as follows: A filter tip 1 is set at one end of the outer casing 9 of the cigarette holder, a smoking material evaporation chamber 2 is set above the filter tip, the vaporizable liquid cigarette is loaded in the smoking material evaporation chamber.” Ex. 1004, 1:9-11.</p> <p>“In order to electrically heat the smoking material to promote evaporation, an electronic heater 15 can be set in the smoking material evaporation chamber. One electrode of the electronic heater is connected to the power supply battery with a wire, and the other electrode is connected to the power contactor 4. Considering that the electronic heater consumes much electricity, an external power supply 14 can be set above the outer casing of the cigarette holder to provide a backup for the battery.” Ex. 1004, 1:20-23.</p> <p>Ex. 1002, ¶69.</p>

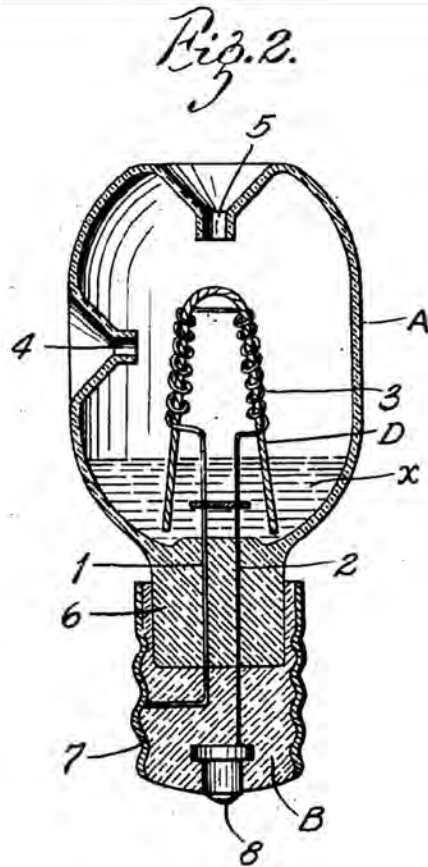
10. 12.9: the atomizer comprises a porous component, a hollow cylindrical chamber and a heating wire

Hongbin includes a hollow cylindrical chamber (evaporation chamber 2) with heater 15. Whittemore, as discussed above in section VIII.A.6, *supra*, discloses a heater wire coil wrapped around a wick, which the PHOSITA would have recognized is porous because it moves the liquid by capillary action. Ex. 1002, ¶70. Further, Whittemore describes the wick as “thread, string or strand” which would all be fibers that can be used to move the liquid by capillary action. Ex. 1002, ¶70, Ex. 1005, p.1 2:9-12. For the reasons explained above, it would have been obvious to modify Hongbin to include a liquid storage container for storing liquid, and to substitute Whittemore’s heater wire and wick for the heater 15 of Hongbin to achieve the predicted result of more efficient heating of the liquid as shown in the annotated version of FIG. 1 of Hongbin:



The filament 3 in Whittemore is a heating wire that is described as “filament wires” or “electrical heating wires” (shown as the heater wire above). Ex. 1005, p.1 1:22-25, 1:50-2:5.

Claim 12.9	
the atomizer comprises a porous component, a hollow cylindrical chamber and a heating wire;	<p>“A smoking material evaporation chamber 2 is set above the filter tip.” “. . . an electronic heater can be set in the smoking evaporation chamber.” Ex. 1004 at 1:10, 1:20-21.</p> <p>Ex. 1005, FIG. 2:</p>

Claim 12.9

“[A] wick D 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.” Ex. 1005, p.1 1:54-2:8.

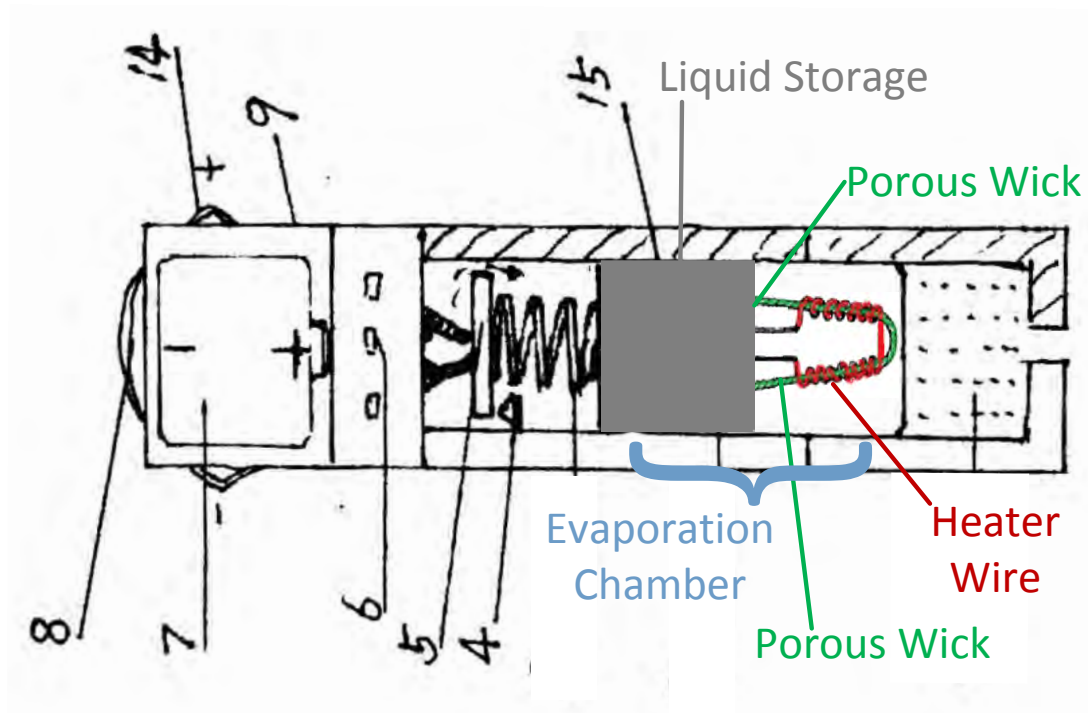
“[T]he wick D consists of a thread, string or stand [sic] of some suitable wick material doubled intermediate its ends so as to form a substantially inverted V-shaped device....” Ex. 1005, p.1 2:9-12.

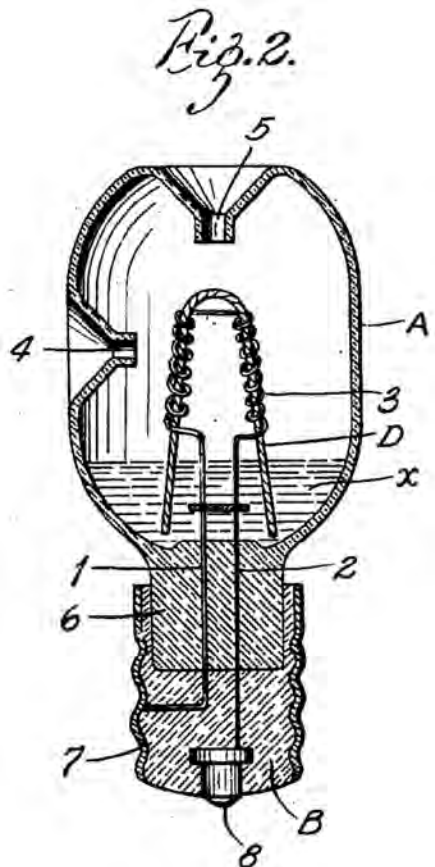
“...portions of the filament wire extending from the plug....” Ex. 1005, Claim 11.

Claim 12.9	
	<p>“...electrical heating wires extending from the plug through the bottom of the vessel into the space adapted to contain the medicament and terminating above the normal liquid level thereof, and a wick surrounded and supported by the electrical heating wires for carrying the medicament by capillary attraction above the liquid surface level thereof.” Ex. 1005, Claim 12.</p> <p>Ex. 1002, ¶70.</p>

11. 12.10: the porous component is in physical contact with the liquid in the liquid supply

Whittemore describes that the porous component (wick D) is in physical contact with the liquid (medicament) in order to transport the liquid to the heating wire. *See* Section VIII.A.6, *supra*. A PHOSITA would have modified Hongbin with the heating wire/wick arrangement of Whittemore in such a way that a portion of the wick is in physical contact with the liquid supply as shown below for the exact same reason—in order to transport liquid from the liquid storage to the heating wire. Ex. 1002, ¶71.

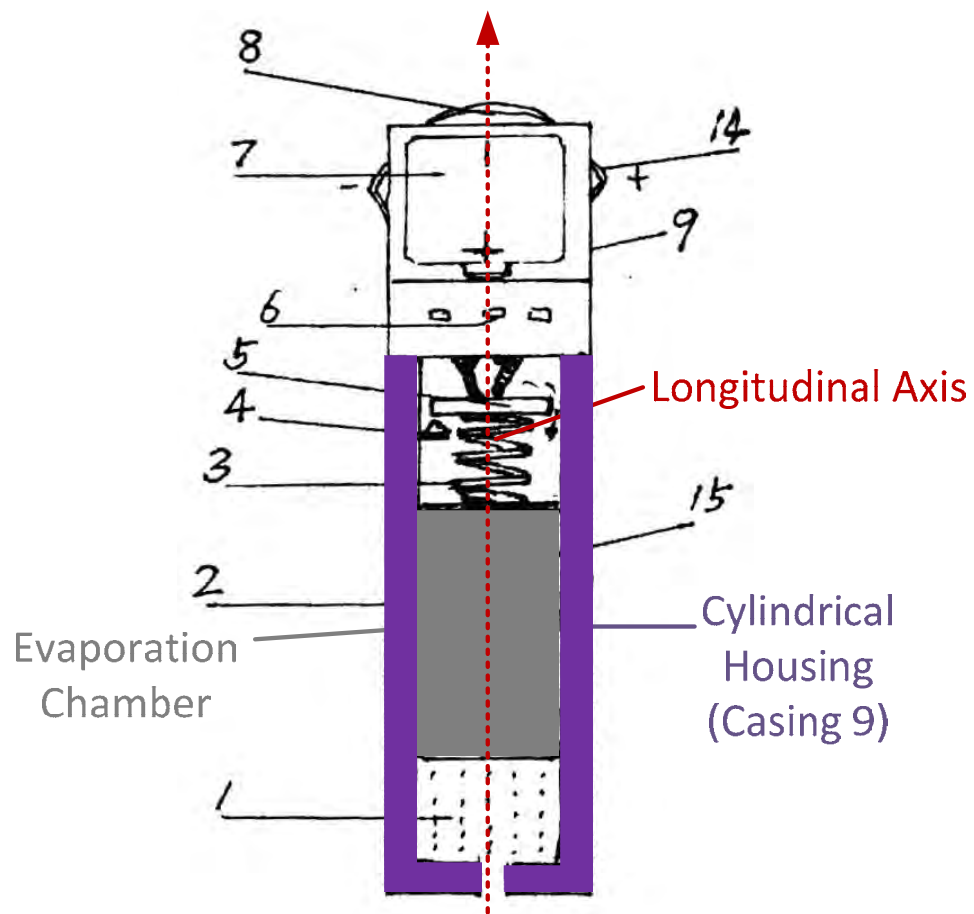


Claim 12.10	
<p>the porous component is in physical contact with the liquid in the liquid supply;</p>	<p>Ex. 1005, FIG. 2:</p>  <p>FIG. 2 is a cross-sectional diagram of a device. It shows a liquid supply (1) at the bottom, which is connected to a porous component (2) via a tube (6). The porous component (2) is in physical contact with the liquid supply. A heater wire (3) is coiled around the porous component (2). The heater wire (3) is connected to a terminal (4) and a terminal (5). The device is housed in a casing (A) and has a base (B) with a plug (7) and a tube (8). A liquid level (x) is indicated in the upper part of the device.</p>

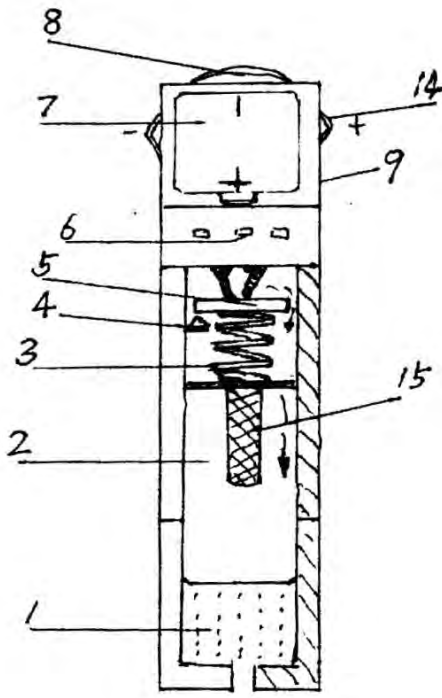
Claim 12.10	
	<p>“... a portion of said wick is always in contact with the medicament in the vaporizing vessel, whereby said medicament will be carried by capillary action to a point where it will be vaporized by the heat from the filament 3.” Ex. 1005, p.1 1:54-2:8.</p> <p>“...a wick surrounded and supported by the electrical heating wires for carrying the medicament by capillary attraction above the liquid surface level thereof.” Ex. 1005, Claim 12.</p> <p>Ex. 1002, ¶71.</p>

12. 12.11: the hollow cylindrical chamber is co-axial with the cylindrical housing

Hongbin describes a hollow cylindrical chamber (evaporation chamber 2) located inside the cylindrical casing 9. Ex. 1004 at 1:10, 1:20-21, Fig. 1. As Dr. Sturges explains, the evaporation chamber shown in annotated Fig. 1 is concentric with the cylindrical casing 9 and thus is co-axial because it is in the same cylindrical casing and concentric with the cylindrical casing along the same longitudinal axis. Ex. 1002, ¶72.



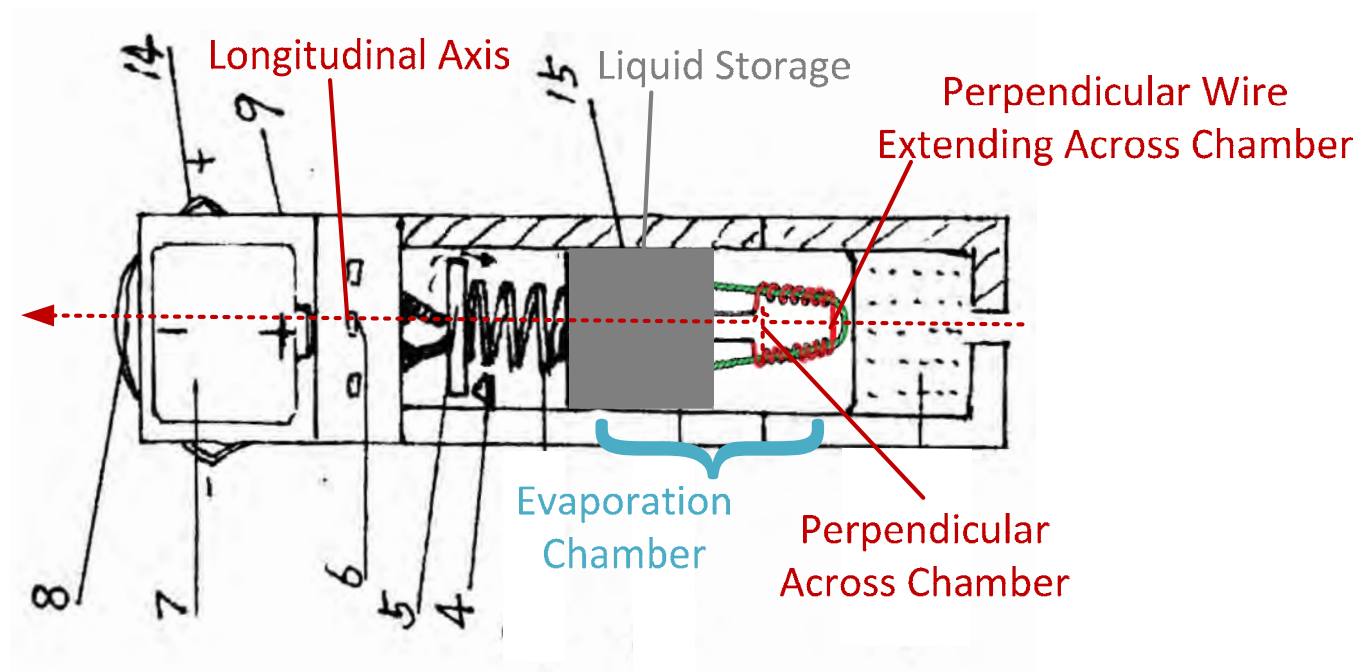
Claim 12.11	
the hollow cylindrical chamber is co-axial with the cylindrical housing;	Ex. 1004, FIG. 1:

Claim 12.11	
	 <p>“A filter tip 1 is set at one end of the outer casing 9 of the cigarette holder, a smoking material evaporation chamber 2 is set above the filter tip, the vaporizable liquid cigarette is loaded in the smoking material evaporation chamber.” Ex. 1004, 1:9-11.</p> <p>Ex. 1002, ¶72.</p>

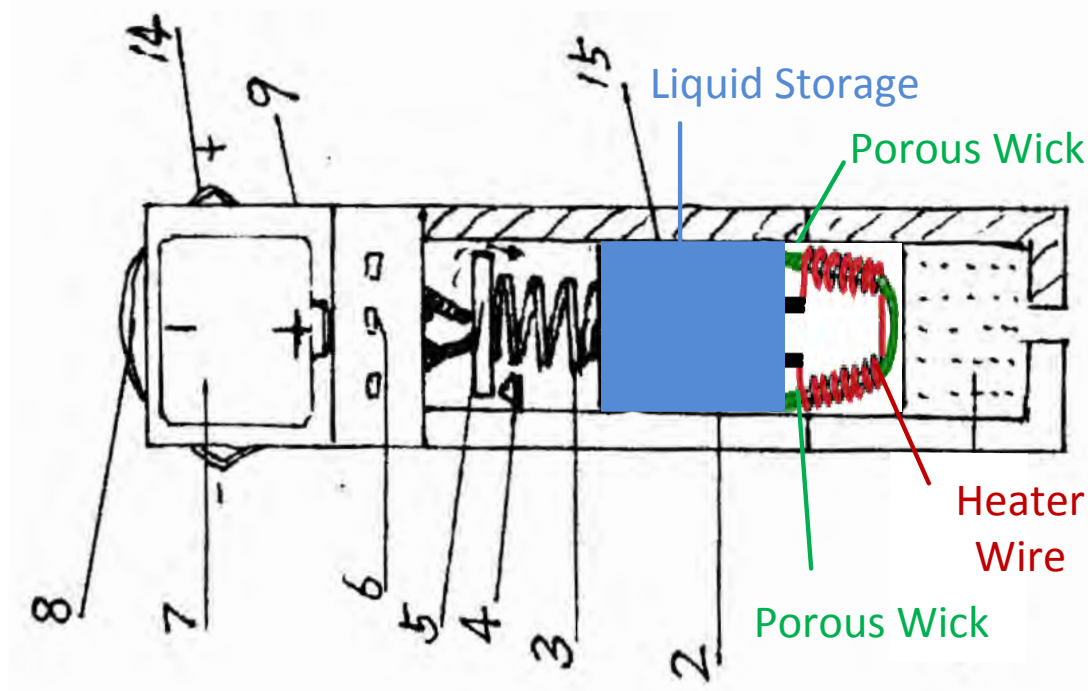
13. 12.12: the heating wire extending across the cylindrical chamber of the atomizer perpendicular to the longitudinal axis of the cylindrical housing

The heating wire in Whittemore (filament 3) is located in the cylindrical evaporation chamber and is coiled around the wick. A portion of the wire is perpendicular to the longitudinal axis of the cylindrical housing, and also the wire extends across the chamber. Ex. 1002, ¶73. Annotated FIG. 1 illustrates the portion of the heating wire that extends across the chamber and is perpendicular to

the longitudinal axis, and also the ends of the coil that extend across the chamber and are perpendicular to the longitudinal axis. Ex. 1002, ¶73.

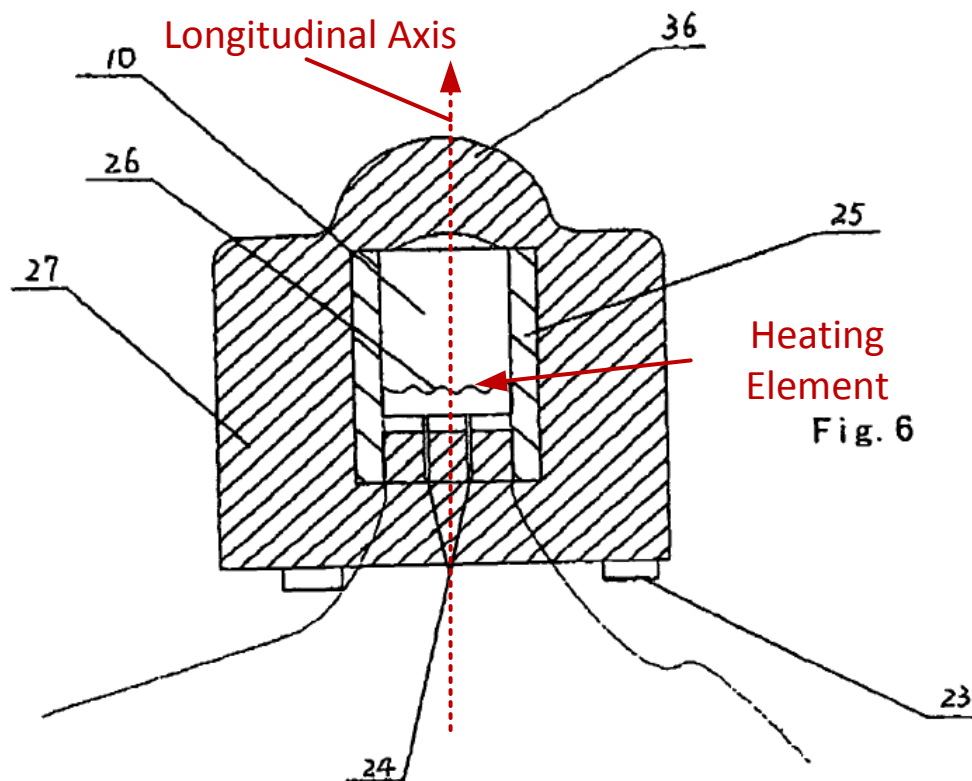


To the extent the Patent Owner contends that under the BRI standard, the wire must extend across the entire chamber diameter, a PHOSITA would have understood that the shape, length and contour of the wick (D) is easily modified and the amount that the wire extends across the chamber at both the end points of the wire and the portion near the curved part of the wire can be made greater or lesser as a matter of mere design choice of how much coil is wound around the wick. Ex. 1002, ¶74. For example, the shape of the porous wick with the heater coil wrapped around it can be shaped and oriented differently as shown in annotated FIG. 1:

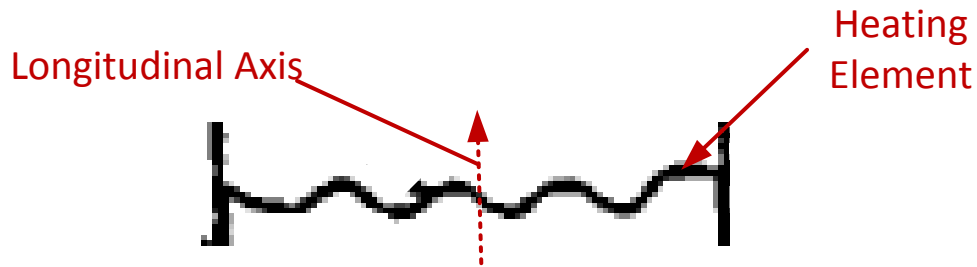


The contour and amount that the wire extends across the chamber will have minimal effect, if any, on the improved heating provided by the Whittemore wick and wire as compared to the inefficient heating described in Hongbin. Ex. 1002, ¶74. Moreover, the ‘549 Patent does not describe or explain any importance or criticality associated with the extent that the wire extends across the chamber. See Ex. 1001; Ex. 1002, ¶74. The Federal Circuit has found dimensional limitations that do not affect the device’s operation should not preclude 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 (1984) (affirming obviousness determination because “the dimensional limitation did not specify a device which performed and operated any differently from the prior art”). Instead of any

explanation about why this limitation is significant, the only description about the wire positioning found in the specification is that “the heating element is provided within the cavity.” Ex. 1001, 2:45-50. And, the words “longitudinal axis,” “perpendicular,” “extend” and “across” are not used in the specification. *See generally* Ex. 1001. Finally, FIG. 6 of the ‘549 Patent illustrates the only usage in the ‘549 Patent of a wire as a heating element 26:



As can be seen above and in the blown up version of the heating element below, heating element (26) from FIG. 6, is not perpendicular to the longitudinal axis of the housing.



This further supports that there is no criticality or significance to this limitation.

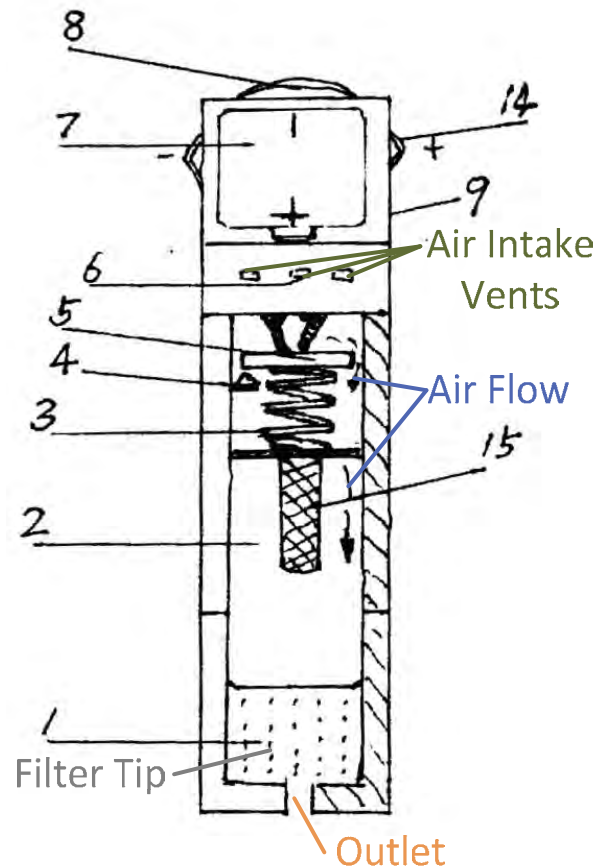
Ex. 1002, ¶74. Thus, to the extent that Fig. 6 discloses a heating wire that extending across the chamber and that is perpendicular to the longitudinal axis, the heating wire from Whittemore must also be. *See* Ex. 1002, 74

Claim 12.12	
<p>the heating wire extending across the cylindrical chamber of the atomizer perpendicular to the longitudinal axis of the cylindrical housing; and</p>	<p>Ex. 1005, FIG. 2:</p> <p>“...portions of the filament wire extending from the</p>

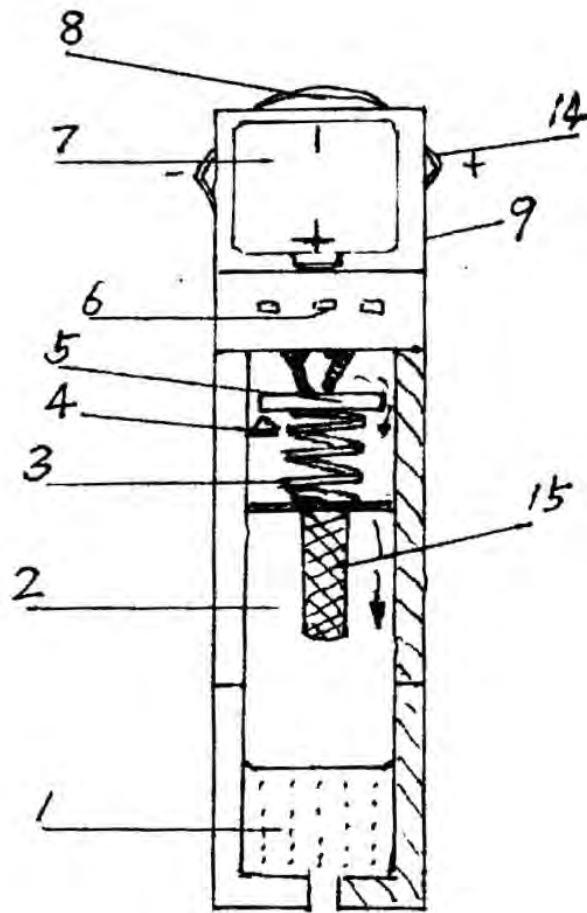
Claim 12.12	
	<p>plug....” Ex. 1005, Claim 11.</p> <p>“...electrical heating wires extending from the plug through the bottom of the vessel into the space adapted to contain the medicament and terminating above the normal liquid level thereof, and a wick surrounded and supported by the electrical heating wires for carrying the medicament by capillary attraction above the liquid surface level thereof.” Ex. 1005, Claim 12.</p> <p>“[F]ilament wires extending from the plug . . . portions of the filament wires extending from the plug . . . and other portions extending above the level thereof, and a wick carried by the filament wires for lifting the medicament by capillary attraction to those portions of the wires extending above the liquid level of the vessel.” Ex. 1005, 2:18-27.</p> <p>Ex. 1002, ¶¶73-74.</p>

14. 12.13: an air stream passage from the inlet through the cylindrical chamber of the atomizer to the outlet, and the heating wire positioned in the air stream passage

Hongbin describes and shows an outlet at the second end (filter tip 1) of the cylindrical housing (outer casing 9). Hongbin describes an inlet (air intake vents 6) that allow air to flow. FIG. 1 includes arrows showing a travel path of the air flowing through the evaporation chamber 2 and out the filter tip 1 as shown in the following annotated version of FIG. 1.



Claim 12.13	
<p>an air stream passage from the inlet through the cylindrical chamber of the atomizer to the outlet, and the heating wire positioned in the air stream passage.</p>	<p>Ex. 1004, FIG. 1:</p>

Claim 12.13

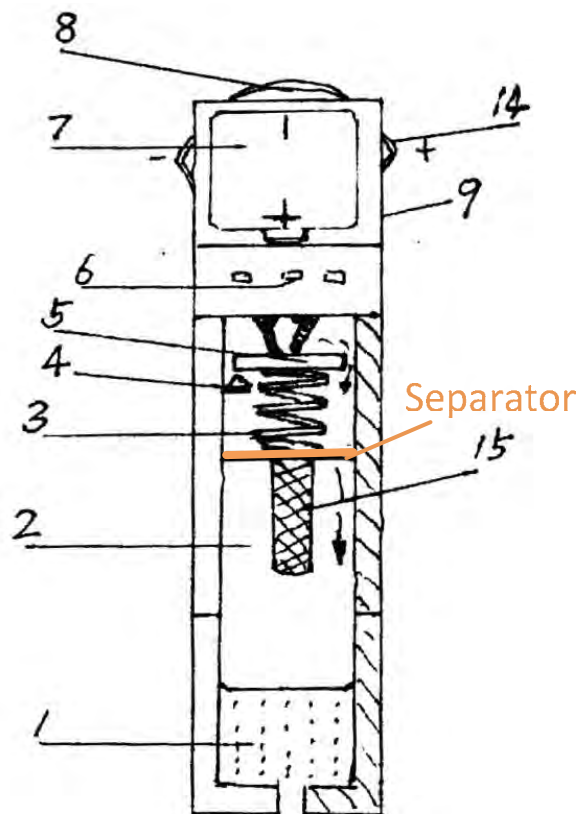
“The cigarette holder of the liquid odor cigarette is designed as follows: ... air intake vents 6 are set above the smoking material evaporation chamber, a suction control valve plate 5 and a spring 3 are set between the smoking material evaporation chamber and the air intake vents, the valve plate touches closely against the air intake vents to close the air intake vents when the cigarette is not smoked, and the valve plate is sucked away when the cigarette is smoked.” Ex. 1004, 1:9-14.

Ex. 1002, ¶75.

B. Claim 13

1. 13.1: a separator in the cylindrical housing the electronic circuit board and the sensor on a first side of the separator, and with the atomizer and the liquid-supply on a second side of the separator, opposite from the first side

Hongbin illustrates a separator between the evaporation chamber 2 and the spring 3 as shown in annotated FIG. 1.



The atomizer and the liquid supply are in the evaporation chamber 2 which is separated by the separator from the sensor (spring 3, power contactor 4, valve plate 5) and the electronic circuit board from Brooks which was discussed in section VIII.A.6 as obvious to include near the battery 7 of Hongbin. Specifically, a PHOSITA would have known to position the circuit from Brooks within the

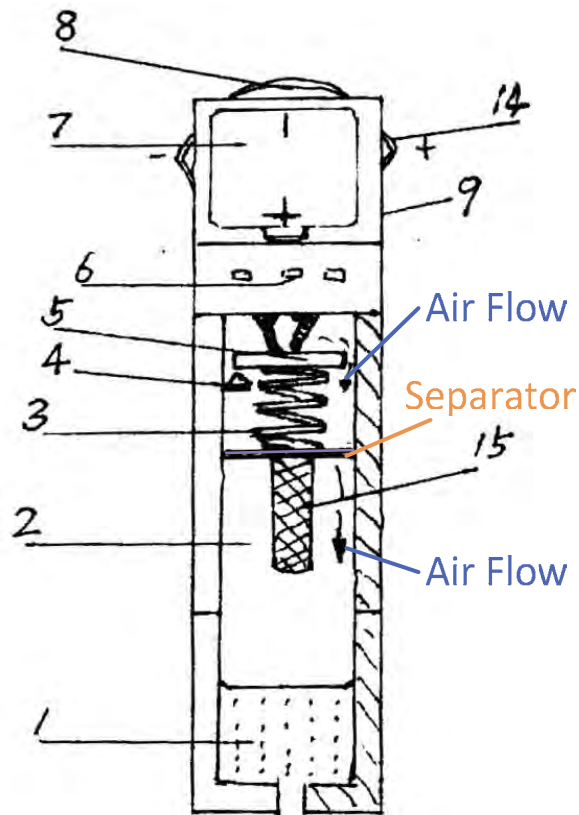
cigarette of Hongbin to be adjacent the battery 7 and separated from the liquid because the circuit requires power and in order to minimize the possibility of any liquid contacting the circuit board and to prevent any short circuit or electrical issues and to avoid the circuit board from interfering with the user's ability to load the smoking material into the evaporation chamber. Ex. 1002, ¶76; Ex. 1004 at 1:10-11. The opposite side of the separator includes the atomizer and the liquid supply.

Claim 13.1	
<p>[13.1] The device of claim 12 further comprising a separator in the cylindrical housing, with the electronic circuit board and the sensor on a first side of the separator, and with the atomizer and the liquid-supply on a second side of the separator, opposite from the first side,</p>	<p>Ex. 1004, FIG. 1:</p> <p>“The cigarette holder of the liquid odor cigarette is</p>

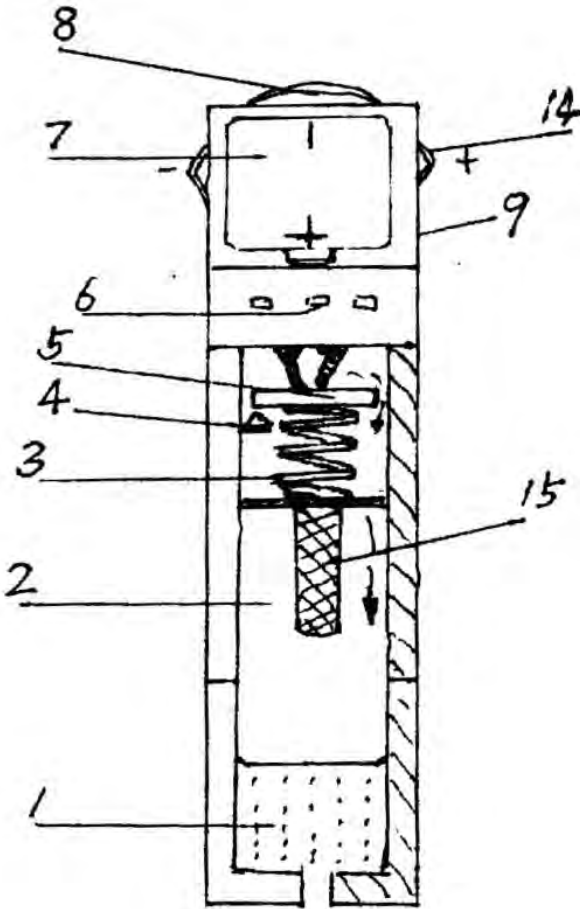
Claim 13.1	
	<p>designed as follows: ... air intake vents 6 are set above the smoking material evaporation chamber, a suction control valve plate 5 and a spring 3 are set between the smoking material evaporation chamber and the air intake vents, the valve plate touches closely against the air intake vents to close the air intake vents when the cigarette is not smoked, and the valve plate is sucked away when the cigarette is smoked.” Ex. 1004, 1:9-14.</p> <p>Ex. 1002, ¶76.</p>

2. 13.2: the separator having a through hole from the first side to the second side

The separator includes a through hole as shown in Hongbin by the airflow lines. Without a hole (or holes), the separator would not allow air to pass from the intake past the separator and into the evaporation chamber. Ex. 1002, ¶77. A PHOSTIA would have known that there is a through hole or holes at the separator because Hongbin illustrates a continuous air flow from one side of the separator to the other. *Id.* Hongbin illustrates the air flow passes through the separator (two arrows in FIG. 1 on opposite sides of the separator) as shown in annotated FIG. 1:



Claim 13.2	
and with the separator having a through hole from the first side to the second side.	Ex. 1004, FIG. 1:

Claim 13.2	
	 <p>“The cigarette holder of the liquid odor cigarette is designed as follows: ... air intake vents 6 are set above the smoking material evaporation chamber, a suction control valve plate 5 and a spring 3 are set between the smoking material evaporation chamber and the air intake vents, the valve plate touches closely against the air intake vents to close the air intake vents when the cigarette is not smoked, and the valve plate is sucked away when the cigarette is smoked.” Ex. 1004, 1:9-14.</p> <p>Ex. 1002, ¶77.</p>

C. Claim 17

1. 17.P: An electronic vaporizing device

See analysis in section VIII.A.1. Ex. 1002, ¶78

2. 17.1: a cylindrical housing having a longitudinal axis, a first end and a second end

See analysis in section VIII.A.2. Ex. 1002, ¶79

3. 17.2: an LED at the first end of the cylindrical housing

See analysis in section VIII.A.3. Ex. 1002, ¶¶80-81

4. 17.3: an outlet at the second end of the cylindrical housing

See analysis in section VIII.A.4. Ex. 1002, ¶82

5. 17.4: an air inlet for allowing air to flow into the cylindrical housing

See analysis in section VIII.A.5. Ex. 1002, ¶83

6. 17.5: a battery, an electronic circuit board, a sensor, a porous component, and a liquid-supply within the cylindrical housing

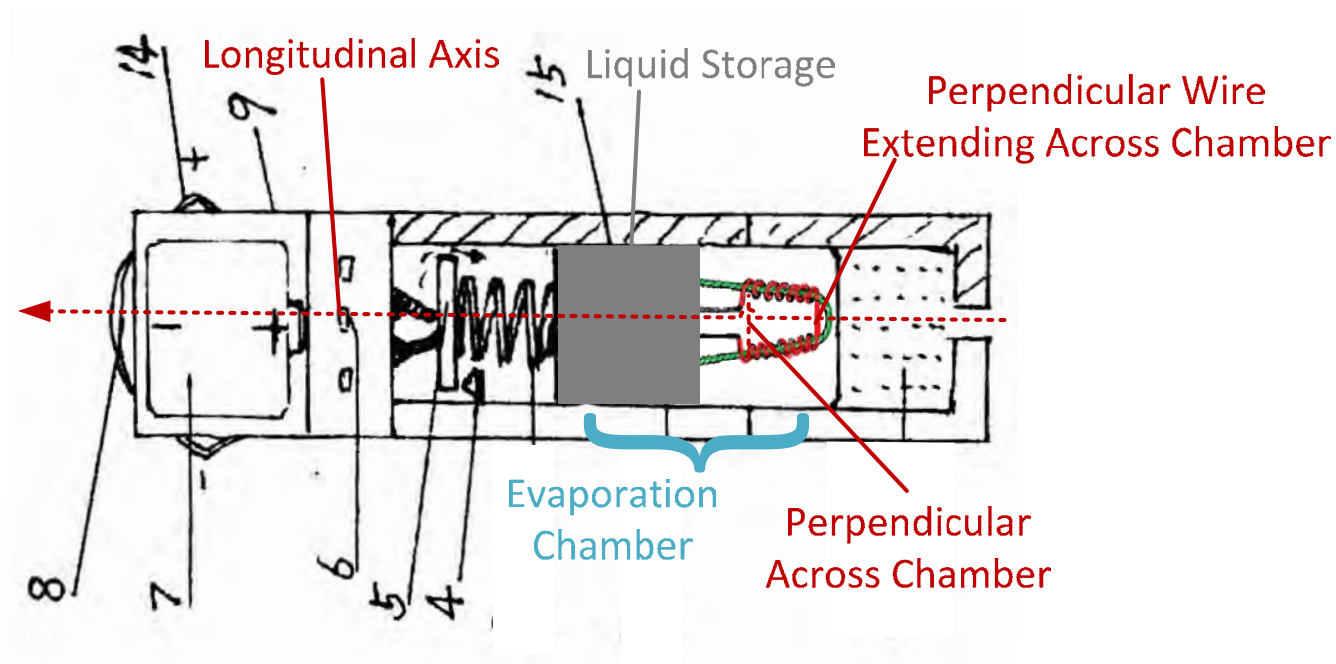
The analysis is similar to that set forth in section VIII.A.6. The wick (D) in Whittemore is a porous component as described in VIII.A.7, *supra*. Rather than reciting an atomizer as in claim 12.5, claim 17.5 recites a porous component which was analyzed in section VIII.A.10. Ex. 1002, ¶¶84-90.

7. 17.6: a heating wire positioned perpendicular to the longitudinal axis of the cylindrical housing

Although this analysis is similar to that set forth in section VIII.A.13, claim 17.6 was explicitly amended to remove the limitation that the heating wire is

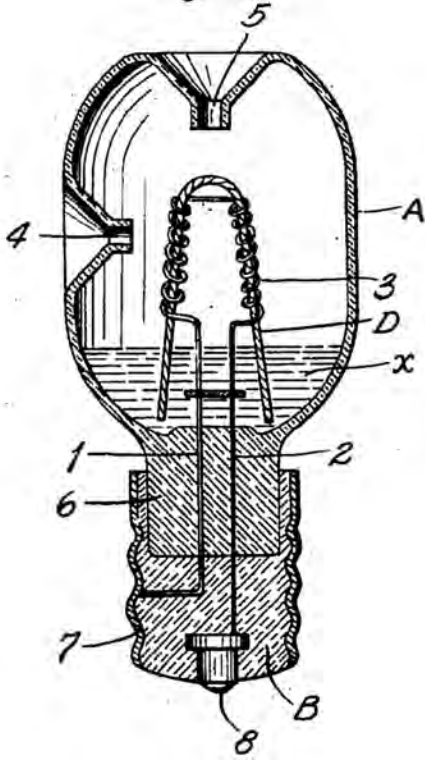
“extending across the cylindrical chamber of the porous component.” Ex. 1025, pp. 114-115. In an amendment, the patent owner stated “Claim 19 is further amended to better differentiate from claims 1 and 14.”¹ Ex. 1025, p.117.

Similar to the analysis in in section VIII.A.13, the heating wire in the cylindrical chamber is perpendicular to the longitudinal axis. Annotated FIG. 1 illustrates where the heating wire is perpendicular to the longitudinal axis. Ex. 1002, ¶¶91-93



Claim 17.6	
a heating wire positioned perpendicular to the	Ex. 1005, FIG. 2:

¹ Application claim 19 would become claim 17 and application claim 14 would become claim 12 after allowance.

Claim 17.6	
longitudinal axis of the cylindrical housing	<p data-bbox="889 216 1039 325"><i>Fig. 2.</i></p>  <p data-bbox="548 1144 1318 1224">“...portions of the filament wire extending from the plug...” Ex. 1005, Claim 11.</p> <p data-bbox="548 1270 1367 1560">“...electrical heating wires extending from the plug through the bottom of the vessel into the space adapted to contain the medicament and terminating above the normal liquid level thereof, and a wick surrounded and supported by the electrical heating wires for carrying the medicament by capillary attraction above the liquid surface level thereof.” Ex. 1005, Claim 12.</p> <p data-bbox="548 1606 1367 1896">“[F]ilament wires extending from the plug . . . portions of the filament wires extending from the plug . . . and other portions extending above the level thereof, and a wick carried by the filament wires for lifting the medicament by capillary attraction to those portions of the wires extending above the liquid level of the vessel.” Ex. 1005, 2:18-27.</p>

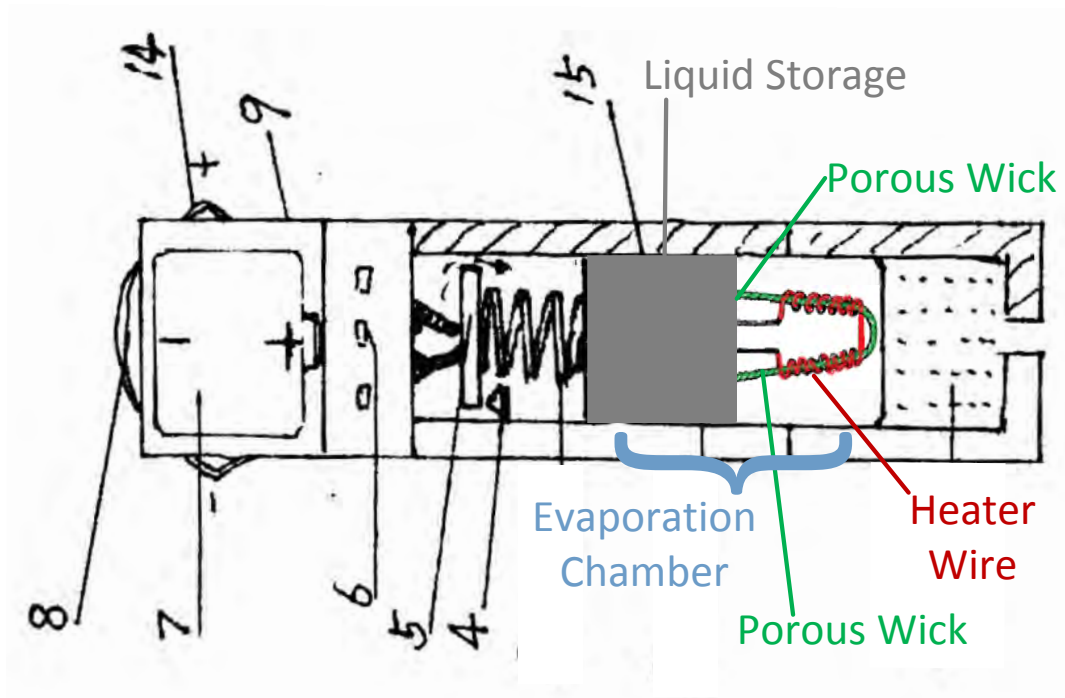
Claim 17.6	
	Ex. 1002, ¶¶91-93.

- 8. 17.7: an air passage between the inlet to the outlet, with the heating wire in the air passage and positioned for air to flow over the heating wire**

See analysis in section VIII.A.14. Ex. 1002, ¶94

- 9. 17.8: with the liquid-supply in physical contact with the porous component, to move liquid from the liquid-supply to the porous component**

The analysis is similar to that set forth in section VIII.A.11. Whittemore describes that liquid (medicament x) is moved to the porous component (wick D) through capillary action. The Hongbin/Whittemore combination, shown below, operates the same way—liquid is moved from the liquid supply (liquid storage container) to the porous component (wick) by capillary action in order for it to be vaporized by the heater wire. Ex. 1002, ¶95.



Claim 17.8	
<p>with the liquid-supply in physical contact with the porous component, to move liquid from the liquid-supply to the porous component; and</p>	<p>Ex. 1005, FIG. 2:</p> <p>FIG. 2 is a diagram of a device, possibly a vaporizer or atomizer, shown in a cross-sectional view. The device has a bulbous upper body (A) and a narrower lower body (B). Inside the upper body, there is a coiled heater wire (3) and a porous wick (4) that extends down into the lower body. A liquid supply (5) is at the top. A spring (6) is located in the lower body. A wick (7) is shown at the bottom. A small component (8) is at the very bottom. The device is labeled with various parts: 1, 2, 3, 4, 5, 6, 7, 8, A, B, D, and x.</p>

Claim 17.8	
	<p>“[A] wick D 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.” Ex. 1005, p.1 1:54-2:8.</p> <p>“...electrical heating wires extending from the plug through the bottom of the vessel into the space adapted to contain the medicament and terminating above the normal liquid level thereof, and a wick surrounded and supported by the electrical heating wires for carrying the medicament by capillary attraction above the liquid surface level thereof.” Ex. 1005, Claim 12.</p> <p>Ex. 1002, ¶86.</p>

10. 17.9: wherein the liquid-supply is cylindrical and arranged parallel to the longitudinal axis of the cylindrical housing

See analysis in section VIII.A.9. Ex. 1002, ¶96.

D. Claim 18: the porous component comprising a fiber material

See analysis in section VIII.A.7. Ex.1002, ¶¶70-71, 97

E. Claim 19: the battery and the liquid-supply co-axial with the longitudinal axis of the cylindrical housing

The analysis is the same as in section VIII.A.12. Claim 12.11 recites the chamber is co-axial with the longitudinal axis of the housing. Likewise, FIG. 1 of

Hongbin illustrates that both the battery (7) and the liquid (in evaporation chamber 2 as in section VIII.A.6) are coaxial with the longitudinal axis of the housing.

Ex.1002, ¶¶98.

Claim 19	
<p>The device of claim 18 with the battery and the liquid-supply co-axial with the longitudinal axis of the cylindrical housing.</p>	<p>Ex. 1004, FIG. 1:</p> <p>“A filter tip 1 is set at one end of the outer casing 9 of the cigarette holder, a smoking material evaporation chamber 2 is set above the filter tip, the vaporizable liquid cigarette is loaded in the smoking material evaporation chamber.” Ex. 1004, 1:9-11.</p> <p>Ex. 1002, ¶98.</p>

F. Claim 21: the liquid-supply comprising propylene glycol

See analysis in section VIII.A.8. Ex. 1002, ¶91.

IX. CONCLUSION

For the foregoing reasons, there is a reasonable likelihood that Petitioner will prevail in its challenge of patentability for at least one of claims 12-13, 17-19 and 21 of the '549 Patent. Petitioner request institution of an *inter partes* review to cancel the challenged claims.

Dated: May 3, 2017

Respectfully submitted,

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CERTIFICATE OF COMPLIANCE

The undersigned certifies that this brief complies with the type-volume limitations of 37 CFR § 42.24(a)(1)(i). This brief contains 10,468 words as calculated by the “Word Count” feature of Microsoft Word 2016, 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 2016 in Times New Roman 14 point font.

DATED: May 3, 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 May 3, 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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