

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 8,899,239

Issue Date: December 2, 2014

Title: Electronic Cigarette

Inter Partes Review No. 2017-01120

**PETITION FOR INTER PARTES REVIEW OF
U.S. PATENT NO. 8,899,239 PURSUANT
TO 35 U.S.C. §§ 311-319 AND 37 C.F.R. § 42**

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OTHER AUTHORITIES

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LIST OF EXHIBITS

Exhibit No.	Exhibit
1001	U.S. Patent No. 8,899,239 (“the 239 patent”)
1002	Chinese Patent Application Publication No. CN1233436A (“Hongbin”)
1003	Certified translation of Chinese Patent Application Publication No. CN1233436A (“Hongbin”)
1004	Japanese Unexamined Patent Application Publication No. 2001-291598 (“JP598” or “JP98 publication”)
1005	Certified translation of Japanese Unexamined Patent Application Publication No. 2001-291598 (“JP598” or “JP98 publication”)
1006	U.S. Patent No. 2,057,353 (“Whittemore”)
1007	U.S. Patent No. 6,155,268 (“Takeuchi”)
1008	Declaration of Dr. Robert H. Sturges regarding U.S. Patent No. 8,899,239
1009	IPR2016-01272, Petition for <i>Inter Partes Review</i>
1010	IPR2016-01272, Decision Instituting <i>Inter Partes Review</i> (“Institution Decision”)
1011	U.S. Patent No. 4,947,874 (“Brooks”)
1012	Excerpt from <i>Marks’ Standard Handbook for Mechanical Engineers</i> (1978)
1013	U.S. Patent No. 6,598,607 (“Adiga”)
1014	U.S. Patent No. 4,793,365 (“Sensabaugh”)
1015	U.S. Patent No. 5,203,355 (“Clearman”)
1016	U.S. Patent No. 2,472,282 (“Burchett”)
1017	U.S. Patent No. 2,032,695 (“Gimera”)
1018	U.S. Patent No. 3,479,561 (“Janning”)
1019	Plaintiff’s Responsive Claim Construction Brief from <i>Fontem Ventures, B. V. et al. v. NJOY, Inc. et al</i> , Case No. 14-cv-1645-GW (MRWx) (C.D. Cal. Apr. 23, 2015) (Dkt No. 117).
1020	Ex. 3 attached to Plaintiff’s Responsive Claim Construction Brief from <i>Fontem Ventures, B. V. et al. v. NJOY, Inc. et al</i> , Case No. 14-cv-1645-GW (MRWx) (C.D. Cal. Apr. 23, 2015) (Dkt No. 117-2)

1021	Ex. 4 attached to Plaintiff's Responsive Claim Construction Brief from <i>Fontem Ventures, B. V. et al. v. NJOY, Inc. et al</i> , Case No. 14-cv-1645-GW (MRWx) (C.D. Cal. Apr. 23, 2015) (Dkt No. 117-2)
1022	Ex. 5 attached to Plaintiff's Responsive Claim Construction Brief from <i>Fontem Ventures, B. V. et al. v. NJOY, Inc. et al</i> , Case No. 14-cv-1645-GW (MRWx) (C.D. Cal. Apr. 23, 2015) (Dkt No. 117-2)
1023	Mosdesign Semiconductor Corp., Datasheet for M1600 LED Drivers
1024	Excerpt from <i>Merriam-Webster's Collegiate Dictionary</i> , 10 th ed. (2002)
1025	Excerpts from James W. Dally, <i>Packaging of Electronic Systems: A Mechanical Engineering Approach</i> (1990)
1026	U.S. Patent No. 5,144,962 ("Counts")
1027	U.S. Patent No. 7,034,814 ("Gong")
1028	Declaration of James Donnelly

I. INTRODUCTION

Pursuant to 35 U.S.C. §§ 311-319 and 37 C.F.R. § 42, R.J. Reynolds Vapor Company (“Petitioner”) respectfully requests *inter partes* review of claims 1-3, 5, 7-9, 13-15, and 17-18 of U.S. Patent No. 8,899,239 (“the 239 Patent”). Ex.1001. These claims are asserted against Petitioner in a presently pending litigation.

This is Petitioner’s second IPR requested for the 239 Patent. On December 30, 2016, the Board instituted review in IPR2016-01272 (filed July 2, 2016) of claims 1, 2, and 9 in the 239 Patent as obvious in view of U.S. Patent No. 3,479,561 (“Janning”) (Ex.1018) and Japanese Unexamined Patent Application Publication No. 2001-291598 (“JP598”) (Ex.1005). Ex.1010 (Institution Decision), p.19. In particular, the Board found that “JP598 contemplates changes or transitions in the intensity of electrical illumination in an effort to create natural looking illumination.” *Id.* at p.14. Further, the Board agreed with Petitioner “that one of ordinary skill and creativity tasked with producing a simulated cigar, as in Janning, would look reasonably to teachings conveying more sophisticated approaches to simulating combustion illumination, such as JP ’598.” *Id.* The Board further concluded that in seeking to simulate the illumination of two combustion conditions, the differences between the actual characteristics of a candle flame and burning cigarette are ones without distinction. *Id.* at p.15.

In this petition, Petitioner seeks review of claims 1, 2 and 9, and claims 3, 5, 7, 8, 13-15, and 17-18. The additional claims were not challenged in IPR2016-01272 because Patent Owner had not asserted them at that time. This request is also different from IPR2016-01272 because it is based on a *different* prior art combination that also discloses the limitations in the newly asserted claims. In particular, this request is based on Chinese Patent Application Publication No. CN1233436 (“Hongbin”) that discloses an electronic cigarette with a light on the end that lights up upon inhalation to make smoking “more real” and “more fun.” Ex.1003, p.4:6-7. The illumination pattern for a cigarette when a user inhales was well-known. *See* Ex.1018 (Janning), col.1:53-55; *see also* Exs.1020-1022 (publications on how cigarettes burn, attached to Plaintiff’s Responsive Claim Construction Brief from *Fontem Ventures, B. V. et al. v. NJOY, Inc. et al*, Case No. 14-cv-1645-GW (MRWx) (C.D. Cal. Apr. 23, 2015) (Dkt No. 117-2)). However, despite its goal to make the electronic cigarette seem “more real,” the illumination in Hongbin is a simple on/off system.

As explained in the IPR2016-01272 Petition, JP598 provides control circuitry to control the illumination of a light to simulate a burning flame as close as possible. Ex.1009, p.2-3; Ex.1005, ¶6. The control circuitry preferably changes the illumination in a sawtooth pattern so that it smoothly changes from darker to brighter and then darker again. Ex.1005, ¶38, Fig. 6. The control circuit used in

JP598 would be equally applicable to the electronic cigarette disclosed in Hongbin, and a PHOSITA would have reason to use JP598's circuit with Hongbin's electronic cigarette to create the known illumination pattern for cigarettes to make smoking "more real" and "more fun." Thus, similar to the Board's decision in IPR2016-01272, "one of ordinary skill and creativity tasked with producing a simulated [cigarette], as in [Hongbin], would look reasonably to teachings conveying more sophisticated approaches to simulating combustion illumination, such as JP '598." Ex.1010, p.14.

Independent claims 1 and 17 include limitations that generally relate to an electronic cigarette with a light that provides a gradual change in luminance to simulate a conventional cigarette in response to a smoking action. Claim 13 is different from claims 1 and 17 as it does not recite the gradual change in luminance. Instead, claim 13 merely recites that the output of the LED changes based on the output of the airflow sensor. The dependent claims recite additional limitations directed to a liquid storage container, an atomizer, and a heating wire, which are included in Hongbin and other prior art references such as U.S. Patent No. 2,057,353 ("Whittemore") (Ex.1006) and U.S. Patent No. 6,155,268 ("Takeuchi") (Ex.1007).

As explained below, Hongbin combined with JP598 provide the basis for rendering all of the challenged claims unpatentable. Neither of these references

were considered during prosecution of the 239 patent and the combination has not been presented to the Board in any prior IPR.

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

A. Real Party-in-Interest

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

1. Related Litigations

This proceeding could affect or be affected by the following pending and terminated matters in which the 239 patent has been asserted:

Pending Litigations and IPRs

Case Name	Filed
<i>Fontem Ventures BV v. RJ Reynolds Vapor Company</i> , 1:16-cv-01255 (NCMD) (filed as 2:16-cv-02286 (CACD))	April 4, 2016
Petition for <i>Inter Partes</i> Review by R.J. Reynolds Vapor Company, IPR2016-01272 (PTAB) (challenging claims 1, 2, and 9 of the '239 patent)	July 2, 2016

Pending Patent Applications

Serial No.	Filed
U.S. Patent Re-Issue No. 15/080,341, which claims priority to the same foreign application as does the '239 patent	March 24, 2016
U.S. Patent Application No. 15/091,296, which claims priority to the same foreign application as does the '239 patent	April 5, 2016
U.S. Patent Application No. 15/167,929, which claims priority to the same foreign application as does the '239 patent	June 1, 2016

Terminated Litigations and Previous IPR Petitions

Case Name	Filed
<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 v. NJOY, Inc.</i> , 2-14-cv-09263 (CACD)	December 2, 2014
<i>Fontem Ventures BV v. LOEC, Inc.</i> , 2-14-cv-09265 (CACD)	December 2, 2014
<i>Fontem Ventures BV v. CB Distributors, Inc.</i> , 2-14-cv-09266 (CACD)	December 2, 2014
<i>Fontem Ventures BV v. Vapor Corp.</i> , 2-14-cv-09267 (CACD)	December 2, 2014
<i>Fontem Ventures BV v. FIN Branding Group, LLC</i> , 2-14-cv-09268 (CACD)	December 2, 2014

Case Name	Filed
<i>Fontem Ventures BV v. Ballantyne Brands, LLC</i> , 2-14-cv-09269 (CACD)	December 2, 2014
<i>Fontem Ventures BV v. Spark Industries, LLC</i> , 2-14-cv-09270 (CACD)	December 2, 2014
<i>Fontem Ventures BV v. Logic Technology Development LLC</i> , 2-14-cv-09271 (CACD)	December 2, 2014
<i>Fontem Ventures BV v. VMR Products, LLC</i> , 2-14-cv-09273 (CACD)	December 2, 2014
<i>Fontem Ventures BV v. NJOY, Inc.</i> , 2-14-cv-08144 (CACD)	October 21, 2014
Petition for <i>Inter Partes</i> Review by NJOY, Inc., IPR2015-01304 (PTAB) (challenging claims 1-3, 5-15, and 17-18 of the ‘239 patent)	May 29, 2015
<i>NJOY, Inc. et al v. Fontem Holdings I B.V.</i> , IPR2015-01299 (PTAB) (U.S. Patent No. 8,910,641)	May 29, 2015
<i>Fontem Ventures BV v. Nu Mark LLC</i> , 1:16-cv-01261 (NCMD) (filed as 2:16-cv-02291 (CACD))	April 4, 2016
Petition for <i>Inter Partes</i> Review by NU MARK LLC, IPR2016-01302 (PTAB) (challenging claims 1, 2, 9, and 10 of the ‘239 patent)	June 28, 2016

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D. Service Information

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III. GROUNDS FOR STANDING UNDER 37 C.F.R. § 42.104(A)

Petitioner certifies that the 239 Patent is available for IPR and that Petitioner is not barred or estopped from requesting IPR on the grounds identified herein.

IV. IDENTIFICATION OF THE 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 1-3, 5, 7-9, 13-15, and 17-18 of the 239 patent based on the following:

Ground 1: Claims 1-3, 9, 13-15, and 17-18 are unpatentable under 35 U.S.C. § 103 as obvious based on Hongbin (Ex.1003) in view of JP598 (Ex.1005);

Ground 2: Claims 3, 5, 7, 8, and 13-15 are unpatentable under 35 U.S.C. § 103 as obvious based on Hongbin in view of JP598 and Whittemore (Ex.1006); and

Ground 3: Claims 3, 5, 7, 8, and 13-15, are unpatentable under 35 U.S.C. § 103 as obvious based on Hongbin in view of JP598 and Takeuchi (Ex.1007).

Each ground is supported by the declaration of Dr. Robert Sturges. Ex.1008.

Each reference identified above is prior art:

Exhibit No.	Description	Publication Date	Prior Art Under 35 USC §
1002 1003 ¹	Chinese Patent Application Publication No. CN 1233436A (“Hongbin”)	Nov. 3, 1999	102(b)
1004 1005 ²	Japanese Unexamined Patent Application Publication No. 20001-291598 (“JP598”)	April 10, 2000	102(b)
1006	U.S. Patent No. 2,057,353 (“Whittemore”)	Sept. 27, 1935	102(b)
1007	U.S. Patent No. 6,155,268 (“Takeuchi”)	Dec. 5, 2000	102(b)

Statement of no redundancy: Grounds 1-3 are not redundant of pending IPR2016-01272 (Ex.1009) that is reviewing only claims 1, 2, and 9 of the 239 patent based on U.S. Patent No. 3,479,561 (Janning) (Ex.1018) in view of JP598; whereas this petition seeks review of claims 1-3, 5, 7-9, 13-15 and 17-18 based on different prior art combinations that have never been considered by the Board or during prosecution. Grounds 1-3 in this petition are based on a combination involving Hongbin in view of JP598, and for certain claims, in further view of Whittemore or Takeuchi. While the Board denied an unrelated petition filed on May 29, 2015 in IPR2015-01304 based on Hongbin in view of other prior art; it

¹ Ex.1003 is a certified translation of Hongbin.

² Ex.1005 is a certified translation of JP598.

did so because the relied-upon prior art did not disclose controlling the light source such that it provides a gradual change in luminance. *NJOY, Inc. et al v. Fontem Holdings 1 B.V.*, IPR2015-01304, Final Written Decision, Paper 15, p.12 (P.T.A.B. Dec. 9, 2015). But, as explained herein, the prior art in this IPR discloses all of the limitations of the challenged claims including a light source that is activated by an airflow sensor and a control circuit that changes the luminance of a light source in a manner designed to replicate the natural patterns of flames.

Thus, the present petition addresses claims and claim limitations not yet considered, using combinations of reference never considered, and is therefore not redundant.

V. THRESHOLD REQUIREMENT FOR *INTER PARTES* REVIEW

This petition meets the threshold requirement for *inter partes* review because as explained below for each of the grounds of unpatentability 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).

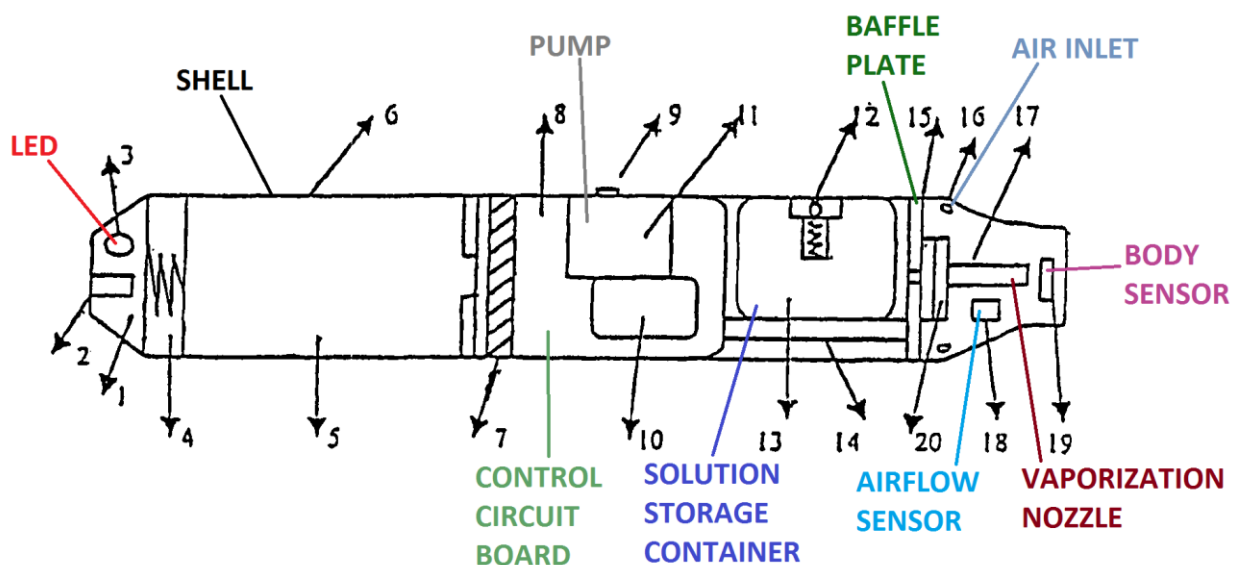
VI. BACKGROUND INFORMATION FOR THE 239 PATENT

A. The 239 Patent and Challenged Claims

The 239 patent describes an electronic cigarette that provides a user with a smoking experience without actually being lit. Ex.1001, Abstract. This experience includes attempting to replicate the appearance of a cigarette by using a red LED at

the end. *Id.* at 4:23-27. A control circuit uses a sawtooth wave signal that lasts 1.2 seconds “for each smoking action” to provide a “gradual change to luminance to imitate the ignition and combustion process of a conventional cigarette.” *Id.* The 239 patent provides no further description of how the control circuit operates the LED. Ex.1008, ¶24.

Fig. 1 (annotated) from the 239 patent is reproduced below. The electronic cigarette includes shell 6, red LED 3, control circuit board 8, pump 11, solution storage container 13, baffle plate 15, air inlets 16, vaporization nozzle 17, airflow sensor 18, and resistance or capacitance sensor 19. Ex.1001, col. 3:50-4:31. The vaporization nozzle 17 includes a heater (not shown below) which vaporizes liquid to create a vapor. *Id.* at col. 3:55-60.



The airflow sensor 18 is “sensitive to” air that enters though inlet 16 when a suction action takes place. *Id.* at col. 4:4-9. The description provides only one airflow sensor example that “can be comprised of an array of integrated thermal sensitive resistors in the shape of film.” *Id.* at col. 2:48-49. The 239 patent does not include any further description about the airflow sensor structure or how it operates. Ex.1008, ¶24. Further, no particular type of airflow sensor is described or required in the Fig. 1 embodiment, which shows the *only* embodiment using an airflow sensor. *Id.* Figs. 7-8 specifically omit the airflow sensor and instead use a resistance or capacitance sensor, functioning as a body sensitive switch, to activate the control circuit. Ex.1001, col. 4:47-51; col. 5:2-5; col. 2:50-55; Ex.1008, ¶24. Consistent with the use of the word “can” to describe the single example of an airflow sensor and the lack of any detail about the sensor used in Fig. 1, the challenged claims do not require any particular type of airflow sensor. Ex.1001, col. 2:48-49; Ex.1008, ¶24.

VII. RELEVANT INFORMATION CONCERNING THE 239 PATENT

A. Person of Ordinary Skill in the Art (“PHOSITA”)

A PHOSITA for the 239 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.1008, ¶32.

B. 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 submits that only the term “section” need be construed. Section was construed in pending IPR2016-01272 to mean “one or more parts that can be fitted together to form a whole.” Ex.1010, p.8-9. For purposes of this IPR only, Petitioner adopts this interpretation, and that the remaining claim terms take on their ordinary and customary meaning that the terms would have to a PHOSITA in view of the specification. Ex.1008, ¶36.

In IPR2016-01272, the Board determined that the term “electronic cigarette” in the preambles of claims 1, 2, and 9, did not establish any necessary or defining aspect of the inventions of those claims. Ex.1010, p.7-8. In particular, the Board found that “the recitation amounts to a lead-in or introduction to the relevant field of the claims of the ’239 patent, rather than focusing on a characteristic of the invention or providing life, meaning, and vitality to the claim.” *Id.* For the same reasons, “electronic cigarette” in the preamble of claims 2-3, 5, 7-8, and 13-15

likewise merely serves as a lead-in or introduction to the relevant field of the claims and is not a claim limitation. *See Id.*; Ex.1008, ¶37.

Claim 17 (and dependent claim 18) recites “sensing airflow in a housing of the electronic cigarette via a sensor” in the body of the claim. Claims 17-18 do not recite any further details on the electronic cigarette other than it has a housing, a body, and an LED on its first end. *Id.* Claim 18 adds a battery and “the vaporizer.” *Id.* Like the preamble in claims 1-3, 5, 7-9 and 13-15, “electronic cigarette” does not focus on a characteristic of the invention or provide life, meaning, and vitality to claims 17-18. Instead, the invention is fully defined by the body of the claim. Thus, just like the other claims, the preamble in claims 17-18 is not a limitation. *Id.* Ex.1010, p.7-8 (citing *On Demand Machine Corp. v. Ingram Indus., Inc.*, 442 F.3d 1331, 1343 (Fed. Cir. 2006)); Ex.1008, ¶37; *Catalina Mktg. Int’l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002).

Petitioner’s construction of claim terms is not binding upon Petitioner in any other proceeding related to the 239 patent.

VIII. DESCRIPTION OF THE PRIOR ART RELIED UPON

A. Chinese Patent Application Publication No. CN 1233436A (“Hongbin”)

Hongbin is directed to an electronic cigarette with an indicator 8 at one end that is connected to a battery 7 and gives out light when a user inhales. Ex.1003,

p.3:18-19. The light at the tip makes the electronic cigarette “more real” and “more fun.” *Id.* at 3:17-18, 4:6-7.

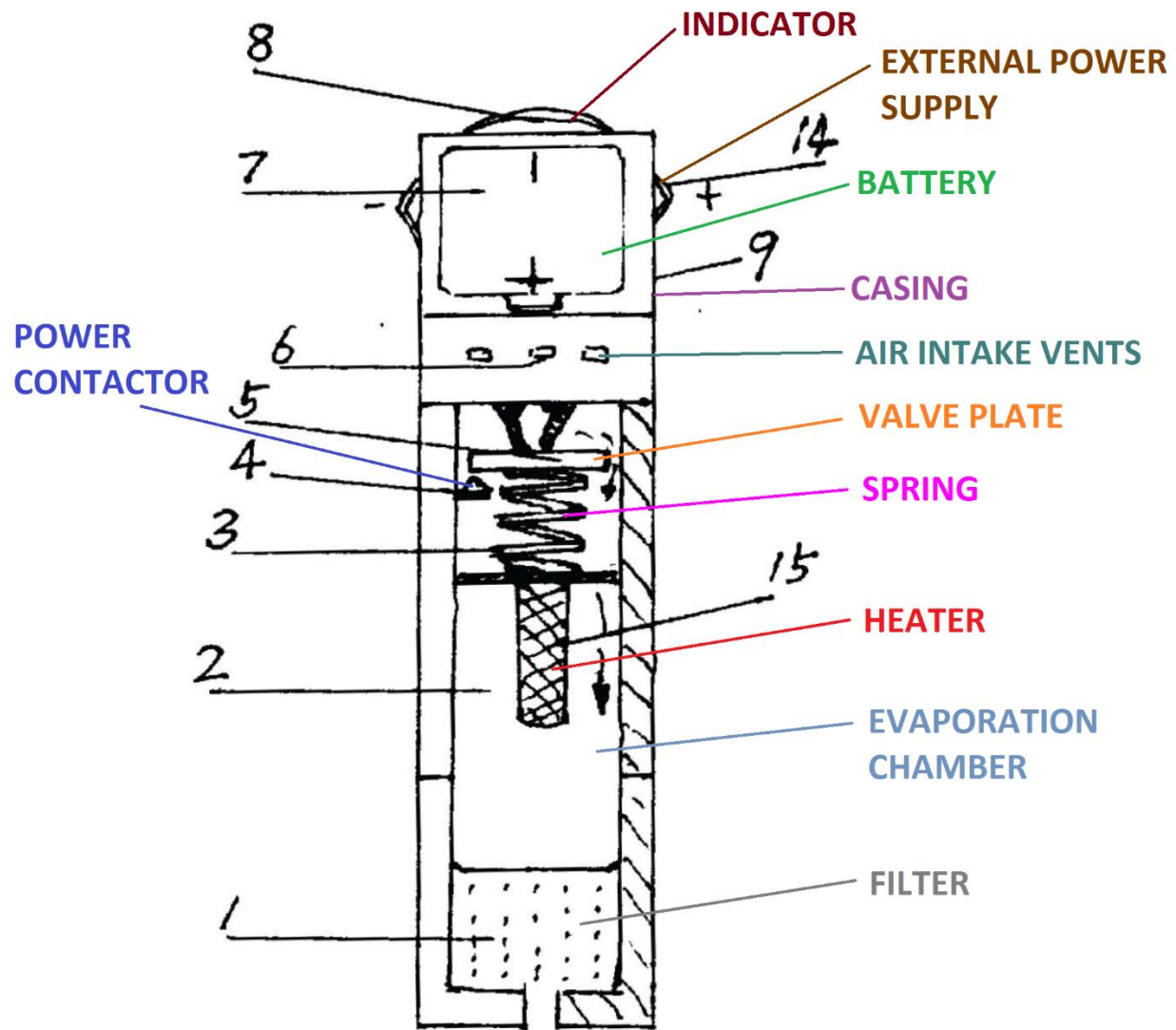


FIG. 1 (annotated)

With reference to annotated FIG. 1, above, the cigarette includes a filter tip 1, 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.1003, p.4:10-12. 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. *Id.* at 3:18. 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.* at 3:18-19.

The suction control valve plate 5 is sensitive to airflow in that it detects and responds to airflow. *Id.*; Ex.1008, ¶41. 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.1012). That is exactly what occurs in Hongbin. Ex.1008, ¶40.

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.1003, p.3:18-19; Ex.1008, ¶41. 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.1003, p.3:15-23; Ex.1008, ¶¶41-42.

A vaporizable liquid is loaded into the smoking material evaporation chamber 2. Ex.1003, p.3:10-11. An electronic heater 15 is also located within the evaporation chamber 2. *Id.* at 3:20-21. The heater 15 heats the liquid to promote evaporation within the smoking material evaporation chamber 2. *Id.*; Ex.1008, ¶43. Hongbin acknowledges that one problem with its electronic heater 15 is that it consumes a lot of electricity. Ex.1003, p.3:22. To remedy this, Hongbin provides an external power supply 14 on the outer casing 9 to provide a backup for the battery 7. *Id.* at 3:22-23.

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.1008, ¶44. 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 the electronic cigarette to leak and malfunction. *Id.* For example, the liquid could soak through

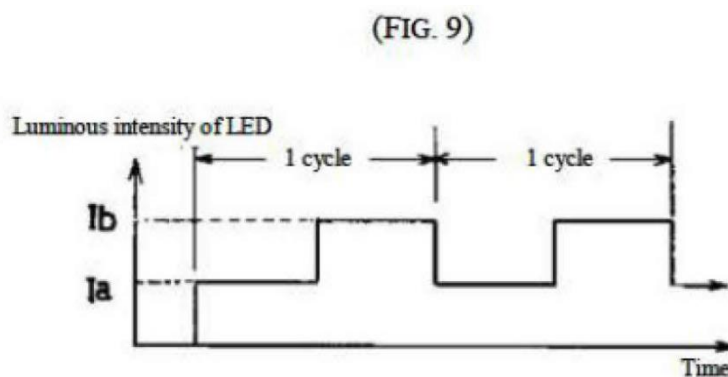
the filter tip 1 and leak through the open end. *Id.* Further, a user could suck the liquid through the filter tip 1 during use. *Id.* Additionally, because the air intake vents 6 are in fluid communication with the evaporation chamber 2 to enable air to flow through, the liquid could leak through the air intake vents 6 when opened. Ex.1008, ¶44. Moreover, as shown by the flow arrows, because the valve plate 5 and the power contactor 4 are in fluid communication with the evaporation chamber 2, the liquid 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.1008, ¶45. 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.1013 (U.S. Patent No. 6,598,607), col. 2:44-47; Ex.1014 (U.S. Patent No. 4,793,365), col. 10:51-66; Ex.1015 (U.S. Patent No. 5,203,355), col. 9:36-52; Ex.1016 (U.S. Patent No. 2,472,282), col. 3:29-32; and Ex.1017 (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.1003, p.3:12-14, 3:18-19; Ex.1008, ¶45.

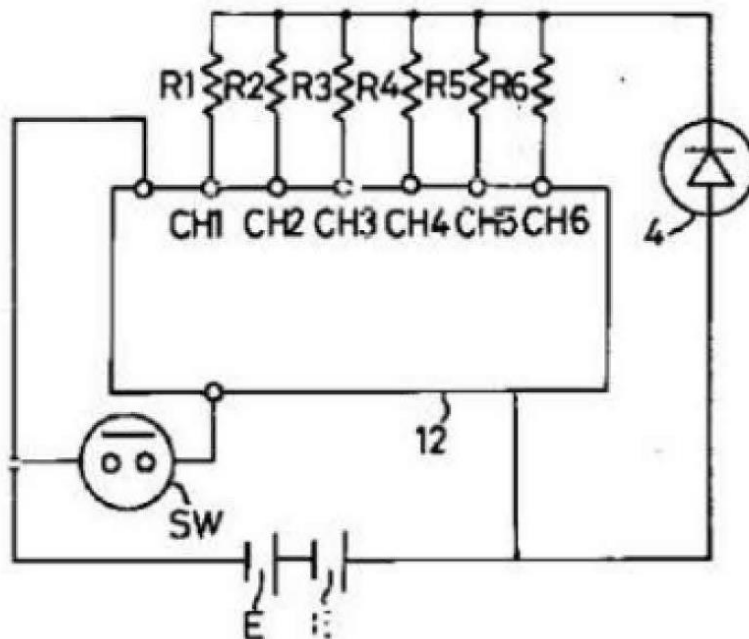
B. JP Unexamined Patent Application Publication 2001-291598 (“JP598”)

JP598 discloses an electric candle that is capable of producing illumination that feels very natural with varying luminous intensity. Ex.1005, Abstract, ¶¶5-6. The ability to provide varying illumination patterns to simulate real candle flames in JP598 differed from the prior art systems that were simply low/high systems. Ex.1005, ¶4; Ex.1008, ¶46. A low/high system is a two-state system much like an on/off system. Ex.1008, ¶46. The prior art low/high systems provided a pattern such as what is shown in Fig. 9:

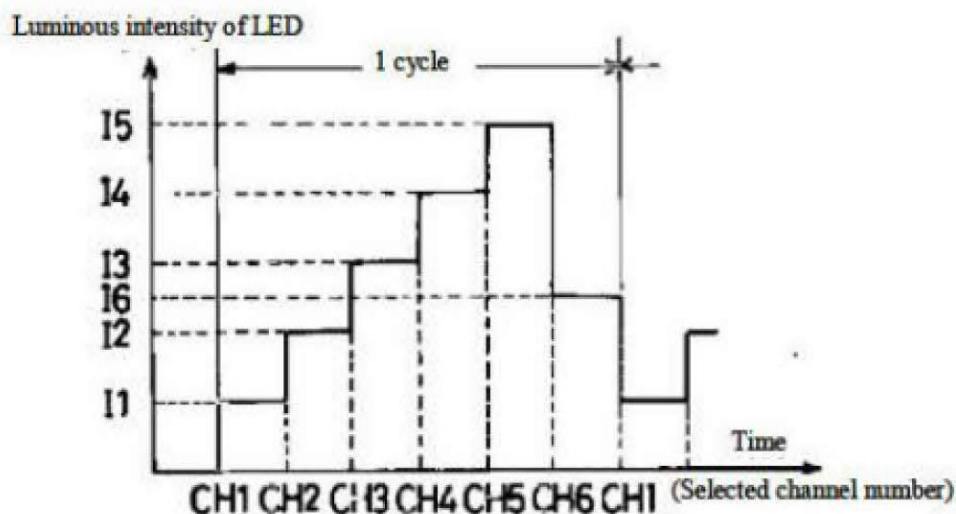


JP598 discloses an example integrated circuit that causes the light intensity to change. Preferably, the light intensity changes in a sawtooth pattern so that the change in luminance appears smooth. Ex.1005, ¶¶12-13. One embodiment of the control circuit includes 6 output channels that provide varying levels of illumination in a sawtooth pattern. *Id.* at ¶36; Fig. 6. The integrated circuit and sawtooth illumination pattern are shown in Figs. 3 and 6:

(FIG. 3)



(FIG. 6)



The integrated circuit includes output channels CH1-CH6. Each channel has a different resistor R1-R6 associated with it corresponding to a luminous output intensity referred to as I1-I6 in Fig. 6. Ex.1005, ¶¶33-39. JP598 explains that “a resistance value suitable to each respective luminous intensity will be calculated and selected beforehand. Ex.1005, ¶35. In the embodiment described, R1 has the greatest resistance and R5 has the least resistance. As a result, the output signal causes the LED to have a different illumination levels as shown in Fig. 6 above. Ex.1008, ¶49. In Fig. 6, the y-axis represents the luminous intensity of the LED and the x-axis represents the selected channel of the integrated circuit over time. *Id.*; Ex.1005, Fig. 6.

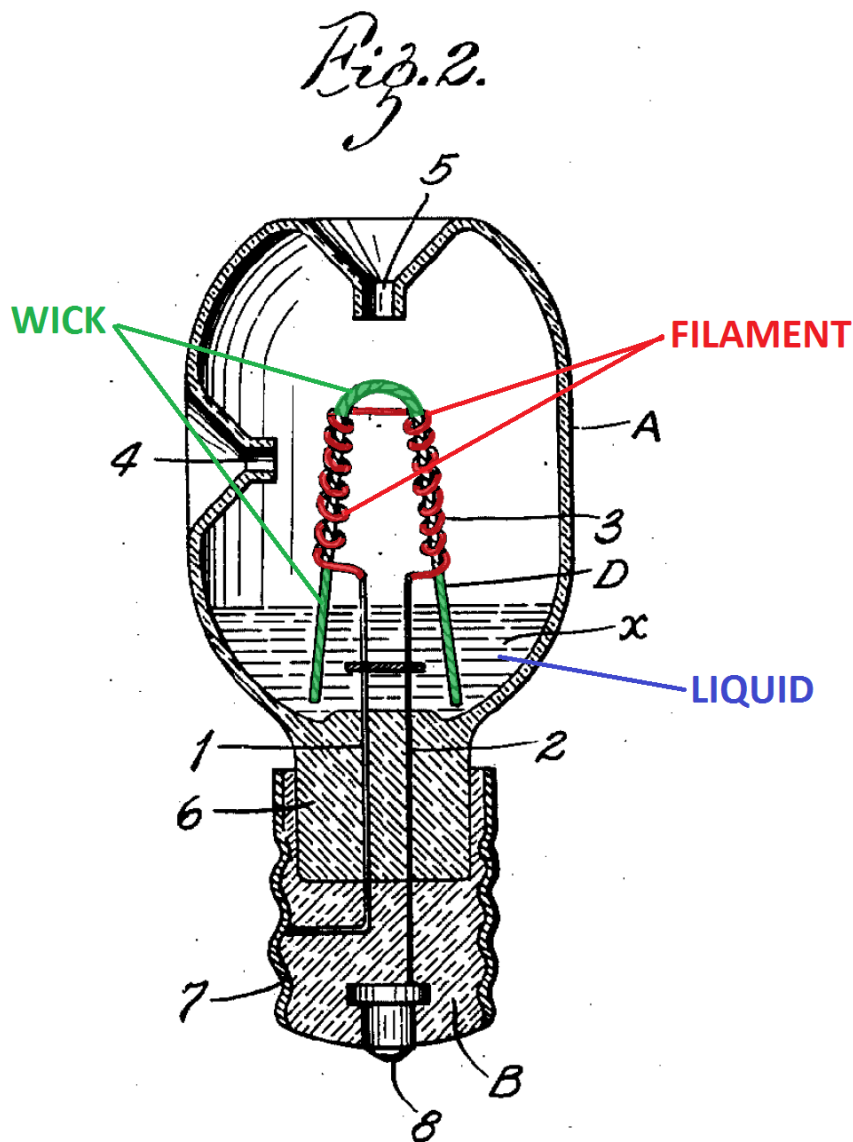
As shown in the example illumination pattern of Fig. 6, the luminous intensity changes in a sawtooth pattern so as to provide a smooth change in

illumination. Ex.1005, ¶38; Ex.1008, ¶50. JP598 further discloses that if a smoother pattern is desired, additional output levels can be used. Ex.1005, ¶43; Ex.1008, ¶50.

Other illumination patterns are available beyond the disclosed sawtooth and triangle patterns, including complex patterns. Ex.1003, ¶43. JP598 recommends that a resistance value suitable to each respective luminous value will be calculated and selected beforehand to create the desired luminous pattern. Ex.1003, ¶34. As Dr. Sturges explains, using JP598, a PHOSITA could have simulated any desired illumination pattern including the well-known gradual change in luminance for cigarettes. Ex.1008, ¶52.

C. 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, col 1:18-28.



The filament 3 may be “filament wires” or “electrical heating wires.” *Id.* at p.2, col. 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, col. 1:54-2:8.

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, col. 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, col. 2:19-25.

D. U.S. Patent No. 6,155,268 to Takeuchi (“Takeuchi”)

The Takeuchi patent is entitled “Flavor-Generating Device” and discloses an electronic simulated smoking article that can use tobacco liquid. Ex.1007, col. 5:43-46. Takeuchi discloses two housing configurations in FIGS. 1 and 8, annotated below.

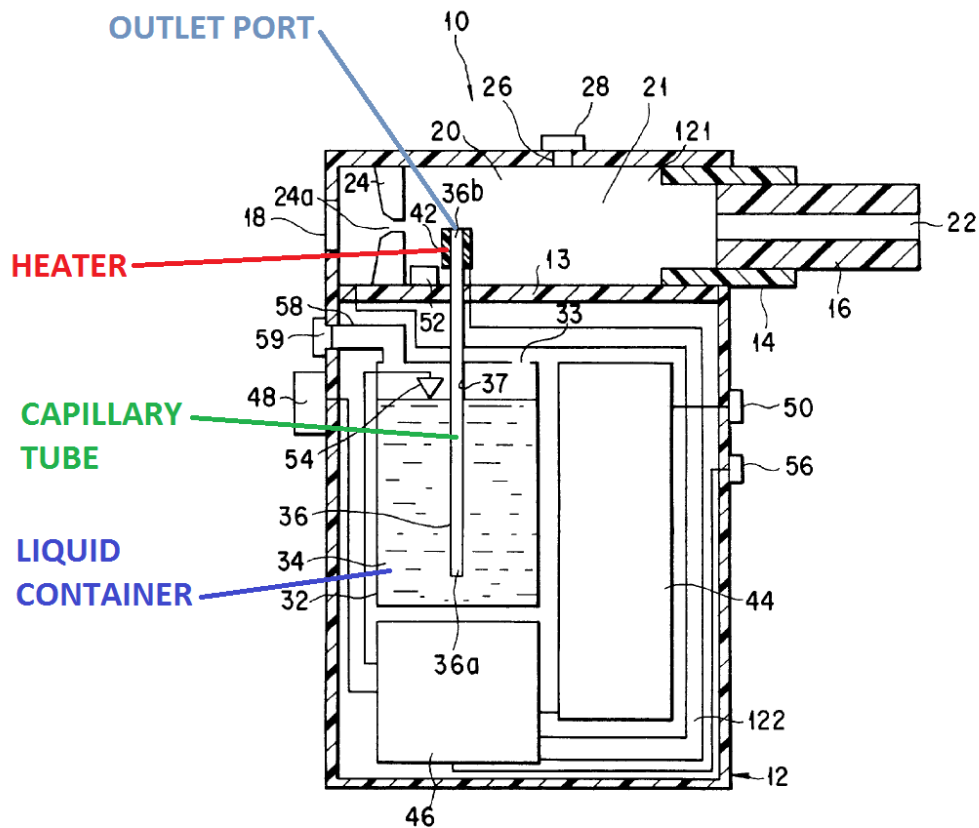


FIG. 1

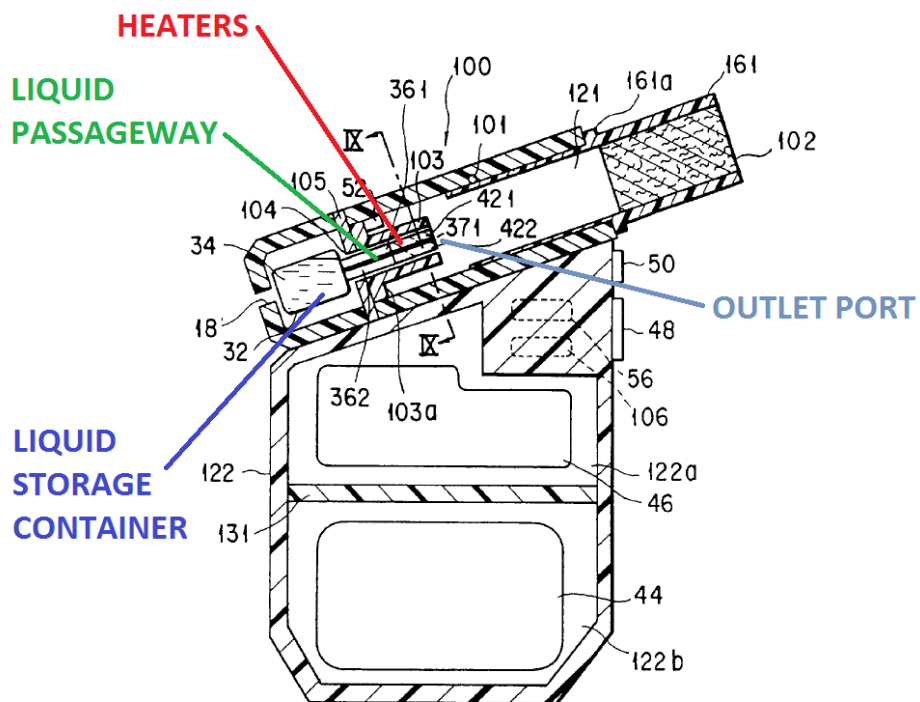


FIG. 8

Annotated Fig. 1 shows a housing (casing 12) having an atomizer comprising outlet port 36b and heater 42, and a liquid passageway 37 (formed by capillary tube 36) that projects into liquid flavor source 34 contained within the liquid container 32. Ex.1007, col. 4:30-32; 5:47-52; 6:55-59. The liquid container 32 is situated adjacent to the atomizer (outlet port 36b portion of capillary tube 36 in Fig. 1; outlet portion of liquid passageway 371 in Fig. 8). Liquid moves by capillary force from the liquid container 32 through the capillary tube 36 into the outlet port 36b. *Id.* at col. 5:47-52. The outlet port 36b forms a vaporization nozzle. *Id.* at col. 7:57-63; Ex.1008, ¶59. The outlet port 36b also includes the heater 42, which may be located within the outlet port 36b. *Id.* at col. 8:22-23; Ex.1008, ¶59. The liquid within the outlet port 36b is heated and gasified (e.g., vaporized) by the heaters 42 and supplied into the gas passageway 20 to be inhaled. Ex.1007, col. 7:57-63; Ex.1008, ¶59. The heater 42 can be energized in response to the user's inhaling action that is detected by sensor 52. Ex.1007, col. 7:51-56.

Takeuchi illustrates numerous heating element configurations that can be used in the flavor-generating device. *See* Ex.1007, Figs. 2A-C, 3-7, 9-11, 14-15; col. 8:16-48; 9:35-44; 10:22-27; 10:50-67; Ex.1008, ¶59. One option includes a rod-like heater (42) within the capillary tube 36 at the outlet port 36b, as shown in FIGS. 4 (below) and 6. Ex.1007, col. 8:22-24 and 8:33-36.

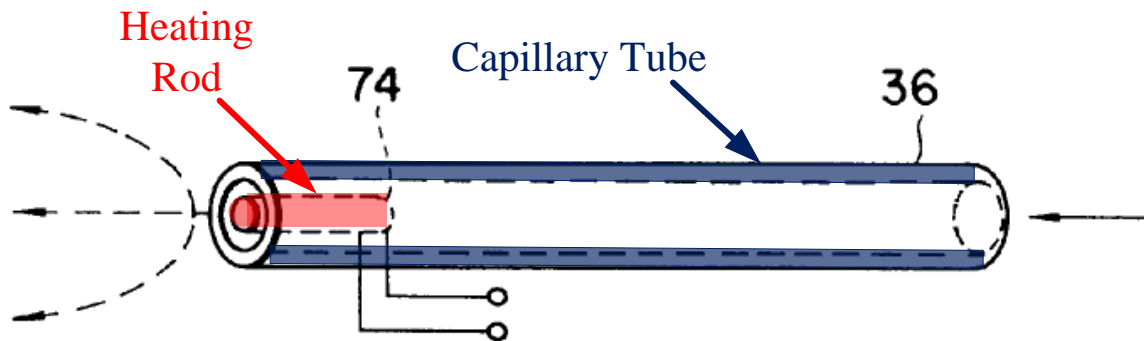


FIG. 4

IX. CLAIM BY CLAIM EXPLANATION OF THE GROUNDS FOR UNPATENTABILITY

A. GROUND 1: Claims 1-3, 9, 13-15, 17, and 18 are obvious under 35 U.S.C. § 103 over Hongbin in view of JP598

1. Claim 1:

a. 1.P: An electronic cigarette

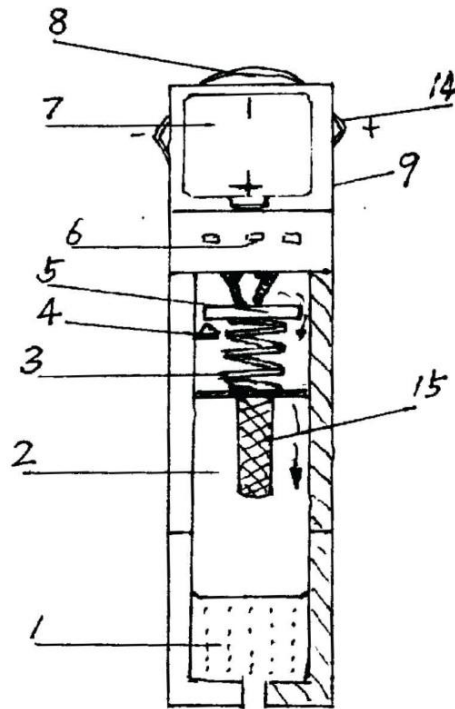
The preamble is not a claim limitation but even if it were, Hongbin discloses an electronic cigarette. Ex.1008, ¶63.

Claim 1.P	
<p>1. An electronic cigarette, comprising:</p>	<p><u>Ex.1003, Hongbin:</u> Abstract: “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.”</p> <p>P.2:1: “A liquid odor cigarette relates to a type of cigarette. . . .”</p> <p>P.2:20: “In order to electrically heat the smoking material to</p>

promote evaporation. . .”

P.3:1: “This invention relates to a type of cigarette.”

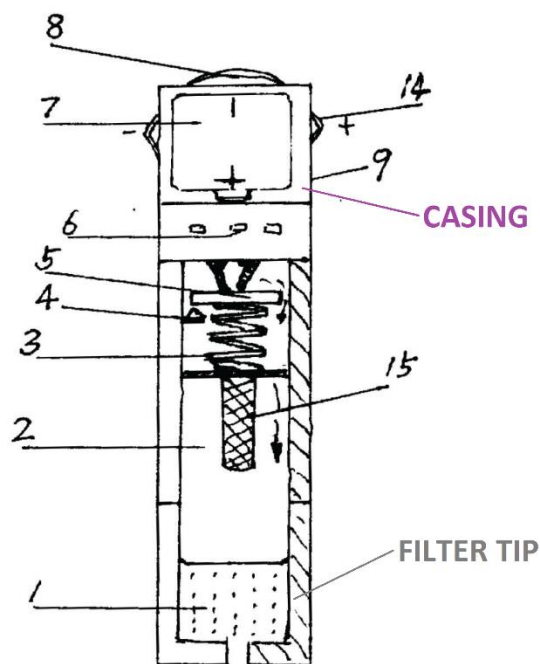
FIG. 1:



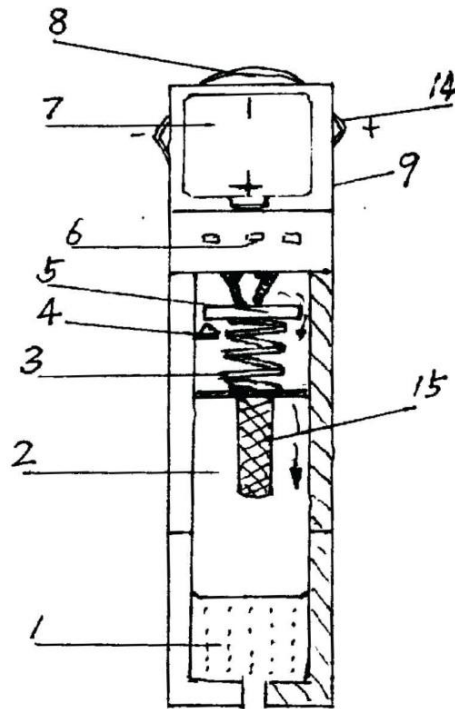
Ex.1008, ¶63.

b. 1.1: Housing

As shown in Fig. 1 below, the “housing” limitation is met by the outer casing 9 and the filter tip 1 that are joined together to form the electronic cigarette housing. Ex.1003, p.3:9-10; Ex.1008, ¶64.



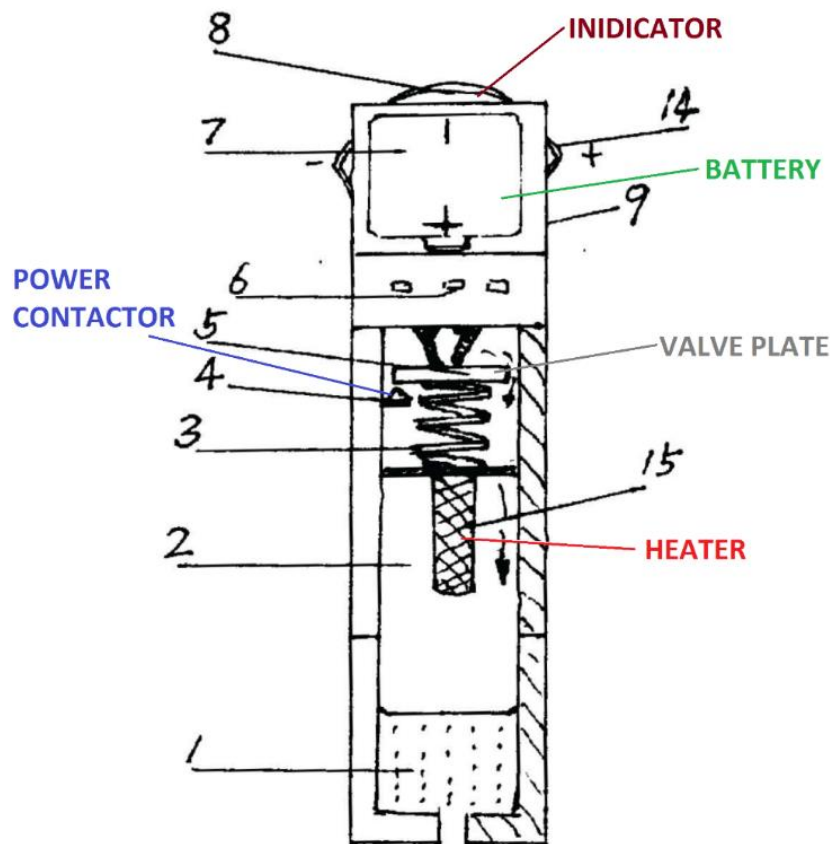
Claim 1.1	
a housing;	<p><u>Ex.1003, Hongbin:</u> Abstract: “The cigarette holder comprises an outer casing.”</p> <p>P.3:9-10: “The cigarette holder of the liquid odor cigarette is designed as follows: A filter tip 1 is set at one end of the outer casing 9 of the cigarette holder.”</p>



Ex.1008, ¶64.

c. 1.2: A control circuit electrically connected to an airflow sensor in the housing

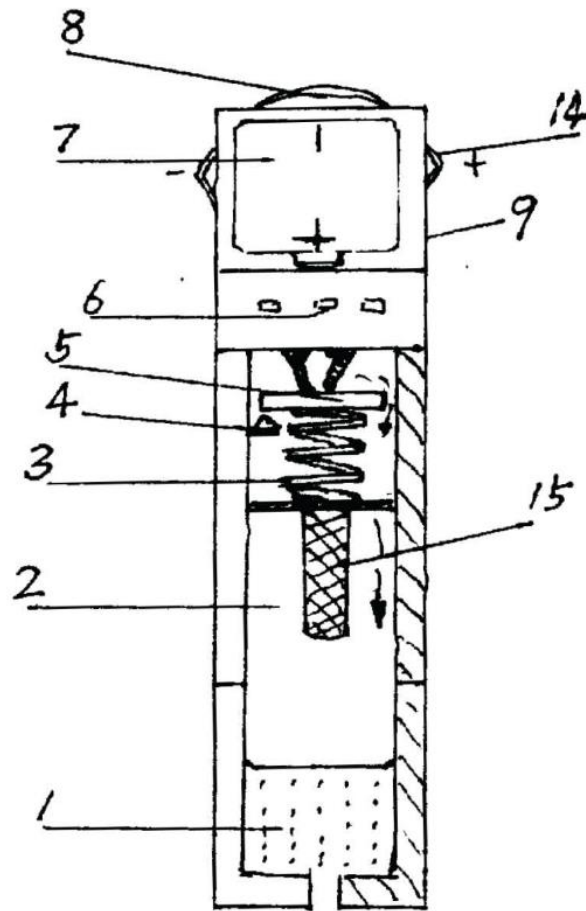
Hongbin discloses a “control circuit” that includes the indicator 8, the heater 15, the valve plate 5, the power contactor 4, and all the wiring and interconnections electrically coupling the above elements. Ex.1003, p.3:15-23; Ex.1008, ¶65. As Dr. Sturges explains, the airflow sensor is the suction control valve plate 5 that responds to suction and controls whether the electronic cigarette is on or off. Ex.1008, ¶¶41-42, 65.



JP598 also discloses a control circuit. Ex.1005, ¶¶32-33; Fig. 3; Ex.1008, ¶65.

Claim 1.2	
<p>a control circuit electrically connected to an airflow sensor in the housing;</p>	<p><u>Ex.1003, Hongbin:</u></p> <p>[Airflow Sensor] P.3:12-14: “[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.”</p> <p>P.3:18-19: “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.”</p> <p>FIG. 1 includes arrows showing a travel path of the air flowing past the valve plate and through the body of the</p>

cigarette.



[Control Circuit connected to Airflow Sensor] P.3:15-19:

“[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.”

P.4:19-22: “[A]n indicator 8 is set at the other end of the cigarette holder, 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.”

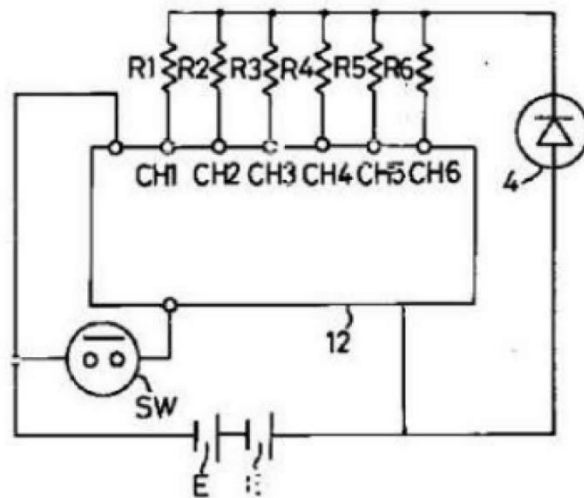
Ex.1005, JP598:

(0007)

(MEANS OF SOLVING THE PROBLEM) The aforesaid objective is achieved by the invention set forth in the claims. Namely, a characteristic feature of the electronic candle in this invention is that it is. . .furnished with a light emitter illumination circuit that cyclically alters the luminous intensity of the aforesaid electric light emitter in such a way that at least 3 times per cycle the aforesaid electric light emitter luminesces at an intensity differing from the others.

(0032) Next, the area around the light emitter illumination circuit of electronic candle 1 will be described. The light emitter illumination circuit of electronic candle 1, as shown in Fig. 3, has six output channels CH1 to CH6, as well as one IC (integrated circuit) 12 disposed so that each output channel CH1 to CH6 switches in the order channel CH1 to CH6 in accordance with the temporal change in luminous intensity during one cycle, and six resistance elements R1 to R6 for lighting current regulation having a resistance value suitable to each of the luminous intensities that temporally change during one cycle, one end of which is connected to each respective corresponding output channel, the other end of which is connected to LED 4.

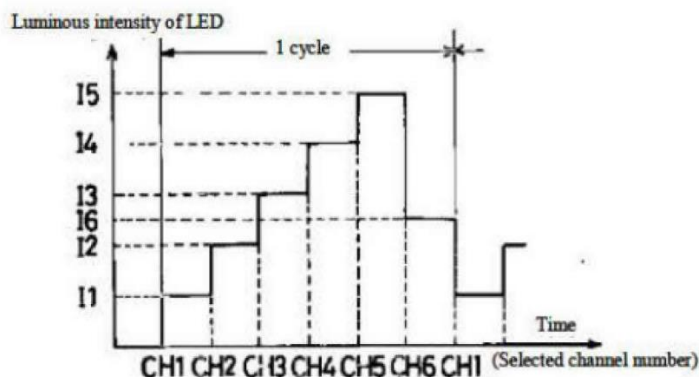
(FIG. 3)



(0043) (2) In the case of electronic candle 1 in the embodiment described above, a configuration was described wherein the luminous intensity of LED 4 changes stepwise to anywhere from a roughly triangular wave shape to a roughly sawtooth shape during one cycle, but a configuration wherein the luminous intensity of LED 4 changes completely smoothly to anywhere from a roughly triangular wave shape to a roughly sawtooth shape during one cycle can be cited as another embodiment of this invention. In this case, the luminous intensity of LED 4 will change an unlimited number of times during one cycle.

Moreover, the change in luminous intensity is not limited to the roughly triangular wave shape to roughly sawtooth shape indicated in Figs. 6 and 7, and any of various changes, including even more complex changes, can be used.

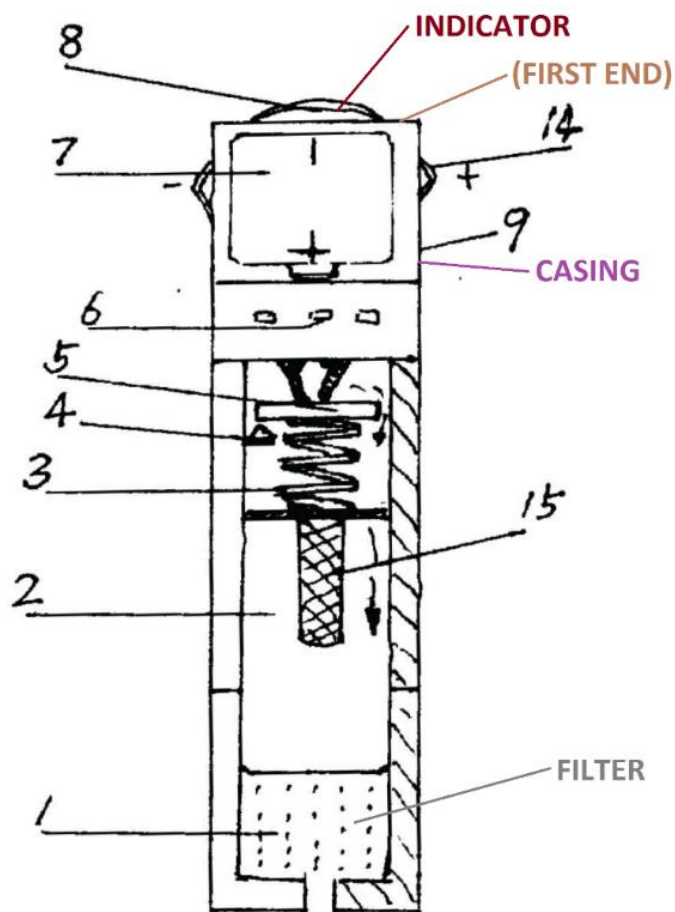
(FIG. 6)



	Ex.1008, ¶¶41-42, 65.
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- d. 1.3: A light source at a first end of the housing, with the light source electrically connected to the control circuit, and with the light source configured to provide a gradual change in luminance via control by the control circuit, when the airflow sensor senses airflow, to simulate a conventional cigarette**

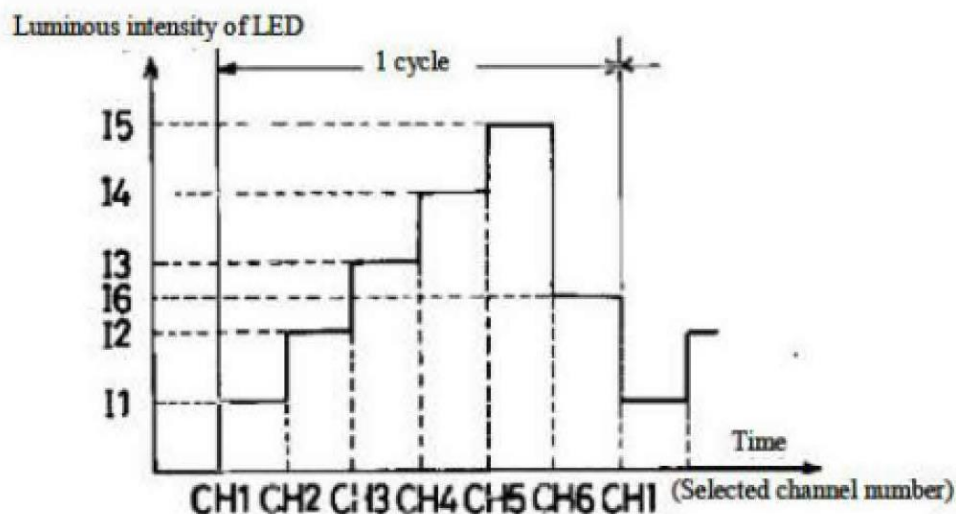
Hongbin includes a light source (indicator 8) located at a first end of the casing 9. The indicator 8 is electrically connected to the control circuit. Ex.1003, p.3:15-18; Ex.1008, ¶66. When the cigarette is smoked, Hongbin's airflow sensor senses the airflow and the indicator outputs light, which increases the fun and realism of smoking. Ex.1003, p.3:18-19; p.4:6-7; Ex.1008, ¶66.



JP598 provides a control circuit that controls the illumination level of an electric candle to produce an illumination that is close to an actual candle.

Ex.1005, ¶5. The control circuit is an integrated circuit connected to a battery and an LED that produces varying illumination levels for an electric candle. Ex.1005, ¶¶ 32, 43; Figs. 3, 6. Ex.1008, ¶67. The preferred output creates a sawtooth luminance intensity pattern as shown in Fig. 6. This pattern provides for a gradual change in brightness from darker to brighter and then darker. Ex.1005, ¶¶12, 13, 32; Figs. 3, 6; Ex.1008, ¶67. As shown in the sawtooth lighting pattern in Fig. 6, the luminance gradually increases and then gradually drops off after it hits its peak:

(FIG. 6)



The luminous intensity (I1-I6) of LED is the y-axis and selected circuit channel over time is the x-axis. CH1-CH6 is one complete cycle. Ex.1005.

JP598 discloses that its circuit can output any number of different lighting patterns and is not limited to the examples shown. Ex.1005, ¶¶43, 47; Ex.1008, ¶68. Thus, a PHOSITA would have understood that the control circuit in JP598 could be used to obtain any desired illumination pattern, including the well-known illumination pattern for a cigarette. Ex.1008, ¶68; Ex.1019, p.5 n.20 (citing Exs.1020-1022).

As Dr. Sturges explains, a PHOSITA would have been motivated to incorporate JP598's control circuit into Hongbin's electronic cigarette as both references are directed to the same problem of simulating combustion illumination

in electronic devices. Ex.1008, ¶69. For example, Hongbin’s illuminator lights up when the cigarette is smoked to make smoking “more real” and “more fun.” Ex.1003, p.4:7-8. In other words, Hongbin uses the light to make the electronic cigarette appear lit up like a real cigarette. Ex.1008, ¶69. The purpose of JP598 is the same with respect to candles. Ex.1005, ¶¶5-6; Ex.1008, ¶69. Additionally, the circuit in JP598 improved upon the prior art high/low circuit, which is functionally equivalent to the on/off circuit used in Hongbin. Ex.1008, ¶69. A PHOSITA would have consulted JP598 to improve the illumination of the electronic cigarette in Hongbin to appear even “more real.” *Id.* In other words, improving the electronic cigarette of Hongbin with the circuitry of JP598 amounts to the use of a known technique in a known device that is ready for improvement to achieve a predictable result, namely, a gradual change in luminance that mimics a conventional cigarette. *See* MPEP § 2143.

Other prior art also disclosed this same common goal of simulating burning elements. Ex.1003, p.4:7-8; Ex.1005, ¶9. For example, Janning taught that it was desirable to use an electric light to simulate illumination of various combustion devices including candles cigarettes, cigars, lighters, and lanterns. Ex.1018, col. 1:25-27, 1:42-49; Ex.1008, ¶70; Ex.1010 (IPR2016-01272, Institution Decision), p.15. Thus, a PHOSITA would be motivated to look to JP598 to solve the

common problem of simulating combustion as closely as possible using an electric light regardless of what type of combustion was being simulated. Ex.1008, ¶70.

Additionally, in instituting IPR2016-01272, the Board stated that “[a]lthough JP ’598 provides express discussion of changes in luminous intensity to simulate a candle, an obviousness analysis does not require that the prior art contain precise teachings directed to the specific subject matter claimed. Rather, the test for obviousness is what the combined teachings of the references would have suggested to those of ordinary skill in the art. Moreover, the obviousness inquiry may take into account the background knowledge, creativity, and common sense of the person of ordinary skill.” Ex.1010, p.15 (internal citations omitted).

The illumination pattern for cigarettes was well-known to a PHOSITA. For example, Janning expressly discloses that light emission is enhanced when a smoker inhales. Ex.1018, col. 1:53-55. Also, Patent Owner has represented that the illumination pattern for cigarettes is well-known. *See* Ex.1009 (IPR2016-01272 Petition), n.3; Ex.1019, 5 n.20 (Patent Owner representation that the illumination pattern was known through “casual observation”) (citing Exs.1020-1022); Ex.1008, ¶72. A PHOSITA could have easily replicated this known pattern using JP598 as it discloses that the control circuit is capable of creating varying lighting patterns and that the circuit outputs for the varying patterns are calculated in advance. Ex.1005, ¶¶34, 43; Ex.1008, ¶73. Specifically, JP598 provides that

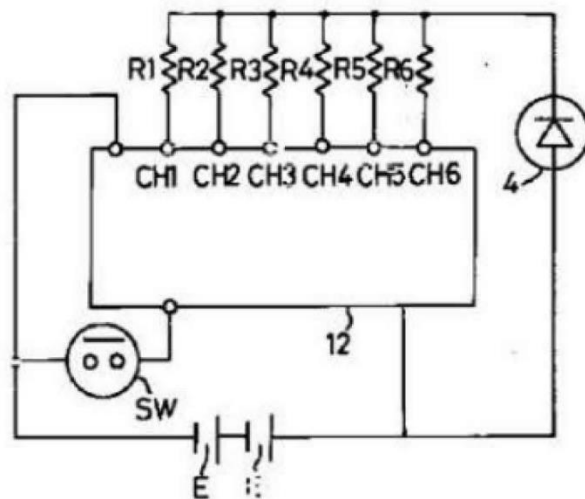
“the luminous intensity is not limited to” the shapes disclosed in the publication and “any various changes, including even more complex changes, can be used.” Ex.1005, ¶43. Further, JP598 explains that “the form of change in the luminous intensity of the LED during one cycle...[and the] type of IC...are not limited to those set forth in this embodiment, and may be altered to any other suitable form on an as-needed basis.” Ex.1005, ¶47. Thus, as Dr. Sturges explains, a PHOSITA would have understood that JP598 could be used for any illumination pattern. Ex.1008, ¶73. Further, in attempting to make Hongbin’s electronic cigarette “more real,” a PHOSITA would have looked to and used the JP598’s control circuit, which allows for replication of illumination patterns using as many outputs as desired, in the electronic cigarette of Hongbin in order to simulate the known light emission pattern for real cigarettes (i.e., make “more real”). The PHOSITA could have simply determined how many outputs were desired, the appropriate timing, and calculated the appropriate circuit outputs to provide the known illumination pattern (i.e., the gradual change in luminance). Ex.1008, ¶73; Ex.1003, p.4:6.

Claim 1.3	
a light source at a first end of the housing, with the light source electrically connected to the control circuit, and with the light source	<p><u>Ex.1003, Hongbin:</u></p> <p>P.3:15-19: 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, 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.</p>

<p>configured to provide a gradual change in luminance via control by the control circuit, when the airflow sensor senses airflow, to simulate a conventional cigarette.</p>	<p>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.</p> <p>P.4:6-7: In addition, the tip can give out light so that it is more real and have more fun.</p> <p><u>Ex.1005, JP598:</u></p> <p>(0008) [T]he artificial flame unit is illuminated by light from the electric light emitter, which is illuminated at least 3 times per cycle at an intensity different from the others due to the action of the light emitter illumination circuit, while the brightness of the illuminated artificial flame unit attains not only a low and high illumination but also an illumination midway between these during one cycle, producing an artificial flame unit that flickers with a feeling far closer to the flame of an actual candle than when the brightness only changes between low and high, as in the prior art.</p> <p>(0012) It is preferred that the aforesaid light emitter illumination circuit is configured in such a way that the luminous intensity of the aforesaid electric light emitter changes during one cycle to anywhere from a roughly triangular wave shape to a roughly sawtooth shape.</p> <p>(0013) Configuring this invention in this manner causes the changes in brightness in the artificial flame unit illuminated by light from the electric illumination unit to become smooth, with a roughly triangular wave shape to a roughly sawtooth shape, producing flickering in the artificial flame unit that feels very close to that of the flame of an actual candle, resulting in a form of illumination that feels very natural.</p> <p>(0032) Next, the area around the light emitter illumination circuit of electronic candle 1 will be described. The light emitter illumination circuit of electronic candle 1, as shown in Fig. 3, has six output channels CH1 to CH6, as well as one IC</p>
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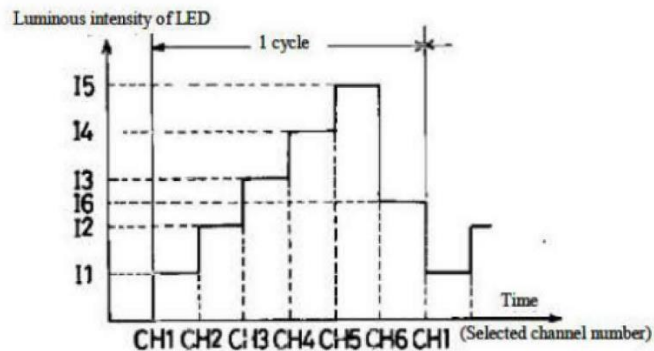
(integrated circuit) 12 disposed so that each output channel CH1 to CH6 switches in the order channel CH1 to CH6 in accordance with the temporal change in luminous intensity during one cycle, and six resistance elements R1 to R6 for lighting current regulation having a resistance value suitable to each of the luminous intensities that temporally change during one cycle, one end of which is connected to each respective corresponding output channel, the other end of which is connected to LED 4.

(FIG. 3)



(0036) In the case of Fig. 6, resistance element R1 corresponding to luminous intensity I1 has resistance value r1, resistance element R2 corresponding to luminous intensity I2 has resistance value r2, resistance element R3 corresponding to luminous intensity I4 has resistance value r3, resistance element R4 corresponding to luminous intensity I5 has resistance value r4, resistance element R5 corresponding to luminous intensity I6 has resistance value r5, resistance element R6 corresponding to luminous intensity I3 has resistance value r6, producing the relationship $r1 > r2 > r6 > r3 > r4 > r5$, and as a result, six times during one cycle, LED 4 is illuminated at an intensity different from the others, and the luminous intensity of LED 4 changes to a roughly sawtooth shape during one cycle.

(FIG. 6)



[Note: Luminous intensity of LED is the y-axis and selected channel is the x-axis over time.]

(0043) (2) In the case of electronic candle 1 in the embodiment described above, a configuration was described wherein the luminous intensity of LED 4 changes stepwise to anywhere from a roughly triangular wave shape to a roughly sawtooth shape during one cycle, but a configuration wherein the luminous intensity of LED 4 changes completely smoothly to anywhere from a roughly triangular wave shape to a roughly sawtooth shape during one cycle can be cited as another embodiment of this invention. In this case, the luminous intensity of LED 4 will change an unlimited number of times during one cycle.

Moreover, the change in luminous intensity is not limited to the roughly triangular wave shape to roughly sawtooth shape indicated in Figs. 6 and 7, and any of various changes, including even more complex changes, can be used.

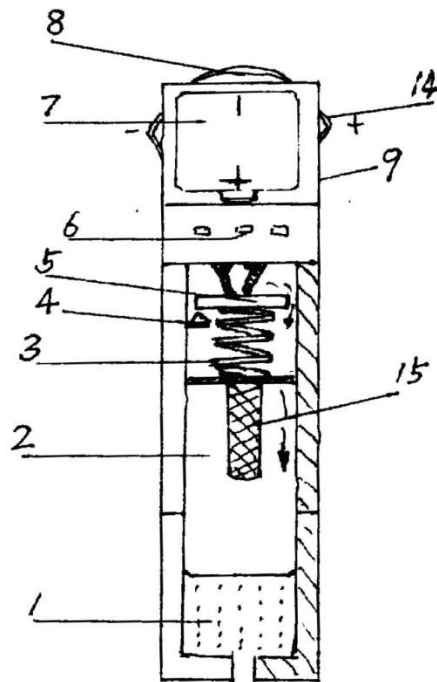
(0047) [T]he form of change in the luminous intensity of the LED during one cycle as well as the . . . type of IC, etc., are not limited to those set forth in this embodiment, and may be altered to any other suitable form on an as-needed basis.

Ex.1008, ¶¶67-73.

a. A battery in the housing electrically connected to the control circuit

A detailed cross-sectional diagram of a mechanical device, likely a battery or a sensor, with numbered parts 1 through 15. The diagram shows a vertical assembly with a battery at the top, a spring mechanism in the middle, and a textured component at the bottom. A green line points from the word 'BATTERY' to the top section.

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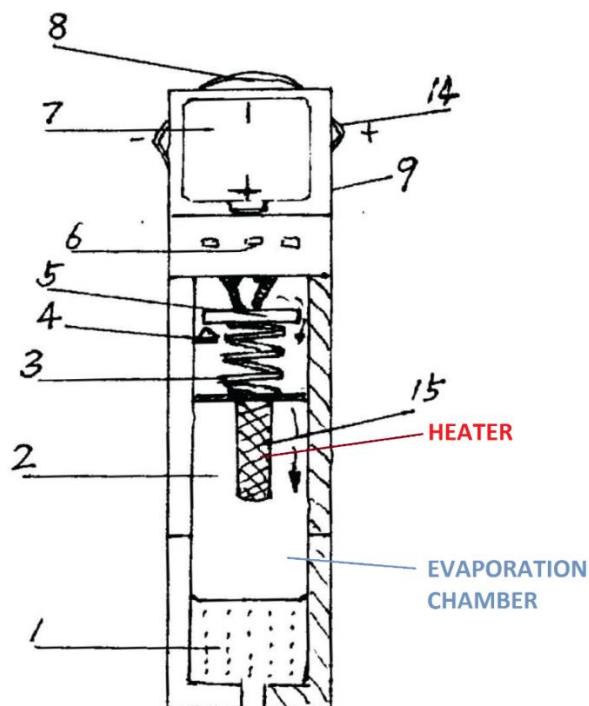


Ex.1008, ¶74.

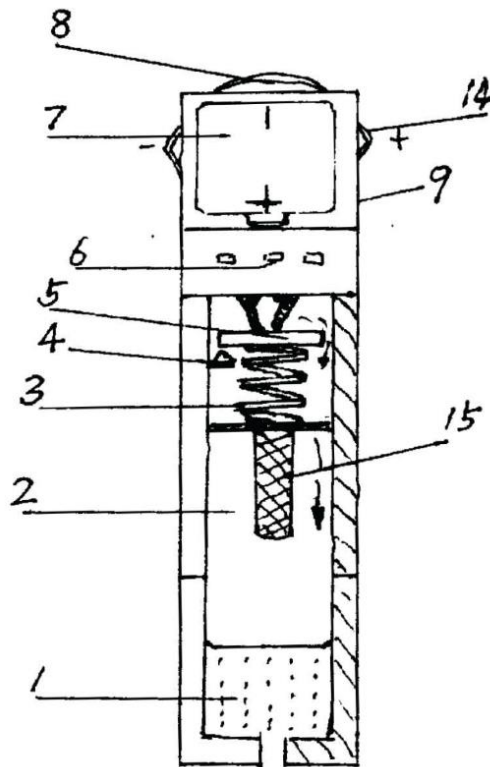
3. Claim 3:

a. 3.1: atomizer in the housing electrically connected to the control circuit

Hongbin discloses an atomizer (including the electronic heater 15) 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.1008, ¶74; Ex.1003, p.3:20-21 (“In order to electrically heat the smoking material to promote evaporation, an electronic heater 15 can be set in the smoking material evaporation chamber.”). Hongbin discloses that the electronic heater 15 is connected to the control circuit, with one electrode being connected to the battery and the other electrode connected to the power contactor 4. Ex.1003, p.3:21-22.



Claim 3.1	
<p>3. The electronic cigarette of claim 2 further including an atomizer in the housing electrically connected to the control circuit</p>	<p><u>Ex.1003, Hongbin:</u></p> <p>P.3:20-23: 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.</p> <p>FIG. 1:</p>



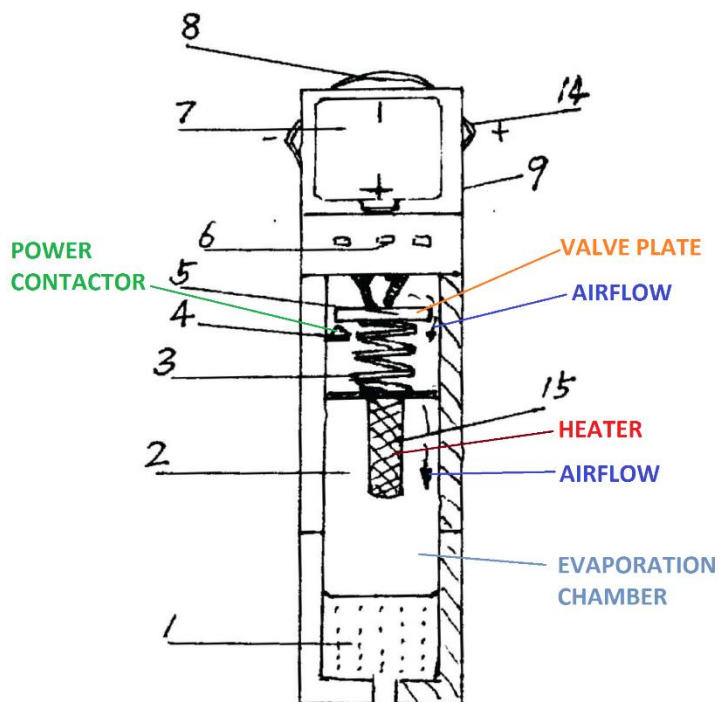
Ex.1008, ¶75.

b. 3.2: a liquid storage container in the housing adjacent to the atomizer.

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.1008, ¶¶43-45, 76. A PHOSITA would have understood that Hongbin likely would not simply pour the liquid into the evaporation chamber without a container such as a vessel or absorbent material, and preferably uses an absorbent material for storing the liquid

in the evaporation chamber, which is also where the electronic heater is located.

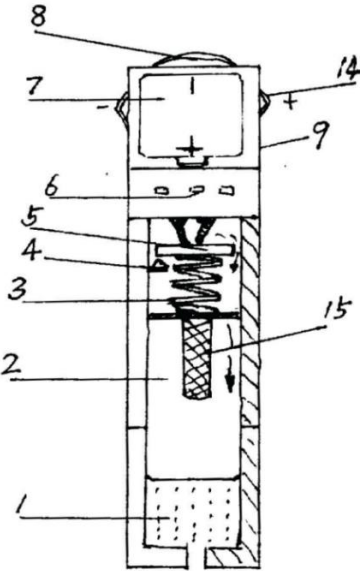
Id.



The 239 patent specification does not use the phrase “adjacent to” or provide any description explaining the term. Ex.1008, ¶77. The 239 patent figures do not show the liquid storage container 13 touching or sharing a common border with the vaporization nozzle 17. Ex.1008, ¶77. In fact, Figs. 1, and 7-9 do not show the liquid storage container 13, 113, 213, or 313 sharing a border with the vaporization nozzle 17, 117, 217 or 317, and all embodiments include a baffle plate 15, 215 or another structure between the liquid storage container and the vaporization nozzle. Ex.1008, ¶77. To the extent the 239 patent figures depict “adjacent” structures, Hongbin also discloses that its container is “adjacent to” its atomizer (e.g.,

electronic heater 15) as they are both located in the evaporation chamber 2.

Ex.1008, ¶77.3

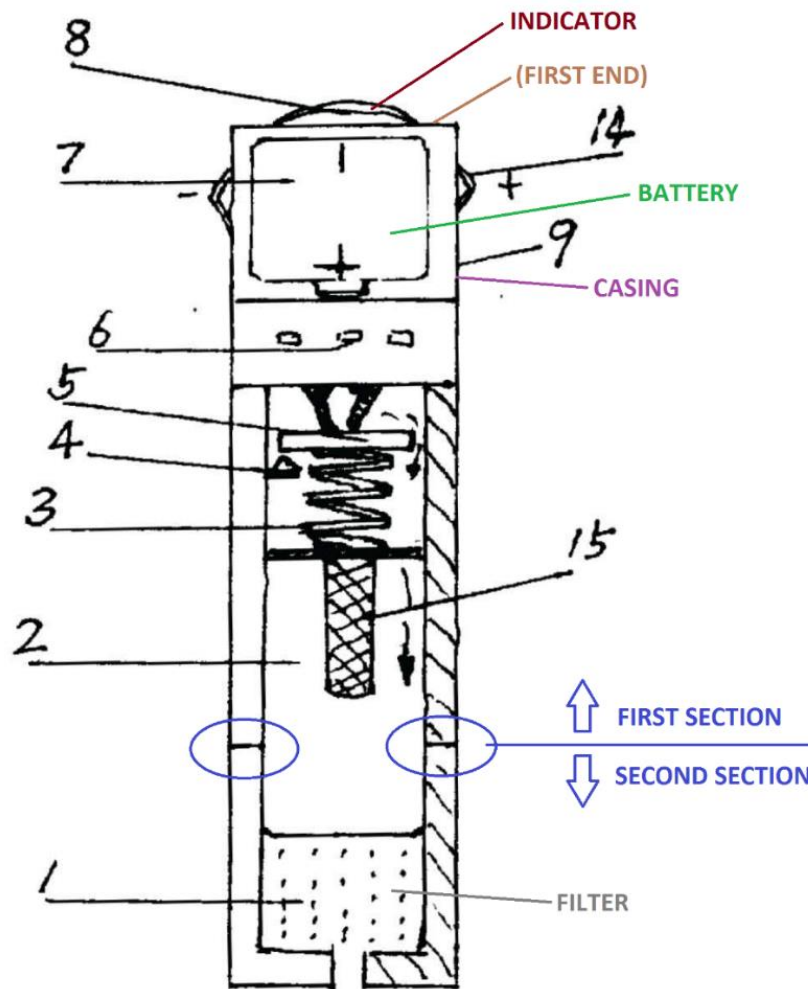
Claim 3.2	
<p>and a liquid storage container in the housing adjacent to the atomizer.</p>	<p><u>Ex.1003, Hongbin:</u></p> <p>P.3:9-11: A filter tip 1 is set at one end of the outer casing 9 of the cigarette holder, a smoking material evaporation chamber 2 is set above the filter tip, the vaporizable liquid cigarette is loaded in the smoking material evaporation chamber.</p> <p>P.3:20-21: In order to electrically heat the smoking material to promote evaporation, an electronic heater 15 can be set in the smoking material evaporation chamber.</p> <p>FIG. 1:</p>  <p>Ex.1008, ¶¶76-77.</p>

³ The same analysis applies if a vessel is used or if the liquid is held directly in the evaporation chamber. Ex.1008, ¶77.

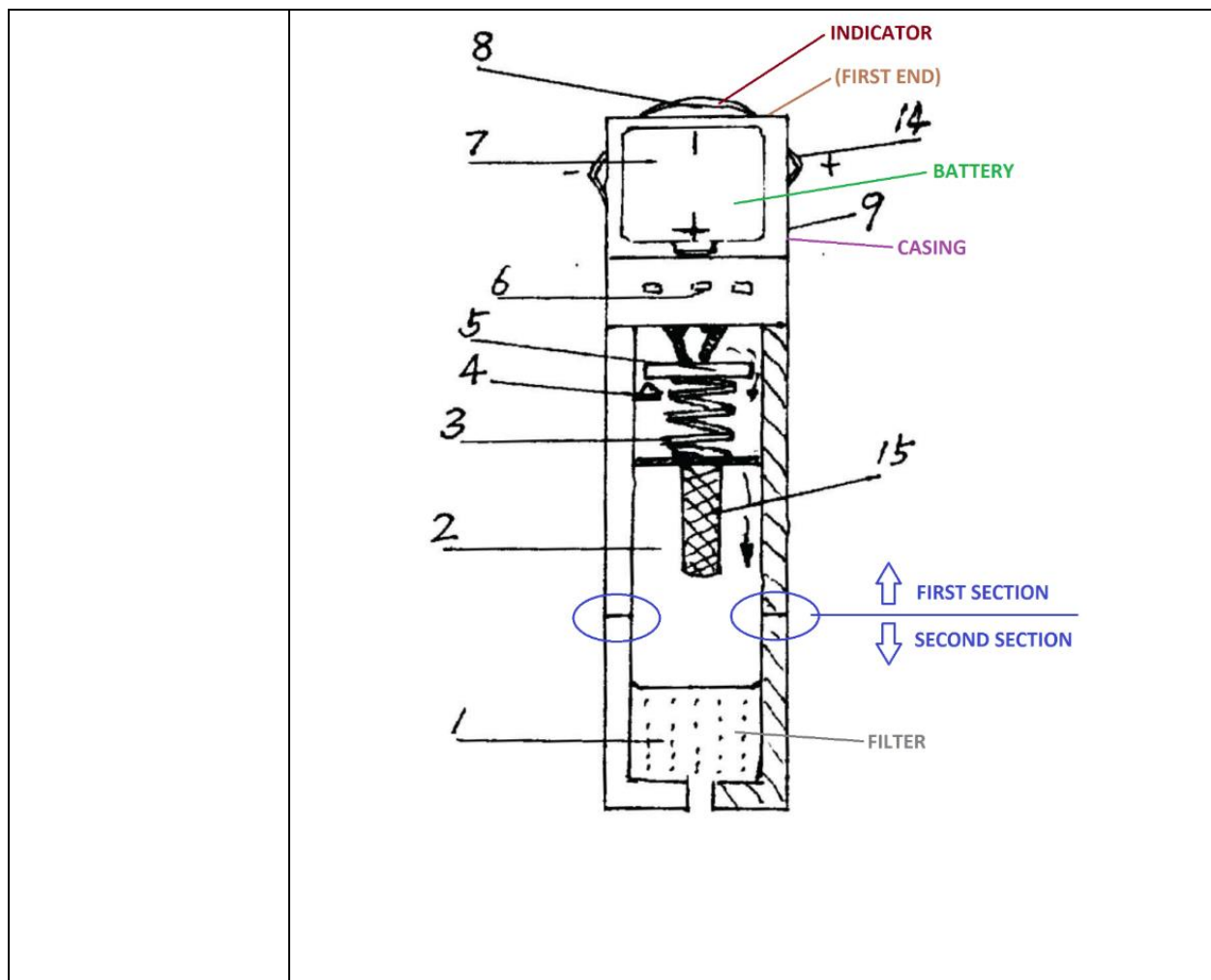
4. Claim 9:

a. The housing having a first section attached to a second section with the battery and light in the first section.

Hongbin FIG. 1 has a housing that is formed by two sections fitted together -
- a casing 9 and filter tip 1 which “is set at one end of the outer casing.” Ex.1003, p.3:9-10; Ex.1008, ¶78. FIG. 1 (annotated, below) shows two break lines, one on each side of the housing, that show the delineation between the outer casing 9 and the filter tip 1. *Id.* As Dr. Sturges explains, the two sections allow the user to load a vaporizable liquid into the evaporation chamber 2. Ex.1003, p.3:10-11; Ex.1008, ¶78. The first section formed by casing 9 includes both the battery 7 and the indicator (light) 8. Ex.1003, p.3:15-16; Fig. 1; Ex.1008, ¶78.



Claim 9	
<p>9. The electronic cigarette of claim 2 with the housing having a first section attached to a second section and with the battery and the light source in the first section.</p>	<p><u>Ex.1003, Hongbin:</u></p> <p>FIG. 1 (annotated), below, shows the battery 7 and the indicator 8 located in the outer casing 9, which is connected to the filter tip 1 to form the housing. Ex.1008, ¶78.</p>



5. Claim 13:

a. 13.P: An electronic cigarette

As discussed with respect to claim 1.P in section IX.A.1.a, *supra*, Hongbin discloses an electronic cigarette.

b. 13.1: a housing

As discussed with respect to claim 1.1 in section IX.A.1.b, *supra*, Hongbin discloses a housing.

- c. 13.2: a control circuit electrically connected to a battery, an airflow sensor, an atomizer and an LED, with the LED at a first end of the housing, configured such that the luminance of the LED changes based on an output of the airflow sensor**

As discussed with respect to claim 1.2-1.3 in sections IX.A.1.c-d, *supra*, Hongbin discloses the control circuit connected to the battery, airflow sensor, atomizer, and a light at the first end. Ex.1008, ¶79. Hongbin discloses that the illuminance of the light can be changed between an on and off state based on the output of the airflow sensor. Ex.1003, p.3:15-19; Ex.1008, ¶81.

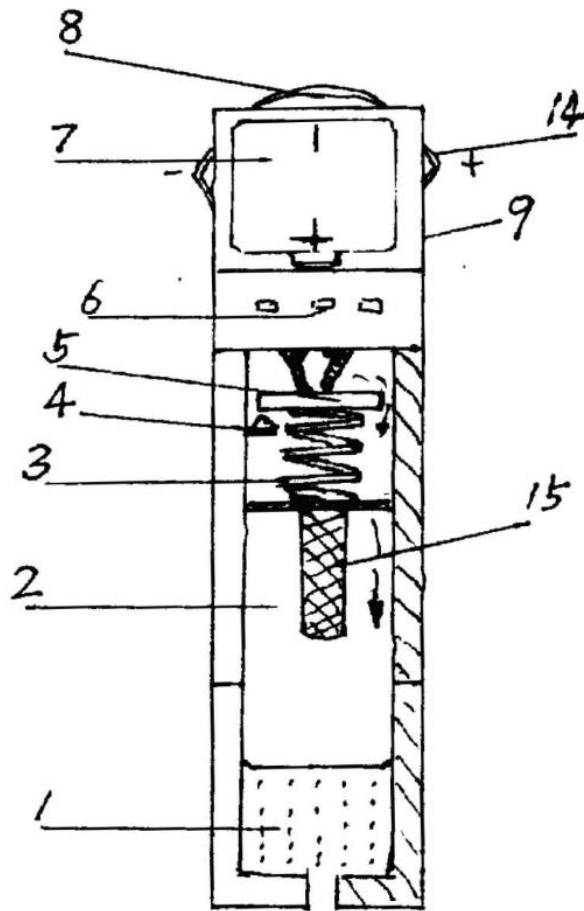
While Hongbin does not explicitly disclose that indicator 8 is an LED, LEDs were well known for use in electronic cigarettes to indicate that a puff was being taken. Ex.1011 (Brooks), col. 5:63-16:4 (illuminating an LED during a draw); Ex.1008, ¶80. Further, JP598 discloses an LED 4 as its illuminator for simulating a burning element. Ex.1005, ¶25. A PHOSITA would have readily understood that the indicator 8 could be any conventional light source, including an LED as disclosed in Brooks or JP598, and that an LED with its long lifespan and low power consumption would be particularly appropriate for Hongbin's device given Hongbin's expressed problem of electricity usage. Ex.1008, ¶80; Ex.1003, p.3:22-23.

Independent claim 13 differs from independent claims 1 and 17 because it does not recite the "gradual change in luminance" to simulate a conventional cigarette as do claims 1 and 17. Ex.1008, ¶81. Instead, the recited change in

luminance in claim 13 may occur abruptly between an on state (illuminated) and off state (not illuminated). *Id.* Accordingly, the teachings of Hongbin (without modification by JP598) anticipate claim 13 for purposes of the change in luminance. Ex.1008, ¶¶81. However, to the extent claim 13 is interpreted to require gradual changes in illumination (or any change in illumination beyond on/off states), JP598 discloses these features as discussed with respect to claim 1.3 in section IX.A.1.d, *supra*. Ex.1008, ¶¶67-73, 82.

Claim 13.2	
<p>a control circuit electrically connected to a battery, an airflow sensor, an atomizer and an LED, with the LED at a first end of the housing, configured such that the luminance of the LED changes based on an output of the airflow sensor;</p>	<p><u>Ex.1003, Hongbin:</u></p> <p>P.3:15-19: 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, 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.</p> <p>P.3:20-23: 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.</p> <p>P.4:6-7: In addition, the tip can give out light so that it is</p>

more real and have more fun.



Ex.1008, ¶¶81-82.

Alternatively, if “gradual change in luminance” is part of claim 13, then see entirety of discussion of claim 1.3 in section IX.A.1.d, above, including Ex.1005, JP598; Ex.1008, ¶¶67-73, 82.

d. 13.3: liquid storage container adjacent to the atomizer

As discussed with respect to claim 3.2 in section IX.A.3.b, *supra*, a PHOSITA would have understood that liquid in the evaporation chamber 2 is

stored in a container such as an absorbent material that is situated adjacent to the atomizer. Ex.1008, ¶¶43-45, 76.

6. Claim 14:

- a. the control circuit configured to control the luminance of the LED when the airflow sensor senses airflow, such that the LED simulates the appearance of a conventional burning cigarette tip**

Unlike claims 1 and 17, which recite “gradually change a luminance” to simulate a conventional cigarette, claim 14 only requires that the LED simulate the appearance of a conventional burning cigarette without a requirement for gradual luminance. Ex.1008, ¶¶83. Thus, under the broadest reasonable interpretation, claim 14 requires only that the light simulate in some way the appearance of a cigarette. *Id.* Under that interpretation, Hongbin without modification by JP598 discloses this limitation because Hongbin’s light makes the cigarette look “more real.” *Id.*; Ex.1003, p.4:6-7.

Hongbin discloses that its airflow sensor (suction control valve plate 5), operating as part of a control circuit, completes a circuit between the valve plate 5 and the contactor 4 in response to sensing airflow. Ex.1003, p.3:15-19; Ex.1008, ¶83. In response to sensing airflow and completing the circuit, the control circuit controls the luminance of the LED by turning it on such that “the indicator gives out light” and makes it look “more real.” Ex.1003, p.3:15-19, p.4:6-7; Ex.1008, ¶83.

Illuminating the tip of Hongbin's cigarette when a user inhales is a simulation of the appearance of a conventional burning cigarette tip. Ex.1008, ¶83. Hongbin's cigarette tip is dark when a user is not inhaling, just like a conventional burning cigarette tip. *Id.*; Ex.1003, p.3:18-19. Similarly, Hongbin's cigarette tip is illuminated when the user is inhaling, also like a conventional burning cigarette tip. *Id.*

However, to the extent claim 14 is interpreted to require gradual changes in luminance (or any other change in illumination beyond on/off states) to simulate the appearance of a conventional burning cigarette tip, JP598 discloses these features as discussed with respect to claim 1.3 in section IX.A.1.d, *supra*. Ex.1008, ¶¶67-73, 84.

Claim 14	
14. The electronic cigarette of claim 13 with the control circuit configured to control the luminance of the LED when the airflow sensor senses airflow, such that the LED simulates the appearance of a conventional	<p><u>Ex.1003, Hongbin:</u></p> <p>P.3:15-19: 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, 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.</p> <p>P.4:6-7: In addition, the tip can give out light so that it is more real and have more fun.</p>

burning cigarette tip.	Ex.1008, ¶83. Alternatively, if “gradual change in luminance” is part of claim 14, then see entirety of discussion of claim 1.3 in section IX.A.1.d, above, including Ex.1005, JP598; Ex.1008, ¶67-73, 84.
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7. Claim 15:

a. the housing having a first section attached to a second section and with the battery in the first section

As discussed with respect to claim 9 in section IX.A.4.a, *supra*, Hongbin discloses a housing having a first section attached to a second section and with the first end of the housing on the first section, and with the battery in the first section. Ex.1008, ¶78.

8. Claim 17:

Claim 17 recites a method of using an electronic cigarette with many of the elements recited in claim 1. Ex.1008, ¶85.

a. 17.P: A method of using an electronic cigarette

As discussed with respect to claim 1.P in section IX.A.1.a, *supra*, Hongbin discloses an electronic cigarette and a method of using the same. Ex.1008, ¶85.

b. 17.1: sensing airflow in a housing of the electronic cigarette via a sensor

As discussed with respect to claims 1.1-1.2 in section IX.A.1.b-c, *supra*, Hongbin discloses an airflow sensor that senses airflow when the user inhales. Ex.1008, ¶85.

c. 17.2: providing a sensed airflow signal from the sensor to an electronic controller in the housing

As discussed in claim 17.1 above and with respect to claim 1.2-1.3 in section IX.A.1.c-d, *supra*, Hongbin discloses this aspect. Ex.1008, ¶85-86.

d. 17.3: operating the electronic controller to gradually change a luminance of an LED at a first end of the housing to simulate a conventional burning cigarette tip; and

As discussed in claims 17.1-17.2 above and with respect to claim 1.3 in section IX.A.1.d, *supra*, Hongbin discloses this aspect. Ex.1008, ¶85-86.

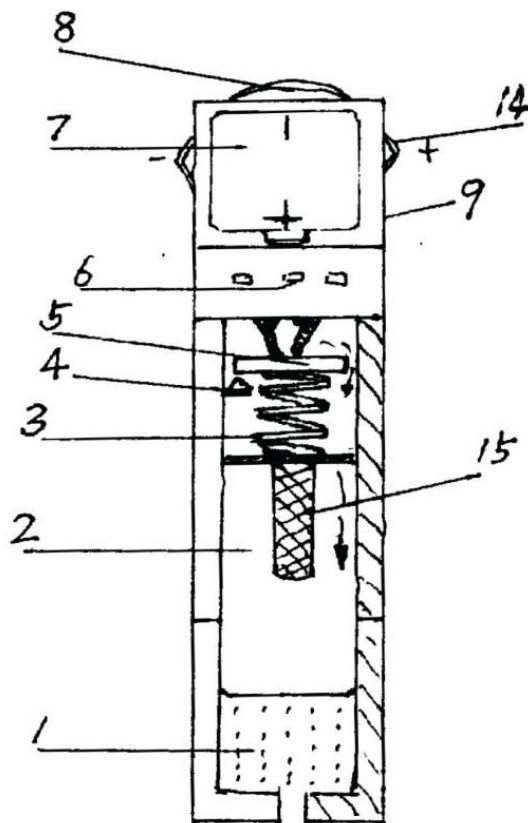
e. 17.4: vaporizing a liquid via an atomizer in the housing

Hongbin discloses an atomizer (electronic heater 15) in the housing in the “smoking material evaporation chamber [2],” in which a liquid substance is vaporized. Ex.1003, p.3:20-21 (“In order to electrically heat the smoking material to promote evaporation, an electronic heater 15 can be set in the smoking material evaporation chamber.”); Ex.1008, ¶86.

Claim 17.4	
and vaporizing a liquid via an	<u>Ex.1003, Hongbin:</u>

atomizer in the housing.

P.3:20-22: 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.



Ex.1008, ¶85-86.

9. Claim 18:

- a. operating the electronic controller to supply electric current from a battery to the vaporizer upon sensing airflow in the housing

The term “the vaporizer” does not include antecedent support in either claim 17 or in claim 18. However, for purposes of this petition only, Petition will

assume that “the vaporizer” is something that operates to vaporize the liquid.

Ex.1008, ¶87.

Hongbin discloses an electronic heater 15 that is connected to the battery and the contactor 4. Ex.1003, p.3:20-22. As discussed in IX.A.1.c-d, *supra*, Hongbin’s airflow detector detects airflow when a user inhales, which moves the suction control valve plate 5 to contact the contactor 4 and complete a circuit (e.g., as a switch). *Id.* at p.3:18-19. In this instance, the completed circuit provides power from the battery 7 to the electronic heater 15, which vaporizes the liquid. Ex.1003, p.3:15-23; Ex.1008, ¶87. Thus, Hongbin’s electronic cigarette supplies power to the electronic heater 15 upon detecting airflow. *Id.*

Claim 18	
18. The method of claim 17 further including operating the electronic controller to supply electric current from a battery to the vaporizer upon sensing airflow in the housing.	<p><u>Ex.1003, Hongbin:</u></p> <p>P.3:20-23: 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.</p> <p>Ex.1008, ¶87.</p>

B. GROUND 2: Claims 3, 5, 7, 8, and 13-15 are obvious under 35 U.S.C. § 103 over Hongbin in view of JP598 and Whittemore

Claims 3, 5, 7, 8, and 13-15 recite additional well-known structures for atomizing and vaporizing liquids. To the extent they are not disclosed in Hongbin, Whittemore discloses these additional common structural aspects. Ex.1008, ¶89.

1. Claim 3:

- a. an atomizer in the housing electrically connected to the control circuit and a liquid storage container in the housing adjacent to the atomizer**

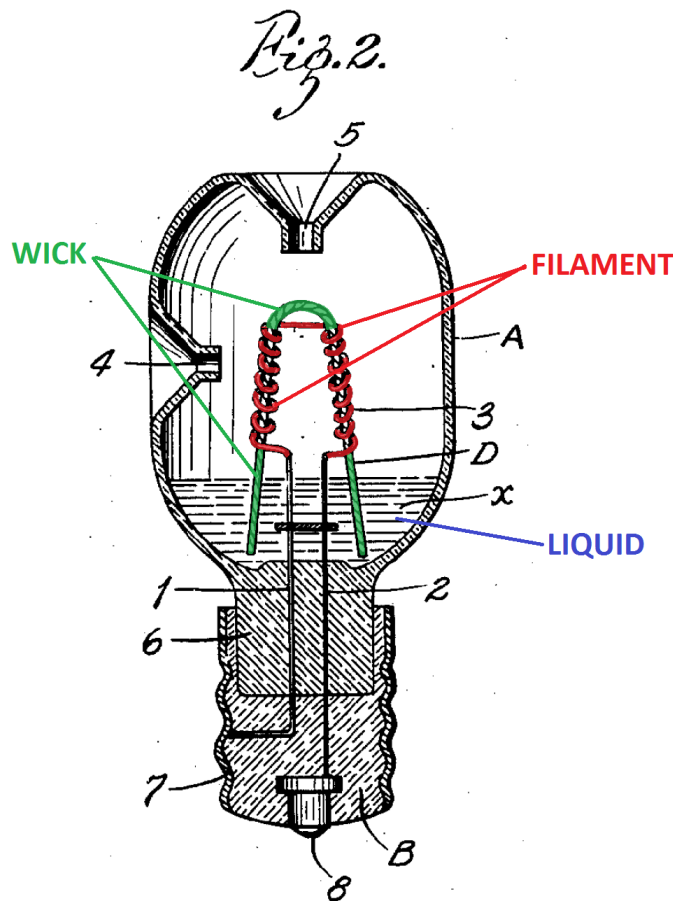
Hongbin discloses an atomizer (including an electronic heater 15) in the housing (outer casing 9) that is electrically connected to the control circuit. Ex.1003, p.3:20-22; Ex.1008, ¶90. In particular, one electrode of the heater is connected to the battery, while the other electrode is connected to the power contactor 4. *Id.*

As discussed in section VIII.A, *supra*, the liquid in Hongbin is located in the evaporation chamber 2 and a PHOSITA would have understood that the liquid is stored in a container. Ex.1003, p.3:10-11; Ex.1008, ¶¶43-45, 76, and 90. Since the liquid container and the electronic heater 15 are both located in the evaporation chamber, they are adjacent to each other. *Id.* In this manner, the electronic heater 15 heats the smoking material to vaporize the smoking liquid contained therein. Ex.1003, p.3:20-21; Ex.1008, ¶¶43-45, 76, and 90.

Hongbin discloses that, in this arrangement, the heater 15 consumes much electricity. Ex.1003, p.3:22-23. Hongbin provides an external power supply 14 as a backup to the battery because of the high electricity usage. *Id.*; Ex.1008, ¶90.

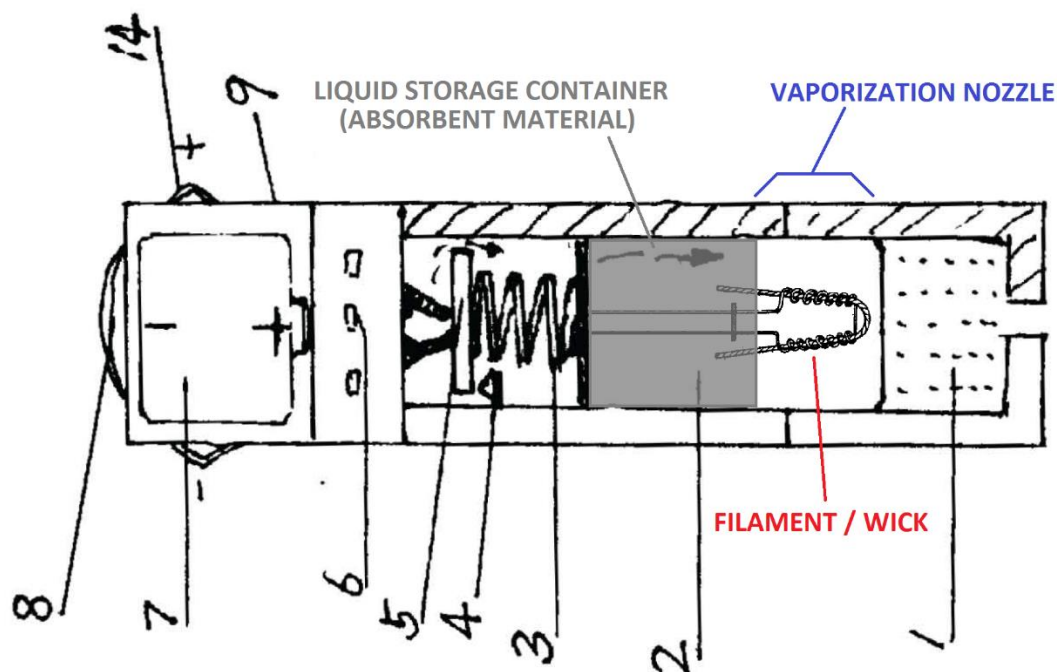
As Dr. Sturges explains, Hongbin's heater 15 uses a high amount of electricity because it must heat all or most of the absorbent material or liquid located in the smoking material evaporation chamber 2 in order to vaporize the liquid needed for a puff. Ex.1003, p.3:20; Ex.1008, ¶90. Such a configuration results in a power inefficiency as the heater 15 must heat a larger volume of liquid and smoking material than is ultimately required to generate a puff of vapor. *Id.* 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.* Whittemore discloses one such efficient vaporization arrangement using a wick/heating wire configuration that is more efficient than Hongbin's configuration because the filament 3 is spaced away from the larger volume of liquid. Ex.1006, p.1, col. 2:19-25; Ex.1008, ¶91.



Whittemore's wick carries the liquid from the liquid reservoir to the heating element via capillary action. Ex.1006, p 1, col. 1:54-2:8; Ex.1008, ¶91. 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. *Id.* 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.1008, ¶92. One possible example would be to place the wick into the liquid container's absorbent material as shown below:



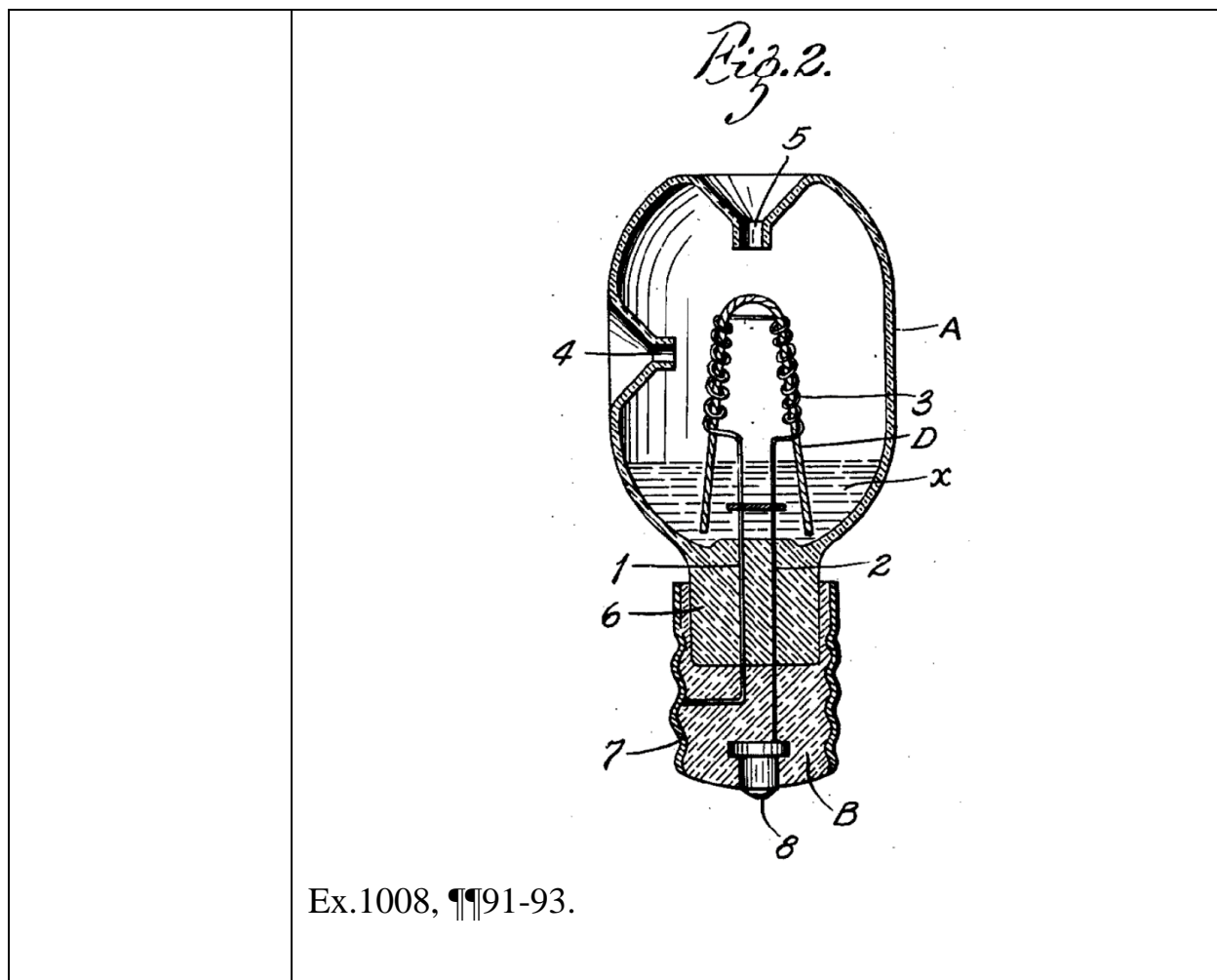
By adding the wick and heating coil outside of the liquid container, the wick/coil heater only needs to heat a small amount of liquid to form a vapor, and uses much less energy when compared to the electronic heater 15 disclosed in Hongbin. Ex.1008, ¶93. Specifically, the wick would be in contact with the absorbent material and would carry the liquid toward the filament to be vaporized. Ex.1006, p 1, col. 1:3-8; Ex.1008, ¶93. 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 more efficient heating. Ex.1008, ¶93. *See also* MPEP § 2143 (exemplary rationale I.(B)) Given Hongbin’s admitted heating inefficiency, applying Whittemore’s heating solution to Hongbin would have been tantamount to applying a known technique (heating wire and wick) to Hongbin’s known device, which was ready for heating improvement to achieve the predictable result of more efficient heating. Ex.1008, ¶93. *See also* MPEP § 2143 (exemplary rationale I.(D))

In the combined Hongbin-Whittemore configuration discussed above, the atomizer (filament) would be situated adjacent to the liquid storage container (absorbent material). Ex.1008, ¶94. As discussed with respect to claim 3.2 in section IX.A.3.b, *supra*, the 239 patent specification does not use or describe the term “adjacent to.” *Id.* Instead, the figures all show arrangements where the liquid storage container 13 is spaced from the atomizer (e.g., nozzle 17). Ex.1001, Figs. 1, 7, 8, and 9; Ex.1008, ¶¶77, 94. Thus, to the extent the 239 patent figures depict “adjacent” structures, the Hongbin-Whittemore combination includes the atomizer (filament) situated adjacent to the liquid storage container (absorbent material). *Id.*

Claim 3	
3. The electronic cigarette of claim 2 further including an	<p><u>Ex.1003, Hongbin:</u></p> <p>P.3:20-23: 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</p>

	<p>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.</p> <p>P.1, col. 2:19-25: 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.</p> <p>P.1, col. 1:54-2:8: 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.</p>
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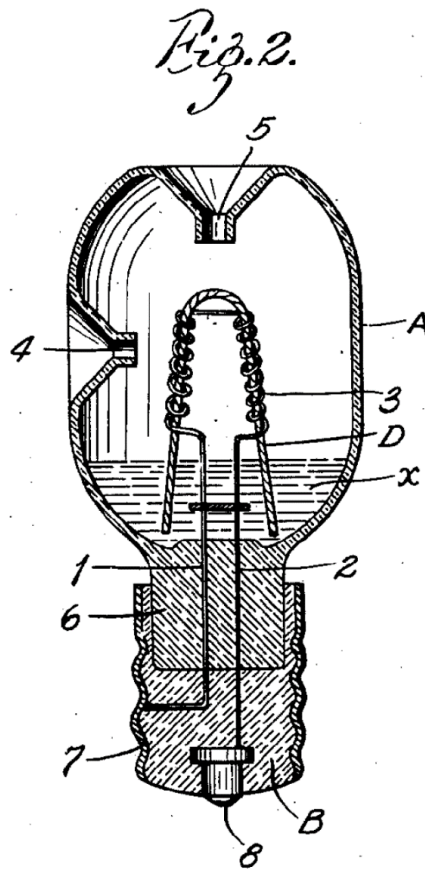
2. Claim 5:

a. the atomizer having a heating wire

Whittemore discloses that its filament can be a heating wire. Ex.1006, p.2, col. 2:34-35.

Claim 5	
5. The electronic cigarette of claim 3 with the atomizer having a heating wire.	<p><u>Ex.1006, Whittemore:</u></p> <p>P.2, col. 2:34-42: [E]lectrical 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.</p>

P.2, col. 2:18-27: [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.



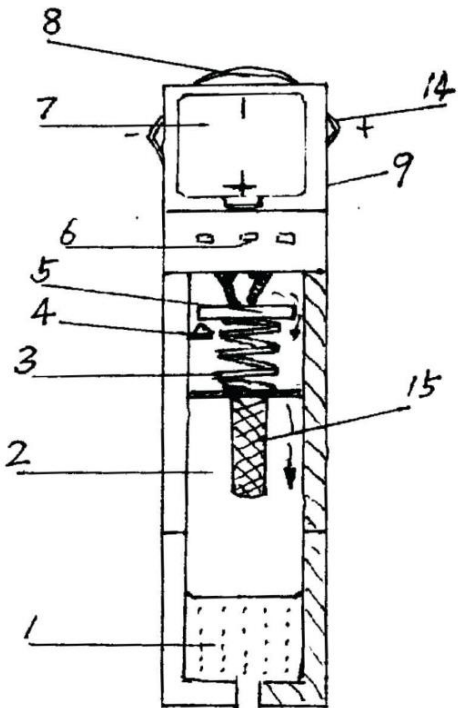
Ex.1008, ¶95.

3. Claim 7:

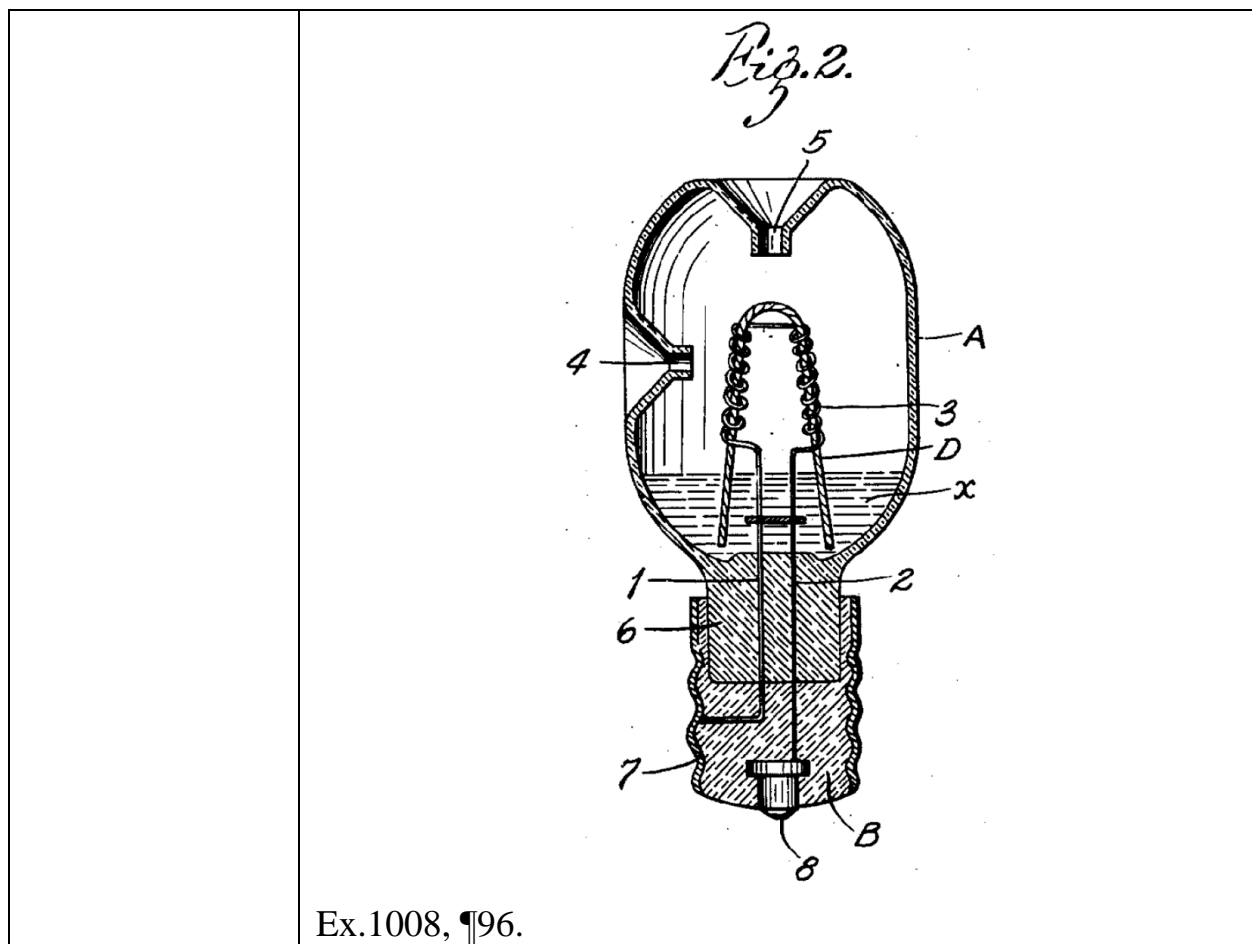
a. atomizer including a vaporization nozzle containing a heating wire

The Hongbin-Whittemore combination discussed in section IX.B.1.a, *supra*, has a vaporization nozzle containing a heating wire. Ex.1008, ¶96. The

evaporation chamber 2 where the heating wire is located is a tube where vaporization occurs, and out of which vaporized gas is provided for inhalation. *Id.* Whittemore discloses that its filament may be a heating wire. Ex.1006, p.2, col. 2:34-35. Thus, the vaporization nozzle (evaporation chamber 2) of the Hongbin-Whittemore combination contains a heating wire. Ex.1008, ¶96.

Claim 7	
<p>7. The electronic cigarette of claim 3 with the atomizer including a vaporization nozzle containing a heating wire.</p>	<p><u>Ex.1003, Hongbin:</u></p> <p>P.3:9-11: 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.</p> <p>FIG. 1:</p>  <p>Ex.1008, ¶96.</p>

	<p><u>Ex.1006, Whittemore:</u></p> <p>P.1, col. 2:19-25: 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.</p> <p>P.2, col. 2:34-42: [E]lectrical 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.</p> <p>P.2, col. 2:18-27: [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</p>
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4. Claim 8:

- a. a liquid passageway from the liquid storage container into the vaporization nozzle**

Whittemore discloses that its wick acts as a passageway that carries the liquid from a liquid reservoir to the heating element via capillary action. Ex.1006, p 1, col. 1:54-2:8; p.2, col. 1:14-16. The Hongbin-Whittemore combination discussed in section IX.B.1, *supra*, discloses that the wick carries liquid from the liquid storage container (absorbent material) toward the filament within the vaporization tube. Ex.1008, ¶97.

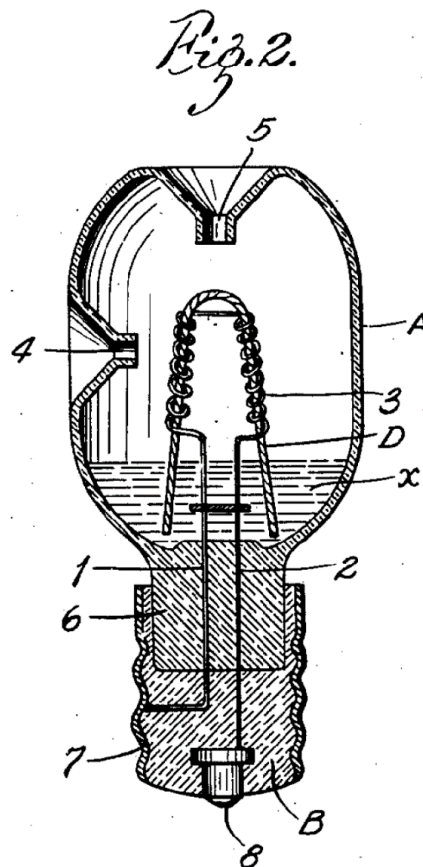
Claim 8

8. The electronic cigarette of claim 7 further including a liquid passageway from the liquid storage container into the vaporization nozzle.

Ex.1006, Whittemore:

P 1, col. 1:54-2:8: [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.

P.2, col. 2:14-16: a liquid reservoir, a heating filament and a wick extending from said reservoir to said filament.



Ex.1008, 97.

5. Claim 13:

a. 13.P: An electronic cigarette

As discussed with respect to claim 1.P in section IX.A.1.a, *supra*, Hongbin discloses an electronic cigarette. Ex.1008, ¶98.

b. 13.1: a housing

As discussed with respect to claim 1.1 in section IX.A.1.b, *supra*, Hongbin discloses a housing. Ex.1008, ¶98.

c. 13.2: a control circuit electrically connected to a battery, an airflow sensor, an atomizer and an LED, with the LED at a first end of the housing, configured such that the luminance of the LED changes based on an output of the airflow sensor

As discussed with respect to claim 13.2 in section IX.A.5.c, *supra*, Hongbin and JP598 disclose these aspects of claim 13. Ex.1008, ¶98.

d. 13.3: a liquid storage container adjacent to the atomizer

As discussed with respect to claim 3 in section IX.B.1.a, *supra*, Hongbin combined with Whittemore discloses this limitation. Ex.1008, ¶98.

6. Claim 14:

- a. the control circuit configured to control the luminance of the LED when the airflow sensor senses airflow, such that the LED simulates the appearance of a conventional burning cigarette tip**

As discussed with respect to claim 1.3 in section IX.A.1.d, *supra*, Hongbin combined with JP598 teaches a control circuit that controls a light to simulate the appearance of a conventional burning cigarette tip. Ex.1008, ¶¶83-84 and 98-99.

7. Claim 15:

- a. the housing having a first section attached to a second section and with the battery in the first section**

As discussed with respect to claim 9 in section IX.A.4.a, *supra*, Hongbin discloses a housing having a first section attached to a second section, with the first end of the housing on the first section, and with the battery in the first section. Ex.1008, ¶¶78, 100.

C. GROUND 3: Claims 3, 5, 7, 8, and 13-15 are obvious under 35 U.S.C. § 103 over Hongbin in view of JP598 and Takeuchi

Claims 3, 5, 7, 8, and 13-15 recite additional well-known structures for atomizing and vaporizing liquids. To the extent they are not disclosed in Hongbin as set forth above, Takeuchi discloses these additional common structural aspects. Ex.1008, ¶102.

1. Claim 3:

- a. an atomizer in the housing electrically connected to the control circuit and a liquid storage container in the housing adjacent to the atomizer**

Takeuchi discloses a liquid storage container 32 that is adjacent to an atomizer in FIGS. 1 and 8. FIG. 1 shows the storage container 32 below the atomizer (outlet port 36b including heater 42), while FIG. 8 shows the storage container 32 to the left of the atomizer (outlet portion of liquid passageway 371 including heaters 421, 422).

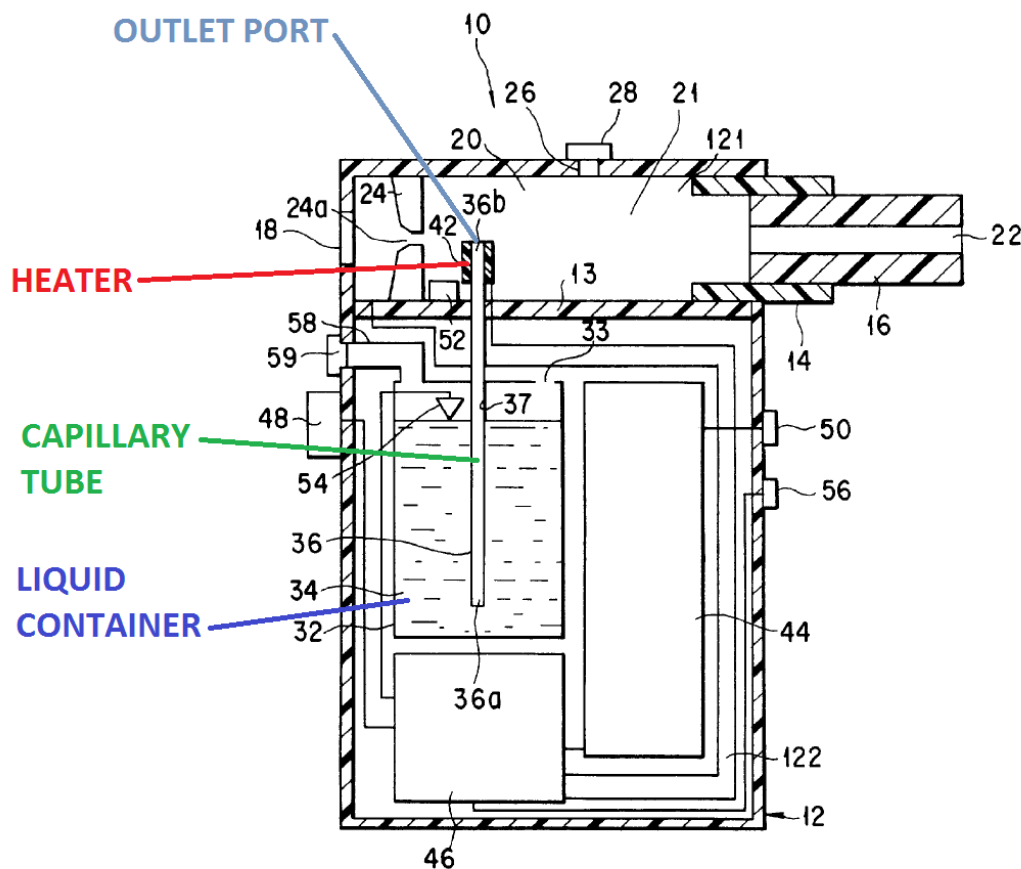


FIG. 1

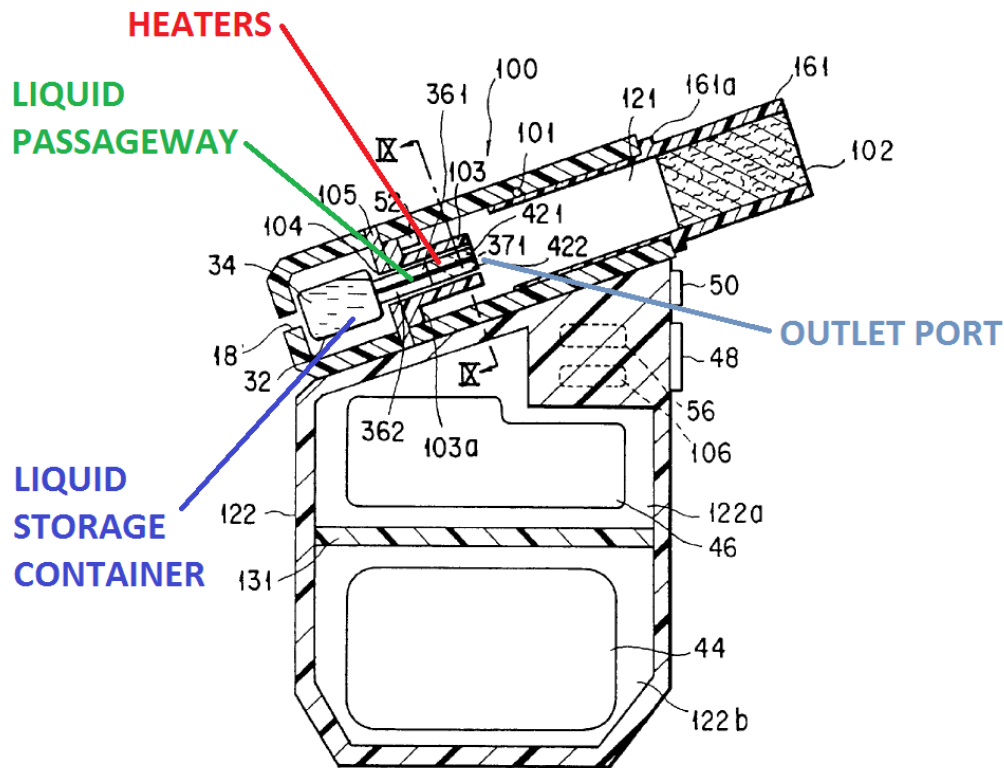


FIG. 8

As discussed with respect to claim 3.2 in section IX.A.3.b, *supra*, the 239 patent specification does not use or describe the term “adjacent to.” Ex.1008, ¶77. Instead, the figures all show arrangements where the liquid storage container 13 is spaced from the atomizer (e.g., nozzle 17). *Id.*, See Ex.1001, Figs. 1, 7, 8, and 9. Thus, to the extent the 239 patent figures depict “adjacent” structures, the Hongbin-Takeuchi combination includes the atomizer (including the heater 42 or 421/422) situated adjacent to the liquid storage container 32. Ex.1008, ¶¶105, 107.

As explained with respect to claim 3 in section IX.B.1.a, *supra*, Hongbin discloses that its heater 15 consumes much electricity and in order to improve the power efficiency of Hongbin, for example, to increase the life of the battery 7 and

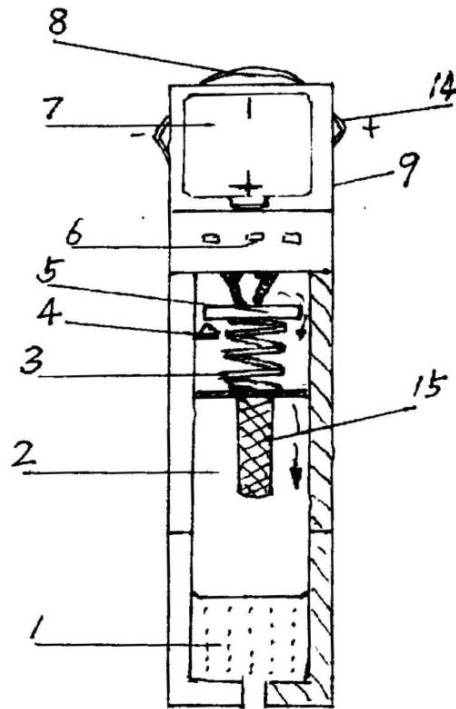
eliminate or reduce the need for backup external power supply 14, a PHOSITA would have looked to other references utilizing more efficient means to vaporize the liquid. Ex.1008, ¶¶90, 103.

As Dr. Sturges explains, a PHOSITA would have recognized that Takeuchi's liquid storage container and heater are power efficient because, like Whittemore, only the liquid that needs to be vaporized is heated. Ex.1008, ¶¶105-106. Specifically, in Takeuchi, the liquid container 32 is spaced away from the heater 42, and only the liquid reaching the heater 42 via the capillary tube 36 is heated to a vapor. *Id.* Limiting the amount of liquid that needs to be heated results in an efficient heating system that would not require a backup for the battery like Hongbin. *Id.* In fact, Takeuchi explicitly discloses that "it is an object of the present invention to provide a flavor-generating device which can be driven with a low energy, which effectively prevents a flavor source from being wasted." Ex.1007, col. 1:58-62.

Accordingly, a PHOSITA would have been motivated to substitute Takeuchi's liquid container and atomizer for Hongbin's liquid container and atomizer to improve power efficiency. Ex.1008, ¶106. This is nothing more than the substitution of known elements to obtain the predictable result of improved heating efficiency, as well as applying a known technique to a known device ready

for improvement to yield the predicted result of better heating efficiency. *See* MPEP § 2143 (rationales I(B) and I(D)).

Claim 3	
<p>3. The electronic cigarette of claim 2 further including an atomizer in the housing electrically connected to the control circuit and a liquid storage container in the housing adjacent to the atomizer.</p>	<p><u>Ex.1003, Hongbin:</u></p> <p>P.3:20-23: 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.</p> <p>P.3:9-11: 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.</p> <p>FIG. 1:</p>



Ex.1007, Takeuchi:

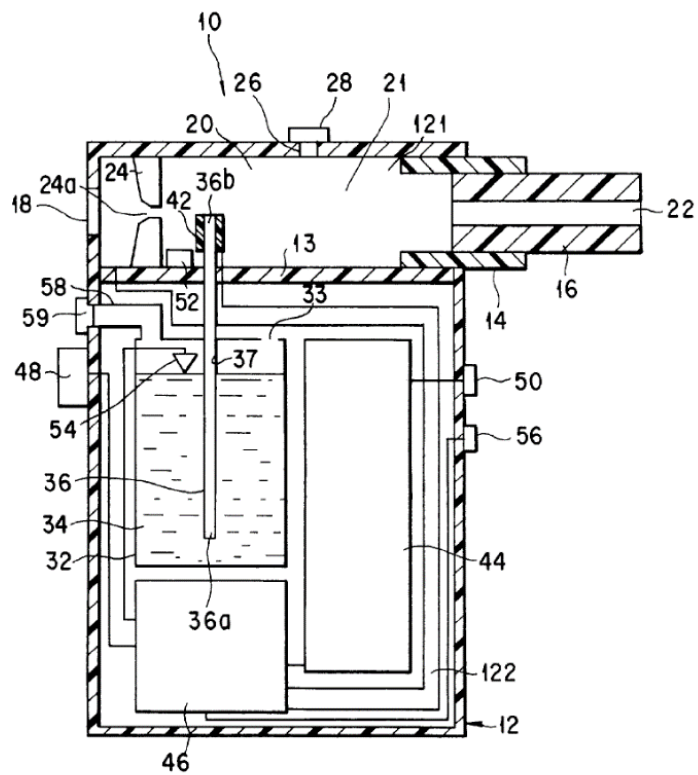


FIG. 1

Col. 5:28-30: [T]he liquid container 32 housing a liquid flavor source 34 is fixed within the lower chamber 122 of the casing 12.

Col. 6:4-7: The upper end portion of the capillary tube 36 protrudes into the upper chamber 121 of the casing 12 somewhat downstream of the squeeze plate 24 and is equipped with the heater 42 serving to gasify the liquid flavor source 34.

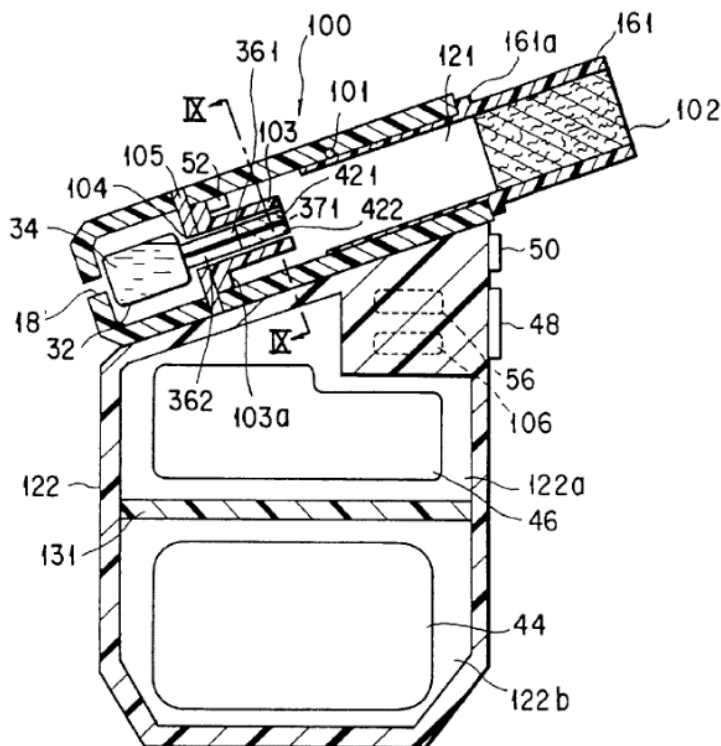


FIG. 8

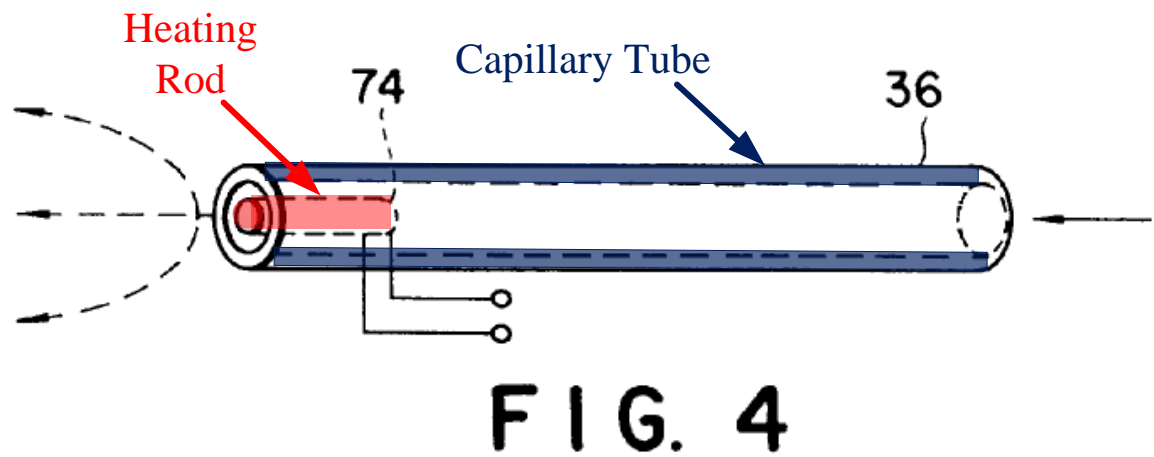
Col. 9:26-34: A liquid passageway 371 for the liquid flavor source is provided in fluid communication with the liquid flavor source 34 in the container 32. In the device shown in FIG. 8, the liquid passageway 371 is defined between two substantially parallel plates spaced apart from each other. The distal end portion (the outlet portion of the liquid flavor

	<p>source) of the liquid passageway 371 is heated by plate-like heaters 421 and 422 mounted to the plate 361 and 362, respectively.</p> <p>Ex.1008, ¶¶103-106.</p>
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2. Claims 5:

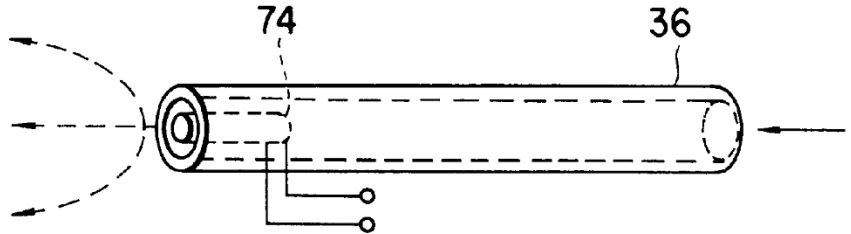
a. atomizer having a heating wire

Dependent claim 5 recites that the atomizer has a heating wire. Takeuchi discloses a rod-like heater inserted in a capillary tube. Ex.1007, col. 8:22-23.



A PHOSITA would understand that the rod-like heater is a wire. Ex.1008, ¶¶108-109. Even the dictionary definition for wire includes “a slender rod.” Ex.1024 (Merriam-Webster’s Collegiate Dictionary, 10th ed. 2002); Ex.1008, ¶109. Accordingly, Takeuchi discloses an atomizer having a heating wire. *Id.*

Claim 5	
5. The electronic cigarette of claim 3 with the	<p><u>Ex.1007, Takeuchi:</u></p> <p>Col. 6:4-7: The upper end portion of the capillary tube 36 protrudes into the upper chamber 121 of the casing 12 somewhat downstream of the squeeze plate 24 and is equipped</p>

<p>atomizer having a heating wire.</p>	<p>with the heater 42 serving to gasify the liquid flavor source 34.</p> <p>Col. 8:22-23: In the modification shown in FIG. 4, a rod-like heater 74 is inserted into the outlet port 36[b] of the capillary tube 36.</p>  <p style="text-align: center;">FIG. 4</p> <p>Ex.1008, ¶¶108-109.</p>
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3. Claim 7:

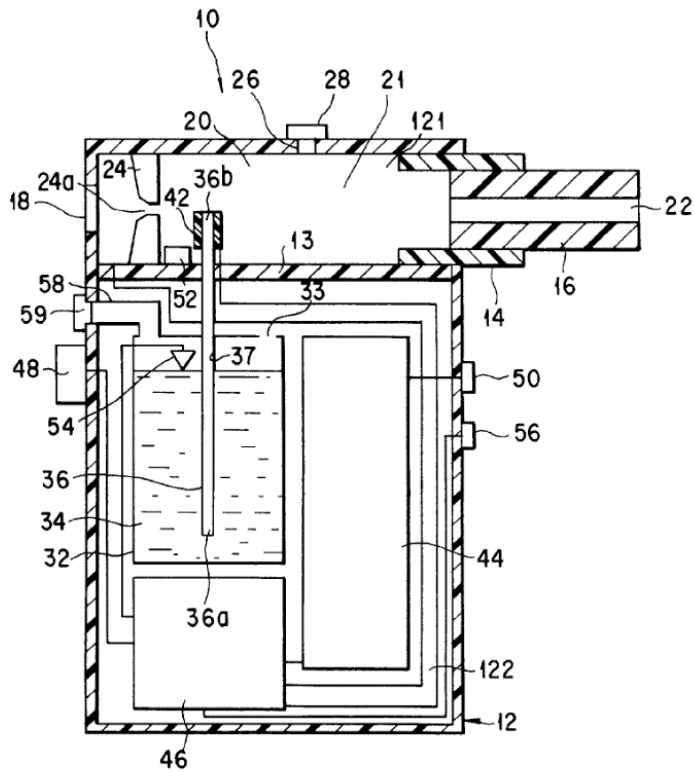
a. atomizer including a vaporization nozzle containing a heating wire

Takeuchi discloses a capillary tube 36 with an outlet portion 36b. Ex.1008, ¶110. Liquid flavor source 34 transported to the outlet portion 36b (or “outlet port”) via the capillary tube 36 is gasified (e.g., vaporized) by the heater 42 and provided to a gas passageway 20 to be inhaled. Ex.1007, col. 7:57-63; Ex.1008, ¶110. Accordingly, Takeuchi discloses a vaporization nozzle. Ex.1008, ¶110.

As discussed in section IX.C.2.a, *supra*, Takeuchi discloses a rod-like heater in a capillary tube that is a heater wire. Ex.1008, ¶¶108-110. Thus, Takeuchi

discloses a vaporization nozzle (output port 36b) containing a heating wire (rod-like heater 74). *Id.*

Claim 7	
<p>7. The electronic cigarette of claim 3 with the atomizer including a vaporization nozzle containing a heating wire.</p>	<p><u>Ex.1007, Takeuchi:</u></p> <p>[Vaporization nozzle]</p> <p>Col. 6:55-59: The control circuit 46 serves to start up the heater 42 based on the signal from the heater switch 48 or in accordance with the inhaling action of the user based on the signal from the sensor 52 so as to gasify the liquid flavor source 34 at the outlet portion 36b of the capillary tube 36.</p> <p>Col. 7:57-63: In this step, the liquid flavor source 34 is already transported to the outlet port 36a of the capillary tube 36 by the capillary force of the capillary tube 36 as shown in FIG. 2A. If the heater 42 is turned on under this condition, the liquid flavor source 34 within the outlet port 36a is instantly gasified by the heat generated from the heater 42 as shown in FIG. 2B so as to be supplied into the gas passageway 20. Upon gasification of the liquid flavor source 34 within the outlet port 36a by the heating with the heater 42, the liquid flavor source 34 is newly supplied from the liquid container 32 into the outlet port 36a of the capillary tube 36 by the</p>



Ex.1008, ¶110.

[Vaporization nozzle containing a heating wire]

(See discussion of claim 5 in section IX.C.2.a, *supra*, showing a rod-like heater 74 inserted within the outlet port 36b.)

Ex.1008, ¶¶108-110.

4. Claim 8:

- a. a liquid passageway from the liquid storage container into the vaporization nozzle**

Takeuchi discloses that the “capillary tube 36 defines a liquid passageway 37 for the liquid flavor source, and its lower end 36a is positioned in the vicinity of the bottom of the liquid container 32.” Ex.1007, col. 5:47-52. Takeuchi also

discloses that “the liquid flavor source 34 is newly supplied from the liquid container 32 into the outlet port 36a of the capillary tube 36 by the capillary force of the capillary tube 36.” Ex.1007, col. 7:65-8:1.

Claim 8	
<p>8. The electronic cigarette of claim 7 further including a liquid passageway from the liquid storage container into the vaporization nozzle.</p>	<p><u>Ex.1007, Takeuchi:</u></p> <p>Col. 5:47-52: The capillary tube 36 for transporting the liquid flavor source by the capillary force is inserted within the liquid container. The capillary tube 36 defines a liquid passageway 37 for the liquid flavor source, and its lower end 36a is positioned in the vicinity of the bottom of the liquid container 32.</p> <p>Col. 7:57-8:4: In this step, the liquid flavor source 34 is already transported to the outlet port 36a of the capillary tube 36 by the capillary force of the capillary tube 36 as shown in FIG. 2A. If the heater 42 is turned on under this condition, the liquid flavor source 34 within the outlet port 36a is instantly gasified by the heat generated from the heater 42 as shown in FIG. 2B so as to be supplied into the gas passageway 20. Upon gasification of the liquid flavor source 34 within the outlet port 36a by the heating with the heater 42, the liquid flavor source 34 is newly supplied from the liquid container 32 into the outlet port 36a of the capillary tube 36 by the capillary force of the capillary tube 36, as shown in FIG. 2C. In this fashion, supply and gasification of the liquid flavor source 34 are repeated within the outlet port 36a of the capillary tube 36.</p> <p>Col. 9:26-34: A liquid passageway 371 for the liquid flavor source is provided in fluid communication with the liquid flavor source 34 in the container 32. In the device shown in FIG. 8, the liquid passageway 371 is defined between two substantially parallel plates spaced apart from each other. The distal end portion (the outlet portion of the liquid flavor source) of the liquid passageway 371 is heated by plate-like heaters 421 and 422 mounted to the plate 361 and 362,</p>

respectively.

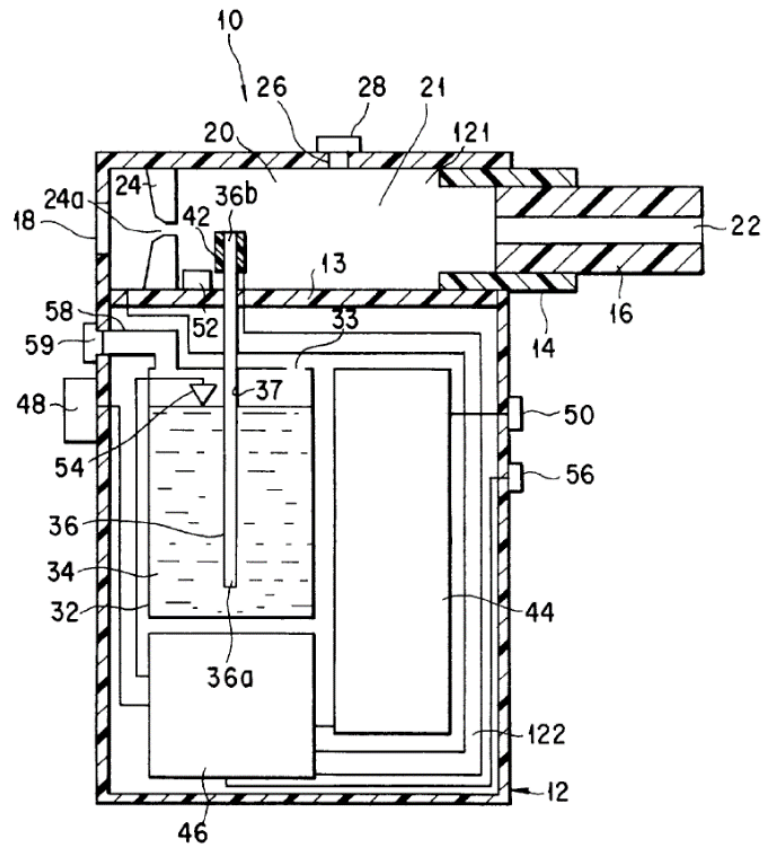


FIG. 1

Ex.1008, ¶111.

5. Claim 13:

a. 13.P: An electronic cigarette

As discussed with respect to claim 1.P in section IX.A.1.a, *supra*, Hongbin discloses an electronic cigarette. Ex.1008, ¶112

b. 13.1: a housing

As discussed with respect to claim 1.1 in section IX.A.1.b, *supra*, Hongbin discloses a housing. Ex.1008, ¶112.

- c. 13.2: a control circuit electrically connected to a battery, an airflow sensor, an atomizer and an LED, with the LED at a first end of the housing, configured such that the luminance of the LED changes based on an output of the airflow sensor**

As discussed with respect to claim 13.2 in section IX.A.5.c, *supra*, Hongbin and JP598 disclose these aspects. Ex.1008, ¶112.

- d. 13.3: a liquid storage container adjacent to the atomizer**

As discussed with respect to claim 3 in section IX.C.1.a, *supra*, Hongbin combined with Takeuchi discloses a liquid storage container 32 adjacent to an atomizer (e.g., outlet port 36b and heater 42). Ex.1008, ¶112.

6. Claim 14:

- a. the control circuit configured to control the luminance of the LED when the airflow sensor senses airflow, such that the LED simulates the appearance of a conventional burning cigarette tip**

As discussed with respect to claim 1.3 in section IX.A.1.d, *supra*, JP598 teaches a control circuit that controls a light to simulate the appearance of a conventional burning cigarette tip. Ex.1008, ¶¶83-84,112-113.

7. Claim 15:

- a. the housing having a first section attached to a second section and with the battery in the first section**

As discussed with respect to claim 9 in section IX.A.4.a, *supra*, Hongbin discloses a housing having a first section attached to a second section and with the

first end of the housing on the first section, and with the battery in the first section.

Ex.1008, ¶114.

X. CONCLUSION

For the foregoing reasons, there is a reasonable likelihood that Petitioners will prevail in its challenge of patentability for at least one of claims 1-3, 5, 7-9, 13-15, and 17-18 of the 239 patent. Petitioners request institution of an *inter partes* review to cancel the challenged claims.

Dated: April 3, 2017

Respectfully submitted,

/s/ Ralph J. Gabric

Ralph J. Gabric, Reg. No. 34,167

Lead counsel for Petitioner

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CERTIFICATE OF COMPLIANCE

The undersigned certifies that this brief complies with the type-volume limitations of 37 CFR § 42.24(a)(1)(i). This brief contains 13,955 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: April 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 April 3, 2017, a complete and entire copy of this Petition for *Inter Partes* Review, and all supporting exhibits, were served EXPRESS MAIL® to the Patent Owner by serving the correspondent of record, as indicated below:

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