

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

R.J. REYNOLDS VAPOR COMPANY
Petitioners

v.

FONTM HOLDINGS 1 B.V.
Patent Owner

Case IPR2017-01120
Patent No. 8,899,239

**PATENT OWNER PRELIMINARY RESPONSE TO PETITION FOR
INTER PARTES REVIEW OF U.S. PATENT NO. 8,899,239**

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Petitioner's Exhibits	
Exhibit	Description
Ex. 1001	U.S. Patent No. 8,899,239 (“the ’239 patent”)
Ex. 1002	Chinese Patent Application Publication No. CN1233436A (“Hongbin”)
Ex. 1003	Certified translation of Chinese Patent Application Publication No. CN1233436A (“Hongbin”)
Ex. 1004	Japanese Unexamined Patent Application Publication No. 2001-291598 (“JP598” or “JP98 publication”)
Ex. 1005	Certified translation of Japanese Unexamined Patent Application Publication No. 2001-291598 (“JP598” or “JP98 publication”)
Ex. 1006	U.S. Patent No. 2,057,353 (“Whittemore”)
Ex. 1007	U.S. Patent No. 6,155,268 (“Takeuchi”)
Ex. 1008	Declaration of Dr. Robert H. Sturges regarding U.S. Patent No. 8,899,239
Ex. 1009	IPR2016-01272, Petition for Inter Partes Review
Ex. 1010	IPR2016-01272, Decision Instituting Inter Partes Review (“Institution Decision”)
Ex. 1011	U.S. Patent No. 4,947,874 (“Brooks”)
Ex. 1012	Excerpt from Marks’ Standard Handbook for Mechanical Engineers (1978)
Ex. 1013	U.S. Patent No. 6,598,607 (“Adiga”)

Ex. 1014	U.S. Patent No. 4,793,365 (“Sensabaugh”)
Ex. 1015	U.S. Patent No. 5,203,355 (“Clearman”)
Ex. 1016	U.S. Patent No. 2,472,282 (“Burchett”)
Ex. 1017	U.S. Patent No. 2,032,695 (“Gimera”)
Ex. 1018	U.S. Patent No. 3,479,561 (“Janning”)
Ex. 1019	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).
Ex. 1020	Ex. 3 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)
Ex. 1021	Ex. 4 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)
Ex. 1022	Ex. 5 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)
Ex. 1023	Mosdesign Semiconductor Corp., Datasheet for M1600 LED Drivers
Ex. 1024	Excerpt from Merriam-Webster’s Collegiate Dictionary, 10th ed. (2002)
Ex. 1025	Excerpts from James W. Dally, Packaging of Electronic Systems: A Mechanical Engineering Approach (1990)
Ex. 1026	U.S. Patent No. 5,144,962 (“Counts”)
Ex. 1027	U.S. Patent No. 7,034,814 (“Gong”)
Ex. 1028	Declaration of James Donnelly

Patent Owner's Exhibits	
Exhibit	Description
Ex. 2001	Declaration of Richard Meyst
Ex. 2002	Electronics Tutorials, Waveform Generators: Electrical Waveforms, http://www.electronics-tutorials.ws/waveforms/waveforms.html (last visited Oct. 7 2016)
Ex. 2003	<i>R.J. Reynolds Vapor Company v. Fontem Holdings 1 B.V.</i> , IPR2016-01272, Ex. 2020, Deposition Transcript of Robert H. Sturges, Mar. 9, 2017
Ex. 2004	<i>NJOY, Inc. et al. v. Fontem Holdings 1 B.V.</i> , IPR2015-01304, Petition, Paper 1 (PTAB May 29, 2015)
Ex. 2005	<i>NJOY, Inc. et al. v. Fontem Holdings 1 B.V.</i> , IPR2015-01304, Decision Denying Institution, Paper 15 (PTAB Dec. 9, 2015)
Ex. 2006	<i>HTC Corp. v. NFC Tech, LLC</i> , IPR2015-00384, Paper 11, Decision Denying Institution (PTAB Jul. 6, 2015)
Ex. 2007	<i>HTC Corp. v. NFC Tech, LLC</i> , IPR2015-00384, Paper 15 Decision Denying Request for Rehearing (PTAB Aug. 20, 2015)
Ex. 2008	<i>Toyota Motor Corp. v. Cellport Sys., Inc.</i> , IPR2015-01423, Paper 7, Decision Denying Institution of Inter Partes Review (PTAB Oct. 28, 2015)
Ex. 2009	<i>R.J. Reynolds Vapor Company v. Fontem Holdings 1 B.V.</i> , IPR2016-01272, Ex. 1012, Declaration of Robert H. Sturges
Ex. 2010	<i>R.J. Reynolds Vapor Company v. Fontem Holdings 1 B.V.</i> , IPR2016-01272, Paper 11, Decision Granting Institution (PTAB Dec. 30, 2016)
Ex. 2011	<i>Akamai Techs, Inc. v. Limelight Networks, Inc.</i> , IPR2017-00358, Decision Denying Institution of Inter Partes Review (Paper 9), p. 8 (PTAB May 2, 2017)
Ex. 2012	<i>R.J. Reynolds Vapor Company v. Fontem Holdings 1 B.V.</i> , IPR2016-

	01268, Paper 2, Petition (PTAB Jul. 2, 2016)
Ex. 2013	<i>R.J. Reynolds Vapor Company v. Fontem Holdings I B.V.</i> , IPR2016-01270, Paper 2, Petition (PTAB Jul. 2, 2016)
Ex. 2014	Ohlemiller, T.J., “Smoldering Combustion,” in <i>SFPE Handbook of Fire Protection Engineering</i> , Chapter 11, Section 2, pp. 171-179 (2nd ed.)
Ex. 2015	Random House Webster’s Unabridged Dictionary (2d ed. 2001), selected pages
Ex. 2016	Merriam-Webster’s Collegiate Dictionary (11th ed. 2003), selected pages
Ex. 2017	U.S. Patent No. 3,500,126 (“Ford”)
Ex. 2018	<i>R.J. Reynolds Vapor Company v. Fontem Holdings I B.V.</i> , IPR2017-01319, Paper 2, Petition (PTAB May 3, 2017)
Ex. 2019	RESERVED
Ex. 2020	RESERVED
Ex. 2021	Davis, R.E., et al., Modern Chemistry (Student Edition), Ch. 12, (Holt, Rinehart and Winston 2002)
Ex. 2022	The Oxford American Dictionary and Thesaurus (2003), selected pages
Ex. 2023	<i>Fontem Ventures B.V. et al. v. NJOY Inc., et al.</i> , Tentative Ruling on Motions for Summary Judgment, Case No. CV14-1645-GW(MRWx) (C.D. Cal. Oct. 22, 2015) (Dkt. 357)
Ex. 2024	<i>R.J. Reynolds Vapor Company v. Fontem Holdings I B.V.</i> , IPR2016-01272, Deposition Transcript of Robert H. Sturges, Jul. 19, 2017 (Rough)
Ex. 2025	<i>NJOY, Inc. et al. v. Fontem Holdings I B.V.</i> , IPR2015-01302 Decision Denying Institution, Paper 15 (PTAB Dec. 9, 2015)
Ex. 2026	<i>Nu Mark LLC v. Fontem Holdings I B.V.</i> , IPR2015-01302, Petition, Paper 1 (PTAB Jun. 28, 2015)

Ex. 2027	<i>Nu Mark LLC v. Fontem Holdings 1 B.V.</i> , IPR2015-01288, Termination Dismissing Petitions, Paper 13 (PTAB Jan. 4, 2017)
Ex. 2028	Declaration of Colleen Kirchner

I. INTRODUCTION

Petitioner filed an IPR challenging U.S. Patent No. 8,899,239 (“the ’239 patent”) over a year ago that was granted as to claims 1, 2, and 9. Petitioner’s current challenge of those claims—and now for the first time claims 3, 5, 7-8, 13-15, and 17-18—should be denied under 35 U.S.C. § 325(d). Petitioner’s proposed combination of references are based on “the same or substantially the same prior art or arguments previously [] presented to the Office” and should have been presented in the earlier Petition. Petitioner offers no proper excuse for why it could not have asserted the current grounds in its earlier Petition.

The dispute in the previous challenge involved a proposed combination of two references, Janning and JP598. Here, Petitioner’s challenge is substantially the same prior art and arguments as the previous IPR, specifically a proposed combination Chinese Patent Application Publication No. CN1233436A (“Hongbin”) (Ex. 1002; certified translation at Ex. 1003) with JP598. But, Hongbin is deficient for at least the same reason as the previous reference Janning—both references lack a 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” as claimed.

Moreover, Petitioner was aware of all the references it now asserts when it filed the prior petition, and many of those references and combinations have already been considered by the board in prior petitions by filed by other Petitioners. Because Petitioner's proposed grounds include "the same or substantially the same prior art or arguments previously [] presented to the Office," Patent owner requests that the Board exercise its discretion and deny the Petition.

Not only are Petitioner's arguments procedurally defective, but they also fail on the merits. Regarding claims 1 and 17, none of the references, alone or in combination, disclose a "gradual change of luminance...to simulate a conventional cigarette." Petitioner and its expert admit that Hongbin does not disclose a "gradual change in luminance," and JP598 does not remedy that omission because it only relates to simulation of a flame, not a burning cigarette. For claim 13, Petitioner relies only on the combination of Hongbin and JP598 to supply the "output" limitation. But the purported sensors of Hongbin and JP598 do not generate any type of "output" to the LED to control its luminance. At best, the proposed combination discloses a simple circuit, where the plate (from Hongbin) and a switch (from JP598) merely act as a conductive material to provide current to flow to the LED from the battery.

In addition, several of the dependent claims are separately allowable over Petitioner's challenge for the reasons set forth below. For those reasons, Petitioner

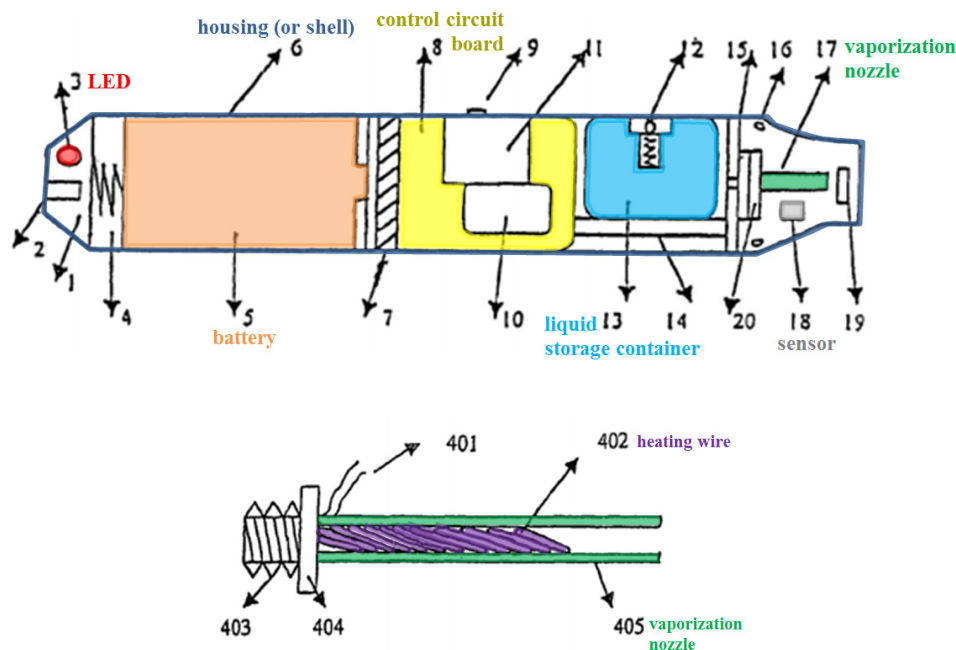
fails to establish a reasonable likelihood that any of the claims of the '239 patent are unpatentable.

II. BACKGROUND

A. The '239 Patent

The '239 patent discloses and claims an electronic cigarette that provides a user with a smoking experience that delivers nicotine without tar, while satisfying the habitual smoking actions of a smoker. Ex. 1001, Abstract, 1:19-20, 1:54-67.

An exemplary embodiment is shown in Figures 1 and 3 below (annotations added).



In this embodiment, the electronic cigarette includes a housing or shell 6 (dark blue), a sensor 18 (gray), and an atomizer including a heating wire 402

(purple) in a vaporization nozzle 17, 405 (green) that heats a nicotine solution¹ to convert the solution into an aerosol or vapor that is inhaled by the user. An LED 3 (red) at the front end of the housing is linked to a control circuit board 8 (yellow) connected to a battery or cell 5 (orange).

The '239 patent also describes an example of LED illumination. In response to airflow that is sensed by the sensor (18), the control circuit controls the LED to provide a gradual change of luminance to imitate the ignition and combustion process of a conventional cigarette. A specific example of how to create a gradual change in luminance for an LED is provided. The specification describes that “[a] red LED 3 blinks for each smoking action, and a sawtooth wave signal that lasts for 1.2 seconds is given by the control circuit for blinking signals, which provides a gradual change of luminance to imitate the ignition and combustion process of a conventional cigarette.” Ex. 1001 at 4:23–27.

B. A Person of Ordinary Skill in the Art

A person of skill in the art with respect to the '239 patent has a mechanical or electrical engineering degree, industrial design degree, or a similar technical degree or equivalent work experience, and 5–10 years of working in the area of electromechanical devices, including medical devices. Ex. 2001, ¶16. Petitioner

¹ In this embodiment, the nicotine solution is stored in a liquid storage container 13 (light blue).

states that a person of ordinary skill in the art at the time of the invention would 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.” Petition at 11-12, Ex. 1008, ¶32; Ex. 2001, ¶16. Any dispute between the parties is over the amount and type of required work experience. But, under either definition of a person of ordinary skill in the art, the analysis below remains the same. Ex. 2001, ¶16.

III. CLAIM CONSTRUCTION

A. “gradual change in luminance...to simulate a conventional cigarette”

Patent Owner’s Construction	Petitioners’ Construction
gradual escalating brightness upon inhalation followed by a gradual de-escalating brightness, similar to that of a conventional cigarette	no proposed construction

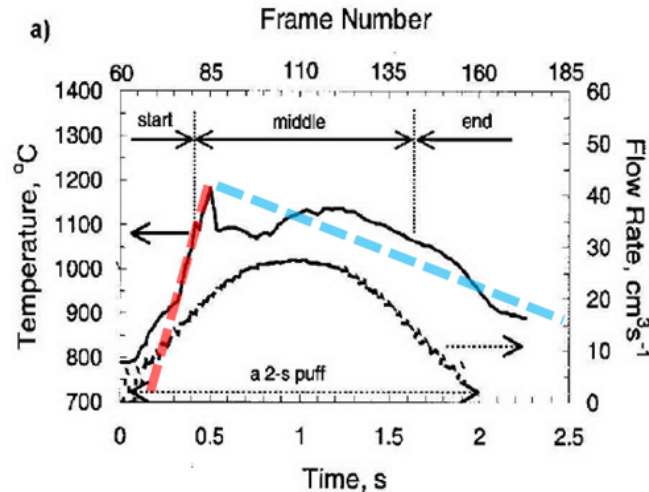
Patent Owner proposes that under the broadest reasonable interpretation, “gradual change in luminance...to simulate a conventional cigarette” means a “gradual escalating brightness upon inhalation followed by a gradual de-escalating

brightness, similar to that of a conventional cigarette.” Petitioner provides no construction.

The '239 patent specification supports that construction. Specifically, the '239 patent recites that “[a] red LED 3 blinks for each smoking action, and a sawtooth wave signal that lasts for 1.2 seconds is given by the control circuit for blinking signals, which provides a gradual change of luminance to imitate the ignition and combustion process of a conventional cigarette.” Ex. 1001 at 4:23–27; Ex. 2001, ¶19. A “sawtooth wave” is an asymmetric triangular waveform that has (i) a steep rise time that is shorter as compared to a corresponding slow decay time, or (ii) a slow rise time that is longer as compared to a steeper decay time. Ex. 2001, ¶20; Ex. 2002 at 6. One of ordinary skill in the art would understand that a “sawtooth wave signal” would produce both a gradual increase in luminance (or brightness) followed by a gradual decrease in luminance within the context of imitating the ignition and combustion process of a conventional cigarette. Ex. 2001, ¶20.

The luminance of a burning cigarette tip is correlated with its temperature during the course of a puff. *See, e.g.*, Ex. 1020 at 2 (“The visible part of the glowing coal is the hottest spot during the puffing.”). Ex. 2001, ¶21. Thus, a change in temperature at the tip of a burning cigarette also correlates with changes in luminance (or brightness) over the course of a puff. *Id.* Figure 5a from Ex.

2021, shown below (annotations added), shows the temperature—and therefore, brightness—over the course of one puff.



Ex. 2021, Figure 5a (annotated)

As shown in Figure 5a, the change in temperature at the start of inhalation is gradual, but rapid. Ex. 2001, ¶22. This is indicated by the slope of the dashed red line. Once the peak flow rate of inhalation is reached, the temperature gradually falls at a slower rate, indicated by the dashed blue line. Ex. 2001, ¶23. This gradual increase and decrease in temperature correlates with an escalating brightness upon a user’s inhalation that is followed by a de-escalating brightness as required in Patent Owner’s proposed construction. Ex. 2001, ¶24.

Petitioner previously filed IPR2016-01272 (“the ’1272 IPR”) challenging claims 1, 2, and 9 of the ’239 patent, which was instituted on December 30, 2016. In the ’1272 IPR, Patent Owner also requested that the Board construe the term “gradual change in luminance...to simulate a conventional cigarette.” At

deposition in the '1272 IPR, Petitioner's expert, Dr. Sturges—who has also submitted an expert Declaration in this case—admitted that he has a “high expectation” that the heat of a burning cigarette correlates with luminance:

Q. So you would have a high expectation that as a user puffs on a cigarette, as the tip of the cigarette gets hotter, the luminance would increase; is that correct?

[Dr. Sturges]. Yes.

Q. And then as the tip of the cigarette decreases in temperature, the luminance would decrease; is that correct?

[Dr. Sturges]. Yes. Yes, that's correct.

Ex. 2003 at 26:5-13. Dr. Sturges also admitted that the change in luminance over the course of a puff is gradual:

Q. What does gradual change in luminance mean in the '239 patent?

[Dr. Sturges]. I would say it refers to being not instantaneous.

Q. Okay. Anything else?

[Dr. Sturges]. No.

Q. So gradual just means not instantaneous?

[Dr. Sturges]. Right.

Q. Okay. So would a person of ordinary skill in the art applying that definition consider the change from the beginning of a puff to maximum brightness of a cigarette a gradual change in luminance?

[Dr. Sturges]. Yes.

Q. ·Would one skilled in the art consider the change from the peak brightness during a puff to the lowest brightness after the puff a gradual change in luminance?

[Dr. Sturges]. Yes, that's not instantaneous as far as I've seen.

Ex. 2003 at 28:18-29:10. Thus, Petitioner's expert's understanding of the claimed "gradual change in luminance" of a conventional cigarette supports Patent Owner's proposed construction.

For these reasons, Patent Owner requests that the Board construe a "gradual change in luminance...to simulate a conventional cigarette" to mean "an escalating brightness upon inhalation followed by a de-escalating brightness, similar to that of a conventional cigarette." Ex. 2001, ¶25.

B. "liquid storage container"

Patent Owner's Construction	Petitioners' Construction
vessel for storing liquid	no proposed construction

Claims 3, 8, and 13 recite the term "liquid storage container." The broadest reasonable interpretation of "liquid storage container" is a "vessel for storing liquid." Ex. 2001, ¶¶26. Petitioner provides no construction.

The claim language supports that "liquid storage container" means a "vessel for storing liquid." Claim 1 recites "a housing," and claim 3 recites "an atomizer" and "a liquid storage container in the housing adjacent to the atomizer." Claim 13

requires “a housing,” “an atomizer,” and “a liquid storage container adjacent to the atomizer.” In all instances of the claim term, “liquid storage container” is listed as a separate component from the “housing,” “atomizer,” and other elements. Additional claims require “a liquid passageway from the liquid storage container into the vaporization nozzle” (claim 8) and that the “liquid storage container” is “refillable via a refilling valve on the housing” (claims 6 and 16). Those limitation confirm that “liquid storage container” means a “vessel for storing liquid.” Ex. 2001, ¶27.

The specification further supports that “liquid storage container” means a “vessel for storing liquid.” The ’239 patent describes the “liquid storage container” as being “made of silicon rubber, alternatively, other polymers.” Ex. 1001, 2:41-45. And, the figures depict liquid storage containers that are separate, walled components within the housing for storing liquid. *See* Ex. 1001, Figs. 1 (item 13), 7 (item 113), 8 (item 213), and 9 (item 313). The specification further discloses that the “liquid storage container...protects against penetration of nicotine.” Ex. 1001, 2:41-45. In a tentative order in a previous district court litigation, the court determined that the term “liquid storage container” as used in the ’239 patent is not inclusive of absorbent materials because the ’239 patent (i) teaches away from using absorbent material, by disclosing containers made from materials that would prevent the penetration of nicotine, and (ii) does not disclose

storing liquid in an absorbent material (while later patent disclosures by the same inventor *did* disclose storing liquid in an absorbent material). Ex. 2023 at 19.

The extrinsic evidence further supports that “liquid storage container” means a “vessel for storing liquid.” A “container” is defined by “one that contains: as a : a receptacle (as a box or jar) for holding goods.” Ex. 2016 at 3. Further, a “vessel” is a “hollow or concave utensil, as a cup, bowl, pitcher or vase, used for holding liquids or other contents.” Ex. 2015 at 5. Moreover, Patent Owner’s expert also concludes that a “liquid storage container” is “a vessel for storing liquid.” Ex. 2001, ¶¶26-29.

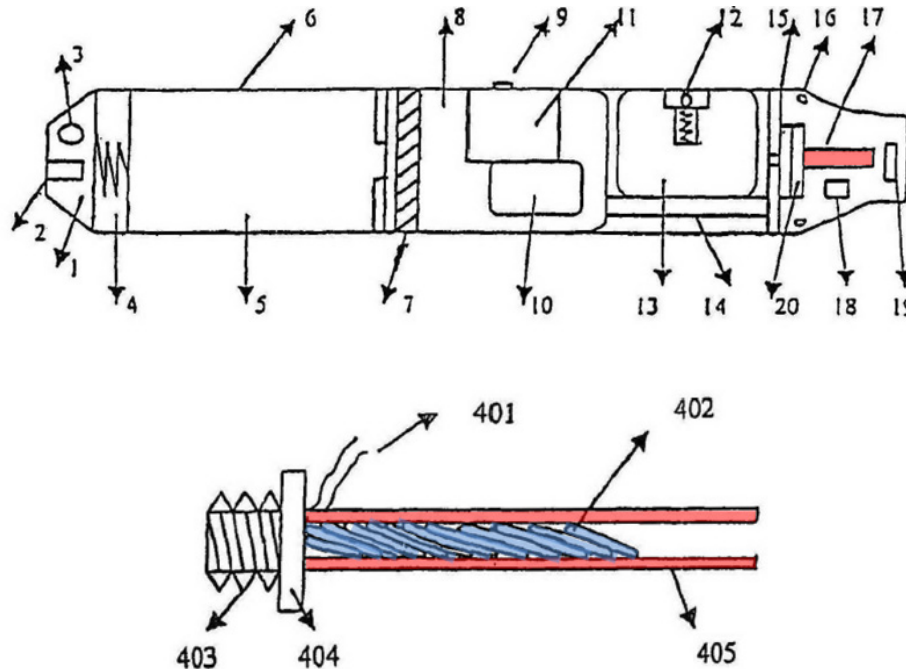
Petitioner’s contention that the container “could be a vessel or an absorbent material such as a fiber that retains the liquid” is unreasonably broad in view of the ’239 specification, claims, and extrinsic evidence. Petition at 17. Instead, given the limitations of “container” discussed above, under the broadest reasonable interpretation “liquid storage container” means “a vessel for storing liquid.”

C. “wire”

Patent Owner’s Construction	Petitioners’ Construction
a flexible metal thread or rod	no proposed construction

Dependent claims 5 and 7 of the ’239 patent require an atomizer that includes “a heating wire.” The ’239 specification discloses a vaporization nozzle

(red) shown in annotated Figures 1 (item 17, red) and 3 (item 405) reproduced below. Ex. 1001, 3:55-61; 5:16-17.



An electric heating element is provided within the vaporization nozzle, that “may be made of wires of nickel chromium alloy, iron chromium aluminum alloy, stainless steel, gold, platinum, tungsten molybdenum alloy, etc., and may be in the shape of straight line, single spiral, double spiral, cluster or spiral cluster.” Ex. 1001 at 3:16-22. The heating wires (item 402) illustrated in annotated Figure 3 above (blue) are consistent with the term’s ordinary definition. Ex. 2001, ¶31-32; Ex. 2016 at 5 (defining “wire” as “metal in the form of a usu[ally] very flexible thread or slender rod”); Ex. 2022 at 3 (defining “wire” as “a metal drawn out into the form of a thread or thin flexible rod”).

D. “electronic cigarette”

The term “electronic cigarette” is limiting at least in claim 17. When a limitation recited in the body of a claim relies upon and derives antecedent basis from the preamble of a claim, the preamble may be considered limiting. *Proveris Scientific Corp. v. Innovasystems, Inc.*, 739 F.3d 1367, 1372-73 (Fed. Cir. 2014). That is the case here. In contrast to claims 1 and 13, where “electronic cigarette” only appears in the preamble, the term “electronic cigarette” is recited both in the preamble and the body of claim 17. Specifically, the preamble of claim 17 recites “[a] method of using an electronic cigarette,” and the body of claim 17 includes, among other things, a step of “sensing airflow in a housing of the electronic cigarette via a sensor.” Thus, contrary to Petitioner’s assertion that the preamble in claims 17-18 is not a limitation, the term “electronic cigarette” of the preamble is limiting because it provides antecedent basis for the term in the body of claim 17. The Board has previously construed the term “electronic cigarette” to mean “a device for generating liquid droplets for inhalation by a user, where the device functions as a substitute for smoking, e.g., by providing nicotine without tar.” *See, e.g., Ex. 2025 at 9.*

IV. PETITIONER’S ARGUMENTS REGARDING THE COMBINATION OF HONGBIN AND JP598 ARE REDUNDANT OF THE PRIOR ’239 IPRS

Under 35 U.S.C. § 325(d), the Board has discretion to deny institution of an IPR where “the same or substantially the same prior art or arguments previously were presented to the office.” The Board should do so here.

A. The Prior ’239 IPRS

The ’239 patent has been involved in three other IPRs before the Board: (1) IPR2015-01304 (“the ’1304 IPR”) filed by NJOY, Inc. and several others; (2) IPR2016-01302 (“the ’1302 IPR”) filed by Nu Mark LLC; and the ’1272 IPR filed by current Petitioner, R.J. Reynolds Vapor Company (together, “the Prior ’239 IPRS”). Petitioner relies on cumulative references and presents substantially the same arguments that were previously presented to the Board in the Prior ’239 IPRS.

The Petitioners in the ’1304 IPR challenged the same claims at issue here and relied on the same primary reference—Hongbin. Ex. 2004 at 7. The Board denied institution of the ’1304 IPR because the cited art—including the primary reference Hongbin—“did not disclose controlling the light source such that it provides a gradual change in luminance” to simulate a conventional cigarette. Petition at 8-9; *NJOY, Inc. et al. v. Fontem Holdings I B.V.*, IPR2015-01304, Decision Denying Institution, Paper 15, p. 12-13 (PTAB Dec. 9, 2015) (Ex. 2005).

In the '1302 IPR, claims 1, 2, and 9 were also challenged based on Hongbin as a primary reference. Ex. 2026 at 13. The '1302 IPR was terminated before institution. *See* Ex. 2027 at 3, 5.

In the '1272 IPR, Petitioner challenged claims 1, 2, and 9, relying on a different primary reference, U.S. Patent No. 3,479,561 issued to Janning (“Janning”). Ex. 1009 at 22, 38. But, like Hongbin asserted here, Janning does not teach a device having a “gradual change in luminance...to simulate a conventional cigarette.” Ex. 1009 at 25; Ex. 2009, ¶¶60-61; Ex. 2010 at 12. Petitioner relied on the same secondary reference it does in this IPR, JP598, to meet that claim limitation. Ex. 1009 at 25. The Board instituted the '1272 IPR based on the combination of Janning and JP598. Ex. 2010 at 19.

B. Petitioner’s arguments are substantially the same as previously presented to the Board

Petitioner contends that Grounds 1-3 are not redundant because “the present petition addresses claims and claim limitations not yet considered, using combinations of reference[s] never considered.” Petition at 8-9. Petitioner’s contention is not correct in view of the Prior '239 IPRs. All of the Prior '239 IPRs boiled down to a dispute over a single limitation, namely a “light source configured to provide a gradual change in luminance...to simulate a conventional cigarette.” And, that limitation is absent from the two primary references used in

the Prior '239 IPRs, Hongbin and Janning. Thus, the difference between a combination of Janning in view of JP598 with a combination of Hongbin and JP598 is one without distinction. Both combinations center on the same argument: the primary reference lacks a “light source configured to provide a gradual change in luminance...to simulate a conventional cigarette” and the secondary reference allegedly meets that missing limitation.

The Board has denied a petition for the same reason. For example, in its decision denying institution of IPR2015-01423, the Board concluded that but for substituting a new reference for an old reference, the petitioner submitted “substantially the same” arguments as those in a prior IPR, which would waste the Board’s limited resources and imposes an undue burden on the Patent Owner. (Ex. 2008 at 7-8).

As such, the Board should deny institution of challenged claims based on the combination of Hongbin and JP598 that require a “light source configured to provide a gradual change in luminance...to simulate a conventional cigarette.” In particular, the Board should deny institution of claim 1 and dependent claims 2, 3, 5, and 7-9; and claim 17 and dependent claim 18 in Grounds 1-3, because those claims rely on “the same or substantially the same prior art or arguments previously were presented to the office.”

C. Petitioner should have raised the grounds regarding to previously challenged claims 1, 2, 9, and previously unchallenged claims 3, 5, 7-8, 13-15, and 17-18 in its earlier Petition

Petitioner limited its challenge in the '1272 IPR to claims 1, 2, and 9 of the '239 patent. Now, Petitioner seeks institution of those claims and additional claims 3, 5, 7-8, 13-15, and 17-18.

Petitioner offers no credible reason why its previous petition did not include the grounds asserted here regarding claims 1, 2, and 9, or why Petitioner could not have challenged claims 3, 5, 7-8, 13-15, and 17-18 in the prior '1272 IPR using references known to Petitioner at the time of filing. The Board denied institution based on this very issue in IPR2015-00384, and should do so here as well. *See HTC Corp. v. NFC Tech, LLC*, IPR2015-00384, Decision Denying Institution of *Inter Partes* Review (Paper 11) at 10 (Ex. 2006); *HTC Corp. v. NFC Tech, LLC*, IPR2015-00384, Decision Denying Request for Rehearing (Paper 15) at 4-5 (Ex. 2007).

Petitioner contends that the additional claims were not challenged in the '1272 IPR because Patent Owner had not asserted them at that time. Petition at 2. But, as the Board noted in IPR2015-00384, Patent Owner's decision to assert certain claims against Petitioner in a complaint for infringement "neither limited Petitioner to challenging only [those claims] nor prevented Petitioner from also challenging [additional claims], in its earlier Petition." Ex. 2007 at 7.

Petitioner's additional reliance on Whittemore and Takeuchi for the new claims is of no import, because knew about all the asserted references when it filed the previous Petition. Specifically, Petitioner knew about the Hongbin, JP598, Whittemore, and Takeuchi references at the time it filed the '1272 IPR. Hongbin was the primary reference relied upon by NJOY *et al.* in the failed '1304 IPR, to which Petitioner references in the "Introduction" and the "Related Matters" sections of the '1272 IPR. Ex. 1009 at 7, 11. Petitioner relied on JP598 in the '1272 IPR. Ex. 1009 at 12. Whittemore and Takeuchi were relied upon by Petitioner in IPRs related to the same patent portfolio that were filed on the same day as the '1272 IPR. Ex. 2012 at *e.g.*, 16; Ex. 2013 at *e.g.*, 22-23. The Petition should be denied for this reason alone.

D. Petitioner should be precluded from taking another bite at the apple at claims 1, 2, and 9

This is the fourth IPR to challenge the '239 patent based on the same primary references that lack a "light source configured to provide a gradual change in luminance...to simulate a conventional cigarette," and the second serial IPR filed by Petitioners that relies on same secondary reference (JP598) it contends meets the missing limitation.

Having the benefit of Patent Owner's arguments in the '1272 IPR, Petitioner attempts another bite at the apple by rearguing and bolstering the positions that it

previously made, under the guise that the combination of Hongbin and JP598 has never been considered. Indeed, Petitioner and its expert addresses several arguments made by Patent Owner in its Opposition to the '1272 IPR Petition, and repeatedly refers to the '1272 IPR, the applicability of Janning, and the Board's decision to institute the '1272 IPR to support its obviousness challenge to claims reciting a "gradual change in luminance...to simulate a conventional cigarette." Petition at 1, 2, 3, 12-13, 37-38; Ex. 1008, ¶¶8, 35, 36, 37, 52 (n.2), 63, 71.

Petitioner's serial attack on the '239 patent claims are a prime example of the Board's concern regarding the inequity that arises from allowing a Petitioner to file multiple attacks, adjusting along the way based on Patent Owner's contentions and the Board's decision responding to a prior challenge. *See Akamai Techs, Inc. v. Limelight Networks, Inc.*, IPR2017-00358, Decision Denying Institution of *Inter Partes* Review (Paper 9), p. 8 (PTAB May 2, 2017) (Ex. 2011). The Board should also deny institution of at least claims 1, 2, and 9 based on the following factors, identified by the Board as relevant to the inequity concern (Ex. 2011):

- The '1272 IPR challenged claims 1, 2, and 9, which have again been challenged in the present Petition.
- Petitioner knew of the prior art asserted in this Petition when it filed the earlier '1272 IPR. *See* Ex. 1009 at 1; Ex. 1009 at *e.g.*, 22; Ex. 2012 at *e.g.*, 16; Ex. 2013 at *e.g.*, 22.

- Petitioner had Patent Owner’s Preliminary Response, the Board’s Institution Decision, and Patent Owner’s subsequent Opposition to the ’1272 IPR when Petitioner filed the present Petition.
- Petitioner had ample time to take advantage of the materials from the ’1272 IPR when crafting its arguments in the present Petition, as evidenced by the fact that Petitioner and its expert specifically address the Board’s Institution Decision and Patent Owner’s Opposition to the ’1272 IPR. *See* Petition at *e.g.*, 1-3, 38; Ex. 1008, ¶¶ 8, 35 (n. 2).
- Petitioner has not provided an adequate reason why the Board should permit another attack on the same claims based on the same argument.

Each of the factors weigh in favor of denying institution—at least with respect to claims 1, 2, and 9. *See also HTC Corp. v. NFC Tech, LLC*, IPR2015-00384, Decision Denying Request for Rehearing (Paper 15) at 4-5 (Ex. 2007) (holding that Petitioner’s request to consider an identical challenge to a single claim that was instituted in an earlier IPR is “unquestionably an attempt to obtain a ‘second bite at the apple’”).

Additionally, claim 17 recites a “gradual change in luminance...to simulate a conventional cigarette,” which is the same limitation at issue with respect to claim 1. Petitioner does not provide an adequate reason why the combination of Hongbin and JP598 are different with respect to claim 17 as compare to claim 1,

thus the Board should also deny institution of claims 17 and 18 for the same reasons, set forth above with respect to claims 1, 2, and 9.

V. THE PETITION FAILS TO SHOW A REASONABLE LIKELIHOOD THAT ANY CLAIM OF THE '239 PATENT IS UNPATENTABLE

Petitioner proposes three grounds of unpatentability:

Ground 1. Petitioner asserts that claims 1-3, 9, 13-15, and 17-18 are obvious over Chinese Patent Application Publication No. CN1233436A (“Hongbin”) (Ex. 1002; certified translation at Ex. 1003) and Japanese Unexamined Patent Application Publication No. 2001-291598 (“JP598”) (Ex. 1004; certified translation at Ex. 1005);

Ground 2. Petitioner asserts that claims 3, 5, 7, 8, and 13-15 are obvious over Hongbin (Ex. 1003) in view of JP598 (Ex. 1005) and U.S. Patent No. 2,057,353 (“Whittemore”) (Ex. 1006);

Ground 3. Petitioner asserts that claims 3, 5, 7, 8, and 13-15 are obvious over Hongbin in view of JP598, and U.S. Patent No. 6,155,268 (“Takeuchi”) (Ex. 1007).

Petition at 7.

Because Petitioner fails to show a reasonable likelihood that claims 1-3, 5, 7-9, 13-15, and 17-18 of the '239 patent are unpatentable, the Board should deny *inter partes* review for all challenged claims.

A. Ground 1: Claims 1-3, 9, 13-15, and 17-18 are not obvious over Hongbin and JP598

Petitioner asserts that claims 1-3, 9, 13-15, and 17-18 are obvious over Hongbin and JP598. Petition at 7. For the reasons set forth below, the Board should deny institution of Ground 1.

1. The cited references

a. Hongbin

Hongbin discloses a liquid odor cigarette. As shown in Fig. 1 below, a gas suction control valve plate 5 and a spring 3 are set between the smoking material evaporation chamber 2 and an air intake vent 6. A power source battery 7 is connected to an indicator 8 and to the valve plate 5.

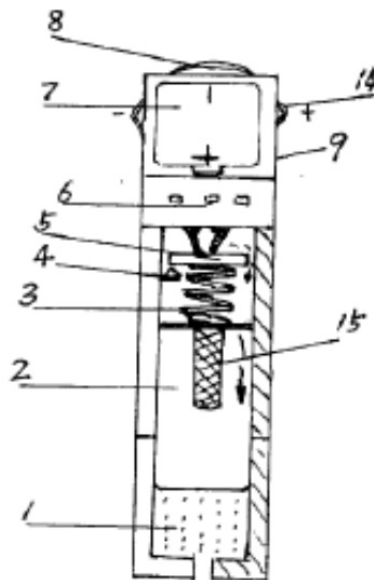


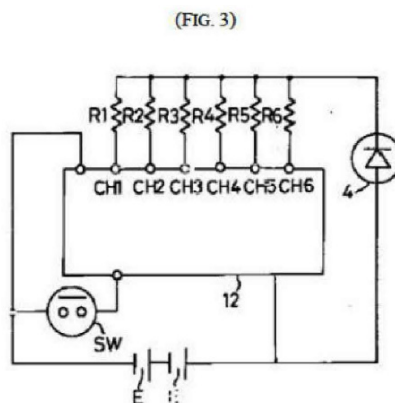
Figure 1

When a user sucks on the Hongbin device, the valve plate is pulled away from the gas inlet to contact the power source contactor for conduction, and the indicator 8 gives out light. Ex. 1006 at 2. Consequently, the indicator 8 is either on (*i.e.*, directly connected to the power source cell 7 when the cigarette is smoked) or it is off. Switching the indicator 8 on and off is achieved mechanically, via movement of the valve plate.

b. JP598

JP598 discloses electronic candles that can be used “as lighting in ceremonial locations such as on the altar of a temple or on a funerary arrangement,” or “as a light source for creating a soft atmosphere in a restaurant, party venue or the like.” Ex. 1005, ¶[0041]; Ex. 2001, ¶40.

The electronic candles have an artificial flame that flickers like a flame of an actual candle. Ex. 1005, ¶[(0037); Ex. 2001, ¶41. This is accomplished with a “light emitter illumination circuit,” shown in Figure 3 below.



The light emitter illumination circuit has output channels CH1 to CH6, resistance elements R1 to R6, and an integrated circuit 12. Ex. 1005, ¶[0032]; Ex. 2001, ¶41. Each resistance element has a resistance value corresponding to different luminous intensities of an LED 4. *Id.* The luminous intensity of the LED is cyclically altered such that the LED is illuminated with at least three different intensities during each cycle. Ex. 1005, ¶[0034]; Ex. 2001, ¶41. This results in a more realistic artificial flame. Ex. 1005, ¶[0037]; Ex. 2001, ¶41.

1. Claims 1-3, 9, 13-15, and 17-18 are not obvious in view of Hongbin and JP598

a. Claim 1

Claim 1 recites, in part:

1. An electronic cigarette, comprising:
a housing;

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.

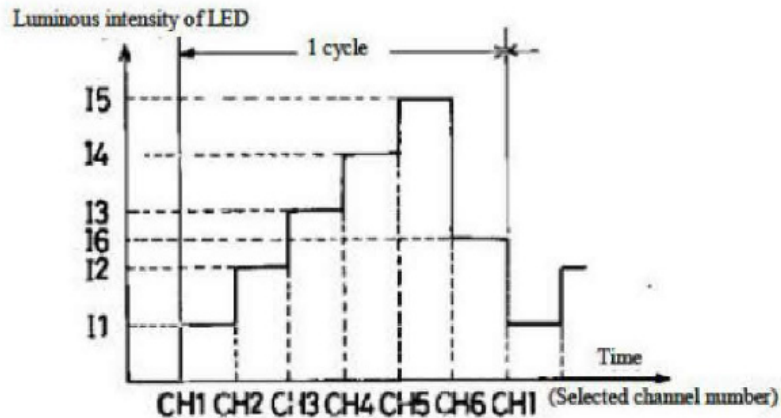
Claim 1 is not obvious over the combination of Hongbin and JP598 for at least the following reasons.

b. Hongbin and JP598 do not disclose “a gradual change in luminance...to simulate a conventional cigarette”

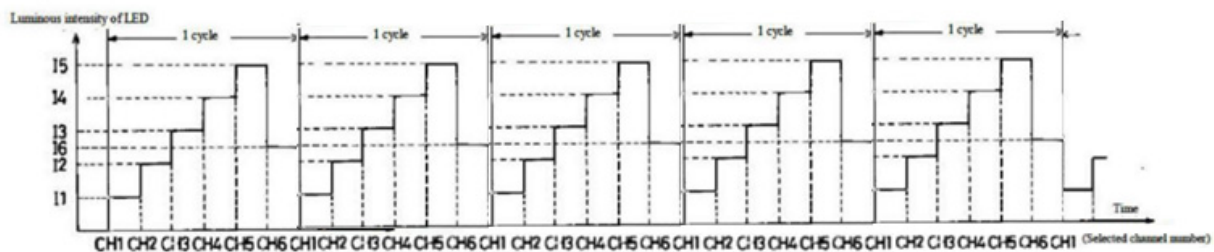
Hongbin does not teach a light source that is configured to provide “a gradual change in luminance...to simulate a conventional cigarette,” *i.e.*, “an escalating brightness upon inhalation followed by a de-escalating brightness, similar to that of a conventional cigarette.” As Petitioner and its expert admit, Hongbin does not disclose a gradual change in luminance, but instead discloses only a simple on/off system. Petition at 2; Ex. 1008, ¶66; Ex. 2001, ¶42.

JP598 does not remedy the deficiency of Hongbin. JP598 is directed solely to simulating a candle flame, disclosing an artificial candle having circuitry that produces an artificial candle flame that “flickers with a feeling far closer to the flame of an actual candle.” Ex. 1005, ¶(0008); Ex. 2001, ¶43. To produce the simulated flame, the circuitry of JP598 has an integrated circuit with a number of output channels, each output channel corresponding to a different luminous intensity that temporally changes over the course of a single cycle. Figure 6 of JP598 shows the luminous intensities (I1 to I6) for an exemplary circuit having six output channels (CH1 to CH6) for one cycle (Ex. 2001, ¶48):

(FIG. 6)



One skilled in the art would understand that one cycle would correspond to a single flicker that is isolated from the pattern of illumination that is produced by the simulated candle of JP598 when turned on. Ex. 2001, ¶49. Thus, when the simulated candle of JP598 is switched on, several cycles are required to produce the flickering effect of a real candle, resulting in several rapid peaks and valleys in brightness. Ex. 2001, ¶49. For example, a pattern of just five flickers using the circuit that produces the illumination pattern shown in Figure 6 of JP598 would look as follows (Ex. 2001, ¶49):



And, one skilled in the art would understand that to simulate a candle flame, the circuitry of a simulated candle should be designed to flicker at a rate between 3

and 30 cycles per second. *See, e.g.*, U.S. Patent No. 3,500,126 to M.T. Ford (“Ford”) at 1:45-46 (Ex. 2017) (“a candle flame tends to flicker at a frequency which randomly varies between 3 and 30 cycles per second”); Ex. 2001, ¶51. As such, one skilled in the art would also understand that the circuitry of JP598 would reasonably produce the five flicker pattern shown above within one second, *i.e.*, 5 cycles per second—a frequency on the low end of the known flicker rate of a candle. Ex. 2001, ¶51. In contrast, the “gradual change in luminance” of a conventional cigarette occurs over the course of 1-2 seconds, or perhaps longer, depending on the user’s actions. Ex. 2001, ¶51; Ex. 1001 at 4:23-27; Ex. 1021.

Consequently, Petitioner’s contention that the pattern shown in Figure 6 above amounts to a “a gradual change in luminance...to simulate a conventional cigarette” as recited in claim 1 is disingenuous. The changes in the illumination pattern of JP598 over the course of several flickers are not “gradual” in the context of a conventional cigarette and do not constitute “a gradual change in luminance...to simulate a conventional cigarette” as claimed. Ex. 2001, ¶49, 52. In other words, the operation of the simulated candle of JP598 does not produce a “gradual escalating brightness upon inhalation by a user followed by a gradual de-escalating brightness, similar to that of a conventional cigarette.”

c. One skilled in the art would not have looked to JP598 to provide an illumination pattern of a conventional cigarette

As discussed above, JP598 discloses an “illumination circuit” for an electric candle that produces an illumination pattern similar to an actual candle. Petition at 35; Ex. 1005, ¶¶(0005), (0006). In its decision to institute the ’1272 IPR, the Board stated that “in seeking to simulate the illumination of [a candle flame and a burning cigarette], the difference appears to [be] one without distinction.” Ex. 1010 at 15. Patent Owner disagrees with the Board’s assessment because the illumination of a candle flame and a burning cigarette are fundamentally different. Those fundamental differences between the illumination patterns of a flame and a burning cigarette would have driven one skilled in the art *away* from the disclosure of JP598 at the time of invention, not toward it. Ex. 2001, ¶52.

A burning candle produces an open flame that flickers, a phenomenon discussed at length in JP598. A flickering flame “move[s] irregularly or unsteadily” and “burn[s] or shine[s] fitfully, or with a fluctuating light.” Ex. 2016 at 4; *also see* Ex. 2015 at 3 (flicker means “to burn unsteadily; shine with a wavering light: *The candle flickered in the wind and went out.*”). As discussed above, the circuitry disclosed in JP598 would include configurations that allow for “various” and “complex changes” to reflect the fitful and irregular movement of a flame that would produce an illumination pattern “that is nearly irregular, rendering

it possible to produce illumination at an essentially irregular cycle” such that the illumination feels like that of an actual candle. Ex. 1005, ¶¶(0008)-(0009), (0013), (0037)-(0038); Ex. 2001, ¶50, 52.

The irregularity of a candle flicker would also suggest to one skilled in the art that the frequency of the flickering would vary—requiring the cycle length to vary. Petitioner’s expert, Dr. Sturges, agrees that the flicker frequency of a candle would vary, as demonstrated during deposition in the ’1272 IPR:

Q. So internal factors such as the wick itself and the fuel supply would cause a candle to flicker, correct?

[Dr. Sturges]. It could do that, yes.

Q. And would other factors such as ambient air and vibration also affect the flicker rate?

[Dr. Sturges]. The flicker rate -- is something different which would be because of ambient air and surrounding external factors would be unpredictable because you would expect the movement of the air to be random, turbulent, and, therefore, the flicker rate would vary.

Ex. 2024 at 10:9-21 (objection omitted). But Dr. Sturges, lacks knowledge as to how long a cycle is for a flicker, as demonstrated during deposition in the ’1272 IPR:

Q. What's a reasonable period of time?

[Dr. Sturges]. For a candle flicker?

Q. Yes.

[Dr. Sturges]. I haven't studied that. I'm using my subjective experience to make that form of statement, and the '598 patent is not specific with respect to how long a cycle is for a flicker.

Ex. 2003 at 77:14-22 (objection omitted). Sturges' failure to acknowledge the temporal scale of a flicker cycle like those shown in Figures 5 and 6 is telling, because it highlights the inadequacy of Dr. Sturges' rationale as to how and why one skilled in the art would look to the integrated circuit of JP598 to meet the claim limitation of a "gradual change in luminance...to simulate a conventional cigarette." Ex. 2001, ¶52. Dr. Sturges bases his entire opinion of why one skilled in the art would understand that Figures 5 and 6 would apply to an electronic cigarette based on the shape of the sawtooth luminance intensity pattern for a single cycle of the electronic candle's flicker—yet he cannot articulate how long that cycle is. Ex. 1008, ¶¶67-68; Ex. 2001, ¶52-53.

Unlike the flame of a candle, a conventional cigarette undergoes a *flameless* smoldering combustion process. Ex. 2014 at 1; Ex. 2001, ¶45. That smoldering combustion process gives rise to an illumination pattern that undergoes a gradual "escalating brightness upon inhalation by a user followed by a de-escalating brightness, similar to that of a conventional cigarette." Consequently, producing an illumination pattern of a candle—which is the sole purpose of the circuitry disclosed in JP598—is fundamentally different than that of a cigarette: a candle's

flame flickers rapidly and irregularly, while the embers of a burning cigarette glow and undergo a more elongated gradual change in brightness during a puff. Ex. 2001, ¶45-47.

Because of the fundamental differences in combustion and illumination patterns between a candle and a conventional cigarette, substituting JP598's circuitry into the Hongbin device would at best produce a device that flickers like a candle. Ex. 2001, ¶44. Further modification of the JP598 circuitry and motivation for that modification would be required to arrive at the claimed limitation of a "gradual change in luminance...to simulate a conventional cigarette." The record is devoid of any such motivation.

d. JP598 does not describe a "known technique" that can be used in the Hongbin device

While a claim may be found to be obvious where one skilled in the art would have recognized that a prior art reference contains a "known technique" that is applicable to and would improve upon a "base device" found in the prior art—that is not the case here. *See* MPEP § 2143(I)(D). According to the Petitioner, the illumination of Hongbin "liquid odor cigarette" (*i.e.*, the purported base device) could be improved to produce a gradual change in luminance that mimics a conventional cigarette using the circuitry of JP598. Yet, Petitioner fails to articulate any "known technique" applicable to simulating a conventional cigarette

that is purportedly disclosed by JP598. Outside of the embodiments disclosed in JP598 that produce a flickering effect, JP598 does not contain any specific techniques that could be employed to simulate the smoldering combustion of a conventional cigarette during a puff. Ex. 2001, ¶53.

Petitioner contends that the JP598 circuitry is capable of creating *any* illumination pattern—including the illumination pattern of a conventional cigarette because JP598 includes language, including:

[T]he change in luminous intensity is not limited to the roughly triangular wave shape to roughly sawtooth shape indicated in Figs. [5 and] 6 [], and any of various changes, including even more complex changes, can be used. Ex. 1005, ¶(0043).

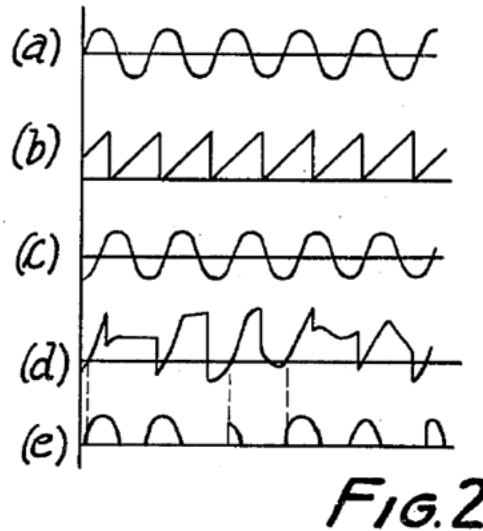
In the electronic candle in this invention, the form of change in the luminous intensity of the LED during one cycle as well as the size and shape of the artificial candle unit and artificial flame unit, type of IC, etc., are not limited to those set forth in this embodiment, and may be altered to any other suitable form on an as-needed basis. Ex. 1005, ¶(0047).

But in the context of the JP598 reference directed only at simulating candle flicker, one skilled in the art would have understood that the language above only relates to the various and complex changes in luminous intensity relative to simulating a flickering candle flame—not to *any* illumination pattern for *any* device. Ex. 2001, ¶43. Indeed, the circuit of JP598 can be configured to produce

an artificial flame that flickers with an illumination pattern “that is nearly irregular, rendering it possible to produce illumination at an essentially irregular cycle” such that the illumination feels like that of an actual candle. Ex. 1005, ¶¶(0008)-(0009), (0013), (0037)-(0038); Ex. 2001, ¶52.

But, the circuit that produces the illumination pattern shown in Fig. 6 produces a flicker pattern that is repetitive, that is, each cycle or flicker is identical over the course of time. Ex. 2001, ¶49. In order to produce an irregular illumination pattern that is closer to that of an actual candle, one skilled in the art would need to “alter the form of change in the luminous intensity of the LED during one cycle” to produce a “more complex” change. Ex. 2001, ¶52. That language is not indicative that such changes can and should be applied to other types of combustion. Ex. 2001, ¶52.

Other prior art also disclosed the need to alter a repetitive flickering cycle to make a simulated flame look irregular and more like a real flame. Ex. 2001, ¶51. For example, U.S. Patent No. 3,500,126 to M.T. Ford (“Ford”) discloses an apparatus that allows an incandescent lamp bulb that will flicker at a rate that randomly varies between 3 and 30 cycles per second so as to simulate a flickering flame. Ex. 2017 at 1:42-50; Ex. 2001, ¶51. Figure 2 of Ford (below) shows representative wave forms at certain points of the circuit disclosed in Ford.



Waveform (d) shown above is a “complex waveform” that contributes to producing a flicker effect that appears random in nature. As Ford further explains:

Although the lamp bulb is, to the casual observer, randomly flickering [based on the output shown in Figure 2], it can be shown that for fixed values of the electrical components, the flicker rate will be repetitive. For example, the flicker rate might repeat frequency patterns on a two or three minute cycle. To make the frequency pattern more complex, two or three oscillators of similar or different types may be connected in parallel to switching circuit 52 and each tuned to a slightly different frequency to drive the switching circuit. Ex. 2017 at 4:27-35.

Thus, one skilled in the art would understand that the concept of producing varied and complex waveforms in a simulated candle would contribute to generating a more realistic candle flicker. Ex. 2001, ¶52 Such complex

waveforms are not applicable to designing a “gradual change in luminance...to simulate a conventional cigarette.” *Id.*

Moreover, because Petitioner is unable to point to any disclosure of “a gradual change in luminance” that “simulate[s] a conventional cigarette” in Hongbin or JP598, illumination circuit from JP598 must be itself be modified to meet the claim limitation. Petitioner argues that one skilled in the art could have “determined how many outputs were desired, the appropriate timing, and calculated the appropriate circuit outputs to provide the known illumination pattern [of a conventional cigarette].” Petition at 39. Ignoring the lack of motivation to make the proposed changes, Petitioner never explains what the appropriate number or outputs or what the appropriate timing would be to generate a “gradual change in luminance...to simulate a conventional cigarette.” Ex. 2001, ¶53. That is because the modification would require a wholesale redesign of the JP598 circuit. *Id.* Indeed, JP598 discloses “integrated circuits,” which are designed and manufactured to implement a specific functionality, and require a complete redesign or new programming to change that functionality. *Id.* What that means is that one skilled in the art would need to redesign or reprogram the integrated circuit disclosed in JP598 to cover the claim limitation. *Id.* But Petitioner has never provided a concrete example of a circuit having the parameters to produce the claimed limitation—in this IPR or in the ’1272 IPR.

Petitioner's contention that one skilled in the art would have not only combined Hongbin and JP598, but would have further modified the integrated circuit of JP598 to provide a gradual change in luminance that simulates an conventional cigarette, pours hindsight on top of hindsight, using the claims as a roadmap. Whether the pattern for cigarettes was known at the time of the invention is not relevant. The question is not whether the actual illumination pattern of cigarette was known, but rather whether one skilled in the art would have looked to JP598 to produce the claimed invention. The answer here is no. The flicker of a candle flame is fundamentally different from "a gradual change in luminance...to simulate a conventional cigarette."

For the aforementioned reasons, one skilled in the art would not have understood that the circuit disclosed in JP598 amounts to a "known technique" that could be used to obtain any desired illumination pattern for any device, including that of a conventional cigarette.

e. There is no "common problem" between Hongbin and JP598

Regardless of whether one skilled in the art could use the disclosure of JP598 to design a circuit that simulate the gradual change in luminance of a conventional cigarette, one skilled in the art would not have been motivated to combine Hongbin with JP598 to arrive at the claimed invention in the first place.

Indeed, for motivation to exist, there must be an “apparent reason” to combine Hongbin and JP598 in the fashion claimed” by the ’239 patent. *Purdue Pharma L.P., v. Depomed*, 643 Fed. Appx. 960, 965; *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007). For the following reasons, no such motivation exists.

Petitioner and its expert contend that one skilled in the art would have reason to combine Hongbin and JP598 because both references are allegedly directed to “the common problem of simulating combustion as closely as possible using an electric light regardless of what type of combustion was being simulated.” Petition at 37-38; Ex. 1008, ¶70. But Hongbin is not directed to such a problem. Rather, the problem addressed by Hongbin relates to existing cigarettes and their “harm to the health of people and pollute the environment.” Ex. 1003 at 3:2. To solve this problem, Hongbin discloses “a smoking liquid which is free of any poison, harm, or environment pollution and benefits people’s health.” Ex. 1003 at 3:2-5. The only disclosure related to the purpose of the indicator light of Hongbin states that “the tip can give out light so that is more real and have more fun.” Ex. 1003 at 4:6-7. This language in no way suggests to one skilled in the art that Hongbin is concerned with simulating combustion *as closely as possible*.

Petitioner makes up that so-called “common problem” using the claims and the teaching of the ’239 patent as a road map for forcing together prior art disclosures based on conclusory rationales. Indeed, Dr. Sturges previously

admitted to using the '239 patent claims and specification to form his opinion as to the nature of the problem to be solved at deposition in the '1272 IPR:

Q. ·So then is it correct to say that you looked at the specification of the '239 patent in determining the nature of the problem to be solved?

[Dr. Sturges]. To get an idea of what the general area was, yes.

Q. ·And is it fair to say that you looked at the claims of the '239 patent to determine the nature of the problem to be solved?

[Dr. Sturges]. Yes, I was interested in the scope of the claims.

Ex. 2003 at 92:20–93:4. In other words, Sturges used the claims and teaching of the '239 patent as a roadmap for determining the nature of the problem to be solved. The law bars that approach. *Cheese Sys., Inc. v. Tetra Pak Cheese & Powder Sys., Inc.*, 725 F.3d 1341, 1352-53 (Fed. Cir. 2013).

f. Unexplained “design choices” are not sufficient to prove obviousness

Recognizing that JP598 does not provide an illumination that simulates the illumination pattern of a cigar or cigarette, Petitioner’s expert contends that “[s]electing the integrated circuit and calculating the appropriate resistor values to use in order to provide an illumination that simulates the known pattern of a cigarette would be a matter of design choice to a PHOSITA and easily accomplished in view of the sawtooth pattern already disclosed in JP598 and the known illumination pattern for cigarettes.” Ex. 1008, ¶68. But neither Petitioner nor its expert provides any evidence as to why such a “design choice” would be

implemented. The Board expressly criticized such conclusory arguments in *Qualcomm, Inc. v. Parkervision, Inc.* 2016 WL 1084247 at *9, IPR2015-01822, (PTAB March 8, 2016). In *Qualcomm*, the claims at issue related to methods and systems for frequency up-conversion of electromagnetic signals that require extraction of harmonic signal(s) as an output. *Qualcomm*, 2016 WL 1084247 at *1-2. Petitioner argued that to the extent one of its three references did not disclose “that its waveform C includes a desired harmonic” as required by the challenged claim, the choice to modify that reference to transmit a harmonic frequency instead of the fundamental frequency “is nothing more than a design choice.” *Id.* at *8-9. But, without explanation of *why* one skilled in the art would have made such a design choice, the Board found that Petitioner did not articulate a sufficient rationale to combine the teachings of the three cited references. *Id.* at *9.

Like *Qualcomm*, the Petitioner here does not provide any credible reason for why one skilled in the art would have made the “design choice” to select from an infinite number of integrated circuit designs not disclosed in JP598 to provide a gradual change in luminance to simulate a cigarette in lieu of simulating a flickering candle. Ex. 2001, ¶53.

2. Claim 2

Claim 2 recites “a battery in the housing electrically connected to the control circuit.” Because claim 2 depends from claim 1, the Board should deny the

Petition as to that claim for the same reasons discussed above with respect to claim

1.

3. Claim 3

Claim 3 recites “an atomizer in the housing electrically connected to the control circuit and a liquid storage container in the housing adjacent to the atomizer.” Claim 3 is not obvious over the combination of Hongbin and JP598 for at least the reasons set forth above with respect to Claim 1. Claim 3 is separately patentable in view of the combination of Hongbin and JP598 for the following reasons.

a. **Hongbin and JP598 do not disclose a “liquid storage container in the housing”**

Claim 3 requires “a liquid storage container *in* the housing” (emphasis added). As set forth above “liquid storage container” should be construed to mean a “vessel for storing liquid.” The proposed combination does not disclose that limitation. Ex. 2001, ¶55.

As shown in Figure 1 below (annotated), Hongbin discloses a casing 9—*i.e.*, the “housing”—that defines the space described as a smoking material evaporation chamber 2, in which the vaporizable liquid “is loaded.” Ex. 1003, 3:9-11; Ex. 2001, ¶55.

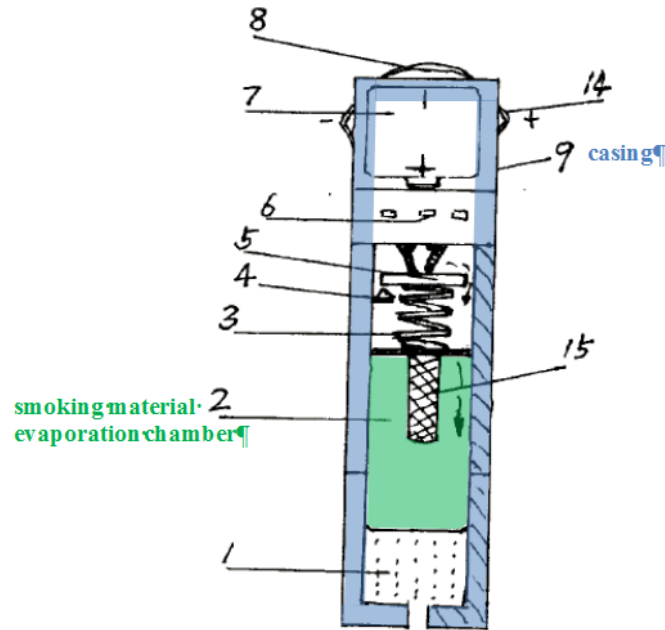


Figure 1

Hongbin teaches little about the liquid storage. All it says is that the cigarette liquid is loaded into the evaporation chamber—which is formed by the housing itself. Ex. 1003, 3:10-11; Ex, 2001, ¶55. Consequently, Hongbin does not teach the claimed liquid storage container, because the evaporation chamber is not a separate vessel for storing liquid *in* the housing as required by the claim. Ex 2001, ¶¶55-56.

Confronted with a disclosure lacking the necessary claim elements, Petitioner and its expert redesign the Hongbin device. Petitioner and its expert contend that one skilled in the art would have understood that the vaporizable liquid of Hongbin would be stored in a separate container such as a “vessel or an absorbent material such as a fiber” to hold the liquid in the evaporation chamber.

Petition at 16-17; Ex. 1008, ¶45. But, Hongbin makes no mention of a separate container to store the liquid. And Petitioner's contention that one skilled in the art would "prefer" to use some undisclosed absorbent material to hold the liquid, even if correct, would not fall within the meaning of the term "liquid storage container." Petition at 18; Ex. 1008, ¶45; Ex. 2001, ¶56. Petitioner does not explain how a separate vessel would work, nor does Petitioner give an example of a separate vessel that could be used in Hongbin's evaporation chamber. Thus, Petitioner's argument fails. Hongbin lacks a separate "liquid storage container," and JP598 does not disclose liquid or a liquid storage container either. Ex. 2001, ¶56-57.

4. Claim 9

Claim 9 recites a "housing having a first section attached to a second section and with the battery and the light source in the first section." Because claim 9 ultimately depends from claim 1, the Board should deny the Petition as to those claims for the same reasons discussed above with respect to claim 1.

5. Claim 13

Claim 13 recites:

13. An electronic cigarette, comprising:
a housing;
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; and
a liquid storage container adjacent to the atomizer.

Claim 13 is not obvious over Hongbin and JP598 for at least the following reasons.

a. Hongbin and JP598 do not disclose that “the luminance of the LED changes based on an output of the airflow sensor”

Petitioner and its expert rely solely on Hongbin to challenge the change in luminance limitation of claim 13, alleging that “the teachings of Hongbin (without modification to JP598) anticipate claim 13 for purposes of the change in luminance.” Petition at 53; Ex. 1008, ¶81. But, Hongbin does not disclose “a control circuit electrically connected to...an air flow sensor...such that the luminance of [an] LED changes based on an output of the airflow sensor.” Ex. 2001, ¶¶58-59. Petitioner wholly ignores the term “output” and fails to recognize that claim 13 requires that the luminance of the light source to change “based on an output of the airflow sensor,” and not of the circuit generally. Ex. 2001, ¶59.

Petitioner contends that the “valve plate” disclosed by Hongbin is the “airflow sensor” recited in the claims. *Id.* When a user sucks on the Hongbin device, the valve plate is “sucked away from air intake vents to connect the power contactor and the indicator gives out light.” Ex. 1003 at 3, lines 18-19.

Assuming, *arguendo*, that the valve plate acts as an airflow sensor in Hongbin, the limitation is still not met because the valve plate itself does not generate an output that changes the luminance of the indicator of Hongbin. Ex. 2001, ¶59. Random House Webster’s Dictionary defines “output” as “the current, voltage, power, or signal produced by an electrical or electronic circuit or device.” Ex. 2015 at 4. Since the claim requires that the luminance of the light source to be changed “based on an output of the airflow sensor” specifically, the valve plate must produce a current, voltage, power, or signal. But it does not. Ex. 2001, ¶59. While the valve plate may allow the output *of the battery* to be transmitted to the indicator and the heater, the valve plate does not itself produce current, voltage, power, or signal. Ex. 2001, ¶59. Petitioner’s expert confirms this to be the case, stating that “when the suction control valve plate 5 contacts the power contactor 4 (*i.e.*, when the cigarette is smoked), a circuit is completed, *allowing the battery 7 to supply electricity* to the electronic heater 15...and also causing the indicator 8 to illuminate.” Ex. 1008, ¶42 (emphasis added); Ex. 2001, ¶60.

JP598 does not remedy the deficiency of Hongbin. Recognizing that the change in luminance recited in claim 13 may be interpreted to require “gradual changes in lamination (or any change in illumination beyond on/off states),” Petitioner and its expert once again rely on JP598 to meet the claim limitation for the reasons stated above with respect to claim 1. Petition at 53; Ex. 1008, ¶¶67-73,

82. In that case, the Board should deny the Petition as redundant of the '1272 IPR for the reasons set forth above, and the combination of Hongbin and JP598 do not render claim 13 obvious for the same reasons discussed above with respect to claim 1.

Further, JP598 does not disclose an airflow sensor at all, much less an airflow sensor having an output that changes the luminance of an LED. Ex. 2001, ¶59. Instead, JP598 discloses a manual switch that, like the valve plate of Hongbin, merely allows the output of other devices to be transmitted to an LED. Consequently, Petitioner fails to establish that Hongbin and JP598, alone or in combination, discloses “a control circuit...configured such that the luminance of the LED changes based on an output of the airflow sensor.”

b. Hongbin and JP598 do not disclose a “liquid storage container”

Claim 13 lists several separate elements: (1) a housing, (2) a control circuit electrically connected to a battery, (3) an airflow sensor, (4) an atomizer, (5) an LED, and (6) a liquid storage container. The Federal Circuit acknowledges that “[w]here a claim lists elements separately, ‘the clear implication of the claim language’ is that those elements are ‘distinct component[s]’ of the patented invention.” *Becton, Dickinson and Co. v. Tyco Healthcare Group, LP*, 616 F.3d 1249, 1254 (Fed. Cir. 2010). In claim 13, the “liquid storage container” is not the

same structure as the “housing.” Thus, Hongbin cannot disclose a “liquid storage container” for the same reasons set forth above with respect to claim 3. Ex. 2001, ¶¶54-56.

JP598 does not remedy the deficiency of Hongbin, because JP598 does not disclose a liquid to be stored in any way. Ex. 2001, ¶57. Thus, because neither Hongbin, nor JP598 disclose “a liquid storage container,” claim 13 is patentable over Hongbin and JP598.

6. Claims 14 and 15

Claim 14 recites “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.”

Claim 15 recites “the 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.”

Because claims 14 and 15 both depend from claim 13, the Board should deny the Petition as to those claims for the same reasons discussed above with respect to claim 13.

7. Claim 17

Claim 17 recites, in part:

17. A method of using an electronic cigarette, comprising:

providing a sensed airflow signal from the sensor to an electronic controller in the housing;
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...

Similar to claim 1, claim 17 recites operated method for using an electronic cigarette that includes operating an electronic controller to “*gradually change a luminance of an LED at a first end of the housing to simulate a conventional burning cigarette tip.*” Thus, claim 17 is patentable over Hongbin and JP598 for the same reasons set forth above with respect to the “gradual change in luminance...to simulate a conventional cigarette” limitation of claim 1. Claim 17 is separately patentable in view of the combination of Hongbin and JP598 for the following reasons.

a. Hongbin and JP598 do not disclose “a sensed airflow signal from the sensor to an electronic controller in the housing”

Claim 17 requires a step of “providing a sensed airflow signal from the sensor to an electronic controller in the housing.” But as discussed above with respect to claim 13, the valve plate (*i.e.*, the purported “airflow sensor”) disclosed by Hongbin may allow the output *of the battery* to be transmitted to the components of the liquid odor cigarette, the valve plate does not itself produce

current, voltage, power, or signal. As such, Hongbin does not disclose “a sensed airflow signal *from the sensor* to an electronic controller in the housing” (emphasis added). Ex. 2001, ¶¶59-61.

Further, Petitioner provides no basis for its assertion that Hongbin discloses the “electronic controller” required by claim 17. Petitioner asserts that Hongbin discloses the “providing a sensed airflow signal from the sensor to an electronic controller in the housing.” limitation by virtue of its discussion of “claim 1.2-1.3 in section IX.A.1.c-d, *supra*.” Petition at 58; Sturges Decl., ¶¶85-86. But claim 1 only recites “control circuit,” while claim 17 recites the term “electronic controller.”

With no basis for support, Petitioner’s expert, Dr. Sturges, states that the term “electronic controller” does not impart any further or different limitations on claim 17 beyond those of the “control circuit” recited in claims 1 and 13. Ex. 1008, ¶86. Contrary to Dr. Sturges’ opinion, the terms “control circuit” and “electronic controller” are not synonymous. Ex. 2001, ¶62. As the Federal Circuit has acknowledged, the term “circuit” is defined as “the combination of a number of electrical devices and conductors that, when interconnected to form a conducting path, fulfill some desired function.” *Apex Inc. v. Raritan Computer, Inc.*, 325 F.3d 1364, 1373 (Fed. Cir. 2003). Modification of the term “circuit” with the term “control” indicates that there is some type of device that controls the

circuit to fulfill the desired function. Ex. 2001, ¶62. The electronic controller recited in claim 17 is a type of control device that could be used as part of a control circuit. *Id.*

While Petitioner's expert states that "Hongbin discloses that its power contactor 4 that is connected to and controls whether the 'electronic heater 15' is energized," and that "JP598 discloses a control circuit including an integrated circuit to control the illuminator" (Ex. 1008, ¶86), neither of these statements explains which component is the electronic controller. Ex. 2001, ¶63. As such, Petitioner does not meet its burden of showing a reasonable likelihood that Hongbin in combination with JP598 disclose an electronic controller. Ex. 2001, ¶¶62-63.

8. Claim 18

Claim 18 recites "operating the electronic controller to supply electric current from a battery to the vaporizer upon sensing airflow in the housing." Because claim 18 depends from claim 17, the Board should deny the Petition as to that claim for the same reasons discussed above with respect to claim 17.

B. Ground 2: Claims 3, 5, 7, 8, and 13-15 are not obvious over Hongbin, JP598, and Whittemore

Petitioner asserts that claims 3, 5, 7, 8, and 13-15 are obvious over the combination of Hongbin, JP598, and Whittemore. Petition at 7. Claims 3, 5, 7, 8, and 13-15 are not obvious for the following reasons.

1. The cited references

a. Hongbin

Hongbin is described above with respect to Ground 1.

b. JP598

JP598 is described above with respect to Ground 1.

c. Whittemore

Whittemore discloses a "vaporizing unit[]" for therapeutic apparatus." Ex. 1006 at 2, 1:1-2. This device, illustrated in Figs. 1 and 2 of Whittemore below, resembles a lightbulb attached to a flashlight body. In the embodiment of Figure 2, Whittemore discloses an "inverted V-shaped" wick D and heating element 3 inside glass vessel A, which holds liquid medicament *x*. *Id.*, 1:19-28, 2:8-18. In the embodiment of Figure 3, heating element 3^a is "a single vertically-disposed coil." *Id.*, 2:25-34.

Fig. 1.

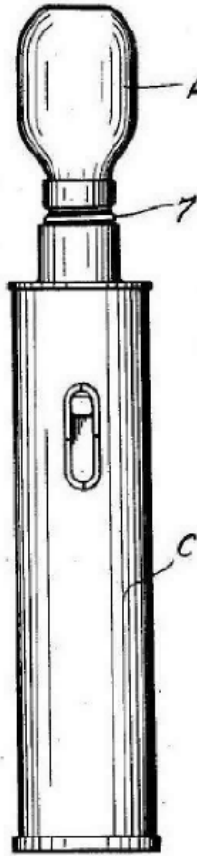


Fig. 2.

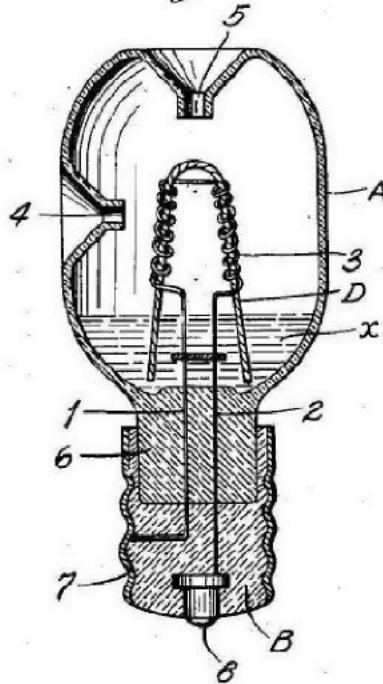
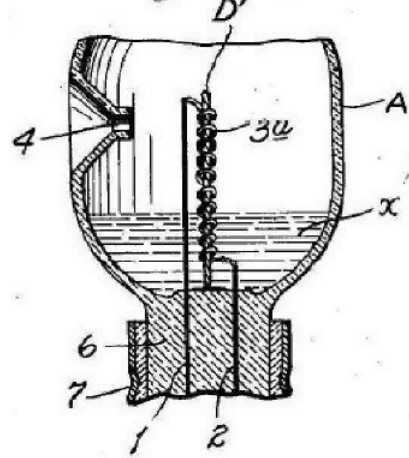


Fig. 3.



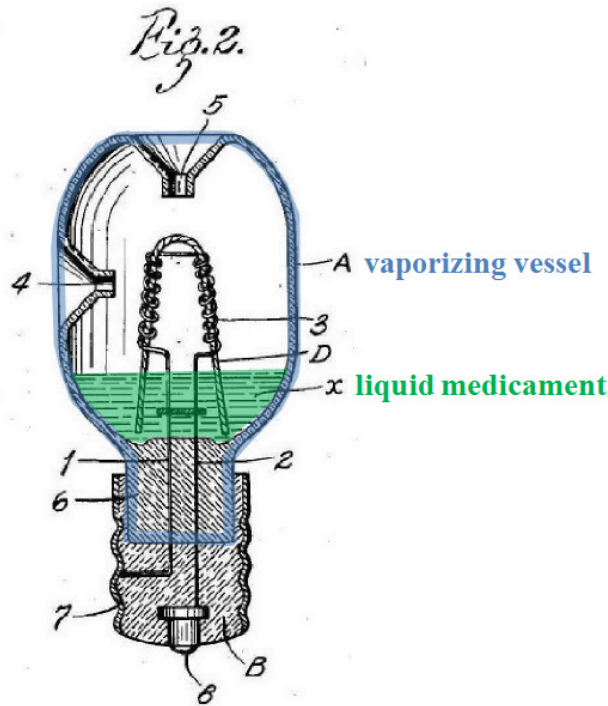
As shown in Fig 2 above, a wick D is combined with and in contact with a heating element or filament 3. A portion of the wick D is always in contact with medicament in the vessel A. The vessel A has an air inlet orifice 4 disposed below the upper end of the vessel, and a vapor outlet 5 formed preferably in the top wall of the vessel. The vessel is permanently connected to a terminal plug B, that may be positioned in a terminal socket, such as in the socket of an ordinary flashlight. Ex. 1006 at 2, 1:44-45. Medicament x is carried by wick D to element 3 is where it

is “vaporized by the heat from the filament 3.” *Id.*, 1:50-2:8. The vapor flows out of the bulb via outlet 5 at the top of the bulb.

2. Claim 3

Claim 3 is not obvious over the combination of Hongbin and JP598 for at least the reasons set forth above with respect to Ground 1. Claim 3 depends from claims 1 and 2. With respect to the limitations of claim 1, Whittemore does not remedy the deficiencies of Hongbin and JP598, because Whittemore does not disclose a light source at all, much less a light source that changes luminance “based on an output of the airflow sensor,” or that is “configured to provide a gradual change in luminance...to simulate a conventional cigarette” as claimed. Ex. 2001, ¶65

With respect to the limitations of claim 3, Whittemore does not remedy the deficiencies of Hongbin and JP598. As shown below, Whittemore discloses a vaporizing vessel A “in the form of a hollow glass container adapted to hold a liquid medicament, x.”



In the case of Whittemore, the walls of the vaporizing vessel A form the “housing” of the device and also define the space in which the liquid medicament is stored. Thus, like Hongbin, Whittemore does not disclose a separate “liquid storage container in the housing.” Ex. 2001, ¶67. As such, the Board should deny the petition as to claim 3 of Ground 2. For the following additional reasons, Petitioner has failed to meet its burden of showing a reasonable likelihood that claim 3 is unpatentable in view of the combination of Hongbin, JP598, and Whittemore.

a. A person of skill in the art would not have applied the teachings of Whittemore to improve the efficiency of Hongbin’s electric heater

One skilled in the art would not have replaced Hongbin’s electric heater with Whittemore’s wick and filament. Petitioner and its expert rely on a non-existent “power efficiency” problem of the Hongbin electric heater to support its position. In doing so, Petitioner and its expert mischaracterize how liquid is vaporized by Hongbin’s “liquid odor cigarette.”

Vaporization is the process by which a liquid or solid changes to a gas that can occur by boiling or by evaporation. Ex. 2001, ¶72; Ex. 2021. In the case of Hongbin, the liquid mixture includes alcohol—which evaporates faster than water—and is “loaded in [a] smoking material *evaporation* chamber.” Ex. 1003 at 3:7-8, 3:10-11 (emphasis added); Ex. 2001, ¶71; Ex. 2021. Evaporation occurs when particles escape from the surface of a liquid below its boiling temperature. Ex. 2001, ¶72; Ex. 2021. Several factors can affect the rate of evaporation, one of which is air movement over the surface of the liquid. Ex. 2001, ¶¶72-73. When a user inhales from the Hongbin device, a suction control valve plate is sucked away from air intake vents, allowing air to flow into the device and over the surface of the liquid stored inside of the evaporation chamber. Ex. 1003 at 3:11-14, 3:18-19; Ex. 2001, ¶74. The air flow generated by the user’s breath increases the rate of

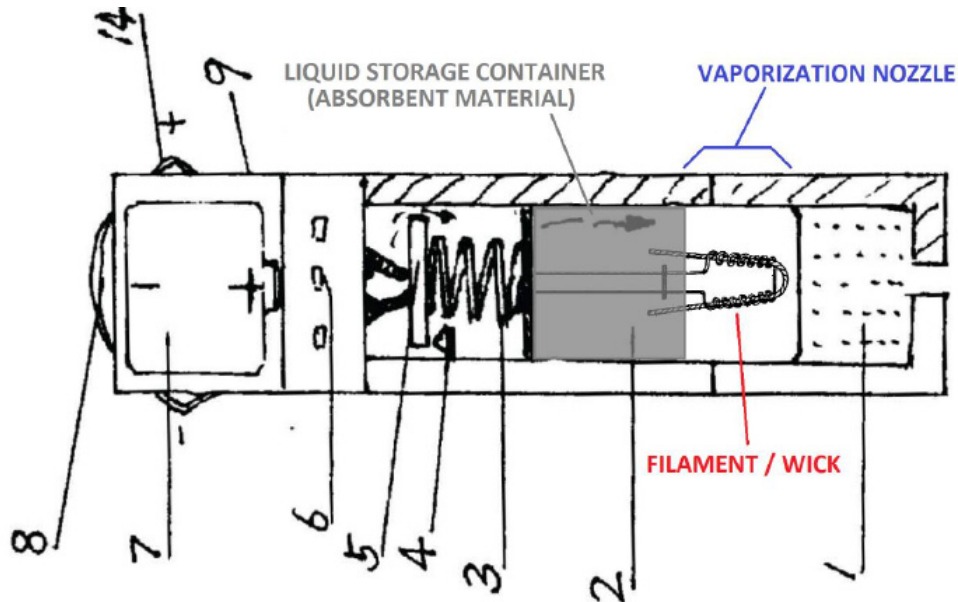
evaporation of the liquid, thereby causing the liquid in the Hongbin device to be vaporized and inhaled by the user—even without a heater. *Id.*

The rate of evaporation also increases when the temperature of the liquid is increased. Thus, an electronic heater can be placed inside of the evaporation chamber “to promote evaporation.” Ex. 1003 at 3:20-21; Ex. 2001, ¶¶72-73. But, contrary to Petitioner and its expert’s opinion, Hongbin’s electronic heater need not “heat all or most of the...liquid located in the smoking material evaporation chamber 2 in order to vaporize the liquid needed for a puff” because the vapor need only be generated by evaporation of the surface of the liquid. Petition at 62; Ex. 1008, ¶90. Hongbin’s evaporation approach has several benefits. It does not require a heater at all because evaporation occurs at lower temperatures. Ex. 2001, ¶75. That simplifies Hongbin’s design and makes the device easier and cheaper to manufacture. *Id.* And even if a heater were included in the device, because evaporation occurs at lower temperatures, increasing the evaporation rate requires less heat and therefore less electrical power to create that heat. *Id.* That extends battery life. *Id.*

Petitioner ignores Hongbin’s fundamental operating principles and seeks to redesign the device to fit the claims of the ’239 patent under the guise of an alleged “power efficiency” problem of the Hongbin electric heater. Ex. 2001, ¶70. Petitioner and its expert argue that it would have been obvious to replace

Hongbin's optional electronic heater 15 within evaporation chamber 2 with an imaginary absorbent material in combination with the "porous wick" and "heating wire" disclosed in Whittemore, as shown in Petitioner's annotated figure below.

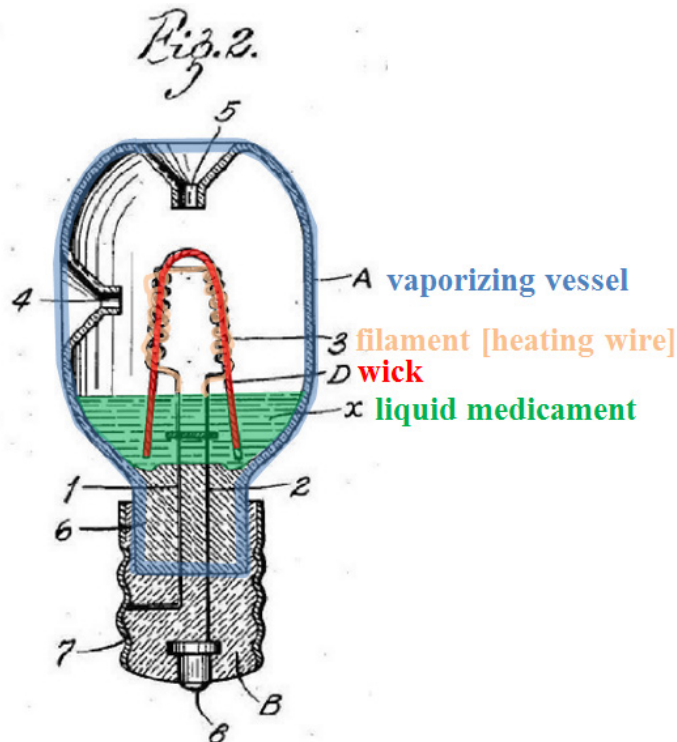
Petition at 62-64; Ex. 1008, ¶¶92-93; Ex. 2001, ¶78.



But an absorbent material is not a "liquid storage container" as claimed at all. Ex. 2001, ¶¶55-56. Petitioner's combination of Hongbin and Whittemore fails on this point alone.

Moreover, Petitioner's proposed redesign of Hongbin would have fundamentally changed Hongbin and does not establish obviousness. *In re Ratti*, 270 F. 2d 810, 813 (CCPA 1959) (reversing obviousness rejection where proposed combination would have caused a "change in the basic principle" under which the reference "was designed to operate"); MPEP § 2143.01(VI). Whittemore's wick and heating wire rely on a boiling approach to vaporization rather than the

evaporation technique disclosed in Hongbin. Ex. 2001, ¶76. As disclosed in Whittemore, liquid medicament *x* moves from where it is stored within vessel A via capillary action through wick D “to a point where it will be vaporized by the heat from the filament 3 [heating wire].” Ex. 1006 at 2, 1:50-2:8. These structures are shown in the annotated version of Whittemore’s Figure 2 below.



Whittemore is designed so that wick D carries liquid to heating element 3, which heats up to boil the liquid creating a “stream of vapor” that “project[s]” upward in vessel A toward outlet 5. *Id.* at 2 col. 1:20-37; Ex. 2001, ¶77. The process occurs as soon as the wire heats up and results in a vapor stream delivering medication to a user. Ex. 2001, ¶77; Ex. 1006 at 2, 1:1-4, 1:20-52 (“[W]hen an electric circuit is completed through the conductors to heat the [wick] and

medicament entrapped within the wick, a stream of vapor will be formed and projected upwardly within the vessel. ... [T]he liquid becomes vaporized upon the filament becoming heated.”). Petitioner and its expert describe Whittemore in similar terms. Petition at 63; Ex. 1008, ¶91. To achieve vaporization, the Whittemore device must have a heating element and apply enough power to heat that element beyond the liquid’s boiling point. Ex. 2001, ¶77. Using this approach in Hongbin’s device would have required a heater and increased its overall power consumption, altering the device’s basic operating principles and undermining the benefits of Hongbin’s disclosed evaporation technique. Ex. 2001, ¶77-79.

Moreover, Petitioner and its expert do not provide a plausible basis for why one skilled in the art would look to other references that “utilize[s] more efficient means to vaporize the liquid” in the first place. Petitioner and its expert point to Hongbin’s embodiment that provides an external power supply 14 as a backup to the battery to account for a “power inefficiency” caused by increased electricity consumption by the electrical heater. Ex. 1003 at 3:22-23; Petition at 62, Ex. 1008, ¶90. Even if heating efficiency were an issue, however, Hongbin solved that problem by providing an “external power supply” as a backup for the device’s battery. Ex. 2001 ¶79; Ex. 1003 at 3:22-23. Simply put, power consumption was not an issue in the device. Petitioner and its expert concoct that issue as an after-the-fact justification for their proposed combination. The law forbids that

approach. *Leo Pharmaceutical Prods, Ltd. v. Rea*, 726 F.3d 1346, 1354-1357 (Fed. Cir. 2013).

Further, Hongbin provides an alternative embodiment in which the liquid is heated using chemical energy that does not need an external power supply. Ex. 1003 at 3:24, 4:27-29; Ex. 2001, ¶80. In that embodiment, “a chemical substance which can be triggered by a metallic plate to give out heat” is loaded between an inner and outer casing. Ex. 1003 at 4:27-29; Ex. 2001, ¶80. When triggered, the chemical substance “gives out heat so that the liquid cigarette in the smoking material evaporation chamber vaporizes...” obviating the need for an electrical heater or an external power supply. Ex. 1003 at 3:30-33; Ex. 2001, ¶80. Accordingly, one skilled in the art need not look further than the disclosure of Hongbin itself to address the alleged “power inefficiency” of Hongbin’s electrical heater. Petitioner’s argument that one skilled in the art would substitute Hongbin’s electrical heater with Whittemore’s wick and filament is impermissible hindsight.

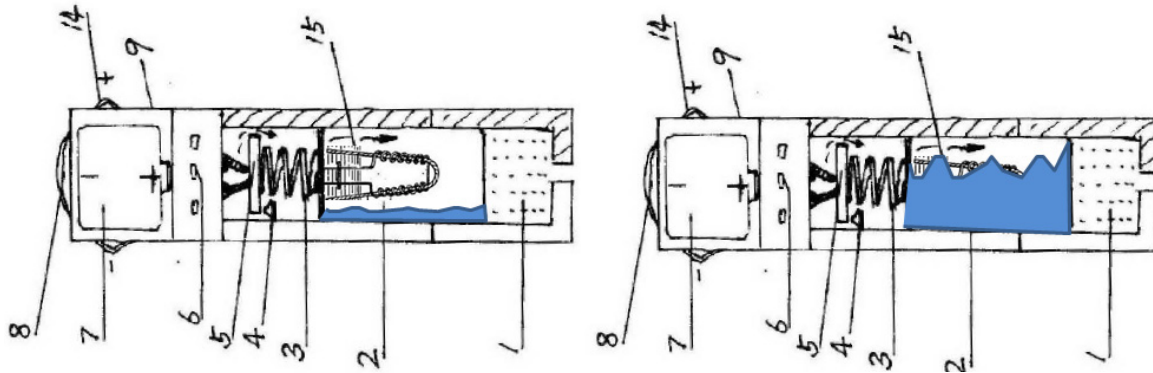
Petitioner and its expert also fail to explain why or how Whittemore’s heater would have been more efficient than Hongbin’s given the devices’ different approaches. The purpose of the optional electronic heater in the Hongbin device is “to promote evaporation” of the “smoking liquid” within evaporation chamber 2. Ex. 1003 at 1:2-3, 1:20-21. That process occurs at temperatures below a liquid’s boiling point, and even a small amount of extra heat accelerates the evaporation

process. Whittemore's device works differently. The heater increases to above the boiling point of the liquid, causing liquid to boil once it contacts the wire and requiring a significant amount of power to drive the heater as compared to Hongbin. Ex. 1006 at 2 col. 1:20-52; Ex. 2001, ¶77. Petitioner and its expert do not account for these functional differences; they merely assert that Whittemore's heater is more efficient. They also skip over the fact that Whittemore's heater requires a large external power supply (such as one found in a flashlight), putting its efficiency in question. Ex. 1006 at 1 col. 1:39-45; Ex. 2001, ¶79. These omissions reflect that hindsight based on the claims is driving Petitioner's analysis.

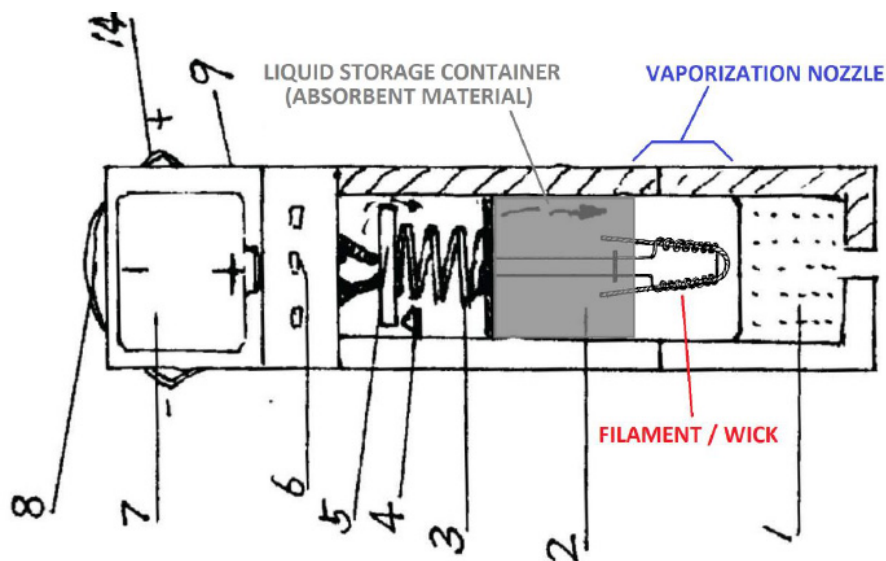
Petitioner and its expert offer several conclusory rationales for their proposed combination of Hongbin and Whittemore. They argue that the change in heating elements is a "simple substitution" to "improve[]" Hongbin's device that would yield the alleged predictable result of "more efficient heating." Petition at 64-65; *see also* Ex. 1008, ¶¶93, 106. These assertions are founded on Petitioner's made-up heating efficiency problem and its self-serving and oversimplified analysis. They do not provide the required "articulated reasoning" with "rationale underpinning" for why a skilled person would have pursued the proposed combination and thus carry no weight. *KSR*, 550 U.S. at 418.

b. Whittemore's wick and filament would not work in Hongbin's liquid odor cigarette

The heating element or filament of Whittemore “is spaced a considerable distance above or away from the medicament from which the vapor is evolved.” Ex. 1006 at 2, 1:5-10. To function properly, part of the wick “is always in contact with the medicament in the vaporizing vessel” to allow the medicament to be “carried by capillary action to a point where it will be vaporized by the heat from the filament 3.” *Id.* at 1:50-2:8. In Whittemore, this function works by virtue of the fact that the device is explicitly configured to be used in an upright orientation only. Ex. 2001, ¶81. As such, a simple substitution of the heater in Hongbin with the wick and filament of Whittemore would not work, because the Whittemore wick and filament would have a horizontal—rather than vertical—configuration. *Id.* That would prevent the wick and filament from working properly, because medicament would fall toward the casing, either out of contact with the wick at low levels (see annotated figure below, left panel), or completely submerging the wick and filament at high levels (see annotated figure below, right panel)—rendering the heating function completely ineffective or inoperable. *Id.*



To compensate for the fact that this substitution would not work, Petitioner inexplicably states that one would place the wick “into the liquid container’s absorbent material” as shown in Petitioner’s annotated figure below (Petition at 64):



As discussed in detail above, Hongbin does not include absorbent materials and Petitioner’s suggestion of including absorbent material in the evaporation chamber is based purely on hindsight. And regardless, an absorbent material is not a “liquid storage container” as required by the claims. Ex. 2001, ¶¶67, 82-83.

For the aforementioned reasons, one skilled in the art would not have combined Hongbin with Whittemore.

3. Claim 5

Claims 5 recites “with the atomizer having a heating wire. Because claim 5 depends from claim 3, the Board should deny the Petition as to those claims for the same reasons discussed above with respect to claim 3.

4. Claims 7 and 8

Claim 7 recites “with the atomizer including a vaporization nozzle containing a heating wire.” Claim 8 recites “further including a liquid passageway from the liquid storage container into the vaporization nozzle.”

Because claims 7 and 8 both depend from claim 3, the Board should deny the Petition as to those claims for the same reasons discussed above with respect to claim 3. For the following additional reasons, Petitioner has failed to meet its burden of showing a reasonable likelihood that claims 7 and 8 are unpatentable in view of the combination of Hongbin, JP598, and Whittemore.

Claim 7 requires the atomizer to include a vaporization nozzle, and claim 3, from which claim 7 depends, requires the atomizer to be “in the housing.” Because claim 8 depends from claim 7, the “vaporization nozzle” recited in claim 8 confers the same requirements as claim 7. Consequently, the claims explicitly

require the atomizer to be a separate component from the housing, and thus the vaporization nozzle also cannot be formed by the housing. Petitioner contends that the vaporization nozzle limitation is met by the evaporation chamber 2 of Hongbin. Petition at 69-70. Petitioner relies on its expert's opinion that the evaporation chamber 2 is the vaporization nozzle because it is a "tube where vaporization occurs" and "when the filament 3 is activated, this tube portion ejects vaporized gas out of the exit hole for inhalation by a user, thereby acting as a nozzle. Ex. 1008, ¶96. That opinion is unfounded. There is no disclosure by Hongbin or Whittemore that discusses ejection of vaporized gas from a nozzle. Ex. 2001, ¶68.

Further, Hongbin's evaporation chamber is formed by the outer casing—or housing—of the device. Petitioner's position that the vaporization nozzle is the same component as the housing is in direct conflict with the requirements of claims 3, 7, and 8 that the atomizer and the vaporization nozzle be separate components in the housing. Ex. 2001, ¶68. Hongbin does not have a vaporization nozzle that is separate from the housing. Nor does JP598 or Whittemore. As such, claims 7 and 8 are patentable over the combination of Hongbin, JP598, and Whittemore.

5. Claims 13, 14, and 15

Petitioner contends that claims 13, 14, and 15 are obvious over Hongbin and JP598 for the same reasons asserted in Ground 1. Consequently, the Board should

deny institution with respect to said claims for the same reasons set forth above with respect to Ground 1. Ex. 2001, ¶69.

C. Ground 3: Claims 3, 5, 7, 8, and 13-15 are not obvious over Hongbin, JP598, and Takeuchi

Petitioner asserts that claims 3, 5, 7, 8, and 13-15 are obvious over the combination of Hongbin, JP598, and Takeuchi. Petition at 75-99. Claims 3, 5, 7, 8, and 13-15 are not obvious for the following reasons.

1. The cited references

a. Hongbin

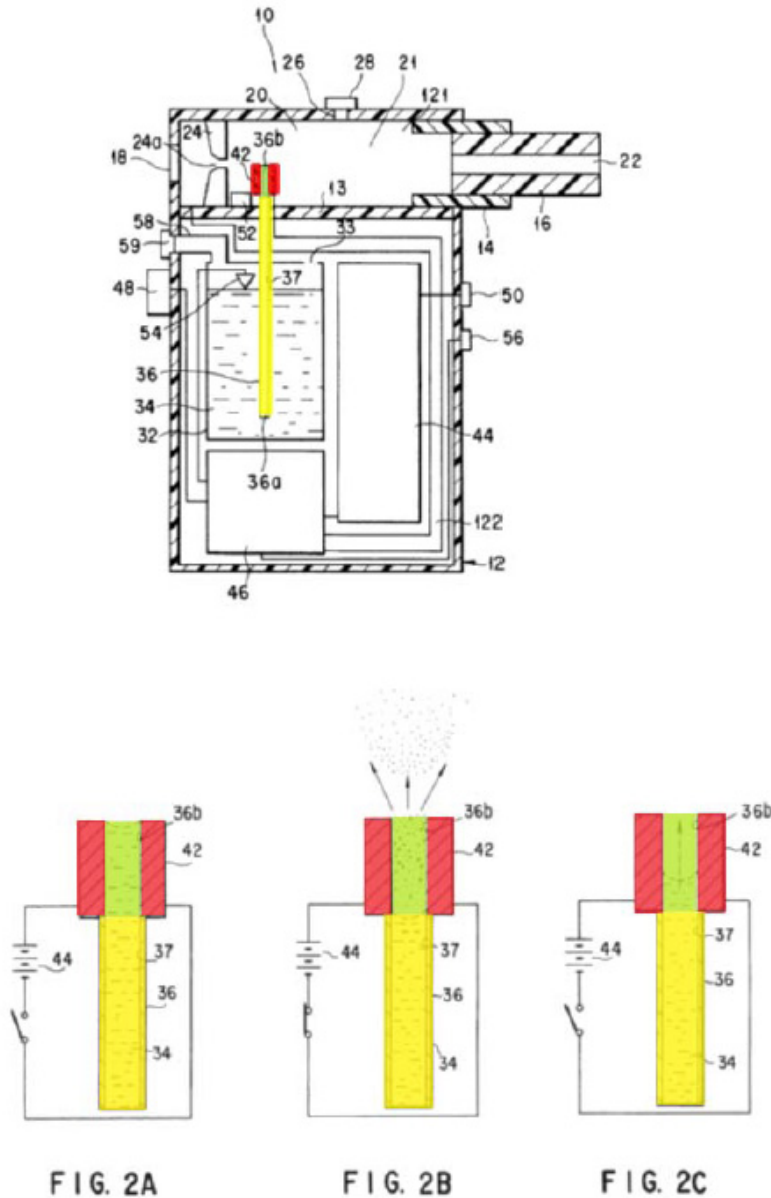
Hongbin is described above with respect to Ground 1.

b. JP598

JP598 is described above with respect to Ground 1.

c. Takeuchi

Takeuchi discloses a “flavor generating device.” Liquid containing a flavor source is transported through a liquid passageway 37 via capillary force to a small electric heater, where it is gasified (atomized) for inhalation by a user. Ex. 1007, 5:47-52. Upper chamber 121 then receives the atomized liquid. *Id.*, 6:4-12. One embodiment is shown in Figure 1 below, with heater 42 (red), outlet port 36b (green), and liquid passageway 37 (yellow). Atomization in the heater’s outlet port 36b is shown below in Figures 2A-2C (Ex. 2001, ¶84).



Takeuchi's compact heater at the end of a liquid passageway has several objectives:

It follows that the flavor-generating device of the present invention *can be driven as a whole at a low energy*. As a result, it is possible to *suppress waste of the flavor source*. In addition,

the flavor can be generated *when the user takes a puff* of the flavor.

Ex. 1007, 2:25-29 (emphasis added). Takeuchi's device aimed to provide a puff of flavor "without a time lag." *Id.*, 1:59-64. Takeuchi disclosed specific heaters that accomplished the objectives listed above. Those heaters were small in size and shaped like a ring, a rod, and a plate, as shown below in Figures 3-5 (Ex. 2001, ¶85).

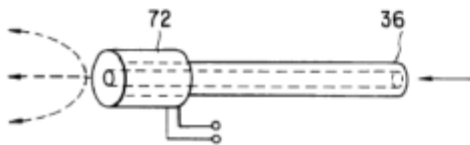


FIG. 3

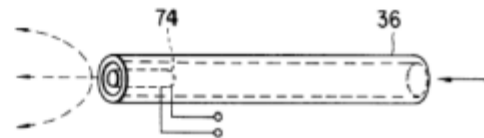


FIG. 4

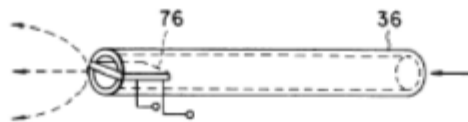


FIG. 5

2. Claim 3

Claim 3, which depends from claims 1 and 2, is not obvious over the combination of Hongbin and JP598 for at least the reasons set forth above with respect to Ground 1. Takeuchi does not remedy the deficiencies of Hongbin and JP598, because Takeuchi does not disclose a light source that changes luminance "based on an output of the airflow sensor," or that is "configured to provide a

gradual change in luminance...to simulate a conventional cigarette” as recited in claim 1. Ex. 2001, ¶86.

In addition, Petitioner has failed to separately meet its burden of showing a reasonable likelihood that claim 3 is unpatentable in view of the combination of Hongbin, JP598, and Takeuchi. Petitioner relies on the same purported inefficiency of Hongbin’s electric heater to provide the motivation to combine Hongbin with Takeuchi. Petition at 77-78. But, as explained above in Ground 2, Claim 3 is separately patentable over claim 1 because Petitioner’s proposed redesign of Hongbin would have fundamentally changed Hongbin and does not establish obviousness. *In re Ratti*, 270 F. 2d at 813; MPEP § 2143.01(VI). A person of skill in the art had no reason to redesign Hongbin to incorporate Takeuchi’s heater to improve the efficiency of Hongbin’s electric heater. Thus, the Board should also deny the petition as to claim 3 of Ground 3 for the same reasons set forth above with respect to claim 3 of Ground 2.

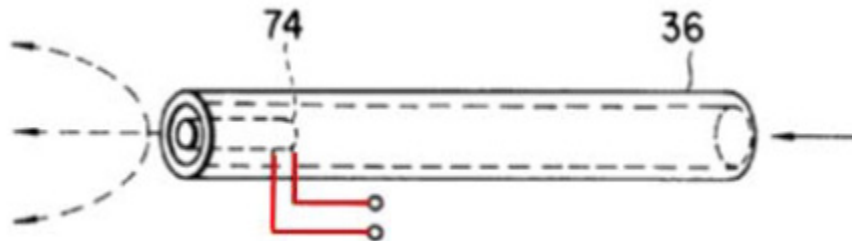
3. Claims 5 and 7

Claims 5 and 7 depend from claim 3, and ultimately depend from claim 1. Thus, claims 5 and 7 are not obvious over the combination of Hongbin and JP598 for at least the reasons set forth above with respect to Ground 1.

Claims 5 and 7 further require a heating wire, but neither Hongbin nor JP598 disclose a wire. Petitioner relies on Takeuchi to satisfy the wire limitation, stating

that one skilled in the art “would understand that the rod-like heater” disclosed in Takeuchi is a wire.

But, Takeuchi does not disclose a heating wire. Ex. 2001, ¶88. A “wire” is “metal drawn out into the form of a thread or thin flexible rod” or “a slender, stringlike piece or filament.” Ex. 2022 at 3; Ex. 2016 at 5. When Takeuchi refers to a wire, it uses the term “wire.” An “electric wire connecting the power source 44 to the casing 12” would have been understood to be a slender, stringlike piece or a flexible metal thread or rod. Ex. 1007, 6:19-22; Ex. 2001 ¶¶31, 87. Takeuchi’s rod-like heater 74 is not a wire. That heater is shown in Figure 4, annotated below, including the two lead wires (red) that attach to the heater. Ex. 2001 ¶89.



There is a marked contrast between the thin wires and the much larger cylindrical heater. Ex. 2001, ¶90. Because none of the cited references disclose an “atomizer having a heating wire,” claim 5 is patentable over the combination of Hongbin, JP598, and Takeuchi.

4. Claim 8

Claim 8 depends from claim 7, and ultimately depends from claim 1. Thus, claim 8 is not obvious over the combination of Hongbin, JP598, and Takeuchi for the same reasons set forth above with respect to claim 1 (Ground 1) and claim 7 (Ground 2) above.

5. Claims 13, 14, and 15

Petitioner contends that claims 13, 14, and 15 are obvious over Hongbin and JP598 for the same reasons asserted in Ground 1. Consequently, the Board should deny institution with respect to said claims for the same reasons set forth above with respect to Ground 1.

VI. CONCLUSION

For the reasons discussed above, Patent Owner requests that the Board deny the Petition for *Inter Partes* Review of the '239 patent.

Respectfully submitted,

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CERTIFICATE OF COMPLIANCE

The undersigned certifies that this brief complies with the type-volume limitations of 37 CFR § 42.24. This brief contains 13,992 words as calculated by the "Word Count" feature of Microsoft Word 2010, the word processing program used to create it.

Date: July 25, 2017

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that service on Petitioner was made as follows, in accordance with 37 CFR 42.6(e):

Date of service: July 25, 2017

Manner of service: 1. Electronic submission through the USPTO Patent Trial and Appeal Board End-to-End System
2. Electronic mail

Document(s) served: **PATENT OWNER PRELIMINARY RESPONSE TO PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 8,899,239**

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