

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

NJOY, LLC and NJOY HOLDINGS, INC.,
Petitioners,

v.

JUUL LABS, INC.,
Patent Owner.

IPR2024-00231
U.S. Patent No. 10,130,123

PETITIONERS' NOTICE OF APPEAL

Pursuant to 35 U.S.C. §§ 141 and 319 and 37 C.F.R. §§ 90.2 and 90.3, notice is hereby given that Petitioners NJOY, LLC, and NJOY Holdings, Inc., hereby appeal to the United States Court of Appeals for the Federal Circuit the Final Written Decision entered June 10, 2025, in IPR2024-00231 (Paper 51, attached as Exhibit A), and from all prior and interlocutory rulings related thereto or subsumed therein, to the extent they are adverse to Petitioners.

In accordance with 37 C.F.R. § 90.2(a)(3)(ii), Petitioners further indicate that the issues on appeal include, but are not limited to:

(1) whether the Board erred in concluding that Petitioners failed to demonstrate by a preponderance of the evidence that independent claims 14 and 27, and dependent claim 32, of U.S. Patent No. 10,130,123 are anticipated by U.S. Patent Publication No. 2015/0245658 (“Worm”);

(2) whether the Board erred in concluding that Petitioners failed to demonstrate by a preponderance of the evidence that independent claims 14 and 27, and dependent claim 32, of U.S. Patent No. 10,130,123 would have been obvious to a person of ordinary skill in the art (“POSA”) over Worm in view of the knowledge of a POSA;

(3) whether the Board erred in concluding that Petitioners failed to demonstrate by a preponderance of the evidence that independent claims 14 and

27, and dependent claim 32, of U.S. Patent No. 10,130,123 would have been obvious to a POSA over Worm in view of WO 2012/142293 (“Levitz”);

(4) whether the Board erred in concluding that Petitioners failed to demonstrate by a preponderance of the evidence that independent claims 14 and 27, and dependent claim 32, of U.S. Patent No. 10,130,123 would have been obvious to a POSA over U.S. Patent Publication No. 2014/0318559 (“Thorens”) and U.S. Patent Publication No. 2015/0020831 (“Weigensberg”) in view of the knowledge of a POSA;

(5) whether the Board erred in concluding that Petitioners failed to demonstrate by a preponderance of the evidence that independent claims 14 and 27, and dependent claims 15, 16, 18, 28, 29, and 31, of U.S. Patent No. 10,130,123 would have been obvious to a POSA over Worm in view of U.S. Patent Publication 2016/0128389 (“Lamb”);

(6) whether the Board erred in concluding that Petitioners failed to demonstrate by a preponderance of the evidence that independent claims 14 and 27, and dependent claims 15, 16, 18, 28, 29, and 31, of U.S. Patent No. 10,130,123 would have been obvious to a POSA over Worm and the knowledge of a POSA further in view of Lamb;

(7) whether the Board erred in concluding that Petitioners failed to demonstrate by a preponderance of the evidence that independent claims 14 and

27, and dependent claims 15, 16, 18, 28, 29, and 31, of U.S. Patent No. 10,130,123 would have been obvious to a POSA over Worm and Levitz further in view of Lamb;

(8) whether the Board erred in concluding that Petitioners failed to demonstrate by a preponderance of the evidence that independent claims 14 and 27, and dependent claims 15, 16, 18, 28, 29, and 31, of U.S. Patent No. 10,130,123 would have been obvious to a POSA over Thorens and Weigensberg further in view of Lamb;

(9) whether, in arriving at its decision, the Board erred by failing to consider the prior art as a whole;

(10) whether, in arriving at its decision, the Board acted in a manner that was arbitrary, capricious, an abuse of discretion or otherwise not in accordance with the law, or based on factual findings unsupported by substantial evidence; and

(11) whether the Board erred in any finding or determination supporting or related to those issues, as well as all other issues decided adversely to Petitioners in any orders, decisions, rulings, and opinions.

Pursuant to 37 C.F.R. § 90.3, this Notice of Appeal is timely, having been filed within 63 days after the date of the issuance of the Final Written Decision.

Pursuant to 35 U.S.C. § 142 and 37 C.F.R. § 90.2(a), a copy of this Notice of Appeal is being filed simultaneously with the Patent Trial and Appeal Board, the

Clerk's Office for the United States Court of Appeals for the Federal Circuit, and
the Director of the Patent and Trademark Office.

Date: August 12, 2025

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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. §§ 90.2(a)(1) and 104.2(a), I hereby certify that, in addition to being filed electronically through the Patent Trial and Appeal Board's P-TACTS system, a true and correct copy of the foregoing **PETITIONERS' NOTICE OF APPEAL** is being served by Express Mail on August 12, 2025, with the Director of the United States Patent and Trademark Office, at the following address:

Director of the United States Patent and Trademark Office
c/o Office of the Solicitor
United States Patent and Trademark Office
Mail Stop 8, P.O. Box 1450
Alexandria, VA 22313-1450

Pursuant to 37 C.F.R. § 90.2(a)(2) and Federal Circuit Rules 15(a)(1), 52(a), and 52(e), I hereby certify that a true and correct copy of the foregoing **PETITIONERS' NOTICE OF APPEAL** is being filed in the United States Court of Appeals for the Federal Circuit on August 12, 2025, and that the filing fee is being paid electronically using pay.gov.

I further certify that the foregoing **PETITIONERS' NOTICE OF APPEAL** was served electronically via e-mail, as agreed to by counsel on August 12, 2025, on the following counsel for Patent Owner:

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EXHIBIT A

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

NJOY, LLC and NJOY HOLDINGS, INC.,
Petitioner,

v.

JUUL LABS, INC.,
Patent Owner.

IPR2024-00231
Patent 10,130,123 B2

Before CHRISTOPHER M. KAISER, KIMBERLY McGRAW, and
AVELYN M. ROSS, *Administrative Patent Judges*.

ROSS, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining No Challenged Claims Unpatentable
35 U.S.C. § 318(a)
Denying Patent Owner's Motion to Submit Supplemental Information
37 C.F.R. § 42.123

I. INTRODUCTION

NJOY, LLC and NJOY Holdings, Inc. (collectively, “Petitioner”) filed a Petition (Paper 2, “Pet.”) requesting an *inter partes* review of claims 14–16, 18, 27–29, 31, and 32 of U.S. Patent No. 10,130,123 B2 (Ex. 1001, “the ’123 patent”). JUUL Labs, Inc. (“Patent Owner”) filed a Preliminary Response to the Petition. Paper 7 (confidential); Paper 8 (redacted) (“Prelim. Resp.”)¹. With Board authorization (Ex. 3001), Petitioner filed a Reply² (Paper 11 (confidential); Paper 13 (redacted)), and Patent Owner filed a Sur-reply (Paper 12).

Upon consideration of the Petition, Preliminary Response, and the parties’ evidence, we determined that Petitioner had demonstrated a reasonable likelihood that it would prevail with respect to at least one claim of the ’123 patent. Paper 15 (“Decision on Institution” or “DI”). Thus, pursuant to the Supreme Court’s decision in *SAS Institute Inc. v. Iancu*, 584 U.S. 357, 364 (2018), and the USPTO Guidance,³ we instituted review of all challenged claims on all challenged grounds. *Id.*

Following institution of trial, Patent Owner filed a Patent Owner Response (Paper 21, “PO Resp.”), Petitioner filed a Reply (Paper 29, “Pet. Reply”), and Patent Owner filed a Sur-reply (Paper 35, “Sur-reply”). In support of their respective positions, Petitioner relies on the testimony of

¹ In this Decision, we refer to the redacted versions of the Patent Owner Preliminary Response.

² In this Decision, we refer to the redacted version of Petitioner’s Reply.

³ In accordance with USPTO Guidance, “if the PTAB institutes a trial, the PTAB will institute on all challenges raised in the petition.” *See* USPTO, Guidance on the Impact of SAS on AIA Trial Proceedings (April 26, 2018) (available at <https://www.uspto.gov/patents-application-process/patent-trial-and-appeal-board/trials/guidance-impact-sas-aia-trial>) (“USPTO Guidance”).

Mr. Joseph C. McAlexander (Ex. 1001, “McAlexander Decl.”; Ex. 1043, “McAlexander Reply Decl.”), and Patent Owner relies on the testimony of Dr. John Collins (Ex. 2001, “Collins Decl.”; Ex. 2053, “Collins Reply Decl.”).

We held an oral hearing on March 19, 2025, and a transcript of the hearing is included in the record (Paper 47, “Tr.”).

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73.

For the reasons discussed below, we determine that Petitioner has not shown by a preponderance of the evidence that claims 14–16, 18, 27–29, 31, and 32 of the ’123 patent are unpatentable.

A. Related Proceedings

The parties identify *Certain Vaporizer Devices, Cartridges Used Therewith, and Components Thereof*, 337-TA-1368 (ITC) and *JUUL Labs, Inc. v. NJOY, LLC*, 23-cv-01204 (D. Ariz.) as related proceedings. Pet. 1; Paper 6, 2.

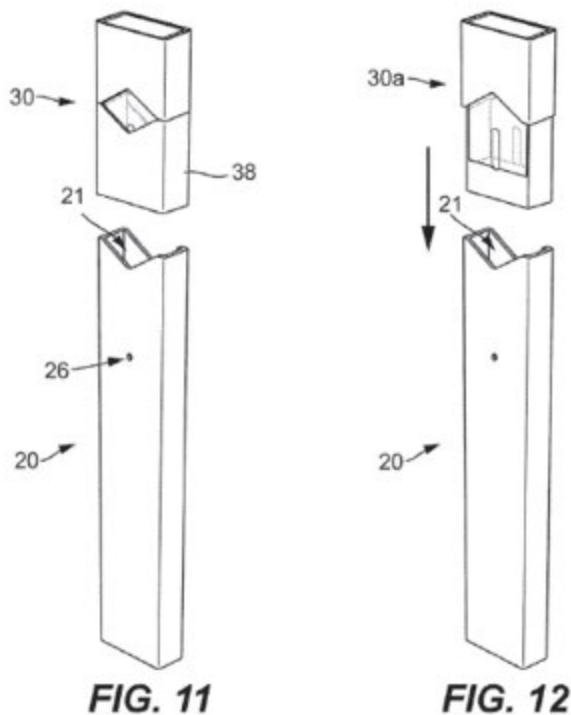
Patent Owner further identifies IPR2024-00223 (U.S. Patent No. 10,709,173), IPR2024-00267 (U.S. Patent No. 11,134,722), IPR2024-00268 (U.S. Patent No. 11,606,981), IPR2024-00536 (U.S. Patent No. 11,606,981 and IPR2024-00567 (U.S. Patent No. RE49,114) as related matters. Paper 6, 2.

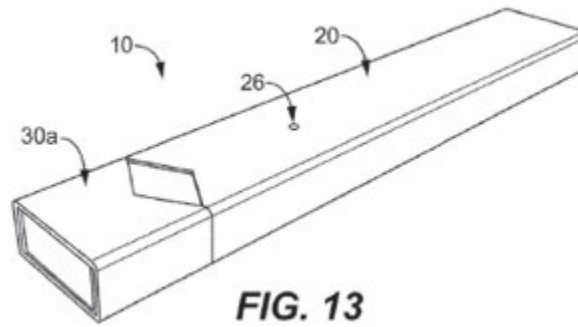
B. The ’123 patent

The ’123 patent, titled “Vaporizer Devices with Blow Discrimination,” issued on November 20, 2018. Ex. 1001, codes (45), (54). The ’123 patent describes electronic cigarettes (“e-cigarettes”) or vaping devices as “battery-powered vaporizers that simulate the feeling of smoking, but without tobacco.” *Id.* at 2:23–25. The ’123 patent describes vaping

devices that “can accurately differentiate between blowing and drawing (sucking) through the mouthpiece and adjust the control of the vaporizer accordingly.” *Id.* at 2:15–19. The ’123 patent explains that e-cigarettes can be activated by a user pressing a button or via a pressure sensor that detects a user drawing (sucking) on the e-cigarette to determine whether a heating element should be in use or not. *Id.* at 2:28–40. An issue with the latter arrangement is that such pressure sensors may detect a draw following a user blowing or exhaling through the device. *Id.* at 2:41–46. This causes the heating element to be activated without the user drawing on the e-cigarette, which provides a non-ideal user experience, wastes battery life and vaporizable material, and may cause overheating of vaporizable material. *Id.* at 2:58–65.

Figures 11–13 are illustrative of a vaporizer according to the ’123 patent and are reproduced below.





Figures 11–13 “represent an illustrative assembly sequence for assembling the main components” of the ’123 patent’s device. *Id.* at 13:42–43. Figures 11–13 show a device body 20 having a cartridge receptacle 21 to receive a cartridge (not shown in Figure 12) or a pod 30a. *Id.* at 28:10–18.

The ’123 patent depicts further details of the device’s components in Figure 25, which is reproduced below.

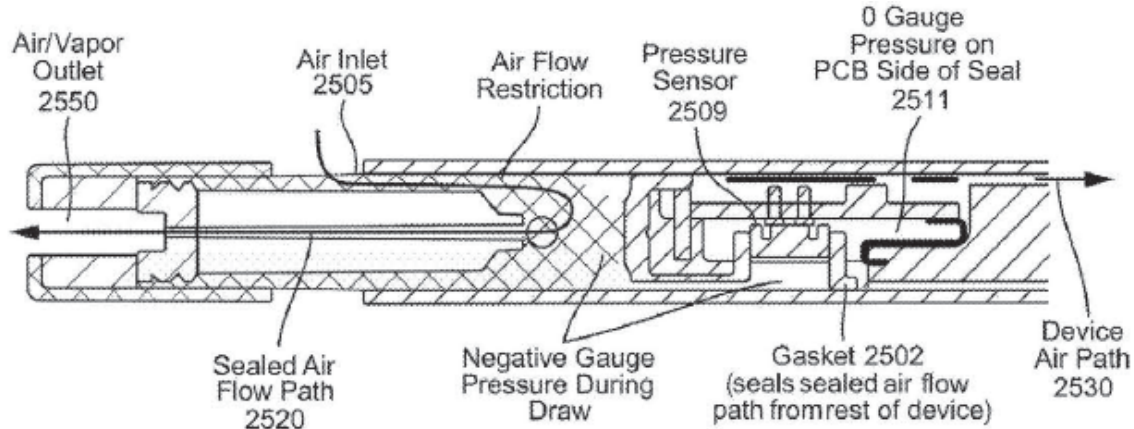


Figure 25 shows a sectional view to illustrate an air path through a vaporizer device. *Id.* at 14:10–12. The ’123 patent describes the use of a pressure sensor “that can distinguish positive and negative pressure.” *Id.* at 42:8–9. The ’123 patent describes that pressure sensor 2509 can be a capacitive

pressure sensor and include a diaphragm. *Id.* at 42:14–16. The ’123 patent also describes other types of pressure sensors that may be used, such as microelectromechanical systems (MEMS) pressure sensors. *Id.* at 41:56–58.

The ’123 patent further describes that pressure sensor 2509 may be included in sealed air path 2520 and that gasket 2502 may form an airtight seal so that sensor 2509 sees gauge pressures in air path 2530 when a user draws from or blows into the device. *Id.* at 42:25–32. For instance, an air flow restriction between nominal air inlet 2505 and sensor 2509 creates a pressure that the static plate side of the sensor registers. *Id.* at 42:32–35. Conversely, PCB (printed circuit board) side 2511 of sensor 2509 remains at an external reference pressure during a draw or blow because PCB side 2511 is not part of sealed air path 2520. *Id.* at 42:35–39. As a result, a negative pressure in sealed air path 2520 due to a draw pulls the diaphragm toward the static plate, which increases the capacitance of the sensor. *Id.* at 42:39–43. A positive pressure in sealed air path 2520 due to a blow pushes the diaphragm away from the static plate, which decreases capacitance. *Id.* at 42:43–46. These capacitance values may then be read and compared to an ambient pressure. *Id.* at 42:50–52.

C. Illustrative Claim

Petitioner challenges claims 14–16, 18, 27–29, 31, and 32 of the ’123 patent. Independent claim 14 is representative of the challenged claims and is reproduced below with Petitioner’s annotations⁴:

[14.A] A vaporizer device body comprising:

[14.B] a cartridge receptacle configured to insertably receive a cartridge containing a vaporizable material;

⁴ For convenience, we adopt Petitioner’s annotated claim format.

[14.C] a pressure sensor configured to output sensor readings,

[14.D] wherein a first side of the pressure sensor is exposed to a sealed air flow path and a second side of the pressure sensor is exposed to a device air path open to ambient pressure,

[14.E] the sealed air flow path comprising a channel formed between an interior surface of the cartridge receptacle and an exterior surface of the cartridge,

[14.F] the sealed air flow path passing from an air inlet, through the channel and to a heater and an outlet of a mouthpiece within the cartridge; and

[14.G] a gasket around the pressure sensor, the gasket configured to seal the device air path from the sealed air flow path.

Ex. 1001, 48:46–60.

D. The Asserted Unpatentability Challenges

Petitioner asserts that claims 14–16, 18, 27–29, 31, and 32 would have been unpatentable based on the following grounds:

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
14, 27, 32	102	Worm ⁵
14, 27, 32	103	Worm, knowledge of a person of ordinary skill in the art
14, 27, 32	103	Worm, Levitz ⁶

⁵ Worm et al., U.S. Patent Pub. No. 2015/0245658 A1, published Sept. 3, 2015 (Ex. 1004, “Worm”).

⁶ Levitz et al., WO 2012/142293 A2, published Oct. 18, 2012 (Ex. 1010, “Levitz”).

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
14, 27, 32	103	Thorens, ⁷ Weigensberg, ⁸ knowledge of a person of ordinary skill in the art
14–16, 18, 27–29, 31, 32 ⁹	103	Worm, Lamb ¹⁰
14–16, 18, 27–29, 31, 32	103	Worm, knowledge of a person of ordinary skill in the art, Lamb
14–16, 18, 27–29, 31, 32	103	Worm, Levitz, Lamb
14–16, 18, 27–29, 31, 32	103	Thorens, Weigensberg, Lamb

Pet. 5–7.

II. ANALYSIS

A. Principles of Law

In an *inter partes* review, “the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (2012) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)). This burden of persuasion never shifts to the

⁷ Thorens et al., U.S. Patent Pub. No. 2014/0318559 A1, published Oct. 30, 2014 (Ex. 1016, “Thorens”).

⁸ Weigensberg et al., U.S. Patent Pub. No. 2015/0020831 A1, published Jan. 22, 2015 (Ex. 1006, “Weigensberg”).

⁹ Petitioner’s summary of grounds omits claim 32 for the final four grounds incorporating Lamb. Pet. 5. We understand this omission to be unintentional because the substantive discussion of these grounds includes claim 32. *See id.* at 87, 99.

¹⁰ Lamb et al., U.S. Patent Pub. No. 2016/0128389 A1, published May 12, 2016 (Ex. 1005, “Lamb”).

patent owner. *See Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (discussing the burden of proof in *inter partes* review). To prevail in its challenge, a Petitioner must demonstrate by a preponderance of the evidence that the claims are unpatentable. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d).

To anticipate, a reference must “show all of the limitations of the claims arranged or combined in the same way as recited in the claims.” *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1370 (Fed. Cir. 2008); *accord In re Bond*, 910 F.2d 831, 832 (Fed. Cir. 1990).

Obviousness is a question of law based on underlying determinations of fact. *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966); *Richardson-Vicks, Inc. v. Upjohn Co.*, 122 F.3d 1476, 1479 (Fed. Cir. 1997). A claim is unpatentable as obvious, under 35 U.S.C. § 103, if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time of the invention to a person having ordinary skill in the art. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) objective evidence of nonobviousness.¹¹ *Graham*, 383 U.S. at 17–18. Consideration of the

¹¹ Patent Owner presents evidence and arguments about objective indicia of nonobviousness, namely, long-felt need, unexpected results, industry praise, commercial success, and copying. PO Resp. 19–55. Because we determine that Petitioner has not demonstrated a sufficient basis for obviousness of the challenged claims, we need not reach Patent Owner’s evidence and arguments relating to objective indicia.

Graham factors “helps inform the ultimate obviousness determination.” *Apple Inc. v. Samsung Elecs. Co.*, 839 F.3d 1034, 1048 (Fed. Cir. 2016) (en banc), *cert. denied*, 138 S. Ct. 420 (2017). Subsumed within the *Graham* factors are the requirements that all claim limitations be found in the prior art references and that the skilled artisan would have had a reasonable expectation of success in combining the prior art references to achieve the claimed invention. *Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1361 (Fed. Cir. 2007). “Obviousness does not require absolute predictability of success . . . all that is required is a reasonable expectation of success.” *In re O’Farrell*, 853 F.2d 894, 903–04 (Fed. Cir. 1988) (citations omitted). But, a petitioner cannot satisfy its burden of proving obviousness by employing “mere conclusory statements.” *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016).

B. Level of Ordinary Skill in the Art and the Testimony of Mr. McAlexander

We review the grounds of unpatentability in view of the understanding of a person of ordinary skill in the art at the time of the invention. *Graham*, 383 U.S. at 17.

Petitioner contends that a person of ordinary skill in the art “would have at least a B.S. degree in Mechanical Engineering, Electrical Engineering, Industrial Design, Product Design, or similar field, with at least two years of industry experience in one of these fields” and that a person of ordinary skill in the art “would have been familiar with electrically powered vaporizing articles, their components or the underlying technologies.” Pet. 7.

Patent Owner argues that a person of ordinary skill in the art “would have had a B.S. in mechanical engineering, electrical engineering, or an

equivalent degree, and either at least two years of experience designing electro-mechanical consumer products or an advanced degree in mechanical engineering, electrical engineering, or an equivalent field.” PO Resp. 2 (citing Ex. 2053 ¶ 19).

Petitioner’s and Patent Owner’s proposed levels of skill are similar and differ in that Petitioner’s relevant degrees and corresponding two years of experience additionally includes “industrial design” and “product design” and familiarity with “electrically powered vaporizing articles, their components or the underlying technologies” where Patent Owner requires two years of experience “designing electro-mechanical consumer products or an advanced degree.” *Compare* Pet. 7, with PO Resp. 2. Patent Owner alleges that “Petitioner has failed to establish unpatentability under either standard,” indicating that the level of skill in the art is not a dispositive issue. PO Resp. 3.

In light of the record before us, we adopt Petitioner’s proposal regarding the level of ordinary skill in the art. Based on our review of the ’123 patent and the prior art of record, we determine that the definition offered by Petitioner comports with the qualifications a person would have needed to understand the ’123 patent and the prior art. We note that the outcome of this Decision would be the same under Patent Owner’s proposed definition.

Patent Owner, however, asserts that Petitioner’s declarant lacks critical experience including experience with “vaporizer devices or ENDS [Electronic Nicotine Delivery Systems] devices’ outside of litigation consulting,” and “the design of air flow pathways or any experience with aerosol generation of vapor formation.” *Id.* at 3. As a result, Patent Owner

asserts that Mr. McAlexander’s testimony in this regard should be given little weight.” *Id.* Patent Owner argues that Petitioner overstates Mr. McAlexander’s experience and that his prior testimonial experience “did not involve airflow mechanics” or “relat[e] to the design of airflow *paths* or how they affect the user experience” and instead “was limited to *sensors*.” Sur-reply 2.

Petitioner argues that Mr. McAlexander satisfies the definition of a person of ordinary skill in the art adopted by the Board at institution and that similar challenges in the parallel ITC investigation were rejected. Pet. Reply 36. Petitioner contends that its declarant possesses “extensive technical experience [that] includes fluid mechanics,” “has been recognized as a technical expert in several legal proceedings involving fluid mechanics,” and “founded a commercial testing laboratory where he has reverse engineered and tested a myriad of e-cigarette devices, modeled airflow of e-cigarettes, and developed an apparatus to emulate human breath to activate ENDS devices.” *Id.* at 37 (citing Ex. 2052, 15:11–23, 20:5–13, Ex. 1024 ¶¶ 11–30, Ex. 1043 ¶ 16). Petitioner asserts that its declarant “is more than qualified to provide opinions on airflow and vapor formation in ENDS devices.” *Id.* at 38.

In this case, Mr. McAlexander meets both Petitioner’s and Patent Owner’s proposed level of skill in the art. As a result, we are persuaded Mr. McAlexander has the requisite skill and relevant expertise to offer testimony in this matter. For example, Mr. McAlexander has a Bachelor’s Degree in Electrical Engineering and far more than 2 years of experience in the electrical engineering field. Ex. 1027, 3–6, 7. In addition, Mr. McAlexander has provided expert consulting services in a wide range of

technology areas involving the process and design of electro-mechanical consumer products. Ex. 1003 ¶ 5. Through one of Mr. McAlexander’s business ventures, his laboratory has “performed detailed airflow analyses, designing and constructing specialized apparatuses to emulate human breath, allowing for precise activation testing of ENDS devices.” Ex. 1043 ¶ 16. That said, a declarant’s expertise, even clothed as a skilled artisan, does not entitle a naked opinion persuasive weight. *Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.*, 776 F.2d 281, 294 (Fed. Cir. 1985). Here, Patent Owner had the opportunity to, and in fact did, thoroughly cross examine Mr. McAlexander about the purported deficiencies in his testimony. *See, e.g.*, Exs. 2052, 2054; *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579, 595 (1993) (“Vigorous cross examination [and] presentation of contrary evidence . . . are the traditional and appropriate means of attacking shaky but admissible evidence.”). Therefore, to the extent Patent Owner credibly identifies deficiencies in Mr. McAlexander’s testimony or that testimony lacks factual support or is based on broad, conclusory assertions, we will assign appropriate weight. *See Velandier v. Garner*, 348 F.3d 1359, 1371 (Fed. Cir. 2003) (explaining that it is within the Board’s discretion, as the trier of fact, to accord appropriate weight to the evidence presented).

C. *Claim Construction*

We construe claim terms according to the standard set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–17 (Fed. Cir. 2005) (en banc); 37 C.F.R. § 42.100(b). Under *Phillips*, we give claim terms “their ordinary and customary meaning.” *Phillips*, 415 F.3d at 1312. “[T]he ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention.” *Id.* at 1313. “Importantly, the person of ordinary skill in the art

is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification.” *Id.*

Petitioner contends that the parties proposed a construction for “pressure valve,” a limitation appearing in claims 18 and 31, during the ITC investigation. Pet. 7 (citing Ex. 1001, 41:58–65). Patent Owner contends that the terms of the ’123 patent should be given their plain and ordinary meaning. PO Resp. 4.

Because resolution of the issues presented in this case do not require construction of the term “pressure valve,” we do not expressly construe this claim term. *See Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (holding that “only those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy”); *see also Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (citing *Vivid Techs.* in the context of an *inter partes* review).

D. Challenge Based on Worm Alone

Petitioner alleges that claims 14, 27, and 32 of the ’123 patent are anticipated by Worm. Pet. 28–49.

1. Overview of Worm (Ex. 1004)

Worm is titled “Control Body for an Electronic Smoking Article” and describes aerosol delivery devices, such as smoking articles and e-cigarettes. Ex. 1004, code (54), ¶¶ 1, 24. An example of a sectional view of Worm’s smoking article is depicted in Figure 2, reproduced below:

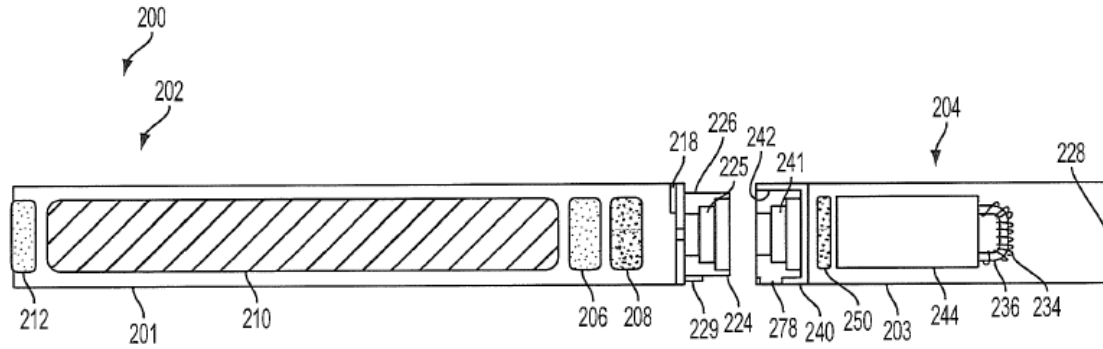


FIG. 2

Figure 2 is a sectional view of an electronic smoking article. *Id.* ¶ 14.

Figure 2 above depicts smoking article 200, which includes control body 202 having control body shell 201, control component 206, and flow sensor 208. *Id.* ¶ 53. Smoking article 200 further includes cartridge 204 having cartridge shell 203 with opening 228. *Id.* Worm describes shell 203 as enclosing reservoir housing 244 in fluid communication with liquid transport element 236 that is “adapted to wick or otherwise transport an aerosol precursor composition” to heater 234. *Id.* Control body 202 may further include coupler 224 to engage with base 240 of cartridge 204 and facilitate fluid engagement between control body 202 and cartridge 204. *Id.* ¶ 56.

Figure 5 of Worm is reproduced below.

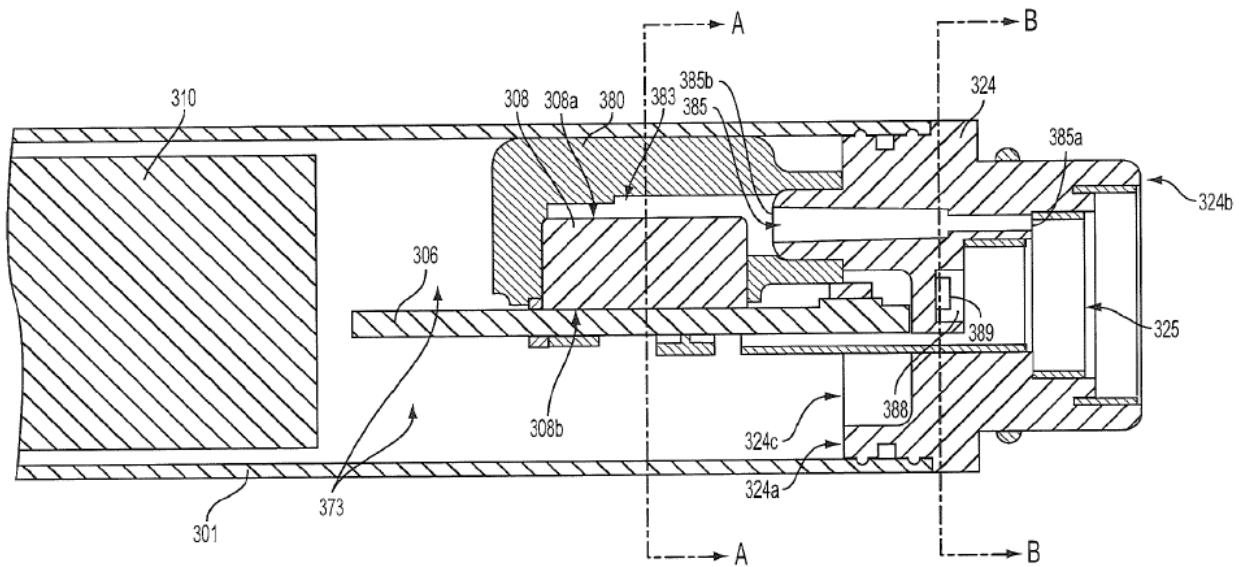


FIG. 5

Figure 5 is a sectional view of the proximal end of a control body. *Id.* ¶ 17. Worm explains that first end 308a of pressure sensor 308 may be in fluid communication with pressure reduction space 383 and second end 308b of pressure sensor 308 may be in fluid communication with normal pressure space 373. *Id.* ¶ 64. As shown in Figure 5, the device may include sealing member 380 that “can substantially surround the perimeter of the pressure sensor 308 and be in a sealing contact therewith” so that second end 308b is positioned within normal pressure space 373. *Id.*

Worm’s Figure 7 is reproduced below.

preferably does not substantially form an air tight connection therebetween” and, thus, the pressure drop is communicated to the pressure channel 785 from the first end 785a to the second end 785b and thus to pressure reduction space 783. *Id.* In turn, the pressure drop is communicated to the pressure sensor, which experiences a pressure differential between its first end in pressure reduction space 783 and its second end in normal pressure space within the shell 701 of the control body 702. *Id.* ¶¶ 74, 77.

2. *Analysis of Claim 14*

Petitioner alleges that Worm anticipates claim 14 of the ’123 patent. Pet. 28–46. Petitioner contends that Worm’s smoking article 200 including control body 202 discloses a “vaporizer device body” as recited in claim 14. Pet. 28–29 (citing Ex. 1004, code (54), ¶¶ 5, 10, 26, 56, Fig. 2, claim 1; Ex. 1003 ¶¶ 99–102). Petitioner contends that Worm’s control body 202 having cavity 225 for receiving cartridge 204 discloses “a cartridge receptacle configured to insertably receive a cartridge containing a vaporizable material” as recited in claim 14. *Id.* at 30–31 (citing Ex. 1004 ¶¶ 53, 56, 57, 77, 104, 105, Fig. 2; Ex. 1003 ¶¶ 103–106).

Petitioner argues that Worm’s sensor 208/308 discloses “a pressure sensor configured to output sensor readings” as disclosed in claim 14. Pet. 31–34 (citing Ex. 1004 ¶¶ 8, 46, 53, 54, 60, Figs. 2, 5; Ex. 1003 ¶¶ 107–116; Ex. 1026). Petitioner contends that Worm’s sensor 308 being exposed to a normal pressure space 373 (“device air path open to ambient pressure”) and a pressure reduction space 383 (“sealed air flow path”) discloses “wherein a first side of the pressure sensor is exposed to a sealed air flow path and a second side of the pressure sensor is exposed to a device air path open to ambient pressure” as recited in claim 14. *Id.* at 34–39 (citing

Ex. 1004 ¶¶ 7, 63, 64, 69, 75–77, Figs. 5, 6B, 7; Ex. 1003 ¶¶ 117–127; Ex. 1001, 4:38–42).

Petitioner asserts that Worm’s pressure reduction space 783 extends into a channel formed by the non-airtight connection between cavity 725 (“interior surface of the cartridge receptacle”) and cartridge projection 741 (“exterior surface of the cartridge”), which discloses “the sealed air flow path comprising a channel formed between an interior surface of the cartridge receptacle and an exterior surface of the cartridge” as recited in claim 14. Pet. 40–42 (citing Ex. 1004 ¶ 76, Fig. 7; Ex. 1003 ¶¶ 128–132).

Petitioner alleges that this channel forms an air inlet that extends to the heater 234 and opening 228, which discloses “the sealed air flow path passing from an air inlet, through the channel and to a heater and an outlet of a mouthpiece within the cartridge.” Pet. 42–45 (citing Ex. 1004 ¶¶ 44, 53, Figs. 1, 2, 7; Ex. 1003 ¶¶ 133–136; Ex. 1019).

Petitioner contends that Worm’s sealing member 380 surrounding sensor 308 to seal normal pressure space 373 from pressure reduction space 383 discloses “a gasket around the pressure sensor, the gasket configured to seal the device air path from the sealed air flow path” as recited in claim 14. Pet. 45–46 (citing Ex. 1004 ¶¶ 7, 63, 64, Fig. 5; Ex. 1003 ¶¶ 137–139).

Patent Owner does not challenge many of Petitioner’s allegations regarding the teachings of Worm. *See generally* PO Resp. Instead, Patent Owner first argues that Petitioner has put forth an anticipation ground that improperly relies on a combination of different embodiments in Worm. PO Resp. 57–59; Ex. 1004 ¶ 54; Ex. 2052, 74:9–74:11; *compare* Pet. 28–29 with Pet. 28–32, 34–35. Second, Patent Owner argues that Worm does not

disclose the claimed “‘air flow path’ that originates from an air inlet, travels through a channel ‘formed between an interior surface of the cartridge receptacle and an exterior surface of the cartridge,’ to a heater, and exits through a mouthpiece.” PO Resp. 59 (citing Ex. 2001 ¶¶ 38–39). We address Patent Owner’s arguments below.

a) whether Petitioner’s allegations support a challenge based on anticipation

Patent Owner argues that Petitioner’s Worm-based grounds fail because Petitioner relies on a combination of multiple, disparate embodiments as demonstrated by Petitioner’s reliance on Figures 2, 5, and 7. PO Resp. 57–58. Further, Patent Owner alleges that Mr. McAlexander, Petitioner’s expert, “admit[s] that these disclosures are ‘multiple different embodiments.’” *Id.* at 58 (citing Ex. 2052, 74:9–74:11). Patent Owner also argues that Petitioner fails to explain how the disparate embodiments could be combined, “especially since Figure 2 embodiment uses a flow sensor instead of a pressure sensor which . . . cannot simply be switched [with the sensors of Figures 5 or 7] without requiring further configuration changes to function properly.” *Id.* at 59 (citing Ex. 1004 ¶ 54).

We agree with Patent Owner. To anticipate a claim, a reference “must not only disclose all elements of the claim within the four corners of the document, but must also disclose those elements ‘arranged as in the claim.’” *Net MoneyIN*, 545 F.3d at 1369. “The requirement that the prior art elements themselves be arranged as in the claim means that the claims cannot be treated . . . as mere catalogs of separate parts, in disregard of the part-to-part relationships set forth in the claims.” *Therasense, Inc. v. Becton, Dickinson & Co.*, 593 F.3d 1325, 1332 (Fed. Cir. 2010). Indeed, the prior art reference “must clearly and unequivocally disclose the claimed

[invention] or direct those skilled in the art to the [invention] without any need for picking, choosing, and combining various disclosures not directly related to each other by the teachings of the cited reference.” *Net MoneyIN*, 545 F.3d at 1371 (citation omitted). “[D]ifferences between the prior art reference and the claimed invention, however slight, invoke the question of obviousness, not anticipation.” *Id.*

Although the various embodiments of Worm contain similar features, we are not persuaded that Petitioner sufficiently demonstrates that a person of ordinary skill in the art would have understood the various embodiments to disclose a single vaporizer device that anticipates the challenged claims. In particular, and as Patent Owner notes, “for limitations [14.A] and [14.B], Petitioners rely on the embodiment of Figure 2 (Pet. 28-29), whereas for limitation [14.C], which requires a pressure sensor, Petitioners rely on Figure 5 [and] for limitations [14.D], [14.E], and [14.F], Petitioners rely on the different embodiment of Figure 7.” *Id.* at 59 (citing Pet. 28–29, 32, 34–45). Worm’s description of the figures suggests each of Figures 2, 5, and 7 relate to different embodiments of Worm. For example, Figure 2 is described as “a sectional view through an electronic smoking article comprising a cartridge and a control body according to an example embodiment of the present disclosure,” Figure 5 “is a detailed view of the proximal end of the control body illustrated in FIG. 3 that also illustrates a sealing member,” and Figure 7 “is a partial sectional view of an electronic smoking article according a further example embodiment of the present disclosure showing a control body connected to a cartridge via the control body coupler and the cartridge base.” *See* Ex. 1004 ¶¶ 14, 17, 20. Based on Worm’s descriptions, it appears that Figure 2 relates to one embodiment,

Figures 3–5 relate to another embodiment, and Figure 7 relates to yet another embodiment. *See id.* ¶¶ 13–20, 53, 59. Furthermore, we agree with Patent Owner that “[t]here are important differences between the embodiments that make them dissimilar.” Sur-reply 3. Specifically, Patent Owner points out that Figure 2 utilizes an “air flow sensor” while Figures 5 and 7 describe a differential “pressure sensor.” *Id.* (citing Ex. 1004 ¶¶ 54, 60, 77; Ex. 2052, 46:3–46:11). This distinction between sensors is important because it impacts the structure of the device. *Id.* at 4. For example, “a pressure differential sensor must have two sides that are sealed from each other: an ambient air side and a pressure reduction side.” *Id.* (citing Pet. 35; Ex. 1004 ¶ 7; Ex. 2052, 46:18–20). The flow sensor, in contrast, does not require separate chambers sealed from one another. *Id.* at 4–5 (citing Ex. 1004, Fig. 2). We acknowledge Petitioner’s argument that “a flow sensor *can be* a pressure sensor” (Pet. Reply 4 (emphasis added)), but find it unpersuasive. Petitioner does not direct our attention to any disclosure in Worm that states a flow sensor can be a pressure sensor. Further, Lamb does not say that a flow sensor is a pressure sensor, rather, Lamb explains that

in some examples, the flow sensor 110 *may* be implemented by a microelectromechanical systems-based (MEMS-bases) sensor such as a MEMS microphone or MEMS pressure sensor [which] *may be* configured to detect a pressure on the MEMS-based sensor caused by airflow through at least a portion of the housing.

Ex. 1005 ¶ 43 (emphasis added).

We acknowledge Petitioner’s position that “Figure 2 is an overview of the device, which is ‘*representative*’ of the components . . . and are not intended to limit the scope,” that “Figures 5 and 7 are not distinct from

Figure 2, but are more detailed drawings illustrating examples of a cartridge and control body for the same vaporizer shown in Figure 2,” and that Worm states that “the disclosed device ‘*can encompass a variety of combinations of components*’ useful for forming an electronic aerosol delivery device.”

Pet. Reply 1–3. But, we are not persuaded by Petitioner’s arguments that the embodiments detailed in Figures 2, 5, and 7 disclose the same vaporizer.

Pet. Reply 3. Indeed, the unique structural differences between Figure 2 and Figures 5 and 7 as well as Figure 7 identification as “a further example embodiment,” lead us to believe that Figures 2, 5, and 7 describe separate and distinct embodiments of Worm’s device.

Nor are we persuaded by Petitioner’s argument that a person of ordinary skill in the art would have understood that Worm’s features disclosed in Figures 2, 5, and 7 can apply across similar embodiments for anticipation. Pet. Reply 3–4. Petitioner does not direct our attention to any disclosure in Worm that show how Figures 2, 5, and 7 interrelate as a single embodiment, that its components are interchangeable between embodiments, or present any argument that a person skilled in the art “would ‘at once envisage’ the claimed arrangement or combination.” *Kennametal, Inc. v. Ingersoll Cutting Tool Co.*, 780 F.3d 1376, 1381 (Fed. Cir. 2015). The *Hayward* and *Victaulic* cases that Petitioner cites do not command an opposite conclusion. *See, e.g.*, Pet. Reply 1, 3–4 (citing *Hayward Indus., Inc. v. Pentair Water Pool and Spa, Inc.*, 814 Fed. Appx. 592 (2020); *Victaulic Company v. Iancu*, 753 Fed. Appx. 895 (2018)). Instead, in each case there was an express teaching that suggested the combination of components forming a basis for anticipation. *Hayward*, 814 Fed. Appx. at 597 (“Although [the prior art] teaches optimization and the arrangement of

components in different embodiments of the patent, [the prior art] also explains that these features may be combined.”); *Victaulic*, 753 Fed. Appx. 899–900 (“This case is distinguishable from *Net MoneyIN* because, . . . [the prior art] expressly contemplates the use of multiple segments, nuts and bolts, and axial insertion as required by claim 1.”). Petitioner identifies no such express teaching in Worm. *See generally* Pet. Petitioner’s suggestion that a general statement in Worm that a “variety of combinations of components” are possible (Pet. Reply 3) and that “modifications and other embodiments are intended to be included within the scope of the appended claims” (*id.*) does not rise to the *express* disclosure required for anticipation. *Net MoneyIN*, 545 F.3d at 1371 (“[I]t is not enough that the prior art reference discloses part of the claimed invention, which an ordinary artisan might supplement to make the whole, or that it might include multiple, distinct teachings that the artisan might somehow combine to achieve the claimed invention.”). And, Dr. Collins’ testimony that “the geometries [of Figures 5 and 7] are similar”—in particular, the *air inlet configuration* shown in Figure 6B—does not render Patent Owner’s “argument that Figure 2 is disparate from Figures 5 and 7,” baseless as Petitioner alleges. Pet. Reply 4; Ex. 1040, 73:16–20 (“Q. Okay. So the configuration of figure 5 is generally consistent with the configuration of figure 7, is that right? A. Well, specifically they’re talking about the air inlet.”). Thus, Petitioner fails to show that the cited material in Worm discloses the limitations of claim 14 arranged in the same way as claimed without the need to pick and choose from disparate disclosures. *Net MoneyIN*, 545 F.3d at 1371.

Therefore, because the teachings of Worm are found in different, disparate embodiments—and Petitioner does not show that an ordinarily

skilled artisan would have at once envisaged the claimed combination—
Petitioner has not sufficiently shown that Worm discloses a vaporizer device
body meeting all of the limitations of claim 14. Accordingly, for at least this
reason, Petitioner fails to show by a preponderance of the evidence that
claim 14 is anticipated by Worm.

*b) whether Worm teaches an air flow path passing
from an air inlet, through the channel and to a heater
and an outlet of a mouthpiece*

Patent Owner also argues that Worm does not disclose any such air
flow path that passes from an air inlet and “travels through . . . a channel”
that is ““formed between an interior surface of the cartridge receptacle and
an exterior surface of the cartridge’ to a heater, and exits through a
mouthpiece” as required by independent claim 14. PO Resp. 59. Petitioner
asserts Worm discloses that “the sealed air flow path includes the channel
formed by the gap between cavity 725 and cartridge projection 741.” Pet. 40
(citing Ex. 1004, 76, Fig. 5; Ex. 1003 ¶¶ 129–130; *id.* at 41–42 (citing
Ex. 1003 ¶¶ 131–132)). But, Patent Owner argues that no such path exists
and instead Worm

discloses that when air is drawn from the mouthpiece, it “causes
air to enter the air inlet channel 788 . . . through one or more air
inlet apertures 789 and flow into the air flow entry 741a . . . from
which the drawn air passes through the interior of the base 740
[which is in cartridge 704] and into the cartridge 704,” after
which the airflow “proceed[s] . . . toward the mouthend of the
cartridge.”

PO Resp. 59–60 (citing Ex. 1004 ¶ 75, Fig. 7; Ex. 2053 ¶¶ 38–42).

Patent Owner illustrates the air flow path in Worm in Patent Owner’s
annotated version of Figure 7 reproduced below.

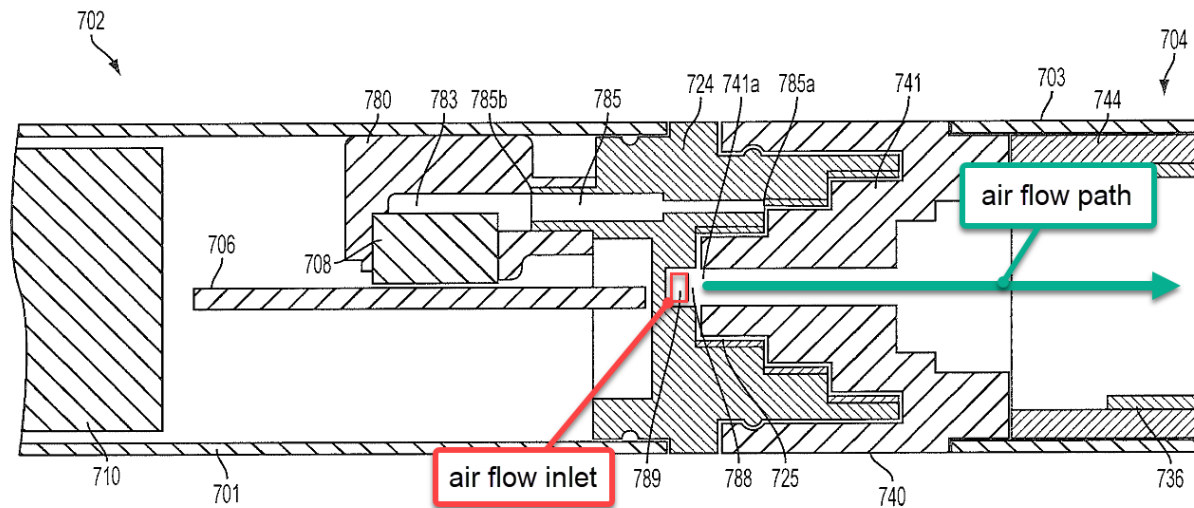


FIG. 7

Patent Owner's Annotated Figure 7 labels air inlet aperture 789 in red and adds a teal-colored arrow through the center of cartridge 704 to illustrate the air flow path. *Id.* at 60 (citing Ex. 1004, Fig.7; Ex. 2053 ¶ 43). This air inlet aperture 789 corresponds to apertures 389a and 389b in Patent Owner's Annotated Figure 6B reproduced below.

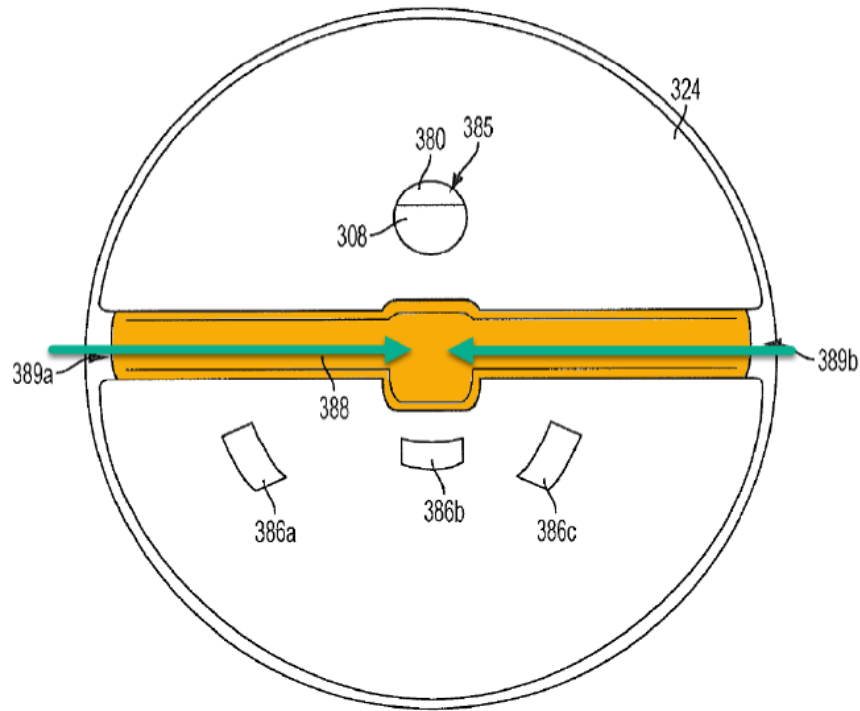


FIG. 6B

Annotated Figure 6B is a cross-section of coupler 324, that is engaged with shell 301 at one end and releasably engages with a cartridge at the other end. Ex. 1004, Fig. 6B, ¶ 59. Annotated Figure 6B illustrates the configuration of air inlet channel 388, highlighted in orange, that extends across the diameter of coupler 324 with air inlet apertures 389a and 389b positioned at opposite ends. Ex. 1004, Fig. 6B, ¶ 70. The direction of air flow through each air inlet aperture, through air inlet channel 388, and toward the center of coupler 324 is noted with teal arrows. Thus, Patent Owner argues that “Worm’s express airflow path does not pass through a channel formed between the cartridge and receptacle as claimed.” PO Resp. 60 (citing Pet. 43; Ex. 2053 ¶¶ 42–44).

Patent Owner further argues that there would not be a uniform gap for air flow between body 702 and cartridge 704, as asserted by Petitioner, because “this space is where the electrical contacts in the cartomizer and

body must touch each other.” *Id.* at 61–62 (citing Ex. 1004 ¶ 58, Fig. 6B; Ex. 2053 ¶ 45). Patent Owner argues that no additional air inlets beyond one or more air inlet apertures 789 are disclosed in Worm. *Id.* at 62 (citing Ex. 1004 ¶ 75). Patent Owner further argues that a person of ordinary skill in the art would understand that air flow travels through the inlets and passages as already described in Worm (namely, air inlet aperture 789) and would not understand the gap between the structures identified by Petitioner to be for air flow. *Id.* at 62.

We are persuaded by Patent Owner’s argument. We agree with Patent Owner’s depiction of Worm’s airflow path as shown in Patent Owner’s Annotated Figures 6B and 7 above. Worm describes embodiments where “[t]he air inlet channel 388 particularly can be in fluid communication with the cavity 325. Drawn, ambient air can enter the air inlet channel 388 through an air inlet aperture 389 that opens through the outer surface of the coupler.” Ex. 1004 ¶ 69. The only air inlet openings described in Worm are through the coupler or a port located on the body of the device. *Id.* ¶¶ 5–8, 10, 56, 66, 70, 73, 75, 77 (each describing an ambient air flow passageway through a coupler), 35, 44 (each describing an air intake port on the body of the device). Notably, no embodiment of Worm describes an air flow channel existing at the junction where the control body and cartridge connect as Petitioner alleges.

We acknowledge Petitioner’s argument that Figure 7 of Worm “depicts a gap that begins at the periphery between the control body 702 and cartridge 704” and that “Worm expressly discloses that the cavity-projection interface is not air tight.” Pet. 40; Pet. Reply 4–5. But, Petitioner incorrectly states that “[a]ir enters this gap, passes to the heater, and exits via

a mouthpiece.” Pet. Reply 4 (citing Ex. 1004 ¶¶ 63–64, 76, 77, 127). Nowhere does Worm state (including within the passages cited by Petitioner above) that as a result of the non-air tight interface, a sealed air flow path is “formed between an interior of the cartridge receptacle and an exterior surface of the cartridge” and “pass[es] from an air inlet, through the channel and to a heater and an outlet of a mouthpiece within the cartridge.”. Thus, Petitioner has not sufficiently shown that merely because of Worm’s non-air tight interface that a sealed air flow path, as claimed, would be formed.

Moreover, as Patent Owner explains, “[t]here is simply no disclosure or need for the airflow to extend past the pressure chamber—indeed, Worm states that the pressure chamber is an ‘isolated segment of the device.’” PO Resp. 64 (citing Ex. 1004 ¶ 5); Ex. 2053 ¶¶ 50–52. Specifically, Worm states that its

coupler element . . . includes an exterior opening that allows external air to enter the device and a pressure channel that communicates a pressure drop caused by the drawn air to an isolated segment of the device that includes a portion of the pressure sensor. Such coupler can particularly be useful to reduce or prevent passage of liquid from an attached cartridge through the coupler and into the control body and thus reduce or prevent contamination of the sensor or other electronic elements present in the control body. [Ex. 1004 ¶ 5].

When draw on the device causing air to enter the air inlet channel 788 through the air inlet aperture 789 causes a pressure drop, such pressure drop is communicated to the cavity 725 Thus, the pressure drop in the cavity 725 is likewise communicated to the pressure channel 785 from the first end 785a to the second end 785b and thus the pressure reduction space 783. [*id.* ¶ 76].

Thus, Worm describes air flow through only a portion of the passageway from the air inlet through the pressure channel to the pressure reduction space and does not disclose the air flow path required by claim 14.

Furthermore, we are also persuaded that a person of ordinary skill in the art would not have understood that the non-air tight connection between the body and the cartridge is a sealed air flow path is “formed between an interior of the cartridge receptacle and an exterior surface of the cartridge” and “pass[es] from an air inlet, through the channel and to a heater and an outlet of a mouthpiece within the cartridge.” As Patent Owner argues, an air flow path through the junction between the cartridge and the body would be ineffective and make air flow difficult to control. PO Resp. 67–68; Ex. 2053 ¶ 53. In particular, we agree with Patent Owner that the winding pathway—also termed a “labyrinth seal”—would not have been understood by the skilled artisan to be an effective air flow passageway. This type of mechanical seal relies on numerous right angles that are known to diminish air flow with each turn and are useful to seal connections from fluids. PO Resp. 65–66 (citing Ex. 2053 ¶ 53); Ex. 2052, 63:21–64:12 (Mr. McAlexander testifying that with each bend, flow is reduced). We are not convinced by Petitioner’s arguments to the contrary, i.e., that “labyrinth seals are well-known to be *non-contacting seals* . . . that permit airflow therethrough” (Pet. Reply 9), because as Dr. Collins testifies, labyrinth seals are “not always noncontact” seals (Ex. 1040, 75:20–76:4) and because Petitioner’s evidence, involving labyrinth seals “[f]or extremely high speeds, where it is desirable to eliminate all rubbing contact” (Ex. 1041, 28), are of little relevance to the device in Worm. We also find Patent Owner’s arguments that the gap, if any, would close upon inhalation due to “the

natural consequence of the fact that negative pressure will bring two components together” and that the electrically conductive heater terminals would inhibit air flow because the electrical contacts must touch the cartridge to be operable, credible. PO Resp. 66–67 (citing Ex. 2053 ¶¶ 54–55), 68 (citing Ex. 1004 ¶ 38; Ex. 2053 ¶ 56); Sur-reply 8–10 (citing Ex. 1004 ¶ 58; Ex. 1040, 69:21–70:4), 11. Petitioner’s arguments that Worm does not teach the pathway is sealed and that Worm states the connection is not air tight, are not convincing. Pet. Reply 10–13. Worm does not state that the non-air tight connection extends the entire length of matched configuration between the coupler and the cartridge. Rather, Worm only teaches that the portion of the connection between the air inlet channel and the pressure reduction space is not substantially air tight. Ex. 1004 ¶ 76. Therefore, we are not persuaded that a person of ordinary skill in the art would have understood that the gap, if any, at the connection point between the body and the cartridge to be the claimed sealed air flow path “formed between an interior of the cartridge receptacle and an exterior surface of the cartridge” and “pass[es] from an air inlet, through the channel and to a heater and an outlet of a mouthpiece within the cartridge.”

Accordingly, for this additional reason, Petitioner fails to meet its burden to establish by a preponderance of the evidence that Worm anticipates claim 14 of the ’123 patent.

3. *Remaining Claims 27 and 32*

Petitioner also asserts that Worm anticipates claims 27 and 32. Pet. 46–49. Claim 32 depends on independent claim 27, which recites limitations substantially similar those discussed above for claim 14 (*see* Ex. 1001, 49:62–67), and Petitioner relies on the same analysis to support its contentions regarding claim 27 (*see* Pet. 46–48). Petitioner does not present

any arguments or evidence with respect to claims 27 and 32 that would remedy the defects detailed above with respect to independent claim 14. Therefore, Petitioner fails to establish by a preponderance of the evidence that Worm anticipates claims 27 and 32 of the '123 patent.

E. Challenge Based on Worm and Knowledge of a Person of Ordinary Skill in the Art

Petitioner alleges that claims 14, 27, and 32 of the '123 patent are rendered obvious by Worm and the knowledge of a person of ordinary skill in the art. Pet. 5, 50. Petitioner relies, generally, on the same analysis and evidence presented above in connection with its anticipation challenge based on Worm in Ground 1 to support its contentions here. *Id.* at 50. However, Petitioner alleges that even if Worm does not disclose limitations [14.E], [14.F], [27.G], and [27.H], the combination of Worm in view of the knowledge of a person of ordinary skill in the art would have rendered obvious those limitations. Pet. 50–52.

1. Analysis of Claim 14

Petitioner argues that it would have been obvious to a person of ordinary skill in the art “that the channel formed between the cartridge receptacle and cartridge of Worm permits air to enter the cavity.” Pet. 50 (citing Ex. 1003 ¶ 156). Petitioner argues that because Worm discloses that cavity 725 and projection 741 do not form an airtight connection, the ordinarily skilled artisan would have understood that the gap between cavity 725 and projection 741 would be for air flow from the air inlet at the periphery between cavity 725 and projection 741. *Id.* at 50–52 (citing Ex. 1003 ¶¶ 157–159; Ex. 1004 ¶¶ 69, 75, 76, Fig. 7). Specifically, Petitioner asserts that “[a]ir entering at the periphery would join the air evacuated from the pressure reduction space and enters [sic] into the

cartridge to pass by the heater and into the smoker's mouth.” *Id.* at 50–51 (citing Ex. 1003 ¶ 157). Petitioner notes that in some embodiments air may enter through air inlet aperture 389/789. *Id.* at 51. In that embodiment, Petitioner alleges that a person of ordinary skill in the art “would have recognized that air would still enter the device through the air inlet at the periphery . . . as negative pressure increased.” *Id.* Additionally, Petitioner asserts that “for embodiments where air inlet aperture 389/789 is not used, the only access to ambient air in Worm is the interface between the cartridge and the cartridge receptacle, as show[n]” and “[w]ithout access to ambient air from the periphery, a vacuum would be created in the device and the device would become nonfunctional.” *Id.* (citing Ex. 1003 ¶ 158).

In addition to the arguments advanced above in connection with Petitioner's anticipation ground based on Worm, Patent Owner further argues that utilizing the channel identified by Petitioner to allow for airflow into the device would be undesirable and that “Petitioners do not provide any sort of ‘articulated reasoning with some rational underpinning’ for why a [person of ordinary skill in the art] would want to modify Worm to include such an airflow channel despite its lack of disclosure.” PO Resp. 69 (citing Ex. 2053 ¶ 57). Patent Owner asserts that Worm “does not describe this gap as uniform,” “some contact between the surfaces is needed to conduct electricity,” and the spacing in the cartridge would vary with use. *Id.* at 70 (citing Ex. 2053 ¶¶ 59); *see also id.* (explaining that uniformity in the gap cannot be assumed because “patent figures are not intended to convey specific dimensions or sizes”). Furthermore, Patent Owner contends that the addition of Petitioner's airflow at the connection point of the cartridge and body “is difficult if not impossible to control.” *Id.* This is because the “size,

shape, and location of air inlets” must be tightly controlled so that the vaporizer simulates traditional cigarette use. *Id.* at 70–71 (citing Ex. 2053 ¶¶ 60–61; Ex. 2052, 26:1–27:13). Patent Owner, relying on the testimony of Dr. Collins, explains that the air inlet proposed by Petitioner includes many variables that are affected by “multiple tolerance stack-ups and by extraneous factors such as wear and tear” that “cannot be tightly engineered or controlled.” *Id.* at 72 (citing Ex. 2053 ¶¶ 63–64). Patent Owner also contends that Petitioner’s argument that air inlet apertures 389/789 are optional is incorrect because “nowhere does Worm describe the air inlet aperture 789 as optional—indeed, ***all of the embodiments Petitioners rely on (Figures 2, 5, and 7) use an air inlet aperture.***” *Id.* at 72–73 (citing Ex. 2053 ¶¶ 65–66). Patent Owner further explains that “Petitioners are incorrect that the device would be nonfunctional without airflow” because “such a device would be considered a ‘fuming’ type device.” *Id.* at 73 (citing Ex. 2053 ¶ 67). Fuming devices “heat liquid in an enclosed space and the liquid that is vaporized substantially expands in volume and exits through the inhalation tube where it can be mixed with air and inhaled.” *Id.* As a result, there is no need to draw air through the cartomizer because the vapor is inhaled directly. *Id.*

In its Reply, Petitioner argues “that air inlets 789 are only ‘[i]n some embodiments’” and “Worm is not a ‘fuming’ device as [Patent Owner] contends.” Pet. Reply 16 (citing Ex. 1043 ¶ 45). Furthermore, even if Worm can be a fuming device, Petitioner states that Patent Owner’s expert “admitted that, even in ‘fuming devices,’ an air inlet is required.” *Id.* (Ex. 1040, 103:4–13). Petitioner also alleges that Patent Owner’s expert testifies that placement of an air inlet anywhere in the housing would have

been an obvious design choice and that both Levitz and Thorens “disclose[] an air inlet at the interface between the cartridge and device body.” *Id.* (citing Ex. 1039 ¶ 60; PO Resp. 6, 8–9). Petitioner further contends that Patent Owner’s expert conceded that “multiple air inlets are beneficial” and if undesirable, “Worm would not have contemplated multiple air inlet apertures.” *Id.* at 17 (citing Ex. 1040, 105:7–16; Ex. 1004 ¶¶ 70, 75; Ex. 1043 ¶ 53). Lastly, Petitioner argues that a person of ordinary skill in the art “would have known how to properly size such a channel to achieve the appropriate air flow.” *Id.* (citing Ex. 1043 ¶ 46).

As discussed above in Section II.D, although Worm describes that its connection may be a non-airtight connection, Worm does not state that the channel extends from the periphery of the device to the center of the device. *See generally* Ex. 1004. Rather, we are persuaded by Patent Owner’s assertions that there is no need for any such channel to extend to the periphery of the device. PO Resp. 64 (citing Ex. 1004 ¶¶ 5, 76; Ex. 2053 ¶¶ 50–51). Accordingly, we determined above that Petitioner had failed to establish that the claimed airflow pathway exists in Worm sufficient to anticipation. We understand Petitioner’s obviousness argument to modify Worm to include an air inlet at the point where the cartridge and body join and a channel that extends the entire length of the connection. Pet. 50 (“To the extent it is argued that Worm does not disclose a sealed air flow path . . . it would have been obvious to a [person of ordinary skill in the art] that the channel formed between the cartridge receptacle and cartridge . . . permits air to enter the cavity.”). However, Petitioner does not provide any reason for the skilled artisan to include such a channel. *See generally id.* at 50–52. Instead, Petitioner states only that “[b]ecause this channel is depicted as a

uniform gap that continues to the periphery of the device, it would have been obvious to a [person of ordinary skill in the art] that, when a smoker draws on the device, negative pressure would cause air to enter at the periphery and into the gap.” *Id.* This reasoning is insufficient to carry Petitioner’s burden of showing that the skilled artisan would have had a reason to modify the teachings of Worm. *KSR*, 550 U.S. at 418–421 (explaining the need to provide articulated reasoning based on rational underpinning to support an obviousness analysis or run the risk of hindsight bias). Furthermore, Petitioner’s basis, i.e., “[b]ecause this channel is depicted as a uniform gap” (Pet. 50), is flawed. Petitioner has not directed our attention to any teaching in Worm (other than the figures) that suggests the gap is in fact uniform. But, “it is well established that patent drawings do not define the precise proportions of the elements and may not be relied on to show particular sizes if the specification is completely silent on the issue.” *Hockerson-Halberstadt, Inc. v. Avia Group Int’l, Inc.*, 222 F.3d 951, 956 (Fed. Cir. 2000). Further, as Patent Owner notes (PO Resp. 8, 70), Worm suggests that the purported gap is in fact nonuniform. Specifically, Worm describes a plurality of electrical contacts on the body of the device where the

electrical contacts configured to contact terminals . . . positioned at differing radial distances in the cavity . . . [where] the depth and radius of each of the electrical contacts is configured such that the end of the terminals come into contact there with when the base and the coupler are joined together to establish an electrical connection therebetween.

Ex. 1004 ¶ 58. We also find persuasive Patent Owner’s assertion that that an ordinarily skilled artisan would have understood that any such channel would vary with use, including blockage when the cartridge is pulled toward the cavity. PO Resp. 66–67, 73 (Ex. 2053 ¶ 54). Dr. Collins testifies that

when a user inhales on the mouthpiece of the cartridge 704, the control body 702 and cartridge 704 will be pulled together to form a seal . . . [and any] airflow through Petitioner’s alleged gap would be substantially limited by this sealing action. As such, a [person of ordinary skill in the art] would clearly understand that airflow is not intended to pass through the alleged gap and into cartridge 702 . . . [and] would not be suitable for its intended purpose.

Ex. 2053 ¶ 54. As a result, an ordinary artisan “would find it undesirable to use the alleged gap for airflow because it creates an *additional* source of airflow that is difficult, if not impossible, to control.” PO Resp. 70. Patent Owner, through the testimony of Dr. Collins, explains that “the airflow in an e-cigarette is the result of considerable engineering” and “[t]he size, shape, and location of air inlets and air passages affect draw resistance, which impacts among other things, vapor and aerosol production, the size distribution of the visible vapor cloud, and nicotine delivery to a user.”

Ex. 2053 ¶¶ 60–61. Dr. Collins testifies that “[t]hese are details that must be carefully balanced so that the use of the vaporizer provides the desired user experience.” *Id.* ¶ 61. Therefore, according to Dr. Collins, “Petitioner’s alleged air inlet and passage . . . cannot be tightly engineered or controlled to ensure an optimal user experience,” and “in order to control the amount of airflow that results in an optimal user experience, it would be preferable and simpler to engineer the size of the air inlet 789 and air passage 788 [as] expressly described in Worm.” *Id.* ¶¶ 63–64. We credit the testimony of Dr. Collins.

We acknowledge Petitioner’s argument that Worm’s air inlets 389/789 are optional but do not find Petitioner’s position convincing. Pet. Reply 16. Petitioner does not direct our attention to any disclosure in Worm that describes air inlets 389/789 as optional or an embodiment that excludes

such air inlets. *See generally* Pet. Reply; Ex. 2053 ¶¶ 65–66 (Dr. Collins testifying that all embodiments Petitioner’s rely upon use an air inlet aperture). Moreover, even if the air inlets are optional, Patent Owner’s argument that Worm would function as a “fuming type device” is persuasive. PO Resp. 73; Ex. 1040, 401:8–18; Ex. 2053 ¶ 67. Patent Owner’s arguments are not diminished by the fact that Dr. Collins testifies that “fuming devices” may include an air inlet (Reply 16 (citing Ex. 1040, 104:4–13)) or that an air inlet may be placed “anywhere in an e-cigarette housing” (*id.* (citing Ex. 1039 ¶ 60)). Dr. Collins explains that an air inlet in a fuming device may be located downstream from the cartridge and “could still be functional without access to ambient air.” Ex. 1040, 104:4–13; Ex. 2053 ¶ 67). And, Dr. Collins’s testimony regarding the placement of an air inlet related to a different device, in a different matter, and “says nothing about whether it would be obvious to turn any alleged ‘gap’ between the housing of two components into an air flow channel.” Sur-reply 16–17.

For the reasons detailed above, Petitioner’s fail to show a reason to modify the teachings of Worm and the knowledge of a skilled artisan to include an air inlet at the point where the cartridge and body join and a channel that extends the entire length of the connection. Therefore, Petitioner fails to establish by a preponderance of the evidence that claim 14 would have been obvious over Worm in view of the knowledge of a person of ordinary skill in the art.

2. *Remaining Claims 27 and 32*

Petitioner also asserts that claims 27 and 32 would have been obvious over Worm in view of the knowledge of a person of ordinary skill in the art. Pet. 50–52. Claims 27 (and 32 by virtue of its dependence on claim 27) recites limitations substantially similar those discussed above for claim 14

(*see* Ex. 1001, 49:62–67). Petitioner relies on the same analysis to support its contentions regarding claim 27 (*see* Pet. 46–52). Petitioner does not present any arguments or evidence with respect to claims 27 and 32 that would remedy the defects detailed above with respect to independent claim 14. Thus, Petitioner fails to establish by a preponderance of the evidence that the combination of Worm and the knowledge of a person of ordinary skill in the art renders claims 27 and 32 of the '123 patent obvious.

F. Challenge Based on Worm and Levitz

Petitioner alleges that claims 14, 27, and 32 of the '123 patent would have been rendered obvious by the combined teachings of Worm and Levitz. Pet. 5, 52. Petitioner relies on much of the same analysis and evidence presented above for Ground 1 to support its contentions here. *Id.* at 52. However, Petitioner alleges that even if Worm does not disclose or render obvious limitations [14.E], [14.F], [27.G], and [27.H], the combination of Worm in view of Levitz would have rendered obvious those limitations. Pet. 52–62.

1. Overview of Levitz (Ex. 1010)

Levitz is titled “Battery Connector for Electronic Cigarette with Side Air Intake” and describes “a battery connector for an electronic cigarette having a side air intake for improved air in-flow and out-flow through the electronic cigarette.” Ex. 1010, code (54), ¶ 2. Levitz states that an electronic cigarette may have a “two-piece” construction in which an atomizer section is detachable from a battery section. *Id.* ¶ 6. Levitz describes an inhalation sequence in which air enters from a side of the battery and enters rear to the battery via groove. *Id.* ¶ 17. The air then enters a cartomizer via an axial opening and then reaches a smoker’s mouth. *Id.*

Levitz's Figure 13 is reproduced below.

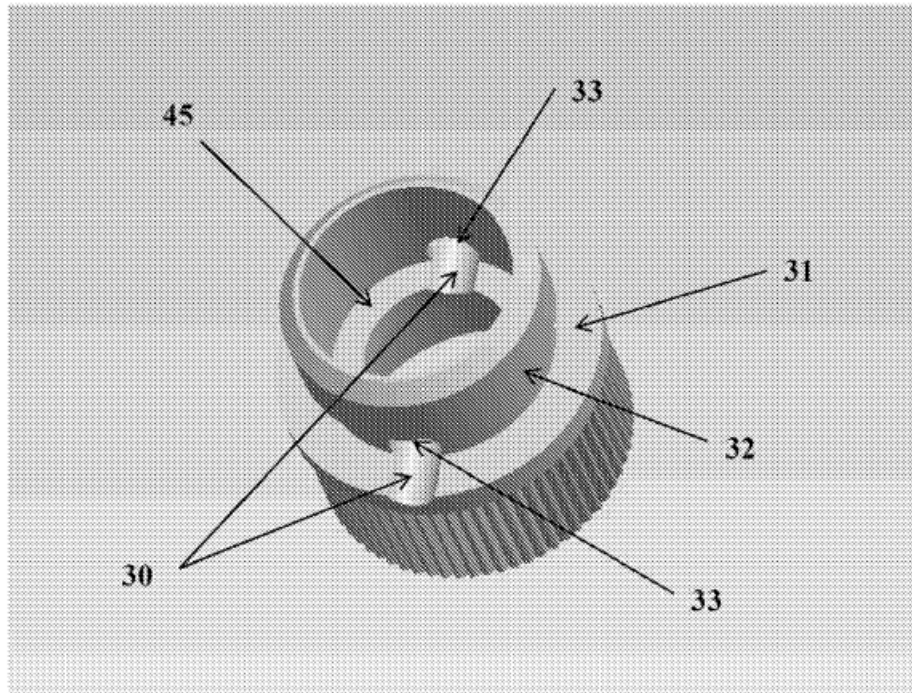


Figure 13

Figure 13 illustrates a connector. *Id.* ¶ 42. Figure 13 shows that the connector (without a battery post) includes perpendicular surface channels 30 that penetrate through the connector's shaft 32 so orifices 33 are formed through inner shelf 45. *Id.*

Figures 14 is reproduced below.

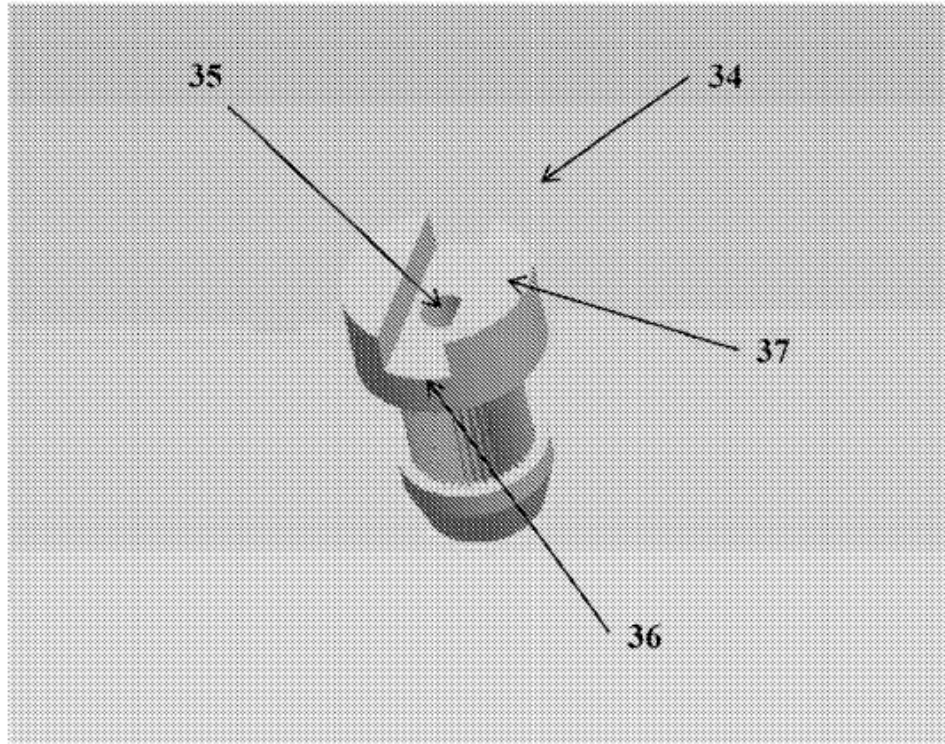


Figure 14

Figure 14 shows a battery post. *Id.* Figure 14 illustrates battery post 34 which includes longitudinal orifice 35 that extends longitudinally through post 34 to form a pressure differential channel. *Id.* ¶ 42. Battery post 34 further includes groove 36 that “assists in guiding air inhaled or exhaled through perpendicular surface channel 30 and orifice 33.” *Id.* According to Levitz, although the battery may include the male connection and the cartomizer the female connection, the reverse may be suitable, depending upon design requirements. *Id.* ¶ 48.

Levitz’s Figure 16 is reproduced below.

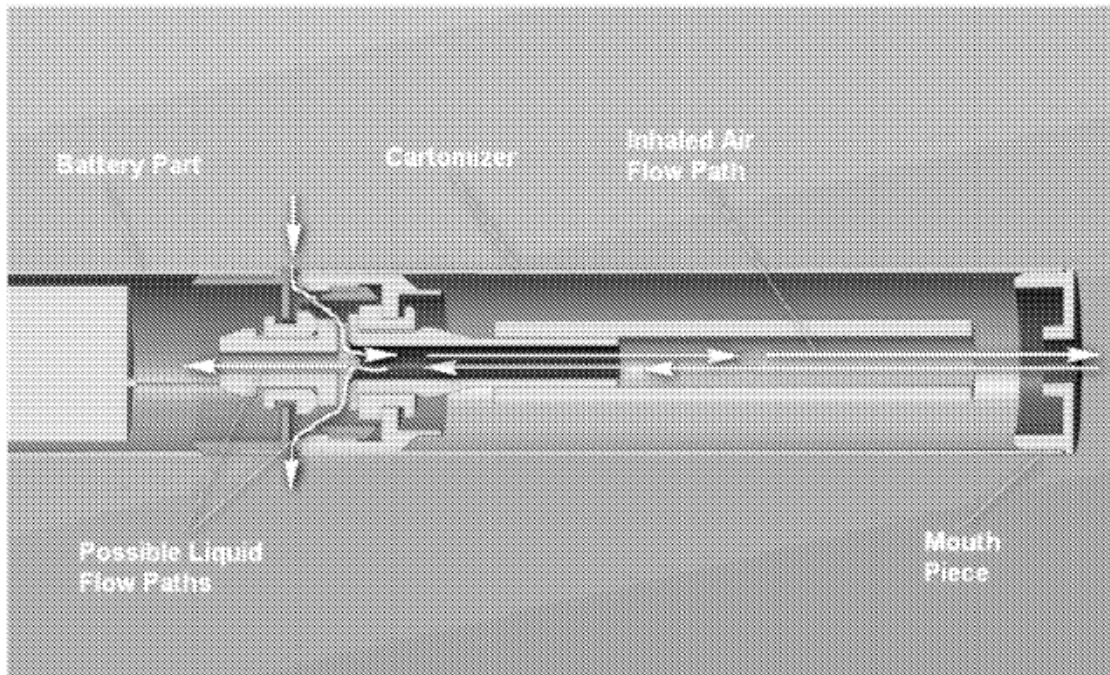


Figure 16

Figure 16 is a sectional view of an electronic cigarette. *Id.* ¶ 26. Levitz explains that Figure 16 depicts “airflow through the connector and battery post combination” and shows a bidirectional air flow path through the center of the cartomizer from the connector and battery post combination to the mouthpiece. *Id.* ¶ 44. Levitz acknowledges that “one possible draw-back of this arrangement is that upon exhalation, any excess fluid (vapor, saliva, etc.) could be blown through orifice 35, into the pressure differential channel and into the Battery.” *Id.*

2. Analysis of Claim 14

Petitioner argues that Levitz discloses a two-piece e-cigarette that includes an air inlet on its side and an air flow path in a channel between its battery and its cartomizer. Pet. 52–56 (citing Ex. 1003 ¶¶ 161–167; Ex. 1010 ¶¶ 6, 17, 42–44, 48, Figs. 15, 16). Petitioner argues that an ordinarily skilled artisan would have modified Worm in view of Levitz so

that outside air enters between the battery and cartridge connection. *Id.* at 56 (citing Ex. 1003 ¶¶ 168–169; Ex. 1007, 4:41–43). To be clear, Petitioner does not propose modifying Worm to include the connector and battery post of Levitz (*see e.g.*, Ex. 1010, Figs. 13–15). Hr. 14:13–25. Instead, Petitioner alleges only that Levitz would have suggested to a person of ordinary skill in the art that the airflow path can exist at the interface between the cartridge and the body. *Id.* at 15:1–6; PO Resp. 6 (“In other words, the **only** teaching that Petitioners argue would be obvious to incorporate into Worm is Levitz’s disclosure of an opening between the battery connector and cartridge.”). Petitioner contends that air inlets are a design choice, will minimize backflow issues, and having the channel between the battery and the cartridge would enable the smoker to clean the channel simply by removing the cartridge. Pet. 57–60 (citing Ex. 1003 ¶¶ 170–173; Ex. 1004 ¶ 72; Ex. 1007, 1:64–2:1, 4:15–18, 4:41–43, Figs. 3a, 3b; Ex. 1009, 4:45–48, Fig. 3; Ex. 1011, 4:9–12, Fig. 5A; Ex. 1012 ¶ 28, Fig. 6; Ex. 1013 ¶ 97, Fig. 16). Petitioner contends that a person of ordinary skill in the art would have had a reasonable expectation of success in combining the teachings of Worm and Levitz because both disclose two-piece e-cigarettes and an ordinary artisan would have understood that placing the air inlet on the periphery of the device would not disrupt its operation and the channel would be along either a male-female or female-male connection. *Id.* at 60–62 (citing Ex. 1003 ¶¶ 174–178; Ex. 1004 ¶ 76; Ex. 1010 ¶ 48).

Patent Owner argues that the combination of Worm and Levitz as proposed by petitioner fails to show the claimed airflow pathway because Petitioner’s “merely propose adding an ***air inlet***.” PO Resp. 6. In addition,

Patent Owner contends that even if the claimed airflow path is disclosed, there is no reason to combine Worm and Levitz. PO Resp. 12–18. Because we agree with Patent Owner that Petitioner failed to adequately establish that a person of ordinary skill in the art would have had reason to combine the teachings of Worm and Levitz, we focus our discussion below on that argument.

Patent Owner argues that Worm already resolves the problems with backflow and that “Petitioner’s reasons for modifying Worm are redundant with Worm’s actual disclosures and driven by hindsight.” PO Resp. 12, 14. Patent Owner explains that “[t]here would be no reason to look to Levitz to resolve issues with backflow, especially not Figures 16 and 17 which Levitz expressly states has backflow issues.” *Id.* at 14, 15–16 (citing Ex. 1010 ¶ 44; Ex. 2053 ¶ 77; Ex. 2054, 23:12–24:17). Patent Owner also argues that Petitioner’s placement of the inlets is not a matter of “design choice” but rather an “arbitrary design choice” that “add[s] an additional air inlet path when one already exists” which would not have been desirable because any such modifications would impact draw resistance and other properties. *Id.* at 12–13. And lastly, Patent Owner asserts that because Worm already solves the backflow problem and because of Petitioner’s proposed “winding path,” “it is unlikely that there would be much backflow residue” and therefore no need to clean the channel. *Id.* at 15.

Petitioner in its Reply argues that the air inlets are not redundant because not all embodiments of Worm include air inlets 389/789 and “Levitz’s air inlets are the only backflow path for embodiments without air inlets 789.” Pet. Reply 20. Petitioner also asserts that “Worm’s embodiments only *reduce* backflow, so Worm does not solve that problem.”

Id. Next Petitioner contends that Levitz does not teach away from using side inlets because other embodiments of Levitz, for example as depicted in Figure 18, also include a side air inlet. *Id.* at 21. Petitioner explains that the concern described in Levitz regarding Figures 16 and 17 is having a pressure channel “in line” with the cartridge air flow path—which is not at issue in Worm. *Id.* (citing Ex. 1043 ¶ 55).

For the reasons discussed above in Section II.E.1, we are persuaded by Patent Owner’s argument that no reason exists to modify Worm because an air inlet and pathway already exist and further that the skilled artisan would have found the modifications “undesirable” and “difficult to control.”

We are also convinced by Patent Owner’s argument that no reason to modify Worm exists because Worm already solves the backflow issues. PO Resp. 14. Specifically, Worm explains that

a coupler element that includes an exterior opening that allows external air to enter the device and a pressure channel that communicates a pressure drop caused by the drawn air to an isolated segment of the device that includes a portion of the pressure sensor. Such coupler can particularly be *useful to reduce or prevent* passage of liquid from an attached cartridge through the coupler and into the control body and thus reduce or prevent contamination of the sensor or other electronic elements present in the control body. [Ex. 1004 ¶ 5 (emphasis added)].

[b]ecause of the spatial arrangement of the air inlet channel 788 and the first end 785a of the pressure channel 785, however, the air flow entry 741 of the seated projection 740 is sufficiently spaced apart from the first end of the pressure channel *to prevent or reduce* incidence of passage of liquid from the cartridge 704 through the base 740 and into the control body 702. [Ex. 1004 ¶ 76 (emphasis added)].

Dr. Collins testifies that “the inlet and channel expressly disclosed by Worm suitably addresses any potential backflow.” Ex. 2053 ¶ 75. Petitioner’s

expert Mr. McAlexander also confirms that Worm resolves backflow problems. Ex. 2052, 72:3–7. Petitioner’s argument that “Worm’s embodiments only *reduce* backflow, so Worm does not solve that problem” (Reply 20) does not sway our opinion as it is inconsistent with the express language of Worm recited above. *See e.g.*, Ex. 1004 ¶¶ 5, 76 (explaining Worm “prevent[s] or reduce[s]” backflow).

In addition, based on the teachings of Levitz, a person of ordinary skill in the art would have been discouraged from implementing a design like Petitioner proposes because it would create backflow problems as “it is undesirable for the inhalation path to be in fluid communication with the pressure differential channel.” PO Resp. 15 (citing Ex. 1010 ¶¶ 44, 46); Ex. 2053 ¶ 77. Levitz explains that in order to minimize this backflow problem, the air path to the pressure differential channel is separate from the inhalation channel so that “there is no direct path for excess liquid to migrate into the Battery compartment.” Ex. 1010, ¶¶ 45–46, Figs. 17–18). Petitioner argues that “Figure 16 may have backflow issue . . . because the pressure channel is directly aligned with the cartridge airflow passage” which is overcome in Figure 18 which shows a diverted flow path design. Pet. Reply. 18 (emphasis omitted) (citing Ex. 1040, 88:21–90:5, 91:2–15). We disagree and instead are persuaded by Dr. Collins’s testimony that Levitz Figure 18 overcomes backflow problems not because it avoids “direct alignment” but rather because there is no fluid connection with the cartomizer. Ex. 2053 ¶¶ 71–72 (stating “the pressure differential path is different from the inhaled path”). Petitioner’s proposed combination—whether input apertures 389/379 are included or not—maintains a fluid connection between the inhalation channel and the pressure differential

channel. Ex. 2053 ¶¶ 77–78. And, because “Worm already solves the backflow problem,” and “because of the winding, perpendicular path of Petitioner’s alleged gap, it is unlikely that there would be much backflow residue relative to the air inlet and passage” and thus would not require cleaning. PO Resp. 15; Ex. 2053 ¶ 76.

For these reasons, Petitioner fail to show a reason to modify the teachings of Worm and Levitz to include an air inlet at the point where the cartridge and body join and a channel that extends the entire length of the connection. Therefore, Petitioner fails to establish by a preponderance of the evidence that claim 14 would have been obvious over the combination of Worm and Levitz.

3. *Remaining Claims 27 and 32*

Petitioner also asserts that claims 27 and 32 would have been obvious over Worm and Levitz. Pet. 52–62. Patent Owner does not separately address remaining claims 27 and 32 beyond what is argued for claim 14. *See generally* Prelim. Resp. Thus, Petitioner fails to establish by a preponderance of the evidence that the combination of Worm and Levitz renders claims 27 and 32 of the ’123 patent obvious.

G. *Challenge Based on Thorens and Weigensberg*

Petitioner alleges that the combination of Thorens in view of Weigensberg would have rendered obvious claims 14, 27, and 32 of the ’123 patent. Pet. 63–87.

1. *Overview of the Prior Art*

a) *Thorens (Ex. 1016)*

Thorens is titled “Electrically Heated Smoking System Having a Liquid Storage Portion” and describes an electrically heated smoking system for receiving an aerosol-forming substrate. Ex. 1016, code (54), ¶ 2.

Figure 1 of Thorens is reproduced below.

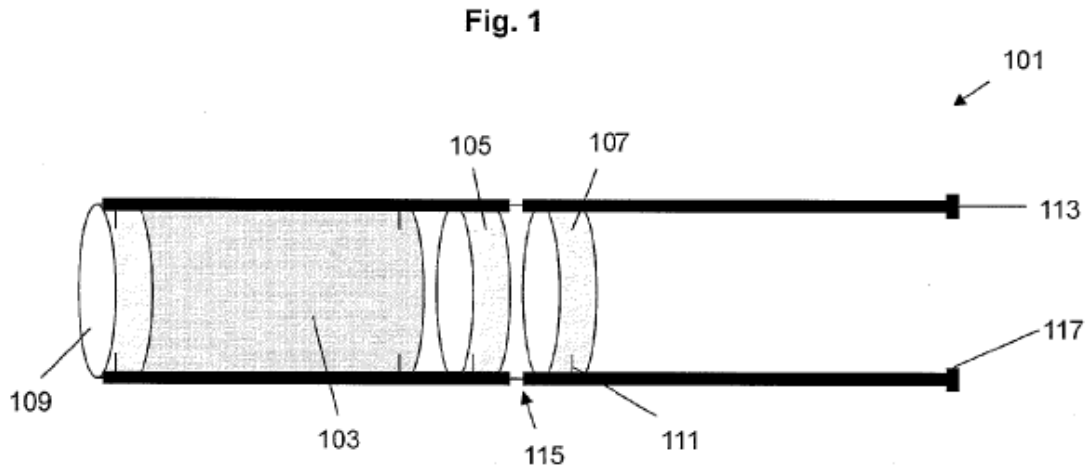


Figure 1 depicts the shell of an electrically heated smoking system. *Id.* ¶ 39. Figure 1 shows shell 101 which includes battery 103, circuitry 105, puff detection system 107, puff indicator 109, electrical connections 111, electrical contacts 113, air inlets 115, and lock mechanism 117. *Id.* ¶ 42. Shell 101 also has lock mechanism 117 to releasably engage with a mouthpiece, which is shown in Figure 2. *Id.* ¶¶ 42, 44.

Figure 2 is reproduced below.

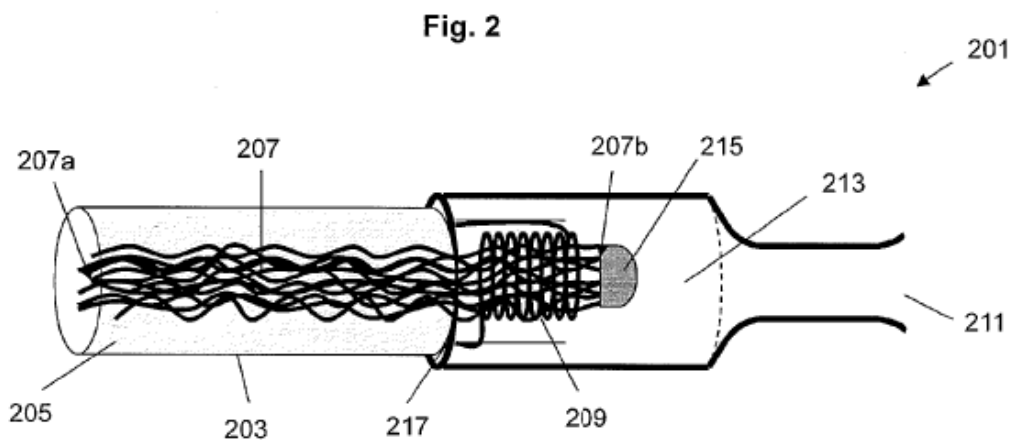


Figure 2 depicts the mouthpiece of an electrically heated smoking system. *Id.* ¶ 40. Mouthpiece 201 includes cartridge 203 containing liquid 205,

capillary wick 207, heating coil 209, air outlet 211, and aerosol forming chamber 213. *Id.* ¶ 43. Thorens describes first end 207a of capillary wick 207 extending into cartridge 203 and second end 207b of capillary wick 207 being surrounded by heating coil 209. *Id.*

Thorens's Figure 3 is reproduced below.

Fig. 3

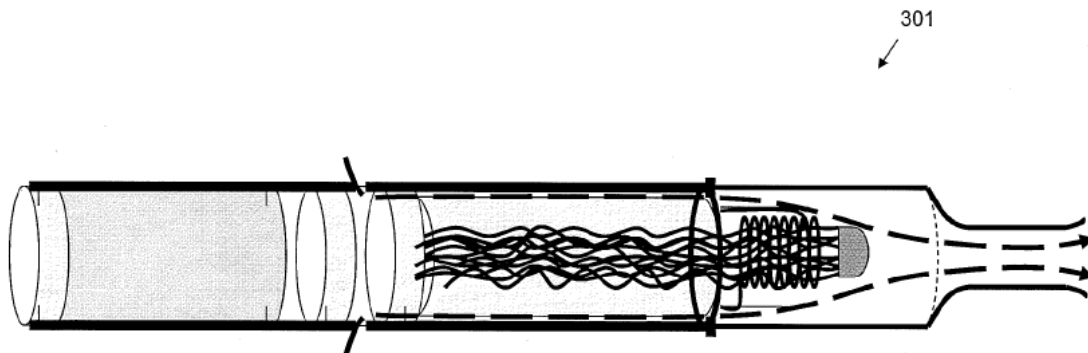


Figure 3 depicts a constructed electrically heated smoking system. *Id.* ¶ 41. Figure 3 shows shell 101 engaged with mouthpiece 201 to form electrically heated smoking system 301. *Id.* ¶ 44. Thorens explains that when a user draws on the device at air outlet 211, ambient air is drawn through air inlets 115. *Id.* ¶ 45. Puff detection system 107 senses this and activates heating coil 209, which heats second end 207b of wick 207. *Id.* Liquid in second end 207b is vaporized to create a supersaturated vapor that is mixed and carried in the air flow from air inlets 115 towards aerosol forming chamber 213 where the vapor condenses to form an inhalable aerosol. *Id.* The aerosol is then carried towards outlet 211 into a user's mouth. *Id.* Thorens explains that ambient air passes around cartridge 203 after being drawn through cartridge 203 and before reaching second end 207b. *Id.* ¶ 48. Thorens also describes an embodiment in which cartridge 203 is positioned downstream of second end 207b and heating coil 209. *Id.* As a result,

ambient air is drawn through air inlets 115 and the vapor or aerosol then passes around cartridge 203 on the way to outlet 211. *Id.*

b) Weigensberg (Ex. 1006)

Weigensberg is titled “Charging Electronic Cigarette” and describes a charger for a battery-operated electronic cigarette that limits exposure to tobacco fumes. Ex. 1006, code (54), ¶ 2. Weigensberg’s Figure 1 is reproduced below.

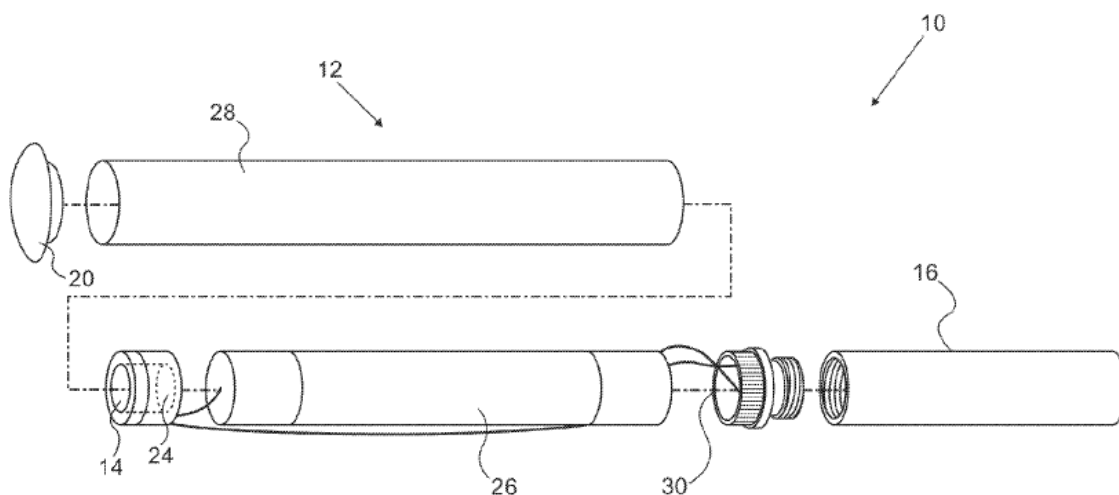


FIG. 1

Figure 1 is an exploded view of an electronic cigarette. *Id.* ¶ 33. As shown in Figure 1, smoking device 10 includes battery section 12 having power control circuitry 14 that is typically encased as a unit with vacuum sensor 24. *Id.* ¶ 58. Device 10 further includes tip 20 and cartridge section 16 having an aerosol generating device. *Id.* ¶¶ 58–59. When smoke enters device 10, an internal pressure typically constricts its flow, which creates a pressure differential that is sensed by vacuum sensor 24. *Id.* ¶ 59. Electronic power control circuitry 14 linked to sensor 24 then activates the aerosol generating device. *Id.*

Weigensberg’s Figure is reproduced below.

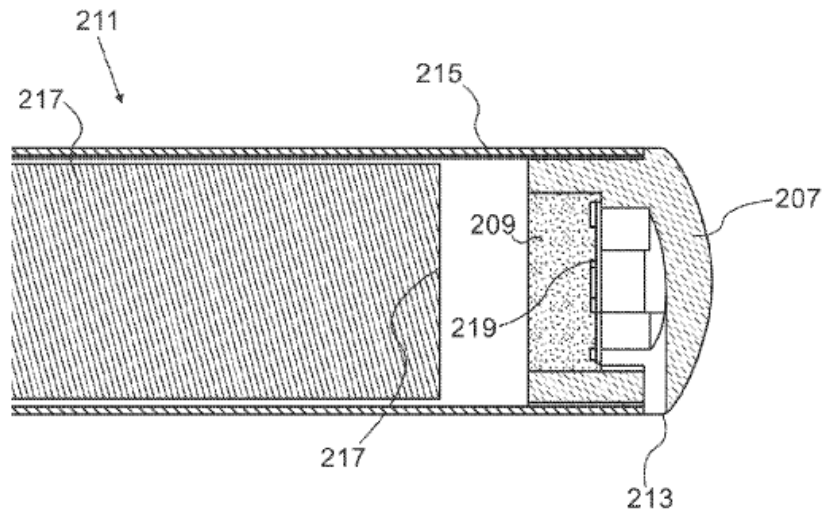


FIG. 24

Figure shows a sectional view of an electronic cigarette. *Id.* ¶ 54.

Weigensberg Figure 24 depicts barrel 215 of electronic cigarette 211 having LED cap 207. *Id.* ¶ 107. Weigensberg states that LED cap 207 “is mostly inset into the end of the barrel 215” and “may be constructed of a plastic material.” *Id.* Sensor unit 209 is located inside LED cap 207, which also has perforation 213 for communication between sensor unit 209 and the ambient atmosphere. *Id.*

2. Analysis of Claim 14

Petitioner alleges that “Thorens and Weigensberg alone or further in view of the knowledge of a [person of ordinary skill in the art] renders obvious claims 14, 27, and 32 of the ’123 patent.” Pet. 63–83.

Petitioner contends that smoking system 301 of Thorens discloses a “vaporizer device body” as recited in claim 14. *Id.* at 70–71 (citing Ex. 1003 ¶¶ 192–193; Ex. 1016 ¶ 44, Figs. 1–3). Petitioner contends that shell 101 receiving mouthpiece 201 that includes vaporizable liquid 205 discloses “a cartridge receptacle configured to insertably receive a cartridge containing a

vaporizable material” as recited in claim 14. *Id.* at 71–73 (citing Ex. 1003 ¶ 194–196; Ex. 1016 ¶¶ 42–43, Figs. 1–3).

Petitioner argues that the combined teachings of Thorens and Weigensberg suggests “a pressure sensor configured to output sensor readings,” as claimed. *Id.* at 73. Specifically, Petitioner argues that “Weigensberg discloses a sensor that outputs sensor readings corresponding to pressure values” as claimed. *Id.* at 73 (citing Ex. 1006 ¶ 87). Petitioner explains that a person of ordinary skill in the art “would have understood that an analog output can include a range of values corresponding to the pressure difference.” *Id.* (citing Ex. 1003 ¶ 98).

Petitioner further contends that Thorens in view of Weigensberg discloses “a first side of the pressure sensor is exposed to a sealed air flow path and a second side of the pressure sensor is exposed to a device air path open to ambient pressure,” as claimed. *Id.* at 75 (citing Ex. 1003 ¶¶ 200–204). According to Petitioner, “Weigensberg discloses a device air flow path open to ambient through perforation 213” and “a sealed air flow path on the opposite side of the sensor.” *Id.* (citing Ex. 1006 ¶¶ 59, 107). Petitioner proposes replacing Thorens’s tip portion with Weigensberg’s tip portion, which comprises a pressure sensor and LED. *Id.* at 76. Therefore, the combined device would have an air flow path through Weigensberg’s perforation 213 which has one side of the pressure sensor exposed to the ambient pressure. *Id.* at 76–77 (citing Ex. 1003 ¶ 202).

Petitioner asserts that Thorens’s negative pressure path, located between the interior surface of the shell 101 and the exterior surface of the cartridge 203, discloses “the sealed air flow path comprising a channel formed between an interior surface of the cartridge receptacle and an

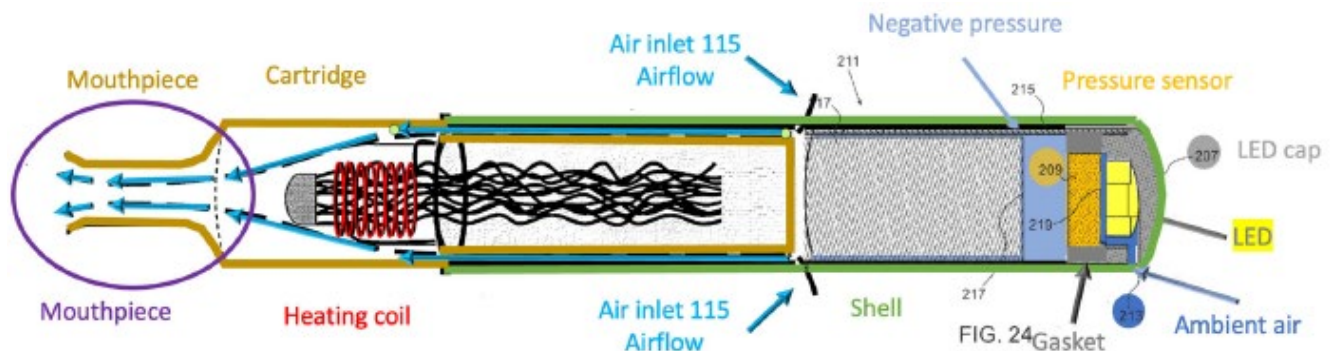
exterior surface of the cartridge” as recited in claim 14. *Id.* at 78–79 (citing Ex. 1016 ¶¶ 45, 48, Figs. 3; Ex. 1003 ¶¶ 205–208). Petitioner also argues that Thorens’s negative pressure path passing from air inlets 115 to the heating coil 209 and the outlet 211 of the mouthpiece discloses “the sealed air flow path passing from an air inlet, through the channel and to a heater and an outlet of a mouthpiece within the cartridge” as recited in claim 14. *Id.* at 80–81 (citing Ex. 1016 ¶¶ 43, 45; Ex. 1003 ¶¶ 209–211).

Petitioner contends that Weigensberg’s plastic LED cap around the pressure sensor to isolate the ambient air pressure from the negative air pressure path inside the device discloses “a gasket around the pressure sensor, [where] the gasket configured to seal the device air path from the sealed air flow path” as recited in claim 14. Pet. 81 (citing Ex. 1003 ¶¶ 212–213; Ex. 1006 ¶¶ 105, 107, Fig. 1). Petitioner also contends that if Weigensberg’s plastic LED cap is not a gasket, an ordinarily skilled artisan would have recognized that Weigensberg’s sensor—“consistent with common practice”—would still have a gasket to isolate the pressure sensor’s ambient side from the negative pressure side because “[i]t was well known that differential pressure sensor[s] would have included a gasket around the pressure sensor to seal the different sensed paths from each other.” *Id.* at 81–82 (citing Ex. 1003 ¶ 214; Ex. 1009, 6:6–9, Fig. 5; Ex. 1022 ¶ 101; Ex. 1023 ¶ 83). Petitioner contends that an ordinary artisan would have used Weigensberg’s sensor and LED cap or gasket to modify Thorens to disclose limitation [14.G]. *Id.* at 83 (citing Ex. 1003 ¶¶ 215–216).

Petitioner also contends that an ordinary artisan would have been motivated to combine Thorens and Weigensberg because a differential pressure sensor is a design choice, a differential pressure sensor open to

ambient air can accommodate external pressure changes, Weigensberg's sensor outputs values that can be used to add features to the device, and replacing Thorens's puff sensor can free up space. Pet. 68–69 (citing Ex. 1003 ¶ 190; Ex. 1016 ¶ 34; Ex. 1021, 25:4–7; Ex. 1022 ¶ 101; Ex. 1023 ¶ 83). Petitioner asserts that an ordinary artisan would have had a reasonable expectation of success modifying Thorens in view of Weigensberg because both disclose similar devices on which an ordinary artisan could make minor adjustments. *Id.* at 68–69 (citing Ex. 1003 ¶ 187–188, 191; Ex. 1006 ¶ 58).

By way of example, Petitioner provides a figure depicting a modified version of Thorens in which Thorens's tip comprising an LED is replaced by Weigensberg's tip portion, comprising a pressure sensor and an LED. This modified figure is reproduced below.



Modified Thorens and combines the cartridge of Thorens's Figure 3 (positioned left) with Weigensberg's tip shown in Figure 24 (positioned right). *Id.* at 80. Petitioner contends that Weigensberg's pressure sensor 209 (orange) is exposed to ambient air through perforation 213 ("device air path open to ambient pressure," dark blue) and Thorens's negative pressure path from air inlets 115 (light blue) to the smoker's mouth ("sealed air flow path") discloses a "wherein a first side of the pressure sensor is exposed to a

sealed air flow path and a second side of the pressure sensor is exposed to a device air path open to ambient pressure” as recited in claim 14. *Id.* at 75–78 (citing Ex. 1003 ¶¶ 200–204; Ex. 1006 ¶¶ 59, 107, Figs. 23, 24; Ex. 1016 ¶ 48; Ex. 1022 ¶ 101; Ex. 1023 ¶ 83). Modified Thorens further depicts the sealed air path from the air inlet through the channel and to a heater and an outlet of a mouthpiece as claimed. *Id.* at 80. “The mouthpiece 201 [(denoted by a purple circle)] comprises a liquid storage portion in the form of cartridge 203 [(brown)] containing liquid 205, a capillary wick 207, a heating element in the form of heating coil 209 [(red)], an air outlet 211 and an aerosol forming chamber 213.” *Id.* (quoting Ex. 1016 ¶ 43). And lastly, gasket (dark grey), i.e., LED cap 207, is shown surrounding pressure sensor 209 with an LED (yellow) positioned over pressure sensor 200.

Patent Owner does not challenge many of Petitioner’s allegations regarding the teachings of Thorens and Weigensberg. *See generally* PO Resp. But, Patent Owner does argue that Petitioner fails to demonstrate that the skilled artisan would have had a reason to combine Thorens and Weigensberg and that the combination of Thorens and Weigensberg does not teach “a gasket,” instead, “Thorens discloses a plastic LED cap.” PO Resp. 75–76. Because we agree with Patent Owner that Petitioner has failed to adequately establish that a person of ordinary skill in the art would have had reason to combine the teachings of Thorens and Weigensberg, we focus our discussion below on that argument.

Patent Owner argues that an ordinarily skilled artisan would not have been motivated to combine Thorens and Weigensberg because the combination requires a redesign of the device and “Thorens *already detects inhalation.*” PO Resp. 76. Specifically, Patent Owner alleges that

“[w]ithout any explanation, Petitioners’ proposed combination replaces Thorens’ ‘puff detection system’ with a differential pressure sensor [and] [t]he two are not the same.” *Id.* at 77–78 (citing Ex. 2053 ¶¶ 84–85). Patent Owner explains that in a puff detection system, the air flow itself is measured while a differential pressure sensor detects “the reduced pressure in the device compared to ambient air pressure” as an indicator of air flow. *Id.* at 77 (Ex. 2053 ¶ 84). Patent Owner states “the pressure drop through a device will be very dependent on the configuration of the pathway and requires careful design and manufacturing.” *Id.* at 78 (citing Ex. 2053 ¶ 85). According to Patent Owner, “[t]here is therefore no reason to replace Thorens’s sensor with Weigensberg’s differential pressure sensor.” *Id.* (citing Ex. 2053 ¶ 86). Furthermore, Patent Owner alleges that in order to incorporate Weigensberg’s differential pressure sensor, “major design changes” must take place including the elimination of components and the modification of existing ones. *Id.* One such change is Petitioner’s proposed extension of the electrical lines which Patent Owner asserts is an undesirable, poor design choice because it results in exposed wiring that may be damaged due to repeated insertion of the cartridge. *Id.* at 79 (Ex. 2053 ¶ 87). Patent Owner also contends that Petitioner proposes to remove much of Thorens’s programmable circuitry without proposing any replacement which “would leave the device inoperable for its intended purpose.” *Id.* at 80 (citing Ex. 1016 ¶ 46; 2053 ¶ 90).

Patent Owner also contends Petitioner’s reasons to modify Thorens to include the differential pressure sensor of Weigensberg are inadequate. *Id.* at 81. Patent Owner states that because “Thorens requires significant, undesirable changes,” Petitioner’s modifications “are more than just a design

choice.” *Id.* (citing Ex. 2053 ¶93). Patent Owner also asserts that Petitioner’s contention that the modification would “better accommodate external pressure changes” applicable because Thorens’s air flow sensor does not have high altitude issues. *Id.* (citing Ex. 2053 ¶ 94). According to Patent Owner, Petitioner’s argument that the modification “can be used to add features to the device, such as ‘changing heater parameters based on airflow rate’” would “be difficult to implement . . . given that the proposed combination removes Thorens’s control circuit” and Thorens’s air flow sensor “can already detect different airflow rates.” *Id.* at 81–82 (citing Ex. 2053 ¶ 95; Ex. 1016 ¶ 34). And lastly, Patent Owner argues that Petitioner’s position that the combination will permit space to be freed up for a larger battery, is incorrect because more space is used to include the sensor at the tip of the device. *Id.* at 82 (citing Ex. 2053 ¶ 96).

On this record, we are persuaded that Petitioner has not established that the skilled artisan would have had a reason to combine Thorens and Weigensberg. First, Petitioner’s position that Weigensberg describes an “explicit motivation to save space by combining the sensor, integrated circuitry, and LED within Weigensberg’s LED cap” (Reply 22; Pet. 68–69) would not necessarily save space. As Patent Owner explains, “Petitioners’ proposed modification does not save space because the addition of a differential pressure sensor requires air flow paths on both sides of the sensor, as well as an LED cap to separate them.” Sur-reply 24. Petitioner does not effectively rebut Patent Owner’s argument and evidence. Pet. Reply 22 (stating only that Weigensberg describes its sensor combination as space-saving). Furthermore, it appears that Petitioner’s space-saving argument is misplaced. Petitioner’s reason to modify Thorens must identify

a reason to replace the puff detection sensor of Thorens with differential pressure sensor of Weigensberg as proposed. Here, however, Weigensberg does not refer to the space-saving advantage of differential pressure sensors over puff detection sensors, but rather, it describes the advantages of one of Weigensberg's embodiments over another of its embodiments—both utilizing differential pressure sensors. *See e.g.*, Ex. 1006 ¶ 107 (describing Figure 23 as “an embodiment of sensor 24 (FIG. 1), but instead of being inside a plastic housing of its own, the sensor unit 209 is now disposed inside the LED cap 207 in order to save space.”).

Second, we acknowledge Petitioner's argument that differential pressure sensors “can better accommodate external pressure changes” (Pet. 68) but are persuaded by Patent Owner's assertion that “Thorens uses an air flow sensor which does not have this high altitude issue” identified by Petitioner. PO Resp. 81 (citing Ex. 2053 ¶ 94).

Third, the purported advantage of including a sensor with “added features” including changing heater parameters based on air flow (Pet. 68), is already achievable by Thorens which includes programmable “electric circuitry [that] comprises a sensor to detect air flow indicative of a user taking a puff,” which Dr. Collins testifies can “detect different airflow rates.” Ex. 1016 ¶ 34; *see also id.* ¶¶ 15, 46 (explaining that the electronic circuitry is programmable and “can be used to manage device operation”); Ex. 2053 ¶ 95; PO Resp. 81–82; Ex. 1003 ¶ 52 (Mr. McAlexander explaining that the air flow sensor detects a puff and then activates the heating coil in response to the sensed air flow); Ex. 2053 ¶¶ 90–91).

And lastly, we reject Petitioner's view that “Weigensberg's pressure sensor is not materially different from Thorens' and would not require

substantial changes.” Pet. Reply 25. Though the Thorens and Weigensberg devices themselves have similar structures—i.e., a shell, a cartridge, a heater, a mouthpiece, etc.—and their sensors are both used to indicate air flow, that does not mean that their respective sensors are of similar structure, operate in the same manner, or detect the same thing. Patent Owner persuasively details the differences between Thorens’s puff detection sensor which directly measures air flow and Weigensberg’s differential pressure sensor which measures the pressure drop through the device as an indicator of air flow. PO Resp. 78; Ex. 2053 ¶¶ 83–85. Indeed, Weigensberg’s differential pressure sensor requires “separate chambers,” in particular, “one that is exposed to ambient air and sealed off from the other side that is exposed to a pressure sensor in fluid communication with the inhalation” and “Thorens’s sensor is directly adjacent to the air inlet.” Sur-reply 26. Petitioner’s combination modifies Thorens’s device to include Weigensberg’s differential pressure sensor and proposes additional structural changes, including Weigensberg’s “tip” which “combines an LED and pressure sensor” and circuitry within the sensor unit. Pet. 63–68, 73. Petitioner explains that this requires “[e]xtending the electrical lines from Weigensberg’s sensor chip assembly 114 to the electrical contacts 113.” *Id.* at 69. According to Patent Owner, however, this extension of the electrical contacts results in “exposed wiring where the cartridge is inserted” and a person of ordinary skill in the art “would find [this] highly undesirable due to the likelihood that repeated insertion would cause damage to the wiring.” PO Resp. 78 (citing Ex. 2053 ¶ 87). In addition, Patent Owner explains that differential pressure sensors pose other problems such as overheating when clogged and being “tricked by blowing into the

mouthpiece increasing pressure in the device.” *Id.* at 77–78 (citing Ex. 2053 ¶ 84).

Therefore, in view of the challenges and redundancies involved, a person of ordinary skill in the art would have had no reason to replace the puff detection system of Thorens with the differential pressure sensor of Weigensberg as proposed by Petitioner. And, even if an ordinarily skilled artisan *could* have made the combination, we question whether Petitioner has sufficiently explained why an ordinary artisan *would have been motivated* to do so. *See, e.g., Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015) (“[O]bviousness concerns whether a skilled artisan not only *could have made* but *would have been motivated to make* the combinations or modifications of prior art to arrive at the claimed invention.”) (citing *InTouch Techs., Inc. v. VGO Commc’ns, Inc.*, 751 F.3d 1327, 1352 (Fed. Cir. 2014)).

We also reject Petitioner’s attempt, in its Reply, to suggest that Thorens may detect air flow using a pressure sensor. Pet. Reply 23. Notably, Petitioner does not direct our attention to any statement in Thorens that describes its sensor as a pressure sensor. *Id.* Furthermore, if Petitioner understood Thorens to describe a pressure sensor then little need exists to combine Thorens with Weigensberg in the first instance. Pet. 63 (adapting “Thorens to include a differential pressure sensor”), 73. Moreover, Mr. McAlexander’s inconsistent testimony in this regard is unhelpful and lacks credibility. *Compare* Ex. 1003 ¶ 179 (testifying that “Thorens discloses all limitations in [the] claims . . . except that Thorens does not disclose a differential pressure sensor”), *with* Ex. 1043 (testifying that a person of ordinary skill in the art “would have understood that Thorens puff detection

system can encompass various sensors . . . including differential pressure sensors”). Finally, Petitioner, in arguing that Thorens describes a differential pressure sensor, improperly raises a new argument for the first time in its Reply brief. As a result, Petitioner’s argument is too late and, therefore, waived. *See Consolidated Trial Practice Guide*, 73–74 (2019) (Available at <https://www.uspto.gov/TrialPracticeGuideConsolidated>) (“Petitioner may not submit new evidence or argument in reply that it could have presented earlier”).

Because Petitioner has not shown that a person of ordinary skill in the art would have had a reason to combine the teachings of Thorens and Weigensberg, Petitioner has not established by a preponderance of the evidence that claim 14 would have been obvious over the combination of Thorens and Weigensberg.

3. *Remaining Claims 27 and 32*

Petitioner also asserts that claims 27 and 32 would have been unpatentable in view of Thorens and Weigensberg. Pet. 83–87. Claim 32 depends on independent claim 27, which recites limitations substantially similar those discussed above for claim 14 (*see* Ex. 1001, 49:62–67), and Petitioner relies on the same analysis to support its contentions regarding claim 27 (*see* Pet. 83–87). Petitioner does not present any arguments or evidence with respect to claims 27 and 32 that would remedy the defects detailed above with respect to independent claim 14. Therefore, Petitioner fails to establish by a preponderance of the evidence that the combination of Thorens and Weigensberg renders claims 27 and 32 of the ’123 patent obvious.

H. Challenges Based on either Worm or Thorens in combination with Lamb

Petitioner alleges that any of Petitioner’s first four grounds in view of Lamb would have rendered obvious claims 14–16, 18, 27–29, 31, and 32 of the ’123 patent. Pet. 87–99. Petitioner relies on the same analysis and evidence presented above for Grounds 1–4 to support its contentions here. Petitioner introduces Lamb to the combinations of Grounds 1–4 to teach or suggest “pressure sensor configured to output sensor readings” and “gasket around the pressure sensor . . . to seal the device air path from the sealed air flow path” (claims 14 and 27), a capacitive pressure sensor (claims 15 and 28), a MEMS sensor (claims 16 and 29), a pressure sensor that outputs pressure values (claims 18 and 31), and a nicotine formulation (claim 32). *Id.* at 87.

1. Overview of Lamb (Ex. 1005)

Lamb is titled “MEMS-Based Sensor for an Aerosol Delivery Device” and describes aerosol delivery devices, such as smoking articles. Ex. 1005, code (54), ¶ 1. An embodiment of an aerosol delivery device is shown in Figure 1, which is reproduced below.

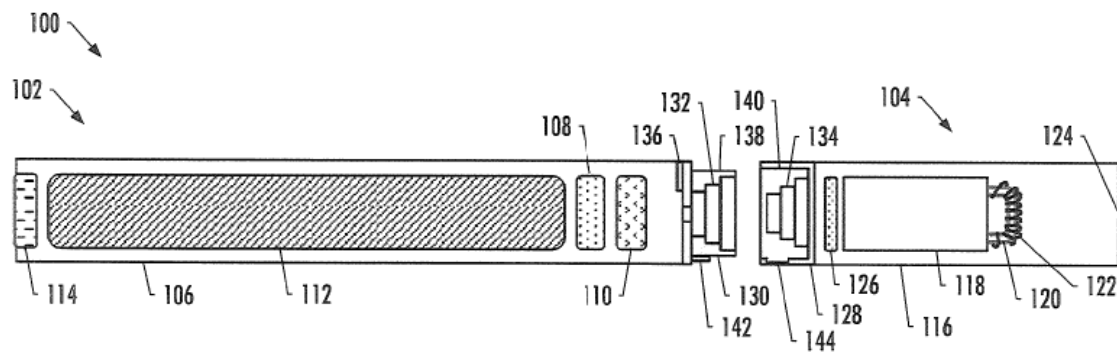


FIG. 1

Figure 1 is a cut-away view of an aerosol delivery device. *Id.* ¶ 11. Aerosol delivery device 100 includes control body 102 and cartridge 104. *Id.* ¶ 24. Control body 102 further includes control component 108, flow sensor 110, battery 112, and light-emitting diode 114. *Id.* ¶ 26. Lamb states that “flow sensor 110 may be implemented by a microelectromechanical systems-based (MEMS-based) sensor such as a MEMS microphone or MEMS pressure sensor.” *Id.* ¶ 43.

According to Lamb, “the MEMS-based sensor may be configured to convert the pressure to the electrical signal that varies with a corresponding variation in the pressure relative to an ambient pressure on the MEMS-based sensor.” *Id.* ¶ 45. Lamb further describes a MEMS microphone that includes a diaphragm that causes the capacitance of a variable capacitor to change when the diaphragm is moved due to a pressure change. *Id.* ¶ 47. The MEMS microphone then outputs a voltage or digital representation thereof as an electrical signal. *Id.*

2. *Analysis of Claim 14*

Petitioner argues that it would be obvious to modify the teachings of Worm (as argued in Grounds 1–3) or Thorens and Weigensberg (as argued in Ground 4) to use Lamb’s MEMS-based pressure sensor configured to output sensor readings (claim limitation [14.C]) and to include a gasket around the pressure sensor (claim limitation [14.G]) from Newton766¹² (incorporated by reference into Lamb). Pet. 87–97 (citing Ex. 1001, 4:49–60; Ex. 1003 ¶¶ 233–260; Ex. 1004 ¶ 77, Fig. 2; Ex. 1005 ¶¶ 4, 6–8, 26, 40, 41, 43, 45–47, Figs. 1, 3; Ex. 1006 ¶¶ 59, 107; Ex. 1009, 6:6–9, Fig. 5;

¹² Newton, U.S. Patent No. 8,499,766 B1, issued Aug. 6, 2013 (Ex. 1009, “Newton766”).

Ex. 1019; Ex. 1014, Abstract, ¶ 11; Ex. 1016 ¶¶ 15, 46; Ex. 1022 ¶ 102; Ex. 1015, 3:3–7; Ex. 1020; Ex. 1028 ¶ 3; Ex. 1021, Abstract, 23:25–28). Petitioner argues that a person of ordinary skill in the art would have had reason to modify Worm or Weigensberg to include Lamb’s MEMS pressure sensor as a matter of “simple substitution of a component that operates in the same manner for the same purpose” and that including “a MEMS pressure sensor . . . ha[s] certain advantages including responsiveness, small footprint, low power consumption, low cost, reliability, precision and easy integration.” *Id.* at 91–94 (citing Ex. 1003 ¶¶ 240–249; Ex. 1001, 4:49–60 (“pressure sensors described herein may be *any differential pressure sensor, such as a MEMS . . .*”); Ex. 1022 ¶ 102; Ex. 1015, 3:3–7; Ex. 1028 ¶ 3; Ex. 1021, 23:25–28, Abstract; Ex. 1014 ¶ 11, Abstract).

Patent Owner argues that “[s]ince these grounds rely on Grounds 1–4 for the claimed air flow path, air inlet and channel, they fail for the same reasons discussed above.” PO Resp. 85. In addition, Patent Owner argues that “Petitioners do not contend that Lamb actually disclose a gasket[, but] [i]nstead, Petitioner’s argue that ‘Lamb incorporates by reference Newton766,’ and Newton766 has a sealing member around its pressure sensor.” *Id.* (citing Pet. 96; Ex. 1005 ¶ 41). Patent Owner also argues that “Lamb clearly limits its incorporation to Newton766’s ‘LED components,’” and does not extend to the sealing member. *Id.* Lastly, Patent Owner asserts that “Petitioner’s do not provide any motivation to combine either Worm or Thorens with Newton766’s gasket.” *Id.* at 86.

On this record, we agree with Patent Owner. Grounds 5–8 correspond to Grounds 1–4 and the addition of Lamb does not remedy our concerns discussed above. Furthermore, Petitioner does not provide a reason to

modify Worm or the combination of Thorens and Weigensberg to include a gasket. Indeed, Petitioner’s motivation to combine arguments are limited to a discussion of the advantages of including Lamb’s sensor. Pet. 90–94; Ex. 1003 ¶¶ 237–249. We acknowledge Petitioner’s argument in its Reply that it has “put forth several reasons to combine Lamb with Thorens” including that “they have similar structures and use a differential pressure sensor.” Pet. Reply 27–28. But Petitioner’s arguments are directed to purported similarities in the prior art structures and not what would have motivated the skilled artisan to combine the teachings of either Worm or Thorens with Lamb to include the claimed gasket described in Newton766. Therefore, Petitioner fails to establish, by a preponderance of the evidence, that claim 14 of the ’123 patent is invalid as obvious over the combination of Worm, with or without the knowledge of a person of ordinary skill in the art or Levitz, and Lamb or the combination of Thorens and Weigensberg with Lamb.

3. *Remaining Claims (Claims 15, 16, 18, 27–29, 31, 32)*

Petitioner also asserts that claims 15, 16, 18, 27–29, 31, and 32 would have been unpatentable the asserted combinations when combined with Lamb. Pet. 97–99. Claims 27 (and claims 15, 16, 18, 28, 29, 31, and 32 by virtue of dependence from either of claim 14 or claim 27) recites limitations substantially similar those discussed above for claim 14 (*see* Ex. 1001, 49:62–67). Petitioner relies on the same analysis to support its contentions regarding claim 27 (*see* Pet. 46–52). Petitioner’s arguments regarding these claims do not address our concern regarding air flow as discussed above regarding claim 14 (*supra* Sections II.D through II.G). Thus, Petitioner fails to establish by a preponderance of the evidence that claims 15, 16, 18, 27–

29, 31, and 32 would have been rendered obvious based for the same reasons set forth above regarding claim 14.

I. Patent Owner’s Motion to Submit Supplemental Information

With prior authorization (Ex. 3002), Patent Owner filed a Motion to Submit Supplemental Information. (Paper 45, “Motion”). Patent Owner seeks to introduce certain portions of the Commission Opinion in Investigation No. 337-TA-1368 that are relevant to the construction of the term “pressure sensor.” Motion 1–2. Petitioner opposes Patent Owner’s Motion. (Paper 46).

Patent Owner proposes using the supplemental information from the Commission Opinion to establish a nexus between its Juul System and the challenged claims of the ’123 patent. Motion 5. Specifically, Patent Owner states that “although the Commission’s determination was in the context of whether JUUL established a Domestic Industry, the Commission’s determination is just as relevant to whether the JUUL System practices the ’123 patent (whether literally or under DOE) for the purposes of establishing nexus to secondary considerations evidence.” *Id.* But because we determine that Petitioner has not shown by a preponderance of the evidence that the challenged claims of the ’123 patent are unpatentable, we need not consider Patent Owner’s argument and evidence relating to objective indicia of nonobviousness. *See supra* note 11. Accordingly, Patent Owner’s Motion to Submit Supplemental Information is DENIED as moot.

III. CONCLUSION

For the foregoing reasons, Petitioner has not satisfied its burden of demonstrating, by a preponderance of the evidence, that the subject matter of claims 14–16, 18, 27–29, 31, and 32 of the ’123 patent are unpatentable.

In summary:

Claims	35 U.S.C. §	Reference(s)/ Basis	Claim(s) Shown Unpatentable	Claim(s) Not Shown Unpatentable
14, 27, 32	102	Worm		14, 27, 32
14, 27, 32	103	Worm, knowledge of a person of ordinary skill in the art		14, 27, 32
14, 27, 32	103	Worm, Levitz		14, 27, 32
14, 27, 32	103	Thorens, Weigensberg, knowledge of a person of ordinary skill in the art		14, 27, 32
14–16, 18, 27–29, 31, 32	103	Worm, Lamb		14–16, 18, 27–29, 31, 32
14–16, 18, 27–29, 31, 32	103	Worm, knowledge of a person of ordinary skill in the art, Lamb		14–16, 18, 27–29, 31, 32
14–16, 18, 27–29, 31, 32	103	Worm, Levitz, Lamb		14–16, 18, 27–29, 31, 32
14–16, 18, 27–29, 31, 32	103	Thorens, Weigensberg, Lamb		14–16, 18, 27–29, 31, 32

Claims	35 U.S.C. §	Reference(s)/ Basis	Claim(s) Shown Unpatentable	Claim(s) Not Shown Unpatentable
14, 27, 32	102	Worm		14, 27, 32
Overall Outcome				14–16, 18, 27–29, 31, 32

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 14–16, 18, 27–29, 31, and 32 of U.S. Patent No. 10,130,123 B2 are not proven unpatentable;

FURTHER ORDERED that Patent Owner’s Motion to Submit Supplemental Information is DENIED; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

IPR2024-00231
Patent 10,130,123 B2

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