

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

JUUL LABS, INC.,
Petitioner,

v.

NJOY, LLC,
Patent Owner.

IPR2024-00161
Patent 10,334,881 B1

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

KAISER, *Administrative Patent Judge*.

JUDGMENT

Final Written Decision

Determining No Challenged Claims Unpatentable

Dismissing Patent Owner's Motion to Exclude

35 U.S.C. § 318(a), 37 C.F.R. § 42.64(c)

I. INTRODUCTION

A. Background

JUUL Labs, Inc. (“Petitioner”) filed a Petition (Paper 2, “Pet.”) requesting *inter partes* review of claims 1–27 of U.S. Patent No. 10,334,881 B1 (Ex. 1001, “the ’881 patent”). NJOY, LLC (“Patent Owner”) filed a Preliminary Response. Paper 6 (“Prelim. Resp.”). Petitioner filed a Preliminary Reply to the Preliminary Response, Paper 7 (“Prelim. Reply”), and Patent Owner filed a Preliminary Sur-Reply to the Preliminary Reply. Paper 8 (“Prelim. Sur-Reply”).

On May 24, 2024, we instituted *inter partes* review of claims 1–27 of the ’881 patent on all grounds set forth in the Petition. Paper 9 (“Inst. Dec.”). After institution of trial, Patent Owner filed a Response (Paper 16, “PO Resp.”), Petitioner filed a Reply (Paper 21), and Patent Owner filed a Sur-Reply (Paper 24). In addition, Patent Owner filed a motion to exclude evidence (Paper 29), Petitioner filed an opposition (Paper 31), and Patent Owner filed a reply (Paper 32). At the request of both parties, we held an oral hearing, the transcript of which has been entered into the record. Paper 37 (“Tr.”).

We have jurisdiction under 35 U.S.C. § 6. This is a Final Written Decision under 35 U.S.C. § 318(a) as to the patentability of the challenged claims of the ’881 patent. For the reasons discussed below, we determine Petitioner has not established by a preponderance of the evidence that any of claims 1–27 of the ’881 patent is unpatentable.

B. Related Matters

The parties identify *Certain Vaporizer Devices, Cartridges Used Therewith, and Components Thereof*, 337-TA-1372 (ITC), and *NJOY, LLC*

v. JUUL Labs, Inc., 1:23-cv-00917 (D. Del.), as related proceedings. Pet. 4; Paper 5, 1. Petitioner also states that the '881 patent was previously the subject of litigation by Patent Owner's "predecessor-in-interest Fuma International LLC as plaintiff against R.J. Reynolds Vapor Company in the U.S. District Court for Middle District of North Carolina, Case Nos. 1-19-cv-00260 and 1-19-cv-00660, both of which were dismissed on December 2, 2021." Pet. 5 (the "M.D.N.C. Litigation").

C. The Instituted Grounds of Unpatentability

Petitioner contends that claims 1–27 of the '881 patent are unpatentable based on the following grounds (Pet. 27–119):¹

Claims Challenged	35 U.S.C. § ²	References/Basis
1–27	103	Xia, ³ Wang, ⁴ Fang ⁵
1–27	103	Wang, Fang

¹ Petitioner also relies on a declaration from Robert H. Sturges, Ph.D. Ex. 1007.

² The Leahy-Smith America Invents Act ("AIA"), Pub. L. No. 112–29, 125 Stat. 284 (2011), amended 35 U.S.C. § 103, effective March 16, 2013. Because applications from which the '881 patent claims priority were filed before this date, the pre-AIA version of § 103 applies.

³ CN201238610Y, issued May 20, 2009 (Ex. 1027; English translation provided as Ex. 1004). When referring to foreign references in this decision, we refer to the English translations.

⁴ CN101366554A, published Feb. 18, 2009 (Ex. 1029; English translation provided as Ex. 1005).

⁵ CN 201085044Y, issued July 16, 2008 (Ex. 1031; English translation provided as Ex. 1006).

D. The '881 Patent

The '881 patent, titled “Electronic Vaporizer,” issued on July 2, 2019. Ex. 1001, codes (45), (54). The '881 is directed to an “electronic vaporizer includ[ing] a cartridge that facilitates provision of a vaporized solution to an individual.” *Id.* at code (57). The '881 patent states that “[c]onventional electronic cigarette designs generally include a battery, a heating element, and a mouthpiece. The mouthpiece includes a liquid solution that comprises nicotine, and the battery provides power to the heating element, which in turn operates to vaporize the solution.” *Id.* at 1:21–26. The '881 patent further states that “manufacturers of vaporizers generally manufacture a power source and a heating element in a proprietary manner, such that only a heating element provided by the manufacturer can be electrically or electronically coupled to a power source provided by the manufacturer.” *Id.* at 1:62–66. The '881 patent provides adapters “configured to electrically or electronically couple power sources from a first manufacturer with a heating element from a second manufacturer.” *Id.* at 2:5–7.

Figure 1 of the '881 patent is reproduced below.

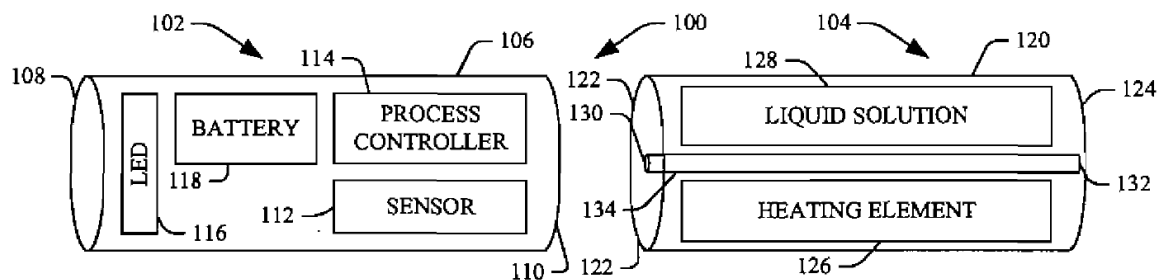


Figure 1 depicts “a functional block diagram of an exemplary electronic vaporizer.” *Id.* at 2:18–19. Electronic vaporizer 100 includes power source 102 and cartridge 104, which are mechanically and electrically coupled. *Id.* at 2:60–63.

Power source 102 includes housing 106 having first end 108, second end 110, and an interior. *Id.* at 3:10, 3:26–28. Second end 110 can include an aperture (not shown) configured to receive airflow from a user. *Id.* at 3:28–30. Cartridge 104 includes housing 120 having first end 122 and second end 124, both of which may be considered as a portion of the housing or apart from the housing, heating element 126 in the interior of housing 120, and solution 128 in the interior of housing 120. *Id.* at 3:44–47, 3:63–64, 4:5–6. First end 122 comprises first aperture 130 that is located approximately the center of first end 122. *Id.* at 4:28–30. Similarly, second end 124 comprises second aperture 132 that is located at approximately the center of second end 124 of cartridge 104. *Id.* at 4:30–32. Airflow passageway 134 extends between first aperture 130 and second aperture 132 axially proximate to the center of housing 120. *Id.* at 4:33–35.

Figure 2 of the '881 patent is reproduced below.

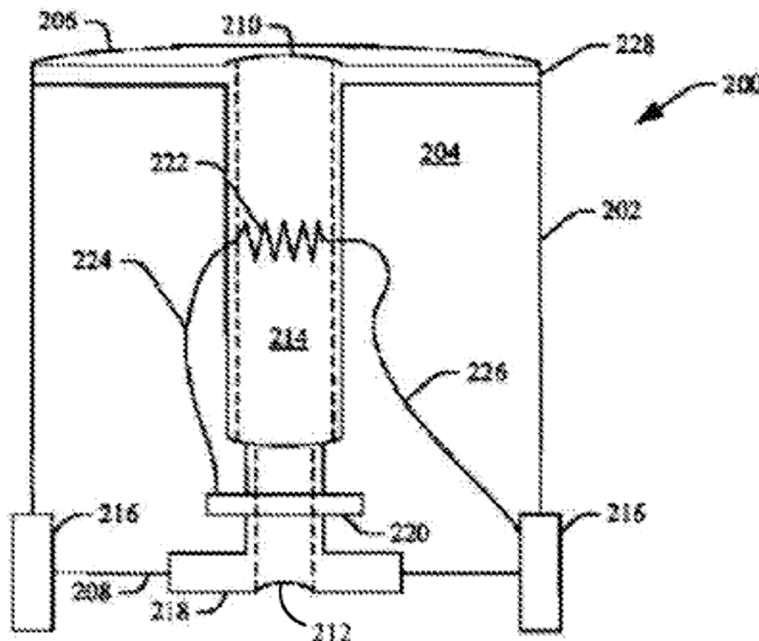


Figure 2 depicts an “exemplary configuration of a cartridge for utilization in an electronic vaporizer.” *Id.* at 2:20–21. Cartridge 200 includes housing 202 having first end 206, second end 208, and liquid solution in absorbent material 204. *Id.* at 5:65–6:4. First and second ends 206, 208 have respective first and second apertures 210, 212; “air passageway 214 begins at the first aperture 210 and extends to the second aperture 212 approximately along the central axis of cartridge 200.” *Id.* at 6:10–22. Cartridge 200 further includes conductive element 216 having metallic threads that facilitate mechanically and electrically coupling the cartridge 200 with a power source (battery). *Id.* at 6:25–29. Conductive lines 224, 226 couple heating element 222 to electrical isolator 220 and conductive element 216. *Id.* at 6:41–44.

E. Illustrative Claim

Claims 1–27 of the ’881 patent are challenged. Claims 1, 8, and 16 are independent, and claim 1 is illustrative; it recites:

1[p] An apparatus comprising:

1[a1] a power source,

1[a2] wherein the power source includes a battery,

1[a3] wherein the power source includes an electrically conductive portion; and

1[b1] a cartridge having a housing that comprises an interior,

1[b2] wherein the housing includes a first end and a second end that is opposite the first end, wherein the housing includes a first aperture on the first end and a second aperture on the second end,

1[c] wherein the housing includes an airflow passageway that extends centrally and axially with respect to the

housing intermediate of the first aperture on the first end of the housing and the second aperture on the second end of the housing,

1[d] wherein the airflow passageway is configured to allow an airflow through the cartridge from the first aperture to the second aperture of the housing,

1[e] wherein the first end of the housing includes an electrically conductive portion that is adapted to mechanically and electrically couple to the electrically conductive portion of the power source,

1[f] wherein the housing includes a solution holding medium adapted to hold a solution in the interior of the housing,

1[g] wherein the housing includes a heating element located in the interior of the housing, wherein the heating element extends transversely across the airflow passageway, wherein the airflow through the passageway passes on both transverse sides of the element,

1[h] wherein the solution holding medium surrounds the airflow passageway and the heating element in the interior of the housing and intermediate of the first end and the second end,

1[i] wherein the heating element is electrically configured to vaporize at least a portion of the solution to be contained in the solution holding medium for oral provision to an individual in an airflow from the second aperture responsive to electrical power received from the battery through the electrically conductive portions of the cartridge and the power source.

Ex. 1001, 17:16–57 (bracketed annotations added by Petitioner).

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). The burden of persuasion never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015).

A claim is unpatentable under 35 U.S.C. § 103 if “the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains.” 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) when present, objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

To show obviousness, it is not enough to merely show that the prior art includes separate references covering each separate limitation in a challenged claim. *Unigene Labs., Inc. v. Apotex, Inc.*, 655 F.3d 1352, 1360 (Fed. Cir. 2011). “Rather, obviousness requires the additional showing that a person of ordinary skill at the time of the invention would have selected and combined those prior art elements in the normal course of research and development to yield the claimed invention.” *Id.* (citing *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007)). “This is so because inventions in

most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known.” *KSR*, 550 U.S. at 418–19. On the other hand, an obviousness analysis “need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.” *Id.* at 418; *accord In re Translogic Tech., Inc.*, 504 F.3d 1249, 1259 (Fed. Cir. 2007).

B. Level of Ordinary Skill in the Art

Petitioner contends that a person of ordinary skill in the art (“POSITA”) “would have had a mechanical or electrical engineering degree, industrial design degree, or a similar technical degree, or equivalent work experience, and 5 to 10 years of experience in electromechanical devices.” Pet. 10 (citing Ex. 1007 ¶ 16). Prior to institution, Patent Owner stated that, for “the limited purpose of this Preliminary Response,” it “does not challenge the definition of a POSITA set forth in the Petition.” Prelim. Resp. 9. We adopted Petitioner’s proposed definition in our Decision granting institution. During trial, neither party disputed this definition. Upon a complete record, we see no reason to change the adopted definition.

C. Claim Construction

In an *inter partes* review, 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.*

During trial, the parties argued regarding the construction of two claim terms, “housing having a first aperture on the first end” and “airflow passageway” extending “centrally and axially.” PO Resp. 22–37; Reply 9–17; Sur-Reply 7–12. We address each of these disputes below, and we determine that we need not expressly construe any other claim terms in order to resolve this case. *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).

1. “the housing includes/having a first aperture on the first end”

Claim element 1[b2] recites “the housing includes a first end and a second end . . . , wherein the housing includes a first aperture on the first end.” Ex. 1001, 17:22–25. Corresponding language in independent claims 8 and 16 recites “the housing having a first end and a second end . . . , the housing having a first aperture on the first end.” *Id.* at 18:23–26, 19:25–29.

When we instituted trial, we preliminarily construed this phrase to encompass apertures that are located within the first end of the housing, determining on the record available at that time that “[t]he term does not

require that the first aperture be located in the housing itself.” Inst. Dec. 16. We invited the parties to “address [the] construction of this term during trial,” *id.*, and, on the full record developed during trial, we reach a different conclusion.

a. Parties’ Positions

Petitioner presents no express claim construction of this term, but argues that, in the M.D.N.C. Litigation, Patent Owner “took—and the District Court adopted—positions relevant to this petition, including positions regarding the claimed first aperture.” Pet. 11. Petitioner argues that Patent Owner “asserted that the claimed ‘first aperture on the first end’ of the cartridge housing is met by a single opening inside the housing, where air entering the cartridge converges at that opening to pass through to the alleged airflow passageway.” *Id.* at 12 (citing Ex. 1021 (“Fuma Summary Judgment Brief”), 9–12). Petitioner asserts that the district court agreed with Patent Owner when it granted summary judgment of infringement, and that the district court “explicitly held that the aperture internal to the device, at the beginning of the internal passageway, *i.e.*, the hole within the internally-contained ‘positive pin’ depicted above, meets the requirement for a first aperture ‘on the first end.’” Pet. 12–13 (citing Ex. 1014 (“RJR Brief”), 44; Ex. 1015 (“Summary Judgment Order”), 14–18). Petitioner argues that in the parallel ITC case, “Patent Owner is asserting this same product is covered by the ’881 patent claims and that this internal aperture meets the ‘on’ limitation.” *Id.* at 13. Petitioner argues, in connection with Ground 1, that “the position of a first aperture is not limited to only the very edge or exterior of the device.” *Id.* at 35. In arguing the merits of the case,

Petitioner asserts that claim element 1[b2] is met by first apertures in Xia and Wang. *See, e.g., id.* at 32–36 (asserting Xia discloses a “first aperture”), 90–91 (asserting Wang discloses a “first aperture”).

Patent Owner responds that, for “the housing [to have] a first aperture on the first end,” there must be “a hole in the housing structure on the first end of the housing.” PO Resp. 28. According to Patent Owner, the proper construction excludes “holes in objects within the housing.” *Id.* Patent Owner argues that the challenged claims use the terms “includes” or “having” in two different ways, one relating to “a solution holding medium reservoir” within the housing, and the other relating to the “first aperture on the first end,” which “recites a characteristic of the housing itself.” *Id.* at 29. Patent Owner further argues that the language of the specification and the arguments in the M.D.N.C. Litigation both support Patent Owner’s proposed construction. *Id.* at 30–37.

Petitioner replies that Patent Owner’s proposed construction is inconsistent with the arguments and conclusions in the M.D.N.C. Litigation and the related ITC litigation. Reply 9–13. Petitioner also argues that Patent Owner’s proposed construction is inconsistent with the representations the applicants made during examination of the ’881 patent. *Id.* at 13–15. According to Petitioner, Patent Owner “and its predecessor-in-interest, Fuma, have consistently taken the position (during examination, in Federal District Court, and at the ITC) that internal apertures can satisfy the claims, and [they] should be held to that claim scope.” *Id.* at 15.

Patent Owner argues that Petitioner is incorrect and that the representations made during examination and litigation are consistent with Patent Owner’s proposed construction. Sur-Reply 7–11.

b. Analysis

(1) Intrinsic Evidence

We start with the language of the claims themselves. Claim 1 recites that “the housing includes a first aperture on the first end,” as well as that “the housing includes a first end.” Ex. 1001, 17:21–25. Claims 8 and 16 similarly recite a “housing having a first end” and “the housing having a first aperture on the first end.” *Id.* at 18:23–26, 19:25–31. We note that the same terms—“having” and “includes”—are used in the same claims in reciting “the housing includes a solution holding medium” and “a housing having an interior and a solution holding medium reservoir.” *Id.* at 17:38–40, 18:22–23, 19:23–25. These latter uses show that “having” and “includes” can refer to elements that are located inside the housing. *Id.* at 9:32–34 (a “heating element and liquid solution (e.g., placed in an absorbent material) are caused to be included in the housing”), 9:36–38 (“The heating element and the liquid solution reside in the interior of the housing.”). The use of the same phrase twice in each claim creates the presumption that the phrase is used consistently throughout the claim. *See Rexnord Corp. v. Laitram Corp.*, 274 F.3d 1336, 1342 (Fed. Cir. 2001) (“a claim term should be construed consistently with its appearance in other places in the same claim or in other claims of the same patent”). Thus, there is a presumption that “the housing includes a first aperture on the first end” and “the housing having a first aperture on the first end” should be interpreted as including apertures located in the interior of the housing, rather than limited to apertures that are physically part of the housing.

Patent Owner argues, however, that this presumption is overcome in the present case, and we agree. PO Resp. 28–32. We note that, although the

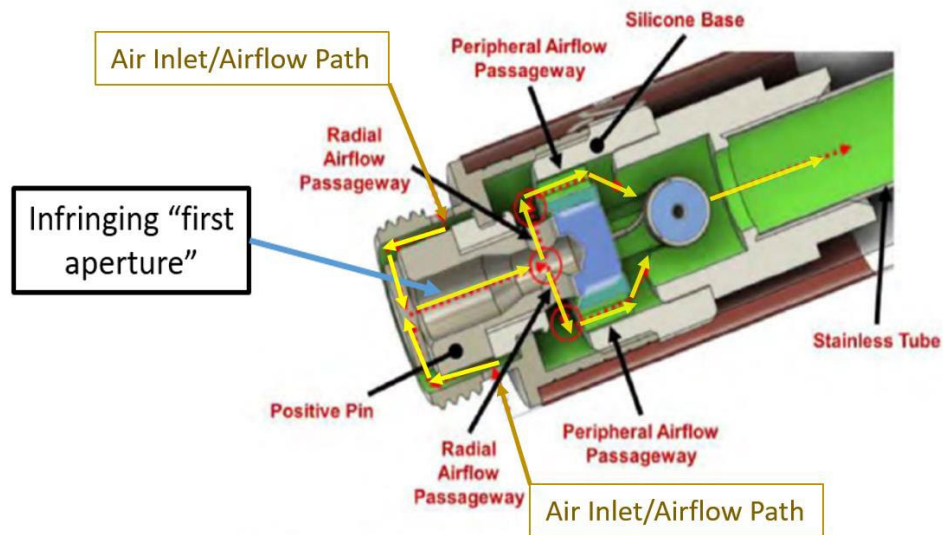
claims require the first aperture to be “on the first end,” the claims still require that the “housing hav[e] a first aperture.” Thus, the issue is whether the aperture must be on the housing itself or part of the housing, as well as whether the aperture is on the first end of the housing. Although “having” and “includes” are used with respect to the solution holding medium to refer to elements located inside the housing, the specification of the ’881 patent suggests that the ends of the housing are part of the housing itself, rather than located inside the housing. First, “the first end . . . can be integrated into a single assembly as part of the housing.” Ex. 1001, 6:16–17. Second, “the housing . . . may comprise the cylindrical wall and two end-caps,” or “the housing . . . may comprise the cartridge wall and a single end-cap.” *Id.* at 3:55–59. The only figures of the ’881 patent that depict first end 206 show it at the end of the housing rather than located within the interior of housing 202. *Id.* at Figs. 2, 3.

Moreover, there is no requirement to construe a claim term uniformly across multiple uses in the claims when doing so would be nonsensical. *Microprocessor Enhancement Corp. v. Texas Instruments, Inc.*, 520 F.3d 1367, 1375 (Fed. Cir. 2008). Here, construing a first element that is recited as “having” or “includ[ing]” a second element *always* as encompassing not only second elements that are part of the first element, but also second elements that are located within the interior of the first element, would lead to nonsensical results. Claim 2 recites an airflow passageway “having a length having a circular cross section.” Ex. 1001, 17:59–60. It would be nonsensical to interpret this claim as encompassing an airflow passageway of non-circular cross section that contains another object that has a circular cross section, and neither party argues in favor of such a reading. Similarly,

claim 16 recites an “airflow passageway having an interior having a uniform cross-sectional area,” and there is no reason to interpret this claim as encompassing an airflow passageway of non-uniform cross-sectional area that contains another object that itself has uniform cross-sectional area. *Id.* at 19:47–48. Thus, the claims do not use “having” or “includes” consistently to refer to elements located within the interior of an object; instead, they sometimes use these terms to refer to elements that are a part of an object. *See Epcon Gas Sys., Inc. v. Bauer Compressors, Inc.*, 279 F.3d 1022, 1030–31 (Fed. Cir. 2002) (terms should be construed based on the context of how the terms are used in the claims).

(2) Extrinsic Evidence

In addition, the extrinsic evidence supports Patent Owner’s proposed construction. Petitioner asserts that Patent Owner’s predecessor-in-interest mapped the “first aperture” recited in the claims of the ’881 patent to an aperture within a threaded connector, not the housing, in the VUSE Ciro device. Pet. 12 (citing Ex. 1021, 9–12). The figure below is reproduced from the Petition:



Id. The figure above depicts a portion of the VUSE Ciro device with an airflow path annotated in yellow arrows. *Id.*; Reply 12–13 (describing same figure as depicting “the Vuse Ciro”). As indicated by the “Infringing ‘first aperture’” annotation in the figure, Petitioner argues that the identification by Patent Owner’s predecessor-in-interest of “the hole within the . . . ‘positive pin’” as the “first aperture ‘on the first end’” means that “on the first end” must encompass structures internal to the housing because the positive pin is “internally-contained.” Pet. 12–13. Petitioner also argues that Patent Owner made the same assertions in the ITC litigation. *Id.* at 13 (citing Ex. 1032, 4–5).

Patent Owner did not directly identify the aperture within the positive pin as internally contained. Ex. 1032, 4–5. Nor did the district court in the M.D.N.C. Litigation. Ex. 1015, 17–18. And, as Patent Owner notes, the identified aperture in the VUSE Ciro is on the non-planar outer surface of the end of the housing. PO Resp. 33–34. Although there are portions of the housing that extend further from the cartridge than the location of the

aperture, those portions of the housing do not enclose or cover the aperture, placing the aperture on the end of the housing. Ex. 2005, 23, Fig. 1.D.

Having considered the parties’ arguments and the intrinsic and extrinsic evidence of record, we construe the term “the housing includes/having a first aperture on the first end” of the housing to encompass apertures that are part of the first end of the housing. The term does not encompass apertures that are not located the housing itself, but rather are only located on a structure that is located within the interior of the housing.

2. *“airflow passageway” extending “centrally and axially”*

Claim 1 recites “an airflow passageway that extends centrally and axially with respect to the housing intermediate of the first aperture on the first end of the housing and the second aperture on the second end of the housing.” Ex. 1001, 17:26–30. Claims 8 and 16 recite a similar limitation. *Id.* at 18:31–38, 19:38–51.

In the Petition, Petitioner did not propose a construction for this phrase, but Petitioner did inform us that, in related litigation in North Carolina, the district court construed this limitation as an “airflow passageway [that] extends in a straight path through the center of the cartridge from a first opening on the first end to a second opening on the opposite end of the cartridge.” Pet. 11 (footnote omitted). Petitioner also noted that the district court applied this construction to an accused product in which the passageway contained obstructions that forced air to depart from a straight-line path along the central axis of the cartridge. *Id.* at 13–15.

Patent Owner argues that we should interpret “airflow passageway that extends centrally and axially” as “encompass[ing] small obstructions . . .

but exclud[ing] structures that define the airflow passageway.” PO Resp. 22–28. Petitioner disagrees, arguing that “[t]here is no principled distinction between large and small obstacles.” Reply 15–17. Patent Owner responds that “[t]he prosecution history . . . provide[s] guidance,” demonstrating that “obstructions like Han’s or Xia’s liquid storage are ‘large,’ and obstructions diverting airflow no more than the heating element are ‘small.’” Sur-Reply 11–12 (citing PO Resp. 23–28).

On the record developed during trial, we agree with Patent Owner. There is significant evidence of record supporting Patent Owner’s interpretation. In particular, in the prosecution history of U.S. Patent No. 11,491,864, a continuation of the ’881 patent, the applicant argued that a component placed “in the middle of [the] shell” that “forc[es] the airflow around [its] peripheral surface” removed “a central airflow passageway.” Ex. 2029, 351–52. The examiner relied on this argument in determining that the applicant had overcome an earlier rejection. *Id.* at 359. Thus, some obstructions of a passageway render the passageway non-central; in particular those obstructions that force air to flow near the peripheral surface of the housing are large enough to render the passageway non-central.

Not all obstructions are of this type, though. In related litigation in district court, the court determined that the presence of “certain obstacles,” including “a ‘positive pin,’ a ‘silicone base,’ and a ‘heating element,’” that “alter the air’s path as it travels from the base of the airflow passageway to the opposite end” nevertheless did not preclude finding the existence of a central passageway. Ex. 1015, 14–16. In reaching this conclusion, the court relied on the recitation in claims 1 and 8 that “airflow through the passageway pass[es] on both transverse sides of the heating element.” *Id.*

at 16; *see* Ex. 1001, 17:44–45, 18:41–44. We find the court’s analysis persuasive and, because that analysis is supported by the language of the challenged claims, we agree with the court that some obstacles placed in the airflow passageway are small enough to maintain a central passageway.

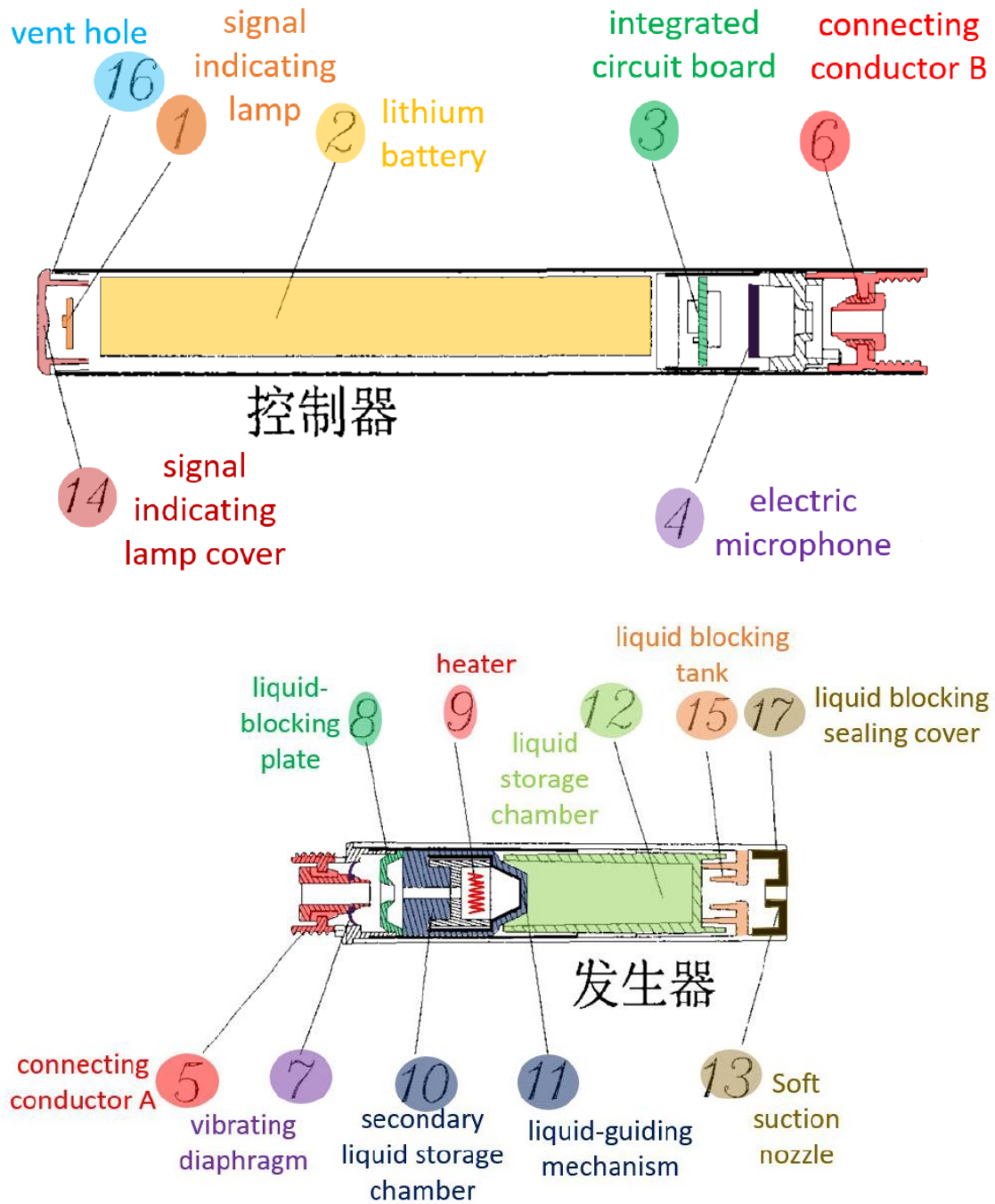
Accordingly, we interpret “airflow passageway that extends centrally and axially” as encompassing passageways that have small obstructions located within them, but as excluding passageways with obstructions large enough to force airflow to the periphery of the housing.

D. Asserted Obviousness over Xia or the Combination of Xia, Wang, and Fang

Petitioner argues that claims 1–27 would have been obvious over Xia alone or over the combination of Xia, Wang, and Fang. Pet. 27–87; Reply 17–26. Patent Owner disagrees. PO Resp. 67–87; Sur-Reply 15–24.

1. Xia

Xia is a Chinese patent titled “Environmental-protecting Type Incombustible Atomizing Electronic Cigarette with Function of Cigarette Substitute” and discloses an electronic cigarette including a “detachable controller and a generator.” Ex. 1004, codes (11), (54), (57); *see also id.* at 7 (“the technical solution . . . [is an] electronic cigarette with a function of a cigarette substitute, comprising a detachable controller and a generator”). Patent Owner’s annotated version of Xia’s Figure 2 from Exhibit 1027 (foreign language version) is reproduced below:



Prelim. Resp. 10–11. Xia’s Figure 2 is a “detachment schematic structural diagram of the . . . atomizing electronic cigarette” comprising a detachable controller (top) and a generator (bottom). Ex. 1004, 9, 17; Ex. 1027, 15.

Xia provides the following listing of the illustrated features:

1 signal indicating lamp, 2 rechargeable lithium battery, 3 integrated circuit board, 4 electret microphone, 5 connecting conductor A, 6 connecting conductor B, 7 vibrating diaphragm, 8 liquid-blocking plate, 9 heater, 10 secondary liquid storage chamber, 11 liquid-guiding mechanism, 12 liquid storage chamber, 13 soft suction nozzle, 14 indicating lamp cover, 15 liquid blocking tank, 16 vent hole, 17 liquid blocking sealing cover.

Ex. 1004, 9.

2. *Wang*

Wang is a Chinese patent publication titled “Electronic Pure Cigarette,” and discloses an electronic cigarette including a “cigarette holder part and a cigarette rod part.” Ex. 1005, codes (54), (57); *see also id.* at 4 (“technical solution” is an electronic cigarette that “comprises a cigarette holder part and a cigarette rod part”). Figures 2 and 3 of Wang are reproduced below.

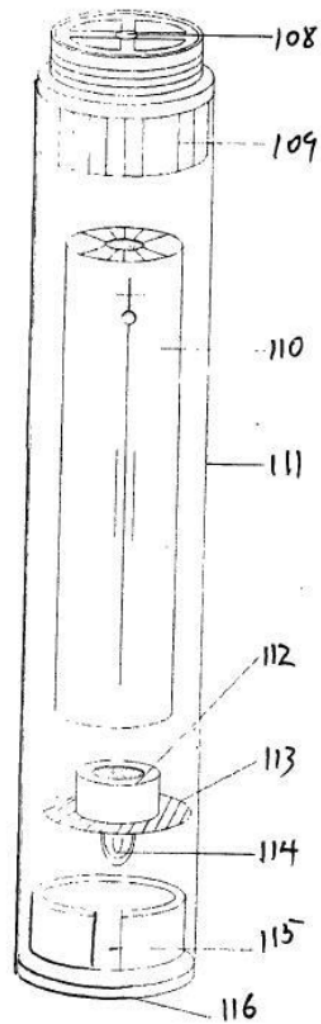


Fig. 2

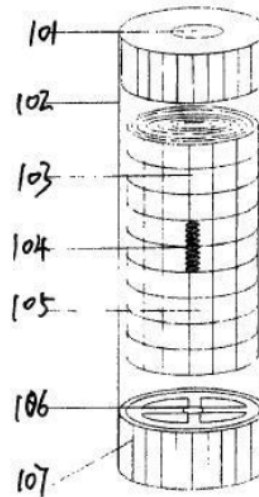


Fig. 3

Figures 2 and 3, shown above, are schematic structural diagrams of a cigarette rod part (Figure 2) and of a cigarette holder part (Figure 3).

Id. at 5.

Wang provides the following listing of the illustrated features:

an electronic pure cigarette comprises a cigarette rod consisting of a cigarette rod shell 111, a battery 110, a sensor 112, an indicating lamp 114, a circuit control board 113, an indicating lamp cover 116, an air inlet 115, an air outlet 108, an output end 109, and the like; and a cigarette holder consisting of a

cigarette holder shell 102, an electric heater 104, a tobacco extract 103, an organic fiber 105, an air inlet 106, an air outlet 101, an input end 107, and the like.

Id.

Rod shell 111 “is a hollow cylinder, providing a space for the battery 110, the sensor 112, the indicating lamp 114, the circuit control board 113 and wires to solder them.” *Id.* at 5–6. At one end of the shell “is one end of the air outlet 108 . . . connected to the input end of the cigarette holder along with the output end 109.” *Id.* at 6. At the other end of the shell “is one end of the air inlet 115 on the indicating lamp cover 116” and “forms an uninterrupted airflow channel together with a gap inside the shell 111.” *Id.*

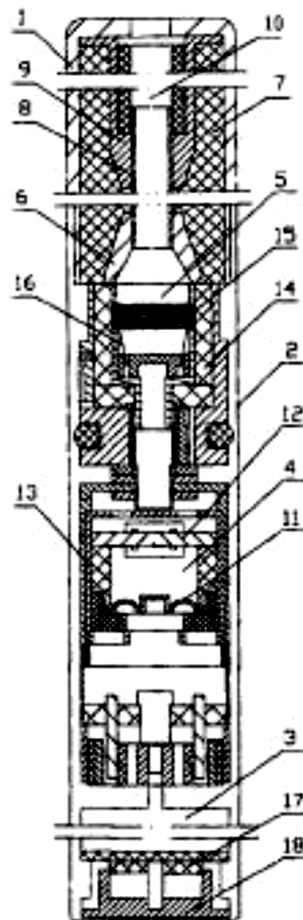
“The cigarette holder shell 102 is a hollow cylinder with one end being one end of the air inlet 106, and is connected to the output end 109 of the cigarette rod together with the input end 107.” *Id.* at 7. “The other end is one end of the air outlet 101.” *Id.* “The interior of the shell 102 provides a space for the electric heater 104 and the tobacco extract 103 and organic fiber 105 wound around it.” *Id.*

The “air inlet 115 of the cigarette rod, an internal gap of the cigarette rod, the air outlet 108 of the cigarette rod, the air inlet 106 of the cigarette holder, an internal gap of the cigarette holder and the air outlet 101 of the cigarette holder form the complete airflow channel.” *Id.* at 8. “The air inlet 115 of the cigarette rod may be placed in the middle or on a side of the indicating lamp cover 116, and may also be opened in the side of the shell 111.” *Id.* at 6. “The air outlet 108 of the cigarette rod is placed in the middle or on a side of the output end 109.” *Id.* “The air inlet 106 of the cigarette holder is placed in the middle or on a side of the input end 107 of

the cigarette holder.” *Id.* at 7. “The air outlet 101 of the cigarette holder may be integrated with the cigarette holder shell 102 or may be separated.” *Id.* at 8.

3. *Fang*

Fang is a Chinese patent titled “Electronic Cigarette,” and discloses an electronic cigarette including a “fuming device control switch” and “nicotine oil fuming device” that are “sequentially nested in the cigarette rod shell.” Ex. 1006, code (54), 4, 6 (“to increase a storage amount of nicotine oil, the oil conservator 7 is nested”). Figure 1, reproduced below, is a “schematic diagram of the utility model.” *Id.* at 5.



Fang provides the following listing of the illustrated features:

1 sucker, 2 cigarette rod shell, 3 battery, 4 fuming device control switch, 5 nicotine oil fuming device, 6 waterproof sleeve with bell mouth, 7 oil conservator, 8 gas pipe, 9 gas pipe support, 10 smoking channel, 11 silicon film-coated tablet, 12 switch circuit board[,], 13 support, 14 oil storage device, 15 temporary oil storage device, 16 electric heating film wire, 17 luminous display panel, 18 lamp cover.

Id. Fang describes the assemblage of the components as follows:

A nicotine oil storage sleeve 7 is nested in the sucker 1, a gas pipe 8 is nested in the center of the evaporation oil storage sleeve 7, the gas pipe 8 is connected with a gas pipe support 9, the gas pipe 8 and the gas pipe support 9 form a smoking channel 10 with the center of the sucker 1 being separated and closed from the oil conservator 7, and the other end of the smoke sucking pipe 8 is communicated with the nicotine oil fuming device 5.

Id.

4. Analysis

Petitioner argues that Xia, or the combination of Xia and Wang, or the combination of Xia, Wang, and Fang, teaches or suggests the subject matter of claims 1–27, as well as that a person of ordinary skill in the art would have had a reason to combine the teachings of Xia, Wang, and Fang with a reasonable expectation of success. Pet. 25–27, 36–52; Reply 20–26.

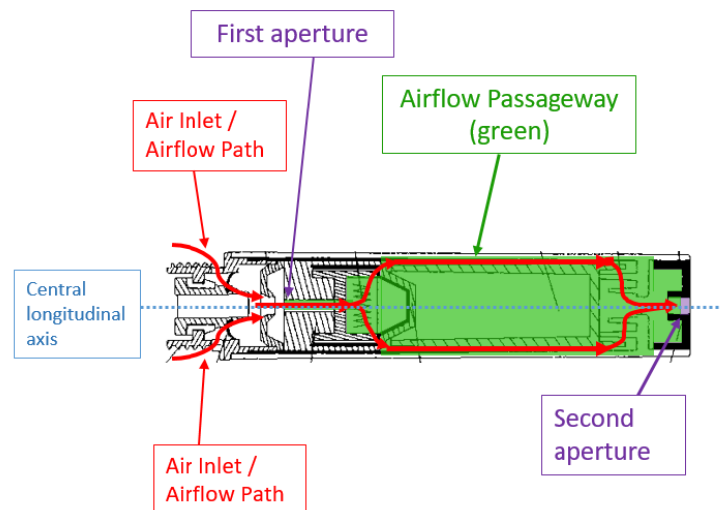
Among other arguments, Patent Owner argues that neither Xia, nor the combination of Xia and Wang, nor the combination of Xia, Wang, and Fang teaches or suggests the “airflow passageway that extends centrally and axially with respect to the housing intermediate of the first aperture on the first end of the housing and the second aperture on the second end of the

housing” that is recited in independent claim 1, or the similar limitations in independent claims 8 and 16. PO Resp. 52–67, 71–73; Sur-Reply 14–24. On the record developed at trial, we agree with Patent Owner.

a. Xia Alone

The challenged claims each recite limitations that require “an airflow passageway that extends centrally and axially with respect to the housing intermediate of the first aperture on the first end of the housing and the second aperture on the second end of the housing.” Ex. 1001, 17:26–30, 18:31–38, 19:38–51. As discussed above, we interpret this limitation to encompass passageways that have small obstructions located within them but to exclude passageways with obstructions large enough to force airflow to the periphery of the housing.

Petitioner argues that Xia teaches or suggests this limitation, depicting the airflow through Xia’s passageway in the annotated figure reproduced below:



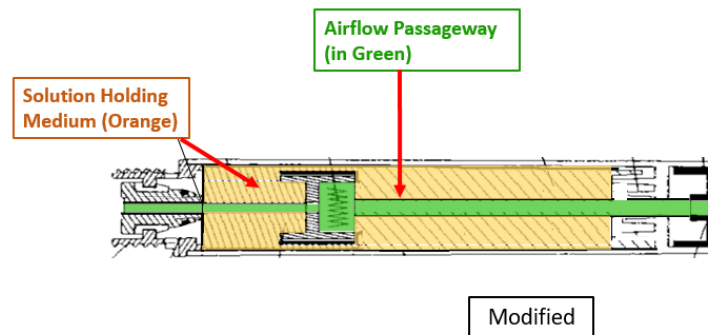
Pet. 39. In the figure reproduced above from the Petition, Petitioner depicts the “Airflow Path” through Xia’s cartridge using red arrows. *Id.* The

airflow path is through spray hole 904, along the central axis of the cartridge and past heating wire 901, then splitting to flow along the inner edge of the housing, between the housing and the outer edge of liquid storage chamber 12. *Id.*; see Ex. 1004, Figs. 2, 4, 5. In this flow path, the airflow is forced to the periphery of the housing. Accordingly, the passageway in Xia does not meet our construction of the limitation that requires a central and axial passageway. Thus, Petitioner has not shown by a preponderance of the evidence that Xia teaches or suggests the recited passageway.

b. Xia and Wang

The challenged claims each recite limitations that require “an airflow passageway that extends centrally and axially with respect to the housing intermediate of the first aperture on the first end of the housing and the second aperture on the second end of the housing.” Ex. 1001, 17:26–30, 18:31–38, 19:38–51. As discussed above, we interpret this limitation to encompass passageways that have small obstructions located within them but to exclude passageways with obstructions large enough to force airflow to the periphery of the housing.

Petitioner argues that the combination of Xia and Wang teaches or suggests this limitation, depicting the passageway of the combined teachings in the annotated figure reproduced below:



Pet. 44. According to Petitioner, a person of ordinary skill in the art would have had reason to combine the teachings of Xia with those of Wang to arrive at a cartridge with an airflow passageway running straight through the center of the cartridge from one end to the other, other than a widened portion in the vicinity of the heating element. *Id.* (depicting the airflow passageway in green).

The parties disagree about whether a person of ordinary skill in the art would have had a reason to combine the teachings of Xia with those of Wang. Petitioner argues that

A POSITA would have been motivated to modify Xia's airflow passageway in light of Wang because, for example, making the obvious change to an airflow passageway located centrally and axially, to the extent it is not already, away from the walls of the housing, with the solution holding medium situated between the passageway and the housing, throughout the length of the housing would provide improved, smoother air flow without pinch points, better temperature control, and vapor content, as well as being simpler and cheaper to design and manufacture. Ex.1007 ¶118. Moreover, improved air flow, temperature, and vapor content can improve the device's appeal to users, for example by making the user experience more similar to a traditional cigarette, and by making the vapor more palatable. *Id.*

This modification would also simplify the structure of the device, making it (1) have fewer parts, and (2) be more easily manufactured by increasing the use of cylindrical shapes. In doing so, a POSITA would move the portion of the liquid blocking plate 8 that stops the backflow of liquid to the end of the secondary liquid storage chamber. Ex.1007 ¶122; *see* Ex. 1004, 13 (“The liquid-blocking plate 8 may prevent the chemical liquid in the secondary liquid storage chamber 10 from flowing out...”).

Pet. 48; *see also* Reply 22–23 (repeating and expanding upon these asserted benefits). Petitioner also argues that “the proposed modifications to Xia” would have “result[ed] in a cheaper and simpler device.” Reply 21–22.

Patent Owner argues that Petitioner’s combination of Xia and Wang “lacks motivation and is plagued by improper hindsight.” Sur-Reply 15–17. On the record developed during trial, we agree with Patent Owner that Petitioner has not shown by a preponderance of the evidence that a person of ordinary skill in the art would have had a reason to combine the teachings of Xia with those of Wang to arrive at the claimed limitations.

Relying on the testimony of Patent Owner’s declarant Dr. Singhose, Petitioner argues that a person of ordinary skill in the art “would have known a central straight path has less airflow resistance than a circuitous one.” Reply 22–23 (citing Ex. 1035, 127:15–128:9). But the same witness also testified that higher airflow resistance might be desirable and explained that providing more resistance to airflow might result in improved mixing. Ex. 1035, 21:21–22:12, 127:20–24, 170:10–14. In addition, Dr. Singhose testifies that the complicated design of the airflow passageway in Xia “serves important functions,” including “allow[ing] large droplets to be reabsorbed by the liquid-guiding mechanism,” allowing “excessive liquid in

the airflow [to] condense,” and “prevent[ing] the chemical liquid from being sucked into the mouth.” Ex. 2022 ¶ 183 (citing Ex. 1004, 11, 13–14, 16). Although Petitioner’s declarant Dr. Sturges testifies that a straight airflow passageway “would provide improved, smoother air flow,” he does not provide any evidence supporting the view that the air flow would be improved. Ex. 1007 ¶ 118. We credit the testimony of Dr. Singhose that using a straight passageway in Xia would have been detrimental rather than beneficial. Ex. 2022 ¶ 183.

Petitioner also argues that the inventors’ use of a straight path is evidence that the use of a straight passageway was “merely common-sense obviousness.” Reply 22–23. This is hindsight. *Otsuka Pharm. Co. v. Sandoz, Inc.*, 678 F.3d 1280, 1296 (Fed. Cir. 2012) (“The inventor’s own path itself never leads to a conclusion of obviousness; that is hindsight.”). Moreover, it does not address the testimony of Dr. Singhose that the use of a complicated passageway like that in Xia had benefits not present in a straight central passageway.

Petitioner argues that, because straightening Xia’s passageway would involve “removal of the over-complicated and error-prone flapping-diaphragm-based suction detection disclosed in Xia,” it both would “create[] greater solution-holding capacity” and would “mak[e] the cartridge cheaper and more reliable.” Reply 23 (citing Ex. 1007 ¶¶ 95–99; Ex. 1035, 58:21–59:4). But the testimony on which Petitioner relies states only that extending Wang’s fiber to “extend all the way from one end to the other” would result in “a device [that] would be able to hold more liquid, all else equal, than the [device of] Wang.” Ex. 1035, 58:21–25. This says nothing about the liquid-holding capacity of the combination of Wang and Xia

relative to that of Xia alone. Moreover, although Dr. Singhose agreed that “storing more liquid” would be “advantageous,” he also testified that extending Wang’s fiber to the end of the cartridge “would be disadvantageous in other ways.” *Id.* at 59:1–4. As for the argument that Petitioner’s proposed change would “mak[e] the cartridge cheaper and more reliable,” Reply 23 (citing Ex. 1007 ¶¶ 95–99), the cited testimony of Dr. Sturges does not discuss the cost or reliability of the modification and thus is not persuasive. Ex. 1007 ¶¶ 95–99.

Because Petitioner has not shown that a person of ordinary skill in the art would have had a reason to combine the teachings of Xia with those of Wang, Petitioner has not shown by a preponderance of the evidence that the challenged claims would have been obvious over the combination of Xia and Wang.

c. Xia, Wang, and Fang

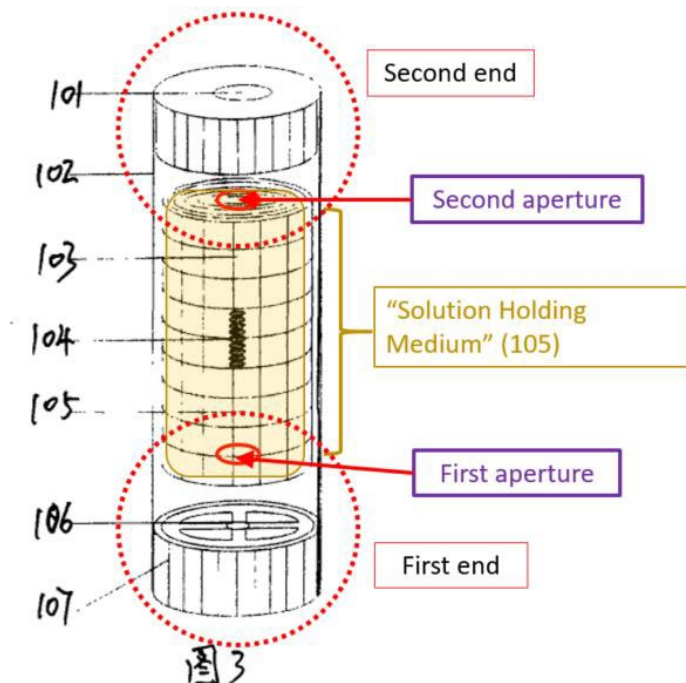
The third argument Petitioner makes for the prior art teaching or suggesting a central and axial passageway relies on the combination of Xia, Wang, and Fang. Pet. 49–52. This argument relies on a person of ordinary skill in the art having had a reason to combine the teachings of all three of these references. *Id.* at 51–52. As discussed above, however, Petitioner does not show sufficiently that a person of ordinary skill in the art would have had a reason to combine the teachings of Xia with those of Wang. Accordingly, Petitioner does not show the obviousness of the challenged claims over any combination that includes the combination of Xia and Wang, such as the combination of Xia, Wang, and Fang.

E. Asserted Obviousness over Wang or the Combination of Wang and Fang

Petitioner argues that claims 1–27 would have been obvious over Wang alone or the combination of Wang and Fang. Pet. 87–118; Reply 26–36. Patent Owner disagrees. PO Resp. 87–97; Sur-Reply 24–36.

The challenged claims each recite limitations that require a “housing having [or including] a first aperture on the first end.” Ex. 1001, 17:23–25, 18:25–26, 19:29–31. As discussed above, we interpret this limitation to encompass apertures that are part of the first end of the housing and not to encompass apertures that are not on the housing, but rather are located on another structure that is within the interior of the housing.

Petitioner argues that Wang teaches or suggests this limitation, as shown in the annotated figure reproduced below:



Pet. 90–91. In the figure reproduced above from the Petition, Petitioner identifies the first end of the housing, as well as the first aperture on one end of the solution holding medium that is contained within the housing. *Id.* Petitioner also argues that a person of ordinary skill in the art would have “extend[ed] the solution-holding medium bringing the apertures to the very edge of the housing . . . , resulting in beneficial increased liquid storage capacity.” Reply 36.

Patent Owner disagrees, arguing that Petitioner’s aperture is not on the housing end and that the evidence of record does not support a finding that a person of ordinary skill in the art would have had reason to extend the solution-holding medium to place the identified aperture at the end of the housing. PO Resp. 89–90; Sur-Reply 35.

On the record developed during trial, we agree with Patent Owner. First, to show that a person of ordinary skill in the art would have had reason to extend the solution-holding medium to “bring[] the apertures to the very edge of the housing,” Petitioner relies on a statement from Patent Owner’s declarant, Dr. Singhose, characterizing that statement as “NJOY’s expert agrees it would be beneficial to” do so because it would “result[] in beneficial increased liquid storage capacity.” Reply 36 (citing Ex. 1035, 58:10–59:4). But Dr. Singhose’s statement actually was that extending the solution-holding medium “would be advantageous in terms of storing more liquid, but . . . would be disadvantageous in other ways.” Ex. 1035, 58:21–59:4. Petitioner directs us to no other evidence of record, Reply 36, and there is therefore no evidence of how a person of ordinary skill in the art would have weighed the advantage of greater liquid storage volume against the disadvantages that Dr. Singhose identified. We do not find such

equivocal and incomplete evidence sufficient to support a finding that a person of ordinary skill in the art would have extended Wang’s solution-holding medium to the ends of the housing.

More importantly, Petitioner’s identified aperture is on the end of the solution-holding medium. Pet. 91. Although Petitioner argues that the aperture is “on the first end . . . of the housing,” Petitioner identifies the aperture only on the solution-holding medium rather than on the housing. *Id.* at 90–91. Petitioner’s declarant, Dr. Sturges, similarly testifies that Wang’s cartridge “has a first end . . . as well as a first aperture on the first end” but relies on an annotated figure identifying the first aperture on the end of the solution-holding medium rather than on the end of the housing. Ex. 1007 ¶ 260. Accordingly, the aperture in Wang does not meet our construction of the limitation that requires an aperture on the end of the housing. Thus, Petitioner has not shown by a preponderance of the evidence that Wang teaches or suggests the recited aperture.

F. Patent Owner’s Motion to Exclude

During trial, Patent Owner moved to exclude Exhibits 1014, 1017, 1018, 1021, 1023–1025, 1036, 1039–1042, and 1044, as well as portions of Exhibits 1007 and 1038. Paper 29, 1.

Because Patent Owner prevails on the merits of Petitioner’s asserted grounds of unpatentability, our decision would be no different were we to exclude any of the exhibits Patent Owner seeks to exclude. Because Patent Owner’s Motion to Exclude would produce no change in the outcome of this proceeding were it to be granted, it is moot. Accordingly, we dismiss the Motion to Exclude.

III. CONCLUSION

For the reasons discussed above, Petitioner has not shown by a preponderance of the evidence that any claim of the '881 patent is unpatentable.

Claim(s)	35 U.S.C. §	Reference(s)/Basis	Claim(s) Shown Unpatentable	Claim(s) Not Shown Unpatentable
1–27	103	Xia, Wang, Fang		1–27
1–27	103	Wang, Fang		1–27
Overall Outcome				1–27

IV. ORDER

It is hereby

ORDERED that, based on the preponderance of the evidence, claims 1–27 of the '881 patent have not been shown to be unpatentable;

FURTHER ORDERED that Patent Owner's Motion to Exclude is dismissed as moot; and

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

IPR2024-00161
Patent 10,334,881 B1

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