

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AROMA360, LLC,
Petitioner,

v.

AIR ESSSENTIALS, INC.,
Patent Owner.

IPR2025-00707
Patent 10,092,918 B1

Before CARL M. DEFRANCO, ERIC C. JESCHKE, and
RICHARD H. MARSCHALL, *Administrative Patent Judges*.

Opinion for the Board filed by *Administrative Patent Judge* JESCHKE.

Opinion dissenting in part filed by *Administrative Patent Judge*
DEFRANCO.

JUDGMENT

Final Written Decision

Determining Some Challenged Claims Unpatentable

35 U.S.C. § 318(a)

Denying Patent Owner's Revised Contingent
Motion to Amend as to Substituting Claim 17

35 U.S.C. § 316(d)

Dismissing Patent Owner's Motion to Exclude

37 C.F.R. § 42.64

I. BACKGROUND

Petitioner Aroma360, LLC challenges claims 1 and 3–8 of U.S. Patent No. 10,092,918 B1 (Ex. 1001, “the challenged patent”), which is assigned to Patent Owner, Air Essentials, Inc. We have jurisdiction under 35 U.S.C. § 6, and we issue this Final Written Decision under 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons below, we conclude that Petitioner has proven, by a preponderance of the evidence, the unpatentability of claim 5 but has not proven, by a preponderance of the evidence, the unpatentability of claims 1, 3, 4, and 6–8. We also dismiss as moot Patent Owner’s Motion to Exclude, and we deny Patent Owner’s Revised Contingent Motion to Amend as to substituting proposed claim 17.

A. Procedural History

Petitioner filed a Petition seeking *inter partes* review of the challenged claims. Paper 2 (“Pet.”). Patent Owner timely filed a Preliminary Response. Paper 8.¹ Patent Owner also filed an authorized brief addressing discretionary denial. Paper 6. After assessing the discretionary denial issues, the Director referred the proceeding to this panel to address the merits and other non-discretionary considerations. Paper 9. Upon review of the arguments and supporting evidence, we instituted an *inter partes* review of all claims and grounds asserted in the Petition. Paper 10 (“Decision on Institution” or “Dec. Inst.”).

After institution, Patent Owner filed a Patent Owner Response (Paper 16, “PO Resp.”) along with a Contingent Motion to Amend the Claims (Paper 15, “MTA”). Petitioner filed a Reply in support of the

¹ As Paper 7 in this proceeding, Patent Owner mistakenly filed the Preliminary Response in a related proceeding.

Petition (Paper 21, “Pet. Reply”) and filed an opposition to Patent Owner’s Motion to Amend (Paper 20). On May 4, 2026, pursuant to Patent Owner’s request (*see* MTA 3), we issued Preliminary Guidance on Patent Owner’s Motion to Amend. Paper 22. Patent Owner then filed a Revised Contingent Motion to Amend with proposed substitute claims 16 and 17 (Paper 25, “RMTA”), and a Sur-reply to Petitioner’s Reply (Paper 26, “PO Sur-reply”). Petitioner opposed Patent Owner’s Revised MTA. Paper 30 (“RMTA Opp.”). Patent Owner filed a Reply in support of its Revised MTA (Paper 33 (“RMTA Reply”)), to which Petitioner filed a Sur-reply (Paper 38 (“RMTA Sur-reply”)).

Petitioner relies on the declaration testimony of Dr. Christopher White, Ph.D., filed with the Petition (Ex. 1002, “White Pet. Decl.”), on a Supplemental Declaration of Dr. White, filed with the Reply (Ex. 1047, “White Reply Decl.”), and on a Second Supplemental Declaration of Dr. White, filed with the Opposition to Patent Owner’s Revised MTA (Ex. 1052). Patent Owner relies on the declaration testimony of Dr. Gerald Micklow, Ph.D., filed with the Patent Owner’s Response. Ex. 2002 (“Micklow Decl.”).²

The parties did not request an oral hearing in this proceeding. *See* Paper 31 (Petitioner declining an oral hearing); Paper 32 (order stating that no oral hearing will be held).

² With the filing of the Sur-reply (Paper 26), Patent Owner also filed two additional declarations from Dr. Micklow (Ex. 2015; Ex. 2016). Because those declarations were improperly filed, we struck them from this proceeding. *See* Paper 36.

B. Related Proceedings

The parties identify a proceeding in the U.S. District Court for the Southern District of Florida involving the challenged patent: *Air Essentials, Inc. v. Aroma360, LLC*, No. 1:24-cv-20594-KMW (S.D. Fla.), filed February 15, 2024 (“the Florida Litigation”). Pet. 1; Paper 4 (Patent Owner’s Mandatory Notice) at 2. The Florida Litigation also involves U.S. Patent No. 9,527,094 B1 (“the ’094 patent”) and U.S. Patent No. 10,583,449 B1 (“the ’449 patent”). The Florida Litigation was stayed on April 8, 2025. Paper 5; IPR2025-00706, Paper 5.

Petitioner also filed petitions for *inter partes* review of claims 7–9 and 11 of the ’094 patent in IPR2025-00705 and (2) claims 1, 4, and 7–10 of the ’449 patent in IPR2025-00706.

C. The Challenged Patent

The challenged patent “relates generally to the field of dispersion of various fluids including, but not limited to, fragrant oils, essential oils, odor neutralizers, disinfectants, e.g., triethylene glycol, air sanitizers, and the like, into a generally enclosed airspace.” Ex. 1001, 1:7–11. According to the challenged patent, “there is a need for a fluid dispersion assembly that is designed to significantly reduce the amount of noise generated during operation” and to operate “quietly while generating a fluid dispersion in air having a uniform particle size distribution, such that dosing of an airspace with a particular liquid . . . can be predicted within acceptable limits.” *Id.* at 1:35–43.

Figure 2 is reproduced below:

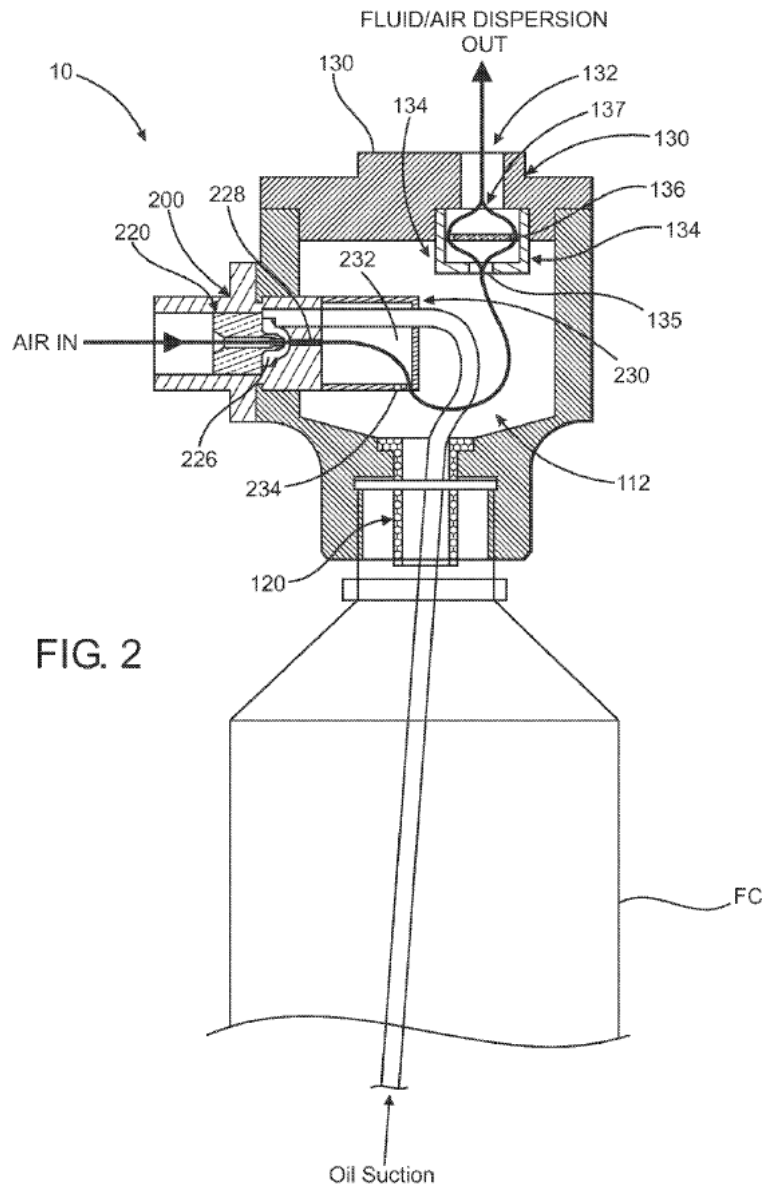


Figure 2 depicts a cross-sectional elevation view of a fluid dispersion assembly 10, powered by a compressed air source. Ex. 1001, 2:53–55, 3:6–9. An unnumbered diffusion unit “at least partially defines a diffusion chamber 112, and in at least one embodiment, the diffusion chamber 112 is

substantially enclosed within [the] diffusion unit.” *Id.* at 3:30–33.³

Discharge port 132 “provides a point of release of the fluid dispersion from the diffusion chamber 112 into the airspace surrounding the fluid dispersion assembly 10.” *Id.* at 3:60–64.

Depicted diffusion assembly 200 “comprises an air inlet 210 and an atomizer assembly 220.” Ex. 1001, 5:13–14. Atomizer assembly 220, in turn, “comprises an atomizer air inlet channel 222, a mixing chamber 226, and an atomizer exhaust channel 228.” *Id.* at 5:15–17.

D. The Challenged Claims

Petitioner challenges claims 1 and 3–8, of which claims 1 and 5 are independent. Claims 3 and 4 depend from claim 1; claims 6–8 depend from claim 5. Independent claim 1 is reproduced below, reformatted from the version provided in the challenged patent and with bracketed labels added to identify each clause:

1. [1PRE] A fluid dispersion assembly operatively engages a container of an operative fluid and a compressed air source and generates and discharges a fluid dispersion into a surrounding airspace, said fluid dispersion assembly comprising:

[1A] a diffusion unit at least partially defining an enclosed diffusion chamber,

[1B] wherein said diffusion chamber comprises an upper chamber and a lower chamber,

[1C] a discharge port disposed in fluid communication between said diffusion chamber and the surrounding airspace,

[1D] a diffusion assembly disposed in an operative engagement with said diffusion unit,

³ In this Decision, we omit emphasis on reference numerals in quotations from the challenged patent and prior art references.

[1E] wherein said diffusion assembly comprises an atomizer assembly,

[1F] said diffusion assembly is disposed between said upper chamber and said lower chamber,

[1G] said atomizer assembly comprising an atomizer air inlet channel, a fluid inlet, a mixing chamber, and an atomizer exhaust aperture, and

[1H] said atomizer air inlet channel interconnected to the compressed air source and

[1I] said fluid inlet disposed in fluid communication with the operative fluid in the container,

[1J] wherein the compressed air and the operative fluid are mixed together in said mixing chamber to form the fluid dispersion.

Ex. 1001, 11:63–12:19.⁴

E. Instituted Grounds of Unpatentability

We instituted *inter partes* review of the challenged claims based on the following grounds of unpatentability asserted by Petitioner:

Claim(s) Challenged	35 U.S.C. § ⁵	Reference(s)/Basis
1, 3–8	103	Goubet ⁶

⁴ We adopt and apply below Petitioner’s labels for the elements of the challenged claims. *See* Pet. (Appendix – Claim Limitation Listing).

⁵ The Leahy-Smith America Invents Act (“AIA”) included revisions to 35 U.S.C. §§ 102, 103 that became effective on March 16, 2013. Pub. L. No. 112-29, §§ 3(b)–3(c), 3(n)(1), 125 Stat. 284, 285–87, 293 (2011). As discussed below (*see* Dec. Inst. § II.E.2.a), the challenged claims have effective filing dates after March 16, 2013. Thus, we apply the AIA versions of the statutes. We would reach the same outcome, however, under the pre-AIA versions.

⁶ French Patent and Trademark Office Publication FR 2 886 160, published December 1, 2006 (Ex. 1015 (French version) and Ex. 1016 (English translation), “Goubet”).

Claim(s) Challenged	35 U.S.C. § ⁵	Reference(s)/Basis
1, 3–8	103	Goubet, Kaiser ⁷
1, 3–8	103	Gao-2 ⁸
1, 3–8	103	Gao-2, Goubet

II. DISCUSSION

A. The Level of Ordinary Skill in the Art

The level of ordinary skill in the art is “a prism or lens” through which we view the prior art and the claimed invention. *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). The person of ordinary skill in the art is a hypothetical person presumed to have known the relevant prior art. *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). In determining the level of ordinary skill in the art, we may consider certain factors, including the “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.” *Id.* (internal quotation marks and citation omitted).

Petitioner contends, with accompanying declaration testimony, that a person having ordinary skill in the art would have had either:

(1) a bachelor’s degree in mechanical engineering, aerospace engineering, chemical engineering, or a closely related field and at least 2 years of work experience designing or developing products involving fluid dynamics; or (2) a master’s degree in

⁷ Sebastian Kaiser et al., *The Electrospray and Combustion at the Mesoscale*, 51 J. Mass Spectrom. Soc. Jpn. 42 (2003) (Ex. 1014, “Kaiser”).

⁸ Chinese National Intellectual Property Administration Utility Model Patent CN 204072864 U, published January 7, 2015 (Ex. 1041 (Chinese version) and Ex. 1042 (certified translation), “Gao-2”).

mechanical engineering, aerospace engineering, chemical engineering, or a closely related field, and at least one year of work experience in fluid dynamics or fluid systems engineering.

Pet. 15–16 (citing White Pet. Decl. ¶¶ 36–44).

In the Response, Patent Owner states that it “does not dispute” the definition of one of ordinary skill in the art proposed by Petitioner, but Patent Owner “reserves the right to address [the definition] should new issues materialize.” PO Resp. 6. Patent Owner did not address this issue in the Sur-reply.

As noted in the Decision on Institution, Petitioner’s proposed definition appears generally consistent with the record, including the prior art. *See* Dec. Inst. 8 (citing *In re GPAC Inc.*, 57 F.3d at 1579). We remove the phrase “at least” in both listed options, however, as that phrase adds ambiguity. Further, Patent Owner has not argued at trial that Petitioner’s proposal for the level of ordinary skill leads to an improper understanding of how a skilled artisan would have understood either the challenged patent or the prior art. In the analysis below, we continue to apply the level of ordinary skill in the art adopted in the Decision on Institution, as proposed by Petitioner.

B. Claim Construction

In *inter partes* reviews, the Board interprets claim language using the same claim construction standard that would be used in a civil action under 35 U.S.C. § 282(b), as described in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). *See* 37 C.F.R. § 42.100(b). Under that standard, we generally give claim terms their ordinary and customary meaning, as would be understood by a person of ordinary skill in the art at the time of the invention, in light of the language of the claims, the specification, and the

prosecution history. *See Phillips*, 415 F.3d at 1313–14. Although extrinsic evidence, when available, may also be useful when construing claim terms under this standard, extrinsic evidence should be considered in the context of the intrinsic evidence. *See id.* at 1317–19.

Neither Petitioner nor Patent Owner propose explicit constructions for any claim terms. Pet. 16–17; PO Resp. 5–6. Based on the complete record, we need not construe explicitly any claim terms because doing so would not change the outcome of the analysis below. *See Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) (“The Board is required to construe ‘only those terms . . . that are in controversy, and only to the extent necessary to resolve the controversy.’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

For completeness, we note that, in late 2024, the parties filed in the Florida Litigation a Joint Claim Construction statement that included stipulated claim constructions and disputed claim constructions for terms in the challenged patent as well as the ’094 patent and the ’449 patent. *See* Ex. 1051, Exhibit A (Stipulated Claim Constructions), Exhibit B (Disputed Claim Constructions).⁹ The parties stipulated to the construction of the term “fluid dispersion” as recited in the challenged claim. *See id.*, Exhibit A.¹⁰

⁹ In the two related proceedings, Petitioner filed the proper document as the Joint Claim Construction Statement. In this proceeding, however, Petitioner mistakenly refiled Exhibit 1008. *See* Dec. Inst. 16 n.8 (raising this issue). In response, Petitioner filed the Joint Claim Construction Statement as Exhibit 1051 in this proceeding. *See* Pet. Reply 2 n.2.

¹⁰ When staying the Florida Litigation, the District Court cancelled the scheduled claim construction hearing. *See* ECF No. 67 (April 8, 2025) (granting joint motion to stay); ECF No. 68 (April 8, 2025) (cancelling the

The stipulated construction of “fluid dispersion” merely restates the express definition of “fluid dispersion” from the challenged patent (although the definition is not cited or discussed in the parties’ filing). *Compare* Ex. 1051, Exhibit A (“mixture of an operative fluid in air comprising a plurality of substantially uniform droplets (having substantially the same diameter) of the operative fluid dispersed throughout the air”), *with* Ex. 1001, 3:15–27. To the extent necessary, we determine that the complete record supports the parties’ stipulated construction of “fluid dispersion,” and we apply that construction below.

C. Petitioner’s Arguments Regarding Dr. Micklow

Petitioner argues that Dr. Micklow’s Declaration filed with the Patent Owner Response should be given no weight because “Dr. Micklow admitted during his deposition that he did not consider the entire disclosure of the [challenged p]atent—including the embodiment from which challenged claims 1 and 3–8 of the [challenged p]atent are derived—or the parties’ claim constructions when arriving at his opinions.” Pet. Reply 1. Patent Owner does not respond to these arguments in the Sur-reply. We first address Petitioner’s argument that Dr. Micklow ignored relevant portions of the challenged patent and then we turn to the argument that Dr. Micklow did not consider or apply the parties’ claim constructions.

claim construction hearing). Thus, the District Court has not substantively considered claim construction in the Florida Litigation. *Cf.* 37 C.F.R. § 42.100(b) (“Any prior claim construction determination concerning a term of the claim in a civil action, or a proceeding before the International Trade Commission, that is timely made of record in the *inter partes* review proceeding will be considered.”).

1. Allegedly Ignored Portions of the Challenged Patent

Petitioner first notes that Patent Owner argues that Goubet fails to disclose the “disposed between” limitation.¹¹ *See* Pet. Reply 1 (citing PO Resp. 6; Ex. 1001, claims 1 and 5). According to Petitioner, Dr. Micklow’s testimony on this issue should be given no weight because he admitted to not reviewing Figure 6 of the challenged patent, which Petitioner contends is the only figure supporting that limitation. *See id.* at 1–2 (citing Ex. 1046, 200:5–9, 200:14–16; Pet. 9–14; Dec. Inst. 26–33).

Undermining Petitioner’s argument, however, Dr. Micklow did not provide *any* declaration testimony addressing the “disposed between” limitation. *See, e.g.*, Micklow Decl. ¶ 19 (providing one paragraph addressing the ground based on Goubet alone and not addressing the “disposed between” limitation). Thus, we could not provide Petitioner the requested relief even if we were persuaded by the argument.

2. Allegedly Ignored Claim Constructions

Next, Petitioner argues that Dr. Micklow’s Declaration should be given no weight (1) because he admits to not reviewing the parties’ constructions and (2) because he “attempts to distinguish the prior art based on a scope of the claim that differs from the parties’ stipulated construction” of “fluid dispersion.” Pet. Reply 4; *see also id.* at 2–4 (entire argument).

As an initial matter, the record here does not support any sound basis to disregard the *entirety* of Dr. Micklow’s Declaration for allegedly not reviewing the parties’ claim constructions. *See* Pet. Reply 2–3 (citing Ex. 1046, 115:15–18). Contrary to Petitioner’s argument, in the cited

¹¹ This refers to the recitation in clauses 1F and 5F that the “diffusion assembly is disposed between said upper chamber and said lower chamber.”

discussion, Dr. Micklow does not indicate that he applied an incorrect understanding of a claim term. *Cf. Cordis Corp. v. Bos. Sci. Corp.*, 658 F.3d 1347, 1357–58 (Fed. Cir. 2011) (disregarding testimony “based on an incorrect understanding of the claim construction”), *cited at* Pet. Reply 1; *see also* Pet. Reply 3 (arguing that “Dr. Micklow’s opinion that the prior art does not render the claims obvious is premised on an interpretation of certain claim limitations that are *inconsistent with* both parties’ constructions” (emphasis added)). Instead, we read Dr. Micklow’s testimony as clarifying that he was not involved in claim construction at all and that, as stated, he “made [his] opinions based on what [he] read in the patents.” Ex. 1046, 112:11–12; *see also id.* at 115:15–18 (“I don’t know if I would even apply claim construction. I applied engineering principles to a document that had been published with the patent office.”).

Next, Petitioner argues that “the parties’ stipulated meaning of ‘fluid dispersion’ requires a plurality of droplets having ‘substantially the same diameter,’” and that, “[o]n the other hand, Dr. Micklow doesn’t compare individual droplet diameters but instead calculates an average ‘distribution’ of the droplet collection.” Pet. Reply 3 (citing Ex. 1046, 119:10–15, 148:5–10).

The record does not support Petitioner’s characterization of Dr. Micklow’s testimony as “inconsistent with both parties’ constructions.” Pet. Reply 3. As an initial matter, as discussed above (*see* § II.B), the parties merely restated the construction of “fluid dispersion” expressly set forth in the challenged patent. Moreover, none of the cited passages of Dr. Micklow’s testimony squarely address any phrase included in the stipulated construction of “fluid dispersion.” Instead, those passages discuss how one

of ordinary skill in the art would *further understand* the language in the stipulated construction, in order to apply *that understanding* to the prior art. As noted by Petitioner (Pet. Reply 3–4), Dr. Micklow discusses a “uniform distribution” and similar phrases, but those phrases are not in the stipulated construction. *See* Ex. 1051, Exhibit A; Ex. 1001, 3:8–20; Ex. 1046, 119:10–15 (discussing “uniform particle size distribution”), 148:5–10 (discussing the meaning of “uniform distribution”), 117:20–24 (discussing a “uniform spray distribution”), 149:3–150:3 (discussing the meaning of “uniform distribution”), 118:1–7 (same). Thus, we view Dr. Micklow as discussing a “uniform distribution” (for example) not to replace the stipulated construction, but rather, to identify a feature that, if present in the prior art, shows that the prior art is outside the scope of the proper understanding of the stipulated construction.

On the record here, Patent Owner’s *further interpretation* of the stipulated construction does not improperly stray from the stipulated construction. Thus, we will not give Dr. Micklow’s declaration testimony on this issue “no weight.” Instead, we will give that testimony the appropriate weight given the strength of the underlying evidence. *See* PTAB Trial Practice Guide (online version) (“TPG”)¹², § I.G (Expert Testimony) (“The Board has broad discretion to assign weight to be accorded expert testimony. *Yorkey v. Diab*, 601 F.3d 1279, 1284 (Fed. Cir. 2010). However, the testimony must be based on sufficient facts and data. Fed. R. Evid. 702(b). ‘Expert testimony that does not disclose the underlying facts or data

¹² Available at <https://www.uspto.gov/patents/ptab/trial-practice-guide>.

on which the opinion is based is entitled to little or no weight.’ 37 C.F.R. § 42.65(a).”).

D. Asserted Obviousness of Claims 1 and 3–8 Based on Goubet

Petitioner asserts that claims 1 and 3–8 of the challenged patent would have been obvious based on Goubet. Pet. 3–4, 25–46; Pet. Reply 4–8. Patent Owner provides arguments addressing this asserted ground. PO Resp. 6–8; PO Sur-reply 4–7. We first summarize aspects of the relied-upon prior art.

1. Overview of Goubet

Goubet discloses “an essential oil diffuser.” Ex. 1016, 1:1.

Figure 1 of Goubet is reproduced below:

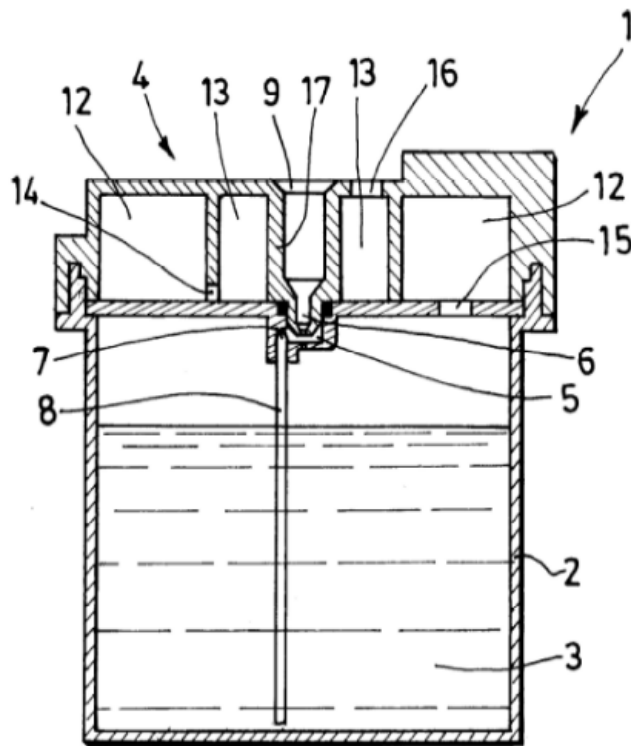


FIG.1

Figure 1 is “a cross-sectional view of a diffuser.” Ex. 1016, 3:18. Depicted oil diffuser 1 includes oil reservoir 2 (with oil 3), diffuser head 4, and diffusion chamber 5 (within which oil droplets are produced). *See id.* at 3:24–26, 3:30–31. Diffuser head 4 includes outer enclosure 12 and inner enclosure 13, “communicating with each other via a passage 14, said two enclosures and said passage forming at least one baffle.” *Id.* at 4:3–6. “[O]uter chamber 12 communicates with the inside of the reservoir 2 via a droplet flow inlet 15” and “inner chamber 13 comprises an outlet 16 for the microdroplets to the ambient air.” *Id.* at 4:7–12.

Figures 2 and 3 are reproduced below:

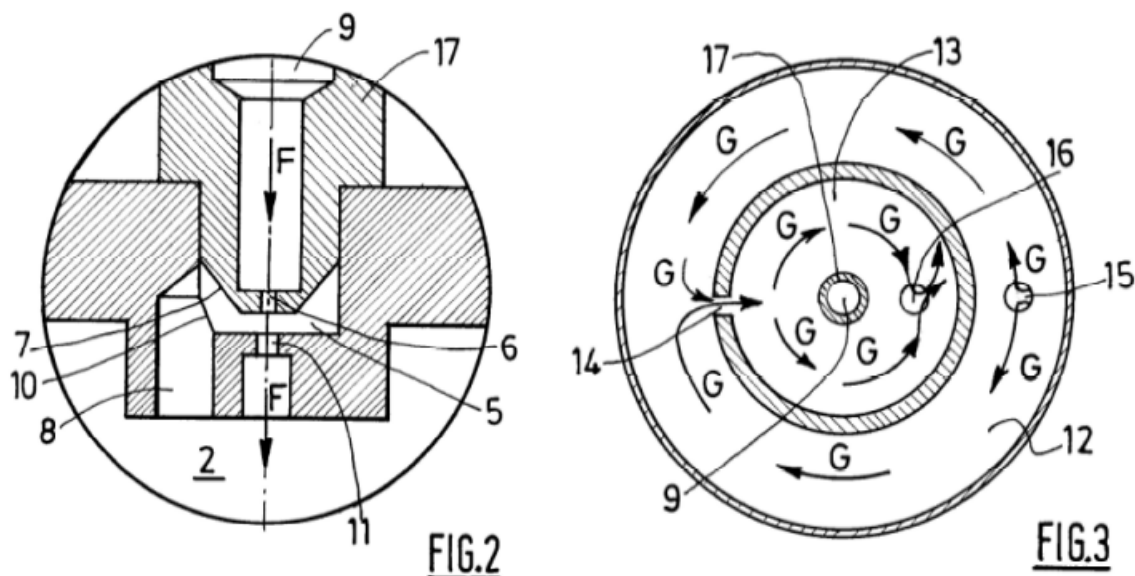


Figure 2 depicts a partial view of a diffuser head and Figure 3 is a simplified diagram showing the path of the droplets in the concentric chambers of the diffuser. *See* Ex. 1016, 3:19–23. As shown in Figure 2, diffusion chamber 5 includes compressed air inlet 6, venturi cone 7, oil inlet 10, which expels oil from dip tube 10 into chamber 5. *See id.* at 3:31–4:2. In operation, compressed air travels from inlet air channel 9 through air inlet 6 into diffusion chamber 5, in which “[a]ir and essential oil and mixed”

and “a flow of oil droplets is created.” *Id.* at 4:15–22. The flow of oil droplets then travels through outlet 11, inside reservoir 2, towards inlet 15, and into outer enclosure 12. *Id.* at 4:23–28. The droplets then follow the path indicated by arrows G in Figure 3, through passage 14, entering inner enclosure 13 before exiting outlet 16 to the ambient air. *Id.* at 4:28–5:7.

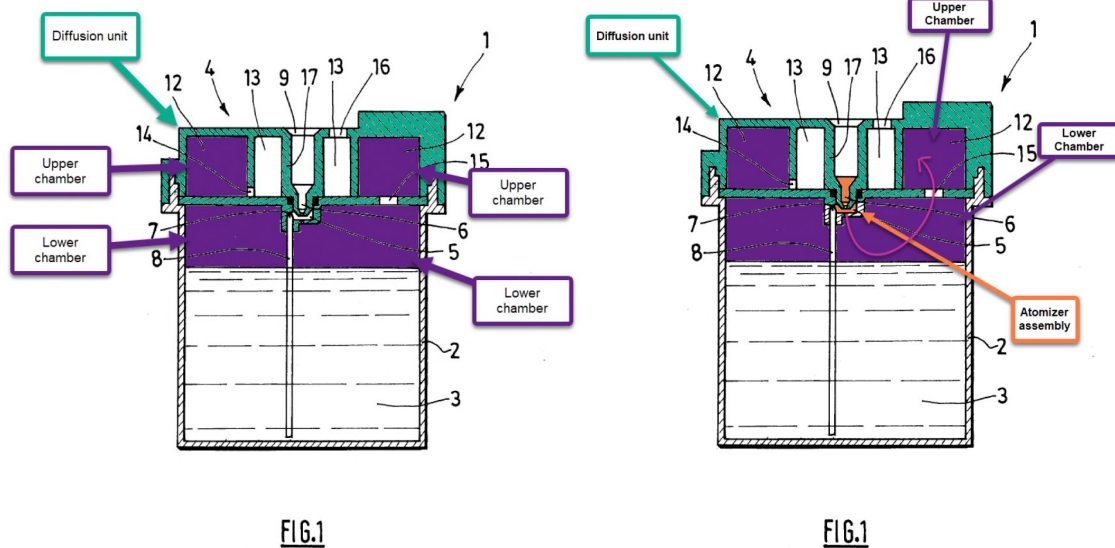
2. Independent Claim 1

For independent claim 1, Petitioner contends that Goubet discloses or suggests each limitation. Pet. 25–41; Pet. Reply 4–8. Patent Owner argues that Goubet lacks the “disposed between” limitation in clause 1F. *See* PO Resp. 6–7; PO Sur-reply 4–5. We view this issue as dispositive for this Ground, and we address it below.

a. The “Disposed Between” Limitation

Clause 1B recites “wherein said diffusion chamber comprises an upper chamber and a lower chamber,” clause 1E recites that the “diffusion assembly comprises an atomizer assembly,” and clause 1F refers back to clause 1B, reciting that “said diffusion assembly is *disposed between* said upper chamber and said lower chamber.” Ex. 1001, 12:2–3, 12:9–10 (emphasis added) (the “disposed between” limitation).

Petitioner provides these two annotated versions of Figure 1 of Goubet to explain its positions as to clauses 1B and 1F:



Pet. 31, 39; *see also* Pet. 30–31, 38–39 (citing White Pet. Decl. ¶¶ 131–132, 147). In the annotated version of Figure 1 at the left above, Petitioner added (1) a text box and teal shading identifying a “Diffusion unit,” (2) two text boxes and purple shading identifying an “Upper chamber,” and (3) two text boxes and purple shading identifying a “Lower chamber.” Pet. 31. In the annotated version of Figure 1 at the right above, Petitioner added (1) a text box and teal shading identifying a “Diffusion unit,” (2) a text box and purple shading identifying an “Upper chamber,” (3) a text box and purple shading identifying a “Lower chamber,” and (4) a text box and orange shading identifying an “Atomizer assembly.” Pet. 39.

Relevant to the discussion below, however, Petitioner also provides this annotated version of Figure 1 of Goubet when addressing clause 1D:

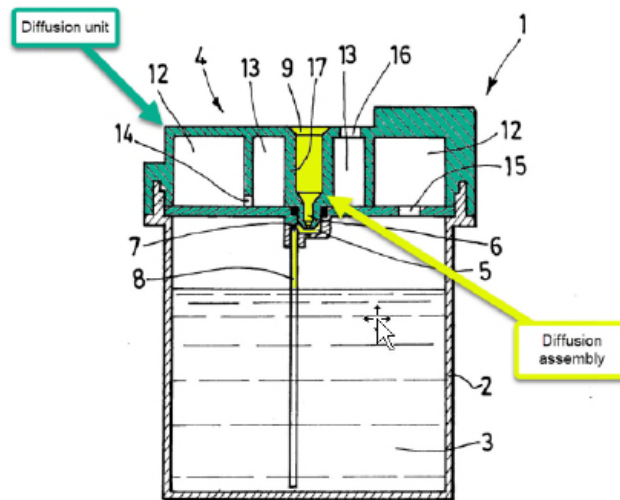


FIG.1

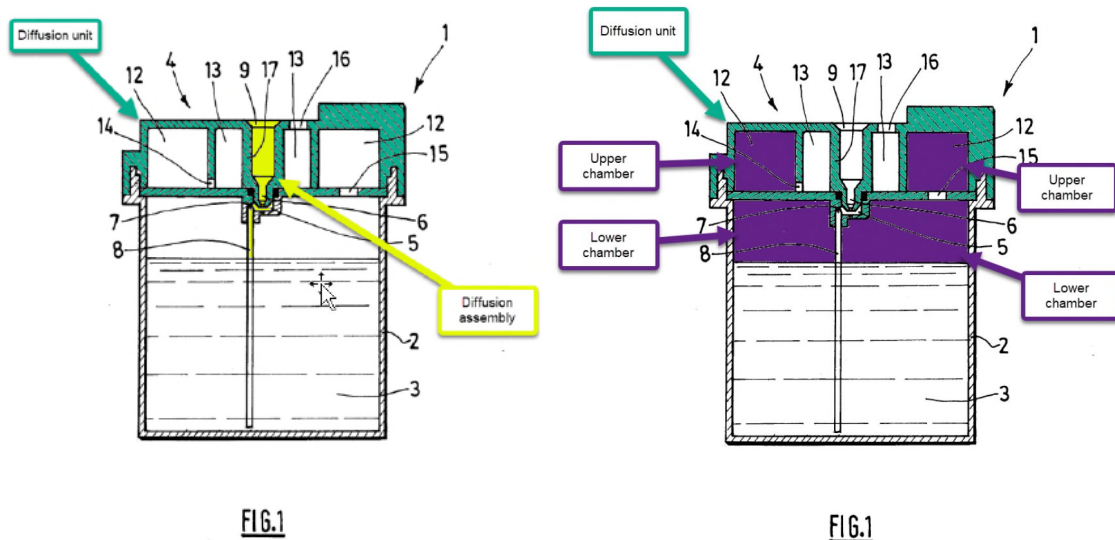
Pet. 34. In the annotated version of Figure 1 above, Petitioner added (1) a text box and teal shading identifying a “Diffusion unit” and (2) a text box and yellow shading identifying a “Diffusion assembly.” *Id.*

Patent Owner argues that Goubet lacks the “disposed between” limitation. *See* PO Resp. 6–7; PO Sur-reply 4–5. Specifically, Patent Owner contends that “the ‘diffusion assembly’ identified by Petitioner rises vertically above the identified ‘upper chamber.’” PO Resp. 7.¹³ According to Patent Owner, “[t]his structure directly contrasts the meaning of the word ‘between’ taught by the [challenged p]atent, where the upper chamber is shown to be above, and the lower chamber below, the diffusion assembly.”

¹³ Patent Owner cites page 63 of the Petition, but page 34 includes the annotated version of Figure 1 of Goubet directly above, in which Petitioner identifies a “Diffusion assembly” in Goubet.

Id. (citing Ex. 1001, 9:52–56; Figs. 1–3, 5, 6). For the reasons below, the record supports Patent Owner’s argument.

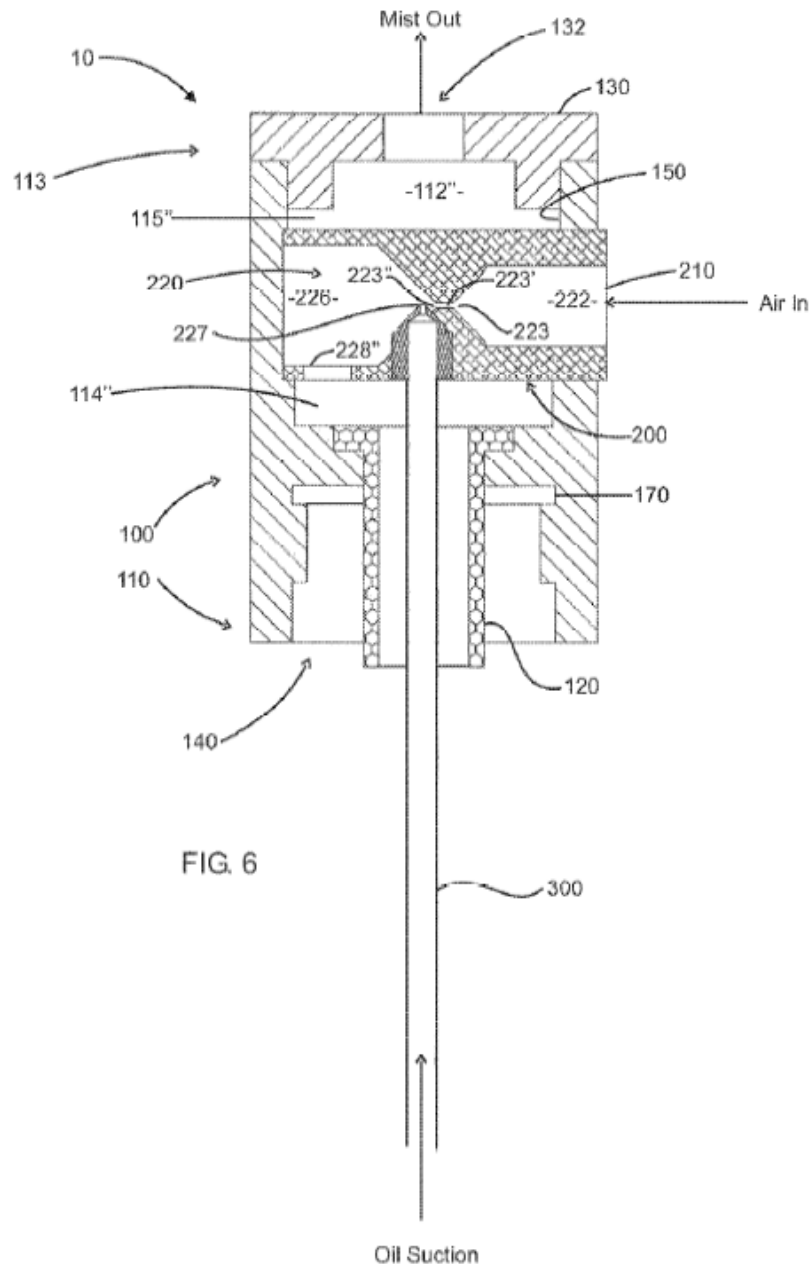
To assist with the discussion, we reproduce side by side two of the three annotated versions of Figure 1 of Goubet discussed above:



Pet. 34, 31. We agree that the identified “diffusion assembly” (in yellow above at left) is not “disposed between” the identified “upper chamber” (in purple above at right) and the identified “lower chamber” (in purple above at right). Instead, as noted by Patent Owner, the identified “diffusion assembly” rises vertically above the “upper chamber.” *See* PO Resp. 7.

In the Reply, Petitioner contends that the challenged patent “does not support Patent Owner’s apparent argument that the claims require the entirety of the diffusion assembly to be ‘between’ the upper and lower chambers” in that “[F]igure 6 shows portions of the diffusion assembly (e.g., air inlet 210) extending beyond the upper/lower chambers.” Pet. Reply 5–6 (citing Ex. 1001, Fig. 6). We are not persuaded by Petitioner’s implied claim construction argument.

We reproduce below Figure 6 of the challenged patent:



Ex. 1001, Fig. 6. Figure 6 is a cross-sectional elevation of a fluid dispersion assembly. *Id.* at 2:65–67. The passage in the challenged patent cited by Patent Owner as to this issue provides context for the analysis:

As further illustrated in the embodiment of FIG. 6, while operatively disposed in the diffusion chamber 112'', the diffusion

assembly 200 is *disposed between* the upper chamber 115" and the lower chamber 114" of the diffusion chamber 112".

Ex. 1001, 9:52–56 (emphasis added), *cited at* PO Resp. 7. The fact that air inlet 210 extends *horizontally* past the end of upper chamber 115" and the lower chamber 114"—despite air inlet 210 being part of diffusion assembly 200 (*see* Ex. 1001, 6:63–65)—does not prove Petitioner’s point. Instead, for the same reasons Petitioner highlights, we read the description of Figure 6 above as discussing “disposed between” with respect to *the vertical direction only*, i.e., the entirety of diffusion assembly 200 is *vertically above* lower chamber 114" and *vertically below* upper chamber 115". *See also* PO Sur-reply 4 (“Indeed, as labeled by Petitioner, the diffusion assembly of Goubet at no point passes between the upper and lower chambers, and cannot be disposed between the chambers vertically as the assembly vertically encompasses the chambers.”). Importantly, we do not construe the “disposed between” limitation *to require* such a configuration, but we do find that such a configuration falls within the scope of the “disposed between” limitation. *Cf.* Pet. Reply 5–6 (arguing that the challenged patent “does not support . . . that the claims require the entirety of the diffusion assembly to be ‘between’ the upper and lower chambers”).

With this understanding of the “disposed between” limitation as referring to the same direction as the separation of the “upper chamber” and “lower chamber” (vertically in both Figure 6 of the challenged patent and Figure 1 of Goubet), we turn back now to Petitioner’s discussion of clause 1F, which includes the limitation at issue. There, Petitioner does not discuss why the “diffusion assembly” is allegedly “disposed between” the “upper chamber” and “lower chamber,” but instead, Petitioner discusses why

a component of the “diffusion assembly”—the “atomizer assembly”—is allegedly “disposed between” the “upper chamber” and “lower chamber”:

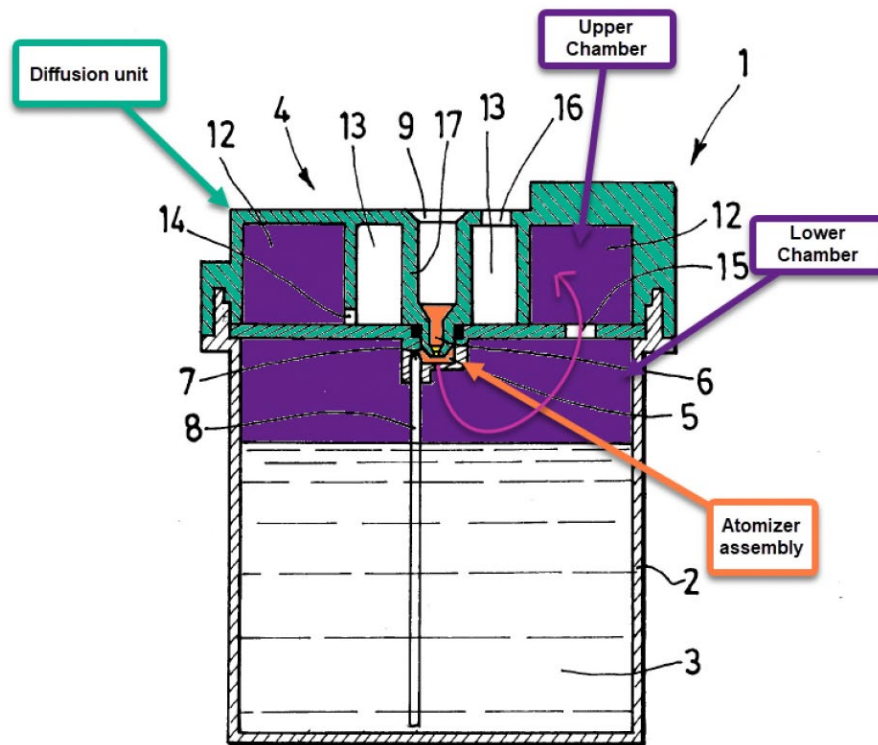


FIG.1

Pet. 39. In the end, we need not assess whether the “atomizer assembly” identified by Petitioner is “disposed between” the “upper chamber” and “lower chamber” under the proper construction of that term (which, again, we need not and do not determine here) because the “disposed between” limitation does not involve the “atomizer assembly.” Instead, we find that, by failing to address why the identified “diffusion assembly” is “disposed between” the identified “upper chamber” and “lower chamber,” Petitioner has failed to provide persuasive evidence that Goubet discloses or suggests the “disposed between” limitation. Pet. 38–39 (discussing the claim language “said diffusion assembly is disposed between said upper chamber

and said lower chamber” but only discussing the location of the “atomizer assembly”); *see* 35 U.S.C. § 316(e) (“In an *inter partes* review . . . , the petitioner shall have the burden of proving a proposition of unpatentability by a preponderance of the evidence.”).

For the reasons above, we find, based on the complete record, that Petitioner has not shown by a preponderance of the evidence that Goubet discloses or suggests the “disposed between” limitation.

b. Conclusion for Claim 1

For the reasons above, we determine, based on the complete record, that Petitioner has not demonstrated by a preponderance of the evidence that claim 1 would have been obvious based on Goubet.

3. Independent Claim 5

For independent claim 5, Petitioner contends that Goubet discloses or suggests each limitation. Pet. 45; Pet. Reply 4–6. Specifically, Petitioner states that “[t]here are no material differences between claim limitations 1[PRE]–1[F] and claim 5” of the challenged patent. Pet. 45.

Patent Owner argues that Goubet lacks the “disposed between” limitation in clause 5F. *See* PO Resp. 6–7; PO Sur-reply 4–5. For the same reasons discussed above (§ II.D.2.a), we find, based on the complete record, that Petitioner has not shown by a preponderance of the evidence that Goubet discloses or suggests the “disposed between” limitation. Thus, we determine, based on the complete record, that Petitioner has not demonstrated by a preponderance of the evidence that claim 5 would have been obvious based on Goubet.

4. Claims 3, 4, and 6–8

For dependent claims 3 and 4 (which depend from claim 1) and claims 6–8 (which depend from claim 5), Petitioner contends that Goubet discloses or suggests each limitation. Pet. 41–46; Pet. Reply 8. As discussed above (*see* §§ II.D.2.a, II.D.3), Petitioner has not demonstrated by a preponderance of the evidence that independent claims 1 or 5 would have been obvious based on Goubet. Thus, we determine, based on the complete record, that Petitioner has not demonstrated by a preponderance of the evidence that claims 3, 4, and 6–8 would have been obvious based on Goubet.

E. Asserted Obviousness of Claims 1 and 3–8 Based on Goubet and Kaiser

Petitioner asserts that claims 1 and 3–8 would have been obvious based on Goubet and Kaiser. Pet. 3–4, 47–49; Pet. Reply 9–12. Patent Owner provides arguments addressing this asserted ground. PO Resp. 8–14; PO Sur-reply 7–12. We first summarize aspects of the relied-upon prior art.

1. Overview of Kaiser

In this asserted ground, Petitioner relies on Kaiser, in addition to Goubet (summarized above (*see* § II.D.1)). Kaiser generally relates to combustor design for power generation. *See* Ex. 1014 at 42. Kaiser discloses that “[c]ritical to uniform evaporation and burning is a good control of the size distribution of the resulting aerosol.” *Id.* at 43.

2. Independent Claims 1 and 5

For independent claims 1 and 5, Petitioner contends that the proposed combination of Goubet and Kaiser discloses each limitation. Pet. 47–48; Pet. Reply 9–12. Patent Owner challenges the articulated reasons to combine Goubet and Kaiser as proposed and also argues that the proposed combination fails to disclose the “disposed between” limitation. *See* PO

Resp. 9, 12–13. We view these issues as dispositive for this ground, and we address them below.

a. The “Disposed Between” Limitation

In the context of this ground, Petitioner continues to rely on Goubet to address the “disposed between” limitations of independent claims 1 and 5. *See* Pet. 48 (discussing how, for this ground, clauses “1[PRE]–1[J] and 5[PRE]–5[F] are taught by Goubet for the reasons previously provided in” the ground based on Goubet alone). For this ground, Patent Owner relies on the prior argument that Goubet lacks the “disposed between” limitations in independent claims 1 and 5. *See* PO Resp. 9 (“First, . . . Petitioner does not establish that Goubet discloses or suggests a dispersion assembly disposed between an upper chamber and a lower chamber . . . as defined and required by the [challenged p]atent.”).

For the same reasons discussed above (*see* § II.D.2.a), we find, based on the complete record, that Petitioner has not shown by a preponderance of the evidence that Goubet and Kaiser discloses or suggests the “disposed between” limitation.

b. The Reasons to Combine Goubet and Kaiser

Addressing clause 1J, Petitioner states that “Goubet does not explicitly disclose that its microdroplets are ‘substantially uniform’ in diameter.” Pet. 47; *see also* Ex. 1051, Exhibit A (construing “fluid dispersion”). Thus, Petitioner “also relies on Kaiser, which demonstrates that it was well known in the field at the time of the invention that droplets of greater uniformity result in uniform droplet evaporation.” Pet. 47 (citing Ex. 1014 at 43 (“Critical to uniform evaporation and burning is a good control of the size distribution of the resulting aerosol”)). According to

Petitioner, if independent claim 1 requires a “fluid dispersion” in the “mixing chamber” (i.e., under Patent Owner’s proposed construction) and “Goubet’s diffuser head 4 does not teach a ‘fluid dispersion,’” one of ordinary skill in the art “would have been motivated to modify Goubet to include additional enclosures to further reduce the size (diameter) of the droplets . . . and to improve droplet uniformity, which will in turn create a more uniform, and less harsh, scent as the oil droplets evaporate in the surrounding airspace.” Pet. 47–48 (citing White Pet. Decl. ¶ 167).

Patent Owner argues that Petitioner has failed to articulate legally sufficient reasons to combine Goubet with Kaiser. PO Resp. 12–13. Specifically, Patent Owner contends that “it is not enough that two systems were merely ‘known’ to combine them for purposes of evaluating obviousness; there must be a reason a skilled artisan would have made the specific substitution or combination.” *Id.* at 12.

“To satisfy its burden of proving obviousness, a petitioner cannot employ mere conclusory statements. The petitioner must instead articulate specific reasoning, based on evidence of record, to support the legal conclusion of obviousness.” *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016); *TriVascular, Inc. v. Samuels*, 812 F.3d 1056, 1066 (Fed. Cir. 2016) (“Although the *KSR* test is flexible, the Board ‘must still be careful not to allow hindsight reconstruction of references . . . without any explanation as to *how* or *why* the references would be combined to produce the claimed invention.’”) (citation omitted).

Based on the complete record, we agree with Patent Owner that “Petitioner’s asserted motivation boils down to the conclusory statement that given Goubet and Kaiser, ‘it was well known in the field . . . to produce

uniform droplets.” PO Resp. 12–13. In reviewing the discussion of this ground, Petitioner provides little discussion of reasons to combine. And we agree with Patent Owner that the statement at issue—that Kaiser “demonstrates that it was well known in the field at the time of the invention that droplets of greater uniformity result in uniform droplet evaporation” (Pet. 47)—is insufficient to support the proposed combination here. *See Magnum Oil*, 829 F.3d at 1380.

For the discussion of the reasons to combine, Petitioner cites two paragraphs of Dr. White’s Petition Declaration. *See* Pet. 47–48 (citing White Pet. Decl. ¶¶ 167–168). But those two paragraphs of testimony largely parrot the statements from the Petitioner and add no technical reasoning. *Compare* Pet. 47–48, *with* White Pet. Decl. ¶¶ 167–168; *Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper 9 at 14–17 (PTAB Aug. 24, 2022) (precedential) (determining that “conclusory and unsupported” declarant testimony was entitled to little weight as it merely repeated, *verbatim*, the petition’s assertions without “cit[ing] any additional supporting evidence or provid[ing] any technical reasoning”).

In the Reply, Petitioner both cites evidence not previously relied on and repeats much of the prior insufficient discussion. *Compare* Pet. Reply 11–12 (citing Pet. 44–48; White Pet. Decl. ¶¶ 80–102, 166–168; Ex. 1016, 2:16–19, 5:12–16), *with* Pet. 47–48 (citing White Pet. Decl. ¶¶ 167–168; Ex. 1014 at 43; Ex. 1016, 2:6–8). Regardless, a petitioner cannot present, in a reply, a new argument necessary for its case-in-chief. *See Intelligent Bio-Sys., Inc. v. Illumina Cambridge, Ltd.*, 821 F.3d 1359, 1370 (Fed. Cir. 2016) (“In these circumstances, we find that the Board did not err in refusing the reply brief as improper under 37 C.F.R. § 42.23(b)

because [the petitioner] relied on an entirely new rationale to explain why one of skill in the art would have been motivated to combine” the prior art.); *Ariosa Diagnostics v. Verinata Health, Inc.*, 805 F.3d 1359, 1367 (Fed. Cir. 2015) (“We see no error in the Board’s rejection of [a petitioner’s] reliance, in its Reply submissions, on previously unidentified portions of a prior-art reference to make a meaningfully distinct contention.”).

For these reasons, we determine, in light of the complete record, that Petitioner has not shown by a preponderance of the evidence that one of ordinary skill in the art at the time of the invention would have had reason to combine Goubet and Kaiser, as proposed.

c. Conclusion for Claims 1 and 5

For the reasons above, we determine, based on the complete record, that Petitioner has not demonstrated by a preponderance of the evidence that claims 1 and 5 would have been obvious based on Goubet and Kaiser.

3. Claims 3, 4 and 6–8

For dependent claims 3 and 4 (which depend from claim 1) and claims 6–8 (which depend from claim 5), Petitioner contends that the proposed combination of Goubet and Kaiser satisfies each limitation. Pet. 47–49; Pet. Reply 9–12. As discussed above (*see* § II.E.2.c), Petitioner has not demonstrated by a preponderance of the evidence that claims 1 and 5, from which claims 3, 4, and 6–8 depend, would have been obvious based on Goubet and Kaiser. Thus, we determine, based on the complete record, that Petitioner has not demonstrated by a preponderance of the evidence that claims 3, 4, and 6–8 would have been obvious based on Goubet and Kaiser.

F. Asserted Obviousness of Claims 1 and 3–8 Based on Gao-2

Petitioner asserts that claims 1 and 3–8 of the challenged patent would have been obvious based on Gao-2. Pet. 3–4, 49–66; Pet. Reply 12–21. Patent Owner provides arguments addressing this asserted ground. PO Resp. 14–20; PO Sur-reply 12–18. We first summarize aspects of the relied-upon prior art.

1. Overview of Gao-2

Gao-2 discloses “an aroma diffuser.” Ex. 1042 ¶ 1.

Figures 2 and 4 of Gao-2 are reproduced below:

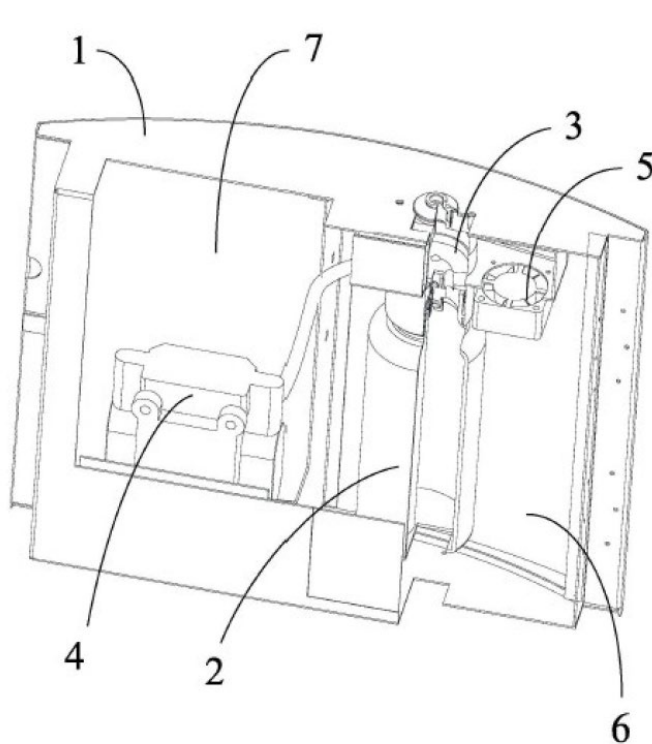


FIG. 2

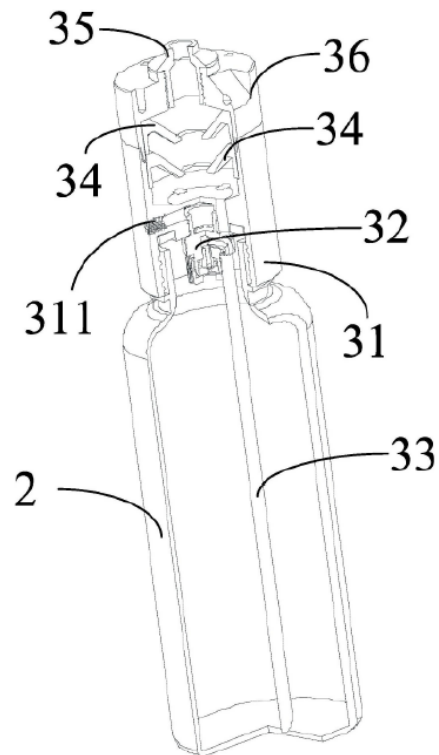


FIG. 4

Figure 2 is a “partial cross-sectional view of an aroma diffuser.” Ex. 1042 ¶ 17. Figure 4 is a “cross-sectional view of an atomization device and an essential oil bottle of an aroma diffuser.” *Id.* ¶ 19. The aroma diffuser in Figure 2 includes housing 1, essential oil bottle 2, atomization

device 3, air pump 4, fan 5, first installation chamber 6, and second installation chamber 7. *Id.* ¶ 27. As shown in Figure 4, the essential oil bottle 2/atomization device 3 portion further includes liquid suction tube 33, atomization device body 31, atomization core 32, noise reduction device 34, and small noise reduction cover 35. *Id.* ¶¶ 27, 28, 32, 34.

2. Independent Claim 1

For independent claim 1, Petitioner contends that Gao-2 discloses or suggests each limitation. Pet. 49–61, 64–65; Pet. Reply 12–21. Patent Owner argues that Gao-2 lacks the “mixing chamber” limitation in clause 1G. PO Resp. 14–19; PO Sur-reply 12–17. We view this issue as dispositive as to claim 1, and we address it below.¹⁴

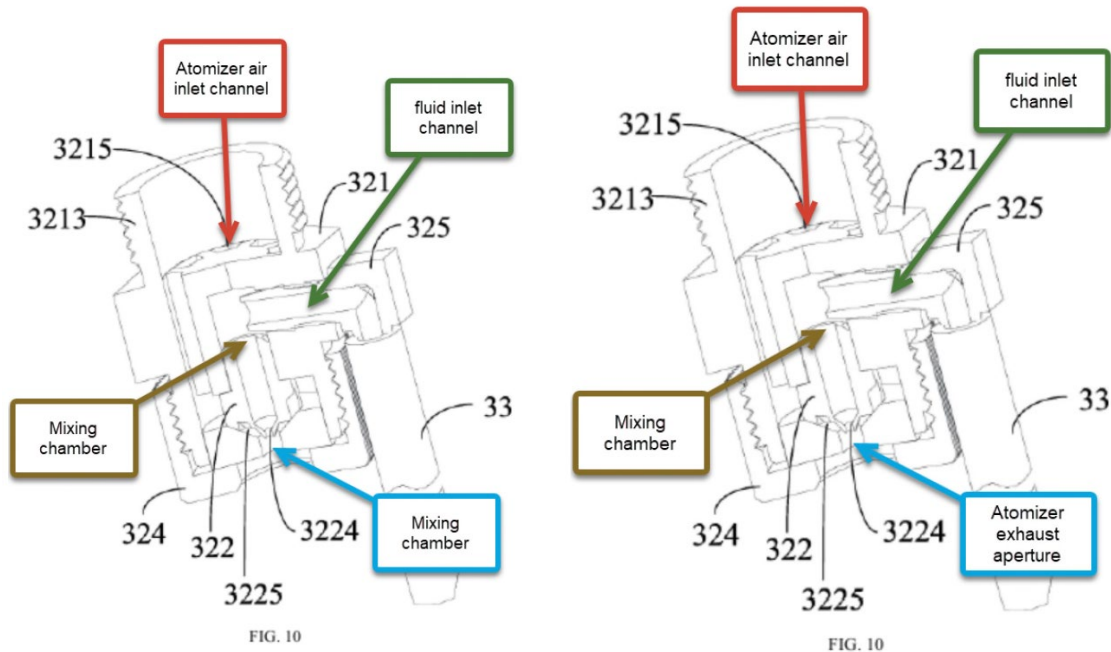
a. The “Mixing Chamber” Limitation

Clause 1G requires a “atomizer assembly comprising an atomizer air inlet channel, a fluid inlet, *a mixing chamber*, and an atomizer exhaust aperture.” Ex. 1001, 12:11–13 (emphasis added). Patent Owner argues that Petitioner’s positions on the “mixing chamber” limitation change

¹⁴ In the Decision on Institution, we addressed Patent Owner’s pre-institution argument that Gao-2 is not prior art to the claims of the challenged patent. *See* Dec. Inst. 26–33. Following institution, Patent Owner has not challenged the prior art status of Gao-2. *See* PO Resp. 5 (stating that “Patent Owner does not dispute that Gao-2 (Ex. 1041) published before Patent Owner’s first disclosure of a diffusion chamber comprising “an upper and a lower chamber”). We do not address this issue at this phase of the proceeding. *See In re NuVasive, Inc.*, 842 F.3d 1376, 1381 (Fed. Cir. 2016) (explaining that a patent owner forfeits an issue presented in its preliminary response if it fails to renew the issue in its response after trial is instituted); Paper 11 at 10 (Scheduling Order in this proceeding, stating that “**Patent Owner is cautioned that any arguments not raised and fully briefed in the response may be deemed forfeited**”).

significantly between the Petition and the Reply. *See* PO Sur-reply 12–15. For the reasons below, we agree with Patent Owner.

Below are Petitioner’s annotated version of Figure 10 of Gao-2 provided with the Petition (on the left) next to Dr. White’s annotated version of Figure 10 on the same issue from his Petition Declaration (on the right):



Pet. 56 (left annotated figure); *see* Pet. 56–58 (citing White Pet. Decl. ¶¶ 183–187) (entire discussion on clause 1E); White Pet. Decl. ¶ 183 (right annotated figure). The annotated version of Figure 10 of Gao-2 on the left (from the Petition) includes (1) a red text box and arrow box identifying an “Atomizer air inlet channel,” (2) a green text box and arrow box identifying a “fluid inlet channel,” (3) a blue text box and arrow box identifying a “Mixing chamber,” and (4) a brown text box and arrow box also identifying a “Mixing chamber.” Pet. 56. The annotated version of Figure 10 of Gao-2 on the right (from Dr. White’s Petition Declaration) includes the same annotations except the blue text box and arrow box identify an “Atomizer exhaust aperture” instead of a “Mixing chamber.” White Pet. Decl. ¶ 183.

In the discussion in the Petition addressing clause 1G (which includes the “mixing chamber” limitation), Petitioner references the discussion from Dr. White that includes the annotated figure on the right above and then identifies the “chamber within core base 322” in Gao-2 as the “mixing chamber.” Pet. 59–60 (citing White Pet. Decl. ¶ 190 (identifying the same)). From these discussions by Petitioner and Dr. White prior to institution, we understand Petitioner to have identified as the “mixing chamber” the portion shown in brown highlighting in this annotated version of Figure 10:

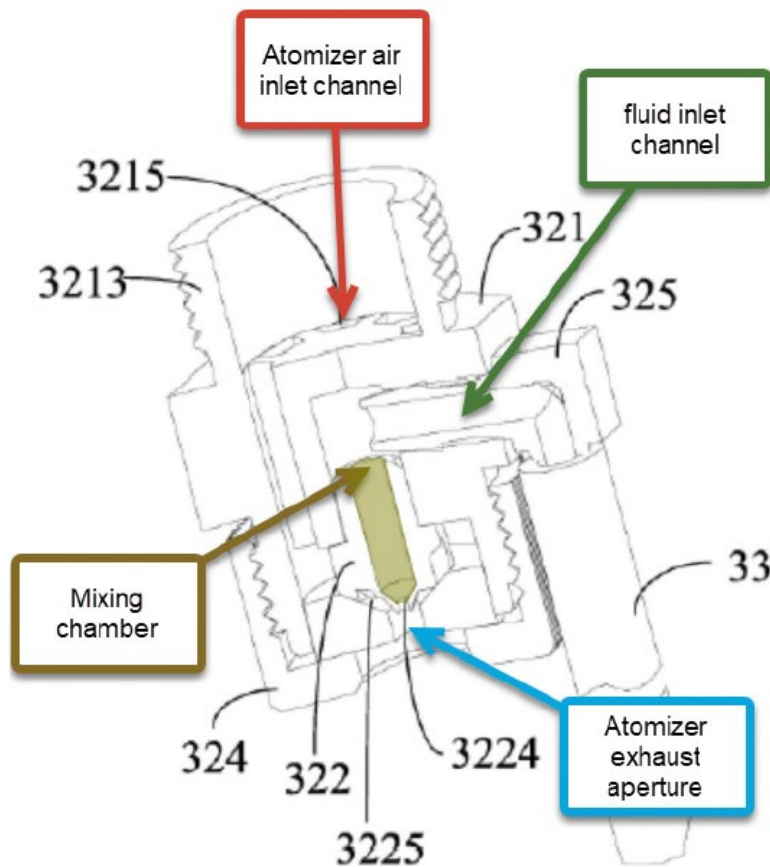


FIG. 10

Starting with the annotated version of Figure 10 of Gao-2 provided in Dr. White's Petition Declaration, we added brown highlighting.¹⁵ The brown highlighting corresponds to the "chamber within core base 322," identified by Petitioner and Dr. White as the "mixing chamber." Pet. 59–60. Further supporting this understanding of Petitioner's initial position as to the "mixing chamber," in the Reply, Petitioner identifies as an error the "Mixing chamber" identified with the *blue label* in the annotated version of Figure 10 of Gao-2 on page 59 of the Petition:

Patent Owner's supposed contradiction between the Petition and Dr. White's declaration on the location of the "mixing chamber" in Gao-2 is manufactured from Patent Owner's self-serving interpretation of Petitioner's annotated figures. Resp., 15–17. *The Petition consistently identifies the mixing chamber as the chamber of rotating core 322 and identifies spray outlet 3231 as the atomizer exhaust aperture.* Pet. 56–57, 59–60. Dr. White said the same. Ex. 1002 ¶¶186, 190–191. To the extent Patent Owner isolates an imprecise callout in an annotated Petition figure, that labeling cannot override the Petition's express and repeated textual mapping.

Pet. Reply 15 (emphasis added).

¹⁵ The dissent takes issue with our brown highlighting to represent Petitioner's position, but we view this interpretation as most favorable to Petitioner because it encompasses a broader volume within core 322 for potential mixing of air and water than Petitioner's single brown arrow to the top of core 322 may suggest. See Pet. 56. We also disagree with the dissent's interpretation of the Petition as "referenc[ing] 'an end' of hole 3224 as defining the 'chamber,'" when the quoted portion of the Petition merely describes "*hole 3224 is provided at an end of atomization rotating core 322.*" Dissent 5 (quoting Pet. 57). The Petition consistently defines the mixing chamber as the volume *within* core 322 and mixing occurring within that volume without describing mixing within hole 3224. See Pet. 56–58, 60.

In the Response, Patent Owner counters this understanding of Petitioner’s position, arguing that Gao-2 does not disclose atomization occurring in the brown highlighted region above—i.e., the identified “mixing chamber.” *See* PO Resp. 18–19. Specifically, Patent Owner argues that “Gao-2 teaches expressly that the fluid atomizes at the ‘outlet of the liquid suction hole’” 3224 and that Dr. White “counterfactually states that airflow passes ‘into rotating core 322’ and suggests that ‘where’ the atomization occurs is *within* ‘atomization core 322.’” *Id.* at 18 (quoting White Pet. Decl. ¶¶185–186). By highlighting these statements in paragraphs 185 and 186 of Dr. White’s Petition Declaration (which align with similar statements in the Petition (*see* Pet. 57–60), Patent Owner identifies a fundamental misunderstanding in Petitioner’s position (at least at the time of filing of the of the Petition) as to how Gao-2 operates. Namely, the initial filings in this proceeding clearly indicate that both Petitioner and Dr. White understood that air and essential oil both *entered into* and then *mixed* within the brown highlighted region identified above as the “mixing chamber”—i.e., “within rotating core 322.” *See* Pet. 57 (discussing how essential oil is drawn “*into* atomization rotating core *where* ‘[t]he essential oil then mixes with the airflow’” (emphasis added) (quoting Ex. 1042 ¶ 36¹⁶), 58 & 60 (both identifying the “mixing chamber” as “*e.g.*, chamber *within* rotating core 322” (emphasis added)); White Pet. Decl. ¶ 185 (stating that airflow passes “into rotating core 322”), ¶ 186 (discussing how essential oil is drawn “*into* atomization rotating core *where* ‘[t]he essential oil then

¹⁶ Petitioner incorrectly cites paragraph 40 of Gao-2. Paragraph 40 has similar disclosures but they are worded slightly differently than that quoted.

mixes with the airflow”” (emphasis added) (quoting Ex. 1042 ¶ 36¹⁷), ¶ 186 (identifying the “mixing chamber” as “*e.g.*, chamber *within* rotating core 322” (emphasis added)).

We agree with Patent Owner that the record more strongly supports that Gao-2 *does not* describe mixing of air and oil in the brown highlighted region above—the “mixing chamber” identified in the Petition—because Gao-2 does not describe air entering the region *within* rotating core 322. Instead, as argued by Patent Owner and supported by Gao-2, airflow *goes around the outside* of atomization rotating core 322 and out spray outlet 2131, thereby causing a negative pressure that draws the essential oil in the brown highlighted region above down through liquid suction hole 3224; only after getting drawn out hole 3224 does the oil mix with the airflow:

The atomization core base 321 has an airflow channel that communicates with the air pump 4 and the spray outlet 3231, thereby directing the airflow from the air pump 4 to the spray outlet 3231. Specifically, the airflow is guided between the atomization rotating core 322 and the atomization core cap 323 and is ejected from the spray outlet 3231. Due to the high-speed ejection of the airflow, a negative pressure is formed near the outlet of the liquid suction hole 3224 opposing the spray outlet 3231, causing the essential oil to be drawn into the liquid suction hole 3224 under this negative pressure. The essential oil then mixes with the airflow and is atomized at the outlet of the liquid suction hole 3224, before being sprayed out from the spray outlet 3231.

Ex. 1042 ¶ 36, *quoted at* PO Resp. 14–15. Thus, contrary to the position taken in the initial filings by Petitioner and Dr. White, Gao-2 *does not* describe mixing of air and oil in the brown highlighted region above within

¹⁷ Dr. White incorrectly cites paragraph 40 of Gao-2.

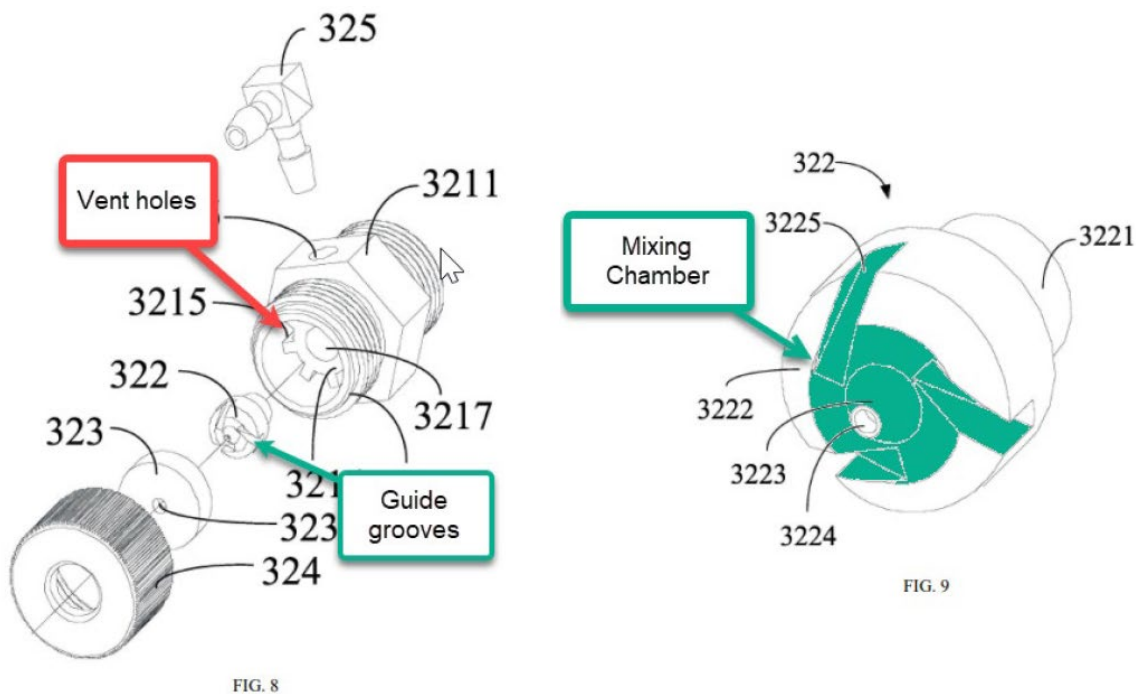
core 322—the “mixing chamber” identified in the Petition—Gao-2 describes that mixing occurring outside core 322.¹⁸

We turn now to the Reply, where Petitioner jettisons its prior position as to the “mixing chamber” to align more closely with the teachings in Gao-2 of the location that mixing of air and oil occurs. Specifically, in the Reply, Petitioner *does not* reproduce the prior annotated versions of Figure 10 of Gao-2 (above)¹⁹ and instead provides two *new* annotated figures from Gao-2, identifying an *entirely different* portion of the assembly in Gao-2 as

¹⁸ The dissent places heavy reliance on mixing occurring within hole 3224, which the dissent views as within core 322 and therefore within the alleged mixing chamber as opposed to outside core 322. Dissent 5–8. As noted above, *supra* note 15, the Petition does not rely on mixing occurring within hold 3224. Pet. 56–58. In addition, both the Petition and Gao-2 describe mixing occurring “at the outlet” of hole 3224 that, given the air circulating outside core 322 and fluid filling and travelling through core 322, means adjacent to hole 3224 and just outside core 322. *Id.*; Ex. 1042 ¶ 36 (describing negative pressure formed outside core 322 “near the outlet of the liquid suction hole 3224 opposing spray outlet 3231,” causing fluid to be drawn through hold 3224, resulting in mixing with air “at the outlet of the liquid such hole 3224” before discharge through outlet 3231). Given that Gao-2 teaches the entirety of core 322, and hole 3224, fills with fluid and airflow occurs outside core 322, it makes little sense to view this as teaching mixing of fluid and air *within* core 322, yet that amounts to Petitioner’s position in the Petition, before it changes tack in its Reply.

¹⁹ In the Reply, Petitioner cites Dr. White’s Petition Declaration, but avoids paragraph 183, which provides the annotated version of Figure 10 of Gao-2 above (which conflicts with Petitioner’s Reply positions). *See* Pet. Reply 12–17 (citing White Pet. Decl. ¶¶ 184–186, 190–191). And neither Dr. White’s Petition Declaration, nor his Reply Declaration, include the annotated versions of Figure 8 and 9 of Gao-2 provided for the first time in the Reply. *See* PO Sur-reply 15 (arguing that Petitioner’s “expert does not correct himself in his supplemental declaration, nor support this altered view” (citing White Reply Decl.)).

the “mixing chamber.” See Pet. Reply 12–17. Petitioner also changes the focus from the “chamber *within* core base 322” (Pet. 59–60 (emphasis added)) to “the chamber *defined by* Gao-2’s atomization rotating core 322” (Pet. Reply 13 (emphasis added)). And, as shown in the annotated figures below, “the chamber *defined by* Gao-2’s atomization rotating core 322” identified by Petitioner is now *on the outside of*—rather than *within*—core base 322:



Pet. Reply 14. In the annotated version of Figure 8 of Gao-2 above on the left, Petitioner added a green text box and arrow identifying “Guide grooves” and a red text box and arrow identifying “Vent holes.” In the annotated version of Figure 9 of Gao-2 above on the right, Petitioner added a green text box and arrow identifying a “Mixing Chamber.”

A petitioner cannot present, in a reply, a new argument necessary for its case-in-chief. See *Ariosa Diagnostics v. Verinata Health, Inc.*, 805 F.3d 1359, 1367 (Fed. Cir. 2015) (“We see no error in the Board’s

rejection of [a petitioner's] reliance, in its Reply submissions, on previously unidentified portions of a prior-art reference to make a meaningfully distinct contention.”); PTAB Trial Practice Guide (online version) (“TPG”)²⁰, § II.I (“Petitioner may not submit new evidence or argument in reply that it could have presented earlier, e.g. to make out a prima facie case of unpatentability.”). For the reasons above, we agree with Patent Owner (PO Sur-reply 12–15) that Petitioner’s positions as to the “mixing chamber” limitation have significantly changed from the Petition to the Reply.

Here, Petitioner has not changed positions in response to a new claim construction argument presented for the first time in the Patent Owner Response. *Cf. Axonics, Inc. v. Medtronic, Inc.*, 75 F.4th 1374, 1384 (Fed. Cir. 2023) (holding that “where a patent owner in an IPR first proposes a claim construction in a patent owner response, a petitioner must be given the opportunity in its reply to argue and present evidence of anticipation or obviousness under the new construction, at least where it relies on the same embodiments for each invalidity ground as were relied on in the petition”). Petitioner does not explain how its new positions are consistent with the positions taken in the Petition or support its argument that mixing occurs on the outside of core 322, as shown in the annotated version of Figure 9 above, with expert testimony. Pet. Reply 13–15.²¹

²⁰ Available at <https://www.uspto.gov/patents/ptab/trial-practice-guide>.

²¹ Petition cites paragraph 186 of Dr. White’s Petition Declaration in its Reply, but that paragraph does not address mixing on the outside of core 322 or provide other support for Petitioner’s new position. The testimony refers to mixing “within” core 322, which Dr. White explains as occurring on the inside of core 322. Ex. 1002 ¶¶ 183, 186.

Instead, in the Reply, Petitioner takes the position that Patent Owner simply failed to address the positions taken in the Petition. *See, e.g.*, Pet. Reply 13 (arguing that the argument in the Patent Owner Response “does not address the structure of Gao-2 that the Petition reads on the claimed ‘mixing chamber’”). We disagree. As summarized above, Patent Owner addresses the positions taken by Petitioner and Dr. White in the *initial filings* in this proceeding, correctly showing why they are based on a fundamental misunderstanding as to the location mixing occurs. *See* PO Resp. 18–19. We will not address the merits of Petitioner’s positions, taken for the first time in the Reply, that the *new* aspects of Gao-2 disclose the “mixing chamber” limitation. *See* Pet. Reply 13–17; PO Sur-reply 14 (arguing that “[n]othing prevented Petitioner from making its current argument before”); TPG § II.I (“While replies and sur-replies can help crystalize issues for decision, a reply or sur-reply that raises a new issue or belatedly presents evidence may not be considered. The Board is not required to attempt to sort proper from improper portions of the reply or sur-reply.”).

For the reasons above, we find, based on the complete record, that Petitioner has not shown by a preponderance of the evidence that Gao-2 discloses the “mixing chamber” limitation.

b. Conclusion as to Claim 1

For the reasons above, we determine, based on the complete record, that Petitioner has not demonstrated by a preponderance of the evidence that claim 1 would have been obvious based on Gao-2.

3. Independent Claim 5

For independent claim 5, Petitioner contends that Gao-2 discloses or suggests each limitation. Pet. 64–65; White Pet. Decl. ¶ 202. To support its

arguments, Petitioner relies on the arguments made as to clauses 1PRE through 1F of independent claim 1. Pet. 64–65.

Patent Owner does not present any arguments specifically addressing the limitations of claim 5 in the context of this ground. *See* PO Resp. 14–20; PO Sur-reply 12–18. The “mixing chamber” limitation argued by Patent Owner is required by every challenged claim *except* independent claim 5.

The “form the fluid dispersion” limitation argued by Patent Owner (PO Resp. 19–20) is recited in independent claim 1 (and thus dependent claims 3 and 4) as well as dependent claims 7 and 8, but not in independent claim 5. The phrase “fluid dispersion” is recited in the preamble of independent claim 5, but Patent Owner does not argue that that language of the preamble is limiting. Supporting this understanding, Patent Owner’s argument addressing the “form the fluid dispersion” limitation is expressly focused on independent claim 1, not independent claim 5. *See* PO Resp. 20 (top paragraph).

The record evidence, as presented, supports Petitioner’s position as to the limitations in independent claim 5. We find, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that Gao-2 discloses or suggests the limitations in claim 5. In addition, we determine, based on the complete record, that Petitioner has shown by a preponderance of the evidence that (to the extent necessary) one of ordinary skill in the art at the time of the invention would have had reason to modify Gao-2 as proposed, and that the articulated reasoning is supported by rational underpinning.

For the reasons above, we determine, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that claim 5 would have been obvious based on Gao-2.

4. Claims 3, 4 and 6–8

For dependent claims 3 and 4 (which depend from claim 1) and claims 6–8 (which depend from claim 5), Petitioner contends that Gao-2 discloses or suggests (or when modified as proposed in the alternative for claim 4), satisfies each limitation. Pet. 61–66; Pet. Reply 12–21. As discussed above (*see* § II.F.2.a), Petitioner has not demonstrated by a preponderance of the evidence that Gao-2 discloses or suggests the “mixing chamber” limitation required by each of dependent claims 3, 4, and 6–8. Thus, we determine, based on the complete record, that Petitioner has not demonstrated by a preponderance of the evidence that claims 3, 4, and 6–8 would have been obvious based on Gao-2.

G. Asserted Obviousness of Claims 1 and 3–8 Based on Gao-2 and Goubet

Petitioner asserts that claims 1 and 3–8 of the challenged patent would have been obvious based on Gao-2 and Goubet. Pet. 3–4, 66–69; Pet. Reply 21–24. Patent Owner provides arguments addressing this asserted ground. PO Resp. 20–21; PO Sur-reply 18–20. In this ground, Petitioner relies on Gao-2 (summarized above (*see* § II.F.1)) and Goubet (summarized above (*see* § II.D.1)).

1. Independent Claim 1

For claim 1, Petitioner contends that the proposed combination of Gao-2 and Goubet discloses each limitation. Pet. 66–69; Pet. Reply 21–23. Patent Owner argues that the proposed combination lacks the “mixing

chamber” limitation in clause 1G. PO Resp. 20–21; PO Sur-reply 18–19. We view this issue as dispositive for claim 1, and we address it below.

a. The “Mixing Chamber” Limitation

In the context of this ground, Petitioner continues to rely on Gao-2 as to the “mixing chamber” limitation in clause 1G. *See* Pet. 66–69 (discussing relying on Goubet as to the “form the fluid dispersion” limitation but continuing to rely on Gao-2 for other limitations, including clause 1G). Patent Owner relies on the same argument as to the “mixing chamber” limitation presented as to the ground based on Gao-2 alone. *See* PO Resp. 21 (arguing, for this ground, that “Gao-2 lacks a mixing chamber”).

For the same reasons discussed above as to the prior ground based on Gao-2 alone (*see* § II.F.2.a), we find, based on the complete record, that Petitioner has not shown by a preponderance of the evidence that Gao-2 discloses the “mixing chamber” limitation.

b. Conclusion as to Claim 1

For the reasons above, we determine, based on the complete record, that Petitioner has not demonstrated by a preponderance of the evidence that claim 1 would have been obvious based on Gao-2 and Goubet.

2. Independent Claim 5

For independent claim 5, Petitioner contends that the proposed combination of Gao-2 and Goubet discloses each limitation. Pet. 68–69; White Pet. Decl. ¶ 211. To support its arguments, Petitioner relies on the arguments made as to clauses 1PRE through 1F of independent claim 1.

Pet. 68–69. Patent Owner challenges the articulated reasons to combine Gao-2 and Goubet. *See* PO Resp. 20–21. We address this issue below.²²

a. The Reasons to Combine Gao-2 and Goubet

Petitioner presents reasons why one of ordinary skill in the art would have combined the relied-upon aspects of Gao-2 and Goubet in the context of this asserted ground. *See* Pet. 66–68; White Pet. Decl. ¶¶ 206–210. Specifically, Petitioner states that “[i]n view of Goubet’s teachings,” one of ordinary skill in the art would have been “motivated to further reduce the size of the droplets discharged by Gao-2’s atomizer to improve their dispersion and aromatic properties.” Pet. 68 (citing White Pet. Decl. ¶¶ 210–211). According to Petitioner, one of ordinary skill in the art “would have been motivated to modify the series of noise reduction devices 34 (*e.g.*, baffles) [in Gao-2] into a series of spiraling encloses, as taught by Goubet, to further reduce the size of the mist droplets that are discharged into the atmosphere, which, in turn, would also increase their uniformity.” *Id.* (citing White Pet. Decl. ¶¶ 210–211). Petitioner adds that “[t]he combination would thus be a simple substitution of one known element for another to achieve the same desired effect of improved atomization and noise reduction.” *Id.* (citing White Pet. Decl. ¶ 214; *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 401 (2007)).

In a brief argument, Patent Owner contends that “Gao-2 lacks a mixing chamber while Goubet introduces compressed air to operative fluid

²² For the reasons discussed above (*see* § II.F.3), Patent Owner’s arguments as to the “mixing chamber” limitation and the “form the fluid dispersion” limitation do not apply to independent claim 5.

within a chamber” and that “these mutually exclusive functionalities could not be reasonably combined.” PO Resp. 21.

On the complete record, Patent Owner’s argument does not identify a deficiency in Petitioner’s position as to claim 5. As noted by Petitioner, Patent Owner’s “premise is incorrect.” Pet. Reply 23. Specifically, as stated by Petitioner, this ground “does not rely on Goubet to supply a ‘mixing chamber’ or replace Gao-2’s atomization mechanism” but rather it “relies only on ‘modify[ing] the series of noise reduction devices 34 (e.g., baffles) [in Gao-2] into a series of spiraling encloses, as taught by Goubet’ to increase the uniformity of the droplets.” *See id.* (citing Pet. 66–68; Ex. 1016, 5:12–16; White Pet. Decl. ¶¶ 206–210). Thus, the “compressed air” allegedly in Goubet is not part of the proposed combination.

Further, Dr. Micklow does not address in his Declaration either ground involving Gao-2. *See* Micklow Decl. ¶¶ 19–25 (addressing only the ground based on Goubet alone and the ground based on Goubet and Kaiser and neither ground involving Gao-2). Accordingly, Patent Owner’s argument as to alleged “mutually exclusive functionalities” is mere attorney argument. *See* PO Resp. 20–21 (not citing any evidence); *Elbit Sys. of Am., LLC v. Thales Visionix, Inc.*, 881 F.3d 1354, 1359 (Fed. Cir. 2018) (“‘[A]ttorney argument is not evidence’ and cannot rebut other admitted evidence.” (quoting *Icon Health & Fitness, Inc. v. Strava, Inc.*, 849 F.3d 1034, 1043 (Fed. Cir. 2017))).

We determine, based on the complete record, that Petitioner has shown by a preponderance of the evidence that one of ordinary skill in the art at the time of the invention would have had reason to combine Gao-2 and

Goubet as proposed, and that the articulated reasoning is supported by rational underpinning.

b. The Subject Matter of Claim 5

The record evidence, as presented, supports Petitioner’s position as to the limitations in independent claim 5. We find, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that the proposed combination of Gao-2 and Goubet discloses or suggests the limitations in claim 5.

c. Conclusion as to Claim 5

For the reasons above, we determine, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that claim 5 would have been obvious based on Gao-2 and Goubet.

3. Claims 3, 4 and 6–8

For dependent claims 3 and 4 (which depend from claim 1) and claims 6–8 (which depend from claim 5), Petitioner contends that the proposed combination of Gao-2 and Goubet discloses each limitation. Pet. 66–69; Pet. Reply 21–24. As discussed above (*see* § II.G.1.a), Petitioner has not demonstrated by a preponderance of the evidence that the proposed combination of Gao-2 and Goubet discloses the “mixing chamber” limitation required by each of dependent claims 3, 4, and 6–8. Thus, we determine, based on the complete record, that Petitioner has not demonstrated by a preponderance of the evidence that claims 3, 4, and 6–8 would have been obvious based on Gao-2 and Goubet.

H. Revised Motion to Amend

Under 35 U.S.C. § 316(d)(1) and 37 C.F.R. § 42.121(a), Patent Owner moves to substitute (1) cancelled claims 1, 3, and 4 with proposed substitute

claim 16 and (2) cancelled claims 5–8 with proposed substitute claim 17. MTA 4 (§ II). Because the Revised Motion to Amend was contingent on a determination of unpatentability (RMTA 3), and because Petitioner has only shown independent claim 5 to be unpatentable, we do not reach the arguments as to proposed substitute claim 16. We address proposed substitute claim 17 below.

1. Proposed Substitute Claim

Patent Owner submits the following proposed substitute independent claim 17, which corresponds to independent claim 5 (with added material underlined, deleted material double bracketed, and internal designations added in single brackets²³):

17. [17PRE] A fluid dispersion assembly is operatively interconnected to a container of an operative fluid and a compressed air source to generate and discharge a fluid dispersion into a surrounding airspace, said fluid dispersion assembly comprising:

[17A] a diffusion unit at least partially defining a diffusion chamber, [17B] wherein said diffusion chamber comprises an upper chamber and a lower chamber,

[17C] a discharge port disposed in fluid communication between said diffusion chamber and the surrounding airspace, and

[17D] a diffusion assembly disposed in an operative engagement with said diffusion unit, [17E] wherein said diffusion assembly comprises an atomizer assembly,

[17F] said diffusion assembly is disposed between said upper chamber and said lower chamber[.].

²³ We add designations for the clauses of proposed substitute claim 17 to aid in the discussion below.

[17G] said atomizer assembly comprises an atomizer air inlet channel, a fluid inlet, a mixing chamber, and an atomizer exhaust aperture;

[17H] said atomizer air inlet channel is interconnected to the compressed air source and defines a compressed-air flow path through said atomizer assembly;

[17I] said fluid inlet is in fluid communication with the operative fluid in the container and comprises an opening into said mixing chamber, said opening disposed along said compressed-air flow path such that said fluid inlet is substantially perpendicular to said compressed-air flow path as the compressed air flows across said opening;

[17J] said mixing chamber disposed along said compressed-air flow path after said atomizer air inlet channel and before said atomizer exhaust aperture, and

[17K] said fluid inlet is substantially perpendicular to a flow path of compressed air from the compressed air source as the compressed air flows across said fluid inlet.

RMTA 18–19²⁴ (Claims App.). Proposed substitute claim 17 corresponds to cancelled claim 5. *See* RMTA 18–19 (Claims App.). Patent Owner does not propose substitute claims corresponding to cancelled claims 6–8.

2. Legal Standard

In an *inter partes* review, amended claims are not added to a patent as a matter of right; rather, they must be proposed as a part of a motion to amend. 35 U.S.C. § 316(d). In reviewing a motion to amend, the Board

²⁴ As discussed below (*see* § II.H.4), Patent Owner provides conflicting recitations for the proposed substitute claim. The recitations here are from the Claim Appendix at the end of the Revised Motion to Amend. RMTA 18–19. To the extent Patent Owner’s statements of the proposed substitute claim does not accurately reflect added or deleted language from the original claim, we indicate the additions or deletions, as appropriate.

assesses the patentability of the proposed substitute claims “without placing the burden of persuasion on the patent owner.” *Aqua Prods., Inc. v. Matal*, 872 F.3d 1290, 1328 (Fed. Cir. 2017) (en banc); *see Lectrosonics, Inc. v. Zaxcom, Inc.*, IPR2018-01129, Paper 15 at 3–4 (PTAB Feb. 25, 2019) (precedential). Instead, petitioners have the burden of persuasion to show, by a preponderance of the evidence, that any proposed substitute claims are unpatentable. *See* 37 C.F.R. § 42.121(d)(2).

Notwithstanding the foregoing, a patent owner’s proposed substitute claim(s) must meet the statutory requirements of 35 U.S.C. § 316(d) and the procedural requirements of 37 C.F.R. § 42.121. *Lectrosonics*, Paper 15 at 4–8. In particular, a patent owner must demonstrate: (1) the amendment proposes a reasonable number of substitute claims; (2) the proposed claims are supported in the original disclosure (and any earlier filed disclosure for which the benefit of a filing date is sought); (3) the amendment responds to a ground of unpatentability involved in the trial; and (4) the amendment does not seek to enlarge the scope of the claims of the patent or introduce new subject matter. *See* 35 U.S.C. § 316(d); 37 C.F.R. § 42.121.

3. *Claim Construction*

Neither Patent Owner nor Petitioner proposes that any language in the amendments in the proposed substitute claim needs express construction. *See* RMTA; RMTA Opp.; RMTA Reply; RMTA Sur-reply. We agree.

4. *Alleged Procedural Deficiencies*

In the Opposition, Petitioner asserts that the Revised Motion to Amend is procedurally deficient because the claim language in the required section showing alleged written description support is “materially inconsistent” with the claim appendix at the end of the Revised Motion to

Amend. *See* RMTA Opp. 1–3. According to Petitioner, “these inconsistencies are highly prejudicial to Petitioner because it is unclear which set of substitute claims Petitioner must address in its Opposition to the Revised MTA.” *Id.* at 3.

In the Reply, Patent Owner characterizes the differences as “obvious,” “incidental,” and “scrivener’s errors.” RMTA Reply 2. According to Patent Owner, these errors did not “prejudice[] Petitioner because it proceeded with its Opposition, rather than contact [Patent Owner] for clarification.” *Id.* With the Reply, however, Patent Owner provided a *new set* of claim language, presented as “corrected language from the original Claims Appendix” from the Revised Motion to Amend. *Id.*

Petitioner, in the Sur-reply, contends that “the Reply’s replacement chart combines various limitations of both versions of the substitute claims to propose entirely new substitute claims.” RMTA Sur-reply 2. Petitioner states that the “Opposition attempted to address both versions where space permitted,” but that “Petitioner primarily addressed the proposed substitute claims on pages 6–10 of the Revised MTA.” *Id.* According to Petitioner, “the Reply cannot function as a new motion to amend (which would be the third motion to amend in this proceeding) after Petitioner responded to the conflicting versions.” *Id.* at 3 (citing 37 C.F.R. § 42.121(f)(3); RMTA Opp. 1–3). For the reasons below, we agree with Petitioner.

Under the relevant regulation: “Any motion to amend claims must include a claim listing [that] *show[s] the changes clearly*” with the motion (or, in this case, revised motion) setting forth “(1) The support in the original disclosure of the patent for *each proposed substitute claim*; and (2) The support in an earlier-filed disclosure *for each claim* for which the benefit of

the filing date of the earlier-filed disclosure is sought.” 37 C.F.R.

§§ 42.121(b)(1)–(2) (emphasis added). Patent Owner bears the burden of persuasion to show, by a preponderance of the evidence, that the revised motion to amend complies with these requirements. 37 C.F.R.

§ 42.121(d)(1). We find that Patent Owner has not “clearly” shown the changes proposed in the claim language and has not shown written description support of the proposed substitute claim *with the filing of the Revised Motion to Amend*, as required by our regulations. Satisfying the regulatory requirements by the filing of the reply to a revised motion to amend is not sufficient (and has not occurred here regardless).

Below, we provide a table with three columns, showing how the language of the proposed substitute claim differs between (1) the Claims Appendix of the Revised Motion to Amend (RMTA 18–19), (2) the written description support section of the Revised Motion to Amend (RMTA 9–11), and (3) the Claims Appendix of the Reply to the Revised Motion to Amend (RMTA Reply 18–19) (which also provides written description support). For ease of review, we use the designations from the claims listings above (*see* § II.H.1), and we change to light gray any claim language consistent across all the three columns (with any underlining or bracketing, showing changes from the original claims, removed):

	Claim Appendix in RMTA	Written Description Section of RMTA	Claims Appendix in RMTA Reply
17PRE	A fluid dispersion assembly is operatively interconnected to a container of an operative fluid and a compressed air source to generate and discharge a fluid dispersion into a surrounding airspace, said fluid dispersion assembly comprising:	A fluid dispersion assembly is operatively interconnected to a container of an operative fluid and a compressed air source to generate and discharge a fluid dispersion into a surrounding airspace, said fluid dispersion assembly comprising:	A fluid dispersion assembly is operatively interconnected to a container of an operative fluid and a compressed air source to generate and discharge a fluid dispersion into a surrounding airspace, said fluid dispersion assembly comprising:
17A	a diffusion unit at least partially defining a diffusion chamber,	a diffusion unit at least partially defining a diffusion chamber,	a diffusion unit at least partially defining a diffusion chamber,
17B	wherein said diffusion chamber comprises an upper chamber and a lower chamber,	wherein said diffusion chamber comprises an upper chamber and a lower chamber,	wherein said diffusion chamber comprises an upper chamber and a lower chamber,
17C	a discharge port disposed in fluid communication between said diffusion chamber and the surrounding airspace, and	a discharge port disposed in fluid communication between said diffusion chamber and the surrounding airspace, and	a discharge port disposed in fluid communication between said diffusion chamber and the surrounding airspace, and
17D	a diffusion assembly disposed in an operative engagement with said diffusion unit,	a diffusion assembly disposed in an operative engagement with said diffusion unit,	a diffusion assembly disposed in an operative engagement with said diffusion unit,
17E	wherein said diffusion assembly comprises an atomizer assembly,	wherein said diffusion assembly comprises an atomizer assembly,	wherein said diffusion assembly comprises an atomizer assembly,
17F	said diffusion assembly is disposed between said upper chamber and said lower chamber,	said diffusion assembly is disposed between said upper chamber and said lower chamber,	said diffusion assembly is disposed between said upper chamber and said lower chamber,

17G	said atomizer assembly comprises an atomizer air inlet channel, a fluid inlet, a mixing chamber, and an atomizer exhaust aperture;	said atomizer assembly comprises an atomizer air inlet channel, a fluid inlet, a mixing chamber, and an atomizer exhaust aperture,	said atomizer assembly comprises an atomizer air inlet channel, a fluid inlet, a mixing chamber, and an atomizer exhaust aperture,
17H	said atomizer air inlet channel is interconnected to the compressed air source and defines a compressed-air flow path through said atomizer assembly;		
17I	said fluid inlet is in fluid communication with the operative fluid in the container and comprises an opening into said mixing chamber, said opening disposed along said compressed-air flow path such that said fluid inlet is substantially perpendicular to said compressed-air flow path as the compressed air flows across said opening;	said fluid inlet is in fluid communication with the operative fluid in the container and comprises an opening into said mixing chamber, said opening disposed along said compressed-air flow path such that said fluid inlet is substantially perpendicular to said compressed-air flow path as the compressed air flows across said opening;	said fluid inlet is in fluid communication with the operative fluid in the container and comprises an opening into said mixing chamber, said opening disposed along said compressed-air flow path such that said fluid inlet is substantially perpendicular to said compressed-air flow path as the compressed air flows across said opening;
17J	said mixing chamber disposed along said compressed-air flow path after said atomizer air inlet channel and before said atomizer exhaust aperture, and	said mixing chamber disposed along said compressed-air flow path after said atomizer air inlet channel and before said atomizer exhaust aperture, and	said mixing chamber disposed along said compressed-air flow path after said atomizer air inlet channel and before said atomizer exhaust aperture, and
17K	said fluid inlet is substantially perpendicular to a flow path of compressed air from the compressed air source as the compressed air flows across said fluid inlet.		said fluid inlet is substantially perpendicular to a flow path of compressed air from the compressed air source as the compressed air flows across said fluid inlet.

?		said atomizer exhaust aperture is spaced from said discharge port and opens laterally from said mixing chamber into said lower chamber along an exhaust path that is transverse to said fluid inlet.	
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In the context of a motion to amend (or revised motion to amend), the burden falls on the Patent Owner to present the proposed changes *clearly* and comply with the regulatory requirements for the proposed substitute claims. *See* 37 C.F.R. § 42.121(b)(1)–(2). Because Patent Owner failed to carry that burden here by a preponderance of the evidence, we deny the Revised Motion to Amend as to proposed substitute claim 17. As discussed above, we do not reach proposed substitute claim 16.

I. Patent Owner’s Motion to Exclude

Patent Owner filed a motion to exclude evidence (Paper 34 (“MTE”)); *see also* Paper 37 (Patent Owner’s reply brief)), which Petitioner opposed (Paper 35). Patent Owner moves to exclude certain testimony in the deposition transcript of Patent Owner’s own declarant, Dr. Micklow. *See* MTE 3 (listing Ex. 1046, 115:15–18, 157:20–159:2, 200:14–16). We reference two of the three passages Patent Owner seeks to exclude above in a discussion of Petitioner’s arguments regarding Dr. Micklow, which we do not find persuasive. *See* § II.C (citing Ex. 1046, 115:15–18, 200:14–16).

We dismiss Patent Owner’s motion as moot because in this Decision we do not rely on the portion of Dr. Micklow’s deposition testimony identified in a manner adverse to Patent Owner. *See* TPG, § II.K (“In the Board’s experience, consideration of the objected-to evidence is often

unnecessary to resolve the patentability of the challenged claims, and the motion to exclude is moot.”).

III. CONCLUSION

Upon consideration of the briefing and the evidence of record, we determine that Petitioner (1) has not proven, by a preponderance of the evidence, that claims 1 and 3–8 would have been obvious based on Goubet, (2) has not proven, by a preponderance of the evidence, that claims 1, 3–8 would have been obvious based on Goubet and Kaiser, (3) has proven, by a preponderance of the evidence, that claim 5 would have been obvious based on Gao-2, (4) has not proven, by a preponderance of the evidence, that claims 1, 3, 4, and 6–8 would have been obvious based on Gao-2, (5) has proven, by a preponderance of the evidence, that claim 5 would have been obvious based on Gao-2 and Goubet, and (6) has not proven, by a preponderance of the evidence, that claims 1, 3, 4, and 6–8 would have been obvious based on Gao-2 and Goubet.²⁵

Upon consideration of the briefing and the evidence of record, (1) we deny Patent Owner’s Revised Motion to Amend as to substituting proposed claim 17, (2) we do not reach proposed substitute claim 16, and (3) we dismiss Patent Owner’s Motion to Exclude.

²⁵ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner’s attention to the April 2019 Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding, 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. §§ 42.8(a)(3), (b)(2).

In summary:

Claims	35 U.S.C. §	Reference(s)/ Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1, 3–8	103	Goubet		1, 3–8
1, 3–8	103	Goubet, Kaiser		1, 3–8
1, 3–8	103	Gao-2	5	1, 3, 4, 6–8
1, 3–8	103	Gao-2, Goubet	5	1, 3, 4, 6–8
Overall Outcome			5	1, 3, 4, 6–8

Motion to Amend Outcome	Claim(s)
Original Claims Cancelled by Amendment	
Substitute Claims Proposed in the Amendment	16, 17
Substitute Claims: Motion to Amend Granted	
Substitute Claims: Motion to Amend Denied	17
Substitute Claims: Not Reached	16

IV. ORDER

Accordingly, it is hereby:

ORDERED that Petitioner has proven, by a preponderance of the evidence, that claim 5 is unpatentable;

FURTHER ORDERED that Petitioner has not proven, by a preponderance of the evidence, that claims 1, 3, 4, and 6–8 are unpatentable;

FURTHER ORDERED that Patent Owner's Revised Motion to Amend is *denied* as to proposed substitute claim 17;

FURTHER ORDERED that we do not reach proposed substitute claim 16;

FURTHER ORDERED that Patent Owner's Motion to Exclude is *dismissed*; 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.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AROMA360, LLC,
Petitioner,

v.

AIR ESSCENTIALS, INC.,
Patent Owner.

IPR2025-00707
Patent 10,092,918 B1

Opinion dissenting in part filed by *Administrative Patent Judge*
DEFranco.

I hereby dissent from the part of the Majority’s decision (Maj. Dec.) that claims 1, 3, 4, and 6–8 are not unpatentable as obvious over Gao-2, i.e., Petitioner’s Ground 3. *See supra* Section II.F.2, 4. According to the Majority, “Petitioner has not shown by a preponderance of the evidence that Gao-2 discloses the ‘mixing chamber’ limitation” of claim 1 because Petitioner’s showing is allegedly based on “a fundamental misunderstanding . . . as to how Gao-2 operates.” Maj. Dec. 35, 40. I respectfully disagree.¹

¹ I also dissent from the Majority’s decision that claims 1, 3, 4, and 6–8 are not unpatentable over Gao-2 and Goubet (Petitioner’s Ground 4), given that the Majority applies the same erroneous reasoning to this additional ground. *See supra* Section II.G.1, 3.

At the outset, I note three points that are not in dispute. *First*, neither Patent Owner nor the Majority disputes Petitioner’s contention that “mixing chamber” means “a region where the operative fluid is combined with compressed air.” *See* Pet. 61.² As such, that construction of “mixing chamber” should control for purposes of our analysis here.³ *Second*, neither Patent Owner nor the Majority disputes that Patent Owner’s expert never addresses the “mixing chamber” limitation. Indeed, Patent Owner’s expert does not provide any testimony on Ground 3, meaning that the testimony of Petitioner’s expert remains unrebutted as to how Gao-2 discloses the claimed mixing chamber. *See* Ex. 2002 ¶¶ 17–25 (identifying only “GROUND 1” and “GROUND 2” as “points of disagreement” with the declaration of Petitioner’s expert (Exhibit 1002)). Thus, Patent Owner’s contentions regarding Gao’s disclosure, on which the Majority relies, rest largely on attorney argument. *Finally*, neither Patent Owner nor the Majority disputes that paragraph 36 of Gao-2 discloses the claimed “mixing chamber.” *See* PO Resp. 14–15; Maj. Dec. 36 (identifying “¶ 36” of Gao-2 as disclosing where mixing of oil and air occurs). Indeed, Patent Owner highlights paragraph 36 of Gao-2 and submits Figure 10, reproduced below, as proof “it is clear that the mixing of the liquid and air occurs at [hole] 3224 of Gao-2,” without ever acknowledging what Petitioner actually argues in the Petition. PO Resp. 14–15.

² That construction aligns with Patent Owner’s definition of “mixing chamber” as a “chamber where compressed air and fluid are initially mixed together.” Ex. 1051, Appx. B, at 1.

³ “[A]ny arguments not raised and fully briefed in the [Patent Owner] response may be deemed forfeited.” Paper 11, at 10.

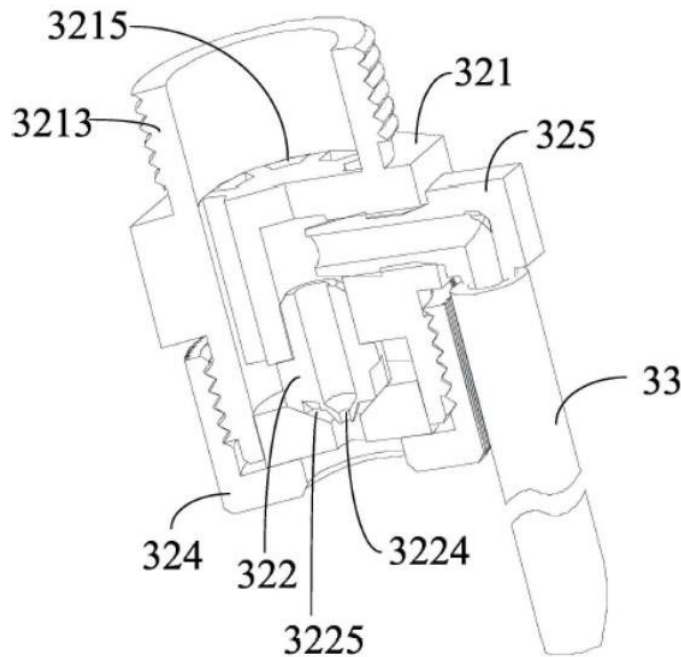
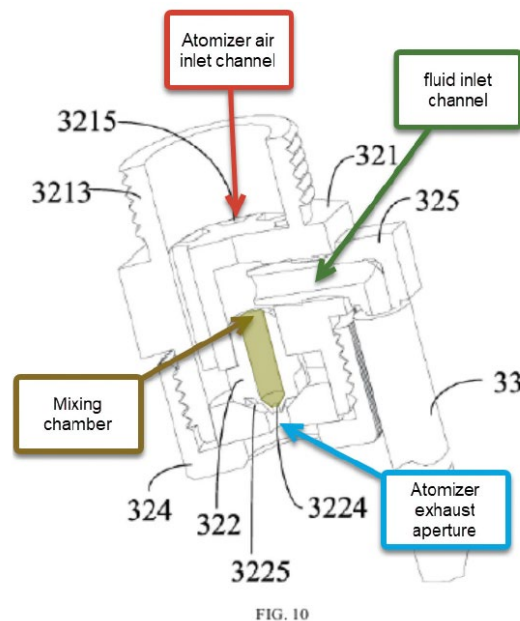


FIG. 10

With those undisputed points in mind, I turn now to the Majority's analysis. The Majority contends that Petitioner identifies the *wrong* location in Gao-2 as corresponding to the claimed "mixing chamber." In particular, the Majority finds that Petitioner's positions "are based on a fundamental misunderstanding as to the location mixing occurs." Maj. Dec. 40; *see also id.* at 35 (addressing what it contends is "a fundamental misunderstanding in Petitioner's position (at least at the time of filing of the Petition") as to how Gao-2 operates"). In doing so, the Majority unilaterally shades (in light brown) the entire hole 3224 in Petitioner's annotation of Gao-2's Figure 10, as reproduced below, to support what it believes Petitioner identifies as the location of Gao-2's mixing chamber. *See id.* at 33 ("[W]e understand Petitioner to have identified as the 'mixing chamber' the portion shown in brown highlighting in this annotated version of Figure 10.").



That understanding by the Majority is erroneous because neither Petitioner nor its expert ever takes the position that the entire “volume” of hole 3224, as shaded in brown by the Majority, corresponds to the claimed mixing chamber. Maj. Dec. 33–34 n.15. Nor do Petitioner and its expert ever suggest that air and oil are “both *entered into* and then *mixed* within the brown highlighted region,” i.e., the entirety of hole 3224, as the Majority also mistakenly believes is Petitioner’s position. *Id.* at 35. Rather, under a fair and reasonable reading, the Petition expressly identifies the “end” of that hole, or the hole’s “outlet,” as the location where mixing of air and oil occurs in Gao-2. *See* Pet. 56–60 (citing Ex. 1042 ¶¶ 36, 38, 40; Ex. 1002 ¶¶ 183–186, 190). Thus, rather than a fundamental misunderstanding on Petitioner’s part, it is the Majority that misreads the Petition.⁴

⁴ Although arguably the brown arrow in Petitioner’s annotation of Gao-2’s Figure 10 is pointing to hole 3224 itself as corresponding to the mixing chamber, that annotation of Figure 10 must be read *in the context of Petitioner’s entire argument*, which, as discussed herein, explicitly identifies the “end” or “outlet” of hole 3224 as the location of the mixing chamber.

More specifically, in showing how Gao-2 discloses the “mixing chamber” of claim limitations 1[G] and 1[J], the Petition states: “*As demonstrated in limitation 1[E] of this Ground 3, the atomizer assembly comprises . . . a mixing chamber (e.g., chamber within core base 322).*” Pet. 59–60 (emphasis added). As that statement make clear, the Petition incorporates its analysis of limitation 1[E] to identify the “chamber” that is being referenced. This is the point where the Majority’s analysis goes astray; it creates the unfair impression that Petitioner identifies the entirety of cylindrical hole 3224 through rotating core 322 as the “chamber” being referenced on pages 59 and 60 of the Petition while ignoring that the Petition predicates its reference to the “chamber” on its earlier analysis of “limitation 1[E]” as found on pages 56–58 of the Petition. *See* Maj. Dec. 33–35.

When pages 59 and 60 of the Petition are read in the context of pages 56–58 of the Petition, it becomes clear that the Majority overlooks what Petitioner clearly identifies as the “chamber” where mixing occurs. In particular, the Petition defines the “chamber” in terms of being located “at an end” of hole 3224 in rotating core 322—

Specifically, Gao-2’s atomizer assembly (e.g., atomization core 32) includes an atomization rotating core 322 attached to a core base 321. Ex-1042, ¶[0038]; *Id.*, FIG. 10. *Atomization rotating core 322 defines a chamber* and is provided underneath a mounting plate 3214. Ex-1042, ¶[0038]; *Id.*, FIG. 10. *A hole 3224 is provided **at an end** of atomization rotating core 322* that is disposed within a spray outlet 3231 of atomization core cap 323. *Id.*, ¶[0036].

Pet. 57 (citing Ex. 1042 ¶¶ 36, 38) (emphasis and bold added). That the Petition references “an end” of hole 3224 as defining the “chamber” shows that Petitioner is not relying on the *entirety* of hole 3224 (as highlighted by the Majority). Indeed, the Petition makes that abundantly clear in the

discussion that immediately follows the above passage, where it explicitly states that airflow mixes with the oil “at the outlet” of hole 3224—

“[A]irflow generated by the air pump 4 enters the upper end of the atomization core base 321 through the air inlet channel 311, then passes through the vent hole(s) 3215” and into rotating core 322. Ex-1042, ¶[0038]. . . . Gao-2 recites, “this [airflow] creates a negative pressure . . . draw[ing] the essential oil from the essential oil bottle 2 through the liquid suction tube 33” and into atomization rotating core 322 where “[t]he essential oil then mixes with the airflow and is atomized at the outlet of the [] hole 3224, before being sprayed out from the spray outlet 3231.” *Id.*⁵

Pet. 57 (citing Ex. 1042 ¶¶ 38, 40). Together, the above two passages *from the Petition* clearly support Petitioner’s reliance on the “outlet” of hole 3224 as corresponding to the “chamber” where mixing occurs rather than throughout the entirety of hole 3224..

Indeed, Gao-2 itself corroborates that understanding with its description of rotating core 322 in Figure 9 of Gao-2, reproduced below.

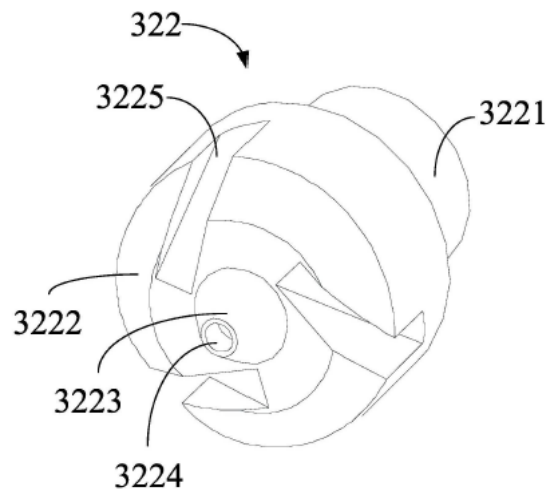


FIG. 9

⁵ Although this particular citation is to paragraph 40 of Gao-2, the quote actually derives from paragraph 36 of Gao-2, which has a similar disclosure but with slightly different wording.

Figure 9 of Gao-2 is a schematic diagram of rotating core 322 with a plurality of airflow grooves 3225 formed within the core and “surrounding the outlet of the liquid suction hole 3224.” Ex. 1042 ¶¶ 24, 37. As described in Gao-2, airflow from grooves 3225 results in the formation of a cyclone “at the outlet” of suction hole 3224—

With reference to FIG. 9, in a preferred embodiment, the lower end of the atomization rotating core 322 is formed with a plurality of guide grooves 3225 surrounding the outlet of the liquid suction hole 3224. . . . Since the extension direction of the multiple guide grooves 3225 forms an angle with the radial direction of the outlet of the liquid suction hole 3224, *it is easy to form a cyclone at the outlet of the liquid suction hole 3224*, which facilitates the atomization of the highly viscous essential oil.

Id. ¶ 37 (emphasis added). That disclosure supports Petitioner’s position, as stated on page 57 of the Petition, that *the outlet* within Gao-2’s rotating core 322 operates as a mixing chamber because that is the region where the airflow from grooves 3225 comes into contact and mixes with oil from hole 3224 to form a mist, which is then sprayed out from spray outlet 3231 (as shown in Gao-2’s Figures 8 and 9).

The Majority never considers Petitioner’s reliance on “the outlet” within Gao-2’s rotating core 322 as being the “chamber” where the cyclone forms and mixing occurs. Instead, the Majority gives the impression that Petitioner relies on the entirety of hole 3224 as the “chamber within core base 322.” Maj. Dec. 33. In doing so, the Majority points to paragraph 36 in Gao-2 as the reason for Petitioner’s alleged misunderstanding of hole 3224, when in reality Petitioner cites paragraph 36 as the very foundation of its position that mixing occurs “at the outlet” of hole 3224, and not “in the brown highlighted region . . . within core 322” that the Majority mistakes as

Petitioner's position. *Compare* Maj. Dec. 36–37 (quoting Ex. 1042 ¶ 36), *with* Pet. 57 (quoting Ex. 1042 ¶ 36).

Also, to the extent the Majority finds that “Gao-2 describes that mixing occur[s] outside core 322,” but not “*within* rotating core 322,” I disagree. *See* Maj. Dec. 36–37. Gao-2 clearly describes “the outlet” of hole 3224 as being part of rotating core 322: “A central part of the atomization section 3222 also forms a conical head 3223, and *the outlet of the liquid suction hole 3224 is located on this conical head 3223.*” Ex. 1042 ¶ 37 (emphasis added). As shown in Figure 9 of Gao-2, reproduced above, conical head 3223 is located on rotating core 322 and the outlet of hole 3224 is formed *within* that conical head, thereby encompassing a chamber within rotating core 322.⁶ That said, I do not dispute that mixing also occurs *proximate* the outlet in conical head 322 and not simply within the outlet. As mentioned above, Gao-2 discloses that a “cyclone” is formed “at the outlet of the liquid suction hole 3224.” *Id.* That disclosure reasonably suggests that the cyclone causes mixing to occur not only within, but also around, the outlet of rotating core 322. Indeed, Petitioner acknowledges as much in its Reply. *See* Pet. Reply 14–15 (annotating Gao-2's Figure 9 (in green) to show that mixing also occurs in a region that “surround[s] suction hole 3224”).

⁶ The Majority mischaracterizes my analysis as “place[ing] heavy reliance on mixing occurring *within hole 3224.*” Maj. Dec. 37 n.18 (emphasis added). More accurately, my analysis emphasizes Petitioner's reliance on “the outlet” of Gao-2's hole 3224, not the entire hole. And, because *the outlet* indisputably is part of rotating core 322, then mixing occurs *within core 322*, rather than throughout the hole as the Majority mistakenly believes is Petitioner's position.

Finally, I disagree with the Majority’s finding that Petitioner improperly raises a new argument in its Reply. *See* Maj. Dec. 37–40. According to the Majority, Petitioner “jettisons its prior position” in the Petition by “identifying an *entirely different* portion of the assembly in Gao-2 as the ‘mixing chamber’” in the Reply. *Id.* at 37–38. While I agree that Petitioner’s Reply describes mixing as occurring in an additional region surrounding the outlet of Gao-2’s rotating core 322, in no way can I reasonably agree that Petitioner abandons its position in the Petition that mixing occurs “at the outlet” of Gao-2’s rotating core 322. In fact, the Reply explicitly maintains that mixing occurs “at the outlet of liquid suction hole 3224,” while clarifying that mixing also occurs in “the space” that “surround[s]” the outlet of hole 3224 due to airflow through grooves 3225 in rotating core 322—

Gao-2’s flow path is straightforward and undisputed: (1) airflow enters . . . and flows along guide grooves 3225 defined within atomization rotating core 322; (2) essential oil is drawn into and through liquid suction hole 3224; (3) within the chamber defined by the atomization rotating core 322, the oil and airflow meet, and Gao-2 explains the oil “then mixes with the airflow and is atomized *at the outlet of the liquid suction hole 3224*”; and (4) the atomized mist is then discharged through spray outlet 3231 (the atomizer’s exhaust aperture). Ex. 1042 ¶¶ 36, 38, 40; Pet. 56–57, 59–60; Ex. 1002 ¶186.

* * *

Because guide grooves 3225 are defined within atomization rotating core 322 and such that they “surround” suction hole 3224, a POSITA would understand Gao-2 to disclose a chamber within rotating core 322 in which air and oil are mixed before discharge – i.e., a “mixing chamber.” Ex. 1042 ¶¶ 36–40; Pet. 56–57.

See Pet. Reply 13–14 (emphases added).

Indeed, Petitioner annotates Gao-2's Figure 9 (in green) to illustrate exactly how airflow from grooves 3225 contributes to mixing "at the tip of the atomization rotating core" and in "the space between the surface of guide grooves and the surface of cap 323 proximate the rotating core." *Id.* at 14. In other words, the Reply makes clear that a skilled artisan would understand that rotating core 322 mixes airflow and oil *both* at the outlet of suction hole 3224 *and* in the region surrounding the hole's outlet. The Reply's identification of that additional mixing area is in direct response to Patent Owner's mistaken belief that mixing only occurs "*downstream* from the hole" in Gao-2's rotating core. PO Resp. 19 (emphasis in original). Contrary to the Majority's finding, the Reply's clarification of the mixing chamber as also including the region surrounding the outlet of hole 3224 does not negate the fact that the Petition clearly identifies "the outlet" of hole 3224 as corresponding to the claimed mixing chamber. Thus, I disagree with the Majority's view that the Reply changes positions and raises new arguments. Rather, I see the Reply as a fair rebuttal to Patent Owner's argument that mixing only occurs "downstream" of rotating core 322.

In sum, the evidence of record does not support the Majority's finding that the Petition fundamentally misunderstands the location of Gao-2's mixing. Instead, the Majority's findings exhibit clear error because they fail to consider the entire record, including Petitioner's clear reliance on "the outlet" of Gao-2's rotating core 322 as corresponding to the mixing chamber.

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