

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AROMA360, LLC,
Petitioner,

v.

AIR ESSSENTIALS, INC.,
Patent Owner.

IPR2025-00705
Patent 9,527,094 B1

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

JESCHKE, *Administrative Patent Judge*.

JUDGMENT

Final Written Decision

Determining All Challenged Claims Unpatentable

35 U.S.C. § 318(a)

Denying Patent Owner's Revised Contingent
Motion to Amend as to Substituting Claim 21

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 7–9 and 11 of U.S. Patent No. 9,527,094 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 claims 7–9 and 11. 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 21.

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 7 (“Prelim. Resp.”). 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 8. Upon review of the arguments and supporting evidence, we instituted an *inter partes* review of all claims and grounds asserted in the Petition. Paper 9 (“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 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 claim 21 (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, “White RMTA Decl.”). Patent Owner relies on the declaration testimony of Dr. Gerald Micklow, Ph.D., filed with the Patent Owner’s Response. Ex. 2002 (“Micklow Decl.”).¹

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).

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

¹ With the filing of the Sur-reply (Paper 26), Patent Owner also filed additional declaration testimony from Dr. Micklow (Ex. 2015). Because that declaration was improperly filed, we struck it from this proceeding. *See* Paper 36.

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. 10,583,449 B1 (“the ’449 patent”) and U.S. Patent No. 10,092,918 B1 (“the ’918 patent”). The Florida Litigation was stayed on April 8, 2025. *See* IPR2025-00706, Paper 5; IPR2025-00707, Paper 5.

Petitioner also filed petitions for *inter partes* review of (1) claims 1, 4, and 7–10 of the ’449 patent in IPR2025-00706 and (2) claims 1 and 3–8 of the ’918 patent in IPR2025-00707.

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, 1:6–10. 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 1:32–40.

Figure 2 is reproduced below:

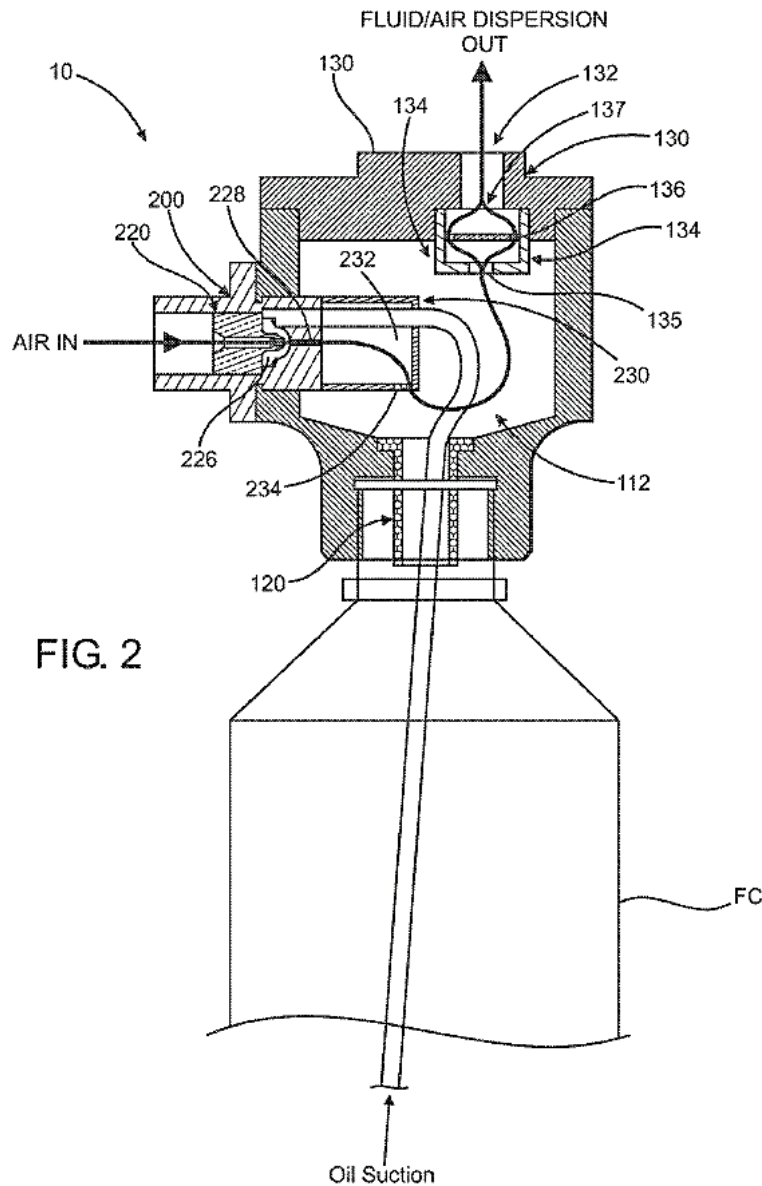


Figure 2 depicts a cross-sectional elevation view of a fluid dispersion assembly 10, powered by a compressed air source. Ex. 1001, 2:48–50, 2:66–3:2. An unnumbered diffusion unit “at least partially defines a diffusion chamber 112, and in at least one embodiment, the diffusion chamber 112 is substantially enclosed within [the] diffusion unit.” *Id.* at

3:24–27.² 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 3:54–58.

Depicted diffusion assembly 200 “comprises an air inlet 210 and an atomizer assembly 220.” Ex. 1001, 5:5–6. Atomizer assembly 220, in turn, “comprises an atomizer air inlet channel 222, a mixing chamber 226, and an atomizer exhaust channel 228.” *Id.* at 5:7–9. This embodiment also includes silencer assembly 134 in communication with discharge port 132. *Id.* at 7:49–52. Silencer assembly 134 comprises “baffle 136 disposed in a silencer chamber 138 between a silencer inlet 135 and a silencer outlet 137” and “serves to further minimize the amount of noise generated during operation of the fluid dispersion assembly 10.” *Id.* at 7:52–57.

D. The Challenged Claims

Petitioner challenges claims 7–9 and 11, of which only claim 7 is independent. Independent claim 7 is reproduced below, reformatted from the version provided in the challenged patent and with bracketed labels added to identify each clause:

7. [7PRE] 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:

[7A] a diffusion unit at least partially defining a diffusion chamber,

[7B] a discharge port disposed in fluid communication between said diffusion chamber and the surrounding airspace,

² In this Decision, we omit emphasis on reference numerals in quotations from the challenged patent and prior art references.

[7C] a diffusion assembly disposed in an operative engagement with said diffusion unit, [7D] wherein said diffusion assembly comprises an atomizer assembly, and

[7E] a silencer assembly having a silencer inlet, a silencer outlet, and a baffle, [7F] wherein said baffle partially restricts movement of the fluid dispersion through said silencer chamber from said silencer inlet to said silencer outlet, thereby dampening sound waves generated during operation of said fluid dispersion assembly.

Ex. 1001, 9:24–42.³

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. § ⁴	Reference(s)/Basis
7–9, 11	103(a)	Goubet ⁵
7–9, 11	103(a)	Goubet, Kaiser ⁶

³ We adopt and apply below Petitioner’s labels for the elements of the challenged claims. See Pet. (Appendix – Claim Limitation Listing).

⁴ 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). Because there is no dispute that the challenged claims have an effective filing date before March 16, 2013, we apply the pre-AIA versions of these statutes. We would reach the same outcome, however, under the AIA versions.

⁵ French Patent and Trademark Office Publication FR 2 886 160, published December 1, 2006 (Ex. 1015 (French version) and Ex. 1016 (English translation), “Goubet”).

⁶ Sebastian Kaiser et al., *The Electrospray and Combustion at the Mesoscale*, 51 J. Mass Spectrom. Soc. Jpn. 42 (2003) (Ex. 1014, “Kaiser”).

Claim(s) Challenged	35 U.S.C. § ⁴	Reference(s)/Basis
7–9, 11	103(a)	Sevy ⁷
7–9, 11	103(a)	Sevy, Zeng ⁸
7–9, 11	103(a)	Gao ⁹
7–9, 11	103(a)	Gao, Zeng

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.*

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

⁷ United States Published Patent Application US 2010/0084484 A1, published April 8, 2010 (Ex. 1009, “Sevy”).

⁸ Taiwanese Patent Office Publication 200528150, published September 1, 2005 (Ex. 1010 (Chinese version) and Ex. 1011 (certified translation), “Zeng”).

⁹ Chinese National Intellectual Property Administration Utility Model Patent CN 201832737, published May 18, 2011 (Ex. 1012 (Chinese version) and Ex. 1013 (certified translation), “Gao”).

(1) a bachelor's degree in mechanical engineering, aerospace engineering, chemical engineering, or a similar engineering field, with at least two years of work experience in fluid dynamics or fluid systems engineering; or (2) a master's degree in mechanical engineering, aerospace engineering, chemical engineering, or a similar engineering field, with at least one year of work experience in fluid dynamics or fluid systems engineering.

Pet. 10 (citing White Pet. Decl. ¶¶ 37–44).

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. 5. 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. 10–11; PO Resp. 5. 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 ’449 patent and the ’918 patent. *See* Ex. 1018, Exhibit A (Stipulated Claim Constructions), Exhibit B (Disputed Claim Constructions). The parties stipulated to the construction of the terms “fluid dispersion” and “baffle” as recited in the challenged claim. *See id.*, Exhibit A.¹⁰

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. 1018, Exhibit A, *with* Ex. 1001, 3:8–20. Similarly, the stipulated construction of “baffle” essentially parrots one sentence in the challenged patent (again, not cited or discussed in the parties’ filing). *Compare* Ex. 1018, Exhibit A, *with* Ex. 1001, 7:57–59. To the extent necessary, we determine that the complete record supports the parties’ stipulated constructions of “fluid dispersion” and “baffle,” and we apply those constructions below.

C. Petitioner’s Arguments Regarding Dr. Micklow’s Testimony

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 parties’ claim constructions when preparing his declaration and testified that he instead applied his own understanding of the terms.” Pet. Reply 1 (citing Ex. 1046 (Micklow Deposition), 115:15–18). In support, Petitioner highlights that the parties stipulated to constructions of “fluid dispersion” and “baffle” and proposed differing constructions of “mixing chamber” and “diffusion chamber.” *Id.* at 1–2; *see also id.* at 1–5 (entire argument). Patent Owner does not respond to this argument in the Sur-reply.

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.”).

The record here does not support any sound basis to disregard the *entirety* of Dr. Micklow’s Declaration, as asserted in Petitioner’s overall argument. *See* Pet. Reply 1–2. Contrary to Petitioner’s argument, in the cited general 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 2 (arguing that “Dr. Micklow’s declaration is premised on understandings of claim scope that are *inconsistent with* the constructions advanced by both of the parties” (emphasis added)). Instead, we read the cited portions of 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* Pet. Reply 1 (citing Ex. 1046, 112:4–12, 113:13–20, 115:15–18). Next, we turn to each of the four specific claim terms that Petitioner highlights in its further arguments.

1. “*Fluid Dispersion*”

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 2 (Ex. 1046, 119:10–15, 148:5–10).

The record does not support Petitioner’s characterization of Dr. Micklow’s testimony as “inconsistent with the constructions advanced by both of the parties.” Pet. Reply 2. As an initial matter, as discussed above (*see* § II.B), the parties here did not truly agree upon a construction of “fluid

dispersion” as much as they merely restated the construction of that term expressly set forth in the challenged patent. Moreover, none of the cited passages of Dr. Micklow’s testimony squarely addresses 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 2–3), Dr. Micklow discusses a “uniform distribution” and similar phrases, but those phrases are not in the stipulated construction. *See* Ex. 1018, 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 that stipulated construction.

Indeed, Petitioner (and Dr. White) perform a similar exercise, applying two *alternative interpretations* of the phrase “substantially uniform droplets” from the stipulated construction of “fluid dispersion.” *See, e.g.,* Pet. 30–32 (first arguing that providing “atomized droplets ranging in diameter from about 1 to 5 microns” provides “substantially uniform droplets” and then, providing an alternative position “if [Patent Owner] argues that atomized droplets on the order of 1 to 5 microns do not meet the limitation ‘fluid dispersion’”). On the record here, neither Petitioner’s nor Patent Owner’s *further interpretation* of the stipulated construction

improperly strays from that construction. For these reasons, 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”)¹¹ § 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 on which the opinion is based is entitled to little or no weight.’ 37 C.F.R. § 42.65(a).”).

2. “Baffle”

Next, Petitioner argues that, “[i]n direct contrast to the parties’ stipulated construction of the term ‘baffle,’ Dr. Micklow defines a baffle as a structure that provides ‘cancellation of the unsteady pressure fluxes occurring within that domain of interest.’” Pet. Reply 3–4 (citing Ex. 1046, 125:24–128:3).

Again, the record does not support Petitioner’s characterization of Dr. Micklow’s testimony as “inconsistent with the constructions advanced by both of the parties.” Pet. Reply 2. In the cited testimony, Dr. Micklow is asked, “So what is your definition of baffle,” and he answered: “A baffle in a fluid flow device would have to be a structure such that you could have cancellation of the unsteady pressure fluxes occurring within that domain of interest.” Ex. 1046, 127:25–128:3. Petitioner never asked, for example, whether Dr. Micklow applied the stated definition of “baffle” or the

¹¹ Available at <https://www.uspto.gov/patents/ptab/trial-practice-guide>.

stipulated construction in his analysis in this proceeding. Moreover, for instance, Petitioner has not identified any portion of Dr. Micklow's Declaration that allegedly relies on this allegedly inconsistent definition of "baffle." For these reasons, we will not give Dr. Micklow's declaration testimony on this issue "little, if any, weight." *See* Pet. Reply 4.

3. *"Mixing Chamber" and "Diffusion Chamber"*

Petitioner then argues that Dr. Micklow's declaration testimony as to "mixing chamber" should be given "little, if any, weight" because his understanding includes features absent from a construction advanced by either party. Pet. Reply 4 (discussing Ex. 1046, 117:4–15). Petitioner presents a similar argument regarding Dr. Micklow's declaration testimony as to "diffusion chamber." *Id.* (discussing Ex. 1046, 117:16–24).

We need not address Petitioner's arguments as to "mixing chamber" or "diffusion chamber" because, in this proceeding, Patent Owner does not provide any arguments addressing those claim terms; thus, the weight we give to Dr. Micklow's related testimony has no bearing on the outcome here. *See* PO Resp. 6–44 (presenting arguments as to the six asserted grounds); PO Sur-reply 3–28 (same).

D. Asserted Obviousness of Claims 7–9 and 11 Based on Goubet

Petitioner asserts that claims 7–9 and 11 would have been obvious based on Goubet. Pet. 3–4, 43–63; Pet. Reply 13–16. Patent Owner provides arguments addressing this asserted ground.¹² PO Resp. 24–28; PO Sur-reply 17–18. We first summarize aspects of the relied-upon prior art.

¹² We address Petitioner's grounds in an order different than they are presented in the Petition.

1. Overview of Goubet

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

Figure 1 of Goubet is reproduced below:

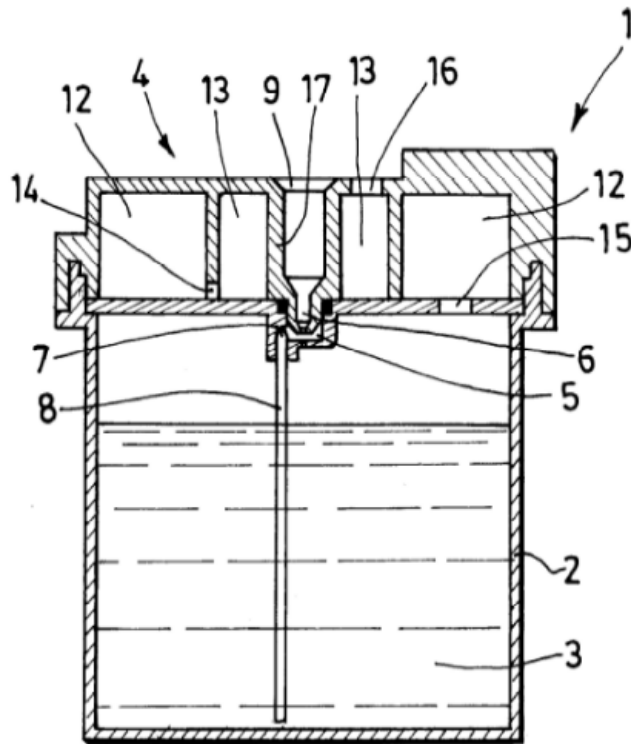


FIG.1

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:

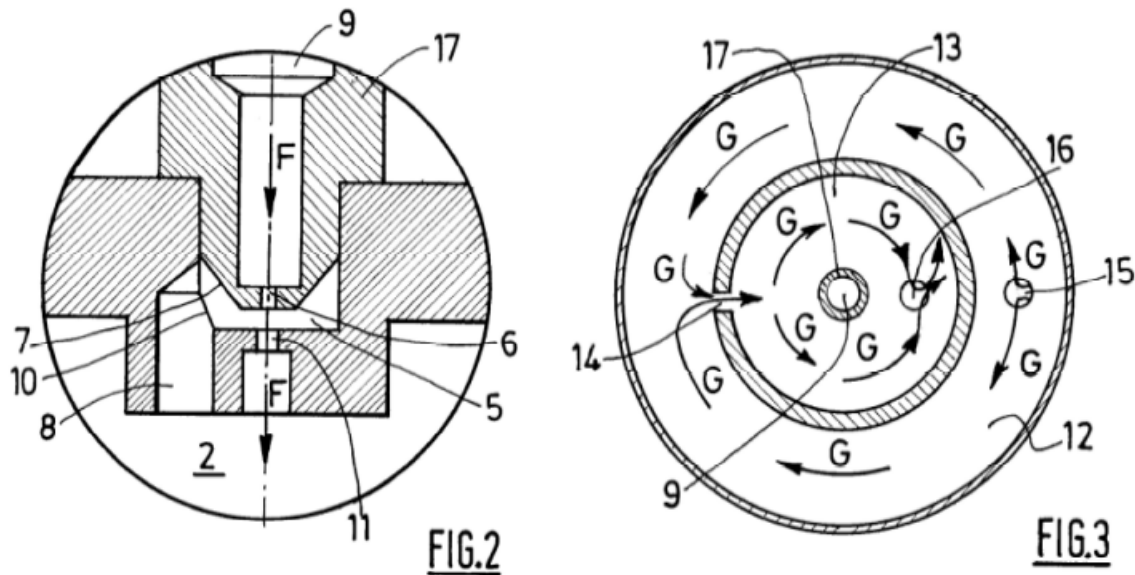


Figure 2 depicts a partial view of a diffuser head and Figure 3 is a simplified diagram showing the path of the droplets in the concentric chambers of the diffuser. *See Ex. 1016, 3:19–23.* As shown in Figure 2, diffusion chamber 5 includes compressed air inlet 6, venturi cone 7, oil inlet 10, which 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 7*

For independent claim 7, Petitioner contends that Goubet discloses or suggests each limitation. Pet. 43–61; White Pet. Decl. ¶¶ 217–296. To support its arguments, Petitioner identifies certain passages in the cited references and explains the significance of each passage with respect to the corresponding claim limitation. Pet. 43–61. In addition, Petitioner articulates, for an alternative position, reasons to modify Goubet. Pet. 60–61. Patent Owner argues (1) that Petitioner improperly identifies the same features in Goubet for the “discharge port” limitation (in clause 7B) and the “silencer outlet” limitation (in clause 7E) and (2) that Goubet does not disclose the “fluid dispersion” limitation (in clause 7E) or the “dampening sound waves” limitation (in clause 7F). *See* PO Resp. 24–28; PO Sur-reply 17–18.¹³ We address in turn each of Patent Owner’s arguments.

a. Whether Petitioner Properly Addresses the “Discharge Port” Limitation and the “Silencer Outlet” Limitation

Clause 7B recites “a discharge port disposed in fluid communication between said diffusion chamber and the surrounding airspace.” Ex. 1001, 9:31–32 (the “discharge port” limitation). Clause 7E recites, in relevant part, recites “a silencer assembly having . . . a *silencer outlet*.” *Id.* at 9:36–37 (emphasis added) (the “silencer outlet” limitation).

¹³ Patent Owner also argues, in one sentence, that Goubet “does not disclose an atomizer assembly disposed between an upper and lower chamber.” PO Resp. 24. As noted by Petitioner, the challenged claims do not recite such a limitation. *See* Pet. Reply 13–14. Patent Owner seems to acknowledge that omission by no longer addressing this issue in the Sur-reply. Thus, we do not address this argument further.

Patent Owner argues that Petitioner “improperly relies on one indivisible feature of Goubet to satisfy two structurally and functionally distinct requirements” in claim 7: the “discharge port” limitation and the “silencer outlet” limitation. PO Resp. 24; *see id.* at 24–27 (entire argument) (citing *Becton, Dickinson & Co. v. Tyco Healthcare Grp., LP*, 616 F.3d 1249, 1254 (Fed. Cir. 2010); *Engel Indus., Inc. v. Lockformer Co.*, 96 F.3d 1398, 1404–05 (Fed. Cir. 1996)). According to Patent Owner, “Petitioner’s annotate[d] figures identically highlight outlet 16 in Figure 3 of Goubet as an analog to both the discharge port and the silencer outlet.” *Id.* at 25.

On the complete record, this argument does not identify a deficiency in Petitioner’s positions as to the two limitations at issue. Whether it is improper to identify one feature in the prior art (e.g., a given structural element) as satisfying two (or more) different claim elements is an issue of claim construction, turning on whether the claim—when properly construed—requires the separateness of the two (or more) claim elements. *See Retractable Techs., Inc. v. Becton, Dickinson & Co.*, 653 F.3d 1296, 1303–04 (Fed. Cir. 2011) (addressing a similar issue in a section on “Claim Construction”); *HTC Corp. v. Cellular Commc’ns Equip., LLC*, 701 F. App’x 978, 981 (Fed. Cir. 2017) (discussing the Board’s prior ruling on a similar issue as “a ruling on claim construction”). Some decisions from the Federal Circuit have permitted reliance on the same prior art features for two (or more) different claim elements, whereas others have not—all based on the facts in each situation. *Compare, e.g., Becton, Dickinson & Co.*, 616 F.3d at 1253–57 *and HTC Corp.*, 701 F. App’x at 981–84 (both construing claims to require separate components for the claim elements at issue), *with Retractable Techs.*, 653 F.3d at 1303–04; *Powell v. Home Depot U.S.A.*,

Inc., 663 F.3d 1221, 1231–32 (Fed. Cir. 2011), and *Gen. Elec. Co. v. Int’l Trade Comm’n*, 685 F.3d 1034, 1044–46 (Fed. Cir. 2012) (all construing claims not to require separate components for the claim elements at issue).

We need not address the claim construction issue identified above, however, because Patent Owner’s argument relies on a faulty premise. Specifically, Petitioner does not identify *one* feature as allegedly satisfying *both* the “discharge port” limitation and the “silencer outlet” limitation. In addressing clause 7B (i.e., the “discharge port” limitation), Petitioner provides the following annotated version of Figure 1 of Goubet, which identifies a “discharge port” with an orange arrow and shading:

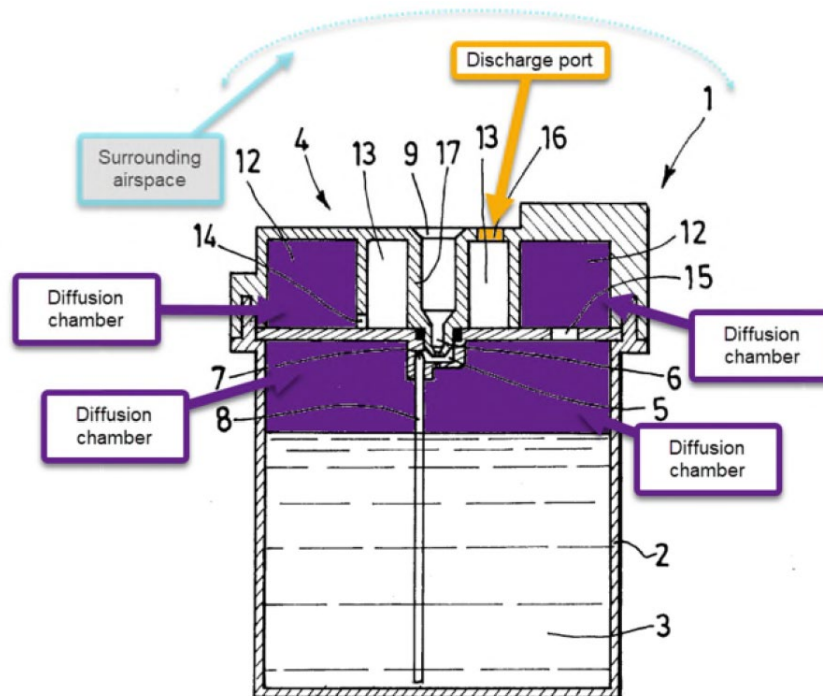


FIG.1

Pet. 49. In the annotated version of Figure 1 of Goubet above, Petitioner added (1) four purple text boxes and shading identifying a “Diffusion chamber,” (2) a blue text box and dotted line identifying “Surrounding

airspace,” and (3) an orange text box and shading identifying a “Discharge port.” *Id.*

For clause 7E (which includes the “silencer outlet” limitation), Petitioner provides the following annotated version of Figure 1 of Goubet, which identifies a “Silencer outlet” with a green arrow and shading:

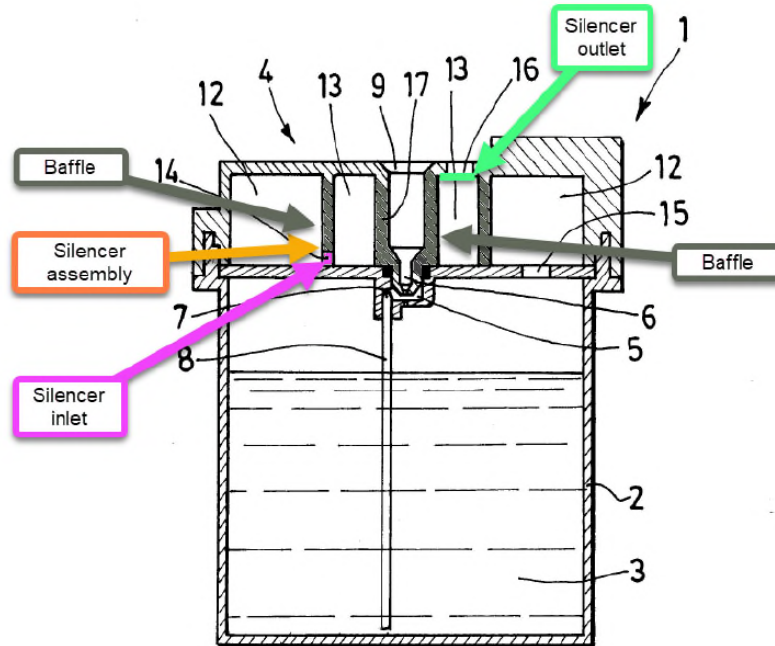


FIG.1

Pet. 57. In the annotated version of Figure 1 above, Petitioner added (1) an orange text box and arrow identifying a “Silencer assembly,” (2) a pink text box and arrow identifying a “Silencer inlet,” (3) a text box and gray shading identifying a “Baffle,” and (4) a green text box and shading identifying a “Silencer outlet” with a green line. *Id.* As made clear from comparing the two annotated figures above, the features identified as the “Discharge port” (in orange shading in the first annotated Figure 1) and the “Silencer outlet” (in a green line in the second annotated Figure 1) are closely located, but

distinct. Thus, the record supports the Reply argument that Petitioner “identifies *distinct* structures disclosed in Goubet that correspond to the “discharge port” (e.g., the opening of outlet 16 leading to the surrounding airspace) and the “silencer outlet” (the opening of inner enclosure 13 leading to outlet 16).” Pet. Reply 14 (citing Pet. 48–50, 56–58; White Pet. Decl. ¶¶ 239–242, 254–265).

In the Sur-reply, Patent Owner asserts that “[n]o such ‘openings’ are identified as structural components of Goubet” and that “the word ‘opening’ never appears in Goubet.” PO Sur-reply 17. But it is not improper to rely on features shown in a figure to satisfy a claim limitation, even if the relevant aspect is not addressed in the text of the reference. *See In re Aslanian*, 590 F.2d 911, 914 (CCPA 1979) (“[A] drawing in a utility patent can be cited against the claims of a utility patent application even though the feature shown in the drawing was unintended or unexplained in the specification of the reference patent.”). We understand Petitioner’s use of the term “opening” to describe the two features of interest in the annotated versions of Figure 1 of Goubet. *See* Pet. 49, 57; Pet. Reply 14.

For these reasons, this argument does not identify a deficiency in Petitioner’s positions as to the two limitations at issue.

*b. The “Fluid Dispersion” Limitation and the
“Dampening Sound Waves” Functionality*

Clause 7E recites “a silencer assembly having a silencer inlet, a silencer outlet, and a baffle” and clause 7F recites “wherein said baffle partially restricts movement of the *fluid dispersion* through said silencer chamber from said silencer inlet to said silencer outlet, thereby *dampening sound waves* generated during operation of said fluid dispersion assembly.” Ex. 1001, 9:36–42 (emphasis added). As discussed below, Patent Owner

contends that Goubet does not disclose or suggest a “fluid dispersion” and does not disclose or suggest the “dampening sound waves” functionality as recited in clause 7F and implied by the terms “baffle” and “silencer assembly” in clause 7E. *See* PO Resp. 27–28; PO Sur-reply 18.

As background, we reproduce Petitioner’s annotated versions of figures of Goubet, which explain its positions as to clause 7E:

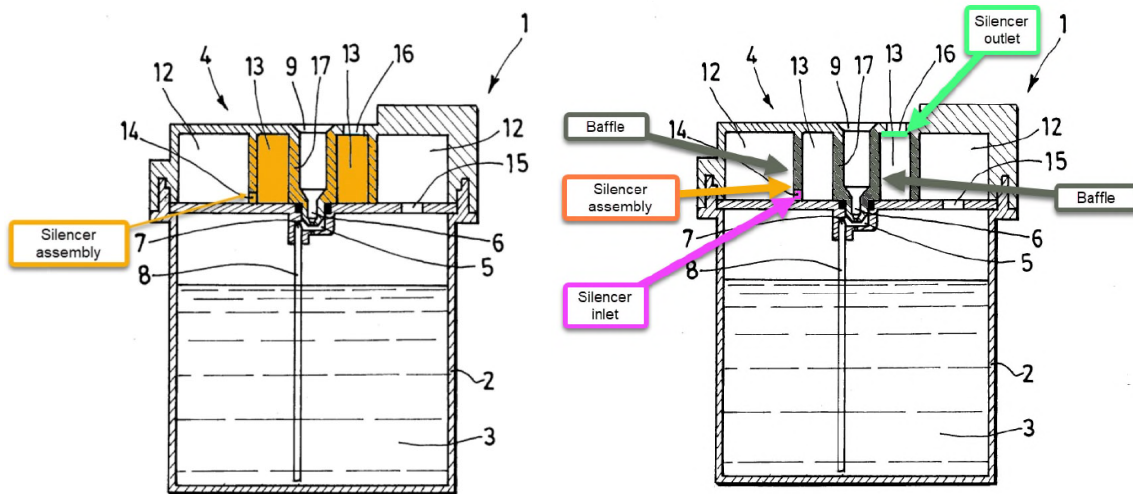


FIG.1

FIG.1

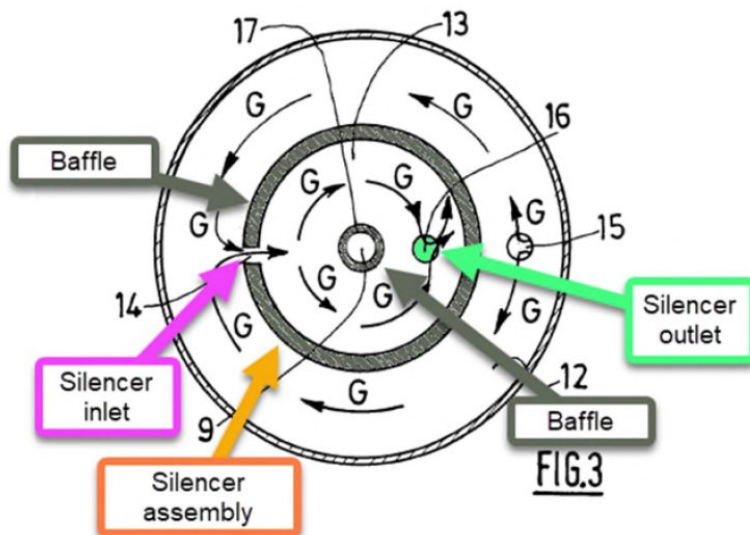


FIG.3

Pet. 56–57; *see also* Pet. 55–61 (citing White Pet. Decl. ¶¶ 254–280) (entire discussion). In the annotated version of Figure 1 of Goubet at left above, Petitioner added a text box and orange shading identifying a “Silencer assembly.” Pet. 56. In the annotated version of Figure 1 at right above and in the annotated version of Figure 3 above, Petitioner added (1) a text box identifying a “Silencer assembly,” (2) a text box identifying a “Silencer inlet,” (3) a text box and gray shading identifying a “Baffle,” and (4) a text box and teal shading identifying a “Silencer outlet.” Pet. 57.

(1) The “Fluid Dispersion” Limitation

We turn now to Patent Owner’s two arguments, summarized above. First, Patent Owner contends that Goubet does not disclose or suggest a “fluid dispersion” (as recited in clause 7F).¹⁴ *See* PO Resp. 27; PO Sur-reply 18. The Petition provides a separate section on “fluid dispersion,” with Petitioner presenting evidence as to why, “[a]lthough Goubet does not explicitly teach that the microdroplets are ‘substantially uniform’ in diameter, [one of ordinary skill in the art] would appreciate that Goubet at least suggests this limitation.” Pet. 59; *see* Pet. 59–61 (section on “fluid dispersion”). Petitioner first highlights that “the atomizer of Goubet includes vaporization means defining a circular and very particular ‘path, allowing [the droplet] size *to be reduced as much as possible*’ before the microdroplets are ‘silently diffused’ into the ambient air.” Pet. 59 (emphasis and alteration added by Petitioner) (quoting Ex, 1016, 5:12–16). According

¹⁴ As discussed above, the parties have defined “fluid dispersion”—in line with the definition in the challenged patent—as: 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.” *See* § II.B.

to Petitioner, one of ordinary skill in the art “would appreciate that the circular shape of the baffled path [in Goubet] will continually separate the droplets into increasingly smaller and thus more uniform droplets” because “only droplets of a particular size (and smaller) will be able to follow the air flow to navigate each additional turn without accumulating on surface of one of the walls.” Pet. 60 (citing White Pet. Decl. ¶¶ 265–276). Petitioner adds that “[e]ach turn will continually filter out droplets over a certain size, such that only smaller and more substantially uniform droplets of a particular size will continue to flow along the path” and that, “[a]s a result, the dual enclosure and circular flow path of Goubet at least suggest that the droplets are divided into substantially uniform microdroplets by the time the microdroplets reach and pass through outlet 16, thereby meeting the limitation ‘fluid dispersion.’” *Id.* (citing White Pet. Decl. ¶¶ 265–276).

In response, Patent Owner contends that one of ordinary skill in the art “would appreciate that the circular shape of the baffle formed by enclosures 12 and 13 and passage 14 [in Goubet] necessitates that the droplets undergo multiple twists and turns, which would cause the droplets to remain in close contact and eventually coalesce into larger droplets.” PO Resp. 27 (citing Micklow Decl. ¶ 29). Patent Owner adds that “fine atomization of a liquid to create the uniform microdroplets required for a ‘fluid dispersion’ is time-dependent; the relatively short time spent traversing the baffle of Goubet would result in a nonuniform spray.” *Id.* (citing Micklow Decl. ¶ 29).

The complete record, developed at trial, more strongly supports Petitioner’s positions. First, several cited *express* disclosures of Goubet *directly contradict* Patent Owner’s contention that along the path of travel in

Goubet (shown by arrows in Figure 3) the droplets would “coalesce into larger droplets.” PO Resp. 27; *see* Pet. Reply 14–15 (arguing that Patent Owner’s positions are “directly contrary” to Goubet’s express disclosures). For example, Goubet discloses that its “droplets follow a very particular path, allowing their size *to be reduced as much as possible*.” Ex. 1016, 5:13–14 (emphasis added), *quoted at* Pet. 59; Ex. 1016, 2:26–27 (same), *quoted at* Pet. 55. In addition, Goubet discloses that along that “particular path”—i.e., from diffusion chamber 5 to outer enclosure 12, then through passage 14 and into inner enclosure 13—its droplets “collide with the walls separating the outer enclosure 12 from the inner enclosure 13” and “then strike the walls separating the inner enclosure 13 from the walls 17 of the compressed air inlet channel 9.” Ex. 1016, 4:26–5:2, *quoted at* Pet. 55. Goubet also expressly discloses that, “[a]long this path, and as a result of the many shocks they receive, the droplets *are broken up into microdroplets*.” *Id.* at 5:2–4, *quoted at* Pet. 55.

Second, other evidence supports Petitioner’s contention that the path taken by the droplets in Goubet would result in “increasingly smaller *and thus more uniform droplets*” such that one of ordinary skill in the art would have understood Goubet as providing “substantially uniform droplets,” as required by the construction of “fluid dispersion” above. Pet. 60 (emphasis added) (citing White Pet. Decl. ¶¶ 265–276). Specifically, the cited declaration testimony of Dr. White further explains and supports Petitioner’s position that one of ordinary skill in the art would have understood that, in Goubet, the decreasing size of the droplets along the path *leads to* “substantially uniform” droplets:

[One of ordinary skill in the art] would appreciate that the circular shape of the baffled path necessitates that the droplets

twist and turn several times, which will divide the droplets into increasingly smaller and thus more uniform droplets. More particularly, only droplets of a particular size (and smaller) will be able to follow the air flow to navigate each additional turn without crashing into one of the walls. That is, each turn will continually filter out droplets over a certain size, such that only smaller and more substantially uniform droplets of a particular size will continue to flow along the path. As a result, Goubet dual path will divide droplets into substantially uniform microdroplets by the time the flow passes through outlet 16, thereby meeting the limitation “fluid dispersion”.

White Pet. Decl. ¶ 276, *cited at* Pet. 60. This process, as described by Dr. White, leads to “substantially uniform droplets” because each successive turn along the path “will continually filter out droplets over a certain size, and/or continually reduce the size of droplets, leaving only droplets of a substantially uniform size to continue along the flow path.” White Pet. Decl. ¶ 271, *cited at* Pet. 60; *see also* White Pet. Decl. ¶ 268 (discussing how the “localized increased turbulence” along the path “will divide droplets into increasingly smaller droplets” and “[t]he smaller the range of droplet sizes, the more uniform their size becomes”), *cited at* Pet. 60; White Pet. Decl. ¶ 263 (discussing how the “collisions” along the path in Goubet “will increase uniformity of droplets because such wall collisions continue to separate out large droplets or break large droplets into smaller droplets” in that “the wall impacts (shocks) experienced by the droplets will decrease the size distribution of the droplets and lead to more uniformity”), *cited at* Pet. 58. As Dr. White explains, this process preferentially removes larger droplets along tortuous paths due to their greater inertia. White Pet. Decl. ¶¶ 100–102, *cited at* Pet. Reply 15.

In contrast, Patent Owner cites a single paragraph from Dr. Micklow’s Declaration, which largely parrots the statements from the Response.

Compare PO Resp. 27 (second and third sentences of the first full paragraph), *with* Micklow Decl. ¶ 29; *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 that discussion, Dr. Micklow fails to provide adequate technical explanation supporting Patent Owner’s conclusory assertion that the droplets in Goubet would have had insufficient time to result in a “fluid dispersion” with “substantially uniform droplets.” *See* Micklow Decl. ¶ 29 (“Fine atomization of a liquid is also time dependent. The amount of time that the droplets spend in the baffle will be relatively short resulting in a non-uniform spray. It will not meet the limitation of ‘fluid dispersion.’”); 37 C.F.R. § 42.65(a) (“Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.”); *see also* Pet. Reply 15–16 (arguing that Patent Owner’s argument on this issue is “conclusory analysis”).

We turn now to Patent Owner’s argument that Petitioner has not carried its burden on this issue because Dr. White “has not conducted any testing or analysis of any embodiment of Goubet.” PO Resp. 27 (citing Ex. 2001 (White Deposition Transcript) at 38–39). Patent Owner fails to provide any legal support for this requirement. We view Goubet’s disclosures and Dr. White’s discussion of what one of ordinary skill in the art would have understood from those disclosures as sufficient to support Petitioner’s arguments as to the “fluid dispersion” limitation. *See In re Lamberti*, 545 F.2d 747, 750 (CCPA 1976) (“[T]he question under

35 U.S.C. § 103 is not merely what the references expressly teach, but what they would have suggested to one of ordinary skill in the art at the time the invention was made.”).

Moreover, unaddressed by Patent Owner in its arguments as to the “fluid dispersion” limitation is Petitioner’s *alternative* argument:

If [Patent Owner] argues that the resulting atomized droplets do not meet the “fluid dispersion” limitation, it would have been obvious to modify Goubet to include additional enclosures to further decrease the diameter of the microdroplets, which would result in greater uniformity in the diameters of the microdroplets that eventually are discharged into the surrounding airspace.

Pet. 60 (citing White Pet. Decl. ¶¶ 277–280); *see* Pet. 60–61 (entire argument). As noted by Petitioner, Patent Owner “does not address or attempt to rebut this proposed modification to Goubet.” Pet. Reply 16.

For the reasons above, we find, based on the complete record, that Petitioner has shown by a preponderance of the evidence that Goubet discloses or suggests the “fluid dispersion” limitation based on Petitioner’s main argument. Moreover, we also find, based on the complete record, that Petitioner has shown by a preponderance of the evidence that Goubet discloses or suggests the “fluid dispersion” limitation based on Petitioner’s alternative argument, which Patent Owner has not addressed.

(2) The “Dampening Sound Waves” Functionality

Having addressed the “fluid dispersion” limitation, we turn now to the second main argument, in which Patent Owner asserts that Goubet does not disclose or suggest the “dampening sound waves” functionality implied by the terms “baffle” and “silencer assembly.” *See* PO Resp. 27–28; PO Sur-reply 18. We reproduce below the entirety of Patent Owner’s discussion:

Additionally, it is known in the art that the inner chamber 13 of Goubet would not function as a baffle, nor the inner chamber 13 in conjunction with the passage 14 and the outlet 16 as a silencer. It is likely that the turbulent airflow therein, in connection with the like diameters of passage 14 and outlet 16, would have no quieting effect on the ultimate ejection of the essential oil.

PO Resp. 27–28 (citing Micklow Decl. ¶¶ 28–29). Patent Owner does not revisit the argument in the Sur-reply.

Petitioner addresses the relevant functionality in the discussion of clause 7E and clause 7F in the Petition. *See* Pet. 55–61 (citing White Pet. Decl. ¶¶ 254–280). As to the “silencer assembly” recited in clause 7E, Petitioner highlights the disclosure in Goubet that the reduction in droplet size (discussed in the prior section (*see* § II.D.2.b(1))) “enables a non-harsh highly atomized oil mist or vapour to be *silently diffused*.” Pet. 55 (quoting Ex. 1016, 5:15–16 (emphasis added by Petitioner)). In addition, Petitioner states (1) that “the surfaces of the walls facing the inner enclosure 13 meet the limitation of a ‘baffle’ as they cause ‘many shocks’ and thus disrupt the flow of diffusion by breaking down the droplets into microdroplets” and (2) that one of ordinary skill in the art would have appreciated “that a structure that disrupts fluid flow, such as a baffle, would also dampen or limit sound during operation of the device.” Pet. 58 (citing Ex. 1016, 4:31–5:6; White Pet. Decl. ¶¶ 254–264); *see also* Pet. 59 (referring to the discussion of clause 7E for the “dampening sound waves” limitation).

The complete record, developed at trial, supports Petitioner’s position as to the “dampening sound waves” functionality. As noted by Petitioner, Goubet discloses that the disclosed “reduction in droplet size enables a non-harsh, highly atomized oil mist or vapour to be *silently diffused*.” Ex. 1016,

5:15–16 (emphasis added), *cited at* Pet. 55.¹⁵ Other disclosures in Goubet (highlighted by Dr. White) describe the diffusion as both “gentle” and “particularly quiet.” Ex. 1016, 2:6–8, *discussed at* White Pet. Decl. ¶¶ 231, 257. We find that the “silently diffused” passage strongly supports Petitioner’s position as to the “dampening sound waves” functionality because it discloses that the “reduction in droplet size”—i.e., along the path that includes the identified “silencer assembly” (discussed in the prior section (*see* § II.D.2.b(1))—“**enables** a non-harsh highly atomized oil mist or vapour to be *silently diffused*.” Ex. 1016, 5:15–16 (emphasis added). In other words, Goubet indicates that the structure *causes* the silent diffusion, or, in the words of claim 7, “dampen[s] sound waves.” Dr. White’s testimony further supports this causal relationship. *See, e.g.*, White Pet. Decl. ¶ 258 (stating that one of ordinary skill in the art “would understand that passage 14 between outer enclosure 12 and inner enclosure 13 forming at least one baffle would also limit sound associated therewith by creating acoustical impedance discontinuities owing to the sudden cross-sectional changes that reflect sound back to the source”). To the extent that Patent Owner argues, for example, that Goubet is silent merely because the entire system generates no noise (i.e., the structure does not “dampen[] sound waves” because none exist), we find that not credible or supported by the record here. *See* PO Resp. 27–28.

In addition, Petitioner provides a thorough discussion—supported by the testimony of Dr. White—as to why one of ordinary skill in the art would have also understood that the identified “baffle” in Goubet would disrupt

¹⁵ Patent Owner does not address this passage after institution, despite addressing it in the Preliminary Response. *See* Prelim. Resp. 20.

fluid flow and thus dampen sound waves. Pet. 58 (citing Ex. 1016, 4:31–5:6; White Pet. Decl. ¶¶ 254–264; Ex. 1001 6:1–8, 7:1–11, 7:64–8:2). For example, Dr. White testifies that one of ordinary skill in the art “would understand that passage 14 between outer enclosure 12 and inner enclosure 13 forming at least one baffle would also limit sound associated therewith by creating acoustical impedance discontinuities owing to the sudden cross-sectional changes that reflect sound back to the source” and would also know “that flow obstructions reduce turbulence and associated flow generated noise.” White Pet. Decl. ¶ 258 (citing *id.* ¶¶ 87–88), *cited at* Pet. 58. Further, Dr. White testifies that one of ordinary skill in the art would have understood “Goubet to teach a silencer assembly because Goubet discloses a specific arrangement of structures that reduces the amount of noise generated during operation as the fluid dispersion flows therethrough.” White Pet. Decl. ¶ 259 (citing Ex. 1016, Fig. 1); *see also* White Pet. Decl. ¶¶ 267, 270 (discussing similar issues). We find this testimony credible and supportive of Petitioner’s positions.

In contrast, Patent Owner cites two paragraphs from Dr. Micklow’s Declaration, but only paragraph 28 relates to the “dampening sound waves” functionality. *See* PO Resp. 27–28 (citing Micklow Decl. ¶¶ 28–29). That paragraph, however, only parrots the statements from the Response. *Compare* PO Resp. 27–28 (paragraph starting “Additionally”), *with* Micklow Decl. ¶ 28; *Xerox Corp.*, IPR2022-00624, Paper 9 at 14–17. For example, Dr. Micklow fails to provide any additional technical explanation supporting Patent Owner’s conclusory assertion that “[i]t is likely that the turbulent airflow therein, in connection with the like diameters of passage 14 and outlet 16, would have no quieting effect on the ultimate ejection of the

essential oil.” PO Resp. 27–28; Micklow Decl. ¶ 28 (“It is likely that the turbulent airflow therein, in connection with the like diameters of reference numeral 14 and reference numeral 16, would have no quieting effect on the ultimate ejection of the fluid dispersion.”); 37 C.F.R. § 42.65(a).

For the reasons above, we find, based on the complete record, that Petitioner has shown by a preponderance of the evidence that Goubet discloses or suggests the “dampening sound waves” functionality in clauses 7E and 7F.

c. The Remaining Limitations of Claim 7

To address the remaining limitations in independent claim 7, Petitioner discusses why Goubet discloses or suggests each limitation. *See* Pet. 43–61; White Pet. Decl. ¶¶ 217–296. The record evidence, as presented, supports Petitioner’s position as to the additional limitations in independent claim 7. Patent Owner does not present arguments addressing these limitations. The record evidence, as presented, also supports Petitioner’s position that one of ordinary skill in the art would have had a reason to modify Goubet (in the alternative) as proposed and that the proposed modification would have had a reasonable expectation of success. *See* Pet. 60–61; White Pet. Decl. ¶¶ 277–280. Patent Owner does not present arguments addressing these aspects of the proposed combination.

We find, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that Goubet discloses or suggests the remaining limitations in claim 7. In addition, 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 modify Goubet (in the alternative) as

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

d. Conclusion for Claim 7

For the reasons above, we determine, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that claim 7 would have been obvious based on Goubet.

3. Claims 8, 9, and 11

For dependent claims 8, 9, and 11 (which depend from claim 7), Petitioner contends that Goubet discloses or suggests each limitation. Pet. 61–63; White Pet. Decl. ¶¶ 281–296. Patent Owner does not present any arguments specifically addressing claims 8, 9, and 11 but rather relies on the arguments addressing claim 7. *See* PO Resp. 28; PO Sur-reply 18.

We determine, based on the complete record, that Goubet discloses or suggests the subject matter of claims 8, 9, and 11. We also determine that Petitioner has adequately explained why one of ordinary skill in the art would have had reason to modify Goubet (in the alternative) as proposed and that there would have been a reasonable expectation of success. Based on the complete record, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 8, 9, and 11 would have been obvious based on Goubet.

E. Asserted Obviousness of Claims 7–9 and 11 Based on Goubet and Kaiser

Petitioner asserts that claims 7–9 and 11 would have been obvious based on Goubet and Kaiser. Pet. 3–4, 63–64; Pet. Reply 16–20. Patent Owner provides arguments addressing this ground. PO Resp. 28–34; PO Sur-reply 19–23. 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 Claim 7

For independent claim 7, Petitioner contends that the proposed combination of Goubet and Kaiser discloses each limitation. Pet. 63–64; Pet. Reply 16–20. Patent Owner challenges the articulated reasons to combine Goubet and Kaiser as proposed. *See* PO Resp. 32–33. We view this issue as dispositive for this ground, and we address it below.

a. The Reasons to Combine Goubet and Kaiser

Addressing the “fluid dispersion” limitation in clause 7F, Petitioner states that “Goubet does not explicitly disclose that the droplets are substantially uniform.” Pet. 63; *see also* Ex. 1018, Exhibit A (construing “fluid dispersion”). Because of this, for this ground, Petitioner “also relies on Kaiser which describes that it was well known in the field at the time of the invention to produce uniform droplets to improve uniform evaporation rates.” Pet. 63–64 (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 Goubet does not teach a ‘fluid dispersion,’” one of ordinary skill in the art “would have been motivated to modify Goubet to include additional enclosures that result in fluid dispersion, as described” in the ground based on Goubet alone. Pet. 64.

Patent Owner argues that Petitioner has failed to articulate a legally sufficient reason to combine Goubet with Kaiser. PO Resp. 32–33. 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 32.

“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.’”) (alteration in original).

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. 32 (alteration in original). In the discussion of this ground, Petitioner provides little discussion of the reasons to combine. And we agree with Patent Owner that the statement at issue—that Kaiser “describes that it was well known in the field at the time of the invention to produce uniform droplets to improve uniform evaporation rates” (Pet. 63)—is insufficient to support the combination. *See In re Magnum Oil*, 829 F.3d at 1380.

In the introduction to this ground, Petitioner cites thirteen paragraphs of Dr. White's Declaration filed with the Petition, but Petitioner provides no discussion of Dr. White's added discussion on reasons to combine. Pet. 63 (first full paragraph) (citing White Pet. Decl. ¶¶ 297–309). Arguments and information that are not presented and developed in the Petition, but instead are incorporated by reference, are not entitled to consideration, as it is improper to incorporate by reference arguments from one document into another document. 37 C.F.R. § 42.6(a)(3); *Cisco Sys., Inc. v. C-Cation Techs., LLC*, IPR2014-00454, Paper 12 at 7–10 (PTAB August 29, 2014) (informative) (discussing incorporation by reference).

In the Reply, Petitioner both (1) cites evidence not previously relied on and (2) provides new discussion of evidence previously cited (including Dr. White's Declaration filed with the Petition). *Compare* Pet. Reply 19–20 (citing Pet. 47, 55; White Pet. Decl. ¶¶ 167, 297–303; Ex. 1016, 2:16–19, 5:12–16), *with* Pet. 63–64 (citing White Pet. Decl. ¶¶ 297–309; Ex. 1014 at 43). 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.

b. Conclusion for Claim 7

For the reasons above, we determine, based on the complete record, that Petitioner has not demonstrated by a preponderance of the evidence that claim 7 would have been obvious based on Goubet and Kaiser.

3. Claims 8, 9, and 11

For dependent claims 8, 9, and 11 (which depend from claim 7), Petitioner contends that the proposed combination of Goubet and Kaiser satisfies each limitation. Pet. 61–64; Pet. Reply 16–20. As discussed above (*see* § II.E.2), Petitioner has not demonstrated by a preponderance of the evidence that independent claim 7, from which claims 8, 9, and 11 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 8, 9, and 11 would have been obvious based on Goubet and Kaiser.

F. Asserted Obviousness of Claims 7–9 and 11 Based on Sevy

Petitioner asserts that claims 7–9 and 11 would have been obvious based on Sevy. Pet. 3–4, 19–36; Pet. Reply 5–10. Patent Owner provides arguments addressing this asserted ground. PO Resp. 6–16; PO Sur-reply 3–10. We first summarize aspects of the relied-upon prior art.

1. Overview of Sevy

Sevy relates to “atomizers and, more particularly, to novel systems and methods for integrating air supplies, reservoirs and atomizers into an

integrated system.” Ex. 1009 ¶ 2. Sevy discloses that “it would be an advance in the art to provide an atomizer that provides a better atomization or a smaller mean or average size of droplet in the distribution of atomized droplets compared with prior art devices capable of atomizing.” *Id.* ¶ 9.

Figure 1 of Sevy is reproduced below:

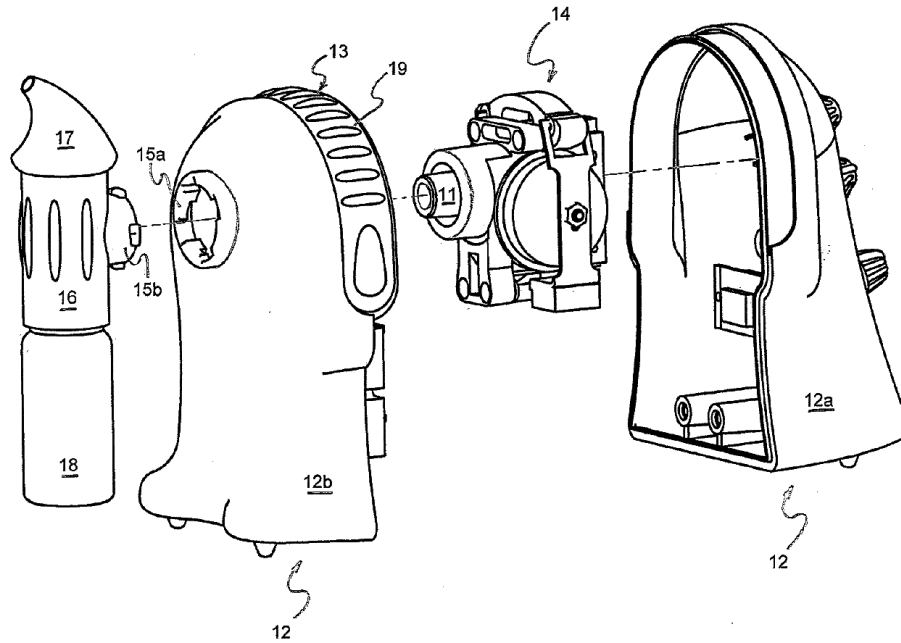


FIG-1

Figure 1 is an exploded view of an integrated atomizer apparatus. Ex. 1009 ¶ 31. The depicted embodiment includes housing 12, pump 14 (with outlet 11 from pump 14), atomizer 16, director 17, and reservoir 18. *Id.* ¶ 41. Sevy discloses that “[a]ir from the pump 14 drives atomization in the atomizer 16 to discharge atomized liquids out the director 17” with the liquids “drawn by the atomizer 16 from the reservoir 18.” *Id.*

Figure 9 is reproduced below:

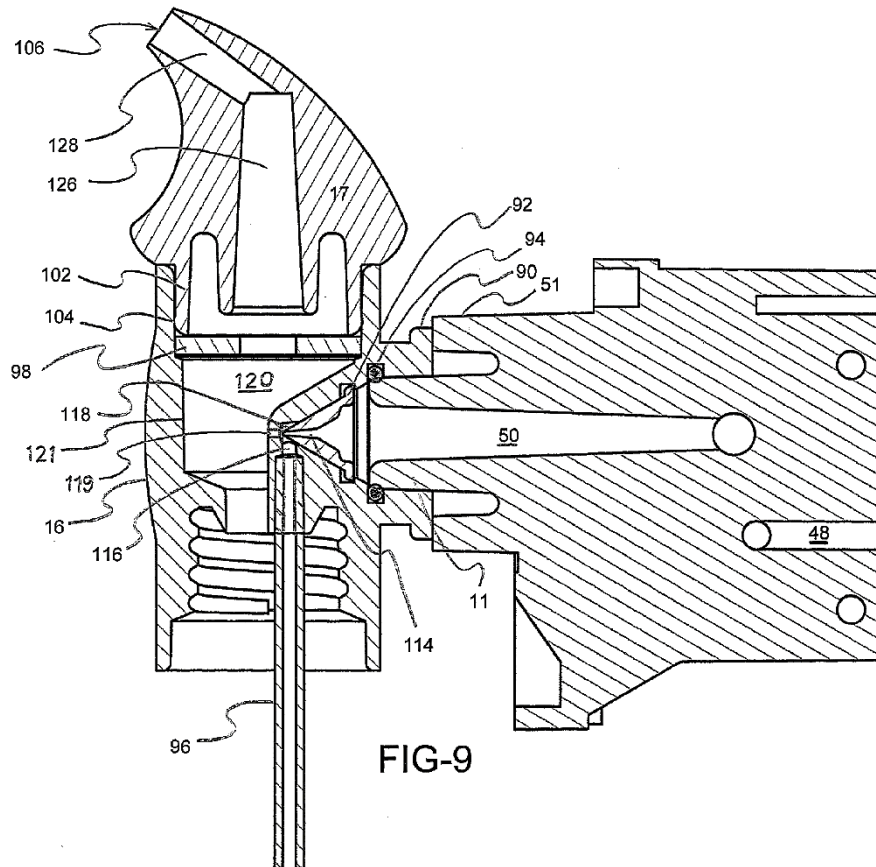


Figure 9 is a “detailed cross-sectional, side elevation view of the pump body and the atomizer body.” Ex. 1009 ¶ 39. In this embodiment, nozzle 92 encloses channel 114 leading from passage 50 to orifice 118 and exit orifice 119 permits discharge of fluids, including air from orifice 118 and liquid from siphon tube 96. *Id.* ¶¶ 79–80. Sevy discloses that the “entire mixture of air and droplets passes through the exit orifice 119 toward the separator 120, and particularly toward the wall 121 thereof.” *Id.* ¶ 82.

2. Independent Claim 7

For independent claim 7, Petitioner contends that Sevy discloses or suggests each limitation. Pet. 19–33; Pet. Reply 5–10. Patent Owner argues that (1) Petitioner improperly addresses the “silencer assembly” limitation

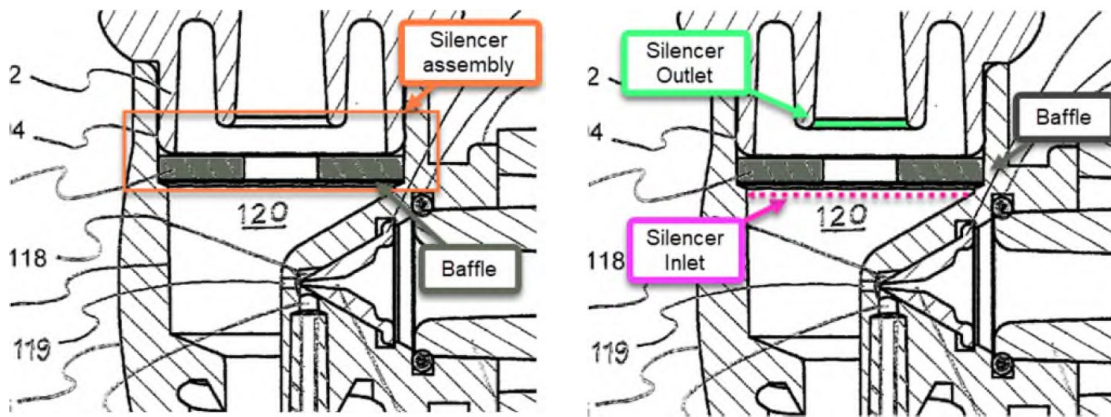
and (2) Sevy does not disclose a “silencer assembly,” including the “dampening sound waves” functionality. *See* PO Resp. 8–13; PO Sur-reply 5–9. We view the second issue as dispositive for this ground, and we address them both below.

a. Whether Petitioner Properly Addresses the “Silencer Assembly” Limitation

Clause 7E recites “a silencer assembly having a silencer inlet, a silencer outlet, and a baffle.” Ex. 1001, 9:36–37 (the “silencer assembly” limitation). Patent Owner argues that the “claim language . . . requires three distinct structural components, not merely a single flow path that performs multiple functions.” PO Resp. 8; *see also id.* at 8–11 (entire argument); PO Sur-reply 5–6. For the reasons below, this argument does not identify a deficiency in Petitioner’s position as to the “silencer assembly” limitation.

As discussed above (*see* § II.D.2.a), whether it is improper to identify one feature in the prior art as allegedly satisfying two different claim elements turns on whether the claim requires the separateness of the two claim elements. We need not address this issue on the record before us, however, because we disagree with the premise of Patent Owner’s argument; here, Petitioner has *not* identified one feature to allegedly satisfy two (or more) claim elements.

Petitioner identifies the structures recited in the “silencer assembly” limitation in these annotated partial images from Figure 9 of Sevy:



Pet. 29; *see also* Pet. 26–30 (citing White Pet. Decl. ¶¶ 83, 84, 97, 160–177).

In the annotated partial image of Figure 9 on the left, Petitioner added (1) a text box and orange box identifying a “Silencer assembly” and (2) a text box and gray shading identifying a “Baffle.” Pet. 29. In the annotated partial image of Figure 9 on the right, Petitioner added (1) a text box and gray shading identifying a “Baffle,” (2) a text box and dotted pink line identifying a “Silencer Inlet,” and (3) a text box and green line identifying a “Silencer Outlet.” *Id.*

As shown in the annotated partial versions of Figure 9 of Sevy above, Petitioner clearly identifies three *distinct* features as the “silencer inlet,” the “silencer outlet,” and the “baffle,” respectively, with those three features together forming the “silencer assembly.” Thus, Petitioner’s approach does not implicate the Federal Circuit’s *Becton, Dickinson* decision cited by Patent Owner (or related case law). *See* PO Resp. 8–9.

Discussing the annotated version of Figure 9 of Sevy on the right above, Patent Owner contends that the “labeled ‘Silencer Inlet’” is “undifferentiable from the separator 120, the component of Sevy most akin to the ‘diffusion chamber’ of the [challenged] patent)” and that the “Silencer Outlet” is “undifferentiable from either the collar 102 or passage 126.” PO

Resp. 9. We disagree. The “silencer inlet” is the pink dotted line at the upper portion of separator 120 and the “silencer outlet” in green is distinct from (but adjacent) both collar 102 and passage 126. Pet. 29.

Patent Owner argues that Petitioner’s positions are improper because the elements in the “silencer assembly” limitation “are neither named, described, suggested, nor structurally delineated in Sevy.” PO Resp. 10–11. That the features relied on are not expressly discussed or given reference numerals in Sevy (even if they are in the challenged patent), however, does not undermine Petitioner’s showing. *See In re Aslanian*, 590 F.2d at 914; *In re Meng*, 492 F.2d 843, 847 (CCPA 1974).

In addition, Patent Owner relies on *In re Chudik* and *Topliff v. Topliff* for the proposition that “prior art cannot be ‘distorted from its obvious design’ to meet claim limitations.” PO Resp. 9, 11. The cited aspects of those decisions, however, do not apply here as they stand for the proposition that a prior art reference that must be modified cannot *anticipate* a patent claim. *See In re Chudik*, 851 F.3d 1365, 1372 (Fed. Cir. 2017) (citing *Topliff v. Topliff*, 145 U.S. 156, 161 (1892)). Petitioner does not propose modifying any aspect of Sevy to address the “silencer assembly” limitation. *See* Pet. 26–30. Identifying structural features in the prior art using annotated figures is not the issue addressed in those Federal Circuit decisions. *Cf.* PO Resp. 9 (arguing that “Petitioner has distorted Sevy from its obvious design to meet claim limitations, specifically via the following annotated figure by adding in a labeled ‘Silencer Inlet,’ . . . and a ‘Silencer Outlet’”).

For these reasons, Patent Owner has not identified a deficiency in how Petitioner addressed the “silencer assembly” limitation.

b. Whether Sevy Discloses the “Dampening Sound Waves” Functionality

Clause 7E and clause 7F together recite “a *silencer assembly* having a silencer inlet, a silencer outlet, and a baffle; wherein said baffle partially restricts movement of the fluid dispersion through said silencer chamber from said silencer inlet to said silencer outlet, thereby *dampening sound waves* generated during operation of said fluid dispersion assembly.”

Ex. 1001, 9:37–42 (emphasis added). Patent Owner argues that Sevy does not disclose or suggest the “dampening sound waves” functionality of the “silencer assembly.” PO Resp. 11–13; PO Sur-reply 7–9. For the reasons below, we determine that Petitioner has not carried its burden of proof on the “dampening sound waves” functionality. We view this issue as dispositive for this ground, and we address it below.

Petitioner argues that one of ordinary skill in the art would have understood “that a structure that disrupts fluid dispersion as it flows from the inlet to the outlet, such as a baffle, would also limit sound associated therewith.” Pet. 28 (citing Ex. 1001, 6:1–8, 7:1–11, 7:64–8:2; White Pet. Decl. ¶¶ 174–177), 33 (citing Ex. 1001, 6:1–8, 7:1–11, 7:64–8:2) (stating that one of ordinary skill in the art “would appreciate that a structure that disrupts fluid flow, such as a baffle, would also dampen or limit sound during operation of the device”). On this issue, Petitioner relies on (1) an inherency position rooted in statements in the challenged patent that seem to link causally *any* flow disruption with the dampening of sound waves and (2) testimony from Dr. White. On an incomplete record as of the Decision on Institution, we determined that Petitioner had made a sufficient showing. *See* Dec. Inst. 17–19. Since then, Patent Owner has provided the testimony of Dr. Micklow on this issue (Micklow Decl. ¶¶ 19–23), which Dr. White

does not address in his Reply Declaration (*see* White Reply Decl. ¶¶ 5–20 (addressing other issues in the discussion supporting the Reply)).

We start with the two relevant statements¹⁶ in the challenged patent appearing to link causally *any* flow disruption with sound dampening:

More in particular, the suppression chamber 232 receives the fluid dispersion from the mixing chamber 226. The suppressor assembly 230 helps to suppress the noise generated during operation of the fluid dispersion assembly 10 as it disrupts the path of flow of the fluid dispersion out of the atomizer assembly 200 and into diffusion chamber 112, and *therefore*, disrupts and dampens the sound waves associated therewith.

...

Once again, as disclosed above with regard to the suppressor assembly 230, the disruption in the flow of the fluid dispersion through the silencer assembly 134 *also creates* a disruption and dampening of the sound waves associated therewith.

Ex. 1001, 6:1–8, 7:64–8:2 (emphasis added). Although we acknowledge that the language of these passages seems to indicate a causal relationship—such that *any* flow disruption results in the dampening of sound waves—we question the broad causation indicated by the statements. *See* PO Sur-reply 9 (“Petitioner’s argument reduces to this: because separator plate 98 disrupts droplet flow, and because some properly designed baffles can dampen sound, Sevy’s separator plate must necessarily dampen sound. That is speculation, not inherency.”). By way of example only, the disrupted flow through a referee’s whistle leads to increased noise, whereas the disrupted flow through an automotive muffler leads to decreased noise. We do not view the statements in the challenged patent, however, as adequately

¹⁶ Petitioner also relies on column 7, lines 1–11 of the challenged patent, but that passage does not address sound dampening. *See* Pet. 28.

supporting Petitioner’s inherency position *merely* based on a disruption of flow around the identified “baffle” in Sevy. *See Southwire Co. v. Cerro Wire LLC*, 870 F.3d 1306, 1311 (Fed. Cir. 2017); PO Resp. 11 (arguing that the “inference is technically unsupported and inconsistent with the principles governing fluid flow and acoustics”). Indeed, in the Reply, Petitioner relies on testimony from Dr. Micklow that a baffle “will dampen sound waves” *if “designed properly.”* *See* Pet. Reply 8–9 (in a section titled “Patent Owner’s own expert conceded baffles *can* dampen sound waves”) (emphasis added). But that the prior art structure *might* provide required functionality does not suffice under an inherency theory, such as Petitioner’s here. *See* Pet. 28–29.

Further, Dr. White’s cited testimony provided with the Petition relies on the same broad assumption—that *any* flow disruption results in the dampening of sound waves—while providing little technical support for the breadth of that assumption. *See* White Pet. Decl. ¶ 174, *cited at* Pet. 28; *see also* 37 C.F.R. § 42.65(a) (“Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.”). Moreover, Petitioner presents *none* of this scant technical reasoning in the Petition, instead relying almost solely on the broad assumption from the challenged patent. *See* Pet. 28 (relying on the statements from the challenged patent and citing four paragraphs of Dr. White’s Petition Declaration, with little comment); *see* 37 C.F.R. § 42.6(a)(3); *Cisco Sys., Inc.*, IPR2014-00454, Paper 12 at 7–10 (prohibiting incorporation by reference of declaration testimony into a petition to support conclusory statements).

In the briefing here, Patent Owner appears to narrow (or even contradict) the statements from the challenged patent, stating that

“restricting or disrupting fluid flow does not inherently dampen sound” and that, “[t]o the contrary, forcing fluid, particularly air, through constricted or obstructed pathways often increases turbulence, which can ***generate or amplify sound rather than suppress it.***” PO Resp. 12 (citing Micklow Decl. ¶¶ 19–20). With this, Patent Owner and Dr. Micklow conclude that the identified “silencer assembly” in Sevy would actually *increase* the noise. See Micklow Decl. ¶¶ 19–21, *cited at* PO Resp. 12. Although the record does not support Patent Owner’s proposed finding on this issue, we agree that Petitioner has not carried its burden to establish this question of fact by a preponderance of the evidence based largely on the statements from the challenged patent. Further, no disclosures in Sevy indicate that the structures comprising the identified “silencer assembly” dampen sound waves. See Pet. 37 (acknowledging that “Sevy does not explicitly disclose that the separator plate 98 has a sound dampening effect”).

For the reasons above, we find, based on the complete record, that Petitioner has not shown by a preponderance of the evidence that Sevy discloses or suggests the “dampening sound waves” functionality of the “silencer assembly.”

c. Conclusion for Claim 7

For the reasons above, we determine, based on the complete record, that Petitioner has not demonstrated by a preponderance of the evidence that claim 7 would have been obvious based on Sevy.

3. Claims 8, 9, and 11

For dependent claims 8, 9, and 11 (which depend from claim 11), Petitioner contends that Sevy discloses or suggests each limitation. Pet. 33–36; Pet. Reply 10. As discussed above (*see* § II.F.2), Petitioner has not

demonstrated by a preponderance of the evidence that independent claim 7, from which claims 8, 9, and 11 depend, would have been obvious based on Sevy. Thus, we determine, based on the complete record, that Petitioner has not demonstrated by a preponderance of the evidence that claims 8, 9, and 11 would have been obvious based on Sevy.

G. Asserted Obviousness of Claims 7–9 and 11 Based on Sevy and Zeng

Petitioner asserts that claims 7–9 and 11 would have been obvious based on Sevy and Zeng. Pet. 3–4, 37–43; Pet. Reply 10–13. Patent Owner provides arguments addressing this asserted ground. PO Resp. 16–24; PO Sur-reply 10–17. In this ground, Petitioner relies on Sevy (summarized above (*see* § II.F.1)) and Zeng (summarized above (*see* § II.G.1)).

1. Overview of Zeng

In this asserted ground, Petitioner relies on Zeng, in addition to Sevy (summarized above (*see* § II.F.1)). Zeng discloses “an atomizer structure with a noise reduction function specially designed for an essential oil diffuser, so as to reduce the spray sound of the atomizer when atomizing an essential oil, and to reduce the distance and volume of atomization.” Ex. 1011 at 4.

Figure 3 of Zeng is reproduced below:

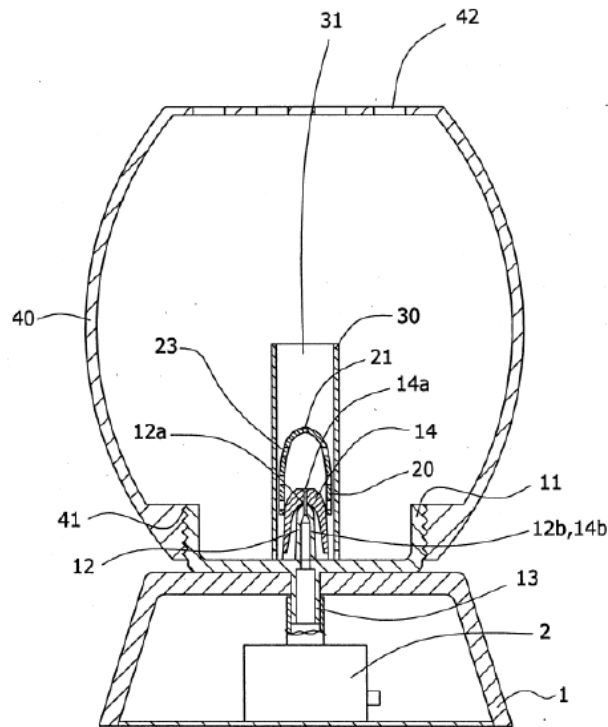


FIG. 3

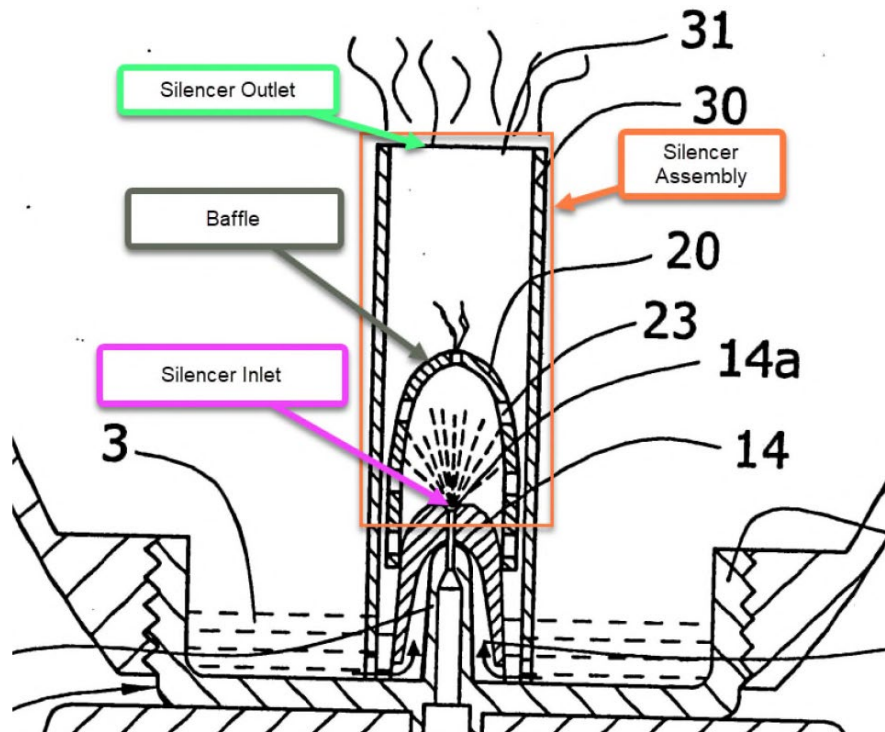
Figure 3 is a cross-sectional view of the disclosed assembly. Ex. 1011 at 8. The depicted aroma diffuser includes main body 1, noise reduction head 20, inner cover 30, and outer cover 40. *Id.* at 6.

2. Independent Claim 7

For independent claim 7, Petitioner contends that the proposed combination of Sevy and Zeng discloses each limitation. Pet. 37–43; Pet. Reply 10–13. Patent Owner argues that the relied-upon aspects of Zeng would not operate as intended in the context of the proposed combination of Sevy and Zeng. *See* PO Resp. 18–19; PO Sur-reply 11–13. We view this issue as dispositive for this ground, and we address it below.

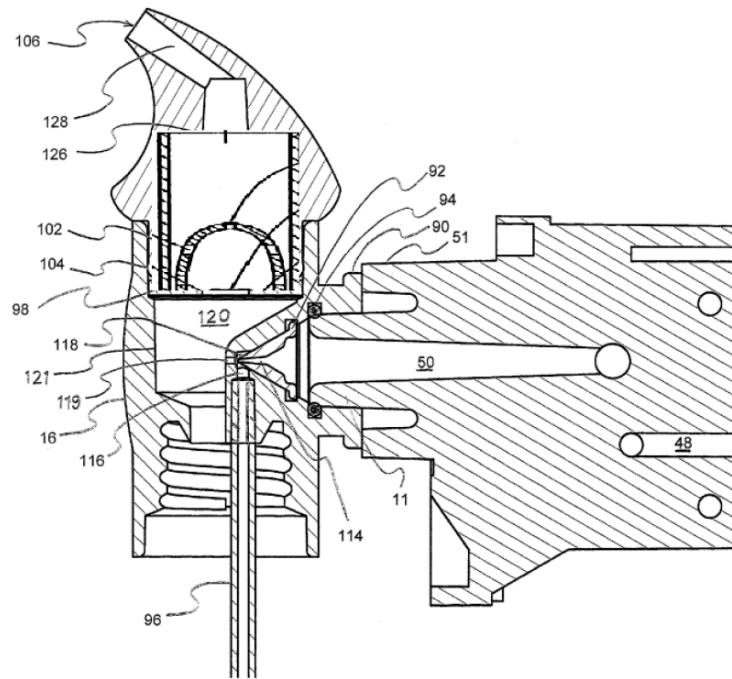
Clause 7E recites “a silencer assembly having a silencer inlet, a silencer outlet, and a baffle” and clause 7F recites “wherein said baffle

partially restricts movement of the fluid dispersion through said silencer chamber from said silencer inlet to said silencer outlet, thereby dampening sound waves generated during operation of said fluid dispersion assembly.”
Ex. 1001, 9:36–42. Addressing these clauses together, Petitioner identifies structures in Zeng as shown in this annotated partial image of Figure 4:



Pet. 40; *see also* Pet. 37–43 (citing White Pet. Decl. ¶¶ 206–214). In the annotated partial image of Figure 4 here, Petitioner added (1) a text box and orange rectangle identifying a “Silencer Assembly,” (2) a text box and green arrow identifying a “Silencer Outlet,” (3) a text box and gray arrow identifying a “Baffle,” and (4) a text box and pink arrow identifying a “Silencer Inlet.” Pet. 40.

Petitioner also provides the following composite image that “roughly illustrates” the proposed combination:



Pet. 42. The composite image includes features of Figure 9 of Sevy overlaid with a portion of Figure 4 of Zeng. *Id.* Petitioner discusses why one of ordinary skill in the art would have combined Sevy and Zeng as generally shown in the composite image above. *See* Pet. 41–43 (citing White Pet. Decl. ¶¶ 206–214). Specifically, Petitioner states that one of ordinary skill in the art would have been “motivated to combine Zeng with Sevy to improve atomization (*e.g.*, form uniform aerosolized particles) and to dampen sound waves, thereby enhancing user experience.” Pet. 41; White Pet. Decl. ¶ 210. Petitioner also discusses why one of ordinary skill in the art would have implemented the combination without undue experimentation. *See* Pet. 41; White Pet. Decl. ¶ 212. According to Petitioner, one of ordinary skill in the art would have been motivated “to combine a silencer assembly as taught by Zeng with the atomizer 16 of Sevy by replacing Sevy’s separator plate 98 and passage 126 with Zeng’s noise reduction head 20 and inner cover 30” as shown in the composite image

above. Pet. 41–42; White Pet. Decl. ¶ 213. Petitioner also discusses why the similar size and functionality between Zeng’s silencer assembly and Sevy’s structures supports that this is a “simple substitution of one known element for another to achieve the same desired effect of improved atomization and noise reduction.” Pet. 42–43; White Pet. Decl. ¶ 214.

Patent Owner contends that “Zeng discloses a noise-reduction head 20 having an opening hole 21 at the top that is designed to form a **“tension film” (i.e., a fluid membrane)** across the opening during operation.” PO Resp. 18 (citing Ex. 1011 at 5). According to Patent Owner, “[t]hat membrane is critical to Zeng’s operation: it prevents essential oil molecules from being directly expelled through the opening, thereby ensuring complete atomization and controlled dispersion.” *Id.* “In other words,” continues Patent Owner, “Zeng’s noise-reduction head 20 is not a passive flow-through structure. It depends on a **precise spatial and functional relationship** between the atomizer and opening hole 21 in order to generate and maintain the fluid membrane.” *Id.* Patent Owner adds that “Petitioner’s proposed combination destroys this operative principle” because “Petitioner proposes situating Zeng’s noise-reduction structure downstream of Sevy’s separator plate 98,” which is “far removed from the location and configuration necessary to form the fluid membrane described in Zeng.” *Id.* at 18–19. Patent Owner argues that, “[u]nder Petitioner’s theory, essential oil molecules would already be atomized and dispersed before reaching Zeng’s opening hole 21, making formation of the fluid membrane impossible.” *Id.* at 19.

For the reasons argued by Patent Owner, we are not persuaded of the operability of the relied-upon components from Zeng—noise reduction head

20 and inner cover 30—after substituting them in for Sevy’s separator plate 98 and passage 126 in the context of the proposed combination. Petitioner relies on these structures from Zeng for the last two clauses of claim 7, which include the “fluid dispersion” requirement and the “dampening sound waves” functionality. *See* Pet. 37–43. Petitioner contends that the “tension film” disclosed by Zeng is “merely the *by-product* of the filtering process that results from large droplets accumulating on the surface of the noise reduction head and not the ‘critical feature’ that causes the filtering of other droplets as Patent Owner suggests.” Pet. Reply 11–12. The record, however, does not support Petitioner’s argument.

The relevant passage in Zeng makes clear that the “tension film” over opening hole 21 in noise reduction head 20 prevents “incomplete atomization” by forcing *all* of the “essential oil molecules” to emit from *side* air holes 23 (and not emit from opening hole 21 at the top) with (1) “large volume” molecules (i.e., those with “incomplete atomization”) contacting inner cover 30 and being sent “for reuse” and (2) “completely atomized molecules” being “quickly spread into the air”:

[T]he essential oil molecules may have different sizes, those with large volume and incomplete atomization are allowed to pass through the air holes provided on the noise reduction head, and then stopped by the inner cover and thus flow back into the receptacle base part for reuse. In addition, the essential oil molecules sprayed from the opening above the atomizer can expand at the opening of the top of the noise reduction head to form a tension film, thereby preventing the essential oil molecules from being directly sprayed out from the opening and causing incomplete atomization. Therefore, when in use, the present invention only allow[s] the completely atomized essential oil molecules to pass through the openings of the inner cover and outer cover and the ventilation holes and then quickly spread into the air. This can reduce the atomization distance and

the volume of the essential oil molecules after atomization, and make the atomization effect better.

Ex. 1011 at 5–6. Thus, contrary to Petitioner’s position (Pet. Reply 11–12), the “tension film” over opening hole 21 (at the top of noise reduction head 20) is essential to complete atomization because it prevents the larger, incompletely atomized essential oil molecules from (1) travelling *directly upwards*, (2) not striking inner cover 30, and (3) not being recycled for reuse. *See* Ex. 1001 at 5–6; PO Sur-reply 13 (discussing how Zeng “does not describe [the tension film as] irrelevant by-product” but rather as “a mechanism that prevents direct spray-out and incomplete atomization”). Petitioner does not explain how this tension film would be present in the context of the proposed combination and also does not explain how the larger, incompletely atomized essential oil molecules (after striking inner cover 30) would be recycled back to fluid reservoir 18 in Sevy for reuse in the context of the proposed combination. Notably, Dr. White provides no testimony directly addressing the operation of the “tension film” in Zeng. *See* White Pet. Decl. ¶¶ 202–216; White Reply Decl.

For the reasons above, we determine, based on the complete record, that Petitioner has not demonstrated by a preponderance of the evidence that claim 7 would have been obvious based on Sevy and Zeng.

3. Claims 8, 9, and 11

For dependent claims 8, 9, and 11 (which depend from claim 11), Petitioner contends that the proposed combination of Sevy and Zeng satisfies each limitation. Pet. 33–36, 43; Pet. Reply 13. As discussed above (*see* § II.G.1), Petitioner has not demonstrated by a preponderance of the evidence that independent claim 7, from which claims 8, 9, and 11 depend, would have been obvious based on Sevy and Zeng. Thus, we determine,

based on the complete record, that Petitioner has not demonstrated by a preponderance of the evidence that claims 8, 9, and 11 would have been obvious based on Sevy and Zeng.

H. Asserted Obviousness of Claims 7–9 and 11 Based on Gao

Petitioner asserts that claims 7–9 and 11 would have been obvious based on Gao. Pet. 3–4, 64–80; Pet. Reply 20–23. Patent Owner provides arguments addressing this asserted ground. PO Resp. 25–33; PO Sur-reply 23–27. We first summarize aspects of the relied-upon prior art.

1. Overview of Gao

Gao discloses “an atomizer used for atomizing essence or essential oil.” Ex. 1013 at 5 (¶ 1).

Figures 1 and 2 of Gao are reproduced below:

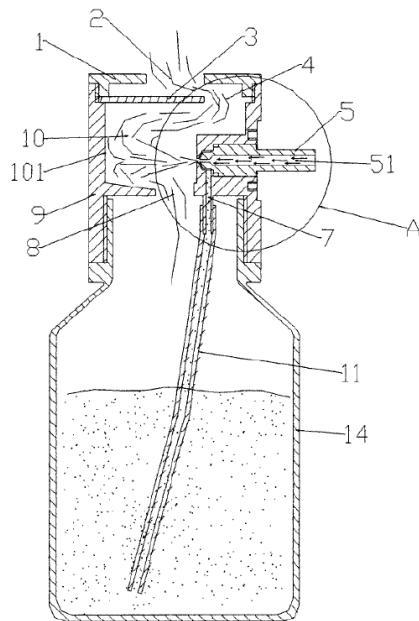


FIG. 1

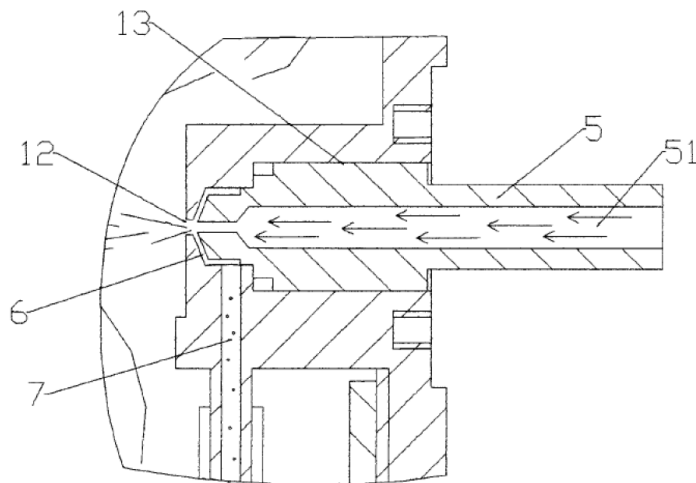


FIG. 2

Figure 1 depicts “the structure of an atomizer for atomizing essence or essential oil.” Ex. 1013 at 7 (¶ 16). Figure 2 depicts an enlarged schematic of “A” in Figure 1. *Id.* (¶ 17). The depicted atomizer includes liquid

pipeline 7, which brings stored liquid up via hose 11 to combine with gas from gas flow nozzle 5 in atomizing cavity 6. *See id.* at 8 (¶ 19), 8–9 (¶ 25). The gas-liquid mixture is then ejected through gas flow spray hole 12 into inner wall 101, where “the liquid is atomized into micron-sized fine particles.” *Id.* at 8–9 (¶ 25). Gao discloses that “[t]he smallest particles will float in the air, and drift out through the through hole 4 and the atomizing gas outlet 2 with the rising gas flow to be converted into gas through heat exchange with the air.” *Id.* at 9 (¶ 25).

2. Independent Claim 7

For independent claim 7, Petitioner contends that Gao discloses or suggests each limitation. Pet. 64–80; Pet. Reply 20–23. Patent Owner argues that (1) Petitioner improperly addresses the “silencer assembly” limitation and (2) Gao does not disclose a “silencer assembly,” including the “dampening sound waves” functionality. PO Resp. 34–39; PO Sur-reply 23–26. We view the second issue as dispositive for this ground, and we address them both below.

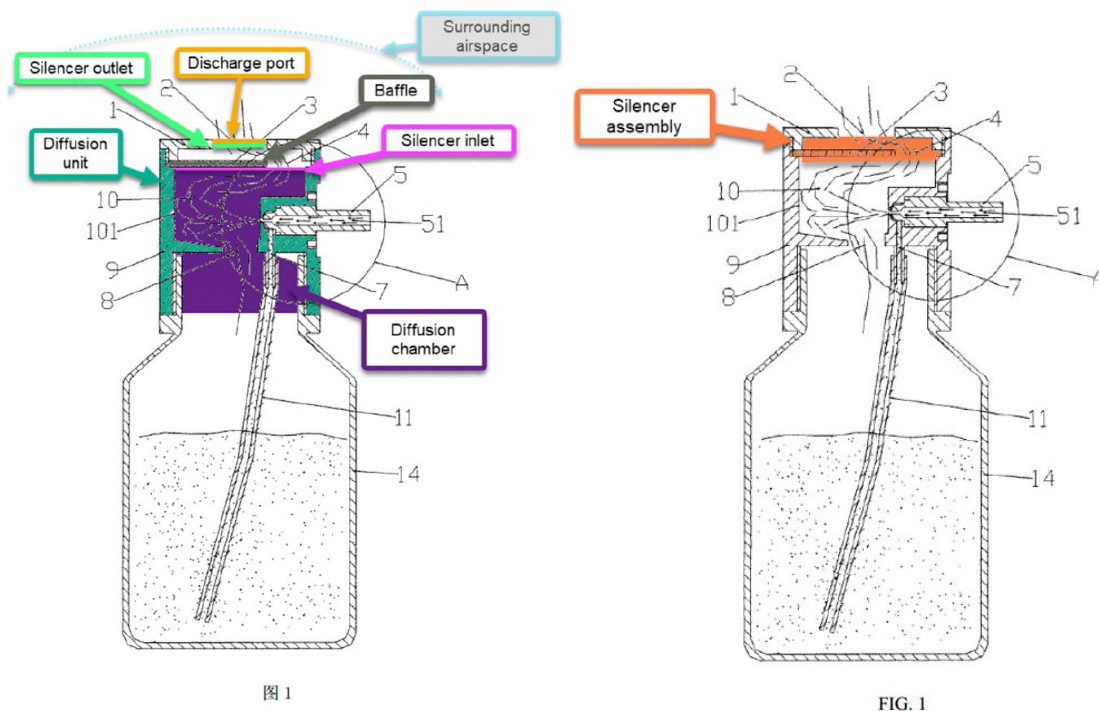
a. Whether Petitioner Properly Addresses the “Silencer Assembly” Limitation

Clause 7E recites “a *silencer assembly* having a silencer inlet, a silencer outlet, and a baffle.” Ex. 1001, 9:36–37 (emphasis added). Patent Owner argues that, for that limitation, Petitioner “impermissibly collapses distinct claimed elements into a single undifferentiated flow path, contrary to the claim language and governing law.” PO Resp. 34 (citing *Becton, Dickinson & Co.*, 616 F.3d at 1254); *see also id.* at 35–38 (entire argument); PO Sur-reply 24–26. Specifically, Patent Owner argues that the “claim language . . . requires three distinct structural components, not merely a single flow path.” PO Resp. 35. For the reasons below, this argument does

not identify a deficiency in Petitioner’s position as to the “silencer assembly” limitation.

As discussed above (*see* § II.D.2.a), whether it is improper to identify one feature in the prior art as allegedly satisfying two different claim elements turns on whether the claim requires the separateness of the two claim elements. We need not address this issue on the record before us, however, because we disagree with the premise of Patent Owner’s argument—here, Petitioner has *not* identified one feature to allegedly satisfy two (or more) claim elements.

Petitioner identifies the structures recited in the “silencer assembly” limitation in these annotated versions of Figure 1 of Gao:



Pet. 75–76; *see also* Pet. 73–76 (citing White Pet. Decl. ¶¶ 340–350) (entire discussion). In the annotated version of Figure 1 on the left, Petitioner added (1) a text box and purple shading identifying a “Diffusion chamber,” (2) a text box and pink shading identifying a “Silencer inlet,” (3) a text box

and gray shading identifying a “Baffle,” (4) a text box and yellow shading identifying a “Discharge port,” (5) a text box and green shading identifying a “Silencer outlet,” (6) a text box and teal shading identifying a “Diffusion unit,” and (7) a text box and dotted blue line identifying a “Surrounding airspace.” Pet. 75. In the annotated version of Figure 1 on the right, Petitioner added a text box and orange shading identifying a “Silencer assembly.” Pet. 76.

As shown in the annotated versions of Figure 1 of Gao above, Petitioner clearly identifies three *distinct* features in Gao as the “silencer inlet,” the “silencer outlet,” and the “baffle,” respectively, with those three features together forming the “silencer assembly. Thus, Petitioner’s approach does not implicate the Federal Circuit’s *Becton, Dickinson* decision cited by Patent Owner (or related case law). See PO Resp. 35.

Discussing the annotated version of Figure 1 of Gao on the left above, Patent Owner contends that the “labeled silencer inlet . . . is undifferentiable from the diffusion chamber” and that the labeled “silencer outlet . . . is undifferentiable from the discharge port.” PO Resp. 36. The annotated figure, however, does not support Patent Owner’s position. The “silencer inlet” in pink is separate from (albeit adjacent) the “diffusion chamber” in purple. Pet. 75. And the “silencer outlet” in green is distinct from (but again adjacent) the “discharge port” in yellow. *Id.*

Patent Owner argues that Petitioner’s positions are improper because the elements in the “silencer assembly” limitation “are neither named, described, suggested, nor structurally delineated in Gao.” PO Resp. 37. That the features relied on are not expressly discussed or given reference numerals in Gao (even if they are in the challenged patent) does not

undermine Petitioner's showing. *See In re Aslanian*, 590 F.2d at 914; *In re Meng*, 492 F.2d at 847.

In addition, Patent Owner again relies on *In re Chudik* and *Topliff v. Topliff* for the proposition that “prior art cannot be ‘distorted from its obvious design’ to meet claim limitations.” PO Resp. 35, 37; PO Sur-reply 24. For the reasons discussed above (*see* § II.F.2.a), the cited aspects of those decisions do not apply as Petitioner does not propose modifying any aspect of Gao to address the “silencer assembly” limitation. *See* Pet. 73–76.

Patent Owner also takes issue with Petitioner's and Dr. White's reliance on “control surfaces separating fluid volumes” as part of a “fluid mechanical analysis,” with Patent Owner arguing that this proceeding “concerns real claimed structures and functions; not applying theoretical fluid mechanics to concoct structures that are simply not there.” PO Sur-reply 24–25; *see also* PO Resp. 35 (arguing that the limitation at issue “requires three distinct *structural* components” (emphasis added)). According to Patent Owner, “[a] ‘control surface’ is a conceptual boundary an engineer draws on a diagram to isolate a region of fluid for calculation; it is not a physical component disclosed in Gao.” PO Sur-reply 25 (citing Ex. 2001, 18:13–17, 23:4–11, 28:8–19). We disagree with Patent Owner that, for example, the “silencer inlet” and “silencer outlet” must be *physical structures* in Gao. *See id.* (“The claim requires a silencer inlet, silencer outlet, and silencer assembly, physical structures with disclosed locations and functions. Gao does not disclose these structures.”).

Indeed, the challenged patent depicts the “silencer inlet” and the “silencer outlet” not as *structural components*, but as *open passageways* for the flow of the “fluid dispersion.” *See* Ex. 1001, Figs. 1 & 2 (showing

“silencer inlet” 135 and “silencer outlet” 137), 7:55–64 (discussing same). Thus, we see no issues with Dr. White’s approach using control surfaces or control volumes. *See* Ex. 2001, 18, 28 (discussing a fluid mechanical approach to this issue using “control surfaces” and “control volumes”).

For these reasons, Patent Owner has not identified a deficiency in how Petitioner addressed the “silencer assembly” limitation.

b. Whether Gao Discloses the “Dampening Sound Waves” Functionality

Clause 7E and clause 7F together recite “a *silencer assembly* having a silencer inlet, a silencer outlet, and a baffle; wherein said baffle partially restricts movement of the fluid dispersion through said silencer chamber from said silencer inlet to said silencer outlet, thereby *dampening sound waves* generated during operation of said fluid dispersion assembly.”

Ex. 1001, 9:37–42 (emphasis added). Patent Owner argues that Gao does not disclose or suggest the “dampening sound waves” functionality of the “silencer assembly.” PO Resp. 38–39; PO Sur-reply 26. For the reasons below, we determine that Petitioner has not carried its burden of proof on the “dampening sound waves” functionality. We view this issue as dispositive for this ground, and we address it below.

Petitioner argues that one of ordinary skill in the art would have understood “that a baffle that disrupts fluid flow, like Gao’s baffle 3, would also limit sound associated therewith.” Pet. 75 (citing Ex. 1001, 6:1–8, 7:1–11, 7:64–8:2; White Pet. Decl. ¶¶ 340–350), 78 (citing Ex. 1001, 6:1–8, 7:1–11, 7:64–8:2; White Pet. Decl. ¶¶ 351–361) (stating that one of ordinary skill in the art “would appreciate that baffle 3, which disrupts fluid flow, would also dampen sound waves generated during operation of said fluid dispersion assembly”). On this issue, Petitioner relies on (1) an inherency

position rooted in statements in the challenged patent that seem to link causally *any* flow disruption with the dampening of sound waves and (2) testimony from Dr. White. On an incomplete record as of the Decision on Institution, we determined that Petitioner had made a sufficient showing. *See* Dec. Inst. 44–45. Since then, Patent Owner has provided the testimony of Dr. Micklow on this issue (Micklow Decl. ¶¶ 36–42), which Dr. White does not address in his Reply Declaration (*see* White Reply Decl. ¶¶ 5–20 (addressing other issues in the discussion supporting the Reply)). *See* PO Sur-reply 26 (discussing how Dr. White does not address Dr. Micklow’s testimony on this issue from the Patent Owner Response).

As discussed above (*see* § II.F.2.b), although the two relevant statements in the challenged patent seem to indicate a causal relationship—such that *any* flow disruption results in the dampening of sound waves—we question the broad causation indicated by the statements. Specifically, we do not view the statements in the challenged patent as supporting Petitioner’s inherency position merely based on a disruption of flow around the baffle in Gao. *See Southwire Co.*, 870 F.3d at 1311. In the Reply, Petitioner relies entirely on the inherency position provided by the statements in the challenged patent, with large citations to Dr. White’s Petition Declaration. *See* Pet. Reply 21 (citing Pet. 74–76; White Pet. Decl. ¶¶ 340–350) (discussing how “the ‘silencer assembly’ limitation is met by Gao’s ‘silencer inlet,’ ‘baffle,’ and ‘silencer outlet’ because air flow is disrupted (as it twists and turns around Gao’s baffle 3) as it travel through Gao’s silencer assembly”).

And Dr. White’s cited testimony provided with the Petition relies on the same broad assumption—that *any* flow disruption results in the

dampening of sound waves—while providing little technical support for the breadth of that assumption. *See* White Pet. Decl. ¶¶ 346, 349, 360; *see also* 37 C.F.R. § 42.65(a) (“Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.”). Moreover, Petitioner presents *none* of this scant technical reasoning in the Petition, instead relying almost solely on the broad assumption from the challenged patent. *See* Pet. 75–76 (relying on the statements from the challenged patent and citing eleven paragraphs of Dr. White’s Petition Declaration, without comment), 78 (same); *see* 37 C.F.R. § 42.6(a)(3); *Cisco Sys., Inc.*, IPR2014-00454, Paper 12 at 7–10.

In the briefing here, Patent Owner appears to narrow (or even contradict) the statements from the challenged patent, stating that “simply obstructing fluid flow, without contoured geometry or phased flow paths, does not dampen sound but instead increases turbulence and amplifies unsteady pressure fluctuations” such that “[t]hose effects would be expected to increase, rather than reduce, the sound generated during operation.” PO Resp. 38 (citing Micklow Decl. ¶ 38). With this, Patent Owner and Dr. Micklow conclude that the identified “silencer assembly” in Gao would actually *increase* the noise. *See* Micklow Decl. ¶¶ 36–38, *cited at* PO Resp. 38. Although the record does not support Patent Owner’s proposed finding on this issue, we agree that Petitioner has not carried its burden to establish this question of fact by a preponderance of the evidence. Further, no disclosures in Gao indicate that the structures comprising the identified “silencer assembly” would dampen sound waves.

For the reasons above, we find, based on the complete record, that Petitioner has not shown by a preponderance of the evidence that Gao

discloses or suggests the “dampening sound waves” functionality of the “silencer assembly.”

c. Conclusion for Claim 7

For the reasons above, we determine, based on the complete record, that Petitioner has not demonstrated by a preponderance of the evidence that claim 7 would have been obvious based on Gao.

3. Claims 8, 9, and 11

For dependent claims 8, 9, and 11 (which depend from claim 7), Petitioner contends that Gao discloses or suggests each limitation. Pet. 78–80; Pet. Reply 20–23. As discussed above (*see* § II.H.2.c), Petitioner has not demonstrated by a preponderance of the evidence that claim 7 would have been obvious based on Gao. Thus, we determine, based on the complete record, that Petitioner has not demonstrated by a preponderance of the evidence that claims 8, 9, and 11 would have been obvious based on Gao.

I. Asserted Obviousness of Claims 7–9 and 11 Based on Gao and Zeng

Petitioner asserts that claims 7–9 and 11 would have been obvious based on Gao and Zeng. Pet. 3–4, 80–83; Pet. Reply 24–26. Patent Owner provides arguments addressing this asserted ground. PO Resp. 40–44; PO Sur-reply 27–28. Petitioner relies on Gao (summarized above (*see* § II.H.1)) and Zeng (summarized above (*see* § II.G.1)).

1. Independent Claim 7

For independent claim 7, Petitioner contends that the proposed combination of Gao and Zeng discloses each limitation. Pet. 80–83; Pet. Reply 24–26. Patent Owner relies on the argument presented as to the ground based on Sevy and Zeng (*see* § II.G.2), arguing that the relied-upon aspects of Zeng would not operate as intended in the context of the proposed

combination of Gao and Zeng. *See* PO Resp. 42–43; PO Sur-reply 27–28. We view this issue as dispositive for this ground, and we address it below.

Petitioner contends that one of ordinary skill in the art “would have been motivated to combine the teachings of Zeng with Gao to dampen the hissing noise, while maintaining the small and uniform droplets taught by Gao to enhance user experience.” Pet. 82 (citing Ex. 1001 at 4–5; White Pet. Decl. ¶¶ 382–389). Specifically, Petitioner proposes two modifications.

As “Modification 1,” Petitioner states that one of ordinary skill in the art “would have been motivated to substitute Gao’s baffle 3 and cover body 1 with Zeng’s silencer 20 and inner cover 30, which would reduce the hissing sound generated during operation of the fluid dispersion assembly as the fluid dispersion flows therethrough without enlarging droplet size.”

Pet. 82. Petitioner adds that “[t]he combination of Zeng’s silencer 20 and inner cover 30 would replace Gao’s baffle 3 and cover body 1 and sit on the ledge formed within Gao’s main body 9.” Pet. 83 (citing White Pet. Decl. ¶¶ 382–386).

As “Modification 2,” Petitioner states that one of ordinary skill in the art “would have alternatively been motivated to modify Gao’s existing orifice baffle into a dome shape orifice baffle as taught by Zeng to produce an improved noise reducing effect.” Pet. 83. According to Petitioner, “[s]uch a modification would be small change in structure that would not require undue experimentation or modification of other components within of the atomizer.” *Id.* (citing White Pet. Decl. ¶¶ 387–389).

For the same reasons discussed above as to the ground of Sevy and Zeng (*see* § II.G.2), we are not persuaded of the operability of the relied-upon components from Zeng—noise reduction head 20 and inner cover 30—

after substituting them in for Gao's baffle 3 and cover body 1 in the context of the proposed Modification 1.

As to Modification 2, the only "dome shape orifice baffle as taught by Zeng" is noise reduction head 20, which has the same issue related to the "tension film" as discussed above. *See* § II.G.2. Petitioner attempts to avoid the "tension film" issue by framing this modification as merely relying on Zeng's noise reduction head 20 as "motivation." *See* Pet. Reply 25. But if Zeng's noise reduction head 20 provides the "motivation" to reshape structure in Gao, the new structure would have the same "tension film" issue as Zeng's noise reduction head 20. *See* PO Sur-reply 27 ("Related to Petitioner's 'Modification 2,' still, the introduction of Zeng to Gao instead disrupts Zeng's own operative principle because Zeng's noise-reduction head depends on the formation of a tension film that requires spatial and structural conditions absent from Gao.").

For these reasons, we determine, based on the complete record, that Petitioner has not demonstrated by a preponderance of the evidence that claim 7 would have been obvious based on Gao and Zeng.

2. Claims 8, 9, and 11

For dependent claims 8, 9, and 11 (which depend from claim 11), Petitioner contends that the proposed combination of Gao and Zeng satisfies each limitation. Pet. 78–80, 83; Pet. Reply 24–26. As discussed above (*see* § II.I.1), Petitioner has not demonstrated by a preponderance of the evidence that independent claim 7, from which claims 8, 9, and 11 depend, would have been obvious based on Gao and Zeng. Thus, we determine, based on the complete record, that Petitioner has not demonstrated by a

preponderance of the evidence that claims 8, 9, and 11 would have been obvious based on Gao and Zeng.

J. 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 cancelled claims 7–9 and 11 with proposed claim 21. RMTA 3–4.

1. Proposed Substitute Claim

Patent Owner submits the following proposed substitute independent claim 21, which corresponds to independent claim 7 (with added material underlined, deleted material double bracketed, and internal designations added in single brackets):

21. [21PRE] 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:

[21A] a diffusion unit at least partially defining a diffusion chamber,

[21B] a discharge port disposed in fluid communication between said diffusion chamber and the surrounding airspace,

[21C] a diffusion assembly disposed in an operative engagement with said diffusion unit, [21D] wherein said diffusion assembly comprises an atomizer assembly, and

[21E] a silencer assembly having a silencer chamber, silencer inlet, a silencer outlet, and a baffle, said baffle being disposed within said silencer chamber, [21F] wherein said baffle partially ~~[[restricts]]~~ disrupts movement of the fluid dispersion through said silencer chamber from said silencer inlet to said silencer outlet, thereby dampening sound waves generated during operation of said fluid dispersion assembly~~[[.]]~~; and

[21G] wherein said silencer inlet is disposed relative to said baffle to substantially direct a flow of said fluid dispersion towards said baffle before said fluid dispersion exits said silencer chamber through said silencer outlet, thereby maximizing disruption of said flow of said fluid dispersion.

RMTA 15–16 (Claims App.); RMTA Opp. 8–18 (adding designations to clauses).¹⁷ Proposed substitute claim 21 corresponds to cancelled claim 7. *See* RMTA 15–16 (Claims App.). Patent Owner does not propose substitute claims corresponding to cancelled claims 8, 9, and 11.

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 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

¹⁷ We adopt these designations for the elements of proposed substitute claim 21. We apply these designations below.

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 claims needs express construction. *See* RMTA; RMTA Reply; RMTA Opp.; RMTA Sur-reply. We agree.

4. Statutory and Regulatory Requirements

“Before considering the patentability of any substitute claims, . . . the Board first must determine whether the motion to amend meets the statutory and regulatory requirements set forth in 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121.” *Lectrosonics*, Paper 15 at 4.

a. Reasonable Number of Substitute Claims

First, we consider whether the Revised Motion to Amend proposes a reasonable number of substitute claims. *See* 35 U.S.C. § 316(d)(1)(B). We apply “a rebuttable presumption that a reasonable number of substitute claims per challenged claim is one (1) substitute claim.” *Lectrosonics*, Paper 15 at 4–5 (citing 37 C.F.R. § 42.121(a)(3)). Patent Owner proposes one substitute claim for four challenged claims. RMTA 5. Thus, Patent Owner has proposed a reasonable number of substitute claims.

b. Responsive to a Ground of Unpatentability

Second, we consider whether the proposed substitute claims respond to a ground of unpatentability involved in this trial. *Lectrosonics*, Paper 15 at 5–6. Proposed substitute claim 21 amends the language of claim 7 to

recite additional features of the fluid dispersion assembly, and Patent Owner asserts that the proposed substitute claim is patentable over the instituted grounds and references at issue in this proceeding, based on the amended language. RMTA 4–5. We conclude that the proposed substitute claim is responsive to grounds of unpatentability involved in this trial because Patent Owner adds limitations in a manner intended to address the prior art cited by Petitioner in relation to the originally challenged claims.

c. Scope of the Substitute Claim

Third, we consider the scope of the substitute claims, as “[a] motion to amend may not present substitute claims that enlarge the scope of the claims of the challenged patent or introduce new subject matter.” *Lectrosonics*, Paper 15 at 6 (citing 35 U.S.C. § 316(d)(3); 37 C.F.R. § 42.121(a)(2)(ii)). Patent Owner states that “the proposed substitute claim only adds non-broadening limitations which do not enlarge the scope of the corresponding original claim” and that, “[o]n the contrary, the newly included recitation further specifies the scope of the original claim.” RMTA 4. Petitioner does not address this issue in the briefing. We conclude that proposed substitute claim 21 does not enlarge the scope of the claims of the challenged patent or introduce new subject matter.

5. Asserted Indefiniteness of Proposed Substitute Claim 21

In clause 21G, proposed substitute claim 21 recites “wherein said silencer inlet is disposed relative to said baffle to substantially direct a flow of said fluid dispersion towards said baffle before said fluid dispersion exits said silencer chamber through said silencer outlet, thereby *maximizing disruption* of said flow of said fluid dispersion.” RMTA 15–16 (Claims App.) (emphasis added).

Petitioner argues that “[c]laim 21 is indefinite because it requires the silencer inlet to be positioned relative to the baffle in a way that ‘maximiz[es] disruption’ of the fluid-dispersion flow but provides no objective boundary for determining when that result is achieved.” RMTA Opp. 4–5 (second alteration in original). According to Petitioner, claim 21 “does not identify a baseline, metric, test, or engineering criterion for measuring ‘disruption’ or determining when disruption has reached a maximum.” *Id.* at 5 (citing White Reply Decl. ¶ 25; White RMTA Decl. ¶¶ 8–10). Petitioner adds that “[t]he specification does not cure the problem.” *Id.*

As a threshold matter, we address the propriety of Petitioner asserting indefiniteness of proposed substitute claim 21 in the context of an *inter partes* review. Although a petitioner cannot assert indefiniteness of the original claims in the context of an *inter partes* review (*see* 35 U.S.C. § 311(b)), a petitioner *may* assert indefiniteness of substitute claims proposed in a motion to amend. *See Amazon.com, Inc. v. Uniloc Luxembourg S.A.*, IPR2017-00948, Paper 34 at 5 (PTAB Jan. 18, 2019) (precedential) (“In contrast to § 311(b), the statutory provision providing a right to a motion to amend, 35 U.S.C. § 316(d), does not prevent us from considering unpatentability under sections other than § 102 and § 103 with respect to substitute claims.”), *aff’d Uniloc 2017 LLC v. Hulu, LLC*, 966 F.3d 1295 (Fed. Cir. 2020); *see also* TPG § II.H (discussing the precedential decision in *Amazon.com* and stating that, in opposition to a motion to amend, a “petitioner may raise, and the Board may consider, other grounds of unpatentability, including 35 U.S.C. §§ 101 and 112, as to proposed substitute claims”).

We turn now to the merits of Petitioner's indefiniteness arguments. To satisfy the definiteness requirement of § 112(b), a claim must, when "viewed in light of the specification and prosecution history, inform those skilled in the art about the scope of the invention with reasonable certainty." *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 910 (2014). Terms of degree are not "inherently indefinite" and "[c]laim language employing terms of degree has long been found definite where it provided enough certainty to one of skill in the art when read in the context of the invention." *Interval Licensing LLC v. AOL, Inc.*, 766 F.3d 1364, 1370 (Fed. Cir. 2014). To satisfy the statute, "[t]he claims, when read in light of the specification and the prosecution history, must provide objective boundaries for those of skill in the art" as to the terms of degree. *Id.* at 1371.

On the complete record developed at trial, and for the reasons below, we agree with Petitioner that proposed substitute claim 21, when read in light of the specification and the prosecution history, does not provide objective boundaries that a person of skill in the art could use to determine whether a particular "silencer inlet is disposed relative to said baffle to substantially direct a flow of said fluid dispersion towards said baffle before said fluid dispersion exits said silencer chamber through said silencer outlet, thereby *maximizing disruption* of said flow of said fluid dispersion."

For completeness and to provide context for the discussion below, we reproduce here the portions of the Specification highlighted by Patent Owner in the Revised Motion to Amend:

The silencer assembly 134 comprises a baffle 136 disposed in a silencer chamber 138 between a silencer inlet 135 and a silencer outlet 137. The baffle 136 is structured and disposed to further disrupt the flow of the fluid dispersion through the fluid dispersion assembly 10, and more specifically, through the

silencer chamber 138. In at least one embodiment, the silencer inlet 135 is disposed relative to the baffle 136 to at least partially, if not substantially, direct the flow of the fluid dispersion towards the baffle 136, so as to maximize the disruption of flow.

Ex. 1001, 7:55–64, *discussed at* RMTA 9 (second paragraph); *see also* RMTA 8 (citing, as supporting clause 21G, Ex. 1005, 18:21–25 & Ex. 1006, 30:9–13, each of which provides the last sentence in the block quote above, but from an application earlier in the challenged patent’s chain).

In the Reply to the Revised Motion to Amend, Patent Owner contends that proposed claim 21 “adds . . . context to the operation of the claimed invention (as explained in the Revised Motion) by explaining to a [one of ordinary skill in the art] the structural limitation by which the ‘maximiz[ation]’ is itself defined.” RMTA Reply 5 (citing RMTA 9–10) (second alteration in original). According to Patent Owner, “[n]one of Petitioner’s evidence speaks to whether [one of ordinary skill in the art] would lack clarity in the requirement of the term ‘substantially direct’ in the context of claim 21, rendering the claim definite.” *Id.* In other words, Patent Owner responds to Petitioner’s indefiniteness argument by contending that one of ordinary skill in the art would not need objective criteria for the “maximizing disruption” limitation because that is *necessarily* achieved so long as the “silencer inlet is disposed relative to said baffle to substantially direct a flow of said fluid dispersion towards said baffle”¹⁸ (as also recited in clause 21G). *See* RMTA 9 (“Thus, in the context of the specification, maximum disruption is achieved when the flow of the fluid dispersion is substantially directed toward the baffle.”).

¹⁸ For brevity, we will refer to this as the “substantially direct” limitation and also the “structural configuration issue.”

First, we address the alleged causal relationship argued by Patent Owner here—i.e., that so long as the “silencer inlet is disposed relative to said baffle to substantially direct a flow of said fluid dispersion towards said baffle,” the assembly *must be* “maximizing disruption of said flow of said fluid dispersion.” Even if the Specification implies such a relationship (*see* Ex. 1001, 7:60–64), we are not bound to accept conclusory statements on technical issues merely based on their disclosure in a specification. *See, e.g., In re Lindner*, 457 F.2d 506, 508 (CCPA 1972) (discussing, in the context of unexpected results, that “mere conclusory statements in the specification and affidavits are entitled to little weight when the Patent Office questions the efficacy of those statements”), *cited in In re Soni*, 54 F.3d 746, 750 (Fed. Cir. 1995) (collecting similar statements as to unexpected results).

In addition, we question how the *relatively broad* set of configurations that would satisfy the structural requirement that the “silencer inlet is disposed relative to said baffle *to substantially direct* a flow of said fluid dispersion towards said baffle” would *necessarily* lead to the *exact same outcome*—i.e., “maximizing disruption of said flow of said fluid dispersion.” This view is supported by Dr. White, who, in testimony cited by Petitioner, states: “A flow can be directed toward a baffle and still produce different degrees of disruption depending on the geometry and operating conditions described above” such that one of ordinary skill in the art “would not understand the revised wording [of the proposed substitute claim] to identify the full scope of inlet, baffle, and chamber arrangements that achieve maximum disruption.” White RMTA Decl. ¶ 10, *cited at* RMTA Opp. 5; *see* RMTA Sur-reply 5 (citing White RMTA Decl. ¶¶ 8–10) (“Dr. White explains that two arrangements can each substantially direct fluid dispersion

toward a baffle yet produce different disruption because inlet size and orientation, baffle geometry and spacing, chamber geometry, flow rate, pressure drop, droplet-size distribution, and downstream restrictions independently affect the flow.”). Thus, we determine that the record does not support that the “maximizing disruption” limitation merely recites a necessary result of the rest of proposed substitute claim 21, including the “substantially direct” limitation.

Even were this not the case, however, we view Petitioner as having argued, and demonstrated, the indefiniteness of the “substantially direct” limitation. Citing Dr. White’s testimony highlighted in the prior paragraph, Petitioner not only highlights the lack of objective criteria for the “maximizing disruption” limitation but also asserts that the Specification does not “*identify the inlet angle, baffle spacing, chamber geometry, flow rate, pressure conditions, or other variables needed to determine whether a particular arrangement maximizes disruption.*” RMTA Opp. 5 (emphasis added) (citing White Reply Decl. ¶ 25; White RMTA Decl. ¶¶ 8–10). In other words, Petitioner posits that the Specification provides *no guidance* on the structural configuration issue—i.e., how to “dispose[]” the “silencer inlet” relative to the “baffle” in order “*to substantially direct* a flow of said dispersion towards said baffle”—which allegedly causes “maximizing disruption of said flow of said fluid dispersion.” *Id.* (adding that “the patent does not define *the degree of direction*, or the degree of disruption, required by the claim” (emphasis added) (citing Ex. 1001, 7:60–8:4). On this issue, we agree with Petitioner that the relied-upon passage of the Specification “[a]t most . . . identifies a design goal of directing flow toward a baffle without objective boundaries for the claimed result.” *Id.*

Moreover, contrary to Patent Owner’s assertion (RMTA Reply 5), Petitioner *has* provided evidence—namely Dr. White’s Declaration filed with the Opposition to the Revised Motion to Amend—that the record here lacks adequate guidance as to the structural configuration issue (i.e., the “substantially direct” limitation). *See* White RMTA Decl. ¶ 8 (“From a technical perspective, the degree of disruption produced by an inlet and baffle arrangement is not determined by inlet direction alone. It depends on multiple design and operating variables, including inlet orientation, inlet size, baffle size and shape, spacing between the inlet and baffle, chamber geometry, flow rate, pressure, pressure drop, droplet size distribution, and downstream restrictions.”), ¶ 9 (discussing how column 7, lines 53–65 of the challenged patent “do[es] not identify a metric, test, comparison method, baseline configuration, *or set of structural or operating parameters* that [one of ordinary skill in the art] would use to determine when disruption has reached a maximum”) (emphasis added). In contrast, Dr. Micklow provides no testimony in support of Patent Owner’s positions, and Patent Owner failed to address substantively Dr. White’s testimony in the motion to amend briefing.

For these reasons, Petitioner has demonstrated, by a preponderance of the evidence, that proposed substitute claim 21 is indefinite.

*6. Asserted Obviousness of Proposed Substitute Claim 21
Based on Prior Art*

Petitioner contends that proposed substitute claim 21 would have been obvious based on (1) Sevy, (2) Sevy and Zeng, (3) Goubet, (4) Goubet and Kaiser, (5) Gao, and (6) Gao and Zeng. RMTA Opp. 6–18; RMTA Sur-reply 5–11. Patent Owner opposes. RMTA Reply 5–11.

For the reasons discussed above, the scope of proposed substitute claim 21 is indefinite. *See* § II.J.5. Given the nature of the indefiniteness on the complete record here, we are unable to compare the scope of proposed substitute claim 21 to the prior art. *See In re Steele*, 305 F.2d 859, 862–63 (CCPA 1962) (holding that the Board erred in affirming a rejection of indefinite claims under 35 U.S.C. § 103 because the rejection was based on speculative assumptions as to the meaning of the claims). Thus, we do not address the asserted obviousness of proposed substitute claim 21.

K. 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, 117:4–15, 125:24–127:3, 179:13–181:24, 183:21–184:13, 243:4–14). We reference three of the six 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, 117:4–15, 125:24–127:3).

We dismiss Patent Owner’s motion as moot because in this Decision we do not rely on the portions 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 proven, by a preponderance of the evidence, that claims 7–9 and 11 would have been obvious based on Goubet, (2) has not proven, by a preponderance of the evidence, that claims 7–9 and 11 would have been obvious based on Goubet and Kaiser, (3) has not proven, by a preponderance of the evidence, that claims 7–9 and 11 would have been obvious based on Sevy, (4) has not proven, by a preponderance of the evidence, that claims 7–9 and 11 would have been obvious based on Sevy and Zeng, (5) has not proven, by a preponderance of the evidence, that claims 7–9 and 11 would have been obvious based on Gao, and (6) has not proven, by a preponderance of the evidence, that claims 7–9 and 11 would have been obvious based on Gao and Zeng.¹⁹

Upon consideration of the briefing and the evidence of record, we also (1) deny Patent Owner’s Revised Motion to Amend as to substituting proposed claim 21 and (2) dismiss Patent Owner’s Motion to Exclude.

¹⁹ 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
7–9, 11	103(a)	Goubet	7–9, 11	
7–9, 11	103(a)	Goubet, Kaiser		7–9, 11
7–9, 11	103(a)	Sevy		7–9, 11
7–9, 11	103(a)	Sevy, Zeng		7–9, 11
7–9, 11	103(a)	Gao		7–9, 11
7–9, 11	103(a)	Gao, Zeng		7–9, 11
Overall Outcome			7–9, 11	

Motion to Amend Outcome	Claim(s)
Original Claims Cancelled by Amendment	
Substitute Claims Proposed in the Amendment	21
Substitute Claims: Motion to Amend Granted	
Substitute Claims: Motion to Amend Denied	21
Substitute Claims: Not Reached	

IV. ORDER

Accordingly, it is hereby:

ORDERED that Petitioner has proven, by a preponderance of the evidence, that claims 7–9 and 11 are unpatentable;

FURTHER ORDERED that Patent Owner’s Revised Contingent Motion to Amend is *denied* as to proposed substitute claim 21;

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.

IPR2025-00705
Patent 9,527,094 B1

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