

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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AROMA360, LLC,  
PETITIONER,

v.

AIR ESSSENTIALS, INC.  
PATENT OWNER.

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Case IPR 2025-00706  
Patent 10,583,449

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**PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE**

## LIST OF EXHIBITS

| Exhibit No.  | Description                                                                                                                    |
|--------------|--------------------------------------------------------------------------------------------------------------------------------|
| Exhibit 1001 | U.S. Patent No. 10,583,449                                                                                                     |
| Exhibit 1002 | Declaration of Dr. Christopher White                                                                                           |
| Exhibit 1003 | Curriculum Vitae of Dr. Christopher White                                                                                      |
| Exhibit 1004 | Prosecution History of U.S. Patent 10,583,449                                                                                  |
| Exhibit 1005 | Prosecution History of Priority U.S. Patent 9,126,215                                                                          |
| Exhibit 1006 | Prosecution History of Provisional U.S. Patent 61/694,500                                                                      |
| Exhibit 1007 | U.S. Patent Publication 2009/0317504 (hereinafter, “Rajala”)                                                                   |
| Exhibit 1008 | U.S. Patent Publication 2009/0025794 (hereinafter, “Dorendorf”)                                                                |
| Exhibit 1009 | U.S. Patent Publication 2010/0084484 (hereinafter “Sevy”)                                                                      |
| Exhibit 1010 | [Reserved]                                                                                                                     |
| Exhibit 1011 | [Reserved]                                                                                                                     |
| Exhibit 1012 | Chinese Utility Model Patent 201832737 (hereinafter, “Gao”)                                                                    |
| Exhibit 1013 | Certified English-language Translation of Gao                                                                                  |
| Exhibit 1014 | Sebastian Kaiser et al., <i>The Electrospray and Combustion at the Mesoscale</i> , 51 J. Mass Spectrom. Soc. Jpn. 42-49 (2003) |
| Exhibit 1015 | French Patent Publication 2886160 (hereinafter, “Goubet”)                                                                      |

| Exhibit No.  | Description                                                                                                                                                                                                            |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Exhibit 1016 | Certified English-language Translation of Goubet                                                                                                                                                                       |
| Exhibit 1017 | Amended Complaint filed in <i>Air Essentials, Inc. v. Aroma360, LLC</i> Case No. 1:24-cv-20594-KMW (SD. Fla) (originally filed on Feb. 15, 2024)                                                                       |
| Exhibit 1018 | Joint Claim Construction Statement filed in <i>Air Essentials, Inc. v. Aroma360, LLC</i> Case No. 1:24-cv-20594-KMW (SD. Fla).                                                                                         |
| Exhibit 1019 | Waiver of the Service of Summons, in <i>Air Essentials, Inc. v. Aroma360, LLC</i> Case No. 1:24-cv-20594-KMW (SD. Fla)                                                                                                 |
| Exhibit 1020 | C. Schaschke, Dictionary of Chemical Engineering, OXFORD UNIVERSITY PRESS (2014)                                                                                                                                       |
| Exhibit 1021 | U.S. Patent No. 2,405,494 (hereinafter, “Dupuy”)                                                                                                                                                                       |
| Exhibit 1022 | Kaye, <i>Aromatic Output for HCI</i> , MAKING SCENTS, Jan. and Feb. 2004 (hereinafter, “Kaye”)                                                                                                                         |
| Exhibit 1023 | U.S. Patent No. 2,820,406 (hereinafter, “Argentieri”)                                                                                                                                                                  |
| Exhibit 1024 | U.S. Patent No. 5,929,396 (hereinafter, “Awad”)                                                                                                                                                                        |
| Exhibit 1025 | E.P Spearman, J.A. Sattarty, and M.J., Reader-Harris, <i>Comparison of velocity and turbulence profiles downstream of perforated plate flow conditioners</i> , FLOW MEAS. INSTRUM., Vol. 7 No. 3/4, pp. 181-199 (1996) |
| Exhibit 1026 | Lighthill, M. J., <i>On Sound Generated Aerodynamically</i> , I. General Theory. Proc. Roy. Soc. (London), Ser. A, vol. 211, no. 1107 (Mar. 20, 1952), pp. 564-587 (hereinafter, “Lighthill”)                          |
| Exhibit 1027 | NOISE AND VIBRATION CONTROL ENGINEERING: PRINCIPLES AND APPLICATIONS (2006), Ed. I.L. Ver and L.L Beranke, Wiley & Sons, ISBN-10 0-471-91842-3 (hereinafter, “the Noise Control Book”)                                 |

| Exhibit No.  | Description                                                                                                                                                               |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Exhibit 1028 | HANDBOOK OF ATOMIZATION AND SPRAYS: THEORY AND APPLICATION (2011), Ed. N. Ashgriz, Springer, DOI 10.1007/978-1-4419-7264-4 (hereinafter, the “Handbook”)                  |
| Exhibit 1029 | Perry’s Chemical Engineers’ Handbook (1997), Ed. R.H. Perry, D.W. Green, and J.O. Maloney McGraw Hill, ISBN 0-07-049841-5 (the “Perry Handbook”)                          |
| Exhibit 1030 | C. Mundi, M. Sommerfeld, and C. Tropea, <i>Droplet-wall collisions: experimental studies of the deformation and breakup process</i> . INT. J. MULTIPHASE FLOW 21: 151-173 |
| Exhibit 1031 | Bernoulli, D. (1738) <i>Hydrodynamica</i> , ETH-Bibliothek Zürich <a href="https://doi.org/10.3931%2Fe-rara-3911">https://doi.org/10.3931%2Fe-rara-3911</a>               |
| Exhibit 1032 | White, F.M. (1994), <i>Fluid Mechanics</i> (3rd Edition), New York, NY: McGraw-Hill Higher Education                                                                      |
| Exhibit 1033 | Maxey M.R. and Riley, J.J., <i>Equation of motion for a small rigid sphere in a nonuniform flow</i> , PHYS. FLUIDS 26, 883-889 (1983)                                     |
| Exhibit 1034 | Sun W, Ji J, Li Y, and Xie X., <i>Dispersion and settling characteristics of evaporating droplets in ventilated room</i> , BUILDING & ENVIRONMENT, 42, 1011-1107 (2007)   |
| Exhibit 1035 | Peiss C.N. <i>Evaporation of small water drops maintained at constant volume</i> , J. APPL. PHYS. 65, 5235-5237 (1989)                                                    |
| Exhibit 1036 | Kuz, V.A. <i>Evaporation of small drops</i> , J. APPL. PHYS. 69, 7034-7036, (1991)                                                                                        |
| Exhibit 1037 | NASA SP-5108, Handbook for Industrial Noise Control (1981)                                                                                                                |
| Exhibit 1038 | Alonso, M., Huang, C.-H., <i>Particle segregation in aerosol flow</i> , J. OF AEROSOL SCIENCE 81, 24-33 (2015)                                                            |
| Exhibit 1039 | Patent Owner’s Response to Petitioner’s Preliminary Invalidity Contentions in <i>Air Esscentials, Inc. v. Aroma360, LLC</i> Case No. 1:24-cv-20594-KMW (SD. Fla)          |

| Exhibit No.  | Description                                                                                                                                                        |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Exhibit 1040 | Patent Owner’s Preliminary Infringement Contentions in <i>Air Essentials, Inc. v. Aroma360, LLC</i> Case No. 1:24-cv-20594-KMW (SD. Fla)                           |
| Exhibit 1041 | [Reserved]                                                                                                                                                         |
| Exhibit 1042 | [Reserved]                                                                                                                                                         |
| Exhibit 1043 | [Reserved]                                                                                                                                                         |
| Exhibit 1044 | Joint Motion to Stay Pending Inter Partes Review in <i>Air Essentials, Inc. v. Aroma360, LLC</i> Case No. 1:24-cv-20594-KMW (SD. Fla) (April 7, 2025)              |
| Exhibit 1045 | Order Granting Motion to Stay Pending Inter Partes Review in <i>Air Essentials, Inc. v. Aroma360, LLC</i> Case No. 1:24-cv-20594-KMW (SD. Fla) (April 8, 2025)     |
| Exhibit 1046 | Transcript for Deposition of Dr. Gerald Micklow taken on March 25, 2026                                                                                            |
| Exhibit 1047 | Supplemental Declaration of Dr. Christopher White                                                                                                                  |
| Exhibit 1048 | H. M. Taylor and S. Karlin, <i>An Introduction to Stochastic Modeling</i> . Orlando, FL: Academic Press, 1984.                                                     |
| Exhibit 1049 | R. A. Mugele and H. D. Evans, “ <i>Droplet size distribution in sprays</i> ,” <i>Industrial &amp; Engineering Chemistry</i> , vol. 43, no. 6, pp. 1317–1324, 1951. |
| Exhibit 1050 | [Reserved]                                                                                                                                                         |
| Exhibit 1051 | [Reserved]                                                                                                                                                         |

## **I. INTRODUCTION**

Patent Owner's Response ("Response" or "Resp.") interprets certain claim limitations—including "mixing chamber" and "fluid dispersion"—inconsistently with the parties' constructions and mischaracterizes the Petition, Dr. White's expert declaration, and the prior art. In its Decision, the Board expressed confusion as to how Limitation 1[G] could be interpreted to mean that the fluid dispersion is not present in the "mixing chamber" in view of the recitation "to form fluid dispersion" in Limitation 1[G]. Inst. Dec. 16-17. The Board requested the parties address this issue in their briefs, but Patent Owner declined this invitation. Instead, Patent Owner argues that Limitation 1[G] requires features that neither party asked for in their claim constructions submitted in the parallel district court proceeding in an attempt to distinguish the claims from the prior art.

Patent Owner's defense of the claims relies on importing geometric, acoustic, and operating characteristics of the 'mixing chamber' into claims 1, 4, and 7–10, contrary to the claims and the parties' proposed constructions. Ex. 1018, Exhibit B; Ex. 1001, 15:24–16:29. Under this guise, Patent Owner alleges that the mixing chamber is designed to generate droplets of substantially uniform diameter within the mixing chamber in attempt to distinguish the challenged claims from the "downstream droplet processing" taught in the prior art references. Resp., 9, 11-12, 16, 17, 20, 24, 36. However, the '449 Patent explicitly teaches that the claimed 'diffusion chamber' performs the same "downstream droplet processing" that Patent Owner criticizes in

the prior art. Each of the prior art references teach Limitation 1[G] whether the Board adopts Patent Owner's or Petitioner's proposed constructions. *See* Ex. 1018.

## **II. PATENT OWNER'S EXPERT DECLARATION SHOULD BE GIVEN NO WEIGHT**

Patent Owner supports its Response with a declaration from Dr. Gerald Micklow, but Dr. Micklow admitted during his deposition that he did not consider the entire disclosure of the '449 Patent or the parties' claim constructions when arriving at his opinions. As such, Dr. Micklow's opinions are entirely unhelpful to the Board's analysis, and are entitled to little, if any, weight. *See, e.g., Cordis Corp. v. Boston Sci. Corp.*, 658 F.3d 1347, 1357–58 (Fed. Cir. 2011) (affirming the district court's disregard of expert testimony based on an incorrect understanding of the claim construction).

### **A. Dr. Micklow Admitted He Did Not Consider Highly Relevant Portions of the '449 Patent in Providing his Opinions**

As mentioned, Patent Owner chiefly contends that a POSITA would not recognize the prior art features identified in the Petition as 'mixing chambers,' because those features lack certain geometric, acoustic, and operational characteristics of 'mixing chambers.' *See* Resp., *generally*. In support of this contention, the Response focuses on the embodiment illustrated in FIG. 6 of the '449 Patent. FIG. 6 is depicted five times in the Response. Resp., 9, 19, 24, 34, 37. No other embodiment of the '449 Patent is depicted even once.

Yet, at deposition, when Dr. Micklow was asked if he considered FIG. 6 of

the '449 Patent in forming his opinions, Dr. Micklow replied, “No, I did not.” Ex. 1046, 200:14-16. This testimony unequivocally demonstrates that when preparing his declaration, Dr. Micklow: (1) did not fully consider relevant disclosure of the challenged patent; and (2) lacked an understanding of the scope for the limitations upon which the Response is based. In view of Dr. Micklow’s concession that he did not consider Figure 6, Patent Owner’s arguments regarding Figure 6 in the Response are nothing more than attorney argument. *See Icon Health & Fitness, Inc. v. Strava, Inc.* 849 F.3d 1034, 1043 (Fed. Cir. 2017) (“Attorney argument is not evidence.”).

**B. Dr. Micklow Admitted He Did Not Consider or Apply the Parties Claim Constructions in Providing his Opinions**

The Petition referenced the parties’ Joint Claim Construction Statement from the underlying litigation. Ex. 1018. Despite being cited in the Petition—the document on which Dr. Micklow based his opinions—Dr. Micklow testified that he did not recall seeing the Joint Claim Construction Statement when he prepared his declaration and instead applied his own understanding of the claim terms. Ex. 1046, 115:15-18 (Dr. Micklow stated “I don’t know if I would even apply claim construction. I applied engineering principles.”). This is particularly problematic because Dr. Micklow’s opinion that the prior art does not render the claims obvious is founded on an interpretation of certain claim limitations that are inconsistent with both parties’ constructions.

**1. ‘Mixing Chamber’**

For example, when asked how he interpreted the term ‘mixing chamber,’ Dr. Micklow testified that he “applied the understanding [he has] of a mixing chamber” and his understanding is “a mixing chamber has significant volume and dimensions so that you can have a finely dispersed fluid at the exit of the mixing chamber.” Ex. 1046, 117:4–15.

Neither Patent Owner, nor Petitioner, advance a construction for the term ‘mixing chamber’ that requires the chamber have any particular volume, much less, “a significant volume and dimensions,” nor does either parties’ proposed construction require “finely dispersed fluid at the exit.” 1018, Exhibit B. Dr. Micklow’s self-imported requirements materially narrow claim scope and skew the analysis of whether the prior art teaches the ‘mixing chamber’ limitation. The Board should therefore disregard Dr. Micklow’s opinions regarding whether the prior art teaches a ‘mixing chamber.’

## **2. ‘Fluid Dispersion’**

The parties’ stipulated meaning of ‘fluid dispersion’ requires a plurality of droplets having “substantially the same diameter.” Ex. 1018, Ex. A. When explicitly asked if he applied the parties’ agreed-to construction of ‘fluid dispersion’ when preparing his declaration, Dr. Micklow testified “[w]ell, I don’t recall seeing that, no.” Ex. 1046, 111:20-25.

Nevertheless, in his declaration, Dr. Micklow opines that the challenged claims

are not rendered obvious by the prior art references, in part, because they produce a “non-uniform spray.” Ex. 2002, ¶19. In contrasting the prior art with the claimed invention of the ’449 Patent, Dr. Micklow testified that in the diffusion chamber of the ’449 Patent, “you’re attempting to obtain a ‘uniform spray distribution.’” Ex. 1046, 117:20-24.

Dr. White explains, a uniform spray *distribution* is not equivalent to the parties’ agreed-to construction of ‘fluid dispersion.’ Ex. 1047 ¶9. That is, “uniform spray distribution” implies that particle size (diameter) has equal probability across a defined interval; or put differently, the diameter of each particle (across the collection) will occur with equal probability. Ex. 1047, ¶¶6, 10. Thus, a droplet collection can qualify as a uniform spray distribution even when the individual particles of the collection have substantially different diameters unlike the parties agreed upon construction of “fluid dispersion,” which requires droplets having substantially the same diameters. Ex. 1047 ¶10.

Dr. Micklow’s testimony confirms this. In describing the meaning of “uniform distribution,” Dr. Micklow testified, “[w]ell, you’re going to have a radius of the particle. *And by the way, there are quite a few different radiuses.* The one I use most often is the Sauter mean radius.” Ex. 1046, 118:1-7. Dr. White agrees that the Sauter mean radius (or diameter) is one accepted way in which a POSITA would interpret the term “uniform distribution” and notes that the Sauter mean diameter refers to the

*average* diameter of a droplet collection that has the same volume-to-surface ratio as the collection. Ex. 1047 ¶¶13, 14. The Sauter Mean Diameter, however, does not represent a typical or most frequent particle diameter, and can be satisfied by a wide range of droplet diameters if the total volume and surface area relationships are similar. Ex. 1047 ¶14.

In a vacuum, an engineer could quantify a dispersion by its “distribution” and not by comparing the individual sizes (diameters) of particles within the collection. However, in view of the explicit definition of the term ‘fluid dispersion’ set forth in the specification—a definition that was later stipulated to between the parties’—a POSITA would appreciate that interpreting the ‘fluid dispersion’ limitation to mean a “uniform spray distribution” would materially alter the scope and meaning of the challenged claims. Ex. 1047, ¶9. Thus, the Board should disregard Dr. Micklow’s opinions on whether the prior art references teach the ‘fluid dispersion’ limitation to the extent they rely on his non-stipulated definition.

### **III. Clarification of Petitioner’s Position on Limitation 1[G]**

Petitioner first addresses the Board’s request for clarification of Petitioner’s position with respect to Limitation 1[G] as Petitioner’s position on this point is highly relevant to Patent Owner’s “downstream processing” argument. This explanation begins with an analysis of the term ‘fluid dispersion’ itself.

#### **A. The Stipulated Construction of the Term ‘Fluid Dispersion’**

The Parties stipulated that ‘fluid dispersion’ means a “mixture of operative fluid

in air comprising a plurality of substantially uniform droplets ... *dispersed throughout the air.*” Ex. 1018, A. The claimed ‘fluid dispersion’ is thus the ultimate output of the claimed fluid dispersion assembly. While the internal components of the fluid dispersion assembly can operate “to form” this output, as the mixing chamber does in Limitation 1[G], the ‘fluid dispersion’ only refers to the mist that is atomized at the mixing chamber and that is eventually dispersed throughout the air. As is further explained below, this comports with the parties’ agreed upon construction of ‘fluid dispersion,’ the language of the claims as a whole, and the disclosure of the ’449 Patent.

**B. ‘Fluid Dispersion’ as Described in the ’449 Patent and by Patent Owners Expert**

More specifically, Limitation 1[G] (and equivalent in claim 8) recites “to form the fluid dispersion.” Ex. 1001, claims 1 and 8. That is, the mixing chamber acts as a precursor step—in which the compressed air and the operative fluid are mixed—in the overall process of forming the ‘fluid dispersion’ that is eventually “dispersed throughout the air.” This also aligns with claim 9, which further recites, “said diffusion chamber *facilitates* formation of the fluid dispersion prior to discharge of the fluid dispersion . . . into the surrounding airspace.” Ex. 1001, claim 9. This is also consistent with the disclosure of the ’449 Patent stating that the fluid produced in the mixing chamber undergoes additional downstream actions in the diffusion chamber before the substantially uniform droplets (*e.g.*, ‘fluid dispersion’) are discharged into the

surrounding airspace. Ex. 1001, 10:39-41 (“compressed air and [] the operable fluid are *initially* mixed together in the mixing chamber 226 to form a fluid dispersion. The diffusion chamber 112” is further structured to facilitate the formation of a plurality of substantially uniform droplets.”). Even Patent Owner’s expert witness agrees forming a fluid dispersion in the ’449 Patent requires that mixing occur downstream of the ‘mixing chamber.’ Ex. 1046, 158:2-159:2 (when asked if the droplets become more uniform in size downstream of the mixing chamber, Dr. Micklow replied “that’s what you attempt to do in the diffusion chamber. Yes.”).

The above understanding of Limitation 1[G], is consistent with Petitioner’s proposed construction of the “mixing chamber” and “diffusion chamber” features, which respectively require, that the compressed air and the fluid be “initially mixed together” and “further mixed together” to form the claimed fluid dispersion. Ex. 1018, Exhibit B. Similarly, Petitioner’s arguments would also teach Limitation 1[G] under the Patent Owner’s proposed construction of “mixing chamber” where “the operative fluid is combined with compressed air.”

Accordingly, Limitation 1[G] (and equivalent in claim 8) do not require the ‘fluid dispersion’ be present in the mixing chamber. In contrast, these limitations require an initial combining/mixing of compressed air and fluid as a precursor step in the formation of the claimed ‘fluid dispersion’ where the formation is subsequently facilitated in the claimed ‘diffusion chamber’ prior to the ‘fluid dispersion’ being

discharged into the surrounding airspace. Ex. 1018, Exhibits A, B.

**C. Patent Owner’s “Downstream Processing” Argument is Inapplicable**

Patent Owner’s theory is that the claims of the ’449 Patent are directed to “integrated diffusion and atomizer assemblies” capable of producing “droplets having substantially the same diameter” *without* additional downstream processing as the Board already considered in the Institution Decision. Inst. Dec., 14, 29. Patent Owner’s Response repeats this argument and adds no reason for the Board to come to a different conclusion, particularly given the problems with Patent Owner’s expert declaration failing to consider Figure 6 of the ’449 Patent and applying the wrong claim scope. Resp., 11-12, 17, 20, 24, 36.

Despite the lack of any supporting evidence, the Response appears to suggest that the claimed ‘mixing chamber’ (recited in claims 1, 7, and 8) should be construed to mean the ‘mixing chamber’ has an unspecified structure capable of generating— “droplets having substantially the same diameter,” despite the claim reciting no additional structure for the mixing chamber. Resp., 15-16. Simultaneously, Patent Owner appears to argue that claim 7 does not exclude the occurrence of downstream processing because it doesn’t expressly recite the limitation “to form fluid dispersion” and under the doctrine of claim differentiation, claim 8 affords it this construction. Resp., 15-16. This theory is divorced from the record and logic.

First, Patent Owner appears to seek a construction for the term ‘mixing chamber’ that is contrary to the construction it asked for in the underlying litigation.

Ex. 1018, Exhibit A. Second, Patent Owner cannot seek to distinguish the challenged claims from the prior art based on its “downstream processing” argument while simultaneously acknowledging that “downstream processing” is permitted by the claimed atomizer assembly (at least with respect to claim 7). Third, claim 9—which depends from claim 8—recites “said diffusion chamber facilitates formation of the fluid dispersion....” Ex. 1001, claim 9. Utilizing the doctrine of claim differentiation noted by Patent Owner, it is unclear why claim 8 should be construed to require formation of ‘fluid dispersion’ in the mixing chamber, while claim 9 which depends therefrom, requires facilitating formation of the fluid dispersion in the diffusion chamber.

For these reasons, Petitioner maintains Limitation 1[G] (and equivalent in claim 8) does not require the presence of a fluid dispersion, meaning droplets “having substantially the same diameter,” within the ‘mixing chamber’ itself. For this reason, in this Reply, Petitioner draws no distinction between the operation of the ‘mixing chamber’ terms recited in claims 1, 7, and 8 as it relates to the formation of a fluid dispersion.

#### **IV. GROUND 1 (SEVY) RENDERS OBVIOUS CLAIMS 1, 4, AND 7–10**

##### **A. Patent Owner’s “Previously Considered” Argument is Misplaced**

Patent Owner’s contention that Sevy was “previously considered” is a request to revisit the Board’s discretionary institution determination under 35 U.S.C. § 325(d)—an issue the Board has already resolved—and has no bearing on

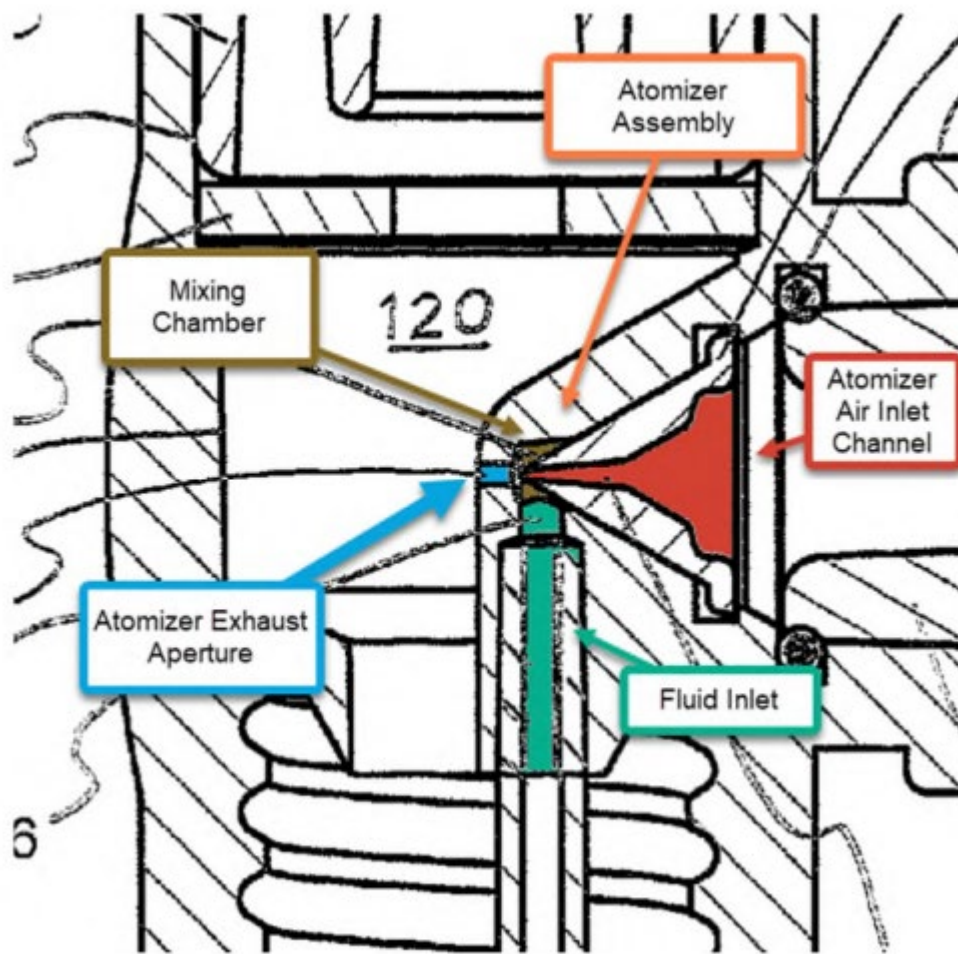
the merits of unpatentability. Resp., 7; Ex. 1001, cover. In any event, the Examiner did not have the benefit of analysis in the Petition, including Dr. White's expert declaration, which explains how Sevy renders obvious claims 1, 4 and 7-10.

**B. The Petition Mapped the Claimed 'Mixing Chamber' to Sevy's Cavity 116 Not to Orifice 118 as Patent Owner Alleges**

The foundation of Patent Owner's defense is built on the erroneous assertion that Petitioner mapped the claimed 'mixing chamber' to Sevy's orifice 118.<sup>1</sup> Resp., 8. This is incorrect. The Petition, and Dr. White's declaration, unmistakably map the claimed 'mixing chamber' to Sevy's cavity 116 (shaded brown below). Pet. 27-29; Ex. 1002, ¶157; *see also* Inst. Dec. at 16 (acknowledging Petitioner's reliance on Sevy's cavity 116 as the mixing chamber).

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<sup>1</sup> Patent Owner offers no pin cite in support of this claim.



**EX-1009, FIG. 9 (partial and enlarged)**

Patent Owner’s repeated argument that “orifice 118 is not a chamber” fails to rebut Petitioner’s showing, based on the testimony of Dr. White, that Sevy’s cavity 116 read on the claimed “mixing chamber.”

**C. Sevy’s Cavity/Chamber is a “Mixing Chamber” Under Petitioner’s Construction and Under Patent Owner’s Construction**

Sevy uses the terms “cavity” and “chamber” interchangeably to refer to feature 116. Pet. 27, FN 8; Ex. 1001, at 59 FN 6; Ex. 1009, ¶81. Sevy discloses “[t]he liquid from the siphon 96 is atomized into droplets of various sizes. The *entire mixture*

of air and droplets passes through the exit orifice 119.” Pet. 30; Ex. 1001, ¶154; Ex. 1009, ¶82. Thus, Sevy expressly teaches that initial mixing of compressed air and fluid occurs in cavity/chamber 116, before passing through exit orifice 119, such that Sevy’s cavity/chamber 116 meets the limitation ‘mixing chamber’ under Patent Owner’s or Petitioner’s proposed construction. Ex. 1018, Exhibit B. Patent Owner’s attempt to import limitations into the claims for geometrical, acoustic, and operational characteristics into the term ‘mixing chamber’ (contrary to the claim language and the parties’ construction) is not tenable. .

#### **D. Sevy Is Analogous Art**

Patent Owner argues Sevy is “inapposite” because it is a small, low-pressure consumer diffuser whereas “the ’094 patent is directed to high-capacity fluid dispersion systems intended for large or commercial environments.” Resp. 12–14; Ex. 1009, ¶6; Ex. 1001, 1:24–28; 3:33–37. Nothing in claim 7 limits the invention to “commercial environments” or to a particular pressure range. Ex. 1001, 9:23–41. As defined by inventor of the ’094 Patent, the invention “relates generally to the field of dispersion of various fluids including, *but not limited to*, fragrant oils... into a *generally enclosed* airspace. Ex. 1001, 1:5-11.

Sevy is directed to a “fluid dispersion assembly” that generates/discharges a fine essential oil mist into a room “or another enclosed space.” Ex. 1001, 9:23–33; Ex. 1009, ¶4. Therefore, Sevy is squarely in the same field of endeavor as the claimed invention and Patent Owner’s reliance on a specific pressure (*e.g.*, 5-50 psig) discussed

in one particular embodiment doesn't render Sevy "inapposite" as Patent Owner contends. Resp. 13–14. *Unwired Planet, LLC v. Google Inc.*, 841 F.3d 995, 1001 (Fed. Cir. 2016) ("The field of endeavor is not limited to the specific point of novelty, the narrowest possible conception of the field, or the particular focus within a given field.")(internal quotations omitted).

**E. Patent Owner Does Not Separately Argue Any Meaningful Distinctions the Dependent Claims**

Patent Owner suggests that claim 8 requires the presence of 'fluid dispersion' ("droplets having substantially the same diameter") within the mixing chamber itself. For all of the reasons set forth in Section III of this Reply, this is not the case. Moreover, Patent Owner arguments for claim 8 rely on its faulty assumption that orifice 118 is the mixing chamber rather than addressing Petitioner's argument that cavity 116 of Sevy is the mixing chamber. Resp., 15-17. Patent Owner cites no meaningful differences between its arguments above and dependent claims 3 and 8-10. Accordingly, if the Board finds claims 1 and 7 are unpatentable, then dependent claims 4 and 8-10 are also unpatentable for the reasons set out in the Petition.

**V. GROUND 2 (SEVY IN VIEW OF GAO) RENDERS OBVIOUS CLAIMS 1, 4, AND 7–10**

Ground 2 addresses the "fluid dispersion" limitation from an alternative obviousness argument. The Petition explains that a POSITA would have been motivated to modify Sevy's separator plate to create even finer and more uniform droplets—in order to improve dispersion and evaporation—in view of Gao's

objective—the creation of atomized particles that are *finer (below 3 microns) and more uniform*. Pet. 38–42; Ex. 1016, 5:12–16; Ex. 1009 ¶69.

Sevy’s separator plate is designed to only allow droplets of about 5 microns or less to be discharged into the surrounding airspace. Pet. 34; Ex. 1002, ¶170; Ex. 1009, ¶24. Petitioner provided evidence that a POSITA would have been motivated—in view of Gao’s objective—to modify the location, size, and/or quantity of apertures 99 in Sevy’s existing separator plate 98 to achieve an even narrower range of droplet sizes. Pet. 35; Ex. 1002, ¶177. Sevy expressly contemplates “one or more apertures,” which may be located in various locations (e.g., “centrally, peripherally, or otherwise”). Pet. 41; Ex. 1002, ¶177; Ex. 1009, ¶68. A POSITA would have had a reasonable expectation of success, without hindering operation, as Sevy already contemplates this modification. Pet. 41-42; Ex. 1002, ¶177.

#### **A. Patent Owner’s Assertions Attack the References Individually**

Patent Owner summarily asserts that the combination of Sevy and Gao do not teach the claimed ‘mixing chamber’ or ‘fluid dispersion’ (*only* based on the argument that the ‘fluid dispersion’ is present in the ‘mixing chamber.’) Resp., 18-23. This approach is legally flawed since it attacks the references individually rather than addressing what they would teach to a POSITA when combined. *Bradium Techs. LLC v. Iancu*, 923 F.3d 1032, 1050 (Fed. Cir. 2019) (cannot overcome obviousness of a combination “by attacking references individually.”).

Ground 2 generally relies on Sevy for all structural features of the claims, but relies on the teaching from Gao to modify the separator plate to further decrease the diameter of the droplets allowed to pass therethrough. Pet. 41; Ex. 1002, ¶177. As such, Patent Owner’s arguments relating to Gao’s alleged structural deficiencies are irrelevant to the combination set out in the Petition. The combination of Sevy and Gao teach the claimed ‘mixing chamber’ and ‘fluid chamber’ for each of the reasons set forth in Ground 1.

**B. Patent Owner Does Not Separately Argue Any Meaningful Distinctions the Dependent Claims**

Patent Owner suggests that claim 8 requires the presence of ‘fluid dispersion’ (“droplets having substantially the same diameter”) within the mixing chamber itself. For all of the reasons set forth in Section III of this Reply, this is not the case. Moreover, Patent Owner arguments for claim 8 rely on its faulty assumption that orifice 118 is the mixing chamber rather than addressing Petitioner’s argument that cavity 116 of Sevy is the mixing chamber. Resp., 15-17 and 26 (referring to its arguments for Ground 1). Patent Owner cites no meaningful differences between its arguments above and dependent claims 3 and 8-10. Accordingly, if the Board finds claims 1 and 7 are unpatentable, then dependent claims 4 and 8-10 are also unpatentable for the reasons set out in the Petition.

## **VI. GROUND 3 (GOUBET) RENDERS OBVIOUS CLAIMS 1, 4, AND 7–10**

### **A. Goubet Teaches a “Fluid Dispersion”**

Patent Owner’s “fluid dispersion” attack incorrectly assumes that Goubet’s baffled flow path would cause coalescence and non-uniformity, notwithstanding Goubet’s express disclosure that the vaporization means is configured to do the opposite. Resp., 26-27; Ex. 2002 ¶26.

Goubet discloses that the droplets and air are channeled through the passage 14 before exiting via outlet 16, and when the droplets “collide with the walls,” the droplets “are broken up into microdroplets.” Ex. 1016, 4:28–5:4; Pet. 45-47; Ex. 1002; ¶207. Goubet further teaches that these microdroplets are “diffuse[d] ... into the ambient air,” and that the droplet size is “reduced as much as possible” before the microdroplets are “silently diffused” into ambient air. Ex. 1016, 2:1–3, 5:6–7, 5:12–16; Pet. 25–26, 28, 42–44. That disclosure is directly contrary to Patent Owner’s assertion that Goubet’s passageway “would cause the droplets to remain in close contact and eventually coalesce into larger droplets.” Resp., 27-28; Ex. 2002 ¶28-29.

Goubet’s express teaching is confirmed by Dr. White who explained that Goubet’s circular baffled path continually separates droplets into increasingly smaller droplets as larger droplets accumulate on walls and are filtered out at each turn. Pet. 58-61; Ex. 1002 ¶¶265–280; Ex. 1016, 5:12–16. This is because larger droplets have greater inertia and are preferentially removed in tortuous flow paths by inertial impaction on walls and baffles, especially when multiple “targets” are encountered in

series. Ex. 1002 ¶¶100-102. When droplets do impact solid surfaces, they may deposit or break up into smaller secondary droplets—mechanisms that remove coarse droplets from the flow and narrow the distribution of droplets that remain airborne. Ex. 1002 ¶102.

Patent Owner does not attempt to undermine Dr. White’s well-reasoned explanation for how larger droplets would be filtered out consistent with Goubet’s express teachings. Instead, Patent Owner argues the time droplets spend traversing Goubet’s baffle is “relatively short” resulting in a “non-uniform spray” without any analysis. Resp., Resp., 27-28; Ex. 2002 ¶28-29. Such conclusory analysis does not undermine Goubet’s express teaching or Dr. White’s reasoned explanation.

Finally, the Petition explains that if Goubet’s teachings did not expressly satisfy the “fluid dispersion” requirement, it would have been obvious to modify Goubet to include additional enclosures to further decrease droplet size and improve uniformity. Pet. 60-61; Ex. 1002 ¶¶277-280; Ex. 1016, 2:16–19, 5:12–16. Additional enclosures would resolve Patent Owner’s alleged problem with Goubet of a “relatively short” transit time for droplets. Patent Owner does not address or attempt to rebut this proposed modification to Goubet.

## **B. Patent Owner Does Not Separately Argue Any Dependent Claims**

Patent Owner relies entirely on its argument addressed above for dependent claims 4 and 8-10. Resp., 27. Accordingly, if the Board finds claims 1 and 7 are unpatentable, then dependent claims 4 and 8-10 are also unpatentable for the reasons

set out in the Petition.

## **VII. GROUND 4 (GOUBET IN VIEW OF KAISER) RENDERS OBVIOUS CLAIMS 1, 4, AND 7–10**

Ground 4 addresses the “fluid dispersion” issue from an alternative angle, where Petitioner relies on Kaiser to teach the well-known relationship between droplet size and evaporation that motivates a POSITA to improve droplet uniformity in Goubet. Pet. 58–60; Ex. 1002 ¶¶246-262; Ex. 1014, 43.

### **A. Kaiser is Analogous Art**

A reference is analogous art to the claimed invention if: (1) the reference is from the same field of endeavor as the claimed invention; or (2) the reference is reasonably pertinent to the problem faced by the inventor. *Virtek Vision Int’l ULC v. Assembly Guidance Sys. Inc.*, 97 F.4th 882, 886-87 (Fed. Cir. 2024); MPEP §2141.01(a). While it is not necessary for a reference to fulfill both tests in order to qualify as analogous art, Kaiser satisfies both.

#### **1. Kaiser is from the Same Field of Endeavor as the Claim Invention**

“The field of endeavor is not limited to the specific point of novelty, the narrowest possible conception of the field, or the particular focus within a given field.” *Unwired Planet*, 841 F.3d 995, 1001 (internal quotation omitted). Yet, Patent Owner appears to suggest that the field of endeavor should be limited to “scent dispersion, consumer appliances, or acoustic attenuation.” Resp., 10. This argument should be rejected. As defined by inventor of the ’449 Patent, the invention “relates generally to the field of dispersion of *various fluids* including, *but not limited to*, fragrant oils...

into a *generally enclosed* airspace. Ex. 1001, 1:7-11.

Kaiser expressly teaches “[f]uel atomization, dispersion and vaporization as well as mixing with the coflowing air stream occurred in the cylindrical chamber.” Ex. 1014, 44. Although Kaiser’s ultimate objective is combustion, its teachings relate directly to dispersing liquid (fuel) uniformly within an enclosed airspace (cylindrical chamber) and includes teachings on droplet formation, electrostatic self-dispersion, airflow interaction, and confinement-induced mixing patterns. Therefore, Kaiser is in the same field of endeavor as the ’449 Patent since it relates to dispersion of a fluid into a generally enclosed airspace.

## **2. Kaiser is Reasonably Pertinent to the Problem of Droplet Size**

In addition, Kaiser is analogous art because it is reasonably pertinent to one of the problems purportedly solved by the ’449 Patent (the formation of substantially uniform droplets). *Donner Technology, LLC v. Pro Stage Gear, LLC*, 979 F.3d 1353, 1359 (Fed. Cir. 2020) (reference is analogous art if it “is reasonably pertinent to one or more of the particular problems to which the [] patent [at issue] relates.”).

Petitioner relies on Kaiser for the directly relevant principle that “good control of the size distribution of the resulting aerosol” is “critical to uniform evaporation” as a reason to modify Goubet’s existing structure with additional enclosures to further reduce droplet size and improve uniformity. Ex. 1014, 43; Pet. 59-60; Ex. 1002 ¶¶251-257. Dr. White applied Kaiser to argue that it is well-known that uniform evaporation

(and thus uniform scenting) is a by-product of uniform droplet size and supported this argument by citing to Kaiser's disclosure, which states "the size of the generated droplets and, consequently, the droplet evaporation time are monotonic function." Ex. 1014, 43.

Dr. Micklow, Patent Owner's expert witness, acknowledged Kaiser was pertinent to problem of controlling droplet size during his own deposition. While answering a question about droplet formation, Dr. Micklow testified, "to get that perfect smell to your nose, you want to have uniform particle size. And you want them to be small. Right? In combustion, you want them to be small, so you get a rapid burn." Ex. 1046, 21:16-19.

Thus, Kaiser is analogous art because it is pertinent to the problem of controlling droplet-size even if the purpose and method of solving that problem was different than the '449 Patent. Ex. 1014, 43; Ex. 1002 ¶252.

**B. A POSITA Would Have Motivation to Combine Goubet and Kaiser**

Patent Owner asserts Petitioner's motivation to combine is conclusory. Resp., 32. Yet, Patent Owner overlooks the fact that not only was producing uniform droplets a well-known desirable outcome, but that Petitioner provides evidence that a POSITA would have appreciated the benefits of doing so with the proposed combination. *Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1075 (Fed. Cir. 2015) (question is whether a POSITA "would recognize the potential benefits and pursue the variation.").

As explained in the petition, a POSITA would understand that more uniform droplets yield a less harsh scent. Pet. 58-59; Ex. 1002 ¶246. As such, a POSITA would have been motivated to modify Goubet by adding additional enclosures (beyond the disclosed “at least two” concentric enclosures) to further decrease droplet size and improve uniformity. Ex. 1016, 2:16–19, 5:12–16; Pet. 59-60; Ex. 1002 ¶¶251-252.

Thus, this motivation is grounded in Goubet’s own stated goal—to reduce droplet size as much as possible—while using Kaiser teachings on droplet uniformity to achieve a predictable modification that produces a better smelling scent than the Goubert device by itself. Again, neither Patent Owner nor its expert dispute that this would have been a known benefit achieved from the proposed modification.

### **C. Patent Owner Does Not Separately Argue Any Dependent Claims**

Patent Owner relies entirely on its argument addressed above for dependent claims 4 and 8-10. Resp., 32-33. Accordingly, if the Board finds claims 1 and 7 are unpatentable, then dependent claims 4 and 8-10 are also unpatentable for the reasons set out in the Petition.

## **VIII. GROUND 5 (GAO) ANTICIPATES CLAIMS 1, 4, AND 7–10**

### **A. Gao’s Atomization Cavity is a “Mixing Chamber” Under Both Parties’ Constructions**

Like with previous grounds, Patent Owner again advance and argument that the prior art, this time Gao, does not disclose the ‘mixing chamber’ or ‘fluid dispersion’ limitations. Resp. 33-39. This argument falls short for the same reasons it fell short in

each of the earlier grounds.

The Petition maps the claimed ‘mixing chamber’ to atomizing cavity 6 of Gao. Pet. 68-69; Ex. 1002, ¶277-287; Ex. 1013, ¶25. Gao goes on to disclose, “[t]he liquid is sucked into the atomizing *cavity* 6 based on the siphon principle, and the liquid and the gas *are fully mixed*. The high-speed *gas-liquid mixture is then ejected* through a gas flow [] port. Ex. 1013, ¶25; Pet. 66; Ex. 1002, ¶192. Thus, Gao discloses a “cavity” where fluids are “mixed” before being “ejected” from the cavity. That teaching directly contrast to Patent Owner’s assertion that “[n]othing in Gao suggests that the atomizing cavity 6 was designed or intended to function as a chamber... Rather, it is just an area for fluid to be ejected from, to be mixed after ejection.” Resp., 38.

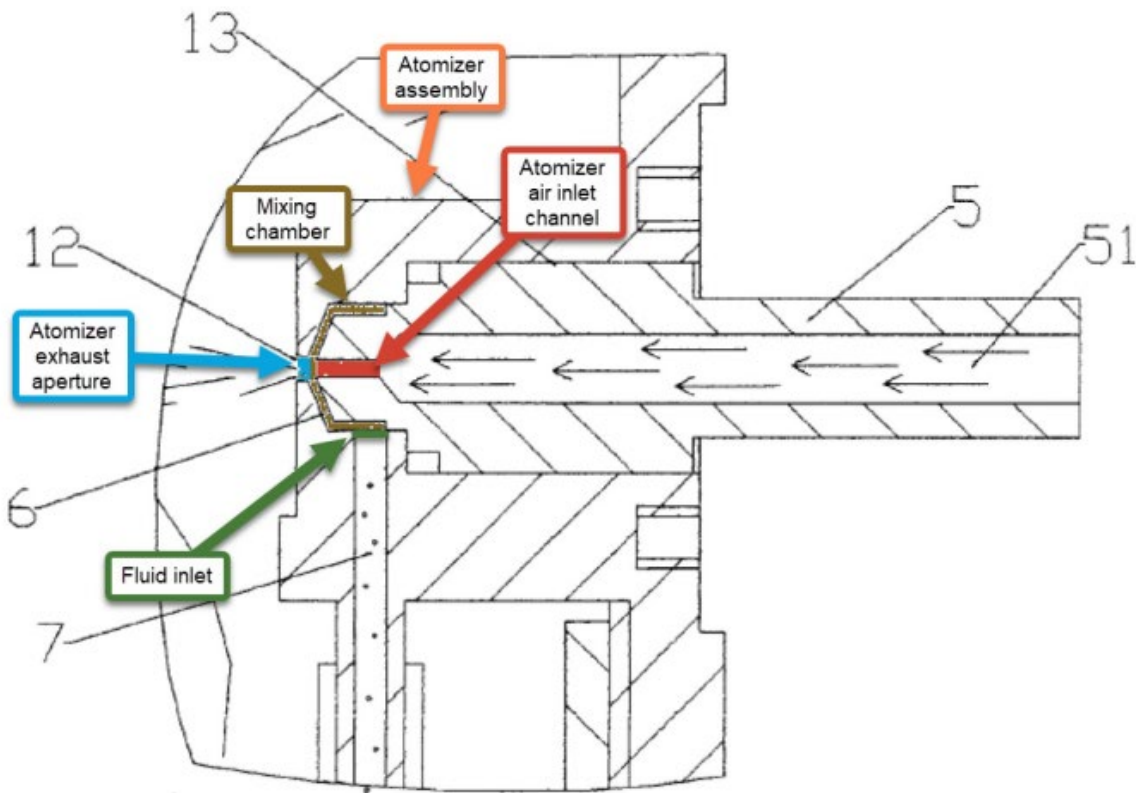


FIG. 2

**Ex-1013, FIG. 2**

Gao's atomization cavity 6 meets either Parties' construction of the 'mixing chamber' limitation because compressed air and fluid are "mixed" therein before the gas-liquid mixture is ejected through the gas flow port, starting to form the fluid dispersion in the process. Ex. 1018, Exhibit B. Patent Owner's attempt to import geometrical, acoustic, and operational features from the specification into the term 'mixing chamber' (contrary to the claim language and the parties' construction) has no legal basis.

Patent Owner’s advances another argument that Gao will cause droplet coalescence and, therefore, not meet the ‘fluid dispersion’ limitation. Resp., 35. In support of this assertion, the Response cites to paragraphs 24-25 of Dr. Micklow’s declaration. However, these paragraphs relate to Ground 2, and it is unclear if the coalescence Dr. Micklow alleges is a result of Gao alone, or the combination of Sevy and Gao, as recited in Ground 2. Nevertheless, Dr. Micklow’s provides no technical basis to support his conclusory opinion on coalescence. Such conclusory testimony cannot (1) rebut Dr. White’s well-reasoned coalescence argument that when droplets impact solid surfaces, they may deposit (coalescence) or break up into smaller secondary droplets—each of which is a mechanism that removes coarse droplets from the flow and narrows the distribution of droplets that remain airborne; or (2) rebut the explicit disclosure of Gao stating that it can be controlled to discharge “uniform” droplets having a diameter of 3 microns or less. Ex. Pet. 72; 1002 ¶290. *See Netflix, Inc. v. Avago Technologies International Sales PTE Ltd.*, IPR2021-012398, Paper No. 44, 39 (PTAB Feb. 6, 2023)(“We give little weight to this testimony because it is insufficiently explained and, more importantly, is contradicted by [Prior Art]’s disclosure.

Therefore, Gao teaches the claimed ‘fluid dispersion’ limitation.

**B. Patent Owner Does Not Separately Argue Any Meaningful Distinctions the Dependent Claims**

Patent Owner suggests that claim 8 requires the presence of ‘fluid dispersion’ (“droplets having substantially the same diameter”) within the mixing chamber itself. For all of the reasons set forth in Section III of this Reply, this is not the case. Patent Owner cites no meaningful differences between its arguments above and dependent claims 3 and 8-10. Accordingly, if the Board finds claims 1 and 7 are unpatentable, then dependent claims 4 and 8-10 are also unpatentable for the reasons set out in the Petition.

**IX. CONCLUSION**

For the reasons discussed herein, the Board should confirm that claims 1, 4, and 7–10 are unpatentable.

Date: April 15, 2026

Respectfully submitted,

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## **CERTIFICATION OF WORD COUNT**

Petitioner certifies that the word count in this Reply, including all footnotes, is 5,599 words as counted by the word-processing program (Microsoft Word) used to prepare this Reply. This word count complies with the 5,600-word limit set forth in 37 C.F.R. § 42.24.

**CERTIFICATE OF SERVICE UNDER 37 CFR § 42.6(e)(4)**

The undersigned hereby certifies that a copy of the accompanying Petitioner's Reply and all accompanying exhibits have been served on April 15, 2026, via electronic mail directed to the following counsel of record for the Patent Owner:

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