

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AROMA360, LLC
Petitioner,

v.

AIR ESSSENTIALS, INC.
Patent Owner.

Case IPR 2025-00706
Patent 10,583,449

**PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 10,583,449**

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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
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Exhibit 1007	U.S. Patent Publication 2009/0317504 (hereinafter, “Rajala”)
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Exhibit 1013	Certified English-language Translation of Gao
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Exhibit 1015	French Patent Publication 2886160 (hereinafter, “Goubet”)

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)
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Exhibit 1022	Kaye, J., <i>Making Scents: Aromatic Output for HCI</i> , INTERACTIONS, V. 11, Issue 1, 48-61 (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 0-471-44942-3 (hereinafter, “the Noise Control Book”)
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")
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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 1040	Patent Owner's Preliminary Infringement Contentions in <i>Air Esscentials, Inc. v. Aroma360, LLC</i> Case No. 1:24-cv-20594-KMW (SD. Fla)

I. INTRODUCTION

Aroma360, LLC (“Petitioner”) requests *Inter Partes* Review (“IPR”) of claims 1, 4 and 7-10 (“challenged claims”) of U.S. Patent No. 10,583,449 (“the ’449 Patent”) (Ex-1001), assigned to Patent Owner Air Essentials, Inc. (“PO”).

II. MANDATORY NOTICES UNDER 37 C.F.R. § 42.8

Petitioner satisfies each requirement for IPR of the ’449 Patent pursuant to 37 C.F.R. § 42.8(a)(1).

A. Real Party in Interest Under 37 C.F.R. § 42.8(b)(1)

The Real Party in Interest is AROMA 360, LLC having a principal place of business at 2058 N.W. Miami Court, Miami, FL 33127.

B. Related Matters Under 37 C.F.R. § 42.8(b)(2)

PO has asserted the ’449 Patent against Petitioner in *Air Essentials, Inc. v. Aroma360, LLC*, Case No. 1:24-cv-20594-KMW (S.D. Fla).

C. Lead and Back-Up Counsel Under 37 C.F.R. § 42.8(b)(3)

Petitioner is represented by the following counsel:

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Pursuant to 37 C.F.R. § 42.10(b), Powers of Attorney have been filed with this Petition.

D. Service Information Under 37 C.F.R. § 42.8(b)(4)

Petitioner consents to electronic service by email at the above email addresses provided for lead and backup counsel.

III. FEES AUTHORIZATION

Pursuant to 37 C.F.R. § 42.15(a) and § 42.103(a), the USPTO is authorized to charge any and all fees for this Petition, not submitted herewith, to Deposit Account No. 50-1662.

IV. GROUNDS FOR STANDING

Petitioner certifies that the '449 Patent is available for IPR, and that Petitioner is not barred or estopped from requesting review. 37 C.F.R. § 42.104(a). Petitioner agreed to waive service of the underlying infringement complaint of the '449 Patent on March 18, 2024, and the waiver was then filed with the district court on March 27, 2024. Ex-1019. This Petition was filed within one year of the date of that waiver of service. *See Motorola Mobility LLC v. Arnouse*, IPR2013-00010, Paper 20 at 6 (P.T.A.B. Jan. 30, 2013) (informative) (“in the situation where the petitioner waives service of a summons, the one-year time period begins on the date on which such a waiver is filed”).

V. PRECISE RELIEF REQUESTED

Petitioner requests review and cancellation of claim 1, 4 and 7-10 as unpatentable based on the following grounds, supported by a declaration from Dr. Christopher White. Ex-1002; Ex-1003.

Ground	Prior Art	Basis	Claims Challenged
1	Sevy	§103	1, 4 and 7-10

2	Sevy in view of Gao	§103	1, 4 and 7-10
3	Goubet	§103	1, 4 and 7-10
4	Goubet in view of Kaiser	§103	1, 4 and 7-10
5	Gao	§102	1, 4 and 7-10

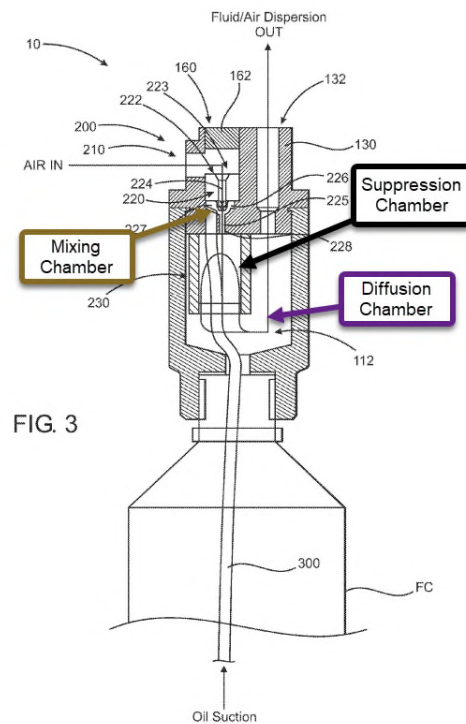
VI. THE CHALLENGED PATENT

The '449 Patent, assigned to Patent Owner Air Essentials, Inc. ("PO"), is directed to a fluid dispersion assembly that is powered by compressed air and designed to deliver fluids, such as fragrant oils and essential oils, into the air. Ex-1001, 1:7-54. The '449 Patent contends that known fluid dispersion assemblies of this type are "often unacceptably noisy," and states there is a need for a fluid dispersion assembly that operates quietly while generating a fluid dispersion having a "uniform particle size distribution." *Id.*, 1:33-44. However, as explained herein and in Dr. White's Declaration, devices configured to disperse fluid particles of substantially uniform size, have been well known for decades, and are colloquially referred to as monodisperse devices. *See, e.g.*, Ex-1002, ¶105, *see also id.*, ¶¶80-112. Noise was also a known issue for these devices and many such devices included structures to reduce noise during operation. *See, e.g.*, Ex-1002, ¶¶68-79. The challenged claims do not claim an explicit noise reduction feature in any event.

A. Summary of the Disclosure of the '449 Patent

The '449 Patent describes several embodiments of the fluid dispersion assembly, each with distinct configurations designed to disrupt the flow of fluid

dispersion and, as a result, reduce noise generated during operation. Ex-1001. In a first embodiment, as annotated in FIG. 3,¹ the fluid dispersion assembly includes “a suppression chamber.” *Id.*, 6:8-10. “[T]he suppression chamber 232 receives the fluid dispersion from the mixing chamber 226 ... [and] 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 atomizer assembly 200 and into diffusion chamber 112, and therefore, *disrupts and dampens sound waves associated therewith.*” (emphasis added)². *Id.*, 6:11-18.

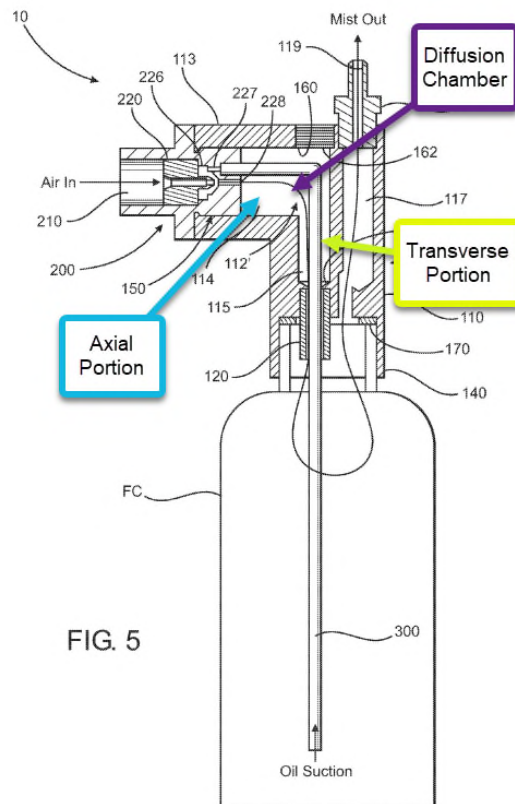


¹ All colorizations and/or annotations of the '449 Patent and/or prior art figures in this Petition are provided by Petitioner unless otherwise noted.

² Emphasis always added by Petitioner unless otherwise noted.

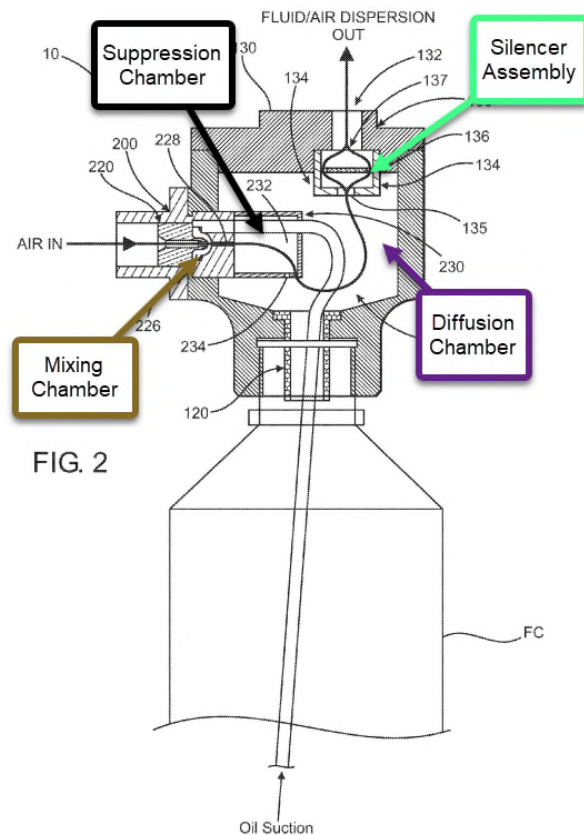
Ex-1001, FIG. 3

In a second and alternative embodiment, shown below in FIG. 5, fluid dispersion assembly 10 has a “modified diffusion chamber 112” that is structured in an “upside down L-shaped configuration” defining an “axial portion 114” and a “transverse portion 115.” *Id.*, 7:34-45. “[F]luid dispersion discharged ... into diffusion chamber 112’ is interrupted and redirected by virtue of axial portion 114 and transverse portion 115 ... [and] serves to suppress or dampen sound waves generated therein, in a similar manner as the suppression chamber 232 of the previously disclosed embodiments.” *Id.*, 7:57-66.



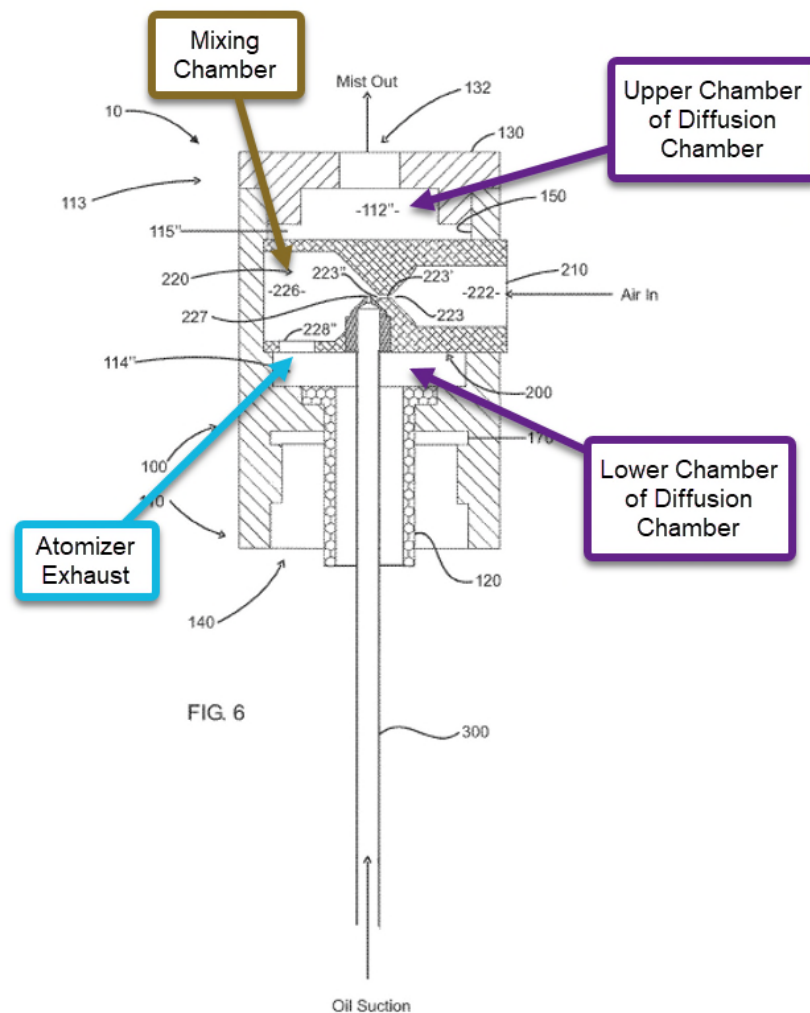
Ex-1001, FIG. 5

In a third alternative embodiment, the fluid dispersion assembly 10 “includes a silencer assembly 134 in communication with the discharge port 132.” *Id.*, 6:31-34. “The silencer assembly 134 comprises a baffle 136 ... structured and disposed to further disrupt the flow of the fluid dispersion through the fluid dispersion assembly.” *Id.*, 6:37-41. “Once again, as disclosed above with respect to the suppressor assembly 230, *the disruption in the flow of the fluid dispersion through the silencer assembly 134 also creates a disruption of the sound waves associated therewith.*” *Id.*, 6:46-51.



Ex-1001, FIG. 2

In a fourth alternative embodiment, diffusion unit 100 has another “modified diffusion chamber 112” as shown in FIG. 6. *Id.*, 11:3-5. “[T]he modified diffusion chamber 112’ of the embodiment of FIG. 6 serves to suppress sound waves generated during operation without the need for a separate suppression chamber, as in previously disclosed embodiments.” *Id.*, 11:8-13.



Ex-1001, FIG. 6

As depicted, “the modified diffusion chamber 112” comprises a lower chamber 114” which is disposed below and adjacent to the discharge of a fluid dispersion through the atomizer exhaust aperture 228”” and “an upper chamber 115” . . . disposed above the diffusion assembly 200 . . . substantially opposite to the direction of flow of a fluid dispersion from atomizer exhaust aperture 228”.” *Id.*, 11:14-24. The ’449 Patent recites, “[m]ore importantly, the fluid dispersion discharged from the atomizer assembly 220 through atomizer exhaust aperture 228” into [modified] diffusion chamber 112” *is interrupted and redirected by virtue of lower chamber 114” and upper chamber 115”.*” *Id.*, 11:25-29. This feature is designed to suppress sound waves generated in the fluid dispersion assembly. *Id.*, 11:29-34.

According to the ’449 Patent, each of the four alternative embodiments discussed above reduce noise during operation by disrupting the flow of fluid dispersion through the fluid dispersion assembly. Ex-1001. A POSITA would thus understand that the ’449 Patent teaches, or at least highly suggests, that the noise reduction (*e.g.*, dampening of sound waves) is a byproduct of disrupting the flow of fluid dispersion.

B. Priority Date of the ’449 Patent

The ’449 Patent was filed on October 8, 2018, as Application No. 16/154,373 (“the ’373 Application”). EX1001, INID Codes (21), (22). The ’373 Application is

a Continuation-In-Part (“CIP”) of Application No. 15/353,951 (“the ’951 Application”), filed on November 17, 2016 (now Patent No. 10,092,918), which is a CIP of Application No. 14/844,650, filed on September 3, 2015 (now Patent No. 9,527,094), which is a continuation of Application No. 13/838,634, filed on March 15, 2013 (now Patent No. 9,126,215), which claims priority to Provisional Application No. 61/694,500 (“the Provisional Application”), filed on August 29, 2012.³ EX1001, INID Codes (60), (63).

While the challenged claims of the ’951 and ’373 Applications (*i.e.*, the ’918 and ’449 Patents) rely on new matter that was first introduced in the November 17, 2016 application, all references relied upon in this Petition are prior art, even if the earliest effective priority date is August 29, 2012.

C. Summary of the Prosecution of the ’449 Patent

A single office action was issued during prosecution of the ’449 Patent. Ex-1004, non-final rejection mailed July 22, 2019. EX1004 (non-final rejection mailed July 22, 2019). In that office action, the Examiner rejected all independent claims on the ground of non-statutory double patenting over each of the priority patents, including the ’094 and ’918 Patents. *Id.* The Examiner also found that dependent

³ The ’918 and ’094 Patents are subject to concurrently filed Petitions for *inter partes* review. The ’215 Patent was not asserted in the parallel district court proceeding and is not being challenged at this time.

claims 8-10, and 13 contained allowable subject matter if rewritten in independent form. *Id.*, pg. 37-39. In response, Patent Owner filed a Terminal Disclaimer with respect to the priority patents and incorporated the allowable subject matter into the independent claim. *Id.*, pgs. 22-29 (Amendment filed October 22, 2019). A Notice of Allowance was then mailed and the '449 Patent ultimately issued on March 10, 2020. *Id.*, pgs. 1, 8-9 (Notice of Allowance mailed on November 15, 2019).

D. Summary of the claimed subject matter of the '449 Patent

Despite the specifications' emphasis on the noise dampening features of the fluid dispersion assembly, none of the challenged claims requires such a feature. Ex-1001, 15:24-16:29. Instead, the challenged claims are directed to a fluid dispersion assembly that forms a fluid dispersion when powered by a compressed air source. *See* Appendix. The Parties have stipulated that the term "fluid dispersion" should be construed to mean a "mixture of operative fluid in air comprising a plurality of substantially uniform droplets (having substantially the same diameter) of the operative fluid dispersed throughout the air." Ex-1018, Exhibit A.

VII. LEVEL OF ORDINARY SKILL IN THE ART

This Petition is supported by the declaration of Dr. Christopher White. *See generally* Ex-1002. In the declaration, Dr. White opines on the knowledge of a POSITA with respect to the issues raised herein. *Id.*

In view of the subject matter of the '449 Patent, a person of ordinary skill in the art ("POSITA") would have either: (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. *Id.*, ¶¶36-44. Dr. White meets this level of skill based on his education and experience. *Id.*; *see also* Ex-1003 (Dr. White's CV).

VIII. CLAIM CONSTRUCTION

For purposes of this IPR, Petitioner views the scope of the challenged claims in a manner that is consistent with PO's broad infringement allegations and proposed claim constructions submitted in the parallel district court proceeding.⁴ Ex-1017 and Ex-1018, Ex-1039, Ex-1040. Petitioner does not believe any term needs to be construed by the PTAB to determine the claims are rendered obvious over the cited prior art.⁵ *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir.

⁴ A *Markman* hearing is scheduled to occur on April 17, 2025. Petitioner may request leave to submit the district court's claim construction in this proceeding as soon as it becomes available.

⁵ Petitioner reserves the right to present its own construction of any claim of the '449 Patent, including constructions that disagree with PO's infringement allegations and

2011) (“claim terms need only be construed to the extent necessary to resolve the controversy”).

IX. STATE OF TECHNOLOGY & SUMMARY OF THE PRIOR ART

A. State of Technology at the Time of the Alleged Invention

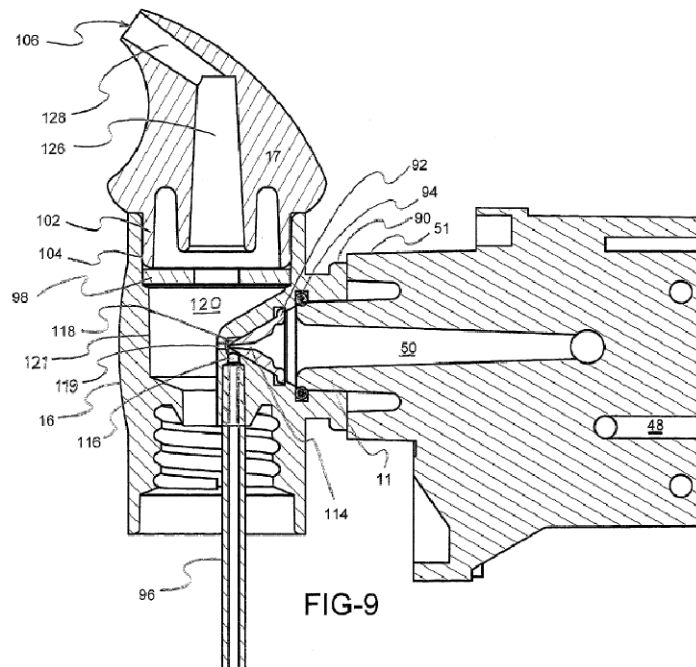
Fluid dispersion assemblies have been used for decades. Ex-1002, ¶¶62-67 (discussing Ex-1020, Ex-1021, and Ex-1022). Such assemblies have also long used compressed air and utilized the venturi effect to aspirate fluid upward from a reservoir. *Id.*, *see also id.*, ¶¶78-122 (discussing, *inter alia*, EX1031 and EX1032). While there are several design considerations for fluid dispersion assemblies, the considerations most relevant to this IPR—(1) size and uniformity of droplets, and (2) minimizing noise associated with compressed air—were known long before the ’918 Patent. Ex-1002, ¶¶62-112. Advantages of producing small and substantially uniform droplets, as well as structural design mechanisms for producing the same, have been long studied and were well known before the invention of the ’918 Patent. *See, e.g.*, Ex-1002, ¶¶ 80-112 (discussing, *inter alia*, Ex-1028, Ex-1029, Ex-1030, Ex-1033, Ex-1034, Ex-1035, Ex-1036, Ex-1037). It has also been long known how to reduce noise in fluid dispersion assemblies, including through the use of a baffle.

proposed constructions. *See* EX-1018 (providing Petitioner’s proposed construction of certain claim terms).

See, e.g., Ex-1002, ¶¶ 68-79 (discussing, *inter alia*, Ex-1023, Ex-1024, Ex-1025, Ex-1026, Ex-1027).

B. U.S. Patent Publication No. 2010/0084484 (“Sevy”) (Ex-1009)

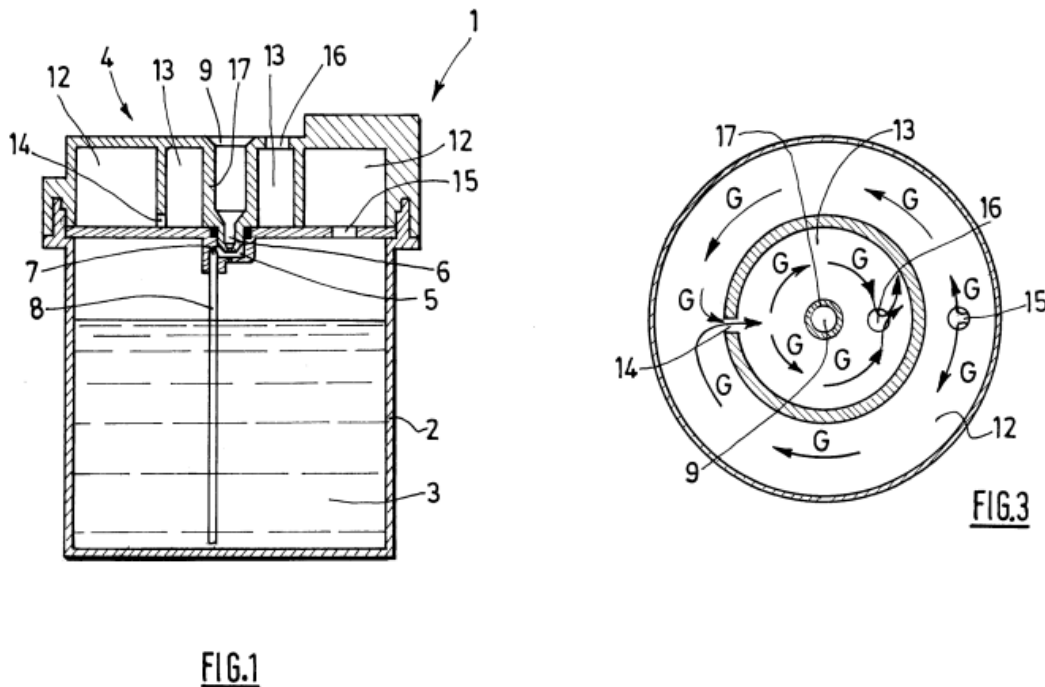
Sevy was published on April 8, 2010. Ex-1009, Cover. Sevy therefore qualifies as prior art to the claims of the ’449 Patent under 35 U.S.C. §102(b). Sevy’s essential-oil atomizer, a cross-section of which is shown in FIG. 9 below, includes a separator plate 98 having apertures 99 for restricting droplets over of a certain size from being discharged into the air. *Id.*, ¶[0070].



Ex-1009, FIG. 9

C. French Patent Publication No. 2886160 (“Goubet”) (Ex-1015)⁶

Goubet was published on December 1, 2006, and is prior art to the claims of the '449 Patent under 35 U.S.C. §102(b). EX-1016, Cover. Goubet's essential oil diffuser includes a diffusion head defining an outer enclosure 12 and an inner enclosure 13 that communicate with each other through a passage 14 to form a baffled path through which atomized droplets flow. Ex-1016, pgs. 4-5. The baffled path, as illustrated in FIGS. 2 and 3 below, breaks the atomized oil droplets into micro-droplets and then diffuses the micro-droplets into ambient air. Id., pages 4-5.



Ex-1016, FIGS. 1 and 3

⁶ The certified translation of Goubet is provided as Ex-1016. Citations and quotations herein to Goubet will refer exclusively to this certified translation.

D. Chinese Utility Model Patent 201832737 (“Gao”)⁷ (Ex-1012)

Gao was published on May 18, 2011. Ex-1013, Cover. Therefore, Gao is prior art to the claims of the ’449 Patent under 35 U.S.C. §102(b). Gao’s atomizer, a cross-section of which is illustrated in FIG. 1 below, includes a baffle 3 such that the “mist can be controlled below 3 microns. *Id.*, ¶[0025]; *Id.*, Abstract (“the atomized particles are finer and more uniform, the aroma is more uniform, and the aroma diffusion area is large.”).

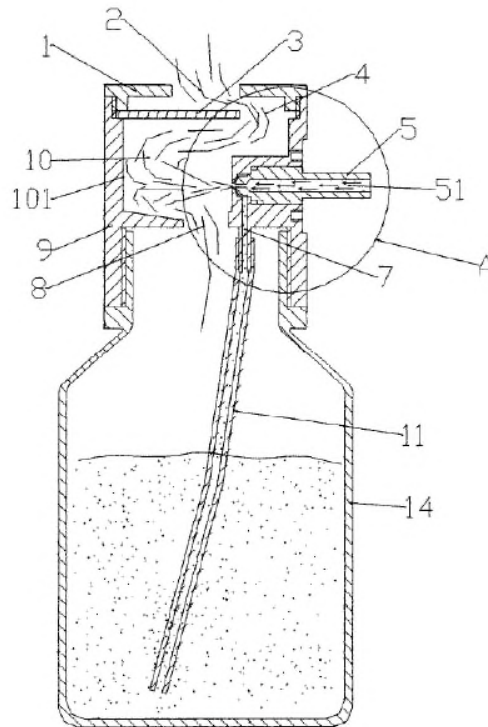


FIG. 1

Ex-1013, FIG. 1

⁷ The certified translation of Gao is provided as Ex-1013. Citations and quotations herein to Gao will refer exclusively to this certified translation.

E. Sebastian Kaiser et al., The Electrospray and Combustion at the Mesoscale, (“Kaiser”) (Ex-1014)

Kaiser was published in 2003 (several years before the earliest priority date of the '449). Ex-1014, Cover. Therefore, Kaiser is prior art to the '449 Patent under 35 U.S.C. §102(b). Kaiser describes that the correlation between uniform droplet size and droplet evaporation rate was a well understood phenomenon in the field, at the time of the invention. Ex-1014, pg. 43 (“critical to uniform evaporation and burning is a good control of the size distribution of the resulting aerosol.”).

X. REASONS WHY THE CHALLENGED CLAIMS ARE UNPATENTABLE UNDER 37 C.F.R. § 42.104(b)(4)

A. Overview of Argument

The '449 Patent relates to “a fluid dispersion assembly.” Ex-1001, 1:6-10. Challenged claims 1 and 7 are written in independent form and require an atomizer assembly “comprising an atomizer air inlet channel, a fluid inlet, a mixing chamber, and an atomizer exhaust aperture.” *Id.* (claims 1 and 7). The preambles of independent claims 1 and 7 further require the fluid dispersion assembly generate and discharge a “fluid dispersion.” The Parties have stipulated that this term means a “mixture of operative fluid in air comprising a plurality of substantially uniform droplets (having substantially the same diameter) of the operative fluid dispersed throughout the air.” Each of Sevy, Goubet, and Gao individually teach this subject matter in addition to the other limitations of the challenged claims.

Ground 1 addresses claims 1, 4, and 7-10 in view of Sevy, which does not explicitly recite the phrase “substantially uniform droplets” as is required by the limitation “fluid dispersion.” Yet, a POSITA would have found this limitation obvious in view of Sevy’s teaching to provide an atomizer having “a better atomization or a smaller mean or average size of droplet in the distribution of atomized droplets.” Ex-1009, ¶[0009]; *see also* Ex-1002, ¶¶80-112. Various features of Sevy’s atomizer would produce this result. *See, e.g.*, Ex-1002, ¶¶80-112. For example, Sevy discloses that when the droplets contact an internal wall of atomizer 16 (*e.g.*, the diffusion chamber), “the droplets further atomize into a cloud containing many more droplets of much smaller size.” Ex-1009, ¶[0067].

Ground 2 addresses that if PO argues that the challenged claims are not obvious in view of Sevy alone, then they would also have been obvious over Sevy in view of Gao’s additional teaching that “mist can be controlled below 3 microns.” Ex-1013, ¶[0025]; *Id.*, Abstract (“the atomized particles are *finer and more uniform*, the aroma is more uniform, and the aroma diffusion area is large.”). As such, the arguments for Ground 2 are substantially the same for the majority of the limitations in the challenged claims but provide a separate alternative basis to teach the “fluid dispersion” limitation.

Ground 3 addresses claims 1, 4, and 7-10 in view of Goubet. Goubet does not explicitly teach an atomizer that forms “substantially uniform droplets.” However,

this limitation is obvious in view of Goubet’s teaching that the dual circular enclosures of the diffusion head are designed to move the droplets along a particular path that allows “their size to be reduced as much as possible” to improve their diffusion in the ambient air. Ex-1016, pg. 2. This teaching at the very least suggests that the microdroplets are uniform in size as it is well-known that monodispersed droplets exhibit superior dispersion and diffusion properties. *See, e.g.*, Ex-1002, ¶¶80-112.

Ground 4 addresses that if PO argues that the challenged claims are not obvious in view of Goubet alone, then they would also have been obvious over Goubet in view of Kaiser, which teaches that substantially uniform atomized droplets were well-known. Ex-1014, pg. 43. Accordingly, if the diffusion head of Goubet did not already produce substantially uniform atomized droplets, a POSITA would have been motivated to add additional circular enclosures until such result was achieved in light of Kaiser. Ex-1002, ¶¶245-259. As such, the arguments for Ground 4 are substantially the same for the majority of the limitations in the challenged claims but provide separate alternative basis to teach the “fluid dispersion” limitation.

Ground 5 addresses claims 1, 4, and 7-10 in view of Gao, which teaches an atomizer configured to generate “mist [that] can be controlled below 3 microns” such

that “the atomized particles are *finer and more uniform*, the aroma is more uniform, and the aroma diffusion area is large.” Ex-1013, ¶[0025]; *Id.*, Abstract.

B. Ground 1: Claims 1, 4, and 7-10 are Unpatentable Under 35 U.S.C. §103 as Obvious Over Sevy

1) Independent Claim 1

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

To the extent the preamble is limiting, it is taught or suggested by Sevy. Ex-1002, ¶¶131-137. Sevy is titled and directed to an “integrated, essential-oil atomizer” for distributing essential oils into the atmosphere of a room. Ex-1009, ¶[0004]. The apparatus, as shown in annotated FIG. 1 below, includes an atomizer 16 that is secured to a reservoir 18, and a director 17 for discharging atomized liquids into the air. Ex-1009, ¶[0041].

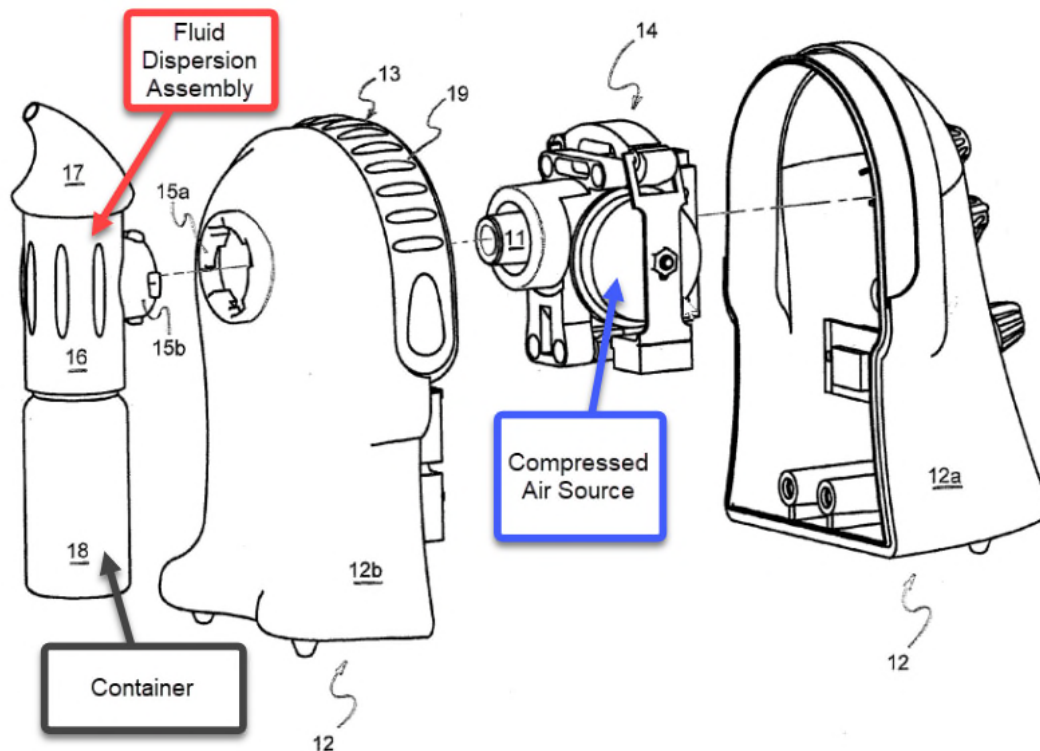


FIG-1

Ex-1009, FIG. 1

“Within the housing 12, may be located a pump 14.” Ex-1009, ¶[0041]. “Air from the pump 14 drives atomization in the atomizer 16 to discharge atomized liquids out of the director 17” and into the atmosphere. *Id.* Sevy’s fluid dispersion assembly (*e.g.*, the combination of atomizer 16 and director 17) is thus operatively engaged to the container (*e.g.*, reservoir 18) and pump 14 for discharging a fluid dispersion into a surrounding airspace. Ex-1002, ¶¶134-136.

The pump is a motorized diaphragm type pump that “compress[es] air to a pressure greater than ambient pressure.” Ex-1009, claim 16 and ¶¶ [0020], [0028], [0041], [0056], [0057]. PO contends the term “compressed air source” should be

given its ordinary meaning or construed as a “source of air that is above ambient pressure.” Ex-1018, Exhibit B. Accordingly, motorized pump 14 is a compressed air source because it compresses air to a pressure greater than ambient pressure. Ex-1002, ¶137.

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

The atomizer 16 of Sevy has a hollow interior referred to in the specification as “separator 120” or a “separator chamber.” Ex-1009, ¶[0082]. The separator chamber is illustrated in FIG. 9 below. During use, nozzle 92 atomizes liquid into droplets, and the atomized droplets are thrown into separator chamber 120 and against the interior wall 121 of atomizer 16. *Id.* Upon impact with the wall 121, “the droplets further atomize into a cloud containing many more droplets of much smaller size.” *Id.*, ¶ [0067]. The comparatively smaller droplets become entrained in the air inside atomizer 16 before they are discharged through director 17 and into the surrounding airspace. *Id.* ¶¶[0082], [0084]. A POSITA would understand that particles entrained within an airflow will spontaneously diffuse within the area in which they are contained, in this case, atomizer 16. Ex-1002, ¶¶140. Atomizer 16 is thus a “diffusion unit” that at least partially defines a “diffusion chamber” (*e.g.*, separator 120). Ex-1002, ¶¶141-142.

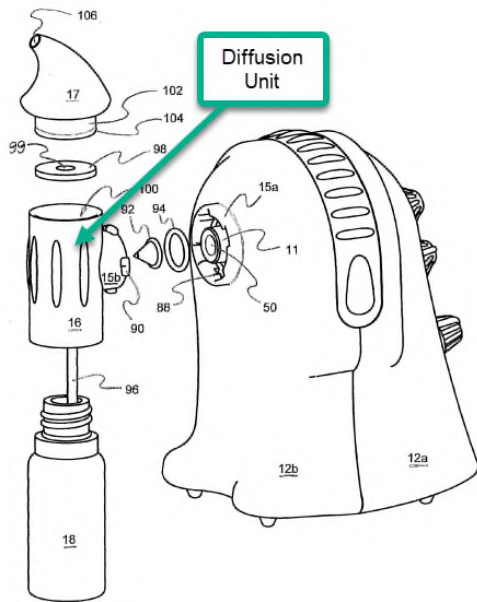


FIG-7

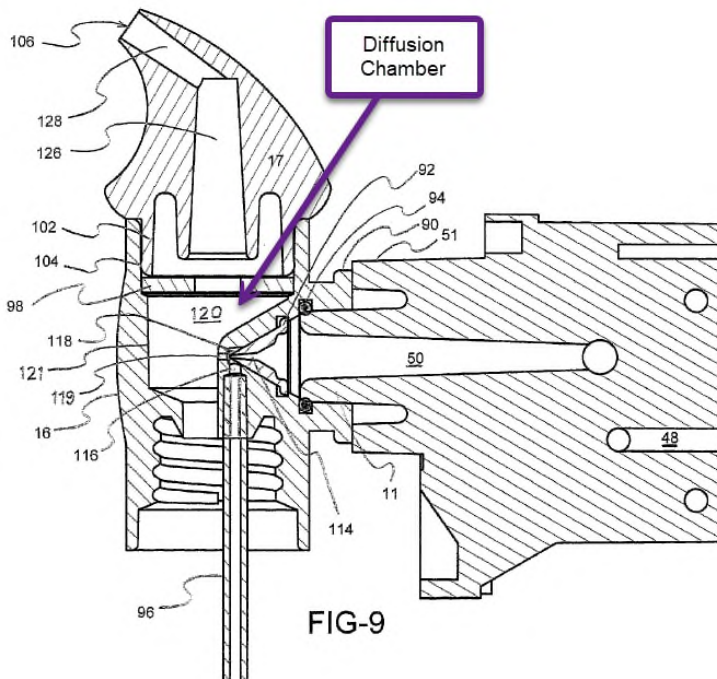


FIG-9

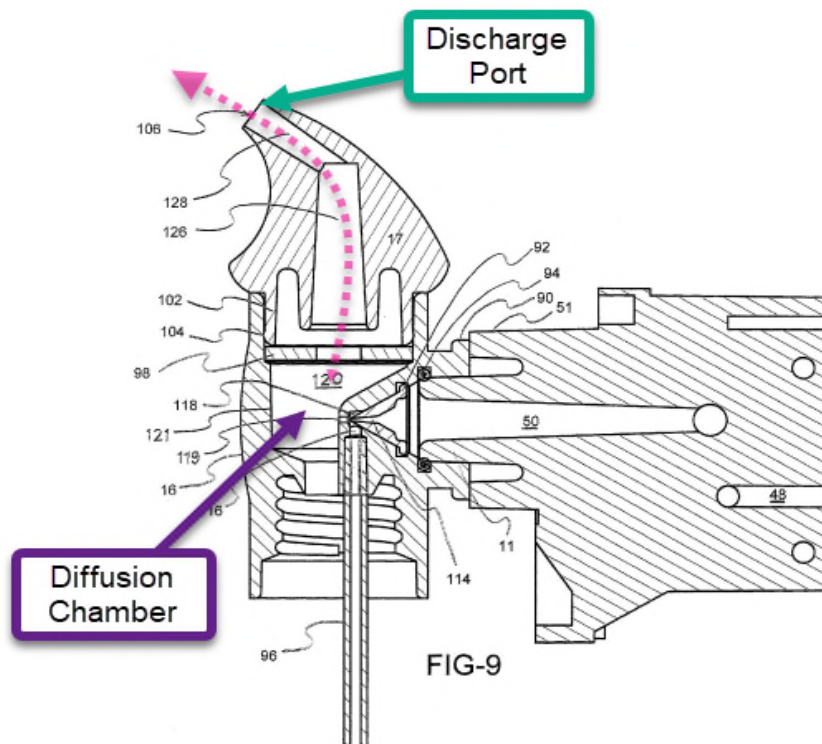
EX1009, FIGS. 7 and 9

Sevy further teaches that a lower end of the atomizer 16 may be secured to reservoir 18 by threads or a similar connector. Ex-1009, ¶[0041]. Likewise, director 17 encloses atomizer 16 or a top thereof. *Id.*, ¶[0049]. Accordingly, and as shown in FIGS. 7 and 9 above, the diffusion unit (*e.g.*, atomizer 16) at least partially defines a diffusion chamber (*e.g.*, separator chamber 120). The diffusion chamber is enclosed by the wall of atomizer 16, reservoir 18, and director 17. Ex-1002, ¶¶-138-142.

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

Sevy discloses a port 106 formed in the director 17 through which atomized liquid droplets are passed. Ex-1009, ¶[0072]. It is explained that “[a]ir from the

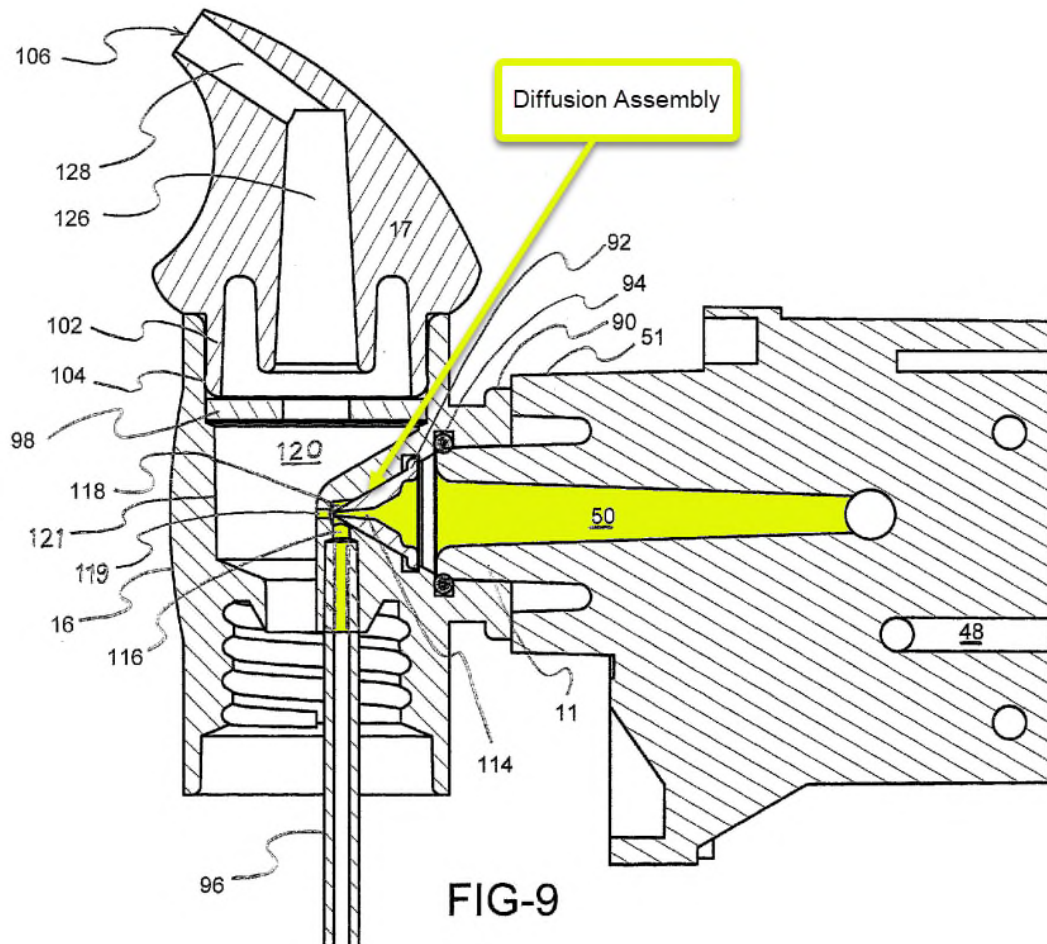
pump 14 drives atomization in the atomizer 16 to discharge atomized liquids out of the director 17.” *Id.*, ¶¶ [0041], [0072] (“director 17 may be turned in a particular direction to discharge a jet of air . . . through the atomizer to a directed flow out the port 106.”). This flow is illustrated in annotated FIG. 9 of Sevy, below, in which the pink arrow depicts the flow of the atomized droplets. Therefore, Sevy teaches a discharge port (*e.g.*, port 106) disposed in fluid communication between said diffusion chamber (*e.g.*, separator chamber 120) and the surrounding airspace. *See* Ex-1002, ¶¶143-145.



Ex-1009, FIG. 9

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

The specification of the '449 Patent recites “the diffusion assembly 200 comprises an air inlet 210 and an atomizer assembly.” Ex-1001, 5:15-16. Sevy teaches a similar and corresponding structure. Specifically, Sevy discloses an air inlet (*e.g.*, passage 50) that passes air from pump 14 to atomizer 16. Ex-1009, ¶¶ [0075]-[0079]. Sevy further recites “[t]he momentum of the jet of air . . . creates a localized vacuum at the top of the siphon 96, drawing liquid up the siphon 96 from the reservoir 18, and transferring momentum into that liquid to atomize it and throw it into the atomizer 16.” *Id.*, ¶[0067]. Sevy’s diffusion assembly (*e.g.*, the combination of the air inlet (*e.g.*, passage 50) and the atomizer assembly that atomizes the liquid) is shaded yellow in annotated FIG. 9 below.



Ex-1009, FIG. 9

Sevy therefore teaches a diffusion assembly disposed in operative engagement with said diffusion unit (*e.g.*, atomizer 16). Ex-1002, ¶¶146-148.

1[D] wherein said diffusion assembly comprises an atomizer assembly, said atomizer assembly comprising an atomizer air inlet channel, a fluid inlet, a mixing chamber, and an atomizer exhaust aperture, and

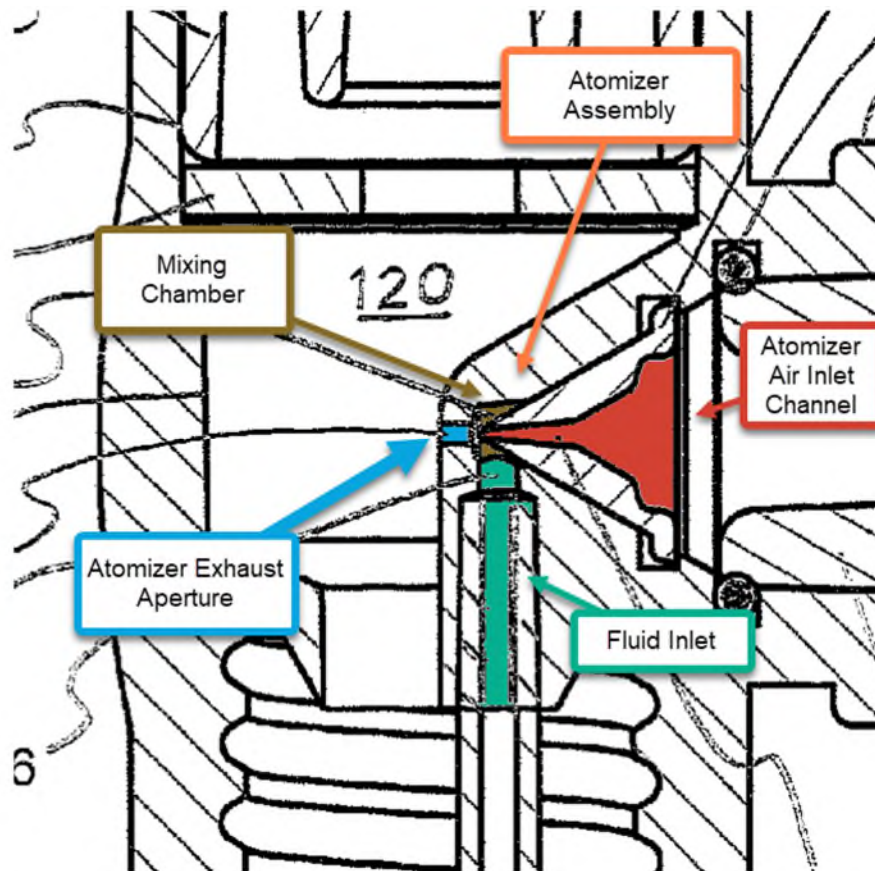
Sevy teaches a nozzle 92 that is formed separately from atomizer 16, and that sits within a cavity⁸ of atomizer 16 to form a seal therewith. Ex-1009, ¶[0065]. Nozzle 92 is shown below in enlarged and partial FIG. 9.

As illustrated, nozzle 92 encloses a channel 114 leading from passage 50 toward an orifice 118 of the nozzle. *Id.*, ¶[0079]. Air flows through the essential-oil atomizer of Sevy from pump 14, and specifically pump body 46, into passage 50, and then into channel 114. *Id.*, ¶[0075]-[0079]. In this regard, channel 114 is in fluid communication with pump 14, and thus, an “atomizer air inlet channel.”

Referring to FIG. 9, “the cavity 116 has three openings.” Ex-1009, ¶ [0080].

- I. “From the pump side, the cavity is open to the orifice 118 of the nozzle 92.” *Id.*
- II. “From below, the cavity 116 is open to the siphon 96 leading to the reservoir 18.” *Id.*
- III. “Toward the atomizer 16, the cavity is open to yet another orifice 119. The exit orifice [119] permits discharge of fluids including air from the orifice 118 and liquid from the siphon tube 96 out the exit orifice 119.” *Id.*

⁸ Sevy uses the terms “cavity” and “chamber” interchangeably to refer to feature 116.



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

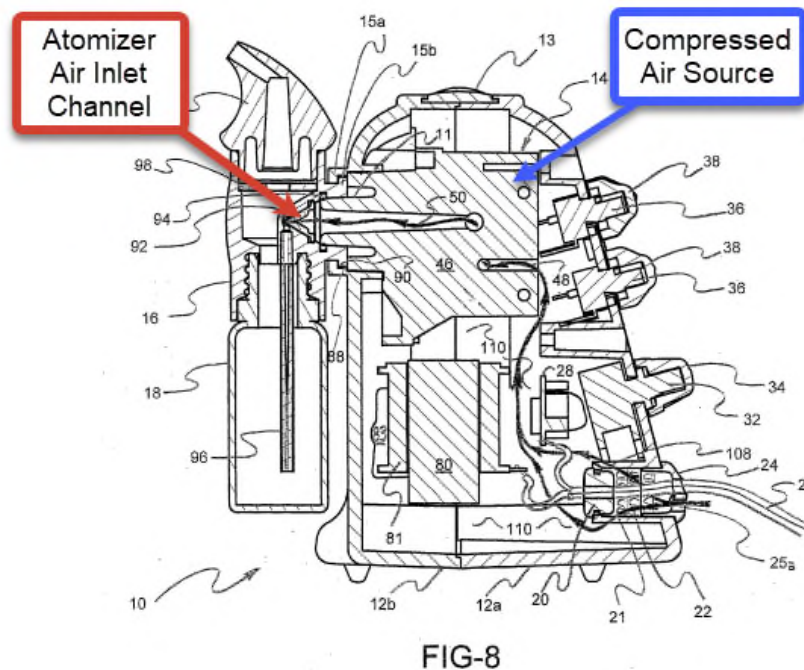
When pressure is reduced in cavity 116, liquid is drawn up from the reservoir 18, through siphon tube 96 and into the cavity 16, where it is comminuted by a blast of high-speed air. *Id.*, ¶[0080], [0081]. As a result, “[t]he liquid from the siphon 96 is atomized into droplets of various size [and] [t]he entire mixture of air and droplets passes through the exit orifice 119.” *Id.*, ¶[0082].

Consequently, Sevy teaches an atomizer assembly including an atomizer air inlet channel (*e.g.*, channel 114 that passes air received from passage 50 to cavity 116), a fluid inlet (*e.g.*, the upper end of siphon tube 96 that receives liquid from reservoir 18), a mixing chamber (*e.g.*, cavity 116 where the liquid from

siphon 96 and the blast of high speed air are initially mixed together to atomize the liquid into liquid droplets), and an atomizer exhaust aperture (*e.g.*, exit orifice 119 through which the initially atomized droplets are ejected into the diffusion chamber). Ex-1002, ¶¶149-159.

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

As demonstrated in this Ground 1 with respect to limitations 1[C] and 1[D], the atomizer air inlet channel (*e.g.*, channel 114) is interconnected to the compressed air source (*e.g.*, pump 14) via passage 50. Ex-1009, ¶¶[0075]-[0079]. This interconnection is illustrated in annotated FIG. 8 below. Ex-1002, ¶¶160-161.



EX-1009, FIG. 8

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

As demonstrated in this Ground 1 with respect to limitations 1[C] and 1[D], liquid is drawn up from the reservoir 18, and into cavity 116, by siphon tube 96. Ex-1009, ¶[0081]. Accordingly, the fluid inlet (*e.g.*, the upper end of siphon tube 96) is disposed in fluid communication with the operative fluid in the container (*e.g.*, reservoir 18). Ex-1002, ¶¶162-163.

1[G] the compressed air and the operative fluid mix together in said mixing chamber to form the fluid dispersion.

As demonstrated in this Ground 1 with respect to limitation 1[D], it was demonstrated that Sevy teaches liquid is comminuted by the blast of high-speed air at orifice 118 within cavity 116 (*e.g.*, the mixing chamber). Ex-1009, ¶[0081]. As a result, “[t]he liquid from the siphon 96 is atomized into droplets of various size [and] [t]he entire mixture of air and droplets passes through the exit orifice 119 toward the separator 120 and particularly toward the wall 121 thereof.” *Id.*, ¶[0082].

Despite stipulating to the meaning of “fluid dispersion,” PO construes this term differently depending on whether the “fluid dispersion” is within the “mixing chamber” or whether the “fluid dispersion” is within the “diffusion chamber.” Ex-1018, Exhibit B. PO has construed the term “diffusion chamber” to mean “a region that is structured to facilitate the formation of the fluid dispersion (*e.g.*, substantially uniform droplets) prior to discharge.” *Id.* In contrast, PO has construed the term

“mixing chamber” to mean, “a region where the operative fluid is combined with compressed air.” *Id.* Put differently, when the term fluid dispersion is claimed as being *within* the mixing chamber, as is the case in limitation 1[G], PO construes the term to mean atomized droplets, but the atomized droplets need not include “a plurality of substantially uniform droplets.” As described herein, Sevy teaches that within the mixing chamber (*e.g.*, cavity 116), the operative fluid is atomized by compressed air. Ex-1002, ¶¶164-168.

PO’s construction of the term “fluid dispersion,” as used in limitation 1[G], is equally applicable to the same limitation in Grounds 2-5. For brevity, this construction is only discussed once in Ground 1.

2) Claim 4

The fluid dispersion assembly as recited in claim 1 wherein said diffusion chamber facilitates formation of the fluid dispersion prior to discharge of the fluid dispersion from said diffusion chamber through said discharge port and into the surrounding airspace.

As demonstrated in this Ground 1 with respect to limitation 1[D], Sevy teaches that liquid is atomized into droplets of various size within the mixing chamber (*e.g.*, cavity 116) and then “[t]he entire mixture of air and droplets passes through the exit orifice 119 toward the separator 120 and particularly toward the wall 121 thereof.” *Id.*, ¶[0082]. The droplets will then break into smaller droplets “as they dash against the wall 121” of atomizer 16 (*e.g.*, the diffusion unit). Ex-1009, ¶[0082]. Sevy goes on to explain, some droplets will agglomerate against the

FIG-9

“The separator plate may have one or more apertures 99 located centrally, peripherally, or otherwise.” *Id.*, ¶[0083]. In this regard, “[d]roplets that cannot move with the air flow, typically because they have too large a size and mass ... will strike the walls of the opening 100 or the separator plate 98.” *Id.*, ¶[0069]. On the other

hand, “more finely divided droplets form a cloud moving with the flow of air . . . through the apertures 99 of the separator plate 98.” *Id.* ¶[0070]. Ultimately, “the jet of air expelled from the port 106 carries with it only those droplets that are sufficiently small, typically on the order of from about 1 to about 5 microns in diameter such that they will drift substantially indefinitely with ambient air movement as they evaporate.” *Id.*, ¶[0084]. A POSITA would understand these teachings of Sevy to mean that only those droplets that have been fragmented by the wall 121 of atomizer 16, into a size small enough be entrained in the air and pass through separator plate 98, will ultimately be discharged from port 106 into the surrounding airspace. Ex-1002, ¶171. Therefore, the diffusion chamber (*e.g.*, separator 120 of atomizer 16) of Sevy facilitates the formation of atomized droplets on an order from about 1 to 5 microns prior to the droplets being expelled from port 106 and into the surrounding airspace. *Id.*

Fluid Dispersion

Although Sevy does not explicitly use the term “substantially uniform” in describing the size of the atomized droplets ranging in diameter from about 1 to 5 microns, a POSITA would appreciate that these droplets meet the limitation “fluid dispersion.” Sevy discloses “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.” Ex-1009, ¶[0009]. A POSITA

would understand that smaller droplets will follow the airflow in the room and quickly spread throughout the entire room. Ex-1002, ¶¶173-174. Sevy recognizes this principle. Ex-1009, ¶[0024] (“spraying the droplets into a separator removes droplets insufficiently small *to be carried indefinitely by ambient air movement*. The separator and flow are sized to release with the air flow those droplets having *an effective diameter of from about 1 micron to about 5 microns*.”). Indeed, droplets within this range do not materially differ from one another in their ability to be carried substantially indefinitely by ambient air. Ex-1002, ¶¶80-112.

In describing the term “substantially uniform droplets,” the specification of the ’449 Patent recites “[i]n at least one embodiment, the plurality of “substantially uniform droplets” each have a diameter in the range of one micron (1 μm), in another embodiment, the diameter of the droplets is in the range of about three microns (3 μm), and, in one further embodiment, droplet diameter is in the range of about five microns (5 μm).” Ex-1001, 3:22-30. Although these examples are provided as three distinct embodiments (*e.g.*, 1, 3, or 5), it cannot be ignored that droplets within this range will not materially differ from one another with respect to their ability to be carried by ambient air, and that the narrow range taught by Sevy spans the from the smallest embodiment to largest embodiment taught by the ’449 Patent. Ex-1002, ¶176.

Furthermore, it is also well known that the evaporation rate of droplets depends on several factors including the size (*e.g.*, surface area) of the droplet. Ex-1002, ¶¶174-176. Sevy also recognizes this principle. Ex-1009, ¶[0074] (“[e]vaporation is a function of vapor pressure of a material, local concentration, and surface area available to evaporate molecules therefrom”). Thus, a POSITA would understand a “better atomization” in the context of the ’449 Patent to mean a smaller and more uniform droplet, which will result in the droplets spreading quickly and indefinitely throughout the room, and evaporating at a uniform rate, to release a consistent scent. Ex-1002, ¶¶174-176.

However, if PO argues that atomized droplets on the order of 1 to 5 microns do not meet the limitation “fluid dispersion,” Petitioner submits that it would have been obvious to modify to the location, size, and/or amount of apertures 99 of the separator plate 98 to achieve an even narrower range of droplet sizes, such that a plurality (at least two) of the droplets are substantially uniform, to further improve the recognized dispersion and evaporation properties. Ex-1002, ¶¶177-178; Ex-1009, ¶[0068] (“the separator plate may include one or more apertures 99 located centrally, peripherally, or otherwise”). Therefore, Sevy teaches, or at least suggest, a diffusion chamber that facilitates formation of the fluid dispersion prior to discharge of the fluid dispersion from said diffusion chamber through said discharge port and into the surrounding airspace.

3) Claim 7

There are no material differences between claim limitations 1[PRE]-1[D] and claim 7 of the '449 Patent. Appendix (*compare* claim limitations 1[PRE]-1[D], *with* claim 7). Thus, for the same reasons discussed in this Ground 1 with respect to claim limitations 1[PRE]-1[D], Sevy discloses or renders obvious all the limitations of claim 7. *See supra* Claim 1, limitations 1[PRE]-1[D]. Ex-1002, ¶¶179-183.

4) Claim 8

There are no material differences between claim 8 and claim limitations 1[E]-1[G] of the '449 Patent. Appendix (*compare* claim 8, *with* claim limitations 1[E]-1[G]). For the same reasons discussed in this Ground 1 with respect to claim limitations 1[E]-1[G], Sevy discloses or renders obvious all the limitations of claim 8. *See supra* Claim 1, limitations 1[E]-1[G].

5) Claim 9

There are no material differences between claim 9 and claim 4 of the '449 Patent. Appendix (*compare* claim 4, *with* claim 9). For the same reasons discussed in this Ground 1 with respect to claim 4, Sevy discloses or renders obvious all the limitations of claim 9. *See supra* Claim 4.

6) Claim 10

The fluid dispersion assembly as recited in claim 7 further comprising a container interconnect operatively interconnecting said diffusion unit to the container.

Sevy recites, “[i]n the illustrated embodiment, the atomizer 16 may secure such as by threads or the like to a reservoir (18).” Ex-1009, ¶[0041]. The threads, as shown in annotated FIG. 7 below, are used to connect the diffusion unit (*e.g.*, atomizer 16) to the container (*e.g.*, reservoir 18), and thus, are a container interconnect. Accordingly, Sevy teaches a container interconnect (*e.g.*, threads) that operatively interconnects the diffusion unit (*e.g.*, atomizer 16) to the container (*e.g.*, reservoir 18). Ex-1002, ¶¶186-188.

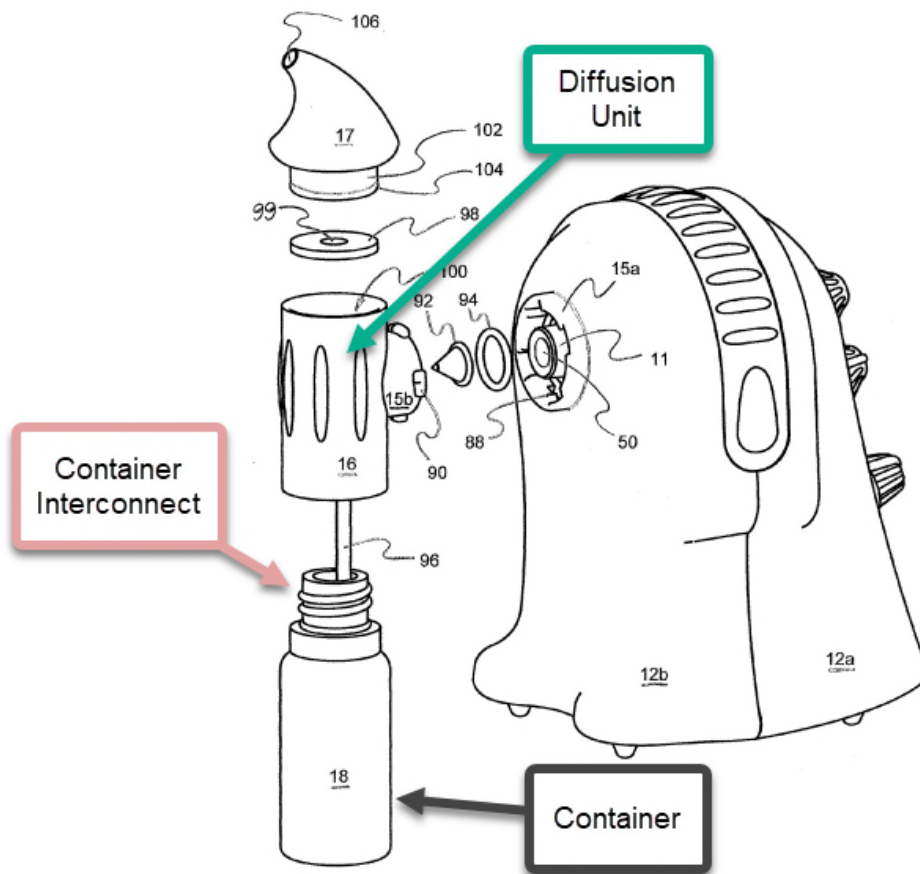


FIG-7

Ex-1009, FIG. 7

C. Ground 2: Claims 1, 4, and 7-10 are Unpatentable Under 35 U.S.C. § 103 as Obvious Over Sevy in view of Gao

As discussed in Ground 1, Sevy alone renders obvious claims 1, 4, and 7-10. As part of that analysis, Petitioner noted that Sevy discloses a diffusion unit (*e.g.*, atomizer 16) that generates and discharges atomized droplets ranging in size from 1 to 5 microns, and that Sevy teaches or suggests that droplets on this order exhibit high-quality dispersion and evaporation properties. Ex-1009, ¶¶[0024], [0074]. However, Sevy does not explicitly disclose that its atomizer generates and discharges “substantially uniform droplets.” For this reason, in Ground 2, and in addressing the limitations set forth in Claim 1 (limitation 1[Pre]), Claim 4, Claim 7 (limitation 7[Pre]), and Claim 9), Petitioner also relies on Gao which explicitly discloses an atomizer in which “the mist can be controlled below 3 microns.” Ex-1013, ¶[0025]; *Id.*, ¶[0007] (“[such that the droplets] are finer and more uniform, the aroma is more uniform, and the aroma diffusion is large.”). Ground 2 still relies on the teachings of Sevy for the other limitations of claims 1, 4, and 7-10 as previously discussed in Ground 1.

Gao is titled and is directed to an “atomizer for atomizing essence or essential oil.” Ex-1013, Cover. Gao teaches that its atomizer controls droplet discharge below 3 microns. Ex-1013, ¶[0025]. In this regard, “the atomized particles are finer and more *uniform*.” *Id.*, ¶[0007].

Gao's atomizer, as shown below in annotated FIG. 1, includes a main body 9 secured to an essential oil bottle 14. *Id.*, ¶[0019]. The main body defines a cavity in which an atomizer assembly is disposed. *Id.* The atomizer assembly is in fluid communication with the essential oil via hose 11, and also in fluid communication with an air pump (not shown) via gas flow pipe 51. *Id.*, ¶¶[0022], [0025]. A baffle 3 is fixed to an upper part of the main body 9 by cover body 1. *Id.*, ¶[0021]. The cover body 1 is provided with an atomizing gas outlet 2 through which the atomized mist is discharged. *Id.*, ¶[0019].

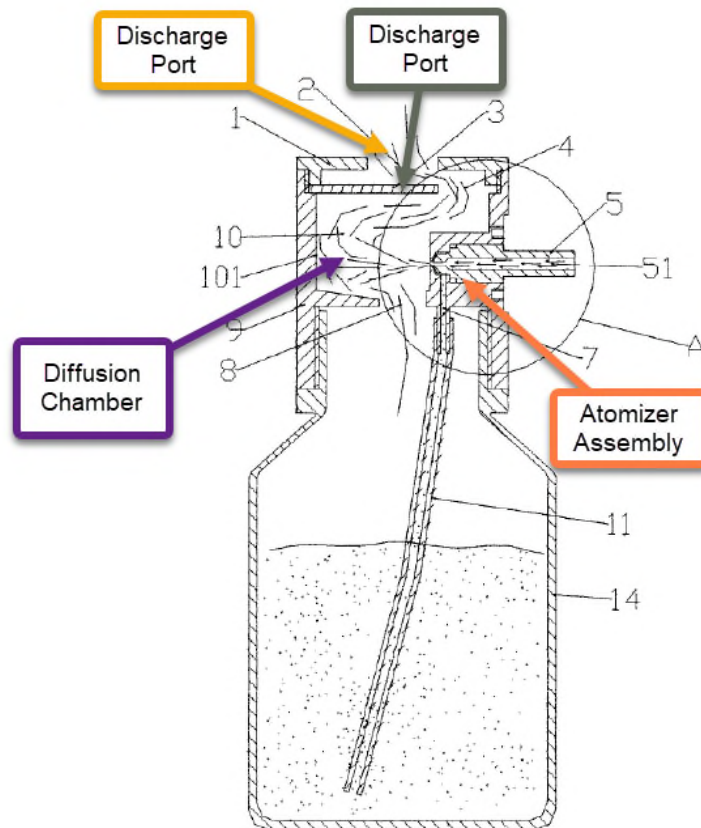


FIG. 1

Ex-1013, FIG. 1

When the air pump is in operation, air is blown through gas flow pipe 51 and liquid is sucked into atomizing cavity 6, where the liquid and air are fully mixed. *Id.*, ¶[0025]. The high-speed gas-liquid mixture is then ejected against an inner wall 101 of main body 9 to atomize the liquid mixture into micron-sized fine particles. *Id.* Only the smallest particles (below 3 microns) will drift around the baffle 3 and out gas outlet 2. *Id.* In this manner, “mist can be controlled below 3 microns.” *Id.*, ¶[0025]; *Id.*, ¶[0007], (“the atomized particles are finer and more uniform . . . and the aroma diffusion area is large”). Gao teaches that the finer and more uniform particles “are easier to vaporize after contact with the air, and the aroma is more uniform.” *Id.*, ¶ [0013]. Thus, Gao provides motivation to minimize droplet size to improve dispersion and to increase droplet uniformity, thereby improving the droplet’s aroma properties. Ex-1002, ¶¶189-193.

In view of Gao’s teachings, a POSITA would be motivated to further reduce the size of the droplets discharged by Sevy’s atomizer to improve their uniformity and corresponding aromatic properties. *Id.* ¶194. First, a POSITA would appreciate that the atomizer of Sevy generates particles on the order of 1 to 5 microns. It thus follows that Sevy’s atomizer generates droplets that are, for example, 1 micron, 2 microns, 3 microns, 4 micron, and 5 microns. Sevy’s separator plate, however, allows any sized droplet under 5 microns in diameter to pass therethrough. Ex-1009, ¶XX[0024]. Second, both Sevy and Gao recognize that evaporation rate is correlated

to the size of the droplet. Ex-1009, ¶¶[0025], [0074] (“[e]vaporation is a function of . . . surface area available to evaporate molecules therefrom”); Ex-1013, ¶ [0013] (“finer and more uniform [droplets] are easier to vaporize after contact with the air, and the aroma is more uniform”). That is, Gao expressly states the principle Sevy suggests, namely, uniform particles create uniform aroma. Third, Sevy teaches its “separator plate may include one or more apertures 99 located centrally, peripherally, or otherwise,” and a POSITA would recognize that the apertures 99 can be modified without negatively impacting the atomizer’s operation given that Sevy contemplates “one or more apertures,” which may be located in various configurations (*e.g.*, “centrally, peripherally, or otherwise”). Fourth, a POSITA would have been motivated to modify the locations and/or sizes of the apertures to prevent droplets on the order of 3-5 microns from passing through the separator plate and being discharged into the surrounding atmosphere.

Modifying Sevy’s separator plate to include smaller apertures that prevent droplets above 3 microns from passing therethrough could be achieved without undue experimentation. *See Railroad Supply Co v. Elyria Iron & Steel Co*, 244 U.S. 285, 292 (1917) (“the mere carrying forward of the original thought, a change only in form, proportions, or degree, doing the same thing in the same way, by substantially the same means, with better results, is not such an invention as will sustain a patent”) (internal quotation marks omitted). Furthermore, a POSITA would

have had a reasonable expectation that such a modification would result in smaller and more uniform droplets being discharged from the diffuser, thereby improving the dispersion and aroma properties of the droplets. Ex-1002, ¶¶194-195.

Other Limitations of Claims 1 and 7

Limitations 1[A]–1[G] and 7[A]-7[E] are taught by Sevy for the reasons previously provided in Ground 1 as such limitations are wholly unrelated to the discharge of “fluid dispersion.”⁹ See Section X(B)(1) and (3); EX-1002, ¶¶138-167.

Claims 8 and 10

Claims 8 and 10 are taught by Sevy for the reasons previously provided in Ground 1 as such limitations are also wholly unrelated to the discharge of fluid dispersion. See Section X(B)(2) and (4) and (6); Ex-1002, ¶¶184-188.

D. Ground 3: Claims 1, 4, and 7-10 are Unpatentable Under 35 U.S.C. §103 as Obvious Over Goubet

1) Claim 1

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

To the extent the preamble is limiting, it is taught by Goubet, which is titled “essential oil diffuser” and shown in FIG. 1 below. Ex-1016, Cover. The essential

⁹ As noted above, PO construes the term “fluid dispersion,” as used in limitation 1[G], to mean “operative fluid combined with compressed air.” That is, as used in this limitation, the term need not require “substantially uniform droplets.”

oil diffuser of Goubet is designed to break oil droplets into microdroplets and diffuse them into the ambient air in the form of an oil vapor. Ex-1016, 2:1-3.

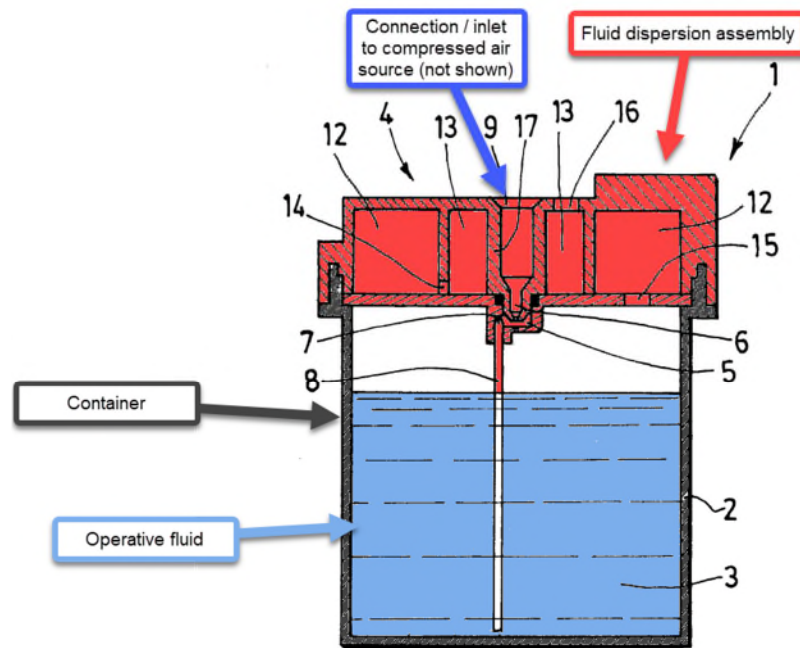


FIG.1

Ex-1016, FIG. 1

The diffuser 1 of Goubet includes a reservoir 2 designed to store oil 3 and a diffuser head 4. Ex-1016, 3:24-25. “The diffuser head 4 comprises a diffusion chamber 5 within which oil droplets are produced.” *Id.*, 3:30-31. Diffuser head also includes an outlet 16 through which microdroplets are discharged into the ambient air. *Id.*, 3:10-11. Thus, the diffusion head 4 of Goubet meets the limitation of a fluid dispersion assembly.

“The diffuser head may be attached to the reservoir by ultrasonic welding or by any other means, such as gluing or screwing.” *Id.*, 3:24-25. Goubet teaches, “[t]he diffusion chamber 5 comprises ... an oil inlet in the form of the upper end 10 of a dip tube 8 connected to the essential oil 3 contained in the reservoir 2.” Ex-1016, 3:31-4:2. Accordingly, Goubet teaches a fluid dispersion assembly (*e.g.*, diffuser head 4) that is operatively engaged to a container (*e.g.*, reservoir 2) of operative fluid (*e.g.*, oil 3). Ex-1002, ¶199.

Goubet further discloses, “[c]ompressed air is supplied by a compressor, not shown, [that] penetrates the diffuser head 4 via an air inlet channel 9, connected to said diffusion chamber 5.” Ex-1016, 4:15-16; *see also* FIG. 2 (where arrows F illustrate the path of compressed air through diffuser head 4). Thus, Goubet teaches a compressed air source (*e.g.* the compressor (not shown)) that is operatively interconnected to the fluid dispersion assembly (*e.g.*, diffuser head 4).

In operation, “[w]hen the compressed air flows into the diffusion chamber 5, the essential oil 3 is drawn into the diffusion chamber 5 by the vacuum created ... [a]ir and essential oil are mixed within the diffusion chamber 5 and a flow of oil droplets is created.” Ex-1016, 4:19-22. The microdroplets are eventually discharged from diffuser head 4 into ambient air through outlet 16. Ex-1016, 4:10-11.

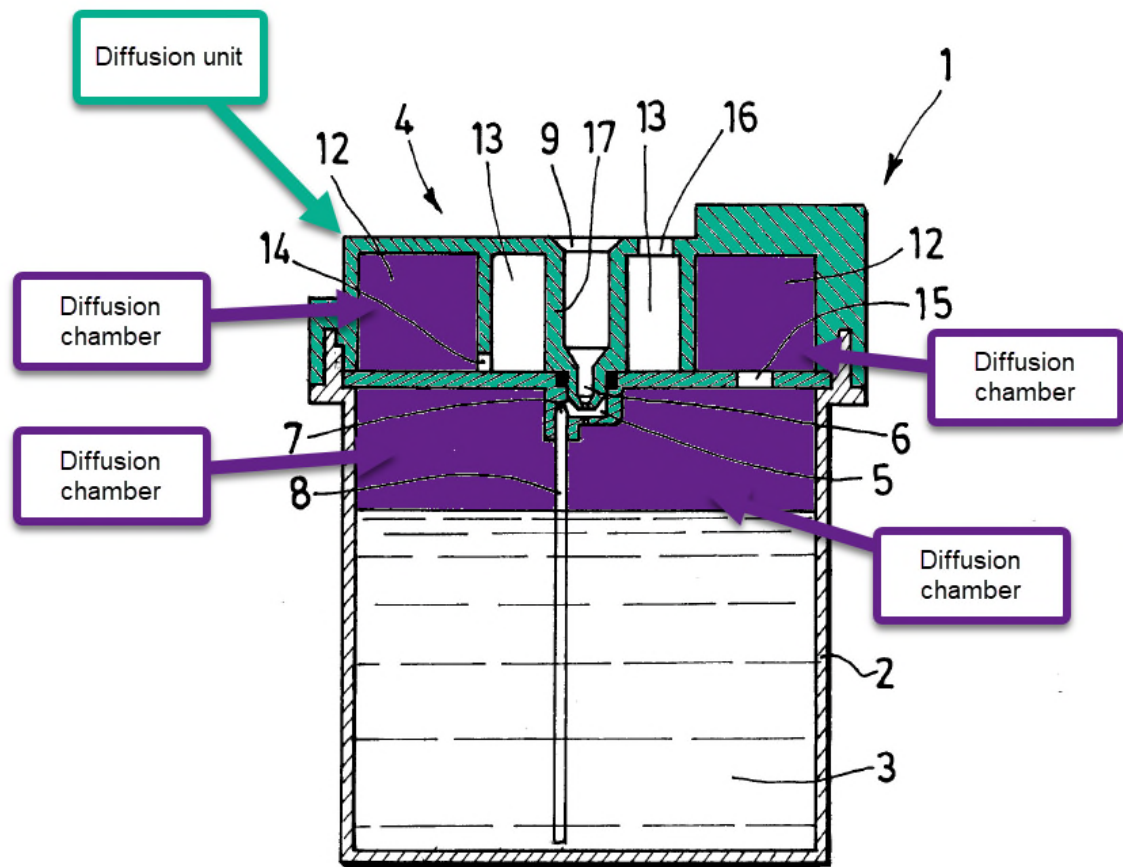
Consequently, Goubet teaches a fluid dispersion assembly (*e.g.*, diffuser head 4) that operatively engages a container (*e.g.*, reservoir 2) of an operative fluid

(*e.g.*, oil 3) and a compressed air source (*e.g.*, air compressor described but not illustrated in Goubet) to generate and discharge a fluid dispersion (*e.g.*, microdroplets) into a surrounding airspace (*e.g.*, the ambient air). See Ex-1002, ¶¶198-204.

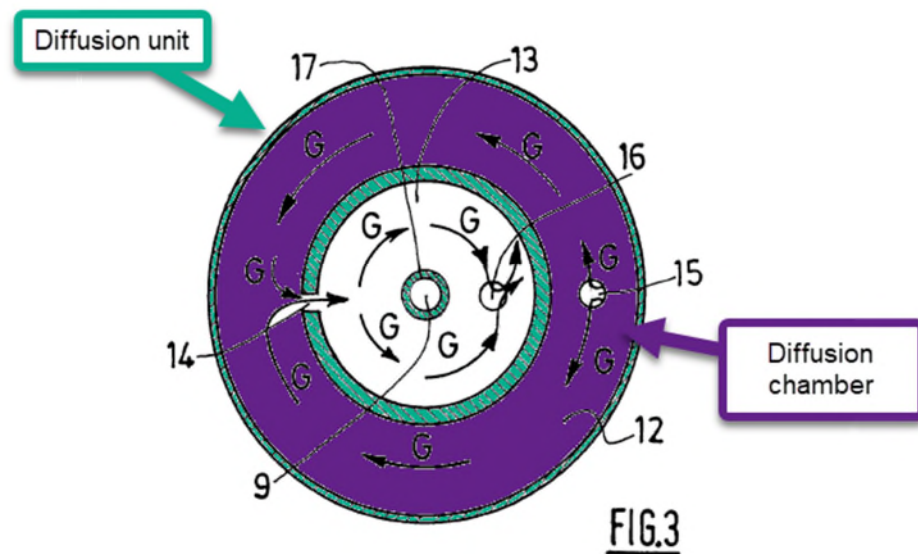
1[A] a diffusion unit at least partially defining an enclosed diffusion chamber,

The diffuser head 4 of Goubet comprises “vaporization means, arranged to break the oil droplets into microdroplets and to diffuse said microdroplets into the ambient air in the form of an oil vapor.” Ex-1016, 2:1-3. In one preferred embodiment, shown in FIGS. 1 and 3, the “vaporization means comprise at least two concentric circular enclosures, an outer enclosure [12] and an inner enclosure [13], communicating with each other through a passage [14], said two enclosures and said passage forming at least one baffle.” Ex-1016, 2:16-19.

Goubet goes on to disclose, “[w]ithin this outer enclosure 12, [the droplets] collide with the walls separating the outer enclosure 12 from the inner enclosure 13 and . . . the droplets are broken up into microdroplets.” Ex-1016, 4:28-5:4. Thereafter, “[t]he microdroplets are diffused into the ambient air in the form of essential oil vapour.” Ex-1016, 5:6-7.



EX1016, FIG. 1



Ex-1016, FIG. 3

Therefore, the walls of diffuser head 4 (*e.g.*, the walls separating the outer enclosure 12 from the inner enclosure 13) meet the limitation of a diffusion unit. As described with respect to the fluid flow path and depicted above, the diffusion unit at least partially defines a diffusion chamber (*e.g.*, shaded purple in FIGS. 1 and 3) within which the droplets are broken into microdroplets. Thus, Goubet teaches a diffusion unit at least partially defining a diffusion chamber.

Again, Goubet teaches “diffuser head [4] may be attached to the reservoir by ultrasonic welding or by any other means, such as gluing or screwing.” *Id.*, 3:24-25. Furthermore, diffuser head 4 includes an upper wall, as shown in FIGS. 1 and 3, such that the diffusion chamber (*e.g.*, shaded purple) is enclosed. Ex-1002, ¶¶205-209.

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

In describing diffuser head 4, Goubet recites “[t]he inner chamber 13 comprises an outlet 16 for the microdroplets to [exit to] the ambient air.” Ex-1016, 4:10-11. Outlet 16 is illustrated in FIG. 1 below.

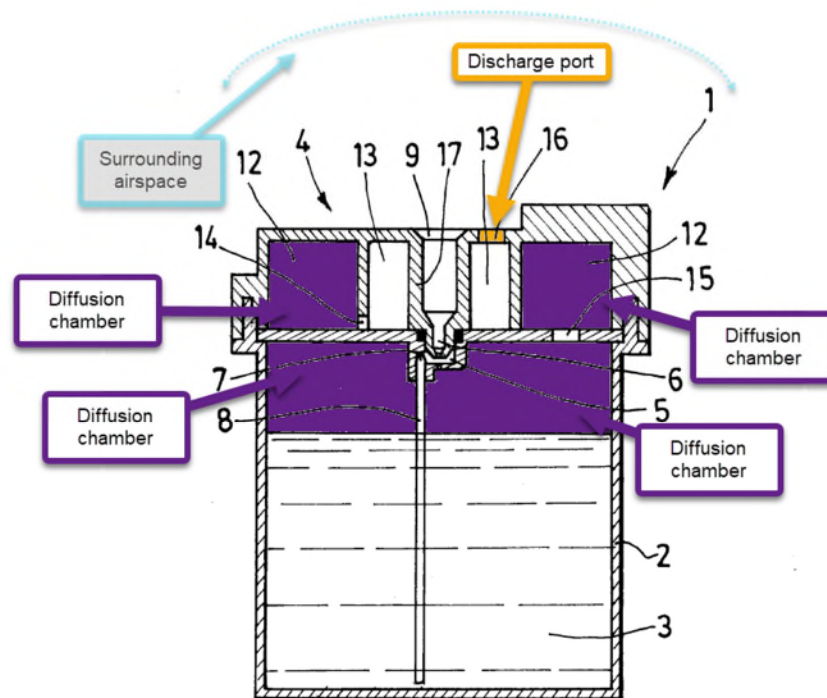
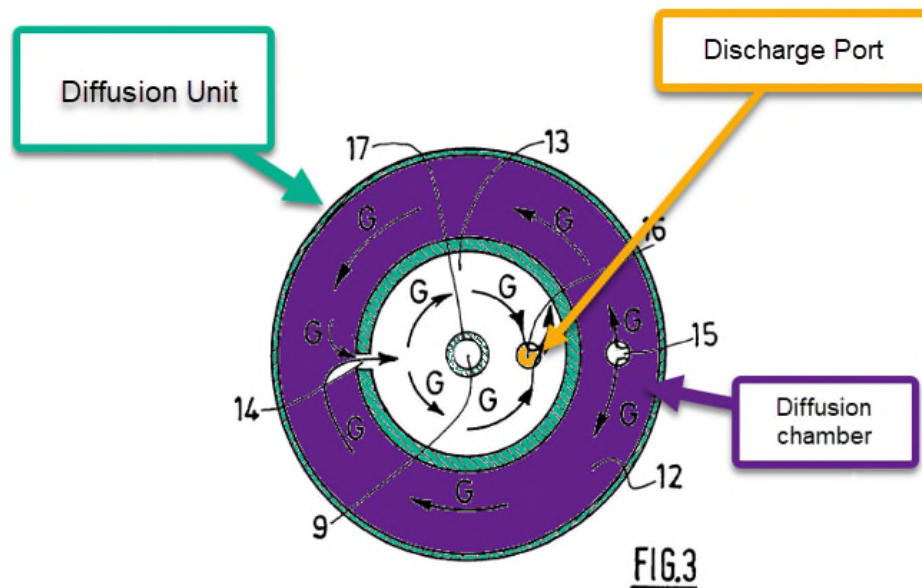


FIG.1

Ex-1016, FIG. 1

The droplet flow path is illustrated by the arrows G in FIG. 3 below. Ex-1016, 4:25. As shown, the droplets travel from outer enclosure 12 (*e.g.*, a portion of the diffusion chamber), to inner enclosure 13, through outlet 16 (*e.g.*, discharge port) and into ambient air. Thus, Goubet teaches a discharge port (*e.g.*, outlet 16) disposed

in fluid communication between said diffusion chamber (e.g., annotated in purple) and the surrounding airspace. Ex-1002, ¶¶208-211.



Ex-1016, FIG. 3

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

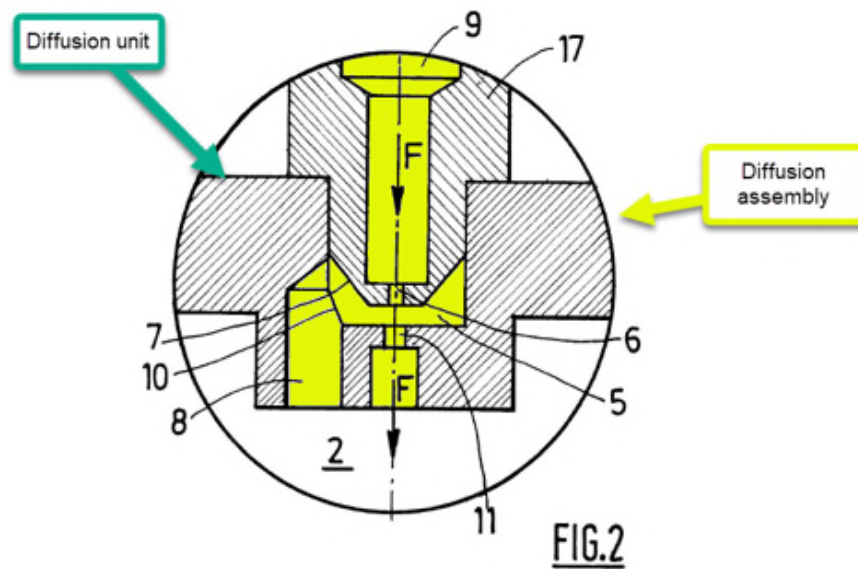
Again, in the '449 Patent, the diffusion assembly 200 is described as “compris[ing] an air inlet 210 and an atomizer assembly.” Ex-1001, 5:15-16. Goubet teaches a corresponding structure. Specifically, Goubet recites “[c]ompressed air is supplied by a compressor, not shown, and penetrates the diffuser head 4 via an air inlet channel 9, connected to said diffusion chamber 5.” Ex-1016, 4:15-16. Thus, Goubet teaches an air inlet in the form of air inlet channel 9.

Goubet further recites “essential oil 3 is drawn into the diffusion chamber through the upper end of the dip tube 8. Air and essential oil are mixed within the

Goubet also teaches a diffusion assembly (*e.g.*, the combination of air inlet channel 9 and the atomizer assembly (*e.g.*, the assembly of components that atomize liquid)) as depicted in FIGS. 1 and 2 below.



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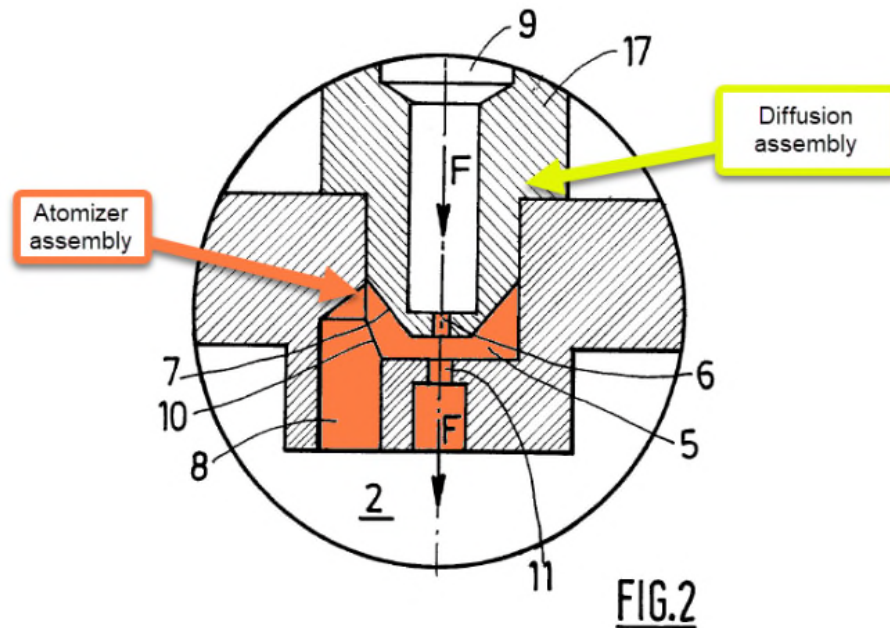
Ex-1016, FIG. 2

As illustrated in FIG. 1, the diffusion assembly of Goubet is disposed within the wall 17 of diffuser head 4, and therefore, disposed in operative engagement with the diffusion unit. Goubet additionally recites “[u]nder the effect of the compressed air pressure, the droplets leaving the diffusion chamber 5 are pushed towards the inside of the reservoir 2 and then towards the inlet 15 of the outer enclosure 12, into which they emerge.” Ex-1016, 4:26-28. As a result, Goubet teaches that the diffusion assembly (*e.g.*, the combination of air inlet channel 9 and the assembly of components that atomize oil 3) is in operative engagement with said diffusion unit, and specifically the diffusion chamber (*e.g.*, shaded purple) thereof. Ex-1002, ¶¶214-218.

1[D] wherein said diffusion assembly comprises an atomizer assembly, said atomizer assembly comprising an atomizer air inlet

channel, a fluid inlet, a mixing chamber, and an atomizer exhaust aperture, and

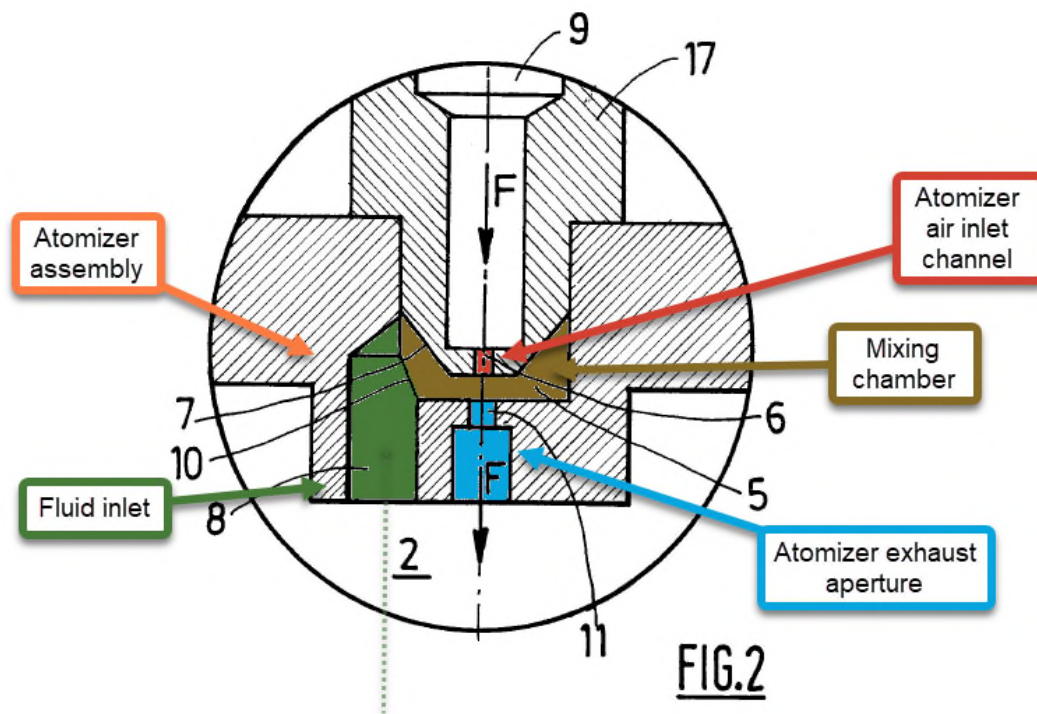
Goubet teaches a diffusion assembly including an atomizer assembly as previously demonstrated in limitation 1[C]. The atomizer assembly is annotated in FIG. 2 below.



Ex-1016, FIG. 2

The components of Goubet's atomizer assembly are detailed further and annotated in another FIG. 2 below. Specifically, Goubet's atomizer assembly includes a diffusion chamber 5, a compressed air inlet 6, a venturi cone 7, and an upper end of a dip tube 8. Ex-1016, 3:31-4:2. In use, compressed air flows in the direction illustrated by arrow F in FIG. 2, and more specifically from the compressor (not shown), through air inlet channel 9 to compressed air inlet 6, and then into

diffusion chamber 5. Ex-1016, 4:15-18. Accordingly, the atomizer assembly of Goubet includes an atomizer air inlet channel (e.g., compressed air inlet 6).



Ex-1016, FIG. 2

Goubet further teaches, “[w]hen the compressed air flows into the diffusion chamber 5, the essential oil 3 is drawn into the diffusion chamber 5 by the vacuum [force] . . . through the upper end 10 of the dip tube 8.” *Id.*, 4:19-21. The atomizer assembly of Goubet thus includes a fluid inlet (e.g., the upper end of the dip tube 8).

Goubet goes on to recite, “[a]ir and essential oil are mixed within the diffusion chamber 5 and a flow of oil droplets is created.” *Id.*, 4:21-22; *Id.*, 5:15-16 (creating atomized oil mist). Goubet’s atomizer assembly therefore includes a mixing

chamber (*e.g.*, diffusion chamber 5). Afterwards, the flow of “oil droplets is then carried along by the compressed air and exits the diffusion chamber 5 through an outlet 11 towards the inside of the reservoir 2.” *Id.*, 4:23:24. The atomizer assembly thus also includes an atomizer exhaust aperture (*e.g.*, outlet 11).

Therefore, Goubet teaches an atomizer assembly having each of the components described in the '449 Patent, namely an atomizer air inlet channel, a fluid inlet, a mixing chamber, and an atomizer exhaust aperture. Ex-1002, ¶¶219-225.

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

As demonstrated in this Ground 3 with respect to limitation 1[D], the atomizer air inlet channel (*e.g.*, compressed air inlet 6) is interconnected to the compressed air source (*e.g.*, not shown yet described) via inlet channel 9. Ex-1016, 4:15-16; *see also Id.*, FIG. 2.

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

As demonstrated in this Ground 3 with respect to limitation 1[D], the fluid inlet (*e.g.*, the upper end of the dip tube 8) is disposed in fluid communication with the operative fluid (*e.g.*, essential oil 3) in the container (*e.g.*, reservoir) via the lower portion of dip tube 8. *Id.*, 4:1-2; *see also Id.*, FIG. 2.

1[G] the compressed air and the operative fluid mix together in said mixing chamber to form the fluid dispersion.

As demonstrated in this Ground 3 with respect to limitation 1[D], the compressed air and the operative fluid (*e.g.*, essential oil 3) mix together in said mixing chamber (*e.g.*, diffusion chamber 5). *Id.*, 4:21-22; *Id.*, 5:15-16 (creating atomized oil mist); *see also Id.*, FIG. 2.

2) Claim 4

The fluid dispersion assembly as recited in claim 1 wherein said diffusion chamber facilitates formation of the fluid dispersion prior to discharge of the fluid dispersion from said diffusion chamber through said discharge port and into the surrounding airspace.

As demonstrated above, the diffuser head 4 of Goubet includes an outer enclosure 12 and an inner enclosure 13 forming a diffusion chamber that breaks oil droplets into microdroplets prior to discharging the microdroplets through outlet 16 and into the surrounding airspace. Ex-1016, 4:3-11.

Although Goubet does not explicitly teach that the microdroplets are “substantially uniform” in diameter, a POSITA would appreciate that Goubet at least suggests this limitation. When discussing known essential oil diffusers, Goubet submits that “compressed air generally arrives in the diffuser head rather abruptly, with the result that a large quantity of oil droplets is rapidly diffused into the ambient atmosphere ... with no real control over this diffusion.” Ex-1016, 1:10-13. Goubet goes on to teach, “such diffusion may be felt as harsh by those present and is detrimental to establishing a refreshing, relaxing atmosphere.” Ex-1016, 1:14-15. To remedy this problem, the diffuser 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 (*emphasis added*). See Ex-1016, 5:12-16.

The microdroplets that have been “reduced [in size] as much as possible” within the confines of Goubet’s structure meet the “fluid dispersion” limitation. A POSITA would appreciate that the circular shape of the baffled path will continually separate 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 accumulating on surface of one of the walls. 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, 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”. Ex-1002, ¶¶229-230.

If PO 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. EX-1002, ¶¶232-233.

Goubet's objective of reducing droplet size as much as possible would have motivated a POSITA to add additional enclosures to the dual enclosure design. Ex-1016, 5:13-16; 2:16-18 (reciting "said vaporization means comprise at least two concentric circular enclosures" and thus suggesting additional circular enclosures were already contemplated). A POSITA would appreciate that additional enclosures would result in further atomization and thus smaller, and more uniform droplets. A POSITA would have had a reasonable expectation of success in adding additional enclosures because the combination would not require undue experimentation or modification of the existing components and because a further enclosure would not introduce any incompatibilities with Goubet's existing design. Ex-1002, ¶¶230-235. Goubet thus renders obvious claim 4 of the '449 Patent.

3) Claim 7

There are no material differences between claim limitations 1[PRE]-1[D] and claim 7 of the '449 Patent. Appendix (*compare* claim limitations 1[PRE]-1[D], *with* claim 7). Thus, for the same reasons discussed in this Ground 3 with respect to claim limitations 1[PRE]-1[D], Goubet discloses or renders obvious all the limitations of claim 7. *See supra* Claim 1, limitations 1[PRE]-1[D].

4) Claim 8

There are no material differences between claim 8 and claim limitations 1[E]-1[G] of the '449 Patent. Appendix (*compare* claim 8, *with* claim limitations 1[E]-

1[G]). For the same reasons discussed in this Ground 3 with respect to claim limitations 1[E]-1[G], Goubet discloses or renders obvious all the limitations of claim 8. *See supra* Claim 1, limitations 1[E]-1[G].

5) Claim 9

There are no material differences between claim 9 and claim 4 of the '449 Patent. Appendix (*compare* claim 4, *with* claim 9). For the same reasons discussed in this Ground 3 with respect to claim 4, Goubet discloses or renders obvious all the limitations of claim 9. *See supra* Claim 4.

6) Claim 10

The fluid dispersion assembly as recited in claim 7 further comprising a container interconnect operatively interconnecting said diffusion unit to the container.

Goubet recites, “[t]he diffuser head may be attached to the reservoir by ultrasonic welding *or by any other means*, such as gluing or screwing.” Ex-1016, 3:26-27. Accordingly, Goubet teaches a container interconnect, namely, the means in which diffuser head 4 is connected to the container (*e.g.*, reservoir 2).

E. Ground 4: Claims 1, 4, and 7-10 are Unpatentable under 35 U.S.C. §103 as Obvious Over Goubet in view of Kaiser.

As discussed in Ground 3, Goubet alone renders obvious claims 1, 4, and 7-10. As part of that analysis, Petitioner noted that Goubet discloses a diffusion unit (*e.g.*, diffuser head 4) that generates and discharges particularly fine microdroplets to improve control over the diffusion, to reduce the harshness of the aroma, and to

quietly disperse the essential oil into the air. Ex-1016, 2:6-8. However, Goubet does not explicitly disclose that its microdroplets are “substantially uniform” in diameter. Thus, Ground 4 relies on Kaiser in combination with Goubet for limitations 1[PRE], Claim 4, 7[PRE], and Claim 9 that recite the “fluid dispersion” term. Kaiser demonstrates that it was well known in the field at the time of the invention that droplets of greater uniformity result in uniform droplet evaporation. Ex-1014, pg. 43 (“critical to uniform evaporation and burning is a good control of the size distribution of the resulting aerosol”). *Id.*

If the PTAB concludes that Goubet does not teach a ‘fluid dispersion’ as presently configured, a POSITA would have been motivated to modify Goubet to include additional enclosures to further reduce the size (diameter) of the droplets for the reasons discussed above within Ground 3. A POSITA would have been motivated to add the additional enclosures in view of Kaiser’s teaching that uniform droplets result in uniform evaporation, which, in turn, would improve the smoothness (*i.e.*, less harsh) of the aroma generated as the oil droplets evaporate in the surrounding airspace.

A POSITA would modify Goubet’s diffuser head to include additional enclosures to further reduce the size of the microdroplets without undue experimentation for the same reasons set forth in Groun 3 above. Furthermore, a POSITA would have reasonably expected such modification to result in the

discharge of smaller and more uniform from the diffuser, which would exhibit improved dispersion and aroma properties. *See Railroad Supply Co v. Elyria Iron & Steel Co*, 244 U.S. 285, 292 (1917) (“the mere carrying forward of the original thought, a change only in form, proportions, or degree, doing the same thing in the same way, by substantially the same means, with better results, is not such an invention as will sustain a patent”) (internal quotation marks omitted). *See, e.g.*, Ex-1002, ¶¶246-257.

Other Limitations of Claims 1 and 7

Limitations 1[A]–1[G] and 7[A]-7[E] are taught by Goubet for the reasons previously provided in Ground 3 as such limitations are wholly unrelated to the discharge of “fluid dispersion.” *See* Section X(D)(1) and (3); Ex-1002, ¶¶205-228.

Claims 8 and 10

Claims 8 and 10 are taught by Goubet for the reasons previously provided in Ground 3 as such limitations are also wholly unrelated to the discharge of fluid dispersion. *See* Section X(D)(2) and (4) and (6); Ex-1002, ¶¶241-245.

Claims 1, 4, and 7-10 are thus rendered obvious under 35 U.S.C. §103 over Goubet in view of Kaiser.

F. Ground 5: Claims 1, 4, and 7-10 are Unpatentable under 35 U.S.C. §102 as Being Anticipated by Gao

1) Claim 1

1[PRE] A fluid dispersion assembly operatively engages a container of an operative fluid and a compressed air source and

generates and discharges a fluid dispersion into a surrounding airspace, said fluid dispersion assembly comprising:

To the extent the preamble is limiting, it is taught by Gao. Gao is titled “atomizer for atomizing essence or essential oil.” Ex-1013, Cover.

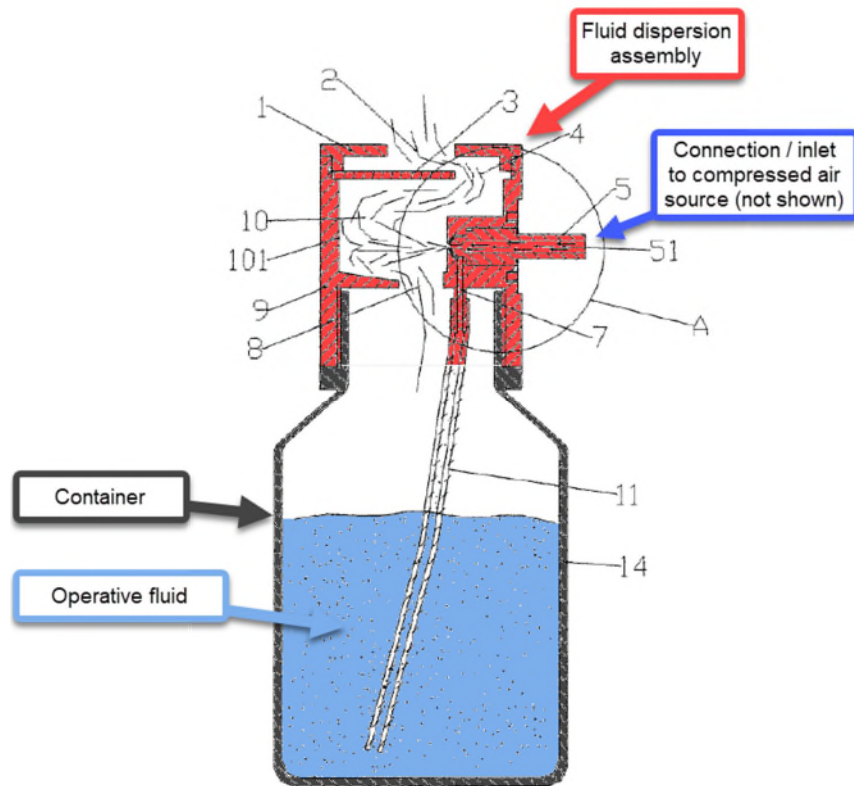


FIG. 1

Ex-1013, FIG. 1

As shown above in FIG. 1, Gao teaches a fluid dispersion assembly (*e.g.*, the atomizer). Gao’s atomizer includes a “a main body 9 and a cover body 1.” Ex-1013, ¶[0020]. The main body 9 has “an upper cavity and a lower cavity,” and the inner wall of the lower cavity “is provided with an internal thread for fixing the entire atomizer on an essence or essential oil bottle 14.” *Id.* Accordingly, the fluid

dispersion assembly (*e.g.*, the atomizer) is interconnected to a container of an operative fluid (*e.g.*, essential oil bottle 14) via the threading for atomizing essential oil. Ex-1002 ¶¶261-263.

Gao further teaches that the “atomizer body is provided with a first cavity and a second cavity 13.” Ex-1013, ¶[0019]. A “gas flow nozzle 5 is fixed in the second cavity 13.” *Id.* “A coaxial gas flow pipe 51 is provided inside the gas flow nozzle 5.” *Id.*, ¶[0023]. The “gas inlet on a side of the atomizer, *i.e.*, the inlet of the gas flow pipe 51 is connected to the air pump [not shown].” *Id.*, ¶[0025]. Accordingly, Gao teaches that the fluid dispersion assembly (*e.g.*, the atomizer) is operatively interconnected to an air pump via the gas flow pipe 51. Ex-1002 ¶¶263-264.

“When the air pump is in operation, a gas flow is blown out through the pipe. The liquid is sucked into the atomizing cavity 6 based on the siphon principle.” *Id.*, ¶[0025]; *see also* Ex-1002 ¶265. The Siphon principle is the fundamental idea that fluids flow from an area of higher pressure to areas of lower pressure. Ex-1002 ¶¶70-84. Given PO’s previously discussed proposed construction of a “compressed air source,” Gao’s pump, which blows air above ambient pressure into the atomizer to produce the siphon principle, pump meets the “compressed air source” limitation. Ex-1002 ¶265.

Therefore, Gao teaches a fluid dispersion assembly (*e.g.*, the atomizer) that operatively engages a container (*e.g.*, essence or essential oil bottle 14) of an

operative fluid (*e.g.*, essence or essential oil) and a compressed air source (*e.g.*, the pump) to generate and discharge a fluid dispersion (*e.g.*, atomized essential oil) into a surrounding airspace.

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

Gao teaches “liquid and gas are fully mixed” as a result of the siphon principle. Ex-1013, ¶[0025]. “The high-speed gas-liquid mixture is then ejected through a gas flow ... port and hits an inner wall 101 of the lower part cavity 10, thus the liquid is atomized into micron-sized fine particles.” *Id.* Accordingly, Gao teaches a diffusion unit (*e.g.*, main body 9), which at least partially defines a diffusion chamber (*e.g.*, lower part cavity 10 in which atomization occurs and the micron-sized fine particles are generated). *Id.*, FIG. 1; *see also* Ex-1002, ¶268.

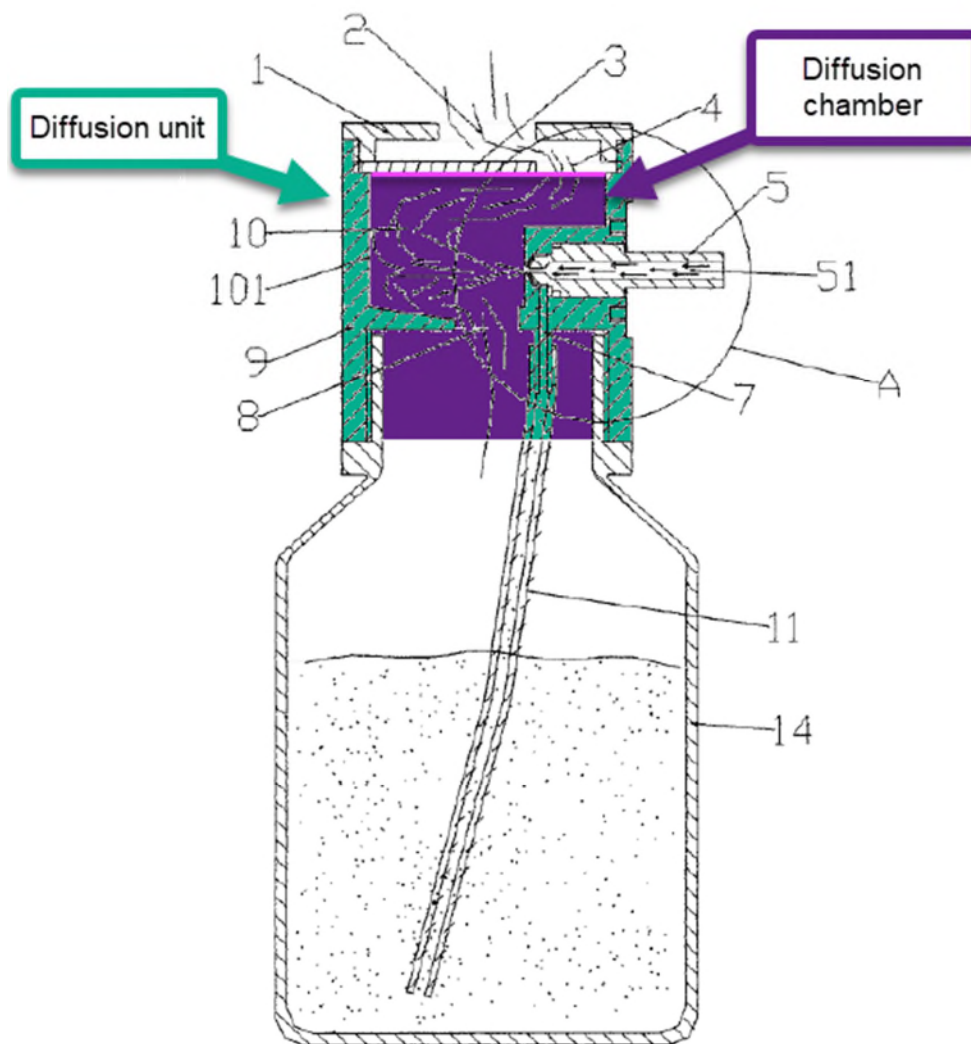


FIG. 1

Ex-1013, FIG. 1

As mentioned, the lower cavity of main body 9 (*e.g.*, the diffusion unit) “is provided with an internal thread for fixing the entire atomizer on an essence or essential oil bottle 14.” Ex-1013, ¶[0020]. The cover body 1 is fixed to an upper portion of main body. *Id.* The diffusion chamber (shaded purple), is enclosed by the inner wall 101 of main body 9, essence or essential oil bottle 14, and cover body 1.

Thus, Gao discloses a diffusion unit that at least partially defines an enclosed chamber.

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

Gao teaches that after the micron-sized fine particles are formed, “[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.” Ex-1013, ¶[0025], FIG. 1.

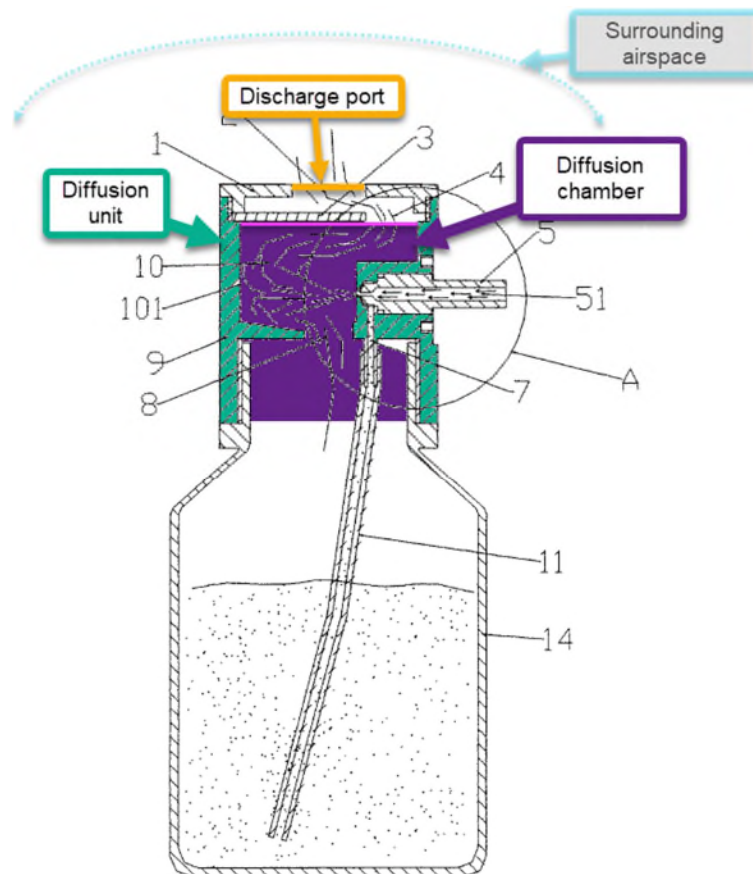


图 1

Ex-1013, FIG. 1

Accordingly, Gao teaches a discharge port (*e.g.*, gas outlet 2) that is disposed in fluid communication between the diffusion chamber (*e.g.*, including lower part cavity 10 in which the micron-sized fine particles are formed) and the surrounding airspace. Ex-1002, ¶¶271-273.

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

The '449 Patent explains that “the diffusion assembly 200 comprises an air inlet 210 and an atomizer assembly.” Ex-1001, 6:5-7. Gao teaches a corresponding structure.

With reference to FIGS. 1 and 2 of Gao, the “gas flow nozzle 5 is fixed in the second cavity 13.” Ex-1013, ¶[0019]. “A coaxial gas flow pipe 51 is provided inside the gas flow nozzle 5.” *Id.*, ¶[0023]. The “gas inlet on a side of the atomizer, *i.e.*, the inlet of the gas flow pipe 51 is connected to the air pump [not shown].” *Id.*, ¶[0025]. Thus, Gao teaches an air inlet, the inlet of the gas flow pipe 51.

Gao further discloses “[t]he liquid is sucked into the atomizing cavity 6 based on the siphon principle, and the liquid and the gas are fully mixed ... then ejected through a gas flow [] port.” *Id.*, 1013, ¶[0025]. A POSITA would appreciate that mixing liquid with air is an atomization process. Ex-1002, ¶218; *see also* Ex-1013, ¶[0025] (referring to the cavity as an “atomizing cavity” in which the liquid is atomized). Thus, Gao discloses an atomizer assembly. As described above, the combination of Gao’s inlet of the gas flow pipe 51 and Gao’s atomizer assembly,

forms structure that corresponds to the diffusion chamber. As shown in FIG. 1, a portion of Gao's diffusion assembly is disposed in operative engagement with the diffusion unit. See Ex-1013, FIGS. 1 and 2 (reproduced below) depicting a portion of the diffusion assembly being fixed within the second cavity of the main body 9 (e.g., diffusion unit).

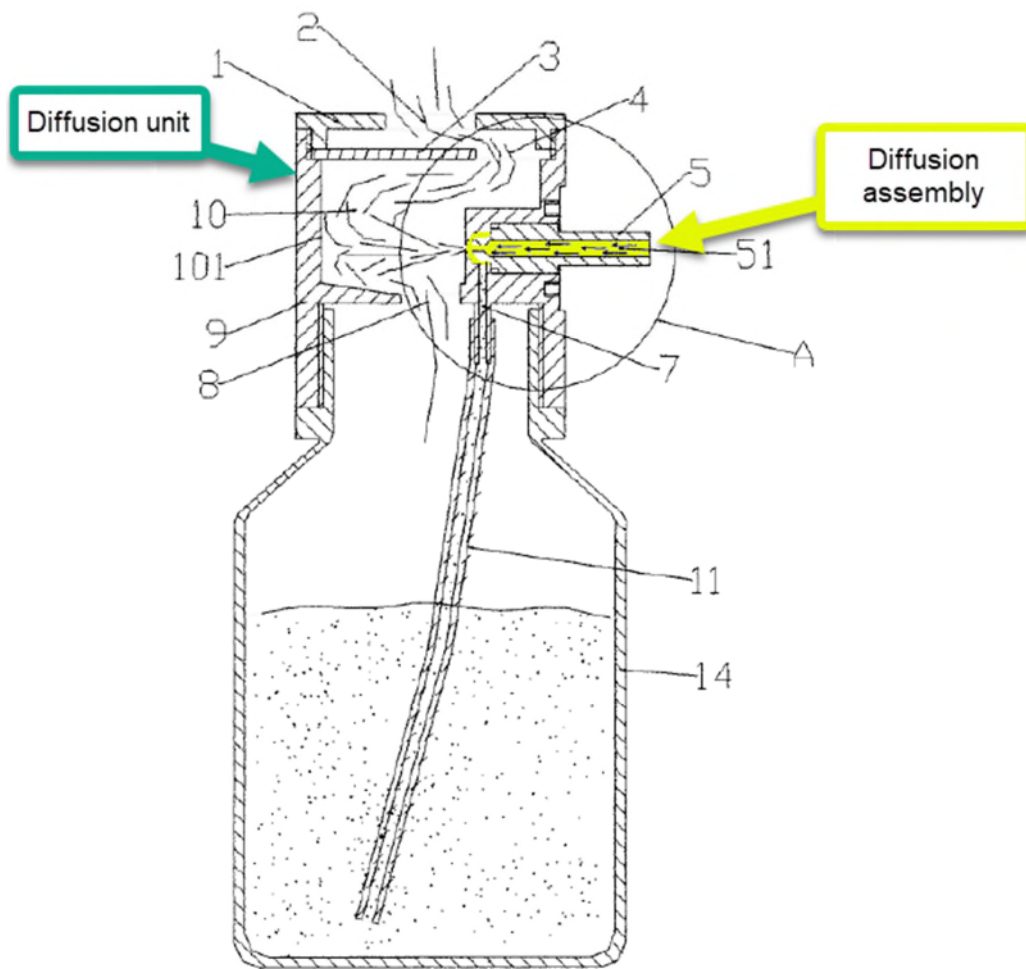


FIG. 1

Ex-1013, FIG. 1

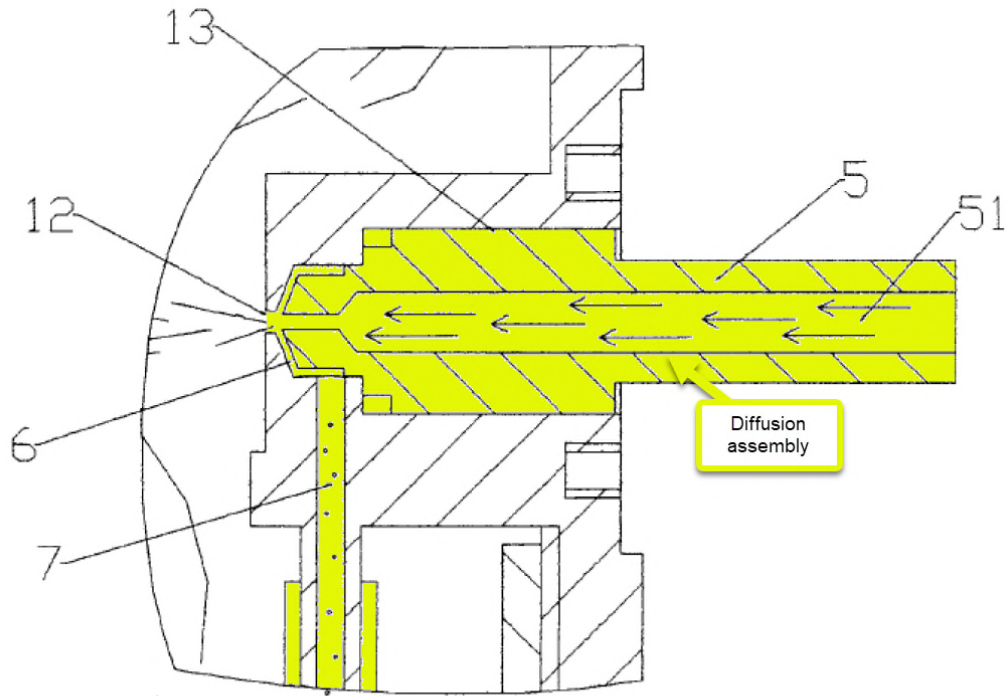


FIG. 2

Ex-1013, FIG. 2

1[D] wherein said diffusion assembly comprises an atomizer assembly, said atomizer assembly comprising an atomizer air inlet channel, a fluid inlet, a mixing chamber, and an atomizer exhaust aperture, and

Gao discloses a diffusion assembly for the reasons set forth in claim limitations 7[C]. The atomizer assembly thereof, and its operation, is described in further detail hereinafter and annotated in FIG. 2 below.

Gao's "gas inlet on [the] side of the atomizer, *i.e.*, inlet of the gas flow pipe 51, is connected to the air pump." Thus, Gao teaches an atomizer air inlet channel. Ex-1013, ¶[0025]. "A gap is provided between the gas flow nozzle 5 and the bottom wall of the second cavity 13. An atomizing cavity 6 is formed between the gas flow

Further, “[w]hen the air pump is in operation, a gas flow is blown out through

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cavity 6). *Id.* “The high-speed gas-liquid mixture is then ejected through a gas flow [] port [12].” *Id.* Thus, Gao also teaches an atomizer exhaust aperture.

Therefore, Goubet teaches an atomizer assembly having each of the components described in the '449 Patent, namely an atomizer air inlet channel (*e.g.*, inlet of gas flow pipe 51), a fluid inlet (*e.g.* upper end of liquid pipeline 7), a mixing chamber (*e.g.*, atomizing cavity 6), and an atomizer exhaust aperture (*e.g.*, gas flow spray hole 12). Ex-1002, ¶¶277-282.

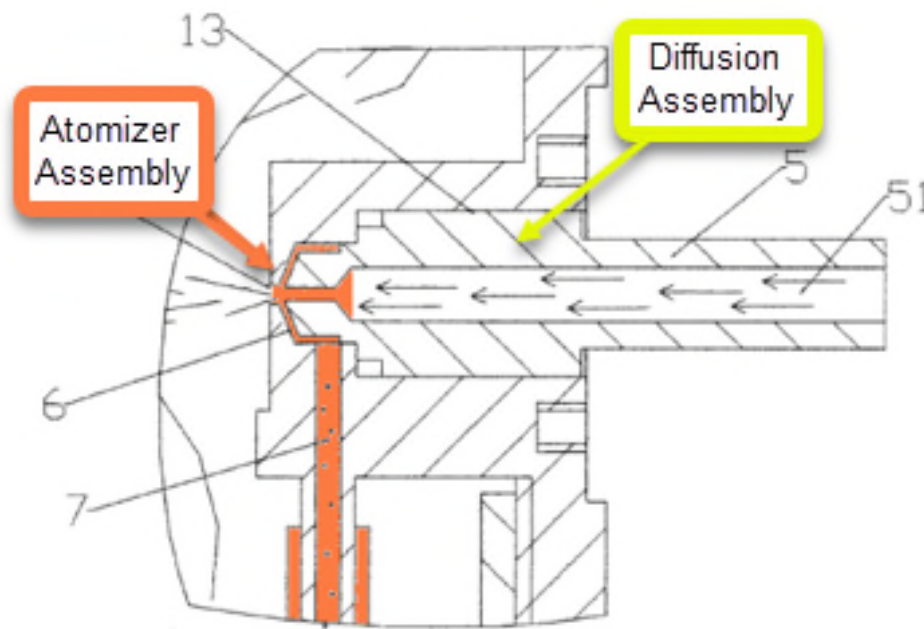


FIG. 2

Ex-1013, FIG. 2

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

As demonstrated in this Ground 5 with respect to limitation 1[D], the atomizer air inlet channel (*e.g.*, inlet of gas flow pipe 51 facing the atomizer) is interconnected

to the compressed air source [not shown] via the end of the of the gas flow pipe 51 facing Gao's air pump (described not shown). Ex-1013, ¶[0025]; *see also Id.*, FIG. 2.

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

As demonstrated in this Ground 5 with respect to limitation 1[D], the fluid inlet (*e.g.* upper end of liquid pipeline 7) is disposed in fluid communication with the operative fluid in the container (*e.g.*, essential oil bottle 14) via the lower portion liquid pipeline. Ex-1013, ¶[0025]; *Id.*, ¶[0019]; (“the liquid pipeline is in communication with the atomizing cavity”); *see also Id.*, FIGS. 1 and 2.

1[G] the compressed air and the operative fluid mix together in said mixing chamber to form the fluid dispersion.

As demonstrated in this Ground 5 with respect to limitation 1[D], the compressed air and the operative fluid mix together in said mixing chamber (*e.g.*, atomizing cavity 6). Ex-1013, ¶[0025] (“liquid is sucked into the atomizing cavity 6 . . . and the liquid and the gas are fully mixed”); *see also id.*, FIG. 2.

2) Claim 4

The fluid dispersion assembly as recited in claim 1 wherein said diffusion chamber facilitates formation of the fluid dispersion prior to discharge of the fluid dispersion from said diffusion chamber through said discharge port and into the surrounding airspace.

Gao teaches, when the air pump is in operation, air is blown through gas flow pipe 51 and liquid is sucked into atomizing cavity 6, where the liquid and air are fully mixed. *Id.*, ¶[0025]. The high-speed gas-liquid mixture is then ejected against

an inner wall 101 of main body 9 to atomize the liquid mixture into micron-sized fine particles. *Id.* Only the smallest particles (below 3 microns) will drift around the baffle 3 and out gas outlet 2. *Id.* In this manner, “mist can be controlled below 3 microns.” *Id.*, ¶¶[0025], [0007] (“the atomized particles are finer *and more uniform* . . . and the aroma diffusion area is large”). Gao goes on to teach, the finer and *more uniform particles* “are easier to vaporize after contact with the air, and the aroma is more uniform.” *Id.*, ¶ [0013]. Thus, Gao teaches the limitation said diffusion chamber (*e.g.*, chamber within main body 9) facilitates formation of the fluid dispersion (*e.g.*, substantially uniform droplets) prior to the discharge of the fluid dispersion from said diffusion chamber through said discharge port (*e.g.*, atomizing gas outlet 2) and into the surrounding airspace.

3) Claim 7

There are no material differences between claim limitations 1[PRE]-1[D] and claim 7 of the '449 Patent. Appendix (*compare* claim limitations 1[PRE]-1[D], *with* claim 7). Thus, for the same reasons discussed in this Ground 5 with respect to claim limitations 1[PRE]-1[D], Gao teaches all the limitations of claim 7. *See supra* Claim 1, limitations 1[PRE]-1[D].

4) Claim 8

There are no material differences between claim 8 and claim limitations 1[E]-1[G] of the '449 Patent. Appendix (*compare* claim 8, *with* claim limitations 1[E]-

1[G]). For the same reasons discussed in this Ground 5 with respect to claim limitations 1[E]-1[G], Gao teaches all the limitations of claim 8. *See supra* Claim 1, limitations 1[E]-1[G].

5) Claim 9

There are no material differences between claim 9 and claim 4 of the '449 Patent. Appendix (*compare* claim 4, *with* claim 9). For the same reasons discussed in this Ground 5 with respect to claim 4, Gao teaches all the limitations of claim 9. *See supra* Claim 4.

6) Claim 10

The fluid dispersion assembly as recited in claim 7 further comprising a container interconnect operatively interconnecting said diffusion unit to the container.

Gao teaches the main body 9 (*e.g.*, diffusion unit) has “an upper cavity and a lower cavity.” Ex-1013, ¶[0020]. The inner wall of the lower cavity “is provided with an internal thread for fixing the entire atomizer on an essence or essential oil bottle 14.” *Id.* Thus, Gao teaches a container interconnect (*e.g.*, an internal thread) operatively interconnecting said diffusion unit to the container (essence or essential oil bottle 14).

For these reasons, Gao anticipates claims 1, 4, and 7-10 of the '449 Patent.

XI. DISCRETIONARY DENIAL IS NOT APPROPRIATE

A. 35 U.S.C. § 325(d)

Under § 325(d), the Board uses the following two-part framework to determine whether to exercise its discretion and deny institution of review: (1) whether the same or substantially the same art previously was presented to the Office or whether the same or substantially the same arguments previously were presented to the Office; and (2) if either condition of first part of the framework is satisfied, whether the petitioner has demonstrated that the Office erred in a manner material to the patentability of challenged claims. *Advanced Bionic v. Med-EL Elektromedizinische Geräte*, IPR2019-01469, 2020 WL 740292, at *3-4 (P.T.A.B. Feb. 13, 2020) (precedential). The Court should not exercise its discretion here because this Petition (1) presents substantially different art and arguments that were not previously presented to the Office, and (2) even if part one of the framework could be satisfied, the Examiner erred in a manner material to the patentability of challenged claims.

First, Grounds 2-5 rely on Goubet, Gao, and Kaiser, none of which were previously presented to the Office. While Sevy was presented during prosecution, there is no indication the Examiner considered its teachings as argued in this Petition. Ex-1005, 2:41-47; Ex-1006, 9:18-22. And, moreover, the arguments presented herein are supported by Dr. White's detailed Declaration explaining how a POSITA would view the teachings of the references herein. Ex-1002. Therefore, part one of

the *Advanced Bionics* test favors institution, as the Grounds set forth herein were not considered by the Examiner.

Second, even assuming part one of the framework could be satisfied, the Examiner mistakenly allowed the '449 Patent claims by overlooking teachings in the prior art that renders the challenged claims obvious, as explained by Dr. White's declaration. *See* MPEP 2411.04(V)(B).

B. 35 U.S.C. § 314(a)

Apple, Inc. v. Fintiv, Inc., IPR2020-00019, Paper 11 (P.T.A.B. Mar. 20, 2020) (precedential) favors institution because this Petition presents compelling evidence of unpatentability and, per PTO interim guidance, Petitioner stipulates that if the Board institutes this IPR then Petitioner will not seek resolution in the district court litigation of invalidity based on the grounds in this Petition, or any grounds that could have reasonably been raised in this Petition. *See Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 at 17 (P.T.A.B. Dec. 1, 2020) (precedential); 35 U.S.C. §311.

XII. CONCLUSION

In view of the foregoing, claims 1, 4, and 7-10 of the '449 Patent are not patentable and Petitioner requests this IPR be instituted.

Date: March 18, 2025

Respectfully submitted,

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APPENDIX - Claim Limitation Listing

Claim 1

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

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

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

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

1[D] wherein said diffusion assembly comprises an atomizer assembly, said atomizer assembly comprising an atomizer air inlet channel, a fluid inlet, a mixing chamber, and an atomizer exhaust aperture, and

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

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

1[G] the compressed air and the operative fluid mix together in said mixing chamber to form the fluid dispersion.

Claim 4

The fluid dispersion assembly as recited in claim 1 wherein said diffusion chamber facilitates formation of the fluid dispersion prior to discharge of the fluid dispersion from said diffusion chamber through said discharge port and into the surrounding airspace.

Claim 7

7[PRE] 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:

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

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

7[C] a diffusion assembly disposed in an operative engagement with said diffusion unit,

7[D] wherein said diffusion assembly comprises an atomizer assembly, said atomizer assembly comprising an atomizer air inlet channel, a fluid inlet, a mixing chamber, and an atomizer exhaust aperture.

Claim 8

8[A] The fluid dispersion assembly as recited in claim 7 wherein said atomizer air inlet channel is interconnected to the compressed air source and

8[B] said fluid inlet disposed in fluid communication with the operative fluid in the container,

8[C] the compressed air and the operative fluid mix together in said mixing chamber to form the fluid dispersion.

Claim 9

The fluid dispersion assembly as recited in claim 8 wherein said diffusion chamber facilitates formation of the fluid dispersion prior to discharge of the fluid dispersion from said diffusion chamber through said discharge port and into the surrounding airspace.

Claim 10

The fluid dispersion assembly as recited in claim 7 further comprising a container interconnect operatively interconnecting said diffusion unit to the container.

CERTIFICATE OF WORD COUNT

Pursuant 37 C.F.R. § 42.24(a)(1)(i), Petitioner certifies that this Petition includes 12,529 words, as measured by Microsoft Word, where such word count excludes the table of contents, mandatory notices, mandatory notices under § 42.8, certificates of service, this certificate of word count, appendix of exhibits or claim listing, and exhibits.

CERTIFICATE OF SERVICE UNDER 37 CFR § 42.6(E)(4)

The undersigned hereby certifies that a copy of the accompanying Petition for *inter partes* review, all accompanying exhibits, and the Power of Attorney has been served on March 18, 2025, by delivering a copy via Federal Express to attorney of record for U.S. Patent No. 10,583,449 at the following address:

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