

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AROMA360, LLC,
PETITIONER,

v.

AIR ESSSENTIALS, INC.
PATENT OWNER.

Case IPR2025-00706
Patent 10,583,449

**PETITIONER'S OPPOSITION TO PATENT OWNER'S
REVISED CONTINGENT MOTION TO AMEND**

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 1016	Certified English-language Translation of Goubet

Exhibit No.	Description
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 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 No.	Description
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) Hydrodynamica, ETH-Bibliothek Zürich https://doi.org/10.3931%2Fe-rara-3911
Exhibit 1032	White, F.M. (1994), Fluid Mechanics (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 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)

Exhibit No.	Description
Exhibit 1041	Chinese Utility Model Patent 204072864 (hereinafter, “Gao-2”)
Exhibit 1042	Certified English-language Translation of Gao-2
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 & Engineering Chemistry</i> , vol. 43, no. 6, pp. 1317–1324, 1951.
Exhibit 1050	[Reserved]
Exhibit 1051	[Reserved]
Exhibit 1052	Second Supplemental Declaration of Dr. Christopher White
Exhibit 1053	U.S. Patent No. 7,913,933 (hereinafter, “Van Roemburg”)
Exhibit 1054	U.S. Patent No. 8,857,735 (hereinafter, “Rosener”)

I. INTRODUCTION

Petitioner opposes Patent Owner's Revised Contingent Motion to Amend ("Revised MTA" or "Rev. MTA") to substitute claims 20 and 21 (referred to herein as "claim 20" and "claim 21") for challenged independent claims 1 and 7. The revised claims still fail for two independent reasons: they violate section 112 and remain unpatentable over the prior art.

II. THE SUBSTITUTE CLAIMS VIOLATE § 112

Claim 20's result-oriented requirement for a drip tube to "minimize contact" between a sealing washer and operative fluid is indefinite. Claim 21 lacks written-description support and is indefinite because the patent does not objectively define the new compressed-air-flow-path and lateral/transverse exhaust relationships.

A. Substitute Claim 20 Is Indefinite Under 35 U.S.C. § 112(b)

Claim 20 adds a sealing washer and drip tube limitation requiring the drip tube to direct accumulated operative fluid into the container and "minimize contact" between the sealing washer and operative fluid. The claim is indefinite because it requires the drip tube to "minimize contact" between the sealing washer and the operative fluid but provides no objective boundary for determining when that result is achieved. Claim 20 does not state how much contact is permitted, what baseline applies, whether incidental wetting defeats the limitation, or what metric, test, or engineering criterion a POSITA should use to determine whether contact has been sufficiently "minimize[d]." Ex. 1052, ¶¶ 38-40; Ex. 1001, 4:28-43, 9:29-44.

The specification does not cure the problem. It states that drip tube 120 “serves to minimize contact” by “essentially preventing” operative fluid from contacting the sealing washer and by channeling accumulated fluid back into the container “without contacting the sealing washer.” Ex. 1001, 4:28-43, 9:29-44. Those passages do not define “minimize” or explain what standard applies, such as how much contact is permitted or how much contact is reduced from an unstated baseline. Ex. 1052, ¶ 40.

Patent Owner relies on “minimize contact” as a patentable distinction, arguing the drip tube protects the sealing washer by minimizing contact with operative fluid. Rev. MTA, 12-15. But neither the claim nor the specification provides an objective way to determine which tube and washer arrangements satisfy that result. Claim scope thus turns on an undefined degree of contact reduction, not a defined structure.

As such, the claim fails to “inform, with reasonable certainty, those skilled in the art about the scope of the invention.” *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 901 (2014). Terms of degree are indefinite when, as here, the intrinsic record fails to provide objective boundaries for applying them. *Interval Licensing LLC v. AOL, Inc.*, 766 F.3d 1364, 1371-74 (Fed. Cir. 2014) (finding “unobtrusive manner” indefinite where intrinsic record failed to provide objective boundaries); *Halliburton Energy Servs., Inc. v. M-I LLC*, 514 F.3d 1244, 1252-56 (Fed. Cir. 2008) (finding “fragile gel” indefinite where claims and specification did not adequately identify degree of fragileness required). Courts applying that rule have found “minimize” terms indefinite where the specification failed to identify the baseline or

objective standard for determining whether the claimed result had been minimized. *See, e.g., CA, Inc. v. Netflix, Inc.*, 2021 WL 5323413, at *16 (E.D. Tex. Nov. 16, 2021) (“The specification’s failure to provide an objective standard to measure against is critical because different baselines could lead to different conclusions about whether a result[] has been ‘minimize[d.]’”); *Secor View Techs. LLC v. Nissan N. Am., Inc.*, 2013 WL 6147788, at *4-5 (D.N.J. Nov. 21, 2013) (finding “minimize lateral protuberance” indefinite because patent lacked any standard to determine when protuberance was sufficiently minimized).

B. Substitute Claim 21 Lacks Written Description Support

Claim 21 recites at least two limitations that lack written description support. First, claim 21 requires “said atomizer air inlet channel interconnected to the compressed air source and defining a compressed-air flow path through said atomizer assembly,” with an opening and mixing chamber “disposed along said compressed-air flow path.” Patent Owner relies on Application 16/154,373, page 71, lines 14-17, and Figures 1 and 2 for support. Rev. MTA, 9-10. But that disclosure does not explain how the atomizer air inlet channel alone can define a flow path “through said atomizer assembly.”

The cited disclosure shows the opposite. It describes the compressed-air flow path as extending through multiple structures, including the air inlet, atomizer air inlet channel, mixing chamber, and atomizer exhaust. Ex. 1004, 79:6-11, 91:8-14. The atomizer air inlet channel may direct air into the atomizer assembly, but the path

through the atomizer assembly depends on downstream structures. The specification does not disclose an atomizer air inlet channel, by itself, defining the claimed compressed-air flow path through the atomizer assembly.

That defect matters because claim 21 uses the alleged “compressed-air flow path” to locate other structures, including an opening and the mixing chamber “disposed along” that path. Revised MTA at 10. Patent Owner attempts to support those limitations by relying on Figures 1 and 6, but Figure 6 is repeatedly described as an “alternative embodiment” with a “modified diffusion unit,” including material changes to the atomizer assembly. Ex. 1004, 91:8-19, 92:10-93:23. Patent Owner cannot establish written-description support by stitching together features from different embodiments that the specification never links in the claimed arrangement. *See Parus Holdings, Inc. v. Google LLC*, 70 F.4th 1365, 1374 (Fed. Cir. 2023) (affirming lack of written-description support where the patent owner relied on embodiments that could not be combined); *Flash-Control, LLC v. Intel Corp.*, No. 2020-2141, 2021 WL 2944592, at *4 (Fed. Cir. July 14, 2021) (“A patent owner cannot show written description support by picking and choosing claim elements from different embodiments that are never linked together in the specification.”).

Second, claim 21 requires “said atomizer exhaust aperture spaced from said discharge port and opening laterally from said mixing chamber into said diffusion chamber along an exhaust path transverse to a direction in which said operative fluid enters said mixing chamber through said fluid inlet.” As support, Patent Owner cites

Application 16/154,373, page 79, lines 6-11, and Figures 1 and 2. Rev. MTA, 10. That disclosure does not support the full limitation.

Figures 1-2 do not disclose an atomizer exhaust aperture opening laterally from the mixing chamber into the diffusion chamber. At most, they show an aperture directly communicating with the suppression chamber, not the diffusion chamber, but claim 21 requires the aperture to open into the diffusion chamber. Pointing to a different chamber does not satisfy the requirement.

Patent Owner also does not identify the claimed geometry. Claim 21 requires a lateral opening along an exhaust path transverse to the direction in which operative fluid enters the mixing chamber. Rev. MTA at 10. Patent Owner identifies no exhaust path in Figures 1 and 2, no transverse relationship between that path and the direction of operative-fluid entry, and no disclosure linking any such path to an opening from the mixing chamber into the diffusion chamber.

Mixing embodiments cannot cure that defect. Patent Owner cited Figures 1 and 2 for this limitation, not Figures 3, 5, or 6. Rev. MTA at 10. Even if it had cited those figures, they do not disclose the full claimed arrangement. Figures 3 and 6 show downward flow, not an aperture opening laterally from the mixing chamber into the diffusion chamber along the claimed transverse exhaust path. Figure 5 likewise does not disclose the claimed transverse relationship or spatial arrangement. The specification provides no disclosure linking those separate embodiments in the arrangement claim 21 now requires. *See Parus Holdings*, 70 F.4th at 1374; *Flash-*

Control, 2021 WL 2944592, at *4. Thus, Patent Owner has not shown possession of claim 21’s compressed-air-flow-path or atomizer-exhaust-aperture limitations.

C. Substitute Claim 21 Is Indefinite Under 35 U.S.C. § 112(b)

Proposed substitute claim 21 recites at least two limitations that fail to “inform, with reasonable certainty, those skilled in the art about the scope of the invention.” *Nautilus*, 572 U.S. 898.

- 1. “said atomizer air inlet channel interconnected to the compressed air source and defining a compressed-air flow path through said atomizer assembly” with an opening and the mixing chamber “disposed along said compressed-air flow path”**

A POSITA would not understand, with reasonable certainty, how the atomizer air inlet channel interconnected to the compressed-air source can itself “defin[e]” the compressed-air flow path through the atomizer assembly. Ex. 1052, ¶41. The atomizer air inlet merely directs air into the mixing chamber but cannot define the path air travels through the atomizer assembly itself, which instead depends on other structural features within the atomizer assembly. Indeed, the disclosed flow path is defined by multiple internal components of the atomizer assembly and not just the atomizer air inlet channel, including the mixing chamber and atomizer exhaust. *See, e.g.*, Ex. 1004 at pg. 79, lines 6-11 (Figure 1) and pg. 91, lines 8-14 (Figure 6).

- 2. “said atomizer exhaust aperture spaced from said discharge port and opening laterally from said mixing chamber into said diffusion chamber along an exhaust path transverse to a direction in which said operative fluid enters said mixing chamber through said fluid inlet”**

A POSITA also would not understand, with reasonable certainty, what

structure is encompassed by an atomizer exhaust aperture “opening laterally from said mixing chamber.” The mixing chamber is a three-dimensional structure, and neither the claim nor the specification identifies the relevant plane, axis, or frame of reference for determining whether an atomizer exhaust aperture opens “laterally” from the mixing chamber. Ex. 1052, ¶¶ 43-45.

Likewise, it is not clear what orientation or direction is encompassed by an “exhaust path transverse to a direction in which the operative fluid enters said mixing chamber.” *Id.* For example, it is uncertain in which direction the fluid enters the mixing chamber given it could be interpreted to mean the direction in which fluid initially enters the mixing chamber (e.g., the direction of the fluid inlet (vertical in Figure 6)) or the direction the fluid is further blown into the mixing chamber by the compressed-air (horizontal in Figure 6). While the term “enters” suggests initial entrance on its face, this interpretation is contradictory to the intrinsic evidence. That is, fluid initially enters mixing chamber in an upward direction through the fluid inlet, before it is blown horizontally by the compressed air, and then carried downwardly through the exhaust aperture. The exhaust aperture has a vertical axis that is parallel to the fluid inlet, and two parallel axes are not transverse to one another. There is no discussion of these various ambiguous directional limitations in the specification and the figures do not convey to a POSITA with reasonable certainty what arrangements these limitations are intended to encompass. Thus, substitute claim 21 is indefinite.

III. SUBSTITUTE CLAIMS 20 AND 21 ARE UNPATENTABLE

The substitute claims remain unpatentable assuming they are not indefinite. The Petition already mapped the unchanged limitations, and the revised amendments add only routine sealing/liquid-return details for claim 20 and air/fluid-path relationships for claim 21 that the prior art discloses or renders obvious. The Board already preliminarily credited Petitioner's original MTA showing, and requested that the parties address whether any modifications to Sevy or Goubet are required and, if so, whether those modifications would change the references' principles of operation. Board Preliminary Guidance 7-12.

Gao-2, asserted in IPR2025-00707, also renders claim 21 obvious. In addition, two new references confirm obviousness for claim 20. U.S. Patent No. 7,913,933 ("Van Roemburg") teaches that washer/O-ring sealing was conventional in essential-oil atomizers, and U.S. Patent No. 8,857,735 ("Rosener") teaches that drainage tubes returning oil to the reservoir were conventional. Exs. 1041-1042, 1053-1054.¹

A. Grounds 1 and 2 – Sevy Based Grounds

1. Substitute claim 20 is obvious over Sevy.

Claim 20 carries forward original claim 1, which the Petition already mapped.

¹ Van Roemburg and Rosener are prior art to the '449 patent as both issued before the '449 patent's earliest alleged priority date. See Ex. 1053; Ex. 1054.

The revised amendment adds a sealing washer between the diffusion unit and container, and a drip tube extending through the washer to return accumulated operative fluid to the container while minimizing contact between the washer and fluid. PO Revised Mot. to Amend, Claim App. 18-19.

Sevy already discloses the two facts that motivate the modification: a diffuser/reservoir interface and accumulated droplets dripping back toward the reservoir. Atomizer 16 secures to reservoir 18 by “threads or the like,” and droplets may strike wall 121, agglomerate, and “drip down toward the reservoir 18.” Ex. 1009 ¶¶41, 82; Pet. 31-33, 37. The Board preliminarily credited Dr. White’s testimony that adding a drip-return tube or drain at that chamber/reservoir interface would have been a routine, predictable refinement, and asked the parties to address motivation and principle of operation. Prelim. Guidance, 7-8; Ex. 1047, ¶38.

A POSITA would have been motivated to add the drip-return tube at Sevy’s diffusion-unit/container interface to direct accumulated oil back into the reservoir, reduce pooling and residue, and limit unintended wetting of sealing components. Ex. 1009 ¶¶14-15, 41, 82; Ex. 1047 ¶38, Ex. 1052, ¶47-48. That modification would not change Sevy’s principle of operation. Sevy would still use pump 14, nozzle 92, cavity 116, separator 120, wall 121, and discharge port 106 to atomize, separate, and discharge droplets; the added tube would merely guide liquid that Sevy already teaches drips back toward reservoir 18. Ex. 1009 ¶¶75-82; Ex. 1047 ¶ 38, Ex. 1052, ¶¶ 41, 47-48.

The added sealing-washer language does not change the result. Sevy's threaded reservoir connection would predictably use a conventional washer or O-ring to reduce leakage and maintain the bottle-mounted connection, thereby minimizing contact of the oil and the washer. Providing a washer and drip tube at the same interface makes routing the tube through the washer a predictable implementation that preserves the seal while directing returned liquid through the tube rather than across the sealing surface. Ex. 1001, 4:28-42, 9:19-44 (describing these as conventional components); Ex. 1047 ¶38, Ex. 1052, ¶ 47-48.

2. Substitute claim 20 is obvious over Sevy in view of Van Roemburg and Rosener.

While Sevy teaches all limitations of proposed substitute claim 20, Van Roemburg and Rosener confirm obviousness of modifying Sevy to read on the sealing washer/drip tube arrangement. Van Roemburg discloses an essential-oil atomizer with threaded portion 20 engaging oil bottle 25 and sealing engagement using O-rings. Ex. 1053, 2:25-33, 2:58-62, Fig. 2; Ex. 1052, ¶ 49. Rosener discloses a fragrance nebulizer with a drainage tube extending from the atomizer complex into the fragrance oil so non-atomized oil drains back to the reservoir for reuse. Ex. 1054, Abstract, 1:37-45, 7:60-8:5, Figs. 2D-2E; Ex. 1052, ¶50.

A POSITA would have had reason to apply the drainage tube teachings of Rosener and the sealing washer teachings of Van Roemburg to Sevy's reservoir-mounted atomizer in light of the analysis provided above regarding why a POSITA

would want to modify Sevy alone to include a drip tube through a sealing washer to direct accumulated oil back into the reservoir, reduce pooling and residue, and limit unintended wetting of sealing components. Ex. 1047, ¶ 38; Ex. 1052, ¶¶ 47-51. Likewise, a POSITA would have had a reasonable expectation of success in doing so for the reasons provided above to modify Sevy alone. *Id.*; Ex. 1052, ¶¶ 47-51.

3. Substitute claim 21 is obvious over Sevy and, alternatively, Sevy in view of Gao.

Claim 21 carries forward original claim 7 and adds four air/fluid-path limitations. Patent Owner argues that the claim requires more than generic compressed air flowing past a fluid inlet. Revised MTA at 13-15. Petitioner does not rely on generic airflow. The Petition maps defined atomizer structures in Sevy and Gao that disclose or render obvious each added limitation. Pet., 23-30, 65-72.

Limitation 1: atomizer air inlet channel interconnected to the compressed-air source and defining a compressed-air flow path.

Sevy discloses that air flows from pump 14 through passage 50/channel 114 and orifice 118 into cavity 116. Ex. 1009, ¶¶75-80; Pet. 27-30. The Petition maps channel 114 to the atomizer air inlet channel. Pet., 27-30; Ex. 1002 ¶¶149-161. Gao also discloses this limitation because gas flows from the air pump through gas flow pipe 51 into atomizing cavity 6. Ex. 1013, ¶25; Pet. 68-71; Ex. 1002, ¶¶280-288.

Limitation 2: fluid inlet opening into the mixing chamber along the compressed-air flow path.

Sevy discloses that cavity 116 has an opening from siphon 96, which draws liquid from reservoir 18 into cavity 116, where the liquid is comminuted by high-speed air before exiting through exit orifice 119. Ex. 1009 ¶¶80-82; Pet. 27-30. The Board preliminarily credited Dr. White's testimony that Sevy describes a Venturi-style eductor and that it would have been obvious to position the fluid inlet relative to the air-flow path so compressed air flows over the inlet opening and into the mixing region. Ex. 1047, ¶¶39-40; Prelim. Guidance, 9-10. Any such positioning is not a change in Sevy's principle of operation; it is the predictable configuration required for Sevy's own suction-based entrainment and mixing. Ex. 1047 ¶¶39-40; Ex. 1052, ¶¶77-78.

Gao discloses the same relationship. Liquid pipeline 7 communicates with atomizing cavity 6, where liquid is drawn in by the siphon effect and mixed with air from gas flow pipe 51. Ex. 1013, ¶¶19, 25; Pet., 68-71.

Limitation 3: mixing chamber disposed along the compressed-air flow path after the atomizer air inlet channel and before the atomizer exhaust aperture.

Sevy discloses air flowing through channel 114/orifice 118 into cavity 116, where it mixes with liquid; the mixture exits at orifice 119. Ex. 1009, ¶¶79-82; Pet. 27-30. The Petition maps channel 114 to the atomizer air inlet channel, cavity 116 to the mixing chamber, and exit orifice 119 to the atomizer exhaust aperture. Pet., 27-30; Ex. 1002, ¶¶149-159. Gao discloses the same sequence; gas flows through gas flow pipe 51 into atomizing cavity 6, mixes with liquid, and exits through gas

flow spray hole 12. Ex. 1013, ¶¶19, 25; Pet., 68-71.

Limitation 4: atomizer exhaust aperture spaced from the discharge port and opening laterally/transversely from the mixing chamber into the diffusion chamber.

Sevy discloses port 106 (*i.e.*, discharge port) and exit orifice 119 separate (*i.e.*, atomizer exhaust aperture) through which droplets exit cavity 116 into separator chamber 120. Pet. 23-30; Ex. 1009 ¶¶72, 80-82, Fig. 9. In Fig. 9, liquid enters cavity 116 from siphon 96 below, while exit orifice 119 opens laterally into separator chamber 120, transverse to the direction of liquid entry. *Id.*; Ex. 1052, ¶79. Gao also discloses the same relationship; side gas flow spray hole 12 is spaced from final atomizing gas outlet 2 and ejects the mixture laterally from atomizing cavity 6 into lower part cavity 10. Ex. 1013 ¶¶19, 25, Figs. 1-2; Pet. 65-72; Ex. 1002 ¶¶280-288.

Thus, no modification of Sevy is required for limitations 1, 3, and 4, and Sevy discloses or at least renders obvious limitation 2. To the extent any adjustment in the relative placement of siphon 96 and the air-flow path is deemed necessary, that adjustment would not change Sevy's principle of operation. Sevy would still use pump-driven compressed air, a Venturi/eductor region, siphon-fed liquid entrainment, cavity 116, exit orifice 119, separator chamber 120, and discharge port 106 to atomize and discharge liquid. Ex. 1009 ¶¶ 75-82; Ex. 1052, ¶¶ 77-78.

B. Ground 3 – Goubet Renders Claims 20 and 21 Obvious

1. Goubet renders substitute claim 20 obvious.

Goubet discloses the same diffuser/reservoir interface and liquid-management objective addressed by claim 20. Diffuser head 4 is attached to reservoir 2, including by screwing, gluing, or ultrasonic welding, and Goubet identifies leakage prevention and avoiding product loss as objectives. Ex. 1016, 2:9-12, 3:1-9, 3:24-27, 4:1-2; Pet. 52-55. Goubet teaches that droplets leaving diffusion chamber 5 are directed toward the inside of reservoir 2 before final release. Ex. 1016, 4:23-28; Ex. 1052, ¶52.

A POSITA would have found it obvious to add a sealing washer and route a drip-return tube or drain through the sealed diffuser/reservoir interface. Doing so would direct returned liquid, reduce pooling and leakage, and minimize wetting of the sealing surface. Ex. 1047, ¶38; Ex. 1052, ¶52, 80-81. It would not change Goubet's principle of operation, which would still use compressed air, the venturi region, dip-tube entrainment of essential oil, mixing in diffusion chamber 5, and droplet discharge toward the reservoir/head release path. Ex. 1016, 3:31-4:28; Ex. 1047 ¶38; Ex. 1052, ¶¶ 52, 80.

2. Goubet renders substitute claim 21 obvious.

Goubet also discloses or renders obvious claim 21's added air/fluid-path limitations. Compressed air enters diffuser head 4 through air inlet channel 9, passes through compressed air inlet 6 and cone 7, and enters diffusion chamber 5. Ex. 1016, 3:31-4:22, Fig. 2; Ex. 1047 ¶41; Ex. 1052, ¶ 82. Dip tube end 10 supplies oil from reservoir 2 to the venturi region, where compressed-air flow creates vacuum and

draws oil into diffusion chamber 5 for mixing. *Id.*

For limitations 1-3, Goubet discloses an air inlet channel connected to the compressed-air source, a fluid inlet opening positioned along the compressed-air path, and a mixing chamber located downstream of the air inlet and upstream of the outlet. Ex. 1016, 3:31-4:22, Fig. 2; Ex. 1047, ¶ 41; Ex. 1052, ¶¶ 82-83. The Board preliminarily credited Dr. White's testimony that Goubet's venturi geometry necessarily requires, or at minimum renders obvious, positioning dip-tube end 10 relative to the air-inlet path so compressed air flows over the inlet opening and into the mixing region. Prelim. Guidance, 11-12; Ex. 1047 ¶41; Ex. 1052 ¶¶82-83. Any necessary modification would be limited to predictable positioning within Goubet's own venturi geometry and would not change Goubet's principle of operation. Goubet would still use compressed air, vacuum-driven oil entrainment through dip tube 8, mixing in diffusion chamber 5, and droplet discharge from the chamber. Ex. 1016, 3:31-4:28; Ex. 1047 ¶41; Ex. 1052 ¶¶82-83.

For limitation 4, Goubet discloses outlet 11 from diffusion chamber 5 and a downstream release path through the reservoir/head structure. Ex. 1016, 4:23-28.

C. New Ground – Chinese Utility Model Patent 204072864 (“Gao-2”) Renders Claim 21 Obvious

1. Gao-2 is prior art.

Gao-2 is prior art to substitute claim 21. Gao-2 was filed on August 6, 2014 and published by January 7, 2015. Ex. 1042, INID Codes (22), (45). The '449 patent

issued from Application No. 16/154,373, which is a continuation-in-part in a chain claiming priority to Provisional Application No. 61/694,500, filed on August 29, 2012. Revised MTA, 6. But claim 21 cannot claim priority to the provisional filing unless Patent Owner shows support for the full claim, including the new limitation requiring “said fluid inlet ... comprising an opening into said mixing chamber,” with that opening “disposed along said compressed-air flow path such that compressed air ... flows past said opening ... into said mixing chamber.” See *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378–80 (Fed. Cir. 2015); see also *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1376 (Fed. Cir. 2016) (“[A] patentee bears the burden of establishing that its claimed invention is entitled to an earlier priority date than an asserted prior art reference.”).

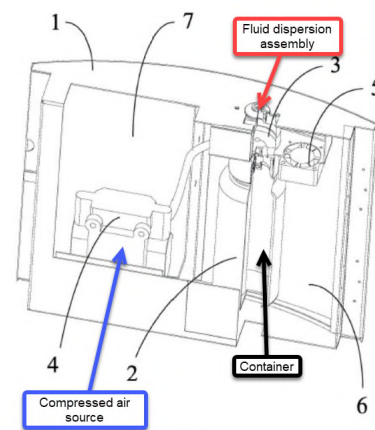
Patent Owner has not made that showing. Patent Owner contends the limitation is supported by the Provisional at Ex. 1006, page 28, lines 1-9, pages 14-15, and Figs. 2-3, and by the ’373 CIP Application at Ex. 1004, Figs. 1-2. Rev. MTA, 10. Figures 1-3, however, do not show the claimed relationship. In the embodiments shown in Figures 1-3, the fluid inlet opening (227) is described and shown as being located at the top (Figs. 1-2) and bottom (Fig. 3) of the mixing chamber rather than disposed along the compressed-air flow path. Ex. 1001, 5:34-43, Figs. 1-3; Ex. 1047, ¶1. Notably, the phrase “disposed along said compressed-air flow path” is missing from the written description. Thus, if the new limitation is supported by the written description, it is only supported by the embodiment of Figure 6.

Because substitute claim 21 lacks written description support in the earlier applications for at least this limitation, it is not entitled to an effective filing date earlier than the later application that first disclosed the Figure 6 arrangement, which was November 17, 2016. Gao-2, published January 7, 2015, therefore predates the effective filing date of substitute claim 21 and is prior art.

2. Gao-2 renders substitute claim 21 obvious.

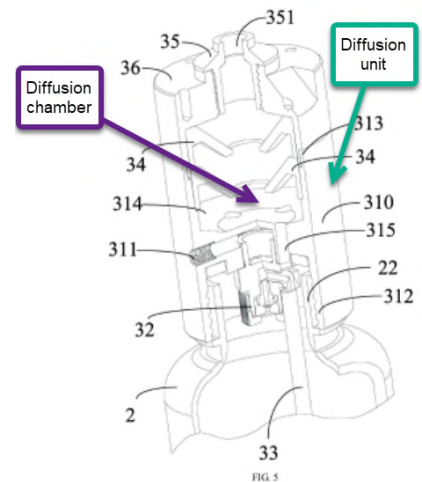
21[PRE] A fluid dispersion assembly is operatively interconnected to a container of an operative fluid and a compressed air source to generate and discharge a fluid dispersion into a surrounding airspace, said fluid dispersion assembly comprising:

To the extent the preamble is limiting, Gao-2 teaches it. Gao-2 is directed to an aroma diffuser that generates fragrant mist, disclosing an atomization device 3 connected to essential oil bottle 2 and air pump 4, which draws essential oil from bottle 2, atomizes it with airflow in atomization core 32, and discharges fragrant mist through mist outlet 351. Ex-1042, ¶¶[0027], [0030], [0034], [0036], [0040], Figs. 2, 4, 5; Ex-1047, Ex. 1052, ¶59.



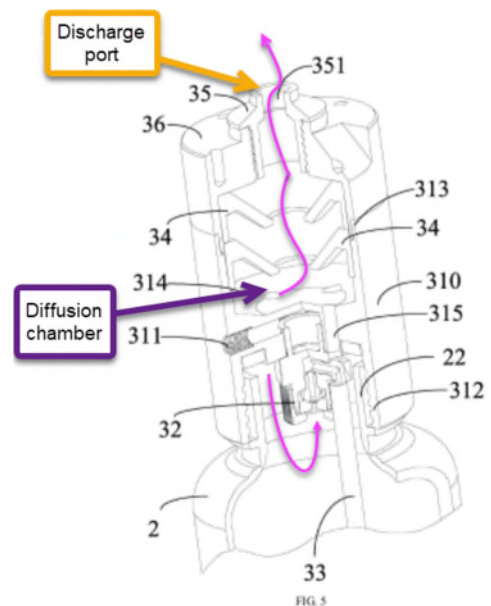
21[A] a diffusion unit at least partially defining a diffusion chamber,

Gao-2 discloses atomization device 3 having cylindrical body 310, atomization head cover 36, and internal chamber regions surrounding atomization core 32. Ex-1042, ¶¶[0031]-[0034], Fig. 5. Cylindrical body 310 and head cover 36 at least partially define the internal chamber path surrounding atomization core 32 and through which mist travels after atomization. *Id.* Thus, Gao-2 teaches limitation 21[A]. Ex. 1052, ¶59.



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

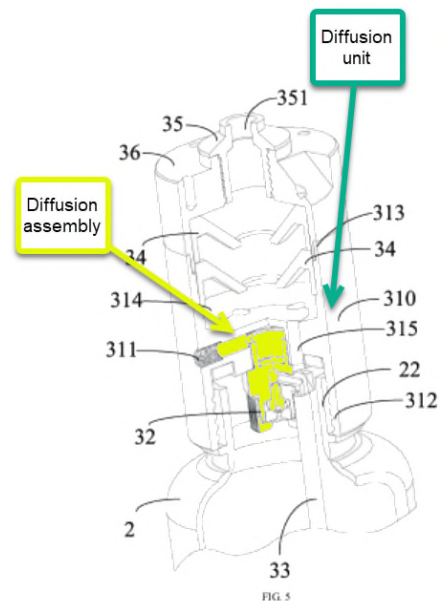
Gao-2 discloses mist outlet 351 in atomization head cover 36. Ex. 1042, ¶[0034], Fig. 5. After atomization, mist is sprayed from spray outlet 3231 into the internal chamber region of atomization device 3 and ultimately exits through mist outlet 351 to the surrounding airspace. *Id.*, ¶¶[0030]-[0034], Fig. 5. Thus, Gao-2's internal chamber region is the claimed diffusion chamber, mist outlet 351 is the claimed discharge port, and Gao-2 teaches limitation 21[B]. Ex. 1052, ¶59.



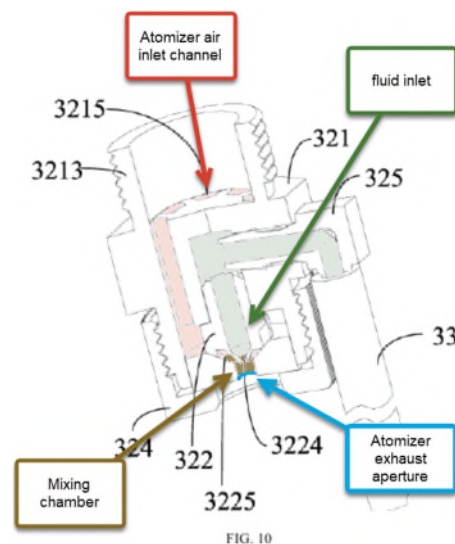
21[C] a diffusion assembly disposed in an operative engagement with said

diffusion unit, 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,

Gao-2 discloses limitation 21[C]. Gao-2's diffusion assembly includes an atomizer assembly (e.g., atomization core 32) and its air/fluid delivery structures, including air inlet channel 311, liquid suction tube 33, connector 325, liquid suction channel 3216, liquid suction hole 3224, and spray outlet 3231. Ex. 1042, ¶¶ [0031]-[0038], Figs. 5, 7, 10. Those components are mounted in, and operatively engaged with, cylindrical body 310. *Id.* Ex. 1052, ¶61.



Air from pump 4 enters through air inlet channel 311, while essential oil is drawn from bottle 2 through liquid suction tube 33, connector 325, liquid suction channel 3216, and liquid suction hole 3224. *Id.*, ¶¶ [0035]-[0038], [0040]. Gao-2 explains that essential oil mixes with airflow and is atomized at the outlet of liquid



suction hole 3224 before being sprayed from spray outlet 3231. *Id.*, ¶¶ [0036], [0040]. A POSITA would understand the mixing chamber to be the chamber/volume

of rotating core 322, including the volume defined by guide grooves 3225 and cap 323, where airflow and essential oil mix and atomize before discharge through spray outlet 3231. Thus, Gao-2 discloses the claimed atomizer air inlet channel, fluid inlet, mixing chamber, and atomizer exhaust aperture. Ex. 1052, ¶62.

21[D] said atomizer air inlet channel interconnected to the compressed air source and defining a compressed-air flow path through said atomizer assembly;

Gao-2 discloses a defined compressed-air flow path through the atomizer assembly. Air pump 4 supplies airflow to atomization device 3 through air inlet channel 311. Ex-1042, ¶¶[0027], [0036]. The airflow then passes through vent holes 3215 and guide grooves 3225 into the mixing chamber/volume of rotating core 322, where essential oil is drawn into the airflow and atomized before the mixture exits through spray outlet 3231. *Id.*, ¶¶[0036]-[0040], Figs. 7, 9, 10. This defines a compressed air flow path through said atomizer assembly. Thus, Gao-2 discloses an atomizer air inlet channel interconnected to the compressed-air source and defining a compressed-air flow path through the atomizer assembly. Ex-1052, ¶61-63.

21[E] said fluid inlet disposed in fluid communication with the operative fluid in the container and comprising an opening into said mixing chamber, said opening disposed along said compressed-air flow path such that compressed air from the compressed air source flows past said opening of said fluid inlet into said mixing chamber,

Gao-2 discloses this limitation. Liquid suction tube 33, connector 325, liquid suction channel 3216, and liquid suction hole 3224 place essential oil in bottle 2 in fluid communication with the mixing chamber/volume of rotating core 322. Ex. 1042, ¶¶ [0035]-[0036], Figs. 7, 10. The outlet/opening of liquid suction hole 3224 is located where high-speed airflow creates negative pressure, draws essential oil into the airflow, and mixes it with the airflow. *Id.*, ¶ [0036]. Thus, the fluid-inlet opening is disposed along the compressed-air flow path so compressed air flows past the opening into the mixing chamber before discharge through spray outlet 3231. Ex. 1052, ¶ 64.

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

Gao-2 discloses the claimed sequence. Air flows from air inlet channel 311 through vent holes 3215 and guide grooves 3225 into the chamber/volume of rotating core 322, where essential oil from liquid suction hole 3224 mixes with the airflow and is atomized. Ex. 1042, ¶¶ [0036]-[0040], Figs. 7, 9, 10. The air/oil mixture then exits through spray outlet 3231. Thus, Gao-2's mixing chamber is disposed along the compressed-air flow path after the atomizer air inlet channel and before the atomizer exhaust aperture. Ex. 1052, ¶ 65-66.

21[G] said atomizer exhaust aperture spaced from said discharge port and opening laterally from said mixing chamber into said diffusion chamber along an exhaust path transverse to a direction in which said operative fluid enters

said mixing chamber through said fluid inlet.

Gao-2 discloses this limitation. Gao-2's spray outlet 3231 is the atomizer exhaust aperture because oil mixes with airflow and is atomized before being sprayed through spray outlet 3231. Ex. 1042 ¶[0036], Fig. 10. Gao-2's mist outlet 351 is the discharge port because the mist exits through mist outlet 351 into the surrounding airspace. Ex. 1042 ¶¶[0031]–[0034], Fig. 5. Thus, spray outlet 3231 is spaced from discharge port 351 and opens from the atomizer/mixing region before downstream discharge. Ex. 1042 ¶¶[0031]–[0036], Figs. 5, 10. Ex. 1052, ¶¶ 66-67.

Gao-2 also teaches the transverse relationship. Gao-2's liquid suction path enters through connector 325/channel 3216/hole 3224, while airflow passes through vent holes 3215 and guide grooves 3225 and the mixture exits through spray outlet 3231. Ex. 1042 ¶¶[0036]–[0038], Figs. 7, 10; Ex. 1047 ¶46. The Board preliminarily agreed that Gao-2's Fig. 7 shows a perpendicular fluid inlet structure, and the same geometry supports the revised claim's "transverse to said fluid inlet" exhaust path. Ex. 1042 ¶¶[0036]–[0038], Figs. 7, 10. Ex. 1052, ¶¶ 67-68.

3. Gao-2 also renders dependent claims 8-10 obvious.

To the extent Patent Owner seeks to preserve the patentability of claims 8-10 by making them depend, directly or indirectly, from proposed amended claim 21, Gao-2 teaches those dependent claim limitations. Ex. 1052, ¶¶ 69.

Claim 8. Claim 8 adds that the atomizer air inlet channel is interconnected to the compressed-air source, the fluid inlet is in fluid communication with operative

fluid in the container, and compressed air and operative fluid mix in the mixing chamber to form the fluid dispersion. Gao-2 teaches those limitations for the same reasons discussed above for limitations 21[C]-21[F]. Air pump 4 supplies air through air inlet channel 311, vent holes 3215, and guide grooves 3225. Essential oil is drawn from bottle 2 through liquid suction tube 33, connector 325, liquid suction channel 3216, and liquid suction hole 3224. Gao-2 explains that essential oil mixes with airflow and is atomized at the outlet of liquid suction hole 3224 before discharge through spray outlet 3231. Ex. 1042, ¶¶ [0027], [0035]-[0040], Figs. 7, 9, 10. A POSITA would understand that mixing to occur in the chamber/volume of rotating core 322, including the volume upstream of spray outlet 3231 where the fluid-inlet opening and compressed-air flow path intersect. Ex. 1052, ¶¶ 70.

Claim 9. Claim 9 requires the diffusion chamber to facilitate further formation of the fluid dispersion before discharge through the discharge port and into the surrounding airspace. Gao-2 teaches that limitation. Gao-2's chamber path, mist-passage structures, and final mist outlet separate and guide the atomized mist so that fine fragrant mist is discharged while coarse mist falls back toward the essential-oil bottle. Ex. 1042, ¶¶ [0030]-[0034], [0040], Fig. 5; Ex. 1052, ¶ 71.

Claim 10. Claim 10 requires a container interconnect operatively interconnecting the diffusion unit to the container. Gao-2 discloses atomization device 3 connected to essential-oil bottle 2, with liquid suction tube 33 extending into bottle 2 so essential oil can be drawn into atomization core 32 during operation.

Ex. 1042, ¶¶[0027], [0030]-[0031], [0035]-[0040], Figs. 2, 5. A POSITA would understand the bottle-mouth connection between atomization device 3 and bottle 2 to be a container interconnect that operatively interconnects the diffusion unit to the container. Ex. 1052, ¶¶ 72.

D. Patent Owner’s Arguments About Gao-2 Raised in a Related IPR Are Not Persuasive

Patent Owner’s argument in related IPR2025-00707 that Gao-2 does not contain a “mixing chamber” elevates labels over structure. *See* IPR2025-00707, Paper 2, 14-19. Gao-2 discloses airflow entering through air inlet channel 311, passing through vent holes 3215 and guide grooves 3225, and being discharged through spray outlet 3231. Ex. 1042, ¶¶ [0036]-[0038], Figs. 7, 9, 10. Gao-2 also discloses liquid suction channel 3216 and liquid suction hole 3224, through which essential oil is drawn by negative pressure and mixed with airflow at the outlet of liquid suction hole 3224 before discharge through spray outlet 3231. Ex. 1042, ¶¶ [0036]-[0040], Figs. 7, 10. A POSITA would understand this intersection of the fluid-inlet opening and compressed-air flow path to be within the chamber of rotating core 322, including the volume upstream of spray outlet 3231 where the airflow and essential oil mix and atomize before being sprayed from spray outlet 3231. Ex. 1052, ¶¶ 62, 64-65, 70. The claims do not require the mixing chamber to be a large, separately labeled enclosure. They require a region of the atomizer assembly where compressed air and operative fluid mix before exiting through an

atomizer exhaust aperture. Gao-2 discloses that structure. Ex. 1052, ¶¶ 64.

Likewise, Patent Owner’s argument in related IPR2025-00707 that Gao-2 does not teach the claimed “fluid dispersion” also fails. See IPR2025-00707, Paper 2 at 19-20. Gao-2 teaches that coarse fragrant mist falls back into the essential-oil bottle while fine fragrant mist disperses outward, and also discloses a downstream chamber path with mist-passage holes and noise-reduction structures before mist exits through mist outlet 351. Ex. 1042, ¶¶ [0030]-[0034], Fig. 5. Those structures separate coarse droplets and permit fine mist to discharge. *Id.*; Ex. 1052 ¶¶ 58, 68, 71. At minimum, a POSITA would have understood Gao-2 to suggest the claimed fluid dispersion and could implement routine droplet-selection or baffle refinements with a reasonable expectation of success. Ex. 1052, ¶¶ 68, 71.

IV. CONCLUSION

For the foregoing reasons, Petitioner respectfully requests that the Board deny entry of substitute claims 20 and 21.

Date: June 25, 2026

Respectfully submitted,
/James P. Murphy/

James P. Murphy
Reg. No. 55,474
Polsinelli, PC
1000 Louisiana Street
Suite 6400
Houston, Texas 77002

William A. Di Bianca
Reg. No. 58,653
Jordan T. Riviello
Reg. No. 72,515
Polsinelli PC
600 Third Avenue
42nd Floor
New York, NY 10016

Joshua L. Rayes
Reg. No. 74,645
Polsinelli LLP
Three Embarcadero Center
Suite 2400
San Francisco, CA 94115

Tele: (713) 374-1631

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

The undersigned hereby certifies that a copy of the accompanying Petitioner's Opposition to the Revised Motion to Amend and all accompanying exhibits have been served on June 25, 2026, via electronic mail directed to the following counsel of record for the Patent Owner:

Peter A. Matos
pmatots@malloylaw.com

W. John Egan
johnegan@malloylaw.com

Victor Bruzos
vbruzos@malloylaw.com

Rafay Asrar
rasrar@malloylaw.com

Tyler Litwak
tlitwak@malloylaw.com
litigation@malloylaw.com

/Ericka McNeil/

Ericka McNeil

Polsinelli PC
1000 Louisiana Street
Suite 6400
Houston, Texas 77002