

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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SCENTAIR TECHNOLOGIES, INC.  
Petitioner

v.

PROLITEC, INC.  
Patent Owner

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Case IPR2013-00179  
Patent 7,712,683 B2

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Before JAMESON LEE, MICHAEL J. FITZPATRICK, and  
CHRISTOPHER L. CRUMBLEY, *Administrative Patent Judges*.

FITZPATRICK, *Administrative Patent Judge*.

FINAL WRITTEN DECISION  
*35 U.S.C. § 318 and 37 C.F.R. § 42.73*

## I. BACKGROUND

Petitioner, ScentAir Technologies, Inc., filed a Petition (Paper 2, “Pet.”) requesting an *inter partes* review of all claims, i.e., claims 1 and 2, of U.S. Patent No. 7,712,683 B2 (“the ’683 patent”). The Patent Owner, Prolitec, Inc., did not file a preliminary response. In an August 6, 2013, Decision to Institute (Paper 13), the Board granted the Petition and instituted trial of both claims on the following grounds:

claims 1 and 2 as anticipated by WO 2004/080604 A2, published September 23, 2004 (Ex. 1004, “Benalikhoudja”)<sup>1</sup>; and

claims 1 and 2 as obvious over Benalikhoudja in view of US 7,131,603 B2, issued November 7, 2006 (Ex. 1006, “Sakaida”).  
Paper 13 at 20.

After institution, Patent Owner filed a Patent Owner Response (Paper 29, “PO Resp.”), and Petitioner filed a Reply (Paper 35, “Pet. Reply”). Patent Owner also filed a contingent motion to amend the ’683 patent (Paper 28, “PO Mot.”), to which Petitioner filed an opposition (Paper 36, “Pet. Opp.”), and in support of which Patent Owner filed a reply (Paper 45, “PO Reply”). Also pending is Petitioner’s motion to exclude certain portions of direct testimony by Patent Owner’s witness, Timothy A. Shedd, Ph.D. Paper 48. Oral hearing was held on March 10, 2014.<sup>2</sup>

The Board has jurisdiction under 35 U.S.C. § 6(c). This final written Decision, issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73, addresses issues and arguments raised during the trial.

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<sup>1</sup> An English translation of Benalikhoudja was submitted as Ex. 1005; our citations to the content of “Benalikhoudja” are to the English language document.

<sup>2</sup> A transcript of the oral hearing is included in the record. Paper 59, “Tr.”

As discussed below, Petitioner has shown by a preponderance of the evidence that claims 1 and 2 of the '683 patent are unpatentable, and Patent Owner has not met its burden of proof on the motion to amend. Petitioner's motion to exclude is dismissed as moot.

A. Related Proceedings

The parties identify a district court case titled *Prolitec, Inc. v. ScentAir Technologies, Inc.*, No. 2:12-cv-483-RTR (E.D. Wis.), in which Patent Owner has asserted the '683 patent against Petitioner. Pet. 1; Paper 7 (Patent Owner Mandatory Notices), 1-2.

B. The '683 Patent

The '683 patent issued on May 11, 2010, and is assigned to Patent Owner. Ex. 1001, 1. It discloses "a removable replaceable cartridge for use with a diffusion device where the liquid to be diffused is contained within the cartridge." Ex. 1001, col. 1, ll. 57-60. Figure 3 of the '683 patent is reproduced below.

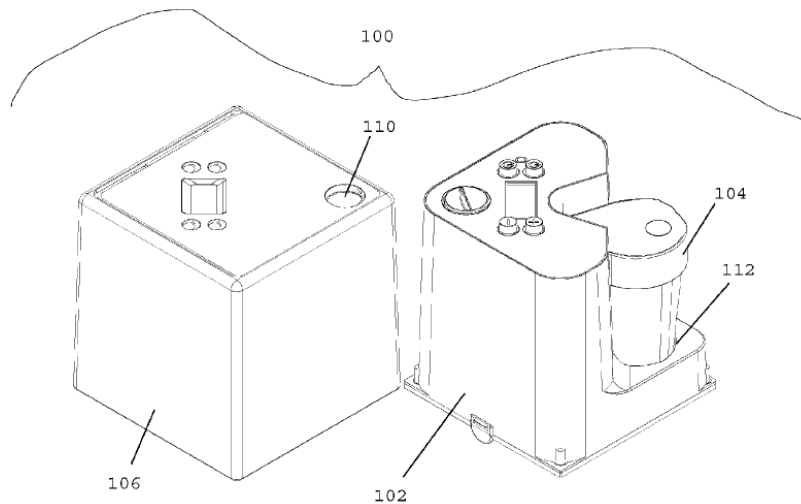


Figure 3 illustrates diffusion device 100, which includes cover 106 that can be removed to expose housing 102 and removable cartridge 104.

Ex. 1001, col. 3, ll. 48-50. The housing includes a source of compressed gas to be directed into the cartridge. *Id.* at col. 5, ll. 16-19; col. 1, ll. 62-63.

Figure 5 of the '683 patent is reproduced below.

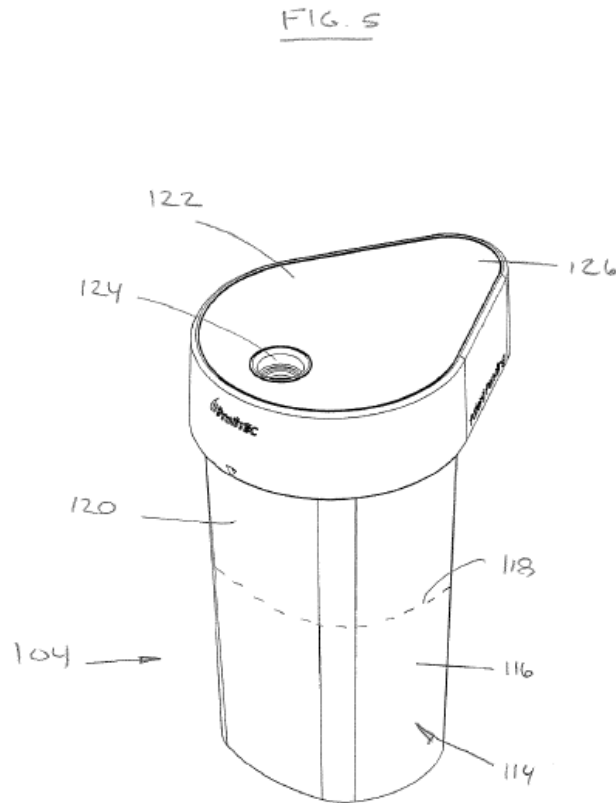


Figure 5 illustrates the cartridge, which includes reservoir 114 and diffusion head 122. Ex. 1001, col. 5, ll. 45-49. The reservoir is filled partially with liquid 116 to be diffused, thus leaving open head space in the reservoir above the surface of fluid level 118. *Id.* at col. 5, ll. 50-51.

Figure 34 of the '683 patent is reproduced below with our annotation added.

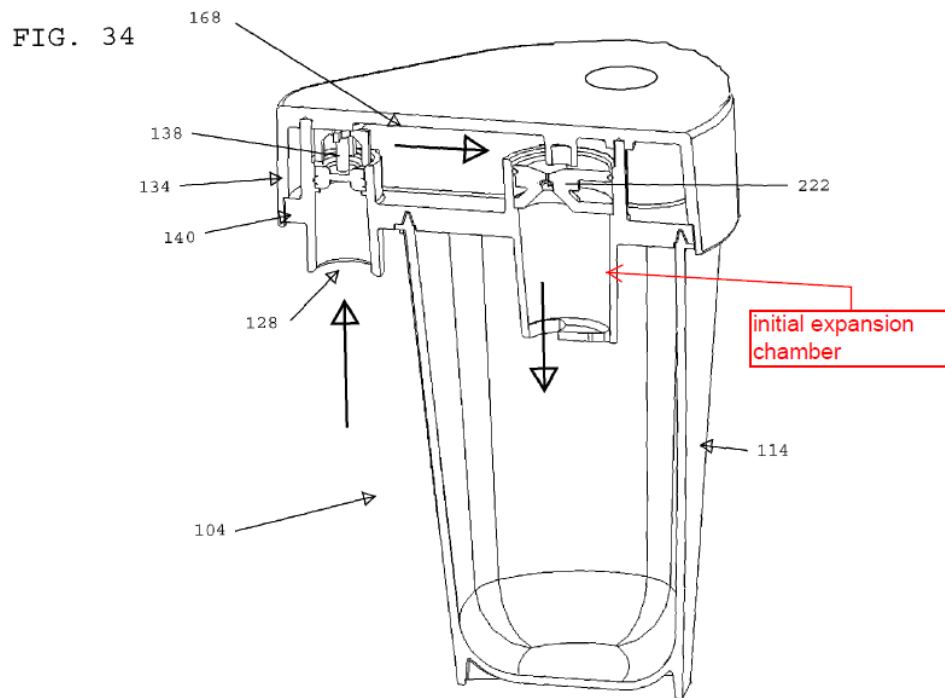


Figure 34 illustrates a cross-sectional view of the cartridge, revealing certain details of the diffusion head. The diffusion head includes a venturi<sup>3</sup> in the vicinity of lead line 222. Ex. 1001, col. 11, ll. 58-59. Below the venturi is an initial expansion chamber (described below in reference to Fig. 20). Using arrows, Figure 34 illustrates the flow of gas from a compressed gas source (not shown) up through inlet 128 of the cartridge, to and through

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<sup>3</sup> The Venturi effect is a decrease in pressure that occurs when the flow rate of a fluid increases through a constriction in a tube. See *Venturi Effect*, HOW IT WORKS: SCIENCE AND TECHNOLOGY 2580 (3d ed. 2003). Ex. 3001. A venturi tube, also referred to as simply a venturi, is a device that utilizes this Venturi effect to create suction or measure fluid flow rate as a fluid flows through a constriction in the device. See “*Venturi tube*,” THE PENGUIN DICTIONARY OF SCIENCE (2009) (Ex. 3002); see also “*venturi tube*,” COLLINS ENGLISH DICTIONARY – COMPLETE AND UNABRIDGED (2003) (“also called venturi, a tube with a constriction used to reduce or control fluid flow”) (Ex. 3003).

the venturi, and then downward into the initial expansion chamber and open head space in reservoir 114. *Id.* at col. 11, ll. 58-63.

Figure 28 of the '683 patent is reproduced below.

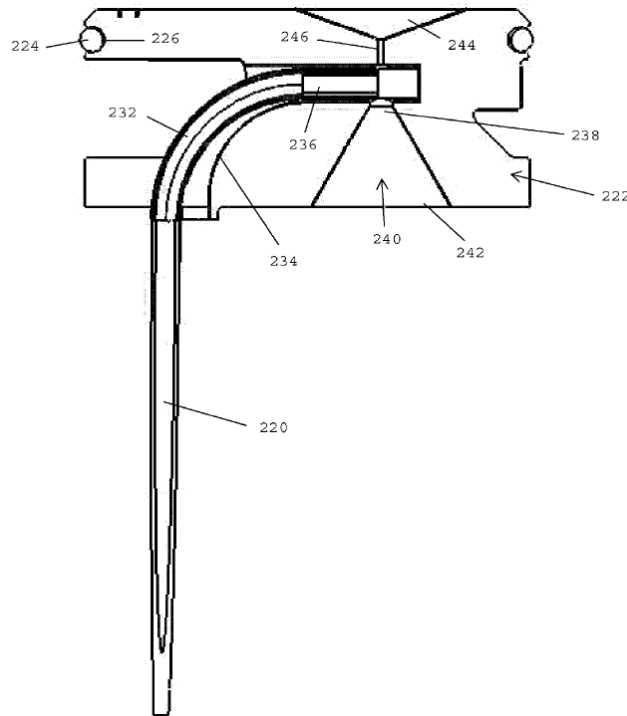


Figure 28 illustrates a cross-sectional view of venturi 240 and associated components. The venturi includes narrow end 238 and wide end 242. Ex. 1001, col. 9, ll. 28-30. Tube 220 is provided to draw liquid into the venturi from the reservoir. The tube includes a first (lower) end that extends into the liquid in the reservoir (not shown in Figure 28), and second end 236 that extends to the narrow end of the venturi. *Id.* at col. 9, ll. 17-20, 26-27. Gas passage 246 is provided to allow compressed gas to flow to the narrow end of the venturi. *Id.* at col. 9, ll. 33-35. Thus, the narrow end of the venturi is in fluid communication with (1) the gas passage and (2) the second end of the liquid tube.

The '683 patent describes the diffusion process as follows:

Gas passage 246 directs the gas into narrow end 238 of venturi 240. The gas flow in narrow end 238 creates a low pressure environment adjacent second end 236 of tube 220. This vacuum draws liquid 116 up tube 220 and into narrow end 238. High velocity gas and liquid 116 mix in venturi 240 as they pass from narrow end 238 to wide end 242. Leaving venturi 240, the mixed gas and liquid pass through openings 182 and into head space 120 of reservoir 114.

Ex. 1001, col. 9, ll. 40-48.

Fig. 20 is reproduced below with our annotation added.

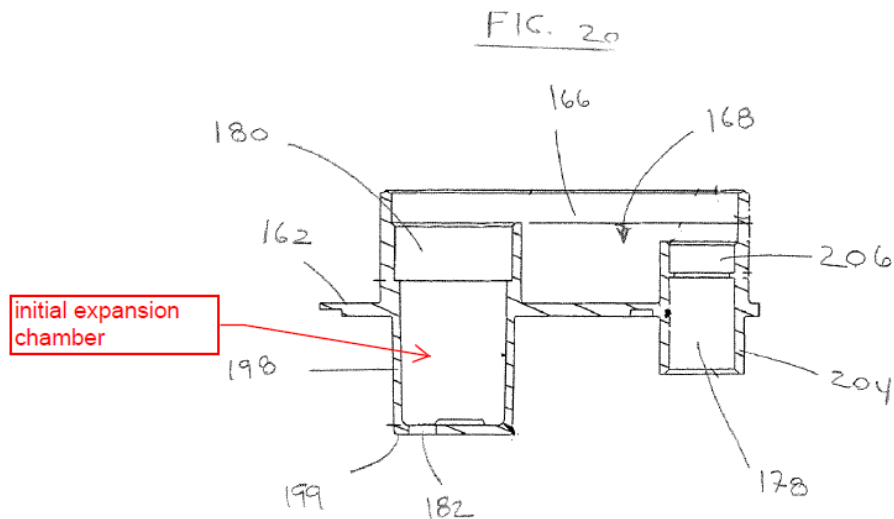


Figure 20 illustrates a cross-sectional view of a baffle of the diffusion head. Ex. 1001, col. 2, ll. 41-42; col. 6, ll. 11-15. The baffle includes recess 180 for mounting the venturi and tube assembly (not shown in Figure 20 but shown previously in Figure 28). *Id.* at col. 6, ll. 49-50. Extending from lower plate 162 is circular wall 198 defining an initial expansion chamber for gas and atomized liquid being ejected into head space 120 from the venturi that is mounted within the recess. Ex. 1001, col. 7, ll. 25-28. A bottom wall of the recess includes one or more openings 182, which allow the gas and atomized liquid to pass through to the head space in the reservoir

(head space 120 and reservoir 114 not shown in Figure 20 but shown previously in Figure 5). *Id.* at col. 6, ll. 50-52.

The '683 patent states that the flow of gas and diffused liquid into the head space urges some of the gas and diffused liquid to exit the cartridge through an outlet. Ex. 1001, col. 9, ll. 49-64. The outlet is structured to cause "larger, less desirable liquid particles atomized in the gas" to precipitate and drain back to the liquid source of the reservoir. *Id.* at col. 9, ll. 54-61.

## II. TRIAL OF ISSUED CLAIMS 1 AND 2

Both claims of the '683 patent are independent and challenged by Petitioner. Claim 1 is directed to a cartridge for use with a liquid diffusion device. Claim 2 is directed to a diffusion device that includes a removable cartridge. Claims 1 and 2 are reproduced below, with emphasis added to limitations that are of particular significance in this proceeding.

1. A cartridge for use with a liquid diffusing device, the diffusing device including a source of compressed gas, the cartridge comprising:

a reservoir and *a diffusion head mounted to the reservoir*;  
the reservoir defining an interior space partially filled with a liquid to be diffused and a head space above the liquid within the reservoir;

the diffusion head comprising:

a venturi having a narrow end and an opposing wide end, the wide end opening into an initial expansion chamber, the expansion chamber having a plurality of openings into the head space, *the narrow end including only a first opening and a second opening*;

a conduit including a first end extending below the liquid level in the reservoir, *a second end of the conduit in fluid communication with the first opening of the narrow end and fixed in position with respect to the narrow end*;



an inlet in fluid communication with the second opening of the narrow end of the venturi and permitting gas to flow from the source of compressed gas of the diffusing device into the venturi;

an outlet in fluid communication with the head space permitting gas within the head space to exit the cartridge, *the outlet including a second chamber through which the gas within the head space must pass to exit the cartridge, the second chamber including a liquid return opening permitting liquid accumulating within the secondary chamber to return the reservoir.*

2. A diffusion device comprising:

a housing including a source of compressed gas and a recess for receiving a removable liquid cartridge;

a removable cartridge within the recess, the cartridge comprising:

a reservoir within which a liquid to be diffused is contained and a head space defined above the liquid within the reservoir;

*a diffusion head mounted to the reservoir, the diffusion head including a tube with a first end extending into the liquid, an inlet in fluid communication with the source of compressed gas of the housing, a venturi with a narrow end and a wide end, the narrow end only in fluid communication with a second end of the tube and the inlet, and the wide end in fluid communication with the head space through an initial expansion chamber opening into the head space;*

*the diffusion head including an outlet separate from the venturi in fluid communication with the head space of the reservoir, the outlet including a secondary chamber through which gas from the head space must pass to exit the cartridge, the secondary chamber including a liquid return opening through which any liquid accumulating within the secondary chamber may return to the reservoir.*

Ex. 1001, col. 15, l. 50 – col. 16, l. 51 (emphasis added).

A. Claim Construction

In an *inter partes* review, “[a] claim in an unexpired patent shall be given its broadest reasonable construction in light of the specification of the patent in which it appears.” 37 C.F.R. § 42.100(b). Pursuant to that standard, the claim language should be read in light of the specification, as it would be interpreted by one of ordinary skill in the art. *In re Suitco Surface, Inc.*, 603 F.3d 1255, 1260 (Fed. Cir. 2010). Thus, we generally give claim terms their ordinary and customary meaning. *See In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007) (“The ordinary and customary meaning is the meaning that the term would have to a person of ordinary skill in the art in question.”) (internal quotation marks omitted). However, a “claim term will not receive its ordinary meaning if the patentee acted as his own lexicographer and clearly set forth a definition of the disputed claim term in either the specification or prosecution history.” *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002). “Although an inventor is indeed free to define the specific terms used to describe his or her invention, this must be done with reasonable clarity, deliberateness, and precision.” *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). Also, we must be careful not to read a particular embodiment appearing in the written description into the claim if the claim language is broader than the embodiment. *See In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993) (“limitations are not to be read into the claims from the specification”).

We address below the limitations that particularly are at issue in the parties’ papers.

1. “fixed in position”

Claim 1 recites “a second end of the conduit . . . fixed in position with respect to the narrow end” of the venturi. Prior to institution, neither party proposed a construction for “fixed in position” (or any other limitation of either challenged claim). In the Decision to Institute, we initially construed “fixed in position” to mean “stationary.” Paper 13 at 11.

Patent Owner proposes that the term instead be construed to mean “non-adjustable,” which Patent Owner contends “is consistent with the intrinsic evidence and the understanding of ordinary skill in the art at the time of the invention.” PO Resp. 8.

With respect to the intrinsic evidence, Patent Owner argues the following:

The Board should consider the purpose of the ’683 patent to provide an improved liquid diffusion appliance with a unitary cartridge having a reservoir and an integrated diffusion means when construing the term “fixed in position.” To achieve that purpose, the ’683 patent discloses and claims a cartridge having no moving parts, which minimizes manufacturing complexity and costs.

PO Resp. 8 (citing Ex. 2003 ¶ 36).<sup>4</sup> But, Patent Owner does not direct us to anywhere in the ’683 patent where the alleged description of a lack of moving parts (as opposed to a lack of a description of moving parts) may be found.

Patent Owner also argues that embodiments of the ’683 patent support its proposed construction. PO Resp. 8. In the only embodiment cited by Patent Owner, however, there is no description, explicit or implicit, of a non-

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<sup>4</sup> Ex. 2003 is a declaration by Patent Owner’s witness Dr. Shedd (“Shedd Decl.”).

adjustable feature. The relevant passage merely states that “second end 236 of tube 220 *is positioned* adjacent a narrow end 238 of a venturi 240.” Ex. 1001, col. 9, ll. 26-27 (emphasis added). Patent Owner points out that the specification lacks any discussion of adjustability. PO Resp. 8-9 (citing Ex. 2003 (Shedd Decl.) ¶ 36). But, that fact is not dispositive in (or against) Patent Owner’s favor, because the specification also lacks any discussion of *non*-adjustability, let alone a basis for construing it as a requirement of the claims. *See Van Geuns*, 988 F.2d at 1184 (“limitations are not to be read into the claims from the specification”).

With respect to the understanding of a person of ordinary skill in the art, Patent Owner argues that he or she, “reading the ’683 patent[,] would understand ‘fixed in position’ to mean ‘non-adjustable’ because the diffusion means in the ’683 patent is a single use item and will only have one liquid pass through it before it is discarded, thereby eliminating the need for any adjustment in the diffusion head.” PO Resp. 9 (citing Ex. 2003 (Shedd Decl.) ¶ 44). However, the ’683 patent is not so limited and, in fact, expressly states that the cartridge may be reused. *See* Ex. 1001, col. 11, ll. 9-13 (“[C]artridge 104 could be configured to be returned to a manufacturer or other entity after its planned use to have the cartridge disassembled, cleaned, any worn or damaged parts replaced and then refilled and resealed for use.”). Thus, Patent Owner’s argument is not persuasive.

As noted in the Decision to Institute, the ’683 patent does not define the term “fixed in position” and, other than in claim 1, the ’683 patent does not use the term. *See* Paper 13 at 11; Ex. 1001. We determine that the broadest reasonable interpretation of the term “fixed in position,” consistent

with the specification, covers “held stationary.”<sup>5</sup> Thus, if the position of the second end is held stationary with respect to the narrow end, such that free movement is precluded, the claim term at issue is met.

Further, our construction does not require the narrow end of the venturi to be held permanently stationary. The ’683 patent states that “second end 236 of tube 220 is positioned adjacent a narrow end 238 of a venturi 240” but does not state that the positioning is permanent. Ex. 1001, col. 9, ll. 26-27. Moreover, Dr. Shedd conceded, on cross-examination, that the position could be adjusted during reassembly upon refilling of the cartridge, and that “it may even be desirable to do so.” Ex. 1019, 183, l. 10 – 184, l. 6.

2. *“mounted”*

Claims 1 and 2 each recite “a diffusion head mounted to the reservoir.” In the Decision to Institute, we did not provide an express construction for this limitation. Paper 13 at 11. In its response, Patent Owner proposes that the word “mounted” be construed to mean “permanently joined.” PO Resp. 9-10. Patent Owner’s proposed construction is based on the alleged “purpose of the ’683 patent to provide a unitary, replaceable, disposable cartridge.” PO Resp. 10. However, and as discussed above, the ’683 patent is not limited to single use cartridges that are disposed and replaced after use. Rather, the ’683 patent expressly states that the cartridge may be reused through disassembly, refilling, and reassembly. Ex. 1001, col. 11, ll. 9-13.

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<sup>5</sup> This is consistent with our initial construction of “stationary.” Our final construction is meant to clarify that the second end is not only stationary but also precluded from freely moving.

Patent Owner asserts that “[i]n every embodiment described in the ’683 patent, the diffusion head is joined or bonded to the reservoir by some permanent means including ‘heat or ultrasonic welding, spin welding, or by use of an adhesive.’” PO Resp. 10 (quoting Ex. 1001, col 13, ll. 31-33 and citing *id.* at col. 6, ll. 1-5). But, the disclosure of the ’683 patent does not support Patent Owner’s assertion. The ’683 patent states that the joining “may” be by heat or ultrasonic welding, spin welding, or by use of an adhesive. Ex. 1001, col 13, ll. 31-33. The ’683 patent does not limit the joining to the disclosed methods nor does it characterize those methods as permanent. In fact, Patent Owner’s witness, Dr. Shedd, conceded that “[a]n adhesive can be permanent or non-permanent.” Ex. 1019, 115, l. 22 – 116, l. 1.

We determine that Patent Owner’s proposed construction is unreasonably narrow. The term “mounted” does not require a “permanently joined” relationship.

3. *second/secondary chamber*

Claim 1 recites “*the outlet including a second chamber* through which the gas within the head space must pass to exit the cartridge” (emphasis added). Claim 2 includes a similar limitation, reciting: “*the outlet including a secondary chamber* through which gas from the head space must pass to exit the cartridge” (emphasis added). In the Decision to Institute, we construed the second/secondary chamber of these claims as being secondary in reference to the “*initial expansion chamber*” that also is recited in both claims (emphasis added). Paper 13 at 11.

Patent Owner argues that our construction omits consideration of the head space and that the second/secondary chamber should be considered

“secondary in reference to the head space, through which the gas must pass after the head space and before exiting the cartridge.” PO Resp. 7. In other words, Patent Owner asserts that the recited head space is a second chamber, and the recited second/secondary chamber is a third chamber. *See* PO Resp. 20 (“The ’683 patent claims an improved [] liquid diffusion system using three chambers: an initial expansion chamber, the head space in the fluid reservoir, and finally a secondary chamber.”); *see also id.* at 1 (“Benalikhoudja, the Patent Owner’s own predecessor system, does not anticipate the ’683 patent because it does not disclose all its claimed features, most notably the claimed three-chamber diffusion system.”).

We disagree that the claims require a three-chambered system, or that the second/secondary chamber is recited as secondary in reference to the headspace. The claims expressly refer to two, and only two, “chambers.” In fact, after introducing an “initial expansion chamber” and a “head space,” the claims expressly refer to the other chamber as being a “second chamber” (claim 1) and “secondary chamber” (claim 2), and not as being a third or tertiary chamber. We determine that claims 1 and 2 require an initial expansion chamber, a head space, and a second/secondary chamber that is secondary in reference to the initial expansion chamber.

**B. Claims 1 And 2 As Anticipated By Benalikhoudja**

Petitioner contends that claims 1 and 2 are anticipated by Benalikhoudja.

Benalikhoudja discloses a device “for the diffusion of liquids, such as the diffusion of perfumes, liquid fuels, etc.” (Ex. 1005, 1, ll. 5-6) and states

that such devices may “be single-use and disposable after the liquid contained in the reservoir is depleted.” *Id.* at 6, ll. 13-14.

Figure 6 of Benalikhoudja is reproduced below.

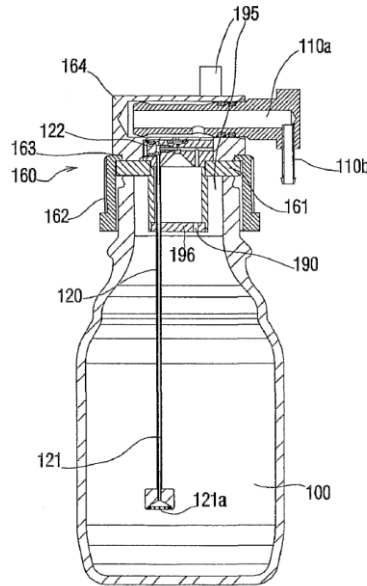


Fig.6

Figure 6 illustrates a cartridge having a reservoir of liquid 100 to be nebulized. Supply line 120 for the liquid includes hollow rod 121 that extends into the liquid and secondary line 122 that extends into venturi 160. Ex. 1005, 5, ll. 29-32. The venturi rests on the rim of the reservoir through centering flange 161. *Id.* at 5, ll. 32-33.

Figure 8 of Benalikhoudja is reproduced below.



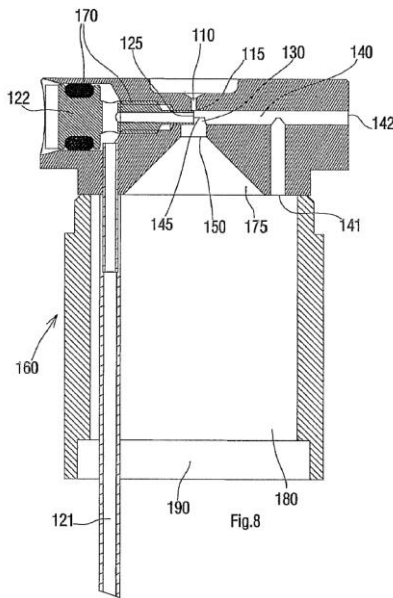


Figure 8 illustrates a sectional view of a venturi and related components. The venturi includes nebulization zone 130 in communication with (1) nozzle 115 of air intake line 110, (2) nozzle 125 of the liquid supply line, and (3) nozzle 145 of outside air line 140. Ex. 1005, 6, ll. 20-27. Benalikhoudja, however, states that the nozzle for the outside air line is optional. *Id.* at 6, ll. 25-26; 6, l. 39 – 7, l. 1; Ex. 1004, Abstract.

As further shown in Figure 8, the nebulization zone of the venturi also includes outlet 150 that extends via taper 175 to cylindrical chamber 180. Ex. 1005, 6, ll. 22-25. The cylindrical chamber includes outlet opening 190 to the reservoir, which outlet opening may include a diaphragm with three lateral openings. *Id.* at 8, ll. 26-31; Fig. 11. In other words, the outlet opening from the cylindrical chamber to the reservoir actually may consist of a plurality of smaller openings.

After nebulization, the nebulized liquid particle stream escapes from the nebulization zone, and the outlet opening feeds the stream into the liquid reservoir above the liquid level. *Id.* at 1, ll. 16-18.

The reservoir includes “nebulized liquid particle release opening 195” (see Fig. 6) through which some of the nebulized liquid particles exit the reservoir into the surrounding atmosphere. Ex. 1005, 7, ll. 7-10. Due to gravity or inertia, larger nebulized liquid particles do not exit the reservoir and instead return to the liquid to be nebulized. *Id.* at 7, ll. 12-13.

Patent Owner argues Benalikhoudja does not anticipate claims 1 and 2 because it lacks the following: “(1) a cartridge having a liquid reservoir that is permanently mounted to a diffusion head; (2) an outlet cavity having a second chamber; (3) a liquid inlet fixed in position relative to the venturi; and (4) a narrow end of the venturi having only a first and second opening.” PO Resp. 14-15. We address each of these items in turn.

1. *Benalikhoudja Discloses “a diffusion head mounted to the reservoir”*

As discussed above, the claims do not require *permanent* joining of the diffusion head to the reservoir. Benalikhoudja discloses a diffusion head mounted to the reservoir, as required by the claims. *See id.* at Fig. 6 (reproduced above); *see also* PO Resp. 18 (conceding that Benalikhoudja discloses “a diffusion head removably attached to a liquid reservoir”).

2. *Benalikhoudja Discloses An Outlet Including A Second/Secondary Chamber*

With respect to the second/secondary chamber limitation, Patent Owner presents myriad arguments, all of which attempt to distinguish the simpler release opening 195 of Benalikhoudja with the more complex outlet cavity 172 of an embodiment of the ’683 patent. *See, e.g.*, PO Resp. 21 (“the liquid particle release opening 195 of Benalikhoudja is not an outlet

*cavity* like the one in the '683 patent”). But, the proper comparison is between features of Benalikhoudja and the limitations of the claims.

Patent Owner argues that the Benalikhoudja release opening is not a second/secondary chamber because it is not a third chamber. PO Resp. 20. That argument is not commensurate with the scope of the claims, which do not require a third chamber.

Patent Owner also argues that the Benalikhoudja release opening “is not [a] separate post-head space chamber,” which Patent Owner asserts to be the case in an embodiment of the '683 patent. PO Resp. 21 (citing Ex. 2003 (Shedd Decl.) ¶¶ 82-83). But, the claims do not recite a second/secondary chamber “separate” from the head space, nor does Patent Owner or the '683 patent explain what “separate” would mean in that context. To the extent Patent Owner means the claims require a second/secondary chamber *in addition to* requiring a head space, we agree. But, to the extent that Patent Owner argues that the claims require some level of physical separation between the head space and second/secondary chamber, we disagree. In fact, the claims expressly require some physical continuity between the outlet (which includes the second/secondary chamber) and the head space, as they must be “in fluid communication” with one another.

Patent Owner points out that Benalikhoudja relies on gravity to prevent large liquid particles from exiting through particle release opening 195. PO Resp. 21; *see also* Ex. 1005, 7, ll. 12-13 (“Thus, the larger nebulized liquid particles settle by the effect of gravity or because of their inertia in the reservoir 100 where they join the liquid to be nebulized.”). That fact has no bearing, however, on whether Benalikhoudja anticipates the claims. The claims require that the second/secondary chamber includes “a

liquid return opening through which any liquid accumulating within the secondary chamber may return to the reservoir.” The claims do not preclude gravity from facilitating or causing the return.

Patent Owner states that “Benalikhoudja does not disclose an outlet *cavity* having a second chamber.” PO Resp. 20 (emphasis added); *id.* at 21 (“the liquid particle release opening 195 of Benalikhoudja is not an outlet *cavity* like the one in the ’683 patent”) (emphasis added); *id.* at 21-22 (“Benalikhoudja neither discloses nor teaches an outlet *cavity* having a second/secondary chamber[.]”) (emphasis added). But, the claims do not require an outlet cavity. The claims recite “outlet” alone. Release opening 195 of Benalikhoudja includes an outlet (upper portion of 195) through which gas must pass to exit the cartridge. Ex. 1005, 7, ll. 5-10; Fig. 6. Thus, it is an outlet.

Finally, Patent Owner argues that the “release opening 195 of Benalikhoudja . . . is not a chamber through which the gas and liquid mixture must pass to exit the device.” PO Resp. 21. However, Patent Owner does not propose a construction for the term “chamber” or otherwise elaborate on its meaning. Patent Owner also does not explain why the Benalikhoudja release opening does not constitute, or include, a chamber. Although the ’683 patent does not define “chamber,” it is clear from the specification, as well as the claims, that the second/secondary chamber cannot be a fully enclosed space, because it requires at least two openings, one for allowing nebulized gas from the head space to enter the chamber, and another for allowing some of that gas to exit the cartridge into the surrounding atmosphere. The upper portion of release opening 195 of

Benalikhoudja is a chamber within the broadest reasonable construction of the term in light of the specification.

3. *Benalikhoudja Discloses “a second end of the conduit . . . fixed in position with respect to the narrow end”*<sup>6</sup>

Benalikhoudja discloses a second end of a conduit, i.e., nozzle 125, that is held stationary with respect to the narrow end of the venturi (i.e., outlet 150). *See* Ex. 1005, Fig. 6. Benalikhoudja discloses “micrometer screw” 170 that can be turned to adjust slidably the position of secondary line 122 (and its nozzle 125) relative to the narrow end of the venturi, but, in the absence of such intervention, the nozzle does not freely move and is held stationary. Ex. 1005, 6, ll. 20-25. The nozzle is not permanently fixed in position with respect to the venturi narrow end, but the claim does not require it to be.<sup>7</sup>

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<sup>6</sup> This is a limitation of claim 1, but not claim 2.

<sup>7</sup> For the “fixed in position” limitation, Petitioner points out that Benalikhoudja discloses a liquid conduit that may be configured either to “allow or prevent the sliding of the contained part inside the containing part.” Ex. 1004, 3, ll. 24-27. However, that teaching relates to a separate embodiment than the one Petitioner relies on to meet claim 1. Thus, we cannot consider it for anticipation purposes. *See Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1371 (Fed. Cir. 2008) (“[U]nless a reference discloses within the four corners of the document not only all of the limitations claimed but also all of the limitations arranged or combined in the same way as recited in the claim, it cannot be said to prove prior invention of the thing claimed and, thus, cannot anticipate under 35 U.S.C. § 102.”). Moreover, we are not persuaded that the teaching refers to allowing or preventing sliding of the *end* of the conduit (i.e., nozzle 25) with respect to the narrow end of the venturi. Indeed, Benalikhoudja elsewhere states that the embodiment includes “means of adjusting 70 the position of the nozzle 25.” Ex. 1005, 4, ll. 4-5.

4. *Benalikhoudja Discloses A Narrow End Of A Venturi In Communication With Only Two Openings*

Claim 1 requires “the narrow end [of the venturi] including only a first opening and a second opening.” Claim 2 similarly requires that “the narrow end [of the venturi is] only in fluid communication with a second end of the tube and the inlet.” Benalikhoudja illustrates an embodiment in which the narrow end of the venturi is in communication with three openings: (1) nozzle 115 of an air intake line 110; (2) nozzle 125 of the liquid supply line; and (3) nozzle 145 of outside air line 140. Ex. 1005, Fig. 6; *see also id.* at 6, ll. 20-27. Patent Owner emphasizes that there are three, and not merely two, openings illustrated in Figure 6 of Benalikhoudja. PO Resp. 13-14. Patent Owner also asserts that Benalikhoudja does not describe any benefit to omitting the third opening. *Id.*

In response, Petitioner points out that Benalikhoudja states that the third opening, for the outside air line, is optional. Pet. 16-17; Ex. 1005 at 6, ll. 25-27; 6, l. 39 – 7, l. 1; Ex. 1004, Abstract.<sup>8</sup> Petitioner directs us to *Upsher-Smith Labs., Inc. v. PamLab*, 412 F.3d 1319, 1322 (Fed. Cir. 2005), in which the court held that “optional inclusion” of a feature in the prior art anticipates a claim that excludes the feature. Pet. Reply 12; *see also Upsher-Smith Labs.*, 412 F.3d at 1322 (“The European Application’s ‘optional inclusion’ of antioxidants teaches vitamin supplement compositions that both do and do not contain antioxidants.”). Thus, Benalikhoudja discloses a narrow end of a venturi in communication with only two openings, meeting the limitations of the claims.

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<sup>8</sup> Exhibit 1004 is the original, foreign language version of Benalikhoudja, which includes an English abstract.

Petitioner has shown by a preponderance of the evidence that claims 1 and 2 are anticipated by Benalikhoudja.

C. Claims 1 And 2 As Obvious Over Benalikhoudja And Sakaida

Petitioner contends that the subject matter of claims 1 and 2 would have been obvious over Benalikhoudja and Sakaida. In doing so, Petitioner relies on Benalikhoudja as teaching all of the limitations of the claims except for the second/secondary chamber. Pet. 21-25. For that feature of the claims, Petitioner relies on a modification of Benalikhoudja in view of Sakaida. *Id.*

Sakaida “relates to a micro-mist generation method and apparatus able to atomize a fluid to the state of a micro-mist.” Ex. 1006, col. 1, ll. 13-15.

Figure 1 of Sakaida is reproduced below.

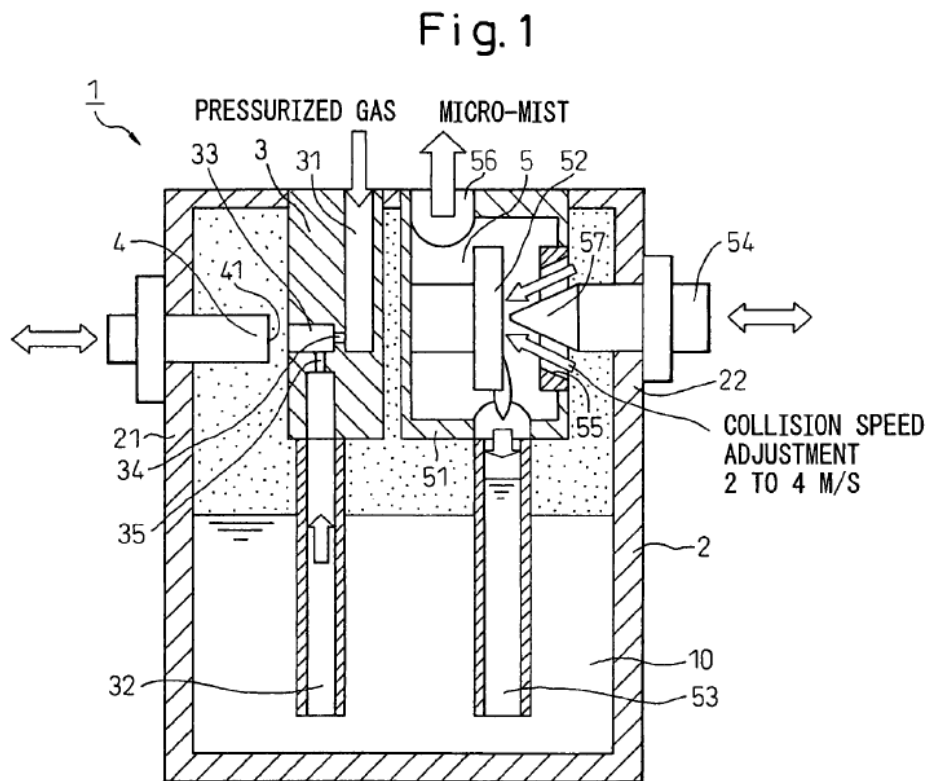


Figure 1 illustrates a “micro-mist generation apparatus” for atomizing a liquid from a reservoir and releasing it “from the discharge port 56 to the outside.” Ex. 1006, col. 3, ll. 41-46; col. 4, ll. 53-57. The micro-mist generation apparatus works by “spraying a liquid stored in a generation chamber [2] by an injection nozzle [33] using introduced pressurized gas, making it collide with a buffer valve [4] to atomize it and holding it in the generation chamber” and then “introducing the atomized fine particles into a particle classifier [5] and making them collide with a collision plate [52], and discharging the bounced back particles as micro-mist.” *Id.* at col. 2, ll. 11-18. Although the small particles bouncing off the collision plate are discharged into the surrounding atmosphere, large particles having a momentum exceeding the surface tension of the liquid deposit on the collision plate and form a liquid, which is then recovered. *Id.* at col. 2, ll. 38-46. Thus, larger liquid particles are prevented from being discharged into the surrounding atmosphere, and are instead returned to the reservoir through return pipe 53. *Id.* at col. 2, ll. 50-54.

Petitioner asserts, with supporting testimony from its witness, Charles A. Garris, Jr., Ph.D., that a person of ordinary skill in the art would have been motivated to integrate the particle classifier of Sakaida into the diffusion device of Benalikhoudja in order to further Benalikhoudja’s objective of preventing large particles escaping from the device by providing an additional particle size classifying structure at the outlet that can also “adjust the classification criteria of the particles.” Pet. 22 (citing Ex. 1006, col. 2, ll. 45-46; Ex. 1003 ¶¶ 33-35). Patent Owner disputes that assertion, arguing that Sakaida is not analogous prior art because it generates atomized particles to be targeted at a work piece to cool it (via evaporation of the



particles), whereas the '683 patent generates atomized particles for release into the surrounding atmosphere to provide a scent. PO Resp. 26-28.

A reference is analogous prior art if (1) it is from the same field of endeavor, or (2) if it is reasonably pertinent to the particular problem with which the inventor was involved. *In re Clay*, 966 F.2d 656, 658-59 (Fed. Cir. 1992). Whether a prior art reference is analogous art is a question of fact. *In re Paulsen*, 30 F.3d 1475, 1481 (Fed. Cir. 1994).

Patent Owner does not identify directly the field to which it asserts the '683 patent is directed. But, Patent Owner implies that the field is “air freshener systems,” by arguing that “a designer making air freshener systems . . . would not be inclined to search beyond the designer’s own field for solutions to problems.” *Id.* (citing Ex. 2003 (Shedd Decl.) ¶¶ 20-21). The testimony of Dr. Shedd that Patent Owner cites, however, does not support limiting the field to “air freshener systems.” In paragraph 20 of his declaration, Dr. Shedd refers only to “the field of liquid diffusion devices and the '683 patent.” Ex. 2003 ¶ 20; *see also id.* ¶ 21 (stating in entirety: “Additional principles of patent law may be explained or alluded to as appropriate in other portions of my report.”). Thus, Patent Owner has not identified any evidence to support its implication that the field of endeavor, to which the '683 patent is directed, is limited to air freshener systems. We find that Sakaida is directed to the same field of endeavor as the '683 patent: liquid diffusion devices for releasing relatively small atomized particles while preventing the release of relatively large particles.

Patent Owner also argues that Sakaida is not reasonably pertinent to the particular problem with which the inventors of the '683 patent were involved. PO Resp. 28. More specifically, Patent Owner argues that the

'683 patent is concerned with discharging atomized particles into the surrounding atmosphere such that they stay suspended, whereas "Sakaida is directed to spraying atomized particles directly at a workpiece, where they evaporate to achieve cooling." *Id.* We are not persuaded by this argument. Both the '683 patent and Sakaida also relate to a common problem of atomizing a liquid such that the atomized liquid particles or drops that are released are not too large. Ex. 1001, col. 9, ll. 54-61; Ex. 1006, col. 2, ll. 1-10. For this reason, even if Sakaida was directed to a different, more narrowly defined field (e.g., liquid diffusion devices for cooling a work piece) than that of the '683 patent (e.g., liquid diffusion devices for air freshener systems), Sakaida still is reasonably pertinent to the particular problem involved in the '683 patent -- releasing relatively small atomized particles while preventing the release of relatively large atomized particles.

Petitioner asserts, with supporting testimony, that a person of ordinary skill in the art would have been motivated to integrate the particle classifier of Sakaida into the diffusion device of Benalikhoudja in order to further Benalikhoudja's objective of preventing large particles escaping from the device by providing an additional particle size classifying structure at the outlet that can also "adjust the classification criteria of the particles." Pet. 22 (citing Ex. 1006, col. 2, ll. 45-46; Ex. 1003 ¶¶ 33-35).

In response, Patent Owner argues that Dr. Garris merely invokes common sense without providing any real analysis. PO Resp. 4. However, we find that Dr. Garris provides adequate reasoning with rational underpinning, including via the following excerpt from his analysis:

Applying common sense, a person of ordinary skill in the art would have been motivated to combine the particle classifier 5 (*i.e.*, second chamber of the outlet) of Sakaida with

Benalikhoudja's nebulization device using well-known methods to obtain predictable desired results, such as smaller liquid particles being discharged from the diffusion device into the environment. Indeed, a stated intention of Benalikhoudja is to remedy the disadvantages of "large particles escap[ing] from the device ...." Benalikhoudja at page 1, lines 10-11. Further, Benalikhoudja contemplates "vary[ing] the operating parameters of the venturi 61 through 64, to compensate at least partially for variations in manufacture and to adapt the stream of nebulized liquid particles to each use." *Id.* at page 4, lines 14-15. To this end, the combination of the particle classifier 5 of Sakaida with the nebulization device of Benalikhoudja would yield a further benefit of allowing the size of atomized particles to be adjusted.

Ex. 1003 ¶ 34.

Petitioner has presented reasoning with rational underpinning for modifying Benalikhoudja in view of Sakaida, such that the modified device would incorporate Sakaida's particle classifier. That modified device falls within the scope of the challenged claims, with the particle classifier serving as a second/secondary chamber. Thus, Petitioner has established by a preponderance of the evidence that claims 1 and 2 would have been obvious over Benalikhoudja and Sakaida.

### III. PATENT OWNER'S MOTION TO AMEND

During an *inter partes* review, a patent owner may file a motion to amend the patent. 35 U.S.C. § 316(d). The proposed amendment is not entered automatically, but only upon the patent owner demonstrating patentability of the substitute claim. As the moving party, Patent Owner bears the burden of proof to establish that it is entitled to the relief requested. 37 C.F.R. § 42.20(c).

Patent Owner filed a motion to amend the '683 patent by substituting proposed claim 3 for claim 1, the motion contingent on claim 1 being held unpatentable. PO Mot. 1. As we hold claim 1 unpatentable, we consider the motion to amend.

Proposed claim 3 would be identical to claim 1, except that instead of requiring “a diffusion head mounted to the reservoir,” it would require “a diffusion head permanently joined to the reservoir.” PO Mot. 2. To support the motion, Patent Owner asserts that “[n]one of the art of record or other art known to Prolitec discloses, teaches, or suggests a cartridge for use with a liquid diffusion device, including all of these limitations, and having a liquid reservoir that is permanently joined to a diffusion head.” PO Mot. 6 (citing Ex. 2004 (Shedd Decl. “Annex A”) ¶ 1007. This assertion, however, is too general and conclusory to support the motion. It amounts to a mere statement that Patent Owner knows of no prior art that would have rendered obvious proposed substitute claim 3. The first three underlying factual inquiries of *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966) are not addressed sufficiently. They are: (1) the scope and content of the prior art; (2) differences between the claimed subject matter and the prior art; and (3) the level of ordinary skill in the art, with special focus and emphasis on that feature which has been added relative to an original patent claim being replaced by the proposed substitute claim. *Id.*

Patent Owner also asserts that “[u]ntil the '683 Patent, no one had invented a cartridge based system wherein the cartridge included *both* the diffusion means and the liquid reservoir where the two were permanently joined to each other.” PO Mot. 10 (citing Ex. 2004 (Shedd Decl. “Annex A”) ¶ 1016). This assertion, however, relates to the purported

novelty of proposed claim 3, but it does not address whether the claim would have been non-obvious.

Furthermore, the assertion that no one had invented a cartridge based system wherein the cartridge included both the diffusion means and the liquid reservoir where the two were permanently joined to each other is not accurate. As pointed out by Petitioner, at least two prior art references disclose this feature. Pet Opp. 10-11.

The first reference, US 6,021,776, issued February 8, 2000 (“Allred”), states that “container 12 can be permanently attached to discharge section 15 of atomizer device 10 by various adhesive or ultrasonic welding techniques known to those skilled in the art.” Ex. 1021, col. 4, ll. 41-44. The second reference, WO 2006/018511 A2, published February 23, 2006 (“Poncelet”) states that “[t]he reservoir and the closure element are preferably part of a replaceable cartridge. . . . the closure element and the reservoir may be made from a suitable plastic, permanently joined together using any suitable means such as a weld or bond.” Ex. 1022, 4, ll. 5-11. During the oral hearing, Patent Owner conceded that these references teach the limitation in question, i.e., “a diffusion head permanently joined to the reservoir.” Tr. 68, l. 19 – 69, l. 2; *see also* Ex. 1019, 298, ll. 1-6 (Dr. Shedd conceding on cross-examination that “Poncelet discloses a replaceable cartridge comprising the reservoir and the diffusion means permanently joined together”); PO Reply 4 (“Although Poncelet does disclose a cartridge having a liquid reservoir permanently attached to a diffusion head, it lacks other elements present in Claim 3[.]”); PO Reply 5 (“Allred’s disclosure does include a liquid reservoir that may be welded to an ‘atomizing nozzle’ but the nozzle does not include anything to prevent large liquid particles

from escaping the device, such as an outlet cavity having a second opening downstream from a head space.”).

Patent Owner was aware of at least one of the references prior to filing its motion to amend. More specifically, Allred was cited by Patent Owner in an Accelerated Examination Support Document during the prosecution of the '683 patent. Ex. 1002 at 0119; *see also id.* at 0098. Additionally, Petitioner alleges that it identified Poncelet in invalidity contentions served on Patent Owner on December 21, 2012, in the related lawsuit between the parties. Pet. Opp. 12 n.1. However, Petitioner does not cite to any corroborating evidence, such as a copy of the invalidity contentions. *Id.*

Patent Owner's motion to amend does not address Allred, Poncelet, or any other prior art reference that also may teach the very limitation Patent Owner seeks to add to claim 3, which it contends would render the claim patentable.<sup>9</sup> Instead, it erroneously is premised on the absence of such a teaching in the prior art. Thus, the motion does not demonstrate that claim 3 is patentable over, for example, Benalikhoudja in view of Allred.

Patent Owner's motion to amend is denied for failure to establish that it is entitled to the relief requested. *See* 37 C.F.R. § 42.20(c).

#### IV. PETITIONER MOTION TO EXCLUDE

Petitioner moved to exclude certain portions of direct testimony by Dr. Shedd, Patent Owner's witness. Paper 48. Resolution of Petitioner's

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<sup>9</sup> We understand that Patent Owner maintains that several limitations, which are common to issued claim 1 and proposed claim 3, provide patentable distinctions over the prior art. As we have already held claim 1 to be unpatentable, these limitations cannot distinguish claim 3 over the prior art.

motion is unnecessary to this final written Decision, as we do not rely on any of the challenged testimony in a manner adverse to Petitioner. Accordingly, we dismiss Petitioner's motion to exclude as moot.

#### V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 1 and 2 of U.S. Patent No. 7,712,683 B2 are held unpatentable;

FURTHER ORDERED that Patent Owner's motion to amend is denied;

FURTHER ORDERED that Petitioner's motion to exclude is dismissed as moot; and

FURTHER ORDERED that, because this Decision is final, a party to the proceeding seeking judicial review of the Decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

Case IPR2013-00179

Patent 7,712,683 B2

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