

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

FISHER & PAYKEL HEALTHCARE LIMITED,
Petitioner,

v.

RESMED LIMITED,
Patent Owner.

Case IPR2017-00061
Patent 9,119,931 B2

Before BARRY L. GROSSMAN, BEVERLY M. BUNTING, and
JAMES J. MAYBERRY, *Administrative Patent Judges*.

BUNTING, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. INTRODUCTION

A. Background

Fisher & Paykel Healthcare Limited (“Petitioner”) filed a Petition (Paper 1, “Pet.”) requesting an *inter partes* review of claims 1, 4–8, 10–22, 25, 26, 28–37, and 40–42 of U.S. Patent No. 9,119,931 B2 (Ex. 1001, “the ’931 Patent”). ResMed Limited (“Patent Owner”) did not file a preliminary response to the Petition. Upon consideration of the information presented in the Petition, we determined that there was a reasonable likelihood that Petitioner would prevail with at least one challenged claim, and instituted this trial, pursuant to 35 U.S.C. § 314(a), only as to claims 33–37 and 40–42 (“the instituted claims”) of the ’931 patent. Paper 7, 25 (“Decision on Institution” or “Dec.”).¹

Subsequent to institution, Patent Owner filed a Patent Owner Response (Paper 16, “PO Resp.”), and Petitioner filed a Reply (Paper 22, “Reply”).² A transcript of the oral hearing held on December 18, 2017 has been entered into the record as Paper 32 (“Tr.”).³

This Final Written Decision is entered pursuant to 35 U.S.C. § 318(a). For the reasons that follow, we conclude that Petitioner has demonstrated, by a preponderance of the evidence, that claims 33–37 and 40–42 of the ’931 patent are unpatentable.

¹ We did not institute trial as to challenged claims 1, 4–8, 10–22, 25, 26, 28–32. Dec. 24–25.

² Patent Owner filed evidentiary objections to Petitioner’s Reply (Paper 23) but did not file a motion to exclude, which is required to preserve any evidentiary objection. See 37 C.F.R. § 42.64(c).

³ Both parties requested to present arguments collectively for IPR2016-00061, and IPR2016-00062. Papers 26 and 27.

B. Related Matters

The parties identify a related federal district court case involving the '931 patent: *Fisher & Paykel Healthcare Ltd. v. ResMed Corp.*, Case No. 3:16-cv-02068-GPC-WVG (S.D. Cal.). Pet. 7–8; Paper 4, 2. The parties also indicate that the '931 patent is involved in U.S. International Trade Commission Investigation No. 337–TA–1022. Pet. 7; Paper 4, 2.

Petitioner has filed five additional petitions for *inter partes* review of the '931 Patent. See IPR2017-00062, IPR2017-00064, IPR2017-00065, 2017-01658, and IPR2017-01659. Pet. 8; Paper 4, 2.

C. The '931 Patent (Ex. 1001)

The '931 patent, titled “Mask System,” issued on September 1, 2015, and claims priority based on a series of applications dating back to February 27, 2009, as well as several provisional applications dating back to September 19, 2008. Ex. 1001, 1:6–17. The '931 patent relates generally to a mask system for treatment of “Sleep Disordered Breathing” using “Continuous Positive Airway Pressure [‘CPAP’]” or “Non-Invasive Positive Pressure Ventilation.” *Id.* at 1:21–24.

Figure 3 of the '931 patent, as reproduced below, illustrates mask system 1010.

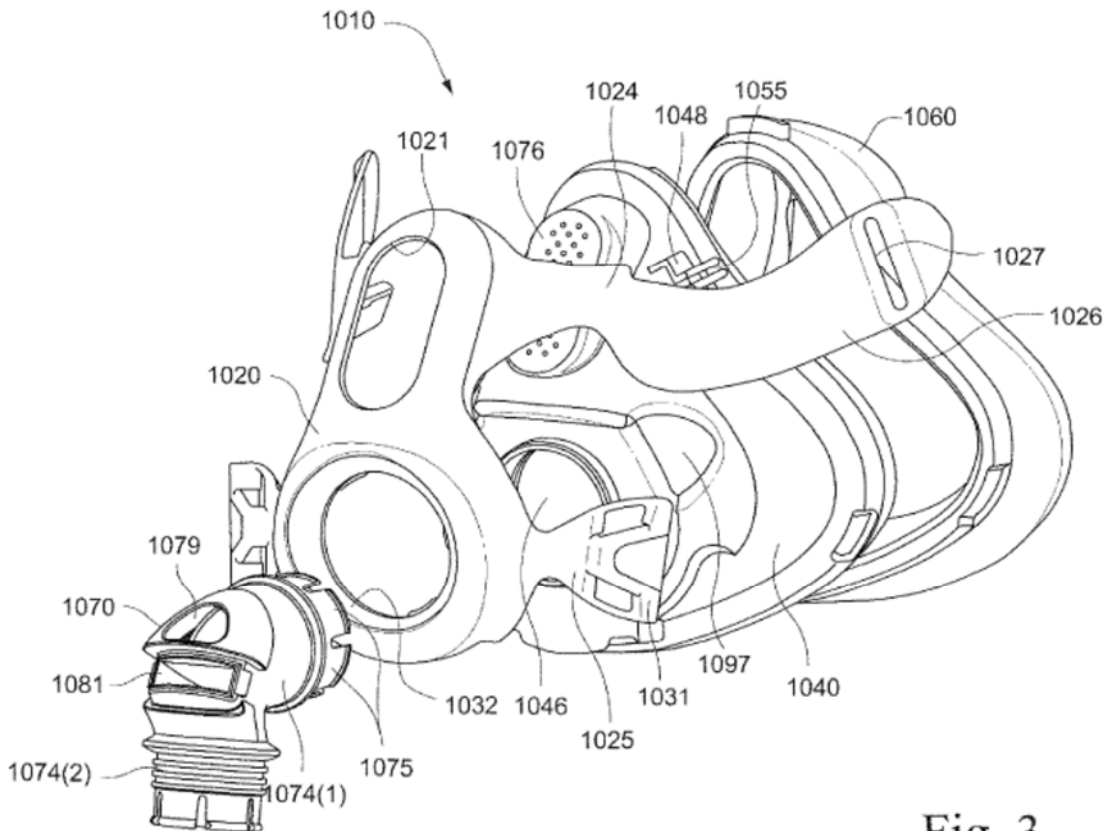


Fig. 3

Figure 3 is an exploded view of the mask system.

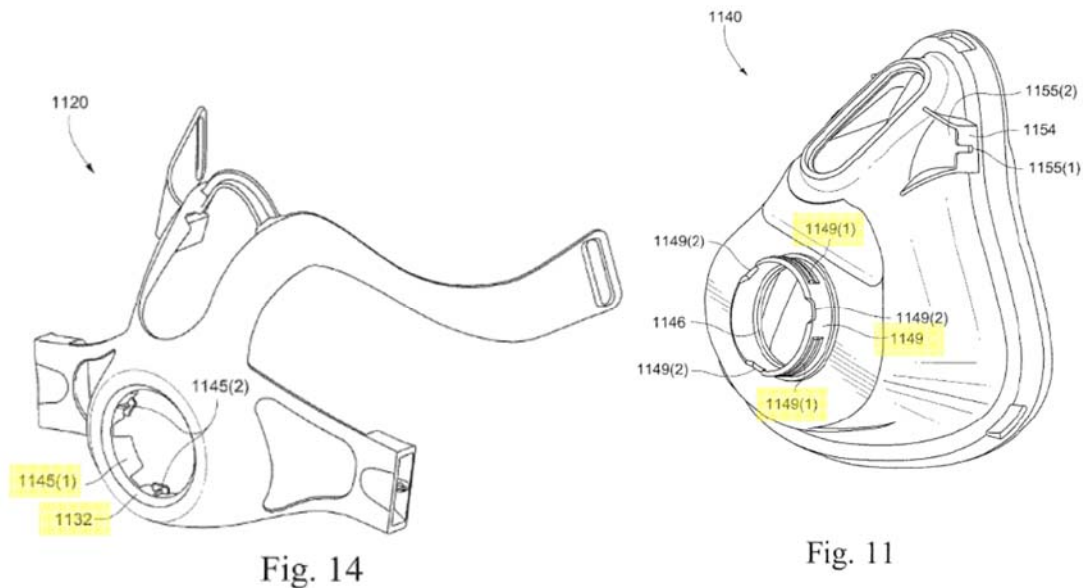
Mask system 1010 includes frame 1040, mask cushion 1060, shroud 1020, and elbow 1070. *Id.* at 6:51–53. Frame 1040 defines a breathing chamber adapted to receive the patient's nose and mouth and includes an opening 1046 that communicates with elbow 1070. *Id.* at 6:60–64. Frame 1040 also includes vent arrangement 1076, shown in Figure 3 that protrudes from frame 1040. *Id.* at 7:22–23. Opening or vent receiving hole 1021 in shroud 1020 accommodates the protruding vent arrangement. *Id.* at 7:21–23.

The '931 patent describes how

[t]he shroud may also be connected to the frame by a lower retaining mechanism located on the bottom end of the frame and shroud. For example, a retaining mechanism may be

provided to the opening of the shroud which is structured to interlock or otherwise engage with the opening of the frame.

Ex. 1001, 17:48–53. Shroud 1120 includes snap fingers 1145(1) and sandwich tabs 1145(2) that extend from opening 1132 and engage annular protrusion 1149(1) to initially retain the shroud 1120 to the 1140 frame to facilitate assembly and disassembly. Petitioner's annotated versions of Figures 14 and 11 of the '931 Patent showing this interlocking arrangement are reproduced below:



Figures 11 and 14 as annotated by Petitioner.

Pet. 20.

D. Illustrative Claim

Claim 33 is independent, and claims 34–37, and 40–42 depend directly or indirectly from claim 33. Claim 33 is reproduced below:

33. A mask system, comprising:
- (i) a shroud module; wherein the shroud module includes headgear connectors adapted to removably attach to respective headgear straps of headgear; and
 - (ii) a cushion module, comprising:
 - a frame defining a breathing chamber; and
 - a cushion to form a seal with the patient's face in at least a nasal bridge region and a cheek region of the patient's face,wherein the cushion is constructed of a first, relatively soft, elastomeric material and the frame is constructed of a second material that is more rigid than the cushion, and a nasal bridge portion of the cushion includes one or more folds to provide in use a higher level of adaptability or flexibility to the nasal bridge region of the cushion module relative to another region of the cushion module;
- wherein the shroud module and the cushion module are configured to be removably coupleable to one another, and
- wherein the shroud module includes a front opening of substantively circular shape and a retaining portion extending rearwardly from the front opening, towards the frame, and structured to snap-fit with the cushion module.

Ex. 1001, 26:54–27:11.

E. Instituted Grounds of Unpatentability

We instituted the instant trial based on the following grounds of unpatentability (Dec. 25):

Reference(s)	Basis	Claims Challenged
D’Souza, ⁴ Ultra Mirage, ⁵ and Matula-II ⁶	§ 103(a) ⁷	33, 37, and 40–42
D’Souza, Ultra Mirage, Matula-II, and Barnett ⁸	§ 103(a)	34 and 36
D’Souza, Ultra Mirage, Matula-II, and FlexiFit ⁹	§ 103(a)	35

II. ANALYSIS

A. Legal Principles

In *inter partes* reviews, petitioner bears the burden of proving unpatentability of the challenged claims, and the burden of persuasion never shifts to the patent owner. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). To prevail in this proceeding, Petitioner must support its challenges by a preponderance of the evidence.

⁴ WO 2007/041751 A1, pub. Apr. 19, 2007 (Ex. 1002, “D’Souza”).

⁵ ResMed product brochure describing the “Ultra Mirage™ Full Face Mask” (Ex. 1003, “Ultra Mirage”). Petitioner has provided evidence to establish that the brochure was publicly available by September 1, 2006. Pet. 11–12 (citing Ex. 1003, 1–2, 7–8; Ex. 1013 ¶¶ 55–56).

⁶ US 2007/0044804 A1, pub. Mar. 1, 2007 (Ex. 1005, “Matula-II”).

⁷ The relevant sections of the Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112–29, 125 Stat. 284 (Sept. 16, 2011), took effect on March 16, 2013. Because the application from which the ’931 patent issued was filed before that date, our citations to Title 35 are to its pre-AIA version.

⁸ US 6,412,488 B1, iss. July 2, 2002 (Ex. 1007, “Barnett”).

⁹ Fisher & Paykel Healthcare Corporation Limited product brochure describing the “FlexiFit™431 Full Face Mask” (Ex. 1006, “FlexiFit”). Petitioner has proffered evidence to establish that the brochure was publicly available by October 16, 2006. Pet. 12–13 (citing Ex. 1006, 1–2, 5, 8, 11; Ex. 1013 ¶¶ 55, 57; 1016, 1–4).

35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). Accordingly, all of our findings and conclusions are based on a preponderance of the evidence.

A claim is unpatentable under § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) where in evidence, so-called secondary considerations. *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17–18 (1966).

We analyze the following grounds of unpatentability in accordance with the above-stated principles.

B. Level of Skill in the Art

In determining the level of ordinary skill in the art, various factors may be considered, including the “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.” *In re GPAC, Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (citation omitted). In that regard, Petitioner asserts that a person having ordinary skill in the art (“PHOSITA”) “would have at least a bachelor’s degree in mechanical engineering, biomedical engineering or other similar type of engineering degree combined with at least two years of experience in the field of masks, respiratory therapy, patient interfaces or relevant product

design experience.” Pet. 21 (citing Ex. 1013 ¶ 27). Patent Owner’s expert, Mr. Sleeper, generally accepts this framework, but according to his formulation, the POSITA “would have at least a bachelor’s degree in mechanical engineering, biomedical engineering, or a similar technical field, with at least two years of relevant product design experience. An increase in experience could compensate for less education, and an increase in education could likewise compensate for less experience.” Ex. 2002 ¶ 12.

Our determination regarding the patentability of the challenged claims does not turn on the minor differences between these definitions. However, for the purpose of our analysis, we accept Petitioner’s formulation, finding that the POSITA “would have at least a bachelor’s degree in mechanical engineering, biomedical engineering or other similar type of engineering degree combined with at least two years of experience in the field of masks, respiratory therapy, patient interfaces or relevant product design experience.”

C. Claim Construction

The Board interprets claims of an unexpired patent using the broadest reasonable construction in light of the specification of the patent in which they appear. See 37 C.F.R. § 42.100(b); *In re Cuozzo Speed Techs., LLC*, 793 F.3d 1268, 1278 (Fed. Cir. 2015) (“We conclude that Congress implicitly approved the broadest reasonable interpretation standard in enacting the AIA”), *aff’d*, *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131 (2016); Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,766 (Aug. 14, 2012). Under the broadest reasonable interpretation standard, and absent any special definitions, claim terms are given their ordinary and

customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech. Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). Any special definitions for claim terms or phrases must be set forth with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). In the absence of such a definition, limitations are not to be read from the specification into the claims. *See In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993).

In its Petition, Petitioner does not propose that any specific claim term requires construction. Pet. 16. Instead, Petitioner asserts that “[t]he claims of the ’931 Patent should be accorded their “broadest reasonable construction” in light of the specification of the ’931 Patent.” *Id.* Patent Owner likewise takes the position that no express construction of any claim term is necessary. PO Resp. 21.

Having considered the entire record, our determination regarding the obviousness of the challenged claims does not turn on the interpretation of any of the claim terms. Thus, based on the final trial record before us, we determine that express construction of these terms or limitations is not necessary for purposes of this Final Written Decision. *See Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

D. Obviousness Based on D’Souza, Ultra Mirage, and Matula-II

Petitioner challenges the patentability of claims 33, 37, and 40–42 of the ’931 patent under 35 U.S.C. § 103 as obvious based on D’Souza, Ultra Mirage, and Matula-II. Pet. 34–42, and 86–90. Petitioner identifies the disclosures in the cited references alleged to describe the subject matter in

each of the challenged claims. *Id.* Petitioner also provides an articulated reasoning with rational underpinning to support its conclusion of obviousness. *Id.* Petitioner supports its arguments and evidence with the testimony of its declarant, Mr. Eaton. Ex. 1013.

Patent Owner disagrees, arguing that neither D’Souza nor Matula-II discloses the snap-fit feature of the challenged claims, and that the POSITA would not have modified the mask of D’Souza using the teachings of Matula-II. PO Resp. 21–57. Patent Owner supports its arguments and evidence with the testimony of its declarant, Mr. Sleeper. Ex. 2002.

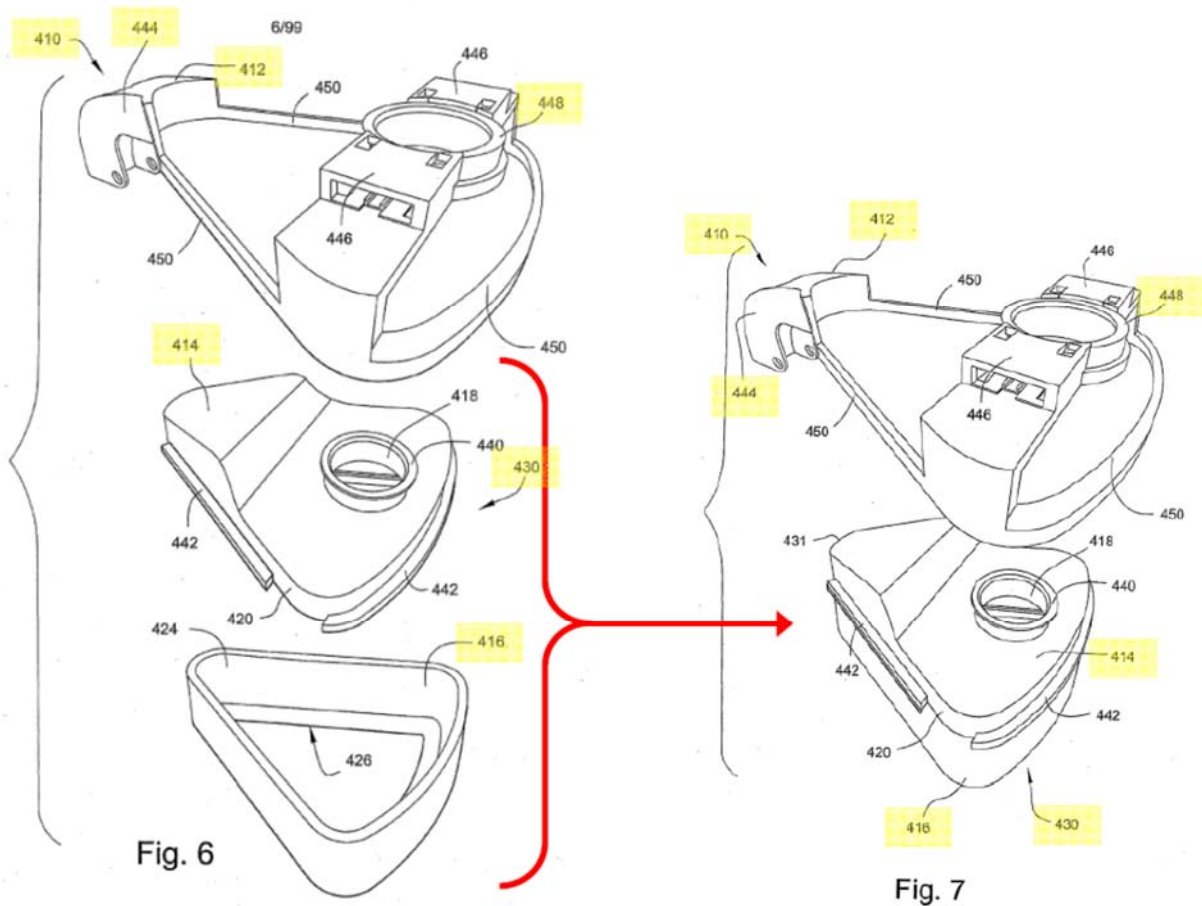
We have reviewed the parties’ contentions and supporting evidence of record in this trial. For the reasons given below, we conclude that Petitioner has demonstrated by a preponderance of the evidence that claims 33, 37, and 40–42 would have been obvious based on D’Souza, Ultra Mirage, and Matula-II. We begin our analysis with a brief summary of these references, and then address the parties’ contentions in turn.

1. Overview of D’Souza (Ex. 1002)

D’Souza is directed to a full-face mask assembly having a frame, cushion that forms a seal around the patient’s nose and mouth. Ex. 1002, abstract.

Mask assembly 410 includes skeleton frame 412 (asserted “shroud module”), frame 414 (asserted “frame”), and cushion 416. *Id.* at ¶¶ 96–97. Frame 414 interlocks with cushion 416 to form cushion/frame sub-assembly 430 (asserted “cushion module”). *Id.* at ¶ 97.

Petitioner’s annotated versions of Figures 6 and 7 of D’Souza showing this arrangement are reproduced below.



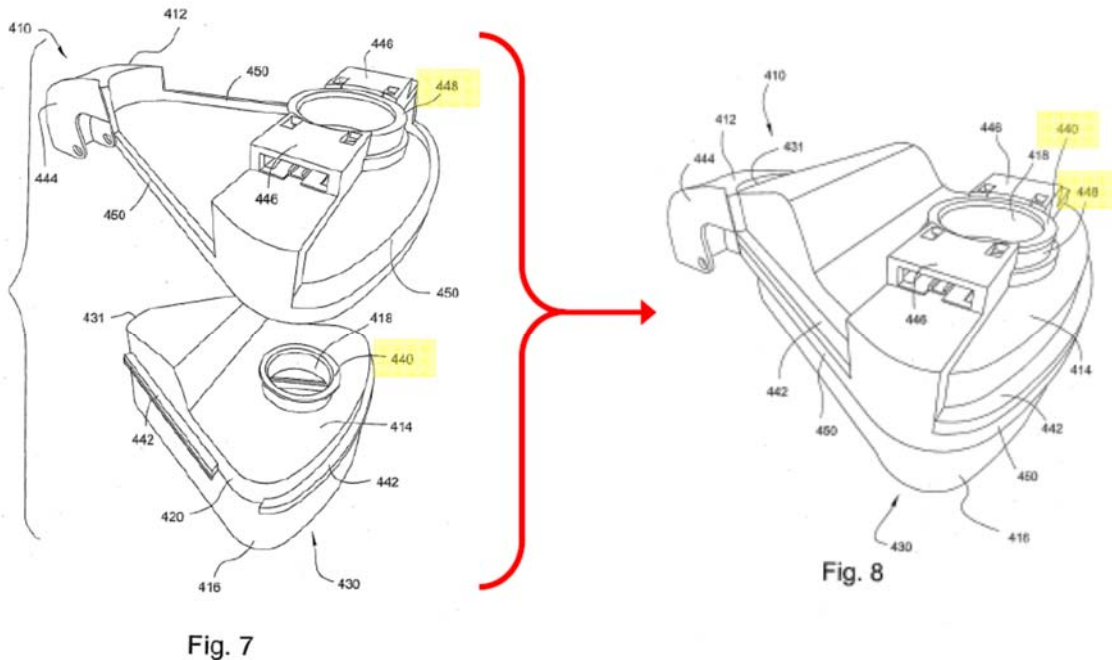
Figures 6 and 7 as annotated by Petitioner.

Pet. 23 (citing Ex. 1002 ¶¶ 96–11, Figs. 6, 7).

Skeleton frame 412 “is adapted to removably interlock” with cushion/frame sub-assembly 430 (asserted “cushion module”). Ex. 1002 ¶ 96. Figures 7 and 8 of D’Souza illustrate that frame 414 of the asserted cushion module includes opening 418, which is surrounded by annular wall 440; and skeleton frame 412 (asserted “shroud module”) includes “an annular elbow connection seal 448 adapted to engage an inlet conduit, e.g., elbow.” Ex. 1002 ¶¶ 98, 100. To assemble and interlock the shroud module and cushion module, the large-diameter collar on the end of annular wall 440

must be passed through the opening in annular seal 448 to rest against the front/top edge of annular seal 448. See *id.* ¶ 101, Figs. 7, 8; Pet. 38.

This arrangement is illustrated in Petitioner’s annotated versions of Figures 7 and 8 of D’Souza, reproduced below.



Figures 7 and 8 as annotated by Petitioner.

Pet. 38.

2. Overview of Ultra Mirage (Ex. 1003)

Ultra Mirage discloses a full face CPAP mask with top and bottom removable headgear clips, an air vent to provide CO₂ washout, and a rotating elbow with a quick release swivel. *See* Pet. 24–25; Ex. 1003, 6. A figure from Ultra Mirage, which is reproduced below, illustrates the mask.

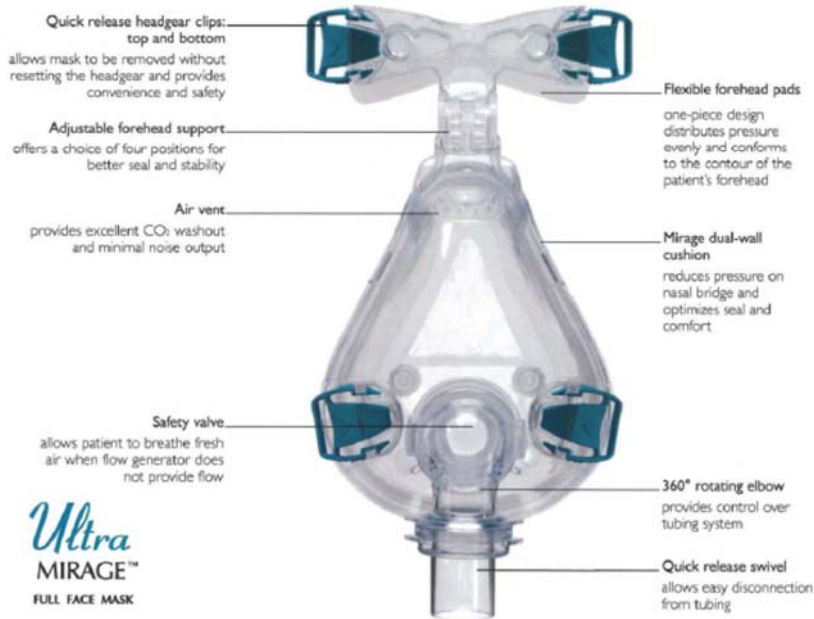
Ultra Mirage™ Full Face Mask

The ultimate solution for mouth leak



Mouth breathing and leak are common problems for CPAP and bilevel therapy users. These problems result in ineffective therapy, discomfort and disrupted sleep—all of which can cause patients to be noncompliant or to abandon therapy altogether.

ResMed's Ultra Mirage™ Full Face Mask covers both the nose and mouth so patients receive effective therapy even in the presence of mouth breathing and leak.



See *id.* at 24–25; Ex. 1003, 6. Various elements of the mask, including the air vent, are identified in the Ultra Mirage figure.

3. Overview of Matula-II (Ex. 1005)

Matula-II is directed to a patient interface that includes a plurality of headgear attachment elements, seal member operatively coupled to a faceplate and an adjustment mechanism coupling the seal member to the faceplate. Ex. 1005, abstract.

Petitioner provides an annotated version of Figure 4 of Matula-II (reproduced below). Pet. 35.

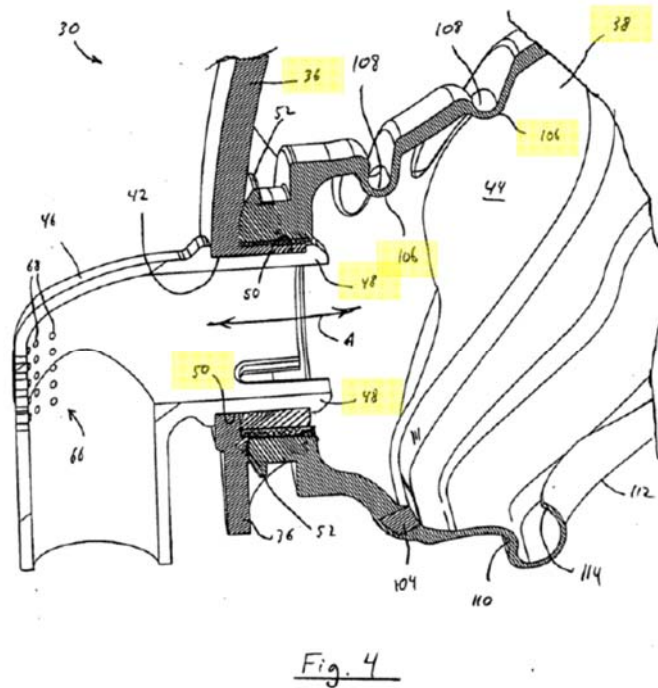


Figure 4 as annotated by Petitioner.

As shown in Figure 4, Matula-II discloses coupling member or elbow piece 46, which has a pair of prongs 48 that define a channel (channel 50). Ex. 1005 ¶¶ 49, 53. Petitioner explains that channel 50 receives the wall of faceplate 36 and the end of seal member 38. Pet. 35 (citing Ex. 1005 ¶ 53).

4. Discussion

a. Claim 33

Claim 33 recites “a shroud module; wherein the shroud module includes headgear connectors adapted to removably attach to respective headgear straps of headgear.” Ex. 1001, 26:55–57. Patent Owner does not dispute Petitioner’s assertion that the shroud module claim element is satisfied by the disclosure in D’Souza regarding skeleton frame 412 that includes “lower headgear clip receptacles 446 adapted to be engaged with clips provided to straps of the headgear assembly (not shown).” Pet. 65, 86 (citing Ex. 1002 ¶ 100). Nor does Patent Owner dispute Petitioner’s

assertion that Ultra Mirage discloses headgear straps. *See* Pet. 65–66 (citing Ex. 1003, 6).

Claim 33 also recites “a cushion module, comprising: a rigid or semi-rigid frame defining a breathing chamber,” “a cushion . . . form[ing] a seal with the patient’s face ,” and “the cushion is constructed of a first, relatively soft elastomeric material and the frame is constructed of a second material that is more rigid than the cushion.” Ex. 1001, 26:58–66. Patent Owner does not challenge Petitioner’s contention that this claim element is satisfied by the disclosure in D’Souza of cushion 416 constructed of liquid silicone rubber, frame 414 constructed of polycarbonate, and of how the cushion “provides a seal around the patient’s nose and mouth.” Pet. 66 (citing Ex. 1002 ¶¶ 97, 98, and 81).

Claim 33 further recites in relevant part that “the shroud module and the cushion module are configured to be removably coupleable to one another.” Ex. 1001, 27:4–6. Patent Owner does not challenge Petitioner’s contention that this claim element is satisfied by the disclosure in D’Souza of the removable interlock between D’Souza’s skeleton frame 412 and cushion/frame assembly 430. Pet. 66–67 (citing Ex. 1002 ¶¶ 96, 101).

We previously instructed Patent Owner that “any arguments for patentability not raised in the [Patent Owner Response] will be deemed waived.” Paper 8, 3; *see also* 37 C.F.R. § 42.23(a) (“Any material fact not specifically denied may be considered admitted.”). With the complete trial record before us, we note that we have reviewed arguments and evidence advanced by Petitioner to support its unpatentability contentions where Patent Owner chose not to address certain limitations in its Patent Owner Response. In this regard, the record contains persuasive arguments and

evidence presented by Petitioner, many of which are unrebutted, regarding the manner in which the asserted prior art teaches corresponding limitations of the instituted claims. Based on the preponderance of the evidence before us, we find that Petitioner presents sufficient evidence to support a finding that the unchallenged limitations are disclosed by the proposed combination based on D'Souza, Ultra Mirage, and Matula-II. The limitations that Patent Owner contests in the Patent Owner Response are addressed below.

Claim 33 recites in relevant part that “the shroud module includes . . . a retaining portion extending rearwardly from the front opening, towards the frame, and structured to snap-fit with the cushion module.” Ex. 1001, 27:7–11. Petitioner contends that “D’Souza teaches a shroud module having an annular opening 448 with a retaining portion extending rearwardly from the opening 448.” Pet. 40 (citing Ex. 1002 ¶ 101). Relying on the testimony of Mr. Eaton, Petitioner argues that D’Souza’s shroud module and cushion module are removably interlocked because assembly requires “elastic deformation between the retaining portion and frame collar, resulting in a snap-fit interlock between the shroud module and cushion module.” *Id.* at 41 (citing Ex. 1002 ¶¶ 98, 100; Ex. 1013 ¶ 90).

In its Patent Owner Response, Patent Owner argues that the Petition is defective because neither D’Souza nor Matula-II discloses “any snap-fit structures on a shroud, let alone snap-fit structures on the shroud ‘extending rearwardly from the opening.’” PO Resp. 22. Instead, Patent Owner contends that “Petitioner points to structures on the cushion module (D’Souza) and on the elbow (Matula-II), but never on the shroud.” *Id.* Patent Owner clarifies that “interlocking annular wall 440 on the cushion module 430 is part of D’Souza’s skeleton frame 412” and Matula-II’s

“prongs 48 are part of Matula’s coupling member 46 (elbow) and not part of the faceplate 36.” *Id.* at 23 (citing Pet. 40–41).

We first address Patent Owner’s contention that D’Souza alone does not disclose a snap-fit between annular wall 440 of the cushion module and annular elbow connection seal 448 of skeleton frame 412 (shroud). PO Resp. 23. In the Decision on Institution, we were not persuaded by Petitioner’s contention that the retaining portion of D’Souza’s skeleton frame 412 is structured to snap-fit with cushion module 430 because Petitioner’s argument and evidence did not demonstrate sufficiently that “the rearwardly extending portion of annular seal 448 is structured to snap-fit with the cushion module.” Dec. 19. Now, with the trial record complete, we find that Petitioner does not provide sufficient arguments and evidence to support a finding that the retaining portion of D’Souza’s shroud is structured to snap-fit with interlocking annular wall 440 of the cushion module. *See* PO Resp. 23–24 (“[Mr. Eaton] conceding that ‘the degree of deformation required to allow assembly of the [annular wall 440] and the [annular elbow connection seal 448], as shown in the figures, appears to exceed acceptable material strain limits of commonly used rigid plastics such as polycarbonate, and thus could have made it difficult or even impossible to assemble these components’”).

We consider, however, Petitioner’s alternative argument (1) “to the extent D’Souza provides insufficient teachings for a removable snap-fit, Matula-II teaches a plurality of snap fingers 48 that elastically deform to mechanically and removably couple the seal member 38 to the faceplate 36” (Pet. 41 (citing Ex. 1005 ¶ 53; Pet. § VII(C)(2)(b))); and (2) “[b]ased on the teachings of Matula-II, a skilled artisan would have been motivated to

incorporate such snap fingers into the removable interlocking arrangement of D’Souza” (*id.* (citing Ex. 1013 ¶ 91; Pet. § VII(C)(3))).

Patent Owner first argues that the snap-fit structures of Matula-II, e.g., prongs 48, are not located on the shroud and do not extend from the front openings. PO Resp. 27. Patent Owner understands Matula-II’s prongs 48 as being “part of Matula-II’s elbow 46, not part of the faceplate 36 or any other part that might be alleged to be a shroud.” *Id.* (citing Pet. 35; Ex. 1013 ¶¶ 78, 90; Ex. 2002 ¶ 39). This argument is not persuasive because it does not address directly Petitioner’s proposed modification to the interlocking engagement of D’Souza’s cushion assembly 430 with skeleton frame 412 using the snap fingers of Matula-II. Attacking the teachings of the references individually does not undermine Petitioner’s showing of obviousness. *See In re Keller*, 642 F.2d 413, 426 (CCPA 1981) (nonobviousness cannot be established by attacking prior art teachings individually where the ground of unpatentability is based upon a combination of the prior art teachings).

Patent Owner argues in the alternative, “to the extent that the opening on the elbow 46 associated with the prongs 48 is considered a ‘front opening’ (Petitioner and Mr. Eaton do not identify a ‘front opening’ on Matula- II’s elbow 46), the prongs 48 do not extend rearwardly *from the front opening of the same structure of which they are a part.*” PO Resp. 28 (citing Ex. 2002 ¶ 40 (emphasis added)). To support this argument, Patent Owner annotated Figure 14 of the ’931 patent, as reproduced below:

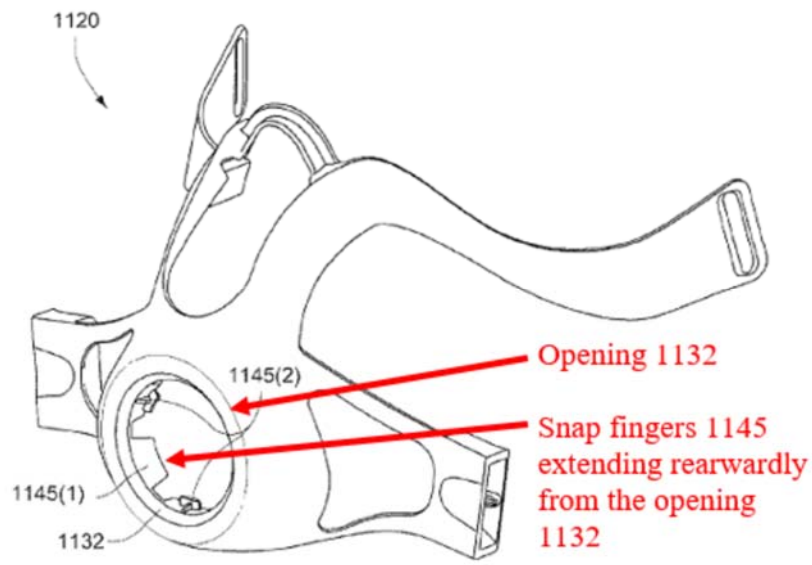


Figure 14 of the '931 patent as annotated by Patent Owner.
PO Resp. 28. Relying on the testimony of Mr. Sleeper, Patent Owner contends that “snap fingers 1145 extend rearward from the opening 1132 of the shroud 1120 so that the snapping structure is located rearward from the opening 1132 (as opposed to the snapping structure being located at the distal end of the opening 1132).” PO Resp. 29 (citing Ex. 2002 ¶ 40).

Patent Owner also annotated Figure 5 of Matula-II, reproduced below:

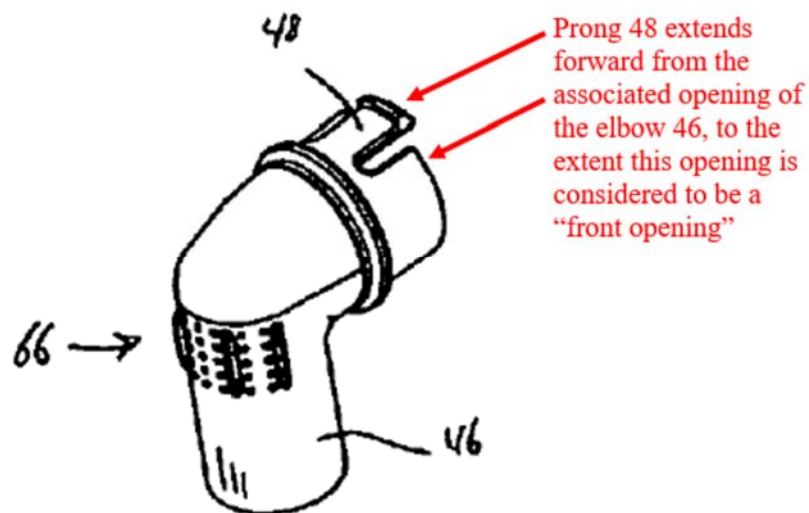


Figure 5 of Matula-II as annotated by Patent Owner.

PO Resp. 29. According to Patent Owner, “prongs 48 are positioned at the distal end of the elbow 46 and extend forward from the associated opening at that end of the elbow 46 (to the extent that opening is considered a ‘front opening’).” *Id.* at 29. Patent Owner concludes that Matula-II does not teach “any structures that include a front opening and that also include a snap-fit feature.” *Id.* Rather, “prongs 48 are part of the elbow 46, which is a different structure from the faceplate 36 and its opening 42.” *Id.* at 30.

The relevant issue here is whether the teachings of D’Souza, Ultra Mirage, and Matula-II, taken as a whole, would have suggested the patentee’s invention to a person having ordinary skill in the art. *See In re Merck & Co.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986). By attacking Matula-II’s teachings individually, Patent Owner does not undermine Petitioner’s showing of obviousness. *See Keller*, 642 at 426. Here, Petitioner is proposing to modify D’Souza’s skeleton frame (shroud) and cushion assembly by “substitut[ing] one mechanical interlock for another.” Pet. Reply. 2. We are persuaded by the testimony of Petitioner’s expert, Mr. Eaton, that Matula-II “teaches a similar snap-fit arrangement with a plurality of snap fingers 48 structured to mechanically and removably couple the seal member 38 to the faceplate 36.” Ex. 1013 ¶ 90. Specifically, that:

[a] person of skill in the art would have been motivated to use such a snap-fit arrangement in order to allow for a patient to more easily separate the shroud module and the cushion module. For example, Worboys (Ex. 1009) also discloses a removable snap-fit and teaches that “[e]ach snap-fit tab 450 includes external finger grips 454 to facilitate release of the elbow 10 from the mask frame 455 by pressing inwards on the external finger grips 454.”
Id.

For these reasons, and based on the complete record, we are persuaded by Petitioner's arguments and evidence and find that D'Souza teaches a shroud module having an annular opening with a retaining portion extending rearwardly from the opening for retaining a cushion module using a mechanical interlock. Likewise, we are persuaded by Petitioner's arguments and evidence and find that Matula-II teaches a mechanical interlock that is a snap-fit.

Articulated Reason to Combine D'Souza, Ultra Mirage and Matula-II

We also consider Petitioner's argument that one of skill in the art would have been motivated to combine the features of D'Souza, Matula-II and Ultra Mirage. Pet. 41 (citing Ex. 1013 ¶ 92; Pet. § VII(B)(4)). As to the proposed modification based on D'Souza and Ultra Mirage, in Section VII(B)(4) of the Petition, Petitioner asserts that "[b]ecause D'Souza and Ultra Mirage both teach CPAP masks for the treatment of sleep-disordered breathing, the features taught in Ultra Mirage would have been readily compatible with and easily incorporated into the mask of D'Souza with a reasonable expectation of success." *Id.* at 33 (citing Ex. 1013 ¶ 70).

Petitioner also asserts that

[a] person of skill in the art at the time of the invention would have been motivated to provide removable headgear straps to the mask assembly of D'Souza to enable quick and easy mask fitting and removal (e.g., for cleaning or replacement). [Ex. 1013] ¶ 71; Ex. 1003 at 6. Additionally, a skilled artisan would have known to add upper headgear connectors as taught by Ultra Mirage to the forehead support of D'Souza to secure the upper portion of the mask assembly and to stabilize the mask assembly. Ex. 1013 ¶ 71.

Id.

Petitioner’s arguments and evidence directed to the proposed modification of D’Souza using the teachings of Ultra Mirage stand un rebutted. Based on further review of the record, we are persuaded by Petitioner’s arguments and evidence and find that one of skill in the art would have combined the features taught by Ultra Mirage into the mask of D’Souza because the proposed modification “would have been mere combinations of familiar elements according to known methods that do no more than yield predictable results.” Pet. 33 (citing *KSR*, 550 U.S. at 416).

Next, we consider Petitioner’s arguments directed to the proposed modification based on D’Souza and Matula-II. Namely, that:

[a] skilled artisan would have also been motivated to modify the rearward extending retaining portion of D’Souza to include the plurality of rearward extending snap fingers, as taught by Matula-II, to facilitate formation of the removable snap-fit of D’Souza. Ex. 1013 ¶¶ 94–95. Although the Matula-II snap fingers are on the elbow, incorporating such snap fingers into the retaining portion of D’Souza would have involved a simple substitution of one known feature for another to obtain predictable results and achieve the same purpose of providing a removable mechanical interlock between the shroud and the cushion module.

Id. at 42 (citing Ex. 1002 ¶ 96).

Petitioner reasons that the proposed modification would (1) “facilitate deformation of the engagement parts and make it easier to join the shroud to the cushion module” (*id.* (citing Ex. 1013 ¶¶ 94–95)); and (2) “facilitate insertion of the rigid collar 440 through the rigid retaining portion 448 and to allow for repeated interlocking without destroying the parts” (*id.* (citing Ex. 1013 ¶¶ 94–95)). Mr. Easton opines:

[a]lthough the location of the snap fingers would have been a matter of *design preference*, one of skill in the art would have

recognized that it would have been advantageous to add snap fingers to the shroud rather than the mask frame based on the simplicity of molding the required snap finger geometry without compromising the airtight surfaces of the mask frame.

Ex. 1013 ¶ 95 (emphasis added).

Patent Owner challenges this reasoning, arguing that Petitioner's proposed modification to D'Souza's mask by incorporating prongs 48 from elbow 46 of Matula-II is based on hindsight and conclusory reasoning rather than rational underpinnings. PO Resp. 32–57. Specifically, Patent Owner views Petitioner's assertion, that the proposed modification would facilitate deformation and insertion of annular wall 440 through annular elbow connection seal 448, as conclusory and “fails to account for the significant gaps” between the cited references and claim 33. *Id.* at 33. According to Patent Owner, these gaps include:

- a shroud with any structure that snap-fits to other structures, including to snap-fit to a cushion module,
- any component with a retaining portion rearwardly extending from the front opening of the component itself, including the retaining portion snap-fitting to another component,
- a shroud with a retaining portion rearwardly extending from the front opening, and
- a shroud with a retaining portion rearwardly extending from the front opening to snap-fit to other structures, including to snap-fit to a cushion module.

Id. at 34 (citing Ex. 2002, ¶ 42).

Patent Owner also argues that Petitioner fails to explain “why a POSITA would have looked at references that are alleged to disclose snap-fitting structures on the cushion module and the elbow, and then would have been prompted to place the snap-fitting structures on the shroud.” *Id.* (citing

Ex. 2002 ¶¶ 43–44). Relatedly, Patent Owner argues that Petitioner fails to explain why one of skill in the art would look at snap-fitting structures extending forwardly from a front opening and instead make these snap-fitting structures extend rearwardly. *Id.* at 35 (citing Ex. 2002 ¶¶ 45–46). Patent Owner maintains that Petitioner does not explain “why a POSITA would have looked at components with alleged snap-fitting structures passing through an interior of an opening to form a snap-fit, and then would have been prompted to place the snap-fitting structures around the exterior of an opening.” *Id.* (citing Ex. 2002 ¶ 47).

For the reasons discussed below, we find that Petitioner has provided articulated reasoning with rational underpinning explaining why a person with ordinary skill in the art would have also combined the teachings of D’Souza and Matula-II. Namely, that the POSITA would modify D’Souza’s shroud to include rearwardly extending snap fingers to provide a removable mechanical interlock between the shroud and cushion module, facilitate deformation of the engagement part; and make it easier to join the shroud to the cushion module. *See KSR*, 550 U.S. at 418 (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (“[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.”)). As the Federal Circuit has made clear, when a reason to combine or modify references is in dispute, we must make a finding of a motivation to combine and must have an adequate evidentiary basis for that finding. *See In re Nuvasive, Inc.*, 842 F.3d 1376, 1382 (Fed. Cir. 2016). “[C]onclusory statements’ alone are insufficient and, instead, the finding must be supported by a ‘reasoned explanation.’” *Id.* at 1383

(quoting *In re Lee*, 277 F.3d 1338, 1342, 1345 (Fed. Cir. 2002)); *accord id.* at 1384 (not permitting the Board to effectively adopt the petitioner’s argument, which “amount[ed] to nothing more than conclusory statements that a PHOSITA would have been motivated to combine the prior art references to obtain additional information.”). Moreover, the Board “cannot rely solely on common knowledge or common sense to support [its] findings.” *Id.* at 1383.

Here, neither Patent Owner, Mr. Eaton, nor Mr. Sleeper dispute that annular snap fits with fingers are common features in CPAP masks. *See e.g.*, Ex. 1013 ¶¶ 89–95; Ex. 1025, 166:24–167:12. Petitioner supports its position by directing us to the cross-examination testimony of Patent Owner’s expert, Mr. Sleeper, “agree[ing] that a POSITA would have been motivated to modify the annular interlock of D’Souza and that the proposed modification would have been a known suitable option.” Pet. Reply 2 (citing Ex. 1025, 168:5—171:10, 173:24—174:15). Moreover, the parties’ experts agree that D’Souza’s flanged element 440 connects to the skeleton frame or shroud by at least an interlocking arrangement or snap fit. *Id.* at 4 (citing Ex. 1025, 150:5–151:25). And, Mr. Sleeper and Mr. Eaton agree that the disclosed interlocking arrangement taught by D’Souza would not function as expected, requiring a change to eliminate material stress and strain as discussed below (Pet. Reply 4–5):

A Well, again, as this is described, both Mr. Eaton and I think it would break. So we had to describe -- he described four nice modifications that would make this work, but as described, I don't -- neither one of us see how this actually could go together without damage.

Q Is it -- is it your opinion that as described in D’Souza that if the part 440 and part 448 were both made out of, say,

polycarbonate, that there would be some material stress or strain if you were trying to put these pieces together?

A That was in Mr. Eaton's deposition and I agreed.

Q You agree with that? And so would you also agree that looking at D'Souza, one of skill would be motivated to change that connection such that you were going to eliminate that material stress or strain?

A Yes, if you were to make this work, you would have to change something.

Q And you would also agree that in 2007, *one of skill in the art would have been capable of making modifications to this connection at 440 and 448 such that you would minimize the material stress or strain*, correct?

A A person of skill in 2007?

Q That's right.

A *Yeah, I think that's correct.*

Ex. 1025, 152:15–153:17 (emphasis added). Given the experts' agreement that the interlocking arrangement taught by D'Souza would not function as expected due to concerns over material stress at the annular interlock between D'Souza's shroud and frame, Petitioner argues persuasively that "this strain would have motivated a POSITA to modify D'Souza and that such a change would have been necessary to make D'Souza work as intended." Pet. Reply 4–5 (citing Ex. 1025, 168:13–25, 153:3–9).

Patent Owner argues that a POSITA would not modify D'Souza as proposed by Petitioner, because D'Souza would require the following modifications:

- making snap fingers out of the annular wall 440 on D'Souza's frame 414 to permit deflection of the annular wall 440 as it passes through the annular elbow connection seal 448 (Ex. 2003, 103:12-104:1);

- change the relative sizing of annular wall 440 and/or the annular elbow connection seal 448 to reduce the interference between the parts, such as reducing the diameter of the flange on the annular wall 440 (Ex. 2003, 104:25-105:22);
- adding lead-out and lead-in features to the annular wall 440 and/or the annular elbow connection seal 448 to lower assembly and disassembly forces (Ex. 2003, 105:23-106:4); and
- changing the material properties of the annular wall 440 and/or the annular elbow connection seal 448 to make one or both of them more flexible (Ex. 2003, 106:5-14).

PO Resp. 37 (citing Ex. 2002 ¶ 49). Absent hindsight, Patent Owner disputes that the POSITA would have changed the type of connection between the annular wall 440 and the annular elbow connection seal 448. *Id.* at 38. Patent Owner further disputes that the proposed modification would be a matter of design choice. *Id.* at 39.

Patent Owner, however, does not present sufficient arguments or credible evidence to refute Petitioner's evidence that the POSITA would have modified the interlocking connection between D'Souza's annular wall 440 and annular elbow connection seal 448. Instead, for the reasons discussed above, we are more persuaded by Petitioner's arguments and evidence, including the testimony of Patent Owner's expert, that a POSITA would have been motivated to modify D'Souza's annular interlocking connection due to concerns regarding material stress.

Additionally, Petitioner presents persuasive arguments and credible evidence to support a finding that it would have been obvious to a POSITA to modify D'Souza by installing snap fingers on D'Souza's shroud instead of the mask frame. Pet. Reply 8 (citing Ex. 1013 ¶ 95; 1025, 173–176:2). For example, we are persuaded by Petitioner's argument concerning the cross-

examination testimony of Mr. Sleeper acknowledging that a POSITA “would have understood that one way of reducing this material stress was modifying an annular snap-fit to include snap fingers” (Pet. Reply 5 (citing Ex. 1025, 166:24—167:12)) and “would have been capable of using such snap fingers on annular components in a CPAP mask” (*id.* (citing Ex. 1025, 166:24—167:12)). We are also persuaded by Petitioner’s argument that Mr. Sleeper acknowledged “that a POSITA would have known that the direction of snap-fits could be reversed and that a POSITA would have been capable of modifying D’Souza’s shroud to include the snap fingers.” *Id.* at 8 (citing Ex. 1025, 186:7—187:3).

Also persuasive is Petitioner’s evidence regarding the teachings of Malloy (Ex. 1015), demonstrating that it was known in the prior art to utilize “‘slotted annular snaps’ (i.e., snap fingers)” when combining rigid materials with an annular snap-fit. Pet. Reply 6 (citing Ex. 1015, 345; Figs. 6, 13). Likewise persuasive is Petitioner’s evidence that Worboys (Ex. 1009) discloses that it was known in the prior art to use a snap-fit connection and snap fingers on a CPAP mask assembly. *Id.* at 6–7 (citing Ex. 1013 ¶¶ 88, 90; Ex. 1009 ¶¶ 15, 150, 165, 190, 192, 194, 197, 199, Fig. 144).

We agree with Petitioner that “[e]ven if the modification to D’Souza’s annular interlock proposed by Mr. Eaton was not the ‘best option’ to solve the problem, it is at least a ‘suitable option.’” As our reviewing court explains, the existence of better alternatives “does not mean that an inferior combination is inapt for obviousness purposes.” *In re Mouttet*, 686 F.3d 1322, 1334 (Fed. Cir. 2012) (citing *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994)); see *Winner Int’l Royalty Corp. v. Wang*, 202 F.3d 1340, 1349 n. 8 (Fed. Cir. 2000) (“The fact that the motivating benefit comes at the expense

of another benefit, however, should not nullify its use as a basis to modify the disclosure of one reference with the teachings of another. Instead, the benefits, both lost and gained, should be weighed against one another.”).

Patent Owner further argues that Petitioner fails to explain *how* to modify D’Souza based on Matula-II’s teachings. PO Resp. 41–51. Specifically, “how D’Souza’s mask assembly would be modified by the teachings of Matula-II, particularly around where prongs would be placed on the annular elbow seal connection 448 and how they would engage the cushion module 430 (especially when neither of these two references present components extending around the exterior of another structure to provide a snap-fit).” *Id.* at 42. Patent Owner notes that Matula-II’s prongs 48 function as a male coupling member, extending through the interior of opening 42 and retained by the end surface of opening 42. *Id.* at 44 (citing Ex. 1005 ¶ 53, Fig. 4; Ex. 2002 ¶¶ 52–53). D’Souza’s annular elbow connection seal 448 functions as a female coupling member, with annular wall 440 extending through the interior of annular connection seal 448 and interlocking with its end surface. *Id.* at 45–46 (citing Ex. 1002 ¶ 48, Fig. 7–7; Ex. 2002 ¶ 53). Patent Owner observes that both Matula-II and D’Souza disclose “an interior passage for a connecting feature for purposes of engaging the end surface of the passageway,” and challenges Petitioner’s proposed modification because it “assume[s] the prongs should be added in an opposite configuration in which the prongs are added to the annular elbow connection seal 448, which passes around the exterior of the cylinder 418 (instead of through the interior opening of the cylinder 418).” *Id.* at 46 (citing Pet. 41–42; Ex. 1013 ¶¶ 94–95; Ex. 2002 ¶ 54).

Patent Owner’s arguments directed to specific details surrounding how D’Souza would be modified based on Matula-II’s teachings are unavailing. Our reviewing courts confirm that

[t]he test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art.

MCM Portfolio LLC v. Hewlett-Packard Co., 812 F.3d 1284, 1294 (Fed. Cir. 2015) (quoting *In re Keller*, 642 F.2d 413, 425 (CCPA 1981)). Here, Patent Owner’s arguments do not inform us that resolving these technical challenges would be beyond the ability of one of skill in the art—which here would be a person having at least a bachelor’s degree in mechanical engineering, biomedical engineering or other similar type of engineering degree combined with at least two years of experience in the field of masks, respiratory therapy, patient interfaces or relevant product design experience.

Instead, Petitioner presents sufficient argument and credible evidence to support a finding that “a POSITA would have been capable of modifying D’Souza to include snap fingers on the shroud.” Pet. Reply 11 (citing Ex. 1025, 166:24–167:12). For example, Petitioner argues that the cross-examination testimony of Patent Owner’s expert, Mr. Sleeper, recognizes that D’Souza suggests an elbow-to-shroud connection and acknowledges that “a POSITA was capable of providing such a connection.” Pet. Reply 2 (citing Ex. 1025, 219:10–14, 223:16–20). It is well settled that “if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the

same way, using the technique is obvious unless its actual application is beyond his or her skill.”). *KSR*, 550 U.S. at 417. Moreover, the Supreme Court informs us that an obviousness analysis “need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.” *KSR*, 550 U.S. at 418; *see also In re Translogic Tech.*, 504 F.3d at 1259. “The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.” *KSR*, 550 U.S. at 416. Here, there is no dispute that the POSITA would be capable of incorporating snap fingers into D’Souza’s shroud. As such, we agree with Petitioner’s assertion that it did provide an explanation of how a POSITA would have incorporated Matula-II’s snap fingers into the removable interlocking arrangement of D’Souza, i.e., by “modif[ying] the ‘retaining portion of D’Souza to include the plurality of rearward extending snap fingers.’” Pet. Reply 11 (citing Pet. 42; Ex. 1013 ¶¶ 94–95).

Patent Owner also argues that the references do not contemplate the proposed combination, and that a POSITA would have avoided the proposed combination due to “significant flaws in the resulting mask.” PO Resp. 46 (citing Ex. 2002 ¶ 54). To support this argument, Patent Owner annotated Figure 7 of D’Souza, reproduced below, to illustrate its interpretation of Petitioner’s proposed modification as including removal of the flange from annular wall 440 at opening 418. *Id.* at 48 (citing Decision on Institution 20–21; Pet. 50; Ex. 1013 ¶ 95).

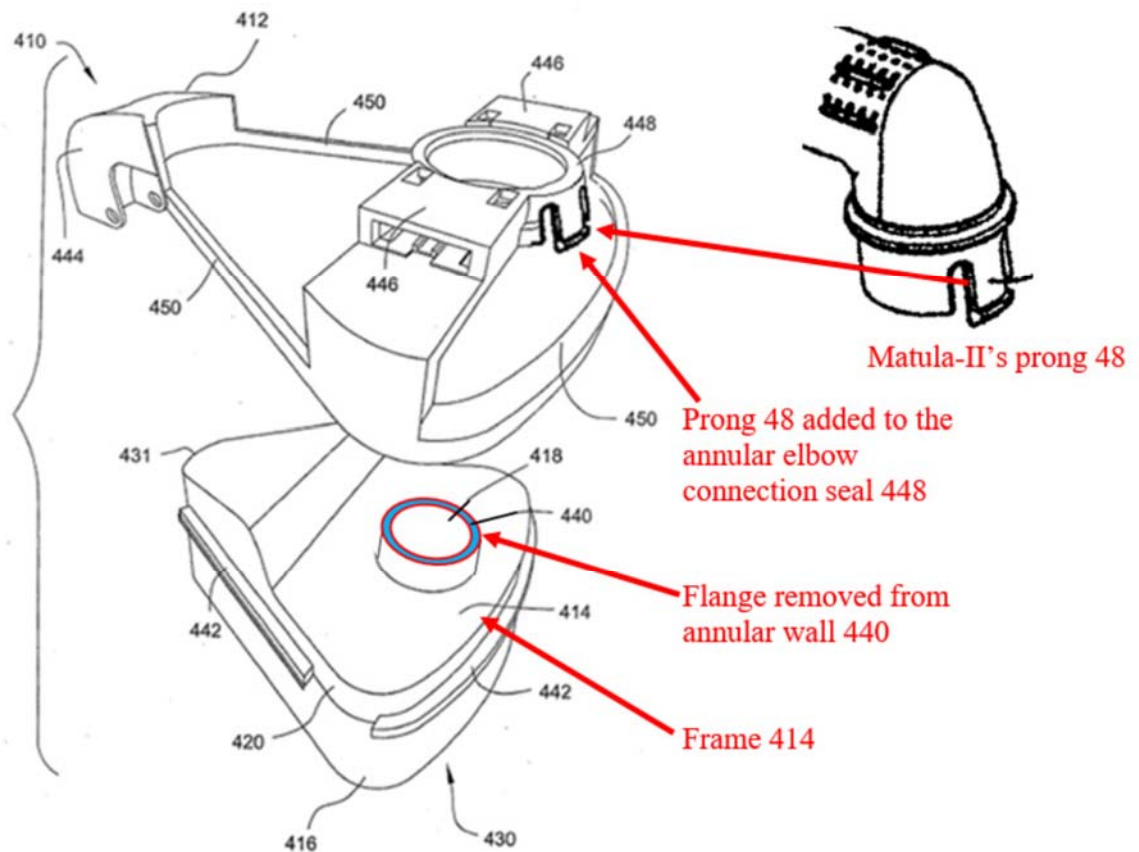


Figure 2 of D'Souza as annotated by Patent Owner.

PO Resp. 49 (citing Ex. 2002 ¶ 54 (citing to Ex. 1002, Fig. 7; Ex. 1005, fig. 5)).

According to Patent Owner, removal of the flange from annular wall 440 would add another sealing connection along the flow path (*id.* at 49–50); and the elbow would connect to annular elbow connection seal 448, doubling the required number of sealing connections for transmitting pressurized air from the elbow to the breathing chamber (*id.* at 51 (citing Ex. 2002 ¶ 56)). Patent Owner contends that “[a] POSITA would have readily recognized the primary sealing function of D’Souza’s annular wall 440 and would have avoided modifying D’Souza as Petitioner proposed because it would have introduced another required sealing connection and another

source of possible air leaks, which are disadvantageous for patient therapy and outcomes.” *Id.* at 51 (citing Ex. 2002, ¶ 56).

Relatedly, Patent Owner argues that a POSITA would have avoided the proposed modification due to flaws in the resulting mask system, e.g., creating additional sealing connections and potential leak paths. PO Resp. 52–55. Patent Owner contends that Petitioner fails to explain why a POSITA “would have avoided the simpler option of modifying D’Souza’s annular wall 440 to have slots (similar to the slots surrounding the prongs 48 of Matula-II) so that forward-extending prongs of the collar 440 would fit through the annular elbow connection seal 448.” *Id.* at 53 (citing Ex. 2002 ¶¶ 49–50).

Patent Owner’s argument, that a POSITA would have been dissuaded from pursuing the proposed modification because it would create an additional sealing connection or potential leak path, is not persuasive. As Petitioner points out, the prior art is replete with examples of CPAP masks having multiple seal connections. Pet. Reply 13 (citing PO Resp. 60–61). For example, Petitioner points out, and Mr. Sleeper agrees, that Ultra Mirage’s elbow attachment contains multiple seal connections. *Id.* at 14 (citing Ex. 1003, 9; Ex. 1025, 214:1–215:5). Petitioner argues that during cross-examination, Mr. Sleeper acknowledged that “a POSITA would have been capable of making seal connections between the elbow, shroud, and frame, that were either leak proof or had acceptable levels of leak.” *Id.* at 15 (citing Ex. 1025, 212:4–9).

Patent Owner further argues that Petitioner has not established that the POSITA would modify D’Souza using the snap fingers of Matula-II as a matter of design choice. PO Resp. 55–57. Specifically, because the

proposed modification creates a new feature and “is not [a] mere substitution of known components, and fails to appreciate all of the deficiencies of the resulting combination.” *Id.* at 55 (citing Pet. 42; Ex. 1013 ¶¶ 95; Ex. 2002 ¶¶ 57–58). According to Patent Owner, the Petition lacks the underlying facts or data supporting that the proposed modification to D’Souza’s mask would be a simple substitution of one known feature for another. *Id.* (citing Pet. 42; Ex. 1013 ¶ 95). The proposed modification is not a simple substitution, in Patent Owner’s view, because it requires an externally extending snap-fit connection from internally extending snap-fit/interlocking features. *Id.* at 56 (citing Ex. 2002 ¶ 59). Patent Owner contends that the proposed modification would not achieve predictable results because it “would be detrimental to D’Souza’s mask assembly by adding more points for possible air leaks.” PO Resp. 56 (citing Ex. 2002 ¶¶ 57–58). Patent Owner concludes that the proposed modification would not be a design choice driven by molding and manufacturing considerations because the proposed modification may require other components, like frame 414, to be redesigned and consequently more complex and expensive to mold/manufacture. PO Resp. 57 (citing Ex. 2002 ¶ 58).

Patent Owner’s further arguments challenging whether a POSITA would modify D’Souza using the snap fingers of Matula-II as a matter of “design choice” are likewise not convincing. Patent Owner’s arguments mischaracterize Petitioner’s position. Petitioner stated

[b]esides being a matter of design preference, such a modification would facilitate deformation of the engagement parts and make it easier to join the shroud to the cushion module. Ex. 1013 ¶¶ 94–95. Based on the teachings of Matula-II, a skilled artisan would have understood that it would be advantageous to provide a plurality of snap-fit fingers on the

retaining portion of D'Souza to facilitate insertion of the rigid collar 440 through the rigid retaining portion 448 and to allow for repeated interlocking without destroying the parts. *Id.*

Pet. 42. Thus, we are more persuaded by Petitioner's evidence that "the combination of the annular interlock of D'Souza with the snap fingers of Matula-II would have been obvious as a mere substitution of one connection means for another." Pet. Reply 16. As discussed above, the use of snap-fits in a CPAP mask are known. Indeed, Patent Owner's expert acknowledges that snap-fits were known to a POSITA and could be placed on either connecting part. *Id.* (citing Ex. 1025, 186:7–187:3). Moreover, Patent Owner's expert indicated that "a POSITA would have understood that putting snap fingers on D'Souza's frame 414 would not be an 'ideal solution,' because of potential issues with leaks, thus supporting that a POSITA would have been motivated to position the snap fingers on the shroud 412." *Id.* (citing Ex. 1025, 175:2–21). Petitioner also supports its position by directing our attention to a passage in the '931 patent recognizing that "other suitable options for attaching the frame 40 to the shroud 20 are possible, e.g., friction fit, snap-fit, mechanical interlock, or other suitable attachment mechanism." *Id.* (citing Ex. 1001, 19:45–48).

Upon review of the parties' contentions and evidence, we agree with Petitioner's analysis finding that it is supported by sufficient explanation and credible evidence. Based on the present record, we find that Petitioner has articulated an adequate reason to combine the teachings of D'Souza and Matula-II. Namely, that a POSITA would have modified the annular snap-fit of D'Souza's shroud by installing snap fingers to reduce material stress with predictable results.

For the foregoing reasons, we determine that Petitioner has established by a preponderance of the evidence that independent claim 33 is unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of D’Souza, Ultra Mirage, and Matula-II.

b. Dependent claims 37, 40–42

Claim 37 recites in relevant part that “the shroud module and the cushion module are removably snap-fit attached to one another by moving the shroud module and the cushion module towards one another along the longitudinal axis.” Ex. 1001, 27:30–36. Petitioner relies on the teaching in D’Souza regarding (1) the shroud module having “annular opening 448 with a retaining portion extending rearwardly from the opening 448” (Pet. 40 (citing Ex. 1002 ¶ 101)); (2) the shroud module is removably interlocked with the cushion module (*id.* at 41 (citing Ex. 1002 ¶ 96)); and (3) moving the shroud module towards the cushion module along the longitudinal axis results in engagement between the two (*id.* (citing 1013 ¶ 90)).

Claim 40 recites in relevant part that the “frame is semi-rigid or rigid. Ex. 1001, 27:44–45. Petitioner asserts that D’Souza teaches that “polycarbonate frame 414 interlocks with a silicone rubber cushion. Pet. 24 (citing Ex. 1002 ¶ 97–98), 66). Claim 41 recites that “the frame is rigid.” Ex. 1001, 27:46–47. Petitioner relies on the same teaching in D’Souza regarding polycarbonate frame 414. Pet. 84 (citing Ex. 1002 ¶ 98), 90.

Claim 42 is a system claim reciting “the mask system of claim 33; a flow generator to generate a supply of air at positive pressure to be delivered to the mask system; and an air delivery tube configured to deliver the supply

of air from the flow generator to the mask system.” Ex. 1001, 27:50–54.¹⁰ In addition to Petitioner’s arguments discussed supra as to claim 33, Petitioner also relies on its arguments directed to claims 32. Pet. 86 (citing Ex. 1002 ¶ 3), 90.

Patent Owner does not address the limitations expressly recited in dependent claims 37, 40–42 with separate, specific arguments. As to the undisputed limitations, we find that, based on the evidence cited in the Petition, Petitioner presents sufficient evidence to support a finding that those limitations are disclosed by D’Souza, Ultra Mirage, and Matula-II, arranged as recited in the claims. *See Nuvasive*, 842 F.3d at 1383 (explaining that although the Board did not make findings as to whether any of the other claim limitations (such as fusion apertures or anti-migration teeth) are disclosed in the prior art, it did not have to: NuVasive did not present arguments about those limitations to the Board).

Based on further review of the trial record, we find that Petitioner has demonstrated by a preponderance of the evidence that the combination of D’Souza, Ultra Mirage, and Matula-II teaches or suggests all of the limitations recited in claims 37, and 40–42.

c. Summary

In view of the foregoing, we conclude that Petitioner has established by a preponderance of the evidence that claims 33, 37, and 40–42 are unpatentable under 35 U.S.C. § 103(a) as obvious over D’Souza, Ultra Mirage, and Matula-II.

¹⁰ Although claim 42 is written in independent form, we treat it as a dependent claim for purposes of our analysis because it includes “the mask system of claim 33.” Ex. 1001, 27:50.

E. D’Souza, Ultra Mirage, Matula-II, and Barnett

Petitioner challenges the patentability of claims 34 and 36 under 35 U.S.C. § 103 as obvious based on D’Souza, Ultra Mirage, Matula-II, and Barnett. Pet. 62–63. Petitioner identifies the disclosures in the cited references alleged to describe the subject matter in each of the challenged claims. *Id.* at 62–63, 88, and 89. Petitioner also provides an articulated reasoning with rational underpinning to support its conclusion of obviousness. *Id.* at 63.

Patent Owner disagrees, arguing that Petitioner has not demonstrated that a POSITA would have modified the shroud module of D’Souza to include an elbow module-to-shroud module connection. PO Resp. 57–67.

We have reviewed the parties’ contentions and supporting evidence of record in this trial. For the reasons given below, we conclude that Petitioner has demonstrated by a preponderance of the evidence that claims 34 and 36 would have been obvious based on D’Souza, Ultra Mirage, Matula-II, and Barnett. We begin our analysis with a brief summary of Barnett, and then address the parties’ contentions in turn.

1. Barnett (Ex. 1007)

Barnett is directed to a low contact nasal mask having “a one-piece, light weight seal member defining a nose receiving cavity, a collar coupled to the seal member, and a conduit coupling member, and to a system for supplying a flow of gas to a patient that incorporates such a low contact nasal mask.” Ex. 1007, 1:9–13. Nasal mask assembly 30 includes collar 34 and conduit coupling member 36. *Id.* at 3:48–50. Conduit coupling member 36 is rotatably mounted to collar 34 “so that conduit coupling member 36

freely rotates over a range of 360° about a center axis of collar 34.” *Id.* at 3:53–56.

2. Discussion

Claim 34 depends from claim 33, and recites in relevant part “an elbow module directly mechanically interlocked with the shroud module while allowing 360 degree rotation of the elbow module.” Ex. 1001, 27:13–15. Similarly, claim 36 depends from claim 33 and recites in relevant part “an elbow module adapted to be connected to an air delivery tube that delivers breathable gas to the patient, wherein the shroud module is structured to directly retain and carry the elbow module.” *Id.* at 27:25–28.

Referring to its arguments directed to claim 14, Petitioner asserts “to the extent D’Souza provides insufficient teachings for these features, Ultra Mirage and Barnett specifically teach the features of claims 34 and 36.” Pet. 62–63 (citing Ex. 1013 ¶ 137; Pet. 47–48). Specifically, Petitioner argues that D’Souza discloses an elbow adapted to engage the mask assembly (*id.* at 48 (citing Ex. 1002 ¶ 100)); Ultra Mirage teaches 360° elbow rotation (*id.* (citing Ex. 1003, 6)); and Barnett teaches “elbow 36 that is mounted to the shroud 34 and freely rotates 360° in direction A” (*id.* (citing Ex. 1007, 3:52–57)). Petitioner contends that “a person of skill would have been motivated to connect the elbow directly to the shroud as taught by Barnett while allowing 360° rotation of the elbow.” *Id.* (citing Ex. 1013 ¶ 106; Pet. § VII (E)(3)). Petitioner reasons that “combining these features would have been a mere combination of familiar elements according to known methods that does no more than yield predictable results.” *Id.* at 63 (citing *KSR*, 550 U.S. at 416).

Patent Owner argues essentially that Petitioner has not demonstrated a POSITA would have modified D’Souza’s shroud module based on Barnett’s teaching of an elbow directly connected to a shroud. PO Resp. 57. Noting that Petitioner’s expert, Mr. Eaton, agrees that D’Souza discloses an “elbow adapted to engage the mask but may not show the elbow being directly attached to the shroud module” (*id.* at 59 (citing Ex. 1013 ¶ 105 (emphasis added); Ex. 2003, 90:14-92:9)); Patent Owner argues that Petitioner fails to explain how D’Souza would be modified based on Barnett’s teachings (*id.* at 59–60 (citing Pet. 48; Ex. 1013 ¶¶ 109–110)). Because D’Souza teaches annular wall 440 of the cushion module extends through the shroud and engages the elbow, and Barnett teaches that the shroud provides the elbow connection, Patent Owner contends “the resulting combination of D’Souza and Barnett is not self-evident or predictable.” *Id.* at 60 (citing Ex. 2002 ¶ 61).

Along this vein, Patent Owner also questions specifically “how Barnett’s elbow connecting structures would be used to modify D’Souza’s diverging elbow connecting structures.” *Id.* at 61 (citing Pet., 48; Ex. 1013 ¶¶ 109–110). For example, Patent Owner questions

would D’Souza’s annular elbow connection seal 448 be further modified to include an additional structure to engage the elbow? How would D’Souza’s annular elbow connection seal 448 interlock with the opening 418 of the cushion/frame sub-assembly 430 if the large diameter collar of the annular wall 440 is removed? Would combinations of these modifications be made? Would seal issues arise from such proposed modifications? Would other modifications not mentioned above be made?

Id. at 62.

Patent Owner's arguments questioning the specifics of how one of skill in the art would combine the respective structures taught by D'Souza, Matula-II, and Barnett are not persuasive. Like Patent Owner's similar arguments directed to claim 33, these arguments do not inform us that resolving these technical challenges would be beyond the relatively high ability of one of ordinary skill in the art discussed above in Section. II. B.

Here, Petitioner presents persuasive arguments and evidence to support a finding that it would have been obvious to a POSITA to combine D'Souza's elbow adapted to engage the mask assembly, with the teaching of Ultra Mirage regarding 360° elbow rotation, and Barnett's teaching regarding an elbow mounted to a shroud and freely rotatable 360°. We are persuaded by Petitioner's argument concerning the cross-examination testimony of Mr. Sleeper, explaining that "a POSITA would have been capable of modifying D'Souza to include an elbow directly connected to the shroud." Pet. Reply 25 (citing Ex. 1025, 223:16–20). According to Petitioner, (1) Patent Owner does not dispute that Barnett teaches an elbow connected directly to a shroud (Pet. Reply 22 (citing Ex. 2002 ¶ 65; Ex. 1025, 210:9–211:10)); (2) that this type of connection was known in the art (*id.* (citing Ex 1013 ¶ 106)); nor that the claimed connection functions differently (*id.*). Petitioner also argues that during cross-examination, Mr. Sleeper acknowledged that "a POSITA would have recognized that one could attach the elbow to either D'Souza's frame or shroud" (*id.* (citing Ex. 1025, 219:15—220:19)); and that "a POSITA would have been capable of attaching an elbow to the shroud" (*id.* (citing Ex. 1025, 223:16–20)). Thus, we are persuaded by Petitioner that "it would have been obvious to connect the elbow to the shroud in view of the teachings of the prior art and as one of

a finite number of predictable options.” Pet. Reply 22 (citing *KSR*, 550 U.S. at 420–21).

Patent Owner further argues that the articulated reasons offered by Petitioner are conclusory and “premised on an incorrect understanding of D’Souza and Barnett, and the differences between them.” PO Resp. 63 (citing Pet. 50; Ex. 1013 ¶ 110). Patent Owner contends that Petitioner’s rationales would not have prompted a POSITA to make the proposed modification. *Id.* (citing Ex. 2002 ¶¶ 62–65). As to Petitioner’s first rationale, Patent Owner argues that D’Souza already provides the benefit of being able to remove the elbow without affecting engagement of the other components, and questions “why such a benefit would prompt further modification of D’Souza in light of Barnett.” *Id.* at 64 (citing Ex. 2002 ¶ 63).

Patent Owner’s argument does not squarely address Petitioner’s stated reasoning. As Petitioner points out, “D’Souza does not even show an elbow or how it would connect, thus the specific functionality and benefits of the D’Souza elbow-to-shroud connection are unknown. Petitioner also argues that Mr. Sleeper admitted in his deposition that ‘D’Souza doesn’t show an elbow’ but does indicate you can connect an elbow to the shroud.” Pet. Reply 23 (citing Ex. 1025 at 218:8—219:14). Further, Petitioner explains that “if **both** the shroud and the elbow are connected to the frame, the removal of the elbow from the frame would affect the engagement of the shroud to the frame and/or the removal of the shroud from the frame would not be possible without removal of the elbow.” *Id.* at 23 (citing Pet. 50; Ex. 1013 ¶ 110). Petitioner concludes that connecting the elbow directly to the

shroud would provide two independent engagements, as taught by Barnett. *Id.* (citing Pet. 50; Ex. 1013 ¶ 110).

We are more persuaded by Petitioner’s position that “[b]ecause the direct elbow-to-shroud connection provides a suitable, well-known option, there is sufficient motivation to adopt the direct elbow-to-shroud connection.” *Id.* at 24 (citing *Par Pharm., Inc.*, 773 F.3d at 1197–98.).

With respect to Petitioner’s second rationale, Patent Owner argues that Petitioner’s analysis is flawed because “an air tight seal is required at all connection points along the fluid flow path from the blower generating pressurized gas to the breathing chamber.” PO Resp. 64 (citing Ex. 2002 ¶ 64-65). Patent Owner further argues that implicit in the proposed modification is that it “(a) shifts the purported airtight seal requirement from being an elbow-to-cushion seal to being a shroud-to-cushion seal and (b) introduces an additional fluid seal that is needed.” *Id.* 64–65 (citing Ex. 2002 ¶ 65). The resulting modification would reduce design flexibility for the shroud because it would now have to have an airtight seal instead of the elbow. *Id.* at 65 (citing Ex. 2002 ¶ 65). In addition, Patent Owner argues that the proposed modification would increase the number of connection points and potential leak paths along the fluid flow path. *Id.* (citing Ex. 2002 ¶ 65; Ex. 2003, 94:25–96:1).

Petitioner counters that Patent Owner mischaracterized its motivation, that the elbow-to-shroud connection would have provided more design flexibility because the breathing chamber requires an air tight seal. Pet. Reply 24 (citing Ex. 1013 ¶ 110). Petitioner clarifies that

a POSITA would have recognized that directly attaching to the shroud would provide more flexibility in the design of the elbow connection, especially where the shroud does not define a surface

of the breathing chamber and the sealed engagement of the elbow can be separate from its attachment to the shroud.

Id. (citing Ex. 1013 ¶ 110). As discussed above with respect to claim 33, we are persuaded by Petitioner’s evidence demonstrating that a POSITA would have been capable of making sealed connections that were leak proof or had acceptable levels of leak. *Id.* (citing Pet. Section II (A)(4)).

As to claim 34, Patent Owner argues that Petitioner fails to show how D’Souza’s skeleton frame 412 would be modified to allow 360 degree rotation of the elbow module based on the teachings of Barnett and/or Ultra Mirage. PO Resp. 65. The lower headgear clip receptacles 446 that surround the cushion/frame subassembly 430 would “inhibit free rotation of an elbow connected to D’Souza’s seal 448.” *Id.* at 65–66. Patent Owner’s argument in this regard is not convincing. We are more persuaded by Petitioner’s argument that Mr. Sleeper acknowledged during cross-examination that a POSITA would have been capable of connecting the elbow to the shroud with 360° rotation. Pet. Reply 25 (citing Ex. 1025, 218:8–219:14.). Also persuasive is Petitioner’s evidence that 360 degree elbow rotation was a known feature in prior art masks, e.g., Barnett, Matula-I and Ultra Mirage. *Id.* (citing Ex. Pet. 48, 50; Ex. 1013 ¶¶ 105–106, 109–111).

In addition, Patent Owner’s arguments do not dispute directly Petitioner’s reasoning, i.e., a “POSITA would have been motivated to allow for 360 degree elbow rotation, such as providing more control over the tubing and allowing positioning of the tubing to provide a convenient, comfortable, and low force mask connection.” *Id.* (citing Pet. 50; Ex. 1013 ¶ 111). We are more persuaded by Petitioner’s arguments concerning the cross-examination testimony of Mr. Sleeper, “confirm[ing] that a POSITA

would have known how and been motivated to incorporate a 360 degree rotating elbow connection, despite clip receptacles or other features already present in D’Souza.” Pet. 27. (*See e.g.*, Ex. 1025, 223:10–20, 224:11–16, 224:17–225:7, 225:8–17, 221:21–223:9).

Based on the present record, we find that Petitioner has articulated an adequate reason to combine the teachings of D’Souza, Ultra Mirage, Matula-II, and Barnett. Namely, that a POSITA would have combined D’Souza’s elbow adapted to engage the mask assembly, the teaching of Ultra Mirage regarding 360° elbow rotation, and Barnett’s teaching regarding an elbow mounted freely to a shroud and 360° rotatable, and that combining these features would have been a mere combination of familiar elements according to known methods that does no more than yield predictable results.

For the reasons given, we conclude that Petitioner has established by a preponderance of the evidence that dependent claims 34 and 36 are unpatentable under 35 U.S.C. § 103(a) as obvious over D’Souza, Ultra Mirage, Matula-II, and Barnett.

F. D’Souza, Ultra Mirage, Matula-II, and FlexiFit

Petitioner further challenges the patentability of claim 35 under 35 U.S.C. § 103 as obvious based on D’Souza, Ultra Mirage, Matula-II and FlexiFit. *Id.* at 63–64. Claim 35 depends from claim 33 and further recites in relevant part that “the shroud module includes upper and lower headgear connectors on each side of the shroud module; wherein each upper headgear connector includes a slot adapted to receive a respective headgear strap in use; and wherein each lower headgear connector is adapted to be removably

interlocked with a headgear clip associated with a respective headgear strap.” Ex. 1001, 27:16–23.

Petitioner argues that “D’Souza does not expressly disclose upper headgear connectors, but Ultra Mirage teaches a shroud having a forehead support with headgear connectors.” Pet. 30 (citing Ex. 1013 ¶¶ 65–66). Petitioner additionally asserts that “a skilled artisan would have known to add upper headgear connectors as taught by Ultra Mirage to the forehead support of D’Souza to secure the upper portion of the mask assembly and to stabilize the mask assembly.” *Id.* at 33 (citing Ex. 1013 ¶ 71). Petitioner also argues that “D’Souza does not expressly disclose upper headgear connector slots and Ultra Mirage shows the slots on headgear clips, but . . . FlexiFit discloses attaching upper horizontal straps to corresponding slots in the mask base.” *Id.* at 44 (citing Ex. 1006, 10; Ex. 1013 ¶ 98). As a reason to modify the headgear connector configuration of D’Souza and Ultra Mirage, Petitioner asserts:

When headgear is pulled over a user’s head, lower headgear straps undergo tension, making it difficult to position the lower headgear straps. [Ex. 1013 ¶¶ 100–101.] A skilled artisan would have been motivated to provide removable lower headgear clips as taught by FlexiFit, so that the user would not have to force the lower headgear straps over his/her head. *Id.* Since upper headgear straps undergo less tension than lower headgear straps when positioning the headgear, a skilled artisan would have known that a simpler design option would have been to provide upper headgear connectors with slots as taught by FlexiFit and that such an alternative arrangement would simplify manufacturing and reduce parts. *Id.*

Id. at 45–46.

Patent Owner does not challenge these assertions in its Patent Owner Response. Thus, we find that Petitioner presents persuasive arguments and

evidence to support a finding that D’Souza, Ultra Mirage, and FlexiFit teach or suggest the limitations added by claim 35, and determine that Petitioner has provided adequate reasoning with rational underpinning to show that a PHOSITA would have been motivated to combine the teachings of D’Souza, Ultra Mirage, Matula-II, and FlexiFit to arrive at the features of claim 35. *See* Pet. 63 (citing Ex. 1013 ¶¶ 139–140).

In view of the foregoing, we conclude that Petitioner has demonstrated by a preponderance of the evidence that claim 35 is unpatentable under 35 U.S.C. § 103(a) as obvious over D’Souza, Ultra Mirage, Matula-II, and FlexiFit.

III. CONCLUSION

Thus, based on our further review of the record, and for the reasons given, we conclude that Petitioner has established by a preponderance of the evidence that claim 33-37 and 40–42 of the ’931 patent are unpatentable.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 33, 37, and 40–42 are unpatentable under 35 U.S.C. § 103(a) over D’Souza, Ultra Mirage, and Matula-II;

FURTHER ORDERED that claims 34 and 36 are unpatentable under 35 U.S.C. § 103(a) over D’Souza, Ultra Mirage, Matula-II, and Barnett;

FURTHER ORDERED that claim 35 is unpatentable under 35 U.S.C. § 103(a) over D’Souza, Ultra Mirage, Matula-II, and FlexiFit; and

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

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