

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

FISHER & PAYKEL HEALTHCARE LIMITED
Petitioner,

v.

RESMED LIMITED,
Patent Owner.

Case IPR2017-00340
Patent 8,950,404 B2

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

MAYBERRY, *Administrative Patent Judge*.

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

I. INTRODUCTION

Petitioner, Fisher & Paykel Healthcare Ltd. (“Fisher”), filed a Petition (Paper 1, “Pet.”) requesting *inter partes* review of claims 1–66 (the “Challenged Claims”) of U.S. Patent No. 8,950,404 B2 (Ex. 1001, the “’404 patent”). Patent Owner, ResMed Ltd. (“ResMed”), filed a Preliminary Patent Owner Response to the Petition. Paper 6 (“Prelim. Resp.”). We initially instituted trial on claims 1–8, 13–20, 22–36, 40–46, 48–55, and 59–65. Paper 8, 52 (“Dec. on Inst.”).

After we instituted trial, ResMed filed a Patent Owner Response. Paper 17 (“PO Resp.”). Fisher filed a Reply to ResMed’s Patent Owner Response. Paper 19 (“Reply”). Oral hearing was conducted for this proceeding on January 23, 2018 and the record contains a transcript of the hearing. Paper 23 (“Tr.”).

On May 3, 2018, we supplemented our Decision on Institution to include in the trial claims 9–12, 21, 37–39, 47, 56–58, and 66 so as to institute trial on all Challenged Claims and all grounds. *See* Paper 25, 3; *see also SAS Inst., Inc. v. Iancu*, 2018 WL 1914661, at *10 (U.S. Apr. 24, 2018) (“Because everything in the statute before us confirms that SAS is entitled to a final written decision addressing all of the claims it has challenged and nothing suggests we lack the power to say so, the judgment of the Federal Circuit is reversed and the case is remanded for further proceedings consistent with this opinion.”). During a conference call to discuss the impact of the *SAS Inst., Inc.* decision on this proceeding, Fisher and ResMed

indicated that no briefing was desired in this proceeding. *See* Ex. 1027, 25 (providing a transcript of the conference call).¹

Fisher relies on the Declaration testimony of Mr. Richard Lordo. Ex. 1013. ResMed relies on the Declaration testimony of Mr. Geoffrey Sleeper. Ex. 2004.

The Board has jurisdiction under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons that follow, we conclude that Fisher has established, by a preponderance of the evidence, that claims 1, 2, 5–7, 13, 14, 16–19, 22–32, 34, 35, 40, 42–46, 48–51, 53, 54, 59, and 61–65 of the ’404 patent are unpatentable. We further conclude that Fisher has not established, by a preponderance of the evidence, that claims 3, 4, 8–12, 15, 20, 21, 33, 36–39, 41, 47, 52, 55–58, 60, and 66 of the ’404 patent are unpatentable.

A. Related Matters

Fisher indicates that the ’404 patent is involved in district court litigation in the Southern District of California, in a case styled *Fisher & Paykel Healthcare Ltd. v. ResMed Corp.*, Case No. 3:16-cv-02068-DMS-WVG (S.D. Cal.). Pet. 6; *see also* Paper 4, 2 (identifying the litigation).

B. The ’404 Patent

The ’404 patent, titled “Headgear for Masks,” issued February 10, 2015, with claims 1–66. Ex. 1001, (54), (45), 23:14–28:53. The ’404 patent is generally directed “to headgear . . . for use in holding a mask in position on a patient’s face, the mask being used for treatment, e.g., of Sleep Disordered Breathing (SDB) with Continuous Positive Airway Pressure

¹ The parties confirmed that they did not desire briefing to address the added claims in this proceeding in an email to the Board dated May 9, 2018.

(CPAP) or Non-Invasive Positive Pressure Ventilation (NIPPV).” *Id.* at 1:16–21. Figures 1 and 6 of the ’404 patent depict embodiments of the ’404 patent’s headgear and are reproduced below.

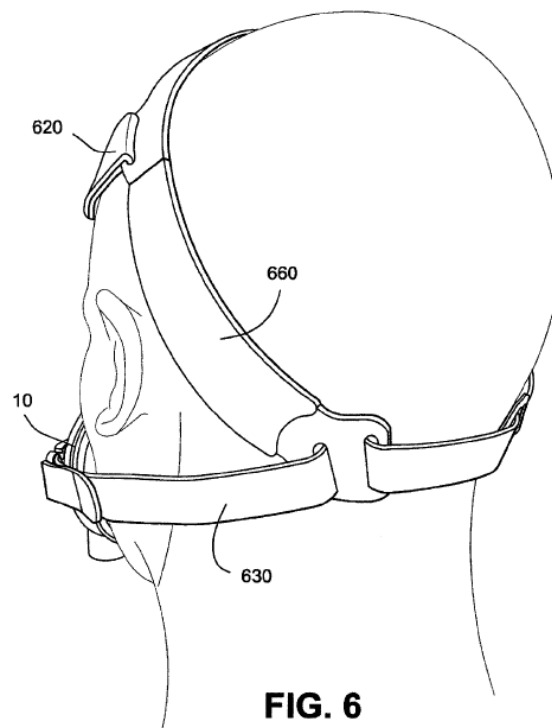
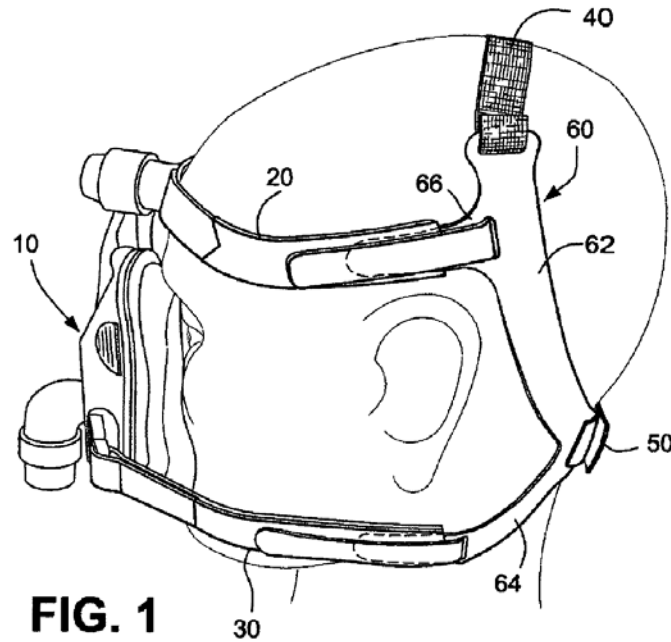


Figure 1 depicts “a side view of headgear in position on a patient’s head according to an embodiment of the” ’404 patent and Figure 6 depicts “a rear perspective view of headgear in position on a patient’s head according to another embodiment of the” ’404 patent. Ex. 1001, 4:9–10, 4:26–28. In the embodiment of Figure 1, mask 10 is connected to upper side strap 20 and lower side strap 30. *Id.* at 8:9–12. Top strap 40 is configured to pass over the top of a wearer’s head and attach to the top ends of two opposing rigidizers 60, with rear strap 50 interconnecting the lower ends of opposing rigidizers 60. *Id.* at 8:12–18. Rigidizers of the ’404 patent are “constructed of a rigid or semi-rigid material that . . . add rigidity to the headgear [The rigidizers] . . . resist or prevent stretching of the headgear in the lengthwise direction of the rigidizer [and] [t]he rigidizers may be substantially inextensible.” *Id.* at 7:36–39.

The headgear of the embodiment of Figure 6 includes upper side strap 620 and lower side strap 630 attached to mask 10. Ex. 1001, 10:5–9. Rigidizer 660 is substantially circular or oval in shape, with an arc removed at the lower portion of rigidizer 660 to allow the size of the shape to be adjusted. *Id.* at 10:1–4. In the embodiments of Figures 1 and 6, straps 20, 30, 620, and 630 include VELCRO® tabs “to engage the remainder of the strap to secure the strap in place and allow” mask 10 to be adjusted. *Id.* at 15:35–39.

Figures 14C and 14G are reproduced below:

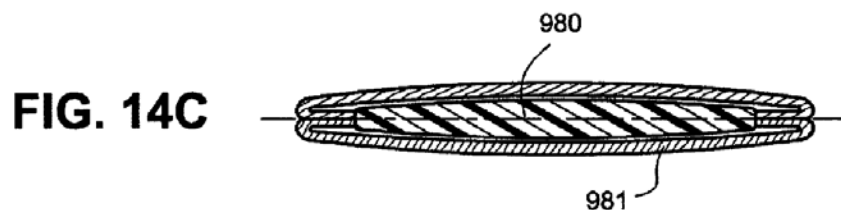
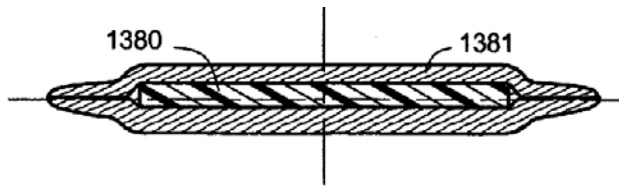


FIG. 14G



Figures 14C and 14G depict “cross-sectional views showing alternative rigidizer configurations.” Ex. 1001, 16:58–59. In the embodiment depicted in Figure 14C, “the rigidizer may include a semi-rigid molded component 980 that is covered in fabric 981, e.g., two pieces of fabric joined by stitching.” *Id.* at 17:21–23. The embodiment depicted in Figure 14G includes fabric layers 1381 around rigidizer 1380, with the fabric layers joined together at abutting ends, with the joint offset from the flat surface of the layers. *See id.*, Fig. 14G. “The fabric outer layers may be heat sealed together, stitched, ultrasonically cut, CNC knife cut, or otherwise joined.” *Id.* at 17:44–46.

C. Challenged Claims

Claims 1, 29, and 48 of the Challenged Claims are independent. Claim 29 differs from claim 1 by requiring a rear portion that (1) circumscribes the rear of a wearer’s head, (2) includes material that is relatively inextensible, and (3) is joined to upper and lower straps by stitched joins. Claim 48 is similar to claim 29. These claims are reproduced below:

1. A headgear system for holding a respiratory mask in a position on a face of a patient to enhance a mask seal with the patient’s face, the headgear system including a plurality of straps providing a four-point arrangement for attachment with the respiratory mask, said plurality of straps comprising:

at least one upper strap configured to extend above the patient’s ears in use;

at least one lower strap configured to extend below the patient’s ears in use; and

a rear portion,

wherein at least one strap of said plurality of straps is constructed from a laminate having at least a first fabric layer and a second fabric layer, said first fabric layer being constructed and arranged to be located on a patient-contacting side in use, and said second fabric layer being constructed and arranged to be located on a non patient-contacting side in use and further wherein said first fabric layer and said second fabric layer are joined at a joint configured to be positioned away from the patient's face when in use and wherein said at least one strap of said plurality of straps has a first rounded lateral edge when viewed in cross-section, and

wherein the joint is positioned at approximately a center or middle of the first rounded lateral edge when viewed in cross section.

Ex. 1001, 23:14–38.

29. A headgear system for holding a respiratory mask in a position on a face of a patient to enhance a mask seal with the patient's face, the headgear system including a plurality of straps providing a four-point arrangement for attachment with the respiratory mask, said plurality of straps comprising:

at least one upper strap configured to extend above the patient's ear in use, the at least one upper strap including loop material and an end with hook material, for adjustable attachment to a slot of a forehead support;

at least one lower strap configured to extend below the patient's ear in use, the at least one lower strap including loop material and an end with hook material for adjustable attachment to a headgear clip that connects with a lower part of the mask; and

a rear strap portion having a rear loop configured and dimensioned to circumscribe the rear of the patient's head, the at least one upper strap and the at least one lower strap being attached to the rear strap portion via stitched joins, the rear strap portion comprising a material that is relatively inextensible

compared to a relatively extensible material of the at least one upper strap,

wherein at least one strap of said plurality of straps is constructed from a laminate having at least a first layer and a second layer, said first layer being constructed and arranged to be located on a patient-contacting side in use, and said second layer being constructed and arranged to be located on a non patient-contacting side in use, and further wherein each of said first layer and said second layer forms a part of at least one rounded lateral edge of the at least one strap when viewed in cross-section.

Ex. 1001, 24:65–25:28.

48. A headgear system for holding a respiratory mask in a position on a face of a patient to enhance a mask seal with the patient's face, the headgear system including a plurality of straps providing a four-point arrangement for attachment with the respiratory mask, said plurality of straps comprising:

a pair of upper straps each configured to extend above the patient's ear in use, each said upper strap including an outwardly facing loop material layer and an end with hook material to adjustably engage the outwardly facing loop material layer, for length-adjustable attachment to a slot of a forehead support;

a pair of lower straps each configured to extend below the patient's ear in use, each said lower strap including an outwardly facing loop material layer and an end with hook material to adjustably engage the outwardly facing loop material layer, for length-adjustable attachment to a headgear clip that connects with a lower part of the mask; and

a rear strap portion having a rear loop configured and dimensioned to circumscribe the rear of the patient's head, each said upper strap and each said lower strap being attached to the rear strap portion via stitched joins, the rear strap portion comprising a first material with a first extensibility and each said upper or lower strap comprising a second material with a second extensibility that is different than the first extensibility of the first material,

wherein each of said upper strap and each said lower strap is constructed from at least a patient-contacting fabric material layer and a respective said outwardly facing loop material layer, each said patient-contacting fabric material layer being constructed and arranged to engage the patient's face while in use, and further wherein mutual edges of the patient-contacting fabric material layer and said outwardly facing loop material layer form a joint positioned, as seen in cross-section, at a lateral edge of each said upper strap and each said lower strap, each said joint being spaced away from the patient's face in use while the patient-contacting fabric material layer contacts the patient's face in use.

Ex. 1001, 26:37–27:9.

D. The Prior Art

We instituted trial on the only two grounds of unpatentability raised by Petitioner for the Challenged Claims, which rely on the following references:

Amarasinghe	WO 2004/041341 A1	May 21, 2004	Ex. 1002
Ho	WO 2008/030831 A2	Mar. 13, 2008	Ex. 1003
Corrigall	US 3,424,633	Jan. 28, 1969	Ex. 1004

Dec. on Inst. 52–53, Paper 25, 3.

E. Instituted Grounds of Unpatentability

We instituted trial, as supplemented by our order of May 3, for the Challenged Claims as follows:

References	Basis ²	Claims Challenged
Amarasinghe and Corrigan	35 U.S.C. § 103(a)	1, 5–9, 14, 16, 17, 19, 21, 27, and 28
Amarasinghe, Corrigan, and Ho	35 U.S.C. § 103(a)	2–4, 10–13, 15, 18, 20, 22–26, and 29–66

Dec. on Inst. 52–53, Paper 25, 3.

II. ANALYSIS

A. *Level of Ordinary Skill in the Art*

The level of skill in the art is “a prism or lens” through which we view the prior art and the claimed invention. *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). Fisher asserts that the level of ordinary skill in the art to which the ’404 patent pertains is “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. 13–14 (citing Ex. 1013 (Decl. of Richard Lordo) ¶ 26).

ResMed’s declarant, Mr. Sleeper, defines the level of ordinary skill in the art as “a bachelor’s degree in mechanical engineering, biomedical engineering, or a similar technical field, and 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 (Decl. of Geoffrey Sleeper) ¶ 12.

² The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 296–307 (2011), took effect on September 16, 2012. Because the application for the patent at issue in this proceeding has an effective filing date before that date, we refer to the pre-AIA versions of the statute.

Factual indicators of the level of ordinary skill in the art include “the various prior art approaches employed, the types of problems encountered in the art, the rapidity with which innovations are made, the sophistication of the technology involved, and the educational background of those actively working in the field.” *Jacobson Bros., Inc. v. United States*, 512 F.2d 1065, 1071 (Ct. Cl. 1975); *see also Orthopedic Equip. Co., Inc. v. United States*, 702 F.2d 1005, 1011 (Fed. Cir. 1983) (quoting with approval *Jacobson Bros.*).

We find both parties assert very similar definitions of the level of ordinary skill in the art. Both definitions include a degreed engineer with two years of experience. Fisher identifies the fields of experience as “masks, respiratory therapy, patient interfaces or relevant product design experience” and ResMed, through Mr. Sleeper, defines the field of experience as “relevant product design experience.” Mr. Sleeper declares that additional experience may compensate for less education and additional education may compensate for less experience.

We find, based on our review of the complete record, that the evidence of record supports a level of ordinary skill in the art consistent with the parties’ definitions—a person having a bachelor’s degree in mechanical engineering, biomedical engineering or other similar type of engineering degree combined with two years of experience in the field of masks, respiratory therapy, patient interfaces, or other relevant product design experience. We also find that additional experience may compensate for less education and additional education may compensate for less experience. Further, we note that our patentability analysis presented below would reach

the same findings and determinations under either party's definition of the level of ordinary skill in the art.

B. Claim Construction

In an *inter partes* review, claim terms in an unexpired patent are given their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b). Under the broadest reasonable construction standard, 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). Also, we are 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) (“[L]imitations are not to be read into the claims from the specification.”).

In two situations, the proper interpretation of a claim term departs from the ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure—when the patentee acted as its own lexicographer or disavowed certain claim scope. *See Luminara Worldwide, LLC v. Liown Elecs. Co.*, 814 F.3d 1343, 1353 (Fed. Cir. 2016). “The standards for finding lexicography and disavowal are ‘*exacting*.’” *Id.* (emphasis added). “To act as a lexicographer, a patentee must ‘clearly set forth a definition of the disputed claim term’ and ‘clearly express an intent to redefine the term.’” *Id.* Disavowal (or disclaimer) requires that the patentee make it clear, either in the Specification or in the prosecution history, “that the invention does not include a particular

feature.” *Id.* “While such disavowal can occur either explicitly or implicitly, *it must be clear and unmistakable.*” *Id.* (emphasis added).

Fisher contends that the terms of the Challenged Claims should be “given their ‘broadest reasonable interpretation’ in light of the [S]pecification of the ’404 [p]atent” and does not offer any express constructions for any term in the Challenged Claims. *See* Pet. 10. In its Patent Owner Response, ResMed proffers express constructions for two terms, which we address below. *See* PO Resp. 9–12. We also address certain claim constructions from our Decision on Institution.

1. “*at least one strap of said plurality of straps is constructed from a laminate having at least a first fabric layer and a second fabric layer . . . wherein said first fabric layer and said second fabric layer are joined at a joint configured to be positioned away from the patient’s face when in use*”

Claim 1 requires at least one of the plurality of straps to include a “joint configured to be positioned away from the patient’s face when” the claimed headgear system is in use. Ex. 1001, 23:24–33. In our Decision on Institution, we construed the phrase “at least one strap of said plurality of straps is constructed from a laminate having at least a first fabric layer and a second fabric layer . . . wherein said first fabric layer and said second fabric layer are joined at a joint configured to be positioned away from the patient’s face when in use” in claim 1 to be limited to an at least one strap that contacts, at some point, a patient’s face when the headgear is in use for the purposes of that Decision. Dec. on Inst. 12. Our construction adopted the construction proposed by ResMed in its Preliminary Patent Owner Response. *See id.* at 11–12.

ResMed maintains its position with respect to the construction of this claim limitation in its Patent Owner Response. PO Resp. 10–11. Fisher

does not dispute our claim construction from the Decision on Institution in its Reply. *See* Reply 13–15. Based on a review of the entire record, we see no need to alter our construction, except for one point of emphasis.

Accordingly, for the reasons provided in our Decision on Institution, we interpret the phrase “at least one strap of said plurality of straps is constructed from a laminate having at least a first fabric layer and a second fabric layer . . . wherein said first fabric layer and said second fabric layer are joined at a joint configured to be positioned away from the patient’s face when in use” in claim 1 to be limited to an at least one strap that contacts, at some point, a patient’s face when the headgear is in use. *See* Dec. on Inst. 11–12. We emphasize that the construction includes the phrase “at some point,” which means that the strap may include points that do not contact the face.

2. *“a substantially circular or oval shape”*

Claims 15, 41, and 60 of the Challenged Claims each requires the rear portion of the headgear to engage the back of a wearer’s head in a substantially circular or oval shape—the “substantially circular or oval shape” limitation. *See, e.g.*, Ex. 1001, 23:63–67 (providing claim 15, which depends from claim 1 and further recites “wherein the rear portion is configured to engage a back of a patient’s head and extend on either side of the patient’s parietal bone behind the patient’s ears and assume, in use, a substantially circular or oval shape”).³

³ Claim 41 depends from independent claim 29 and claim 60 depends from independent claim 48 and each further recites “wherein the rear strap portion is configured to engage a back of a patient’s head and extend on either side of the patient’s parietal bone behind the patient’s ears and assume, in use, a substantially circular or oval shape.” Ex. 1001, 25:66–26:3, 27:53–28:3.

Both parties agree that the “substantially circular or oval shape” limitation should be given its plain and ordinary meaning, although the parties dispute what that meaning is. ResMed contends that the plain and ordinary meaning of the term “is that in use, the rear portion of the headgear forms a loop having an oval, i.e., ellipsoidal, shape or a substantially circular shape.” PO Resp. 12. We adopted ResMed’s definition in our Decision on Institution. Dec. on Inst. 12–13. ResMed maintains its proffered construction in its Patent Owner Response. PO Resp. 12.

Fisher contends that we should clarify our construction, as Fisher argues that ResMed’s wording of the plain and ordinary meaning distorts that meaning. Reply 21. Specifically, Fisher argues that ResMed improperly narrows the term “oval” to mean ellipsoid. *Id.* at 20. Fisher also argues that the word “substantially” in the claims should modify both “circular” and “oval.” *Id.* at 21; *See* Tr. 26:20–23 (“And I think because [the claim] says *substantially* circular *and* *substantially* oval, you can look at the opening and say, yeah, that’s substantially oval, even by ResMed’s own dictionaries.”) (emphasis added).

To clarify our construction, we determine that the “substantially circular or oval shape” limitation should be given its plain and ordinary meaning. As we describe in greater detail below, we further determine that meaning to be as the words of the claim require—the rear portion of the headgear, in use, assumes a substantially circular shape or an oval shape. The word “substantially” modifies the word “circular,” but not the word “oval,” while “shape” is the noun which is modified by the adjectives “substantially circular” and “oval.”

Also, “oval” is not limited to the exact geometric shape of an ellipsoid. Instead, the word “oval,” means “resembling the shape of an egg.” *See, e.g.,* MERRIAM-WEBSTER ONLINE DICT., available at <https://www.merriam-webster.com/dictionary/oval> (last visited Apr. 12, 2018) (defining the adjective “oval” as “having the shape of an egg” also “broadly elliptical”). In other words, an oval shape is not a precise ellipse,⁴ but is, substantially, or broadly, elliptical, and thus the term does not require exacting geometric precision, unlike the shape implicated by the term circular. Thus, the word “oval” itself encompasses the variability concept conveyed by the term “substantially.”

The plain reading of the claim language supports our construction. *See, e.g., Phillips v. AWH Corp.*, 415 F.3d 1303, 1314 (Fed. Cir. 2005) (en banc) (“[T]he context in which a term is used in the [claim at issue] can be highly instructive.”). First, the word “substantially” modifies “circular” but not “oval.” Second, the language of the claim uses the more general term “oval,” not ellipse or ellipsoid.

The language of other claims informs our construction. *See Phillips*, 415 F.3d at 1314 (“Other claims of the patent in question . . . can also be valuable sources of enlightenment as to the meaning of a claim term.”). In each and every claim limitation that recites the “substantially circular or oval

⁴ We also note that an ellipsoid is a three-dimensional shape, while an oval and circle, shapes recited in the “substantially circular or oval shape” limitation, are two-dimensional. *See, e.g.,* MERRIAM-WEBSTER ONLINE DICT., available at <https://www.merriam-webster.com/dictionary/ellipsoid> (last visited April 12, 2018) (defining “ellipsoid” as “a surface all plane sections of which are ellipses or circles”). An ellipse is the two-dimensional representation of an ellipsoid.

shape” limitation, the word “substantially” modifies the word “circular” only and the word “oval” is used in each occurrence of the limitation. *See* Ex. 1001, 23:63–67 (providing claim 10), 24:16–21 (claim 15), 25:48–52 (claim 37), 25:66–26:3 (claim 41), 27:35–39 (claim 56), 27:53–28:3 (claim 60).

The Specification does not provide an express definition of this claim term, but the disclosure is consistent with our construction. The Specification uses the phrase “substantially circular or oval shape” in describing the embodiment of Figures 6 and 7. *See* Ex. 1001, 10:1–4. This single use of the phrase substantially circular or oval shape is not inconsistent with our construction.

During prosecution, the Examiner interpreted the word “substantially” in the “substantially circular or oval shape” limitation to modify the word “oval.” *See* Ex. 1015, 557. However, the Examiner did not provide any explicit analysis for arriving at that conclusion. The Examiner allowed the application based on amendments made to claim limitations other than the “substantially circular or oval shape” limitation, so the applicants did not address how the Examiner construed the limitation. *See id.* at 583–598, 634–643; Pet. 13. Although the broadest reasonable construction must be applied during patent prosecution, the record is devoid of any analysis by the Examiner in reaching a construction of the claim term “substantially circular or oval shape.” Accordingly, given the absence of any analysis by the Examiner in the record, and based on our own claim construction analysis, we construe the phrase differently.

As we indicated above, we depart from the plain and ordinary meaning of a claim term in two very limited situations only—where the patentee acted as his or her own lexicographer or when the patentee

disavowed certain claim scope. We have reviewed the record and we do not discern anything in the Specification or the prosecution history to warrant departing from the plain and ordinary meaning of the “substantially circular or oval shape” limitation. Although the prosecution history offers some evidence that “substantially” modifies “oval,” we do not discern from the prosecution history that we should depart from the plain and ordinary meaning of the term as we find no clear disavowal or definition. Similarly, neither Fisher nor ResMed directs us to anything in the record to warrant departing from the plain and ordinary meaning of the “substantially circular or oval shape” limitation. *See* PO Resp. 12 (“Patent Owner maintains [the plain and ordinary meaning of the term ‘substantially circular or oval’] in the analysis of claims 15, 41, and 60.”); Reply 21 (“The Board should . . . adopt[] the plain and ordinary meaning of the [‘substantially circular or oval shape’ limitation].”). “Absent a clear disavowal or contrary definition in the [S]pecification or the prosecution history, the [claim] is entitled to the full scope of its claim language.” *Home Diagnostics, Inc. v. LifeScan, Inc.*, 381 F.3d 1352, 1358 (Fed. Cir. 2004).

To reiterate, we construe the “substantially circular or oval shape” limitation to require the rear portion of the headgear, in use, to assume either a substantially circular shape or an oval shape.

3. “*inextensible*,” “*substantially inextensible*,” and “*relatively inextensible*”

In our Decision on Institution, we construed the terms “inextensible,” “substantially inextensible,” and “relatively inextensible.” Dec. on Inst. 13–16. Based on a review of the entire record, we see no need to alter our constructions for these terms. Accordingly, for the reasons provided in our Decision on Institution, we interpret the term “inextensible” to mean “not

extensible, incapable of being stretched” and the term “substantially inextensible” to mean “a structure that when subject to the forces normally encountered in use of a respiratory mask, will have an elongation of less than about 5%.” *See id.* We interpret the term “relatively inextensible” to encompass a structure that is less extensible relative to another structure. *See id.*

C. Overview of the Prior Art

The Petition relies on three prior art references in its asserted grounds of unpatentability for the Challenged Claims—Amarasinghe, Ho, and Corrigall. We briefly discuss relevant portions of these references, below.

1. Amarasinghe

Amarasinghe, titled “Headgear Assembly for a Respiratory Mask Assembly,” published as an international application on May 21, 2004. Ex. 1002, (54), (43). Amarasinghe’s “Applicant” is ResMed. *Id.* at (71). Amarasinghe is generally directed to “a headgear assembly for use in holding a respiratory mask assembly in position on a patient’s face, the mask assembly being used for treatment, e.g., of Sleep Disordered Breathing

(SDB) with Non-invasive Positive Pressure Ventilation (NPPV).” *Id.* at 1:7–10. Amarasinghe’s Figures 1 and 2 are reproduced below:

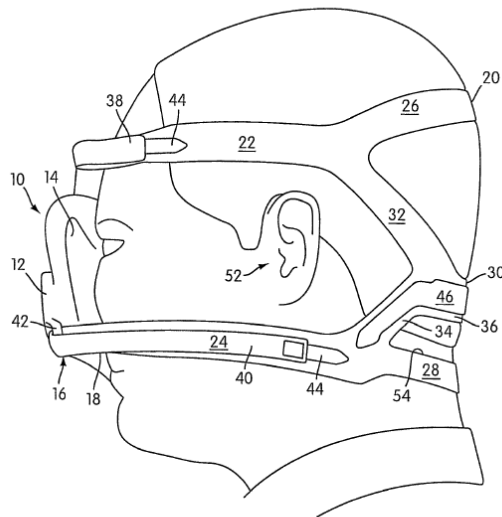


FIG. 1

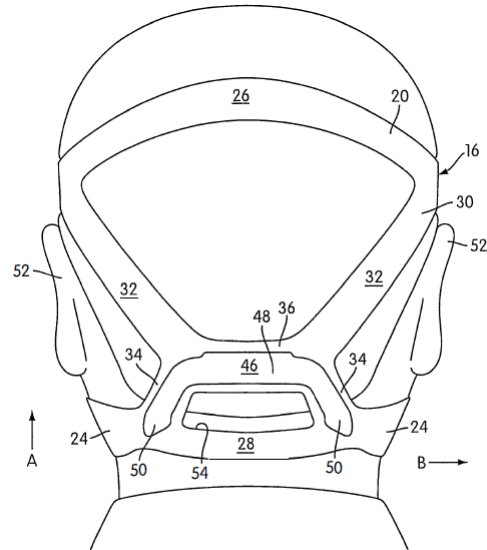


FIG. 2

Figures 1 and 2 depict “a side view illustrating a mask assembly having a headgear assembly . . . mounted on a patient’s head” and “a rear view illustrating the headgear assembly of [Figure] 1,” respectively. Ex. 1002, 3:23–26. Mask assembly 10 is removably attached to headgear assembly 16 at frame 12. Ex. 1002, 4:21–23. Headgear assembly 16 includes upper side strap 22, lower side strap 24, and rear portion 20, which interconnects with the upper and lower side straps. *Id.* at 5:3–6. Rear portion 20 includes upper strap 26, lower strap 28, and intermediate strap arrangement 30. *Id.* at 5:5–7. Intermediate strap arrangement 30 is formed by upper straps 32, lower straps 34, and cross-bar strap 36. *Id.* at 5:7–8. Curved upper strap 26 engages a posterior portion of the parietal bone of the patient’s head and cross-bar strap 36 is structured to engage a lower portion of the occipital bone of the patient’s head. *Id.* at 8:3–6.

Upper side straps 22 and lower side straps 24 connect to the upper and lower portion of frame 12, respectively. Ex. 1002, 5:15–16. End portions of the upper and lower side straps have a reduced width to wrap around clip structure 42 on frame 12. *Id.* at 5:17–19. Upper side straps 22 and lower side straps 24 may employ hook and loop material to secure the straps to themselves. *Id.* at 5:19–24.

Headgear assembly 16's straps are made "from a soft, flexible composite material such as BREATHE-O-PRENE™."⁵ Ex. 1002, 6:3–4. Rear portion 20 includes stiffener 46, which "is constructed from a semi-rigid skin-compatible material such as thermoplastics, e.g., nylon or polyester or a thermoplastic elastomer, e.g. santoprene." *Id.* at 6:17–19. "[S]tiffener 46 is secured to [] straps 34, 36 by stitching around the periphery of [] stiffener 46." *Id.* at 6:23–24. Stiffener 46 adds rigidity to headgear assembly 16—it "reduces the flexibility of [] straps 34, 36 at the back of the patient's head along the direction of arrow A or in a reverse direction of arrow A, as shown in [Figure] 2." *Id.* at 7:3–8.

2. Ho

Ho, titled "Headgear Assembly," published as an international application on March 13, 2008. Ex. 1003, (54), (43). Ho is generally directed to "a headgear having curved beams that enable the headgear to assume a spherical configuration when donned by a user." *Id.* ¶ 2. Ho's Figures 1, 2, and 3 are reproduced below:

⁵ Fisher indicates that BREATHE-O-PRENE is now a registered trademark. See Pet. 39.

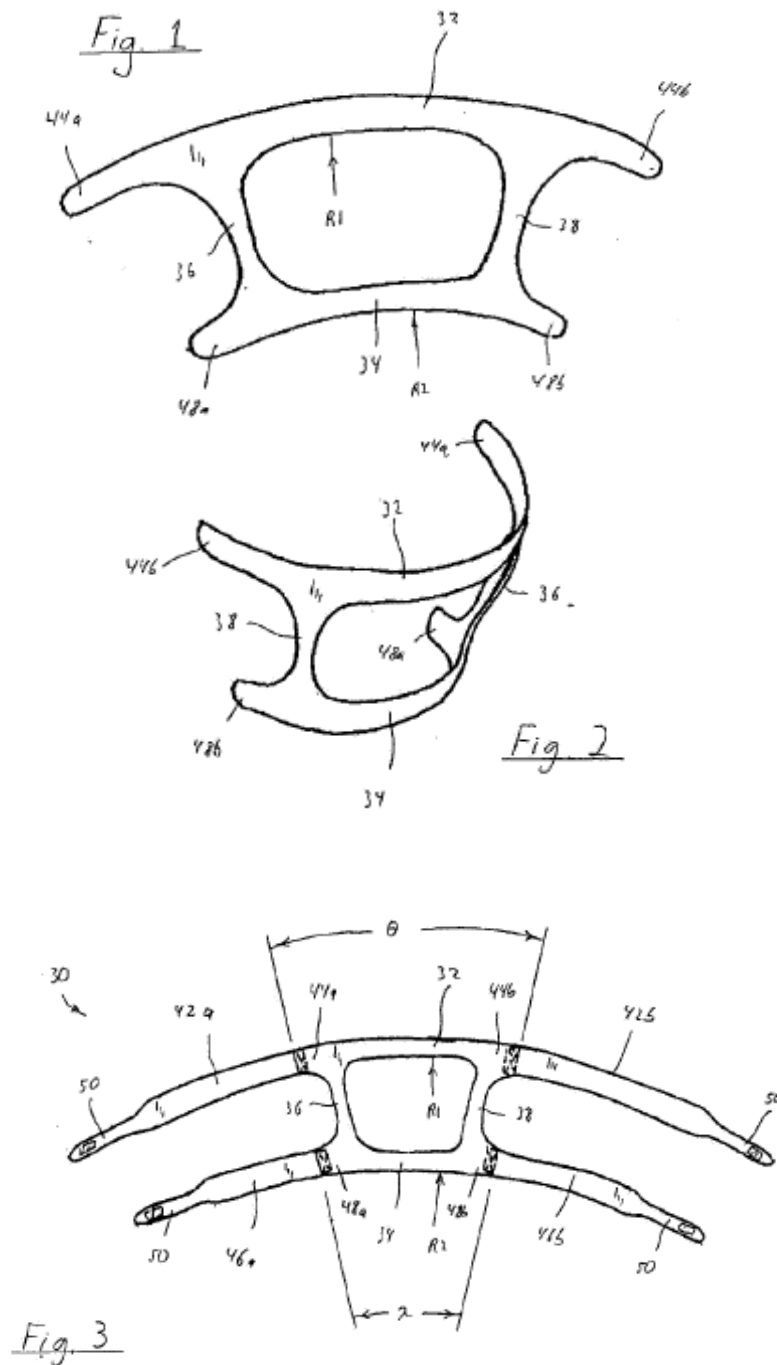


Figure 1 depicts “plan view of a portion of a first embodiment headgear assembly” of Ho. Ex. 1003 ¶ 11. Figures 2 and 3 depict “a perspective view of the headgear portion shown in [Figure] 1” and “a plan view a headgear assembly that includes the portion shown in [Figure] 1,”

respectively. *Id.* ¶ 12–13. Headgear assembly 30 includes a rear portion formed by first beam 32, second beam 34, first member 36, and second member 38. *Id.* ¶ 26, 29. “First beam 32 and second beam 34 are generally planer, i.e., are relative thin, and are flexible or semi rigid.” *Id.* ¶ 27.

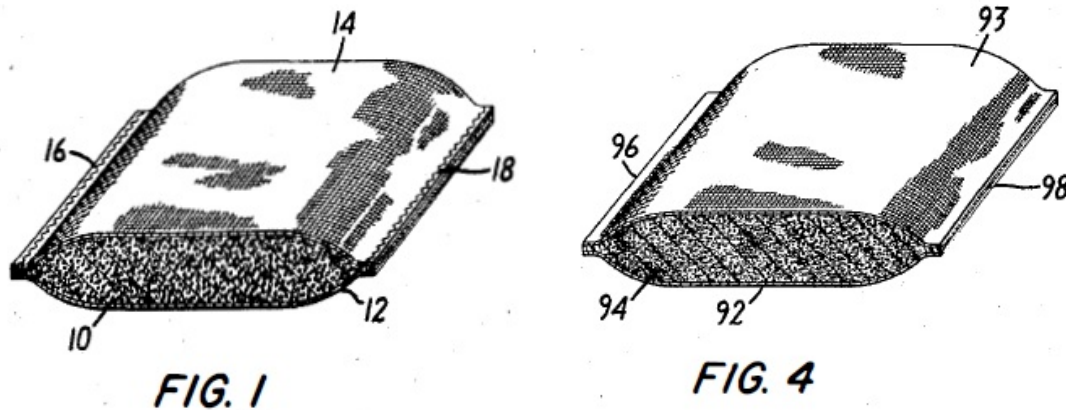
[W]hen the headgear assembly is lying flat, such as on a flat surface, the first beam and the second beam also lie flat on that surface. First beam 32 is curved along its length such that it has a first radius of curvature R1 defined in the first plane. Second beam 34 is also curved with respect to its lengthwise axis such that it has a second radius of curvature R2 that is also defined in the first plane. The first radius of curvature R1 and the second radius of curvature R2 are in the same direction.

Id. “[W]hen headgear assembly 30 is worn by a user, first beam 32 and second beam 34 bend or wrap around the head/neck of the user” and “the structure defined by the first and second beams has a generally spherical shape.” Ex. 1003 ¶ 32.

Coupling members 42a, 42b, 46, and 46b are made of fabric and are attached to the ends of the first and second beams by stitching, sewing, or sonic/heat welding. Ex. 1003 ¶ 34.

3. *Corrigall*

Corrigall, titled “Method of Making Strap Material,” issued January 28, 1969. Ex. 1004. Corrigall is generally directed to “[a] method for making laminated fully air breathable foam-fabric articles.” *Id.* at 1:15–17. Corrigall’s strap construction results in a more comfortable garment. *Id.* at 2:16–19. Corrigall’s Figures 1 and 4 are reproduced below:



Figures 1 and 4 depict segments of strap material from alternative embodiments. Ex. 1004, 2:70–3:6. In the embodiment of Figure 1, fabric strips 12, 14, and foam strip 10 form a laminate structure, with strips 12, 14 preferably adhered to foam strip 10. *Id.* at 3:50–54. Fabric strip 12 is an inner, body-contacting fabric chosen for its softness and fabric strip 14 is chosen for its durability. *Id.* at 3:44–49. Strips 12, 14 are made of an extensible fabric. *Id.* at 3:35–36.

“[F]oam and fabric strips of equal widths [are] adhered together to form a laminate, and the edges of the laminate then stitched together, the stitching serving . . . to join the fabric strips [and] to compress the edge portions of the foam to form . . . rounded edges.” Ex. 1004, 4:3–8. In the embodiment of Figure 4, strips 92, 93 are mechanically adhered to foam layer 94. *Id.* at 6:2–6. Foam layer 94 is heat-formed to collapse the foam cells at the lateral edges 96, 98 of the laminate strip, such that the edges do not require stitching. *Id.* at 6:6–17.

D. Instituted Grounds of Unpatentability

In *inter partes* reviews, a 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 challenge by a preponderance of the evidence. 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. We instituted trial for the Challenged Claims of the '404 patent based on the following two asserted grounds of unpatentability under 35 U.S.C. § 103(a): 1) claims 1, 5–9, 14, 16, 17, 19, 21, 27, and 28 over Amarasinghe and Corrigall; and 2) claims 2–4, 10–13, 15, 18, 20, 22–26, and 29–66 over Amarasinghe, Corrigall, and Ho.

Section 103(a) [of 35 U.S.C.] forbids issuance of a patent when “the differences between the subject matter sought to be patented 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 ordinary skill in the art; and (4) when available, secondary considerations, such as commercial success, long felt but unsolved needs, and failure of others. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). We address these underlying factual issues with respect to each asserted ground, below.⁶

⁶ We address the level of ordinary skill in the art in Section II.A., *supra*. Patent Owner does not argue or provide evidence of secondary considerations.

1. Claims 1, 5–8, 14, 16, 17, 19, 27, and 28 over Amarasinghe and Corrigall

a. Independent claim 1

(i) *The subject matter of claim 1*

Claim 1 requires “at least one upper strap configured to extend above the patient’s ears in use; at least one lower strap configured to extend below the patient’s ears in use; and a rear portion.” Ex. 1001, 23:19–23. Fisher contends that Amarasinghe discloses this subject matter. Pet. 17–18, 22–23. Specifically, Fisher contends that Amarasinghe’s headgear system 16 includes (1) upper side strap 22, configured to extend above the patient’s ears during use of the headgear system; (2) lower side strap 24, configured to extend below the patient’s ears during use; and (3) rear portion 20. *Id.* In support of its position, Fisher annotates Amarasinghe’s, which we reproduce below.

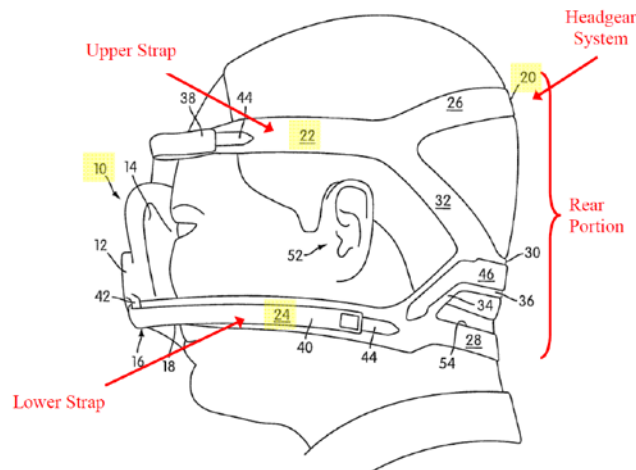


FIG. 1

Fisher’s annotated Figure 1 from Amarasinghe indicates the upper strap, lower strap, and rear portion. See Pet. 19; Ex. 1013 ¶ 56. We find that Amarasinghe discloses the above-quoted subject matter, as asserted by Fisher in the Petition. See, e.g., Ex. 1002 Fig. 1 (depicting headgear

assembly 16 with upper straps 22, lower straps 24, and rear portion 20), Fig. 2 (depicting rear portion 20), 5:3–14 (describing side portion 18 with upper side strap 22 and lower side strap 24 and rear portion 20 with upper strap 26, lower strap 28, and intermediate strap 30). ResMed does not dispute Fisher’s contentions with respect to this subject matter.

Claim 1 further recites:

wherein at least one strap of said plurality of straps is constructed from a laminate having at least a first fabric layer and a second fabric layer, said first fabric layer being constructed and arranged to be located on a patient-contacting side in use, and said second fabric layer being constructed and arranged to be located on a non patient-contacting side in use.

Ex. 1001, 23:24–30. Fisher asserts that Amarasinghe discloses this subject matter. Pet. 18. Fisher explains that Amarasinghe discloses that headgear 16’s straps are made of BREATHE-O-PRENE. *Id.* at 18, 24–25. Fisher’s declarant, Mr. Richard Lordo, declares that BREATHE-O-PRENE is a stretchable fabric well known at the relevant time for the ’404 patent. Ex. 1013 ¶ 44. Mr. Lordo explains that BREATHE-O-PRENE is a composite laminate of fabric and foam having three layers—two fabric layers with a foam layer in between. *Id.* Mr. Lordo also explains that the patient-contacting side of the laminate is made of polyester/nylon and the non-patient-contacting side is made of hook material. *Id.* Fisher further explains that Amarasinghe discloses that its straps include two layers, with the outside layer having loop material to facilitate attaching its strap ends with hook material to the outside layer of the straps. Pet. 25.

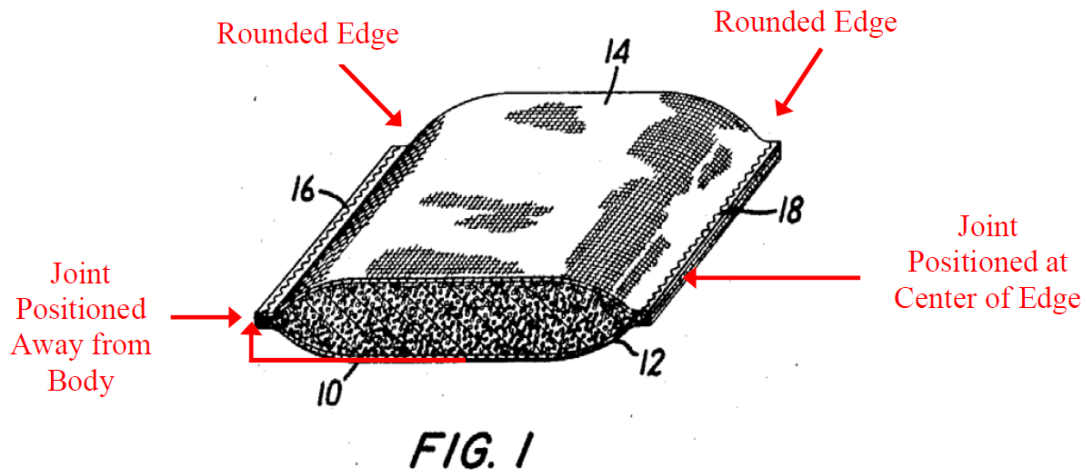
We find, based on the complete trial record and consistent with Fisher’s assertions, that Amarasinghe discloses the recited strap construction subject matter. *See, e.g.*, Ex. 1002, 6:3–8 (describing straps for headgear

assembly 16 manufactured of BREATHE-O-PRENE), Fig. 7 (depicting composite nature of a headgear assembly strap). ResMed does not dispute Fisher's contentions with respect to this subject matter.

Claim 1 further recites:

wherein said first fabric layer and said second fabric layer are joined at a joint configured to be positioned away from the patient's face when in use [the "positioned away" clause] and wherein said at least one strap of said plurality of straps has a first rounded lateral edge when viewed in cross-section [the "rounded lateral edge" clause], and wherein the joint is positioned at approximately a center or middle of the first rounded lateral edge when viewed in cross section [the "joint position" clause].

Ex. 1001, 23:30–38. Fisher acknowledges that Amarasinghe fails to explicitly disclose the subject matter of these three wherein clauses. Pet. 20. Fisher contends that Corrigall discloses a strap material that includes a first rounded lateral edge when viewed in cross-section and a joint connecting two fabric layers that is positioned at approximately a center or middle of the first rounded lateral edge when viewed in cross-section (that is, the subject matter of the "rounded lateral edge" clause and the "joint position" clause). *Id.* at 20, 26. To support its position, Fisher annotates Corrigall's Figure 1, which we reproduce below.



Fisher’s annotated version of Corrigan’s Figure 1 identifies the straps rounded edges and joint. See Pet. 27; Ex. 1013 ¶ 60. We find, based on the complete record, that Corrigan discloses a strap that satisfies the subject matter of the subject matter of the “rounded lateral edge” clause and the “joint position” clause of claim 1. As seen in Corrigan’s Figure 1, the laminate strap has rounded edges, formed by joining fabric layers 12 and 14 at lengthwise edges (shown adjacent to zig-zag stitches 16, 18) and compressing foam strip 10 at those edges. Figure 1 also shows that the resulting joints are at approximately a center or middle of the first rounded lateral edge when viewed in cross section as required by the “joint position” clause. ResMed does not dispute that Corrigan’s strap satisfies the subject matter of the “rounded lateral edge” clause and the “joint position” clause of claim 1.

With respect to the subject matter of the “positioned away” clause, Fisher explains that Corrigan discloses that the joined edges of its strap are above the normal contour of the body, such that the joint is positioned away from the body. Pet. 27; Ex. 1013 ¶ 61. Fisher further contends that

Corrigall's embodiment depicted in Figure 4 also discloses the recited strap configuration subject matter. Pet. 28; Ex. 1013 ¶ 62.

We find, based on the complete record, that Corrigall discloses the subject matter of the “positioned away” clause of claim 1. As illustrated in the annotated version of Corrigall's Figure 1, the strap's joint is located at the side of the strap, away from the face-contacting surface. *See also* Ex. 1004, 2:33–41 (“*In use . . . the edges of the strap material lying contiguous to or above the normal body contour* The load on the strap material is thus substantially uniform transversely, there being no ‘digging in’ of the edges of the strap material.”) (emphasis added). As seen in Corrigall's Figure 1, reproduced above, the seam is *positioned away* from the user's skin as required by the claim. There is a distance between the lower surface (that is, the skin-contacting surface) of the strap and the joint, such that the joint is positioned away from the user's skin when the strap sits against the skin. Further, foam strip 10 adds thickness to the laminated foam/fabric strap and provides the rounded edges, which positions the joint away from the user's skin.

We further find that even given Corrigall's disclosure that the edges of the strap material may lie *contiguous* to the body contour discloses that the joint is positioned away from the skin, as the fabric (that is, one side of the joint) would rest against the skin, rather than the cut edges of the fabric layers. *See* Ex. 1013 ¶ 62 (explaining, with respect to Corrigall's Figure 4, that the “centrally positioned joints near the middle of the rounded edge 96, 98 that are positioned away from the body contacting fabric layer 92.”). Corrigall expressly teaches that *the center portion of its strap*, not the edges, press into a wearer's body “to a degree governed by the tightness required

for a particular garment.” Ex. 1004, 2:30–39. That is, Corrigan expressly teaches that, when its strap is in use, the central portion of the strap presses into the body, the amount of which depends on the force on the strap, but the edges do not. Corrigan further teaches that its strap resists curling and twisting, which also keeps the edge away from the skin. *See id.* at 2:30–33. Also, Corrigan teaches that, “in use, [the strap] cups very slightly so that the wearer’s skin and flesh are gradually depressed.” *Id.* at 2:33–35. This cupping positions the edges away from the skin.

ResMed contends that Fisher has failed to demonstrate “that any of the references disclose such a joint that ‘does not contact the patient’s face in use.’” PO Resp. 27. ResMed argues that “the evidence . . . shows that the purported joint along the edge of the strap material would have contacted the patient’s face in use at one or more locations along its length due to the profile of the strap and the forces normally imparted on the headgear straps in use.” *Id.* (referencing Ex. 2004 ¶¶ 52–61).

ResMed further argues that Corrigan never addresses its straps extending along a facial region, as all the exemplary straps are for garments that do not have straps positioned at the face. *Id.* at 28. ResMed also argues that Fisher’s reliance on Corrigan’s disclosure that, in use . . . the edges of Corrigan’s strap material lie contiguous to or above the normal body contour and that the edges of the straps do not dig in fails to satisfy the subject matter of the claim. *See id.* at 28–29. Specifically, ResMed argues that these disclosures in Corrigan demonstrate that the edges of Corrigan’s strap would contact the user’s skin, depending on the load applied. *Id.* ResMed continues that Fisher fails to provide any evidence of how Corrigan’s straps would function in a headgear system. *Id.* at 29–30. ResMed criticizes

Fisher’s declarant’s testimony, as it is based on Corrigall’s strap configuration in a non-compressed state (that is, that Corrigall’s Figures 1 and 4 do not show the strap material in use). *Id.* at 30–31.

ResMed argues that a person having ordinary skill in the art would have recognized that, because headgear straps are pulled taught, the foam layer in Corrigall’s strap would compress, causing the edges of the strap to contact the user’s face, especially given that the skin of the face is susceptible to depression. PO Resp. 31. ResMed points out that Mr. Lordo concedes “that he would need to consider a range of factors to determine the issue of whether a strap would leave a mark on a patient’s body after normal use.” *Id.* at 32 (referencing Ex. 2005, 22:4–16).⁷

Fisher replies that the strap configuration in Corrigall is similar to that disclosed in Figure 14G of the ’404 patent. Reply 13–14.⁸ Fisher also replies that ResMed’s argument that Corrigall does not disclose applying its strap to the face ignores the capabilities of a person having ordinary skill in the art. *Id.* at 14–15. Fisher also replies that ResMed’s argument that Corrigall’s strap edges would contact the face is contrary to the express disclosure in Corrigall that the edges of the strap would be above the body when the strap is in use. *Id.* at 15.

⁷ We take this opportunity to confirm that “whether a strap would leave a mark on a patient’s body after normal use” is not a limitation within claim 1. The “positioned away” clause requires “a joint configured to be positioned away from the patient’s face when in use” and does not preclude other parts of a strap from leaving a mark on a patient’s body. Neither ResMed nor Fisher proposes a claim construction contrary to our reading of the claim.

⁸ ResMed’s counsel indicated, at oral argument, that the strap embodiment depicted in Figure 14G of the ’404 patent would be covered by the strap limitations of claim 1. *See* Tr. 29:8–13.

We find that ResMed's arguments do not inform us of a deficiency in our findings with respect to the "positioned away" clause of claim 1. We agree with Fisher that ResMed's position that Corrigall does not contemplate using its strap against the face ignores the ability of a person having ordinary skill in the art—a degreed engineer with two years of experience in the field of respiratory masks—to understand that the teachings of Corrigall could be applied to a strap that is used against the face, such as the straps disclosed in Amarasinghe. *See* Reply 14–15.

We also agree with Fisher that ResMed's position that the edges of a strap configured as disclosed in Corrigall would contact the user's face when used with a respiratory mask is against the express teaching of Corrigall. As we indicate above, Corrigall expressly teaches that, in use, its strap configuration is designed to cup such that the center of the straps, and not the edges, contact the user's skin when a load is placed on the straps. *See* Ex. 1004, 2:30–41.

We also do not credit Mr. Sleeper's testimony in support of ResMed's position. Mr. Sleeper declares that a person having ordinary skill in the art:

would have recognized that factors such as the tensile force exerted on the strap, the angles of forces applied along different locations of the strap, the dimensions of the strap (e.g., the distance that the edges are raised from the bottom of the central portion of the strap in the non-use condition), the compressibility of the strap (e.g., how much the foam layer depresses/thins when a load is applied), and characteristics of the wearer's body over which the strap is laid would all impact whether the strap edges would contact the patient's body *in use*. Thus, whether or not the edges of Corrigall's straps would actually contact the body in use would depend on the particular implementation of the strap (e.g., its dimensions and material properties), characteristics of the wearer (e.g., whether the patient prefers a tight or loose fit

and whether the strap is placed on a fatty, muscular, or bony area of the body), the nature of the load applied (e.g., a brassiere or a facial mask for respiratory therapy), and other factors that would have been appreciated by a [person having ordinary skill in the art].

Ex. 2004 ¶ 58. Mr. Sleeper, however, fails to testify if consideration of these factors are beyond the level of ordinary skill in the art, such that specific properties of the strap could address these considerations. Mr. Sleeper goes on to declare that a person having ordinary skill in the art “would have found it more likely that, particularly in the context of headgear for a breathing/CPAP mask, Corrigan’s strap edges would press into and form markings upon the patient’s face in use.” *Id.* at ¶ 59. Mr. Sleeper fails, however, to explain the basis of his opinion. Although he recites factors to be considered, he does not explain adequately his reasoning as to why a person having ordinary skill in the art could not have taken the teachings of Corrigan and applied these teachings to Amarasinghe to arrive at a strap with edges that did not contact the user’s face when in use. *See* 37 C.F.R. § 42.65(a) (“Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.”).

We recognize that Mr. Lordo also fails to provide the underlying facts or data on which his opinion with respect to the “positioned away” clause is based and, accordingly, we afford it little or no weight. Our findings as to the “positioned away” clause of claim 1 is based on the express teachings in Corrigan and the relatively high level of ordinary skill in the art to which the ’404 patent pertains. Indeed, as Mr. Sleeper recognizes, “whether or not the edges of Corrigan’s straps [as applied to Amarasinghe’s mask] would actually contact the body in use would depend *on the particular implementation of the strap.*” *See* Ex. 2004 ¶ 58 (emphasis added). We

discern nothing in the trial record to support a finding that it would have been beyond the level of a person having ordinary skill in the art to implement Corrigall's teachings in Amarasinghe's strap.

Additionally, Corrigall discloses that:

The foam should be capable of bearing the ordinary loads imposed upon it without being fully compressed and should be susceptible of being compressed somewhat further by larger concentrations of loads at projecting parts of the wearer's body. In order to provide good uniformity of compressibility across the area of the strap material, the foam should be relatively fine-celled.

Ex. 1004, 3:22–29. That is, Corrigall expressly teaches that the type of foam should be chosen, based on anticipated loads, to prevent the foam from being fully compressed. This disclosure undermines Mr. Sleeper's testimony that marks would be formed on the wearer's skin based on the compression of the strap's foam. *See* Ex. 2004 ¶ 59.

Accordingly, we find that Amarasinghe, as modified by the teachings of Corrigall, discloses the subject matter of independent claim 1.

(ii) Corrigall as analogous art

“To be considered within the prior art for purposes of the obviousness analysis, a reference must be analogous.” *Circuit Check Inc. v. QXQ Inc.*, 795 F.3d 1331, 1335 (Fed. Cir. 2015). Accordingly, a threshold question for our analysis as to whether a person having ordinary skill in the art would have combined the teachings of Amarasinghe and Corrigall is whether Corrigall is analogous art. Whether a prior art reference is analogous art is a question of fact. *In re Bigio*, 381 F.3d 1320, 1324 (Fed. Cir. 2004).

Two separate tests define the scope of analogous prior art: (1) whether the art is from the same field of endeavor, regardless of the problem addressed and, (2) if the reference is not within the

field of the inventor's endeavor, whether the reference still is reasonably pertinent to the particular problem with which the inventor is involved.

Id. at 1325. In order for a reference to be “reasonably pertinent” to the problem, it must “logically [] have commended itself to an inventor’s attention in considering his problem.” *In re Icon Health and Fitness, Inc.*, 496 F.3d 1374, 1379–80 (Fed. Cir. 2007); *see also KSR Int’l Co.*, 550 U.S. at 417 (“When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one.”). The scope of analogous art is to be construed broadly. *Wyers v. Master Lock Co.*, 616 F.3d 1231, 1238 (Fed. Cir. 2010).

Fisher contends that Corrigall is in the same field of endeavor and thus, analogous art, as Corrigall and the ’404 patent “both relate to providing comfortable, wearable, strap material.” Pet. 29 (referencing Ex. 1013 ¶ 64). Fisher further contends that “Corrigall . . . is also pertinent to [the] exact same problem faced by the Applicant for the ’404 [p]atent, namely making comfortable straps.” *Id.* (referencing Ex. 1013 ¶ 64). Mr. Lordo adds that Corrigall is pertinent to “making straps that contact the skin of a user and are still comfortable even when worn for long periods of time.” Ex. 1013 ¶ 64. Mr. Lordo explains that “both [Amarasinghe and Corrigall] teach forming straps using a multilayer combination, including the use of a multilayer fabric/foam/fabric laminate for wearable comfort straps to minimize patient discomfort and provide appropriate support.” *Id.* at ¶ 65.

ResMed responds that “Corrigall is non-analogous art that is neither from the same field as the ’404 patent, nor reasonably pertinent to the problems that the ’404 patent addresses.” PO Resp. 54. In our Decision on

Institution, we preliminarily found that the field of endeavor of the '404 patent is headgear for use in holding a mask in position on a patient's face while treating the patient for a breathing disorder. *See* Ex. 1001, 14–21. We preliminarily found that Corrigall's field of endeavor is strap material for wearing apparel. *See* Ex. 1004, 1:34–35. Based on the entire trial record, we discern no reason to change these findings. That is, we find that Corrigall is not in the field of endeavor of the '404 patent.

As for the second prong, ResMed argues that Corrigall fails to address the problem of a strap whose edges do not mark a user's face (or elsewhere on the body). PO Resp. 57. ResMed argues that none of Corrigall's features are directed to *preventing* marks on a user's body. *Id.* ResMed explains that Corrigall's straps are intended to be worn over an extended period of time and would result in marks on the wearer's body. *Id.* at 57–58. ResMed argues that the narrowness of Corrigall's straps and likely forces seen by the straps would leave visible marks on a wearer's body. *Id.* at 58.

In reply, Fisher emphasizes that the second prong of the analogous art test looks at “whether the reference is ‘***reasonably pertinent***’ to the particular problem with which the inventor is involved.” Reply 26. Fisher points to testimony from Mr. Lordo that a person having ordinary skill in the art would look to the undergarment industry “because headgear and undergarments have similar comfort constraints.” *Id.* (referencing Ex. 1013 ¶¶ 67–68).

We find that Corrigall is reasonably pertinent to the particular problems with which the inventor is involved. On the complete record before us, we find that the inventors of the '404 patent were involved with the problems of (1) providing headgear for a respiratory mask that

comfortably fits a wide range of patients; and (2) providing headgear that lessens the tendency to produce facial marks. We base these findings directly on the stated background of the invention and the summary of the invention from the '404 patent. The inventors indicate that “headgear should be comfortable so that a patient can wear the mask at night while they sleep” and that “[t]here is a continuous need in the art for headgear that is comfortable.” Ex. 1001, 1:29–32. The summary of the invention states that one aspect of the invention “is to provide headgear that comfortably fits a wide range of patients.” *Id.* at 1:45–47. Another aspect of the invention “is that it has a lesser tendency to produce facial marks.” *Id.* at 2:52–54. Other record evidence supports our factual findings. *See* Ex. 2004 ¶ 17 (characterizing the headgear of the '404 patent as providing a comfortable fit by, for example, locating joints of the straps to avoid contacting a patient's face).

We further find that Corrigan is reasonably pertinent to the problems facing the inventors of the '404 patent. The disclosure in Corrigan supports our finding. Corrigan discloses that its strap material is “soft and compressible and provides a greatly improved distribution of load carried by the strap. Ex. 1004, 2:9–12. Corrigan also expressly discloses that, with the use of its strap material, “pressure points are substantially eliminated and the garment is considerably more comfortable to wear.” *Id.* at 2:17–19. Corrigan further discloses that the strap material's comfort is enhanced by its flexibility, yet the material resists curling and twisting. *Id.* at 2:17–19. Corrigan states that, “[i]n use, [the strap material] cups very slightly so that the wearer's skin and flesh are gradually depressed, . . . [and] there being no ‘digging in’ of the edges of the strap material.” *Id.* at 2:33–41. Other record

evidence supports our finding. See Ex. 1013 ¶ 69 (discussing how Corriganall discloses “padded straps with rounded edges and seams positioned away from the surface that contacts the wearer” “to improve comfort”).

ResMed’s arguments do not inform us of a deficiency in our findings with respect to whether Corriganall satisfies the second prong of the analogous art test. To the extent that ResMed argues that the problem addressed by the ’404 patent is to *prevent* facial marks, this argument is not supported by the evidence of record. As we indicate above, the ’404 patent itself states that the inventors were addressing *lessening* the tendency to produce facial marks, not *preventing* those marks. See Ex. 1001, 2:52–54. Corriganall is directed to lessening marks on the body, by having a strap with edges that do not dig into the skin, but instead, having the center part of the strap gradually depress the skin. Even if ResMed is correct in its assumption that wearing a garment with Corriganall’s straps over an extended period of time would leave marks on the body, we find, based on the record evidence including the express disclosure in Corriganall, that Corriganall’s strap design would *lessen* the tendency of such marks. Further, an overriding theme of Corriganall is to produce a comfortable strap, another problem addressed by the inventors of the ’404 patent (indeed, the ’404 patent states that there is a “continuous need in the art for headgear that is comfortable” (see Ex. 1001, 1:31–32)). Accordingly, we find that Corriganall logically would have commended itself to the attention of the inventors of the ’404 patent when considering the problem of strap comfort.

ResMed also responds that “the pertinence of prior art as a source of solution to the inventor’s problem cannot be considered using hindsight,” apparently arguing that Fisher improperly relied on hindsight in combining

Amarasinghe and Corrigan. PO Resp. 59 (citing *In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992)). To the extent that ResMed cites *In re Oetiker* for the proposition that employing hindsight is an indication that a prior art reference is not reasonably pertinent to the particular problem with which the inventor is involved, then we do not read *In re Oetiker* so broadly. Instead, we read the portion of the decision relied on by ResMed⁹ to hold that the Lauro '004 patent was non-analogous art *and* that the Examiner arrived at the inventor's claim by employing hindsight. *See In re Oetiker*, 977 F.2d at 1446–47. To the extent that ResMed contends that Fisher relied on hindsight reasoning to combine the references, we address that contention in the subsection below.

ResMed also argues that the passage of time from Corrigan to the '404 patent supports a finding that Corrigan is non-analogous art. PO Resp. 59–60 (citing *Mintz v. Dietz & Watson, Inc.*, 679 F.3d 1372, 1380 (Fed. Cir. 2012)). Such passage of time may represent an indicium of non-obviousness, but otherwise is not a factor in our analogous art analysis.¹⁰ Indeed, in *Mintz*, cited by ResMed's to support its position, the Federal Circuit addresses objective indicia of non-obviousness, not whether a prior art reference is analogous art. *See Mintz*, 679 F.3d 1372, 1379–80.

⁹ We note that ResMed's pinpoint citation is to page 1445 of the decision. The portion of the decision discussing analogous art and hindsight is actually at page 1447.

¹⁰ We do not discern ResMed as providing any argument or evidence of any secondary indicia of non-obviousness, including the invention of the '404 patent solving a long-felt, yet unresolved need.

(iii) Combining Amarasinghe and Corrigall

Fisher contends that a person having ordinary skill in the art would have modified Amarasinghe with straps as disclosed in Corrigall. Pet. 29–31; *see* Ex. 1013 ¶¶ 63–71. Fisher reasons that an artisan of ordinary skill would have chosen Corrigall’s strap configuration to make the strap edge more comfortable. *Id.* at 30. Mr. Lordo explains that one known problem of mask headgear was causing strap marks on a wearer’s face. Ex. 1013 ¶ 66. Mr. Lordo further explains that one known solution was to change the edge profile of the straps or use softened, rounded straps. *Id.* (referencing Ex. 1020, 1021, and 1022).

Fisher further contends that its proposed modification “would have involved no more than a combination of familiar elements according to known methods that does no more than yield predictable results” and that Corrigall’s disclosed strap configuration “was just one of a limited number of known options.” Pet. 31 (referencing Ex. 1013 ¶ 71).

We find that Fisher provides a reason for combining the teachings of Corrigall with Amarasinghe that has a rational underpinning. *See KSR Int’l Co.*, 550 U.S. at 418 (“[O]bviousness 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.” (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006))). We find that the combination is suggested by Corrigall itself. As the inventors of the ’404 patent admit, in the relevant art there is a “continuous need . . . for headgear that is comfortable.” *See* Ex. 1001, 1:31–32. Corrigall is expressly directed to a wearable strap configuration with improved comfort. We agree with Mr. Lordo that an artisan of ordinary skill would have been

motivated to apply the teachings of Corrigall to a CPAP mask given this suggestion of improved comfort. *See* Ex. 1013 ¶¶ 65–70. We credit Mr. Lordo’s testimony, in part, because other evidence of record shows similar straps employed in the CPAP industry prior to the ’404 patent. *See, e.g.*, Ex. 1021 (“In an embodiment, edges of the headgear straps may have radii molded therein, e.g., 0.1 mm, to reduce the likelihood of the headgear leaving a mark on the skin of a patient.”); Ex. 1022 ¶ 195 (disclosing that headgear straps with rounded edges “improves comfort”). That is, we find that a person having ordinary skill in the art would have looked to wearable straps with rounded edges to increase a patient’s comfort with CPAP masks, and the fact that Corrigall discloses such a strap supports a motivation to combine Corrigall’s teachings with Amarasinghe. *See, e.g.*, Ex. 1004, Figs. 1, 4 (depicting a strap with rounded edges).

As we indicated in subsection ii above concerning analogous art, ResMed argues that Fisher’s combination is the product of hindsight reconstruction. PO Resp. 59. ResMed’s position is apparently that Fisher improperly used the claims as a checklist to find prior art references, such as Corrigall, that disclose certain aspect of the claims not in Amarasinghe and “plucking these references out of the sea of prior art” based on hindsight. *See* Tr. 25:21–26:30. We do not agree.

Of course, any analysis of the patentability of a claim necessarily uses the elements of the claim to identify potential prior art. The issue before us is whether there is a rational justification for modifying Amarasinghe with the teachings of Corrigall as proposed by Fisher in the Petition other than hindsight. As we discuss above, we find that there is—indeed, Corrigall itself provides a suggestion for the proposed modification.

ResMed contends that modifying Amarasinghe with Corrigall as Fisher proposes “thwart[s] the intended purpose of Amarasinghe’s design to provide a one-piece headgear that can be efficiently cut from a single sheet of material” and, consequently, that a person having ordinary skill in the art would not have made the proposed modification. PO Resp. 13–14. ResMed argues that an “alleged motivation to combine is negated where a proposed combination would produce an inoperative result or would not work for its intended purpose. *Id.* at 14 (citing *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1326 (Fed. Cir. 2009)¹¹).

ResMed argues that “Amarasinghe is clear that a core, intended purpose of his headgear design is that it ‘can be easily manufactured by cutting or stamping.’” PO Resp. 14. ResMed criticizes our characterization of Amarasinghe’s intended purpose in our Institution Decision as overly broad. *Id.* at 16; *see* Dec. on Inst. 32 n.7 (“[T]he intended purpose of Amarasinghe is a headgear for a mask system”). ResMed argues that Amarasinghe confirms that the overly broad category of ‘a headgear for a mask system’ was accomplished long before the filing of the Amarasinghe reference, so merely providing ‘a headgear for a mask system’ was not Amarasinghe’s intended purpose.” *Id.* (referencing Ex. 2004 ¶ 42¹²). ResMed continues that “Amarasinghe did not ‘merely express a general

¹¹ We recognize, as Fisher asserts, that *DePuy* is primarily concerned with teaching away. *See* Reply 9. ResMed was clear at oral argument that it was not contending that Amarasinghe taught away from Fisher’s proposed modification with the teachings of Corrigall. *See* Tr. 37:16–19.

¹² We assume, for the purposes of this Decision, that ResMed intended to reference Exhibit 2004 ¶ 40, as Exhibit 2004 ¶ 42 does not discuss the intended purpose of Amarasinghe and ¶ 40 does.

preference’ for a headgear for a mask system, but rather purposefully and expressly intended to achieve specific improvements to such headgear, including to provide a headgear that can be easily manufactured by cutting or stamping.’” *Id.* at 17 (referencing Ex. 1002, 4:3–5; Ex. 2004 ¶ 42).

Mr. Sleeper testifies that:

it is clear a [person having ordinary skill in the art] would have recognized that the intended purpose of Amarasinghe’s one-piece headgear design was to provide a headgear that could be cut or stamped from a single sheet of material. A [person having ordinary skill in the art] would have appreciated that this approach to cutting an entire headgear assembly from a single sheet of material would eliminate stages in the manufacturing process that would otherwise be required to join smaller components of strap material together. Accordingly, Amarasinghe’s headgear could be manufactured more efficiently than a headgear with a multi-piece construction. Additionally, a [person having ordinary skill in the art] would have recognized additional benefits of Amarasinghe’s one-piece design outside the context of manufacturing. For example, a one-piece headgear may be aesthetically pleasing and more comfortable for patients, since the joints between strap components (which may cause itchiness or other irritability to a patient) are eliminated. A [person having ordinary skill in the art] would also have understood that piecing together strap components to form a multi-piece headgear assembly can introduce potential failure points where the headgear is more likely to break when stretched. By diecutting or stamping a one-piece headgear from a single sheet of material and eliminating such joints, Amarasinghe’s design therefore reduces or eliminates the risk of the headgear tearing apart at the joints.

Ex. 2004 ¶ 40.

ResMed argues that Corrigan’s teachings are “fundamentally inconsistent” with the intended purpose of Amarasinghe as Corrigan teaches producing linear straps, which would need to be joined to form the headgear,

rather than being cut or stamped from a single piece of fabric. PO Resp. 18–20.¹³

Fisher replies that “[n]othing in Amarasinghe[] requires making the headgear straps from ‘one-piece’ or a ‘single sheet’ of material, much less teaches that it is the primary purpose.” Reply 8. Fisher continues that Amarasinghe does not “disclose any desire to eliminate ‘the need to stitch/weld/join individual straps to form the headgear assembly.’” *Id.* (quoting PO Resp. 13). Fisher also points out that Mr. Sleeper testified that Corrigall’s straps could be used to make a multi-piece headgear assembly as disclosed in Amarasinghe. Reply 10; *see also* Ex. 2004 ¶ 45 (declaring that “[b]ecause Corrigall’s straps are formed as relatively narrow, linear strips of material, a multi-piece construction of straps based on Corrigall’s teachings would be required for their application in Amarasinghe’s headgear” but also explaining that such an assembly would not be a single-piece construction).

A proposed modification of a prior art reference that renders the structure of the prior art reference “inoperable for its intended purpose,” may fail to support a conclusion that the proposed modification would have been obvious to a person having ordinary skill in the art. *See In re Gordon*, 733 F.2d 900, 902 (Fed. Cir. 1984). ResMed’s arguments do not inform us of a deficiency in our finding that a person having ordinary skill in the art would have had reason to modify Amarasinghe with Corrigall’s teachings.

¹³ Both parties address whether Corrigall’s straps could be manufactured as a single sheet of composite material and then cut or stamped into a one-piece headgear, which was introduced in our Decision on Institution. *See* PO Resp. 20–21; Reply 11; Dec. on Inst. 32. We find that the factual record is not sufficiently developed to analyze this scenario and we do not address it further here.

Specifically, we do not agree with ResMed that the intended purpose of Amarasinghe is to form its headgear from a single flat sheet and that making a multi-piece headgear assembly based on Corrigall's teachings would destroy that intended purpose. We find, based on the complete record, that the intended purpose of Amarasinghe is to form a headgear assembly for a respiratory mask that is suitable for a broad range of patients and is comfortable. *See* Ex. 1002, 1:18–26, 2:22–25, 2:28–29.

The first statement under the summary of Amarasinghe's invention is that "the present invention is directed towards a mask assembly having a headgear assembly that offers more comfort to the patient yet does not sacrifice functionality." Ex. 1002, 2:28–29. That is, a paramount purpose of Amarasinghe's invention is to provide a comfortable headgear assembly. *Cf.* Ex. 1001, 1:31–32 ("There is a continuous need in the art for headgear that is comfortable."). Another aspect of Amarasinghe is to provide, more than just a headgear assembly, "a respiratory mask assembly for delivering breathable gas to a patient." Ex. 1002, 3:1–2. Amarasinghe discloses that the headgear assembly of this mask:

includes a pair of side portions and a rear portion that interconnects the pair of side portions. The pair of side portions includes at least one strap. The rear portion has at least one strap constructed of at least two layers of material. One of the layers of material has a more rigid construction than the other of the layers of material to resist compression of the at least one strap of the rear portion in a first direction and thereby resist movement of the at least one strap of the pair of side straps in the first direction.

Id. at 3:4–9. Other aspects of the invention include: (1) "provid[ing] means for maintaining flexible headgear straps of a mask assembly in correct relative position on a patient's head in use;" (2) "provid[ing] a comfortable

headgear assembly for a mask assembly which fits a wide range of head shapes and sizes;” (3) “provid[ing] a comfortable headgear assembly of a mask assembly which fits a wide range of patients and can be cut from a flat piece of fabric.” *Id.* at 3:10–15. Significant to our findings as to the principle of operation of Amarasinghe, is that the second and third aspects of the invention enumerated above are almost identical, except that the third aspect indicates that the headgear assembly can be cut from a flat piece of fabric.¹⁴ We find that this disclosure of two separate aspects of the invention would inform a person having ordinary skill in the art that Amarasinghe’s principle of operation is broader than having a headgear cut from a single sheet, as the express disclosure indicates that the headgear assembly may or may not be cut from a single sheet. The inclusion of these two separate aspects of the invention undercuts ResMed’s position.

Further, as Fisher asserts, none of the claims listed in Amarasinghe is directed to a headgear assembly formed from a single sheet of material. *See* Ex. 1002, 10–13; Reply 8 (“Mr. Sleeper concedes that the claimed invention of Amarasinghe[] was not limited to a single-piece strap arrangement.”). This fact undercuts ResMed’s argument that a core intended purpose of Amarasinghe was a headgear assembly formed from a single sheet of material. Indeed, the only mention of forming the headgear assembly from a flat piece of fabric or composite, is the statement that it is desirable to cut the headgear assemblies from a flat piece of material (Ex. 1002, 2:1–2) and the

¹⁴ As Fisher asserts, nothing in Amarasinghe expressly states that the headgear assembly is cut from a *single sheet* of flat material. For the purposes of our analysis, we have assumed that the implication of Amarasinghe’s disclosure is that the headgear is cut from a single, flat piece of fabric.

statement quoted above about one aspect of the invention, where the headgear assembly “can be cut from a flat piece of fabric” (*Id.* at 3:14–15). Nowhere in the detailed description of Amarasinghe’s invention is cutting or stamping the headgear from a flat piece of fabric discussed. This fact also cuts against ResMed’s contention as to the intended purpose of Amarasinghe.

Further, we do not credit Mr. Sleeper’s testimony as to the principle of operation of Amarasinghe, as he ignores the aspects of Amarasinghe’s disclosure we discuss above. Mr. Sleeper’s testimony may provide certain advantages of making Amarasinghe’s headgear assembly from a single sheet of flat material, but it fails to support a finding that such is Amarasinghe’s intended purpose of operation.

We do not ignore Amarasinghe’s disclosure of the desirability of cutting the headgear assemblies from a flat piece of fabric or composite. We recognize, as Mr. Sleeper testifies, that there may be advantages to manufacturing Amarasinghe’s headgear assembly from a single sheet of material or composite and that modifying Amarasinghe with Corrigall’s teachings may negate some of these advantages. In weighing all of the facts, we find that a person having ordinary skill in the art would have had reasons to modify Amarasinghe with Corrigall as proposed by Fisher, as the reasons for the modification outweigh the lost advantages. *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.”). Significant to our weighing of the facts

is the comfort taught by Corrigall, which we find is of paramount importance in Amarasinghe (and to a person having ordinary skill in the art at the time of the invention, as the '404 patent admits).

(iv) Conclusion

For the reasons discussed above, we determine, based on the complete trial record, that Fisher has demonstrated, by a preponderance of the evidence, that claim 1 is unpatentable under 35 U.S.C. § 103(a) over Amarasinghe and Corrigall.

b. Dependent claim 8

Claim 8 depends from claim 1 and further recites “wherein the plurality of straps further comprises a stretch portion and a portion configured not to stretch.” Ex. 1001, 23:57–59. Fisher contends that Amarasinghe discloses that its headgear straps are BREATH-O-PRENE, which stretches, and rear portion 20 of headgear 16 includes stiffeners 46, and these stiffeners 46 make the rear portion “non-stretchable” or “*relatively inextensible*.” Pet. 38–39 (emphasis added); *see* Ex. 1013 ¶¶ 44, 93, 94.

Amarasinghe discloses that “stiffener 46 adds to the rigidity of the headgear assembly 16 in certain planes and directions, which assists in stabilizing . . . mask assembly 10 on the head of the patient during use. In other planes and directions, the headgear assembly 16 has a different rigidity.” Ex. 1002, 7:3–5. Amarasinghe further discloses that “[t]he presence of . . . stiffener 46 stops compression of . . . straps 34, 36 along the reverse direction of arrow A [depicted in Amarasinghe’s Figure 2].” *Id.* at 7:7–8. We reproduce Amarasinghe’s Figure 2:

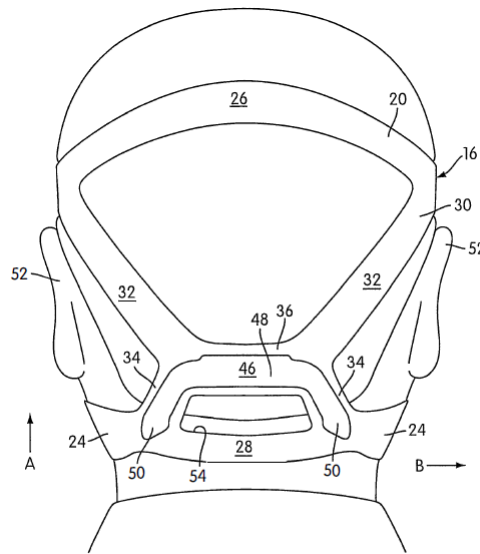


FIG. 2

Figure 2 depicts “a rear view illustrating the headgear assembly of [Figure] 1.” Ex. 1002, 3:25. As seen in Figure 2, arrow A points upwardly, so that stiffener 46 stops compression of straps 34, 36 in the downward direction.

ResMed contends that, similar to our finding in our Decision on Institution, a disclosure that stiffener 46 reduces the flexibility of a strap does not necessarily mean that the strap is configured not to stretch, that is, inextensible or, at least, substantially inextensible. PO Resp. 33; Tr. 43:22–25 (“A portion configured [not] to stretch, a person of ordinary skill would understand that to be either substantially inextensible or inextensible.”).

Fisher replies that a person having ordinary skill in the art would understand that the subject matter of claim 8 “convey[s] that there are two strap portions of different relative extensibility.” Reply 16. Fisher asserts that the “portion configured not to stretch” means “relatively inextensible” rather than “inextensible.” *Id.*; see also Pet. 38–39 (equating the language of claim 8 with that of claim 14, which requires the rear portion to be *relatively*

inextensible and contending that stiffeners 46 make rear portion 20 relatively inextensible).

To support its position, Fisher argues that “[t]hroughout the [S]pecification of the ’404 [p]atent, the term ‘stretch’ is used as a relative term.” Reply 16 (citing, as examples, Ex. 1001, 7:37–39, 8:46–48). Fisher also relies on the testimony of Mr. Lordo, who explains that “[s]tiffness or stiffener in the context of what we’re using here, ***the stiffeners seem to inhibit what I would call bending as well as localized stretching.***” *Id.* at 17 (referencing Ex. 2005, 29:8–23).

Fisher further contends that, to the extent “portion configured not to stretch” means “inextensible,” Amarasinghe discloses the subject matter. Reply 17. Fisher argues that a person having ordinary skill in the art “would have understood that at least the portion of the headgear strap surrounded by stitching and attached to the stiffener is configured not to stretch.” *Id.* (referencing Ex. 1002, 6:16–24). Fisher continues that an artisan of ordinary skill would have understood that, if stiffener 46 stops compression, it would also stop extension under a tensile force. *Id.* at 18 (referencing Ex. 1013 ¶¶ 47–48, 126, 168; Ex. 2005, 29:8–23). Fisher also argues that Amarasinghe discloses that its straps maintain a predetermined shape and, if the straps stretched, they would not be able to maintain this shape. *Id.* (referencing Ex. 1002, 7:10–12, 21–22).

Fisher also criticizes ResMed’s reliance on the statement in Amarasinghe that stiffener 46 reduces flexibility (that is, suggesting that flexibility is not eliminated), as flexibility is not related to extensibility.

Finally, Fisher argues that “a rear portion that was configured not to stretch was well known in the art and would have been readily understood as

an alternative design choice.” Reply 17 (referencing Ex. 1013 ¶ 177). Fisher contends that Ho discloses such a feature. *Id.* at 19. Fisher argued at oral hearing that, although the Petition does not rely on Ho for disclosing the subject matter of claim 8, we can properly find in our Final Written Decision that Ho discloses this element. See Tr. 19:23–20:17 (relying on *Genzyme Therapeutic Prod. Ltd. P’ship v. Biomarin Pharm. Inc.*, 825 F.3d 1360 (Fed. Cir. 2016)); see also Tr. 17:24–19:23 (describing how Ho discloses the “configured not to stretch,” where Ho was relied on for other claims). Fisher argues that it would be an anomaly for us to apply Ho to the same subject matter for other claims (36 and 55) and not claim 8. See *id.* at 20:18–21:14.

We find that Fisher fails to demonstrate, by a preponderance of the evidence, that Amarasinghe discloses that its straps comprise a portion configured not to stretch, as required by claim 8. First, we do not agree that “configured not to stretch” means “relatively inextensible.” We discern nothing in the language of claim 8 to suggest that “configured not to stretch” means *relatively* less extensible than the “stretch portion.”¹⁵

Further, we do not agree with Fisher that the term “stretch” as used in the Specification is used as a relative term. For example, the Specification states: “The mesh-like rigidizer 360 may be flexible to conform to the patient’s head yet non-stretch to anchor the headgear in position.” Ex. 1001,

¹⁵ We need not reach the question of whether the term “configured not to stretch” means “inextensible” or “substantially inextensible,” as ResMed contends. To resolve the dispute before us, we need only determine that the term does not mean “relatively inextensible.” See *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (construing *explicitly* only those claim terms in controversy and only to the extent necessary to resolve the controversy).

8:67–9:2. It also states: “The *inextensibility* of the rigidizer 7460 also prevents the crown strap 7462 from being stretched into impinging on the patient’s ears.” *Id.* at 15:4–7 (emphasis added). Even the exemplary citations relied on by Fisher do not suggest that the term “stretch” is a relative term. *See id.* at 7:37–40 (“Rigidizer may be able to bend or deform along its length but resist or prevent stretching of the headgear in the lengthwise direction of the rigidizer. *The rigidizers may be substantially inextensible.*”) (emphasis added); 8:46–48 (“That is, the lower side straps 230 may be constructed of a material with less stretch for a given force when compared to the material used for upper side strap 220.”). This last phrase could be interpreted to mean that the phrase “less stretch” means “relatively inextensible,” but the phrase “less stretch” does not appear in claim 8. Similarly, Mr. Lordo’s quoted testimony does not support a construction of the term “configured not to stretch” as meaning “*relatively inextensible.*” Mr. Lordo appears to testify, in the quoted passage, that stiffeners make the strap, in a localized area, inextensible. *See Ex. 2005, 29:8–23* (“[T]he stiffeners seem to *inhibit* what I would call bending as well as *localized stretching.*”) (emphasis added). Mr. Lordo also testified, however, that “[s]o if I apply a stiffener, you’re asking if I -- a stiffener is applied to an extensible material, will it change the extensibility of that material? . . . It’s *possible* it would.” *Id.* at 30:5–11 (emphasis added). We find this testimony to be equivocal as to how a stiffener affects the extensibility of a strap.

We also do not agree with Fisher that Amarasinghe discloses a portion of a strap that is inextensible. Fisher fails to direct us to any persuasive evidence to support this position. Fisher cites to Amarasinghe at page 6, lines 16–24. This passage, however, provides details on stiffener 46 and

how it may be attached to straps 34, 36. It provides nothing about making the straps so they do not stretch. Mr. Lordo's Declaration testimony at paragraphs 47, 48, 126, and 168 also fails to support Fisher's position. These paragraphs describe Amarasinghe (§§ 47 and 48) or address how Amarasinghe discloses a rear portion that is *relatively* inextensible (§ 126) and reasons to combine Ho with Amarasinghe (§ 128). None of this testimony is directed to how Amarasinghe's stiffener makes a portion of its strap inextensible (or substantially inextensible). Similarly, the citation to Mr. Lordo's deposition testimony (Ex. 2005, 29:8–23) fails to support persuasively Fisher's position. This testimony is directed to stiffeners in the abstract, not Amarasinghe's stiffeners. More significantly, as we indicate above, Mr. Lordo equivocates as to how a stiffener affects extensibility. See Ex. 2005, 30:5–11.

We also do not agree with Fisher that the holding in *Genzyme Therapeutic Prod. Ltd. P'ship* allows us to find, for the first time in this proceeding, that the combination of Amarasinghe, Corrigall, and Ho discloses the subject matter of claim 8. In *EmeraChem Holdings, LLC v. Volkswagen Grp. of Am., Inc.*, 859 F.3d 1341 (Fed. Cir. 2017), the Federal Circuit explained its holding in *Genzyme*. The court stated that, “Genzyme had actual notice of the [Kikuchi and van der Ploeg '91] references and an opportunity to respond to them—an opportunity that Genzyme took advantage of in arguing that those references could be used only for limited purposes.” *EmeraChem Holdings, LLC*, 859 F.3d at 1351 (quoting *Genzyme Therapeutic Prod. Ltd. P'ship*, 825 F.3d at 1368). The court continued that, “[u]nlike *Genzyme*, *EmeraChem* did not have the same notice and

opportunity to respond to the Board’s ultimate usage of Stiles against claims 3, 16, and 20, and the prior art was used to establish a claim limitation.” *Id.*

Here, although ResMed had notice of Ho, it did not have notice of how Fisher contends that Ho discloses the subject matter of claim 8. With respect to claims 36 and 55, which Fisher asserts are obvious over Amarasinghe, Corrigall, and Ho, the Petition states that “[a]s described above with respect to at least [c]laim 8, Amarasinghe[] teaches a stretch portion and a portion configured not to stretch as claimed.” Pet. 70. The Petition *does not explain* how Ho discloses the recited subject matter of claims 8, 36, and 55. For us to now rely on teachings from Ho to render claim 8 obvious would not give ResMed a fair opportunity to respond.

Accordingly, we conclude that Fisher has not established, by a preponderance of the evidence, that claim 8 is unpatentable under 35 U.S.C. §103(a) over Amarasinghe and Corrigall.

c. Dependent claim 19

Claim 19 depends from claim 1 and further recites “wherein the first fabric layer and the second fabric layer are stitched in a region to stiffen the at least one strap of said plurality of straps.” Ex. 1001, 24:32–34. Fisher contends that “Amarasinghe[] discloses that ‘[t]he stiffener 46 is secured to the straps 34, 36 by stitching around the periphery of the stiffener 46.’” Pet. 41 (referencing Ex. 1002, 6:21–24).

ResMed argues that Amarasinghe fails to disclose stitching a first and second fabric layer to stiffen a strap, as it discloses stitching a stiffener to the strap. PO Resp. 48. ResMed also argues that Amarasinghe fails to disclose that stitching (as opposed to stiffener 46) would stiffen the strap. *Id.* at 48. Fisher does not reply to this argument. See Reply 22–24.

We agree with ResMed that Fisher fails to establish, by a preponderance of the evidence, that Amarasinghe discloses the subject matter of claim 19. Amarasinghe fails to disclose that the first fabric layer and the second fabric layer are stitched in a region (rather than stiffener 46 to a fabric layer) and that the purpose (or consequence) of the stitching is to stiffen the strap.

Alternatively, Fisher relies on Corrigall for disclosing the subject matter of claim 19. Pet. 41. Fisher contends that “Corrigall also discloses that ‘[n]on-extensible garment bands or straps are usually made of one or more fabric plies stitched together along the longitudinal edges or folded over at the edges and stitched to form non-fraying, neat edges.’” *Id.* at 41–42 (referencing Ex. 1004, 1:46–50). Fisher further contends that “[a] person of [ordinary] skill would have understood that stitching stiffens the strap.” *Id.* at 42 (referencing Ex. 1013 ¶ 100). Mr. Lordo repeats this statement. *See* Ex. 1013 ¶ 100.

Mr. Lordo further declares that:

A person of ordinary skill would readily understand that stitching is a common means to fasten multiple layers (laminates) of fabric and that the stitched region would have differing properties than the unstitched region. Stitching inherently adds stiffness to a material as thread used in sewing operations is generally non-extensible as sewing equipment must operate with thread under tension in order to create a proper stitch. In fact, if fabric needs to be made extensible in a stitched region, alternate means such as adding elastic, using a zigzag stitch, or gathering the fabric must be employed to offset the rigidity created by the stitching operation.

Ex. 1013 ¶ 106.

ResMed contends that Fisher’s position with respect to Corrigall is contrary to Corrigall’s express teaching. PO Resp. 50. ResMed argues that

Corrigall discloses that “any stitching must preserve the ‘extensibility of the strap material.’” *Id.* (referencing Ex. 1004, 1:46–50; 3:73–75). ResMed further argues that Corrigall does not disclose that stitching stiffens the strap, but instead, emphasizes that the straps should be extensible and, as such, not stiffened. *Id.* ResMed explains that a person having ordinary skill in the art “would have understood that extensibility and stiffness are interrelated characteristics of a material for such straps.” *Id.* at 51 (referencing Ex. 2004 ¶ 93). ResMed further argues that Mr. Lordo testified that a zig-zag stitch, such as that shown in Corrigall’s Figure 1, would offset the rigidity created by stitching. *Id.* (referencing Ex. 1013 ¶ 106).

Fisher replies that ResMed too narrowly reads Corrigall. Reply 23. Fisher contends that Corrigall states that joining the edges of Corrigall’s composite should not substantially inhibit extensibility, suggesting that some inhibiting will occur. *Id.* Fisher further explains that, in describing the embodiment of Figure 4, Corrigall discloses that heat-formed edges do not restrict stretching of straps as stitching usually does, which further supports the position that Corrigall’s stitching would stiffen the strap. *Id.*

Fisher further argues that Corrigall discloses that stitching compresses the foam component of Corrigall’s laminate strap and that “Mr. Lordo explained that ‘compressing a material would decrease the compliance of that region due the deformation of the material structure required to permanently compress the material.’” Reply 24 (referencing Ex. 1013 ¶ 106).

We find that Corrigall discloses the additional subject matter of claim 19. We base our finding on the disclosure of Corrigall, which suggests some stiffening due to stitching its edges. *See* Ex. 1004, 2:57–63 (indicating that

heat-formed edges “do not restrict the stretching of the straps as stitching usually does”), 3:73–75 (suggesting that stitching may inhibit extensibility, which is related to stiffness, to at least an insubstantial amount). We note that claim 19 does not quantify the degree of stiffening required. We also base our finding on Corrigall’s disclosure that stitching the edges compresses the foam layer, which would stiffen the strap. *See id.* at 4:6–8. We credit Mr. Lordo’s testimony at paragraph 106 of his Declaration, testimony that stands unrebutted. Mr. Sleeper declares that “[t]here is not suggestion in Corrigall that the added stitching would in fact add any stiffness to the strap.” Ex. 2004 ¶ 93. During his deposition, Mr. Sleeper indicated that he never considered whether a person having ordinary skill in the art would have understood that stitching adds stiffness to a strap. *See* Ex. 1026, 26:23–27:11 (“Q.· Would a person of skill in the art recognize that adding stitching to a fabric strap ·would stiffen the fabric strap? . . . A.· I never consider[ed] that.”). Accordingly, we do not credit Mr. Sleeper’s testimony, which also contradicts Corrigall (which, as we indicated above, we find does suggest that stitching adds stiffness to the strap).

Accordingly, we conclude that Fisher has established, by a preponderance of the evidence, that claim 19 is unpatentable under 35 U.S.C. § 103(a) over Amarasinghe and Corrigall.

d. Dependent claims 5–7, 14, 16, 17, 27, and 28

Claim 5 depends from claim 1 and further recites “wherein the laminate further comprises a foam layer.” Ex. 1001, 23:48–49. Fisher contends that Amarasinghe discloses that its straps may be made from BREATHE-O-PRENE, which includes a composite laminate that includes a foam layer. Pet. 31. We find that Amarasinghe discloses a strap with a

laminate structure including a foam layer. *See, e.g.*, Ex. 1013 ¶ 44 (describing BREATHE-O-PRENE). We also find that Corrigall discloses a laminate strap structure with a foam layer. *See, e.g.*, Ex. 1004, Fig. 1 (showing foam strip 10). ResMed does not dispute Fisher’s contentions with respect to the subject matter of claim 5.

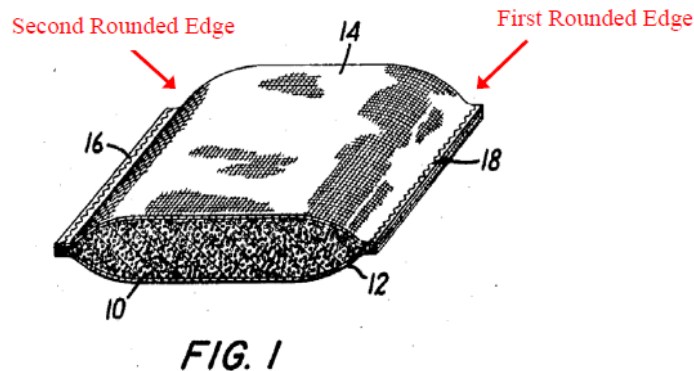
Accordingly, we conclude that Fisher has established, by a preponderance of the evidence, that claim 5 is unpatentable under 35 U.S.C. § 103(a) over Amarasinghe and Corrigall.

Claim 6 depends from claim 5 and further recites “wherein said foam layer is encapsulated between said first fabric layer and said second fabric layer.” Ex. 1001, 23:50–52. Fisher contends that Corrigall discloses that the edges of its strap mechanically bind the first and second fabric layers together and encapsulate the foam strip. Pet. 32. We find that Corrigall’s strap structure includes a foam layer that is encapsulated between the first and second fabric layers when the fabric layers are joined at the edges. *See, e.g.*, Ex. 1004, Fig. 1 (showing foam strip 10 surrounded by fabric layer 12 and fabric layer 14, which are joined along edges 16, 18); *id.* at Fig. 4 (showing foam strip 94 surrounded by fabric layer 92 and fabric layer 93, which are joined along edges 96, 98). ResMed does not dispute Fisher’s contentions with respect to the subject matter of claim 6.

Accordingly, we conclude that Fisher has established, by a preponderance of the evidence, that claim 6 is unpatentable under 35 U.S.C. § 103(a) over Amarasinghe and Corrigall.

Claim 7 depends from claim 1 and further recites “wherein the at least one strap of said plurality of straps includes a second rounded lateral edge, opposite said first rounded lateral edge, as seen in said cross section.” Ex.

1001, 23:53–55. Fisher contends that Corrigan discloses a strap with a second rounded lateral edge, opposite a first rounded lateral edge, as seen in cross section of the strap. Pet. 33–34 (providing an annotated version of Corrigan’s Figure 1). We reproduce Fisher’s annotated figure below:



The annotated figure shows the first and second rounded edges of the strap of Corrigan’s Figure 1. Pet. 34; Ex. 1013 ¶ 84. We find, consistent with the above annotated figure, that Corrigan discloses the subject matter of claim 7. ResMed does not dispute Fisher’s contentions with respect to the subject matter of claim 7.

Accordingly, we conclude that Fisher has established, by a preponderance of the evidence, that claim 7 is unpatentable under 35 U.S.C. § 103(a) over Amarasinghe and Corrigan.

Claim 14 depends from claim 1 and further recites “wherein the plurality of straps is relatively extensible and the rear portion is relatively inextensible.” Ex. 1001, 24:14–16. Fisher contends that Amarasinghe discloses this subject matter, as stiffeners 46, 245 make the rear portion of Amarasinghe’s headgear less extensible than the side straps of the headgear. We find, consistent with Fisher’s contention, that Amarasinghe discloses that the side straps of its headgear (the “plurality of straps”) are relatively extensible (relative to the rear portion) and that the rear portion is relatively

inextensible (relative to the side straps). We base our finding on presence of stiffeners on the rear portion of the headgear. *See, e.g.*, Ex. 1002, Fig. 2 (showing stiffener on rear portion of headgear). We also credit Mr. Lordo's un rebutted testimony that "the rigidity of the stiffener, as well as the attachment mechanism, such as stitching, both contribute to the inextensibility of the rear portions," that is, making the rear portion *relatively* inextensible. *See* Ex. 1013 ¶ 94. ResMed does not dispute Fisher's contentions with respect to the subject matter of claim 14.

Accordingly, we conclude that Fisher has established, by a preponderance of the evidence, that claim 14 is unpatentable under 35 U.S.C. § 103(a) over Amarasinghe and Corrigall.

Claim 16 depends from claim 1 and further recites "wherein said at least one lower strap includes a hook and loop material tab for attachment to the respiratory mask." Ex. 1001, 24:22–24. Similarly, claim 17 depends from claim 1 and further recites "wherein the at least one upper strap includes a hook and loop material tab for attachment to the respiratory mask." *Id.* at 24:25–27. Fisher contends that Amarasinghe discloses the subject matter of claims 16 and 17. Pet. 40–41. We agree. We find, as illustrated in Amarasinghe's Figure 4, the upper and lower straps include hook and loop material to attach the mask. *See* Ex. 1002, Fig. 4, 5:21–24 ("As shown in Fig. 4, the free end of each upper and lower strap 22, 24 includes a strip of hook material 44 attached thereto by stitching, for example. The upper and lower straps 22, 24 are constructed of a loop material that engages the strip of hook material 44 when the upper and lower straps 22, 24 are connected to the frame 12.").

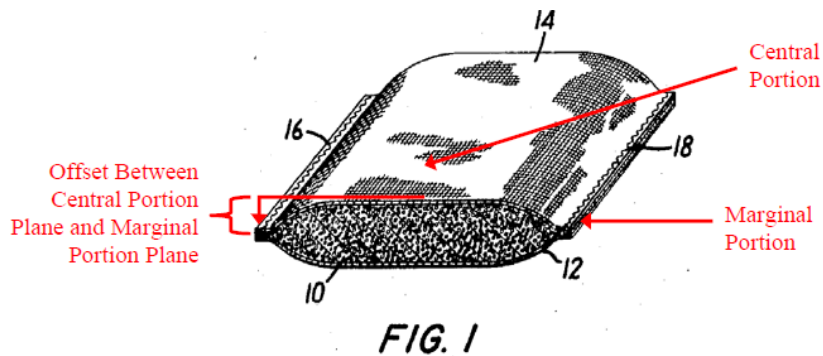
ResMed does not dispute Fisher's contentions with respect to the subject matter of claims 16 and 17.

Accordingly, we conclude that Fisher has established, by a preponderance of the evidence, that claims 16 and 17 are unpatentable under 35 U.S.C. § 103(a) over Amarasinghe and Corrigall.

Claim 27 depends from claim 1 and further recites:

wherein at least one of said first fabric layer and said second fabric layer having, as viewed in said cross-section, a central portion and a marginal portion on each lateral side of said central portion, the central portion projecting to a plane that is offset from a plane in which each said marginal portion projects.

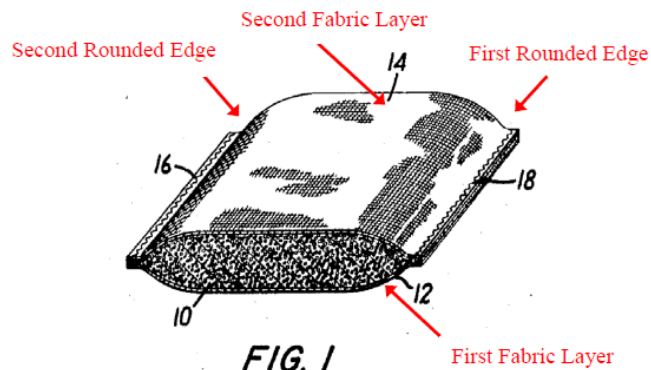
Ex. 1001, 24:56–61. Fisher contends that Corrigall discloses the subject matter of claim 27 and provides an annotated version of Corrigall's Figure 1 to support its contention. Pet. 35. We reproduce Fisher's annotated figure below:



The annotated figure points to the central portion, marginal portion and offset between the planes of the central portion and marginal portion for fabric layer 14. See Pet. 35; Ex. 1013 ¶ 86. We find, consistent with the annotated figure above, the Corrigall discloses the subject matter of claim 27. ResMed does not dispute Fisher's contentions with respect to the subject matter of claim 27.

Accordingly, we conclude that Fisher has established, by a preponderance of the evidence, that claim 27 is unpatentable under 35 U.S.C. § 103(a) over Amarasinghe and Corrigall.

Claim 28 depends from claim 1 and further recites “wherein each of said first fabric layer and said second fabric layer forms an exterior surface of said first rounded lateral edge.” Ex. 1001, 24:62–64. Fisher contends that Corrigall discloses the subject matter of claim 28, providing an annotated version of Corrigall’s Figure 1 to support its position. Pet. 36. We reproduce this annotated figure below:



The annotated figure shows the first and second fabric layers and the first and second rounded edges. Pet. 36. We find that Corrigall discloses the subject matter of claim 28. As seen in the annotated figure above, each side of Corrigall’s strap includes a rounded edge, with stitched edges 16, 18 at the center of each rounded edge. Each of the first and second fabric layers forms a portion of each rounded edge. *See, e.g.*, Ex. 1004, 4:3–8 (“To make the strap material, foam and fabric strips of equal widths may be adhered together to form a laminate, and the edges of the laminate then stitched together, the stitching serving not only to join the fabric strips but also to compress the edge portions of the foam to form tapered or smoothly rounded edges.”).

ResMed does not dispute Fisher’s contentions with respect to the subject matter of claim 28.

Accordingly, we conclude that Fisher has established, by a preponderance of the evidence, that claim 28 is unpatentable under 35 U.S.C. § 103(a) over Amarasinghe and Corrigall.

e. Summary as to claims 1, 5–8, 14, 16, 17, 19, 27, and 28 over Amarasinghe and Corrigall

In summary, we determine, based on the complete record, that Fisher has established, by a preponderance of the evidence, that independent claim 1 and claims 5–7, 14, 16, 17, 19, 27, and 28 are unpatentable under 35 U.S.C. § 103(a) over Amarasinghe and Corrigall. Fisher fails to establish, by a preponderance of the evidence, that claim 8 is unpatentable under 35 U.S.C. § 103(a) over Amarasinghe and Corrigall.

2. Claims 2–4, 13, 15, 18, 20, 22–26, 29–36, 40–46, 48–55, and 59–65 over Amarasinghe, Corrigall, and Ho

a. Independent Claims 29 and 48

(i) Subject matter of claims 29 and 49

Independent claim 29 recites “at least one upper strap configured to extend above the patient’s ear in use, the at least one upper strap including loop material and an end with hook material, for adjustable attachment to a slot of a forehead support.” Ex. 1001, 25:3–6. Claim 29 further recites “at least one lower strap configured to extend below the patient’s ear in use, the at least one lower strap including loop material and an end with hook material for adjustable attachment to a headgear clip that connects with a

lower part of the mask.” *Id.* at 25:7–11. Similarly, independent claim 48 recites:

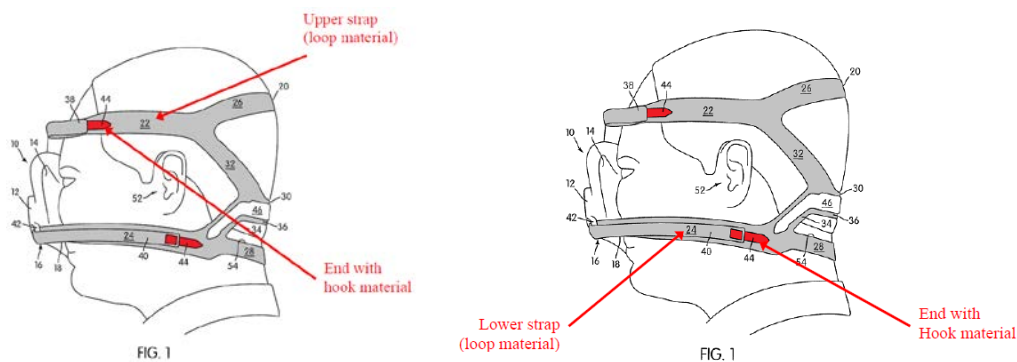
a pair of upper straps each configured to extend above the patient’s ear in use, each said upper strap including an outwardly facing loop material layer and an end with hook material to adjustably engage the outwardly facing loop material layer, for length-adjustable attachment to a slot of a forehead support.

Id. at 26:42–47. Claim 48 further recites:

a pair of lower straps each configured to extend below the patient’s ear in use, each said lower strap including an outwardly facing loop material layer and an end with hook material to adjustably engage the outwardly facing loop material layer, for length-adjustable attachment to a headgear clip that connects with a lower part of the mask.

Id. at 25:48–54. We refer to these limitations as the “hook and loop” limitations of claims 29 and 48.

Fisher contends that Amarasinghe discloses the subject matter of the “hook and loop” limitations of claims 29 and 48. Pet. 48. In support of its contentions, Fisher provides two annotated versions of Amarasinghe’s Figure 1, which we reproduce below.



The annotated versions of Figure 1 illustrate straps 22, 24 having loop material, with ends 44 having hook material. Pet. 49, 51; see Ex. 1013

¶ 116. As to the requirement that the upper straps attach to slots in a forehead support, Fisher contends that Amarasinghe discloses that upper straps 22 may be connected to clips on a forehead support. *Id.* at 49 (citing Ex. 1002 at 5:25–6:2). Fisher further contends that Amarasinghe does not expressly disclose a slot in a forehead support, but argues Ho discloses this subject matter. *Id.* (referencing Ex. 1003 ¶ 36). Fisher also contends, with respect to the lower straps, that Amarasinghe discloses that lower straps 24 may engage frame 12 with locking clips. *Id.* at 51.

We find, based on the complete record, that the combination of Amarasinghe and Ho discloses the subject matter of the “hook and loop” limitations of claims 29 and 48. *See* Ex. 1002, Fig. 4, 5:21–24 (“As shown in Fig. 4, the free end of each upper and lower strap 22, 24 includes a strip of hook material 44 attached thereto by stitching, for example. The upper and lower straps 22, 24 are constructed of a loop material that engages the strip of hook material 44 when the upper and lower straps 22, 24 are connected to the frame 12.”); Ex. 1003 ¶ 36 (“To attach the illustrated coupling members to a patient interface device the present invention contemplates threading a free end 50 of the coupling member through a slot or orifice provide in the patient interface or in a patient interface connector.”). ResMed does not dispute Fisher’s contentions with respect to the “hook and loop” limitations of claims 29 and 48.

Claims 29 and 48 further recite “a rear strap portion having a rear loop configured and dimensioned to circumscribe the rear of the patient’s head.” Ex. 1001, 25:12–14, 26:55–57 (the “rear loop” limitation of claims 29 and 48). Fisher contends that both Amarasinghe and Ho disclose this subject

matter. Pet. 52–53. With respect to Amarasinghe, Fisher provides an annotated figure, which we reproduce below:

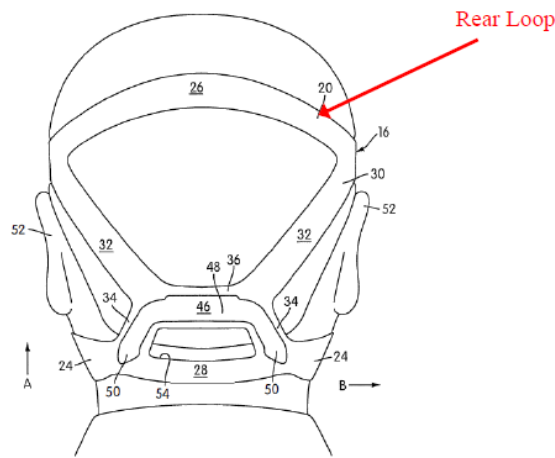
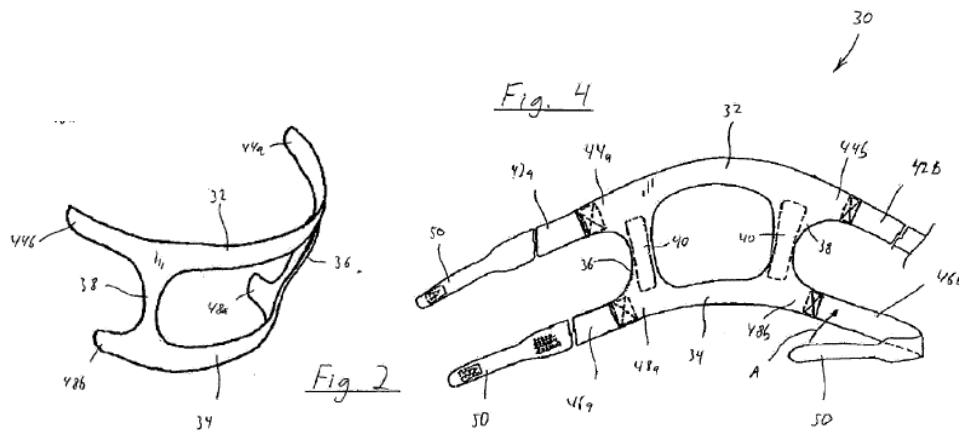


FIG. 2

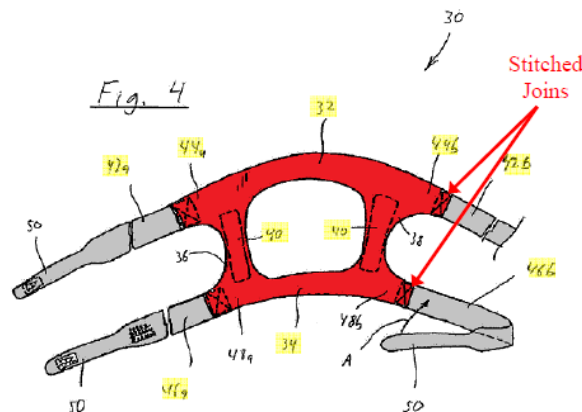
The annotated figure points to strap 26 as forming the rear loop, with straps 32. Pet. 52, *see* Ex. 1013 ¶ 128. With respect to Ho, Fisher relies on the depiction in Ho's Figure 4, which shows an opening at the center of the rear portion of its headgear 30. Pet. at 53. We reproduce Ho's Figures 2 and 4 below:



We find, based on the complete record, that Amarasinghe and Ho disclose the subject matter of the “rear loop” limitation of claims 29 and 48. Our findings are based on the depictions of the headgear assembly of Amarasinghe and Ho reproduced above, both of which show an opening in the rear portion of the headgear assembly configured and dimensioned to circumscribe the rear of a wearer’s head.

ResMed does not dispute Fisher’s contentions with respect to the “rear loop” limitation of claims 29 and 48.

Claim 29 further recites “the at least one upper strap and the at least one lower strap being attached to the rear strap portion via stitched joints” and claim 48 further recites “each said upper strap and each said lower strap being attached to the rear strap portion via stitched joints.” Ex. 1001, 25:14–16, 26:57–58 (the “stitched joints” limitation of claims 29 and 48). Fisher concedes that Amarasinghe does not disclose the subject matter of the “stitched joints” limitation of claims 29 and 48, but contends that Ho does. Pet. 54. Fisher annotates Ho’s Figure 4, which we reproduce below:



The annotated figure shows the rear portion of Ho’s headgear assembly in red and points to stitched joints connecting the rear portion to upper and lower side straps. Pet. 54; see Ex. 1013 ¶ 123.

We find, based on the complete record, that Ho discloses the subject matter of the “stitched joints” limitation of claims 29 and 48, as illustrated in the annotated figure above. *See also* Ex. 1003 ¶ 34 (“[C]oupling members 42a, 42b, 46, and 46b are . . . flexible and lightweight and are attached to the ends of the first and second beams in any conventional manner. For example, the coupling member can be *stitched*, sewn, or sonic/heat welded onto the ends of the first and second beams.”) (emphasis added). ResMed does not dispute Fisher’s contentions with respect to the “stitched joints” limitation of claims 29 and 48.

Claim 29 further recites “the rear strap portion comprising a material that is relatively inextensible compared to a relatively extensible material of the at least one upper strap” and claim 48 recites “the rear strap portion comprising a first material with a first extensibility and each said upper or lower strap comprising a second material with a second extensibility that is different than the first extensibility of the first material.” Ex. 1001, 25:16–18, 26:59–63 (the “extensibility” limitation of claims 29 and 48).

Fisher contends that Amarasinghe discloses the subject matter of the “extensibility” limitation of claims 29 and 48. Specifically, Fisher contends that Amarasinghe’s side straps 22, 24 are extensible and the rear portion is relatively inextensible. Pet. 56. Fisher explains that Amarasinghe’s rear portion includes stiffeners, a first material with a different extensibility from the extensible BREATHE-O-PRENE material of the side straps. *Id.*

We find, based on the complete record, that Amarasinghe discloses a headgear assembly with a rear strap portion having a first material that is relatively inextensible (stiffeners 46) compared to a relatively extensible second material of the upper strap and lower strap (BREATHE-O-PRENE)

as required by the “extensibility” limitation of claims 29 and 48. See Ex. 1002, 6:3–27; Ex. 1013 ¶¶ 44, 106, 126.

ResMed does not dispute Fisher’s contentions as to the “extensibility” limitation of claims 29 and 48.

Claim 29 further recites:

wherein at least one strap of said plurality of straps is constructed from a laminate having at least a first layer and a second layer, said first layer being constructed and arranged to be located on a patient-contacting side in use, and said second layer being constructed and arranged to be located on a non patient-contacting side in use, and further wherein each of said first layer and said second layer forms a part of at least one rounded lateral edge of the at least one strap when viewed in cross-section.

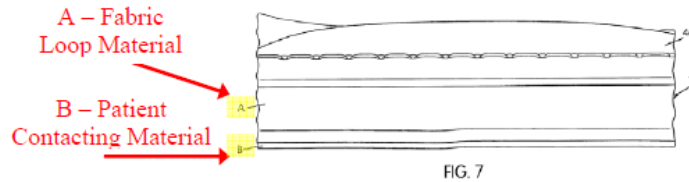
Ex. 1001, 25:19–28 (the “rounded edge” limitation of claim 29). Similarly, claim 48 recites:

wherein each of said upper strap and each said lower strap is constructed from at least a patient-contacting fabric material layer and a respective said outwardly facing loop material layer, each said patient-contacting fabric material layer being constructed and arranged to engage the patient’s face while in use, and further wherein mutual edges of the patient-contacting fabric material layer and said outwardly facing loop material layer form a joint positioned, as seen in cross-section, at a lateral edge of each said upper strap and each said lower strap, *each said joint being spaced away from the patient’s face in use while the patient-contacting fabric material layer contacts the patient’s face in use.*

Id. at 26:64–27:9 (emphasis added) (the “spaced away” limitation of claim 48). Fisher contends that Amarasinghe, as modified by the teachings of Corrigall, disclose the subject matter of these limitations. Pet. 57–59.

Fisher contends that Amarasinghe discloses a laminate structure with a first patient contacting layer and a second fabric loop layer and provides an

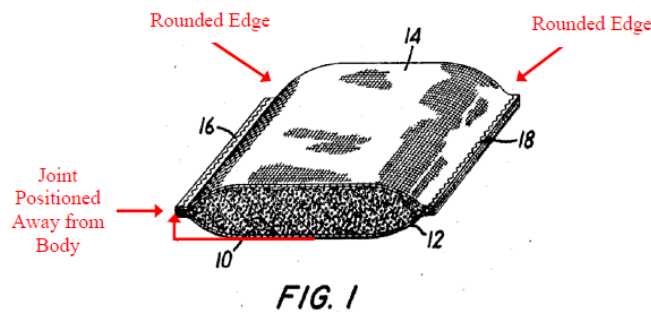
annotated version of Amarasinghe's Figure 7, which we reproduce below.
Pet. 57; see Ex. 1013 ¶ 45.



The annotated figure shows Amarasinghe's laminate structure, with fabric loop material "A" and patient contacting material "B." Pet. 45. We find, based on the complete record, that Amarasinghe discloses a laminate strap structure with a first patient contacting layer and a second fabric loop layer as required by both the "rounded edge" limitation of claim 29 and the "spaced away" limitation of claim 48, as illustrated in the annotated figure above. *See also* Ex. 1002, 6:3–8 ("The straps of the headgear assembly 16 are constructed from a soft, flexible composite material such as [BREATHE-O-PRENE] As shown in Fig. 7, the straps include two layers of material A, B with one of the layers A having a loop material to facilitate the connection with the strip of hook material 44 provided on the free ends the upper and lower straps 22, 24."). As Fisher correctly notes, although Figure 7 depicts stiffener 46 on the outer surface of the laminate, stiffener 46 is present only in limited areas, so that in other areas, the fabric loop material would be on the exterior of the laminate structure, particularly with respect to the side straps 22, 24. *See, e.g., id.* at Fig. 1 (depicting stiffener 46 at rear portion only), 5:22–24 ("The upper and lower straps 22, 24 are constructed of a loop material that engages the strip of hook material 44 when the upper and lower straps 22, 24 are connected to the frame 12.").

Fisher further contends that Amarasinghe, as modified by Corrigall's teachings, results in a strap material with a first layer and a second layer

forming a part of at least one rounded lateral edge of the strap when viewed in cross-section and the mutual edges of the first and second layers form a joint spaced away from the patient's face as required by both the "rounded edge" limitation of claim 29 and the "spaced away" limitation of claim 48, as illustrated in the annotated figure above. Pet. 59 (providing an annotated version of Corrigan's Figure 1). Fisher's annotated version of Corrigan's Figure 1 is reproduced below:



The annotated figure identifies the rounded edges and joints of Corrigan's strap structure. Pet. 59; see Ex. 1013 ¶ 134. We find that Amarasinghe, as modified by Corrigan's strap structure, results in a strap with a first layer and a second layer forming a part of at least one rounded lateral edge of the strap when viewed in cross-section and the mutual edges of the first and second layers form a joint spaced away from the patient's face. As seen in the annotated figure above (and previously analyzed with respect to claims 1, 27, and 28), the mutual ends of Corrigan's two fabric layers form joints spaced away from a wearer's body and the two layers form rounded edges. As we discussed in detail above, in connection with our analysis of claim 1, Corrigan's joints would be spaced away from a wearer's face when in use, based on the teachings in Corrigan. We incorporate that reasoning, as well as our reasoning for claims 27 and 28, herein.

ResMed argues that Corrigall's joints would not be spaced away from a user's face, or, at least, that Fisher has failed to demonstrate this requirement of claim 48. PO Resp. 26–32. As we discussed in detail above, in connection with a similar claim limitation of claim 1, ResMed's arguments do not inform us of a deficiency in our findings that Corrigall's joints are spaced away from a wearer's face when in use.

(ii) Reasons to combine Amarasinghe, Corrigall, and Ho

Fisher contends that a person having ordinary skill in the art would have had reason to combine the teachings of Amarasinghe, Corrigall, and Ho. Pet. 60. Specifically, Fisher provides reasoning for adding Ho's slots for attaching straps, Ho's stitching, and Ho's rear portion circumscribing the rear of a user's head. *See id.* at 60–61; *see also id.* at 29–31 (providing reasons for combining Amarasinghe and Corrigall); Ex. 1013 ¶¶ 63–71, 135–141 (providing testimony supporting reasons to combine Amarasinghe, Corrigall, and Ho). As to modifying Amarasinghe with Ho's headgear slots and clips, Fisher contends that “[w]hen headgear is pulled over a user's head, upper straps undergo less tension than lower straps, and a person of skill would have known that providing upper headgear slots, as taught by Ho, would have simplified manufacturing and reduced parts.” Pet. 60 (referencing Ex. 1013 ¶ 136).

Fisher further provides that “[a] person of [ordinary] skill also would have been motivated to modify Amarasinghe[] to attach upper and lower straps to a rear portion using stitched joints at least because attaching straps was a known alternative to forming unitary straps, and stitching was one of a few common methods for attaching straps” and “[a] person of [ordinary] skill would have been motivated to select the stitching method to provide

increased support in the stitched join region and reduce waste.” Pet. 60–61 (referencing Ex. 1013 ¶ 138).

With respect to Ho’s rear loop configuration, Fisher contends that “a person of [ordinary] skill would have recognized that a rear loop configuration would have been desirable to create a stable means of securement that comfortably fits a wide range of patient populations.” Pet. 61 (referencing Ex. 1013 ¶ 140).

Fisher concludes that “[c]ombining these features of Amarasinghe[], Corrigall, and Ho would have been a mere combination of familiar elements according to known methods that does no more than yield predictable results.” Pet. 61 (referencing Ex. 1013 ¶ 141).

We find, based on the complete record before us, that Fisher has provided adequate reasoning, with rational underpinnings, for combining the teachings of Amarasinghe, Corrigall, and Ho with respect to claims 29 and 48. *See KSR Int’l Co.*, 550 U.S. at 418. We credit Mr. Lordo’s testimony in support of this reasoning, which is mostly unrebutted. We also credit the testimony as the reasoning is consistent with the teachings of Ho as to its benefits. *See, e.g.*, Ex. 1003 ¶ 32 (describing the comfort of its headgear “over a wide range of patient populations” and, specifically, with respect to beams 32, 34, which forms the opening in the rear portion).

Except for arguments we addressed above, with respect to our analysis of claim 1 over Amarasinghe and Corrigall, ResMed does not provide any arguments addressing Fisher’s reasons to combine Amarasinghe, Corrigall, and Ho.

(iii) Conclusion

For the reasons discussed above, we determine, based on the complete trial record, that Fisher has demonstrated, by a preponderance of the evidence, that claims 29 and 48 are unpatentable under 35 U.S.C. § 103(a) over Amarasinghe, Corrigall, and Ho.

b. Dependent claims 36 and 55

Claim 36 depends from claim 29 and claim 55 depends from claim 48, both further reciting “wherein the plurality of straps further comprises a stretch portion *and a portion configured not to stretch.*” Ex. 1001, 25:45–47, 27:32–34 (emphasis added). Fisher relies on its contentions for claim 8 in support of its position with respect to claims 36 and 55. See Pet. 50. As discussed above in connection with our analysis of claim 8, we determined that Fisher failed to demonstrate, by a preponderance of the evidence, that Amarasinghe discloses the recited portion “configured not to stretch.” Further, although Fisher’s asserted combination against claims 36 and 55 include the Ho reference, Fisher does not contend expressly *in the Petition* that Ho discloses the subject matter of claims 36 and 55. See Pet. 50 (“As described above with respect to at least Claim 8, Amarasinghe[] teaches a stretch portion and a portion configured not to stretch as claimed.”); *cf.* Tr. 18:3–9 (“I like slide 46 the best because Ho says exactly what [claims 8, 36, and 55] say. . . . So it’s not much of a stretch for the panel to say that Ho teaches not to stretch because it says nonstretchy. ”). Although at oral argument, Fisher points to Ho as disclosing the subject matter of claims 36 and 55, such a position does not appear in the Petition. See Paper 22 (Trial Hearing Order), 3 (“No new evidence or arguments may be presented at the

oral argument.”) (quoting Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,768 (Aug. 14, 2012)).

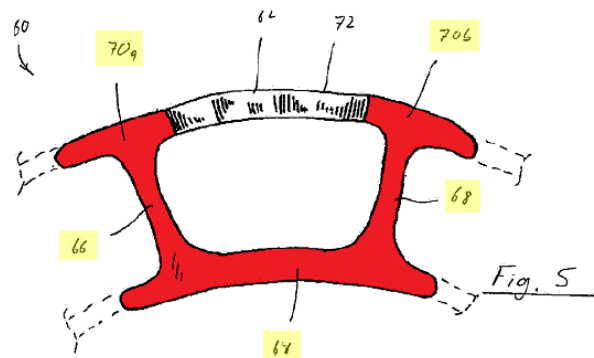
Accordingly, for the reasons presented in our analysis for claim 8, Fisher fails to demonstrate, by a preponderance of the evidence, that claims 36 and 55 are unpatentable under 35 U.S.C. § 103(a) over Amarasinghe, Corrigall, and Ho.

c. Dependent claims 13, 40, and 59

Claim 13 depends from claim 1 and further recites “wherein the rear portion comprises a relatively inextensible rear portion that is configured to be located at the upper half of the patient’s head while in use.” Ex. 1001, 24:9–12. Claims 40 and 59 depend from claims 29 and 48, respectively, and recite similar additional subject matter, including the “relatively inextensible” language. *See id.* at 25:62–65, 27:49–52.

Fisher contends that Amarasinghe discloses a rear portion that includes a relatively inextensible portion—the portion that includes stiffener 46. Pet. 70–71. Fisher further contends that it would have been obvious to locate a stiffener 46 or 246 on strap 26 at the upper half of the rear portion of the headgear (and, consequently, at the upper half of the patient’s head while in use) as required by these claims. Pet. 72.

Fisher further argues that Ho discloses the subject matter of claims 13, 40, and 59. Fisher provides the following annotated version of Ho’s Figure 5.



The annotated figure highlights a “non-stretchy” portion of the rear portion in red, including a portion at the upper half of the headgear assembly, and a second portion 72 (in white) that is not highlighted. See Pet. 72; Ex. 1013 ¶ 181. Ho discloses that this white portion (item 72) is an “elastic portion.” Ex. 1003 ¶ 37.

Fisher reasons that “a person of skill would have been motivated to provide the mask of Amarasinghe-I with an inextensible rear portion that is configured to be located at the upper half of the patient’s head to provide better support and maintain the position of the upper straps.” Pet. 74 (referencing Ex. 1013 ¶¶ 187–190). Mr. Lordo declares that “[p]roviding an inextensible portion that extends into the upper portion of the headgear rear section allows the headgear to maintain appropriate positioning between an upper rear strap and the lower rear strap.” Ex. 1013 ¶189. Mr. Lordo further declares that “the use of inextensible headgear elements placed on the upper half of the patient’s head was well-known in the art.” *Id.* at 190.

ResMed argues that “Amarasinghe discloses a relatively inextensible portion of the headgear located at the *lower* half of the patient’s head in use,” because stiffener 46 and 246 are located in the lower half of Amarasinghe’s headgear. See PO Resp. 36–37. This argument ignores, however, the Petition’s express contention that it would have been obvious

to put a stiffener at the upper half of the headgear. *See* Pet. 72 (“A person of skill would have recognized that the stiffener as taught by Amarasinghe[] could be located on the upper strap 26”).

ResMed contends that reliance on Ho’s teaching for this subject matter “is . . . unfounded.” PO Resp. 38. ResMed argues that the headgear in Ho teaches the exact opposite configuration as that claimed in claims 13, 40, and 59. *Id.* at 39. ResMed argues that “varying extensibilities *within* the upper rear portion of the headgear is not what claims 13, 40, and 59 require.” *Id.* ResMed contends that “the claims . . . relate to the upper rear portion of the headgear, and particularly to the requirement that the rear portion of the headgear that is located at the upper half of the patient’s head in use be relatively inextensible as compared to the lower rear portion of the headgear.” *Id.* at 39–40. ResMed argues that Ho does not disclose such a structure, as the upper portion of Ho’s rear portion, with the exception of elastic portion 72, is less extensible than elastic portion 72. *Id.* at 40.

ResMed does not dispute Fisher’s contention that it would have been obvious to move stiffener 46 or 246 to the upper portion of Amarasinghe’s rear portion of its headgear.

Fisher replies that the plain language of claims 13, 40, and 59 is not as limiting as ResMed contends. Reply 19. Fisher asserts that the subject matter of the claims “is satisfied by any rear ‘portion’ located in the upper half of the head during use that is relatively inextensible compared with any other aspect, not just the lower portion, of the headgear assembly” and that Ho includes such a structure. *Id.* at 19–20.

We determine, based on the complete trial record, that Fisher demonstrates, by a preponderance of the evidence, that it would have been

obvious to modify Amarasinghe's headgear to move stiffener 46 or 246 to the upper portion of Amarasinghe's rear portion of its headgear. This modification would result in Amarasinghe's headgear comprising a relatively inextensible rear portion (that is, the portion that has stiffener 46) that is located at the upper half of the patient's head while in use, as required by claims 13, 40, and 59. We agree with Fisher that ResMed reads claims 13, 40, and 59 too narrowly. The plain language of the claims merely requires the rear portion of the headgear assembly to *comprise* a relatively inextensible rear portion that is configured to be located at the upper half of the patient's head while in use. The claim does not require that the entire part of the headgear that is located at the upper half of the patient's head be relatively inextensible. ResMed directs us to nothing in the Specification or prosecution history to cause us to depart from the plain and ordinary meaning of the words of these claims.

To summarize, we find that Amarasinghe, as modified by moving a stiffener to upper strap 26 of its rear portion, would result in a rear portion as recited in claims 13, 40, 59. *See, e.g.*, Ex. 1002 Fig. 2 (showing strap 26 at the upper half of the wearer's head when the headgear assembly is in use).

We also find that Fisher provides a reason that has a rational underpinning to modify Amarasinghe by moving stiffener 46 to upper strap 26. Fisher states that a person having ordinary skill in the art would have been motivated to make this modification “to provide better support and maintain the position of the upper straps.” *See* Pet. 74 (referencing Ex. 1013 ¶¶ 187–190). Mr. Lordo expressly declares that “[p]roviding an inextensible portion that extends into the upper portion of the headgear rear section

allows the headgear to maintain appropriate positioning between an upper rear strap and the lower rear strap.” Ex. 1013 ¶189.

With respect to Fisher’s proposed modification of Amarasinghe with Ho’s configuration, we similarly conclude that Fisher demonstrates that its proposed modification would have been obvious. As we understand the complete record, Fisher proposes to modify Amarasinghe’s strap 26 to include an elastic portion over most of the strap but the ends being less extensive, as disclosed in Ho. That is, Fisher proposes to simply substitute in an elastic portion along part of strap 26. We find such a substitution would have been within the level of ordinary skill and would have yielded predictable results. Ho supports these findings. Ho states that:

The elastic portion of the first beam allows the top beam to adjust to fit the user in comfort. Any suitable elastic may be used for this portion of the headgear assembly. The present invention contemplates that the size, shape, elasticity, configuration, number, and locations of the elastic portions can be changed from that shown.

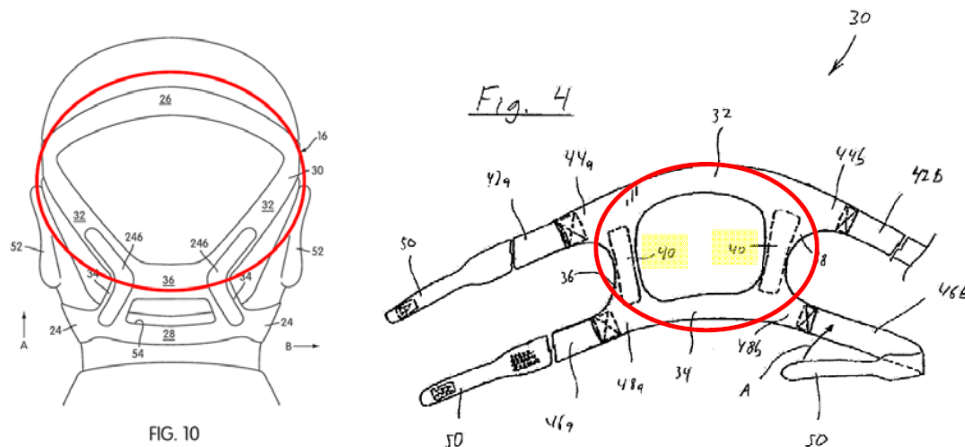
Ex. 1003 ¶ 38. That is, Ho expressly contemplates that a person having ordinary skill in the art would understand how to successfully modify a strap with an elastic portion. As disclosed in the passage above, Ho also suggests a reason for the modification—comfort. *Id.*; *see also* Pet. 74 (“[A] person of skill would have been motivated to provide the mask of Amarasinghe[] with an inextensible rear portion that is configured to be located at the upper half of the patient’s head to provide better support and maintain the position of the upper straps.”); Ex. 1013 ¶ 189 (“A person of ordinary skill in the art would have been motivated to combine the teachings of Ho with Amarasinghe[] to provide an inextensible rear portion that is configured to

be located at the upper half of the patient's head to provide better comfort and support to the user of the headgear.”).

Accordingly, for the reasons above based on our review of the complete record, we determine that Fisher demonstrates, by a preponderance of the evidence, that claims 13, 40, and 59 are unpatentable under 35 U.S.C. § 103(a) over Amarasinghe, Corrigall, and Ho.

d. Dependent claims 15, 41, and 60

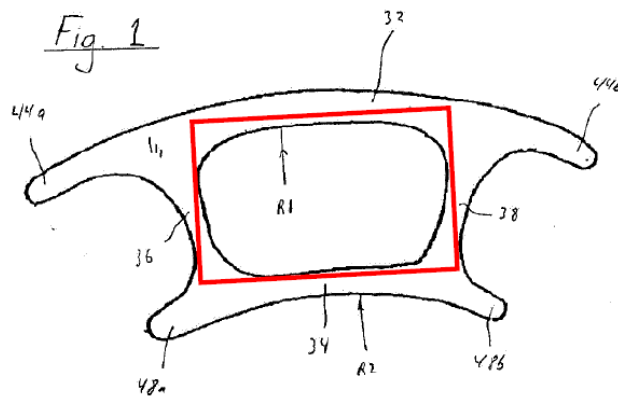
Claim 15 depends from claim 1 and recites “wherein the rear portion is configured to engage a back of a patient's head and extend on either side of the patient's parietal bone behind the patient's ears and assume, in use, a substantially circular or oval shape.” Ex. 1001, 24:17–21 (the “substantially circular or oval shape” limitation). Claims 41 and 60 depend from claims 29 and 48, respectively, and recite similar additional subject matter. *See id.* at 25:66–26:3, 27:53–28:3. Fisher contends that Amarasinghe, or alternatively, Ho, discloses the subject matter of the “substantially circular or oval shape” limitation. Fisher illustrates its position by annotating Amarasinghe's Figure 10 and Ho's Figure 4, which we reproduce below.



Fisher's annotation of Amarasinghe's Figure 10 superimposes an ellipse over the rear portion of headgear assembly 16 and Fisher's annotation of Ho's Figure 4 superimposes an ellipse over the rear portion of headgear 30. See Pet. 76, 77; Ex. 1013 ¶¶ 201, 202.

ResMed contends that neither Amarasinghe nor Ho discloses a headgear with a rear portion that is configured to engage a back of a patient's head and assume, in use, a substantially circular or oval shape. PO Resp. 40. ResMed explains that Amarasinghe discloses a trapezoidal/H-shaped configuration and distinguishes its shape from that disclosed in the '404 patent. *Id.* at 40–43.

ResMed further contends that Ho's headgear includes “an *arched* or *substantially rectangular or trapezoidal* shaped loop, rather than an oval or substantially circular shaped loop.” PO Resp. 43–44. ResMed annotates Ho's Figure 1, which we reproduce below:



ResMed's annotation draws a rectangle around the opening in Ho's rear portion of its headgear. PO Resp. 44. As ResMed explains, “Ho discloses that the first beam 32 and second beam 34 are each curved along their lengths by bending in the same direction as each other.” Pet. 44 (referencing Ex. 1003 ¶ 27). ResMed argues that “[b]ecause the top and bottom beams 32, 34 in Ho's headgear are curved in the same direction, the

loop formed by elements 32, 34, 36, and 38 cannot reasonably be called a substantially circular or oval-shaped loop.” *Id.* at 45. ResMed continues that a person having ordinary skill in the art “would have understood that a circle or oval-shaped loop would not have a convex side like Ho’s second beam 34 that bends inward toward the center of the loop, let alone a side that bends inward along a major portion of the perimeter of the loop.” *Id.* (referencing Ex. 2004 ¶¶ 85–86).

Fisher replies that ResMed improperly narrows the meaning of “oval” to “ellipsoidal” and that the evidence of record supports a finding that an oval encompasses a rectangle having rounded corners. Reply 20. Fisher further argues that ResMed improperly reads the claim such that “substantially” does not modify “oval.” *Id.* at 21. Fisher argues that Ho discloses an opening that is substantially oval.

We find, after review of the complete record and consistent with our claim construction discussed above, that neither Amarasinghe nor Ho discloses a rear portion of a headgear assembly that is configured to engage a back of a patient’s head and assume, in use, a substantially circular or oval shape. We agree with ResMed that Amarasinghe discloses openings that are substantially trapezoidal. As seen in Fisher’s own annotation of Amarasinghe’s Figure 10, which we reproduced above, the shape assumed by the rear portion of Amarasinghe’s headgear departs from the ellipse that is drawn in red. *See also* Ex. 1002, Fig. 2 (illustrating openings, when in use, that are shaped like an inverted trapezoid with strap 26 forming a rounded base and each segment forming the shape meeting at rounded corners and a smaller trapezoid with a slightly rounded base). We provide our own annotation of Amarasinghe’s Figure 2, below:

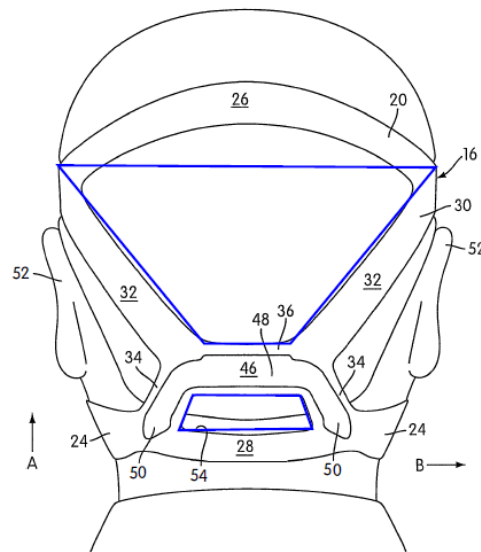
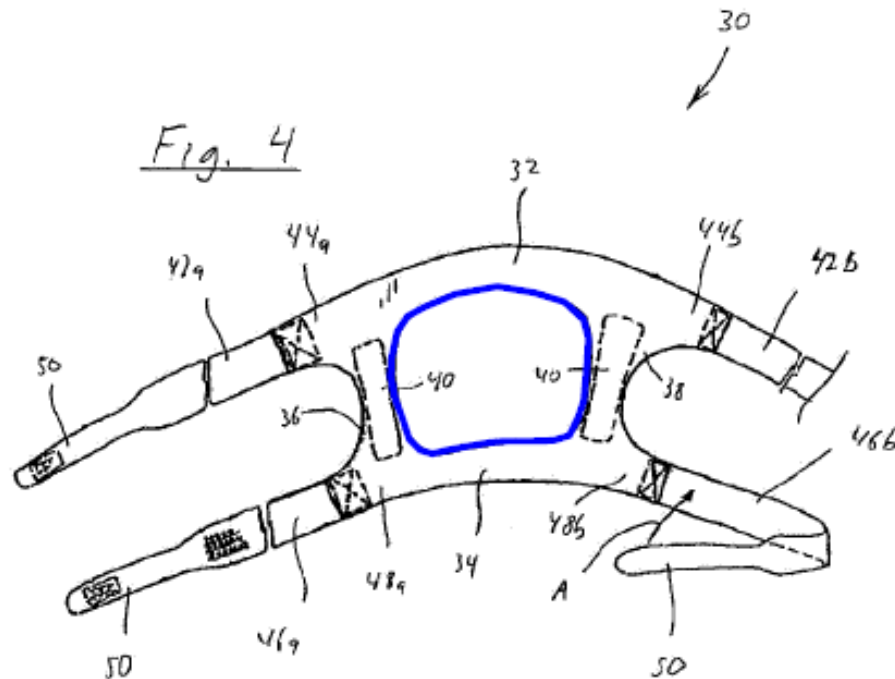


FIG. 2

This annotated figure overlays two blue trapezoids over the openings in the rear portion of Amarasinghe's rear portion of its headgear to illustrate our findings.

We find, on the complete record before us, that Ho's opening is also not an oval. As ResMed correctly asserts, Ho expressly discloses that the top and bottom bars forming the opening in the rear portion of its headgear curve in the same direction. See Ex. 1003 ¶ 27. Even if Fisher is correct in saying that the opening is "substantially oval," it is not oval. Because beam 32 and beam 34 bend in the same direction, the resulting shape is *not a rectangle*. Accordingly, the shape is also not a rectangle with rounded corners and, therefore, not an oval as Fisher contends. Further, as we construed the term "substantially circular or oval shape," the word "substantially" does not modify the word "oval." Claims 15, 41, and 60 encompass either a substantially circular shape or an oval shape, but not a shape that is substantially oval. We find that Ho's shape departs from an

oval shape, bringing it outside the scope of claims 15, 41, and 60. We illustrate this finding with our annotation of Ho's Figure 4, below:



The annotated figure highlights that both the top and bottom segment of the opening curve in the same direction by emphasizing the border of the opening in blue, such that it is not oval or egg-shaped.

Based on our review of the complete trial record, we read the Petition to rely on the express teachings in Amarasinghe or Ho only for disclosing the subject matter of the “substantially circular or oval shape” claim limitations of claims 15, 41, and 60. As we explain above, we find that these two references fail to expressly disclose this subject matter. We discern nothing in the Petition, and Fisher does not point us to anything in the record, to support a finding that subject matter of the “substantially circular or oval shape” limitation would have been obvious despite this lack of express disclosure.

Accordingly, for the reasons above based on our review of the complete record, we determine that Fisher has not demonstrated, by a preponderance of the evidence, that claims 15, 41, and 60 are unpatentable under 35 U.S.C. § 103(a) over Amarasinghe, Corrigall, and Ho.

e. Dependent claim 20

Claim 20 depends from claim 1 and further recites “wherein the first fabric layer and the second fabric layer are ultrasonically welded in a region to stiffen the at least one strap of said plurality of straps.” Ex. 1001, 24:35–38. Fisher contends that “Ho discloses that the upper and lower straps can be ‘sonic/heat welded’ onto the rear portion [and] [a] person of [ordinary] skill would have understood that the sonic welding would stiffen the strap.” Pet. 84 (referencing Ex. 1003 ¶ 34; Ex. 1013 ¶ 224).

ResMed responds that Ho discloses sonic welding a strap to another object, not welding a first and second fabric layers to stiffen the strap. PO Resp. 52–53. ResMed argues that Mr. Lordo’s statement that ultrasonic welding would stiffen the strap is without support. *Id.* at 54.

Fisher replies that Ho’s disclosure supports a finding that ultrasonic welding was a known technique. Reply 25. Fisher also argues that Mr. Lordo confirmed his testimony during his deposition that a person having ordinary skill in the art would understand that in the area of a weld, the fabric would likely become locally stiffer. *Id.* Fisher continues that Mr. Lordo’s testimony is un rebutted. *Id.*

We find, based on our review of the complete record, that Fisher has not demonstrated that it would have been obvious to use ultrasonic welding, as disclosed in Ho, to join the first and second fabric layers to stiffen Amarasinghe’s strap. The only evidence of record is Mr. Lordo’s testimony.

In his Declaration, he states: “A person of skill would have understood that the portions including the sonic welding stiffen the strap.” Ex. 1013 ¶ 224. Mr. Lordo does not provide any support for this statement. Accordingly, we afford it no weight. See 37 C.F.R. § 42.65(a) (“Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.”). Without any supporting evidence or further explanation, Fisher fails to satisfy its burden.

Accordingly, for the reasons above based on our review of the complete record, we determine that Fisher has not demonstrated, by a preponderance of the evidence, that claim 20 is unpatentable under 35 U.S.C. § 103(a) over Amarasinghe, Corrigall, and Ho.

f. Dependent Claims 2–4, 18, 22–26, 30–35, 42–46, 49–54, and 61–65

Claims 2, 32, 34, 35, 51, 53, and 54

Claim 2 depends from claim 1 and further recites “wherein the laminate comprises a layer of resilient material between the first fabric layer and the second fabric layer.” Ex. 1001, 23:39–41. Similarly, claim 32 depends from claim 29 and further recites “wherein the laminate comprises a layer of rigid or resilient material between the first layer and the second layer” and claim 51 depends from claim 48 and further recites “wherein each upper strap and each lower strap comprises a layer of rigid or resilient material between the patient-contacting fabric material layer and the outwardly facing loop material layer.” *Id.* at 25:34–36, 27:17–20.

Fisher contends that Amarasinghe discloses that the laminate forming the straps is made of BREATHE-O-PRENE, which includes a resilient material between the fabric layers. Pet. 62 (referencing Ex. 1013 ¶ 44). Fisher adds that Ho discloses a foam laminate with loop fabric material. *Id.*

(referencing Ex. 1003 ¶ 30). Fisher continues that Corrigall’s foam layer is a resilient material. *Id.* (referencing (Ex. 1004, 3:68–70, Ex. 1013 ¶ 145).

We find that at least Corrigall discloses that its laminate includes a layer of resilient material between the first fabric layer and the second fabric layer. See Ex. 1004, 3:68–70 (indicating that foam strip 10 is a “resilient foam layer”). ResMed does not dispute Fisher’s contention with respect to the disclosure of a laminate that includes a layer of resilient material between the first fabric layer and the second fabric layer.

Claim 34 depends from claim 29 and further recites “wherein the laminate further comprises a foam layer.” Ex. 1001, 25:40–41. Claim 53 depends from claim 48 and further “compris[es] a foam material layer for each said upper strap and each said lower strap.” *Id.* at 27:25–27. Claim 54 depends from claim 53 and further recites “wherein said foam material layer is between each said patient-contacting material layer and a respective said outwardly facing loop material layer.” *Id.* at 27:28–31.

As we indicate above, we find that at least Corrigall discloses a foam material layer in its laminate strap structure. See also our analysis of claim 5, *supra*, where we present findings regarding a laminate strap structure including a foam layer.

Claim 35 depends from claim 34 and further recites “wherein said foam layer is encapsulated between said first layer and said second layer.” Ex. 1001, 25:42–44. As we indicate above, we find that at least Corrigall discloses a foam material layer in its laminate strap structure. See also our analysis of claim 6, *supra*, where we present findings regarding a foam layer encapsulated between a first and second fabric layers.

Accordingly, we conclude that Fisher has established, by a preponderance of the evidence, that claims 2, 32, 34, 35, 51, 53, and 54 are unpatentable under 35 U.S.C. 103(a) over Amarasinghe, Corrigan, and Ho.

Claims 3, 4, 33, and 52

Claim 3 depends from claim 1 and further recites “wherein the laminate comprises a layer of rigid material between the first fabric layer and the second fabric layer.” Ex. 1001, 23:42–44. Claim 4 depends from claim 1 and further recites “wherein the laminate comprises a layer of semi-rigid material between the first fabric and the second fabric layer.” *Id.* at 23:45–47. Claim 33 depends from claim 29 and further recites “wherein the laminate comprises a layer of semi-rigid material between the first and the second layer.” *Id.* at 25:37–39. Claim 52 depends from claim 48 and further “compris[es] a semi-rigid material layer between the patient-contacting fabric material layer and the outwardly facing loop material layer.” *Id.* at 27:21–24.

Fisher contends that Amarasinghe discloses a semi-rigid stiffener. Pet. 62–63 (indicating that stiffener 46 satisfies the recited subject matter). Fisher also seems to allege that stiffener 46 constitutes a rigid material. *See id.* at 64. Fisher continues that Amarasinghe discloses that stiffener 46 may be included in a pocket sleeve, alleging that the pocket sleeve puts the material between a first fabric layer and a second fabric layer as required by claims 4, 33, and 53. Fisher further contends that “Ho discloses that ‘a rigid or semi-rigid support or batten can be provided in the fabric or material forming the portion of the headgear.’” Pet. 64 (referencing Ex. 1003 ¶ 31; Ex. 1013 ¶ 166).

We find, based on the complete record, that Fisher has failed to meet its burden with respect to claims 3, 4, 33, and 52. First, we note that the patentee of the '404 patent acted as its own lexicographer, defining “rigid” to mean “a structure relatively more rigid tha[n] a ‘floppy’ structure, such as the fabrics typically used as headgear.” Ex. 1001, 6:14–16. The plain and ordinary meaning of “rigid” is “stiff or inflexible.” See, e.g., Merriam-Webster Online Dict., <https://www.merriam-webster.com/dictionary/rigid> (last visited Apr. 23, 2018) (defining “rigid” as “deficient in or devoid of flexibility” or “appearing stiff and unyielding”). In comparison, the word “semi-rigid” means “rigid to some degree or in some parts.” See, e.g., *id.* at <https://www.merriam-webster.com/dictionary/semirigid> (last visited Apr. 23, 2018). By defining the word “rigid” as it did, the patentee assigned it a definition that is effectively the same as for the word “semi-rigid.”

With respect to Amarasinghe, although we agree with Fisher that stiffener 46 would be encompassed by the terms “rigid material” and “semi-rigid material” as used in the '404 patent, Fisher fails to demonstrate persuasively that stiffener 46 would be positioned between the first fabric layer and the second fabric layer. In its position with respect to claim 1 (and other claims), Fisher contends that the first and second fabric layers are the layers that cover an inner layer and whose edges are joined at the center of each lateral edge to form rounded lateral edges as taught by Corrigall in its Figures 1 and 4. See Pet. 20. Fisher fails to explain adequately how positioning stiffener 46 in a pocket sleeve satisfies the requirement of positioning the rigid or semi-rigid material between *the* first and *the* second fabric layers. That is, Fisher fails to explain adequately that a pocket sleeve would position stiffener 46 under the first or second fabric layer rather than

between the first or second fabric layer and an outer layer of the pocket sleeve. Also, we find that Mr. Lordo's testimony fails to provide any further explanation as to why stiffener 46 would be positioned between the first and second fabric layers. See Ex. 1013 ¶¶ 146–150.

With respect to Fisher's position that Ho discloses this subject matter, we determine that Fisher similarly fails to demonstrate persuasively that Ho teaches positioning a rigid or semi-rigid support or batten *between* the first and second fabric layers. Ho, like Amarasinghe, discloses that “[t]o allow the amount of reinforcement or stiffening to be changed or removed pockets or other mechanisms for selectively attaching a reinforcement member to the headgear are contemplated.” Ex. 1003 ¶ 31. That is, Ho contemplates uses of a pocket to receive the rigid or semi-rigid support or batten. Fisher fails to explain persuasively that a person having ordinary skill in the art would have positioned a rigid or semi-rigid support or batten between the first and second fabric layers as required by the claims, rather than adding a pocket to the first or second layer, such that the support would be positioned between the first or second layer and the outside layer of the pocket. Also, we find that Mr. Lordo's testimony fails to provide any further explanation as to why a rigid or semi-rigid support or batten would be positioned between the first and second fabric layers. See Ex. 1013 ¶¶ 146–150.

Accordingly, we determine that Fisher has failed to establish, by a preponderance of the evidence, that claims 3, 4, 33, and 52 are unpatentable under 35 U.S.C. 103(a) over Amarasinghe, Corrigall, and Ho.

Claims 18, 22, 23, 42, 43, 61, and 62

Claim 18 depends from claim 1 and further recites “wherein the plurality of straps comprises a portion that is configured to be relatively self-

supporting such that the headgear system maintains a three dimensional shape when not in use.” Ex. 1001, 24:28–31. Claims 42 and 61 depend from claims 29 and 48, respectively, and recite the same subject matter. *Id.* at 26:4–7, 28:4–7.

Similarly, claim 23 depends from claim 1 and further recites “wherein a stiffened region provides the headgear with a 3D shape when not in use.” Ex. 1001, 24:46–47. Claims 43 and 62 depend from claims 29 and 48, respectively, and further “compris[es] a stiffened region that provides the headgear with a 3D shape when not in use.” *Id.* at 26:8–10, 28:8–10.

Fisher contends that Amarasinghe discloses that “the use of ‘arcuate-shaped stiffeners’ and that ‘[d]ue to the added rigidity provided by the stiffener 46, all the straps of the headgear assembly 16 are better able to maintain a predetermined shape.’” Pet. 73 (quoting Ex. 1002, 7:21–22, 9:6–12.” Fisher alternatively contends that:

Ho discloses that “the headgear assembly assumes a generally spherical shape, at least in the portion that extends over the back of the user’s head/neck.” Ho further states that the rear portion is “formed so that the overall structure is rigid or semi-rigid,” and explains that “‘semi-rigid’ means that these structures retain their shape when no load is applied on them, but flex to some degree to allow them to conform to the patient to reduce pressure points when a load is applied.” Thus, Ho discloses headgear constructed to resiliently return to a predetermined shape or maintain a three-dimensional shape when not in use.

Id. at 73–74 (quoting Ex. 1003 ¶¶ 9, 29; Ex. 1013 ¶ 185). Fisher contends that “a person of skill also would have been motivated to provide a rear portion configured to resiliently return to a predetermined three-dimensional shape for a better fit and ease of use.” *Id.* at 74 (referencing Ex. 1013 ¶¶ 187–188, 191–195).

We find that Amarasinghe discloses a portion of a strap that is configured to be relatively self-supporting or stiffened such that the headgear system maintains a three dimensional shape when not in use. *See, e.g.*, Ex. 1002, 7:21–22 (“Due to the added rigidity provided by the stiffener 46, all the straps of the headgear assembly 16 are better able to maintain a predetermined shape.”).¹⁶

ResMed does not dispute Fisher’s contentions with respect to claims 18, 23, 42, 43, 61, and 62.

Further, claim 22 depends from claim 1 and recites “wherein the first fabric layer and the second fabric layer are thickened or treated in a region to stiffen the at least one strap of said plurality of straps.” Ex. 1001, 24:42–45. Fisher contends that Amarasinghe discloses thickening or treating a strap using stiffener 46. Pet. 84. We find that Amarasinghe discloses thickening or treating the strap laminate structure, which includes the first fabric layer and the second fabric layer, such as by adding stiffener 46. *See* Ex. 1002, 6:9–7:28.

ResMed does not dispute Fisher’s contentions with respect to claim 22.

Accordingly, we determine that Fisher has established, by a preponderance of the evidence, that claims 18, 22, 23, 42, 43, 61, and 62 are unpatentable under 35 U.S.C. 103(a) over Amarasinghe, Corrigall, and Ho.

¹⁶ We note that any headgear assembly would maintain a three-dimensional shape when not in use, as any headgear would be three-dimensional, even when lying flat as it would have a length, width, and thickness. Our findings here, however, go beyond this interpretation of the claims, as Amarasinghe discloses stiffening portions of the headgear to have the headgear retain shape.

Claim 24, 25, 26, 44, 45, 46, 63, 64, and 65

Claim 24 depends from claim 1 and further recites “wherein said plurality of straps further comprises a crown strap.” Ex. 1001, 24:48–49. Claims 44 and 63 depend from claims 29 and 48, respectively, and recite the same subject matter. *See id.* at 26:11–12, 28:11–12.

Claim 25 depends from claim 24 and further recites “wherein the crown strap is configured to lie flat on the crown of a patient’s head in use.” Ex. 1001, 24:50–52. Claims 45 and 64 depend from claims 44 and 63, respectively, and recite the same subject matter. *See id.* at 26:13–15, 28:13–15.

Claim 26 depends from claim 1 and further recites “wherein the rear portion is configured to lie flat on the rear of a patient’s head in use.” Ex. 1001, 24:53–55. Claims 46 and 65 depend from claims 29 and 48 and recite the same subject matter. *See id.* at 26:16–18, 28:16–18.

Fisher contends that “Amarasinghe[] discloses that ‘as shown in Fig. 1, the curved upper strap 26 extends across a rear upper portion of the patient’s head.’” Pet. 86 (quoting Ex. 1002, 7:30—8:6). Fisher contends that “[a] person of [ordinary] skill would have recognized that the curved upper strap 26 is a crown strap that lies flat.” *Id.* (referencing Ex. 1013 ¶ 234). Fisher explains that Amarasinghe’s Figure 1 shows upper strap 26 and lower strap 28 lying flat. *Id.*

Fisher further contends that Ho discloses a crown strap (strap 186) that lies flat and that Ho’s rear portion of its headgear is also configured to lie flat. Pet. 87 (reproducing Ho’s Figure 15). Fisher’s expert, Mr. Lordo, reasons that “a person of [ordinary] skill would have been motivated to combine the teachings of Ho with Amarasinghe[] to provide a cross strap

portion and a rear strap portion that . . . provide[s] additional support and structure to provide better fit and ease of use for the user.” Ex. 1013 ¶ 238.

We find, based on our review of the complete record, that Amarasinghe discloses a headgear assembly with a crown strap configured to lie flat on the crown of a patient’s head in use and a rear portion configured to lie flat on the rear of a patient’s head in use. We base this finding, in part, on Amarasinghe’s Figures 1–3. These figures depict an embodiment of Amarasinghe’s headgear assembly with a crown strap (strap 26) that lies flat on the wearer’s head. These figures also depict straps 28, 32, 34, 36 at the rear portion of the headgear assembly, each of which lies flat on the wearer’s head. *See also* Ex. 1002, 5:5–8 (“[R]ear portion 20 . . . includes a curved upper strap 26, a lower strap 28, and an intermediate strap arrangement 30 therebetween. The intermediate strap arrangement 30 is generally H-shaped and has a pair of upper straps 32, a pair of lower straps 34, and a cross-bar strap 36.”); *id.* at 8:3–4 (“[C]urved upper strap 26 is structured to engage a posterior portion of the parietal bone [i.e., the central side and upper back portion of the skull] of the patient’s head. . . . The cross-bar strap 36 is structured to engage a lower portion of the occipital bone of the patient’s head”).

We also find that Ho discloses a headgear assembly with a crown strap configured to lie flat on the crown of a patient’s head in use and a rear portion configured to lie flat on the rear of a patient’s head in use. We base this finding, in part, on Ho’s Figures 2, 14, and 15. These figures depict Ho’s rear portion as to would rest against the back of a wearer’s head and also depicts an embodiment with a crown strap (strap 186). We further find

that Fisher provides a sufficient reason, with a rational underpinning for including a crown strap as taught by Ho in Amarasinghe's headgear.

ResMed does not dispute Fisher's contentions with respect to claims 24, 25, 26, 44, 45, 46, 63, 64, and 65.

Accordingly, we determine that Fisher has established, by a preponderance of the evidence, that claims 24, 25, 26, 44, 45, 46, 63, 64, and 65 are unpatentable under 35 U.S.C. § 103(a) over Amarasinghe, Corrigan, and Ho.

Claim 30, 31, 49, and 50

Claim 30 depends from claim 29 and further "compris[es] a joint located along mutual edges of the first and second layers." Ex. 1001, 25:29–30. Claim 31 depends from claim 30 and further recites "wherein the joint is positioned at approximately a center or middle of the at least one rounded lateral edge when viewed in cross section." *Id.* at 25:31–33. Claim 50 depends from claim 49 and further recites "wherein each said joint is positioned at approximately a center or middle of said rounded or tapered portion when viewed in cross section." *Id.* at 27:14–16. For the reasons discussed in connection with our analysis of claim 1 (the "joint position" clause), *supra*, we find that Amarasinghe, as modified by Corrigan, discloses the subject matter of claims 30, 31, and 50.

Claim 49 depends from claim 48 and further recites "wherein each said lateral edge includes a rounded or tapered portion including a part of the patient-contacting fabric material layer and a part of the outwardly facing loop material layer." Ex. 1001, 27:10–13. For the reasons discussed in connection with our analysis of claims 7 and 28, *supra*, we find that

Amarasinghe, as modified by Corrigall, discloses the subject matter of claim 49.

ResMed does not dispute Fisher's contentions with respect to claims 30, 31, 49, and 50.

Accordingly, we determine that Fisher has established, by a preponderance of the evidence, that claims 30, 31, 49, and 50 are unpatentable under 35 U.S.C. § 103(a) over Amarasinghe, Corrigall, and Ho.

g. Summary as to claims 2–4, 13, 15, 18, 20, 22–26, 29–36, 40–46, 48–55, and 59–65 over Amarasinghe, Corrigall, and Ho

We determine that Fisher has demonstrated, by a preponderance of the evidence, that claims 2, 13, 18, 22–26, 29–32, 34, 35, 40, 42–46, 48–51, 53, 54, and 59, 61–65 are unpatentable under 35 U.S.C. § 103(a) over Amarasinghe, Corrigall, and Ho. We further determine that Fisher has not demonstrated, by a preponderance of the evidence, that claims 3, 4, 15, 20, 33, 36, 41, 52, 55, and 60 are unpatentable under 35 U.S.C. § 103(a) over Amarasinghe, Corrigall, and Ho.

3. Claims 9 and 21 over Amarasinghe and Corrigall

a. Claim 9

Claim 9 depends from claim 1 and further recites “wherein said plurality of straps comprises an extensible portion and an *inextensible* portion.” Ex. 1001, 23:60–62 (emphasis added). Fisher contends that Amarasinghe discloses this subject matter. Pet. 38. Fisher contends that Amarasinghe discloses that headgear assembly 16 includes straps made from a soft, flexible composite material, for example, BREATHE-O-PRENE, and that BREATHE-O-PRENE is known to be extensible. Pet. 38. Fisher further contends that Amarasinghe discloses that stiffeners 46 are added to the straps of rear portion 20 of headgear assembly 16, and these stiffeners

make that part of rear portion 20 relatively inextensible. *Id.* at 39. The Petition quotes Amarasinghe: “stiffener 46 reduces the flexibility of the straps 34, 36 at the back of the patient’s head along the direction of arrow A or in a reverse direction of arrow A, as shown in Fig. 2.” *Id.* (quoting Ex. 1002, 7:6–8).

As we discussed in our claim construction analysis, we determine that the plain and ordinary meaning of the term “inextensible” is “not extensible, incapable of being stretched.” Applying our claim construction, we determine that Fisher has not demonstrated, by a preponderance of the evidence, that Amarasinghe discloses that the plurality of straps comprises an extensible portion *and an inextensible portion*, as required by claim 9. Amarasinghe discloses that “stiffener 46 *reduces* the flexibility of the straps 34, 36,” not that it makes the strap inextensible, that is, incapable of being stretched. *See* Ex. 1002, 7:6–8 (emphasis added); *see also* Ex. 2004 ¶ 93 (declaring that extensibility and stiffness are interrelated characteristics of a material for straps). Neither Fisher nor Mr. Lordo explains how Amarasinghe disclosing that stiffener 46 *reduces* flexibility would indicate to a person having ordinary skill in the art that the portion of the rear portion with stiffener 46 would be *incapable* of stretching. *See* Ex. 1013 ¶ 95 (“Amarasinghe[] discloses an extensible or stretchable portion and a rear portion that is *relatively* inextensible”) (emphasis added).

For the reasons discussed above, we determine, based on the complete record, that Fisher fails to demonstrate, by a preponderance of the evidence, that claim 9 is unpatentable under 35 U.S.C. § 103(a) over Amarasinghe and Corrigall.

b. Claim 21

Claim 21 depends from claim 1 and further recites “wherein the first fabric layer and the second fabric layer are compressed in a region to stiffen the at least one strap of said plurality of straps.” Ex. 1001, 24:39–41. Fisher contends that Corrigan discloses, for the embodiment of Figure 1, that stitching compresses the edge portions of the foam to form rounded edges. Pet. 43. Fisher further contends that, with respect to Corrigan’s embodiment of Figure 4, heat sealing the edges collapses the foam. *Id.* at 44. Mr. Lordo declares that “[a] person of skill would have understood that the portions including the compressed regions [of Corrigan’s strap] stiffen the strap.” Ex. 1013 ¶ 103.

We find that Corrigan fails to disclose the subject matter of claim 21. Instead, Corrigan discloses, in the embodiment of Figure 1, compressing foam strip 10. Corrigan expressly discloses that:

To make the strap material, foam and fabric strips of equal widths may be adhered together to form a laminate, and the edges of the laminate then stitched together, the stitching serving not only to join the fabric strips but also to compress the edge portions of the foam to form tapered or smoothly rounded edges.

Ex. 1004, 4:3–8. That is, Corrigan discloses that the edges of the fabric strips are sewn together, which compresses the intervening foam strip. We discern nothing in Corrigan that indicates that the fabric strips are compressed. Mr. Lordo’s testimony fails to support persuasively Fisher’s position. Mr. Lordo merely declares that “[a] person of skill would have understood that the portions including the compressed regions stiffen the strap.” Ex. 1013 ¶ 103. This testimony fails to indicate that the first fabric layer and the second fabric layer are compressed and also fails to provide any basis for this conclusory statement.

For the reasons discussed above, we determine, based on the complete record, that Fisher fails to demonstrate, by a preponderance of the evidence, that claim 21 is unpatentable under 35 U.S.C. § 103(a) over Amarasinghe and Corrigall.

4. Claims 10–12, 37–39, 47, 56–58, and 66 over Amarasinghe, Corrigall, and Ho

Each of claims 10–12, 37–39, 47, 56–58, and 66 requires a portion of the claimed headgear assembly to be “substantially inextensible.” *See, e.g.*, Ex. 1001, 24:1–4 (“11. The headgear system of claim 1, wherein the rear portion comprises a rear loop of straps that circumscribes the rear of the head, the rear loop being substantially inextensible along its length.”). As we determined above in connection with our claim construction analysis, the term “substantially inextensible” means “a structure that when subject to the forces normally encountered in use of a respiratory mask, will have an elongation of less than about 5%,” a definition provided expressly in the ’404 patent. *See id.* at 6:4–7.

Fisher fails to explain in the Petition how Amarasinghe, Corrigall, Ho, or any combination of these three references discloses the “substantially inextensible” subject matter. For claims 12, 39, and 58, we cannot determine from the Petition where Fisher addresses the “substantially inextensible” claim language. *See* Pet. 73–74 (addressing claims 12, 39, and 58 with respect to the requirement in these claims that a portion of the rear strap return to a predetermined shape, but not the “substantially inextensible” language).

For the remainder of the claims that recite the term “substantially inextensible,” Fisher relies on its analysis for claim 29. *See* Pet. 75–76 (cross-referencing the analysis for claim 29 for claims 10, 37, and 56), 77–

78 (cross-referencing the analysis for claims 8 and 29 for claims 11, 38, and 57), (cross-referencing the analysis for claim 29 for claims 47 and 88). The analysis for claim 29 states: “For example, Amarasinghe[] discloses upper and lower straps 22, 24 constructed from Breathe-O-Prene[®], which was well-known to be a stretchable, extensible fabric, and a rear portion that includes stiffeners 46 that provide inextensibility. *Id.* at 55 (referencing Ex. 1002, 6:3–10; Ex. 1013 ¶¶ 44, 126). Fisher’s analysis for claim 8 relies on Amarasinghe’s disclosure of stiffener 46 as a portion configured not to stretch. *See id.* at 38. Finally, Fisher contends that “Ho further teaches that the rear portion includes a first strap having at least a portion (40) that is substantially inextensible.” *Id.* at 77 (referencing Ex. 1003 ¶ 31; Ex. 1013 ¶ 202).

Neither Fisher nor Mr. Lordo, however, adequately explains how the teachings of Amarasinghe or Ho disclose that any strap of their headgear is constructed such that, when subject to the forces normally encountered in use of a respiratory mask, the structure will have an elongation of less than about 5%. That is, Fisher fails to offer any persuasive evidence that the results of adding stiffener 46 to a strap of Amarasinghe’s headgear assembly 16 or the semi-rigid, non-stretchy nature of Ho’s elements 70a, 70b, 64, 66, and 68 results in a structure that satisfies the “substantially inextensible” claim limitation. Significantly, neither claim 29, which requires a strap portion that is “*relatively* inextensible,” nor claim 8, which requires a strap portion that is “configured not to stretch,” recites the term “substantially inextensible.” *See* Ex. 1001, 23:57–59, 24:65–25:28 (emphasis added).

For the reasons discussed above, we determine, based on the complete record, that Fisher fails to demonstrate, by a preponderance of the evidence,

that claims 10–12, 37–39, 47, 56–58, and 66 are unpatentable under 35 U.S.C. § 103(a) over Amarasinghe, Corrigall, and Ho.

III. CONCLUSION

For the foregoing reasons, we conclude that Fisher has established, by a preponderance of the evidence, that claims 1, 2, 5–7, 13, 14, 16–19, 22–32, 34, 35, 40, 42–46, 48–51, 53, 54, 59, and 61–65 of the '404 patent are unpatentable. We further conclude that Fisher has not established, by a preponderance of the evidence, that claims 3, 4, 8–12, 15, 20, 21, 33, 36–39, 41, 47, 52, 55–58, 60, and 66 of the '404 patent are unpatentable.

IV. ORDER

After due consideration of the record before us, it is:

ORDERED that claims 1, 5–7, 14, 16, 17, 19, 27, and 28 are unpatentable under 35 U.S.C. § 103(a) over Amarasinghe and Corrigall;

FURTHER ORDERED that claims 8, 9, and 21 have *not* been shown to be unpatentable under 35 U.S.C. § 103(a) over Amarasinghe and Corrigall

FURTHER ORDERED that claims 2, 13, 18, 22–26, 29–32, 34, 35, 40, 42–46, 48–51, 53, 54, 59, and 61–65 are unpatentable under 35 U.S.C. § 103(a) over Amarasinghe, Corrigall, and Ho;

FURTHER ORDERED that claims 3, 4, 10–12, 15, 20, 33, 36–39, 41, 47, 52, 55–58, 60, and 66 have *not* been shown to be unpatentable under 35 U.S.C. § 103(a) over Amarasinghe, Corrigall, and Ho; and

FURTHER ORDERED 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.

IPR2017-00340
Patent 8,950,404 B2

For PETITIONER:

Brenton R. Babcock
Curtis R. Huffmire
Benjamin J. Everton
KNOBBE, MARTENS, OLSON & BEAR, LLP
2brb@knobbe.com
2crh@knobbe.com
2bje@knobbe.com

For PATENT OWNER:

Michael T. Hawkins
Michael J. Kane
Christopher C. Hoff
Nicholas W. Stephens
Craig A. Deutsch
Stephen R. Schaefer
FISH & RICHARDSON P.C.
hawkins@fr.com
kane@fr.com @fr.com
schaefer@fr.com
hoff@fr.com
nstephens@fr.com
deutsch@fr.com