

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

LIFE SPINE, INC.,
Petitioner,
v.

GLOBUS MEDICAL, INC.,
Patent Owner.

IPR2022-01602
Patent 9,956,087 B2

Before DEVON ZASTROW NEWMAN, CYNTHIA M. HARDMAN, and
MICHAEL A. VALEK, *Administrative Patent Judges*.

NEWMAN, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Claims Unpatentable
Denying Patent Owner's Motion to Amend
35 U.S.C. § 318(a)

I. INTRODUCTION

This is a Final Written Decision in an *inter partes* review challenging the patentability of claims 1–14 of U.S. Patent No. 9,956,087 B2 (“the ’087 patent,” Ex. 1001). We have jurisdiction under 35 U.S.C. § 6.

Petitioner has the burden of proving unpatentability of the challenged claims by a preponderance of the evidence. 35 U.S.C. § 316(e). Having reviewed the parties’ arguments and cited evidence, for the reasons we discuss below, we find that Petitioner has demonstrated by a preponderance of the evidence that claims 1–14 are unpatentable over the cited prior art. With regard to Patent Owner’s Revised Contingent Motion to Amend (“RMTA”), Petitioner has demonstrated, by a preponderance of the evidence, that proposed substitute claims 15–23 are unpatentable as obvious under 35 U.S.C. § 103. Accordingly, we deny Patent Owner’s Revised Motion to Amend.

A. *Procedural History*

Petitioner Life Spine, Inc., filed a Petition requesting *inter partes* review of claims 1–14 of the ’087 patent. Paper 2 (“Pet.”). Patent Owner Globus Medical, Inc., did not file a Preliminary Response. On June 14, 2023, we instituted an *inter partes* review. Paper 7 (“Inst. Dec.”). Patent Owner subsequently filed a Patent Owner Response (Paper 11, “Response”), and Petitioner filed a Reply (Paper 13, “Reply”).

Patent Owner also filed a Contingent Motion to Amend (Paper 10) and requested that we provide preliminary guidance concerning the Motion in accordance with the Board’s pilot program concerning motion to amend practice and procedures. Petitioner filed an Opposition (Paper 12). We issued Preliminary Guidance (Paper 15) determining, based on the record at

the time, that Patent Owner had shown a reasonable likelihood that it satisfied the statutory and regulatory requirements associated with filing a motion to amend, and that Petitioner had shown a reasonable likelihood that the proposed substitute claims are unpatentable. *Id.* Patent Owner then filed a Revised Contingent Motion to Amend (Paper 17, “RMTA”) and Petitioner filed an Opposition (Paper 20, “RMTA Opp.”). Patent Owner filed a Reply to the Opposition (Paper 21, “RMTA Reply”) and Petitioner filed a Sur-reply (Paper 22, “RMTA Sur-reply”). An oral hearing was scheduled for April 10, 2024, but the parties elected to forgo oral argument. *See* Ex. 3001.

B. Real Parties in Interest

Petitioner and Patent Owner each identify themselves as the real party in interest. Pet. 1; Paper 5 (Patent Owner’s Updated Mandatory Notices), 2.

C. Related Matters

The parties identify *Globus Medical, Inc. v. Life Spine, Inc.*, 1:21-cv-01445 (D. Del.), as involving the ’087 patent. Pet. 1; Paper 5, 2. The parties also identify a number of patent applications related to the ’087 patent, including 17/157,099, 17/477,597, 17/478,213, and 17/715,461. Pet. 2; Paper 5, 2. Petitioner identifies a number of related *inter partes* review proceedings, i.e., IPR2022-01434, IPR2022-01435, and IPR2022-01601. Paper 5, 2. We also identify related matter IPR2022-01599.

D. The ’087 Patent (Ex. 1001)

The ’087 patent, titled “Intervertebral Spacer and Plate,” relates to a spinal implant comprising an intervertebral spacer and a plate member. Ex. 1001, codes (54), (57). The Specification describes exemplary spinal implants for installing in an intervertebral disc space to facilitate

intervertebral fusion and/or stabilization. *Id.*, code (57). One exemplary device is depicted in Figure 12A, reproduced below.

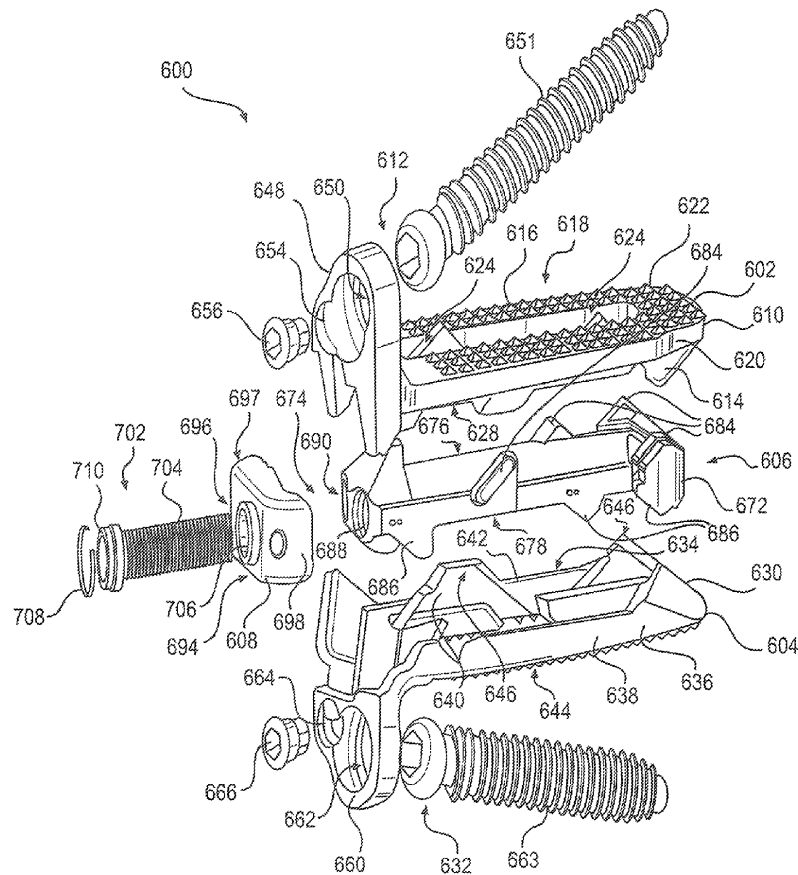


FIG. 12A

Figure 12A of the '087 patent is an exploded view of a vertebral fusion device 600. *Id.* at 3:60–61, 28:4–6. The vertebral fusion device 600 may include a first (e.g., upper and/or superior) endplate 602, a second (e.g., lower and/or inferior) endplate 604, a first ramped body 606, and a second ramped body 608. *Id.* at 28:18–22.

As shown in Figure 12A, the first endplate 602 has an upper surface 622 that “can include a plurality of protrusions (e.g., bumps, teeth, and/or peaks) configured to engage a vertebral body.” *Id.* at 28:40–43. The first endplate 602 may also include first extension portion 648, that “can extend,

to threadably engage the first ramped body 606.” *Id.* at 34:29–31. “[A]s the threaded member 704 is rotated in a first direction, the threaded member 704 may pull the first ramped body 606 towards the second ramped body 608.” *Id.* at 34:34–36. And, “[a]s the first ramped body 606 moves towards the second ramped body 608, the mating features on the first ramped body 606 may engage the mating features on the first and/or second endplates 602, 604, thereby pushing (e.g., wedging) the first and second endplates 602, 604 apart.” *Id.* at 34:36–41.

Another embodiment of the expandable fusion device of the ’087 patent is shown in Figure 21, reproduced below. *Id.* at 4:25–27.

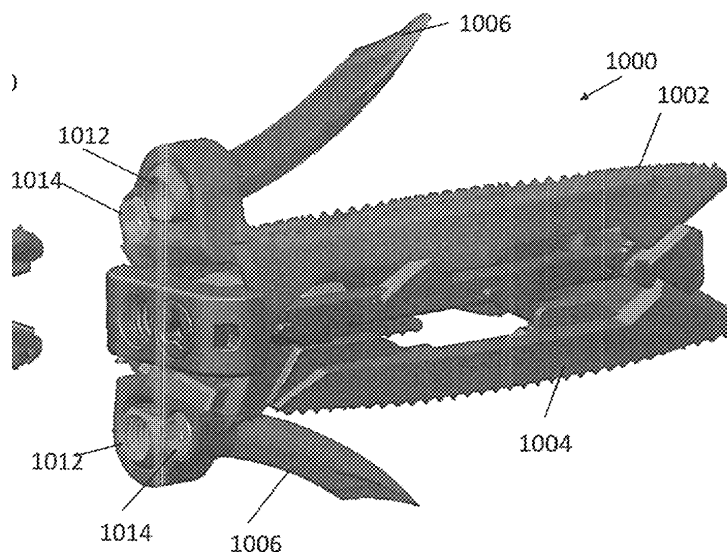


FIG. 21

Figure 21 of the ’087 patent depicts expandable fusion device 100 including first endplate 1002 and second endplate 1004, and one or more anchors 1006. *Id.* at 48:39–41, 55–56. The ’087 patent states that the anchors 1006 are used as fasteners to attach the fusion device to the patient. *Id.* at 48:56–59. Specifically, the anchors “pass through an adapter, such as socket or bore 1012 within device 1000, and into body tissue of the patient.” *Id.* at 49:26–29.

E. Challenged Claims

Petitioner challenges all 14 claims of the '087 patent. Claims 1 and 8 are independent. Claim 1, reproduced below with bracketed and bolded roman numerals added,¹ is illustrative:

1. **[i]** A surgical system comprising:
 - [ii]** an implant comprising:
 - [iii]** a first endplate, wherein the first endplate comprises a planar portion with protrusions and an extension portion;
 - [iv]** a second endplate;
 - [v]** a first ramped body extending between the first endplate and the second endplate, wherein the first ramped body comprises at least one upwardly facing ramp engaging the first endplate and at least one downwardly facing ramp engaging the second endplate;
 - [vi]** an actuator in engagement with the first ramped body, **[vii]** wherein rotation of the actuator causes translation of the first ramped body, thereby causing expansion of the implant; and
 - [viii]** a first socket formed through the extension portion of the first endplate, wherein the first socket extends completely above the planar portion of the first endplate; and
 - [ix]** a first anchor configured to fasten the implant to the patient, wherein the anchor is received in the first socket.

Ex. 1001, 50:42–65.

Challenged independent claim 8 is identical to claim 1, except that it does not recite that “the first ramped body comprises at least one upwardly

¹ For ease of reference, we use the same bracketed numbering Petitioner uses in the Petition. *See* Pet. 15–27.

facing ramp engaging the first endplate and at least one downwardly facing ramp engaging the second endplate.” *Compare id.* (claim 1), *with id.* at 51:18–52:7 (claim 8). Challenged claims 2–7 depend directly or indirectly from claim 1 and recite additional features, including with respect to endplates (claims 2, 6, and 7) and anchors (claims 3–5). *Id.* at 50:66–51:17. Challenged claims 9–14 depend directly or indirectly from claim 8 and recite the same additional features relating to the endplates (claims 9, 13, and 14) and anchors (claims 10–12). *Id.* at 52:8–28.

F. Asserted Grounds of Unpatentability

We instituted trial based on the following grounds of alleged unpatentability:

Ground	Claim(s) Challenged	35 U.S.C. § ²	Reference(s)/Basis
I	1–3, 8–10	102/103	Weiman ³
II	4–7, 11–14	103	Weiman and Mozeleski ⁴
III	7, 14	103	Weiman, Mozeleski, and

² The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), amended several provisions of 35 U.S.C., including §§ 102 and 103. The ’087 patent issued from Application No. 15/144,054, filed May 2, 2016, and claims priority, as a continuation-in-part, to Application No. 15/097,466, filed on April 13, 2016. Ex. 1001, codes (21), (63). Under either date (May 2, 2016, or April 13, 2016), the post-AIA versions of 35 U.S.C. §§ 102 and 103 apply.

³ Weiman et al., U.S. Patent Pub. 2014/0067071 A1 (published Mar. 6, 2014) (Ex. 1004, “Weiman”).

⁴ Mozeleski et al., Intl. Pub. No. WO 2015/009793 A1 (published Jan. 22, 2015) (Ex. 1006, “Mozeleski”).

Ground	Claim(s) Challenged	35 U.S.C. § ²	Reference(s)/Basis
			Seifert ⁵
IV	1–3, 8–10	102/103	Seifert
V	4–7, 11–14	103	Seifert and Mozeleski
VI	7, 14	103	Seifert, Mozeleski, and Weiman

Inst. Dec. 3, 42; Pet. 4. Petitioner supports its contentions with the Declaration of Troy D. Drewry (Ex. 1002 (“Drewry Decl.”), among other evidence.

II. ANALYSIS

A. Principles of Law

In an *inter partes* review, “the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)). This burden never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). To prevail, Petitioner must demonstrate unpatentability by a preponderance of the evidence. 35 U.S.C. § 316(e).

Anticipation under 35 U.S.C. § 102 requires that a prior art reference set forth each and every element of a claim as set forth in the claim.

Verdegaal Bros. v. Union Oil Co., 814 F.2d 628, 631 (Fed. Cir. 1987);
see also Net MoneyIN, Inc. v. VeriSign, Inc., 545 F.3d 1359, 1371 (Fed. Cir.

⁵ Seifert et al., U.S. Patent Pub. 2014/0163683 A1 (published June 12, 2014) (Ex. 1010, “Seifert”).

2008) (anticipation not only requires that each element of a claim be present in a prior art reference, but also the arrangement or combination of those elements as claimed).

A claim is unpatentable as obvious under 35 U.S.C. § 103 if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. 35 U.S.C. § 103; *see also KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved based on 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) any objective indicia of nonobviousness.⁶ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). An obviousness determination requires finding a reason to combine accompanied by a reasonable expectation of achieving what is claimed in the challenged patent. *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1367 (Fed. Cir. 2016). “[A]ny need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed.” *KSR*, 550 U.S. at 419–20.

B. Level of Ordinary Skill in the Art

We consider the grounds of unpatentability in view of the understanding of a person of ordinary skill in the art at the time of the

⁶ Patent Owner does not assert objective indicia supporting nonobviousness of the challenged claims. *See generally* Response.

invention. *Graham*, 383 U.S. at 17–18. Petitioner contends that a person of ordinary skill in the art (sometimes abbreviated herein as “POSITA”):

would have had at least a Bachelor’s Degree in mechanical engineering or biomedical engineering and two or more years of experience in biomechanical engineering, biomedical engineering, and/or spinal implant devices. A person could also have qualified as a POSITA with some combination of more formal education (e.g., an M.D.) and less technical experience or less formal education and more technical or professional experience in the foregoing fields. Superior education could compensate for a deficiency in work experience, and vice-versa.

Pet. 11 (citing Ex. 1002 (Drewry Decl.) ¶¶ 76–79). Patent Owner does not dispute Petitioner’s proposal. *See generally* Response.

We adopt Petitioner’s proposed level of ordinary skill in the art because it is consistent with the cited prior art and is undisputed on this record. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (indicating that the prior art itself may reflect an appropriate skill level).

Based on his statement of qualifications, we find Petitioner’s declarant Mr. Drewry is qualified to provide technical opinions from the perspective of a person of ordinary skill in the art in this proceeding. *See* Ex. 1002 (Drewry Decl.) ¶¶ 7–13 (Mr. Drewry’s statement of qualifications).

C. Overview of Asserted Prior Art

Before turning to Petitioner’s asserted grounds of unpatentability, we provide a brief summary of the asserted prior art references.

1. *Weiman (Ex. 1004)*

Weiman, titled “Expandable Fusion Device and Method of Installation Thereof,” relates to “an expandable fusion device capable of being installed inside an intervertebral disc space to maintain normal disc

spacing and restore spinal stability.” Ex. 1004, codes (54), (57). One exemplary device is depicted in Figure 78, reproduced below.

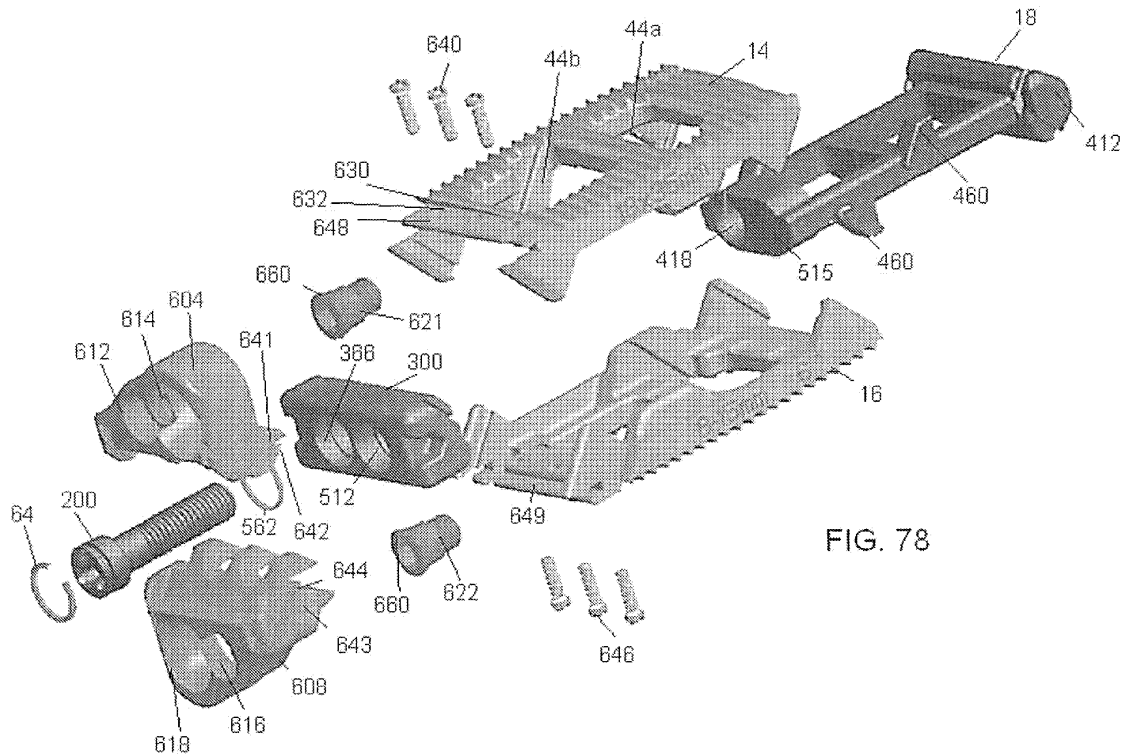


FIG. 78

Figure 78 of Weiman is an exploded view of expandable fusion device 10. *Id.* ¶ 187. Weiman states that the fusion device 10 includes “a first endplate 14, a second endplate 16, a central ramp 18 with ramped surfaces 460, a driving ramp 300 and an actuator assembly 200.” *Id.* Weiman also states that “the fusion device 10 in FIG. 78 also includes additional features, including an upper plate member 604 and a lower plate member 608 that can be removably attached to the first endplate 14 and second endplate 16, respectively.” *Id.*

Figure 80 of Weiman is reproduced below.

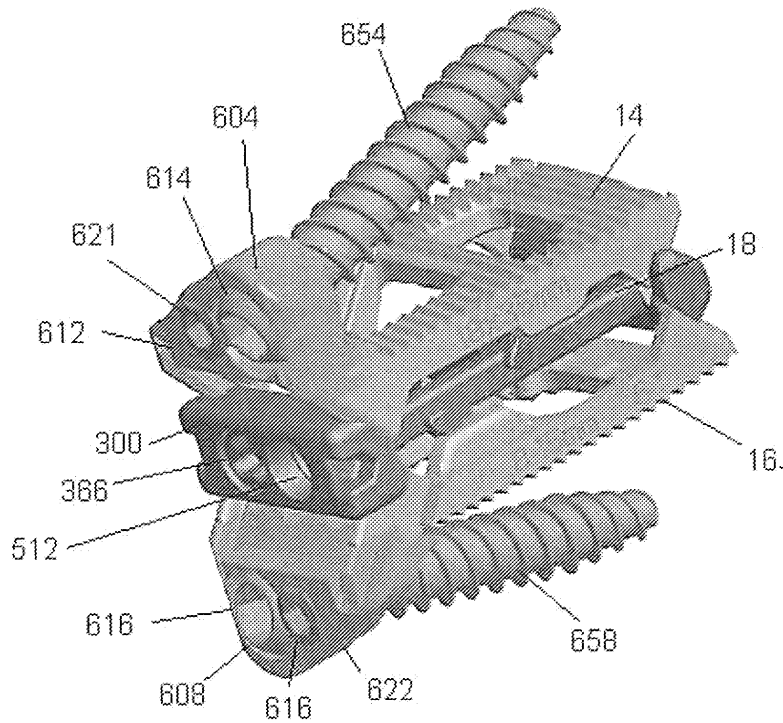


FIG. 80

Figure 80 of Weiman illustrates “a top perspective view of the fusion device 10 of FIG. 78 in an expanded state.” *Id.* ¶ 196. As to Figure 80, Weiman states that “the expansion of the first endplate 14 away from the second endplate 16 also causes expansion of the upper plate member 604 away from the lower plate member 608.” *Id.*

2. *Mozeleski (Ex. 1006)*

Mozeleski, titled “Modular Intervertebral Cage System,” relates to devices for spinal disc replacement comprising a plate configured to couple to an intervertebral cage. Ex. 1006, codes (54), (57). Figure 1 of Mozeleski is reproduced below.

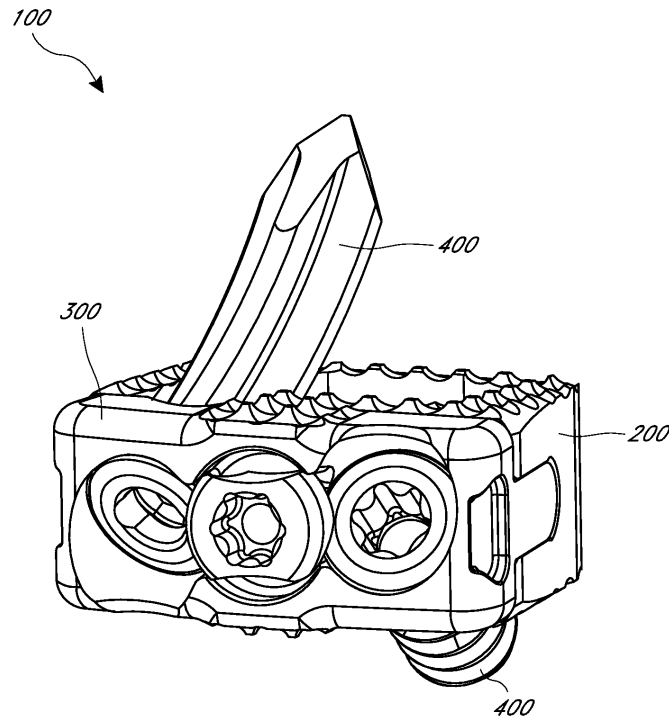


FIG. 1

Figure 1 of Mozeleski is a perspective view of modular cage system 100 in an unexpanded state. *Id.* ¶ 32. Modular cage system 100 comprises an intervertebral cage 200, plate 300, and bone fixation members 400. *Id.*

¶¶ 58–59. Mozeleski states that the “plurality of bone fixation members 400 [are] adapted to anchor the modular cage system 100 in an intervertebral space between two vertebrae of a patient” by “pass[ing] through the plate 300” and “engag[ing] the adjacent vertebrae.” *Id.* ¶ 59.

Figure 6B of Mozeleski is reproduced below.

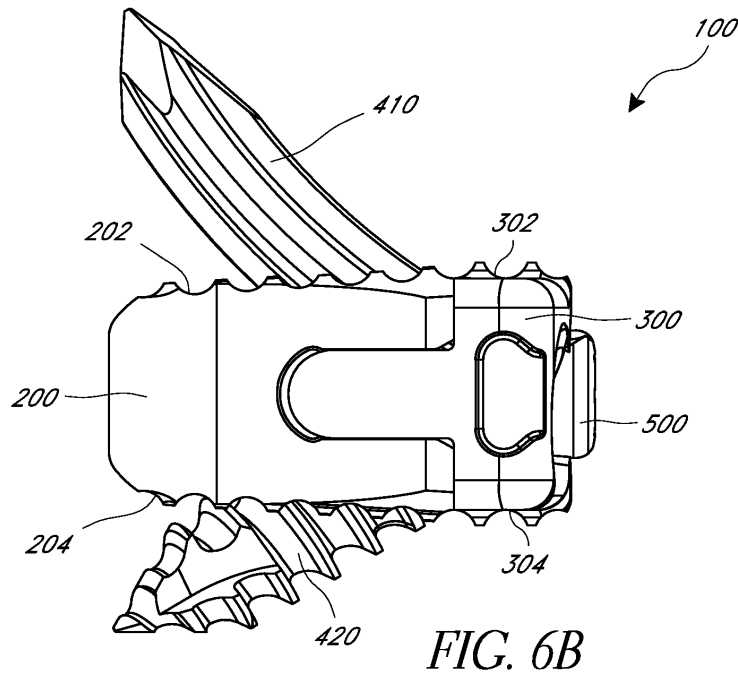


Figure 6B of Mozeleski is a side view of the modular cage system of Figure 1. *Id.* ¶ 38. Mozeleski states that the bone fixation members 400 are bone screws 420 and bone blades 410 illustrated in Figure 6B. *Id.* ¶ 74.

Mozeleski states that bone screws 420 “are generally limited to a straight configuration without any bends or curves,” whereas “[i]n some embodiments, bone blades 410 are curved, allowing the bone blade 410 to engage a vertebra in a different manner and orientation than a bone screw 420.” *Id.*

3. *Seifert (Ex. 1010)*

Seifert, titled “Expandable Vertebral Implant,” relates to “an intervertebral spacer that is adjustable in height with plates for fixation.” Ex. 1010, code (54), ¶ 2.

Seifert's Figure 1 is reproduced below.

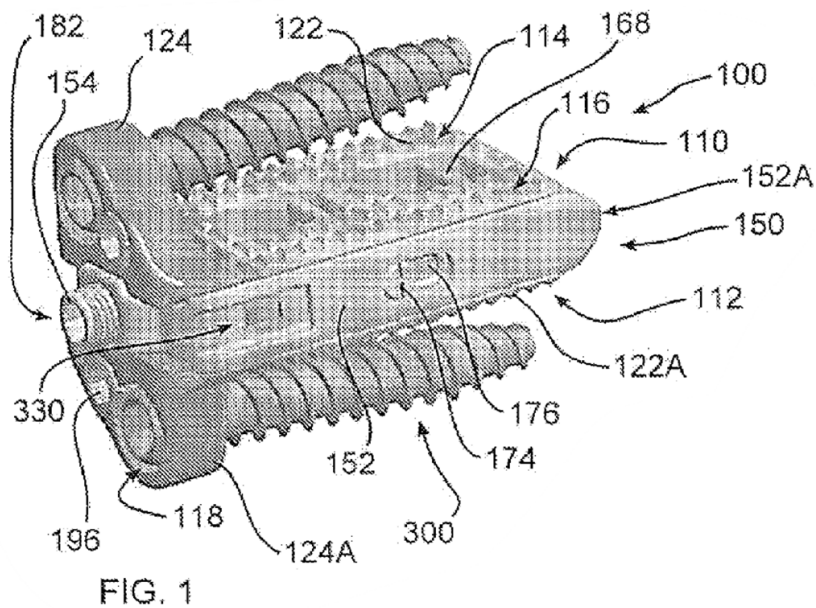


Figure 1 is a perspective view of an expandable vertebral implant according to Seifert in a collapsed position. *Id.* ¶¶ 20, 79. As shown in Figure 1, the expandable vertebral implant comprises spacer 100 having two separable endplates 110, 112. *Id.* ¶ 80. The endplates have a surface 114 “with teeth or other projections 116 which can penetrate body tissue to reduce a likelihood of migration of the spacer 100 after implantation.” *Id.* Seifert states that the “[s]pacer 100 is further secured with one or more fasteners, such as bone screws 300, which pass through an adapter, such as bone screw socket 118 within spacer 100, and into body tissue of the patient.” *Id.*

opening 421 for receiving a bone screw (not shown) for insertion into a bone member and a blocking screw opening 420 for receiving a blocking screw 419.” *Id.*

D. Claim Interpretation

In AIA proceedings we interpret a claim “using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. 282(b).” 37 C.F.R. § 42.100(b). Under this standard, we construe the claim “in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.” *Id.*; *see also Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–19 (Fed. Cir. 2005) (en banc).

Petitioner asserts that no terms require construction “because they are shown to be anticipated and/or obvious regardless of construction.” Pet. 12. Patent Owner did not propose any terms for construction. *See generally* Response.

We determine that no claim terms require express construction to render this Decision.

E. Ground I — Alleged Anticipation/Obviousness Based on Weiman

Petitioner contends that claims 1–3 and 8–10 are unpatentable as anticipated by, or obvious over, Weiman. Pet. 13–30. Patent Owner generally argues in one paragraph, without citing evidence, that (1) Petitioner has not met its burden to show anticipation or obviousness by a preponderance of the evidence for any ground, and (2) Petitioner has failed to show a sufficient rationale for combining references in support of its contentions of obviousness. *See* Response 2. Patent Owner’s arguments are

unavailing because they are not directed to any specific ground, and they identify no particular alleged failing in the prior art or in Petitioner's arguments, and they are not supported by evidence. Nevertheless, the burden remains on Petitioner to prove unpatentability by a preponderance of the evidence as this burden never shifts to Patent Owner. *Dynamic Drinkware*, 800 F.3d at 1378.

After considering all of the arguments and cited evidence of record, we find that Petitioner demonstrates by a preponderance of the evidence that claims 1–3 and 8–10 are unpatentable as anticipated by Weiman.

1. *Independent Claim 1*

Petitioner argues that Weiman discloses each and every limitation of claim 1. *See* Pet. 15–27.

a. *“Preamble - A surgical system”*⁷

Petitioner argues that Weiman discloses a “surgical system” (limitation [i]). *See* Pet. 15–16 (citing Ex. 1004 (Weiman), code (57), Figs. 78–82, ¶ 187; Ex. 1002 (Drewry Decl.) ¶ 199). Mr. Drewry opines that “Weiman discloses an ‘expandable fusion device capable of being installed inside an intervertebral disc space to maintain normal disc spacing and restore spinal stability’” and illustrates a surgical system in Figures 78–82B. Ex. 1002 (Drewry Decl.) ¶ 199 (quoting Ex. 1004 (Weiman), Abstract).

Weiman discloses that its device may be used for a lumbar lateral interbody fusion surgical procedure. *See* Ex. 1004 (Weiman) ¶ 188. We

⁷ Neither party takes a position on whether the preamble to claim 1 is limiting. *See* Pet. 15; Response (*generally*). We determine we need not decide whether the preamble is limiting, because Weiman teaches the preamble.

determine that Petitioner shows by a preponderance of the evidence that Weiman discloses limitation [i].

b. *“limitation [ii] — an implant comprising”*

Petitioner alleges that Weiman discloses “an implant” (limitation [ii]). Pet. 17 (citing Ex. 1004 (Weiman) ¶¶ 89, 185, 188; Ex. 1002 (Drewry Decl.) ¶ 200). Weiman refers to “the implant” or “implantation” of the disclosed expandable fusion device. *See, e.g.*, Ex. 1004 (Weiman) ¶¶ 89, 185. We determine that Petitioner shows by a preponderance of the evidence that Weiman discloses limitation [ii].

c. *“limitation [iii] — a first endplate, wherein the first endplate comprises a planar portion with protrusions and an extension portion”*

d. *“limitation [iv] — a second endplate”*

Petitioner alleges that Weiman discloses a first and second endplate, with the first endplate having “a planar portion with protrusions and an extension portion” (limitations [iii], [iv]). *See* Pet. 17–19 (citing Ex. 1004 (Weiman) ¶¶ 91, 94, 127, 187, 189, Figs. 78–80; Ex. 1002 (Drewry Decl.) ¶¶ 201–210).

We agree with Petitioner that these features are disclosed. Weiman discloses a first endplate 14 (Ex. 1004 (Weiman) ¶ 187), that the upper surface of the first endplate “is flat and generally planar,” (*id.* ¶ 127), and that the first endplate “can include surface texturing, such as teeth, ribbing, grooves and ridges that assist in preventing expulsion of the device in between vertebral members” (*id.* ¶ 189)—i.e., “protrusions.” Pet. 18.

Weiman also discloses an extension portion as upper plate member 604. *See* Pet. 18, citing Ex. 1001, 28:61–63, 29:5–7; Ex. 1004 (Weiman) ¶ 187; Ex. 1002 (Drewry Decl.) ¶¶ 204–208). Specifically, Weiman

discloses that “the fusion device 10 in FIG. 78 also includes additional features, including an upper plate member 604” that can be either “removably attached to the first endplate 14” or “fixedly attached such that it is not removable or detachable.” Ex. 1004 (Weiman) ¶ 187. Weiman’s Figure 79 reproduced below shows the referenced elements:

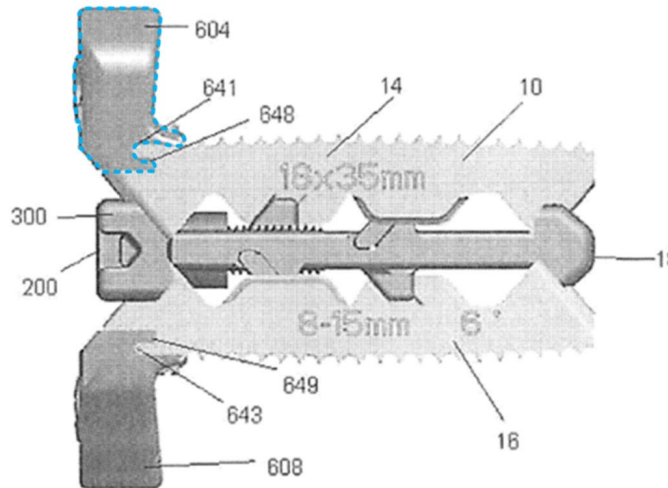


FIG. 79

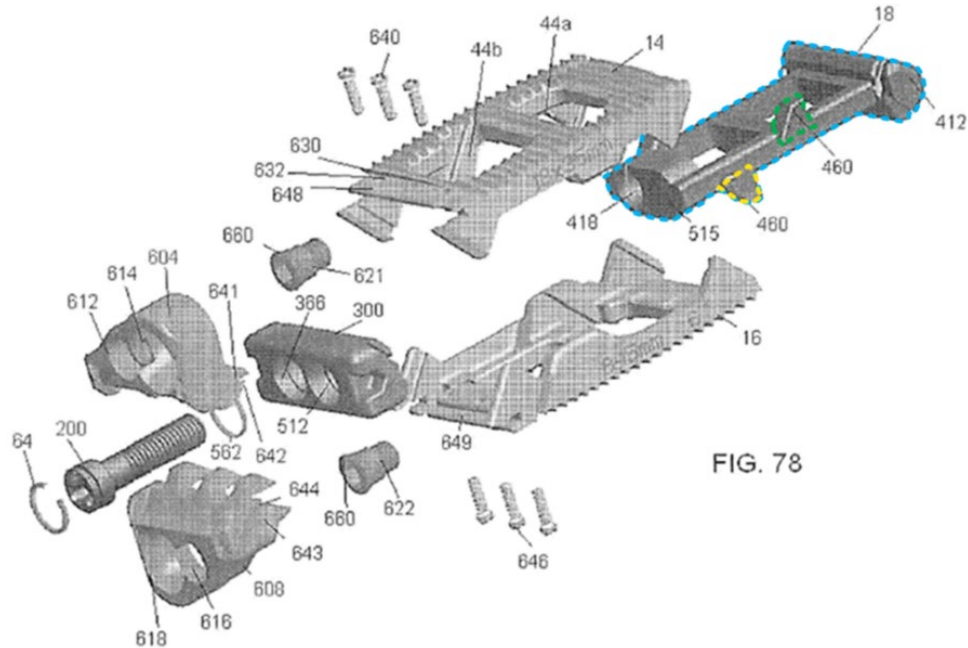
Ex. 1004 (Weiman), Figure 79. Figure 79 shown above is a side view of a spinal fusion device, with upper plate member 604 outlined in blue. *Id.*

¶ 195. We determine that Petitioner shows by a preponderance of the evidence that Weiman discloses limitations [iii] and [iv].

- e. *“limitation [v] — a first ramped body extending between the first endplate and the second endplate, wherein the first ramped body comprises at least one upwardly facing ramp engaging the first endplate and at least one downwardly facing ramp engaging the second endplate”*

Petitioner alleges that Weiman discloses a ramped body extending between the first endplate 14 and second endplate 16 as central ramp 18 with various ramped surfaces 460 (limitation [v]). *See* Pet. 20 (citing Ex. 1004 (Weiman) ¶ 193, Figures 77–80; Ex. 1002 (Drewry Decl.) ¶¶ 211–218.

Petitioner notes that Weiman discloses Figure 78 as an alternative embodiment of an expandable fusion device. Pet. 20 (citing Ex. 1004 (Weiman) ¶ 187). We reproduce Figure 78 below with annotations added by Petitioner.



Pet. 20–21. In its annotated version of Weiman’s Figure 78, above, depicting an exploded version of an intervertebral implant, Petitioner highlights “central ramp 18” in blue, one of the “ramped surfaces 460” in green, and one of the “ramped surfaces 460” in yellow. *Id.* at 20–21. Petitioner alleges that a POSITA would have understood the embodiment of Figure 78 as having a first ramped body (central ramp 18) with an upwardly facing ramp (ramped portion 460, green) engaging the first endplate 14 and a downwardly facing ramp (ramped portion 460, yellow) engaging the second endplate. Pet. 20 (citing Ex. 1002 (Drewry Decl.) ¶¶ 95, 211, 216–218, 273).

We agree with Petitioner that a POSITA would have understood that Weiman’s central ramp 18 is a “first ramped body extending between the

first endplate and the second endplate,” that Weiman’s ramped portion 460 (highlighted in green) is an “upwardly facing ramp engaging the first endplate” 14, and that Weiman’s ramped portion 460 (highlighted in yellow) is a “downwardly facing ramp engaging the second endplate” 16, as recited in limitation [v] of claim 1. *See* Pet. 20–21 (citing Ex. 1002 (Drewry Decl.) ¶ 218). In particular, we note that Weiman discloses that the expandable fusion device may include “a central ramp 18 with ramped surfaces 460,” as shown in Figure 78. Ex. 1004 (Weiman) ¶ 187. And Weiman discloses “the interaction between the various ramps 460 of the central ramp 18 with the ramped surfaces of the adjacent endplates 14, 16.” *Id.* ¶ 186. Petitioner has shown by a preponderance of the evidence that Weiman discloses limitation [v].

- f. *“limitation [vi] — an actuator in engagement with the first ramped body”*
- g. *limitation [vii] — “wherein rotation of the actuator causes translation of the first ramped body, thereby causing expansion of the implant”*

Petitioner alleges that Weiman discloses the actuator and its implant expansion caused by actuator rotation (limitations [vi], [vii]). Pet. 21–23. Petitioner alleges that Weiman discloses “an actuator in engagement with the first ramped body” (limitation [vi]), “wherein rotation of the actuator causes translation of the first ramped body, thereby causing expansion of the implant” (limitation [vii]). *Id.* (citing Ex. 1004 (Weiman) ¶¶ 125, 183, 187, 194, Figure 78; Ex. 1002 (Drewry Decl.) ¶¶ 219–226).

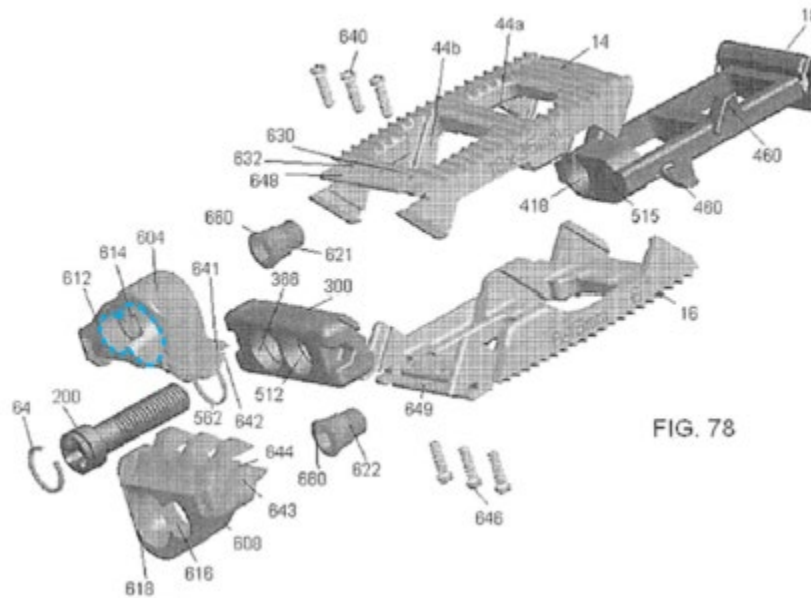
Through Mr. Drewry, Petitioner alleges that Weiman discloses “an actuator assembly 200” that is “operably coupled to the central ramp 18.” Ex. 1002 (Drewry Decl.) ¶ 183. Weiman further discloses that “[t]he

actuator assembly 200 can be used to increase or decrease the height of the fusion device 10,” (*id.* ¶ 194) and that “the actuator assembly 200 functions, in an embodiment, to pull the central ramp 18 and the driving ramp 300 together, which forces apart the first and second endplates 14, 16,” (*id.* ¶ 125). Petitioner alleges that a POSITA “would have understood Weiman as teaching that rotation of the actuator assembly 200 causes translation of the central ramp 18, thereby causing expansion of the fusion device 10.” Pet. 22 (citing Ex. 1002 (Drewry Decl.) ¶¶ 225–226).

After consideration of the evidence and argument, we find that Petitioner has shown by a preponderance of the evidence that Weiman discloses limitations [vi] and [vii].

- h. *limitation [viii] — first socket formed through the extension portion of the first endplate, wherein the first socket extends completely above the planar portion of the first endplate*

Petitioner alleges that Weiman discloses the socket and its extension above the first endplate (limitation [viii]). Pet. 23–25. First, Petitioner alleges that Weiman discloses “a first socket formed through the extension portion of the first endplate, wherein the first socket extends completely above the planar portion of the first endplate” (limitation [viii]). *Id.* (citing Ex. 1004 (Weiman) ¶¶ 191, Figures 78–80, 82A, 82B; Ex. 1002 (Drewry Decl.) ¶¶ 107–108, 227–230). We again reproduce Figure 78, below, with annotations added by Petitioner.



Pet. 23–24. In its annotated version of Weiman’s Figure 78, above, depicting an exploded version of an intervertebral implant, Petitioner identifies the “first opening 614 and second opening 612” in blue as the claimed “first socket.” *Id.* at 23 (citing Ex. 1002 (Drewry Decl.)) ¶¶ 227–230). Petitioner contends that this “first socket” is formed through the “upper plate member 604” of the “first endplate 14,” and thus satisfies the claim language “a first socket formed through the extension portion of the first endplate.” *Id.*

After review of the evidence and argument, we agree with Petitioner that Weiman discloses a socket. As noted above, Weiman’s “first endplate 14” and “upper plate member 604” satisfy the claimed “first endplate” and “extension portion,” respectively. *See supra*, II.E.1(c), (d). Weiman discloses that the “[u]pper plate member 604 comprises a first opening 614 for receiving a bone fastener 654 for inserting into an upper vertebral member, and a second opening 612 for receiving a blocking set screw 621

for preventing back-out of the bone fastener 654 once the bone fastener 654 is inserted into upper plate member 604.” Ex. 1004 (Weiman)¶ 191. We agree with Petitioner on this record that Weiman’s first and second openings, or alternatively that opening 614 alone constitute the claimed “socket.” *See* Pet. 24 (citing Ex. 1002 (Drewry Decl.) ¶¶ 229–230); *see also* Ex. 1001, 49:26–29 (stating that “fasteners, such as anchors . . . pass through an adaptor, such as [a] socket”).

Petitioner further argues that Weiman discloses that the first and second openings ““extend[] completely above the planar portion of the first endplate”” as recited in limitation [viii]. Pet. 24 (citing Ex. 1004 (Weiman) Figures 78–80, 82A, 82B; Ex. 1002 (Drewry Decl.) ¶ 228). In this regard, Petitioner relies on, e.g., Figure 79, reproduced below.

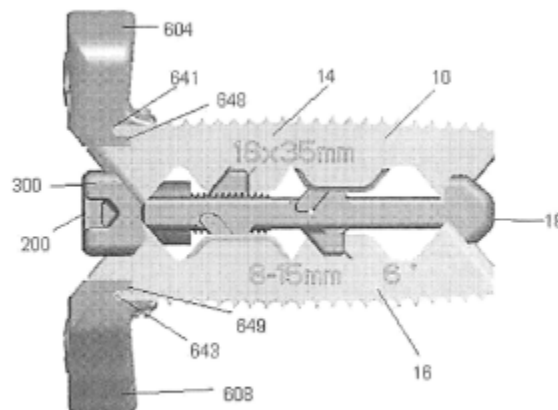


FIG. 79

Pet. 24. Figure 79, reproduced above, is a side view of Weiman's expandable fusion device. Ex. 1004 (Weiman) ¶ 83. Mr. Drewry states, and we agree, that this illustration shows that the upper plate member 604 extends completely above the planar portion of the first endplate 14. Ex. 1002 (Drewry Decl.) ¶ 228. And, because the first opening 614 and

second opening 612 are formed through the upper plate member 604, we also agree with Mr. Drewry that the first opening 614 and second opening 612 also extend completely above the planar portion of the first endplate 14. *Id.*; *see also* Pet. 23–24. For these reasons, Petitioner has shown by a preponderance of the evidence that Weiman discloses limitation [viii].

- i. *limitation [ix] — a first anchor configured to fasten the implant to the patient, wherein the anchor is received in the first socket*

Petitioner alleges that Weiman discloses an anchor configured to fasten the implant to the patient as recited in limitation [ix]. Pet. 25–27. Building on its allegations that Weiman’s first and second openings 614, 612 in the upper plate member 604 constitute a “socket” as claimed in the ’087 patent, Petitioner alleges that Weiman discloses that the first opening 614 “receiv[es] a bone fastener 654 for inserting into an upper vertebral member.” Pet. 25 (citing Ex. 1004 (Weiman) ¶¶ 187, 191; Ex. 1002 (Drewry Decl.) ¶ 231). Weiman does not specifically use the term “anchor,” but Petitioner, through Mr. Drewry, articulates that a POSITA would have readily understood that Weiman’s “bone fastener 654” is an “anchor” as claimed. *Id.* at 26 (citing Ex. 1002 (Drewry Decl.) ¶¶ 232–233). Petitioner further alleges that it would have been obvious to a POSITA to use other types of known fasteners in Weiman’s device. *Id.* (citing Ex. 1020 (Schoenly⁸) ¶ 8, Figure 1A; Ex. 1002 (Drewry Decl.) ¶¶ 234–238).

After review of the evidence and argument, we determine that Weiman discloses the “anchor” recited in limitation [xiii], e.g., Weiman’s

⁸ Schoenly, Jared et al, WO 2012/121726 A1, published September 13, 2012 (Ex. 1020, “Schoenly”).

fasteners and bone screws, such as “bone fastener 654.” *See* Ex. 1002 (Drewry Decl.) ¶¶ 231–232; Ex. 1004 (Weiman) ¶ 187 (“The upper plate member 604 and the lower plate member 608 are advantageously configured to receive a fastener or bone screw (as shown in FIG. 80).”). The written description of the ’087 patent itself identifies “anchors 1006” as “fasteners.” *See* Ex. 1001, 48:56–59 (stating that “[a]nchors 1006 may be used as fasteners in order to attach device 1000 to the patient”). For these reasons, we agree with Petitioner on this record that Weiman discloses “a first anchor configured to fasten the implant to the patient, wherein the anchor is received in the first socket,” as recited in limitation [ix], even though Weiman does not specifically use the term “anchor.”

We further agree that it would have been obvious to a POSITA to substitute other known types of anchors for Weiman’s “bone fastener 654.” Pet. 26 (citing Ex. 1020 (Schoenly) ¶ 8, Figure 1A; Ex. 1002 (Drewry Decl.) ¶¶ 234–238). For example, prior art reference Schoenly discloses a “bone anchor 99a” configured to “provide locking fixation between the implant and the underlying bone.” Ex. 1020 (Schoenly) ¶ 62. For these reasons, we determine that Petitioner has shown by a preponderance of the evidence that Weiman discloses limitation [ix].

j. *Conclusion on Claim 1*

For the above reasons, we determine that Petitioner has shown by a preponderance of the evidence that Weiman discloses each and every limitation of claim 1, and therefore anticipates claim 1.

2. *Independent claim 8*

As noted above, challenged independent claim 8 is identical to claim 1, except that it does not recite that “the first ramped body comprises at least

one upwardly facing ramp engaging the first endplate and at least one downwardly facing ramp engaging the second endplate.” *Supra* § I.E. Claim 8, therefore, is broader in scope than claim 1. Having determined that Petitioner has shown by a preponderance of the evidence that Weiman discloses each and every limitation of claim 1, we also determine that Petitioner has shown by a preponderance of the evidence that Weiman discloses each and every limitation of claim 8. *See* Pet. 28–30 (referring to its analysis of the same limitations in claim 1).

3. *Dependent claims*

Claims 2 and 3 depend, either directly or indirectly, from claim 1, and claims 9 and 10 depend, either directly or indirectly, from claim 8. We have reviewed Petitioner’s arguments and supporting evidence as to these claims, and find Petitioner has shown by a preponderance of the evidence that Weiman discloses all limitations of dependent claims 2, 3, 9, and 10. *See* Pet. 27–28, 30 (citing Ex. 1002 (Drewry Decl.) ¶¶ 187, 191; Ex. 1004 (Weiman) ¶¶ 227–242, 251–253).

4. *Conclusion for Ground I*

For all of the above reasons, we find that Petitioner demonstrates by a preponderance of the evidence that Weiman expressly discloses all limitations of claims 1–3 and 8–10, and therefore anticipates these claims. Because we conclude that Weiman anticipates claims 1–3 and 8–10, we do not reach the issue of whether Weiman renders these claims unpatentable as obvious.

F. Ground II — Alleged Obviousness Based on Weiman and Mozeleski

Petitioner contends that claims 4–7 and 11–14⁹ are unpatentable as obvious over Weiman and Mozeleski. Pet. 30–43. Patent Owner generally denies Petitioner has met its burden of proof. *See* Response 2. After considering all of the arguments and cited evidence of record, we find that Petitioner demonstrates by a preponderance of the evidence that claims 4–7 and 11–14 are unpatentable as obvious over Weiman and Mozeleski.

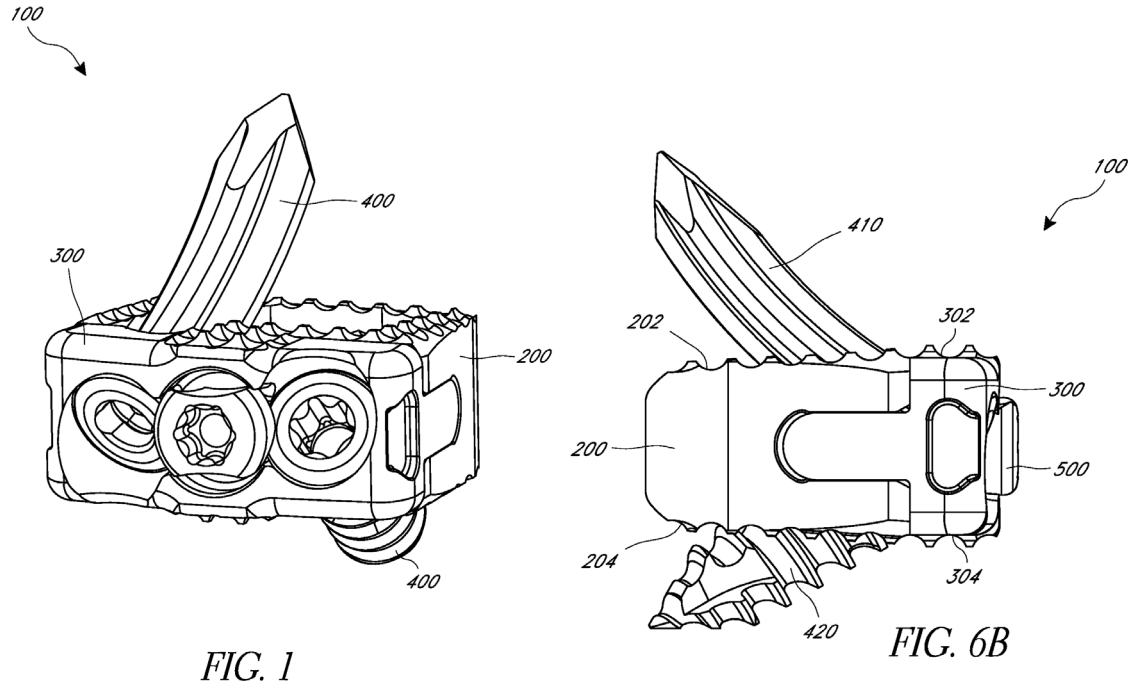
1. Petitioner’s General Allegations

Petitioner alleges that a POSITA would have found it obvious to combine Weiman and Mozeleski and would have had a reasonable expectation of success in doing so. Pet. 34–35. With regard to the combination, Petitioner alleges that Mozeleski is, like Weiman, directed to “systems, devices, and methods for disc replacement surgeries.” Pet. 30 (citing Ex. 1006 (Mozeleski) ¶¶ 2, 57; Ex. 1002 (Drewry Decl.) ¶¶ 113–139). Petitioner alleges that a POSITA would have had reason to combine Weiman and Mozeleski because both references are directed to intervertebral devices and methods of installing the devices, including installation in a manner that would “facilitate fusion of adjacent vertebrae.” *Id.* at 34 (citing Ex. 1001, 1:14–15; Ex. 1004 (Weiman) ¶ 2; Ex. 1006 (Mozeleski) ¶ 2; Ex. 1002 (Drewry Decl.) ¶ 141). For this reason, Petitioner argues that Weiman and Mozeleski are analogous references and that a

⁹ Petitioner identifies Ground II as directed to claims “4–7 and 11–14” on page 4 of the Petition, but as directed to claims “4–7 and 11–13” on page 30 of the Petition. Because Petitioner presents a substantive analysis of claim 14 under this Ground, we consider the identification of claims 4–7 and 11–13 on page 30 to be a typographical error. *See* Pet. 42–43.

POSITA would have consulted references in this field when looking for solutions to problems involving a need to fuse adjacent vertebrae. *Id.* (citing Ex. 1002 (Drewry Decl.) ¶¶ 143–148).

Petitioner further argues that Weiman and Mozeleski use complementary mechanisms for achieving vertebral fusion, such that “[t]he first opening 614 of Weiman is capable of receiving the bone blade 410 of Mozeleski.” *Id.* (citing Ex. 1004 (Weiman) ¶ 191; Ex. 1006 (Mozeleski) ¶ 74; Ex. 1002 (Drewry Decl.) ¶ 144). Figures 1 and 6B of Mozeleski are reproduced below:



Ex. 1006 (Mozeleski) Figures 1, 6B. Figure 1 illustrates a perspective view of an embodiment of a “modular cage system¹⁰” while Figure 6B illustrates

¹⁰ A “modular cage system” is an intervertebral cage used in spinal disc replacement. See Ex. 1006 (Mozeleski) codes (54), (56).

a side view of an embodiment of a modular cage system. *Id.* ¶¶ 32, 38. The bone blade 410 is shown from the side view in Figure 6B. *Id.* ¶ 74.

Petitioner argues, through Mr. Drewry, that a POSITA “would have found it obvious to use the bone blade 410 of Mozeleski to include a known, alternative mechanism for insertion into a vertebral member.” *Id.* at 35 (citing Ex. 1022 (Drewry Decl.) ¶¶ 144–148). Petitioner argues that a POSITA would have been motivated to use Mozeleski’s bone blade 410 in place of Weinman’s bone fastener because “the bone blade 410 can engage a vertebra in a different manner and orientation than a bone screw and . . . a bone blade can engage a vertebra via translation without rotation of the bone blade 410,” and because a POSITA would have found this benefit “desirable for certain applications.” *Id.* (citing Ex. 1006 (Mozeleski) ¶¶ 74–75; Ex. 1002 (Drewry Decl.) ¶¶ 146–147). Mr. Drewry opines that a POSITA “would have had a reasonable expectation of success in making such a modification of Weiman.” Ex. 1002 (Drewry Decl.) ¶ 148.

Patent Owner generally denies that Petitioner has shown a sufficient rationale for combining references in support of its contentions of obviousness. *See* Response 2. We disagree. Petitioner has established, for the reasons stated above and in light of the supporting evidence cited by Petitioner, that a POSITA would have considered Weiman and Mozeleski analogous references with similar goals, and would have been motivated to combine their similar teachings to improve fusion capability in circumstances where fixing a vertebra in a different manner or orientation was necessary. *See* Pet. 34–35 (citing Ex. 1001, 1:14–15, 5:65–6:1; Ex. 1002 (Drewry Decl.) ¶¶ 140–148; Ex. 1004 (Weiman) ¶¶ 6, 191; Ex. 1006 (Mozeleski) ¶¶ 2, 7, 74, 75).

We next analyze Petitioner's allegations regarding obviousness of each claim individually below.

2. *Claims 4–7 and 11–14*

- a. *Claims 4, 11 — “at least one of the first anchor and the second anchor is curved and configured to pierce a bone of the patient to fasten the implant to the patient”*

Petitioner alleges that Weiman and Mozeleski disclose each and every limitation of claims 4 and 11. *See* Pet. 35–36, 41. Petitioner cites Mozeleski's disclosures that “[i]n some embodiments, bone blades 410 are curved, allowing the bone blade 410 to engage a vertebra in a different manner and orientation than a bone screw 420” and that “the bone engaging portion 414 of the bone blade 410 can include a curve along its central axis” for teaching the limitation requiring that an anchor be curved and configured to pierce the patient's bone for fastening the implant to the patient. *Id.* at 35–36 (citing Ex. 1006 (Mozeleski) ¶¶ 74, 75). Petitioner, through Mr. Drewry, alleges that because “a bone blade 410 is configured to engage a vertebra via translation without rotation of the bone blade 410,” this allows the blade “to pierce a vertebra and aid in the insertion of the bone blade 410 into a vertebra.” *Id.* (citing Ex. 1002 (Drewry Decl.) ¶¶ 254–258). Mr. Drewry further opines that a POSITA would have understood that the “orientation of engagement is one reason why the bone blade 410 would be desirable in certain applications where a bone screw would be undesirable” and further would have “understood that Mozeleski is therefore teaching that the bone blades 410 are utilized in applications where the shape/configuration of a bone screw would be undesirable.” *Id.* (citing Ex. 1002 (Drewry Decl.) ¶¶ 254–258).

For the above reasons, we find that Petitioner has shown by a preponderance of the evidence that the combined teachings of Weiman and Mozeleski render claims 4 and 11 unpatentable as obvious.

- b. *Claims 5 and 12 — “at least one of the first anchor and the second anchor is configured to have a t-shaped cross-section and sharp edges to pierce the bone of the patient to fasten the spacer to the patient”*

Petitioner alleges that Weiman and Mozeleski disclose each and every limitation of claims 5 and 12. *See* Pet. 36–38, 41. Petitioner cites Mozeleski’s disclosures that the “bone engaging portion 414 of the bone blade 410 can include a cross sectional shape configured to translate through bone” and that “the bone blade 410 can include a major rib 416” and “minor rib 418.” *Id.* at 36 (citing Ex. 1006 (Mozeleski) ¶ 75). Petitioner alleges that Mozeleski explains that, in one proposed orientation of the major and minor ribs, the bone blade 410 would have a t-shaped cross section. *Id.* at 37 (citing Ex. 1006 (Mozeleski) ¶ 75 (“[i]n some embodiments, the major rib 416 is substantially perpendicular to the minor rib 418 along the curve of the bone engaging portion 414”)). Petitioner, through Mr. Drewry, alleges that a POSITA would have understood that Mozeleski’s perpendicular embodiment would result in a t-shaped bone blade 410, as shown below in Petitioner’s annotated Figure 6B of Mozeleski and accompanying diagram.

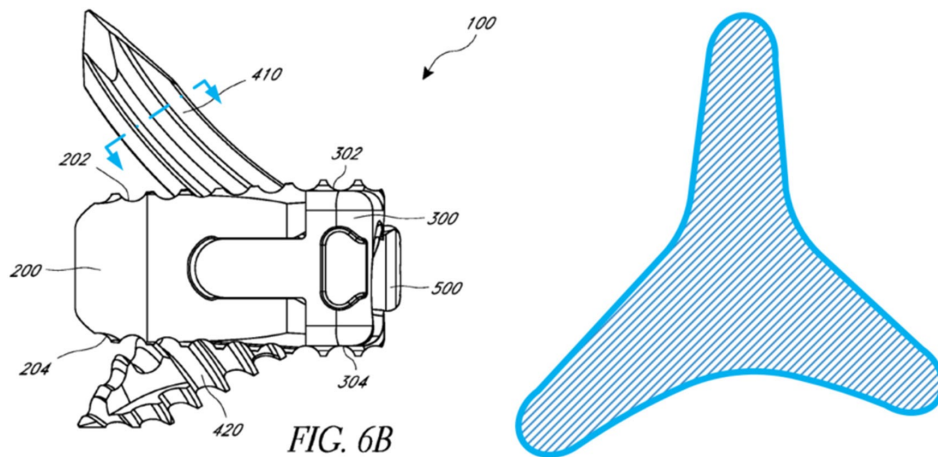


Figure 6B of Mozeleski, shown above, depicts an intervertebral fusion device using a bone blade, and the diagram to the right is Mr. Drewry's representation of the shape of the device in the perpendicular embodiment. Pet. 36–37 (citing Ex. 1006 (Mozeleski)) ¶ 75; Ex. 1002 (Drewry Decl.) ¶¶ 259–272). Mr. Drewry further opines that because “use of t-shaped anchors was conventional,” a POSITA would have “found it obvious to modify the bone blade 410 of Mozeleski to have a t-shaped cross-section and sharp edges to pierce the bone of the patient to fasten the spacer to the patient.” See Ex. 1002 (Drewry Decl.) ¶¶ 266–272 (citing Ex. 1032 (Donner¹¹) 10:22–26, and Figures 6A, 7A–7J as an example of “an intervertebral implant system 100 with arcuate bone fixation members 12D that have a t-shaped cross-section”).

For the above reasons, we find that Petitioner has shown by a preponderance of the evidence that the combined teachings of Weiman and Mozeleski render claims 5 and 12 unpatentable as obvious.

¹¹ Donner et al., U.S. Patent No. 8,641,766 B2, issued Feb. 2, 2014 (Ex. 1032, “Donner”).

- c. *Claims 6 and 13* — “the implant is configured to expand in a manner such that the first endplate and the second endplate are parallel.”

Petitioner alleges that the combined teachings of Weiman and Mozeleski disclose each and every limitation of claims 6 and 13. *See* Pet. 39, 41. Petitioner alleges that Weiman discloses in Figure 79 that its fusion device 10 expands “such that the first endplate 14 is separated from the second endplate 16,” which is a “straight rise expansion of the first endplate 14 and the second endplate 16 where the endplates are parallel.” *Id.* (citing Ex. 1004 (Weiman) ¶¶ 103, 195). Figure 79 of Weiman is reproduced below:

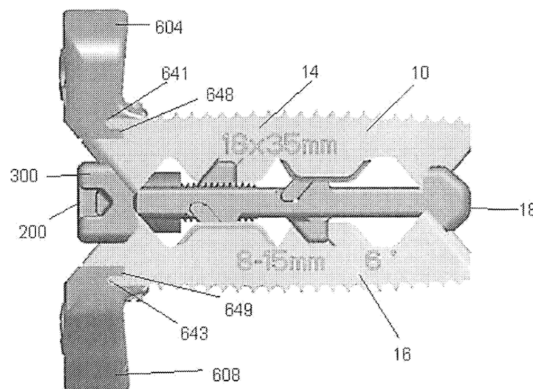


FIG. 79

Ex. 1004 (Weiman). Figure 79 above is a side view of an embodiment of Weiman's intervertebral fusion device. *Id.* ¶ 195.

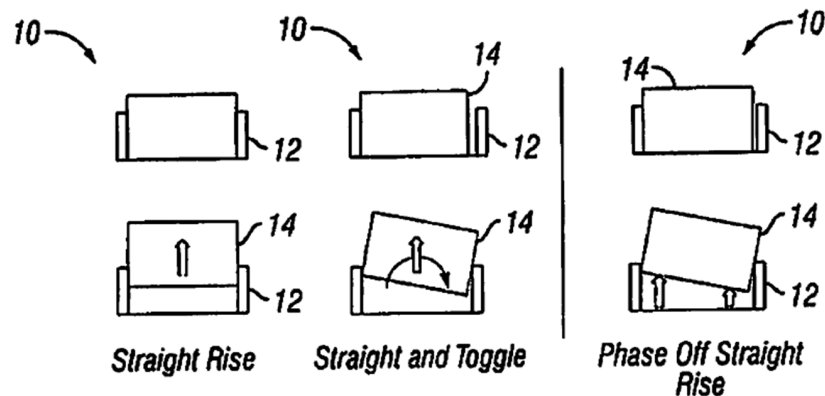
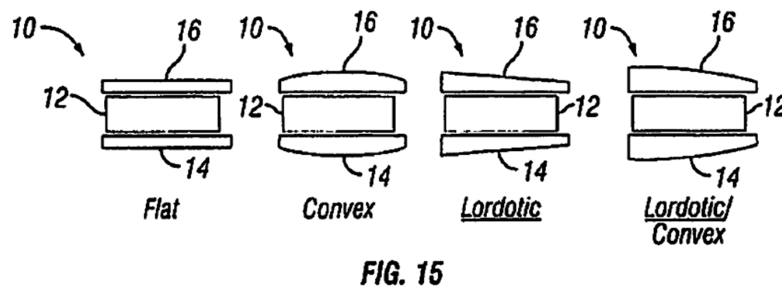
Mr. Drewry opines that Figure 79 of Weiman illustrates a straight rise expansion in the expanded state, which would have informed a POSITA that that “the fusion device is expanded in a manner such that the first endplate 14 and the second endplate 16 are parallel.” Ex. 1002 (Drewry Decl.) ¶ 274. Mr. Drewry further opines that Weiman's Figure 16 illustrates multiple ways that a fusion device can be expanded, with straight rise being one. *Id.* ¶ 275.

Mr. Drewry opines that a POSITA would have understood that an expansion of this type was compatible with use of Mozeleski's bone blades. *Id.*

For the above reasons, we find that Petitioner has shown by a preponderance of the evidence that the combined teachings of Weiman and Mozeleski render claims 6 and 13 unpatentable as obvious.

- d. *Claim 7 — “the implant is configured to expand in a manner such that the first endplate and the second endplate are non-parallel”*

Petitioner alleges that Weiman and Mozeleski disclose each and every limitation of claim 7. *See* Pet. 40–41. Petitioner cites in support Weiman Figures 15 and 16, reproduced below.



Pet. 40–41. Figure 15 of Weiman is a side schematic view of an expandable fusion device having different endplates. Ex. 1004 (Weiman) ¶ 24. Figure 16 is a partial side schematic view of an expandable fusion device showing different modes of endplate expansion. *Id.* ¶ 25. Petitioner cites Figure 16 of Weiman as disclosing expansion of the end plate in a nonlinear fashion and Figure 15 as showing curvature options of the endplate. Pet. 40–41. Petitioner alleges that Weiman discloses that “the endplates 14, 16 can be expanded in any of the following ways: straight rise expansion, straight rise expansion followed by a toggle into a lordotic expanded configuration, or a phase off straight rise into a lordotic expanded configuration” and also that “the upper surface 40 can be generally planar but includes a generally straight ramped surface or a curved ramped surface,” and that the “ramped surface allows for engagement with the adjacent vertebral body 2 in a lordotic fashion.” Pet. 40–41 (citing Ex. 1004 (Weiman) ¶¶ 94, 103, 109, 127, 141, 156, 170; Ex. 1002 (Drewry Decl.) ¶¶ 278–282). Mr. Drewry opines that a POSITA would have had significant knowledge regarding the reasons for using expandable fusion devices and the related surgical procedures. *See* Ex. 1002 (Drewry Decl.) ¶¶ 65–70. Mr. Drewry further opines that Weiman’s disclosures would permit the implants to engage with the vertebral bodies in different configurations, including “to provide lordosis (tilting toward the back of the spine) when expanded.” *See* Ex. 1002 ¶¶ 278–279.

Petitioner alleges that Mozeleski reinforces that expansion of the implant in a manner with non-parallel first and second endplates is “nothing more than mere design choice” and teaches that the upper surface of its vertebral cage can be angled relative to the lower surface. *Id.* at 41 (citing

Ex. 1006 (Mozeleski) ¶¶ 65, 70; Ex. 1002 (Drewry Decl.) ¶ 280).

Mr. Drewry opines that a POSITA “would have recognized Mozeleski as also teaching the benefits of angling surfaces,” would have found it obvious to modify Weiman to configure it to permit non-parallel endplates, and would have understood that this modification would not prevent the use of Mozeleski’s curved bone blade. Ex. 1002 (Drewry Decl.) ¶¶ 278–282.

For the above reasons, we find that Petitioner has shown by a preponderance of the evidence that the combined teachings of Weiman and Mozeleski render claim 7 unpatentable as obvious.

- e. *Claim 14 — “the implant is configured to expand in a manner such that the first endplate and the second endplate are non-parallel”*

Petitioner incorporates its allegations regarding claim 7 in alleging that Weiman and Mozeleski disclose each and every limitation of claim 14. *See* Pet. 42–43 (citing Ex. 1002 (Drewry Decl.) ¶¶ 140–148, 278–282, 289–293). However, due to the dependence of claim 14 from claim 13, Petitioner notes that claim 14 requires that the implant be configured to expand in a manner permitting the first and second endplates to be parallel and also non-parallel. *Id.* at 42. Petitioner argues that “a POSITA would have understood claim 14 to require that the first endplate and second endplate are parallel at one time during the expansion and non-parallel at another time during the expansion.” *Id.* (citing Ex. 1002 (Drewry Decl.) ¶ 291). Based on this understanding, Petitioner argues that Weiman discloses such an expansion, when describing “the ‘straight rise expansion followed by a toggle into a lordotic expanded configuration’ or the ‘phase off straight rise into a lordotic expanded configuration.’” *Id.* (citing Ex. 1004 (Weiman) ¶¶ 103, 156, 170, Figure 16; Ex. 1002 (Drewry Decl.) ¶ 292). Mr. Drewry opines that a

POSITA would have understood Weiman’s disclosure cited above to describe expansion in a manner permitting the first and second endplates to be parallel and also non-parallel. Ex. 1002 (Drewry Decl.) ¶ 292.

For the above reasons, we find that Petitioner has shown by a preponderance of the evidence that the combined teachings of Weiman and Mozeleski render claim 14 unpatentable as obvious.

3. *Conclusion for Ground II*

For all of the above reasons, we find that Petitioner demonstrates by a preponderance of the evidence that claims 4–7 and 11–14 are unpatentable as obvious over the combination of Weiman and Mozeleski.

G. *Grounds III–VI*

In our analysis of Grounds I and II above, we have concluded that all of challenged claims 1–14 are either anticipated by Weiman or obvious over the combination of Weiman and Mozeleski. Accordingly, we need not reach Grounds III–VI. *See Bos. Sci. Scimed, Inc. v. Cook Grp. Inc.*, 809 F. App’x 984, 990 (Fed. Cir. 2020) (non-precedential) (recognizing that the “Board need not address issues that are not necessary to the resolution of the proceeding” and, thus, agreeing that the Board has “discretion to decline to decide additional instituted grounds once the petitioner has prevailed on all its challenged claims”).

III. PATENT OWNER’S REVISED MOTION TO AMEND

A. *Procedural History*

Pursuant to 35 U.S.C. § 316(d)(1) and 37 C.F.R. § 42.121(a), Patent Owner filed a RMTA stating that, if claims 1–14 are found unpatentable, Patent Owner “requests the Board grant this Revised Motion,” issue the corresponding substitute claims 15–23, and amend claims 4 and 13 to

depend from substitute claims 15 and 18, respectively. RMTA 1–2. Having determined that Petitioner has shown by a preponderance of the evidence that original claims 1–14 of the '087 patent are unpatentable, we address Patent Owner's RMTA.

Patent Owner proposes substitute claims 15–23 to replace challenged patent claims 1–3, 5, and 8–12, and proposes to amend claims 4 and 13 to depend from substitute claims 15 and 18, respectively. Proposed substitute claims 15–23, as well as proposed amended claims 4 and 13, together with original claims 6, 7, and 14, are provided by Patent Owner in the Claims Appendix of the RMTA. *See* RMTA App. A.

As a preliminary matter regarding the proposed amendment of claims 4 and 13, we note that 35 U.S.C. § 316(d)(1) and 37 C.F.R. § 42.121(a) provide for amending the patent by proposing substitute claims for each challenged patent claim. Section 316(d)(1) provides:

(d) Amendment of the Patent.

(1) In general.—During an inter partes review instituted under this chapter, the patent owner may file 1 motion to amend the patent in 1 or more of the following ways:

(A) Cancel any challenged patent claim.

(B) For each challenged claim, propose a reasonable number of substitute claims.

Thus, where the motion is styled as contingent, the proper approach is for Patent Owner to provide substitute claim(s) proposed to replace the challenged claim in the event that claim is found unpatentable. Our procedures do not permit amending claims, as Patent Owner attempts here, to change the dependency of claims that have been found unpatentable such that they retain the original numbering of that unpatentable claim. Thus, we do not consider the proposed amendments to claims 4 and 13. *See*

Consolidated Trial Practice Guide¹²; *see also Lectrosonics, Inc. v. Zaxcon, Inc.*, IPR2018-01129 Paper 15, 8 (PTAB Feb. 25, 2019) (precedential).

Additionally, we do not consider original claims 6, 7, and 14, given that we have already determined above that Petitioner has shown by a preponderance of the evidence that these claims are unpatentable. Accordingly, we focus our discussion here on proposed substitute claims 15–23, the only substitute claims that are properly before us pursuant to 35 U.S.C. § 316(d)(1) and 37 C.F.R. § 42.121(a).

For the reasons discussed below, Patent Owner has shown that proposed substitute claims 15–23 meet the statutory and regulatory requirements set forth in 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121. However, as discussed below, we conclude that Petitioner has proven by a preponderance of the evidence that proposed substitute claims 15–23 are each unpatentable over the prior art of record. Therefore, we *deny* Patent Owner’s Revised Motion to Amend.

B. Principles of Law

In an *inter partes* review, amended claims are not added to a patent as of right, but rather must be proposed as a part of a motion to amend claims.

¹² The PTAB Consolidated Trial Practice Guide (Nov. 2019) (“CTPG”) states:

Contents of Motion to Amend: . . . Where a motion seeks to replace an original patent claim with a new claim, the new claim should be identified as a proposed substitute claim, specifying the original claim for which the new claim is a proposed substitute, with all changes relative to the original claim clearly identified and discussed.

CTPG, 67 (available at <https://www.uspto.gov/TrialPracticeGuideConsolidated>).

35 U.S.C. § 316(d). Ordinarily, the petitioner “bears the burden of persuasion to show, by a preponderance of the evidence, that any proposed substitute claims are unpatentable.” 37 C.F.R. § 42.121(d)(2); *Lectrosonics*, Paper 15, 3–4.

Before considering the patentability of the substitute claims, we first must determine whether the motion to amend meets the statutory and regulatory requirements set forth in 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121. *Lectrosonics*, Paper 15 at 4. In that regard, Patent Owner bears the burden of persuasion to show that: (1) the amendment proposes a reasonable number of substitute claims; (2) the amendment responds to a ground of unpatentability involved in the trial; (3) the amendment does not seek to enlarge the scope of the claims of the patent or introduce new subject matter; and (4) the original disclosure sets forth written description support for each proposed substitute claim. *Id.*; 35 U.S.C. § 316(d); 37 C.F.R. § 42.121(d)(1).

C. The Proposed Substitute Claims

Patent Owner proposes to amend the '087 patent by adding new claims 15–23 as respective substitutes for original claims 1–3, 5, and 8–12. *See* RMTA 1–2, App. A. Claim 15 is proposed as a substitute for original claim 1 and is reproduced below, with underlining reflecting subject matter added to original claim 1, and strike-through reflecting deleted language.

~~1~~15. A surgical system comprising:

an implant comprising:

a first endplate having a longitudinal axis,
wherein the first endplate comprises a planar portion
with protrusions and an extension portion;

a second endplate having a second longitudinal axis, wherein the second endplate comprises a planar portion with protrusions and an extension portion;

a first ramped body extending between the first endplate and the second endplate, wherein the first ramped body comprises at least one upwardly facing ramp engaging the first endplate and at least one downwardly facing ramp engaging the second endplate;

a second ramped body extending between the first endplate and the second endplate, wherein the second ramped body comprises at least one upwardly facing ramp engaging the first endplate and at least one downwardly facing ramp engaging the second endplate;

an actuator in engagement with the first ramped body and the second ramped body, wherein rotation of the actuator causes translation of at least one of the first ramped body and the second ramped body, thereby causing expansion of the implant; and

a first socket formed through the extension portion of the first endplate, wherein the first socket extends completely above the planar portion of the first endplate and has a first socket axis that extends through the first socket; and

a second socket formed through the extension portion of the second endplate, wherein the second socket extends completely above the planar portion of the second endplate and has a second socket axis that extends through the second socket;

a first anchor configured to fasten the implant to the patient, wherein the anchor is received in the first socket; and

a second anchor configured to fasten the implant to the patient, wherein the second anchor is received in the second socket,

wherein the first socket axis and the longitudinal axis of the first endplate are oblique such that the first socket axis

is horizontally offset from the longitudinal axis at an angle of from 5° to 45°, and

wherein the second socket axis and the second longitudinal axis of the second endplate are oblique such that the second socket axis is horizontally offset from the second longitudinal axis at an angle of from 5° to 45°.

RMTA App. A, 1–3.

Independent claim 18 is proposed as a substitute for original independent claim 8. RMTA App. A, 4–6. Proposed substitute claim 18 contains many of the same newly added limitations as proposed substitute claim 15. *Compare* Mot. App. A, 1–3, *with id.* at 4–6. To avoid repetition, we address only the two differences. First, unlike proposed substitute claim 15, proposed substitute claim 18 recites that “rotation of the actuator causes translation of at least one of the first ramped body and the second ramped body toward the other of the first ramped body and the second ramped body.” *Id.* at 5. Second, instead of a first “anchor” as recited in proposed substitute claim 15, proposed substitute claim 18 recites a first “screw.” *Id.* The remaining proposed substitute claims depend directly or indirectly from proposed substitute claims 15 and 18. *See* RMTA App. A, 3–4 and 6–7.

D. Statutory and Regulatory Requirements

1. *Reasonable number of substitute claims*

A motion to amend must “propose a reasonable number of substitute claims.” 35 U.S.C. § 316(d)(1)(B); *see also* 37 C.F.R. § 42.121(a)(3) (“A motion to amend may cancel a challenged claim or propose a reasonable number of substitute claims.”). “There is a rebuttable presumption that a reasonable number of substitute claims per challenged claim is one (1)

substitute claim.” *Lectrosonics*, Paper 15 at 4; *see also* 37 C.F.R.

§ 42.121(a)(3). Patent Owner proposes no more than one substitute claim for each challenged claim. *See* RMTA 5, App. A. Petitioner does not contend that Patent Owner proposes more than a reasonable number of substitute claims. *See generally* RMTA Opp. We determine that Patent Owner proposes a reasonable number of substitute claims.

2. *Respond to ground of unpatentability*

“A motion to amend may be denied where . . . [t]he amendment does not respond to a ground of unpatentability involved in the trial.” 37 C.F.R. § 42.121(a)(2)(i). The Petition asserts that challenged claims 1–14 are unpatentable over prior art. As shown above in marked-up claim 1, through the RMTA, Patent Owner has sought to add features to the substitute claims to distinguish over the prior art. “A revised MTA includes one or more new proposed substitute claims in place of previously presented substitute claims, and may provide new arguments and/or evidence as to why the revised MTA meets statutory and regulatory requirements for an MTA.” Notice Regarding a New Pilot Program Concerning Motion to Amend Practice and Procedures in Trial Proceedings under the America Invents Act before the Patent Trial and Appeal Board, 84 Fed. Reg. 9,497, 9,501 (Mar. 15, 2019). At least one amendment presented is responsive to a ground of unpatentability because Patent Owner seeks to “add limitations not found in the prior art relied on by Petitioner,” and asserts that the substitute “claims would not have been obvious over Weiman alone or in view of Seifert.” *See* RMTA 2, 19–23. Petitioner does not argue that the proposed amendments to the substitute claims are not responsive to a ground of unpatentability.

Because the amendments attempt to distinguish over at least Weiman and Seifert, we determine that the proposed amendments respond to a ground of unpatentability involved in this trial.

3. *Does not enlarge the scope of the claims*

An amendment may not enlarge the scope of the claims of the patent. 35 U.S.C. § 316(d)(3); 37 C.F.R. §§ 42.121(b)(1), 42.121(b)(2). Patent Owner asserts that the proposed substitute claims do not enlarge the scope of the challenged claims. RMTA 2–3. Petitioner does not contend that any proposed substitute claim enlarges the scope of any challenged patent claim. *See generally* RMTA Opp. We determine that each proposed substitute claim includes narrowing limitations and therefore does not enlarge the scope of the challenged claims.

4. *New matter*

An amendment may not introduce new subject matter. 35 U.S.C. § 316(d)(3); 37 C.F.R. §§ 42.121(b)(1), 42.121(b)(2). New matter is any addition to the claims that lacks sufficient support in the subject patent’s original disclosure. *See TurboCare Div. of Demag Delaval Turbomach. v. Gen. Elec. Co.*, 264 F.3d 1111, 1118 (Fed. Cir. 2001) (“When [an] applicant adds a claim . . . , the new claim[] must find support in the original specification.”). Patent Owner also is required to show written description support in “the original disclosure of the patent for each claim that is . . . amended,” and in “an earlier-filed disclosure for each claim for which benefit of the filing date of the earlier filed disclosure is sought.” 37 C.F.R. § 42.121(b).

According to Patent Owner, the original disclosure of “the ’087 patent corresponds to U.S. Patent App. 15/144,054 (‘the ’054 application’).”

RMTA, 6 (citing Ex. 2003 ('054 application)). Patent Owner asserts that “the '054 application is a third patent application in a series of patent applications, with the '054 application claiming priority to [U.S. Patent App. 14/802,229] the '229 application (the '229 application) and [U.S. Patent App. 15/097,466] the intervening '466 application (the second application) as a continuation-in-part.” *Id.* (citing Exs. 2001 ('229 application); 2002 ('466 application)). Patent Owner contends that “all of the '229, '466, and '054 applications provide written description support for the proposed substitute claims.” RMTA 7.

Having considered the original disclosure of the '087 patent and the disclosure in the priority applications, we find that Patent Owner has sufficiently set forth adequate written description support for proposed substitute claims 15–23 in the priority applications and does not introduce new matter. Petitioner does not argue otherwise.

5. *Conclusion*

For the above reasons, we determine that Patent Owner has shown that the proposed substitute claims meet the statutory and regulatory requirements set forth in 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121.

E. Petitioner's Assertions of Unpatentability

Petitioner contends that the proposed substitute claims 15–23 are unpatentable under 35 U.S.C. § 103 on the following bases.¹³

¹³ As stated above, only substitute claims 15–23 are properly before us in this RMTA. Accordingly, we address only the grounds relevant to those claims.

Claims	35 U.S.C. §	Reference(s)/Basis
15–20, 23	103	Weiman, Waugh ¹⁴
21, 22	103	Weiman, Waugh, Seifert
15–20, 23	103	Seifert, Waugh

RMTA Opp. 2–25. Petitioner supports its contentions with the Supplemental Declaration and Second Supplemental Declaration of Troy D. Drewry (Exs. 1041 (“Drewry Suppl. Decl.”) and 1044 (“Drewry Second. Suppl. Decl.”)), among other evidence.

1. *Asserted Obviousness of Claims 15–20 and 23 Based on Weiman and Waugh*

Petitioner asserts that Patent Owner’s proposed substitute claims include limitations that are “conventional and well known, as demonstrated by Waugh.” RMTA Opp. 1. We first provide a brief overview of Waugh before we address Petitioner’s contentions.

a. *Waugh (Ex. 1043)*

Waugh, titled “Spinal Implant System and Method,” relates to “a spinal implant system and a method for treating a spine, which employ an oblique pathway.” Ex. 1043 ¶ 2, code (54). In an embodiment of Waugh, the method includes “an oblique lateral interbody fusion (OLIF) procedure in the lower lumbar region.” *Id.* ¶ 36. An exemplary intervertebral implant is depicted in Figure 12, reproduced below.

¹⁴ Waugh et al., U.S. Patent Pub. 2015/0100129 A1, published Apr. 9, 2015, (Ex. 1043, “Waugh”).

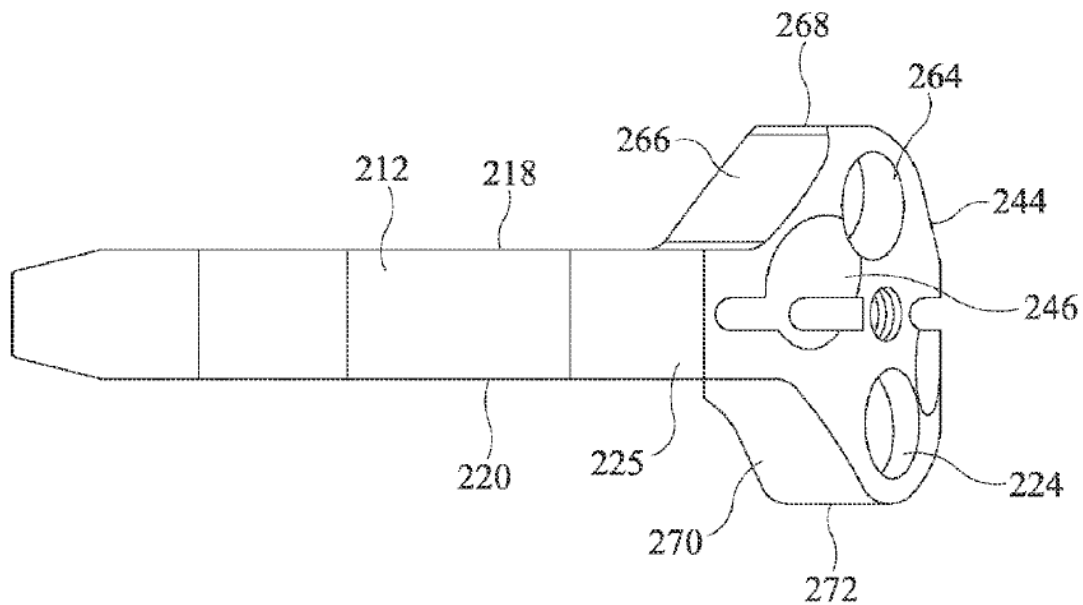


FIG. 12

Figure 12 is an oblique end view of an implant body depicted as cage 212. Ex. 1043 ¶¶ 22, 82. Waugh explains that “cage 212 is shown as a ‘hybrid’ flanged implant which is configured to receive and guide a set of 4 fasteners (42a, 42b, 42c, 42d) along a generally oblique angle.” *Id.* ¶ 82. Cage 212 is formed with “flange 272 defining holes (224, 226) for guiding some of the fasteners into the adjacent vertebral endplates.” *Id.* Flange 272 has an oblique surface that defines outer holes 264, 274 that guide other fasteners into side walls of adjacent vertebral bodies. *Id.*

Two adjacent vertebral bodies, VI and V2, are depicted in Figure 15, reproduced below.

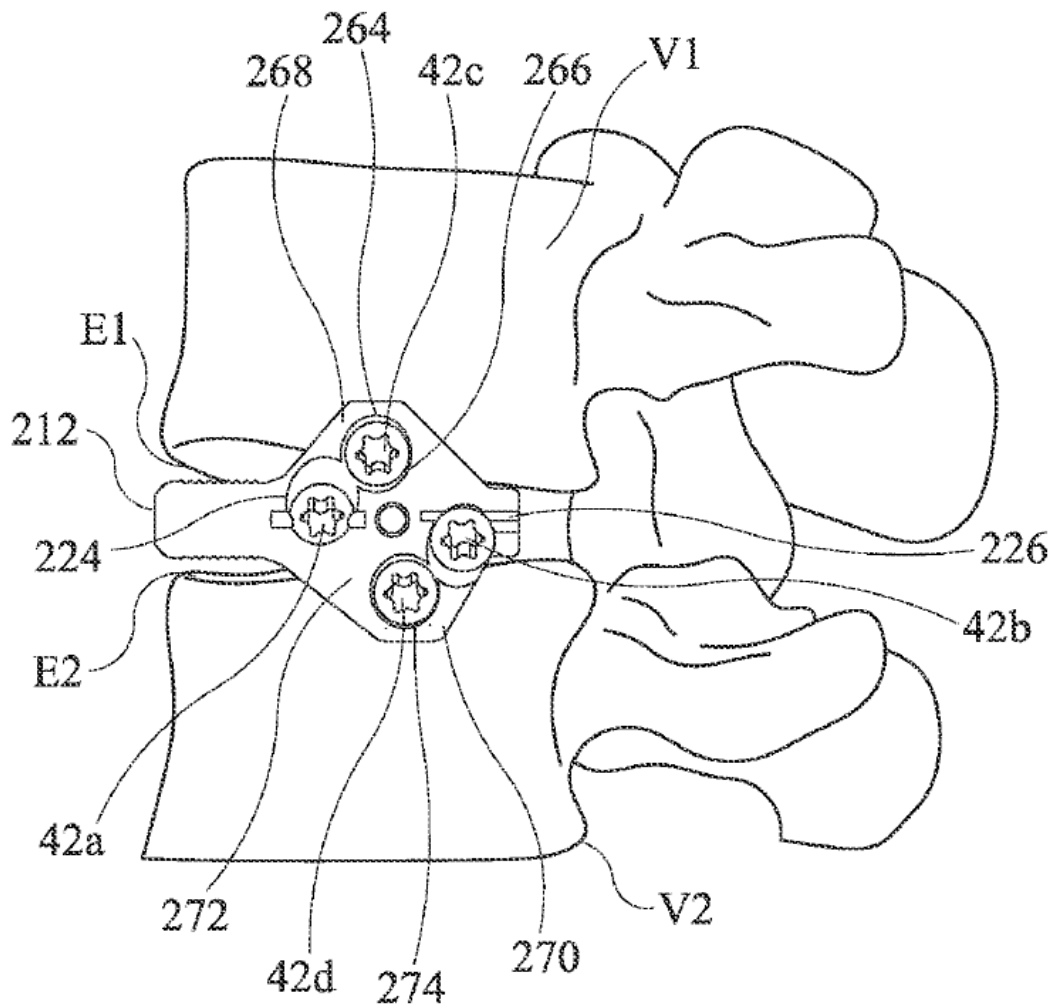


FIG. 15

Figure 15 is a plan view of cage 212 implanted between endplate E1 of vertebral body V1 and endplate E2 of vertebral body V2. Ex. 1043

¶¶ 29, 82. Cage 212 includes screw hole 224 and screw hole 226 that each “extend[] along the body of cage 212 in a transverse configuration relative to the surfaces of cage 212, described herein, for fixation with tissue.” *Id.*

¶¶ 86, 89.

Fixation of the fastener to the vertebrae is depicted in Figure 15A, reproduced below.

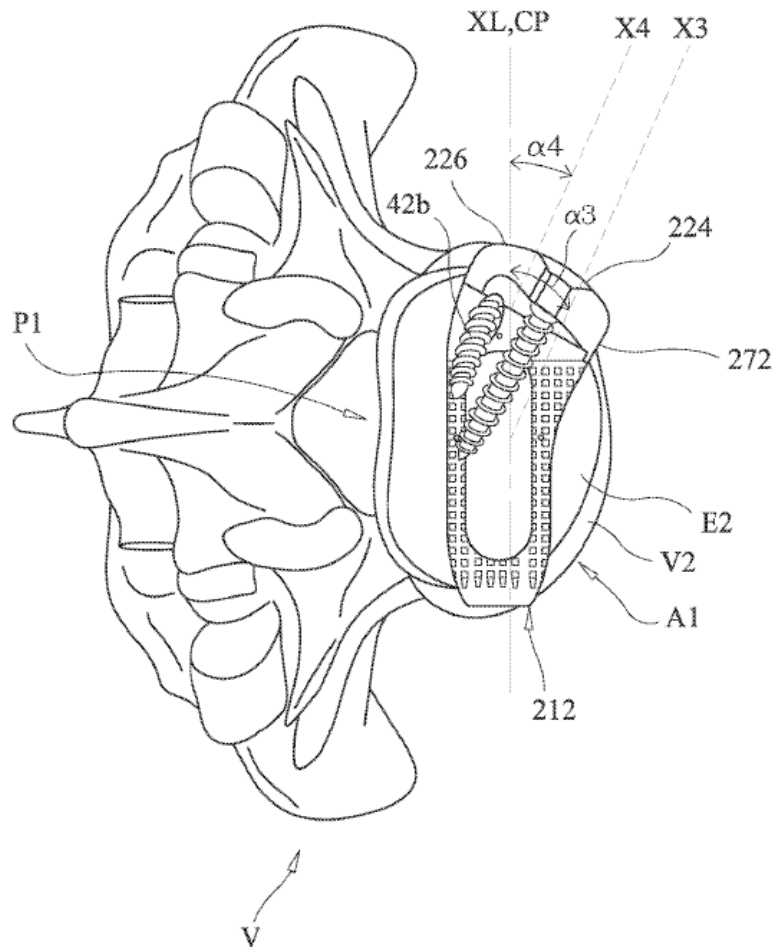


FIG. 15A

Figure 15A is a plan view of the components and vertebrae showing fasteners installed along generally oblique angles, $\alpha 3$ and $\alpha 4$. Ex. 1034 ¶¶ 30, 82. As shown, screw hole 224 defines axis X3 oriented oblique relative to lateral axis XL, such that screw hole 224 implants a fastener obliquely relative to axis XL and adjacent to anterior vertebrae portion A1. *Id.* ¶ 87. “Axis XL lies in plane CP defined by body B in substantial

alignment with one or more intervertebral spaces of the L2-L5 vertebral levels.” *Id.* “Axis X3 is disposed in substantial alignment with surgical pathway P and at an oblique angle α_3 relative to axis XL.” *Id.* ¶ 88. Waugh explains that “angle α_3 is in a range of approximately 0–45 degrees,” and alternately, “angle α_3 is oriented approximately 15–30 degrees relative to axis XL and substantially aligned with surgical pathway P such that screw hole 224 is configured to receive a fastener via surgical pathway P.” *Id.* Waugh discloses that screw hole 226 is similarly oriented with the body of cage 212, and defines axis X4 oriented oblique relative to axis XL such that screw hole 226 implants a fastener oblique relative to axis XL at an oblique angle α_4 relative to axis XL in a range of approximately 0–45 degrees, or approximately 15–30 degrees. *Id.* ¶¶ 89–90.

b. *Claim 15*

Among other edits to substitute claim 15, Patent Owner proposes amending the claims to recite that “the first socket axis is horizontally offset from the longitudinal axis at an angle of from 5° to 45°” and “the second socket axis is horizontally offset from the second longitudinal axis at an angle of from 5° to 45°.” RMTA App. A, 2–3. The parties agree that the offset angle is the key limitation in dispute. RMTA 1; RMTA Opp. 1–2. Accordingly, we focus our analysis on Petitioner’s showing regarding the offset angle limitation.

Petitioner asserts that, “[t]he only distinction Patent Owner attempts to draw between Weiman and the amended claims is its contention that ‘neither of Weiman’s openings (614, 616) include[s] [sic] a socket axis that is oblique at an angle of 5° to 45° relative to the longitudinal axis of their respective end plates (14, 16),’” because Weiman’s “axes are parallel in at

least the horizontal offset.” RMTA Opp. (citing RMTA, 20–21). Petitioner asserts that Waugh teaches the claimed “horizontal offset” of the first and second socket axes, because Waugh discloses that “cage 212 is shown as a ‘hybrid’ flanged implant which is configured to receive and guide a set of 4 fasteners (42a, 42b, 42c, 42d) along a generally oblique angle, such as, for example, $\alpha 3$ and $\alpha 4$ of FIG. 15A,” wherein “angle $\alpha 3$ ¹⁵ is in a range of approximately 0–45 degrees.” *Id.* at 8–9 (citing Ex. 1043 (Waugh) ¶¶ 82, 88, 90). Angle $\alpha 3$ is described as “oriented approximately 15–30 degrees relative to axis XL and substantially aligned with surgical pathway P such that screw hole 224 is configured to receive a fastener via surgical pathway P. Ex. 1043 (Waugh) ¶ 88.

Petitioner asserts that the modification of Weiman to add the horizontal offset axis of Waugh would have been “a matter of design choice” that “would have been obvious to a POSITA because it provides several predictable and well-known benefits.” *Id.* at 9 (citing *KSR*, 550 U.S. at 424). In particular, Petitioner asserts that the modification: 1) “would have enabled angling of the bone fasteners 654 of Weiman to portions of the vertebral members with the most bone and/or with the highest bone density;” 2) would “decrease the amount of bone graft material flowing through the opening 44 that would be blocked by the fastener;” and 3) “would have enabled angling of the bone fasteners away from certain body tissue (i.e., nerves, etc.), which would have been desirable.” RMTA Opp. at 9–10 (citing Ex. 1041 (Drewry Supp. Decl.) ¶¶ 68–70, 72).

¹⁵ Angle $\alpha 3$ is described as “oriented approximately 15–30 degrees relative to axis XL and substantially aligned with surgical pathway P such that screw hole 224 is configured to receive a fastener via surgical pathway P. Ex. 1043 (Waugh) ¶ 88.

According to Petitioner, “a POSITA would have had a reasonable expectation of success in performing such a modification” because it “would only involve the application of known methods (e.g., applying a twist/rotation to the upper plate member 604 and the lower plate member 608) to obtain predictable results.” *Id.* at 11 (citing Ex. 1044 (Drewry Second Supp. Decl.) ¶ 20).

Having considered the parties’ assertions, we determine that Petitioner has shown by a preponderance of the evidence that the limitations of proposed substitute claim 15 are disclosed by the combined teachings of Weiman and Waugh as discussed above. *See* Pet. 15–27 (regarding limitations of original claim 1 that remain in substitute claim 15); Ex. 1002 (Drewry Decl.) ¶¶ 95, 199–238; RMTA Opp. 5–12 (regarding new limitations in substitute claim 15); Ex. 1041 (Drewry Suppl. Decl. ¶¶ 21–23, 28–35, 37–44, 47–52, 53–55, 68–70); Ex. 1044 (Drewry Second Suppl. Decl. ¶¶ 16–18, 24, 29–33).

Petitioner has also shown that a POSITA would have had a reason to modify Weiman and would have had a reasonable expectation of success in making the modification, for the reasons asserted above. We adopt those assertions as our findings and address Patent Owner’s arguments below.

Patent Owner contends that Waugh does not disclose the claimed “horizontal offset,” because Waugh’s offset is based on a “spinal implant’s oblique angle of insertion relative to the patient’s body, not the horizontal offset between a socket axis and a longitudinal axis of the device.” RMTA Reply 2 (citing RMTA Opp. 1, 4, 8–9 (citing Ex. 1043 (Waugh) ¶¶ 54, 88, 90–94)).

Although we appreciate that Waugh describes axis XL as “a lateral axis XL of [the patient’s] body” (Ex. 1043 (Waugh) ¶ 49; RMTA Reply, 3), axis XL is coincident with the longitudinal axis of Waugh’s implant, or cage 212. *See* Ex. 1043 (Waugh), Fig. 15a, reproduced on page 56, above; *see also* RMTA Sur-Reply 2 (comparing Figure 12D of Waugh to Figure 12C of Ex. 2001, i.e., Patent Owner’s priority application depicting the recited longitudinal axis¹⁶). Waugh discloses that “cage 212 is formed with a flange 272 defining holes (224, 226) for guiding some of the fasteners into the adjacent vertebral endplates (see fasteners 42a, 42b),” with “flange 272 (having an oblique surface).” *Id.* ¶ 82. Given that Figure 12 of Waugh, to which the aforementioned disclosure relates, depicts flange 272 angled at an oblique angle with respect to the longitudinal axis of cage 212, a preponderance of the evidence supports Petitioner’s assertion that Waugh discloses that a first socket axis and the longitudinal axis of the first endplate are oblique to each other. *See* Ex. 1043 (Waugh), Figure 12. As Petitioner correctly notes, Waugh’s “screw holes are angled obliquely relative to the longitudinal axis of the device [and thus are “horizontally offset” as recited in claim 15], whether or not the device is implanted.” RMTA Sur-Reply 3.

Patent Owner also contends that a POSITA would not have combined the teachings of Weiman and Waugh because 1) Waugh’s angle teachings are inapplicable to Weiman; 2) Petitioner’s proposed combination relies on hindsight rather than sound reasoning based on evidence; and 3) Petitioner does not demonstrate a motivation to combine Weiman and Waugh. RMTA Reply 5–12. We address these arguments in turn.

¹⁶ Patent Owner agrees that Figure 12C of Ex. 2001 describes the “longitudinal axis” and horizontal offset recited in claim 15. RMTA 10.

(1) *Alleged inapplicability of Waugh’s angle teachings to Weiman*

Patent Owner argues that “Weiman is an expandable implant designed to fit between vertebrae” before being expanded, whereas “Waugh is a non-expandable implant, malleted into the body and relies on angles that are inapplicable to Weiman.” RMTA Opp. at 5–6. According to Patent Owner, “[t]here is no indication in Waugh that its’ [*sic*] angle teachings are applicable to or translatable to the Weiman device.” *Id.* at 6–7.

Patent Owner’s argument is unavailing. As an initial matter, we note that the cited references need not disclose an express motivation to combine their teachings. *See DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.*, 464 F.3d 1356, 1368 (Fed. Cir. 2006) (noting that an implicit motivation to combine exists when the combination of references results in a product or process that is more desirable, “for example because it is stronger, cheaper, cleaner, faster, lighter, smaller, more durable, or more efficient”). Here, we credit Mr. Drewry’s testimony that a POSITA would have been motivated to make the proposed modification because Waugh’s flanges and openings, implemented in Weiman’s implant, “would have beneficially provided the ability to use an oblique lateral surgical pathway,” and “use of an oblique surgical pathway is a known alternative that would avoid” anatomical constraints. *See* Ex. 1044 (Drewry Second Supp. Decl.) ¶¶ 25–26; *see also id.* ¶ 19 (explaining that expandable and fixed implants were used interchangeably). Weiman discloses that an access path to the intervertebral disc space for insertion of device 10 “may be created using a posterolateral approach” and that “the access path may be at an angle of about 45° from the posterior of the patient.” Ex. 1004 (Weiman) ¶ 177.

Weiman further discloses, “fusion device 10 can be used in a lateral procedure, such as a lumbar lateral interbody fusion procedure, though one skilled in the art will appreciate that the device need not be limited to this approach.” *Id.* ¶ 180. Given that Waugh relates to “an oblique lateral interbody fusion (OLIF) procedure” (Ex. 1043 (Waugh) ¶ 36) and Weiman discloses a lateral interbody fusion procedure and an approach of 45°, to the extent that Weiman’s disclosure of an access approach at an angle of 45° is not an oblique approach, we agree with Mr. Drewry that use of an oblique surgical pathway is a known alternative, because it would avoid anatomical constraints. Thus, Petitioner has sufficiently demonstrated that a skilled artisan would have been able and motivated to apply Waugh’s angle teachings to Weiman.

(2) *Alleged inconsistency with prior testimony and reliance on hindsight*

Patent Owner argues that because Mr. Drewry’s testimony in his second supplemental declaration conflicts with his testimony in his first supplemental declaration, “Petitioner’s change in course should be rejected for what it is—a transparent effort to apply hindsight to Weiman in order to recreate the claimed invention.” RMTA Reply 7–9. According to Patent Owner, Mr. Drewry originally opined that small changes would be “quite consequential” when he opined that the term “about” was indefinite because “in spinal implant devices, variations of 0.001°, 0.01°, 0.1°, 1°, and 2° are often quite consequential.” *Id.* at 9 (referring to Ex. 1041 (Drewry Supp. Decl.) ¶ 14). Patent Owner argues that Mr. Drewry ignores this testimony in assessing the impact of the proposed changes to Weiman’s device, and that a POSITA would not take “unnecessary risks . . . with medical devices.” *Id.* at

7. Thus, Patent Owner argues that Mr. Drewry's supplemental testimony that a POSITA would have found it obvious to "exchange Weiman's screw/socket arrangement for Waugh's" (Ex. 1044 (Drewry Second Supp. Decl.) ¶¶ 20–27) is based on an improper hindsight reconstruction rather than the evidence. *Id.* at 7–9. These arguments are unavailing.

Regarding the alleged hindsight, we disagree because Petitioner has sufficiently demonstrated that the articulated combination is premised on the teachings in cited art as understood by a POSITA. RMTA Opp. at 9–10 (citing Ex. 1041 (Drewry Supp. Decl.) ¶¶ 68–70, 72. Indeed, Patent Owner has not identified any portion of Mr. Drewry's testimony that is not supported by Waugh or within the skill of a POSITA and is instead gleaned solely from Patent Owner's disclosure. *See In re McLaughlin*, 443 F.2d 1392, 1395 (CCPA 1971) ("Any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning, but so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made and does not include knowledge gleaned only from applicant's disclosure, such a reconstruction is proper.").

With regard to the allegedly inconsistent testimony, we agree with Petitioner that Mr. Drewry's testimony regarding the potential consequences of changes to angles does not conflict with his subsequent testimony that a POSITA would have found it obvious to "exchange Weiman's screw/socket arrangement for Waugh's." *See* RMTA Opp. 11–12, RMTA Sur-reply 7 (citing Ex. 1044 (Drewry Second Suppl. Decl.) ¶ 33 (Mr. Drewry opining that a "POSITA would have been motivated to provide the ability to fasten the implant at various angles relative to the vertebra.")) *Id.* In particular, we

note that Waugh addresses safety “to ensure that the most relevant and sensitive vascular structures near the surgical site are safely separated from the oblique-lateral and/or oblique spinal surgical pathway.” Ex. 1043 (Waugh) ¶ 66. This disclosure supports that a POSITA would have been aware of the benefits and consequences of using an oblique angle and would have been able to account for such in the articulated combination of references, as Mr. Drewry opines. *See* Ex. 1044 (Drewry Second Suppl. Decl.) ¶¶ 9, 12, 13, 19, 33.

Patent Owner’s citations to Petitioner’s unrelated patent regarding pedicular implants are unavailing. The portions of Petitioner’s patent to which Patent Owner refers discuss why it is important to correctly place screws. Ex. 2011¹⁷ (Hamada), 1:66–3:21. There is no suggestion in the cited text of Hamada that a horizontal offset could not be used, or that expandable inserts could not be modified as Petitioner proposes. Rather, the text contains only a general acknowledgement that complications may occur and that a surgeon should be careful about screw placement. *Id.* As Petitioner notes, moreover, Hamada relates to temporary pedicular implants that are anchored through different anatomical structures (pedicles), and “Patent Owner fails to establish that complications associated with placement of a pedicle implant similarly apply to horizontally offset socket axes in the context of the substitute claims.” RMTA Sur-Reply 8. The record does not demonstrate that a POSITA would have been dissuaded from using the teachings of Waugh due to potential complications during surgery.

¹⁷ U.S. Patent No. 8,236,006 B2, issued Aug. 7, 2012 (Ex. 2011, “Hamada”), assigned to Petitioner Life Spine, Inc.

Patent Owner has not adequately explained why Mr. Drewry's assessment of the POSITA's ability to understand the impact of such changes is incorrect (*see* Ex. 1044 (Drewry Second Suppl. Decl.) ¶¶ 9, 12, 13, 19, 33), even if the POSITA had only "two years of experience."¹⁸ *See* RMTA Reply 7; RMTA Sur-reply 8. Instead, we agree with Petitioner that Patent Owner's attorney argument that "a POSITA would find it too risky to overhaul Weiman in view of Waugh" does not undercut Petitioner's showing on obviousness. *See* RMTA Sur-reply 7–8.

We find persuasive, and credit, Mr. Drewry's testimony that (1) a POSITA would have appreciated that the proposed modification to replace Weiman's screw/socket with Waugh's angled version provides benefits including "avoiding selected muscular and abdominal anatomical structures," and (2) such "benefits would have been desirable for certain applications, such as those where the patient's anatomy dictates that OLIF would provide the patient with the best medical outcome." Ex. 1044 (Drewry Second Suppl. Decl.) ¶¶ 23–26; *see also* Ex. 1043 (Waugh), ¶¶ 54, 87–90 (describing use of angled screw holes to, e.g., "receive a fastener via a surgical pathway" and configured "to penetrate endplate tissue of a vertebral body"). We find the weight of evidence supports Petitioner's articulation of a POSITA's understanding of how to use angles to avoid anatomical features

¹⁸ We agree with Petitioner that Patent Owner's argument that a POSITA would have only two years of industry experience is untimely, given that the Board made a preliminary finding about the level of ordinary skill in the Institution Decision, and Patent Owner did not address this finding in its Patent Owner Response, Motion to Amend, or RMTA. *See* RMTA Reply 7 n.3; RMTA Sur-reply 7–8.

and more securely attach to vertebral bodies depending on the patient's anatomy.

(3) *Allegedly insufficient motivation to combine*

Patent Owner asserts that “Petitioner provides several ‘motivations’ all of which are lacking.” RMTA Reply 9. Patent Owner contends that Petitioner's argument that the combination is “predictable” is contrary to Waugh's disclosure and to Petitioner's admissions. *Id.* Similar to its prior arguments, Patent Owner again contends that Waugh's offset is “inapplicable to and fail[s] to translate to the Weiman device.” *Id.* (citing *id.* at 1–5, 8). We disagree.

As to the predictability of the proposed combination of Weiman and Waugh, as discussed above, we credit Mr. Drewry's testimony that, based on the similarities of Weiman and Waugh, a POSITA would have been motivated to “use an oblique lateral surgical pathway,” as taught by Waugh, as “a known, predictable extension to Weiman” for avoiding anatomical constraints or to avoid tissue trauma in certain instances. *See* Ex. 1044 (Drewry Second Supp. Decl.) ¶¶ 23–26. As Mr. Drewry further opines, because Waugh's oblique flanges and Weiman's plate members are similar, and because Weiman does not “describe any structure which would prohibit use of another type of extension portion (such as the oblique flanges 244, 268)” of Waugh, a POSITA “would have had a reasonable expectation of success in making such a modification of Weiman.” *Id.* ¶ 27.

As to Petitioner's “admissions” (*see* RMTA Reply 9), this refers to the cited portions of Petitioner's Hamada patent, which we discuss above in III.E.1.b(2). As stated above, Patent Owner does not direct us to any teaching in Hamada indicating that a horizontal offset could not be used, or

that expandable inserts could not be modified as Petitioner and Mr. Drewry propose, or provide a reason to believe that the disclosures of Hamada related to pedicle implants would have discouraged a POSITA from making those proposed changes to an intervertebral implant. Accordingly, the alleged “admissions” that Patent Owner points to do not undermine Petitioner’s showing.

Patent Owner also argues that “Petitioner’s ‘same problem and same field of endeavor’ argument is defective,” because “the problem to be solved is never defined by Petitioner.” RMTA Reply 9–10. We disagree.

Petitioner asserts that the problem is “how to facilitate fusion of adjacent vertebrae.” RMTA Opp. 3 (citing Ex. 1001, 5:65–6:1; Ex. 1004 (Weiman) ¶ 6; Ex. 1043 ¶¶ 35–36; Ex. 1044 (Drewry Second Supp. Decl.) ¶ 10); *see also* RMTA Sur-Reply 9. Petitioner asserts that a POSITA would have looked to Weiman and Waugh to address this problem, because they are “directed to the same field of endeavor as the ’087 patent (i.e., intervertebral devices and methods used to install these devices).” RMTA Opp. 3 (citing Ex. 1001, 1:14–15; Ex. 1004 (Weiman) ¶ 2; Ex. 1043 (Waugh) ¶¶ 3–5; Ex. 1044 (Drewry Second Supp. Decl.) ¶ 10). Given that Weiman “relates to the apparatus and method for promoting an intervertebral fusion” and Waugh relates to “a spinal implant system and method,” Petitioner’s assertion is supported by evidence of record. Ex. 1004 (Weiman) ¶ 4; Ex. 1043 (Waugh) codes (54) (57).

Patent Owner also argues that, even if Petitioner had defined the problem, a POSITA “would not address that problem with an admittedly dangerous solution.” RMTA Reply 9–10. As discussed above in § III.E.1.b(2), Patent Owner’s reliance on Hamada and alleged

inconsistencies in Mr. Drewry's testimony are unavailing. Patent Owner's attorney argument regarding Petitioner's proposed combination being an allegedly "dangerous solution" or "too risky" is similarly unavailing. *See Johnston v. IVAC Corp.*, 885 F.2d 1574, 1581 (Fed. Cir. 1989) (noting that attorney argument is "no substitute for evidence").

Patent Owner next argues that Petitioner's rationale is "nothing more than [a POSITA] 'could have' used Waugh's sockets with Weiman."

RMTA Reply 10. We disagree.

Petitioner contends that a POSITA "*would* have found it obvious to configure the sockets of Weiman like the screw holes 264, 274 of Waugh because the screw holes 264, 274 of Waugh are a well-known, alternative mechanism for receiving a fastener." RMTA Opp. 4 (emphasis added); *see also* RMTA Sur-Reply 10–11. Petitioner also articulates reasoning to do so, because it "is advantageous for certain surgical applications." RMTA Opp. 4–55 (citing Ex. 1043 (Waugh) ¶ 60 (identifying a fusion procedure where oblique fusion would "provide direct access to one or more intervertebral spaces of the L2-L5 vertebral levels of vertebrae V while avoiding selected muscular and abdominal anatomical structures, such as, for example anterior vasculature"); Ex. 1044 (Drewry Second Suppl. Decl. ¶¶ 23–26). Based on the use of "would" instead of "could" and Petitioner's reason for making the modification, as supported by the testimony of Mr. Drewry, we find Patent Owner's argument unavailing.

Patent Owner also asserts that Petitioner's "motivation is illusory." RMTA Reply 11. According to Patent Owner, there is no evidence that a POSITA "would want to employ Weiman in an oblique lateral procedure," and that for such a procedure they "could simply use Waugh's device." *Id.*

Patent Owner also asserts that “there is no evidence that the Weiman device had any issue accessing high density bones or avoiding certain body areas,” and there is no evidence that the Weiman device blocks bone graft material. *Id.* at 11–12.

Patent Owner’s arguments are unavailing. The question is not whether Waugh’s device could be used for an oblique lateral procedure, but instead whether one of ordinary skill would have had a reason to modify Weiman’s device for use in an oblique lateral procedure. As discussed above, we determine that Petitioner has articulated sufficient reasoning to explain why a POSITA would have been motivated to modify Weiman. As to Patent Owner’s assertion that “there is no evidence that the Weiman device had any issue accessing high density bones or avoiding certain body areas,” Mr. Drewry opines that “a greater rotation would enable locating the fasteners away from edges of the bone which may be more prone to fracture (and may have a lower density).” Ex. 1041 (Drewry Supp. Decl.) ¶ 69. Patent Owner does not dispute this statement. Absent persuasive evidence that adapting Weiman’s device for greater rotation would not enable angling away from certain tissue, we find Mr. Drewry’s testimony that such rotation “would have been desirable” persuasive as to motivation to combine. *See* Ex. 1041 (Drewry Supp. Decl.) ¶¶ 69–73; *see also* Ex. 1010 (Seifert) ¶ 80 (“bone screw 300 may be inserted into body tissue at an optimal angle with respect to spacer 100, whereby optimal purchase may be obtained, or certain body tissue may be avoided”), ¶ 102 (discussing entering bone “at a beneficial or desired angle”); RMTA Sur-Reply 12.

Accordingly, for the foregoing reasons, we conclude that Petitioner has shown, by a preponderance of the evidence, that the limitations of

proposed substitute claim 15 are taught or suggested by the combination of Weiman and Waugh, and that one of ordinary skill in the art would have combined these references with a reasonable expectation of success for the reasons provided by Petitioner.

c. Claim 18

As discussed above in Section III.C, substitute claim 18 is substantially the same as substitute claim 15 and differs in two respects, neither of which are argued by Patent Owner as a basis for patentability. *See generally* RMTA Reply. Rather, Patent Owner broadly argues against the combination of Weiman and Waugh. *Id.* For the same reasons set forth above as to claim 15, Patent Owner's arguments are unavailing. We conclude that Petitioner has shown, by a preponderance of the evidence, that proposed substitute claim 18 would have been obvious over the combination of Weiman and Waugh. *See, e.g.,* RMTA Opp. 3–5, 12–13.

d. Claims 16, 17, 19, 20, and 23

Substitute claims 16, 17, 19, 20, and 23 depend from one of claims 15 and 18. RMTA App. 3–4, 6. Petitioner asserts that the subject matter of claims 16, 17, 19, 20, and 23 would have been obvious over the combined teachings of Weiman and Waugh and provides a detailed analysis of each of these claims with argument and evidence in support thereof. RMTA Opp. 13–14. We adopt Petitioner's arguments and cited evidence as to these claims and limitations as our own determination and basis. Patent Owner does not raise any arguments specifically directed to claims 16, 17, 19, 20, and 23 aside from the arguments Patent Owner directs to claim 15, which we have addressed above. *See generally* RMTA Reply. We determine that Petitioner has shown by a preponderance of the evidence that the

combination of Weiman and Waugh would have rendered obvious claims 16, 17, 19, 20, and 23.

2. *Asserted Obviousness of Claims 21 and 22 Based on Weiman, Waugh, and Seifert*

Proposed substitute claims 21 and 22 depend from claim 18. RMTA App. 7.

Petitioner asserts that the subject matter of claims 21 and 22 would have been obvious over the combined teachings of Weiman, Waugh, and Seifert and provides a detailed analysis of each of these claims with argument and evidence in support thereof. RMTA Opp. 16–17. We adopt Petitioner’s arguments and cited evidence as to these claims and limitations as our own determination and basis.

Patent Owner does not raise any arguments specifically directed to claims 21 and 22 aside from the arguments Patent Owner directs to claim 15, which we have addressed above. *See generally* RMTA Reply. We determine that Petitioner has shown by a preponderance of the evidence that the combination of Weiman, Waugh, and Seifert would have rendered claims 21 and 22 obvious.

3. *Asserted Obviousness of Claims 15–20 and 23 Based on Seifert and Waugh*

Petitioner asserts that the subject matter of claims 15–20 and 23 would have been obvious over the combined teachings of Seifert and Waugh and provides a detailed analysis of each of these claims with argument and evidence in support thereof. RMTA Opp. 19–24; *see also* Ex. 1044 (Drewry Second Supp. Decl.) ¶¶ 49–59. Petitioner relies on Waugh for the same disclosure of the horizontal offset and uses similar reasoning as to why a

POSITA would have made the proposed modification as Petitioner did in its allegations as to the combination of Seifert and Waugh, above in Section III.E.1(b). We adopt Petitioner's arguments and cited evidence as to these claims and limitations as our own determination and basis.

Patent Owner does not raise any arguments specifically directed to the combination of Seifert and Waugh. *See generally* RMTA Reply. As discussed above in Section III.E.1(b), the parties agree that the issue of whether the offset angle taught by Waugh discloses the "horizontal offset" limitation of substitute claim 15 is the sole issue in dispute. RMTA 1; RMTA Opp. 1–2. We addressed Patent Owner's arguments opposing Waugh's disclosure of the "horizontal offset" limitation above in Section III.E.1(b), where we concluded that Waugh discloses the limitation. Our reasoning in Section III.E.1(b) equally applies here. We determine that Petitioner has shown by a preponderance of the evidence that the combination of Seifert and Waugh would have rendered claims 15–20 and 23 obvious.

IV. CONCLUSION

Petitioner has demonstrated, by a preponderance of the evidence, that claims 1–14 of the '087 patent are unpatentable as anticipated and obvious, as set forth in the chart below. With regard to Patent Owner's RMTA, Petitioner has demonstrated, by a preponderance of the evidence, that proposed substitute claims 15–23 are unpatentable as obvious under 35 U.S.C. § 103. In summary:

Claims	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1–3, 8–10	102/103 ¹⁹	Weiman	1–3, 8–10	
4–7, 11–14	103	Weiman, Mozeleski	4–7, 11–14	
7, 14	103 ²⁰	Weiman, Mozeleski, Seifert		
1–3, 8–10	102/103 ²¹	Seifert		
4–7, 11–14	103 ²²	Seifert, Mozeleski		
7, 14	103 ²³	Seifert, Mozeleski, Weiman		
Overall Outcome			1–14	

Motion to Amend Outcome	Claims
Original Claims Cancelled by Amendment	1–14
Substitute Claims Proposed in the Amendment	15–23
Substitute Claims: Motion to Amend Granted	
Substitute Claims: Motion to Amend Denied	15–23
Substitute Claims: Not Reached	

V. ORDER

In consideration of the foregoing, it is hereby:

¹⁹ Because we find that Weiman anticipates claims 1–3 and 8–10, we do not reach whether these claims are unpatentable as obviousness over Weiman.

²⁰ As discussed in II.G, we do not reach this ground.

²¹ As discussed in II.G, we do not reach this ground.

²² As discussed in II.G, we do not reach this ground.

²³ As discussed in II.G, we do not reach this ground.

ORDERED that Petitioner has shown that claims 1–14 of the '087 patent are unpatentable; and

FURTHER ORDERED that Patent Owner's Revised Contingent Motion to Amend is *denied*.

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

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Patent 9,956,087 B2

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