

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

LIFE SPINE, INC.,
Petitioner,

v.

GLOBUS MEDICAL, INC.,
Patent Owner.

IPR2022-01600
Patent 10,973,649 B2

Before KRISTIL R. SAWERT, CYNTHIA M. HARDMAN, and
MICHAEL A. VALEK, *Administrative Patent Judges*.

SAWERT, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

Petitioner Life Spine, Inc. requests *inter partes* review of claims 1–20 of U.S. Patent No. 10,973,649 B2 (“the ’649 patent,” Ex. 1001). Paper 1 (“Pet.”). Patent Owner Globus Medical, Inc. filed a Preliminary Response. Paper 7 (“Prelim. Resp.”). With our authorization, Petitioner filed a Preliminary Reply and Patent Owner filed a Preliminary Sur-reply. Paper 8 (“Prelim. Reply”); Paper 9 (“Prelim. Sur-reply”).¹

We have authority under 35 U.S.C. § 314 to determine whether to institute an *inter partes* review. The standard for instituting an *inter partes* review is set forth in 35 U.S.C. § 314(a), which provides that an *inter partes* review may not be instituted unless “there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” The Supreme Court has held that the Board, in a decision to institute under 35 U.S.C. § 314(b), may not institute review on fewer than all claims challenged in the petition. *SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1355–56 (2018). Moreover, if the Board institutes trial, it “will authorize the review to proceed on all of the challenged claims and on all grounds of unpatentability asserted for each claim.” 37 C.F.R. § 42.108(a).

¹ The Board observes that both parties delete spacing between words, in an apparent effort to circumvent our word count limits. For example, Petitioner uses “EX1001,” while Patent Owner uses “Ex-1001.” *See, e.g.*, Pet. 1; Prelim. Resp. 1. The parties are cautioned that continuing this practice may lead to a party’s brief not being considered. *See* Consolidated Office Trial Practice Guide (Nov. 2019) (“Consolidated TPG”), at 40, *available at* <https://www.uspto.gov/TrialPracticeGuideConsolidated>.

After considering the Petition, Preliminary Response, Preliminary Reply, Preliminary Sur-reply, and associated evidence, we institute an *inter partes* review.

A. 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.

B. Related Matters

The parties identify *Globus Medical, Inc. v. Life Spine, Inc.*, 1:21-cv-01445 (D. Del.), as involving the ’649 patent. Pet. 1; Paper 5, 2. The parties also identify a number of patent applications related to the ’649 patent, including 12/875,637, 13/530,691, 13/531,844, 13/531,700, 13/531,943, 13/793,481, 13/793,668, 13/961,603, 14/466,468, 15/142,142, 15/391,133, 15/900,833, 15/996,792, 16/870,260, 16/910,279, 17/192,231, 17/409,079, 17/410,335, 17/589,029, and 17/931,913. Pet. 1–2; Paper 5, 2–3. There are a number of related *inter partes* review proceedings, including IPR2022-01434, IPR2022-01435, IPR2022-01599, IPR2022-01601, IPR2022-01602, IPR2022-01603, and IPR2023-00041. Pet. 1; Paper 5, 2.

C. The ’649 patent (Ex. 1001)

The ’649 patent, titled “Expandable Fusion Device and Method of Installation Thereof,” relates to an expandable device for insertion between adjacent vertebrae to facilitate fusion. Ex. 1001, code (54), 1:26–30. According to the Specification, a need exists for a fusion device that is “capable of being installed inside an intervertebral disc space at a minimum to no distraction height and . . . that can maintain a normal distance between adjacent vertebral bodies when implanted.” *Id.* at 1:65–2:2. The ’649 patent purports to meet this need with a fusion device including first and second

endplates and a central ramp capable of moving in a first direction to push the endplates outwardly into an unexpanded configuration. *Id.* at 2:10–14.

The Specification describes exemplary expandable fusion devices for installing in an intervertebral disc space to facilitate intervertebral fusion. *Id.* at 2:6–10. One exemplary device is depicted in Figure 60, reproduced below.

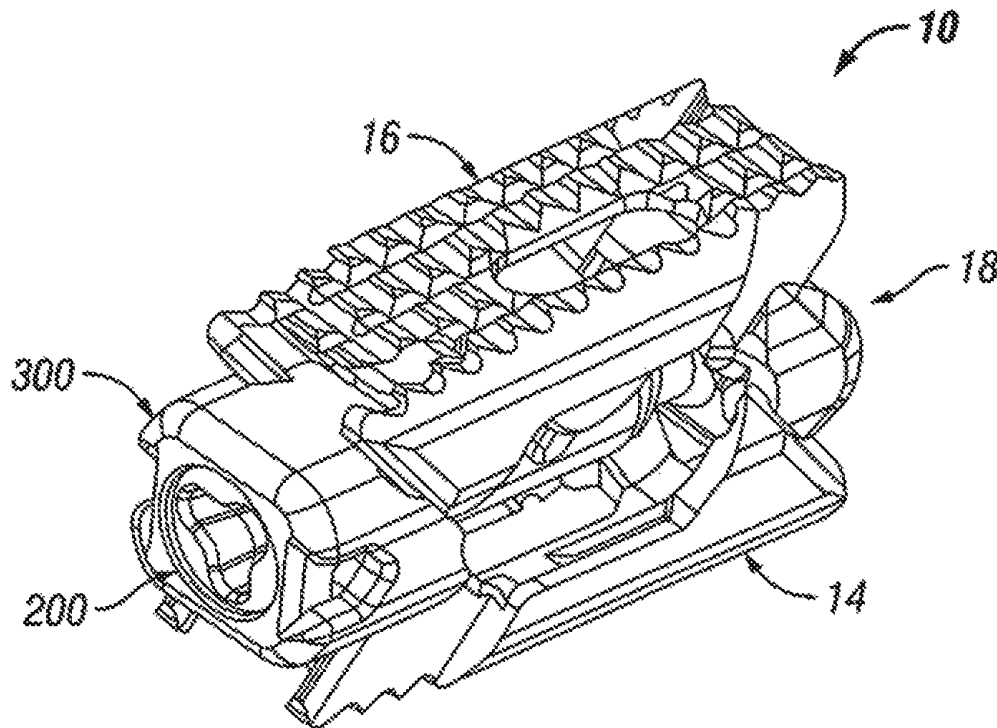


FIG. 60

Figure 60 of the '649 patent, reproduced above, is a perspective view of expandable fusion device 10 in an expanded position. *Id.* at 5:17–19, 22:45–46. Expandable fusion device 10 includes first endplate 14, second endplate 16, central ramp 18, actuator assembly 200, and driving ramp 300. *Id.* at 22:46–49. Actuator assembly 200 functions to pull central ramp 18 and driving ramp 300 together, which forces apart endplates 14 and 16. *Id.* at 22:49–52.

Figure 58 of the '649 patent, reproduced below, is an exploded view of the expandable fusion device shown in Figure 60. *Id.* at 5:10–12.

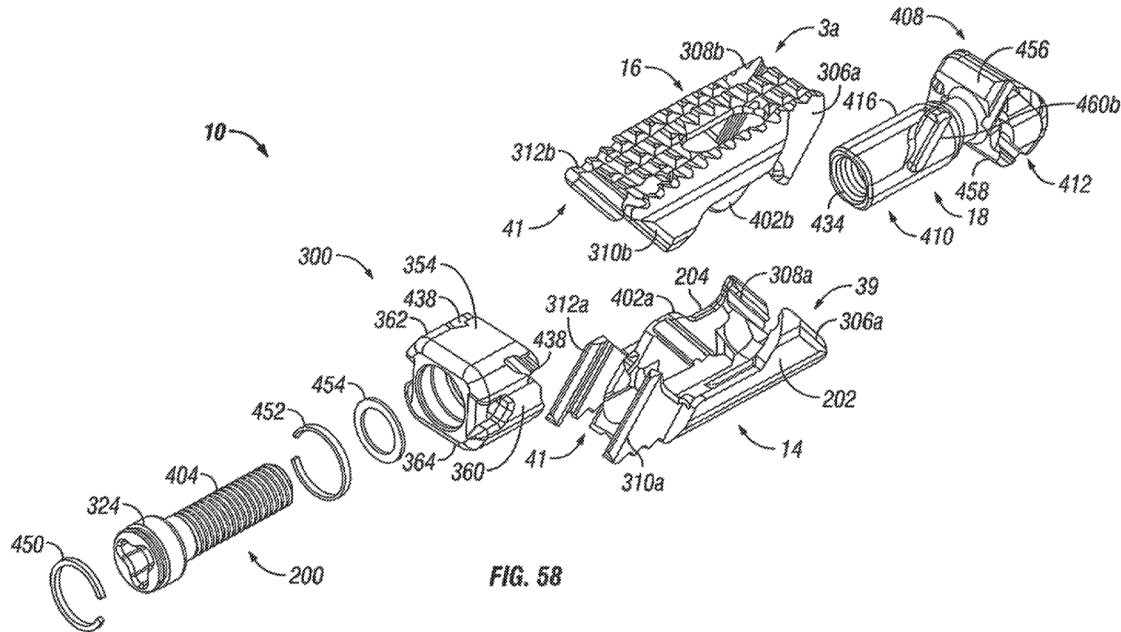


Figure 58, reproduced above, depicts central ramp 18 with a first end 408 and second end 410, expansion portion 412, and a rod-receiving extension 416 extending longitudinally from the expansion portion 412. *Id.* at 23:57–62. Driving ramp 300 includes side portions 360 and 362, each having ramped portion 438. *Id.* at 24:40–48.

Figure 61 of the '649 patent, reproduced below, is a side cross-section view of the expandable fusion device of Figure 58 in an expanded position. *Id.* at 5:20–22.

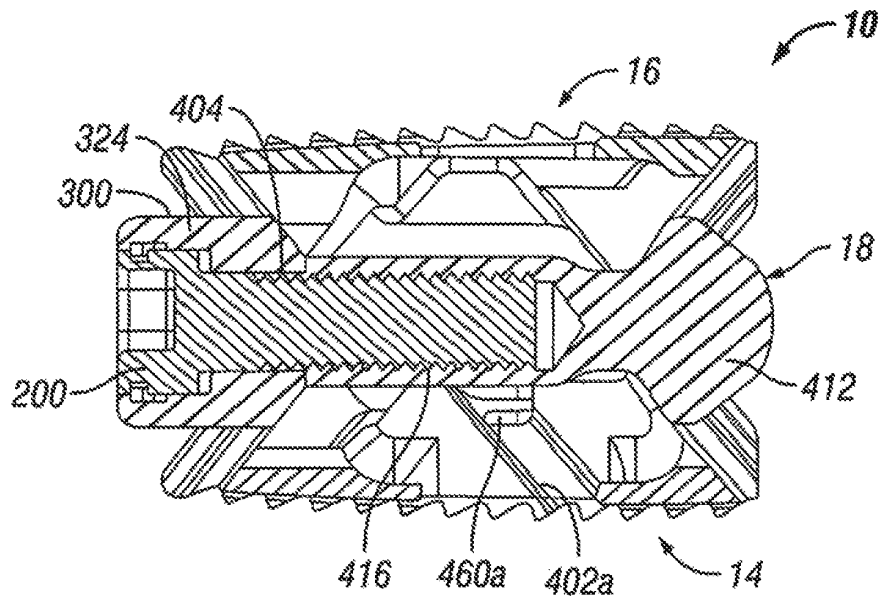


FIG. 61

Figure 61 of the '649 patent, reproduced above, depicts the expandable fusion device having actuator assembly 200, which includes head portion 324 and an extension 404. *Id.* at 23:43–45. Rod-receiving extension 416 of central ramp 18 is threaded to receive threading of extension 404 of actuator assembly 200. *Id.* at 24:8–11.

In operation, expandable fusion device 10 is inserted into an intervertebral disc space and seated into position. *Id.* at 24:57–59. An instrument is used to engage head portion 324 of actuator assembly 200. *Id.* at 25:7–8. Rotating actuator assembly 200 in a first direction pulls central ramp 18 linearly towards driving ramp 300 and pushes driving ramp 300 linearly towards central ramp 18. *Id.* at 25:9–17. Ramped portions of central ramp 18 and driving ramp 300 push against corresponding ramped portions of endplates 14 and 16, which forces the endplates outward into an expanded position. *Id.* at 25:18–33, 39–42.

D. Challenged Claims

Petitioner challenges all 20 claims of the '649 patent. Claims 1 and 10 are independent. Claim 1, reproduced below with bracketed lettering added,² is illustrative:

1. [pre]An expandable intervertebral implant, the expandable implant capable of moving from a collapsed position to an expanded position, the implant comprising:
 - [a] a first endplate extending from a proximal end to a distal end, wherein the first endplate has a first surface, a second surface, a first side surface and a second side surface,
 - [b] a second endplate extending from a proximal end to a distal end, wherein the second endplate has a first surface, a second surface, a first side surface and a second side surface;
 - [c] a central ramp positioned between the first endplate and the second endplate, the central ramp positioned proximate the distal end of the first endplate and the distal end of the second endplate;
 - [d] a driving ramp positioned proximate the proximal end of the first endplate and the proximal end of the second endplate, wherein the driving ramp is operably connected with the central ramp,

² For ease of reference, we use the same bracketed lettering Petitioner uses in the Petition. *See* Pet. 24–32, 44–52.

- [e] an actuator assembly configured to move at least one of the central ramp and the driving ramp;
- [f] wherein the expandable implant defines a horizontal plane that extends through the central ramp, driving ramp and the actuator assembly;
- [g] wherein the first side surface of the first endplate includes at least one ramped portion,
- [h] wherein the first side surface of the second endplate includes at least one ramped portion,
- [i] wherein in the collapsed position, the at least one ramped portion of the first side of the first endplate extends through the horizontal plane such that the at least one ramped portion of the first endplate is positioned on both sides of the horizontal plane.

Ex. 1001, 32:55–21.

Challenged independent claim 10 is similar to claim 1, but differs with respect to limitations relating to the expandable implant's configuration in an “collapsed position.” In particular, claim 1 recites that “the expandable implant defines a *horizontal plane* that extends through the central ramp, driving ramp and the actuator assembly” (limitation 1[f]), and that, when “in the collapsed position, the at least one ramped portion of the first side of the first endplate extends through the *horizontal plane* such that the at least one ramped portion of the first endplate is positioned on both sides of the horizontal plane” (limitation 1[i]). *Id.* (emphases added). The parties refer to these limitations in claim 1 as the “Horizontal-Plane Limitation.” Pet. 8–9; Prelim. Resp. 5–6.

Claim 10, on the other hand, recites several limitations relating to “overlap”: “wherein the first side surface of the first endplate includes at least one ramped portion having an inwardly facing surface and an outwardly facing surface” (limitation 10[f]); “wherein the first side surface of the second endplate includes an inwardly facing surface and an outwardly facing surface” (limitation 10[g]); and, when “in the collapsed position, at least a portion of the inwardly facing surface of the ramped portion of the first endplate *overlaps* at least a portion of the outwardly facing surface of the first side surface of the second endplate” (limitation 10[h]). Ex. 1001, 34:3–34 (emphasis added). The parties refer to these limitations in claim 10 as the “Overlap Limitation.” Pet. 8–9; Prelim. Resp. 5–6.

Challenged claims 2–9 depend directly or indirectly from claim 1 and recite additional features, including with respect to the endplates (claims 2 and 3), the central ramp (claim 4), the actuator assembly (claims 5–7), and the driving ramp (claims 8 and 9). Ex. 1001, 33:22–34:2. Similarly, challenged claims 11–20 depend directly or indirectly from claim 10 and recite additional features relating to the endplates (claims 11–14), the central ramp (claim 15), the actuator assembly (claims 16 and 18–20), and the driving ramp (claim 17). *Id.* at 34:35–35:26.

E. Evidence

Petitioner submits evidence including:

Evidence	Exhibit No.
Declaration of Troy D. Drewry	1002
Varela, U.S. Patent Pub. 2012/0226357 A1 (published Sept. 6, 2012) (“Varela ’357”)	1005
Oglaza et al., Intl. Pub. No. WO 2010/103344 A1 (published Sept. 16, 2010) (“Oglaza”)	1007

Evidence	Exhibit No.
Olmos et al., U.S. Patent Pub. 2008/0140207 A1 (published June 12, 2008) (“Olmos”)	1006
Varela, U.S. Patent Pub. 2011/0172774 A1 (published July 14, 2011) (“Varela ’774”)	1008

F. Asserted Grounds of Unpatentability

Petitioner asserts that claims 1–20 are unpatentable on the following grounds:

Claim(s) Challenged	35 U.S.C. §³	Reference(s)/Basis
1–7, 9–20	102/103	Varela ’357
8	103	Varela ’357 and Oglaza
1–7, 9–20	103	Olmos and Varela ’774
8	103	Olmos, Varela ’774, and Oglaza

³ The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), amended 35 U.S.C. §§ 102 and 103, and set the effective date for these amendments as March 16, 2013. The ’649 patent claims benefit to three applications, all of which were filed before March 16, 2013. Ex. 1001, code (63). Petitioner argues, however, that “the claims of the ’649 patent are subject to the first-inventor-to-file provisions of the AIA.” Pet. 3. We agree. As discussed herein, we find that at least one claim of the ’649 patent (i.e., claim 8) has an effective filing date of August 7, 2013, which is after the effective date of the AIA amendments. *See infra* § III.E.4.

Accordingly, we apply the post-AIA versions of the statutes. *See* MPEP § 2159.02 (stating that “AIA 35 U.S.C. 102 and 103 apply to any patent application that contains or contained at any time a claim to a claimed invention that has an effective filing date that is on or after March 16, 2013” “even if the remaining claimed inventions all have an effective filing date before March 16, 2013”); *see also* AIA § 3(n)(1)(A)–(B). We note, however, that our decision would be the same were we to apply either the pre- or post-AIA version of the statutes.

Pet. 3. Patent Owner disputes Petitioner’s asserted grounds of unpatentability. *See generally* Prelim. Resp. Patent Owner supports its contentions with the Declaration of Brad Culbert (Ex. 2001), among other evidence.

II. DISCRETION ANALYSIS

A. Discretionary Denial Under § 325(d)

The parties dispute whether the Board should discretionarily deny the Petition under 35 U.S.C. § 325(d). Pet. 117–118; Prelim. Resp. 73–77; Prelim. Reply 4–6; Prelim. Sur-reply 4–5.

1. Legal Standard

Section 325(d) provides that the Director⁴ may “reject the petition” if “the same or substantially the same prior art or arguments previously were presented to the Office.” The Board analyzes this issue under a two-part framework:

(1) whether the same or substantially the same art previously was presented to the Office or whether the same or substantially the same arguments previously were presented to the Office; and (2) if either condition of [the] first part of the framework is satisfied, whether the petitioner has demonstrated that the Office erred in a manner material to the patentability of challenged claims.

Advanced Bionics, LLC v. Med-El Elektromedizinische Geräte GmbH, IPR2019-01469, Paper 6 at 8 (PTAB Feb. 13, 2020) (precedential).

In analyzing whether the same or substantially the same art or arguments were previously presented to the Office, we consider factors including: (i) the similarities and material differences between the asserted

⁴ The Board institutes trial on behalf of the Director. 37 C.F.R. § 42.4(a).

art and the prior art previously presented to the Office; (ii) the cumulative nature of the asserted art and the prior art previously evaluated by the Office; and (iii) the extent of the overlap between the arguments made before the Office and the manner in which the petitioner relies on the prior art or the patent owner distinguishes the prior art. *See id.* at 8–10.

In analyzing whether the petitioner has demonstrated that the Office erred in a manner material to the patentability of challenged claims, we consider factors including: (iv) the extent to which the asserted art was evaluated by the Office, including whether the prior art was the basis for rejection during examination; (v) whether the petitioner has pointed out sufficiently how the Office erred in its evaluation of the asserted prior art; and (vi) the extent to which additional evidence and facts presented in the petition warrant reconsideration of prior art or arguments. *See id.*

2. Analysis

a. Part 1: Whether the Same or Substantially the Same Art or Arguments Were Previously Presented

The first part of the *Advanced Bionics* framework requires us to determine whether the Petition advances the same or substantially the same art or arguments that were previously presented to the Office. *Advanced Bionics*, IPR2019-01469, Paper 6 at 8. For the reasons explained below, we determine that substantially the same art or arguments were previously presented, such that part one of the framework is satisfied.

Petitioner relies on four references in its asserted grounds of unpatentability: Varela '357, Oglaza, Olmos, and Varela '774. There is no dispute that Olmos and Varela '774 were before the Office. *See* Pet. 117 (acknowledging that Varela '774 was “listed in an IDS” and that “[t]he

Examiner rejected pending claims over Olmos in several office actions”). Accordingly, Olmos and Varela ’774 are “[p]reviously presented art.” *See Advanced Bionics*, IPR2019-01469, Paper 6 at 7–8 (indicating that “previously presented art” includes “art made of record by the Examiner”).

On the other hand, Varela ’357 and Oglaza were not listed in an IDS and therefore are not the “same art” previously presented to the Office under *Advanced Bionics*. *See* Pet. 19 (stating that Oglaza “was not cited during prosecution”), 117 (stating that “Varela ’357 was not cited in any IDS”).⁵

Patent Owner does not address Oglaza. *See generally* Prelim. Resp. 73–77; Prelim. Sur-reply 4–5. But, as to Varela ’357, Patent Owner points out that Varela ’357’s parent application publication—Varela ’049⁶—was listed in an IDS. Prelim. Resp. 75. Patent Owner argues that Varela ’357 is cumulative of Varela ’049 because “Varela ’049 includes the *same* figures and description cited . . . by Petitioner in Varela ’357 as bases for invalidity in this Petition.” *Id.* (citing Pet. 24–32; Ex. 2003, FIGS. 18a–b, 19a–b, 23a–b, 24a–b, 25). Thus, Patent Owner argues, Varela ’357 is “substantially the same art” as art presented previously to the Office.

Having considered the record, we agree with Patent Owner that Varela ’357 is cumulative of Varela ’049 and, therefore, “substantially the same art” that was previously presented to the Office. *Advanced Bionics*,

⁵ In its Preliminary Reply, Petitioner states that “Varela ’357 and Varela ’774 were both cited in an IDS.” Prelim. Reply 4. We consider the recitation of “Varela ’357” as a typographical error, meant to refer instead to “Varela ’049.”

⁶ Varela, U.S. Patent Pub. 2012/0185049 A1 (published Jul. 19, 2012) (“Varela ’049”) (Ex. 2003).

IPR2019-01469, Paper 6 at 8. First, Varela '049 was presented to the Office during the prosecution of the application that matured into the '649 patent. The Examiner listed Varela '049 in a Notice of References Cited, Ex. 1004, 119, and the face of the '649 patent identifies Varela '049 as a cited reference, Ex. 1001, code (56). Second, Petitioner relies on portions of Varela '357 that are also present in Varela '049 in asserting unpatentability of the challenged claims. For example, Petitioner relies on Varela '357's Figures 18a–b, 19a–b, 23a–b, 24a–b, and 25 to teach the limitations of independent claim 1. *See* Pet. 21–32. These figures, however, appear identically in Varela '049. *See* Ex. 2003. Indeed, Petitioner does not appear to challenge Patent Owner's position that Varela '357 is cumulative of Varela '049, nor point to any relevant material in Varela '357 that is missing from Varela '049. *See generally* Pet. 117; Prelim. Reply 4–5.

For these reasons, we determine that three out of the four references that Petitioner advances in the Petition (i.e., Varela '357, Olmos, and Varela '774) are the same or substantially the same art that were previously presented to the Office. Neither party addresses Oglaza, the remaining reference, in detail. Nevertheless, we determine that Oglaza does not materially alter our analysis. Petitioner relies on Oglaza only for the limited purpose of teaching the subject matter of dependent claim 8, which is only one of the twenty claims challenged in the Petition. Pet. 66–67, 116. Accordingly, we determine that the first part of the *Advanced Bionics* framework is satisfied.

b. Part 2: Whether the Petitioner Demonstrates Material Error

Next, we consider “whether the petitioner has demonstrated that the Office erred in a manner material to the patentability of challenged claims.” *Advanced Bionics*, IPR2019-01469, Paper 6 at 8. For the reasons set forth below, we determine that part two of the framework is not satisfied.

Petitioner argues that the Examiner committed material error by “fail[ing] to appreciate that Varela ’774 discloses the limitations that were found to be missing from Olmos.” Pet. 117. Petitioner argues that, during prosecution, “the only limitations that the Examiner found to be missing from Olmos are the Horizontal-Plane and Overlap Limitations,” but that an ordinarily skilled artisan “would have immediately recognized that Varela ’774 teaches these limitations and would have been motivated to combine Varela ’774 with Olmos.” *Id.* at 118; *see also* Prelim. Reply 5 (arguing that “there is nothing in the prosecution history suggesting that the Examiner considered any reference that discloses endplates with overlapping ramped portions such as those disclosed by Varela ’774”). Petitioner also argues that Varela ’049 and Varela ’774 “were both cited in an IDS among over 450 other references” and the Examiner “did not apply or otherwise substantively refer to either Varela reference in any office action.” Prelim. Reply 4. This fact, Petitioner argues, weighs against exercising our discretion to deny institution. *Id.* at 4–5.

Patent Owner argues that Petitioner has not demonstrated that the Examiner erred in a manner material to patentability. Prelim. Resp. 76–77; Prelim. Sur-reply 4–5. Patent Owner argues that neither Varela ’357 nor Varela ’049 are prior art, and thus, there could be no material error as to

these references. Prelim. Resp. 76. Patent Owner also argues that Petitioner has not adequately explained how the Office materially erred as to the combination of the Olmos and Varela '774 references. Prelim. Resp. 76–77; Prelim. Sur-reply 5. As to the latter, Patent Owner argues “the Examiner originally identified Varela '774 as relevant art, along with Olmos, during prosecution of” a parent application of the '649 patent. Prelim. Resp. 77 (citing Ex. 2004). Patent Owner argues that “the Examiner was aware of and had previously considered, together, both Olmos and Varela '774 and correctly decided not to reject the challenged claims as obvious over this combination.” *Id.*; *see also* Prelim. Sur-reply 4.

Having considered the record, we determine that Petitioner has sufficiently shown that the Examiner erred in a manner material to patentability. *See Advanced Bionics*, IPR2019-01469, Paper 6 at 8. As an initial matter, we determine that the extent to which Varela '774 was evaluated during prosecution of the application that matured into the '649 patent appears to have been minimal. Varela '774 was not the basis for any rejection during prosecution. This fact weighs against exercising our discretion to deny institution. *Id.* We do not find Patent Owner’s arguments about the prosecution of a parent application of the '649 patent persuasive on this record. *See, e.g.*, Prelim. Sur-reply 4 (arguing that Petitioner fails to address that the Examiner “identified Olmos and Varela '774 **together** as relevant art during prosecution of the 2010 Parent” (citing Ex. 2004)). The Horizontal Plane and Overlap Limitations at issue here were not added to the claims until prosecution of the application leading to the '649 patent. *See, e.g.*, Ex. 1004, 492, 534–35. Thus, the fact that the Examiner did not reject the claims over Olmos and Varela '774 during prosecution of an earlier

parent application—with claims that did not recite the Horizontal-Plane and Overlap Limitations—does not weigh in favor of discretionary denial here.⁷

In any event, we agree with Petitioner, on this record and for institution, that the Examiner erred by not applying Olmos and Varela ’774 in the manner Petitioner argues and as supported by Dr. Drewry’s testimony. *See, e.g., Apple Inc. v. MPH Techs. OY*, IPR2019-00820, Paper 10 at 16–17 (PTAB Oct. 7, 2019); *see also Advanced Bionics*, IPR2019-01469, Paper 6 at 8–9 n.9 (stating that “[a]n example of a material error may include misapprehending or overlooking specific teachings of the relevant prior art where those teachings impact patentability of the challenged claims”).

The Examiner allowed the subject matter of the challenged claims because “no references, or reasonable combination thereof, could be found which disclose, or suggest, the implant as claimed with the placement of the horizontal plane and position of the ramped portion as claimed . . . and the ‘overlap’ of the inwardly and outwardly facing surfaces as claimed.” Ex. 1004, 554. But, for the reasons we explain below, we find that Petitioner has shown a reasonable likelihood that at least one challenged claim would have been obvious over Olmos and Varela ’774. *Infra* § III.H. Thus, we determine that Petitioner has sufficiently demonstrated Office error in a manner material to patentability of the challenged claims.

For these reasons, and considering the Petition as a whole, we decline to exercise our discretion to deny *inter partes* review under § 325(d).

⁷ We note that the parent application to which Patent Owner refers matured into U.S. Patent 8,845,731. *See* Ex. 1001, code (63). This patent is the subject of a pending *inter partes* review in IPR2022-01434.

B. Discretionary Denial Under § 314(a)

The parties also dispute whether the Board should discretionarily deny the Petition under 35 U.S.C. § 314(a). Pet. 117; Prelim. Resp. 77–78; Prelim. Reply 6; Prelim. Sur-reply 6.

1. Legal Standard

As noted above, institution of an *inter partes* review is discretionary. See 35 U.S.C. § 314(a) (authorizing institution of an *inter partes* review under particular circumstances, but not requiring institution under any circumstances); *Cuozzo Speed Techs., LLC v. Lee*, 579 U.S. 261, 273 (2016) (“[T]he agency’s decision to deny a petition is a matter committed to the Patent Office’s discretion.”); *SAS*, 138 S. Ct. at 1356 (stating that “[section] 314(a) invests the Director with discretion on the question whether to institute review” (emphasis omitted)).

2. Analysis

Patent Owner contends that “[s]hould the Board agree that all Grounds fail except for Ground 2, then Patentee requests the Board discretionarily deny this Petition under §314(a).” Prelim. Resp. 77. Patent Owner contends that it would be “a waste of Board and party resources to proceed with an IPR here on a single dependent claim, if Petitioner has not met its burden with respect to the nineteen (19) other claims.” *Id.* at 78 (citing *Deeper, UAB v. Vexilar, Inc.*, IPR2018-01310, Paper 7 at 42–43 (PTAB Jan. 24, 2019) (informative)).

We do not agree with Patent Owner that all grounds of unpatentability fail except for Petitioner’s second asserted ground. Instead, for the reasons discussed below, we determine that Petitioner has met its burden in showing a reasonable likelihood of unpatentability based on all asserted grounds of

unpatentability except for Ground 1. *Infra* §§ G–I. Asserted Grounds 2, 3, and 4 cover all twenty claims of the ’649 patent. Pet. 3. Thus, we decline to exercise our discretion to deny institution under § 314(a) as Patent Owner requests. *See* Prelim. Sur-reply 6 (contending that “if the Board agrees that all Grounds fail except for Ground 2, then the Board should discretionarily deny the Petition under §314(a)”).

III. PATENTABILITY ANALYSIS

We address below whether the Petition meets the threshold showing for institution of an *inter partes* review under 35 U.S.C. § 314(a). The following preliminary findings of fact and conclusions of law are made solely for determining whether to institute review. Any final decision will be based on the full trial record.

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”)). Petitioner ultimately bears the burden of persuasion to prove unpatentability of each challenged claim by a preponderance of the evidence. 35 U.S.C. § 316(e). This burden never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). The Board may authorize an *inter partes* review if we determine that the information presented in the Petition and Patent Owner’s Preliminary Response shows that there is a reasonable

likelihood that Petitioner will prevail with respect to at least one of the claims challenged in the petition. 35 U.S.C. § 314(a).

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. 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).

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.⁸ *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

⁸ Patent Owner does not presently assert objective indicia supporting nonobviousness of the challenged claims. *See generally* Prelim. Resp.; Prelim. Sur-reply.

(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 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 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, and would have had further appreciation of various technical concepts in this field.

Pet. 18 (citing Ex. 1002 ¶¶ 32–35). Patent Owner does not presently dispute Petitioner’s proposal. Prelim. Resp. 8.

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

C. Claim Construction

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 constructions differing from their plain and ordinary meaning.” Pet. 19. Patent Owner “currently takes no position on Petitioner’s assertion” but “reserves the right to propose specific constructions in this proceeding, if necessary.” Prelim. Resp. 7–8.

We determine that no claim terms require express construction for this Decision. Any final written decision entered in this case may include a final claim construction based on the full trial record that differs from any discussion of claim scope provided in our analysis below.

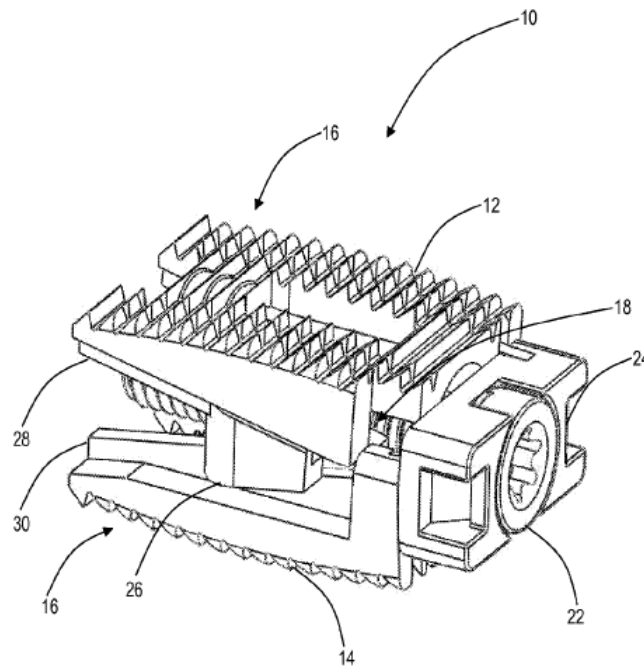
D. Overview of Asserted Prior Art

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

1. Varela ’357 (Ex. 1005)

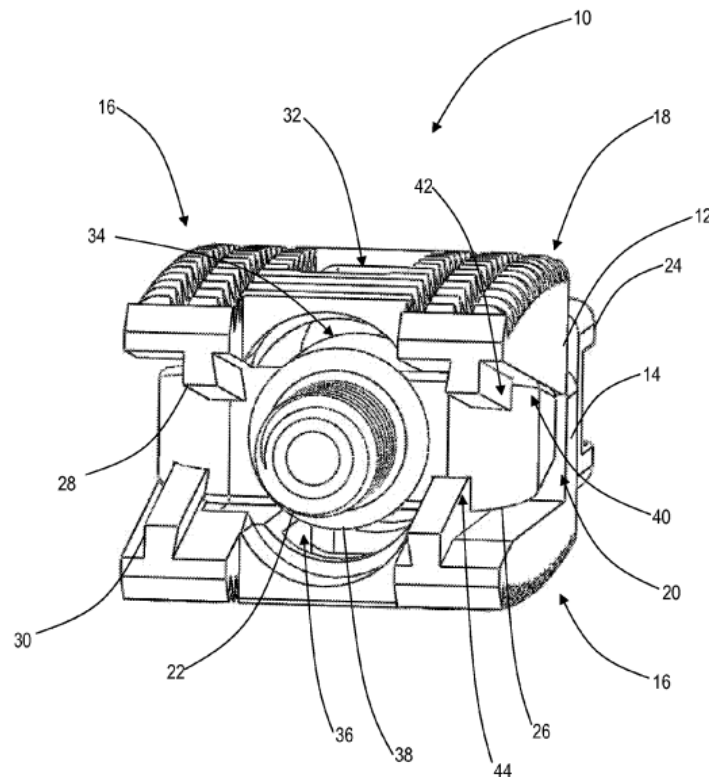
Varela ’357, titled “Expandable Intervertebral Implant and Associated Surgical Method,” relates “to minimally-invasive, surgically-implantable spinal devices and systems.” Ex. 1005, code (54), ¶ 2. Varela ’357 discloses an expandable intervertebral implant selectively deployed in the intervertebral space to provide in-situ distracting, realigning, stabilizing, or fusing a portion of the spine. *Id.* ¶ 5.

We reproduce below Varela ’357’s Figure 1.



Varela '357's Figure 1 depicts expandable intervertebral implant 10 including superior member 12, inferior member 14, and internally-threaded wedge structure 26. *Id.* ¶¶ 15, 65, 67. Rotating screw 22 engages internally-threaded wedge structure 26 to selectively translate the wedge structure along the central axis of expandable intervertebral implant 10. *Id.* ¶ 67. The translation causes internally-threaded wedge structure 26 to interact with associated wedge shapes of superior member 12 and inferior member 14 to force the members apart or together depending on the direction of the translation. *Id.*

We reproduce below Varela '357's Figure 3.



Varela '357's Figure 3 depicts each of superior member 12 and inferior member 14 including respective track structures 28, 30. *Id.* ¶ 68. In particular, track structures 28, 30 are dove-tailed on one or both sides to engage corresponding channels 42, 44 of wedge structure 26 to secure couple superior member 12 and inferior member 14. *Id.*

2. Olmos (*Ex. 1006*)

Olmos, titled "Intervertebral Implant," relates to "[a]n adjustable spinal fusion intervertebral implant." *Ex. 1006*, code (54), (57). Figure 16A of Olmos is reproduced below.

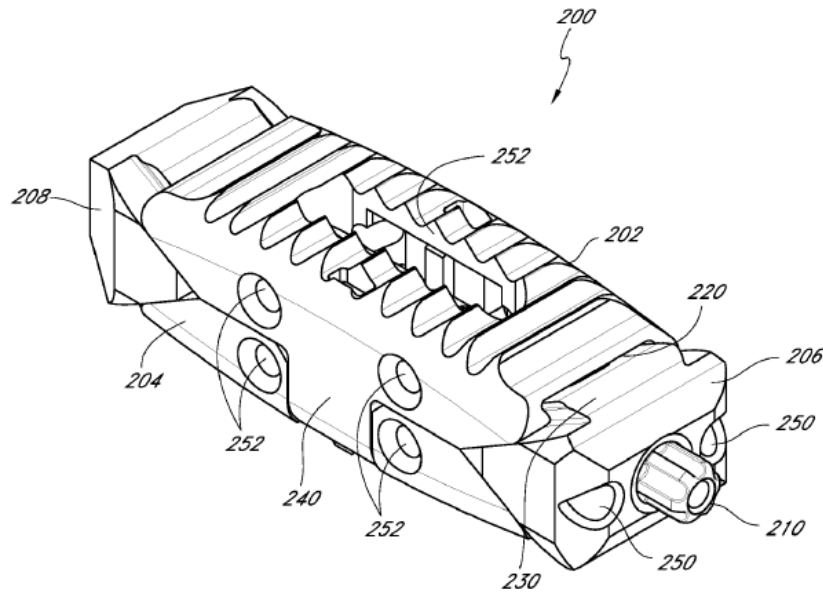


FIG. 16A

Figure 16A of Olmos, reproduced above, is a perspective view of intervertebral implant 200 in an unexpanded state. *Id.* ¶ 152. Implant 200 comprises upper body portion 202, lower body portion 204, proximal wedge member 206, distal wedge member 208, and actuator shaft 210. *Id.* ¶¶ 152, 156. Proximal wedge member 206 includes upper guide member 230 engaging a corresponding slot in upper body portion 202 to enhance stability. *Id.* ¶ 156; *see also id.* (describing that proximal wedge member 208 includes a similar feature).

Figure 18 of Olmos is reproduced below.

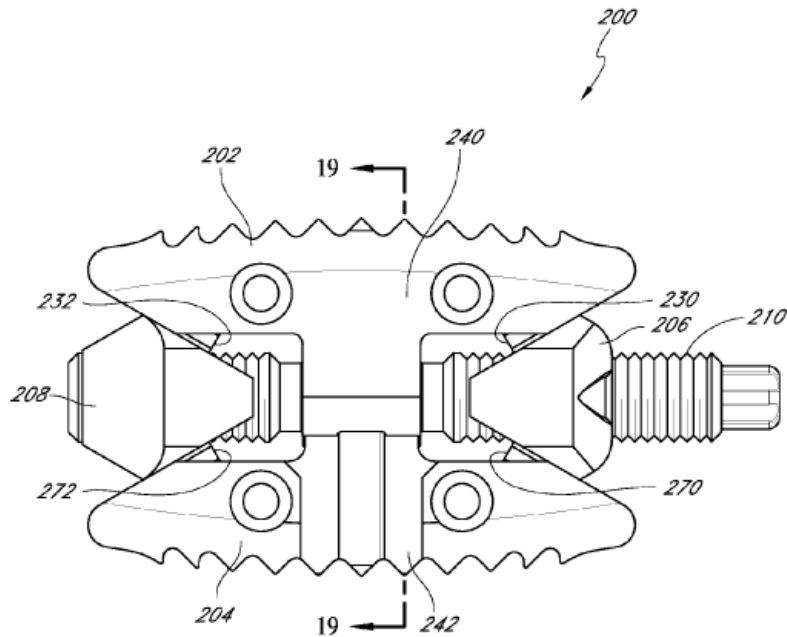


FIG. 18

Figure 18 of Olmos, reproduced above, is a side view of intervertebral implant 200 in an expanded state. *Id.* ¶ 168. Actuator shaft 210 includes threads to engage at least one of the proximal and distal wedge members 206 and 208. *Id.* ¶ 159. Rotating actuator shaft 210 causes proximal and distal wedge members 206 and 208 to move towards each other and separate upper and lower body portions 202 and 204. *Id.* ¶ 155. Proximal wedge member 206 includes upper guide member 230 and lower guide member 270 and distal wedge member 208 includes upper guide member 232 and lower guide member 272. *Id.* ¶¶ 156, 167. Olmos discloses that the guide members and corresponding slots in the upper and lower body portions may have a dovetail shape to ensure secure engagement between the wedge members and the body portions. *Id.*

3. Oglaza (Ex. 1007)

Oglaza, titled “Apparatus for Bone Restoration of the Spine and Methods of Use,” relates to expandable implants for vertebral and spinal correction. Ex. 1007, codes (54), (57). Figure 1A of Oglaza is reproduced below.

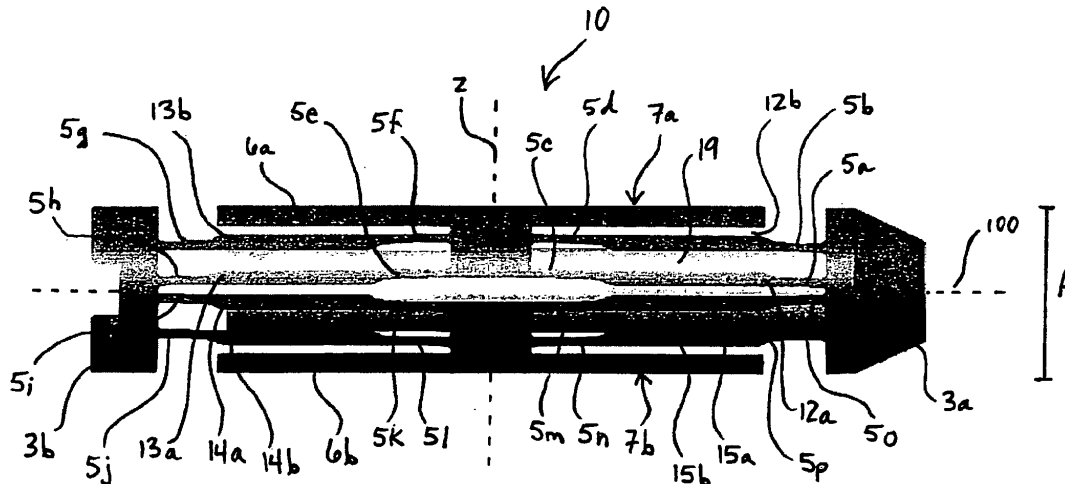


FIG. 1A

Figure 1A of Oglaza, reproduced above, is a perspective view of expandable implant 10 in an unexpanded state. *Id.* ¶ 27. The expandable implant 10 includes end members 3a and 3b that “may be used for positioning the expansible implant between two surfaces, such as two opposed restoration surfaces of bone, and facilitating the expansion of the implant along a plane of expansion between the two surfaces.” *Id.* ¶ 142. In particular, “[o]ne or more of the end members, e.g., 3b, is moveable and may be brought towards the other end member, e.g., 3a, to allow the opening-out/expansion of the implant.” *Id.* ¶ 144. As also shown in Figure 1A, the expandable implant 10 includes retaining element 19, that “spans the implant and may be moveably associated with one or more end members 3a and 3b.” *Id.* ¶ 149. When

engaged, “end member 3b moves along retaining element 19 toward end member 3a,” “thereby causing the implant to expand.” *Id.*

Figure 2A of Oglaza is reproduced below.

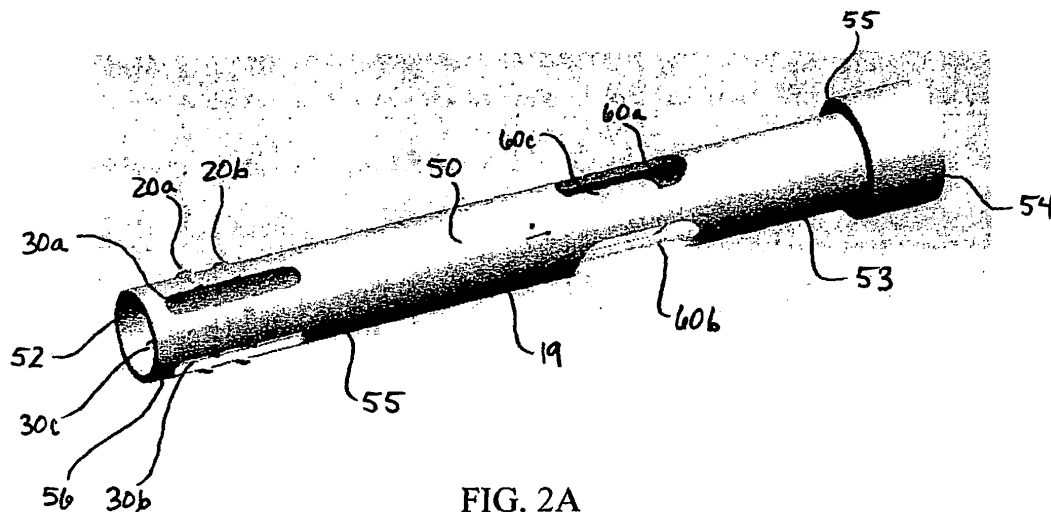
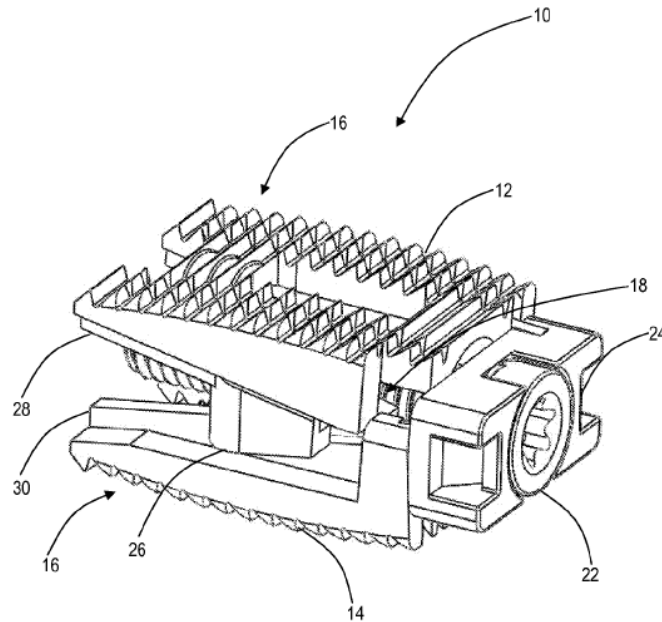


Figure 2A of Oglaza, reproduced above, is a perspective view of retaining element 19. *Id.* ¶ 29. Retaining element 19 includes a passage 52 that extends through the retaining element and “one or more apertures (60) configured for allowing the egress of a fluid that is passed through the passage (52) of the retaining element (19).” *Id.* ¶ 153. In its claims, Oglaza refers to this fluid (or flowable material) as bone cement or bone graft. *See id.* at 55 (claims 10–11), 56 (claims 17–18).

4. Varela '774 (Ex. 1008)

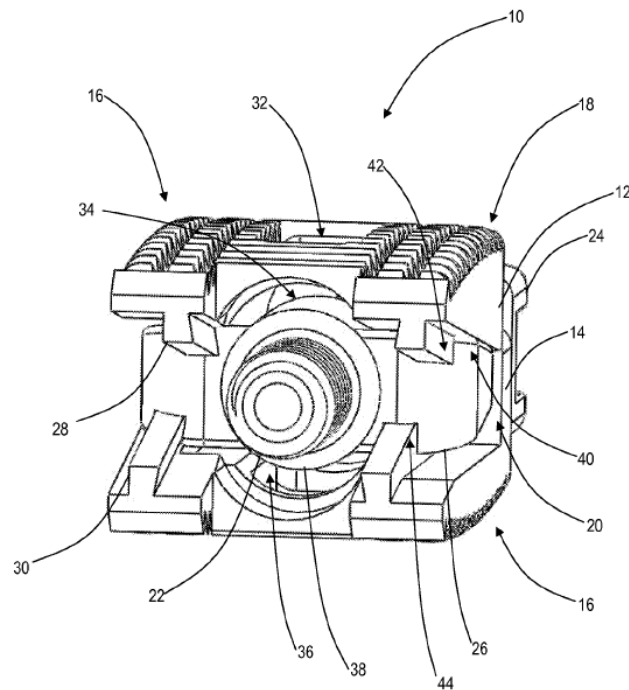
Varela '774, titled “Expandable Intervertebral Implant and Associated Surgical Method,” relates “to minimally-invasive, surgically-implantable spinal devices and systems.” Ex. 1008, code (54), ¶ 2. Varela '774 discloses an expandable intervertebral implant selectively deployed in the intervertebral space to provide in-situ distracting, realigning, stabilizing, or fusing a portion of the spine. *Id.* ¶ 5.

We reproduce below Varela '774's Figure 1.



Varela '774's Figure 1 depicts expandable intervertebral implant 10 including superior member 12, inferior member 14, and internally-threaded wedge structure 26. *Id.* ¶¶ 33, 35. Rotating screw 22 engages internally-threaded wedge structure 26 to selectively translate the wedge structure along the central axis of expandable intervertebral implant 10. *Id.* The translation causes internally-threaded wedge structure 26 to interact with associated wedge shapes of superior member 12 and inferior member 14 to force the members apart or together depending on the direction of the translation. *Id.*

We reproduce below Varela '774's Figure 3.



Varela '774's Figure 3 depicts each of superior member 12 and inferior member 14 including respective track structures 28, 30. *Id.* ¶ 36. In particular, track structures 28, 30 are dove-tailed on one or both sides to engage corresponding channels 42, 44 of wedge structure 26 to secure couple superior member 12 and inferior member 14. *Id.*

E. Priority

The parties dispute whether claims 1–20 of the '649 patent are entitled to a priority date before May 4, 2012, the filing date of Varela '357. *See* Pet. 10–18; Prelim. Reply 1–4; Prelim. Resp. 8–56; Prelim. Sur-reply 1–4.

The '649 patent claims priority to three documents: (1) the “2010 Parent” application, filed on September 3, 2010; (2) the “2012 CIP” application, filed on June 25, 2012; and (3) the “2013 CIP” application, filed

on August 7, 2013.⁹ Ex. 1001, code (63). As this nomenclature suggests, the 2012 CIP was a continuation-in-part application of the 2010 Parent and the 2013 CIP was a continuation-in-part application of the 2012 CIP. *Id.* Both the 2012 CIP and 2013 CIP, as continuation-in-part applications, added subject matter not disclosed in their respective preceding applications. *See* Ex. 1014 (redline comparison of subject matter in 2012 CIP to that in 2010 Parent); Ex. 1015 (redline comparison of subject matter in 2013 CIP to that in 2012 CIP). The application maturing into the '649 patent, however, was a continuation application of the 2013 CIP, and thus shares the same written description as the 2013 CIP.

Briefly, Petitioner argues that the earliest priority date for claims 1–7 and 9 (reciting the Horizontal-Plane Limitation) and claims 10–20 (reciting the Overlap Limitation) is June 25, 2012, the filing date of the 2012 CIP. *See* Pet. 17 (stating that “both the specification and prosecution history show that the Horizontal-Plane and Overlap Limitations are not supported by the 2010 Parent and, thus, the priority date for any claim is no earlier than June 25, 2012”). Petitioner also argues that the earliest priority date for dependent claim 8 (reciting an additional feature related to a graft delivery opening) is August 7, 2013, the filing date of the 2013 CIP. *See id.* at 18 (stating that “any arguable support for th[e] limitation [in claim 8] was added in the 2013 CIP”).

Petitioner argues that Varela '357 is prior art under 35 U.S.C. §§ 102(a)–(b) because it has a filing date of May 4, 2012. *Id.* at 19. Patent

⁹ We use the same nomenclature for the priority documents that the parties use for ease of reference.

Owner, on the other hand, argues that Varela '357 is not prior art because the claims of the '649 patent are fully supported by the 2010 Parent and are thus entitled to a priority date of September 3, 2010. *See, e.g.*, Prelim. Resp. 8.

1. Legal Standard

Although a petitioner has the ultimate burden of persuasion to prove unpatentability, a patent owner must demonstrate entitlement to a priority date when the patent owner relies on that priority date to overcome an anticipation or obviousness argument. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1379–80 (Fed. Cir. 2015). “[A] patent’s claims are not entitled to an earlier priority date because the patentee claims priority Rather, for a patent’s claims to be entitled to an earlier priority date, the patentee must demonstrate that the claims meet the requirements of 35 U.S.C. § 120,” which includes establishing that the earlier application to which priority is claimed provides, for the relevant claims, an adequate written description under 35 U.S.C. § 112. *In re NTP, Inc.*, 654 F.3d 1268, 1276–77 (Fed. Cir. 2011) (citations omitted); *see also Research Corp. Techs., Inc. v. Microsoft Corp.*, 627 F.3d 859, 870–71 (Fed. Cir. 2010).

“[T]he hallmark of written description is disclosure.” *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (*en banc*). The test for adequate written description support “requires an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art.” *Id.* “The level of detail required to satisfy the written description requirement” necessarily “varies depending on the nature and scope of the claims and on the complexity and predictability of the

relevant technology.” *Id.* But the written description need not recite the claimed invention *in haec verba* to satisfy § 112. *Id.* at 1352.

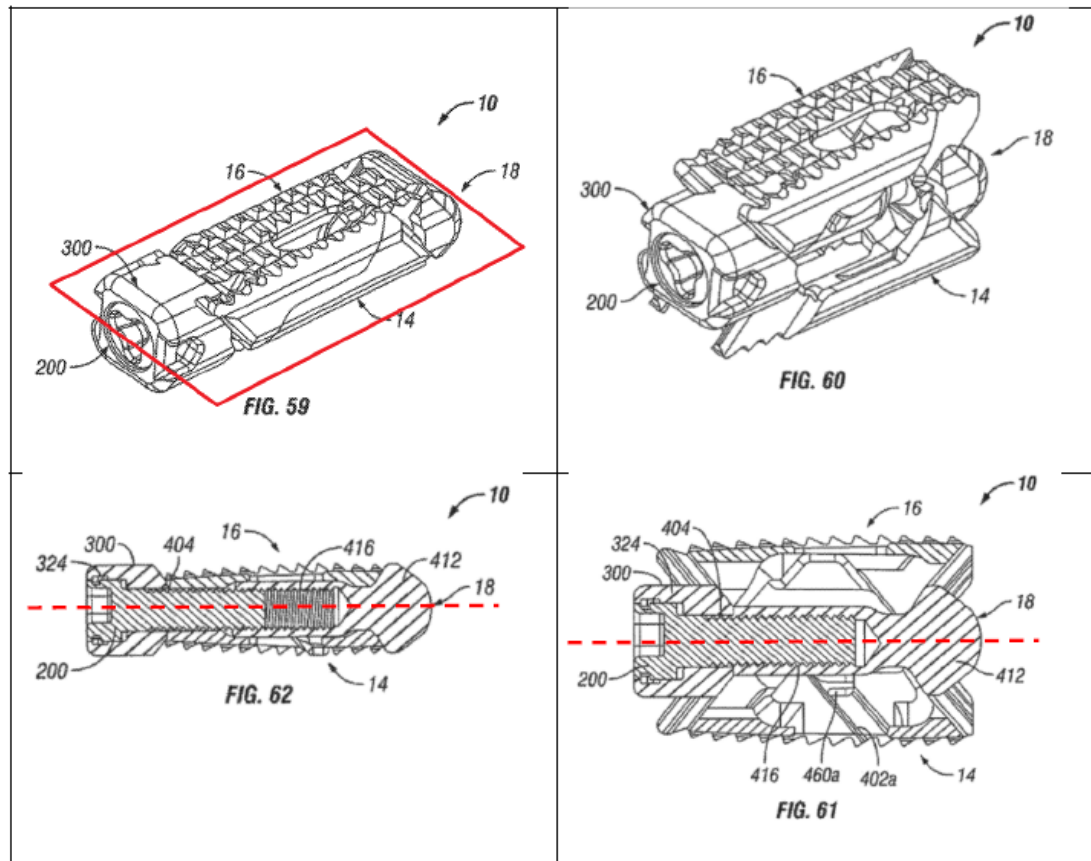
“Patent claims are awarded priority on a claim-by-claim basis based on the disclosure in the priority applications.” *Lucent Techs., Inc. v. Gateway, Inc.*, 543 F.3d 710, 718 (Fed. Cir. 2008). We address below the priority dates of the ’649 patent’s claims in three groups: claims 1–7 and 9, claims 10–20, and claim 8.

2. Analysis of Claims 1–7 and 9: The Horizontal-Plane Limitation

The question presented here is whether the 2012 CIP (as Petitioner argues) or the 2010 Parent (as Patent Owner argues) provides adequate written support for the Horizontal-Plane Limitation recited in independent claim 1. As explained above, the Horizontal-Plane Limitation consists of limitation 1[f] (“the expandable implant defines a horizontal plane that extends through the central ramp, driving ramp and the actuator assembly”) and limitation 1[i] (“in the collapsed position, the at least one ramped portion of the first side of the first endplate extends through the horizontal plane such that the at least one ramped portion of the first endplate is positioned on both sides of the horizontal plane”). *Supra* § I.D.

Petitioner argues that the 2010 Parent does not provide adequate written description support for the Horizontal-Plane Limitation because it neither mentions a horizontal plane nor depicts in any figure a ramped portion extending past a horizontal plane. Pet. 11–12 (citing Ex. 1011; Ex. 1001; Ex. 1002 ¶¶ 81–91). Petitioner points out that 2012 CIP added Figures 58–63, and argues that the embodiment depicted in these figures provided, for the first time in the priority chain of applications, “the claimed

horizontal plane and the ramped portions of the first and second endplates passing through this horizontal plane.” *Id.* at 13–14 (citing Ex. 1001, FIGS. 59–62; Ex. 1012, FIGS. 59–62; Ex. 1002 ¶¶ 81–91). Petitioner relies on an annotated version of Figures 59–62, reproduced below:

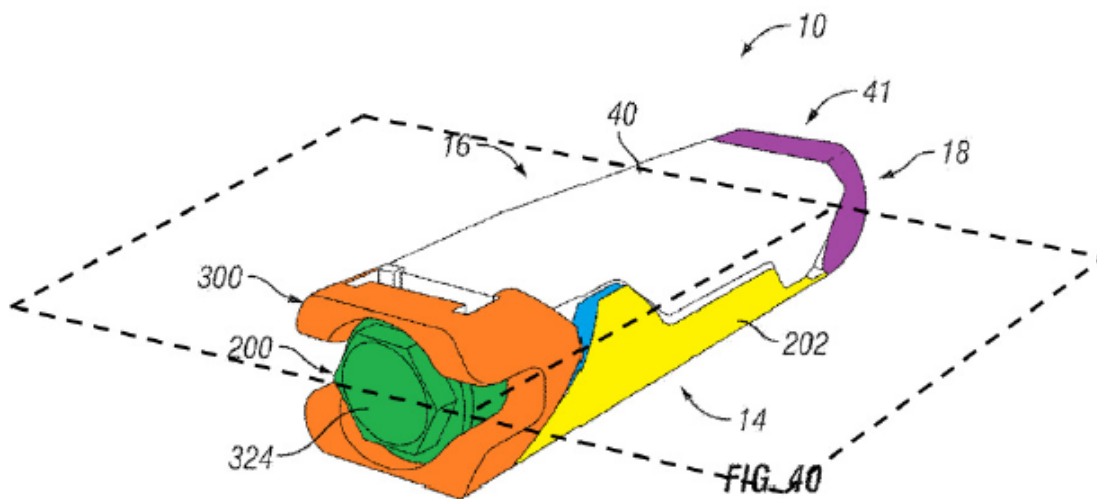


Id. at 14 (citing Ex. 1001, FIGS. 59–62; Ex. 1012, FIGS. 59–62). In Petitioner’s annotated version of Figures 59–62, reproduced above, Petitioner identifies a horizontal plane with a red rectangle or red dotted line. *Id.* Petitioner argues that newly added figures “depict[] the claimed horizontal plane and the ramped portions of the first and second endplates passing through this horizontal plane.” *Id.* at 13.

Finally, Petitioner argues that the 2012 CIP characterizes the Horizontal-Plane limitation “as providing beneficial features (i.e., ‘greater

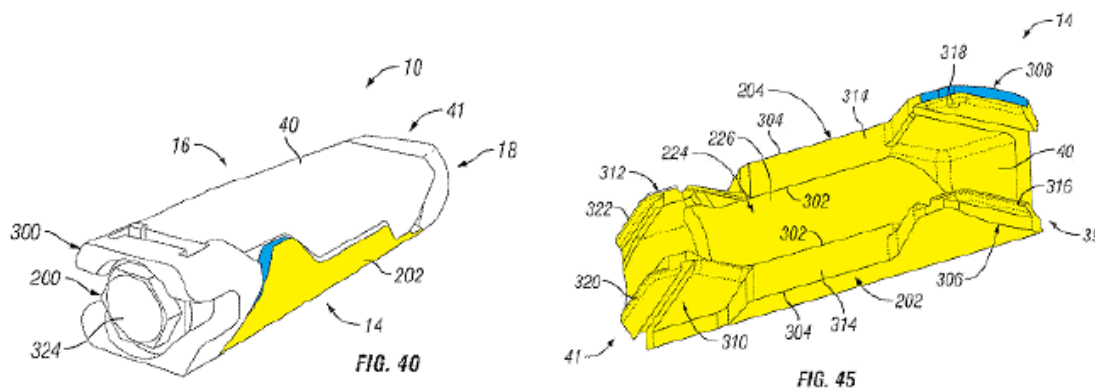
degree of expansion’ and ‘more compact design’).” *Id.* (quoting Ex. 1012 ¶ 151; citing Ex. 1001, 23:15–22). Petitioner argues that an ordinarily skilled artisan would understand that the addition of this text in the 2012 CIP “mean[t] that such features are not disclosed in the embodiments of the 2010 Parent.” *Id.* (citing Ex. 1002 ¶ 97). Petitioner also points to other features of the embodiment depicted in Figures 58–63, including a “narrower and more compact” central ramp and the absence of a “hump” in the central ramp, as supporting its argument that only the 2012 CIP—and not the 2010 Parent—provides written description support for the Horizontal-Plane Limitation. *Id.* at 14–15 (citing Ex. 1001, FIGS. 56, 58; Ex. 1011, FIG. 56; Ex. 1012, FIG. 58; Ex. 1002 ¶¶ 94–97).

Patent Owner, in response, argues that the 2010 Parent discloses the Horizontal-Plane Limitation “at least in the embodiment of FIGS. 40–49.” Prelim. Resp. 11 (citing Ex. 2001 ¶¶ 70–76). To show support for the Horizontal-Plane Limitation, Patent Owner relies on an annotated version of Figure 40, reproduced below:



Id. In Patent Owner’s annotated version of Figure 40, reproduced above, Patent Owner identifies an “actuator assembly 200” in green, a “central ramp 18” in purple, and a “driving ramp 300” in orange. *Id.* (citing Ex. 1011 ¶¶ 103–107). Patent Owner also identifies a horizontal plane by a dashed line that Patent Owner argues “extends through each of the central ramp, the driving ramp, and the actuator assembly.” *Id.* (emphasis omitted). Accordingly, Patent Owner argues, the 2010 Parent discloses limitation 1[f], i.e., “the expandable implant defines a horizontal plane that extends through the central ramp, driving ramp and the actuator assembly.” *Id.* at 10–11 (citing Ex. 2001 ¶¶ 70–72).

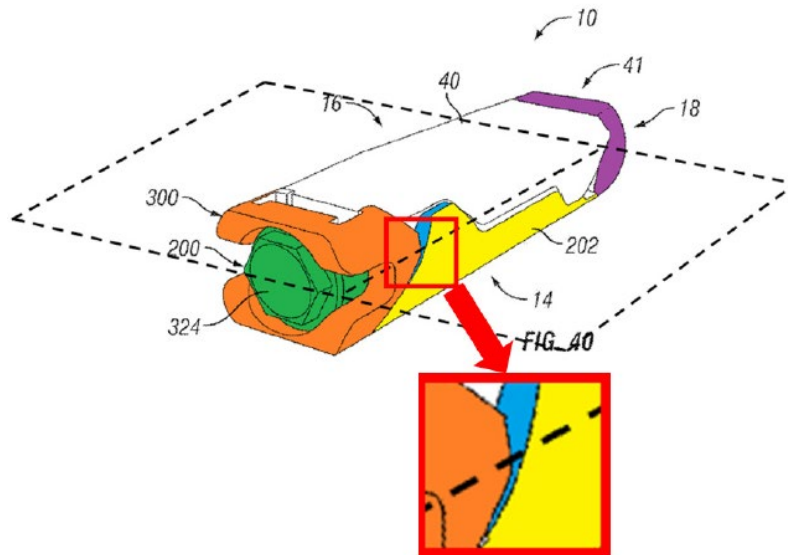
As to the limitation 1[i], i.e., “in the collapsed position, the at least one ramped portion of the first side of the first endplate extends through the horizontal plane such that the at least one ramped portion of the first endplate is positioned on both sides of the horizontal plane,” Patent Owner relies on annotated Figures 40 and 45, reproduced below:



Id. at 12–13. In Patent Owner’s annotated versions of Figures 40 and 45, reproduced above, Patent Owner identifies “a first endplate with a first side” in yellow with “at least one ramped portion” in blue. *Id.* at 12 (citing Ex. 1011 ¶ 106; Ex. 2001 ¶¶ 74–75). Patent Owner argues that the 2010

Parent states that Figure 40 is in an “unexpanded position,” and that an ordinarily skilled artisan would understand that “unexpanded position” correlates to the claimed “collapsed position.” *Id.* (quoting Ex. 1011 ¶ 48).

Patent Owner also reproduces its annotated version of Figure 40, below, but this time with an exploded box view of the ramp portion:



Id. at 13. Patent Owner argues that the exploded box view “shows that the at least one ramped portion (blue) of the first side (yellow) of the first endplate extends through the horizontal plane (dashed-line) such that the at least one ramped portion of the first endplate is positioned on both sides of the horizontal plane, as per limitation 1[i].” *Id.* at 12–13 (citing Ex. 2001 ¶ 76) (emphasis omitted).

Patent Owner also challenges Petitioner’s argument that the 2010 Parent cannot provide adequate written description for the Horizontal-Plane Limitation because it does not recite “horizontal plane” *in haec verba*. *Id.* at 13–14. Relying on Mr. Culbert’s testimony, Patent Owner argues that “[a] horizontal plane is an imaginary flat surface, which is parallel to the planar

bottom of the device and divides an object into upper and lower parts—i.e., it is an inherent feature of every object.” *Id.* (citing Ex. 2001 ¶ 78).

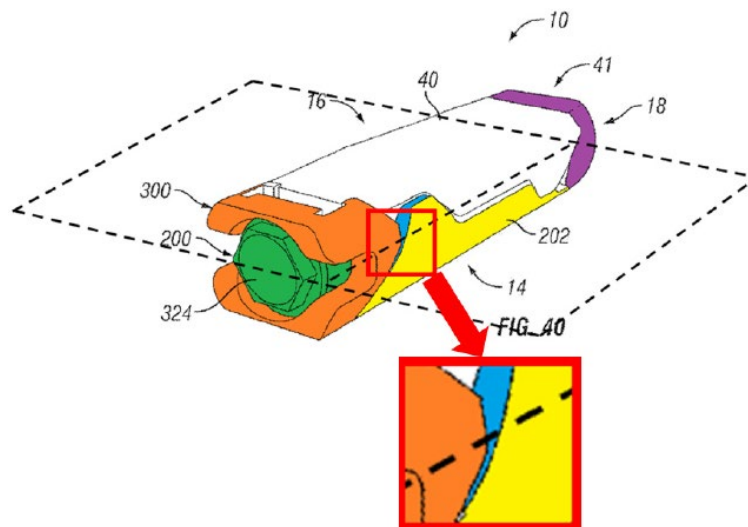
Having considered the record, including the Preliminary Reply and Preliminary Sur-reply, we determine that Patent Owner has the better position for the reasons explained below. Therefore, on the current record, we accord claims 1–7 and 9 a priority date of September 3, 2010, the filing date of the 2010 Parent, for this Decision.

First, for this Decision, we credit Mr. Culbert’s testimony that an ordinarily skilled artisan would understand that every object has a horizontal plane, and thus, every expandable spinal implant depicted in the 2010 Parent also has a horizontal plane. *See* Ex. 2001 ¶ 78 (stating that “a POSITA knows that a horizontal plane is an imaginary flat surface, which is parallel to the planar bottom of the device and divides an object into upper and lower parts”). That the 2010 Parent does not recite the words “horizontal plane” is not dispositive. A patent owner may rely on drawings to establish written description support for a claim limitation if the drawings “convey[] with reasonable clarity to those of ordinary skill” that the patentee actually invented what is claimed. *Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1564–68 (Fed. Cir. 1991). And here, we find that the drawings of the 2010 Parent convey to an ordinarily skilled artisan that a horizontal plane “extend[s] through the central ramp, driving ramp and the actuator assembly” as claimed in limitation 1[f]. For example, Petitioner’s declarant, Mr. Drewry, identifies horizontal planes bisecting the spinal implants depicted in the several figures of the 2010 Parent that extend through these structures. *See* Ex. 1002 ¶¶ 81–91.

Second, we agree with Patent Owner that Figures 40–49 of the 2010 Parent depict an embodiment where “in the collapsed position, the at least one ramped portion of the first side of the first endplate extends through the horizontal plane such that the at least one ramped portion of the first endplate is positioned on both sides of the horizontal plane” as claimed in limitation 1[i].

Figure 40 of the 2010 Parent is “a rear perspective view of an alternative embodiment of an expandable fusion device shown in an unexpanded position.” Ex. 1011 ¶ 48. We agree with Patent Owner that an ordinarily skilled artisan would understand that “unexpanded position” is equivalent to “collapsed position.” Prelim. Resp. 12; Ex. 2001 ¶ 73. Figure 40 also depicts a first endplate 14 having a first side portion 202. Ex. 1011 ¶ 106. Figure 45 of the 2010 Parent is “a perspective view of an endplate of the expandable fusion device of FIG. 40.” *Id.* ¶ 53. Figure 45 depicts the first side portion 202 of the first endplate having “one or more ramped portions,” including “first ramped portions 306, 308” and “second ramped portions 310, 312.” *Id.* ¶ 106. We agree with Patent Owner that, when in the collapsed position (i.e., shown in Figure 40), the “at least one ramped portion of the first side of the first endplate” (i.e., identified in Figure 45) “extends through the horizontal plane” as claimed in limitation 1[i].

Specifically, we reproduce below Patent Owner’s annotated version of Figure 40:



Prelim. Resp. 13. As shown in Patent Owner’s annotated Figure 40, reproduced above, the first endplate 14 has a first side portion 202 (in yellow) having a least one ramp (in blue). And, as shown in the exploded box view, the ramp has portions present on both sides of the horizontal plate bisecting the expandable spinal implant.

Petitioner argues that Figure 40 does not depict the first ramped portions extending through the horizontal plane because the “first ramped portions” are either not numbered in the figure or are “far shorter” than Patent Owner alleges. Pet. 12; Prelim. Reply 2. We disagree. First, Figure 40 shows a ramp on the first side portion 202 of the first endplate 14 that follows the same curvature shown in Figure 45. We are not persuaded by the notion that an ordinarily skilled artisan would not understand the shape of the ramp structures without numbering, especially given the high skill level of an ordinarily skilled artisan in this field of art. *Supra* § III.B.¹⁰

¹⁰ Similarly, as to Figure 44, we find that an ordinarily skilled artisan would understand that the 2010 Parent’s description of the fusion device depicted in that figure as “in an unexpanded position” to be a clear typographical error for “in an expanded position.” See Ex. 1011 ¶ 53. The 2010 Parent

Second, even if Patent Owner’s blue highlighting should have stopped at the top of the ramp curve (e.g., at the top of the red box pictured above) as Petitioner argues, the ramp would still have portions both above and below the horizontal plane, as Patent Owner’s exploded box view shows.

Finally, we are not persuaded by Petitioner’s argument that the addition of Figures 58–63 in the 2012 CIP necessarily means that the 2010 Parent fails to provide adequate written description support for the Horizontal-Plane Limitation. Pet. 13–15. Indeed, on this record, we see little material difference in ramp curvature between Figure 40 of the 2010 Parent and Figure 59 of the 2012 CIP. *Compare* Ex. 1011, FIG. 40, *with* Ex. 1012, FIG. 59. Put differently, if the ramp of the first endplate 14 depicted in Figure 59 of the 2012 CIP extends through the horizontal plane, as Petitioner argues, then it appears to us that the ramp of the first endplate 14 depicted in Figure 40 of the 2010 Parent must also extend through the horizontal plane. *See* Pet. 13–14 (arguing that newly added Figure 58 of the 2012 CIP “is depicting the claimed horizontal plane and the ramped portions of the first and second endplates passing through this horizontal plane”).

For these reasons, we agree with Patent Owner that the 2010 Parent adequately supports the Horizontal-Plane Limitation of claims 1–7 and 9. Thus, we find on this record and for this Decision that claims 1–7 and 9 are

consistently describes similar cross-sectional side views of other embodiments as “in an expanded position.” *See id.* ¶¶ 45–46 (describing the cross-sectional side views of Figures 37 and 38 as showing the “unexpanded” and “expanded” positions, respectively), ¶ 57 (describing the cross-sectional side view of Figure 51 as showing the “expanded position”).

entitled to a priority date of September 3, 2010, the filing date of the 2010 Parent.¹¹

3. Analysis of Claims 10–20: The Overlap Limitation

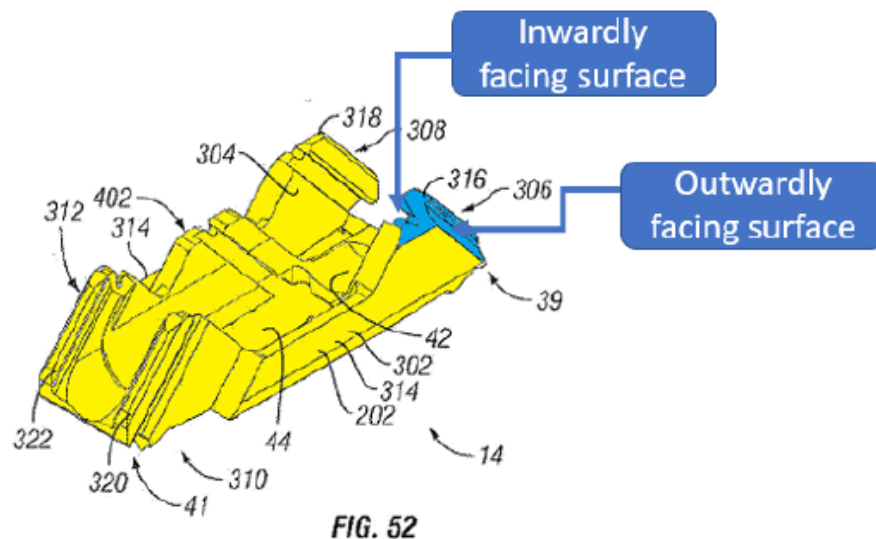
We now turn to the Overlap Limitation. The question presented as to this limitation is the same as above, i.e., whether the 2012 CIP (as Petitioner argues) or the 2010 Parent (as Patent Owner argues) provides adequate written support. As explained above, independent claim 10 recites several limitations relating to “overlap”: “wherein the first side surface of the first endplate includes at least one ramped portion having an inwardly facing surface and an outwardly facing surface” (limitation 10[f]); “wherein the first side surface of the second endplate includes an inwardly facing surface and an outwardly facing surface” (limitation 10[g]); and, when “in the collapsed position, at least a portion of the inwardly facing surface of the ramped portion of the first endplate overlaps at least a portion of the outwardly facing surface of the first side surface of the second endplate” (limitation 10[h]). *Supra* § I.D.

Relying on many of the same arguments as those outlined above as to the Horizontal-Plane Limitation, Petitioner argues that the 2010 Parent does not support the Overlap Limitation. *See* Pet. 11–17; Prelim. Reply 2–5. Specifically, Petitioner argues that the 2010 Parent only uses the term “overlap” in connection with the central and driving ramps—not the endplates—and also does not depict “any embodiment where ramped portions of the endplates overlap.” Pet. 13 (citing Ex. 1011; Ex. 1001;

¹¹ Petitioner does not dispute that the remaining limitations of claims 1–7 and 9 have adequate written description support in the 2010 Parent.

Ex. 1002 ¶¶ 81–91). Petitioner also argues that Patent Owner implicitly acknowledged that the 2010 Parent does not provide written description support for the Overlap Limitation during prosecution of the application that matured into the '649 patent, when—in response to an Examiner request—applicant identified Figures 58–60 as support for “overlap and non-overlap of the surfaces when the implant is in either the collapsed or expanded positions.” *Id.* at 16–17 (quoting Ex. 1004, 541).

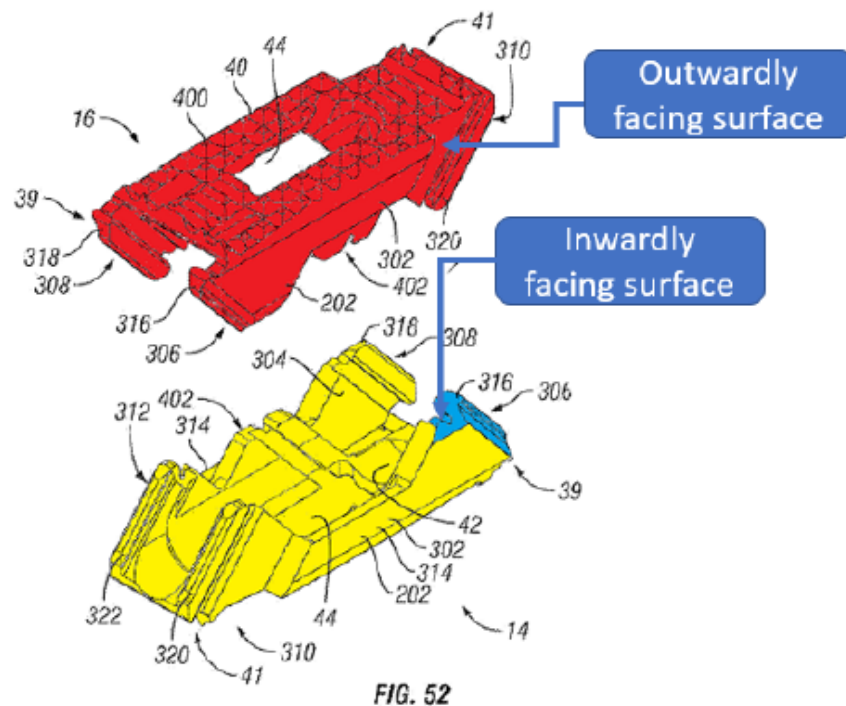
Patent Owner, in response, argues that the 2010 Parent discloses the Overlap Limitation “at least in the embodiment of FIGS. 50–57.” Prelim. Resp. 35 (citing Ex. 2001 ¶¶ 86–92). As to limitation 10[f], i.e., “wherein the first side surface of the first endplate includes at least one ramped portion having an inwardly facing surface and an outwardly facing surface,” Patent Owner relies on an annotated version of Figure 52 that excerpts the first endplate 14, reproduced below:



Id. at 35–36. In Patent Owner’s annotated version of Figure 52, reproduced above, Patent Owner identifies “the first side surface [202] of the first endplate” 14 in yellow and the “at least one ramped portion” 306 “having an

outwardly facing surface and an inwardly facing surface” in blue. *Id.* (citing Ex. 1011 ¶ 120, FIG. 52; Ex. 2001 ¶ 88). Accordingly, Patent Owner argues, the 2010 Parent discloses limitation 10[f]. *Id.* (citing Ex. 2001 ¶ 88).

As to limitation 10[g], i.e., “wherein the first side surface of the second endplate includes an inwardly facing surface and an outwardly facing surface,” Patent Owner again relies on an annotated version of Figure 52, reproduced below, this time which excerpts both the first endplate 14 and the second endplate 16:



Id. at 36–37. In this version of Patent Owner’s annotated Figure 52, reproduced above, Patent Owner identifies the first endplate 14 in yellow and the second endplate 16 in red. *Id.* (citing Ex. 1011, FIG. 52). Patent Owner argues that the 2010 Parent states that “‘the first and second side portions 202, 204’ of endplate 14 includes ‘an interior surface [304] and an exterior surface [302],’” and that “the disclosure with respect to endplate 14

‘also equally applies to the second endplate 16 as the second endplate 16 is substantially identical to the first endplate.’” *Id.* at 36 (quoting Ex. 1011 ¶ 120). Accordingly, Patent Owner argues, the second endplate 16—like the first endplate 14—includes “an inwardly facing surface [304] and an outwardly facing surface [302]” and thus provides written description support for limitation 10[g]. *Id.* (citing Ex. 2001 ¶ 89).

As to limitation 10[h], i.e., “in the collapsed position, at least a portion of the inwardly facing surface of the ramped portion of the first endplate overlaps at least a portion of the outwardly facing surface of the first side surface of the second endplate,” Patent Owner again relies on its annotated version of Figure 52 excerpting both the first and second endplates, reproduced above. Patent Owner identifies via text boxes the inwardly facing surface of the first endplate’s ramped portion (blue) and the outwardly facing surface of the second endplate’s (red) first side surface. *Id.* at 37 (citing Ex. 2001 ¶¶ 90–92). Patent Owner points out that the 2010 Parent states that “the first ramped portions 306, 308 of the first endplate 14 are generally designed and configured to fit over the second ramped portions 310, 312 of the second endplate 16 when the device 10 is in a closed position,” and argues that an ordinarily skilled artisan would understand the term “fit over” to be synonymous with “overlap.” *Id.* at 38 (quoting Ex. 1011 ¶ 121; citing Ex. 2001 ¶ 92) (emphasis omitted).

Finally, Patent Owner refutes Petitioner’s argument that the 2010 Parent cannot provide adequate written description for the Overlap Limitation because it does not recite the word “overlap.” *Id.* at 38–39. Patent Owner argues that “the 2010 Parent describes ramped portions on the first endplate *fitting over* ramped portions on the second endplate.” *Id.* at 39

(citing Ex. 2001 ¶¶ 86–94). This description, Patent Owner argues, reasonably conveys to an ordinarily skilled artisan that “an overlap exists.” *Id.*

Having considered the record, including the Preliminary Reply and Preliminary Sur-reply, we determine again that Patent Owner has the better position for the reasons explained below. Therefore, we accord claims 10–20 a priority date of September 3, 2010, the filing date of the 2010 Parent, for this Decision.

The 2010 Parent describes an embodiment where “the first ramped portions 306, 308 of the first endplate 14 are generally designed and configured to *fit over* the second ramped portions 310, 312 of the second endplate 16 when the device 10 is in a closed position.” Ex. 1011 ¶ 121 (emphasis added). We agree with, and credit for this Decision, Mr. Culbert’s testimony that, by describing the first ramped portions as “generally designed and configured to fit over the second ramped portions,” the 2010 Parent reasonably discloses to an ordinarily skilled artisan that the first and second ramped portions “overlap” one another when the expandable intervertebral implant is in the collapsed (or closed) position. Ex. 2001 ¶¶ 92, 94. Indeed, it is unclear to us on this record what else “fit over” could mean in this context.¹²

¹² In its Preliminary Reply, Petitioner suggests that “fit over” at most conveys that the ramped portions “fit on top of one another.” Prelim. Reply 2. But again, we see no difference on this record between “fit on top of one another” and “overlap.” For example, two objects that fit on top of one another overlap in at least one dimension.

We are not persuaded by Petitioner’s argument that certain features of the embodiment depicted in Figures 58–63 of the 2012 CIP—including a “narrower and more compact central ramp” and the absence of a “hump” in the central ramp—necessarily means that there is no overlap in the embodiment depicted in Figures 50–57 of the 2010 Parent. Petitioner’s declarant, Mr. Drewry, states only that the protrusions “make it *more difficult* for the first and second endplates to overlap or nest when in the collapsed position” and that the “hump” “*may prevent* the endplates from overlapping or passing through any horizontal plane.” Ex. 1002 ¶¶ 95–96 (emphases added). We find that Mr. Drewry’s testimony on this issue is equivocal, and falls short of addressing the claim language that requires only “a portion” of the inwardly- and outwardly-facing surfaces to overlap. *See* Ex. 1001, 34:30–34 (limitation 10[h]).

Finally, we do not agree with Petitioner that the prosecution history of the ’649 patent provides evidence that the Overlap Limitation lacks written description support in the 2010 Parent. *See* Pet. 16–17. In response to the Examiner’s objection to the Specification and Drawings for lack of antecedent basis, Ex. 1004, 501–503, the applicant stated that “there are numerous other instances of antecedent basis for the identified claimed subject matter in the specification as well as numerous instances of the drawings showing every feature of the claimed invention,” *id.* at 541. That the applicant focused on Figures 58–60 as “one example,” *id.*, is not an admission that the Overlap Limitation is supported *only* in the 2012 CIP.

Petitioner relies on *Technology Licensing Corp. v. Videotek, Inc.*, 545 F.3d 1316, 1332 (Fed. Cir. 2008), as an example of a decision by the Court of Appeals for the Federal Circuit where an “earlier application did not show

[an] inventor possessed [a] limitation” because the “only support identified during prosecution was new matter.” Prelim. Reply 3–4. We decline to read *Technology Licensing* so broadly.

The inventor in *Technology Licensing* filed a first application (“’323 application”) and, later, a series of continuation-in-part applications that resulted in the patent-at-issue (“the ’250 patent”). 545 F.3d at 1321. During prosecution of the ’250 patent, the inventor added a new claim, and identified support for one feature of the new claim (i.e., a capacitor) in the original ’323 application. *Id.* at 1332. But, for another feature of the claim (i.e., “other circuit”), the inventor identified support only in the new matter added to the application that matured into the ’250 patent. *See id.* at 1333 (“Thus, although he found support for the capacitor in the original written description, the only support that the inventor acknowledged for the ‘other circuit’ was the new matter added in 1995.”).

Although recounting this fact, the Court did not base its decision on it, as Petitioner appears to suggest. Prelim. Reply 3–4. Instead, the Court explained that the “pertinent issue” is not what an ordinarily skilled artisan would glean from reading the ’323 application and ’250 patent together, but “whether a person skilled in the art would understand from the earlier application alone, *without consulting the new matter in the ’250 patent*, that the inventor had possession of the claimed ‘other circuit’ . . . when the ’323 application was filed.” *Tech. Licensing*, 545 F.3d at 1333–34 (emphasis added). The Court ultimately found the ’323 application did not adequately support the “other circuit” limitation because the application did not show that the inventor had actually invented, and was in possession of, the claimed subject matter at that time. *Id.* at 1334.

At most, then, *Technology Licensing* holds that it is improper to cobble together written description support from two applications filed at different times. *Id.* It does not, in our view, hold that an applicant's non-limiting statements about representative descriptive support define the entirety of potential descriptive support in the putative priority chain. For these reasons, we are not persuaded by Petitioner's argument regarding *Technology Licensing*.

In summary, we agree with Patent Owner that the 2010 Parent adequately supports the Overlap Limitation of claims 10–20. Thus, we find on this record and for this Decision that claims 10–20 are entitled to a priority date of September 3, 2010, the filing date of the 2010 Parent.¹³

4. Analysis of Claim 8

Claim 8 depends directly from claim 1 and recites “[t]he expandable implant of claim 1, wherein the driving ramp includes an opening configured and dimensioned as a graft delivery opening to allow for graft to be introduced into the expandable implant.” Ex. 1001, 33:55-58. Petitioner argues that the earliest priority date for claim 8 is August 7, 2013, the filing date of the 2013 CIP.

Petitioner argues that “neither the 2010 Parent nor the 2012 CIP make any reference to a driving ramp having an opening to [sic] allowing the graft to be introduced to the implant.” Pet. 17–18. “Instead,” Petitioner argues, “the 2010 Parent and 2012 CIP reference only refer to a graft opening as

¹³ Petitioner does not dispute that the remaining limitations of claims 10–20 have adequate written description support in the 2010 Parent.

being an opening in the endplates—not the driving ramp—of certain embodiments.” *Id.* at 18 (citing Ex. 1012 ¶¶ 82, 99–117; Ex. 1001¹⁴, 7:15–19, 14:59–62; Ex. 1002 ¶¶ 99–100).

Having considered the record, we determine that Petitioner has met its initial burden of production by identifying Varela ’357 as prior art to claim 8. *Dynamic Drinkware*, 800 F.3d at 1380. Patent Owner does not challenge Petitioner’s asserted priority date for claim 8. *See generally* Prelim. Resp.; Prelim. Sur-reply. Thus, Patent Owner has not met its burden of production on this record to show that claim 8 is “entitled to the benefit of a filing date . . . prior to the filing date of” Varela ’357. *Id.* For these reasons, we accord claim 8 a priority date of August 7, 2013, the filing date of the 2013 CIP.

F. Ground 1 – Alleged Anticipation by Varela ’357

Petitioner argues that claims 1–7 and 9–20 of the ’649 patent are unpatentable as anticipated by Varela ’357. Pet. 37–53. As discussed above, we determine on this record and for this Decision that claims 1–7 and 9–20 are entitled to a priority date of September 3, 2010, the filing date of the 2010 Parent. Because Varela ’357 was filed on May 4, 2012,¹⁵ it is not prior art under 35 U.S.C. § 102.

Nevertheless, the Board, in a decision to institute under 35 U.S.C. § 314(b), may not institute review on fewer than all grounds asserted and all claims challenged in the petition. *SAS*, 138 S. Ct. at 1355–56; 37 C.F.R.

¹⁴ We consider Petitioner’s citation to Ex. 1002 here as a typographical error, intending instead to cite to Ex. 1001.

¹⁵ Petitioner does not allege that Varela ’357 has an effective filing date earlier than May 4, 2012. *See generally* Pet.; *see also* Prelim. Resp. 9 n.3.

§ 42.108(a). Because we determine that Petitioner has met its burden under 35 U.S.C. § 314(a) as to its challenge of at least one claim of the '649 patent on other grounds, we institute *inter partes* review as to all claims challenged in the Petition, and on all grounds presented, including this ground.

G. Ground 2 – Alleged Obviousness Over Varela '357 With Oglaza

Petitioner argues that claim 8 is unpatentable as obvious over Varela '357 in view of Oglaza. Pet. 54–66. As explained above, we accord claim 8 a priority date of August 7, 2013, which is after the May 4, 2012, filing date of Varela '357. *Supra* § III.E.4. Thus, Varela '357 is prior art to claim 8 under 35 U.S.C. § 102.

Briefly, Petitioner argues that the combination of Varela '357 and Oglaza discloses all limitations of claim 8, and that an ordinarily skilled artisan would have been motivated to combine the teachings of Varela '357 and Oglaza with a reasonable expectation of success to achieve the subject matter of claim 8. Pet. 61–66. Patent Owner does not dispute Petitioner's mapping of claim 8 to the disclosures of Varela '357 and Oglaza. *See generally* Prelim. Resp. Instead, Patent Owner argues that Petitioner fails to establish a motivation to combine Varela '357 with Oglaza. *Id.* at 56–62.

1. The Limitations of Claim 8

Claim 8 depends from directly from claim 1, and therefore includes all the limitations of claim 1. Petitioner argues that Varela '357 discloses all limitations of claim 1, Pet. 24–32, and that Oglaza discloses the limitation of claim 8, *id.* at 61–63, 66–67.

As to the limitations of claim 1, Petitioner provides a mapping of: the preamble,¹⁶ *id.* at 24 (citing Ex. 1005, FIGS. 18a–19b; Ex. 1002 ¶¶ 165–166); limitation 1[a], *id.* at 25 (citing Ex. 1005, FIGS. 24a–b; Ex. 1002 ¶¶ 167–169); limitation 1[b], *id.* at 25–26 (citing Ex. 1005, FIGS. 23a–b, ¶ 77; Ex. 1002 ¶¶ 170–171); limitation 1[c], *id.* at 26–27 (citing Ex. 1005, FIGS. 18b, 19b, ¶ 79; Ex. 1002 ¶¶ 172–173); limitation 1[d], *id.* at 27–28 (citing Ex. 1005, FIGS. 18a, 19a, 34, ¶¶ 79, 82; Ex. 1002 ¶¶ 174–175); limitation 1[e], *id.* at 28–29 (citing Ex. 1005, FIGS. 33b, 34, ¶¶ 79, 86; Ex. 1002 ¶¶ 176–177); limitation 1[f], *id.* at 29 (citing Ex. 1005, FIG. 18a, ¶¶ 77–82, 89; Ex. 1002 ¶¶ 178–179; Ex. 1004, 544); limitation 1[g], *id.* at 30 (citing Ex. 1005, FIG. 19b, ¶¶ 10, 77, 79; Ex. 1002 ¶¶ 180–181); limitation 1[h], *id.* at 30–31 (citing Ex. 1005, FIG. 19b, ¶¶ 77, 79; Ex. 1002 ¶¶ 182–183); limitation 1[i], *id.* at 31–32 (citing Ex. 1005, FIG. 18a, ¶¶ 77–79; Ex. 1002 ¶¶ 184–185). We have reviewed Petitioner’s arguments and supporting evidence regarding these limitations, and are satisfied on this record that Petitioner establishes sufficiently for institution that Varela ’357 discloses these limitations of claim 1.

In support of its arguments as to the combination of Varela ’357 and Oglaza, Petitioner provides a mapping of the subject matter of claim 8 to Oglaza’s retaining element 19. *See* Pet. 61–63 (citing Ex. 1007, FIGS. 1A–2B, ¶¶ 104, 144, 149, 153, claim 18; Ex. 1002 ¶¶ 158–159, 161–164). Specifically, Petitioner argues that Oglaza discloses a retaining element,

¹⁶ Petitioner does not take a position whether the preamble to the claim is limiting. On this record, and at this stage of the proceeding, we accept Petitioner’s showing that the preamble is disclosed by the prior art, without deciding whether the preamble is limiting.

similar to the claimed driving ramp, that contains “one or more apertures (60) configured for allowing the egress of a fluid that is passed through the passage (52) of the retaining element (19).” *Id.* at 62–63 (citing Ex. 1005, FIGS. 2A–B, ¶ 153; Ex. 1002 ¶¶ 276–285) (emphasis omitted). Petitioner also argues that Oglaza’s retaining element 19 may be used to deliver a fluid such as bone cement or graft into the expandable implant, as disclosed in Oglaza’s claim 18. *Id.* at 63 (citing Ex. 1007 ¶ 104, claim 18; Ex. 1002 ¶¶ 163–164).

Again, we have reviewed Petitioner’s arguments and supporting evidence regarding the limitation of claim 8, and are satisfied on this record that Petitioner establishes sufficiently for institution that the combination of Varela ’357 and Oglaza discloses the limitations of claim 8. *See* Ex. 1001, 33:55–58.

2. Motivation to Combine Varela ’357 and Oglaza With a Reasonable Expectation of Success

Petitioner argues that an ordinarily skilled artisan would have been motivated to modify Varela ’357’s actuator bolt with the apertures of Oglaza’s retaining element. *See* Pet. 63–66. Petitioner argues that Varela ’357 discloses having “one or more holes 132 or fenestrations” in its endplates to place bone graft materials “to promote bony in-growth or fusion.” *Id.* at 64 (citing Ex. 1005 ¶ 80; Ex. 1002 ¶¶ 139, 279). But an ordinarily skilled artisan, Petitioner argues, “would have recognized that introducing bone-graft material through holes in the endplates after implantation would be unnecessarily difficult given the orientation of the endplates within the intervertebral space.” *Id.* (citing Ex. 1002 ¶ 283). An ordinarily skilled artisan, Petitioner argues, “therefore would have been

motivated to insert holes in more accessible portions to make the process easier.” *Id.* (citing Ex. 1002 ¶ 282).

Petitioner argues that an ordinarily skilled artisan would have recognized that the proximal end of Varela ’357’s actuator bolt would provide a “necessarily accessible” access point to introduce bone-graft material. *Id.* (citing Ex. 1005 ¶ 79; Ex. 1002 ¶ 283). Specifically, Petitioner argues that “a POSITA would recognize that modifying Varela ’357’s actuator bolt with the apertures of Oglaza’s retaining element “would make it easier for a clinician to introduce bone-graft material into the expandable implant when the implant is in place.” *Id.* at 64 (citing Ex. 1002 ¶ 282).

Petitioner also argues that an ordinarily skilled artisan would have had a reasonable expectation of success because Oglaza’s retaining element performs a similar function as Varela ’357’s actuator bolt (i.e., facilitating movement of the endplates), and because Varela ’357 teaches that its actuator screw may be cannulated or hollow. *Id.* at 65 (citing Ex. 1002 ¶¶ 161, 162, 278). Petitioner argues that “it would have been straightforward to use a hollow actuator with dispersed apertures, such as O[gl]aza’s apertures 60, to allow bone graft to be introduced through the actuator itself and, by extension, through the already existing opening in the driving ramp.” *Id.* (citing Ex. 1002 ¶ 278). Petitioner characterizes Varela ’357’s device as “ready for improvement based on Oglaza’s teachings.” *Id.* at 66 (citing Ex. 1002 ¶ 285).

Patent Owner argues that Petitioner’s asserted motivation to combine is illogical, lacks evidence, and is based on hindsight. Prelim. Resp. 56–62. Patent Owner argues that it would have been illogical to add holes to Varela ’357’s actuator bolt when Varela ’357’s endplate already has holes

for introducing bone-graft materials. *Id.* at 57–58. Relying on Mr. Culbert’s testimony, Patent Owner argues that Varela ’357’s endplates have holes in their top and side surfaces, and thus, “Varela ’357’s implant is already configured so that bone-graft material can be inserted therein *prior to and after* implantation.” *Id.* at 60 (emphasis added) (citing Ex. 2001 ¶¶ 96–101; Ex. 1005, FIGS. 20, 45b, ¶ 87). Patent Owner also argues that Petitioner provides no evidentiary support for its argument that “introducing bone-graft material through holes in the endplates after implantation would be unnecessarily difficult given the orientation of the endplates within the intervertebral space.” *Id.* at 58 (quoting Pet. 64; citing Ex. 1002 ¶¶ 282–284). Patent Owner argues that “[t]he only apparent basis for Petitioner’s modification is because Petitioner needs to have a combination that reads on claim 8 of the ’649 patent.” *Id.* at 59.

After considering the arguments and evidence of record, we determine that Petitioner has shown a reasonable likelihood of establishing that claim 8 would have been obvious over Varela ’357 and Oglaza. Nevertheless, we recognize that the issues in dispute are highly fact-intensive and implicate genuine issues of fact more appropriately resolved on a fully developed record.

At this early stage, we offer the following observation on Patent Owner’s argument that “a POSITA would not have recognized Petitioner’s alleged problem, i.e., introducing bone-graft material through holes in the endplates after implantation would be unnecessarily difficult given the orientation of the endplates within the intervertebral space as a motivation to combine Varela ’357 and Oglaza, because Varela ’357’s implant does not have this problem.” Prelim. Resp. 61 (quotation omitted). Patent Owner

may want to address post-institution the Federal Circuit’s observation that “a challenger need not prove that there was a known problem with the prior art in order to demonstrate that there was a motivation to combine prior art references.” *Arctic Cat Inc. v. Polaris Indus., Inc.*, 795 F. App’x 827, 833 (Fed. Cir. 2019); *see also Unwired Planet, LLC v. Google Inc.*, 841 F.3d 995, 1002–03 (Fed. Cir. 2016) (finding that patent challenger need not establish “a known problem with the prior art system in order to articulate the required rational underpinning for the proposed combination”).

Moreover, to the extent Patent Owner pursues this argument during trial, the parties may wish to address whether an ordinarily skilled artisan would have appreciated that having additional locations for bone-graft delivery openings would be beneficial. *See* Ex. 1002 ¶ 144.

3. Summary for Ground 2

In sum, based on the record before us, we determine that Petitioner has established a reasonable likelihood that it would prevail in showing that claim 8 would have been obvious over Varela ’357 and Oglaza.

H. Ground 3 – Alleged Obviousness Over Olmos With Varela ’774

Petitioner argues that claims 1–7 and 9–20 are unpatentable as obvious over Olmos in view of Varela ’774. Pet. 67–113. Briefly, Petitioner relies on Olmos for disclosing nearly all claim limitations. *Id.* at 74–113. On this record, Petitioner’s mapping of the claimed limitations—other than the Horizontal-Plane and Overlap Limitations—to the prior art is unchallenged. *See* Prelim. Resp. 63–73. We have reviewed Petitioner’s arguments and supporting evidence, and are satisfied on this record that Petitioner establishes sufficiently for institution that Olmos, either alone or

in combination with Varela '357, discloses all undisputed limitations of claims 1–7 and 9–20. *See* Pet. 74–113.

As to limitations 1[i] and 10[h] (relating to the Horizontal-Plane and Overlap Limitations, respectively), Petitioner provides additional analysis alleging that these limitations are disclosed by the combination of Olmos and Varela '774. *Id.* at 86–88, 105–107. Petitioner points out that the Examiner allowed the '649 patent's claims over Olmos after the addition of the Horizontal-Plane and Overlap Limitations. *Id.* at 67. But, Petitioner argues, “when Olmos is combined with the track structures of Varela '774 both these limitations are met.” *Id.*

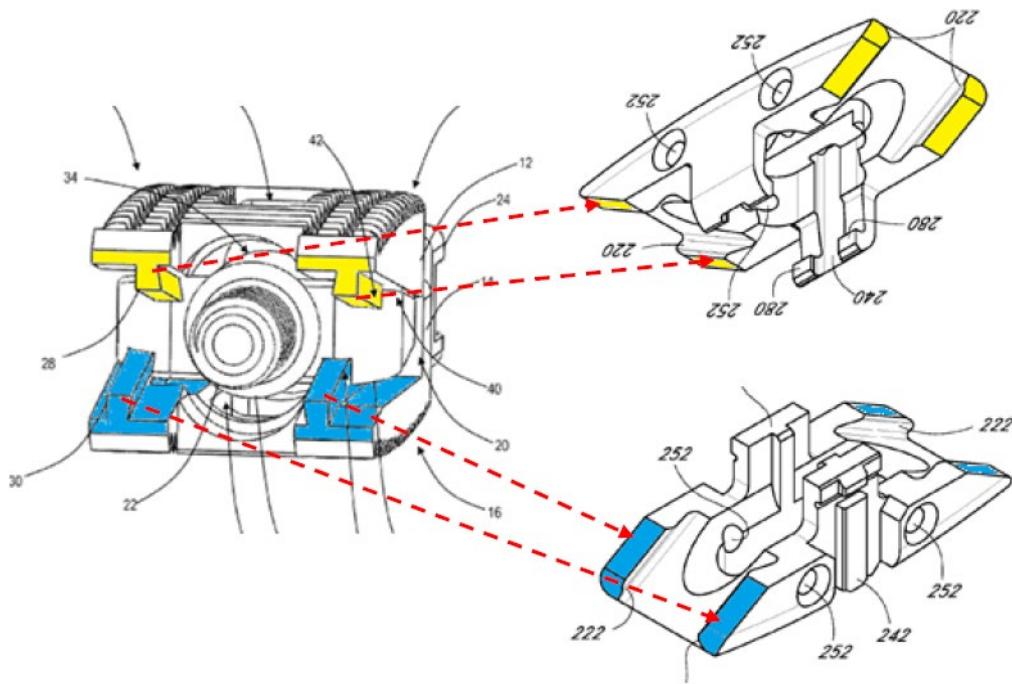
At this stage of the proceeding, Patent Owner disputes Petitioner's contentions as to: (1) whether an ordinarily skilled artisan would have been motivated to combine Olmos and Varela '774; and (2) whether Petitioner has met its burden of showing that the combination of Olmos and Varela '774 meets the Horizontal-Plane and Overlap limitations. *See* Prelim. Resp. 63–73.

After considering the arguments and evidence of record, we determine that Petitioner has shown a reasonable likelihood of establishing that claims 1–7 and 9–20 would have been obvious over Olmos in view of Varela '774 for the purpose of institution. Nevertheless, we recognize that the issues in dispute are highly fact-intensive and implicate genuine issues of fact more appropriately resolved on a fully developed record. At this early stage, we offer the following observations on Patent Owner's arguments.

1. Motivation to Combine Olmos and Varela '774

Petitioner argues that an ordinarily skilled artisan “would have found it predictable and obvious to modify Olmos' upper-body portion 202

and lower-body portions [*sic*] 204 to include Varela ' 774' s track structures 28 and 30." Pet. 70 (citing Ex. 1002 ¶ ¶ 301-309). Petitioner also argues that an ordinarily skilled artisan would have found it predictable and obvious "to modify Olmos' proximal and distal wedges to include Varela ' 774' s corresponding channels 42 and 44." *Id.* Petitioner relies on an annotated version of Olmos' s Figures 20A and 21A and Varela ' 774' s Figure 3, reproduced below:



Id. at 71 (citing Ex. 1006, FIGS. 20A, 21A; Ex. 1008, FIG. 3). In Petitioner's annotated version of the prior-art figures, reproduced above, Petitioner highlights Varela '774's track structure 28 in yellow and track structure 30 in blue. *Id.* Petitioner highlights the ramps of Olmos's upper body and lower body portions in the same colors. *Id.*

Petitioner argues that an ordinarily skilled artisan would have been motivated to combine Olmos and Varela '774, because adding Varela '774's tracks to Olmos's upper- and lower-body portions would have resulted in Olmos's intervertebral implant having: (i) "a lower profile which would be more easily inserted" in the collapsed position; (ii) "a greater height" in the expanded configuration; and (iii) "a more secure engagement between the upper and lower-body portions (end plates) and the wedge portions (central and driving ramps)." *Id.* at 72–73 (citing Ex. 1006 ¶ 13; Ex. 1008 ¶¶ 6, 36; Ex. 1002 ¶¶ 304–307). Patent Owner, in response, argues that "none of Petitioner's alleged motivations are supported by an articulated reasoning with some rational underpinning." Prelim. Resp. 63–64 (quotation omitted). We address each proffered motivation to combine separately below.

a. "more secure engagement"

First, Patent Owner argues that Petitioner's contention that an ordinarily skilled artisan would have been motivated to combine Olmos and Varela '774 to obtain a "more secure engagement" is "incorrect because Olmos already discloses that its implant has this feature." Prelim. Resp. 64 (citing Ex. 2001 ¶¶ 106–107). Patent Owner supports its argument with an annotated version of Olmos's Figure 16A, reproduced below:

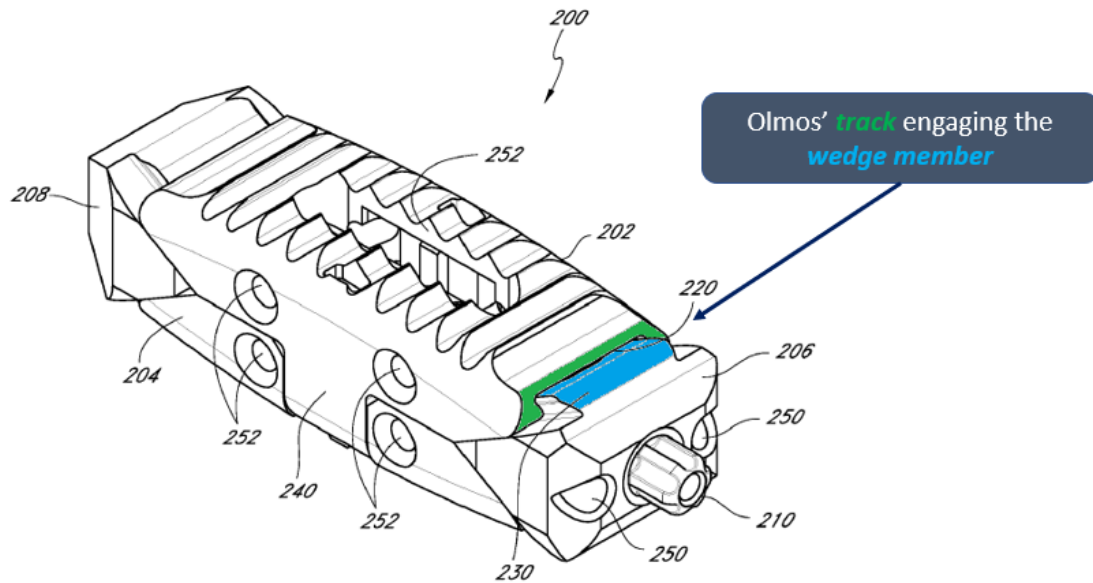


FIG. 16A

Id. at 65 (citing Ex. 1006, FIG. 16A). In its annotated version, Patent Owner highlights a portion of guide member 230 in blue abutting slot 220 in green. *Id.* at 64–65. Patent Owner argues that “the edge of the slot forms a track (green), which engages with the guide member (blue) on the distal wedge member 206.” *Id.* at 64 (emphasis omitted). Quoting Olmos, Patent Owner argues that this configuration “enhance[s] the structural stability and alignment of the implant 200.” *Id.* (quoting Ex. 1006 ¶ 156) (alteration in original). Patent Owner argues that “a POSITA would not have been motivated to add Varela ’774’s tracks to Olmos’ ramped portions as that would be an unnecessary design without an appreciable benefit.” *Id.* at 66 (citing Ex. 2001 ¶¶ 105–107).

Having considered the record, we determine that Patent Owner has the better position as to this proffered motivation to combine. Specifically, we have reservations on this record whether Petitioner has adequately explained why an ordinarily skilled artisan would have had a reason to add

Varela '774's tracks to Olmos's upper and lower-body portions for the purpose of "a more secure engagement" when Olmos discloses an interlinking mechanism that already achieves that purpose. *See* Ex. 1006 ¶ 156 (disclosing that "the proximal and distal wedge members 206, 208 are interlinked with the upper and lower body portions 202, 204 to improve stability and alignment of the implant 200"). Petitioner points to Varela '774's teachings that "the track structures 28 and 30 are 'dove-tailed' and 'engage corresponding channels 42 and 44' that are manufactured into the wedge surfaces and that this dove-tail arrangement provides a 'secure[] coupling.'" Pet. 73 (quoting Ex. 1008 ¶ 36) (alteration in original). But Petitioner does not address Olmos's teachings about the interlocking mechanism that performs the same function. *See id.*

The parties may address this issue further at trial, keeping in mind that the Petition itself must satisfy the particularity requirements of 35 U.S.C. § 312(a)(3). *See Intelligent Bio-Sys.*, 821 F.3d at 1369 ("It is of the utmost importance that petitioners in the IPR proceedings adhere to the requirement that the initial petition identify with particularity the evidence that supports the grounds for the challenge to each claim." (quotation omitted)).

b. "greater height"

Second, Patent Owner argues that adding Varela '774's tracks to Olmos's upper- and lower-body portions would "not create a greater height implant in the expanded configuration," as Petitioner contends. Prelim. Resp. 66–69 (citing Pet. 72). Patent Owner argues that Petitioner "offers no support" for this contention, other than conclusory statements from

Mr. Drewry. *Id.* at 66–67 (citing Ex. 1002 ¶ 308).¹⁷ Patent Owner also argues that Olmos “contradicts Petitioner’s alleged motivation because Olmos’ implant is designed to ‘prevent expansion of the implant’ once the implant ‘has reached maximum expansion.’” *Id.* at 67 (quoting Ex. 1006 ¶¶ 157–158, 171).

Specifically, Patent Owner points out that the upper- and lower-body portions (i.e., endplates) of Olmos’s implant include “complementary structures” 240, 242 “that ‘project therefrom and facilitate the alignment, interconnection, and stability of the components of the implant.’” *Id.* at 67–68 (quoting Ex. 1006 ¶ 157; citing *id.* at FIGS. 18, 20A–B, 21 A–B). Patent Owner also points out that Olmos describes these complementary structures as having “motion limiting structures” 280, 282 “that prevent expansion of the implant beyond a certain height.” *Id.* at 68 (quoting Ex. 1006 ¶ 158) (emphasis omitted).

We again have reservations on this record whether Petitioner has adequately explained why an ordinarily skilled artisan would have had a reason to add Varela ’774’s tracks to Olmos’s upper and lower-body portions for the purpose of achieving “a greater height” in the expanded position when Olmos’s design, as explained above, includes specific “motion limiting” features that prevent expansion beyond a certain height. *See* Ex. 1006 ¶¶ 158, 171. Both Petitioner and Mr. Drewry state, in a single

¹⁷ Petitioner cites to paragraph 305 of Mr. Drewry’s Declaration in support of its proffered motivation to combine, but this paragraph appears to be unrelated. We consider Petitioner’s citation of paragraph 305 to be a typographical error for paragraph 308, as Patent Owner deduced. Prelim. Resp. 66.

sentence and without explanation, that an Olmos-Varela '774 combination would have created a configuration having a greater height in the expanded position. *See* Pet. 72 (“When expanded, this configuration would have a greater height.”); Ex. 1002 ¶ 308 (“And, in the expanded position, this configuration would have a greater height.”). On the current record, we are sympathetic to Patent Owner that these statements do not sufficiently support Petitioner’s rationale to combine based on “greater height.” *See Xerox Corp. v. Bytemark*, IPR2022-00624, Paper 9 at 15 (PTAB Aug. 24, 2022) (precedential) (explaining that declaration testimony that “is conclusory and unsupported” and which “adds little to the conclusory assertion for which it is offered to support . . . is entitled to little weight”).

c. “lower profile”

Finally, Patent Owner argues that Petitioner’s contention that combining Olmos and Varela '774 would result in “a lower profile” is “wrong.” Prelim. Resp. 69. Patent Owner argues that Petitioner provides no support for this proffered motivation to combine, and that, in any event, Olmos “contradicts Petitioner’s contention.” *Id.* at 69–70 (citing Pet. 72).

As to the latter, Patent Owner argues that, when in a collapsed position, the bottom surface of Olmos’s upper-body portion (i.e., endplate 202) abuts the top surface of Olmos’s lower-body portion (i.e., endplate 204). *Id.* at 70 (citing Ex. 2001 ¶ 114). Patent Owner supports its argument with an annotated version of Olmos’s Figure 16A, reproduced below:

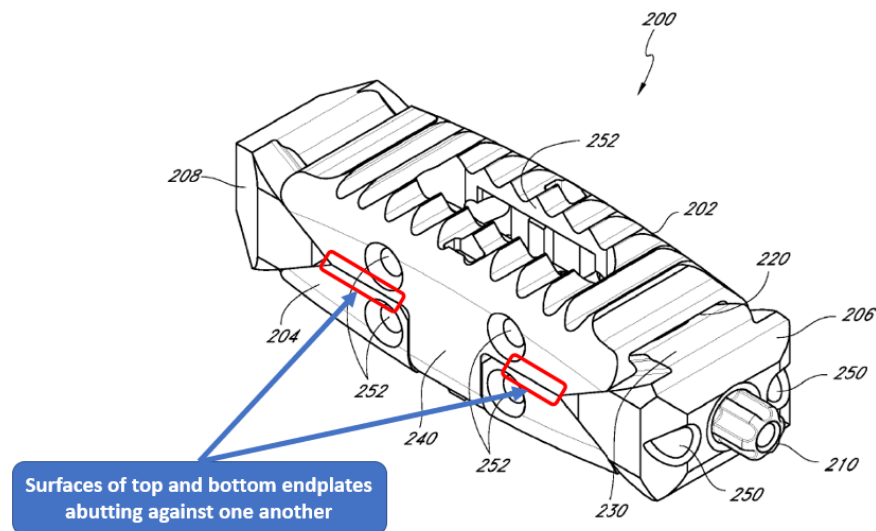


FIG. 16A

Id. (citing Ex. 1006, FIG. 16A). In its annotated version, Patent Owner highlights abutting portions of Olmos’s upper- and lower-body portions with red boxes. *Id.* Patent Owner argues that “[n]either Petition[er] nor its expert explain how Varela ’774’s tracks can create a lower profile implant when Olmos’ endplates are not configured to be moved closer together in the collapsed configuration.” *Id.* (citing 2001 ¶ 114).

Having considered the record, we determine that Petitioner has the better position as to this proffered motivation to combine. As Petitioner points out, the prior art teaches the desirability of expandable spinal implants having the lowest-possible profile in the collapsed configuration for ease of implantation. *See, e.g.*, Ex. 1008 ¶¶ 3–4 (stating that “the use of an alternative intervertebral implant, especially one compatible with minimally-invasive surgical techniques, is desirable” due to the “morbidities associated with . . . more-invasive procedures”); Ex. 1006 ¶ 13 (stating that “there remains a need in the art for an improved intervertebral implant” that “is implantable through a minimally-invasive procedure” and “easy to implant and deploy in such a narrow space”); Pet. 72; Ex. 1002 ¶ 304. And

Varela '774 teaches that its nesting tracks provide for an “expandable intervertebral implant with the smallest-possible form factor for insertion . . . into the intervertebral space.” Ex. 1008 ¶ 6. We agree with Petitioner, on this record and for institution, that an ordinarily skilled artisan would have had a reason to modify Olmos’s structure to achieve a lowest-possible profile for minimally-invasive procedures. And Varela '774 teaches a structure for achieving such a profile. *See id.* ¶ 34 (“[w]hen un-deployed, the superior member 12 and the inferior member 14 are configured such that they nest against one another, thereby providing the un-deployed expandable intervertebral implant 10 with the smallest possible form factor”).

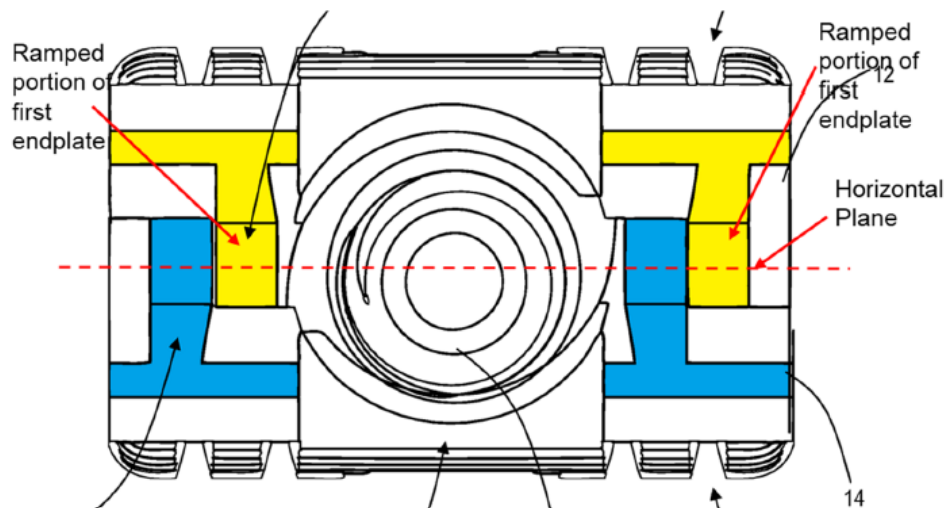
Moreover, we note that an ordinarily skilled artisan “is also a person of ordinary creativity, not an automaton.” *KSR*, 550 U.S. at 421. We are not aware of any evidence on this record that reconfiguring Olmos’s upper and lower-body portions so that their ramped surfaces would overlap (rather than abut) in a collapsed position would have been beyond the abilities of the ordinarily skilled artisan in this field. *See supra* § III.B. For these reasons, we determine that Petitioner has established an adequate reason to combine the teachings of Olmos and Varela '774 for the purpose of institution. The parties may wish to further develop the record on this issue during trial.

2. The Horizontal-Plane and Overlap Limitations

Petitioner argues that, by adding Varela '774’s track structures to the ramps of Olmos’s upper and lower-body portions, “a POSITA would understand that the track structures of the upper-body portion would nest against corresponding track structures of the lower-body portion when the device is in the collapsed position.” Pet. 71; *see also* Pet. 86–87, 105–107. Petitioner argues that Varela '774 “teaches that the track structures are off-

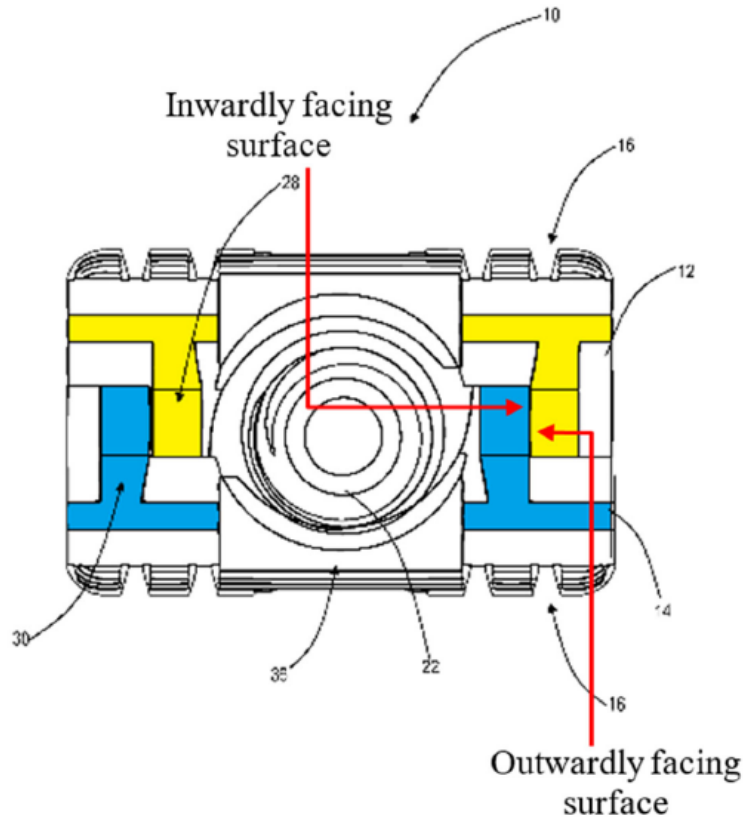
set such that for one side of the endplate, the track structure would be on the outer edge and on the other side, the track structure would be nested on the inside.” *Id.* at 71–72 (citing Ex. 1008 ¶¶ 6, 34, 36, 39). Accordingly, Petitioner argues, “the upper and lower track structures would extend through the horizontal plane and overlap with one another.” *Id.* at 72 (citing Ex. 1002 ¶ 304).

As to the Horizontal-Plane Limitation specifically, Petitioner relies on an annotated version of Varela ’774’s Figure 5, reproduced below:



Id. at 88 (citing Ex. 1008, FIG. 5). In Petitioner’s annotated version of Figure 5, Petitioner highlights the ramped portion of Varela ’774’s superior member (i.e., first endplate) in yellow, and the ramped portion of Varela ’774’s inferior member (i.e., second endplate) in blue. *Id.* (citing Ex. 1002 ¶ 36). Petitioner also illustrates a horizontal plane by a red-dashed line. *Id.* Petitioner argues that, once combined, “the Olmos-Varela’774 device” in the collapsed position would have nesting track structures that “necessarily extend through a horizontal plane extending through the central ramp, driving ramp, and actuator assembly.” *Id.* at 86–87 (citing Ex. 1002 ¶¶ 305–306).

Similarly, as to the Overlap Limitation, Petitioner relies on another annotated version of Varela '774's Figure 5, reproduced below:



Id. at 107 (citing Ex. 1008, FIG. 5; Ex. 1002 ¶¶ 390–391). In this annotated version of Figure 5, Petitioner illustrates an “inwardly facing surface” and an “outwardly facing surface” of Varela '774's track structures by red arrows.

Id. Petitioner argues that, in the collapsed position, “at least a portion of Olmos's inwardly-facing surface of the ramped portion of the first endplate overlaps at least a portion of the outwardly-facing surface of the first side surface of the second endplate.” *Id.* (citing Ex. 1002 ¶¶ 389–392).

Patent Owner argues that “Petitioner has not met its burden of showing that there is a reasonable likelihood that the combination of Olmos and Varela '774 discloses the Horizontal-Plane and Overlap Limitations.” Prelim. Resp. 72. Specifically, Patent Owner argues that “Petitioner has not

explained how adding Varela '774's tracks to Olmos' ramped portions meets the Overlap and Horizontal-Plane Limitations.” *Id.* at 73. Patent Owner argues that Petitioner has failed to “address[] the combination, as a whole,” and that, in any event, Varela '774's “tracks would be positioned on opposite sides of the horizontal plane, like Olmos' ramped portions.” *Id.* (citing Pet. 86–88, 105–107).

We have considered Patent Owner's arguments but determine that Petitioner has adequately set forth a teaching for the Horizontal-Plane and Overlap Limitations in the prior art, at least for institution purposes. There appears to be no dispute that Varela '774's track structures, on their own, meet the Horizontal-Plane and Overlap Limitations. For example, Varela '774 discloses that the superior member 12 (i.e., first endplate) and the inferior member 14 (i.e., second endplate) have “track structures 28 and 30” that are “are offset from one another relative to the central axis of the expandable intervertebral implant 10 such that they sit side-by-side when the expandable intervertebral implant 10 is un-deployed.” Ex. 1008 ¶ 39. “Accordingly,” Varela '774 continues, “the channels 42 and 44 manufactured into the superior and inferior surfaces of the wedge structure 26, respectively, are also offset from one another relative to the central axis.” *Id.* Varela '774's Figure 5, as annotated by Petitioner, shows that the track structures, when in a collapsed position, cross over the horizontal plane bisecting the spinal implant and overlap in a nested configuration. *See* Pet. 86–88, 105–107.

Thus, we determine that Petitioner sets forth a reasonable argument on this record that an ordinarily skilled artisan would have found it obvious and predictable to add these track structures and corresponding channels to

Olmos’s device. We will, of course, evaluate this ground on the record that is developed during trial. During the trial phase, we encourage the parties to keep in mind that “[t]he test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference,” *Facebook, Inc. v. Windy City Innovations, LLC*, 973 F.3d 1321, 1343 (Fed. Cir. 2020) (alteration in original), and to consider tailoring their arguments accordingly.

3. Summary for Ground 3

In sum, based on the record before us, we determine that Petitioner has established a reasonable likelihood that it would prevail in showing that claims 1–7 and 9–20 would have been obvious over Olmos in view of Varela ’774.

I. Ground 4 – Alleged Obviousness Over Olmos With Varela ’774 and Oglaza

Petitioner argues that claim 8 is unpatentable as obvious over Olmos with Varela ’774 and Oglaza. Pet. 113–116. For this Ground, Petitioner argues that it would have been obvious for an ordinarily skilled artisan to have modified “Olmos’s actuator shaft 210 to incorporate the apertures of Oglaza’s retaining element.” *Id.* at 114 (citing Ex. 1002 ¶ 429). Petitioner repeats many of its arguments from Ground 2, including that an ordinarily skilled artisan would have had a reason to look to locations other than the endplates for providing bone-graft delivery openings, and that a hollow actuator would have been an obvious choice. *Id.* at 116 (citing Ex. 1002 ¶¶ 428–437; Ex. 1008, FIGS. 5, 7, ¶ 38).

Patent Owner does not substantially address Ground 4, other than to dispute Petitioner’s alleged motivation to add Varela ’774’s track structures

to Olmos's ramped portions. *See generally* Prelim. Resp. 62. For the reasons discussed above, however, we accept Petitioner's arguments as to the combination of Olmos and Varela '774 for the purpose of institution. *Supra* § III.H. And, given the fact-intensive nature of Petitioner's arguments and the absence of any specific commentary on this ground from Patent Owner, we will evaluate this ground on the record that is developed during trial.

IV. CONCLUSION

For the foregoing reasons, we determine that the information presented establishes a reasonable likelihood that Petitioner would prevail in showing that at least one of the challenged claims of the '649 patent is unpatentable.

At this preliminary stage, we have not made a final determination with respect to the patentability of any challenged claim or any underlying factual and legal issues. *See TriVascular, Inc. v. Samuels*, 812 F.3d 1056, 1068 (Fed. Cir. 2016) (noting that "there is a significant difference between a petitioner's burden to establish a 'reasonable likelihood of success' at institution, and actually proving invalidity by a preponderance of the evidence at trial"). Any final decision in this proceeding will be based on the full trial record.

The Board will deem forfeited any issue not raised by Patent Owner in a timely response to the Petition, or as permitted in another manner during trial, even if asserted in the Preliminary Response or discussed in this Decision.

Nothing in this Decision authorizes Petitioner, in a manner not otherwise permitted by the Board's rules, to supplement the information pertaining to any ground advanced in the Petition.

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review is instituted based on all grounds asserted in the Petition; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial commencing on the entry date of this Decision.

IPR2022-01600
Patent 10,973,649 B2

For PETITIONER:

George Beck
Scott Anderson
Jeffrey Costakos
Michael Houston
Roberto Fernandez
FOLEY & LARDNER LLP
gbeck@foley.com
sanderson@foley.com
jcostakos@foley.com
mhouston@foley.com
rfernandez@foley.com

For PATENT OWNER:

Heath Briggs
Elana Araj
Andrew Sommer
Vivian Kuo
Joshua Rudawitz
GREENBERG TRAURIG, LLP
briggsh@gtlaw.com
araje@gtlaw.com
sommera@gtlaw.com
kuov@gtlaw.com
rudawitzj@gtlaw.com