

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

LIFE SPINE, INC.,
Petitioner,

v.

GLOBUS MEDICAL, INC.,
Patent Owner.

IPR2022-01599
Patent 8,845,732 B2

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

HARDMAN, *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, 7–13, and 16 of U.S. Patent No. 8,845,732 B2 (“the ’732 patent,” Ex. 1001). Paper 2 (“Pet.”). Patent Owner Globus Medical, Inc. filed a Preliminary Response. Paper 8 (“Prelim. Resp.”). With our authorization, Petitioner filed a Preliminary Reply and Patent Owner filed a Preliminary Sur-reply. Paper 9 (“Prelim. Reply”); Paper 10 (“Prelim. Sur-reply”).

We have authority under 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.” After considering the briefing of record and cited evidence, we institute an *inter partes* review.

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. Real Parties in Interest

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

B. Related Matters

The parties identify *Globus Medical, Inc. v. Life Spine, Inc.*, Case No. 1:21-cv-01445 (D. Del.), filed October 13, 2021, as involving the ’732 patent. Pet. 1; Paper 5, 1. The parties also identify a number of patent applications related to the ’732 patent, i.e., 17/192,231, 17/409,079, 17/410,335, 17/589,029, and 17/931,913. Pet. 1–2; Paper 5, 1.

The parties also identify IPR2022-1434, IPR2022-01435, IPR2022-01600, IPR2022-01601, IPR2022-01602, and IPR2022-01603, which

concern patents related to the '732 patent, as well as IPR2023-00041, which concerns the same claims of the '732 patent challenged herein. Pet. 1–2; Paper 5, 1.

C. The '732 Patent (Ex. 1001)

The '732 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), 1:15–19. 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 . . . a fusion device that can maintain a normal distance between adjacent vertebral bodies when implanted.” *Id.* at 1:53–57. The '732 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 expanded configuration. *Id.* at 1:65–2:2.

The Specification describes exemplary expandable fusion devices for installation in an intervertebral disc space to facilitate intervertebral fusion. *Id.* at 1:61–65. One embodiment of an expandable device is depicted in Figure 60 of the '732 patent, reproduced below.

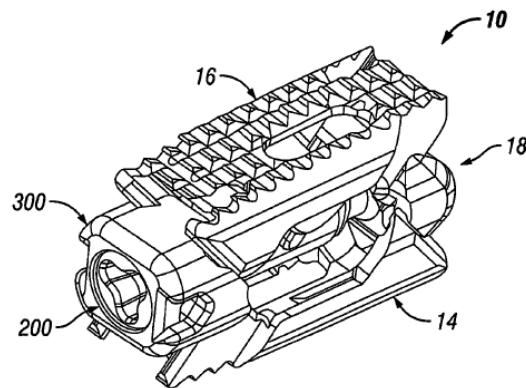


FIG. 60

Figure 60 of the '732 patent, reproduced above, is a perspective view of expandable fusion device 10 in an expanded position. *Id.* at 5:1–3.

Expandable fusion device 10 includes first endplate 14, second endplate 16, central ramp 18, actuator assembly 200, and driving ramp 300. *Id.* at 21:39–42. Actuator assembly 200 functions to pull central ramp 18 and driving ramp 300 together, which forces apart endplates 14 and 16. *Id.* at 21:42–45.

Figure 58 of the '732 patent, reproduced below, is an exploded view of the expandable fusion device in Figure 60. *Id.* at 4:62–64.

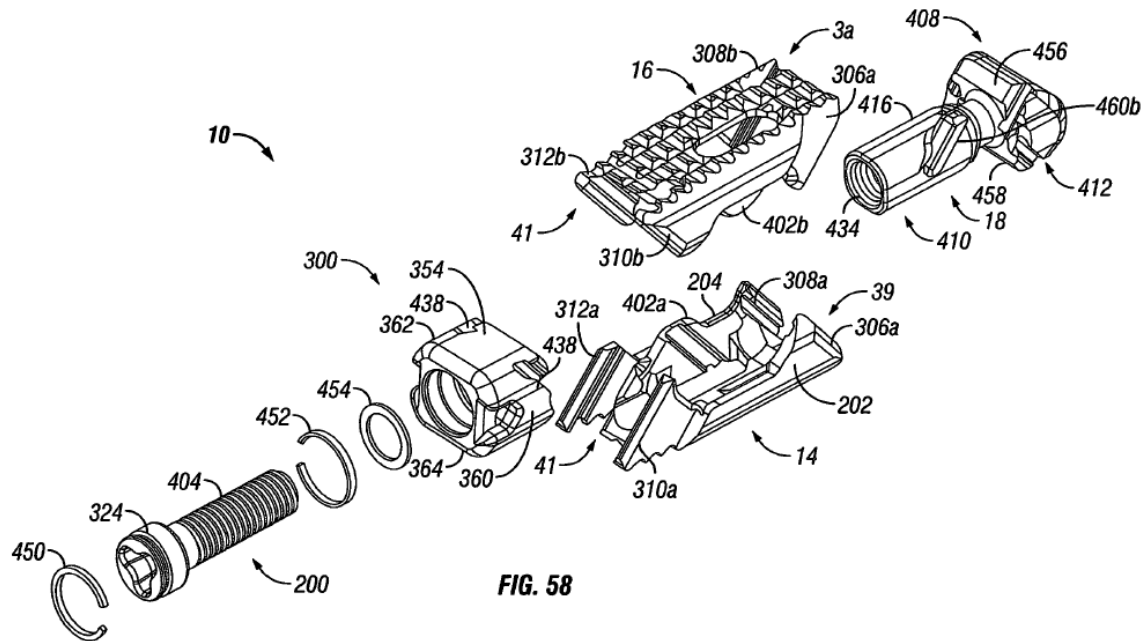


Figure 58 of the '732 patent, reproduced above, depicts central ramp 18 with first end 408 and second end 410, expansion portion 412, second expansion portion 414, and rod-receiving extension 416 extending longitudinally from expansion portion 412 of central ramp 18. *Id.* at 22:47–52. Driving ramp 300 includes side portions 360 and 362, each having ramped portion 438. *Id.* at 23:14–19.

Figure 61 of the '732 patent, reproduced below, is a side cross-section view of the expandable fusion device in Figure 58 in an expanded position. *Id.* at 5:4–6.

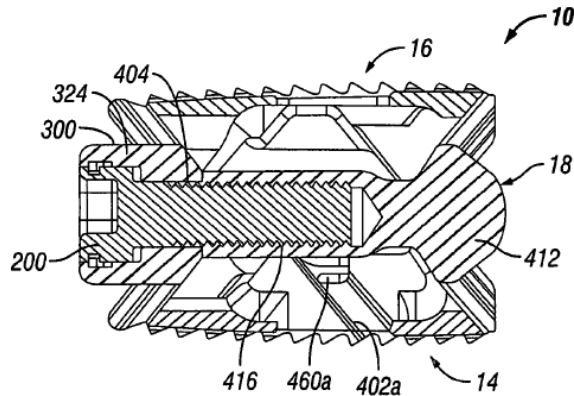


Figure 61 of the '732 patent, reproduced above, depicts the expandable fusion device having actuator assembly 200, which includes head portion 324 and extension 404. *Id.* at 22:33–35. Rod-receiving extension 416 of central ramp 18 is threaded to receive threading of extension 404 of actuator assembly 200. *Id.* at 22:64–67.

In operation, expandable fusion device 10 is inserted into an intervertebral disc space and seated into position. *Id.* at 23:28–30. To expand the device, an instrument is used to engage head portion 324 of actuator assembly 200. *Id.* at 23:45–46. Rotating actuator assembly 200 in a first direction pulls central ramp 18 linearly towards actuator assembly 200 and pushes driving ramp 300 linearly towards central ramp 18. *Id.* at 23:47–51, 24:5–8. Ramped portions of central ramp 18 and driving ramp 300 push against corresponding ramped portions of endplates 14 and 16, which pushes the endplates outward into an expanded position. *Id.* at 23:56–61, 24:9–14.

The Specification describes an exemplary technique for endoscopically inserting the expandable fusion devices into the intervertebral disc space between adjacent vertebrae. *Id.* at 5:51–6:8, 26:3–46. An access path to the intervertebral disc space is created, for example, by using a posterolateral approach. *Id.* at 26:5–8. The expandable fusion device 10 is placed into the intervertebral disc space and expanded to the desired height. *Id.* at 26:37–39. A bone graft or similar bone-growth inducing material may be introduced around or within the expandable fusion device 10. *Id.* at 6:9–18, 26:39–41.

D. The Challenged Claims

Petitioner challenges claims 1, 7–13, and 16 of the '732 patent. Claims 1, 13, and 16 are independent. Claim 1, reproduced below with bracketed lettering added,¹ is illustrative:

1. [a] A system for intervertebral fusion comprising:
 - [b] a dilator having a proximal end and a tapered distal end for penetrating soft tissue;
 - [c] a cannula having a proximal end and a distal end; and
 - [d] an intervertebral implant sized for insertion into an intervertebral space through the cannula, [e] wherein the intervertebral implant comprises a first endplate, a second endplate, and a central ramp disposed between the first endplate and the second endplate, [f] wherein the central ramp is configured to move in a first direction and cause the first and second endplates to move outwardly and away from one another,
 - [g] a driving ramp disposed between the first endplate and the second endplate at an opposite end of the intervertebral

¹ For ease of reference, we use the same bracketed lettering Petitioner uses in the Petition. *See* Pet. 123.

implant from the central ramp, [h] wherein the driving ramp has a longitudinal through bore, [i] wherein the driving ramp is configured to engage ramped surfaces of the first endplate and ramped surfaces of the second endplate; and

[j] an actuation member comprising a head portion and an actuation member extension that extends through an unthreaded opening in a longitudinal through bore of the driving ramp to be received within an opening in the central ramp extension, [k] wherein rotational movement of the actuation member in the first direction pulls the central ramp towards the driving ramp;

[l] wherein when the actuation member is rotated, the driving ramp is fixed with respect to the actuation member and the central ramp is moved in either the first direction or a second direction.

Ex. 1001, 27:12–41.

Challenged independent claims 13 and 16 are similar to claim 1, but have a few notable differences. For example, unlike claim 1, claim 13 requires that “when the intervertebral implant is in an unexpanded configuration, the first ramped surfaces of the first endplate and the first ramped surfaces of the second endplate overlap.” *Id.* at 28:51–54. Additionally, unlike claim 1, claim 16 recites that the central ramp further comprises “a ramped expansion portion.” *Id.* at 30:5–8.

Challenged claims 7–12 depend directly or indirectly from independent claim 1 and recite additional features of the first and second endplates of the intervertebral implant. *Id.* at 27:55–28:32.

E. Asserted Grounds of Unpatentability

Petitioner asserts that claims 1, 7–13, and 16 are unpatentable on the following grounds:

Ground	Claim(s) Challenged	35 U.S.C. §²	Reference(s)/Basis
1	1, 7–13, 16	§ 103(a)	Chung, ³ Boehm ⁴ and/or Song ⁵
2	1, 7–13, 16	§ 103(a)	Chung, Boehm and/or Song, Baynham ⁶

² The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), amended several provisions of 35 U.S.C., including § 103. The ’732 patent issued from Application No. 13/531,943, filed June 25, 2012, and claims priority, as a continuation-in-part, to Application No. 12/875,637, filed on September 3, 2010. Ex. 1001, codes (21), (63). For purposes of this Decision, we need not decide whether the challenged claims have a priority date of June 25, 2012 or September 3, 2010. Under either date, the pre-AIA version of 35 U.S.C. § 103 applies. On the current record, our analyses herein would be the same under either priority date.

³ Chung et al., KR 20-0290058, issued September 26, 2002 (“Chung,” Ex. 1005). Exhibit 1005 includes a certified English translation on pages 1–12 and the original Korean document on pages 13–22. When citing Chung, we refer to the page numbers indicated by the six-digit page numbering scheme applied at the bottom center of the exhibit. For convenience we drop the lead-in zeros.

⁴ Boehm, Jr. et al., U.S. Patent Pub. 2003/0176926 A1, published September 18, 2003 (“Boehm,” Ex. 1028).

⁵ Song, U.S. Patent Pub. 2009/0062833 A1, published March 5, 2009 (“Song,” Ex. 1029).

⁶ Baynham et al., U.S. Patent Pub. 2007/0270968 A1, published November 22, 2007 (“Baynham,” Ex. 1007).

Ground	Claim(s) Challenged	35 U.S.C. § ²	Reference(s)/Basis
3	8, 10, 11, 13	§ 103(a)	Chung, Boehm and/or Song, Varela ⁷ , <i>or</i> Chung, Boehm and/or Song, Baynham, Varela
4	1, 7–13	§ 103(a)	Olmos, ⁸ Boehm and/or Song
5	1, 7–13	§ 103(a)	Olmos, Boehm and/or Song, Chung
6	8, 10, 11, 13	§ 103(a)	Olmos, Boehm and/or Song, Varela, <i>or</i> Olmos, Boehm and/or Song, Chung, Varela

Pet. 3–4. Petitioner supports its contentions with the Declaration of Troy D. Drewry (Ex. 1002), among other evidence. Patent Owner supports its contentions with the Declaration of Brad Culbert (Ex. 2001), among other evidence.

II. ANALYSIS

A. Discretionary Denial Under § 314(a)

The parties dispute whether the Board should discretionarily deny the Petition under 35 U.S.C. § 314(a) based on a lack of particularity, as required by 35 U.S.C. § 312(a)(3). *See* Prelim. Resp. 7–13; Prelim. Reply 7; Prelim. Sur-reply 7.

Patent Owner argues that we should exercise our discretion to deny institution because “the Petition fails to meet the particularity requirement of

⁷ Varela, U.S. Patent Pub. 2011/0172774 A1, published July 14, 2011 (“Varela,” Ex. 1030). The parties call this reference “Varela-’774.”

⁸ Olmos et al., U.S. Patent Pub. 2008/0140207 A1, published June 12, 2008 (“Olmos,” Ex. 1006).

35 U.S.C. § 312(a)(3).” Prelim. Resp. 13. Although “Petitioner purports to assert six separate grounds,” Patent Owner argues that its use of “various conjunctives and disjunctives (‘and/or’) result in twenty-four separate grounds.” *Id.* at 7–8; *see also id.* at 8 (providing a chart listing twenty-four grounds). Patent Owner contends that this is “an unreasonably large number of obviousness grounds” for nine challenged claims. *Id.* at 11–12 (citing *Adaptics Ltd. v. Perfect Co.*, IPR2018-01596, Paper 20, 22 (PTAB Mar. 6, 2019) (informative); *EIK Eng’g Sdn. Bhd. v. Wilco March Buggies & Draglines, Inc.*, IPR2020-00344, Paper 7 at 5–7, 12–14 (PTAB Jun. 23, 2020)). Patent Owner also contends that “[i]t is difficult to understand exactly what combination Petitioner references, as some analyses alternately use both conjunctive and alternative language, while others fail to address the proposed combination of all references,” “thus unfairly prejudic[ing] Patent Owner.” *Id.* at 10, 12; *see also* Prelim. Sur-reply 7.

We are not persuaded by Patent Owner’s arguments. Every ground in the Petition uses “and/or” once, namely, in the phrase “Boehm and/or Song.” *See* Pet. 3–4. Additionally, ground 3 optionally adds Baynham, and ground 6 optionally adds Chung. *See id.* Patent Owner is correct that these variations arguably lead to nominally more than the six combinations listed in the Petition. *See* Prelim. Resp. 7–8. Nevertheless, we agree with Petitioner that “[t]hese alternatives impose no meaningful additional burden.” Prelim. Reply 7. This is because the Petition “alternatively cites Boehm, Song, Varela-’774, and Baynham for specific limitations, i.e., dilator/cannula (Boehm and Song), overlapping (Varela-’774), and central ramp extension limitations (Baynham).” *Id.* (citing, *e.g.*, Pet. 11–19, 63–72, 76, 116–17). Thus, under the circumstances presented here, we find that

because the “alternative combinations are used to teach the same limitation[s],” “the additional burden is minimal.” *Protect Animals with Satellites v. OnPoint Sys., LLC*, IPR2021-01483, Paper 11, 18 (PTAB Mar. 4, 2022). Moreover, the differences between the alternative grounds set forth in the Petition are not particularly difficult to understand. Indeed, Patent Owner itself succinctly summarizes those differences. *See* Prelim. Resp. 20–21.

This case is materially different than *Adaptics*, where the Board found the petition “suffers from a lack of particularity that results in voluminous and excessive grounds.” *Adaptics*, IPR2018-01596, Paper 20, 18. The petition included a “catch-all” ground that cited “up to ten references connected by the conjunction ‘and/or,’” “yielding hundreds of possible combinations,” “none of which [wa]s presented with sufficient particularity.” *Id.* at 18–19. The petitioner and its declarant also relied on additional documents beyond those named in the grounds themselves, requiring “the Board and Patent Owner to search the record for evidence that might support the full breadth of Petitioner’s contentions.” *Id.* at 22–23. Here, the Petition does not present “hundreds of possible combinations,” nor is there any allegation of reliance on additional references beyond those named in the grounds themselves.

For the above reasons, we decline to discretionarily deny the Petition based on a lack of particularity.

B. Discretionary Denial Under § 325(d)

The parties dispute whether the Board should discretionarily deny the Petition under 35 U.S.C. § 325(d). Prelim. Resp. 13–42; Pet. 119–21; Prelim. Reply 5–7; Prelim. Sur-reply 6–7.

1. Legal Standard

Section 325(d) provides that the Director⁹ 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, 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 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

⁹ The Board institutes trial on behalf of the Director. 37 C.F.R. § 42.4(a).

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

The unpatentability challenges presented in the Petition rely on six different prior art references. *See* Pet. 3–4. There is no dispute that three of these references—Olmos, Baynham, and Boehm—were before the Office. *See* Pet. 120 (acknowledging that “Baynham was submitted in an Information Disclosure Statement,” and “[t]he Examiner rejected pending claims . . . over Olmos in view of . . . Boehm”); Prelim. Resp. 13. Accordingly, Olmos, Baynham, and Boehm are “[p]reviously presented art.” *Advanced Bionics*, IPR2019-01469, Paper 6, at 7–8 (indicating that “previously presented art” includes “art made of record by the Examiner”).

Turning to Song, this reference was not before the Examiner during prosecution. *See* Pet. 120. Nevertheless, we agree with Patent Owner that Song is cumulative of Boehm. *See, e.g.*, Prelim. Resp. 21. Petitioner cites Song for its teachings related to a dilator, cannula, and intervertebral implant sized for insertion through the cannula. *See, e.g.*, Pet. 11–19, 61–63. During prosecution, the Examiner cited Boehm for these same teachings. *See, e.g.*, Ex. 1004, 107–08. Everywhere the Petition asserts Song, it also asserts Boehm in the alternative for the same teachings. *See, e.g.*, Pet. 11–19, 61–63. On this record we discern no material difference between the way Petitioner uses Song and Boehm and the way the Examiner used Boehm. *See, e.g., id.* at 61 (“The Examiner found obvious the combination of Boehm with Olmos . . . and the same rationale identified by the Examiner likewise

applies to Chung with Boehm and/or Song.”). Accordingly, we agree with Patent Owner that Song is cumulative of Boehm and is thus substantially the same art previously presented to the Office.

Varela and Chung, however, stand on different footing. Neither reference was before the Examiner during prosecution. *See, e.g.*, Pet. 120. Petitioner cites Varela as teaching claim limitations relating to “overlap” of certain ramped surfaces. *See, e.g., id.* at 70–74. The Examiner cited Olmos for this disclosure. *See, e.g.*, Ex. 1004, 46–47. We agree with Petitioner that a review of Varela and Olmos demonstrates that their respective teachings regarding the “overlap” limitations are very different. *Compare id., with* Pet. 70–72; *see also* Prelim. Reply 6. Accordingly, Patent Owner has not persuaded us that Varela is cumulative of Olmos.

Nor has Patent Owner persuaded us that Chung is cumulative of Olmos. *See* Prelim. Resp. 36. Patent Owner presents tables purporting to show that Petitioner’s mapping of Chung to the challenged claims is similar to Petitioner’s mapping of Olmos to the challenged claims. *See* Prelim. Resp. 22–36. Petitioner, however, maps Olmos to the challenged claims in a materially different manner than did the Examiner. As one example, Patent Owner itself points out that Petitioner maps Olmos’s guide members to the claimed “extension,” whereas the Examiner never made this mapping, and instead “identified various rod-like components as the claimed central ramp extensions.” Prelim. Resp. 77; *see also id.* at 57 (acknowledging that “the Examiner never considered guides 232, 272 to be an ‘extension’”). *See, e.g., Advanced Bionics*, IPR2019-01469, Paper 6, at 15 (in analyzing whether Charvin and Zimmerling are “substantially the same art,” considering “whether Petitioner relies on Charvin in substantially the same manner as the

Examiner cited Zimmerling during prosecution such that Charvin discloses substantially the same information as Zimmerling in relevant part”). We also find that “the extent of the overlap between the arguments made during examination and the manner in which petitioner relies on the prior art” are different. *Advanced Bionics*, IPR2019-01469, Paper 6, at 9 n.10.

The *Advanced Bionics* framework “reflects a commitment to defer to previous Office evaluations of the evidence.” *Id.* at 9. Here, however, the Office did not evaluate Chung or the arguments Petitioner presently advances based on Chung in its prior consideration of Olmos. Thus, based on the totality of the evidence presented, we are not persuaded that Petitioner’s similar mapping of Chung and Olmos to the challenged claims—where that mapping differs from the Examiner’s mapping of Olmos to applicant’s claims—compels a conclusion that Chung is cumulative of Olmos.

Five of the six grounds listed in the Petition include Chung, a reference that was not before the Examiner. And Petitioner uses Chung differently than the Examiner used the allegedly cumulative reference, Olmos. Accordingly, we find that the first part of the *Advanced Bionics* framework is not met with respect to Chung. *See, e.g., Halliburton Energy Servs., Inc. v. U.S. Well Servs., LLC*, IPR2021-01036, Paper 12 at 19–20 (PTAB Jan. 19, 2022); *Advanced Bionics*, IPR2019-01469, Paper 6 at 10.

For these reasons, even though Olmos, Baynham, and Boehm were before the Office, and Song is cumulative of Boehm, we find that in view of our analyses above regarding Varela and Chung, § 325(d) is not sufficiently implicated such that its statutory purpose would be undermined by

instituting on all challenges. *See* SAS Q&A’s (June 5, 2018),¹⁰ Question/Answer D1 (explaining that “[i]n view of the Office’s policy to institute on all challenges or none,” where “only some of the challenges fall within” the scope of § 325(d), “[t]he panel will evaluate the challenges and determine whether § 325(d) is sufficiently implicated that its statutory purpose would be undermined by instituting on all challenges”).

Additionally, even if the first part of the *Advanced Bionics* framework were met, we would also find that “the Office erred in a manner material to the patentability of challenged claims” under the second part of the *Advanced Bionics* framework. *Advanced Bionics*, IPR2019-01469, Paper 6 at 8. For example, we are persuaded that Petitioner, by showing a reasonable likelihood that the challenged claims would have been obvious over Olmos with Boehm and/or Song (as discussed below in Section II.J), has demonstrated that the Examiner erred by not applying Olmos and Boehm in the manner Petitioner argues and as supported by Dr. Drewry. *See, e.g., Apple Inc. v. MPH Techs. OY*, IPR2019-00820, Paper 10 at 16–17 (PTAB Oct. 7, 2019); *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”).

For the above reasons, we decline to exercise our discretion to deny *inter partes* review under § 325(d).

¹⁰ Available at https://www.uspto.gov/sites/default/files/documents/sas_qas_20180605.pdf.

C. 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 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).

Under the pre-AIA statute, a claim is unpatentable as obvious if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. 35 U.S.C. § 103(a); *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.¹¹ *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. *See Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1367 (Fed. Cir. 2016). “[A]ny need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed.” *KSR*, 550 U.S. at 419–20.

D. 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 the invention was made.¹² *See 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

¹¹ Patent Owner does not presently assert objective indicia supporting nonobviousness of the challenged claims. *See generally* Prelim. Resp.

¹² As noted above (*supra* n.2), for purposes of this Decision we need not decide whether the challenged claims have a priority date in June 2012 or September 2010. The current record reflects that the level of skill in the art would have been the same under either date. *See* Ex. 1002 ¶ 32.

various technical concepts in this field, as explained by Prof. Drewry.

Pet. 5 (citing Ex. 1002 (Drewry Decl.) ¶¶ 31–32). Patent Owner does not presently dispute Petitioner’s proposal. Prelim. Resp. 6–7.

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).

E. 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.*

Petitioner “does not believe any terms require constructions differing from their plain and ordinary meaning in this IPR.” Pet. 5. Patent Owner addresses Petitioner’s implicit interpretation of the claim term “central ramp extension.” *See, e.g.*, Prelim. Resp. 47–57. We address this term below. We also address Petitioner’s arguments regarding an alleged lack of antecedent basis for certain terms appearing in claims 1 and 13.

1. “central ramp extension” (Claims 1, 12, 13, and 16)

Patent Owner argues that Petitioner’s implicit interpretation of the claim term “central ramp extension”—which is recited in independent claims 1, 13, and 16, and in dependent claim 12—is contrary to the plain and

ordinary meaning of this term and is inconsistent with the Specification. *See, e.g.*, Prelim. Resp. 47–57 (addressing the meaning of “central ramp extension”); Prelim. Sur-reply 1–3. Patent Owner argues that a “central ramp extension” is “a structure that increases the axial length (i.e., extends) of the central ramp.” Prelim. Resp. 52.

Patent Owner supports this construction by arguing, among other things, that the Examiner repeatedly “identified various rod-like components [in Olmos] as the claimed central ramp extensions,” and that “the central ramp extensions in the specification . . . are uniformly described as cylindrical or oblong structures that increase the axial length of the central ramp.” Prelim. Resp. 77, 55. Patent Owner argues that Petitioner presents a “hidden” construction (presented only in Dr. Drewry’s declaration), i.e., a central ramp extension “is merely a ‘protrusion’ off of the ramp,” which Patent Owner argues is not supported by the intrinsic evidence. Prelim. Sur-reply 1 (quoting Ex. 1002 ¶ 149).

Petitioner responds that Patent Owner’s construction “improperly reads limitations from disclosed embodiments into the claims.” Prelim. Reply 1. Petitioner also argues that the Specification uses the term “‘extension’ to refer to a myriad of structures.” *Id.* (citing Ex. 1001, 6:47–58, Fig. 10, 12:8–10, 12:40–43, Fig. 23, 10:40–45, 11:1–19, Fig. 24, 22:52–59, Fig. 58).

On this preliminary record, Petitioner has the better argument. It appears that Patent Owner’s construction improperly reads in limitations from example embodiments, such as the embodiments depicted in Figures 58, 64, 67, 52, 25, and 46 of the ’732 patent. *See* Prelim. Resp. 48–52 (Patent Owner’s annotated Figures 58, 64, 67, 52, 25, and 46). Patent

Owner does not adequately explain why the example embodiments depicted in the Specification should be understood to limit the claims. Indeed, on the present record, Patent Owner's construction appears to run contrary to the Federal Circuit's guidance that "a particular embodiment appearing in the written description may not be read into a claim when the claim language is broader than the embodiment." *SuperGuide Corp. v. DirecTV Enters., Inc.*, 358 F.3d 870, 875 (Fed. Cir. 2004); *see also Phillips v. AWH Corp.*, 415 F.3d 1303, 1323 (Fed. Cir. 2005) ("[A]lthough the specification often describes very specific embodiments of the invention, we have repeatedly warned against confining the claims to those embodiments.").

Petitioner demonstrates that the Specification uses the term "extension" more broadly to refer to a variety of structures, not merely to structures that "increase the length of the central ramp." *See, e.g.*, Prelim. Reply 1; Ex. 1001, 6:47–58, Fig. 10 (element 46), 12:8–10, 40–43, Fig. 23 (elements 250 and 254), 10:40–45, 11:1–19, Fig. 24 (elements 202, 204, 224). Patent Owner does not take into account the Specification's use of the term "extension" in connection with structures other than the central ramp (*see, e.g.*, Prelim. Sur-reply 1–2), but on this record nothing indicates that the patentee intended a special definition for the term "extension" in the context of the central ramp.

For purposes of this Decision, we apply what we presently understand to be the plain and ordinary meaning of the term "extension" within the phrase "central ramp extension," i.e., "an addition to the main structure." *See* Ex. 3002, 4. Thus, we preliminarily construe the term "central ramp extension" to mean "an addition to the central ramp." This construction is consistent with the broad use of the term "extension" in the Specification to

refer to a variety of additions to a main structure having a variety of shapes. *See, e.g.*, Prelim. Reply 1; Ex. 1001, 6:47–58, Fig. 10 (element 46), 12:8–10, 40–43, Fig. 23 (elements 250 and 254), 10:40–45, 11:1–19, Fig. 24 (elements 202, 204, 224). To the extent either party disagrees with this preliminary construction, they should timely present evidence and argument in support of their construction at trial.

Any final written decision entered in this case may include a final claim construction that differs from this preliminary construction, or from any discussion of claim scope provided in our analysis below. Any final written decision entered in this case may also construe additional terms. Any final claim constructions will be based on the full trial record.

2. Alleged Lack of Antecedent Basis (Claims 1, 13)

Petitioner contends that the terms “the central ramp extension” (recited in claims 1, 13) and “the expansion portion of the central ramp” (recited in claim 13) lack antecedent basis and thus render claims 1 and 13 indefinite. Pet. 26, 52–53, 84, 106–07. For purposes of its obviousness arguments, Petitioner assumes that these terms refer to claim 12’s “central ramp extension” and “ramped expansion portion.” *See id.* at, *e.g.*, 26, 52. On this record, Patent Owner does not respond to Petitioner’s contentions regarding lack of antecedent basis or indefiniteness.

Because “an antecedent basis can be present by implication,” lack of antecedent basis does not necessarily mean that a claim is indefinite. *Energizer Holdings, Inc. v. Int’l Trade Comm’n*, 435 F.3d 1366, 1371 (Fed. Cir. 2006). Moreover, even if some aspect of a claim renders the claim indefinite, “it is not always impossible to adjudicate a prior-art challenge, one way or the other.” *Intel Corp. v. Qualcomm Inc.*, 21 F.4th

801, 813 (Fed. Cir. 2021); *see also Samsung Elecs. Am., Inc. v. Prisia Eng'g Corp.*, 948 F.3d 1342, 1353 (Fed. Cir. 2020).

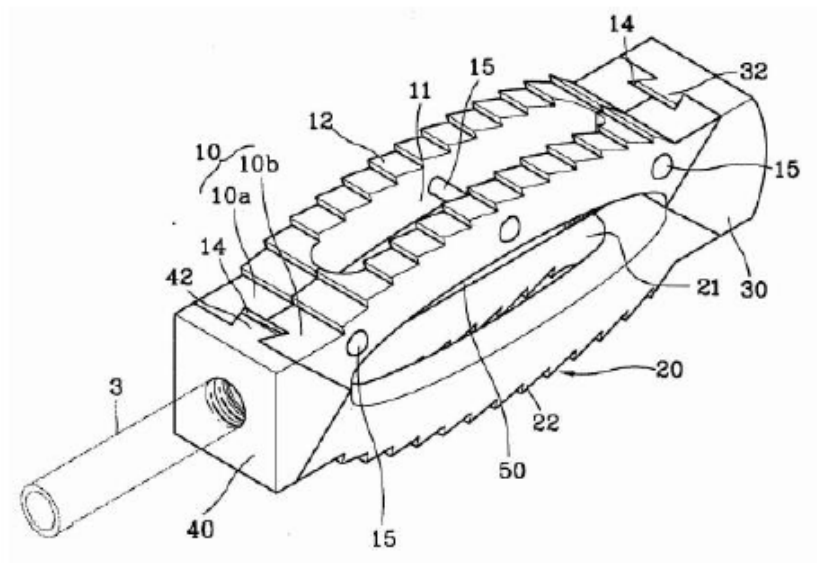
On the present record, we agree with Petitioner that the term “the central ramp extension” in claims 1 and 13, and the term “the expansion portion of the central ramp” in claim 13, lack an explicit antecedent basis. Nevertheless, based on the claims as a whole, and in the absence of any input from Patent Owner, for purposes of institution we find it reasonable for Petitioner to assume that these terms refer to the same structures recited in claim 12 as “a central ramp extension” and “ramped expansion portion.” *See* Pet. at, e.g., 26, 52; Ex. 1002 ¶¶ 147, 223. For purposes of institution, we likewise assume that these terms refer to the same “central ramp extension” and “ramped expansion portion” recited in claim 12. Should Patent Owner disagree that these terms refer to the same structures recited in claim 12 as “a central ramp extension” and “ramped expansion portion,” it can address the meaning of these claim terms in its Patent Owner Response.

F. Overview of Asserted Prior Art

1. Chung (Ex. 1005)

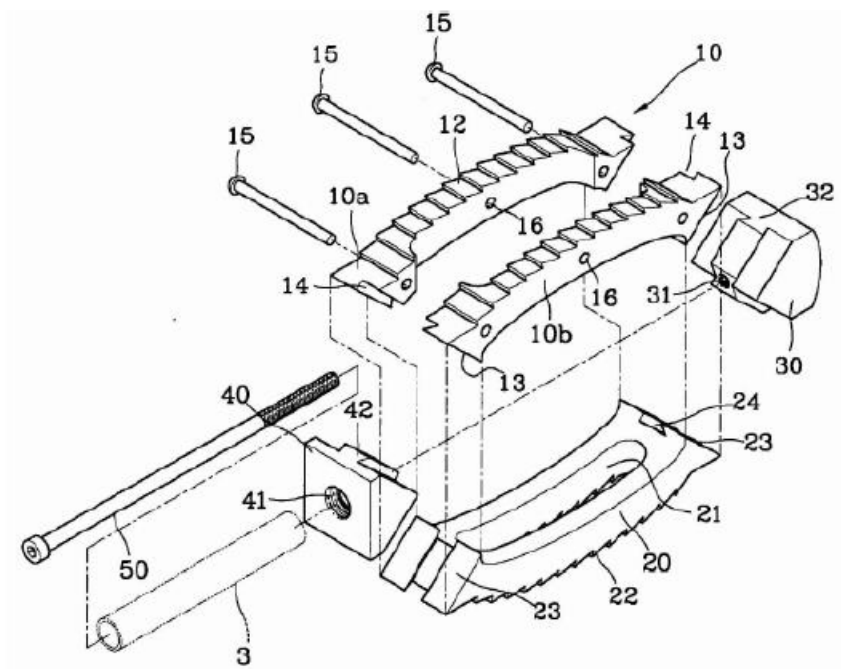
Chung, titled “A lumbar holder,” relates “to a medical device for correcting the back.” Ex. 1004, code (54), 2, 4. Chung discloses “a lumbar holder that is inserted between the back bones consisting of the lumbar in order to fix the back bones robustly while freely adjusting the height in order to maintain the appropriate space according to the patient’s state.” *Id.* at 4.

Chung’s Figure 1, reproduced below, is a perspective view of a lumbar holder. *Id.* at 3.



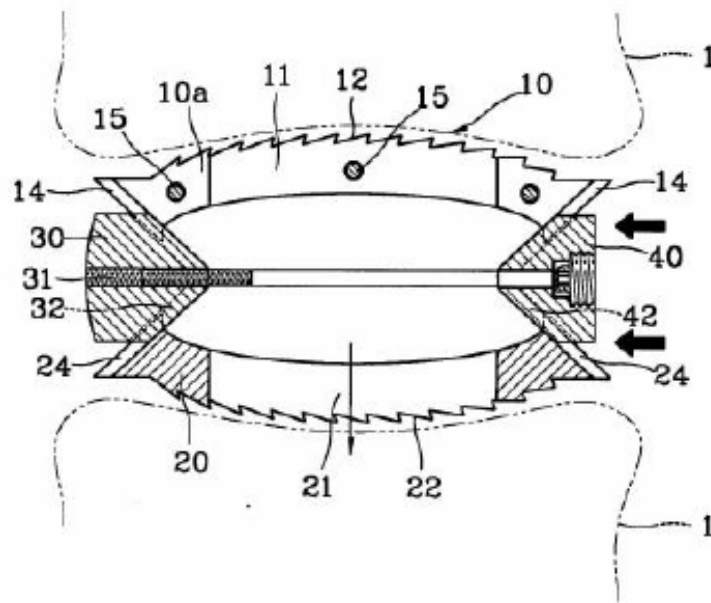
Chung's Figure 1 depicts main holder bodies 10 and 20, lead wedge 30, and opposing wedge 40. *Id.* at 6.

Chung's Figure 2, reproduced below, is an exploded view of the lumbar holder in Figure 1 above.



Chung's Figure 2 depicts groove fastening screw 50, which fastens to screw hole 31 of lead wedge 30. *Id.* at 6. Opposing wedge 40 has penetrating hole 41, which has a raised spot to hold the head of groove fastening screw 50. *Id.* at 7. Tightening or loosening groove fastening screw 50 adjusts the distance between lead wedge 30 and opposing wedge 40, and the wedges slide along guiding surfaces 13 and 23 of holder bodies 10 and 20 to widen or narrow the space between the holder bodies. *Id.* at 6-7.

We reproduce below Chung's Figure 4.



Chung's Figure 4 is a cross-section view of a lumbar holder inserted between back bones. Chung discloses that, in operation, the lumbar holder is inserted between back bones and a wrench is used to tighten groove fastening screw 50, which brings lead wedge 30 and opposing wedge 40 together such that the wedges push main holder bodies 10 and 20 outward into contact with the back bones. *Id.* at 7. Conversely, loosening groove fastening screw 50 moves lead wedge 30 and opposing wedge 40 apart, which pulls main holder bodies 10 and 20 together. *Id.*

2. *Boehm (Ex. 1028)*

Boehm, titled “Device and Method for Lumbar Interbody Fusion,” “relates to a device and method for performing interbody spinal fusion, stabilization and restoration of the disc height in the spine.” Ex. 1028, code (54), ¶ 2. Boehm discloses “a collapsible and expand[a]ble interbody fusion spacer device.” *Id.* ¶ 16.

We reproduce below Boehm’s Figure 5.

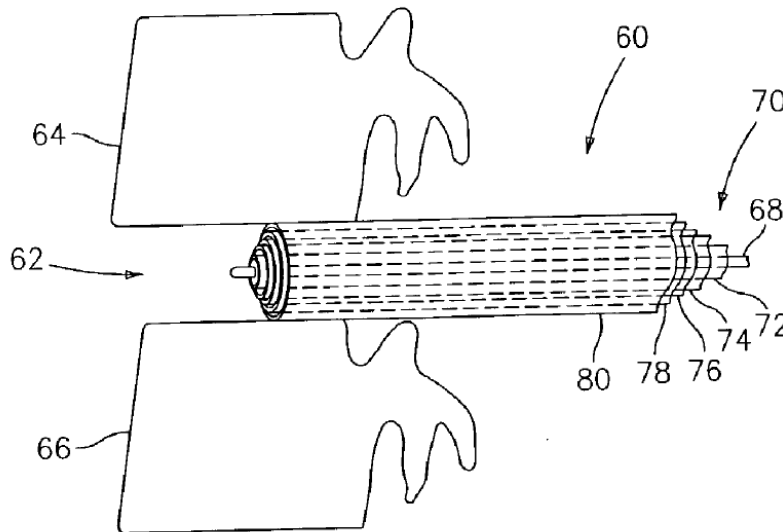


FIG. 5

Boehm’s Figure 5 depicts dilator system 60 for enlarging disc space 62 between vertebra 64, 66. *Id.* ¶ 32. Guide needle 68 is inserted into disc space 62 and a series of successively-larger dilators 70 are placed over the guide needle to enlarge the disc space. *Id.* Once dilators 70 are in place, guide needle 68 and the dilators other than outermost dilator 80 are removed so that an expandable intervertebral disc spacer (not shown) can be passed through dilator 80 into disc space 62. *Id.* ¶ 32.

3. *Song (Ex. 1029)*

Song, titled “Device and Method for Placement of Interbody Device,” “relates to a device for percutaneously preparing an interbody space and placing a device within the interbody space of the spine.” Ex. 1029, code (54), ¶ 1. Song discloses “a method and means of placing an interbody device percutaneously into the space between vertebrae with a substantially posterior, posterolateral, or lateral approach.” *Id.* ¶ 9.

We reproduce below Song’s Figure 2C.

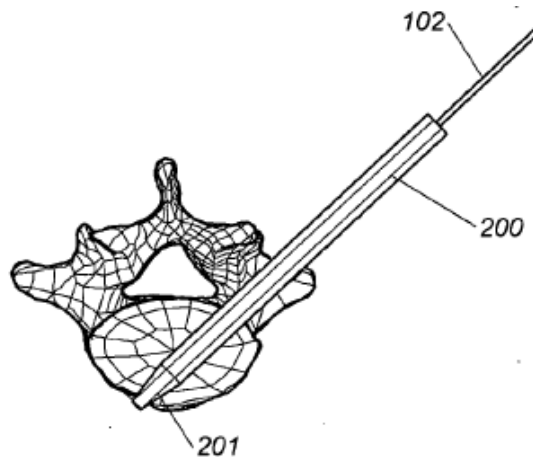


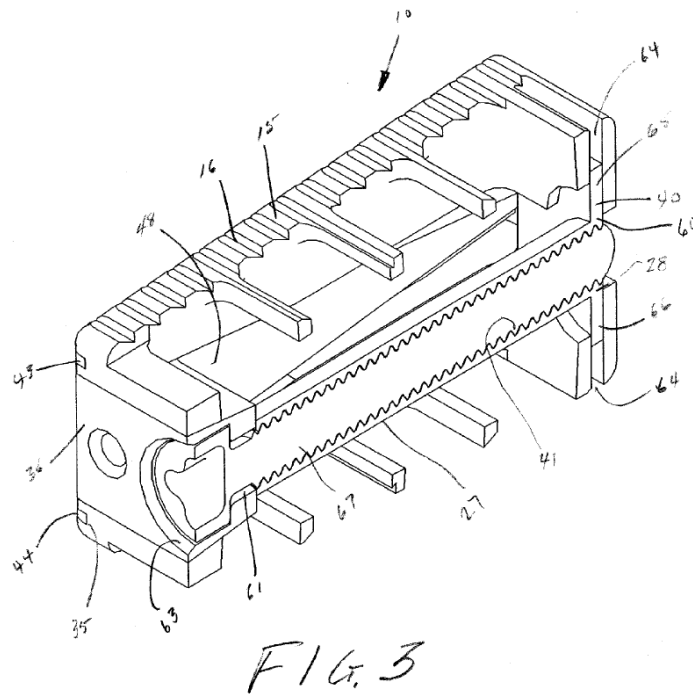
Fig. 2C

Song’s Figure 2C depicts initial dilator 200 placed over guide wire 102. *Id.* ¶ 50. Initial dilator 200 includes tapered top 201 to ease passage into soft tissue and the disc space. *Id.*

4. *Baynham (Ex. 1007)*

Baynham, titled “PLIF Opposing Wedge Ramp,” relates to “implants to be placed between vertebrae in the spine.” Ex. 1007, code (54), ¶ 3. Baynham discloses a spinal fusion implant for implantation between vertebrae. *Id.*, code (57).

Baynham's Figure 3 is reproduced below.

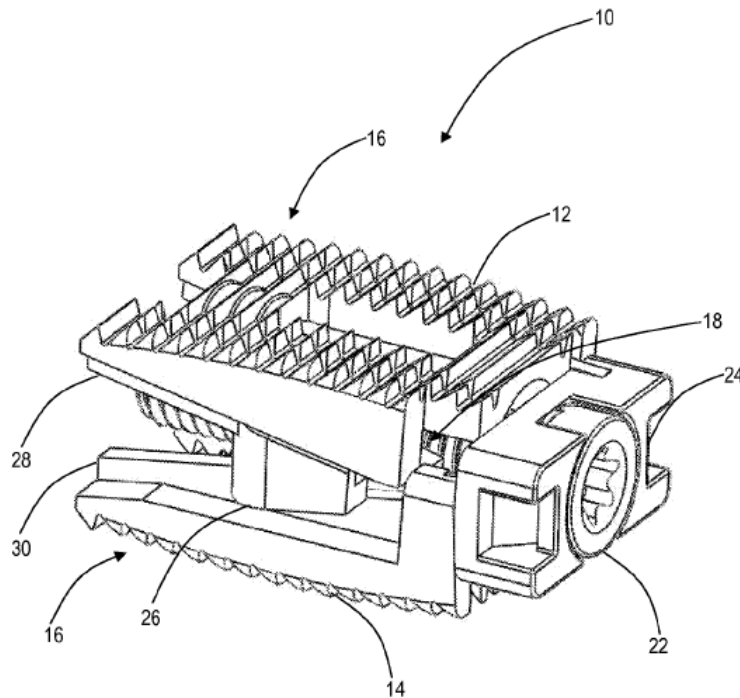


Baynham's Figure 3, reproduced above, is a cross-section view of spinal fusion device 10 including jack screw 67, which is inserted through bore 61 of distractor 42. *Id.* ¶ 29. Jack screw 67 engages internal threads in tube 27 of link 40. *Id.* ¶ 25. Tightening jack screw 67 draws distractor 42 between the upper and lower sections 11 and 13, increasing the distance between those sections. *Id.*

5. *Varela (Ex. 1030)*

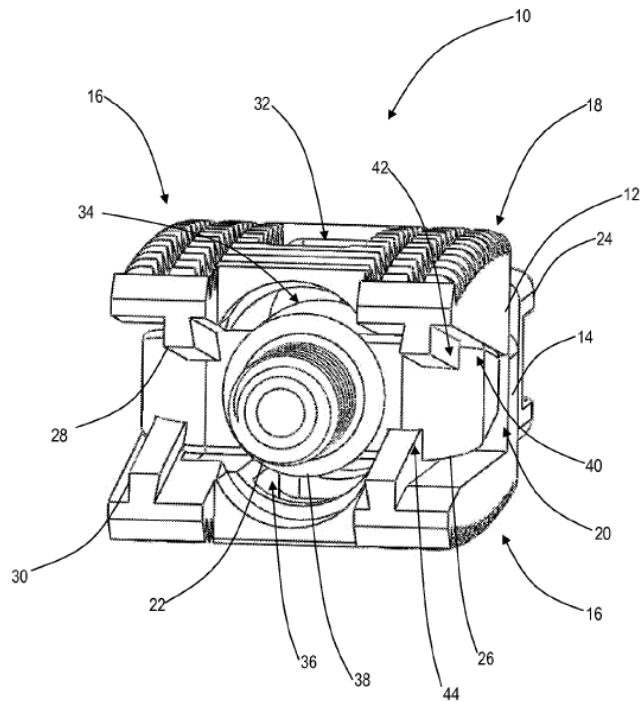
Varela, titled "Expandable Intervertebral Implant and Associated Surgical Method," relates "to minimally-invasive, surgically-implantable spinal devices and systems." Ex. 1030, code (54), ¶ 2. Varela discloses an expandable intervertebral implant selectively deployed in the intervertebral space to provide in-situ distracting, realigning, stabilizing, or fusing a portion of the spine. *Id.* ¶ 5.

We reproduce below Varela's Figure 1.



Varela'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's Figure 3.



Varela'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.*

6. Olmos (Ex. 1006)

Olmos, titled "Intervertebral Implant," relates to "[a]n adjustable spinal fusion intervertebral implant." Ex. 1006, code (54), (57). We reproduce below Olmos's Figure 16A.

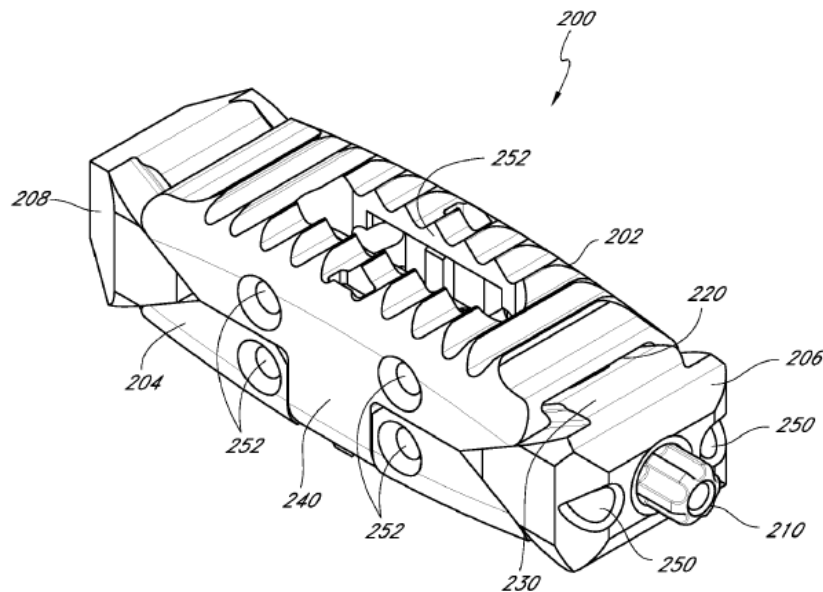


FIG. 16A

Olmos's Figure 16A 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).

We reproduce below Olmos's Figure 18.

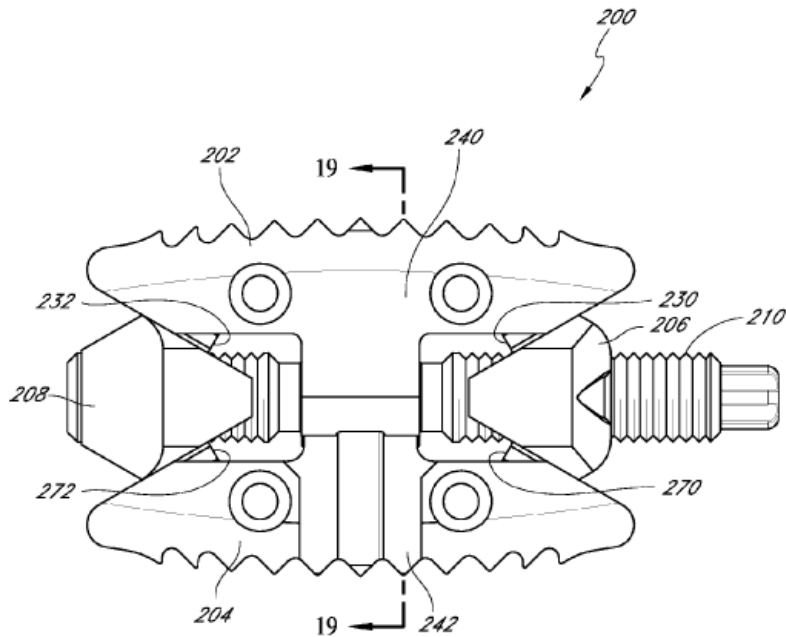


FIG. 18

Olmos's Figure 18 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.* ¶¶ 156, 167.

G. Ground 1 – Alleged Obviousness Based on Chung with Boehm and/or Song

Petitioner asserts that claims 1, 7–13, and 16 are unpatentable as obvious over Chung in combination with Boehm and/or Song. Pet. 10–63. Patent Owner disputes Petitioner’s contentions. *See* Prelim. Resp. 63–78.

In brief, Petitioner relies on Chung as disclosing an intervertebral implant meeting most limitations of the claims, and relies on Boehm and/or Song as disclosing a dilator, cannula, and intervertebral implant sized for insertion through the cannula, as claimed in, for example, claim limitations 1[b]–[d]. *See generally id.* at 10–60. Petitioner argues that a person of ordinary skill in the art “would have been motivated to combine Chung with the teachings of Boehm and/or Song—specifically those related to the use of certain tools such as dilators and cannulas—to create an access path to an intervertebral space and insert the intervertebral implant.” *Id.* at 61.

Petitioner asserts that

because use of the tools to create an access path to the intervertebral space was ubiquitous in the field of minimally invasive spinal surgery, a POSITA would have had a reasonable expectation of success in using Boehm’s and Song’s dilators and cannulas to create the desired pathway to the appropriate intervertebral disc space and insert Chung’s device where desired through the cannula.

Id. at 62 (citing Ex. 1002 (Drewry Decl.) ¶ 272).

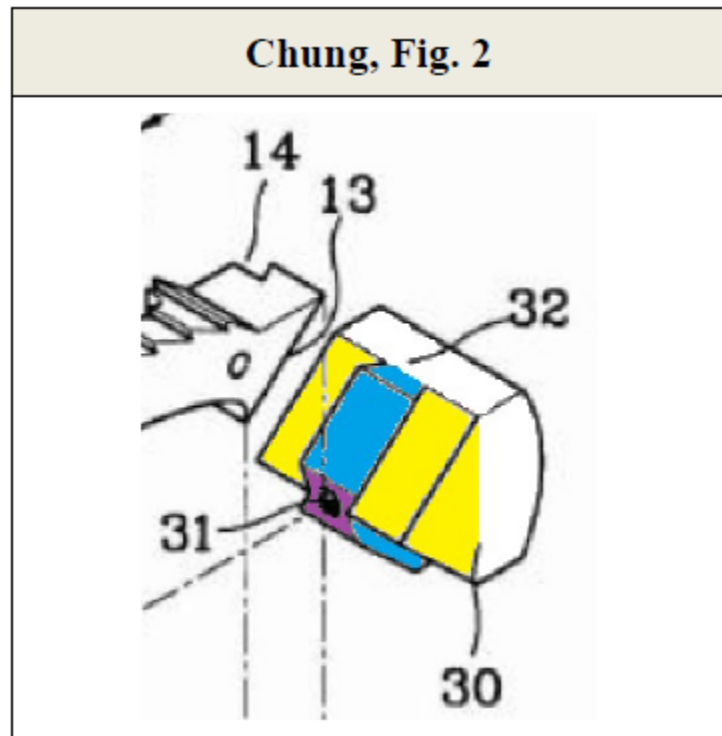
At this stage of the proceeding, Patent Owner disputes Petitioner’s contention that Chung discloses the claimed “central ramp extension.” *See* Prelim. Resp. 63–78.

After considering the arguments and evidence of record, we determine that Petitioner has shown a reasonable likelihood of establishing that claims

1, 7–13, and 16 would have been obvious over Chung in combination with Boehm and/or Song. Before addressing Patent Owner’s arguments, we first review Petitioner’s contentions regarding how Chung discloses the claimed “central ramp extension,” to provide context for the discussion.

Petitioner maps Chung’s “lead wedge (30)” to the claimed “central ramp,” and “dovetail (32)” to the claimed “central ramp extension.” *See, e.g.,* Pet. 19, 26,¹³ 46. To illustrate, we reproduce below Petitioner’s annotated excerpt of Chung’s Figure 2:

¹³ In discussing claim limitation 1[j], which recites in part “the central ramp extension,” Petitioner cross-references its arguments in Section “§IX(A)(4)(a)” of the Petition. *See* Pet. 26. Patent Owner points out that “§IX(A)(4)(a)” of the Petition “relates to Claim 9 and contains no analysis of Chung’s extension.” Prelim. Resp. 43 n.8. Patent Owner is correct. However, based on the Petition as a whole, we understand Petitioner’s cross-reference to Section IX(A)(4)(a) to be a typographical error, with Section IX(A)(6)(a) being the intended cross-reference. This is because Section IX(A)(6)(a) relates to claim limitation 12[a], which recites a central ramp extension, and because Petitioner cross-references Section IX(A)(6)(a) for its analysis of claims limitation 13[l] and 16[h], which likewise recite a central ramp extension.



Pet. 45. Petitioner’s annotated excerpt of Chung’s Figure 2, reproduced above, shows Chung’s lead wedge (30). Petitioner highlighted dovetail (32) (which Petitioner maps to the claimed “central ramp extension”) in blue, and highlighted the ramped surfaces that flank dovetail (32) (which Petitioner maps to the claimed “expansion portion” of the central ramp¹⁴) in yellow. *See id.* at 45–46.

Patent Owner disputes that dovetail 32 (blue) teaches the claimed “central ramp extension,” because, as shown in Chung’s Figure 2, it “does not increase the axial length of the central ramp, as it does not extend beyond the side ramped portion (yellow).” Prelim. Resp. 66. Patent Owner also contends that a person of ordinary skill in the art would have recognized

¹⁴ Claim limitations 12[a], 13[j], and 16[h] recite an “expansion portion” of the central ramp. *See* Pet. 125, 126, 127.

Chung's dovetail 32 to map to the claimed "expansion portion," not the claimed "extension," and argues that during prosecution, the Examiner never identified any part of Olmos's guide 232 (which is similar to Chung's lead wedge (30)) as the claimed "extension." *See, e.g., id.* at 75–76 (analogizing Chung Fig. 2 to Figs. 52 and 58 of the '732 patent), 77.

Patent Owner's arguments are unavailing. First, we compare Chung's disclosure to the challenged claims, rather than analogizing Chung's disclosure to the Examiner's view of Olmos's disclosure, or to the figures of the '732 patent. Second, Patent Owner's arguments are based on its proposed construction of "central ramp extension," which is a "structure that increases the axial length (i.e., extends) of the central ramp." *See supra* Section II.E.1. However, our preliminary construction of this term does not require the extension to increase the axial length of the central ramp. Rather, we preliminarily construe "central ramp extension" to mean "an addition to the central ramp." *See id.* We find for purposes of institution that Petitioner has sufficiently shown that Chung's "dovetail (32)" is an addition to central ramp/lead wedge (30). This can be seen, for example, in Petitioner's annotated excerpt of Chung's Figure 2, reproduced above, where a portion of dovetail (32) protrudes below the bottom surface of lead wedge (30).

In sum, we find for purposes of institution that Petitioner has sufficiently shown Chung's "dovetail (32)" teaches the claimed "central ramp extension."

H. Ground 2 – Alleged Obviousness Based on Chung, Boehm and/or Song, and Baynham

For Ground 2, Petitioner asserts that claims 1, 7–13, and 16 are unpatentable as obvious over Chung in combination with Boehm and/or

Song, and further in combination with Baynham. Pet. 63–69. Patent Owner disputes Petitioner’s contentions. Prelim. Resp. 78–92.

Petitioner presents Ground 2 as an alternative to Ground 1, in the event Chung is “found to not disclose a ‘central ramp extension.’” Pet. 63. In brief, in Ground 2 Petitioner relies on Chung and Boehm and/or Song as summarized above for Ground 1, and additionally argues that it “would have been obvious to add a further extension to Chung’s central ramp to engage the actuation member 40, as taught by Baynham, satisfying the extension element.”¹⁵ *Id.* at 63–64.

Petitioner describes Baynham’s spinal fusion implant as including a threaded tube that engages a screw/actuation member, and argues that a person of ordinary skill in the art “would have been motivated to modify the structure surrounding Chung’s screw hole (31) to further lengthen Chung’s extension longitudinally towards the driving ramp, as taught by Baynham’s tube 27.” *Id.* at 65, 68. Petitioner asserts that this modification would have provided advantages such as “improving the strength of the connection” and “allow[ing] use of a shorter screw.” *Id.* at 69 (citing Ex. 1002 (Drewry Decl.) ¶¶ 285–86). Petitioner further asserts that a person of ordinary skill in the art would have had a reasonable expectation of success in combining Baynham’s tube with Chung, including because it is a “simple substitution

¹⁵ We understand Petitioner’s reference to “actuation member 40” to contain a typographical error, with Chung’s “actuation member 50” having been intended. *See, e.g.*, Pet. 26 (stating “Chung discloses an actuation member (‘groove fastening screw (50)’”), 27 (Petitioner’s annotated version of Chung Fig. 2 appearing to identify item 50 as the actuation member).

of known mechanical features with each performing their known and expected function.” *Id.* (citing Ex. 1002 (Drewry Decl.) ¶¶ 289–90).

Patent Owner responds that Petitioner’s proffered motivations to combine Chung’s implant with Baynham’s extension are based on hindsight. *See* Prelim. Resp. 78–89; Prelim. Sur-reply 4–6. In brief, Patent Owner argues that “Chung has no use for an extension because its implant already has sufficient threaded engagement [sic] that (1) provides enough structural integrity and (2) allows for full expansion of the device without the screw protruding from the distal end of the lead wedge.” Prelim. Resp. 81 (citing Ex. 2001 (Culbert Decl.) ¶ 126). Patent Owner also argues that Petitioner has not demonstrated a reasonable expectation of success in adding Baynham’s extension to Chung, including because “Petitioner fails to address any changes to Chung required to add Baynham’s threaded extension.” *Id.* at 91; *see also id.* at 90–92.

After considering the arguments and evidence of record, we determine that Petitioner has shown a reasonable likelihood of establishing that claims 1, 7–13, and 16 would have been obvious over Chung, Boehm and/or Song, and Baynham. 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.

Patent Owner contends that “neither the Petition nor supporting declaration contain any evidence that a POSITA recognized that the actuator/wedge connection in Chung required strengthening.” Prelim. Resp. 83. To the extent Patent Owner maintains this argument post-institution, Patent Owner may want to address why it contends such

evidence is needed, given the Federal Circuit’s statement 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”); Prelim. Reply 4.

Patent Owner also argues that a person of ordinary skill in the art would have understood “that it is important to have as much internal space as possible [within the implant] to facilitate natural integration of the expandable implant between the vertebral bodies as the body heals.” Prelim. Resp. 88 (citing Ex. 2001 (Culbert Decl.) ¶ 143; Ex. 2003, Abstr., ¶ 13; Ex. 1006 ¶ 75). Patent Owner argues that a person of ordinary skill in the art “would have avoided sacrificing this [internal] space to achieve additional threaded engagement, which . . . is unnecessary and solves no problems present in Chung.” *Id.* at 89 (citing, *e.g.*, Ex. 2001 (Culbert Decl.) ¶ 144).

To the extent Patent Owner maintains this argument during trial, the parties may want to more specifically address the volume of bone graft material needed to facilitate natural integration of the expandable implant, as compared to the space occupied by the proposed elongated extension. Additionally, Patent Owner may want to more specifically address how this argument is compatible with prior art that teaches embodiments that can include both bone graft material and elongated extensions. *See* Prelim. Reply 4–5 (citing, *e.g.*, Ex. 1006 ¶ 75; Pet. 101–02).

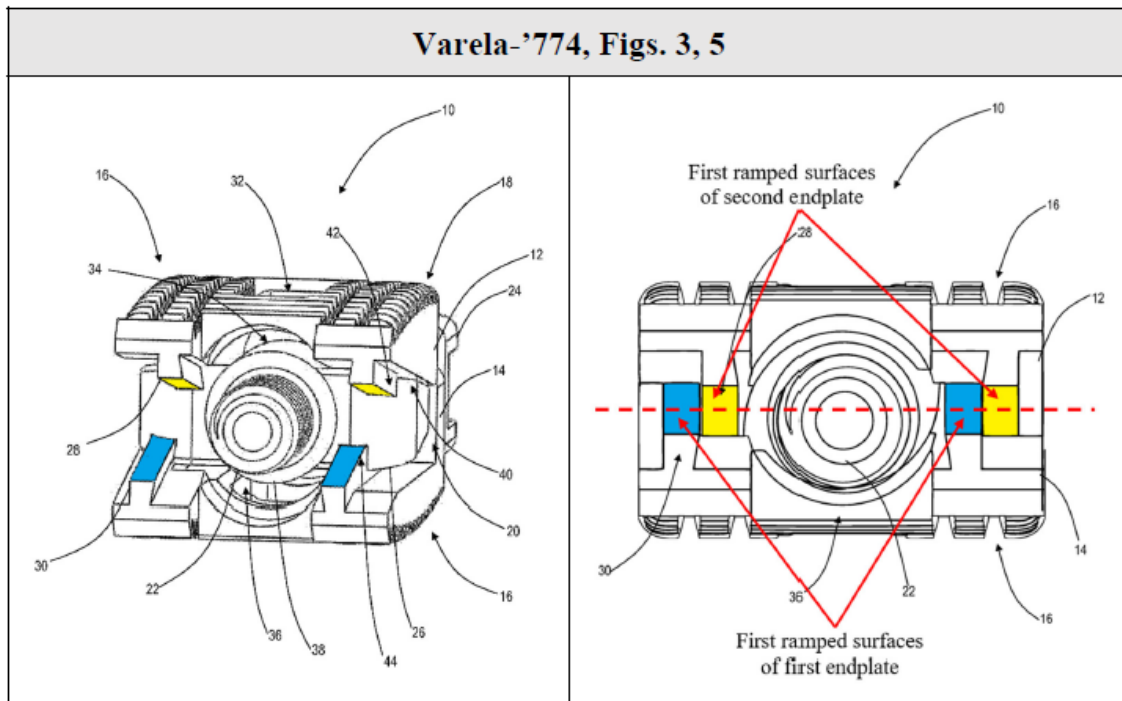
Regarding reasonable expectation of success, Patent Owner argues that “Petitioner fails to address any changes to Chung required to add Baynham’s threaded extension,” and that “adding an extension (without additional changes) will allow the implant to easily over-expand.” Prelim. Resp. 91 (citing, *e.g.*, Ex. 2001 (Culbert Decl.) ¶¶ 152–53). 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,” *see Facebook, Inc. v. Windy City Innovations, LLC*, 973 F.3d 1321, 1343 (Fed. Cir. 2020) (citations omitted), and to consider tailoring their arguments accordingly.

I. Ground 3 – Alleged Obviousness Based on Chung, Boehm and/or Song, and Varela, or Based on Chung, Boehm and/or Song, Baynham, and Varela

For Ground 3, Petitioner asserts that claims 8, 10, 11, and 13 are unpatentable as obvious over Chung in view of Boehm and/or Song (as detailed in Ground 1 above), or Chung in view of Boehm and/or Song and Baynham (as detailed in Ground 2 above), further in view of Varela. Pet. 70–74. In brief, claims 8, 10, 11, and 13 each recite that the ramped surfaces of the implant’s first and second endplates “overlap.” *See, e.g.*, Pet. 124 (dependent claims 8, 10, 11), 125 (limitation 13[g]). In Ground 1, Petitioner argues that Chung teaches first and second endplates that overlap. *See id.* at 36–38 (citing Ex. 1005, Figs. 1, 3; Ex. 1002 (Drewry Decl.) ¶¶ 173–79). Petitioner presents this ground as an alternative, to the extent the “overlap” feature is not already present in Chung. *See id.* at 70.

Petitioner argues that Varela discloses an expandable intervertebral implant with ramped structures that “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 undeployed [*sic*], thereby making the assembly as compact as possible.” *Id.* at 70–71 (quoting Ex. 1030 ¶ 39, alteration Petitioner’s). Petitioner provides the below annotated versions of Varela’s Figures 3 and 5:



Id. at 71. Petitioner’s annotated versions of Varela’s Figures 3 and 5 show the device in an expanded state (Fig. 3) and in a collapsed state (Fig. 5), with the ramped surfaces of the first endplate in blue and the ramped surfaces of the second endplate in yellow and (in Fig. 5) the plane of overlap denoted with a red dashed line.

Id. Petitioner argues that a person of ordinary skill in the art would have been motivated to combine Chung with Varela given Varela’s express teaching of achieving “the smallest possible form factor,” which is

advantageous in minimally invasive surgery. *Id.* at 72–74 (quoting Ex. 1030 ¶¶ 2, 34, 39).

At this stage of the proceeding, other than arguments already discussed above in connection with Grounds 1 and 2, Patent Owner does not specifically dispute Petitioner’s contentions with respect to Varela or Ground 3. *See generally* Prelim. Resp.

After considering the arguments and evidence of record, we determine that Petitioner has shown a reasonable likelihood of establishing that claims 8, 10, 11, and 13 would have been obvious over Chung in view of Boehm and/or Song, or Chung in view of Boehm and/or Song and Baynham, further in view of Varela.

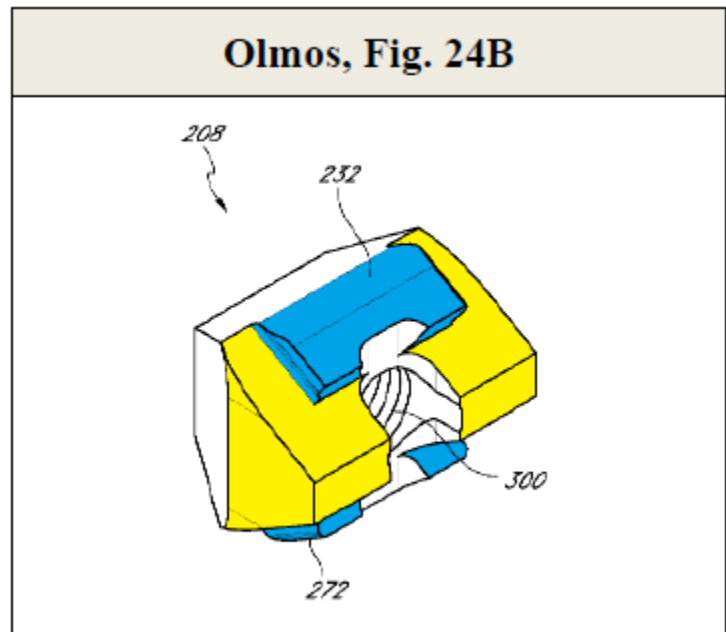
J. Ground 4 – Alleged Obviousness Based on Olmos with Boehm and/or Song

For Ground 4, Petitioner asserts that claims 1 and 7–13 would have been obvious over Olmos in combination with Boehm and/or Song. Pet. 74–112. In brief, Petitioner relies on Olmos’s Figure 16–26 embodiment as disclosing an intervertebral implant meeting most limitations of the claims, and relies on Boehm and/or Song as disclosing a dilator, cannula, and intervertebral implant sized for insertion through the cannula, in a manner similar to how it used Boehm and Song in Ground 1. *See id.* at 107–09 (explaining motivation to combine Olmos with Boehm and/or Song with a reasonable expectation of success). Petitioner also provides an alternative argument regarding modifying Olmos’s Figure 16–26 embodiment to include an additional extension as taught in Olmos’s Figure 8 embodiment. *See id.* at 101–02, 109–12.

At this stage of the proceeding, Patent Owner disputes Petitioner’s contention that Olmos’s Figure 16–26 embodiment discloses the claimed “central ramp extension,” and Petitioner’s proffered motivations to combine the central ramp extension taught in Olmos’s Figure 8 embodiment with Olmos’s Figure 16–26 embodiment with a reasonable expectation of success. *See* Prelim. Resp. 43–63, 92–110.

After considering the arguments and evidence of record, we determine that Petitioner has shown a reasonable likelihood of establishing that claims 1, 7–13, and 16 would have been obvious over Olmos in combination with Boehm and/or Song, based on both alternative arguments. 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.

To provide context for this discussion, we first review Petitioner’s contentions regarding how Olmos’s Figure 16–26 embodiment discloses the claimed “central ramp extension.” We reproduce below Petitioner’s annotated version of Olmos’s Figure 24B:



Pet. 100. Petitioner’s annotated version of Olmos’s Figure 24B depicts distal wedge member 208, which Petitioner maps to the claimed “central ramp.” *Id.* at 78. On this wedge member/central ramp, Petitioner highlights “guide member 232” in blue and the portion of the structure flanking the guide member in yellow. *See id.* at 100. Petitioner maps “guide member **232**” (blue) to the claimed “central ramp extension,” and the flanking structure (yellow) to the claimed “expansion portion” (recited in claim limitations 12[a], 13[j], and 16[h]). *See id.* at 99–100. Petitioner argues that “Olmos teaches that ‘guide member **232**’ ‘at least partially extends into a respective slot of the upper and lower body portions.’” *Id.* at 100 (quoting Ex. 1006 ¶ 156).

Petitioner alternatively contends that “it would have been obvious to add a further extension to the central ramp,” namely, Olmos’s outer sleeve member 34 as depicted in Olmos’s Fig. 8. *Id.* at 101–02. Petitioner argues that a person of ordinary skill in the art would have been motivated to make

this modification including because it would allow use of a shorter actuator/screw and would make the connection between the wedges stronger. *Id.* at 109.

With that context in mind, we now turn to Patent Owner’s arguments.

1. Whether Olmos Teaches the Claimed “central ramp extension”

Patent Owner argues that “guide member 232” in Olmos’s Figure 16–26 embodiment is not a “central ramp extension” as claimed. *See, e.g.*, Prelim. Resp. 45–46. This argument is largely based on Patent Owner’s proposed construction of “central ramp extension” as meaning “a structure that increases the axial length (i.e., extends) of the central ramp.” *See supra* Section II.E.1; Prelim. Resp. 46–57. Patent Owner also contends that a person of ordinary skill in the art would have recognized Olmos’s “guide member 232” (colored blue in Petitioner’s annotated version of Olmos’s Figure 24B reproduced above) as mapping to the claimed “expansion portion,” not the claimed “extension,” and argues that during prosecution, the Examiner never identified Olmos’s guide member 232 as the claimed “extension.” *See, e.g.*, Prelim. Resp. 55, 57.

On this record, we find Patent Owner’s arguments unavailing. Under our preliminary construction of “central ramp extension” as meaning “an addition to the central ramp,” Olmos’s guide member 232 is “an addition to the central ramp.” More specifically, Petitioner has sufficiently shown for purposes of institution that Olmos’s guide member 232 is an addition to wedge member 208 in that it extends from or protrudes above and below the top and bottom surfaces of wedge member 208 as shown, for example, in Petitioner’s annotated version of Olmos’s Figure 24B, reproduced above.

See also Pet. 100 (noting that “Olmos teaches that ‘guide member **232**’ ‘at least partially extends into a respective slot of the upper and lower body portions’”) (quoting Ex. 1006 ¶ 156)).

Accordingly, for purposes of institution, we find that Petitioner has sufficiently shown that Olmos’s guide member 232 teaches the claimed “central ramp extension.”

2. Whether it Would Have Been Obvious to Add the Extension in Olmos’s Figure 8 Embodiment to Olmos’s Figure 16–26 Embodiment

With respect to Petitioner’s alternative argument, Patent Owner argues that Petitioner’s proposed motivations to combine “are premised on hindsight and ignore the purpose of Olmos’ Figure 8 extension.” Prelim. Resp. 92. In brief, Patent Owner argues that Olmos’s “Figure 16–26 Embodiment has no use for extension 34 because it is already robust and fully expands without its actuator protruding from distal wedge 68, while also providing sufficient structural integrity.” *Id.* at 95 (citing, *e.g.*, Ex. 2001 (Culbert Decl.) ¶ 165). Patent Owner also argues that a person of ordinary skill in the art would have been motivated to “provide as much volume as possible for growth material” inside the implant, and therefore would have been “discouraged from adding another structure inside the cavity.” *Id.* at 103 (citing Ex. 2001 (Culbert Decl.) ¶¶ 197–98). Patent Owner also argues that Petitioner’s “proposed modification would . . . render Olmos’s Figure 16-26 Embodiment inoperable for its intended purpose without additional unidentified and unexplained modifications.” *Id.* at 109.

Given the similarity of arguments regarding motivation to combine and reasonable expectation of success between Ground 2 and Ground 4, we

encourage the parties to consider the guidance provided above for Ground 2 (*see supra* Section II.H) as it is also applies to Ground 4.

K. Ground 5 – Alleged Obviousness Based on Olmos, Boehm and/or Song, and Chung

For Ground 5, Petitioner asserts that claims 1 and 7–13 would have been obvious over Olmos in combination with Boehm and/or Song, in further view of Chung. Pet. 112–16. In brief, Petitioner presents this ground if Olmos is “found to not teach an unthreaded driving ramp through bore” (claim limitation 1[j]) or a “head portion” (claim limitations 1[j], 13[l]). *See id.* at 112. Aside from the arguments already discussed above that are also applicable here, Patent Owner does not specifically address this ground. *See generally* Prelim. Resp.

Given the fact-intensive nature of Petitioner’s arguments, and in the absence of any commentary on this ground from Patent Owner at this stage, we will evaluate this ground on the record that is developed during trial.

L. Ground 6 – Alleged Obviousness Based on Olmos, Boehm and/or Song, and Varela, or Based on Olmos, Boehm and/or Song, Chung, and Varela

For Ground 6, Petitioner asserts that claims 8, 10, 11, and 13 would have been obvious over Olmos in combination with Boehm and/or Song (as detailed in Ground 4 above), or over Olmos in combination with Boehm and/or Song, and Chung (as detailed in Ground 5 above), further in view of Varela. Pet. 116–19. In brief, Petitioner presents this ground if Olmos is “found to not disclose overlapping ramped surfaces,” as recited in claims 8, 10, 11, and limitation 13[g]. *See id.* at 116. For the “overlap” limitations, Petitioner turns to Varela. *See id.* at 116–17. Aside from the arguments already discussed above that are also applicable here, Patent Owner does not specifically address this ground. *See generally* Prelim. Resp.

Given the fact-intensive nature of Petitioner's arguments, and in the absence of any commentary on this ground from Patent Owner at this stage, we will evaluate this ground on the record that is developed during trial.

III. 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 '732 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.

IV. 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.

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Patent 8,845,732 B2

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