

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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LIFE SPINE, INC.,  
Petitioner,

v.

GLOBUS MEDICAL, INC.,  
Patent Owner.

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IPR2022-01603  
Patent 9,402,739 B2

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

VALEK, *Administrative Patent Judge*.

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

## I. INTRODUCTION

Petitioner Life Spine, Inc. requests *inter partes* review of claims 1–17 of U.S. Patent No. 9,402,739 B2 (“the ’739 patent,” Ex. 1001). Paper 2 (“Pet.”). Patent Owner Globus Medical, Inc. filed a Preliminary Response. Paper 7 (“Prelim. Resp.”).

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 arguments and evidence presented at this stage of the proceeding, we are not persuaded that Petitioner has demonstrated a reasonable likelihood that it would prevail with respect to at least one claim challenged in the Petition. Accordingly, *inter partes* review is denied.

## II. BACKGROUND

### 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), 2.

### B. *Related Matters*

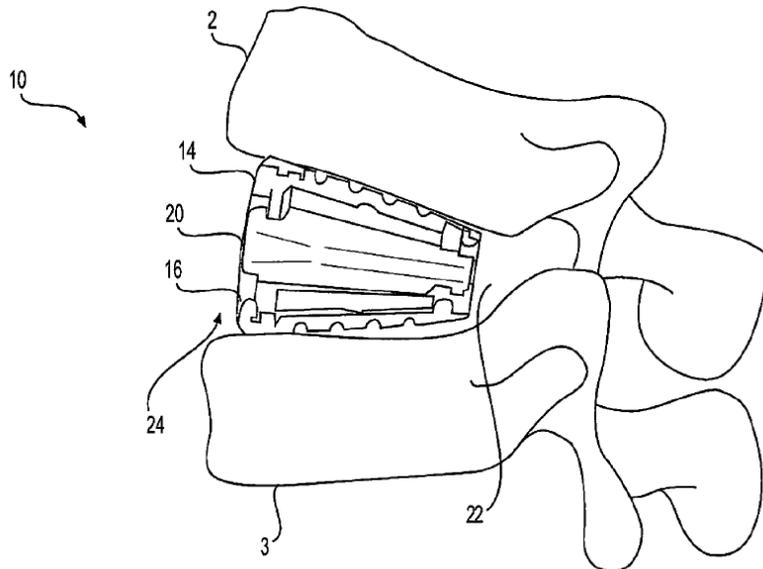
The parties identify *Globus Medical, Inc. v. Life Spine, Inc.*, Case No. 1:21-cv-01445 (D. Del.), filed October 13, 2021, as involving the ’739 patent. Pet. 1; Paper 5, 1. The parties also identify the following patent applications related to the ’739 patent: 17/157,099, and 17/520,851. Pet. 2; Paper 5, 2.

Petitioner additionally identifies IPR2022-1434, IPR2022-01435, and IPR2022-01600, IPR2022-01601, and IPR2022-01602 as related matters. Pet. 2.

*C. The '739 Patent (Ex. 1001)*

The '739 patent, titled “Variable Lordosis Spacer and Related Methods of Use,” “relates to devices, systems, and methods for correcting lordosis and/or other spinal abnormalities.” Ex. 1001, code (54), 1:8–10. According to the Specification, conventional vertebral fusion devices do not properly align with adjacent vertebral bodies because they do not adequately account for lordosis, which is the curvature of the spine. *Id.* at 1:44–50. The '739 patent purports to meet this need with an expandable fusion device in which at least one of first and second sides pivotally expands about a pivot point. *Id.* at 2:58–60.

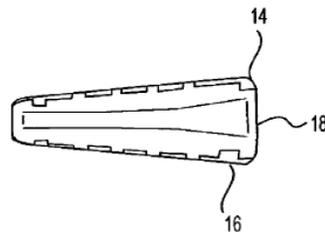
The Specification describes exemplary expandable fusion devices and methods of use. *Id.* at 1:61–62. Figure 1 of the '739 patent, reproduced below, depicts an embodiment of the '739 patent's expandable fusion device.



**FIG. 1**

Figure 1 of the '739 patent shows a side view of expandable fusion device 10 installed between adjacent vertebral bodies 2 and 3. *Id.* at 3:36–38, 4:20–22. Expandable fusion device 10 is generally wedge-shaped with a height that increases from first side 22 (e.g., posterior) to second side 24 (e.g., anterior). *Id.* at 4:22–24, 54–56. The device facilitates intervertebral fusion by engaging adjacent vertebral bodies 2 and 3 to maintain normal intervertebral disc spacing and restore stability of the spine. *Id.* at 4:24–28. The device may also provide lordosis correction. *Id.* at 4:28–31.

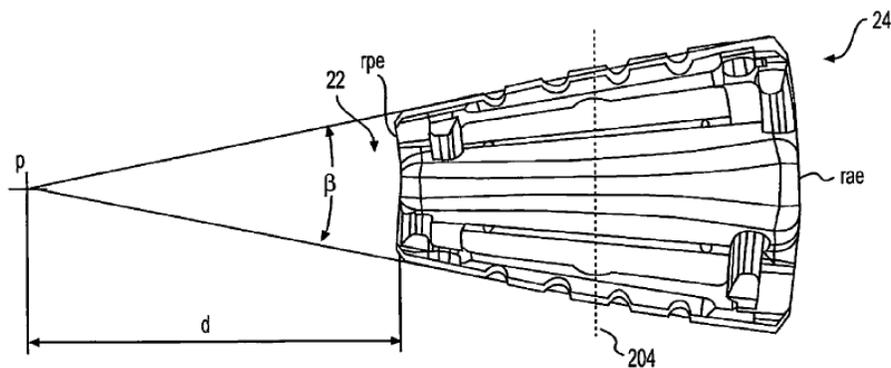
Figure 3 of the '739 patent is reproduced below.



**FIG. 3**

Figure 3 of the '739 patent shows a side view of expandable fusion device 10 in a collapsed configuration. *Id.* at 3:39–43, 5:37–40. Expandable fusion device 10 includes first endplate 14 and second endplate 16. *Id.* at 5:34–37. As shown in Figure 3, the plane of the bone contacting surface of first endplate 14 is non-parallel to the plane of the bone contacting surface of second end plate 16 when the device is a collapsed configuration.

Figure 9 of the '739 patent is reproduced below.



**FIG. 9**

Figure 9 of the '739 patent provides a side view of expandable fusion device 10 in an expanded configuration. *Id.* at 5:37–40. The components of expandable fusion device 10 in Figure 9 are constructed to exhibit a curvature upon expansion so that the device provides an angle  $\beta$  about pivot point P, which is shown to the left of the device in Figure 9. *Id.* at 55–58, 61–63.

Figure 11 of the '739 patent, reproduced below, is an exploded view of expandable fusion device 10. *Id.* at 3:59–60.



actuating mechanism 300 moves first and second ramps 18 and 20 toward each other, and the respective mating features on the ramps push against corresponding mating features on endplates 14 and 15 to expand the device. *Id.* at 13:18–23, 37–42.

*D. The Challenged Claims*

Petitioner challenges claims 1–17 of the '739 patent. Claims 1 and 13 are independent. Claims 1 and 13 are reproduced below with bracketed numbering<sup>1</sup> added to identify certain limitations:

1. [1pre] An expandable fusion device comprising:

[1a] a first endplate having an upper surface defining a first plane extending from a first side of the expandable fusion device to a second side of the expandable fusion device;

[1b] a second endplate having a lower surface defining a second plane extending from the first side of the expandable fusion device to the second side of the expandable fusion device;

[1c] a first ramp configured to mate with both the first and second endplates, wherein the first ramp is a wedge with an incline extending along a longitudinal axis of the expandable fusion device, and is also a wedge having an incline extending along a lateral axis of the expandable fusion device; and

[1d] a second ramp configured to mate with both the first and second endplates, wherein the second ramp is a wedge having an incline extending along the longitudinal axis of the expandable fusion device, and is also a wedge having an incline extending along the lateral axis of the expandable fusion device

[1e] wherein the expandable fusion device is moveable between a collapsed configuration and an expanded configuration, and

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<sup>1</sup> The bracketed numbering here is the same as that used by Patent Owner in the Preliminary Response.

[1f] wherein in the collapsed configuration the first plane and second plane are non-parallel.

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13. [13pre] An expandable fusion device comprising:

[13a] a first endplate and a second endplate, both the first and second endplates extending from a first side of the expandable fusion device to a second side of the expandable fusion device;

[13b] a first ramp and a second ramp, both the first ramp and the second ramp being configured to mate with both the first and second endplates, and both the first ramp and the second ramp extending from the first side of the expandable fusion device to the second side of the expandable fusion device,

[13c] wherein at least one of the first and second sides of the expandable fusion device pivotally expand about a pivot point,

[13d] wherein the expandable fusion device is moveable between a collapsed configuration and an expanded configuration, and

[13e] wherein the first side has a first height and the second side has a second height, the second height being greater than the first height in the collapsed configuration and in the expanded configuration.

Ex. 1001, 15:19–44, 16:29–50. Additional features are recited in claims 2–12, which depend directly or indirectly from independent claim 1, and claims 14–17, which depend directly or indirectly from independent claim 13. *Id.* at 15:45–16:28, 16:51–62.

*E. Asserted Grounds of Unpatentability*

Petitioner asserts that claims 1–17 are unpatentable on the following grounds:

<b>Ground</b>	<b>Claim(s) Challenged</b>	<b>35 U.S.C. §<sup>2</sup></b>	<b>Reference(s)/Basis</b>
1	1–15	§ 103	Wolters, <sup>3</sup> Alheidt <sup>4</sup>
2	16, 17	§ 103	Wolters, Alheidt, Miller <sup>5</sup>
3	1–3, 9, 11, 12	§ 103	Miller, Olmos, <sup>6</sup>
4	1–17	§ 103	Olmos, Miller

Pet. 4. Petitioner supports its contentions with the Declaration of Troy D. Drewry, 7 (Ex. 1002), among other evidence. Patent Owner supports its contentions with the Declaration of Brad Culbert (Ex. 2001), among other evidence.

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<sup>2</sup> 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, that became effective on March 16, 2013. The ’739 patent issued from Application No. 14/175,601, filed February 7, 2014, which is after the effective date of the AIA. Ex. 1001, codes (21), (22). Thus, the AIA version of 35 U.S.C. § 103 applies.

<sup>3</sup> Wolters et al., U.S. Patent Pub. 2013/0197647 A1, published August 1, 2013 (“Wolters,” Ex. 1004).

<sup>4</sup> Alheidt et al., U.S. Patent Pub. 2013/0211526 A1, published August 15, 2013 (“Alheidt,” Ex. 1006).

<sup>5</sup> Miller, U.S. Patent Pub. 2013/0158663 A1, published June 20, 2013 (“Miller,” Ex. 1010).

<sup>6</sup> Olmos et al., U.S. Patent Pub. 2008/0140207 A1, published June 12, 2008 (“Olmos,” Ex. 1012).

### III. ANALYSIS

#### *A. Principles of Law*

In an *inter partes* review, “the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)). 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).

A claim is unpatentable as obvious if the differences between the claimed invention and the prior art are such that the 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 said 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.<sup>7</sup> *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.

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

would have had at least a Bachelor’s Degree in mechanical engineering or biomedical engineering and two or more years of experience in biomechanical engineering, biomedical engineering, and/or spinal implant devices. EX1002, ¶59. 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. *Id.* Superior education could compensate for a deficiency in work experience, and vice-versa. *Id.*

Pet. 10. Patent Owner does not dispute Petitioner’s proposal. Prelim. Resp. 9–10.

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<sup>7</sup> Patent Owner does not presently assert objective indicia supporting nonobviousness of the challenged claims. *See generally* Prelim. Resp.

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.

*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.*

Petitioner contends “that the Board need not specially construe any terms of the Challenged Claims to institute IPR because they are shown to be obvious regardless of construction.” Pet. 10. Patent Owner argues that “[t]he Board does not need to construe any terms or phrases in the Challenged Claims to resolve the parties’ disputes at the preliminary response stage—Patentee’s arguments herein do not require adopting any express constructions.” Prelim. Resp. 9 (citing *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017)).

For purposes of this Decision, and given that neither party seeks any express claim construction, we determine that no express claim construction is necessary. *See VividTechs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (“[O]nly those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy.”). To the extent our consideration of Petitioner’s grounds touches on any implicit issues of claim construction, those are addressed in our analysis of Petitioner’s grounds below.

*D. Overview of Asserted Prior Art*

*1. Wolters (Ex. 1004)*

Wolters, titled “Expandable Spinal Interbody and Intravertebral Body Devices,” describes “vertebral interbody and intravertebral devices that are expandable after spinal placement thereof.” Ex. 1004, code (54), ¶ 2.

Wolters discloses “embodiments of expandable and/or dynamic vertebral interbody and intravertebral body devices that expand from a first radial profile into a second radial profile.” *Id.* ¶ 10.

Figure 75 of Wolters, reproduced below, is a perspective view of an exemplary expandable implant in a retracted configuration. Ex. 1004 ¶ 91.

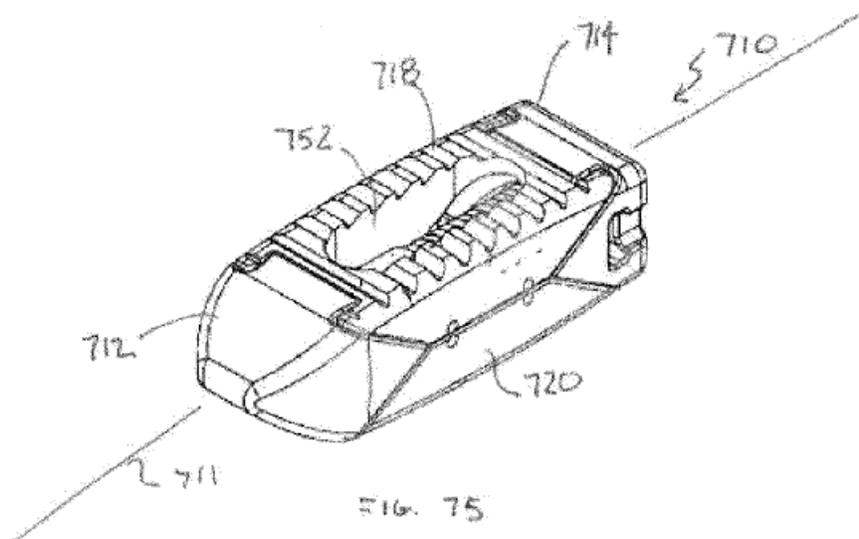
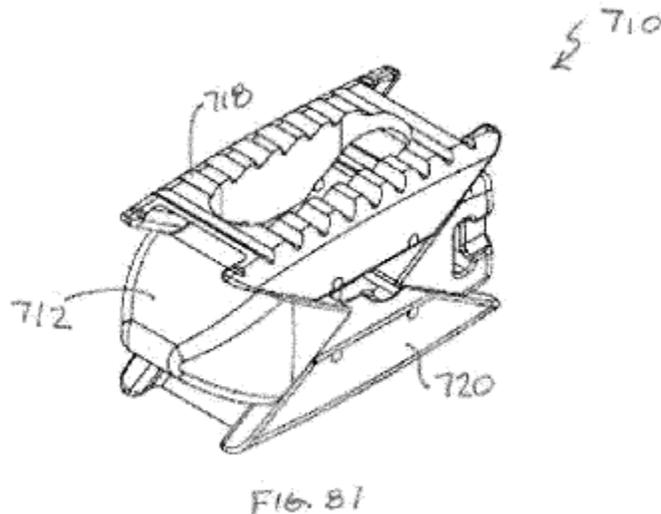


Figure 75 of Wolters depicts expandable intervertebral implant 110 having a body assembly comprising front portion 712 and rear portion 714 that extends along a longitudinal axis 711. *Id.* ¶ 163. Upper support 718 and lower support 720 are coupled to the body assembly and extend between the front and rear portion portions 712 and 714. *Id.* The upper and lower

supports 718 and 720 are movable relative to the body assembly such that expandable implant 710. *Id.* ¶ 170.

Figure 81 of Wolters, reproduced below, is a perspective view of the expandable implant in an expanded configuration. Ex. 1004 ¶ 97.



Wolters's device is expanded as shown in Figure 81 by rotation of a control (not shown in Figure 81) that extends through a through-hole in rear portion 714 and threads into front portion 712. *Id.* ¶¶ 170, 173. Rotating the control member moves front and rear portions 712 and 714 toward each other. *Id.* ¶ 170. Corresponding ramped surfaces on front and rear portions 712 and 714 and first and second supports 718 and 720 interact such that the movement of front and rear portions 712 and 714 toward each other along the longitudinal axis 711 causes first and second supports 718 and 720 to move away from each other as the implant is expanded. *Id.* ¶¶ 170, 171.

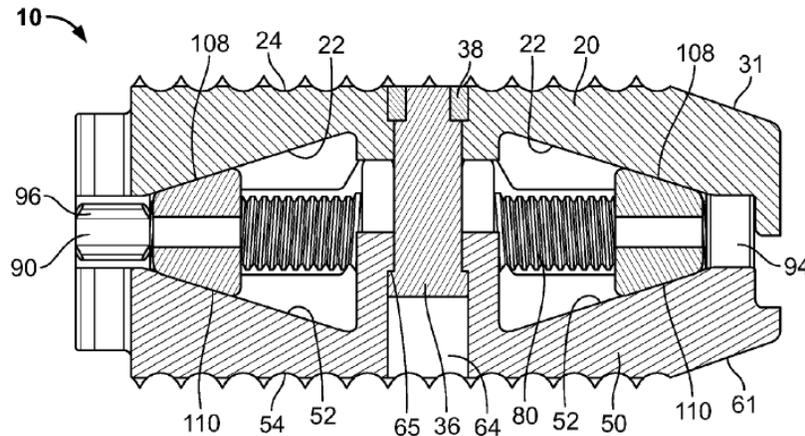
## 2. Alheidt (Ex. 1006)

Alheidt, titled "Expandable Implant," "relates to expandable implants and tools for the insertion of such implants." Ex. 1006, code (54), ¶ 2.

Alheidt discloses an expandable intervertebral implant including top and

bottom plates with inner and outer surfaces, with the inner surfaces facing each other and having a ramp surface, and expansion members situated between the inner surfaces and coupled by an actuator. *Id.* ¶ 7.

Figure 2B of Alheidt is reproduced below.



**FIG. 2B**

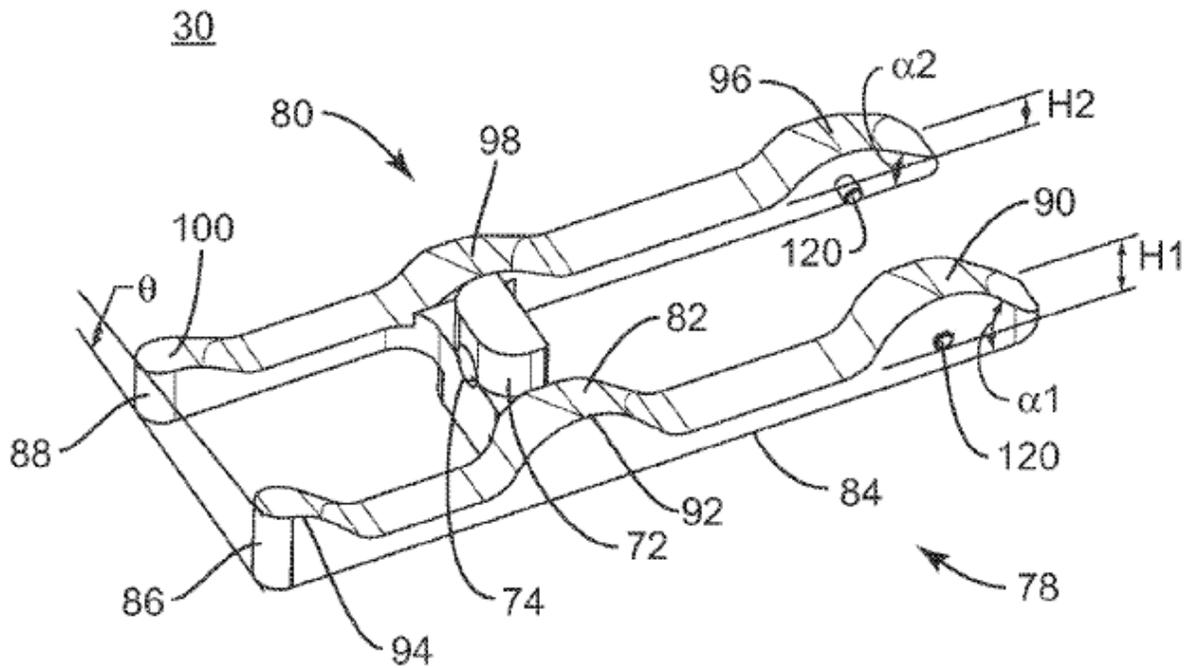
Figure 2B of Alheidt shows a cross-sectional view of implant 10 in its expanded form. Ex. 1006 ¶ 13. Implant 10 includes top and bottom plates 20 and 50 with respective outer bone-contacting surfaces 24 and 54, a rod or axle 80 arranged between the top and bottom plates, and expansion members on the left and right sides having angled top and bottom surfaces 108 and 110 in contact with angled surfaces 22 on top and bottom plates 20 and 50. *Id.* ¶¶ 28–29, 33. Movement of the expansion members toward the ends of axle 80 causes them “to ride up angled surfaces 22, 52 on plates 20, 50 and thereby cause expansion of the implant 10.” *Id.* ¶ 37. This movement is “generally uniform” meaning that the plane of the “outer bone-contacting surfaces 24, 54 of plates 20, 50 . . . remain in generally the same orientation with respect to one another” upon expansion. *Id.*

In another embodiment, not shown in Figure 2B, outer bone-contacting surfaces 24 and 54 “may be arranged at lordotic angles to one



mounted to piston component 16 via an actuator (i.e., threaded screw 66).  
*Id.*, ¶¶ 28, 32, 36. Wedge 30 is disposed intermediate and movable relative to piston and base components 16 and 18. *Id.* ¶¶ 31, 40. Each of extensions 32 and 34 has inner surface 28 that engages surfaces of wedge 30 to expand or collapse the implant. *Id.* ¶¶ 33, 40.

Figure 5 of Miller, reproduced below, is a perspective view of wedge 30. Ex. 1010 ¶¶ 40–42.



**FIG. 5**

Figure 5 of Miller shows first rail portion 86 on anterior side 78 and second rail portion 88 on posterior side 80 of wedge 30. *Id.* These rail portions have wedge portions 90, 92, 94 on the first rail and wedge portions 96, 98, 100 on the second rail at different heights H1, H2. *Id.* ¶¶ 41–42. According to Miller, height differentiation between the various wedge portions of the first and second rail portions 86 and 88 “results in a restoration of lordosis as the device is being expanded.” *Id.* ¶ 43.

In addition, Miller explains that “components 16, 18 can be expanded to create lordosis at an oblique angle.” Ex. 1010 ¶ 51. According to Miller, “[t]his configuration of implant 10 creates a lordosis from a selected corner of the body of implant 10 to an opposing corner of the body of implant 10” that “extends diagonally across the surfaces of components 16, 18.” *Id.*

#### 4. Olmos (Ex. 1012)

Olmos, titled “Intervertebral Implant,” relates to “[a]n adjustable spinal fusion intervertebral implant.” Ex. 1012, code (54), (57). Figure 16A of Olmos is reproduced below.

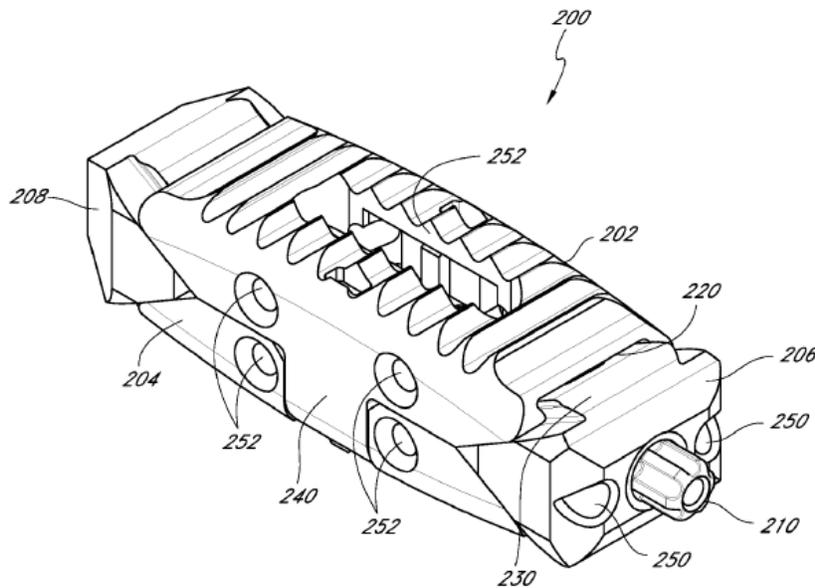


FIG. 16A

Figure 16A of Olmos 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 Figure 18 of Olmos below.

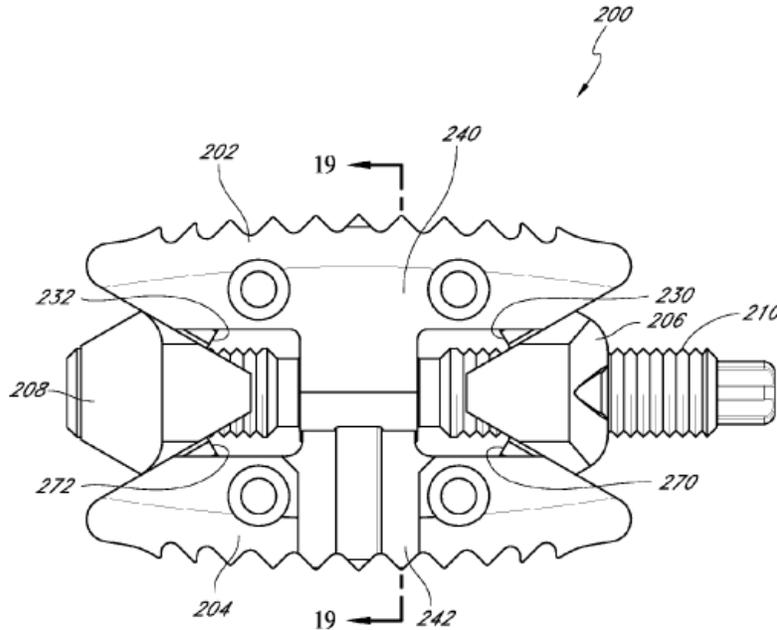


FIG. 18

Figure 18 of Olmos is a side view of intervertebral implant 200 in an expanded state. Ex. 1012 ¶ 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.

*E. Ground 1 – Alleged Obviousness Based on Wolters and Alheidt*

Petitioner asserts that claims 1–15 are unpatentable as obvious over Wolters in combination with Alheidt. Pet. 12–45. Patent Owner disputes Petitioner’s contentions. *See* Prelim. Resp. 17–40.

*1. Analysis for Claims 1–12*

Claims 2–12 depend from claim 1, which is representative for purposes of our analysis of these claims. Below we focus on the Petition’s showing for claim elements 1c and 1d and, in particular, those element’s requirements that the first and second ramps be “a wedge having an incline extending along a lateral axis of the expandable fusion device.” Ex. 1001, 15:28–39. As explained below, after reviewing the arguments and evidence presented, we determine that Petitioner has not met its burden with respect to elements 1c and 1d.

Regarding elements 1c and 1d, Petitioner argues that front portion 712 and rear portion 714 of the device depicted in Figures 75–88 of Wolters correspond to the claimed “first ramp” and “second ramp.” *See* Pet. 19–24. According to Petitioner, the front and rear portions in Wolters’s device have ramped surfaces that “facilitate controlled sliding movement” between those portions and the first and second supports 718 and 720, which Petitioner maps to the claimed first and second endplate. *Id.* at 20. Petitioner illustrates its contentions for the element 1c with the annotated version of Figure 87 of Wolters reproduced below. Pet. 21.

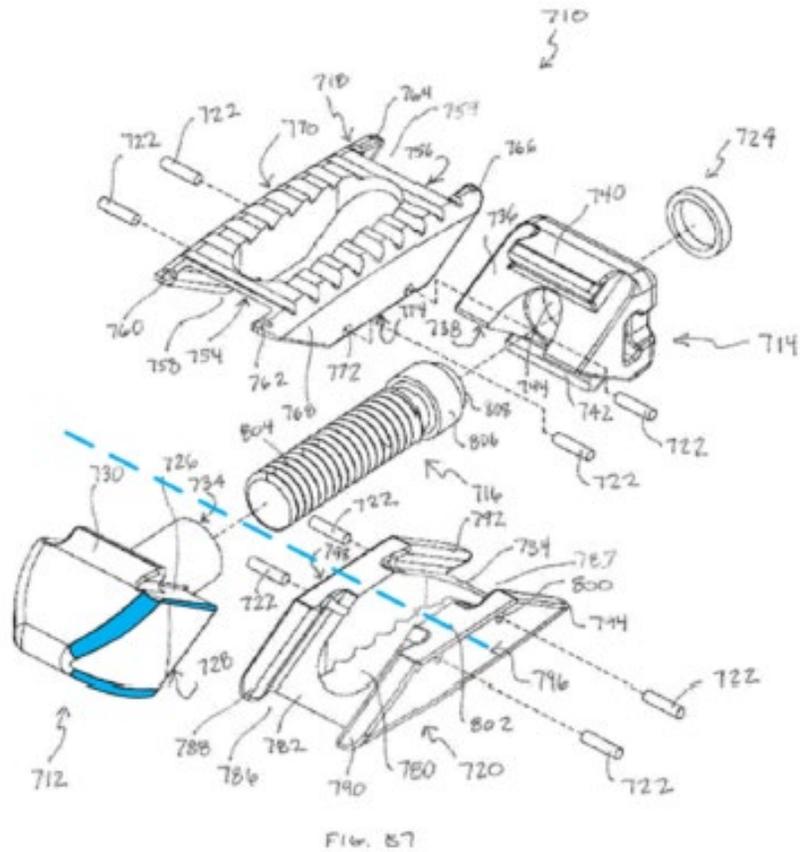


Figure 87 of Wolters shows an exploded view of Wolters’s device with first portion 712 having ramped surfaces 726 and 728 extending in a longitudinal direction, which Petitioner contends are a “wedge” as recited in claim 1. *Id.* at 20 (citing Ex. 1002 ¶ 261). Petitioner annotates the figure with blue highlighting on the edges extending off those ramped surfaces and the back of first portion 712, which Petitioner argues meets the limitation requiring that the ramp “is also a wedge having an incline extending along a lateral axis of the expandable fusion device” (shown with a blue dashed line). *Id.* at 21.

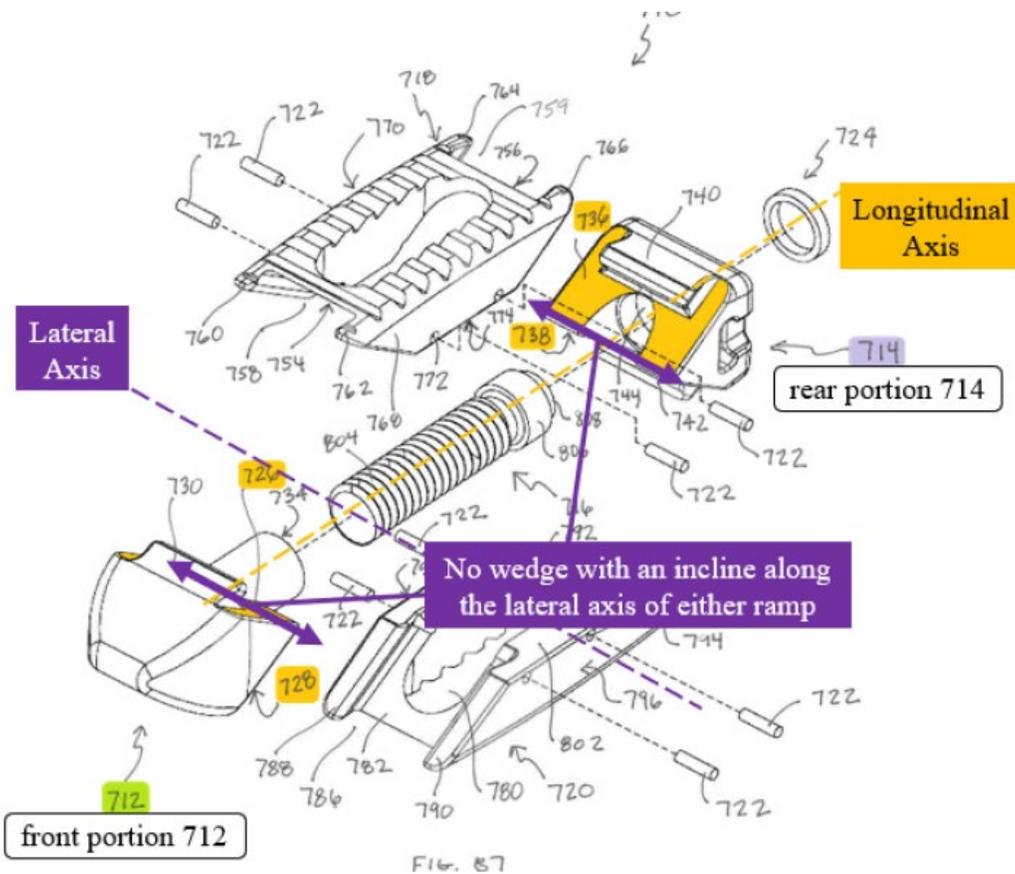
Petitioner offers a second annotated version of Figure 87 of Wolters, reproduced below, to illustrate its contentions for element 1d. Pet. 23.



appropriately accommodate lordosis of adjacent vertebral bodies, if present.” *Id.* at 21–22 (quoting Ex. 1006 ¶ 37). Based on this teaching, Petitioner asserts that “[a] POSITA would have understood that angling surfaces of the front portion 712 [and the rear portion 714], such as a top surface, in the lateral direction would have been useful in accommodating lordosis, as taught by Alheidt, and therefore would have been a beneficial modification.” *Id.* at 22–24.

Patent Owner disputes Petitioner’s contentions regarding elements 1c and 1d. *See* Prelim. Resp. 17–27. Patent Owner points out that claim 1 recites that each of the first and second ramps are “a wedge having an incline extending along the longitudinal axis” and “also a wedge having an incline extending along the lateral axis” of the device. *Id.* at 17–18 (emphasis omitted). Patent Owner refers to the second of these requirements as the “lateral wedge” limitations. *Id.* at 18. According to Patent Owner, in the ’739 patent the lateral wedges “accommodate lordosis and force the top and bottom portions of the expandable device apart in a pivoting fashion rather than just a linear, up-and-down fashion.” *Id.*

Patent Owner contrasts this with the blue highlighted portions of Wolters’s device shown in Petitioner’s annotated version of Figure 87. Prelim. Resp. 21. Patent Owner contends these are merely “ornamental edge features in Wolters that play no role in the functionality of the device in the collapsed configuration or during expansion.” *Id.* at 22. According to Patent Owner, “Wolters’s ramps are, at best, only a wedge along the longitudinal axis . . . because there is no corresponding inclined wedge along the lateral axis.” *Id.* at 23. Patent Owner illustrates this with its own annotated version of Figure 87 of Wolters, which is reproduced below.



In the figure above, Patent Owner adds yellow highlighting to ramped surfaces 726 and 728 of first portion 712 and ramped surfaces 736 and 738 of second portion 714 to show that these wedges have an incline only along the longitudinal axis. Patent Owner urges that the ornamental “rounding features” on the edges of those ramped surfaces, i.e., the portions Petitioner highlights in blue in its annotated versions of Figure 87, do not teach or suggest elements 1c and 1d because they are not configured to mate with the endplates and “do not meet Petitioner’s own wedge definition.” *Id.* at 24–25.

Regarding Petitioner’s alternative theory, Patent Owner argues that Alheidt also fails to disclose lateral wedges. *See* Prelim. Resp. 25–27. According to Patent Owner, Alheidt discloses implants “that linearly expand in height.” *Id.* at 13. Patent Owner acknowledges that paragraph 37 of

Alheidt “suggests that the outer bone contacting surfaces may accommodate lordotic angles,” but asserts that “this is achieved by angled bone-contacting surfaces and those angles are maintained during expansion.” *Id.* at 13, 25–26 (citing Ex. 1006 ¶ 37). Thus, urges Patent Owner, Alheidt does not teach or suggest “ramps hav[ing] inclined lateral wedges” as required by elements 1c and 1d. *Id.* at 26.

On the current record, we determine that Patent Owner has the better position. Claim 1 expressly recites that the first and second ramp “is a wedge” with an incline along the longitudinal axis “and is also a wedge” with an incline along the lateral axis. Ex. 1001, 15:29–39. Thus, we agree with Patent Owner that claim 1 requires that the first and second ramps have a “lateral wedge.” *See* Prelim. Resp. 18.

Moreover, the fact that claim 1 recites that the ramp is a “wedge” as opposed to simply reciting that the ramp has inclines along both axes suggests that “wedge” describes more than just the shape of that structure. According to Petitioner’s declarant, Mr. Drewry, “[t]he wedge has long been a foundational component of engineering” that is “considered one of the five simple machines in mechanics.” Ex. 1002 ¶ 265. “They were (and still are) commonly used to force two adjacent objects apart or to force one object away from an adjacent surface.” *Id.* ¶ 266 (explaining how a wedge functions). This understanding is consistent with the description in the Specification, which explains that the incline of the lateral wedges accommodates the uneven lengths of the sides of the endplates, meaning the lateral wedges are in contact with the endplates affecting their movement relative to each other during actuation of the device. *See* Ex. 1001, 12:60–63.

Petitioner has not sufficiently shown that the blue highlighted portions it identifies in Figure 87 of Wolters teach or suggest such a lateral wedge. The blue highlighted portions on the edges of those surfaces that Petitioner relies upon for elements 1c and 1d do not appear to contact any surface of the first and second support in either a collapsed or expanded configuration. Thus, on the current record, we agree with Patent Owner and Patent Owner's declarant, Mr. Culbert, that these portions are merely ornamental in nature. Ex. 2001 ¶ 70 (explaining that claimed lateral wedges are a feature of the ramps that meet with the endplates, whereas the blue highlighted portions in Petitioner's annotated figures "are merely ornamental and additionally do not meet the endplates in any way"). Given the testimony of Petitioner's declarant regarding a POSITA's understanding of a wedge, Petitioner has not sufficiently demonstrated that a POSITA would understand the ornamental blue highlighted portions in its annotated versions of Figure 87 of Wolters to disclose a "*wedge* having an incline extending along a lateral axis." Ex. 1001, 15:29–39 (emphasis added). Nor has Petitioner explained how the blue highlighted portions, which do not contact the first and second support in Wolters's figures, could be considered to be a "ramp configured to mate" with those supports (i.e., the "first and second endplates" according to Petitioner's mapping) as separately recited in elements 1c and 1d.

Petitioner's alternative argument that Alheidt teaches or suggests a lateral wedge is also unpersuasive. As Patent Owner points out, Alheidt's figures depict an implant device that expands linearly such that the bone contacting surfaces on the top and bottom maintain the same angle relative to each other in both a collapsed and expanded configuration. Prelim. Resp.

14 (showing Figures 10A and 10B of Alheidt). Alheidt refers to its Figures 2A and 2B, reproduced below, to describe this functionality.

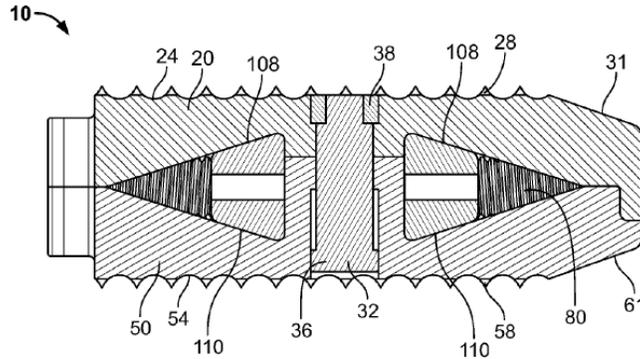


FIG. 2A

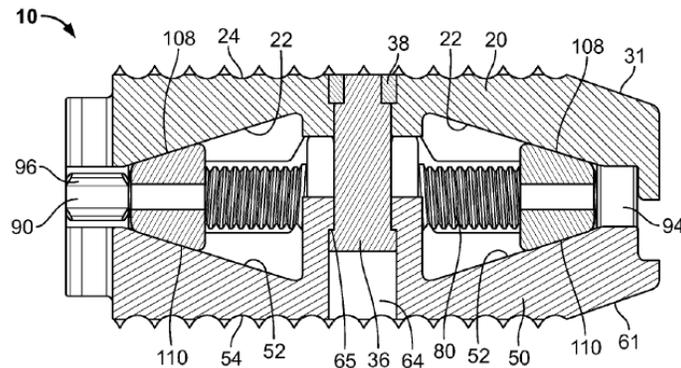


FIG. 2B

Figures 2A and 2B of Alheidt depict a cross-section view of implant 10 having top plate 20 and bottom plate 50 in a collapsed configuration (Fig. 2A) and an expanded configuration (Fig. 2B). Alheidt explains that “were respective planes drawn along outer bone-contacting surfaces 24, 54 of plates 20, 50, upon expansion of implant 10, such planes would remain in generally the same orientation with respect to one another.” Ex. 1006 ¶ 37.

Petitioner’s argument is premised on the description of a related embodiment in the same paragraph of Alheidt, which states:

It is also contemplated that, in one embodiment, the aforementioned planes (and thus outer bone-contacting Surfaces 24, 54) may be arranged at lordotic angles to one another. This

may appropriately accommodate lordosis of adjacent vertebral bodies, if present. Such lordotic angles may also be maintained upon expansion of implant 10.

Ex. 1006 ¶ 37. However, nothing in this description teaches or suggests the use of lateral wedges as recited in elements 1c and 1d. Rather, Alheidt says only that the bone-contacting surfaces of the top and bottom plate “may be arranged at lordotic angles to one another.” *Id.*

Such an arrangement does not disclose the use of lateral wedges as recited in elements 1c and 1d. Indeed, both Petitioner and its declarant illustrate this point in an annotated version of Alheidt Figure 2A, reproduced below. Pet. 26; Ex. 1002 ¶ 289.

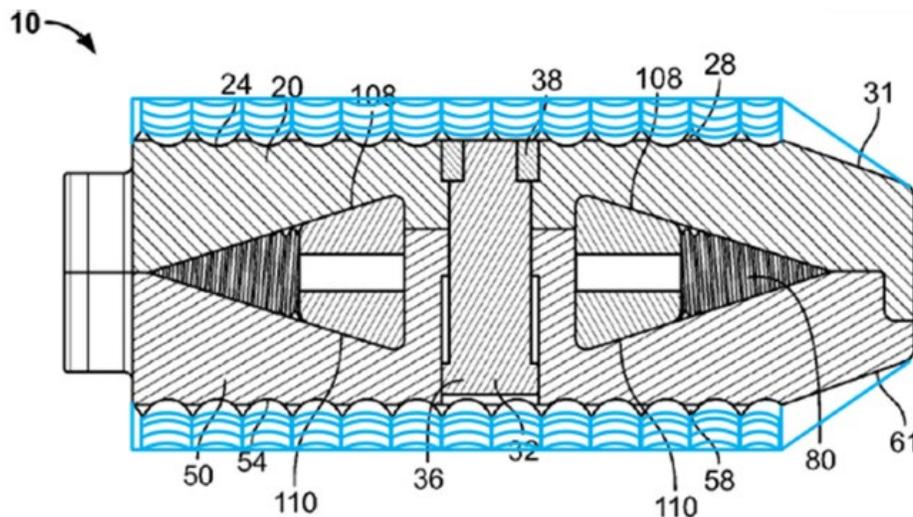


FIG. 2A

Here, Petitioner annotates Figure 2A “with blue showing the angling of the top and bottom surfaces behind the plane where the cross-section is taken” to illustrate an example of how Alheidt’s device could be configured “to achieve the described lordotic angles.” Pet. 25. As Mr. Drewy explains, this “angling would cause the top surface and the bottom surface to increase in height in the direction of the page.” Ex. 1002 ¶ 289. Thus, in Petitioner’s

annotated figure, the bone-contacting surfaces 24 and 54 are arranged at lordotic angles to one another, but the ramps providing for linear expansion are unchanged, i.e., there is an incline along the longitudinal axis, but *no lateral wedge*.

Moreover, as Patent Owner points out, if there was a lateral wedge in Alheidt's device, the bone-contacting surfaces would pivot upon expansion, causing the angle of those surfaces relative to each other to change. *See* Prelim. Resp. 13–15; *see also* Ex. 2001 ¶¶ 71–72. This would contradict Alheidt's teaching that the “lordotic angles” between the bone-contacting surfaces “may also be maintained upon expansion” just as the device in Figures 2A and 2B maintains the same orientation between bone-contacting surfaces 24 and 25 in both a collapsed and expanded configuration. *See* Ex. 1006 ¶ 37. Thus, Petitioner has not shown that Alheidt discloses elements 1c and 1d, much less that it would have been obvious to a POSITA to include lateral wedges based on the teachings of Alheidt.

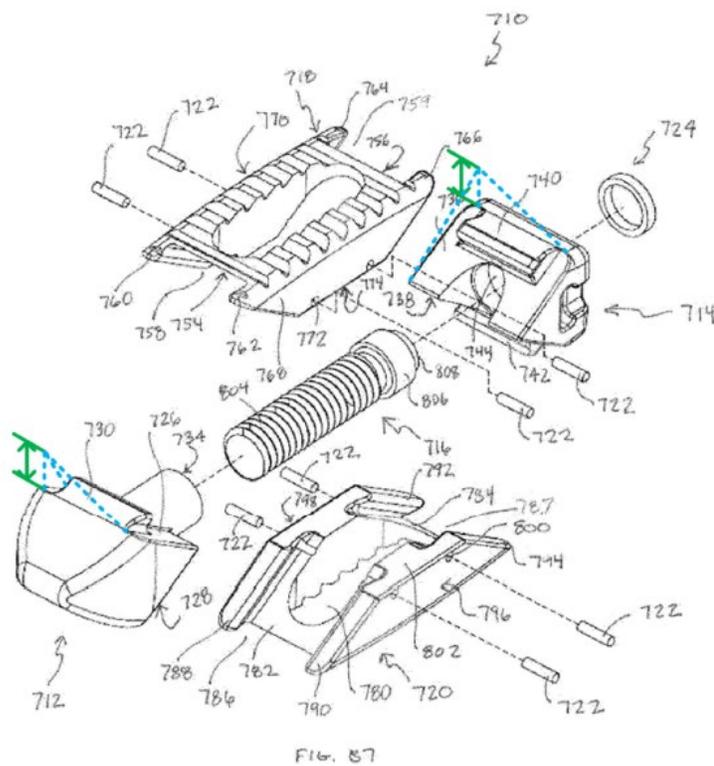
For these reasons, Petitioner has not established a reasonable likelihood of prevailing on its assertion that independent claim 1, and therefore claims 2–12 as well, would have been obvious over Wolters and Alheidt.

## *2. Analysis for Claims 13–15*

Claims 14 and 15 depend from claim 13, which is representative for purposes of our analysis of these claims. Below we focus on the Petition's showing for element 13c and, in particular, that element's requirement that at least one of first and second sides of the device “pivotally expand about a pivot point.” Ex. 1001, 16:40–42. As explained below, after reviewing the

arguments and evidence presented, we determine that Petitioner has not met its burden with respect to element 13c.

Regarding element 13c, Petitioner contends it would have been “obvious to have laterally angled the ramped surfaces 726, 728, 736, 738 of Wolters so that the first side and/or second side pivotally expand about a pivot point.” Pet. 43 (citing Ex. 1002 ¶¶ 355–361). Petitioner provides an annotated version of Figure 87 of Wolters, reproduced below, to illustrate this contention.



In its annotated figure, Petitioner adds blue dotted lines and green arrows to show what it calls “minor modifications” to the thickness of one corner of front portion 712 and the opposing corner of rear portion 714. *Id.* at 44. According to Petitioner, “[b]y increasing the thickness at the corners, the ramped surfaces 726, 736 would be inclined in both the lateral and longitudinal directions” and as a result the first and second sides of the

implant “would pivotally expand about the same pivot point, which would have been disposed outside of the implant 710.” *Id.* at 43–44. Petitioner asserts that “[a] POSITA would have understood that such modifications of Wolters would have been useful in accommodating lordosis, as taught by Alheidt, and therefore would have been a beneficial modification.” *Id.* at 44 (citing Ex. 1006 ¶ 37; Ex. 1002 ¶ 360).

Patent Owner disputes Petitioner’s contention, urging that “the Petition is devoid of any citation to Wolters or Alheidt showing that those references disclose a fusion device that includes a pivot” and merely relies on conclusory testimony from Mr. Drewry for element 13c. Prelim. Resp. 32. Patent Owner argues that Mr. Drewry’s testimony is premised on passages in Wolters that specifically refer to changing the slope of the device’s ramped surfaces along their longitudinal, not their lateral, axis. *Id.* at 32–35. Moreover, Patent Owner reiterates that Alheidt does not teach the addition of lateral wedges such as those in Petitioner’s proposed modification, but instead proposes “modifications to bone-contacting outer surfaces rather than ramps” to address lordosis. *Id.* at 36–37.

On the current record, we again determine that Patent Owner has the better position. Petitioner’s obviousness theory is premised on increasing the thickness of the corners of Wolters’s device to create an incline “in both the lateral and longitudinal direction,” i.e., a modification to add lateral wedges to the existing longitudinal wedges in Wolters’s device. Pet. 43. However, Petitioner has not identified any disclosure in Wolters or Alheidt that teaches or suggests the use of lateral wedges. Instead, every figure and disclosure Petitioner cites from these references consistently describes devices with

wedges and ramped surfaces having an incline only along the longitudinal axis. *See* Pet. 12–45.

The passages in Wolters on which Mr. Drewry bases his opinion that adding a lateral wedge to create a pivot would have been obvious are no different. *See* Ex. 1002 ¶¶ 356–357 (citing Ex. 1004 ¶¶ 166, 169). According to Mr. Drewry, these passages teach that the incline of ramped surfaces 726, 728, 736, 738 may be changed to “provide any desirable adjustment features.” *Id.* But his testimony does not address the fact that both passages specifically state that they refer to changing the incline “relative to axis 711.” Ex. 1004 ¶¶ 166, 169. Axis 711 is the “longitudinal axis” in Wolters’s device. *Id.* ¶ 163, Figs. 75, 80. Mr. Drewry does not sufficiently explain why a POSITA would have understood these teachings regarding modifications to the slope of the existing inclines along axis 711 to suggest the addition of a new incline along latitudinal axis so as to create a pivot point as recited in element 13c. *See generally* Ex. 1002 ¶¶ 355–361. Thus, we agree with Patent Owner that Mr. Drewry’s testimony on this point is conclusory and not entitled to any substantial weight. *See Xerox Corp. v. Bytemark*, IPR2022-00624, Paper 9, 15 (PTAB 2023) (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”).

Petitioner’s argument that a POSITA would have been motivated to modify Wolters based on Alheidt’s teachings regarding lordosis is similarly unpersuasive. *See* Pet. 44 (citing Ex. 1006 ¶ 37; Ex. 1002 ¶ 360). As explained above, Alheidt teaches a device that expands linearly without a pivot. In “one embodiment” the outer bone-contacting surfaces of the device

“may be arranged at lordotic angles to one another.” Ex. 1006 ¶ 37. But that teaching does not itself suggest that the device pivotally expands about a pivot point. Indeed, such functionality would run contrary to Alheidt’s teaching that the “lordotic angles” between the upper and lower bone-contacting surfaces may be “maintained upon expansion.” *Id.*

For these reasons, Petitioner has not sufficiently shown that it would have been obvious to modify Wolters’s device to “pivotally expand about a pivot point” as recited in element 13c. Accordingly, Petitioner has not established a reasonable likelihood of prevailing on its assertion that independent claim 13, and therefore claims 14 and 15 as well, would have been obvious over Wolters and Alheidt.

*F. Ground 2 – Alleged Obviousness Based on Wolters, Alheidt, and Miller*

For Ground 2, Petitioner asserts that claims 16 and 17 are unpatentable as obvious over Wolters in combination with Alheidt and Miller. Pet. 46–51. Patent Owner argues that Miller fails to remedy the deficiencies in the combination of Wolters and Alheidt argued in connection with Ground 1. Prelim. Resp. 40.

We agree with Patent Owner. As explained above, Petitioner has not established a reasonable likelihood of prevailing with respect to its argument that independent claim 13 would have been obvious over Wolters and Alheidt. For Ground 2, Petitioner relies on Miller only with respect to the additional limitations recited in dependent claims 16 and 17. *See* Pet. 46–51. Thus, Petitioner has not met its burden for Ground 2 for the same reasons explained in our analysis of Ground 1.

*G. Ground 3 – Alleged Obviousness Based on Miller and Olmos*

For Ground 3, Petitioner asserts that claims 1–3, 9, 11, and 12 are unpatentable as obvious over Miller in combination with Olmos. Pet. 51–67. Patent Owner disputes Petitioner’s contentions. *See* Prelim. Resp. 40–48.

Claims 2, 3, 9, 11, and 12 depend from claim 1, which is representative for purposes of our analysis of these claims. Below we focus on the Petition’s showing for claim element 1f and, in particular, the element’s requirement that, in the collapsed configuration for the expandable fusion device, “the first plane and second plane are non-parallel.” Ex. 1001, 15:43–44. As explained below, after reviewing the arguments and evidence presented, we determine that Petitioner has not met its burden with respect to element 1f.

Regarding element 1f, Petitioner argues that Miller discloses an embodiment in which the first and second planes would be non-parallel in the implant’s collapsed configuration. Pet. 60–61. More specifically, Petitioner asserts that Miller discloses first height H1 of wedge portions 90, 92, and 94 being greater than second height H2 of wedge portions 96, 98, and 100, and this height differential restores lordosis as the implant is expanded. *Id.* at 60 (citing Ex. 1010 ¶¶ 43, 50–51; Ex. 1002 ¶ 398). Petitioner illustrates its contentions for element 1f with an annotated version of Figure 2 of Miller, reproduced below. *Id.* at 61.

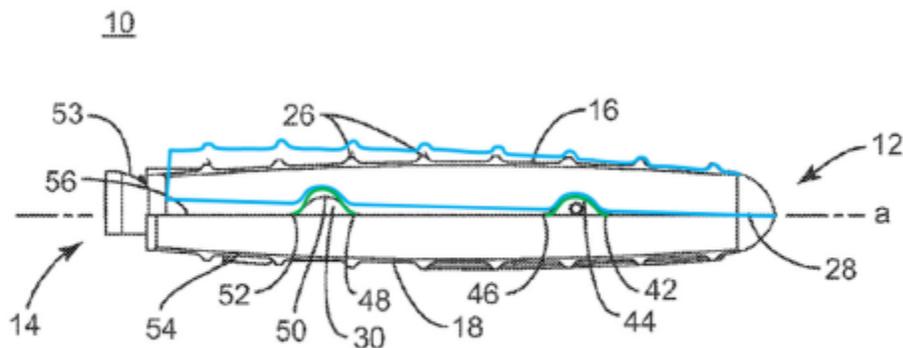


FIG. 2

Figure 2 of Miller shows a side view of Miller's device in a collapsed configuration. In its annotated version of Figure 2, Petitioner adds green lines to show an increase in the height of the wedge portion. According to Petitioner, because "Miller does not teach the recess portions 44, 50 as having increasing depths – only some of the wedge portions 90, 92, 94, 96, 98, 100 as having different heights,"<sup>8</sup> the increased wedge height shown in green would push the corresponding end of component 16 up as depicted by the blue lines in Petitioner's annotated figure. *Id.*

For this reason, Petitioner contends that a "POSITA would have understood that the increased height of some of the wedge portions 90, 92, 94, 96, 98, 100 (green in the annotation of Figure 2 [above]) would necessarily result in the endplate surfaces 22, 54 being disposed on non-parallel planes when the implant 10 is collapsed." *Id.* at 61 (citing Ex. 1002 ¶¶ 403–407). Petitioner offers the following testimony from Mr. Drewry in support of this contention:

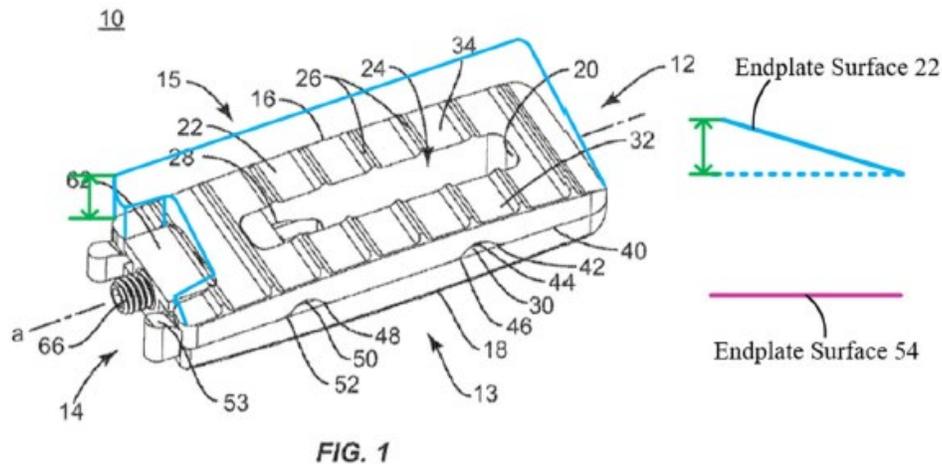
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<sup>8</sup> We understand Petitioner to be referring to the wedge portions 90, 92, 94 on first rail 86 and wedge portions 96, 98, 100 on second rail 88 in Figure 5 of Miller.

because Miller teaches that the recess portions 44, 50 have *the same* depth, the height differentiation between the wedges on the rail portion 86 and wedges on the rail portion 88, as taught by Miller for the purpose of providing lordosis, would result in the endplate surface 22 (of the piston component 16) and the endplate surface 54 (of the base component 18) being disposed on non-parallel planes when the implant 10 is collapsed.

Ex. 1002 ¶ 405 (citing Ex. 1010 ¶ 51); *see also id.* ¶ 407 (stating that a POSITA would have understood Miller, alone, to disclose limitation 1f).

Petitioner alternatively argues that one of ordinary skill would have been motivated by the teachings of Olmos to modify Miller such that the planes of its bone-contacting surfaces would be non-parallel planes when the implant is in a collapsed configuration. *See* Pet. 53–55, 61–63. Petitioner asserts that Olmos teaches intervertebral implant 10 with upper body portion 14 and lower body portion 16 in a generally-slanted configuration in which upper surface 140 and lower surface 142 are generally planar and oriented at an angle relative to each other (i.e., forming a wedge shape). *Id.* at 61–62 (citing Ex. 1012 ¶ 137; Ex. 1002 ¶ 409). According to Petitioner, “a POSITA would have found it to be obvious to have varied the heights of the piston component 16 and/or the base component 18 of Miller laterally so as to cause the endplate surfaces 22, 54 to be oriented at an angle relative to each other, as taught by Olmos.” *Id.* at 62 (citing Ex. 1002 ¶¶ 61–71, 205–221, 398–420). Petitioner illustrates its contentions for this proposed modification with the annotated version of Figure 1 of Miller reproduced below. *Id.* at 63.



In its annotated version of Figure 1, Petitioner adds blue lines to illustrate that raising the height of the two rear corners of piston component 16 results in bone-contacting surface 22 being arranged at an angle relative to bone-contacting surface 54 of base plate 18 when the implant is in a collapsed configuration. Pet. 62 (citing Ex. 1002 ¶¶ 215–219, 413–417). Petitioner contends that a “POSITA would have been motivated to make such a modification of the implant 10 of Miller to predictably provide the ability to accommodate lordosis,” and “would have understood that these benefits are desirable for certain applications.” *Id.* at 63 (citing Ex. 1002 ¶¶ 61–71, 418–420).

Patent Owner disputes Petitioner’s contentions. *See* Prelim. Resp. 44–48. First, Patent Owner argues that Miller does not teach or suggest the “non-parallel” requirement of limitation 1f. *Id.* at 44–45. Patent Owner asserts that Miller’s figures and disclosure describe a device with bone-contacting surfaces that are parallel in the collapsed configuration, and that Mr. Drewry’s testimony acknowledges this. *Id.* at 44 (citing Ex. 1002 ¶ 379). According to Patent Owner, the paragraphs of Miller that Petitioner and Mr. Drewry rely upon for their annotated version of Figure 2 do “not

disclose a non-parallel collapsed configuration as required by limitation 1f.”  
*Id.* at 46.

Second, with respect to Petitioner’s proposed modification of Miller based on Olmos, Patent Owner argues that “a POSITA would not have been motivated to . . . modify Miller to accommodate lordosis as Miller already solves lordosis on its own.” *Id.* at 48 (citing Ex. 2001 ¶¶ 82–85); *see also id.* at 47 (citing Pet. 58–59) (asserting that the Petition acknowledges Miller’s ability to accommodate lordosis). According to Patent Owner, Petitioner’s proposed modification of Miller is based upon impermissible hindsight reconstruction. *Id.* at 47–48 (citing Pet. 62).

On the current record, we determine that Patent Owner has the better position. Petitioner has not sufficiently shown that varying the height of Miller’s wedges, as discussed in the paragraphs it cites from Miller, would result in a device in which the planes of the bone-contacting surfaces are non-parallel planes when the implant is in the closed configuration. *See* Pet. 61. For example, Figures 4 and 9 of Miller, reproduced side-by-side below, show a device in which some of the wedges have different heights.

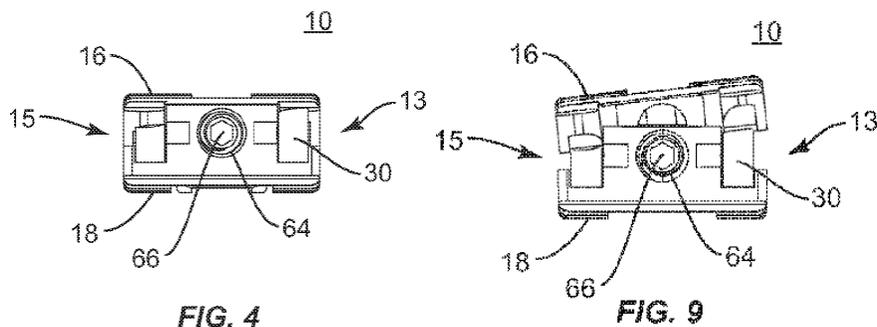


Figure 4 shows this device in a collapsed configuration with the plane of the upper bone-contacting surface of component 16 parallel to the plane of the lower bone-contacting surface of component 18. Figure 8 shows that when

the device is expanded, those planes are no longer parallel to each other. Nevertheless, it is clear from these figures that the recesses in component 16 are sized to accommodate the height variation of the corresponding wedges such that the planes of the bone-contacting surfaces sit parallel to each other in the collapsed configuration. Indeed, as Patent Owner point out, Mr. Drewry agrees that Figure 4 shows that the planes of the bone-contacting surfaces are parallel to each other in the collapsed configuration. Prelim. Resp. 45 (quoting Ex. 1002 ¶ 379).

For this reason, the premise for Petitioner’s annotated version of Miller Figure 2, i.e., Mr. Drewry’s testimony that “Miller teaches that the recess portions 44, 50 have the *same depth*,” is not supported by the record. Ex. 1002 ¶ 405 (citing Ex. 1010 ¶ 51). First, neither Petitioner nor Mr. Drewry cite any teaching in Miller that those recesses have the same depth. Indeed, none of the paragraphs they cite (i.e., Ex. 1010 ¶¶ 43, 50–51) say anything about those recess portions. Second, as explained above, the recesses in Figure 4 are sized to accommodate the greater height of the wedges on first rail 86 such that the planes of the bone-contacting surfaces are parallel when the device is collapsed. Thus, it stands to reason that a POSITA following Miller’s teachings that the wedge heights may vary as depicted in Petitioner’s annotated figure would similarly size the recesses to accommodate the increased height of the wedge marked in green. *See KSR*, 550 U.S. at 421 (“A person of ordinary skill is also a person of ordinary creativity, not an automaton.”). In any event, Petitioner has not demonstrated that Miller’s teaching that the heights of the wedges may vary to accommodate lordosis (*see* Ex. 1010 ¶¶ 43, 50–51) will result in a device

wherein the planes of the bone-contacting surfaces are parallel in a collapsed configuration.

We are also unpersuaded by Petitioner’s alternative argument that it would have been obvious to one of ordinary skill in the art to modify Miller to have non-parallel endplate surfaces in the device’s collapsed configuration based on the teachings in Olmos. *See* Pet. 53–55, 61–63. The only reasoning Petitioner articulates for modifying Miller is that the modification would “predictably provide the ability to accommodate lordosis,” and a “POSITA would have understood that these benefits are desirable for certain applications.” *Id.* at 63 (citing Ex. 1002 ¶¶ 61–71, 418–420). However, Miller discloses that its implant already accommodates lordosis by varying the height of the wedges. *See* Ex. 1010 ¶ 43 (“The height differentiation [between the wedges] results in a restoration of lordosis as the device is being expanded.”).

Petitioner has not articulated sufficient reasoning to explain why a POSITA would modify Miller to address a concern that Miller already addresses via a different mechanism. Neither Petitioner, nor Mr. Drewry, explains any additional functionality or other benefit that such a modification might provide that would not already have been present in Miller’s device. *See* Pet. 63 (stating only that “[a] POSITA would have understood that these benefits are desirable for certain applications”). On this record, Petitioner’s vague and conclusory reference to “benefits,” in the absence of any identification of an actual purported benefit—other than the lordosis-accommodating benefit already provided by Miller’s implant—is not sufficient reasoning to support the asserted combination of references.

*See TQ Delta, LLC v. CISCO Sys., Inc.*, 942 F.3d 1352, 1359 (Fed. Cir. 2019) (quoting *KSR*, 550 U.S. at 418) (Obviousness “cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.”).

Moreover, our reviewing court has long cautioned that “[c]are must be taken to avoid hindsight reasoning to avoid hindsight reconstruction by using ‘the patent in suit as a guide through the maze of prior art references, combining the right references in the right way so as to achieve the result of the claims in suit.’” *In re NTP, Inc.*, 654 F.3d 1279, 1299 (Fed. Cir. 2011) (quoting *Grain Processing Corp. v. Am. Maize-Prods. Co.*, 840 F.2d 902, 907 (Fed. Cir. 1988)). Here, the cited references teach distinct approaches with a similar result, i.e., when the device is in its elongated configuration the bone-contacting surfaces are at an angle to each other sufficient to accommodate lordosis. Given that both approaches accomplish the same result, the current record does not reveal a reason for making the multiple modifications Petitioner proposes in its combination other than a desire to arrive at device with all of the elements recited in claim 1. Thus, absent improper hindsight, Petitioner has not sufficiently explained why a POSITA would have been led to modify Miller in the manner argued in the Petition.

For these reasons, Petitioner has not established a reasonable likelihood of prevailing on its assertion that independent claim 1, and therefore claims 2, 3, 9, 11, and 12 as well, would have been obvious over Miller and Olmos.

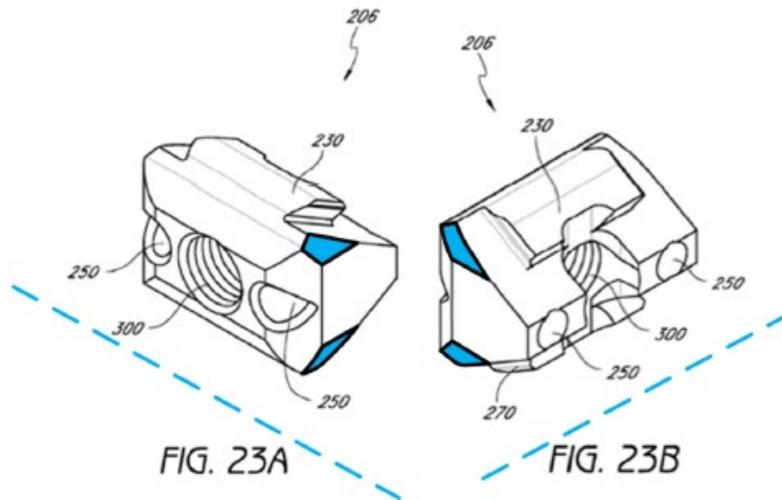
*H. Ground 4 – Alleged Obviousness Based on Olmos and Miller*

For Ground 4, Petitioner asserts that claims 1–17 would have been obvious over Olmos in combination with Miller. Pet. 67–90. Patent Owner disputes Petitioner’s contentions. *See* Prelim. Resp. 48–55.

*1. Analysis for Claims 1–12*

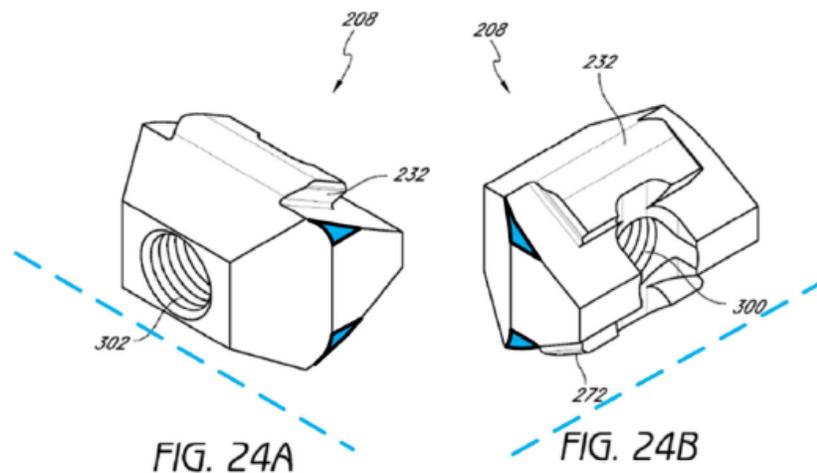
Claims 2–12 depend from claim 1, which is representative for purposes of our analysis of these claims. Below we focus on the Petition’s showing for claim elements 1c and 1d and, in particular, those element’s requirements that the first and second ramps be “a wedge having an incline extending along a lateral axis of the expandable fusion device.” Ex. 1001, 15:28–39. As explained below, after reviewing the arguments and evidence presented, we determine that Petitioner has not met its burden with respect to elements 1c and 1d.

Regarding elements 1c and 1d, Petitioner argues that proximal wedge member 206 and distal wedge member 208 depicted in Figures 23A and 23B of Olmos correspond to the claimed “first ramp” and “second ramp,” respectively. *See* Pet. 70–75. According to Petitioner, the proximal and distal wedge members in Olmos’ implant have upper and lower guide members that extend into respective slots of upper and lower body portions 202 and 204, which Petitioner maps to the claimed first and second endplates. *Id.* at 70–71. Petitioner illustrates its contentions for element 1c with the annotated versions of Figures 23A and 23B of Olmos reproduced below. *Id.* at 71.



Figures 23A and 23B show perspective views of proximal wedge member 206 (which Petitioner maps to the claimed “first ramp”) of Olmos’s implant. Ex. 1012 ¶ 77. Petitioner annotates these figures with blue highlighting on the corner surfaces of proximal wedge member 206, which Petitioner argues meet the limitation requiring that the first ramp “is also a wedge having an incline extending along the lateral axis of the expandable fusion device” (shown with a blue dashed line in each figure). Pet. 71. According to Petitioner, a “POSITA would have understood at least these inclines of the proximal wedge member 206 to be ‘incline[s] extending along a lateral axis’ of the implant 200.” *Id.* at 72 (citing Ex. 1002 ¶ 436).

Petitioner offers annotated versions of Figures 24A and 24B of Olmos, reproduced below, to illustrate its contentions for element 1d. Pet. 74.



Similar to its contentions for element 1c, Petitioner’s annotated versions of Figures 24A and 24B use blue highlighting to identify the corner surfaces of distal wedge member 208 (which Petitioner maps to the claimed “second ramp”). Petitioner similarly asserts that these blue highlighted corner surfaces of distal wedge member 208 teach the limitation requiring that the second ramp “is also a wedge having an incline extending along the lateral axis of the expandable fusion device.” Pet. 74. According to Petitioner, a “POSITA would have understood at least these inclines of the distal wedge member 208 to be ‘incline[s] extending along a lateral axis’ of the implant 200.” *Id.* at 74 (citing Ex. 1002 ¶ 454).

Petitioner alternatively argues that “that it would have been obvious to a POSITA to add such inclines” to the proximal and distal wedge portions of Olmos’s device “in view of paragraph [0137] of Olmos” and “in view of Miller.” Pet. 74–75 (citing Ex. 1002 ¶¶ 437–449); *see also id.* at 75 (relying on the same arguments for element 1d). Petitioner asserts that Olmos “describes shaping the implant so as to ‘complement the natural curvature of the spine’ and ‘match the concavity of adjacent upper and lower vertebral bodies.’” *Id.* at 72 (citing Ex. 1002 ¶¶ 437–439). According to Petitioner, a

“POSITA would have understood that this modification would have been useful in achieving these goals of Olmos, and therefore would have been a beneficial modification of the implant 200.” *Id.* (citing Ex. 1002 ¶ 427). Petitioner also argues that, in view of Miller, a “POSITA would have found it to be obvious to have varied the heights of . . . the proximal wedge portion 206 laterally so as to cause the top and bottom surfaces to be oriented at a lordotic angle relative to each other.” *Id.* (citing Ex. 1002 ¶¶ 61–71, 222–246, 441–449). Petitioner illustrates this contention with the annotated version of Figure 16A of Olmos reproduced below. *Id.* at 73.

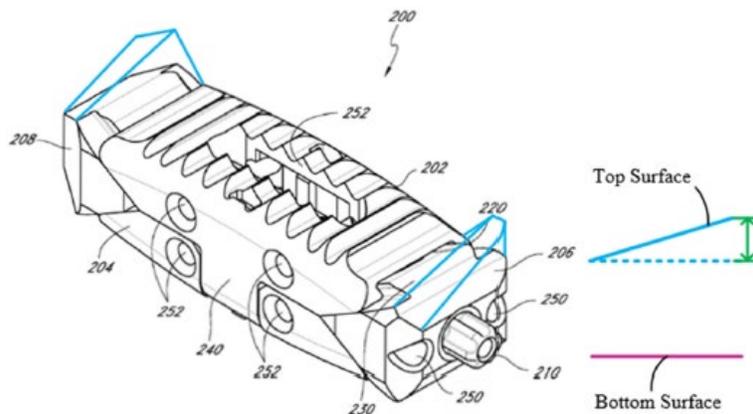


FIG. 16A

Figure 16A shows a perspective view of Olmos’s intervertebral implant 200 including proximal and distal wedge members 206 and 208 and upper and lower body portions 202 and 204. Ex. 1012 ¶ 152. Petitioner annotates the figure with blue lines “illustrating this varied height on the proximal and distal wedge members 206, 208.” Pet. 73 (citing Ex. 1002 ¶¶ 229–233, 445–446). According to Petitioner, a “POSITA would have been motivated to make such a modification of the implant 200 of Olmos to predictably provide the ability to accommodate lordosis,” and “[a] POSITA would have

understood that these benefits are desirable for certain applications.” *Id.* (citing Ex. 1002 ¶¶ 61–71, 447–448).

Patent Owner disputes Petitioner’s contentions regarding elements 1c and 1d. *See* Prelim. Resp. 48–53. Patent Owner argues that, “like Wolters’s ornamental rounded edges of Ground 1, Petitioner is relying on features [of Olmos’s implant] that are not inclined lateral wedges.”<sup>9</sup> *Id.* at 49. Referring to Petitioner’s annotated figures, Patent Owner contends that “Petitioner’s highlighted surfaces in Olmos cannot be the claimed ‘wedge having an incline extending along the lateral axis of the expandable fusion device’ because they play no role in forcing objects apart or away from a surface.” *Id.* at 50; *see also id.* (citing Ex. 1002 ¶¶ 265–267) (asserting that “Mr. Drewry effectively admits that these features are not wedges because he states a ‘wedge’ is ‘used to force two adjacent objects apart or to force one object away from an adjacent surface’”).

Regarding Petitioner’s alternative argument that paragraph 137 of Olmos would have led one of ordinary skill in the art to add inclined lateral wedges, Patent Owner argues that this paragraph teaches an embodiment with upper and lower body portions 14 and 16 having a slanted configuration. Prelim. Resp. 51 (citing Ex. 1012 ¶ 137). Patent Owner asserts that “[t]his does not disclose, teach, or suggest adding inclined lateral wedges to Olmos; instead, like Alheidt, Olmos’s paragraph 0137 at best suggests using angled bone-contacting surfaces to accommodate lordosis.” *Id.*

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<sup>9</sup> As discussed above, Patent Owner refers to the limitations in elements 1c and 1d reciting “a wedge having an incline extending along the lateral axis” as the “lateral wedge” limitations.

On the current record, we determine that Patent Owner has the better position. As explained above, claim 1 expressly recites that the first and second ramp “is a wedge” with an incline along the longitudinal axis “and is also a wedge” with an incline along the lateral axis. Ex. 1001, 15:29–39. Thus, we agree with Patent Owner that claim 1 requires that each of the first and second ramps has a “lateral wedge.” *See* Prelim. Resp. 18.

Petitioner has not sufficiently shown that the blue highlighted portions it identifies in Figures 23A, 23B, 24A, and 24B of Olmos teach or suggest a lateral wedge. As discussed above, Petitioner’s declarant, Mr. Drewry, explains that a wedge is commonly used to force objects apart. *See infra* § 2.E.1. In Olmos, proximal and distal wedge members 206 and 208 function as wedges by forcing upper and lower body portions 202 and 204 apart as the implant is expanded. *See* Ex. 1012 ¶ 155.

In contrast, the blue highlighted corner surfaces of Olmos’s proximal and distal wedge members 206 and 208 that Petitioner identifies as lateral wedges do not appear to contact any surface of upper and lower body portions 202 and 204. Thus, on the current record, we agree with Patent Owner that these surfaces, like the features in Wolters’s device that Petitioner points to in Ground 1, are merely ornamental and do not contact the upper and lower body portions. Accordingly, Petitioner has not sufficiently demonstrated that a POSITA would understand the ornamental blue highlighted portions in its annotated versions of Figures 23A, 23B, 24A, and 24B of Olmos to disclose a “wedge having an incline extending along a lateral axis.” Ex. 1001, 15:29–39 (emphasis added). Nor has Petitioner explained how the blue highlighted surfaces, which do not contact upper and lower body portions 202 and 204 in Olmos’ figures, could be

considered to be a “ramp configured to mate” with the upper and lower body portions (i.e., the “first and second endplates” according to Petitioner’s mapping) as separately recited in elements 1c and 1d. For these reasons, Petitioner has not shown that Olmos teaches or suggests elements 1c and 1d.

We are also unpersuaded by Petitioner’s alternative argument that it would have been obvious to modify Olmos to include lateral wedges based on the teachings in Miller. Similar to the reasoning Petitioner offers for its other combinations, Petitioner posits that a POSITA would have been motivated to vary the heights of Olmos’s proximal and distal wedge portions 206 and 208 in order to “provide the ability to accommodate lordosis,” and “would have understood that these benefits are desirable for certain applications.” Pet. 73 (citing Ex. 1002 ¶¶ 61–71, 447–448). However, as Patent Owner points out, Petitioner has not explained how this reasoning would have motivated the combination because “Olmos already [accommodates lordosis] by other means (namely, angled bone-contacting surfaces).” Prelim. Resp. 52. More specifically, Olmos teaches that the bone-contacting surfaces may be arranged in a generally slanted configuration to form a wedge shape. *See* Ex. 1012 ¶ 137 (describing Fig. 14A). Olmos explains that “[s]uch an embodiment can be beneficial especially in applications where the implant 10 must complement the natural curvature of the spine.” *Id.*

Given that Olmos already teaches a mechanism for accommodating lordosis, the bare reasoning Petitioner offers, i.e., “to accommodate lordosis,” does not sufficiently explain why a POSITA would further modify Olmos’s device. Pet. 63. As with its other contentions, Petitioner does not identify any additional functionality or other benefit that such a modification

might provide that would not already have been present in Olmos’s device. *See Id.* (stating only that “[a] POSITA would have understood that these benefits are desirable for certain applications”). On this record, Petitioner’s vague and conclusory reference to “benefits,” in the absence of any identification of an actual purported benefit—other than the lordosis-accommodating benefit already provided by Olmos’s device—is not sufficient reasoning to support the asserted combination of references. *See TQ Delta*, 942 F.3d at 1359. Thus, absent improper hindsight, Petitioner has not articulated sufficient reasoning with rational underpinning to explain why a POSITA would have been led to modify Olmos in the manner asserted in the Petition.

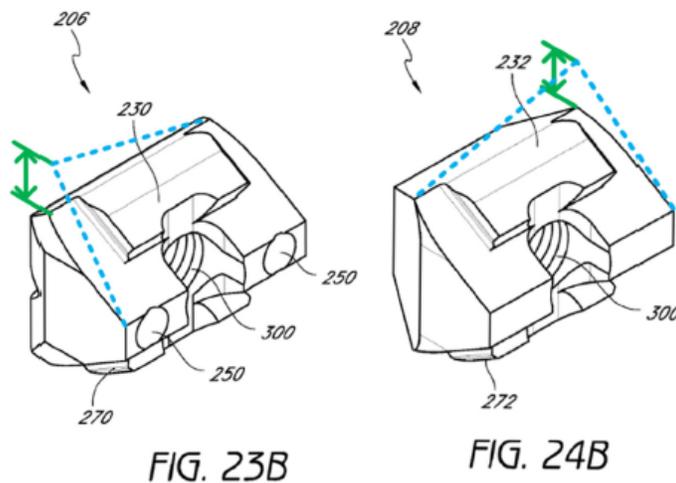
For these reasons, Petitioner has not established a reasonable likelihood of prevailing on its assertion that independent claim 1, and therefore claims 2–12 as well, would have been obvious over Olmos and Miller.

## *2. Analysis for Claims 13–17*

Claims 14–17 depend from claim 13, which is representative for purposes of our analysis of these claims. Below we focus on the Petition’s showing for claim element 13c and, in particular, this element’s requirement that at least one of first and second sides of the device “pivotally expand about a pivot point.” Ex. 1001, 16:40–42. As explained below, after reviewing the arguments and evidence presented, we determine that Petitioner has not met its burden with respect to element 13c.

Regarding element 13c, Petitioner contends that it would have been “obvious to have laterally angled the ramped surfaces of the proximal wedge member 206 and the distal wedge member 208 of Olmos so that the first side

and/or second side of the implant 200 pivotally expand about a pivot point.” Pet. 86 (citing Ex. 1002 ¶¶ 222–246, 508–517). Petitioner provides annotated versions of Figures 23B and 24B of Olmos, reproduced below, to illustrate this contention. *Id.* at 87.



In its annotated figures, Petitioner adds blue dotted lines and green arrows to show purported “minor modifications” to the thickness of one corner of proximal wedge member 206 and the opposing corner of distal wedge member 208. *Id.* at 86–87. Petitioner asserts that, “[b]y increasing the thickness at the corners, the ramped surfaces would be inclined in both the lateral and longitudinal directions,” and, “[a]s a result, the first and second sides of the implant 200 would pivotally expand about the same pivot point, which would have been disposed outside of the implant 200.” *Id.* (citing Ex. 1002 ¶¶ 513, 523, 524). Petitioner argues that “[a] POSITA would have understood that such modifications of Olmos would have been useful in accommodating lordosis, as taught by Miller, and therefore would have been a beneficial modification of the implant 200.” *Id.* at 87 (citing Ex. 1010 ¶¶ 43, 50–51; Ex. 1002 ¶¶ 61–71, 516). According to Petitioner, “a POSITA

would have had a reasonable expectation of success in making such a modification of the implant 200.” *Id.* at 88 (citing Ex. 1002 ¶ 517).

Patent Owner disputes Petitioner’s contention. Prelim. Resp. 53–55. Patent Owner argues that “a POSITA would have had no reason to modify Olmos in view of Miller to accommodate lordosis given that Olmos already addressed lordosis with angled bone-contacted surfaces.” *Id.* at 53–54.

Patent Owner further argues that one of ordinary skill in the art would not have had a reasonable expectation of success in modifying Olmos’s device because it is not capable of pivotally expanding. *Id.* at 54. Patent Owner supports this contention with an annotated version of Figure 16A of Olmos, which is reproduced below. *Id.* at 16–17, 55.

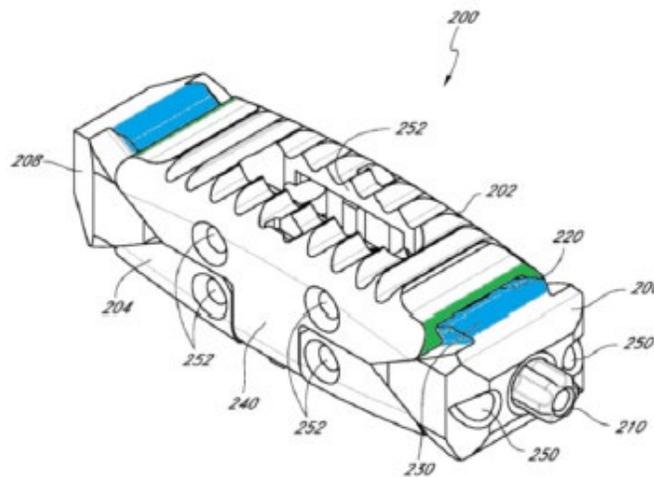


FIG. 16A

Figure 16A shows Olmos’s device in a collapsed configuration. In its annotated version, Patent Owner adds blue highlighting to the portions of guide members 230 and 232 (not labeled) abutting slot 220, which is highlighted in green. Patent Owner argues that “[t]he interlocking relationship of wedge members (206, 208), guide members (230, 232

(blue)), and the upper and lower body portions (202,204) via, e.g., slot (220 (green)) preclude pivoting.” *Id.* at 55. Patent Owner asserts that “[t]his mechanical linkage allows **only linear expansion** (e.g., up and down movement) between the upper and lower body portions 202, 204.” *Id.*; *see also id.* at 17 (citing Ex. 2001 ¶¶ 86–93 (testimony from Patent Owner’s declarant explaining that Petitioner’s proposed modifications “would cause the device to jam due to interference between blue angled surfaces [in Patent Owner’s annotated version of Figure 16A] and the slots 220” as well as other “motion limiting features” taught in Olmos)).

On the current record, we again determine that Patent Owner has the better position. First, we agree with Patent Owner that Petitioner’s proffered reasoning for the combination of Olmos’s and Miller’s teachings are unavailing for reasons similar those discussed above for the related grounds. *See supra* §§ III.G, III.H.1. That is, given that Olmos already provides its own mechanism for accommodating lordosis, it is unclear why “accommodating lordosis” (Pet. 87) would have motivated a POSITA to modify Olmos’s device so that the sides “pivotally expand about a pivot point” as recited in element 13c. As before, neither Petitioner, nor Mr. Drewry, identify any additional benefits or functionality not already provided by Olmos’s device that such a modification might provide. Petitioner’s bare assertion that such a modification offers the same benefit Olmos already provides is conclusory and does not articulate sufficient reasoning with rational underpinning for the proposed modification. *See Pet. 87.*

The conclusory nature of Petitioner’s argument is highlighted by Patent Owner’s evidence suggesting that the proposed modifications would

jam Olmos's device. *See* Prelim. Resp. 17 (citing Ex. 2001 ¶¶ 86–93). Patent Owner's declarant, Mr. Culbert, identifies several reasons why the proposed modifications depicted in Petitioner's annotated version of Figure 16A of Olmos would cause jamming and other mechanical problems based on Olmos's teachings that its device is limited to linear expansion. Ex. 2001 ¶¶ 89–93 (citing Ex. 1012 ¶¶ 157, 165, 171, Figs. 20A–B, 21A–B). None of these issues, at least some of which are apparent on the face of Figure 16A, are addressed by Petitioner or its declarant. This undermines Petitioner's argument that it is merely proposing "minor modifications" to the device shown in Figure 16A and exacerbates the shortcomings in Petitioner's reasoning for the purported combination. *See* Pet. 87.

For these reasons, Petitioner has not sufficiently shown that it would have been obvious to modify Olmos's device to "pivotally expand about a pivot point" as recited in element 13c. Accordingly, Petitioner has not established a reasonable likelihood of prevailing on its assertion that independent claim 13, and therefore claims 14 and 15 as well, would have been obvious over Olmos and Miller.

#### IV. CONCLUSION

Based on the current record, Petitioner has not shown a reasonable likelihood of establishing that any of the challenged claims are unpatentable on any of the grounds in the Petition. Accordingly, institution of *inter partes* review is denied.

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V. ORDER

Accordingly, it is:

ORDERED that the Petition is denied, and no *inter partes* review is instituted.

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