

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MEDACTA USA, INC., PRECISION SPINE INC., and LIFE SPINE, INC.

Petitioners

v.

RSB SPINE, LLC,

Patent Owner

Case IPR2020-00264

Patent 9,713,537

PETITIONERS' NOTICE OF APPEAL

Pursuant to 35 U.S.C. §§ 141, 142 and 319 and 37 C.F.R. § 90.2(a), Petitioners Life Spine, Inc. and Precision Spine, Inc. (“Petitioners”) hereby respectfully give notice that they appeal to the United States Court of Appeals for the Federal Circuit from the Patent Trial and Appeal Board’s (“Board”) Final Written Decision entered on April 15, 2021 (Paper No. 46) (the “Final Written Decision”) (Exhibit A), as well as from all other underlying orders, decisions, rulings, and opinions that are adverse to Petitioners.

For the limited purpose of providing the Director with the information requested in 37 C.F.R. § 90.2(a)(3)(ii), the issues on Petitioners’ appeal may include, but are not limited to:

(1) the Board’s determination of no unpatentability as to claims 1, 3-6, 10, 13-15, 18, 19, 21, 22, 24, 29 and 30; and

(2) any and all findings or determinations supporting or related to the aforementioned issues, as well as other issues decided adversely to Petitioners in any orders, decisions, rulings or opinions.

Pursuant to 37 C.F.R. § 90.3(b), this Notice of Appeal is timely, having been duly filed within 63 days after the Final Written Decision entered April 15, 2021.

Simultaneous with the submission, a copy of the Notice of Appeal is being filed electronically with the Patent Trial and Appeal Board. In addition, a copy of

this Notice of Appeal, along with the required docketing fees, is being electronically filed with the Clerk's Office for the United States Court of Appeals for the Federal Circuit.

Dated: June 17, 2021

Respectfully submitted,

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Inc.*

CERTIFICATE OF SERVICE

Pursuant to 37CFR §§ 42.6(e)(4) and 42.205(b), the undersigned certifies that on June 17, 2021, a complete and entire copy of Petitioners' Notice of Appeal was provided via email to the Patent Owner's by serving the correspondence address of record as follows:

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I hereby certify that, in addition to being filed electronically through the Board's E2E System, the original version of the foregoing Notice of Appeal was filed by hand on June 17, 2021, with the Director of the United States Patent and Trademark Office, at the following address:

Director of the United States Patent and Trademark Office
c/o Office of the General Counsel
Madison Building East, 1 OB20
600 Dulany Street
Alexandria, VA 22314-5793

I hereby certify that on June 17, 2021, a true and correct copy of the foregoing Notice of Appeal, along with a copy of the Final Written Decision, was filed electronically with the Clerk's Office of the United States Court of Appeals for the Federal Circuit, at the following address:

United States Court of Appeals for the Federal Circuit

717 Madison Place, N.W., Suite 401
Washington, DC 20005

Dated: June 17, 2021

Respectfully submitted,

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EXHIBIT A

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MEDACTA USA, INC., PRECISION SPINE, INC.,
and LIFE SPINE, INC.,
Petitioner,

v.

RSB SPINE, LLC,
Patent Owner.

IPR2020-00264
Patent 9,713,537 B2

Before PATRICK R. SCANLON, MICHAEL L. WOODS, and
ERIC C. JESCHKE, *Administrative Patent Judges*.

WOODS, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining No Challenged Claims Unpatentable
35 U.S.C. § 318(a)
Dismissing Petitioner's Motion to Exclude
37 C.F.R. § 42.64

I. INTRODUCTION

Medacta USA, Inc., Precision Spine, Inc., and Life Spine, Inc. (collectively, “Petitioner”) filed a Petition to institute an *inter partes* review of claims 1, 3–6, 10, 13–15, 18, 19, 21, 22, 24, 29, and 30 (the “challenged claims”) of U.S. Patent No. 9,713,537 B2 (Ex. 1002, “the ’537 patent”). Paper 2 (“Pet.”). We instituted an *inter partes* review of these claims. Paper 24 (“Institution Decision” or “Inst. Dec.”).

After institution, RSB Spine, LLC (“Patent Owner”) filed a Patent Owner’s Response (Paper 27 (“PO Resp.” or “Response”)), to which Petitioner replied (Paper 31 (“Pet. Reply” or “Reply”)). Patent Owner also filed a Sur-reply to Petitioner’s Reply. Paper 34 (“PO Sur-reply” or “Sur-reply”).

Oral argument, or hearing, was held on February 23, 2021, and the transcript of the hearing has been entered as Paper 45 (“Transcript” or “Tr.”).

We have jurisdiction under 35 U.S.C. § 6. Petitioner bears the burden of proving unpatentability of the challenged claims, and the burden of persuasion never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). To prevail, Petitioner must prove unpatentability by a preponderance of the evidence. *See* 35 U.S.C. § 316(e) (2018); 37 C.F.R. § 42.1(d) (2019). This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons that follow, Petitioner has not shown that any of the challenged claims are unpatentable.

A. Related Proceedings

The parties identify five pending proceedings in the U.S. District Court for the District of Delaware involving the '537 patent: (1) *RSB Spine, LLC. v. Life Spine, Inc.*, No. 18-cv-1972 (D. Del.); (2) *RSB Spine, LLC. v. Medacta USA, Inc.*, No. 18-cv-1973 (D. Del.); (3) *RSB Spine, LLC. v. Precision Spine, Inc.*, No. 18-cv-1974 (D. Del.); (4) *RSB Spine, LLC v. Xtant Medical Holdings, Inc.*, No. 18-cv-1976 (D. Del.); and (5) *RSB Spine, LLC. v. DePuy Synthes, Inc.*, No. 19-cv-1515 (D. Del.) (collectively, the “Delaware Litigations”). Pet. 1–2; Paper 5, 2. The Delaware Litigations also involve a related patent, U.S. Patent No. 6,713,234 B2 (“the ’234 patent”). Pet. 1.

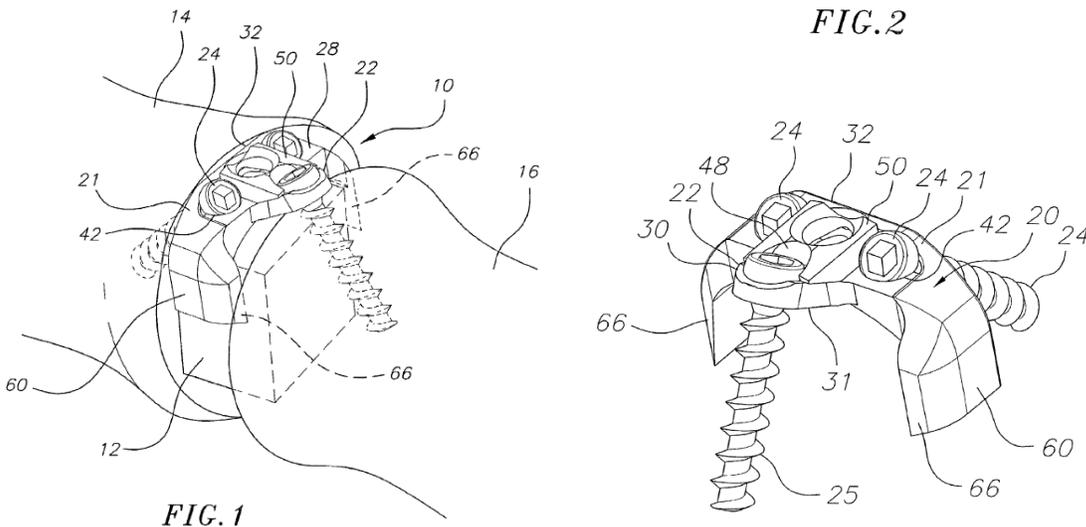
On the same day as the filing of the Petition in this Proceeding (December 13, 2019), Petitioner filed an additional petition for *inter partes* review of the same challenged claims (1, 3–6, 10, 13–15, 18, 19, 21, 22, 24, 29, and 30) in IPR2020-00275. IPR2020-00275, Paper 4. We denied institution in that proceeding. IPR2020-00275, Paper 22.

Also that same day, Petitioner filed petitions for *inter partes* review of (1) claims 1–10, 13, 14, 16, 18–20, 22, 24, 25, 28, 29, 31 and 32 of the '234 patent in IPR2020-00274, and (2) claims 35, 37, and 39 of the '234 patent in IPR2020-00265. IPR2020-00265, Paper 2; IPR2020-00274, Paper 4. We granted institution in those proceedings. IPR2020-00265, Paper 24; IPR2020-00274, Paper 22.

Finally, the parties identify “related” U.S. Patent Application No. 15/723,522 as currently pending before the U.S. Patent and Trademark Office. Pet. 2; Paper 5, 2.

B. The '537 Patent (Ex. 1002)

The '537 patent is titled “Bone Plate Stabilization System and Method for its Use.” Ex. 1002, code (54).¹ The patent describes a system with a base plate configured to fit primarily between anterior portions of two adjacent vertebral bodies’ (or bones’) lip osteophytes for treating disorders of the spine. *See id.* at code (57), 4:6–12. The patent further describes surgical treatment of the spine accomplished by removing the intervertebral disc material from the space between two adjacent vertebral bodies, and replacing it with a surgical implant and bone graft to promote fusion of the two vertebral bodies.² *See id.* at 4:7–15. To illustrate an embodiment of the described system, we reproduce Figures 1 and 2, below:



¹ Throughout this Final Written Decision, we omit any bolding of reference numerals or claim numbers in quotations from the '537 patent and from prior art references.

² The terms “disc” and “disk” are used interchangeably in the record. *See, e.g.,* Ex. 1002, 3:54 (using the term “disc”), 12:49 (using the term “disk”).

The '537 patent explains that Figures 1 and 2 are perspective views of a bone stabilization plate system according to the invention, with Figure 1 (left) depicting the system assembled between adjacent vertebrae. *Id.* at 5:63–67. In particular, these figures depict bone stabilization plate system 10 comprising base plate 20 having a first end and a second end, with primary member 21 and secondary member 22 at the second end of the base plate. *Id.* at 8:33–36. In this embodiment, secondary member 22 is angled relative to primary member 21. *Id.* at 8:37–38. As shown in Figure 1, base plate 20 may be mounted to adjacent vertebral bodies (14, 16) with bone graft 12 interposed between the bodies. *See id.* at 8:46–49. Bone graft, or bone tissue, promotes fusion between the vertebral bodies. *See id.* at 13:16–18.

We also reproduce Figure 3 of the '537 patent, below:

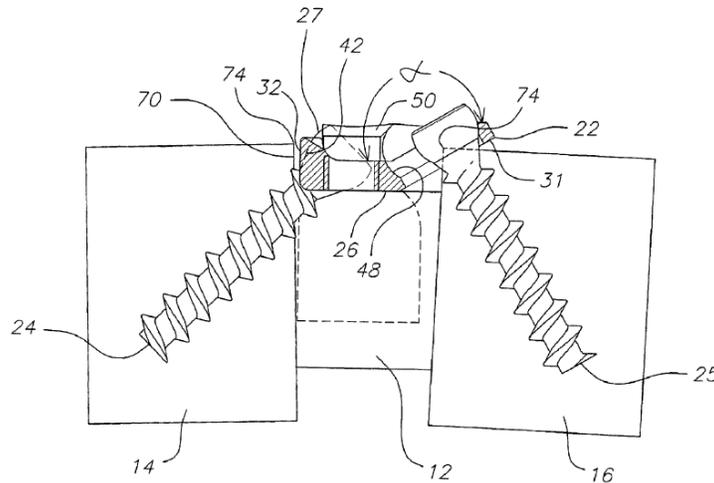


FIG. 3

Figure 3 is a cross-sectional view of the bone plate stabilization system assembled between adjacent vertebrae. *Id.* at 6:1–3. As shown collectively in this figure and Figures 1 and 2, bottom surface 26 of base plate 20 contacts bone graft 12, and primary member 21 has a top surface,

denoted as 28. *See id.* at 8:48–56, Figs. 1, 2. Primary member 21 also has side wall 32 at the first end of base plate 20 that contacts first vertebral body 14. *Id.* at 8:56–58. The top surface of base plate 20 may also have apertures for receiving one or more bone screws. *See id.* at 8:58–60. In this embodiment, primary member 21 includes two first bone screw holes 42 for receiving first bone screws 24. *See id.* at 9:8–11, Fig. 2. Bone screw holes 42 are angled relative to the bottom surface of the base plate so that a first bone screw extending through the hole extends through the base plate at an angle. *Id.* at 9:11–18, Fig. 4. Secondary member 22 also includes a bone screw hole or slot 48 for receiving second bone screw 25. *Id.* at 9:26–28. Second bone screw 25 is received through bone screw slot 48 and into second vertebral body 16. *Id.* at 9:28–30.

C. Illustrative Claims

Petitioner challenges claims 1, 3–6, 10, 13–15, 18, 19, 21, 22, 24, 29, and 30. Pet. 1. Of these claims, claims 1, 15, and 21 are independent. Ex. 1002, 37:65–40:57. We reproduce claim 1, below, reformatted from the version provided in the '537 patent to include bracketed alphanumeric nomenclature that corresponds with Petitioner's nomenclature. *See, e.g.*, Pet. 23–41.

1. [1(Preamble)] A bone stabilization plate system comprising:

[1(a)] a base plate having a top surface, first and second ends, a bottom surface, and a plurality of bone screw holes,

[1(b)] wherein the base plate is configured to fit primarily between anterior portions of adjacent vertebral bones' lip osteophytes to bear weight to hold the vertebral bones while sharing weight with bone graft material for fusion; and

[1(c)] a plurality of bone screws configured to fit in the plurality of bone screw holes, respectively;

[1(d)] wherein the vertebral bones have top surfaces and have side surfaces generally facing each other;

[1(e)] wherein a first of the bone screw holes, being configured to receive a first of the bone screws, extends at least partially from the top surface of the base plate and opens at least partially toward the side surface of a first of the vertebral bones;

[1(f)] wherein a second of the bone screw holes, being configured to receive a second of the bone screws, extends at least partially from the top surface of the base plate and opens at least partially toward the lip osteophyte of a second of the vertebral bones; and

[1(g)] wherein each and every one of the plurality of bone screw holes is configured to receive one of the bone screws angled relative to the base plate and oriented generally in an anterior-posterior direction through at least partially the top surface of the base plate.

Ex. 1002, 37:65–38:24; Pet. 23–41.

We also reproduce dependent claims 10 and 24, below:

10. The system as set forth in claim 1, *wherein the base plate includes two lateral tabs* configured to fit between the lip osteophytes of the vertebral bones and extending from opposite ends of the bottom surface of the base plate in a direction generally transverse to the vertebral bones.

Id. at 38:51–55 (emphasis added).

24. The system as set forth in claim 21, wherein the base plate has more than two bone screw holes, a first one of the bone screw holes extends partially through both the bottom surface and the first end, and a second one of the bone screw holes extends partially through both the *bottom surface* and the second end.

Id. at 40:27–32 (emphasis added).

D. Asserted Grounds of Unpatentability

Petitioner contends that the challenged claims are unpatentable based on the following asserted grounds (Pet. 5):

Ground³	Claim(s) Challenged	35 U.S.C. §⁴	Reference(s)/Basis
1	1, 10, 13, 14, 21, 22, 29	103	Fraser ⁵ (fused embodiment)
2	3, 15, 19	103	Fraser (fused embodiment), Byrd ⁶
3	1, 3, 13–15, 19, 21, 22, 29	103	Fraser (two-piece embodiment)
4	4–6, 24, 30	103	Fraser (both embodiments), Michelson ⁷
5	18	103	Fraser (both embodiments), Michelson, Byrd

Petitioner supports its challenge with declarations from Mr. Michael C. Sherman (Exs. 1005, 1023). Patent Owner submits testimony from Mr. Troy D. Drewry (Ex. 2006).

³ For clarity and consistency of record, we adopt the parties’ reference to the numbered “grounds” in our Final Written Decision. *See* Pet. 5 (referring to the five challenges as Grounds 1–5); *see also* PO Resp. i–ii (referencing Grounds 1–5).

⁴ The Leahy-Smith America Invents Act (“AIA”) included revisions to 35 U.S.C. § 103 that became effective on March 16, 2013. Pub. L. No. 112-29, §§ 3(c), 3(n)(1), 125 Stat. 284, 287, 293 (2011). Because there is no dispute that the challenged claims of the ’537 patent have an effective filing date before March 16, 2013, we apply the pre-AIA version of § 103. *See also* Pet. 3–4 (confirming same).

⁵ US 6,432,106 B1, issued Aug. 13, 2002 (Ex. 1007).

⁶ US 7,077,864 B2, issued July 18, 2006 (Ex. 1008).

II. ANALYSIS

A. Level of Ordinary Skill in the Art

The level of ordinary skill in the art is “a prism or lens” through which we view the prior art and the claimed invention. *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). The person of ordinary skill in the art (“POSITA”) is a hypothetical person who is presumed to have known the relevant art at the time of the invention. *In re GPAC, Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). In determining the level of ordinary skill in the art, we may consider certain factors, including the “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.” *Id.* (internal quotation marks omitted).

Petitioner contends that a person having ordinary skill in the art “at the time of the alleged invention would have had at least a Bachelor of Science degree in the field of Mechanical, Biomechanical or Biomedical engineering with at least 5 years of experience designing and developing orthopedic implants and/or spinal interbody devices.” Pet. 17.

Patent Owner, on the other hand, contends that

A person of ordinary skill in the relevant art as of April 2003 would be a biomedical engineer with 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 person of ordinary skill in the art with some combination of (1) more formal education (such as an M.D. in addition to a bachelor’s degree in mechanical engineering) and less technical experience or (2) less formal

⁷ WO 00/66045, published Nov. 9, 2000 (Ex. 1006).

education and more technical or professional experience in the fields listed above.

PO Resp. 6 (citing Ex. 2006 ¶¶ 9–10).

In the Institution Decision, we adopted Petitioner’s proposed level of ordinary skill in the art. Inst. Dec. 20. Although the level of ordinary skill in the art proposed by Patent Owner (and applied by Mr. Drewry (*see, e.g.*, Ex. 2006 ¶¶ 8–11)) differs slightly from the level proposed by Petitioner and adopted in our Institution Decision, Patent Owner stated, at the oral argument, that the differences are not “material” and that Patent Owner’s and Mr. Drewry’s positions would be the same under either level. *See* Tr. 56:17–57:4.

Because we agree that the differences in the two levels are immaterial, we continue to apply Petitioner’s proposed level of ordinary skill in the art in the analysis below. Regardless, the analysis would be the same under Patent Owner’s proposed level.

B. Claim Construction

In *inter partes* reviews, the Board interprets claim language using the same claim construction standard that would be used in a civil action under 35 U.S.C. § 282(b), as described in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). *See* 37 C.F.R. § 42.100(b). Under that standard, we generally give claim terms their ordinary and customary meaning, as would be understood by a person of ordinary skill in the art at the time of the invention, in light of the language of the claims, the specification, and the prosecution history. *See Phillips*, 415 F.3d at 1313–14. Although extrinsic evidence, when available, may also be useful when construing claim terms

under this standard, extrinsic evidence should be considered in the context of the intrinsic evidence. *See id.* at 1317–19.

Petitioner proposes constructions for the following claim terms: (1) “base plate”; (2) “lip osteophyte”; and (3) “screw retainer.” Pet. 17–23. In the claim construction section of its Response, Patent Owner addresses only the term “base plate.” PO Resp. 6–10; *see also id.* at 7 (stating that Patent Owner “addresses the constructions of other terms, as proposed by [Petitioner] or preliminarily adopted by the Board, as necessary, in the sections that follow”).

Based on the full record developed at trial, we construe only the terms “configured to fit *primarily* between anterior portions of adjacent vertebral bones’ lip osteophytes” and “base plate configured to . . . *bear weight*” (emphases added). We do not discern a need to construe explicitly any of the other claim language discussed in this section or any other claim terms because doing so would have no effect on the analysis below. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (stating that “we need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

1. “*base plate is configured to fit primarily between anterior portions of adjacent vertebral bones’ lip osteophytes*”

In the Delaware Litigations, the parties agree that the term “primarily” means “mainly” and “does not connote a temporal aspect.” *See Ex. 1021*, 6. In our Institution Decision, we adopted the parties’ district court interpretation and preliminarily construed “primarily” to mean “mainly.”

Inst. Dec. 32. We encouraged the parties to address this interpretation in future briefing if they disagreed with our preliminary construction. *Id.*

In its Response, Patent Owner did not dispute our interpretation and instead appeared to agree with it. *See* PO Resp. 6–10 (construing only “base plate”); *see also id.* at 35–36 (arguing that the *majority* of the implant must fit between the anterior portions of adjacent lip osteophytes).

Petitioner, on the other hand, contends that Patent Owner’s “interpretation of the limitation is incorrect.” Pet. Reply 18. Petitioner proposes that the “limitation requires the base plate to be implanted between the lip osteophytes (*i.e.*, viewed laterally from a side-view).” *Id.* In support of this interpretation, Petitioner cites the prosecution history of the ’537 patent, submitting that, during prosecution, “PO argued prior art cage devices are not configured to fit primarily between anterior portions of the bone bodies’ lip osteophytes because the top plates cover portions of the top surfaces of the bones bodies.” *Id.* (citing in relevant part Ex. 1004, 218–19).

We disagree that Patent Owner’s—or our—claim construction is incorrect.

Petitioner’s citation to the prosecution history does not support its position that Patent Owner’s or our construction is wrong. Petitioner fails to explain how the prosecution history limits the meaning of the term “primarily,” or otherwise explain why the claimed limitation does not require a majority of the base plate be configured to fit between anterior portions of adjacent lip osteophytes. The cited portion of the prosecution history does not demonstrate that the patent applicant’s statements amount to a “disavowal . . . ‘clear and unmistakable’ to one of ordinary skill in the art” as to the meaning of “primarily.” *See Elbex Video. Ltd. v. Sensormatic*

Elecs. Corp., 508 F.3d 1366, 1371 (Fed. Cir. 2007) (quoting *Omega Eng'g, Inc. v. Raytek Corp.*, 334 F.3d 1314, 1326 (Fed. Cir. 2003)). Rather, the cited portion of the prosecution history includes statements from the patent applicant that distinguishes prior art base plates that fit on the anterior side surfaces (or faces) of adjacent vertebral bodies. *See* Ex. 1004, 218–19. We do not see these statements as conflicting with our construction of the term “primarily,” which we interpret to mean “mainly” (Inst. Dec. 32), or otherwise conflict with Patent Owner’s understanding that a majority of the claimed “base plate” must be “configured to fit primarily between anterior portions of adjacent vertebral bones’ lip osteophytes” (PO Resp. 35–36; Ex. 1002, 38:1–3) in order to satisfy the claimed limitation.

Furthermore, the claim does not simply require the base plate to be configured to fit between lip osteophytes, when viewed laterally, as Petitioner contends. *See* Pet. Reply 18. Rather, claim 1 recites, “wherein the base plate is configured to fit *primarily* between the anterior portions of adjacent vertebral bones’ lip osteophytes.” Ex. 1002, 38:1–3 (emphasis added). We agree with Patent Owner that Petitioner’s proposed definition ignores the term “primarily.” PO Sur-reply 13. Petitioner’s interpretation of the limitation renders the term “primarily” superfluous. *See Bicon Inc. v. Straumann Co.*, 441 F.3d 945, 950 (Fed. Cir. 2006) (“[C]laims are interpreted with an eye toward giving effect to all terms in the claim.”); *see also Stumbo v. Eastman Outdoors, Inc.*, 508 F.3d 1358, 1362 (Fed. Cir. 2007) (denouncing claim constructions that render phrases in claims superfluous); *Merck & Co. v. Teva Pharms. USA, Inc.*, 395 F.3d 1364, 1372 (Fed. Cir. 2005) (rejecting a proposed claim construction that would render claim terms superfluous).

Accordingly, we maintain our initial construction that “primarily” means “mainly,” as also agreed to by the parties in the Delaware Litigations. Ex. 1021, 6; Inst. Dec. 32. We further clarify our construction in that “mainly” requires more than 50% of the base plate be configured to fit between anterior portions of adjacent vertebral bones’ lip osteophytes, as understood and argued by the parties. *See* PO Resp. 35–36 (arguing that a majority of Fraser’s “base plate” is not configured to fit between the anterior portions of adjacent vertebral bones’ lip osteophytes); *see also* Pet. Reply 19–20 (arguing 60% of Fraser’s “base plate” fits between the anterior portions of the lip osteophytes).

2. “*configured . . . to bear weight to hold the vertebral bones while sharing weight with bone graft material for fusion*”

Petitioner submits that the *plate* of Fraser’s two-piece embodiment *bears weight*. *See* Pet. 71. In particular, Petitioner submits that

A POSITA would understand that after the Fraser . . . implant is filled with bone graft material and subsequently inserted between the surfaces of the vertebrae, the vertebrae would be in direct contact with the bone graft material. A POSITA would further understand that when the bone screws engage each of the vertebral bodies, *those screws would place a compressive load on the bone graft material and promote fusion between the bones*. As such, a POSITA would understand that Fraser . . . discloses that *the base plate shares weight with bone graft material for fusion*.

Pet. 71 (citing Ex. 1005 ¶ 279) (emphases added). To paraphrase, Petitioner submits that a POSITA would have understood that because the bone screws “would place a compressive load on the bone graft material . . . [,] the base plate shares weight with bone graft material,” thereby satisfying the limitation of a “base plate . . . configured . . . to bear weight.” *See id.*

In our Institution Decision, we disagreed with Petitioner’s implied construction that a base plate is configured “to bear weight” if the bone screws placed a compressive load on the bone graft material. *See* Inst. Dec. 32–34. We explained that in order for the “base plate” to “*bear weight* to hold the vertebral bones while *sharing weight* with bone graft material,” the anterior portions of the adjacent lip osteophytes must apply a compressive force to the base plate. *See id.* (emphases added).

Petitioner disagrees with our construction in its Reply, arguing that “the patent applies a broader meaning to the term weight bearing.” Pet. Reply 28. With the support of Mr. Sherman’s testimony, Petitioner contends that “the term means ‘holding the vertebral bones, *e.g. by imparting compressive, tensile, torsional, sheer or other load to the base plate.*’” *Id.* at 28–29 (referencing Ex. 1023 ¶ 118) (emphasis added); *see* Ex. 1023 ¶ 118 (testifying, “in my opinion, the proper construction of this term should be ‘holding the vertebral bones while experiencing compressive, tensile, torsional, or sheer loads”). Mr. Sherman testifies that this meaning “is consistent with the plain and ordinary meaning in the medical field.” Ex. 1023 ¶ 120.

In its Sur-reply, Patent Owner argues that Petitioner “seek[s] to expand the meaning of ‘bear weight’ far beyond its ordinary meaning to encompass essentially any force exerted on the base plate, regardless of its source.” PO Sur-reply 21.

We agree with Patent Owner. We further agree that in order to be configured to “primarily” or “mainly” bear weight, the *majority* (or more than 50%) of the base plate must be configured to fit between anterior portions of adjacent vertebral bones’ lip osteophytes. *See* PO Resp. 35–36.

We give words of the claim their “ordinary and customary meaning,” which is the meaning the term would have to a person of ordinary skill at the time of the invention, in the context of the entire patent including the specification. *See Phillips*, 415 F.3d at 1312–13.

Claim 1 recites, “[a] base plate that is configured to fit primarily between anterior portions of adjacent vertebral bones lip osteophytes to *bear weight* to hold the vertebral bones while sharing weight with bone graft material for fusion.” Ex. 1002, 38:1–5 (emphasis added). Importantly, the claim recites, “*bear weight*,” not “*bear load*,” as Petitioner’s construction implies. As discussed below, weight is a gravitational force, whereas not all loads result from gravity.

Furthermore, Petitioner’s construction is inconsistent with the Specification’s discussion of weight bearing. The Specification describes that “[t]he spinal column of vertebrates provides support to bear weight and protection of the delicate spinal cord and spinal nerves. The spinal column includes a series of vertebrae stacked on top of each other.” *Id.* at 3:45–48. The Specification further describes, “Between each vertebral body is an intervertebral disk, a cartilaginous cushion to help absorb impact and dampen compressive forces on the spine” (*id.* at 3:53–55) and that, after the disk has been removed, the implanted bone graft and interbody device “share in the weight bearing during settling of the vertebral bodies” (*see, e.g., id.* at 22:15–17). We find the Specification’s discussion of “weight bearing” refers to the compressive forces from gravity exerted between adjacent vertebral bodies, which are vertically stacked in relation to one another.

Furthermore, the limitation more fully recites, “configured . . . to bear weight to hold the vertebral bones while *sharing weight* with bone graft material.” Ex. 1002, 38:1–5 (emphasis added). Indeed, the plain language of the claim requires the base plate to be configured to “share weight” with the bone graft material. *Id.* Because the bone graft material resides within the disc space of adjacent vertebral bodies, the bone graft encounters compressive stress from gravitational forces imparted between the vertically-stacked vertebrae. *See, e.g., id.* at 22:15–17. By “sharing weight” with the bone graft material, the base plate also encounters compressive stress from gravity when positioned between adjacent lip osteophytes. *See id.* at 38:1–5.

We further agree with Patent Owner’s position that Petitioner’s proposed construction “is so broad that [it] would improperly render the ‘configured to . . . bear weight’ limitation a meaningless nullity, as any spinal fixation device . . . would experience some types of forces when affixed to the spine.” PO Sur-reply 21 (emphasis omitted, first alteration in original). The term “weight” “is the result of the force of gravity acting on an object, not just any force.” *Id.* (citing Ex. 2006 ¶ 131). Having weighed the competing testimony of Mr. Sherman and Mr. Drewry, we credit Mr. Drewry’s testimony that

a person of ordinary skill would have understood that “weight” is the result of the force of gravity acting on an object and that additional compressive “flexion loads” are not the same thing, as they could be the result of other forces acting on the object, such as forces generated by an [sic] spinal fusion patient’s neck muscles.

Ex. 2006 ¶ 131.

For the foregoing reasons, we maintain the construction of “base plate is configured . . . to bear weight” from our Institution Decision. Inst. Dec. 34. In particular, giving the language of claim 1 its ordinary and customary meaning in light the Specification (*see Phillips*, 415 F.3d at 1313–14), we determine that, in order for the “base plate” to “bear weight,” the anterior portions of the adjacent lip osteophytes must apply a compressive force to the base plate. Because the claim recites “configured to fit primarily between anterior portions of adjacent vertebral bones’ lip osteophytes to bear weight” (Ex. 1002, 38:1–5), a POSITA would understand that the weight bearing occurs between adjacent anterior lip osteophytes.

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). This burden never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015).

Petitioner’s challenges are based on obviousness. Pet. 5.

As to obviousness, a claim is unpatentable as obvious under 35 U.S.C. § 103(a) 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. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the

prior art; (3) the level of skill in the art; and (4) where in evidence, so-called secondary considerations. *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17–18 (1966).

D. Ground 1: Obviousness over Fraser’s Fused Embodiment

Petitioner contends that claims 1, 10, 13, 14, 21, 22, and 29 are unpatentable under 35 U.S.C. § 103 in view of Fraser’s “fused implant embodiment” and the knowledge of a POSITA. Pet. 23. Fraser discloses at least two embodiments, and Petitioner relies on the fused implant embodiment under this ground. *See id.*

1. Fraser (Ex. 1007)

Fraser describes its invention as “an implantable structure for promoting fusion of adjacent vertebral bodies.” Ex. 1007, 1:14–16. Figures 1 and 2 are reproduced below:

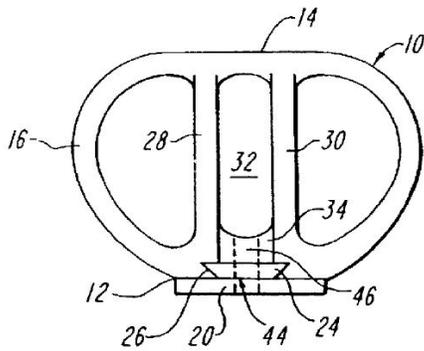


FIG. 1

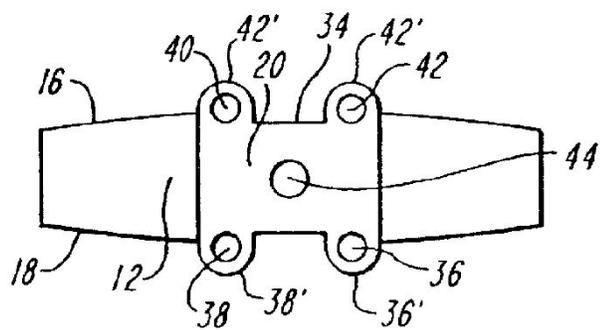


FIG. 2

Figure 1 is a “plan view of a fusion cage” and Figure 2 is a “view of the anterior face of the fusion cage” of Figure 1. *Id.* at 1:62–65. The depicted “cage” includes body 10, which, in turn, “includes an anterior face 12, a posterior face 14, a superior face 16, and an inferior face 18.” *Id.* at

2:23–27. “The cage further includes a plate 20 that is matable with the body 10.” *Id.* at 2:34–35. Fraser discloses that “[a]lthough the plate 20 can be bonded firmly to the body 10 so that the plate and body cannot move with respect to each other, they can also be mated to allow movement with respect to each other.” *Id.* at 2:43–46. Figure 2 shows bone screw holes 36, 38, 40, and 42. *Id.* at 2:67–3:2. Figures 3 and 8 are reproduced below:

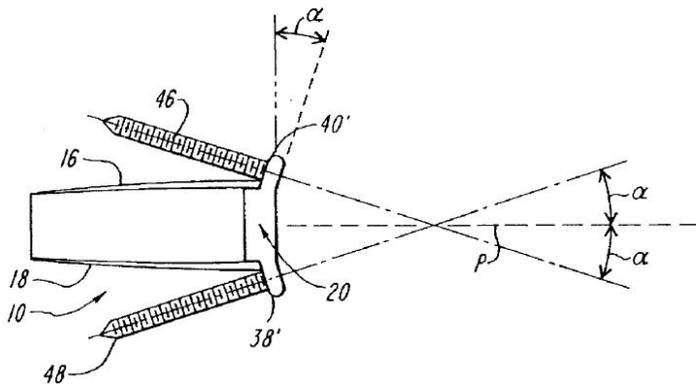


FIG. 3

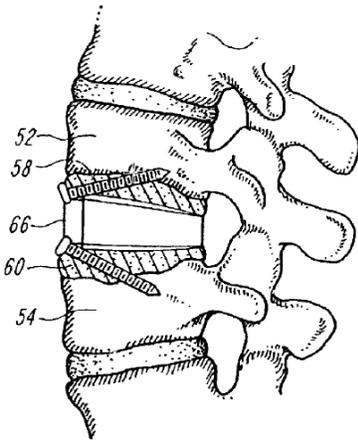


FIG. 8

Figure 3, shown on the left, is “a side view of the fusion cage of [Figure] 1 with bone screws” inserted and Figure 8 “depicts a portion of the spine following placement of the fusion cage” of Figure 1. *Id.* at 1:66–67, 2:9–10. Figure 8, reproduced on the right, depicts “portions of the vertebral bodies are shown cut-away to illustrate the penetration of the bone screws 58 and 60 into the bodies.” *Id.* at 4:13–15. Fraser discloses:

Prior to inserting a fusion cage between vertebral bodies, the space bounded by the body 10 and transverse elements 28 and 30 (if included) can be filled with autograft or allograft bone, or demineralized bone matrix (DBM) to promote fusion. Over a period of about three months the vertebral bodies fuse.

Id. at 4:38–43.

Fraser discloses an embodiment in which plate 20 is bonded with body 10 (referred to as the “fused” embodiment) and an embodiment in which the plate 20 can slide relative to body 10 (referred to as the “two-piece” embodiment). *See id.* at 2:43–50.

2. *Independent Claim 1*

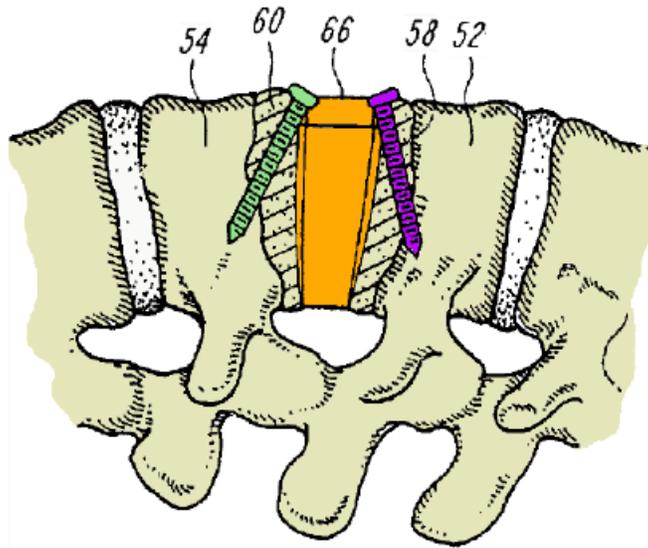
We address the claim limitations using Petitioner’s nomenclature as identified above. *See supra* Part I.C.

a) *Element 1 (Preamble)*

Petitioner submits that the preamble is not limiting, as it does not breathe life or meaning into the claim. Pet. 23. Nevertheless, Petitioner submits that Fraser discloses this recitation, quoting the abstract, which states, “[a] spinal fixation assembly [that] includes a fusion cage to which a plate is mated.” *See id.* at 24.

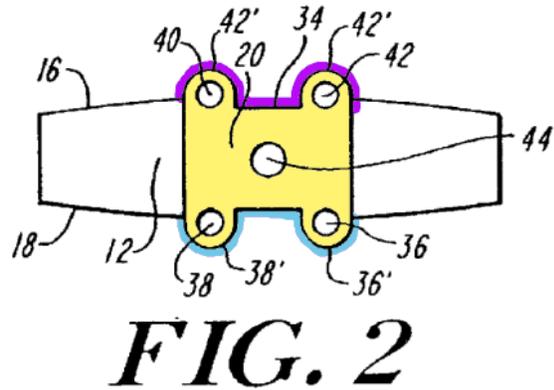
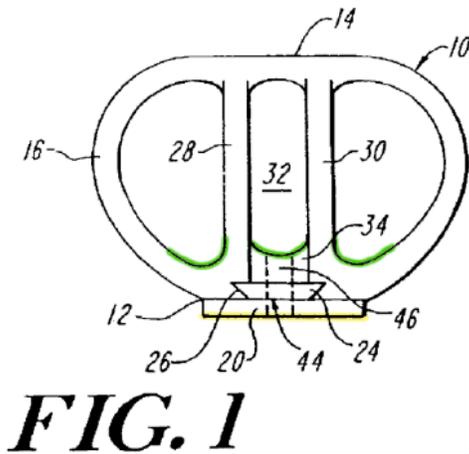
b) *Element 1a – Base Plate*

Petitioner submits that the “fused implant embodiment” described in Fraser discloses a “base plate” as claimed. *See* Pet. 24–25. To support this assertion, Petitioner submits an annotated version of Figure 8 of Fraser (*id.* at 25), which we reproduce, below:



According to Petitioner, and as shown above in annotated Figure 8, Fraser discloses fixation plate 66, illustrated in orange, for fusing adjacent vertebrae. *See id.* Petitioner submits that the plate “is configured to receive, retain and orient bone screws, thereby holding the fusion cage and adjacent vertebral bodies in a stable relationship to promote fusion.” *Id.* (quoting Ex. 1007, 1:36–42; citing Ex. 1005 ¶ 70).

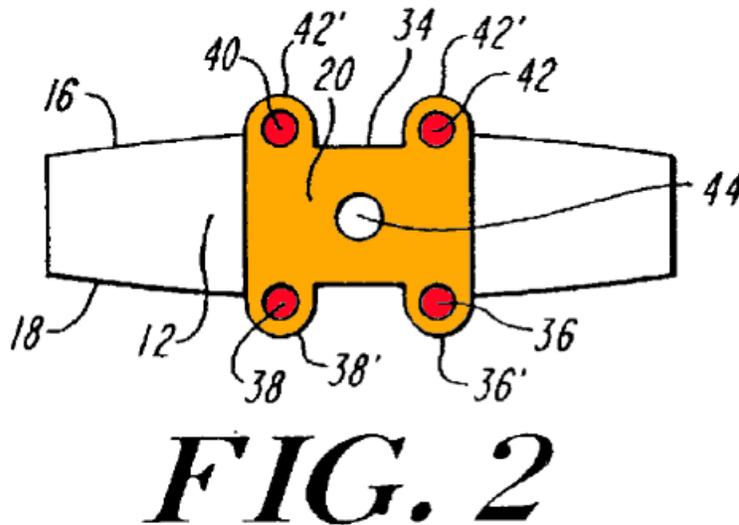
As to the base plate “having a top surface, first and second ends, [and] a bottom surface,” Petitioner submits an annotated version of Fraser’s Figures 1 and 2 (*id.* at 27), which we reproduce below:



Fraser '106, Ex.1007, Figs. 1-2

According to Petitioner, Fraser discloses a base plate with a top surface (yellow), first end (blue, shown at bottom of Figure 2), second end (purple, shown at top of Figure 2), and a bottom surface (green, shown within the cavities of body 10 in Figure 1). *See id.*

As to the claimed base plate having “a plurality of bone screw holes,” Petitioner submits an annotated version of Fraser’s Figure 2 (Pet. 29), which we reproduce, below:

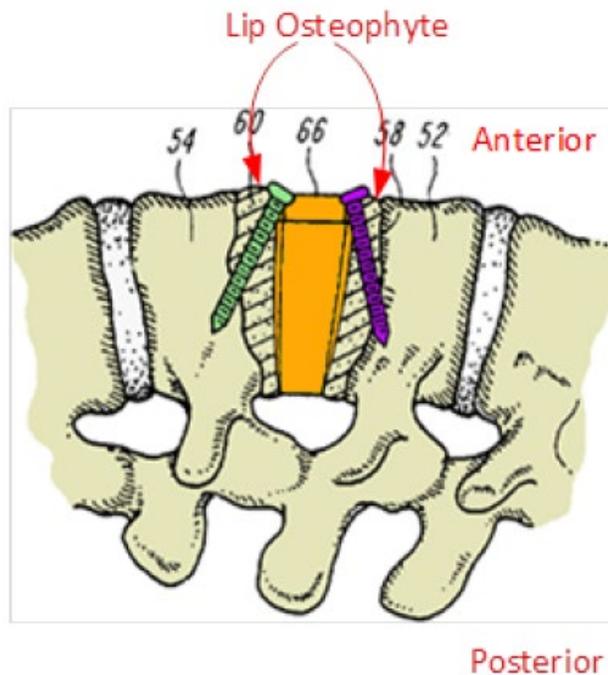


Fraser '106, Ex.1007, Fig.2

Figure 2 “is a view of the anterior face of the fusion cage of” Figure 1. Ex. 1007, 1:64–65. According to Petitioner, four bone screw holes are depicted in red. Pet. 28.

c) *Element 1b – Base Plate Fit*

In addressing “wherein the base plate is configured to fit primarily between anterior portions of adjacent vertebral bones’ lip osteophytes,” Petitioner submits an annotated version of Fraser’s Figure 8 (Pet. 30), which we reproduce below:

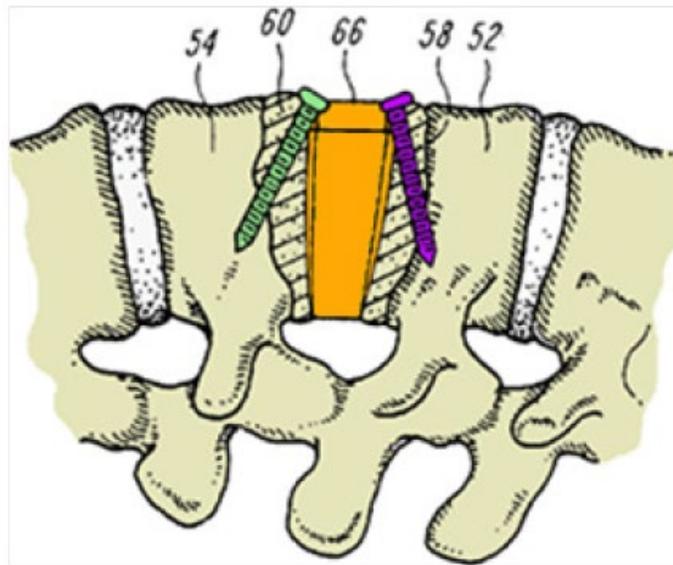


Petitioner submits that this annotated figure shows that the “cage includes a body that approximates the shape and size of the annulus portion of a disk which normally separates two vertebral bodies.” *See id.* (quoting Ex. 1007, 2:21–23). Mr. Sherman testifies that Fraser “explicitly teaches it is important for the implant to sit flush with, or recessed below, the anterior

surface of the vertebrae.” Ex. 1005 ¶ 84 (citing Ex. 1007, 4:16–19). Fraser discloses, “It is important to note that screw heads 62 and 64 are flush or sub-flush with the anterior face surface 66 of the fusion cage, thus minimizing the likelihood that major blood vessels running along the spine will be injured.” Ex. 1007, 4:15–19.

d) *Element 1c – Bone Screws*

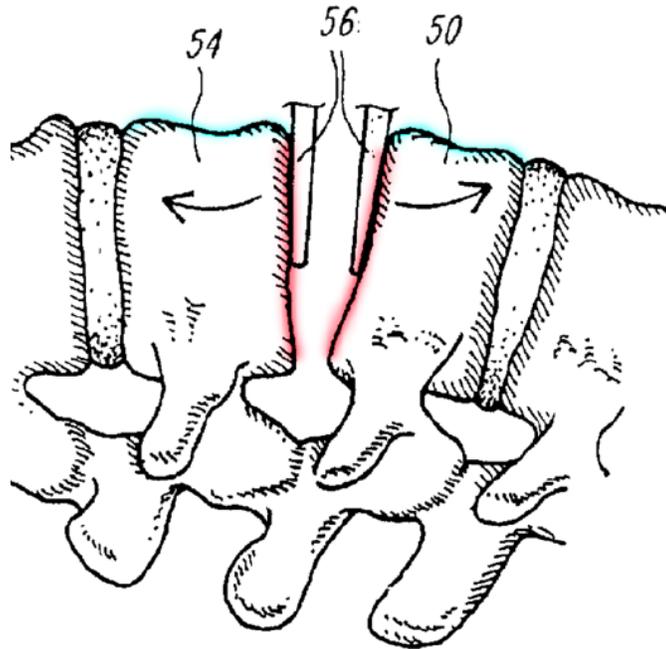
Claim 1 recites, “a plurality of bone screws configured to fit in the plurality of bone screw holes.” Ex. 1002, 38:6–7. Petitioner asserts that Fraser discloses this limitation, submitting an annotated version of Figure 8 (Pet. 34), which we reproduce, below:



According to Petitioner, and as shown in the above figure, Fraser discloses bone screws 58 (purple), 60 (green) disposed in bone screw holes of Fraser’s plate (orange). *See id.*

e) *Element 1d – Vertebral Bones*

Claim 1 recites, “wherein the vertebral bones have top surfaces and have side surfaces generally facing each other.” Ex. 1002, 38:8–9. Petitioner submits that Fraser discloses this limitation, submitting an annotated version of Figure 7 (Pet. 35), which we reproduce, below:



Fraser '106, Ex.1007, Fig.7

As shown in the annotated version of Figure 7 above, and according to Petitioner, Fraser discloses adjacent vertebral bodies 54, 50, each having a top surface (shown in blue) and a side surface (shown in red). *Id.*

f) *Element 1e – First Bone Screw Hole - Side Surface*

Claim 1 requires “a first of the bone screw holes . . . extends at least partially from the top surface of the base plate and opens at least partially toward the side surface of a first of the vertebral bones.” Ex. 1002, 38:10–14. Petitioner submits that Fraser discloses this limitation. Pet. 36.

Petitioner provides an annotated version of Fraser's Figure 3 (*id.* at 37) and Figure 8 (*id.* at 36), which we reproduce below:

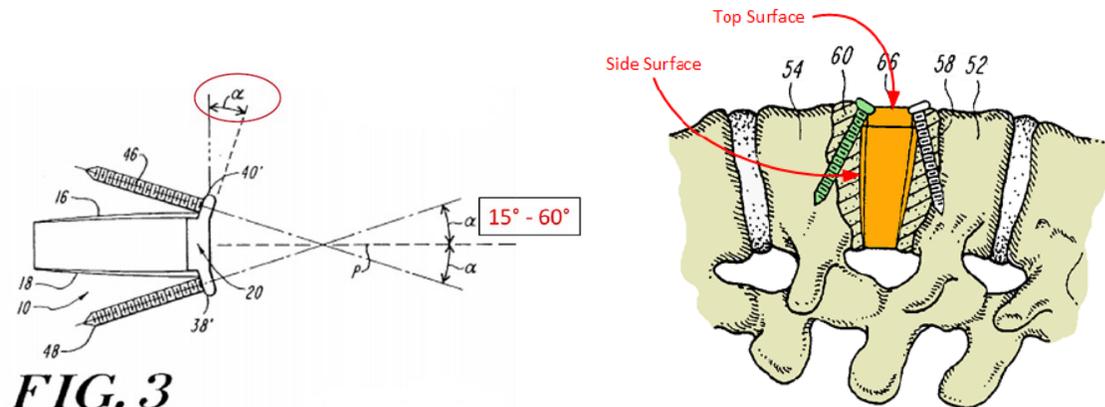


FIG. 3

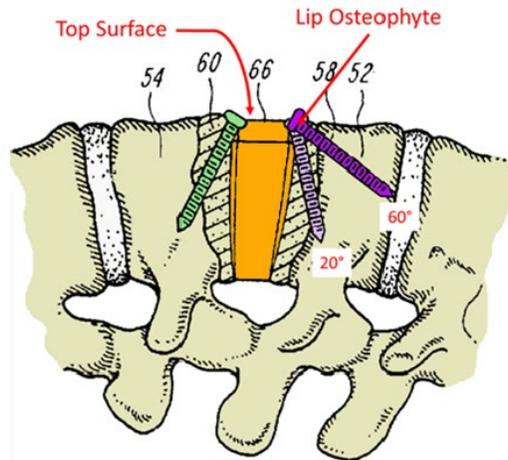
As shown above in annotated Figures 3 (left) and 8 (right), Fraser discloses first bone screw 46 (green in Figure 8) disposed through a hole within plate 20 and toward the side surface of first vertebral bone 54. *See id.* (citing Ex. 1007, 3:13–17; Ex. 1005 ¶ 95). Petitioner further submits that Fraser teaches that the angle of insertion (α) may range from 15° to 60°. *Id.* at 36–37 (citing Ex. 1007, 3:24–28; Ex. 1005 ¶ 96). Petitioner relies on this range of screw angles in addressing the next limitation, “lip osteophyte.” *See id.* at 38.

g) Element 1f – Second Bone Screw Hole - Lip Osteophyte

Claim 1 recites “a second of the bone screw holes . . . extends at least partially from the top surface of the base plate and opens at least partially toward the lip osteophyte of a second of the vertebral bones.” Ex. 1002, 38:15–19.

Petitioner submits that Fraser’s teaching of screw angles between 15° to 60° include screw holes that would “open toward the side surface of the vertebrae or a steep angle to open toward the lip osteophyte.” Pet. 38

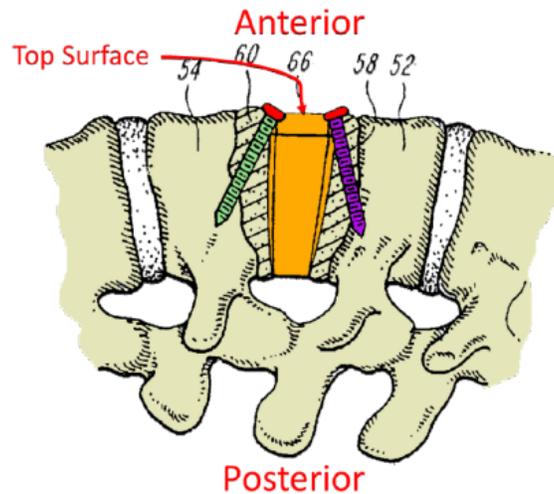
(emphasis added). Petitioner submits that Fraser “discloses this claim limitation.” *Id.* at 39. Petitioner also submits an annotated version of Figure 8 (*id.*), which we reproduce, below:



According to Petitioner, and as shown above, annotated Figure 8 depicts a bone screw (in dark purple) that extends at “a steep angle to open toward the lip osteophyte.” *See id.* Petitioner also submits that it would have been obvious for a POSITA “to perform routine experimentation and optimization to choose the most suitable angle for each hole based on any particular patient or set of patients.” *Id.* (citing Ex. 1005 ¶ 101).

h) Element 1g – Bone Screw Orientation

Petitioner submits that Fraser discloses, “wherein each and every one of the plurality of bone screw holes is configured to receive one of the bone screws angled relative to the base plate and oriented generally in an anterior-posterior direction through at least partially the top surface of the base plate.” Pet. 40. Petitioner provides an annotated version of Fraser’s Figure 8 (*id.*), which we reproduce, below:



According to Petitioner, and as shown above in the annotated version of Figure 8, Fraser discloses bone screw holes that are angled relative to the top surface of the base plate and face the posterior direction. *Id.*

i) Analysis of Independent Claim 1

Patent Owner argues that Fraser’s “base plate” is not “configured to fit *primarily* between anterior portions of adjacent vertebral bones’ lip osteophytes,” as recited in the claim. *See* PO Resp. 31 (emphasis added). In support of its position, Patent Owner submits an annotated version of Fraser’s Figure 1 along with a “[s]implified plan view of anterior and posterior portions of lip osteophytes” (*id.* at 36), which we reproduce, below:

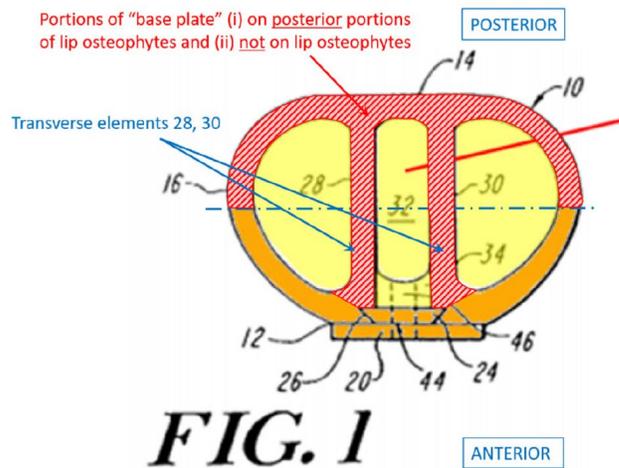
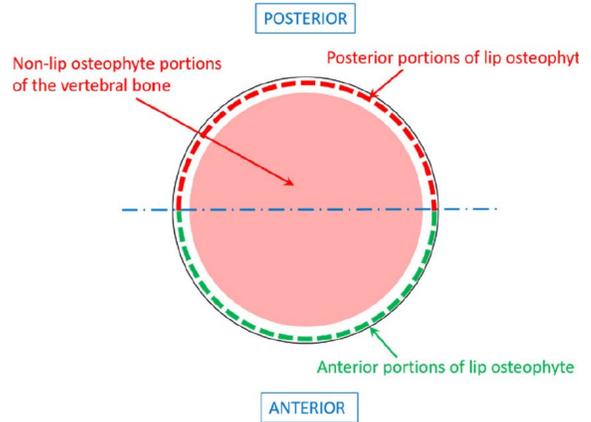


FIG. 1

See Pet. at 26 (additional annotations added to Fraser '106, Fig. 1)



Simplified plan view of anterior and posterior portions of lip osteophytes

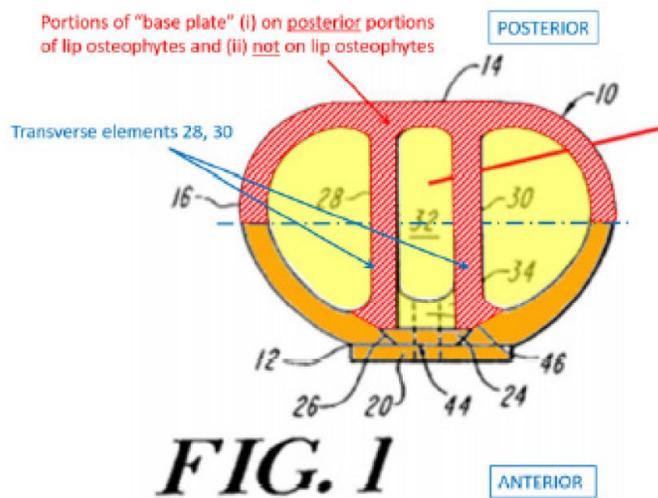
Above and to the left is an annotated version of Fraser's Figure 1, which "is a plan view of a fusion cage." Ex. 1007, 1:61–62. Above and to the right is a simplified plan view of anterior and posterior portions of lip osteophytes. PO Resp. 36. Patent Owner explains that Fraser's fused implant "would have essentially equal portions of its outer, ring-shaped walls sitting between the anterior and posterior portions of the vertebral bones' lip osteophytes, respectively." *Id.* (citing Ex. 2006 ¶ 94). Patent Owner's expert testifies that a POSITA, "even considering just the outer walls alone, would have recognized that [Fraser's] fused implant does not primarily or mainly sit between the anterior portions of the lip osteophytes." Ex. 2006 ¶ 94 (emphasis omitted).

In response to Patent Owner's argument, Petitioner contends that Patent Owner is wrong for two reasons. Pet. Reply 18.

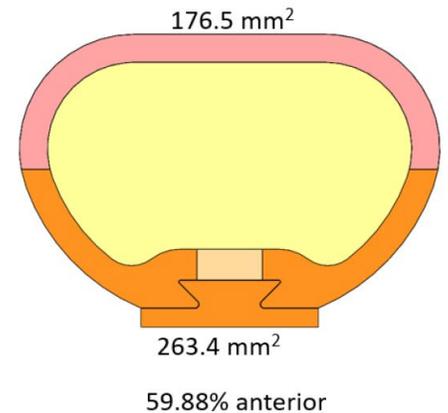
First, Petitioner contends that Patent Owner's "interpretation of the limitation is incorrect," and that the "limitation requires the base plate to be implanted between the lip osteophytes (*i.e.*, viewed laterally from a side-view)." *Id.*

As explained above, we disagree that Patent Owner's claim construction is incorrect. *See supra* Part II.B.1. The claim does not simply require that the base plate be configured to be implanted between lip osteophytes, when viewed laterally, as Petitioner contends. *See* Pet. Reply 18. Rather, claim 1 recites, "wherein the base plate is configured to fit *primarily* between the anterior portions of adjacent vertebral bones' lip osteophytes." Ex. 1002, 38:1–3 (emphasis added). We agree with Patent Owner that Petitioner's proposed definition ignores the term "primarily." PO Sur-reply 13. Petitioner's interpretation of the limitation renders the term *primarily* superfluous. *See Bicon*, 441 F.3d at 950 ("[C]laims are interpreted with an eye toward giving effect to all terms in the claim."); *see also Stumbo*, 508 F.3d at 1362 (denouncing claim constructions that render phrases in claims superfluous); *see also Merck*, 395 F.3d at 1372 (rejecting a proposed claim construction that would render claim terms superfluous). As we construed it above, the term *primarily* means *mainly*, and requires that a majority of Fraser's base plate be configured to fit between the anterior portions of adjacent vertebral bones' lip osteophytes to satisfy the claim. *See supra* Part II.B.1.

Second, Petitioner argues that even if "the claims require the base plate to be primarily (*i.e.*, more than 50%) within the 'green' area of a bone (as viewed in the superior/inferior direction), Fraser's base plate meets the definition." Pet. Reply 19; *see also supra* p. 30 (reproducing Patent Owner's annotated figures of the anterior and posterior portions of lip osteophytes). In support of this argument, Petitioner submits the following annotated and modified versions of Fraser's Figure 1 (Pet. Reply 20), which we reproduce, below:



**PO Annotations to
Fraser, Fig.1 (POR, 36)**



Modified Fraser, Fig.1

As shown in the annotated and modified figures above, the orange portions of the fusion cage represent the portions that allegedly fit between the anterior portions of adjacent lip osteophytes, whereas the red (or pink) portions of the fusion cage represent the portions of the cage that allegedly fit outside of the anterior portions of the lip osteophytes. Petitioner asserts that “Fraser’s transverse elements 28 and 30 are optional” and “[w]ithout these elements, *sixty percent* of the implant is between the anterior portions of the lip osteophytes,” as shown in the annotated figure to the right. See Pet. Reply 20 (emphasis added).

Petitioner’s second argument is not persuasive for at least two reasons.

First, Petitioner’s argument is untimely. “Unlike district court litigation—where parties have greater freedom to revise and develop their arguments over time and in response to newly discovered material—the expedited nature of [*inter partes* reviews] bring with it an obligation for

petitioners to make their case in their petition to institute.” *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1369 (Fed. Cir. 2016). As participants in an adjudication under the Administrative Procedure Act, parties in an *inter partes* review must be given notice of the “matters of fact and law asserted,” and the opportunity to meaningfully respond. *See Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1080 (Fed. Cir. 2015). For this reason, Petitioner may not assert, and we may not base our Final Written Decision on, late-arising factual assertions or theories. *See Dell Inc. v. Accelaron, LLC*, 818 F.3d 1293, 1301 (Fed. Cir. 2016).

In addressing the disputed limitation, the Petition did not rely on Fraser’s embodiment in which transverse elements 28, 30 are omitted. *See* Pet. 29–32; *see also* PO Sur-reply 12 (“Petitioners cannot cure their failure to provide in the Petition ‘in writing and with particularity’ an explanation as to how the fused implant embodiment that they relied upon (*i.e.*, having transverse elements 28, 30) purportedly satisfies this limitation by arguing that a ***different implant*** (*i.e.*, without transverse elements 28, 30) would satisfy this limitation in their Reply instead.”). As such, Petitioner’s new theory in its Reply that relies on Fraser’s embodiment that omits transverse elements 28, 30 is untimely. *See Dell*, 818 F.3d at 1301.

Second, even considering Petitioner’s argument, we are not persuaded by Petitioner’s calculation that 60% of Fraser’s fused implant is configured to fit between the anterior portions of adjacent lip osteophytes. *See* Pet. Reply 20 (“Without [transverse elements 28, 30], sixty percent of the implant is between the anterior portions of the lip osteophytes.”). Rather, we agree with Patent Owner that Petitioner’s calculation is based on unreliable speculation. *See* PO Sur-reply 14 (“Petitioner[’s] speculation regarding the

form of such an implant is unsupported and insufficient”). Importantly, Fraser does not disclose or describe the shape of its implant without transverse elements 28, 30. Moreover, we are not persuaded that the specific embodiment relied upon by Mr. Sherman would have the shape presented in his testimony. *See* Ex. 1005 ¶ 91; *see also supra* p. 32 (reproducing the same figure). Like Patent Owner, we are skeptical of Petitioner’s “assumptions regarding the size and shape of the *bump out* on the anterior face of body 10” as well as Petitioner’s “assumption that all such structure on the anterior portions of body 10 and on plate 20 would sit between lip osteophyte portions of the vertebral bones, as opposed to non-lip osteophyte portions of the bones or outside the bones.” PO Sur-reply 14–15 (emphasis added). As such, Petitioner has failed to establish, by a preponderance of the evidence, that Fraser’s fused implant embodiment—even without transverse elements 28, 30—would be “configured to fit *primarily* between anterior portions of adjacent vertebral bones’ lip osteophytes,” as required by claim 1. Ex. 1002, 38:1–3 (emphasis added).

For the foregoing reasons, Petitioner has failed to prove by a preponderance of the evidence that claim 1 is unpatentable over Fraser’s fused implant embodiment.

3. *Claims 10, 13, 14, 21, 22, and 29*

Like independent claim 1, independent claim 21 similarly recites, “a base plate . . . configured to fit primarily between an anterior portion of the first bone’s lip osteophyte and an anterior portion of the second bone’s lip osteophyte while bearing weight.” Ex. 1002, 39:52–40:5. As with claim 1, Petitioner relies on the same unsupportable assertion that Fraser’s fused implant embodiment satisfies this limitation. *See* Pet. 45–46 (relying on the

analysis of independent claim 1 in setting forth its challenge of independent claim 21). Accordingly, Petitioner’s challenge of independent claim 21 fails for the same reasons as Petitioner’s challenge of independent claim 1.

Claims 10, 13, 14, 22, and 29 depend from either claim 1 or 21 (Ex. 1002, 38:51–40:53), and Petitioner’s challenge to these claims inherits the same infirmity as its challenge under claim 1 (*see* Pet. 41–51). For the same reasons that Petitioner has failed to prove by a preponderance of the evidence that Fraser’s fused implant embodiment, i.e., Petitioner’s alleged “base plate,” “is configured to fit primarily between anterior portions of adjacent vertebral bones’ lip osteophytes,” Petitioner has failed to prove that dependent claims 10, 13, 14, 22, and 29 are unpatentable over Fraser’s fused implant embodiment.

Further, we discuss below an *additional* reason that Petitioner has not demonstrated by a preponderance of the evidence that dependent claim 10 would have been obvious based on Fraser’s fused implant embodiment.

Claim 10 depends from claim 1 and further recites, “wherein the base plate includes two lateral tabs” Ex. 1002, 38:51–52. In addressing this limitation, Petitioner submits the following annotated version of Fraser’s Figure 1 (Pet. 42):

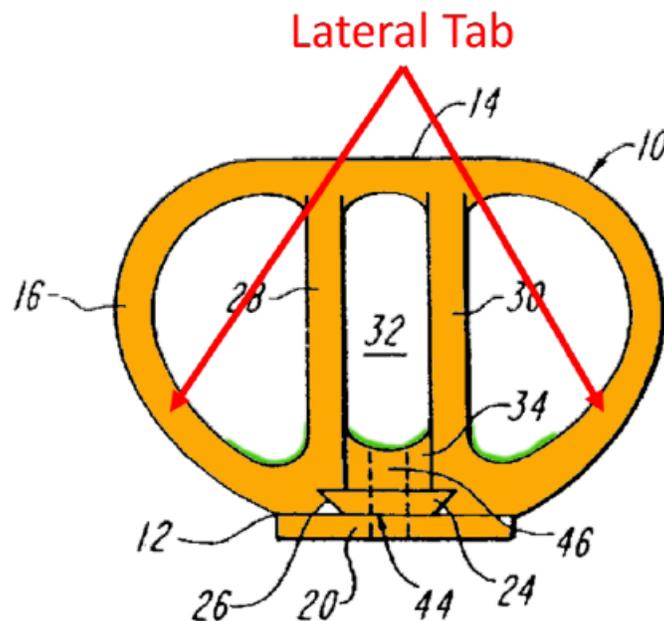


FIG. 1
Fraser '106, Ex.1007, Fig.1

Figure 1 is a plan view of Fraser's fusion cage. Ex. 1007, 1:61–62.

Petitioner submits that this figure depicts “two lateral tabs that extend from opposite ends of the bottom surface (green) of the base plate.” Pet. 42.

Patent Owner disputes Petitioner's contention, arguing that Petitioner “improperly conflates a ‘tab’—i.e., a projection, flap, or short strip attached to an object—with the side(s) of an object.” PO Resp. 72 (citing Ex. 2006 ¶¶ 145–46).

We agree with Patent Owner. Petitioner fails to show that Fraser's fused implant embodiment includes the claimed “tabs.” See Pet. 41–43; see also Pet. Reply 23–24. The portions of Fraser's fusion cage that Petitioner identifies as “tabs” are instead contiguous sides of Fraser's implant. See Ex. 1007, Fig. 1. We disagree with Petitioner's contention that these structures are “tabs.”

Rather, we agree with Mr. Drewry’s testimony that a “tab” is a “projection, flap, or short strip attached to an object.” *See* Ex. 2006 ¶ 146. Mr. Drewry’s definition is consistent with the Specification of the ’537 patent, which describes embodiments having lateral tabs as projections that extend from opposite sides of the bottom surface of a base plate. *See, e.g.*, Ex. 1002, Figs. 1, 2; *see also id.* at 10:62–65 (“[B]ase plate 20 further includes a pair of lateral tabs integrally formed with the primary member 21 and extending outwardly from opposite ends of the bottom surface 26 of the primary member . . .”). We credit Mr. Drewry’s testimony that Petitioner fails to “explain why [Fraser’s] contiguous sides of the fused implant embodiment are ‘tabs’ under a proper understanding of this term.” Ex. 2006 ¶ 147.

4. *Summary of Ground 1*

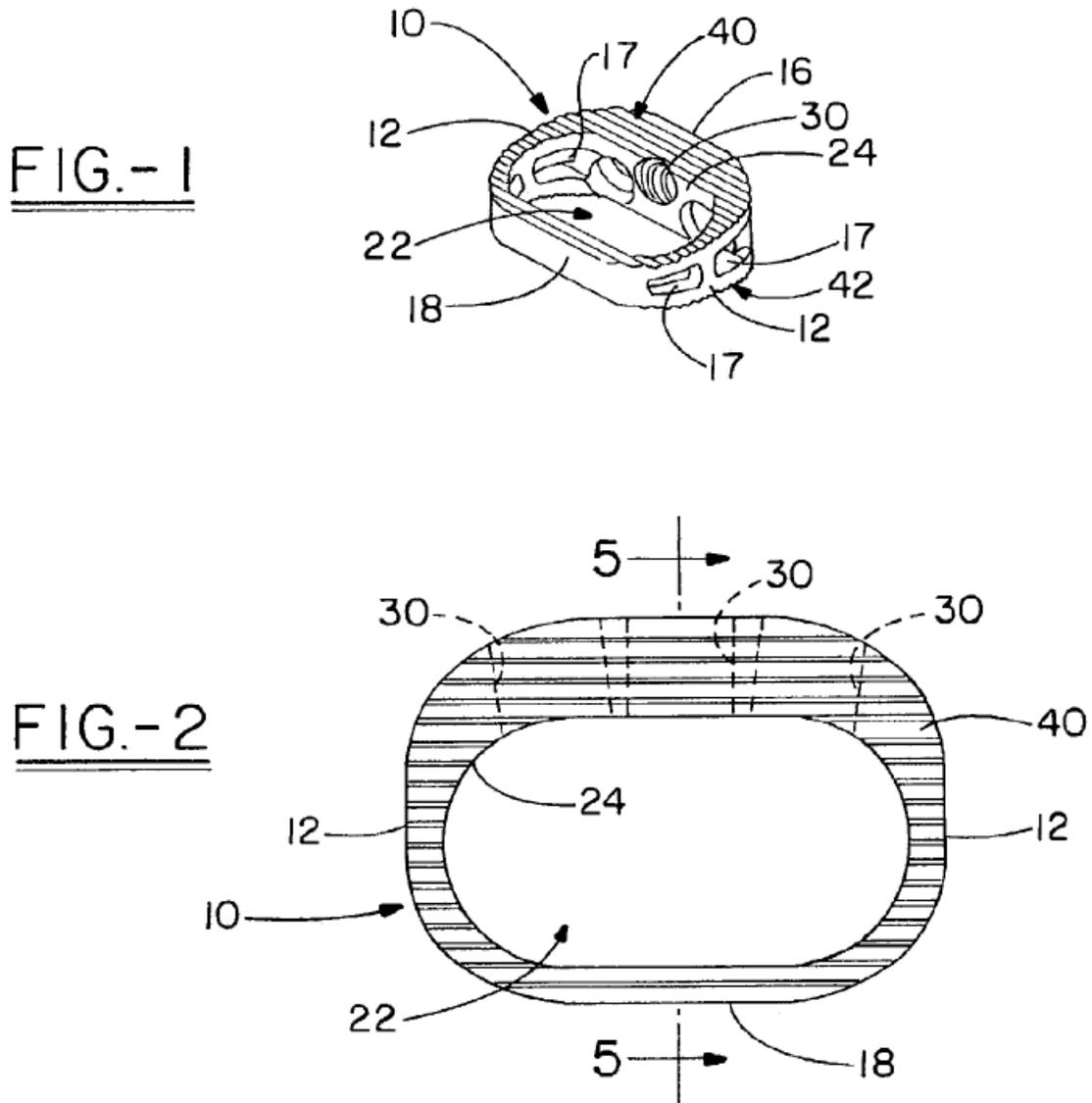
Based on the foregoing, Petitioner has failed to prove by a preponderance of the evidence that claims 1, 10, 13, 14, 21, 22, and 29 are unpatentable over Fraser’s fused implant embodiment.

E. Ground 2: Obviousness over Fraser (Fused Embodiment) and Byrd

Petitioner contends that claims 3, 15, and 19 are unpatentable under 35 U.S.C. § 103 in view of Fraser’s “fused implant embodiment” in view of Byrd. Pet. 51.

1. *Byrd (Ex. 1008)*

Byrd discloses a “vertebral cage . . . for use in preserving the space between adjacent vertebral during the process of spinal fusion.” Ex. 1008, code (57). We reproduce Figures 1 and 2 of Byrd, below:



According to Byrd, Figure 1 depicts a top perspective view of Byrd’s vertebral cage and Figure 2 depicts a top view of that cage. *Id.* at 4:62–64.

2. *Analysis*

Like independent claim 1, independent claim 15 requires a “base plate [that] is configured to fit primarily between anterior portions of the bone bodies’ lip osteophytes.” Ex. 1002, 39:7–14. Petitioner does not rely on Byrd to address Fraser’s shortcomings, discussed above. *See* Pet. 57. Rather, and just as with independent claim 1, Petitioner submits that Fraser’s fused implant embodiment meets this limitation. *See id.* (“This element is analogous in scope to elements recited in claim 1, and is disclosed by Fraser . . .”). As such, for the same reasons that Petitioner’s challenge of independent claim 1 fails, Petitioner’s challenge of independent claim 15 also fails.

Claims 3 and 19 depend from independent claims 1 and 15, respectively. *See* Ex. 1002, 38:28–29, 39:38–41. Petitioner’s challenge of claims 3 and 19 inherits the same infirmity as its challenge of independent claims 1 and 15. *See* Pet. 51–54, 63–65.

For the same reasons that Petitioner has failed to prove by a preponderance of the evidence that Fraser’s fused implant embodiment, i.e., Petitioner’s alleged “base plate,” “is configured to fit primarily between anterior portions of adjacent vertebral bones’ lip osteophytes,” Petitioner has failed to prove that claims 3, 15, and 19 are unpatentable over Fraser’s fused implant embodiment in view of Byrd.

F. Ground 3: Obviousness over Fraser’s Two-Piece Embodiment

Petitioner asserts that claims 1–3, 8–16, 19–23, 25–27, and 29 are unpatentable under 35 U.S.C. § 103 in view of Fraser’s two-piece embodiment and the knowledge of a POSITA. Pet. 65, 66. As distinguished from Fraser’s fused embodiment, in which plate 20 is bonded with body 10,

Fraser's two-piece embodiment is structured so that plate 20 can slide relative to body 10. *See* Ex. 1007, 2:43–50.

1. *Petitioner's Challenge of Independent Claim 1*

In addressing the claimed “base plate,” Petitioner submits annotated versions of Figures 1 and 2 of Fraser (Pet. 68), which we reproduce, below:

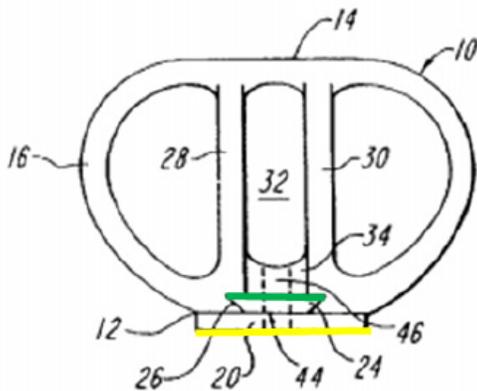


FIG. 1

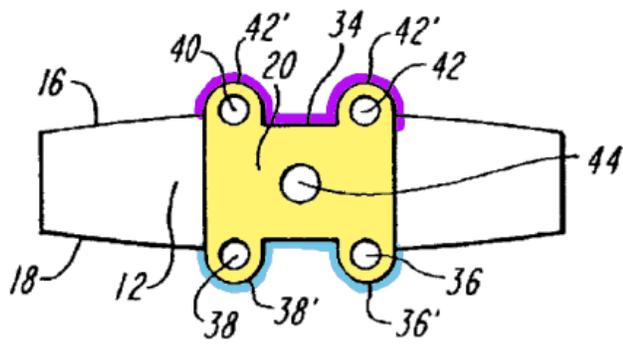
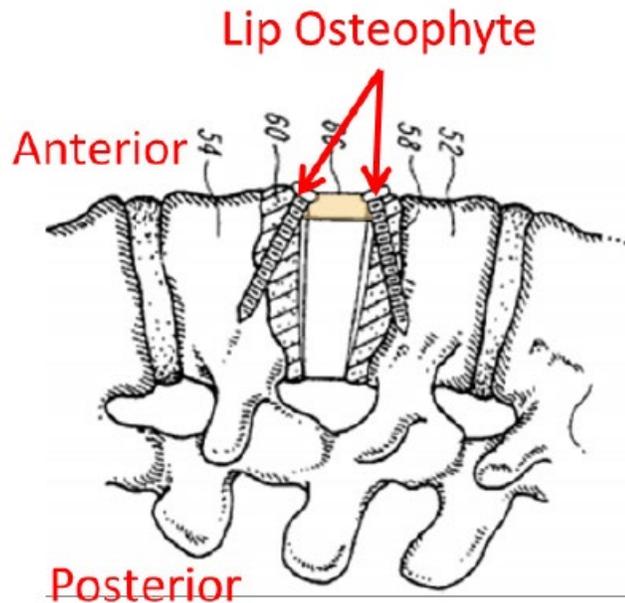


FIG. 2

According to Petitioner, Fraser depicts that plate 20 and body 10 are distinct, and not bonded. *Id.* at 67. In this two-piece embodiment, plate 20 has a top surface (yellow), a first end (blue), a second end (purple), and a bottom surface (green). *Id.* at 68.

To address the claimed “base plate is configured to fit primarily between anterior portions of adjacent vertebral bones’ lip osteophytes to bear weight and hold the vertebral bones while sharing weight with bone graft material,” Petitioner submits an annotated version of Figure 8 of Fraser (*id.* at 70), which we reproduce, below:



According to Petitioner, Fraser discloses that “the plate and its screws are designed to sit flush with anterior surface 66, which is within the cavity between the bones that was previously occupied by the disk.” *Id.*

Petitioner also submits that

[a] POSITA would further understand that when the bone screws engage each of the vertebral bodies, those screws would place a compressive load on the bone graft material and promote fusion between the bones. As such, a POSITA would understand that Fraser discloses that the base plate shares weight with bone graft material for fusion.

Finally, Fraser teaches a base plate that holds the bones. Fraser teaches that its “plate is configured to receive, retain and orient bone screws, thereby **holding the fusion cage and adjacent vertebral bodies in a stable relationship to promote fusion.**”

Therefore, Fraser in view of the knowledge of a POSITA renders the claim limitation “the base plate is configured to fit primarily between anterior portions of adjacent vertebral bones’

lip osteophytes to bear weight to hold the vertebral bones while sharing weight with bone graft material for fusion” obvious.

Id. at 71–72 (citing Ex. 1007, 4:37–42; Ex. 1005 ¶¶ 279, 280).

Patent Owner argues that Petitioner has “failed to show that [Fraser] discloses or suggests that plate 20 is configured to bear any weight when used as part of a spinal implant.” PO Resp. 47.

Patent Owner’s argument is persuasive.

As discussed above, giving the language of claim 1 its ordinary and customary meaning in light the Specification, we determine that, in order for the “base plate” to “bear weight,” the anterior portions of the adjacent lip osteophytes must apply a compressive force, due to gravity, to the base plate. *Supra* Part II.B.2.

Petitioner submits that plate 20 (of the two-piece implant of Fraser) bears weight because the “screws would place a *compressive load on the bone graft material.*” Pet. 71 (emphasis added); *see also* Ex. 1005 ¶¶ 278, 279 (testifying to the same). Petitioner’s assertions, even if true, fail to satisfy the claimed limitation.

The issue isn’t whether a compressive load is placed on the bone graft material, as Petitioner contends (*see* Pet. 71), but whether plate 20 bears a compressive stress from gravitational forces acting between adjacent lip osteophytes (*see supra* Part II.B.2). Furthermore, the express teachings of Fraser contradict Petitioner’s assertions as to the forces imparted on Fraser’s plate 20.

Fraser discloses that its body 10 (or fusion cage body) approximates the shape of the space between adjacent vertebral bodies to “provide an excellent, stable, load-bearing surface.” Ex. 1007, 4:49–52. Fraser further discloses that its “transverse elements 28 and 30 enhance the structural

integrity of the body 10 and provide additional load bearing surface.” *Id.* at 2:54–56 (emphasis added). Importantly, Fraser teaches that its *body 10* bears weight.

Turning to plate 20, rather than bearing weight, Fraser discloses that “[t]he plate, when included, ensures that the body [10] will not become dislodged from the spine.” *Id.* at 4:52–55. We credit Mr. Drewry’s testimony that Fraser teaches that plate 20 is not necessary, but when it is included, it is simply provided to prevent load-bearing body 10 from becoming dislodged. Ex. 2006 ¶ 116. Importantly, Fraser teaches that plate 20 simply keeps body 10 in place, and plate 20 does not bear weight. *See* Ex. 1007, 2:54–56, 4:52–55.

We also credit Mr. Drewry’s testimony that Figure 3 of Fraser further confirms that Fraser’s plate is not configured to bear weight. *See* Ex. 2006 ¶ 117. To illustrate, we reproduce an annotated version of Fraser’s Figure 3 (*id.*), below:

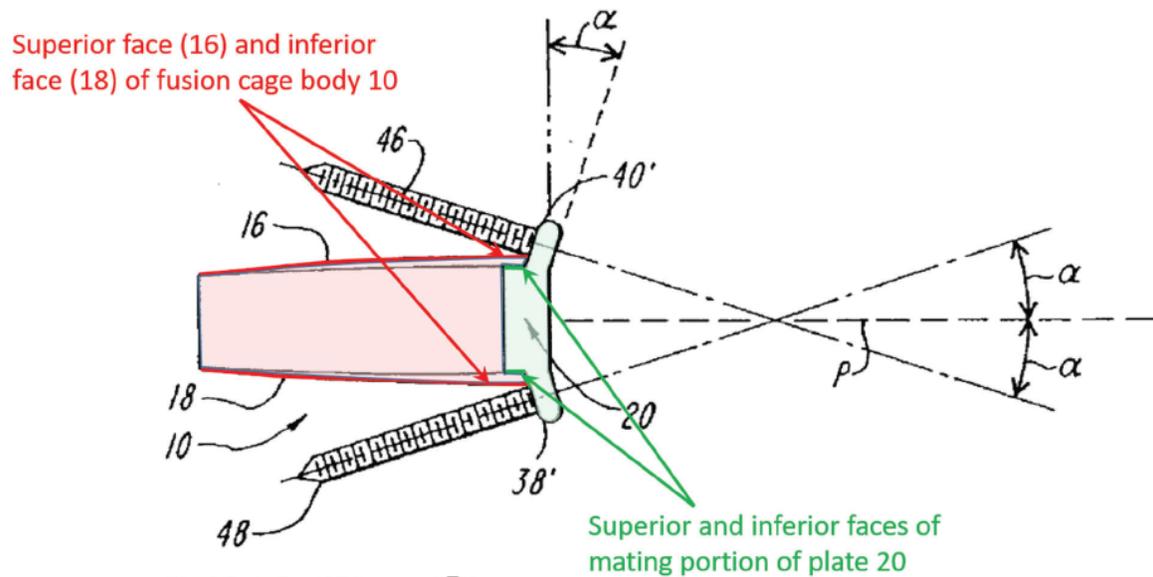


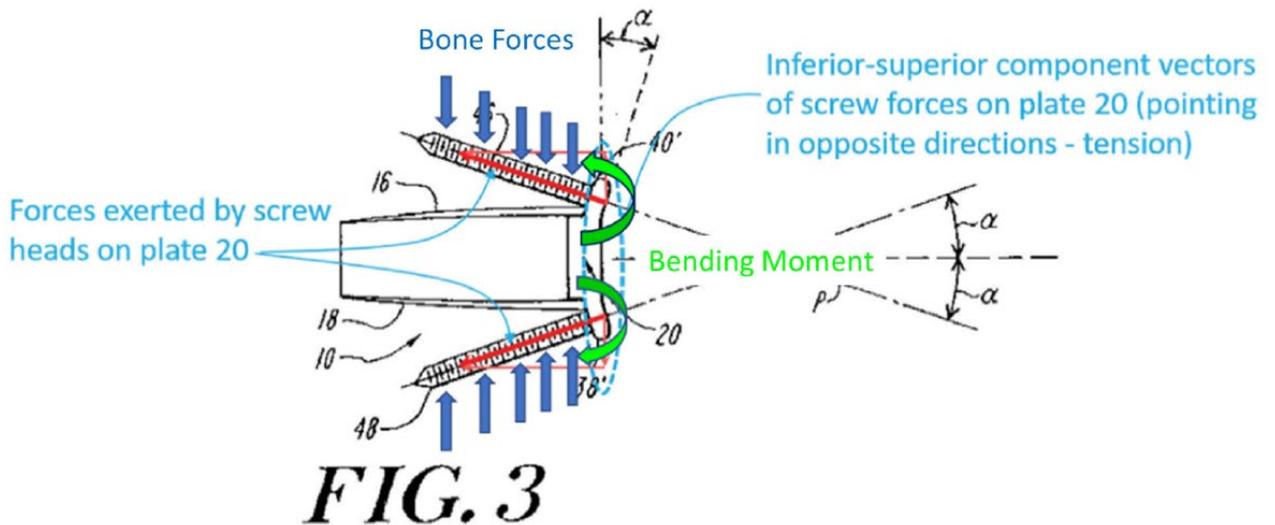
FIG. 3

Figure 3 depicts a side view of Fraser's fusion cage with bone screws. Ex. 1007, 1:66–67. Specifically, Figure 3 shows slightly convex inferior face surface 18 and slightly convex superior face surface 16 with a slightly tapered wedge profile, in which body 10 (shown in red) is thicker at the anterior location (on the right) than at the posterior location (on the left). *Id.* at 3:31–35. We credit Mr. Drewry's testimony that

Figure 3 demonstrates that the vertebral bones do not and cannot rest on plate 20; they rest only on body 10 when the implant is inserted between such vertebral bones. This arrangement depicted in Figure 3 further confirms the textual disclosure in [Fraser]—that the weight is borne exclusively by the fusion cage body 10 and that (optional) plate 20 is simply configured to keep the weight-bearing body 10 in place and ensure that it does not become dislodged from the spine. Plate 20 is not configured to bear weight itself.

Ex. 2006 ¶ 117 (citing Ex. 1007, 4:49–55).

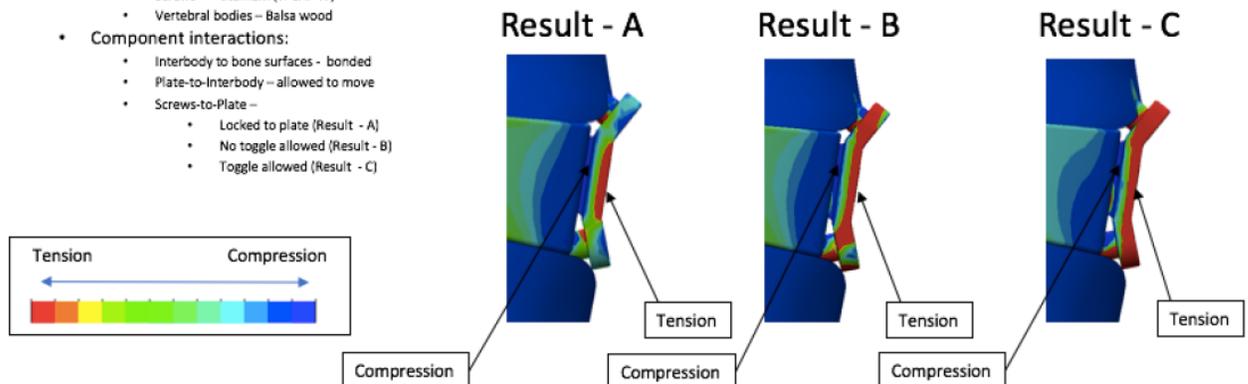
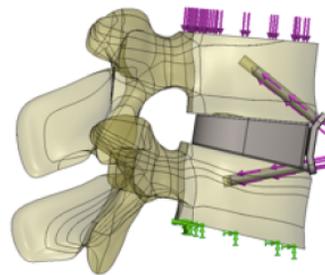
In its Reply, Petitioner submits an annotated version of Fraser's Figure 3 to illustrate how, precisely, Fraser's plate 20 bears weight. Pet. Reply 26. We reproduce that annotated figure, below:



Petitioner submits that annotated Figure 3 depicts bone screws 48 as imparting a *bending moment* on Fraser’s plate, as shown by the two green arrows. Ex. 1023 ¶ 110. Mr. Sherman submits that this “bending moment puts the anterior portion of the plate into tension and the posterior position of the plate into compression.” *Id.* Mr. Sherman further submits a finite element analysis (“FEA”) to support a finding that Fraser’s plate 20 bears weight under the Board’s construction. *See id.* ¶¶ 113–117. We reproduce a summary of Mr. Sherman’s FEA (*id.* ¶ 113), below:

Plate Stress Analysis

- Assumptions:
 - Loads and constraints:
 - Bottom surface of lower vertebral body – fixed in place
 - Top surface of upper vertebral body – force of 1000 Newtons downward
 - Screws – force of 100 Newtons each
 - Materials:
 - Interbody – titanium (Ti-6Al-4V)
 - Plate – titanium (Ti-6Al-4V)
 - Screws – titanium (Ti-6Al-4V)
 - Vertebral bodies – Balsa wood
 - Component interactions:
 - Interbody to bone surfaces - bonded
 - Plate-to-Interbody – allowed to move
 - Screws-to-Plate –
 - Locked to plate (Result - A)
 - No toggle allowed (Result - B)
 - Toggle allowed (Result - C)



As shown above, the FEA includes three different analyses: (1) Result A - in which the screws are bonded to the plate; (2) Result B – in which the screw cannot toggle but can slide in and out of the plate; and (3) Result C – in which the screws can toggle in the plate as well as slide in and out of the plate. *Id.* ¶ 114. As also shown above in blue, each of the “Results” depicts a portion of Fraser’s base plate exposed to compressive stress adjacent the bone-contacting face of the plate. *See id.* ¶ 115.

In response to the FEA, Patent Owner first argues that Petitioner’s new argument and evidence are untimely. *See* PO Sur-reply 18–19. Second, Patent Owner takes issue with Mr. Sherman’s FEA, asserting that he fails “to identify critical assumptions,” including “whether he accounted for Fraser’s teaching that the plate has ‘tabs [that] are flexible or readily bent with respect to the remainder of the plate 20.’” *Id.* at 22 (citing Pet. Reply 21) (emphasis omitted, alteration in original).

We agree with Patent Owner’s two arguments.

First, Petitioner’s alternative position that Fraser’s bone screws would impart a *bending moment* on Fraser’s plate is untimely.

As explained above in connection with Ground 1, unlike in district court litigation, where parties may freely revise and develop their arguments over time in response to newly discovered material, the expedited nature of *inter partes* reviews obligates petitioners to make their case in the petition. *See Intelligent Bio-Sys.*, 821 F.3d at 1369. Petitioner may not assert, and we may not base our Final Written Decision on, late-arising factual assertions or theories. *See Dell*, 818 F.3d at 1301.

In the present case, the Petition asserts that the bone “screws would place a *compressive load on the bone graft material*” and, because of this, a POSITA “would understand that [Fraser] discloses that the base plate shares weight with bone graft material for fusion.” Pet. 71 (emphasis added). The Petition does not contend that the bone screws impart a *bending moment* (with accompanying compressive stresses) or any compressive stress on the base plate, as Petitioner’s Reply now proposes. *Compare id.* at 71–72, with Pet. Reply 26–28. Furthermore, Petitioner does not submit the new bending moment theory in response to our preliminary claim construction. *See* Pet.

Reply 25–28; *see also id.* at 28 (disputing the Board’s preliminary construction and arguing that “Bearing Weight Means More Than Compression”). For at least this reason, we may not base our Final Written Decision on Petitioner’s late-arising theory that the bone screws would impart a *bending moment* resulting in compressive forces on the base plate. *See Dell*, 818 F.3d at 1301.

Second, we agree with Patent Owner that Mr. Sherman’s FEA fails to account for the fact that Fraser’s tabs are flexible, or “readily bent.” *See* PO Sur-reply 22 (citing Pet. Reply 21) (emphasis omitted).

Fraser discloses that in some of its embodiments, “the tabs are flexible or readily bent with respect to the remainder of the plate 20.” Ex. 1007, 3:29–30. Petitioner relies on the embodiment with “flexible or readily bent” tabs in its challenge, as well. *See, e.g.*, Pet. Reply 1, 21. In particular, Petitioner submits that “[w]hen the tabs are bent, the orientation, location, and angle of the screws change relative to the bone surface.” *Id.* at 1 (citing Ex. 1007, 3:29–30); *see also id.* at 21 (“Fraser states that the base plate includes ‘tabs [that] are flexible or readily bent with respect to the remainder of the plate.’” (citing Ex. 1007, 3:29–30) (emphasis omitted)). Yet, when we review Mr. Sherman’s FEA, the flexible tabs are not accounted for. *See* Ex. 1023 ¶¶ 109–114. Indeed, if we understand the tabs to be “readily bent,” we do not see how, exactly, the bending moment that Mr. Sherman testifies to would be present in plate 20. To Mr. Sherman’s credit, Fraser does not disclose what, exactly, it means to be “readily bent” or “flexible.” Fraser is a patent document, not an engineering specification, and it omits critical details necessary for preparing a meaningful FEA. For example, although Mr. Sherman assumes that Fraser’s plate is made of a particular titanium

alloy (Ti-6Al-4V) (Ex. 1023 ¶ 113) and Fraser more generally discloses that its plate is made of titanium or carbon fiber composites (Ex. 1007, 2:35–36), Fraser does not precisely disclose the dimensions or composition of the plate or tabs or otherwise explain how the tabs are “readily bent” or “flexible.” Absent such detail, we agree with Patent Owner that the FEA “is unsupported and unreliable.” PO Sur-reply 22.

As such, Petitioner has failed to prove by a preponderance of the evidence that claim 1 is unpatentable over Fraser’s two-piece embodiment.

2. *Independent Claims 15 and 21*

Independent claims 15 and 21 are similar to independent claim 1 in that they each require the base plate to bear weight. *See* Ex. 1002, 39:12–15 (claim 15 reciting, “base plate is configured . . . to primarily bear weight”); *see also id.* at 39:53–40:5 (claim 21 reciting, “base plate . . . configured to fit primarily between . . . while bearing weight”).

As with its challenge of claim 1, Petitioner relies on the same unsupported argument that Fraser’s plate 20 is configured to bear weight. *See* Pet. 76 (referencing the analysis of claim 1 in its challenge of claim 15); *see also id.* at 77 (referencing the analysis of claim 1 in its challenge of claim 21).

For the same reasons that Petitioner has failed to prove by a preponderance of the evidence that Petitioner’s alleged “base plate” of Fraser’s two-piece embodiment bears weight, Petitioner has failed to prove that independent claims 15 and 21 are unpatentable over Fraser’s two-piece embodiment.

3. *Dependent Claims 2, 3, 8–14, 16, 19, 20, 22, 23, 25–27, and 29*

Claims 2, 3, 8–14, 16, 19, 20, 22, 23, 25–27, and 29 depend from either claim 1, 15, or 21 (Ex. 1002, 38:25–40:53), and Petitioner’s challenge to these claims inherits the same infirmity as its challenge under claim 1 (*see* Pet. 65–78). For the same reasons that Petitioner has failed to prove by a preponderance of the evidence that Fraser’s plate is configured to bear weight, Petitioner has failed to prove that dependent claims 2, 3, 8–14, 16, 19, 20, 22, 23, 25–27, and 29 are unpatentable over Fraser’s two-piece embodiment.

4. *Summary of Ground 3*

Petitioner has failed to prove by a preponderance of the evidence that claims 1–3, 8–16, 19–23, 25–27, and 29 are unpatentable under 35 U.S.C. § 103 in view of Fraser’s two-piece embodiment.

G. *Ground 4: Obviousness over Fraser in view of Michelson*

Petitioner contends that claims 4–6, 24, and 30 are unpatentable as obvious over Fraser (both the fused and two-piece embodiments) in view of Michelson. Pet. 5.

1. *Michelson (Ex. 1006)*

Michelson is an International Patent Publication titled “Spinal Fusion Implants with Opposed Locking Screws.” Ex. 1006, code (54). Michelson discloses, in relevant part, a spinal implant with bone screws that “are

adapted to receive locks to lock the screws to the implants to prevent the backing out of the bone screws from the implants.” *Id.* at 9.⁸

2. *Analysis*

In challenging dependent claims 4–6, 24, and 30 as unpatentable over Fraser in view of Michelson, Petitioner does not rely on Michelson to cure the shortcomings discussed above under Grounds 1–3. *See* Pet. 79–86. Rather, Petitioner relies on Michelson’s locking system to “securely hold bone screws in place.” *Id.* at 86.

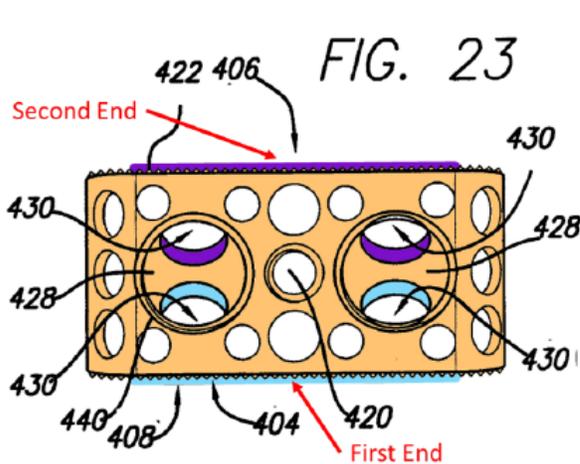
As such, Petitioner’s challenge to dependent claims 4–6, 24, and 30 inherit the same infirmity as its challenge under Grounds 1–3 (*see* Pet. 65–78), and Petitioner has failed to prove by a preponderance of the evidence that these claims are unpatentable over Fraser in view of Michelson.

Further, we discuss below an *additional* reason that Petitioner has not demonstrated by a preponderance of the evidence that dependent claim 24 would have been obvious based on Fraser’s fused implant embodiment in view of Michelson.

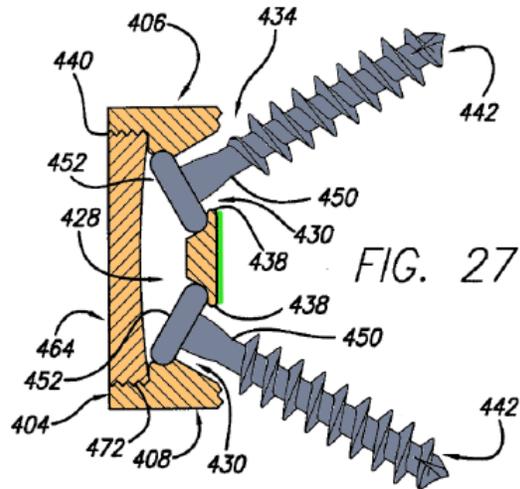
Claim 24 depends from claim 21 and further recites, *inter alia*, “wherein the base plate has more than two bone screw holes, a first one of the bone screw holes extends partially through both the *bottom surface* and the first end, and a second one of the bone screw holes extends partially through both the *bottom surface* and the second end.” Ex. 1002, 40:27–32 (emphases added).

⁸ Both Petitioner and Patent Owner cite to the internal pagination in Michelson rather than the page numbers added by Petitioner (e.g., “Petitioners 1006-1” on the first page). For consistency, we do the same.

In addressing this claimed limitation in relation to Fraser’s fused implant embodiment (Ground 1), Petitioner relies on Michelson’s disclosure of two bone screw holes. Pet. 81–83. Petitioner submits the following two annotated versions of Michelson’s Figures 23 and 27 in support of its position (*id.* at 83):



Michelson '045, Ex.1006, Fig.23



Michelson '045, Ex.1006, Fig.27

In citing these figures, Petitioner submits that Fraser in view of Michelson teaches “the base plate has more than two bone screw holes [screw holes 430], a first one of the bone screw holes extends partially through both the *bottom surface* [green] and the first end [blue], and a second one of the bone screw holes extends partially through both the bottom surface [green] and the second end [purple].” *Id.* (citing Ex. 1005 ¶¶ 393–396) (alterations in original) (emphasis added).

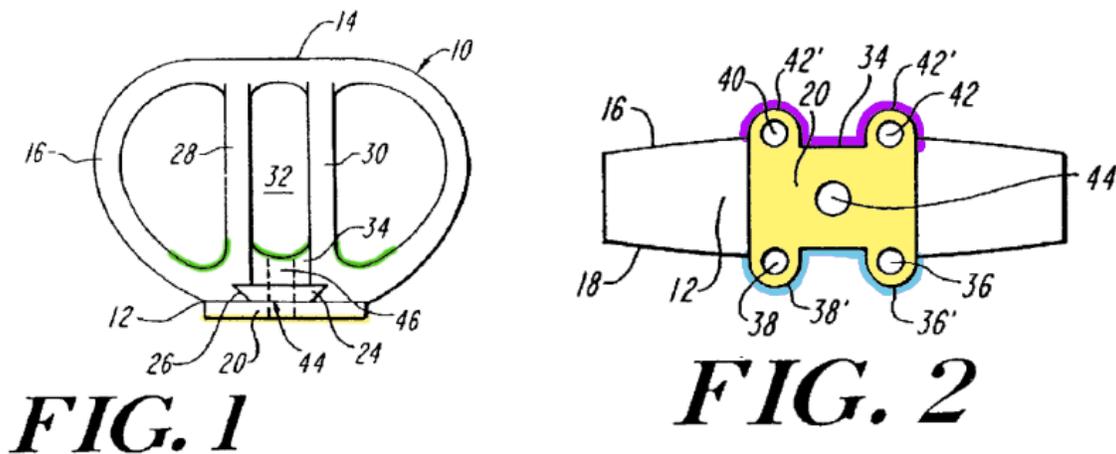
In combining Fraser with Michelson, Petitioner reasons that a POSITA would have “recognized that using toggle screws to permit the bones to settle was advantageous, so long as there was an anti-back out mechanism,” and explains that the modification would have yielded “a

spinal implant with an anti-back out plate that can securely hold bone screws in place.” Pet. 85–86 (citing Ex. 1005 ¶ 406).

Patent Owner argues that Petitioner “fail[s] to explain, for example, how elements identified from Michelson would have been incorporated into the [Fraser] implant, or how the implant, as modified, would meet . . . all of the claim limitations.” PO Resp. 66–67. Patent Owner further argues, “There is no explanation whatsoever regarding how the Michelson elements identified for claim 24 would be incorporated into Fraser’s plate 20 and/or fusion cage body 10.” *Id.* at 67.

As to dependent claim 24, and to Fraser’s *fused implant* embodiment, we agree with Patent Owner.

Petitioner submits annotated versions of Fraser’s Figures 1 and 2 to identify corresponding structure of Fraser’s fused implant under Ground 1 (Pet. 27):



Petitioner submits that as shown in the annotated version of Fraser’s Figure 1 above, Fraser’s “base plate” has a “bottom surface” in green. *See id.* Petitioner alternatively asserts that “a POSITA would recognize that surface 14 could also be the claimed ‘bottom surface.’” *Id.* n.5 (citing Ex. 1005 ¶ 75).

If surface 14 of Fraser’s fused implant embodiment is the claimed “bottom surface,” we do not see how the “bone screw holes extend partially through” the “bottom surface,” as recited in claim 24. Further, we are not persuaded that the three curved surfaces of Fraser’s inner cavities reasonably satisfy the claimed “bottom surface” either. We agree with Patent Owner that Petitioner’s application of the term “bottom surface” “runs contrary to its ordinary meaning and should be rejected.” *See* PO Sur-reply 27. Accordingly, we are not persuaded that claim 24 would have been obvious over Fraser’s *fused implant embodiment* in view of Michelson.

3. *Summary of Ground 4*

Petitioner has failed to prove by a preponderance of the evidence that claims 4–6, 24, and 30 are unpatentable under 35 U.S.C. § 103 over Fraser (both the fused and two-piece embodiments) in view of Michelson.

H. *Ground 5: Obviousness over Fraser, Michelson, and Byrd*

Petitioner contends that claim 18 is unpatentable as obvious over Fraser (both the fused and two-piece embodiments) in view of Michelson and Byrd. Pet. 5.

Claim 18 depends from independent claim 15 and further recites, *inter alia*, “screw retainer . . . configured to prevent one or more of the bone screws from backing out.” Ex. 1002, 39:33–37.

In challenging dependent claim 18 as unpatentable over Fraser in view of Michelson and Byrd, Petitioner does not rely on Michelson or Byrd to cure the shortcomings discussed above under Grounds 1–4. *See* Pet. 86–89.

Rather, Petitioner proposes to modify Fraser by including Michelson’s “anti-back out screw plate” and Byrd’s “flat bottom surface.” *See id.* at 88.

As such, Petitioner’s challenge to dependent claim 18 inherits the same infirmity as its challenge under Grounds 1–4, and Petitioner has failed to prove by a preponderance of the evidence that claim 18 is unpatentable over Fraser in view of Michelson and Byrd.

III. MOTION TO EXCLUDE

Petitioner moves to exclude (Paper 37 (“Motion” or “Mot.”)) certain testimony in the deposition transcript of Patent Owner’s expert, Mr. Drewry, elicited on redirect examination. *See* Mot. 1. Specifically, Petitioner seeks to exclude page 197, line 20 through page 205, line 16 of Exhibit 1024 as improper redirect testimony based on allegedly leading questions from Patent Owner’s counsel. *See id.* at 15. Patent Owner filed an Opposition to the Motion (Paper 38 (“Opposition” or “Opp.”)), noting that neither party relied upon the portions of Mr. Drewry’s testimony identified by Petitioner. *See* Opp. 1–2.

We dismiss Petitioner’s Motion as moot because we do not rely on any portion of Mr. Drewry’s deposition testimony in this Final Written Decision. *See* Patent Trial and Appeal Board Consolidated Trial Practice Guide 79–80 (Nov. 2019) (“In the Board’s experience, consideration of the objected-to evidence is often unnecessary to resolve the patentability of the challenged claims, and the motion to exclude is moot.”), *available at* <https://www.uspto.gov/sites/default/files/documents/tpgnov.pdf>.

IV. CONCLUSION

Weighing the evidence of the disclosure of the references, the competing testimony, and the reasoning to combine the references, we determine that Petitioner has failed to show, by a preponderance of the evidence, that any of claims 1, 3–6, 10, 13–15, 18, 19, 21, 22, 24, 29, or 30 of the '537 patent is unpatentable.

We also dismiss as moot Petitioner's Motion.

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 1, 3–6, 10, 13–15, 18, 19, 21, 22, 24, 29, and 30 of the '537 patent are not determined to be unpatentable;

FURTHER ORDERED that Petitioner's Motion is dismissed as moot; and

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

In summary:

Claims	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1, 10, 13, 14, 21, 22, 29	103	Fraser (fused embodiment)		1, 10, 13, 14, 21, 22, 29
3, 15, 19	103	Fraser (fused embodiment), Byrd		3, 15, 19
1, 3, 13– 15, 19, 21, 22, 29	103	Fraser (two-piece embodiment)		1, 3, 13–15, 19, 21, 22, 29
4–6, 24, 30	103	Fraser (fused and two-piece embodiments), Michelson		4–6, 24, 30
18	103	Fraser (fused and two-piece embodiments), Michelson, Byrd		18
Overall Outcome				1, 3–6, 10, 13–15, 18, 19, 21, 22, 24, 29, 30

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