

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MEDTRONIC, INC.
Petitioner

v.

MOSKOWITZ FAMILY LLC.
Patent Owner

Patent No. 10,603,183

**PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 10,603,183**

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LIST OF EXHIBITS

Exhibit No.	Document
Ex. 1001	U.S. Patent No. 10,603,183 (“the ’183 patent”)
Ex. 1002	Declaration of Brad Culbert
Ex. 1003	Curriculum Vitae of Brad Culbert
Ex. 1004	File History for U.S. Patent No. 10,603,183
Ex. 1005	U.S. Patent Application Publication No. 2008/0033440 A1 to Moskowitz et al. (“Moskowitz 440”)
Ex. 1006	U.S. Patent Application Publication No. 2008/0249569 A1 to Waugh et al. (“Waugh”)
Ex. 1007	File History for U.S. Patent No. 10,064,738
Ex. 1008- Ex. 1019	RESERVED
Ex. 1020	Phulchand Prithvi Raj, <i>Intervertebral Disc: Anatomy-Physiology-Pathophysiology-Treatment</i> , 8(1) PAIN PRACT. 18 (2008)
Ex. 1021	Fabio Galbusera et al., <i>Ageing and degenerative changes of the intervertebral disc and their impact on spinal flexibility</i> , 23(3) EUR. SPINE J. 324 (2014)
Ex. 1022	Dil Patel et al., <i>Interbody options in lumbar fusion</i> , 5(1) J. SPINE SURG. S19 (2019)
Ex. 1023- Ex. 1029	RESERVED
Ex. 1030	U.S. Patent No. 6,716,247 to Michelson (“Michelson ’247”)
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Ex. 1043	File History for U.S. Patent No. 11,903,849

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Exhibit No.	Document
Ex. 1044	U.S. Patent No. 9,889,022
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Ex. 1048	U.S. Patent No. 11,903,849 to Moskowitz et al. (“the ’849 patent”)
Ex. 1049	U.S. Patent No. 6,972,019 to Michelson (“Michelson ’019”)
Ex. 1050- Ex. 1058	RESERVED
Ex. 1059	Patent Owner’s Infringement Claim Charts, Exhibit G1, <i>Moskowitz Family, LLC v. Medtronic, Inc.</i> , No. 0:25-cv-00769 (D. Minn.), served October 30, 2025.
Ex. 1060	Office Action citing Waugh in related U.S. Patent Application No. 13/418,335 (September 9, 2013)
Ex. 1061	Plaintiff’s Responses to Defendants’ First Set of Interrogatories (Nos. 1-12), <i>Moskowitz Family, LLC v. Medtronic, Inc.</i> , No. 0:25-cv-00769 (D. Minn.), served January 5, 2026.
Ex. 1062	Patent Owner’s Preliminary Response, <i>Globus Medical, Inc., v. Moskowitz Family LLC</i> , IPR2020-01308 (October 28, 2020)
Ex. 1063	U.S. Patent Application Publication No. 2003/0208275 A1 to Michelson (“Michelson ’275”)

I. INTRODUCTION

Medtronic, Inc. (“Petitioner”) respectfully requests *inter partes* review of claims 1-4, 6, 8, 10-14, and 18-20 of U.S. Patent No. 10,603,183 (Ex. 1001) assigned to Moskowitz Family LLC (“Patent Owner” or “Moskowitz”). As this narrowly tailored Petition demonstrates, the challenged claims issued because the Patent Office failed to adequately examine critical prior art, including the Patent Owner’s *own* prior art.

While the Office did not provide any explanation in the Notice of Allowance regarding the limitations of the ’183 patent it found missing from the prior art (Ex. 1004, 162-64), the Office provided such explanation during prosecution of the ’183 patent’s parent, *i.e.*, U.S. Patent No. 10,064,738 (“the ’738 patent”). (Ex. 1007, 208.) Those reasons for allowance apply equally to the ’183 patent claims because the limitations forming the basis for allowance of the ’738 patent are also recited in each independent claim of the ’183 patent. (*See infra* Section X.A.1.v.) The Office, however, erred in issuing both the ’738 and ’183 patents because Moskowitz 440 (Ex. 1048), which is a publication of a parent application of the ’738 patent and was before the Office during prosecution, discloses those allegedly missing limitations.

This error appears to have been perpetuated by Patent Owner’s obfuscation of the ’183 patent’s priority chain. Patent Owner included Moskowitz 440 in the ’183 patent’s priority chain, but now concedes that the ’183 patent cannot claim priority

to Moskowitz 440 (*see infra* Section V). As a result, the Office appears to have overlooked that Moskowitz 440 is prior art and discloses the limitations forming the basis of the Office's allowance of both the '738 and '183 patents.

Inter partes review is thus warranted to correct this Office error.

II. MANDATORY NOTICES

Real Parties-in-Interest: Pursuant to 37 C.F.R. § 42.8(b)(1), the real party-in-interest is Medtronic, Inc. Medtronic plc is the ultimate parent of Medtronic Inc. Medtronic, Inc. is a co-defendant with Medtronic Sofamor Danek, Inc., Medtronic Sofamor Danek USA, Inc., Warsaw Orthopedic, Inc., and Titan Spine, Inc. in a suit involving the '183 patent (*see* Related Matters below).

Related Matters: Moskowitz asserted the '183 patent against Petitioner in the following civil action: *Moskowitz Family LLC v. Medtronic, Inc. et al.*, U.S. District Court for the District of Minnesota, civil action no. 0:25-cv-00769, filed on February 28, 2025 ("the Pending Litigation"). In the Pending Litigation, Moskowitz accused Petitioner's spinal implant devices of infringing the '183 patent. Patents related to the '183 patent were previously at issue in IPRs filed by Globus Medical, Inc. (*See* IPR2020-01303, -01304, -01305, -01306, -01307, -01308, -01309, -01310.)

The '183 patent is one of twelve patents currently asserted against Medtronic in the Pending Litigation. Petitioner has thus far filed *inter partes* review petitions challenging eight of those patents: IPR2025-01598, IPR2026-00121, IPR2026-

00124, IPR2026-00162, IPR2026-00163, IPR2026-00216, IPR2026-00217,
IPR2026-00265.

Counsel and Service Information: Lead counsel is Naveen Modi (Reg. No. 46,224). Backup counsel are (1) Young Park (Reg. No. 51,114) and (2) Chetan Bansal (Reg. No. 81,590). Service information is Paul Hastings LLP, 2050 M Street NW, Washington, D.C. 20036, Tel.: 202.551.1700, Fax: 202.551.1705, email: PH-Medtronic-Moskowitz-IPR@paulhastings.com. Petitioner consents to electronic service.

III. PAYMENT OF FEES

The PTO is authorized to charge any fees due during this proceeding to Deposit Account No. 50-2613.

IV. STANDING

Petitioner certifies under 37 C.F.R. § 42.104(a) that the '183 patent is available for review and that Petitioner is not barred or estopped from requesting review on the grounds identified herein.

V. RELIEF REQUESTED AND GROUNDS RAISED

Claims 1-4, 6, 8, 10-14, and 18-20 are unpatentable based on the following grounds:

Ground 1: Claims 1-4, 6, 8, 10-14, and 18-20 are unpatentable under pre-AIA 35 U.S.C. §103(a) as obvious over Moskowitz 440 (Ex. 1005) and Waugh (Ex. 1006).

Ground 2: Claims 1-4, 6, 8, 10-14, and 18-20 are unpatentable under pre-AIA 35 U.S.C. §103(a) as obvious over Moskowitz 440, Waugh, and Michelson 019 (Ex. 1049).

In the Pending Litigation, in response to an interrogatory seeking Moskowitz's contention regarding, *inter alia*, the earliest priority date for each asserted claim of the patents-in-suit, Moskowitz admitted that the challenged claims of the '183 Patent have a priority date of May 22, 2009. (Ex. 1061, 11.) The '183 patent claims are not entitled to a priority date earlier than May 22, 2009 because no application filed before May 22, 2009, in the priority chain of the '183 patent discloses the claimed combination of an intervertebral cage with a screw locking bracket. (Ex. 1002, ¶40.) Moskowitz 440 is thus prior art under at least pre-AIA 35 U.S.C. § 102(b) based on its February 7, 2008 publication date. Waugh published on October 9, 2008. Thus, Waugh is prior art under at least pre-AIA 35 U.S.C. §§ 102(a) and 102(e). Michelson 019 issued on December 6, 2005. Michelson 019 is prior art under at least pre-AIA 35 U.S.C. § 102(b).

VI. BACKGROUND

A. Technology Overview

The human spine, or spinal column, is the body's central support structure that protects the spinal cord and allows flexibility for movement. (See Ex. 1020, 18-19; Ex. 1002, ¶¶24-25.¹) The figure below “shows a lateral view of a portion of a spinal column 10, illustrating a group of adjacent upper and lower vertebrae V1, V2, V3, V4 separated by natural intervertebral discs D1, D2, D3.” (Ex. 1006, [0025].)

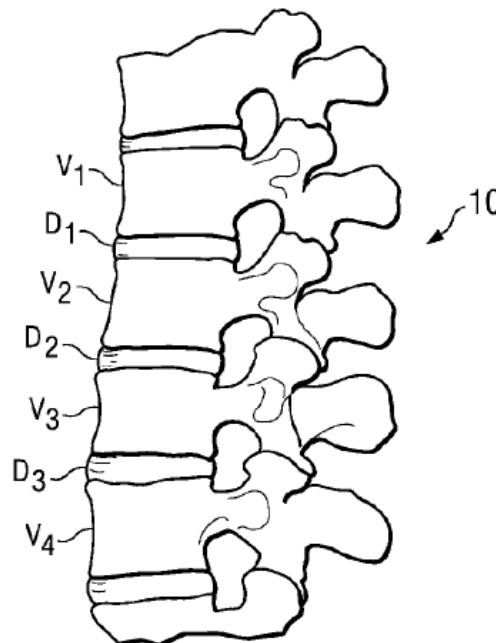
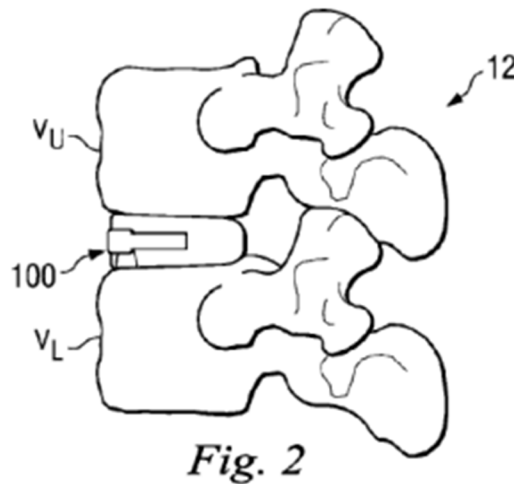


Fig. 1

(*Id.*, Fig. 1.)

¹ Petitioner submits a declaration (Ex. 1002) by Mr. Brad Culbert, an expert in the field of spinal implants (Ex. 1003). (Ex. 1002, ¶¶3-14.)

The intervertebral discs, however, can become damaged. (*See* Ex. 1020, 23-26; *see also* Ex. 1021, 2-3.) Surgical intervention for severely damaged discs may involve a discectomy, in which the surgeon removes all or part of the damaged disc, followed by placement of an implant together with bone graft material that can fuse adjacent vertebrae through the implant. (*See* Ex. 1020, 32-37; *see also* Ex. 1022, 20; Ex. 1002, ¶¶26-29.) These implants, known as intervertebral or interbody fusion devices, are positioned between adjacent vertebrae, as shown in the figure below. (*See* Ex. 1006, [0027]; Ex. 1022, 19-21; *see also* Ex. 1002, ¶¶30-37.)

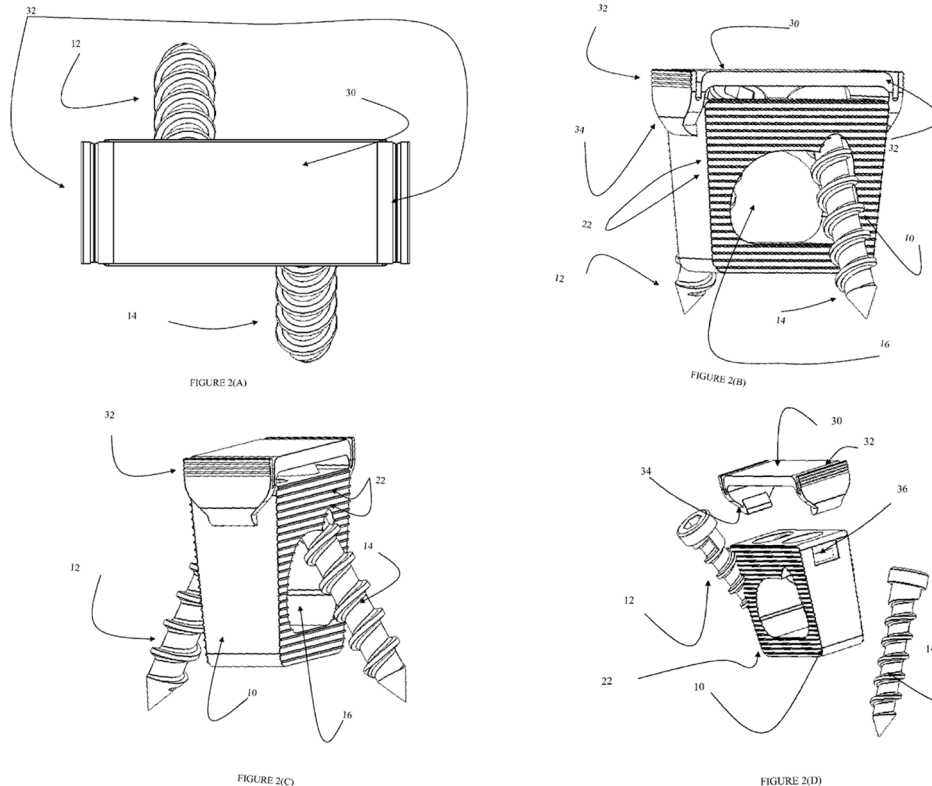


(Ex. 1006, Fig. 2.)

B. '183 Patent Overview

The '183 patent generally relates to spinal devices, expandable and non-expandable, designed for insertion into the disc space between adjacent vertebrae. (*See generally* Ex. 1001.) As exemplified in figures 2(A)-2(D) (reproduced below), the '183 patent discloses a “screw/cage apparatus” 10 with bi-directional screws 12,

14, and a screw locking bracket which partially covers the screws. (*Id.*, 7:9-22, 8:43-48.) The screw box 10 also has a hollow space for receiving bone graft filling. (*Id.*, 7:22-23.) These bi-directional screws allow the screw box to be attached to adjacent vertebrae. (*Id.*, 7:15-39.)



(*Id.*, Figs. 2(A)-2(D).)

Claim 1 recites a spinal implant with the above-identified features, but also recites a host of limitations (*e.g.*, internal bore, top wall, bottom wall, side wall) that are not described textually anywhere in the specification of the '183 patent. (Ex. 1002, ¶¶39-40.) To the extent they are even supported by the '183 patent under 35 U.S.C. § 112, they can only be inferred from the figures.

During prosecution of the related '849 patent (Ex. 1048)², the Patent Office required Moskowitz to show support for these structures in the specification because, like the '183 patent, the application that ultimately issued as the '849 patent, also lacked textual support for these features. (Ex. 1043, 172, 176-77 (noting that the claim limitations “are not supported or identified in the Specification”).) Moskowitz then attempted to amend the specification and annotated figures 2A-2C to show purported disclosure of these claimed structures in the as-filed application. (*See id.*, 180-82 (providing annotated figures during a telephonic interview), 231 (amending the specification), 245 (representing that “[n]o new matter is added” by the amendments).) Based on those representations, Moskowitz 440 discloses the limitations found missing by the Examiner during prosecution of the related '183 patent and therefore also in the '183 patent. (*See infra* Section X.A.1.v.)

² The '849 patent claims priority to U.S. Application No. 11/842,855 (“the '855 application”), which published as Moskowitz 440, through a series of continuations. (Ex. 1043, 6.) The '849 patent has the same figures as Moskowitz 400. The '183 patent also claims priority to the '855 application, and is therefore related to the '849 patent.

VII. LEVEL OF ORDINARY SKILL

A person of ordinary skill in the art (“POSITA”) at the time of the alleged invention (late-2000s, including the time leading up to May 22, 2009) would have a bachelor’s or equivalent degree in Mechanical Engineering or a related discipline (*e.g.*, biomechanics, biomedical or metals and materials engineering), and at least five years of experience. (Ex. 1002, ¶21.) More education can supplement practical experience and *vice versa*. For example, a POSITA could have an advanced degree, in the technical disciplines provided above, or a Doctor of Medicine, and at least two years of experience in the subject areas provided above.

VIII. OVERVIEW OF THE PRIOR ART

A. Moskowitz 440

Moskowitz 440 generally relates to spinal devices, expandable and non-expandable, designed for insertion into the disc space between adjacent vertebrae. (*See generally* Ex. 1005; Ex. 1002, ¶¶44-45.) As exemplified in figures 2A-2C, Moskowitz 440 discloses a “screw box” 200 with “bi-directional fixating transvertebral screws” 201, 202. (Ex. 1005, [0065].) The screws engage and penetrate the vertebral bodies above and below the disc space to link, interlock, and eventually biologically fuse the vertebrae. (*Id.*, [0009].)

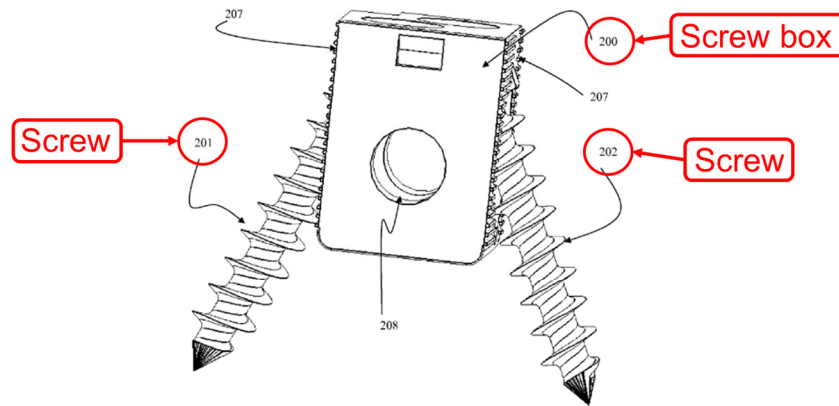


Fig. 2A

(*Id.*, Fig. 2A (annotated).)

Screws 201 and 202 are oriented in opposing directions, with one screw designed to penetrate a superior vertebra, and the other to penetrate an adjacent, inferior vertebra. (*Id.*, [0010].) To facilitate screw placement, screws 201, 202 sit within “internalized drill guides.” (*Id.*, [0065], [0093].)

IX. CLAIM CONSTRUCTION

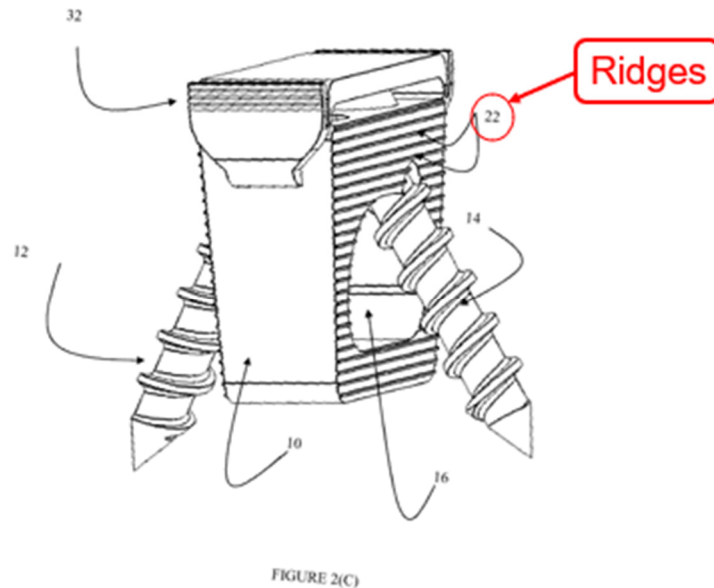
For IPR proceedings, the Board applies the claim construction standard set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (*en banc*). See 83 Fed. Reg. 51,340-59 (Oct. 11, 2018). Under *Phillips*, claim terms are typically given their ordinary and customary meanings, as would have been understood by a POSITA, at the time of the invention, having taken into consideration the language of the claims, the specification, and the prosecution history of record. *Phillips*, 415 F.3d at 1313; see also *id.* at 1312-16. Except for the terms identified below, the

Board need not construe any claim terms, as the claims are unpatentable under any reasonable construction, or any interpretation offered by Moskowitz. *Toyota Motor Corp. v. Cellport Systems, Inc.*, IPR2015-00633, Paper No. 11 at 16 (P.T.A.B. Aug. 14, 2015).³

Claim 13 includes a means-plus-function limitation, *i.e.*, “means for fusing superior and inferior vertebral bodies in conjunction with the intervertebral cage.” **Claims 6 and 14** includes a similar means-plus function limitation, *i.e.*, “means for fusing superior and inferior lumbar vertebral bodies in conjunction with the intervertebral cage.” The specification discloses that “[t]he superior and inferior surfaces or edges of the lumbar cage 10 can include ridges 22 to facilitate integration and fusion with superior and inferior vertebral bodies.” (Ex. 1001, 7:36-39.) Figure 2C below shows ridges 22 on the surface of lumbar cage 10. Thus, the corresponding

³ Petitioner reserves all rights to raise claim construction and other arguments in other venues. Specifically, Petitioner is not conceding that each claim satisfies all statutory requirements, nor waiving any arguments concerning claim scope or grounds that can only be raised in district court. Nor is Petitioner conceding that any interpretation offered by Patent Owner thus far in the corresponding litigation is reasonable.

structure for the claimed “means” is ridges that facilitate integration and fusion with superior and inferior vertebral bodies. (Ex. 1002, ¶42.)



(Ex. 1001, Fig. 2C (annotated).)

X. DETAILED EXPLANATION OF GROUNDS

Claims 1-4, 6, 8, 10-14, and 18-20 are unpatentable.

A. Ground 1: Moskowitz 440 in View of Waugh Render Obvious Claims 1-4, 6, 8, 10-14, and 18-20 of the '183 Patent

1. Claim 1

- i) [1.pre] **“A intervertebral combination internal screw guide and fixation apparatus configured to be inserted into a disc space between a first vertebral body and a second vertebral body and to provide fusion of the first vertebral body to the second vertebral body via biological bone fusion and screw fusion, the apparatus comprising:”**⁴

⁴ Claim language is bolded throughout.

To the extent the preamble is limiting, Moskowitz 440 discloses this limitation. (Ex. 1002, Appendix [1.pre].) Figures 2A-2C disclose an “intervertebral screw box 200 with two BDFT screws 201, 202.” (Ex. 1005, [0065].) The screw box is designed for insertion into the intervertebral disc space between two adjacent vertebral bodies. (*Id.*, [0009]-[0010], [0065].) Once inserted, the BDFT screws engage and penetrate the vertebral bodies above and below the device to link, interlock, and biologically fuse the vertebrae. (*Id.*)

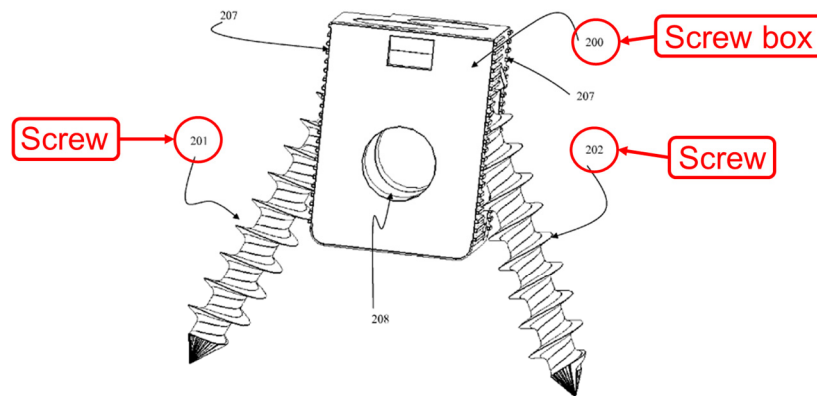


Fig. 2A

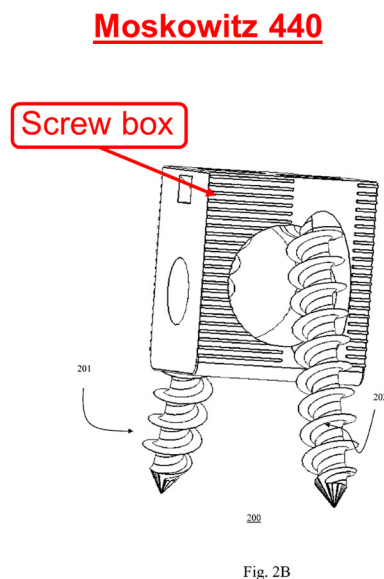
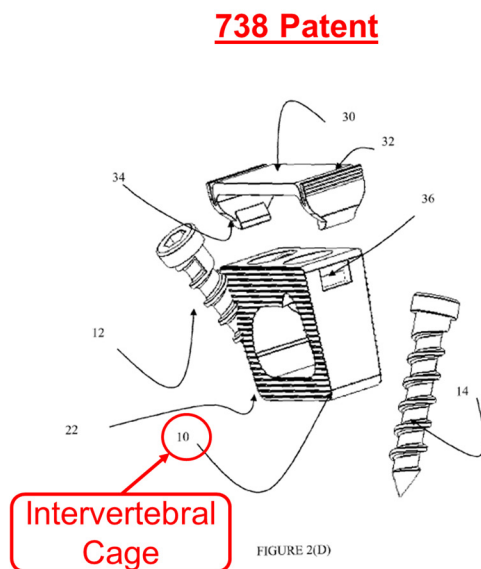
(*Id.*, Fig. 2A (annotated).)

Screw box 200 “incorporates built-in screw and/or drill guides which allow the direct placement and insertion” of the self-drilling screws in opposing directions. (*Id.*, [0010], [0093].) These screw guides have “built-in prescribe angles” that guide the screws through the screw box. (*Id.*, [0013].) As discussed in Section VIII.A, BDFT screws are fixation devices. Screw box 200 also includes “holes 208 and

hollow spaces allowing packaging with bone,” which facilitates bone fusion. (*Id.*, [0002], [0065]; Ex. 1002, Appendix [1.pre].)

- ii) [1.a] “an intervertebral cage including: a top wall, a bottom wall, and sidewalls defining a fusion material space capable of receiving bone filling for the biological bone fusion;”

Moskowitz 440 discloses this limitation. (Ex. 1002, Appendix [1.a].) The ’183 patent defines the box structure including screw guides and a cavity for filling with bone fusion material as an “intervertebral cage 10.” (Ex. 1001, 7:15-17, 7:54-57, Fig. 2D.) Screw box 200 of Moskowitz 440 has the same structure as cage 10 of the ’183 patent, including screw guides and a hollow space for packaging with bone. (Ex. 1005, [0065].) Moskowitz 440 thus discloses “an intervertebral cage.”



(Ex. 1001, Fig. 2D; Ex. 1005, Fig. 2B (both annotated).)

As shown in figure 2B below, Moskowitz 440's screw box 200 has four walls – **“a top wall, a bottom wall, and sidewalls”** as Moskowitz defined them in related prosecution. The top wall is formed at the top of the cage where the screws enter the cage, and the bottom wall is formed opposite the top wall at the bottom-most area of the cage. Those four walls define a central space, as shown below. Moskowitz 440 discloses that its intervertebral device “can be filled with bone fusion material(s)” and specifically, that screw box 200 has hollow spaces “allowing packaging with bone.” (Ex. 1005, [0002], [0065].) Therefore, figure 2B has a **“fusion material space”** that is **“capable of receiving bone filling for the biological bone fusion.”**

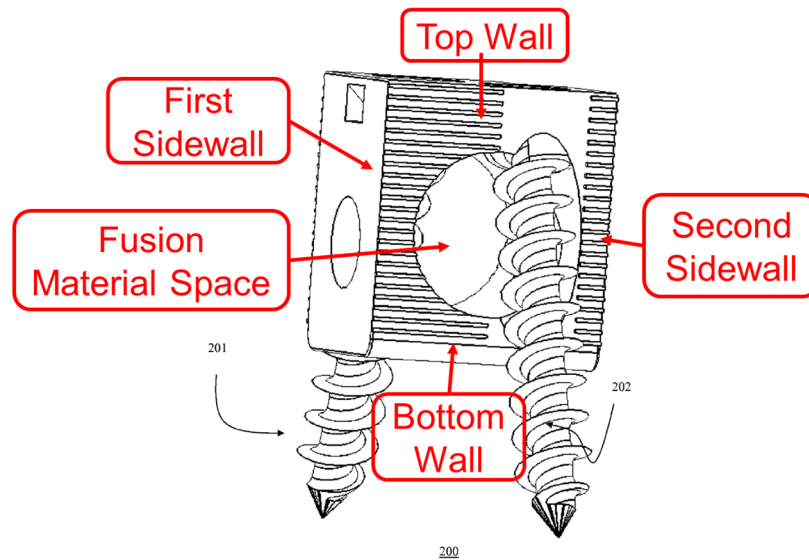
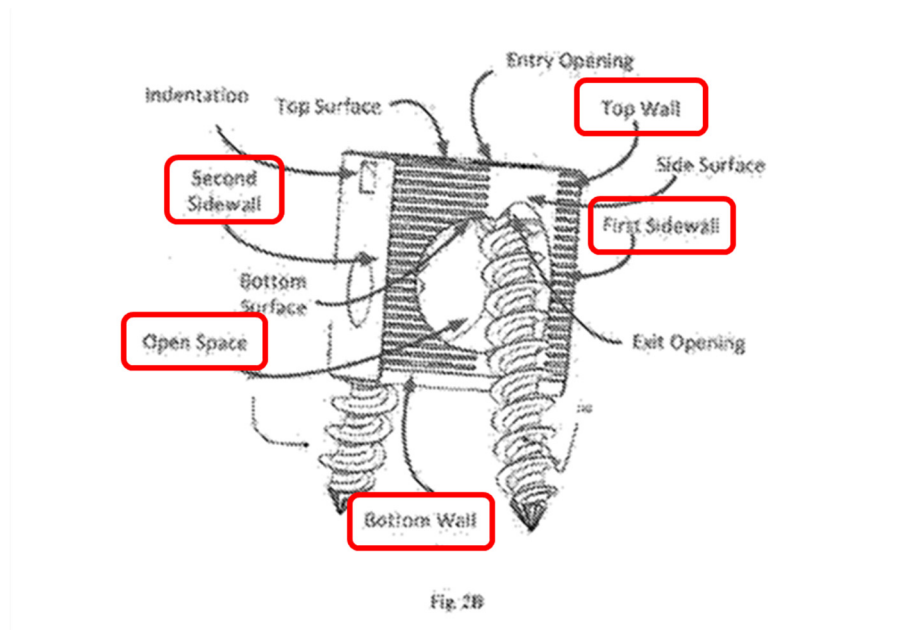


Fig. 2B

(Ex. 1005, Fig. 2B (annotated).)

The above analysis is consistent with how Moskowitz has previously defined these structures. During the prosecution of the related '849 Patent (Ex. 1043), Moskowitz provided amended figures identifying the “top wall,” “bottom wall,” “sidewalls,” and “open space” (*i.e.*, a “**fusion material space**” as explained above) for figure 2B. (*Compare* Ex. 1043, 180, 182 (excerpted and reproduced below), with Ex. 1005, Fig. 2B (reproduced above).)



(Ex. 1043, 182 (excerpted and annotated).)

iii) [1.b] “an internal screw guide having a screw entrance portion and an internal bore portion,”

Moskowitz 440 discloses this limitation. (Ex. 1002, Appendix [1.b].) Moskowitz 440 discloses that the screw box “incorporates built-in screw and/or drill guides which allow the direct placement and insertion of two self drilling screws.” (Ex. 1005, [0010].) In particular, screw box 200 has “self-contained internalized

drill guides.” (*Id.*, [0065], Fig. 2C (reproduced below).) Moskowitz 440 thus discloses “**an internal screw guide.**” (*Id.*) As shown in figure 2C below, screws 201, 202, enter the screw guide (which is partially hidden) via a “**screw entrance portion,**” where the screw head sits when the screw is fully inserted. Deeper into the internal screw guide than the screw entrance portion is an “**internal bore portion**” of the internal screw guide that receives the threaded portion of a screw. (*See id.*, Fig. 2C (reproduced below).⁵) As shown in figure 2C below, the implant features two “**internal screw guide[s],**” each of which receive a screw. Therefore, each of the internal screw guides has its own respective “**screw entrance portion**” and “**internal bore portion.**”

⁵ The term “internal bore” or “internal bore portion” has no textual support in the ’183 patent specification.

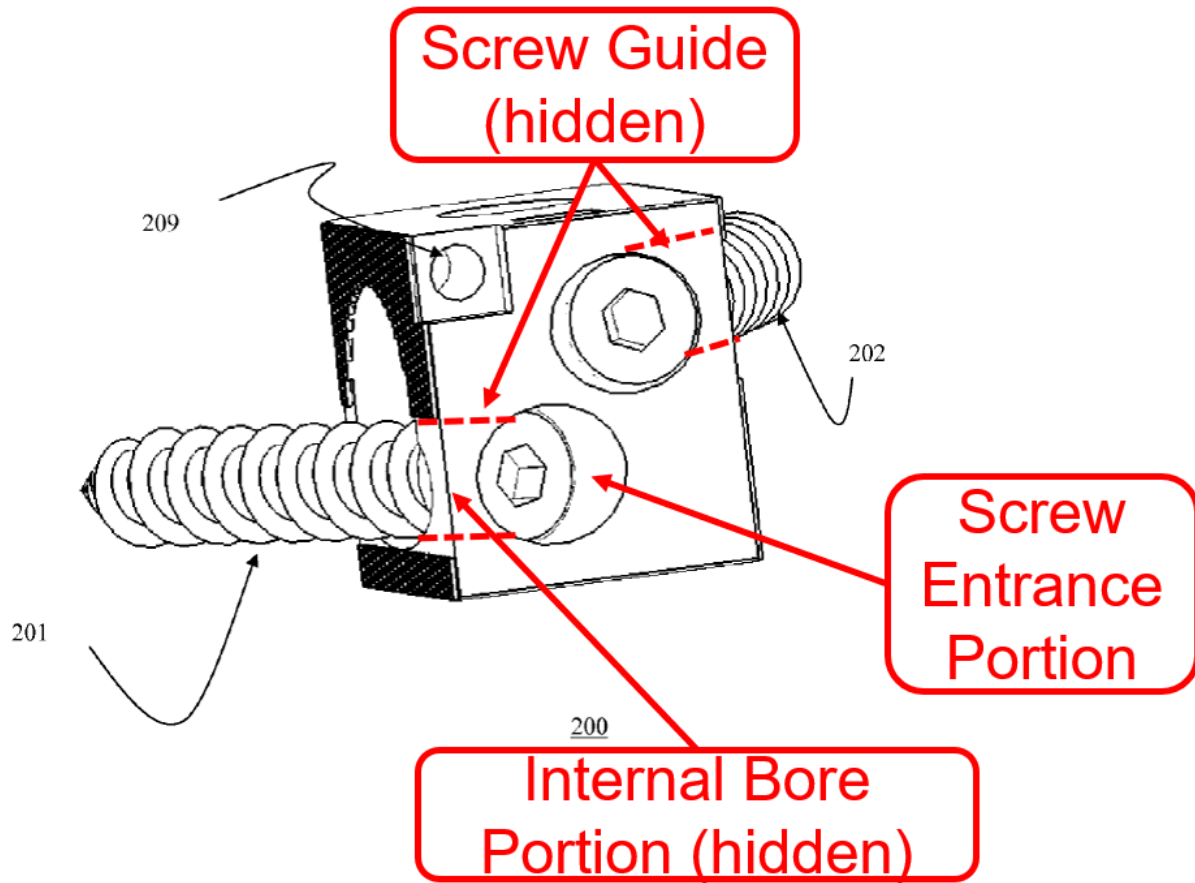


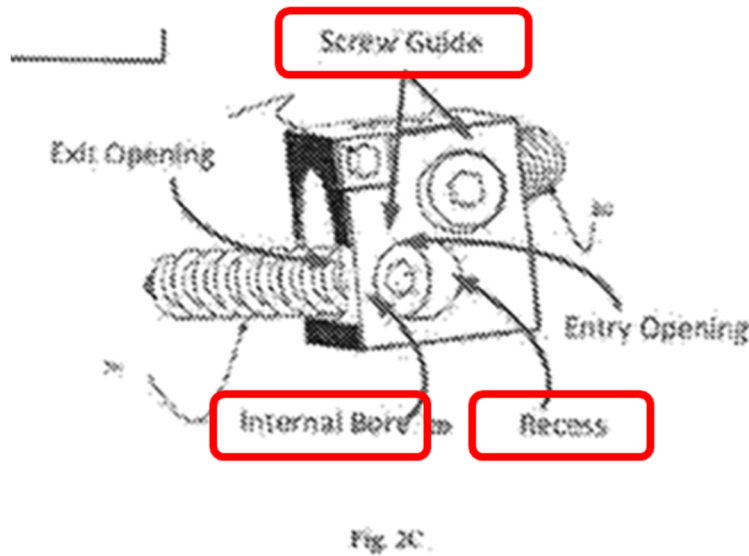
Fig. 2C

(Ex. 1005, Fig. 2C (annotated).)

This mapping of limitation [1.b] is consistent with Moskowitz’s representation to the Office, during the ’849 patent prosecution, that figure 2C discloses a “**screw guide**,” an “**internal bore**,” and a “recess.” (*Compare* Ex. 1043, 180, 182 (excerpted and reproduced below), *with* Ex. 1005, Fig. 2C (reproduced above).) The “recess” corresponds to the claimed “**screw entrance portion**” because, like the “screw entrance portion,” it accommodates a screw head of the screw. Notably, claim 1 of the ’183 patent requires the screw head to be “**in the**

screw entrance portion.” (Ex. 1001, 21:5-13.) During prosecution of the ’849 patent, then-pending claim 21 recited a “recess sized and shaped to accommodate a screw head” (Ex. 1043, 161), and Moskowitz annotated figure 2C to show the “recess.” (*Id.*, 180, 182.) Thus, what Moskowitz now refers to as the “**screw entrance portion**” is no different than what the Moskowitz previously called the “recess.”⁶

⁶ Moskowitz has used different (and confusing) terminology for the same structural element across its maze of patent applications. As explained below in Section X.A.1.iv, Moskowitz refers to the “**screw entrance portion**” as a “counterbore” in other applications.



(Ex. 1043, 182 (excerpted).)

- iv) [1.c] “wherein the screw entrance portion is larger than and coaxial with the internal bore and is formed at least partially in a top surface of the top wall as viewed from a top of the intervertebral cage,”

Moskowitz 440 discloses this limitation. (Ex. 1002, ¶¶46-52, Appendix [1.c].) As shown in figure 2C below, the screw entrance portions cut through the outer “top surface” of the **top wall** as seen from the top of the implant and are thus “**formed at least partially in a top surface of the top wall as viewed from a top of the intervertebral cage.**” (Ex. 1005, [0040] (figure 2C is a superior perspective view).) Moreover, the different portions of the screw guide are aligned about a

central axis of the screw as shown in figure 2C above, *i.e.*, “**the screw entrance portion**” is “**coaxial with the internal bore.**” (Ex. 1002, ¶48.⁷)

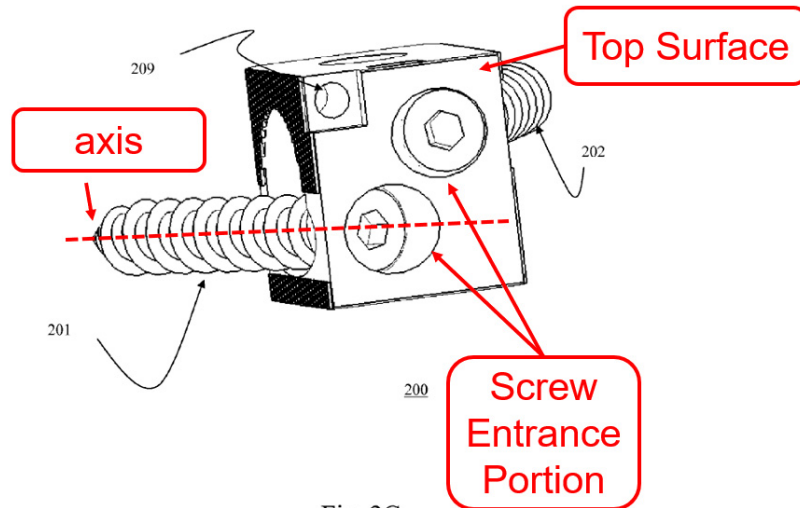


Fig. 2C

(*Id.*, Fig. 2C (annotated).)

The above analysis is consistent with Moskowitz’s prior representations. Moskowitz stated during prosecution of the ’849 patent that the embodiment of figures 2A-2C shows that the “internal bore is coaxial with *the recess*,” as recited in then-pending claim 22. (Ex. 1043, 232 (claim 22) (emphasis added), 244-245 (“the structures recited in the claims . . . appear in Figs. 2A-2C”).) As explained above in Section X.A.1.iii, the claimed “recess” corresponds to the “**screw entrance portion**” recited in claim 1 of the ’183 patent. Thus, Moskowitz confirmed during prosecution

⁷ There is no discussion of an “**internal bore**” or the claimed “**coaxial**” aspect in the text of the ’183 patent. (Ex. 1002, n.3.)

of the '849 patent that **“the screw entrance portion is . . . coaxial with the internal bore portion.”**

Moskowitz 440 also discloses that the **“the screw entrance portion is larger than . . . the internal bore portion”** in the sense that the circumference of the screw entrance portion is larger than the circumference of the internal bore. For example, in figure 2C the screw is inserted at an angle relative to the top surface, which requires the **screw entrance portion**, which opens on a flat top surface, to be larger in circumference than the screw body, and therefore, larger than the **internal bore**. (Ex. 1002, ¶49; *see also infra* Section X.A.1.xvi (explaining that Moskowitz 440 discloses **“the internal bore portion of the internal screw guide is sized with a smaller diameter than the screw entrance portion”**).)

Moskowitz's statements in another related patent further confirm this understanding. While figures 2A-2C do not depict the implant with screws 201, 202, removed, Moskowitz 440 provides an embodiment in figures 1A-1E where the entire structure of the screws is visible.

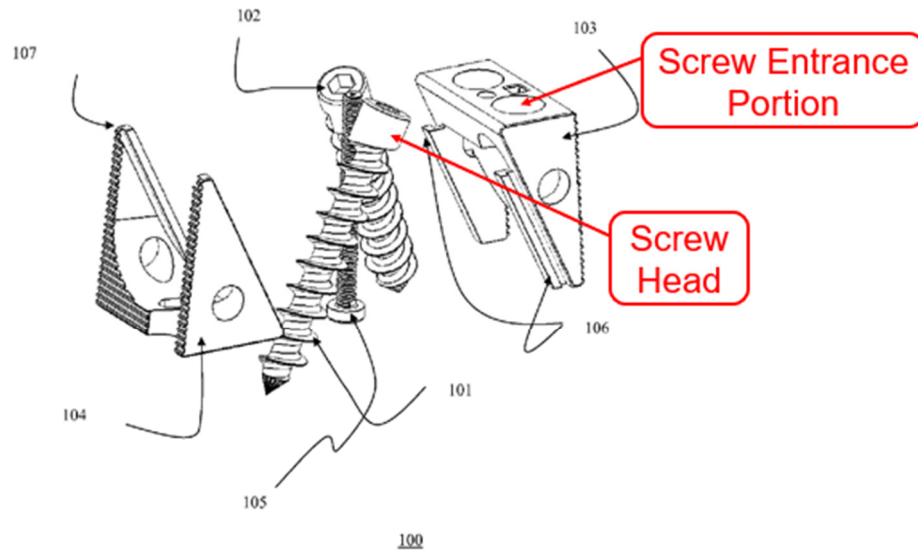


Fig. 1D

(Ex. 1005, Fig. 1D (annotated).)

Like box 200, box 100 also includes screw guides with screw entrance portions designed to allow insertion of transvertebral screws. (*Id.*, [0064]-[0065].) During IPR2020-01308 of U.S. Patent No. 9,889,022, which has the same specification and figures as Moskowitz 440 (*compare*, Ex. 1044, Figs. 1A-1E, *with* Ex. 1005, Figs. 1A-1E), Moskowitz stated that figures 1A-1E of the '022 patent (which are identical to figures 1A-1E of Moskowitz 440) disclose a “counterbore that is larger than and coaxial with the internal bore.” (Ex. 1062, 4-5.⁸) Thus,

⁸ The term “counterbore” again appears nowhere in the '022 patent specification but is synonymous with “screw entrance portion” because the “counterbore,” like

Moskowitz confirmed that figures 1A-1E of Moskowitz 440 disclose a “**screw entrance portion**” that is “**larger than . . . the internal bore.**” (Ex. 1002, ¶50.)

A POSITA would have understood that the screws, screw entrance portions, and internal bore portions in the figure 2A-2C embodiment are similar, if not identical, in form and function to those in the figure 1A-1E embodiment. (*Id.*, ¶51.) For example, screws 101, 102, and screws 201, 202 are all BDFT screws that extend through respective screw boxes in opposing directions, to facilitate bi-directional transvertebral fusion. (Ex. 1005, [0009], [0062], [0064]-[0065], Fig. 1A, Fig. 2A.) Moskowitz 440 also teaches that the same surgical method is used for screw boxes 100 and 200, and that in both instances internal screw guides assist with screw placement. (*Id.*, [0086], [0089]-[0090], [0093] (“One, two or three screw box embodiments 100, 200, 300 (I-III) or a 2 in I construct can be placed. The screw placement is facilitated by the internal screw guides.”).) Notably, Moskowitz 440 does not point out any differences in the screws or screw guides across the figures 1A-1E and figures 2A-2C embodiments. Thus, from the disclosures in figures 1A-1D and elsewhere in the specification, a POSITA would have understood that figures

the “screw entrance portion” accommodates a screw head of the screw member.

(*See* Ex. 1044, claim 37.)

2A-2C additionally disclose a “**screw entrance portion [that] is larger than and coaxial with the internal bore.**”

- v) [1.d] “**wherein the internal bore portion has an entry opening formed only in a top surface of the top wall as viewed from the top of the intervertebral cage and has an exit opening formed at least partially in a bottom surface of the top wall and at least partially in a side surface of the top wall;**”

Moskowitz 440 discloses this limitation. (Ex. 1002, Appendix [1.d].) As discussed in Section X.A.1.iii, the “**internal bore**” is the portion of the internal screw guide that fits the threaded portion of the screw. Therefore, the “**entry opening**” of the “**internal bore**” is where the screw first enters the internal bore when the screw is inserted. (*Id.*) As discussed in Section X.A.1.iv, the outer surface of the “**top wall**” is the “**top surface**” of the top wall. Further, as shown below in figure 2B, opposite the top surface of the top wall is a “**bottom surface of the top wall**” that is exposed to the “**fusion material space**” as defined in Section X.A.1.ii. The surface of the top wall adjacent to and extending between the “**top surface**” and “**bottom surface**” is a “**side surface**” of the top wall.

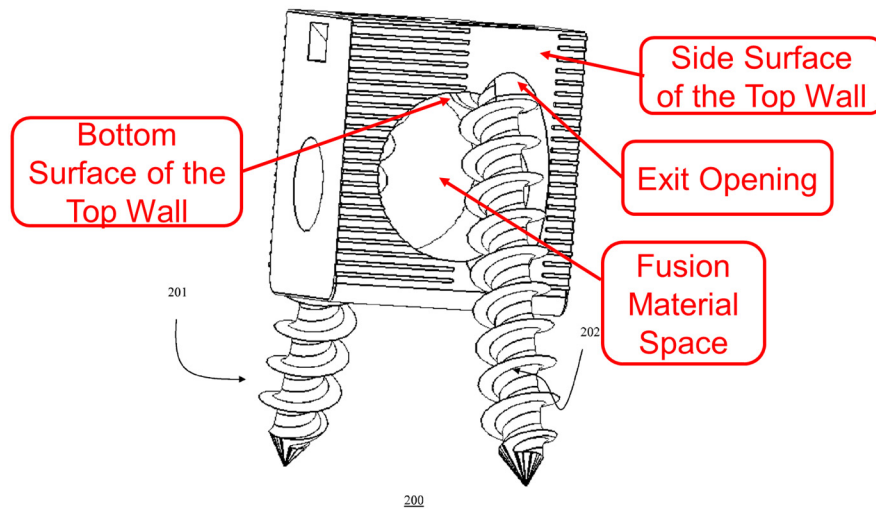
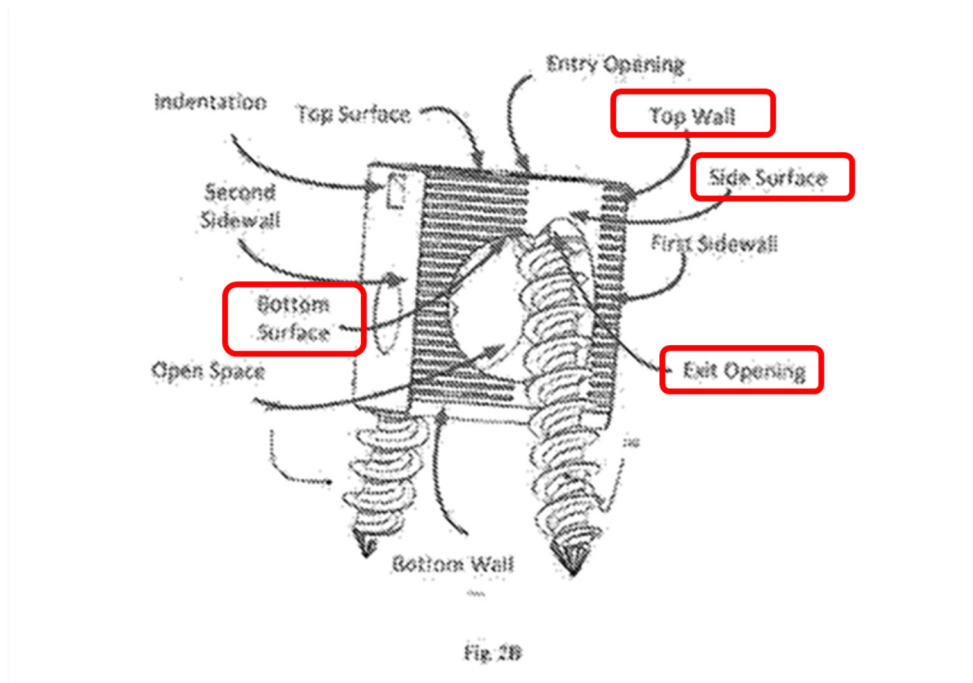


Fig. 2B

(Ex. 1005, Fig. 2B (annotated).)

The screws 201, 202 extend entirely through the internal bore. (Ex. 1005, Figs. 2A-2C.) Therefore, the internal bore has an “**exit opening**” where the screw exits the internal bore. As shown in figure 2B (reproduced above), the exit opening is angled and cuts through two planes of the top wall – the side and bottom surfaces of the top wall, as Moskowitz has defined them. The exit opening is “**formed at least partially in a bottom surface of the top wall and at least partially in a side surface of the top wall.**”

This mapping is consistent with Moskowitz’s previous representations to the Office. As excerpted below, Moskowitz provided annotated figure 2B of the ’849 patent, signifying Moskowitz’s understanding of the “exit opening,” “bottom surface of the top wall,” and “side surface of the top wall.” (Ex. 1043, 180, 182.)



(*Id.*, 182 (excerpted and annotated).)

Moskowitz has also previously admitted that figures 2A-2C disclose limitation [1.d], including that “**the internal bore portion has an entry opening formed only in a top surface of the top wall as viewed from the top of the intervertebral cage.**” In particular, Moskowitz provided annotated figure 2C of the ’849 patent specification, which is the same as figure 2C of Moskowitz 440, indicating what Moskowitz alleges is the “**entry opening**” and “**exit opening**” of the “**internal bore.**” (Ex. 1043, 180, 182.)

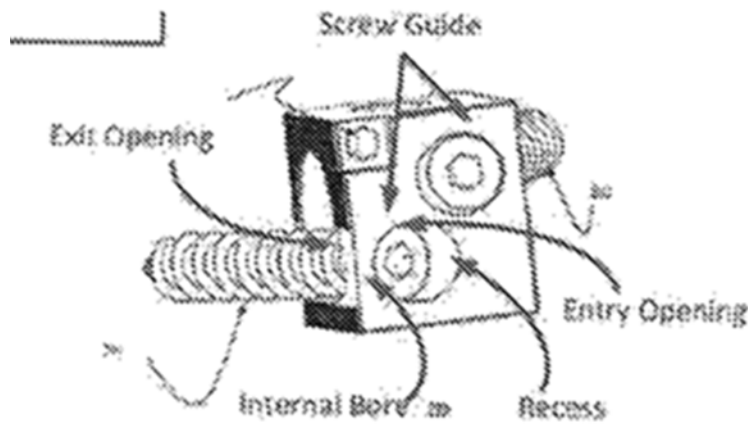
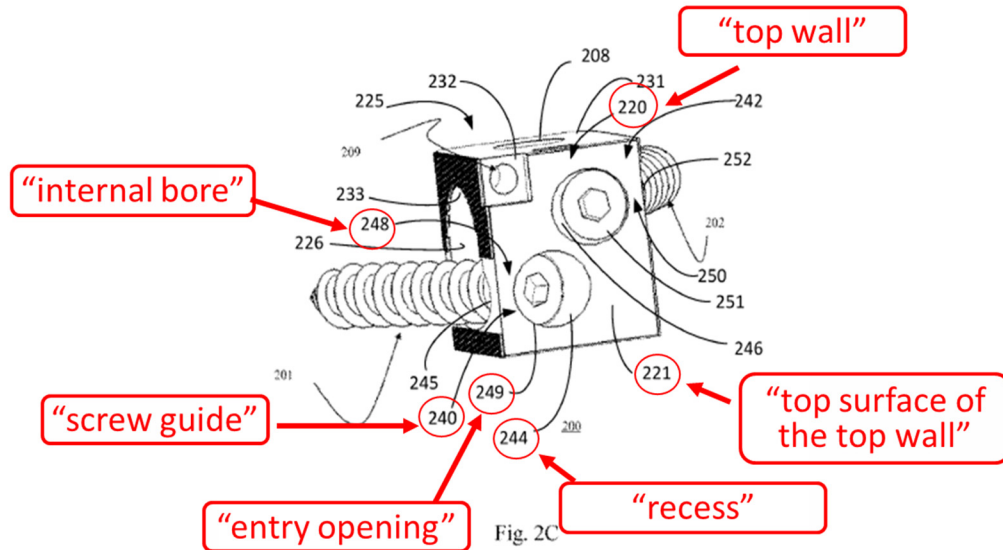


Fig. 2C.

(*Id.*, 182 (excerpted).)

Moskowitz also added reference numerals as shown below to figure 2C to illustrate, *inter alia*, the claimed “**internal bore**,” “**entry opening**,” and “**exit opening**.” (*Id.*, 231, 240.) Moskowitz represented to the Office that the embodiment of figures 2A-2C shows that the “*the entry opening of the internal bore [is] formed only in the top surface of the top wall*,” and “*the exit opening [is] formed at least partially in the bottom surface of the top wall and at least partially in a side surface of the top wall*,” as recited in then-pending claim 21. (*Id.*, 232 (claim 21) (emphases added), 244-245 (“the structures recited in the claims . . . appear in Figs. 2A-2C”).) Based on Moskowitz’s representations, figure 2C of Moskowitz 440 discloses limitation [1.d]. Because Moskowitz admitted that figures 2A-2C shows that the entry opening of the internal bore [is] formed only in the top surface of the top wall, he also necessarily admitted that this feature is true when viewed from the top

because the view would not change the basic fact that the entry opening of the internal bore is formed only in the top surface of the top wall. (Ex. 1002, Appendix [1.d].)



(Ex. 1043, 240 (annotated).)

Moskowitz's representations during prosecution of the '849 patent confirm that the Office erred in allowing the '183 patent claims based on the reasons for allowing the parent of the '183 patent (Ex. 1007, 208), which apply equally to the '183 patent claims given the overlap in the relevant claim limitations between the two patents.

- vi) [1.e] **“a second internal screw guide having a second screw entrance portion and a second internal bore portion, wherein the second screw entrance portion is larger than and coaxial with the second internal bore and is formed at least partially in the top surface of the top wall as viewed from the top,”**

Moskowitz 440 discloses this limitation. (Ex. 1002, Appendix [1.e].) As discussed in Section X.A.1.iii, Moskowitz 440 discloses an implant with two “**internal screw guide[s]**,” each of which has a “**screw entrance portion**” and an “**internal bore portion**.” As shown in figure 2C below, screw box 200 of Moskowitz 440 is a substantially symmetrical implant and screws 201, 202 have the same structure so that the “**internal screw guide**” and “**second internal screw guide**” have the same features (though angled in opposing directions), such that the discussion in Sections X.A.1.iii-iv regarding the “**internal screw guide**” equally applies to the “**second internal screw guide**.” (*Id.*)

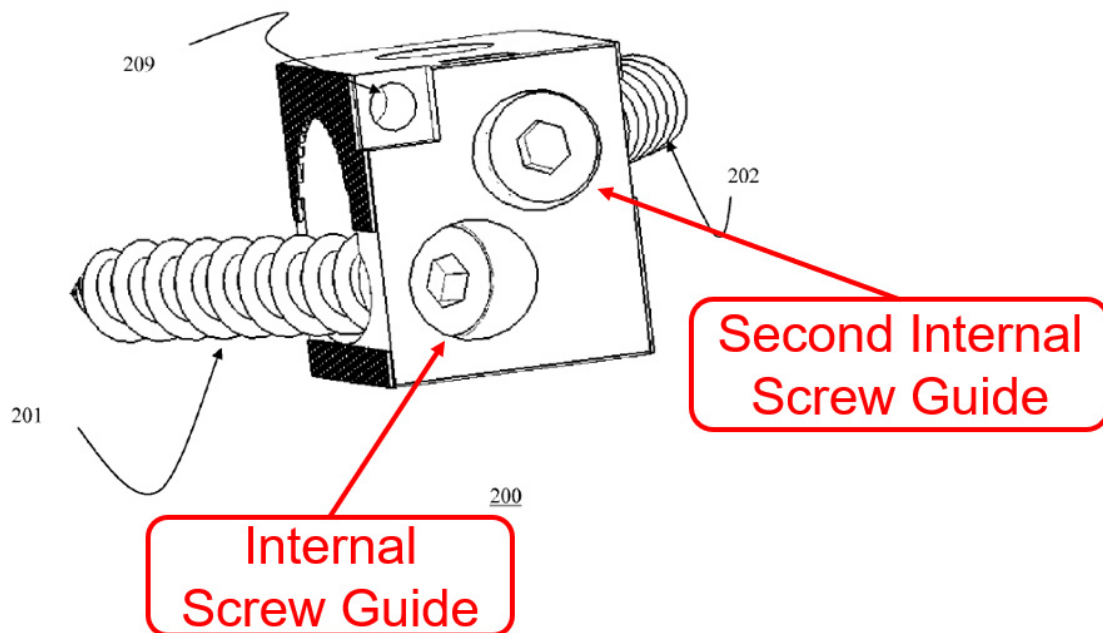


Fig. 2C

(Ex. 1005, Fig. 2C (annotated).)

- vii) [1.f] **“wherein the second internal bore portion has a second entry opening formed only in the top surface of the top wall as viewed from the top of the intervertebral cage and has a second exit opening formed at least partially in the bottom surface of the top wall and at least partially in a second side surface of the top wall, and”**

Moskowitz 440 discloses this limitation. (Ex. 1002, Appendix [1.f].) As discussed in Section X.A.1.vi, the teachings in Moskowitz 440 regarding the **“internal bore portion”** also apply to the **“second internal bore portion”** such that Moskowitz 440 discloses **“the second internal bore portion has a second entry opening formed only in the top surface of the top wall as viewed from the top of the intervertebral cage.”** (*Id.*) While the **“second exit opening”** is not visible in Moskowitz 440’s figures, a POSITA would have understood that there is a **“second exit opening”** because as shown in figure 2B below, the second screw goes through the implant. (*Id.*) Additionally, a POSITA would have understood that there is a **“second side surface of the top wall”** and that like the **“first exit opening,”** the **“second exit opening [is] formed at least partially in the bottom surface of the top wall and at least partially in a second side surface of the top wall,”** given the symmetry of the device and opposing screw angles evident from figures 2B and 2C below.

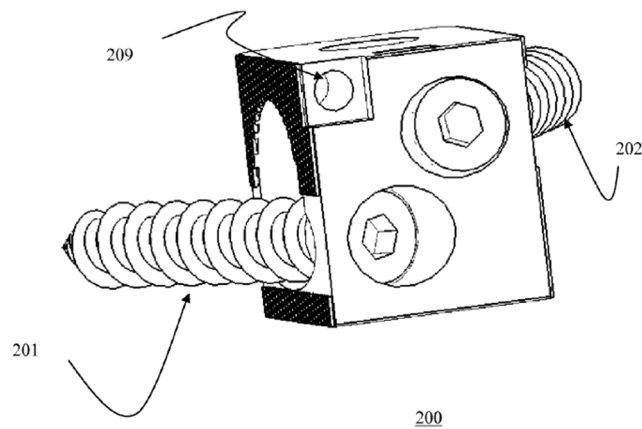
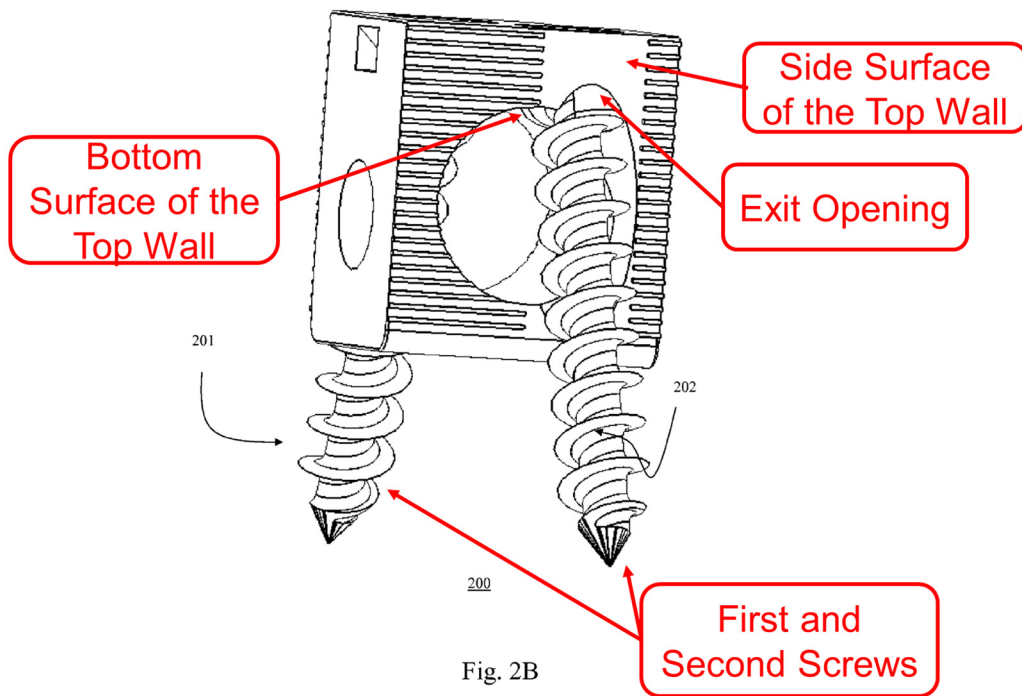


Fig. 2C

(Ex. 1005, Fig. 2B (annotated), Fig. 2C.)

Moskowitz 440 thus discloses limitation [1.f] for reasons discussed above in this Section and in Section X.A.1.v.

- viii) **[1.g] “wherein the internal screw guide and the second internal screw guide are angled to orient a first screw member and a second member bi-directionally in opposite directions;”**

Moskowitz 440 discloses this limitation. (Ex. 1002, Appendix [1.g].) As discussed above in Sections X.A.1.iii and X.A.1.vi, Moskowitz 440’s implant includes an **“internal screw guide”** and a **“second internal screw guide.”** Moskowitz 440’s implant also includes “BDFT screws 201 and 202” that are **“a first screw member and a second member.”** (Ex. 1005, [0065].) The internal screw guides orient the screws because, as discussed in Section X.A.1.i, the internal screw guides “allow the direct placement and insertion” of the screws and have “built-in prescribed angles” to guide the screws. (*Id.*, [0010], [0013].) Moskowitz 440 further discloses that “screws 201 and 202 perforate [the adjacent vertebral bodies] and orient in opposing, superior and inferior directions.” (*Id.*, [0065].) As shown in figure 2A reproduced below, the BDFT screws 201 and 202 are bi-directional such that they are angled in opposite directions.

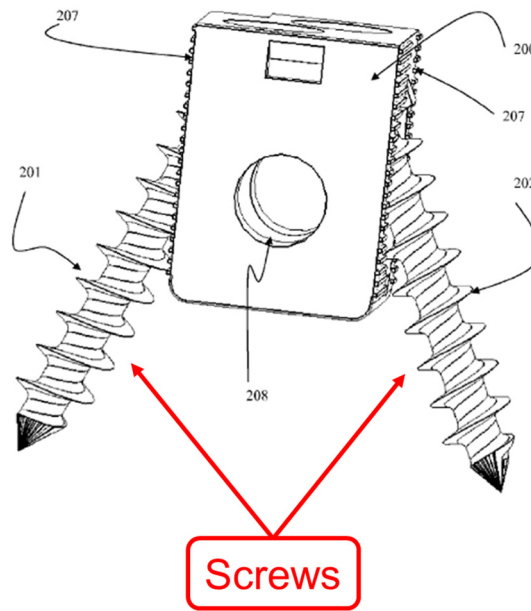


Fig. 2A

(*Id.*, Fig. 2A (annotated).)

ix) [1.h] “a first slot on a first outer side of a first sidewall of the sidewalls;”

Moskowitz 440 discloses this limitation. (Ex. 1002, Appendix [1.h].) As shown in figure 2B, the “**first sidewall of the sidewalls**” as defined in Section X.A.1.ii of Moskowitz 440’s implant has a slot, *i.e.*, “**a first slot**” on its “**first outer side.**”

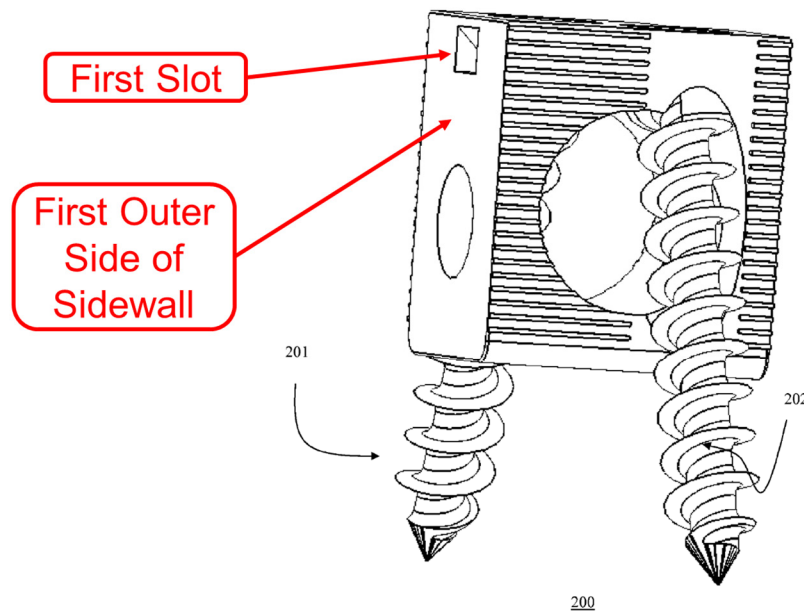


Fig. 2B

(Ex. 1005, Fig. 2B (annotated).)

The interpretation depicted in the figure above is consistent with Moskowitz's representations to the Office during prosecution of the '849 patent. (Ex. 1043, 180, 182; Ex. 1002, Appendix [1.h].)

- x) [1.i] “a second slot on a second outer side of a second sidewall of the sidewalls, wherein the second slot is positioned opposite of the first slot;”

Moskowitz 440 discloses this limitation. (Ex. 1002, Appendix [1.i].) As discussed in Section X.A.1.ix, Moskowitz discloses a “**first slot**” on a “**first sidewall**.” Moskowitz 440's implant is substantially symmetrical, so a POSITA would understand there to be a slot in each of the sidewalls on their respective outer sides. (*Id.*; see also Ex. 1043, 231.) As discussed in Section X.A.1.ii, the two

sidewalls are on opposite sides of screw box 200 such that the “**second slot is positioned opposite of the first slot.**”

- xi) [1.j] “**wherein the first slot is positioned along a first centerline axis that bisects the first sidewall and is positioned nearer a top of the intervertebral cage than a bottom of the intervertebral cage,**”

Moskowitz 440 discloses this limitation. (Ex. 1002, Appendix [1.j].) As shown in figure 2A below, the “**first slot**” is aligned along the center of the first side wall and is closer to the top surface of the top wall (as defined in Section X.A.1.iv) than the bottom of the implant. Also, as shown in figure 2A, this “**centerline axis**” of the first side wall that aligns with the first slot, “**bisects the first side wall.**”

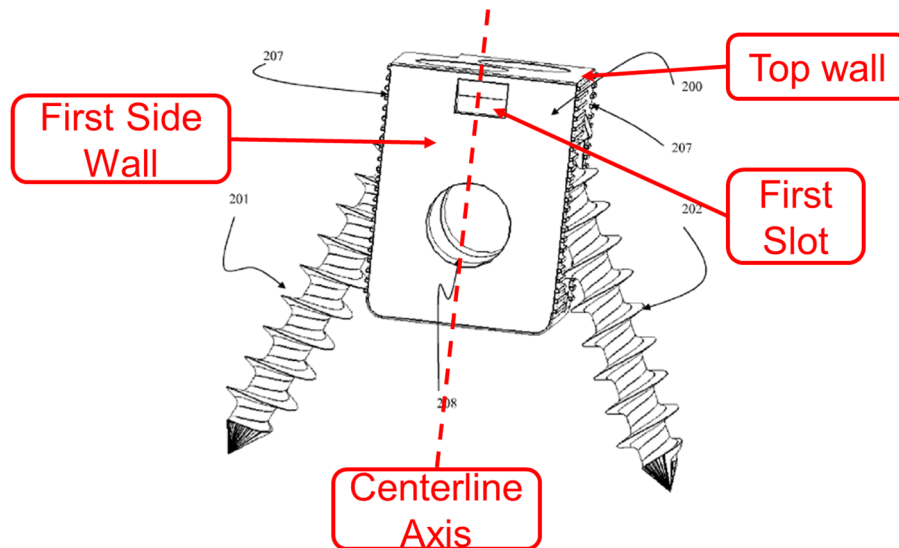


Fig. 2A

(Ex. 1005, Fig. 2A (annotated).)

The interpretation depicted in the figure above is consistent with Moskowitz's representations to the Office during prosecution of the '849 patent. (Ex. 1043, 231, 238; Ex. 1002, Appendix [1.j].)

- xii) [1.k] **“wherein the second slot is positioned along a second centerline axis that bisects the second sidewall and is positioned nearer the top of the intervertebral cage than the bottom of the intervertebral cage,”**

Moskowitz 440 discloses this limitation. (Ex. 1002, Appendix [1.k].) Moskowitz 440's implant is substantially symmetrical; thus, the analysis in Section X.A.1.xi regarding the that the **“first slot”** also applies to the **“second slot”** in this limitation. (*See also* Ex. 1043, 231, 239; Ex. 1002, Appendix [1.k].)

- xiii) [1.l] **“wherein the side surface and the second side surface of the top wall are patterned with a plurality of surface features to create rough side surfaces,”**

Moskowitz 440 discloses this limitation. (Ex. 1002, Appendix [1.l].) As shown in figure 2A below, Moskowitz 440 discloses that the “[t]he superior and inferior edges include ridges 207 to facilitate integration and fusion with superior and inferior vertebral bodies.” (Ex. 1005, [0065].) As discussed in Sections X.A.1.v and X.A.1.vii, these ridged surfaces are the **“side surface”** and **“second side surface of the top wall.”** A POSITA would have understood that ridges 207 disclosed in Moskowitz 440 comprise a **“pattern”** of **“a plurality of surface features”** because there are multiple ridges, and ridges 207 create a **“rough side surface.”** (Ex. 1002, Appendix [1.l].)

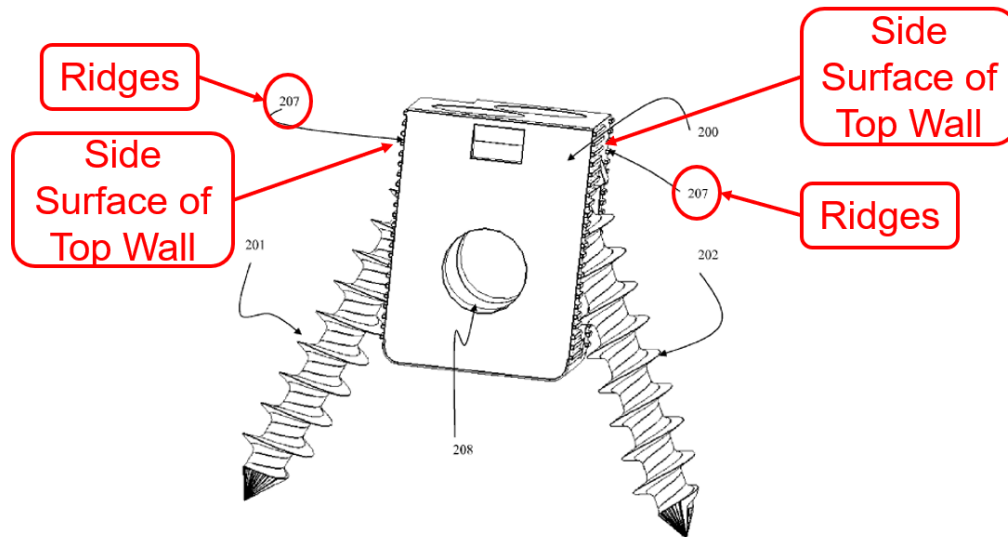


Fig. 2A

(Ex. 1005, Fig. 2A (annotated).)

- xiv) [1.m] “wherein at least some of the plurality of surface features are positioned on the side surface between the top wall and the exit opening, and”⁹

Moskowitz 440 alone and in combination with Waugh discloses or suggests this limitation. (Ex. 1002, Appendix [1.m].) As shown in figure 2C below, some of

⁹ Claim limitation [1.m] is awkwardly worded because it recites that at least some of the “surface features” must be positioned “on the side surface *between* the top wall and the exit opening,” while claim limitation [1.d] expressly states that the “exit opening” is “formed at least partially in a bottom surface of the top wall.” In view of the surrounding claim language, and solely for the purpose of this IPR, Petitioner

ridges 207, which make up “**the plurality of surface features**” (Section X.A.1.xiii),
“**are positioned on the side surface between the top wall and the exit opening**”
as those structures are defined in Sections X.A.1.ii and X.A.1.v.

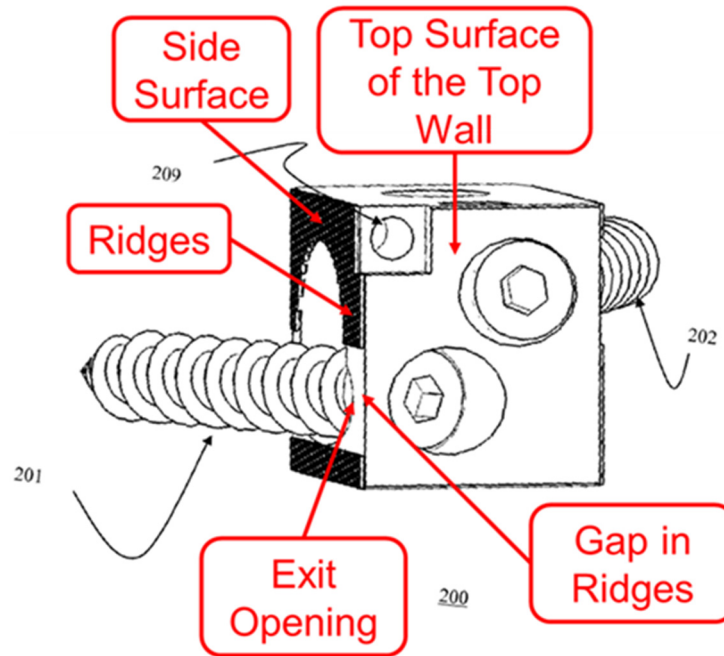


Fig. 2C

(Ex. 1005, Fig. 2C (annotated).)

Although figure 2C of Moskowitz 440 shows a gap in ridges 207 directly above the exit opening, the claim only requires that “**at least some**” of the “**surface**

interprets claim limitation [1.m] as reciting “wherein at least some of the plurality of surface features are positioned on the side surface between the top surface of the top wall and the exit opening.”

features are positioned on the side surface between the top wall and the exit opening.” Because the top surface of the top wall is a surface that extends across the entire width of screw box 200, some of ridges 207 need only be between some area along the top surface of the top wall and the exit opening. The applicable ridges for this limitation are thus not limited to those that lie directly above the exit opening. Therefore, figure 2C discloses that at least some of these ridges lie between the top surface of the top wall and the exit opening. Additionally, in another embodiment, Moskowitz 440 shows some uninterrupted ridges across the entire width of the side surface between the top surface of the top wall and the exit opening, as shown in figure 1C below.

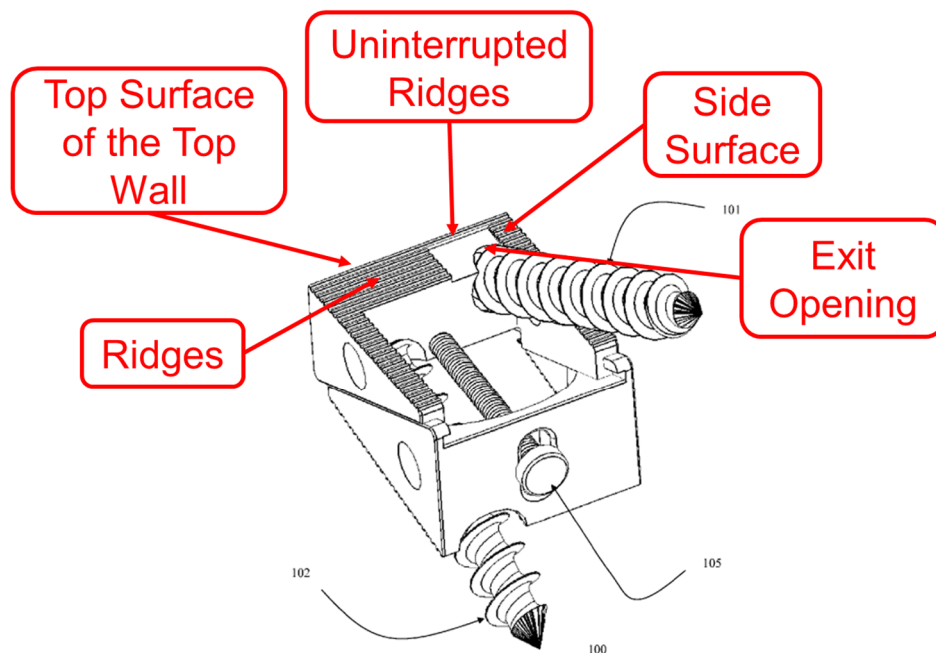
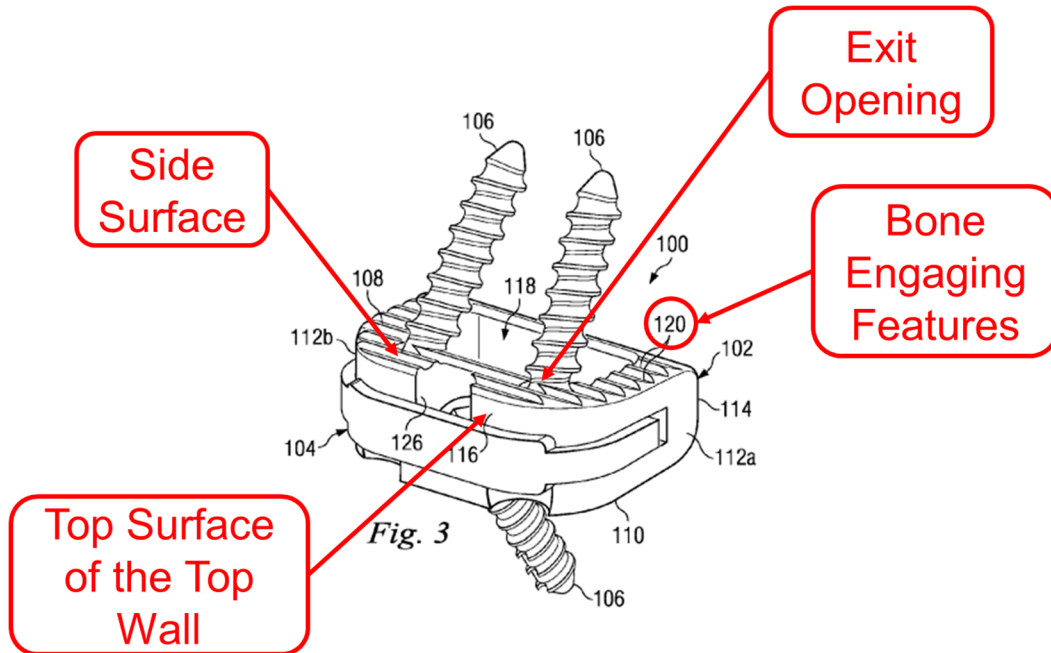


Fig. 1C

(*Id.*, Fig. 1C (annotated).)

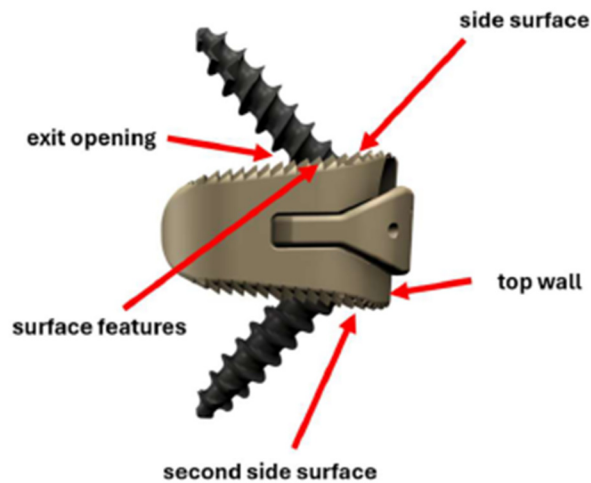
Because Moskowitz 440 discloses that its ridges facilitate incorporation into and fusion with vertebral bodies (Ex. 1005, [0064]-[0065]), a POSITA would have understood that the arrangement of ridges with more of the side surface covered (like in Moskowitz 440's figure 1C) would have been preferred to promote fusion. (Ex. 1002, Appendix [1.m].) Moskowitz 440 thus discloses limitation [1.m].

Waugh also discloses this limitation. (*Id.*) As shown in Waugh's figure 3 below, Waugh discloses "bone engaging features 120 configured to reduce slipping or movement of the implant member 102 relative to the vertebrae 14, 16." (Ex. 1006, [0029].) As discussed above, a POSITA would have been motivated to use ridges across the entire width of the side surface in the Moskowitz 440 implant shown in figure 2C to hold the implant in its proper placement, which will lead to increased fusion with the adjacent vertebral body. (Ex. 1002, Appendix [1.m].) A POSITA would have had a reasonable expectation of success in using Waugh's bone engaging features 120 with Moskowitz 440's screw box because they are like Moskowitz 440's ridges in structure, placement, and function, and a POSITA would have had to simply extend the ridges depicted in Moskowitz 440's figure 2C. (*Id.*)



(Ex. 1006, Fig. 3 (annotated).)

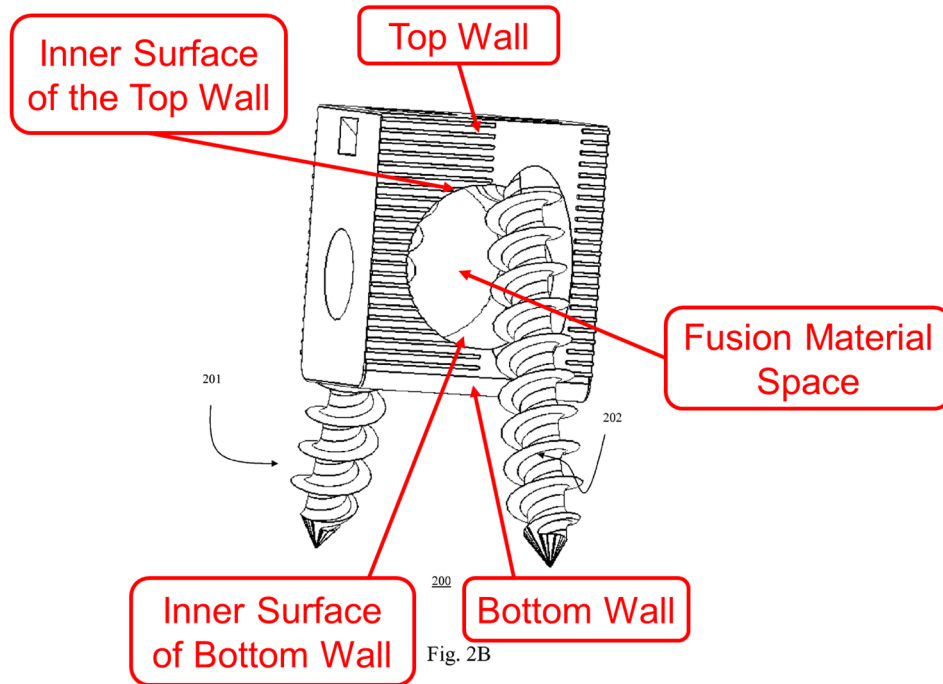
The above mappings are consistent with Moskowitz's infringement contentions that were served in the Pending Litigation.



(Ex. 1059, 8 (excerpted).)

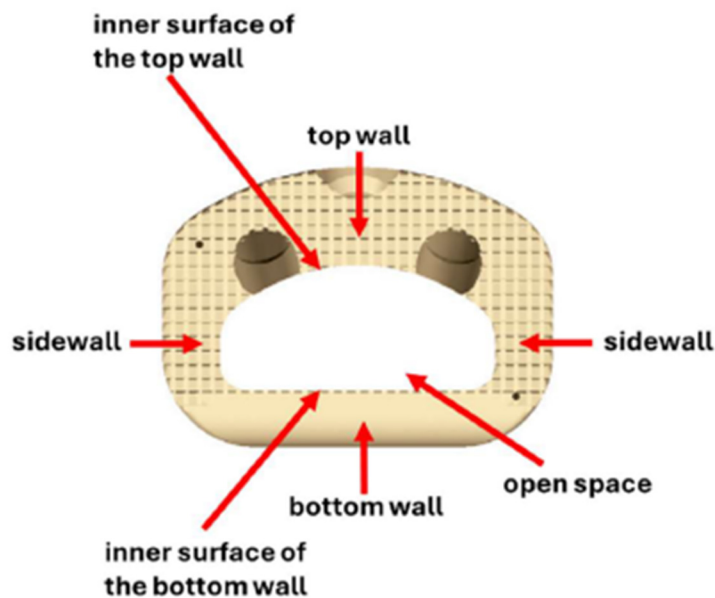
- xv) [1.n] **“wherein the top wall, the bottom wall, and the sidewalls are integrally formed and the fusion material space for receiving bone graft material extends continuously from an inner surface of the top wall to an inner surface of the bottom wall;”**

Moskowitz 440 discloses this limitation. (Ex. 1002, Appendix [1.n].) As shown in figure 2B below, the walls of screw box 200 are all joined to form the unitary piece that is the box, such that **“the top wall, the bottom wall, and the sidewalls”** as defined in Section X.A.1.ii above are **“integrally formed.”** The open space that is the **“fusion material space”** is a circular hollow space that extends uninterruptedly about the inner surfaces of the screw box and entirely through it. (See Ex. 1005, Fig. 2B). Because this space is circular through the inner portion of the screw box, it **“extends continuously from an inner surface of the top wall to an inner surface of the bottom wall.”**



(*Id.*, Fig. 2B (annotated).)

The above mapping is consistent with Moskowitz's infringement contentions.

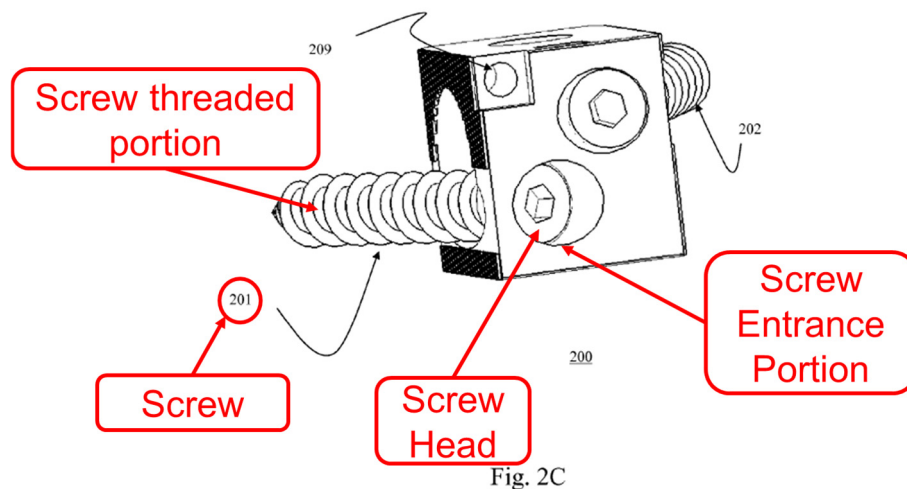


(Ex. 1059, 9 (excerpted).)

xvi) [1.o] “a first screw having a first screw head and a

first screw shaft having a first screw threaded portion, wherein the screw entrance portion of the internal screw guide is sized large enough to receive at least part of the first screw head and wherein the internal bore portion of the internal screw guide is sized with a smaller diameter than the screw entrance portion and is sized to receive the first screw shaft of the first screw;

Moskowitz 440 discloses this limitation. (Ex. 1002, Appendix [1.o].) As shown in figure 2C below, screws 201 and 202 each have a “**screw head**” and a “**screw shaft having a [] screw threaded portion,**” *i.e.*, the portion of the screw with a ridge wrapping around the screw. (Ex. 1005, Abstract.) Additionally, the heads of screws 201, 202 are depicted “**in the screw entrance portion[s].**” (*Id.*, Fig. 2C; *see supra*, Section X.A.1.iii.) Moskowitz 440 thus discloses “**the screw entrance portion of the internal screw guide is sized large enough to receive at least part of the first screw head.**”



(Ex. 1005, Fig. 2C (annotated).)

A POSITA would have understood that Moskowitz 440 also discloses that the **“internal bore portion of the internal screw guide is sized with a smaller diameter than the screw entrance portion.”** (Ex. 1002, Appendix [1.o].) This smaller diameter internal portion serves to stop the screw from screwing entirely through the implant. (*Id.*) Without a smaller internal bore portion, there would be nothing holding the screw to the implant and the implant could back out of the disc space after insertion of the screws. (*Id.*) An implant without such a feature would go against the purpose of Moskowitz 440’s screw box 200 to maintain disc space height and to link, interlock, and fuse the adjacent vertebrae (*Id.*; Ex. 1005, [0006], [0009].)

That Moskowitz 440’s screw heads and threaded portion of the screws appear to have approximately the same diameter does not affect this disclosure of an **“internal bore portion [having] . . . a smaller diameter than the screw entrance portion.”** A POSITA would have understood that a screw shaft has two diameters, a major diameter measured by the outer diameter of the thread, and a minor diameter measured by the diameter of the inner core of the screw shaft. (Ex. 1002, Appendix [1.o].) A POSITA would have also understood that so long as the diameter of the internal bore is larger than the minor diameter of the screw shaft, the screw shaft’s larger major diameter would not prevent it from fitting within the internal bore. (*Id.*)

Moskowitz 440 thus discloses limitation [1.o].

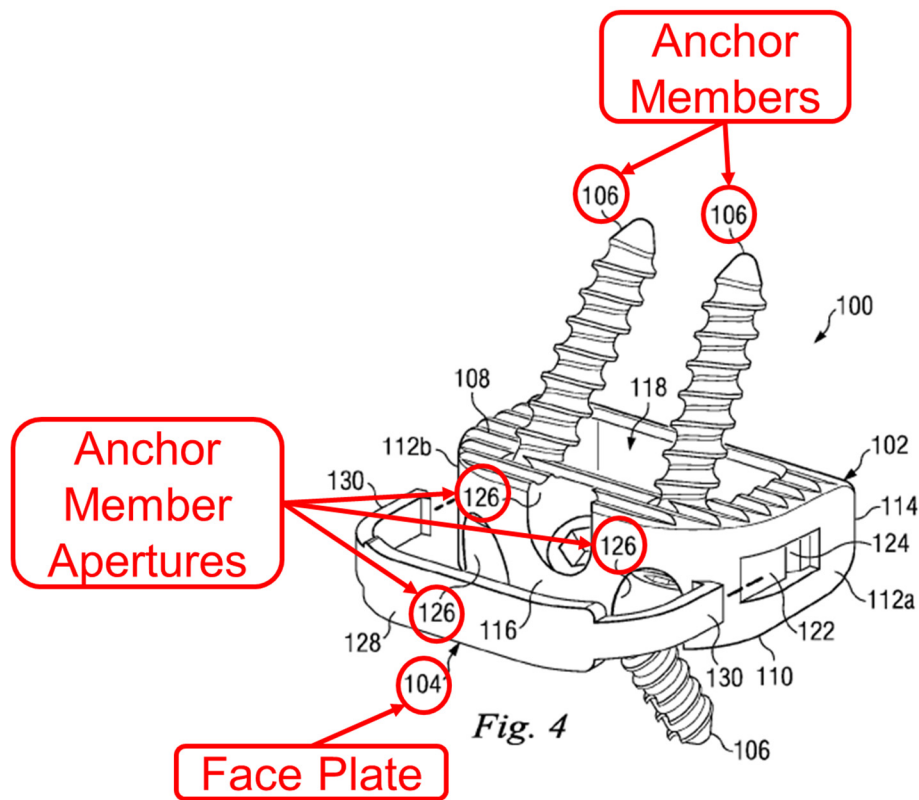
- xvii) **[1.p] “a second screw having a second [sic] screw head and a second [sic] screw threaded portion, wherein the second screw entrance portion of the second internal screw guide is sized large enough to receive at least part of the second screw head and wherein the second internal bore portion of the second internal screw guide is sized with a smaller diameter than the second screw entrance portion and is sized to receive the second screw shaft of the second screw; and”**

Moskowitz 440 discloses this limitation. (Ex. 1002, Appendix [1.p].) As discussed in Section X.A.1.xvi, Moskowitz 440 discloses two screws that each fit within the internal screw guide in the same manner. Screws 201, 202 have the same structure and function as part of the BDFT screw construct. (Ex. 1005, Abstract, [0002], [0009], [0027], [0065], Figs. 2A-2C.) Therefore, the analysis in Section X.A.1.xvi regarding the “**first screw**” applies equally to the “**second screw.**”

- xviii) **[1.q] “a screw locking bracket having a first end portion sized and positioned to be inserted into the first slot,”**

Moskowitz 440 combined with Waugh discloses and suggests this limitation. (Ex. 1002, ¶¶57-63, Appendix [1.q].) As discussed above in Section VIII.A, Moskowitz 440 discloses a non-expandable spinal implant with screws for securing the implant to the adjacent vertebrae. As shown in Moskowitz 440’s figure 2C, however, Moskowitz 440’s implant does not have a locking bracket to prevent screw back-out. (*Id.*, ¶58.)

Waugh discloses an implant that is similar to Moskowitz 440's figure 2C (*see* figure 4 below) with anchor members 106 (*i.e.*, screws), but also discloses a "face plate 104" that "reduce[s] the chance of the anchor members 106 backing out of the vertebral bodies over time and causing the implant member 102 to become loose." (Ex. 1006, [0031].)

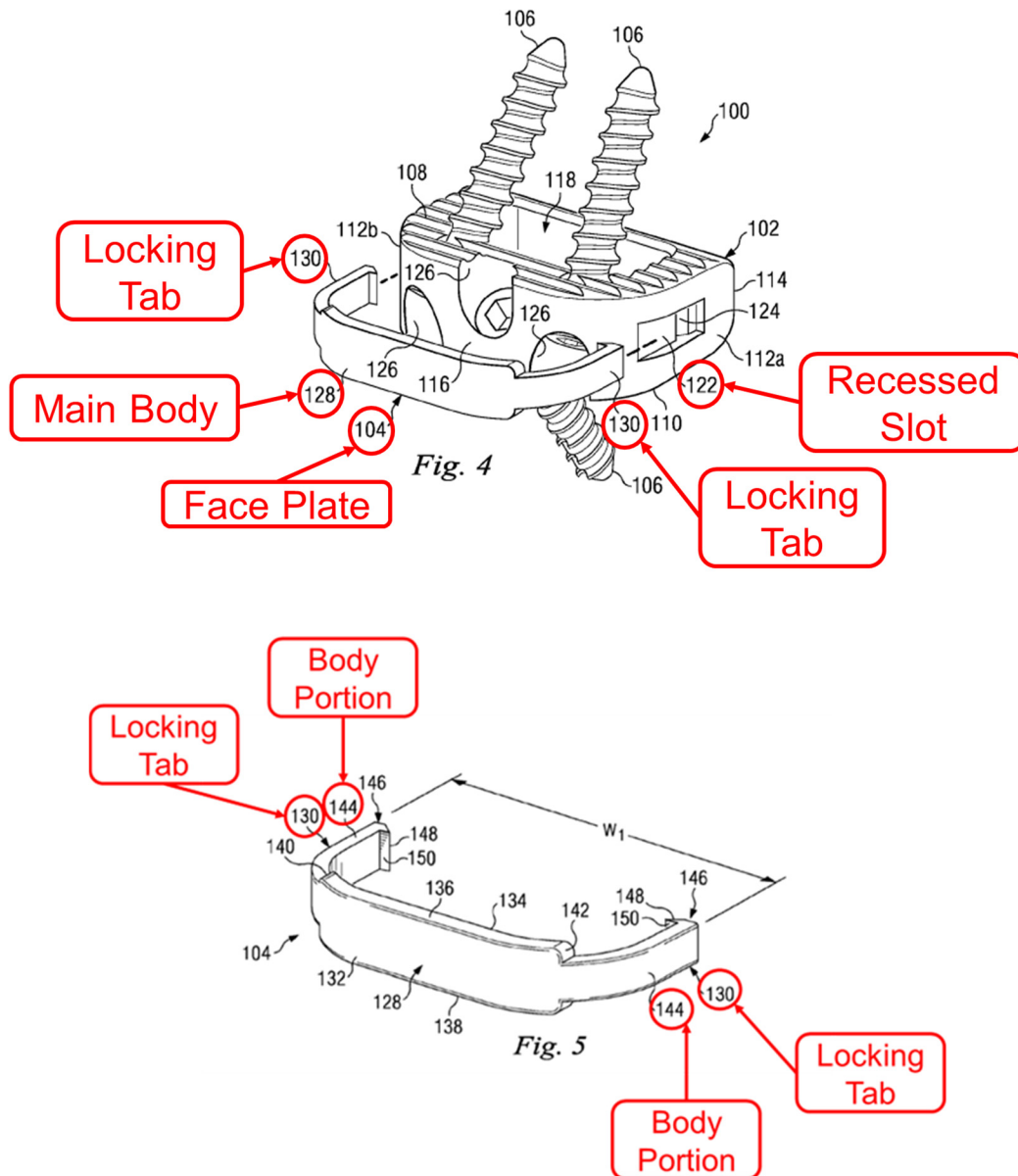


(*Id.*, Fig. 4 (annotated).)

As shown in figure 4 above, face plate 104 "extend[s] across at least a portion of the anchor member apertures 126 [*i.e.*, screw holes)] and physically block anchor member back-out." (*Id.*, [0031].) Waugh's face plate 104 is therefore a "**screw locking bracket.**" Waugh further discloses that face plate 104 "includes a main

body 128 and locking features that cooperate with the implant member 102 to secure the main body 128 in place over the anchor member apertures 126.” (*Id.*, [0031].) The locking features are “locking tabs 130” that extend from the first and second ends 140, 142 of the main body 128. (*Id.*, [0031], [0033].) The first of Waugh’s two locking tabs 130 is “**a first end portion.**” As shown in figures 4 and 5 below, “[e]ach locking tab 130 includes a body portion 144” that “is configured to fit within the corresponding recessed slots 122 formed in the side surfaces 122*a-b* of the implant member 102.” (*Id.*, [0033].) Waugh thus discloses limitation [1.q].¹⁰

¹⁰ Before filing the ’183 patent, Moskowitz was made aware of Waugh during the prosecution of a related patent application, U.S. Appl. No. 13/418,335 (“the ’335 application”). (Ex. 1060, 6-9.) Moskowitz knew that Waugh was relevant to the pending claims of the ’183 patent because the pending claims of the ’335 recited a screw locking bracket that the Office had identified as disclosed in Waugh. Despite this knowledge, Moskowitz did not disclose Waugh to the Office during prosecution of the ’183 patent.



(*Id.*, Figs. 4-5 (both annotated).)

In view of Waugh, a POSITA's knowledge, and Moskowitz 440's teachings, a POSITA would have been motivated to combine Waugh's face plate 104 with Moskowitz 440's implant. (Ex. 1002, ¶¶58-62.) Waugh teaches that "[o]ver time, due to micro motion of the vertebrae relative to the implant member, the anchor

members may loosen and start to back out of the vertebrae.” (Ex. 1006, [0004].)

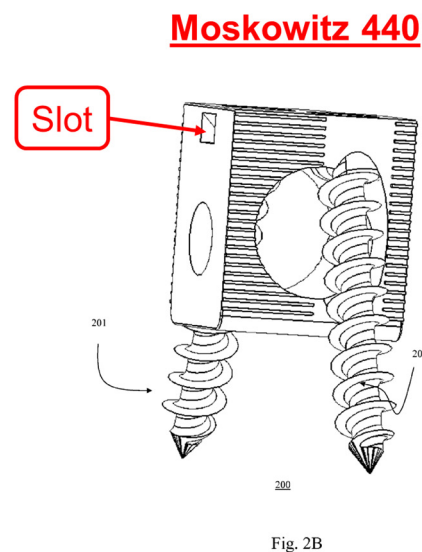
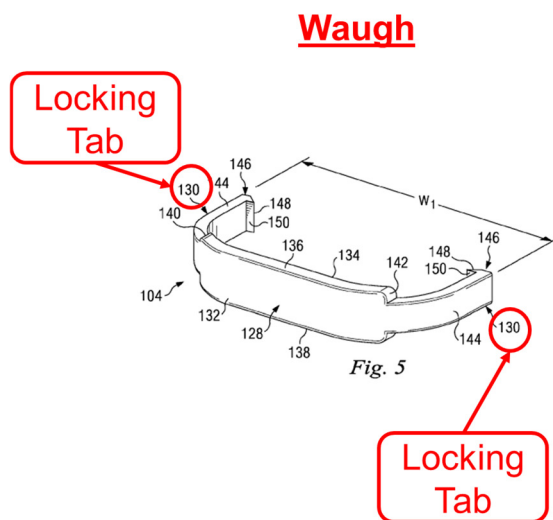
Waugh’s face plate 104 fixes or, at minimum, reduces this issue by covering the screw holes to ensure the anchor members (screws) do not back out. (*Id.*, [0031].)

Moskowitz 440’s implant would be vulnerable to such back-out because it does not disclose any mechanism to block the screws 201 and 202 from backing out. Thus, a POSITA would have been motivated to look to Waugh’s face plate 104 as a solution because Moskowitz’s implant does not have any structure that is similar to Waugh’s face plate 104. (Ex. 1002, ¶62.) In particular, a POSITA would have been motivated to use Waugh’s face plate 104 over other mechanisms to prevent back-out because Moskowitz’s 440 implant already has indentations/slots on the sidewalls that could interact with the side locking tabs 130 of Waugh’s face plate 104, just as Waugh’s face plate 104 interacts with recessed slots 122 on Waugh’s implant. (*Id.*)

Given these functional and structural similarities between the Moskowitz 440 and Waugh implants, a POSITA would have been motivated to use Waugh’s face plate 104 to prevent back-out of Moskowitz 440’s screws because the modification could be made without otherwise affecting the performance of Moskowitz 440’s implant. (*Id.*) Furthermore, Waugh’s face plate 104 would have allowed a surgeon to use the same structure, *i.e.*, indentations/slots, for both gripper prongs of a tool for insertion and for attaching the face plate. (Ex. 1006, [0029], [0033] (teaching that nearly

identical slots as those in Moskowitz 440 can be used both “to cooperate with an insertion tool” and to “interface with locking protrusions” of the face plate 104).)

A POSITA would have had a reasonable expectation of success in configuring and using Waugh’s face plate 104 with Moskowitz 440’s implant because little to no modifications would have been needed to Waugh’s face plate 104 or the slots in Moskowitz 440’s implant. (Ex. 1002, ¶63.) As shown in the figures below, a POSITA would have known Waugh’s locking tabs 130 could likewise insert into Moskowitz 440’s slots in the sidewalls to attach Waugh’s face plate 104 to Moskowitz 440’s screw box 200 and that the only modifications required to do so would be to account for the shape and size of the implant and the associated slots in screw box 200. (*Id.*) Although Waugh’s implant has three screws, a POSITA would have known Waugh’s face plate 104 would have also worked with an implant with two screws. (*Id.*)



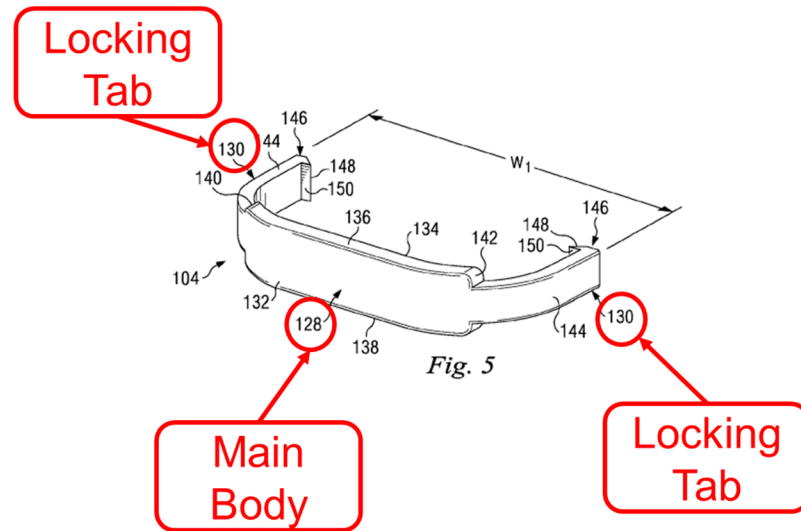
(Ex. 1006, Fig. 5; Ex. 1005, Fig. 2B (both annotated).)

xix) [1.r] “a second end portion sized and positioned to be inserted into the second slot and”

Moskowitz 440 combined with Waugh discloses and suggests this limitation. (Ex. 1002, Appendix [1.r].) As discussed in Section X.A.1.xviii, Waugh discloses a face plate 104 (*i.e.*, “screw locking bracket”) with locking tabs 130 at both the first and second end portions that are inserted in slots in the sidewalls. The second of Waugh’s two locking tabs 130 is thus **“a second end portion.”**

xx) [1.s] “a central portion extending between the first end portion and the second end portion,”

Moskowitz 440 combined with Waugh discloses and suggests this limitation. (Ex. 1002, Appendix [1.s].) As discussed in Section X.A.1.xviii, Waugh’s face plate 104 has a main body 128 with locking tabs 130 (*i.e.*, **“the first end portion and the second end portion”**) at each end of the main body. The main body 128 is **“a central portion extending between the first end portion and the second end portion.”**

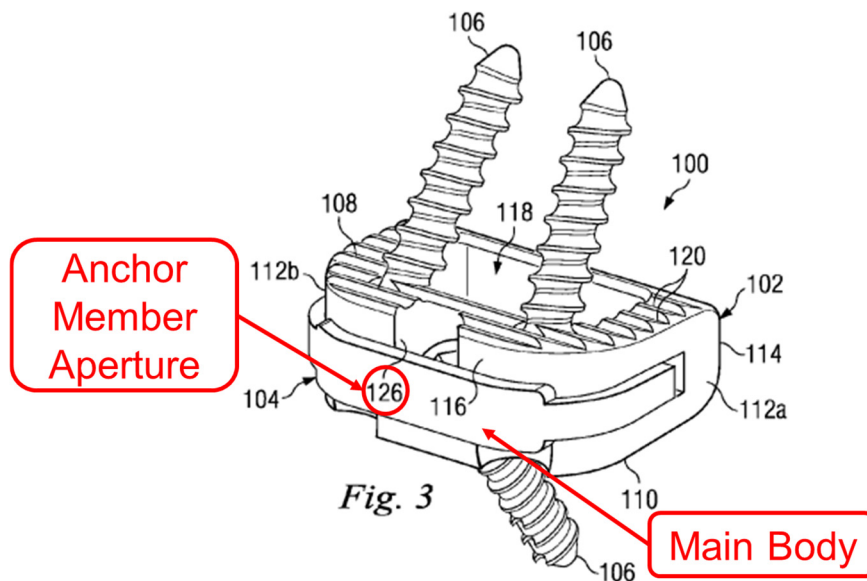


(Ex. 1006, Fig. 5 (annotated).)

- xxi) [1.t] “wherein when the screw locking bracket is connected to the intervertebral cage with the first end portion in the first slot and the second end portion in the second slot, the central portion partially blocks the screw entrance portion and the second screw entrance portion so as to retain the first and second screws in the internal screw guide and the second internal screw guide while leaving at least a portion of each of the first and second screw heads at least partially visible through gaps between the screw locking bracket and the intervertebral cage.”

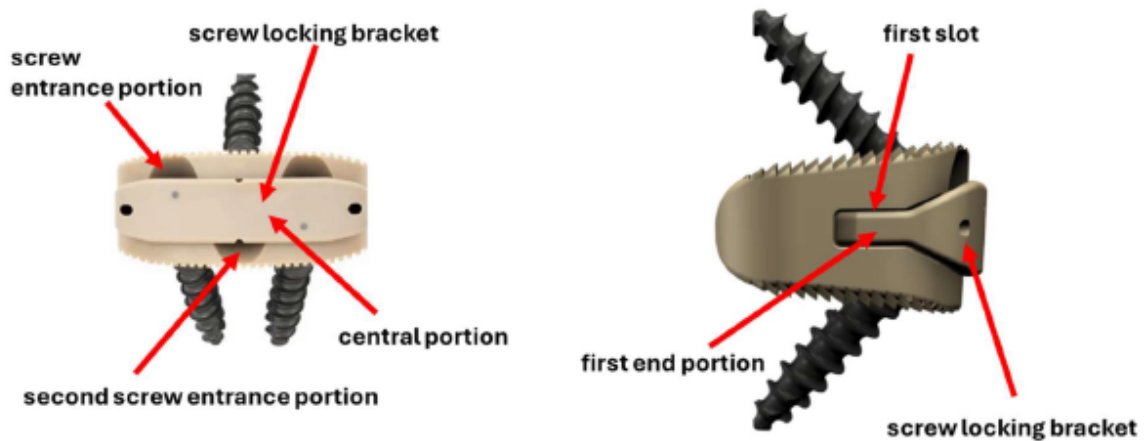
Moskowitz 440 combined with Waugh discloses and suggests this limitation. (Ex. 1002, Appendix [1.t].) As discussed in Sections X.A.1.xviii and X.A.1.xix, the “screw locking bracket” disclosed in Waugh is “connected to the intervertebral cage with the first end portion in the first slot and the second end portion in the second slot.” Waugh further explains that its faceplate 104 “at least partially cover[s] a *plurality* of anchor member apertures” 126. (Ex. 1006, [0007] (emphasis

added).) As discussed in Section X.A.1.xviii, Waugh's anchor members are screws and anchor member apertures are holes through which Waugh's screws enter the implant and in which the screw heads sit. (*Id.*, [0006], Fig. 4.) Therefore, Waugh's anchor member apertures are the same as the **"screw entrance portion."** (*See supra*, Section X.A.1.iii.) As shown in Fig. 3 below, when Waugh's faceplate 104 (**"the screw locking bracket"**) is connected to Waugh's cage, main body 128 (**"the central portion"**) partially blocks the anchor member apertures 126 (**"the screw entrance portions"**), **"while leaving at least a portion of each of the first and second screw heads at least partially visible through gaps between the screw locking bracket and the intervertebral cage."** This retains the screws in their respective screw guides since they are blocked from backing out. The Moskowitz 440-Waugh combination thus discloses limitation [1.t] because, as discussed above in Section X.A.1.xviii, a POSA would have found it obvious to combine Moskowitz 440's implant with Waugh's face plate 104.



(Ex. 1006, Fig. 3 (annotated).)

The above analysis is consistent with Moskowitz's infringement contentions.



See also Claim 1, Row 1E.

(Ex. 1059, 14-15.)

Furthermore, the '183 patent does not identify any benefit associated with having the face plate only partially cover the screw entrance portions. (Ex. 1002,

Appendix [1.t].) The feature is essentially a design choice and a POSA would have understood that Waugh's design choice (in leaving the screw entrance portions partially exposed) could be predictably applied to Moskowitz 440's implant. (*Id.*) For example, a POSA would decide between a design that covers more of the screw entrance portion to reduce the possibility of the screw backing out, or a design that covers less of the screw entrance portion to obtain other benefits, *e.g.*, save material and weight, while increasing bone fusion. (*Id.*)

Moreover, as shown in figure 1B of Moskowitz 440, screw heads can protrude above the top surface of the top wall. (Ex. 1005, Fig. 1B.) Thus, a POSA would have understood that when Waugh's face plate is combined with Moskowitz's implant, the face plate would contact the screw heads in some configurations where the screw heads protrude (like in figure 1B of Moskowitz 440) above the top surface of the implant depending on the thickness of the top wall. For example, a POSA may want to use a thinner top wall (like in figure 1B) because less implant material allows for more bone graft. (Ex. 1002, Appendix [1.t].) A face plate covering such screws will leave a gap between the plate and the cage such that the protruding portion of the screws will be visible from that gap. (*Id.*)

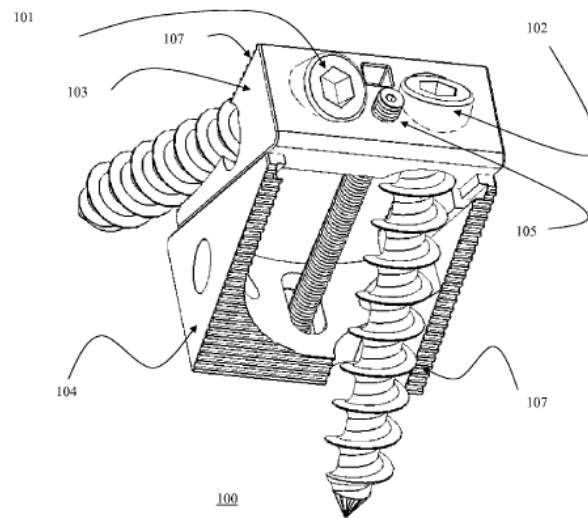


Fig. 1B

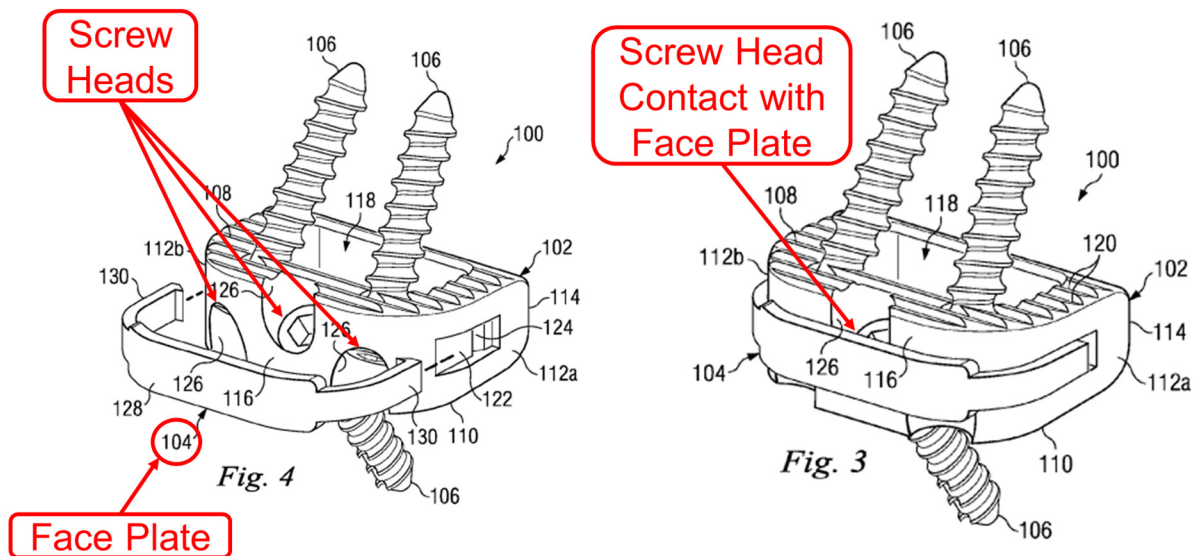
(Ex. 1005, 1B.)

2. Claim 2

- i) **“The apparatus of claim 1, wherein the screw locking bracket abuts both the first and second screw heads when the screw locking bracket is connect [sic] to the intervertebral cage.”**

Moskowitz 440 combined with Waugh discloses and suggests this limitation. (Ex. 1002, Appendix [2].) As discussed in Section X.A.1.xxi, Waugh discloses that when face plate 104 (“**screw locking bracket**”) is connected, it at least partially blocks the screw entrance portions where the screw heads sit. Waugh further discloses that face plate 104 “physically block[s] anchor member back-out” and inhibits the anchor members 106 from backing out by being physically located within the back-out path. (Ex. 1006, [0031]-[0032].) As Waugh recognizes, “[o]ver

time . . . anchor members 106 may loosen slightly . . . [but] may be unable to back-out because they come into contact with the main body 128 of the faceplate 104.” (*Id.*, [0059].) As shown in figure 4 below, the tops of Waugh’s screw heads are exposed, such that when face plate 104 is attached, it contacts the screw heads. This contact is shown in figure 3 below for the center screw head and a POSITA would have understood that face plate 104 similarly contacts the other two screw heads. The Moskowitz-Waugh combination thus discloses claim 2.



(Ex. 1006, Figs. 4, 3 (both annotated).)

The above analysis would also apply to the combination of Moskowitz 440’s screw box 200 and Waugh’s face plate 104. Because face plate 104 functions by physically blocking the screws from backing out of vertebrae, a POSITA would have understood that face plate 104 would also contact the heads of Moskowitz 440’s screws 201, 202 in the Moskowitz 440-Waugh combination. (Ex. 1002, Appendix

[2].) Additionally, as shown in Moskowitz 440 figure 2C below, just as in Waugh, the heads of screws 201, 202 have portions exposed to the top surface where the screw locking bracket, face plate 104, would sit when connected to the intervertebral cage, screw box 200.

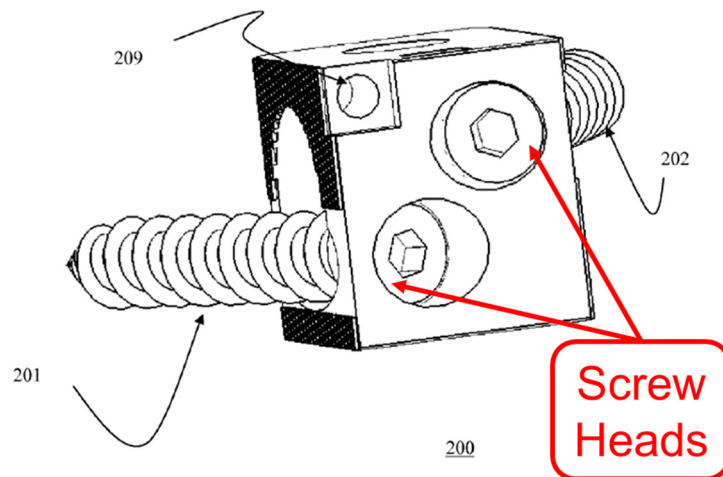


Fig. 2C

Moreover, as shown in figure 1B of Moskowitz 440, screw heads can protrude above the top surface of the top wall (Ex. 1005, Fig. 1B) and in that configuration, the plate will abut with the screw heads. (Ex. 1002, Appendix [2]; *supra* Section X.A.1.xxi.)

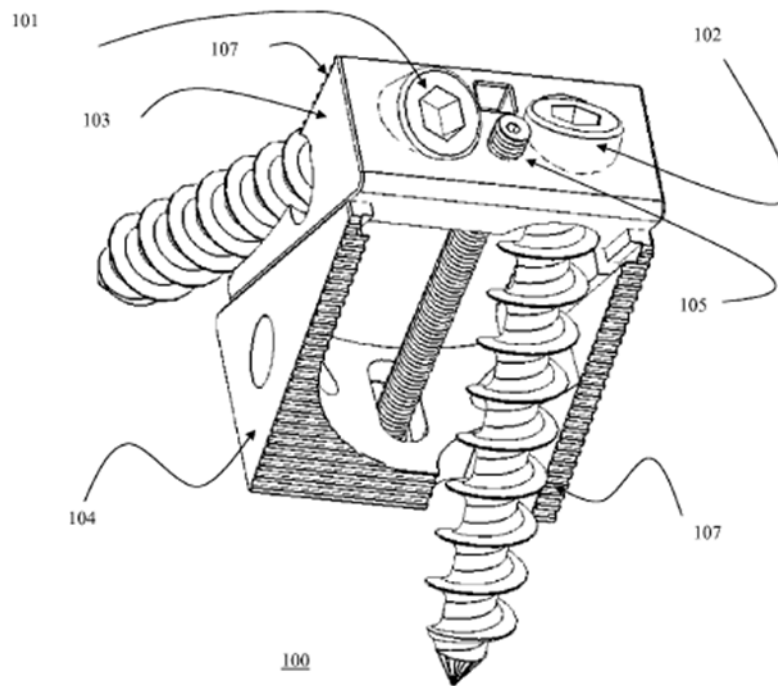


Fig. 1B

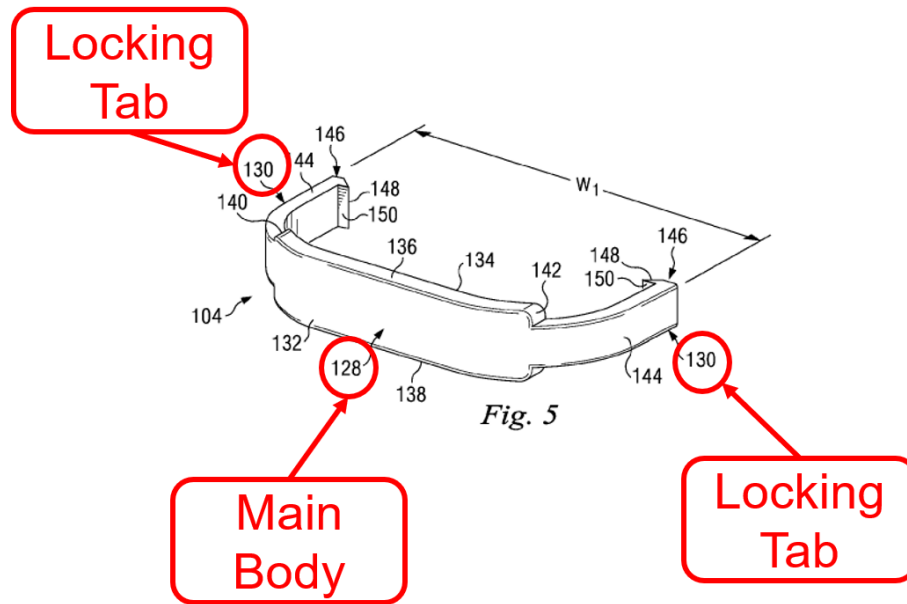
(Ex. 1005, Figs. 2C (annotated), 1B.)

3. Claim 3

- i) **“The apparatus of claim 1, wherein the screw locking bracket is at least partially U-shaped such that the first and second end portions wrap at least partially around the first second sidewalls.”**

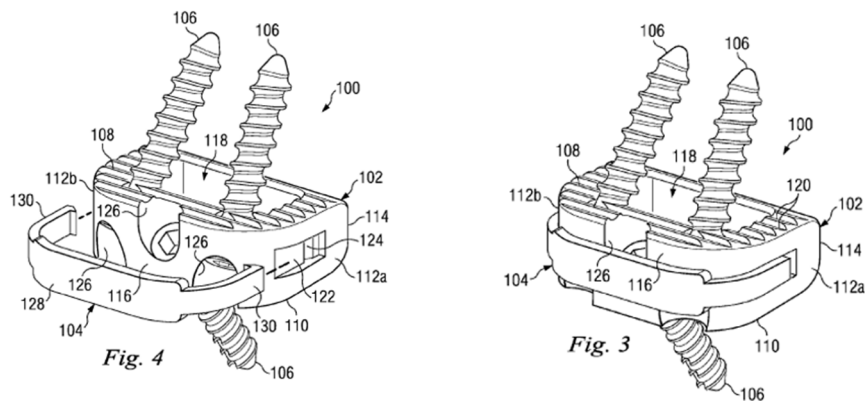
Moskowitz 440 combined with Waugh discloses and suggests this limitation.

(Ex. 1002, Appendix [3].) As shown in figure 5 below, Waugh’s locking tabs 130 curve from main body 128 so that **“the screw locking bracket is at least partially U-shaped.”**



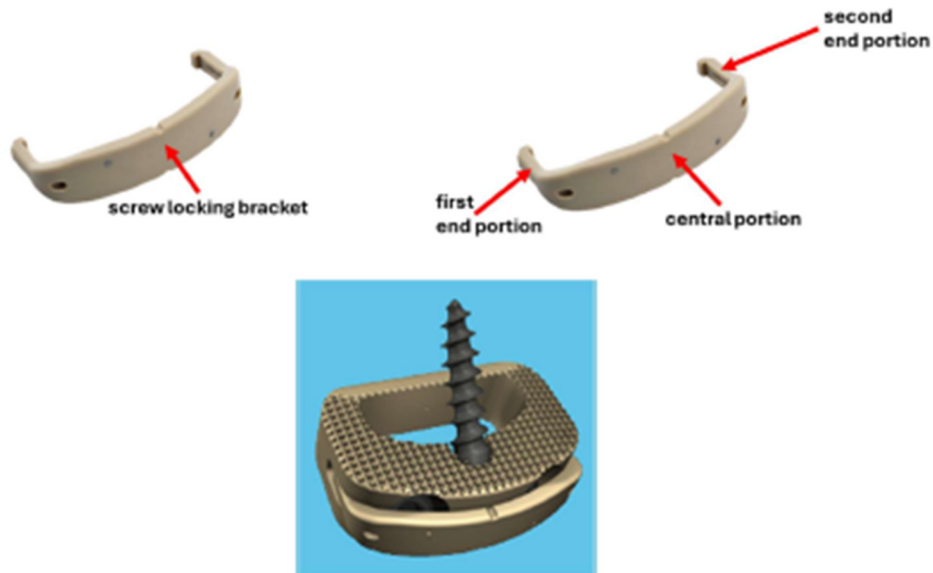
(Ex. 1006, Fig. 5 (annotated).)

The locking tabs 130 also partially wrap around the sidewalls, as shown in figures 3 and 4 below.



(*Id.*, Figs. 3, 4.)

The above mapping is consistent with Moskowitz's infringement contentions that were served in the Pending Litigation.

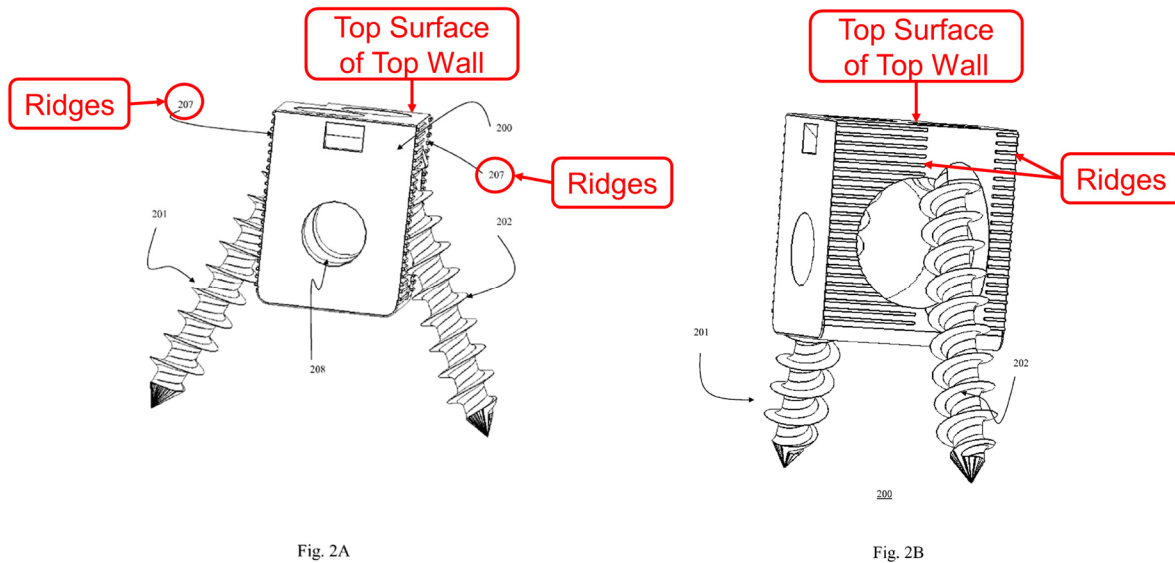


(Ex. 1059, 17 (excerpted).)

4. Claim 4

- i) **“The apparatus of claim 1, wherein the plurality of surface features on the side surface and the second side surface are patterned all the way next to the top surface of the top wall so as to be adjacent the top surface of the top wall.”**

Moskowitz 440 discloses this limitation. (Ex. 1002, Appendix [4].) As shown in figure 2A below, ridges 207 extend up to the top surface of the top wall.



(Ex. 1005, Figs. 2A-2B (both annotated).)

5. Claim 6

- i) **“The apparatus of claim 1, wherein the intervertebral cage is sized and configured for use in a patient's lumbar spine, the apparatus further comprising means for fusing superior and inferior lumbar vertebral bodies in conjunction with the intervertebral cage.”**

Moskowitz 440 discloses this limitation. (Ex. 1002, Appendix [6].)

Moskowitz 440 describes the figures 2A-2C embodiment as a “[l]umbar intervertebral non-expandable screw box” and discloses that screw box 200 “can be implanted via . . . posterior lumbar interbody fusion (PLIF) or posterior transforaminal lumbar interbody fusion (TLIF).” (Ex. 1005, [0040], [0065], [0086].)

Because Moskowitz 440's screw box 200 is an intervertebral cage (*supra*, Section

X.A.1.ii), Moskowitz 440 discloses **“the intervertebral cage is sized and configured for use in a patient's lumbar spine.”**

As discussed in Section IX, the structure corresponding to the means recited in claim 6 is ridges that facilitate integration and fusion with superior and inferior vertebral bodies. As discussed in Section X.A.1.xiii, Moskowitz 440's screw box 200 has ridges 207. Moskowitz 440 additionally discloses that “ridges 207 [] facilitate integration and fusion with superior and inferior vertebral bodies.” Moskowitz 440 thus discloses the claimed means.

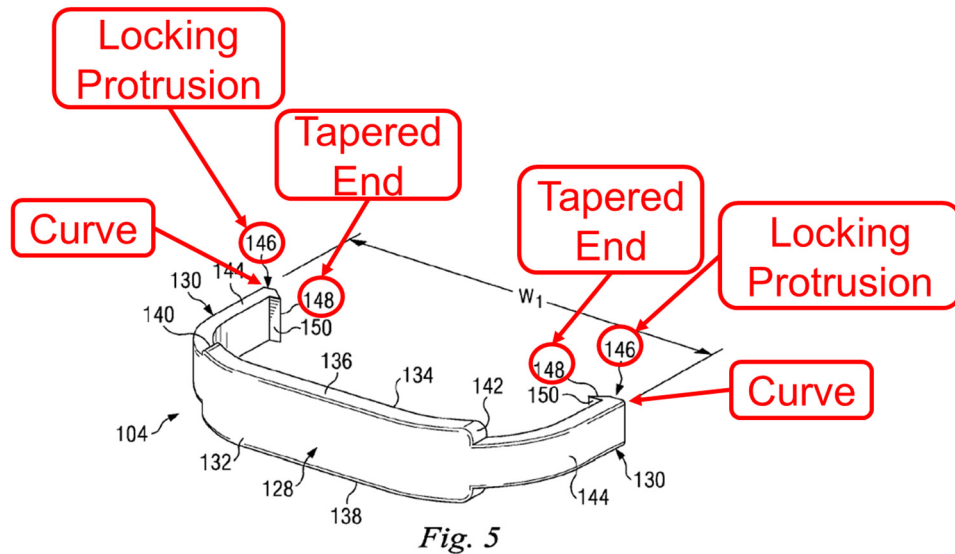
In the Pending Litigation, Moskowitz has suggested that the means recited in claim 6 is bone graft/fusion material. (Ex. 1059, 21-22.) To the extent Moskowitz maintains that position in this IPR, Moskowitz 440 discloses that its spacer “can be filled with bone fusion material(s)” (Ex. 1005, [0002]), and more specifically, that screw box 200 has “holes 208 and hollow spaces allowing packaging with bone.” (*Id.*, [0065].)

6. Claim 8

- i) “The apparatus of claim 1, wherein the screw locking bracket comprises a first hook at the first end portion that curves inward to engage the first slot and a second hook at the second end portion that curves inward to engage the second slot.”**

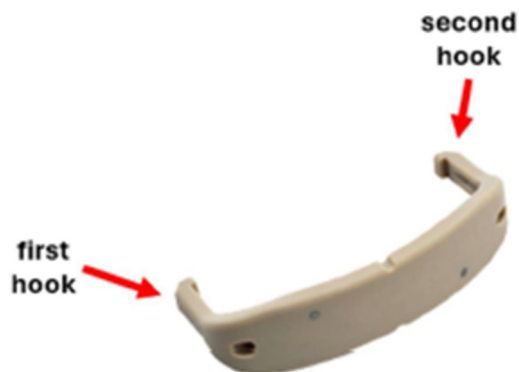
Moskowitz 440 combined with Waugh discloses and suggests this limitation. (Ex. 1002, Appendix [8].) As shown in figure 5 below, Waugh's curved locking

protrusions 146 (“**first hook**” and “**second hook**”) have tapered ends 148 that point towards the center of face plate 104, *i.e.*, “**curve[] inward to engage**” “**the first slot**” and “**the second slot.**” (*Id.*; *Supra*, Section X.A.1.xxi.)



(Ex. 1006, Fig. 5 (annotated).)

The above mapping is consistent with Moskowitz’s infringement contentions that were served in the Pending Litigation.



(Ex. 1059, 23 (excerpted).)

7. Claim 10

- i) **“The apparatus of claim 1, wherein the screw locking bracket is configured to be press fit to the intervertebral cage.”**

The Moskowitz-Waugh combination discloses and suggests this limitation. (Ex. 1002, Appendix [10].) Waugh discloses that “the faceplate 104 snap[s] onto the implant member 102 because the locking tabs 130 deform toward their original positions as the locking protrusions 146 at least partially snap into the connecting impressions 124.” (Ex. 1006, [0058].) Combining Waugh’s face plate 104 with Moskowitz 440’s implant would not change this functionality. (Ex. 1002, Appendix [10].) The Waugh-Moskowitz 440 combination thus discloses claim 10.

8. Claim 11

- i) **[11.pre] “A intervertebral combination internal screw guide and fixation apparatus configured to be inserted into a disc space between a first vertebral body and a second vertebral body and to provide fusion of the first vertebral body to the second vertebral body via biological bone fusion and screw fusion, the apparatus comprising:”**

Moskowitz 440 discloses this limitation. (*Supra*, Section X.A.1.i; Ex. 1002, Appendix [11.pre].)

- ii) **[11.a] “an intervertebral cage including: a top wall, a bottom wall, and first and second sidewalls defining a fusion material space capable of receiving bone filling for the biological bone fusion;”**

Moskowitz 440 discloses this limitation. (*Supra*, Section X.A.1.ii; Ex. 1002, Appendix [11.a].)

- iii) **[11.b] “an internal screw guide having a screw entrance portion and an internal bore portion,”**

Moskowitz 440 discloses this limitation. (*Supra*, Section X.A.1.iii; Ex. 1002, Appendix [11.b].)

- iv) **[11.c] “wherein the screw entrance portion is larger than and coaxial with the internal bore and is formed at least partially in a top surface of the top wall as viewed from a top of the intervertebral cage,”**

Moskowitz 440 discloses this limitation. (*Supra*, Section X.A.1.iv; Ex. 1002, Appendix [11.c].)

- v) **[11.d] “wherein the internal bore portion has an entry opening formed only in a top surface of the top wall as viewed from the top of the intervertebral cage and has an exit opening formed at least partially in a bottom surface of the top wall and at least partially in a side surface of the top wall;”**

Moskowitz 440 discloses this limitation. (*Supra*, Section X.A.1.v; Ex. 1002, Appendix [11.d].)

- vi) **[11.e] “a second internal screw guide having a second screw entrance portion and a second internal bore portion, wherein the second screw entrance portion is larger than and coaxial with the second internal bore and is formed at least partially in the top surface of the top wall as viewed from the top,”**

Moskowitz 440 discloses this limitation. (*Supra*, Section X.A.1.vi; Ex. 1002, Appendix [11.e].)

- vii) **[11.f] “wherein the second internal bore portion has a second entry opening formed only in the top surface of the top wall as viewed from the top of the intervertebral cage and has a second exit opening formed at least partially in the bottom surface of the top wall and at least partially in a second side surface of the top wall, and”**

Moskowitz 440 discloses this limitation. (*Supra*, Section X.A.1.vii; Ex. 1002, Appendix [11.f].)

- viii) **[11.g] “wherein the internal screw guide and the second internal screw guide are angled to orient a first screw member and a second member bi-directionally in opposite directions;”**

Moskowitz 440 discloses this limitation. (*Supra*, Section X.A.1.viii; Ex. 1002, Appendix [11.g].)

- ix) **[11.h] “a first slot extending at least partially into the first sidewall;”**

Moskowitz 440 discloses this limitation. (*Supra*, Section X.A.1.ix; Ex. 1002, Appendix [11.h].) Because the first slot (*see* Section X.A.1.ix) is an indentation, it also “**extend[s] at least partially into the first sidewall.**”

- x) **[11.i] “a second slot extending at least partially into the second sidewall, wherein the second slot is positioned opposite of the first slot;”**

Moskowitz 440 discloses this limitation. (*Supra*, Section X.A.1.x; Ex. 1002, Appendix [11.i].) Because the second slot (*see* Section X.A.1.x) is an indentation, it also **“extend[s] at least partially into the second sidewall.”**

- xi) [11.j] “wherein the first slot is positioned along a first centerline axis that bisects the first sidewall and is positioned nearer a top of the intervertebral cage than a bottom of the intervertebral cage,”**

Moskowitz 440 discloses this limitation. (*Supra*, Section X.A.1.xi; Ex. 1002, Appendix [11.j].)

- xii) [11.k] “wherein the second slot is positioned along a second centerline axis that bisects the second sidewall and is positioned nearer the top of the intervertebral cage than the bottom of the intervertebral cage,”**

Moskowitz 440 discloses this limitation. (*Supra*, Section X.A.1.xii; Ex. 1002, Appendix [11.k].)

- xiii) [11.l] “wherein the side surface and the second side surface of the top wall are patterned with a plurality of surface features to create rough side surfaces,”**

Moskowitz 440 discloses this limitation. (*Supra*, Section X.A.1.xiii; Ex. 1002, Appendix [11.l].)

- xiv) [11.m] “wherein at least some of the plurality of surface features are positioned on the side surface between the top wall and the exit opening, and”**

Moskowitz 440 discloses this limitation. (*Supra*, Section X.A.1.xiv; Ex. 1002, Appendix [11.m].)

- xv) **[11.n] “wherein the top wall, the bottom wall, and the sidewalls are integrally formed;”**

Moskowitz 440 discloses this limitation. (*Supra*, Section X.A.1.xv; Ex. 1002, Appendix [11.n].)

- xvi) **[11.o] “a first screw having a first screw head and a first screw shaft having a first screw threaded portion, wherein the screw entrance portion of the internal screw guide is sized large enough to receive at least part of the first screw head and wherein the internal bore portion of the internal screw guide is sized with a smaller diameter than the screw entrance portion and is sized to receive the first screw shaft of the first screw;”**

Moskowitz 440 discloses this limitation. (*Supra*, Section X.A.1.xvi; Ex. 1002, Appendix [11.o].)

- xvii) **[11.p] “a second screw having a seconds [sic] screw head and a seconds [sic] screw threaded portion, wherein the second screw entrance portion of the second internal screw guide is sized large enough to receive at least part of the second screw head and wherein the second internal bore portion of the second internal screw guide is sized with a smaller diameter than the second screw entrance portion and is sized to receive the second screw shaft of the second screw; and”**

Moskowitz 440 discloses this limitation. (*Supra*, Section X.A.1.xvii; Ex. 1002, Appendix [11.p].)

- xviii) **[11.q] “a screw locking bracket having a first end portion sized and positioned to be inserted into the first slot,”**

Moskowitz 440 combined with Waugh discloses and suggests this limitation.

(*Supra*, Section X.A.1.xviii; Ex. 1002, Appendix [11.q].)

xix) [11.r] “a second end portion sized and positioned to be inserted into the second slot and”

Moskowitz 440 combined with Waugh discloses and suggests this limitation.

(*Supra*, Section X.A.1.xix; Ex. 1002, Appendix [11.r].)

xx) [11.s] “a central portion extending between the first end portion and the second end portion,”

Moskowitz 440 combined with Waugh discloses and suggests this limitation.

(*Supra*, Section X.A.1.xx; Ex. 1002, Appendix [11.s].)

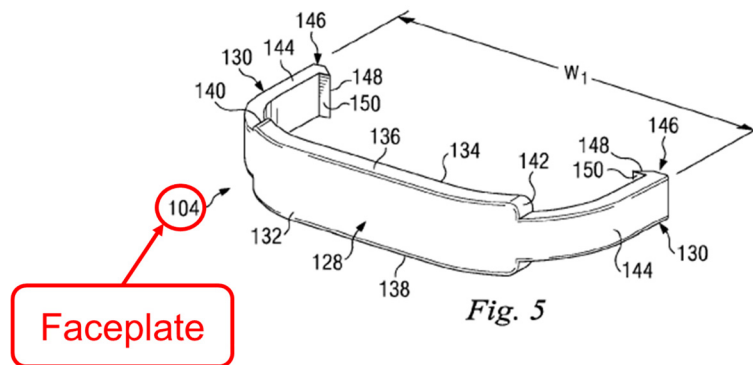
xxi) [11.t] “wherein when the screw locking bracket is connected to the intervertebral cage with the first end portion in the first slot and the second end portion in the second slot, the central portion partially blocks the screw entrance portion and the second screw entrance portion so as to retain the first and second screws in the internal screw guide and the second internal screw guide while leaving at least a portion of each of the first and second screw heads at least partially exposed via gaps between the screw locking bracket and the intervertebral cage,”

Moskowitz 440 combined with Waugh discloses and suggests this limitation.

(*Supra*, Section X.A.1.xxi; Ex. 1002, Appendix [11.t].)

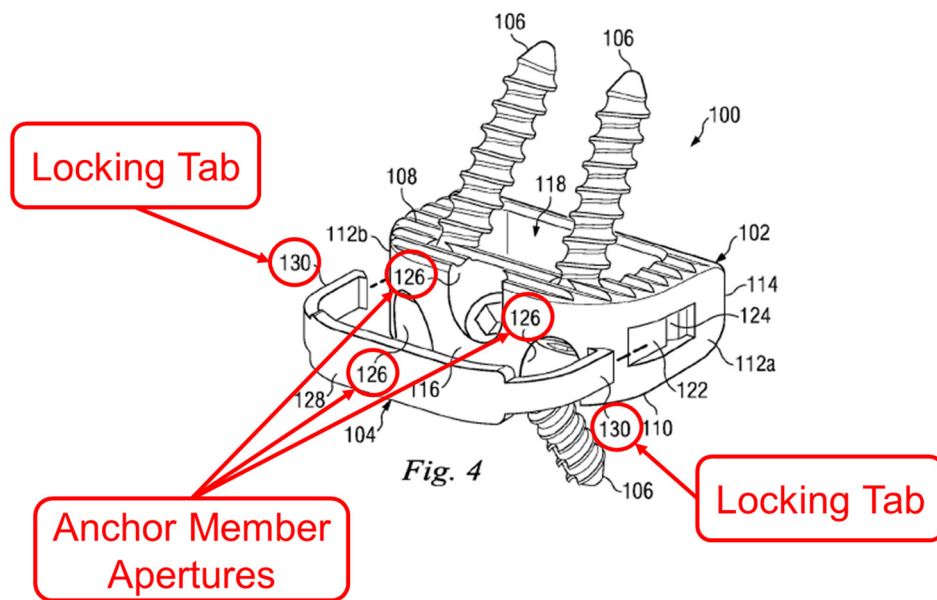
xxii) [11.u] “and wherein the screw locking bracket has a curvature such that first and second distal ends of the first and second end portions are positioned downward with respect to the central portion when the screw locking bracket is connected to the intervertebral cage.”

The Moskowitz-Waugh combination discloses and suggests this limitation. (Ex. 1002, Appendix [11.u].) As shown in figure 5 below, Waugh's faceplate 104 (*i.e.*, “**the screw locking bracket**”) is curved, or “**has a curvature.**”



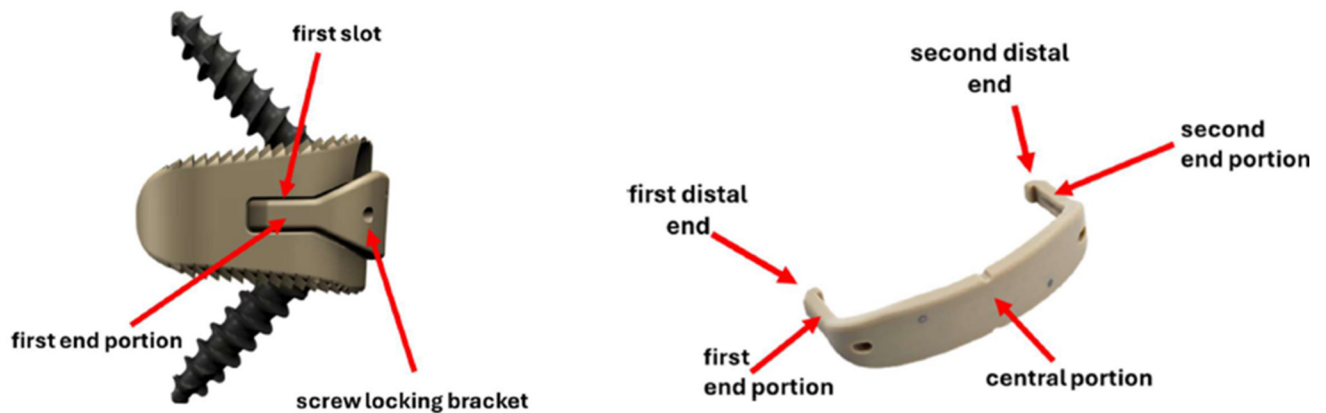
(Ex. 1006, Fig. 5 (annotated).)

As discussed in Sections X.A.1.xviii-xix, locking tabs 130 have portions farthest from the center of main body 128 (*i.e.*, “**first and second distal ends**”). As shown in figure 4, when faceplate 104 is connected to implant member 102, **the first and second distal ends of locking tabs 130 are positioned downward with respect to the central portion** in the sense that locking tabs 130 extend from the central portion—which covers the “top surface of the top wall” as defined in Section X.A.1.iv—downward such that the “first and second distal ends” are positioned closer to the “bottom wall,” also defined in Section X.A.1.iv. This same configuration would also apply to the Moskowitz 440-Waugh combination. (Ex. 1002, Appendix [11.u].)



(*Id.*, Fig. 4 (annotated).)

The above mapping is consistent with Moskowitz’s infringement contentions that were served in the Pending Litigation.



(Ex. 1059, 41-42 (excerpted).)

9. Claim 12

- i) “The apparatus of claim 11, wherein the plurality of surface features on the side surface and the second side surface are patterned at locations next to the top

surface.”

Moskowitz 440 discloses this limitation. (*Supra*, Section X.A.4.i; Ex. 1002, Appendix [12].)

10. Claim 13

- i) “The apparatus of claim 11, and further comprising means for fusing superior and inferior vertebral bodies in conjunction with the intervertebral cage.”**

Moskowitz 440 discloses this limitation. (*Supra*, Section X.A.5.i; Ex. 1002, Appendix [13].)

11. Claim 14

- i) “The apparatus of claim 11, wherein the intervertebral cage is sized and configured for use in a patient’s lumbar spine, the apparatus further comprising means for fusing superior and inferior lumbar vertebral bodies in conjunction with the intervertebral cage.”**

Moskowitz 440 discloses this limitation. (*Supra*, Section X.A.5.i; Ex. 1002, Appendix [14].)

12. Claim 18

- i) “The apparatus of claim 11, wherein the screw locking bracket contacts both the first and second screw heads when the screw locking bracket is connect [sic] to the intervertebral cage and wherein the screw locking bracket comprises a first hook at the first end portion that is sized to fit in the first slot and a second hook at the second end portion that is sized to fit in the second slot.”**

Moskowitz 440 combined with Waugh discloses and suggests this limitation.
(*Supra*, Sections X.A.2.i, X.A.6.i; Ex. 1002, Appendix [18].)

13. Claim 19

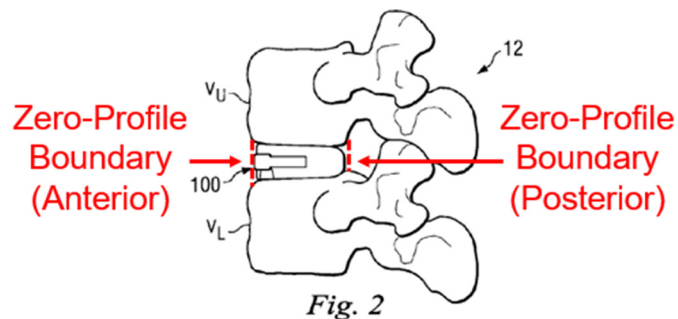
- i) [19.pre] **“A method of inserting a bi-directional fixating transvertebral (BDFT) screw/cage apparatus between a first vertebral body and a second vertebral body, the method including:”**

Moskowitz 440 discloses this limitation. (Ex. 1002, Appendix [19.pre].) As discussed in Section X.A.1.i, Moskowitz 440 discloses **“a bi-directional fixating transvertebral (BDFT) screw/cage apparatus.”** Moskowitz 440 further discloses inserting this device **“between a first vertebral body and a second vertebral body.”** (Ex. 1005, [0009], [0087]-[0094].)

- ii) [19.a] **“inserting an intervertebral cage into a midline of a disc space between the first vertebral body and the second vertebral body until the intervertebral cage is one of flush and countersunk relative to the first vertebral body and the second vertebral body,”**

Moskowitz 440 in combination with Waugh discloses and suggests this limitation. (Ex. 1002, Appendix [19.a].) Moskowitz 440 discloses surgical methods for inserting screw box 200 (**“intervertebral cage”**) where **“a midline incision is made”** before screw box 200 is inserted into the disc space, and where screw box 200 is **“placed midline deeply.”** (Ex. 1005, [0087], [0093].) Moskowitz 440 thus discloses **“inserting an intervertebral cage into a midline of a disc space between the first vertebral body and the second vertebral body.”**

Waugh discloses the same limitation and additionally discloses that the cage is inserted “**until the intervertebral cage is one of flush and countersunk relative to the first vertebral body and the second vertebral body.**” (Ex. 1002, Appendix [19.a].) Waugh discloses that its cage is implanted in the disc space between two vertebrae through a midline incision, *i.e.*, “**into a midline of a disc space between the first vertebral body and the second vertebral body.**” (Ex. 1006, [0056].) As shown in the figure below, and discussed further below, Waugh discloses that the intervertebral cage is “**one of flush and countersunk relative to the first vertebral body and the second vertebral body.**” (Ex. 1006, [0027], Figs. 2-4; Ex. 1002, Appendix [19.a].)



(Ex. 1006, Fig. 2 (annotated).)

Waugh expressly states that the implantable device 100 “is capable of being entirely contained within the disc space.” (*Id.*, [0036].) According to Waugh, “patient trauma [] can occur if organs and tissues are able to easily contact the implantable device outside the disc space.” (*Id.*) Waugh’s disclosure of the advantages of an implant that is contained entirely within the disc space is consistent

with contemporaneous art and with a POSITA's understanding that reducing the protrusions beyond the disc space through a flush design reduces soft tissue irritation. (Ex. 1002, ¶¶30-31 (discussing Simpson and Michelson '019).)

Given this understanding, a POSA would have been motivated to insert Moskowitz 440's implant entirely within the disc space such that it is "**flush**" or "**countersunk**" with the adjacent vertebral bodies. (Ex. 1002, Appendix [19.a].) This would have been a predictable design choice given the considerations described above in Moskowitz 440, Waugh, and the cited state-of-the-art references. (*Id.*) A POSITA would have reasonably expected success in configuring Moskowitz 440's implant in this manner because it would not have required the design of Moskowitz 440's implant to be altered. (*Id.*) Instead, a POSITA would only need to choose the dimensions of the cage that would allow the cage to fit entirely within the intervertebral space. (*Id.*)

- iii) [19.b] "**wherein the intervertebral cage includes: a top wall, a bottom wall, and sidewalls defining a fusion material space capable of receiving bone filling for the biological bone fusion;**"

Moskowitz 440 discloses this limitation. (*Supra*, Section X.A.1.ii; Ex. 1002, Appendix [19.b].)

- iv) [19.c] "**an internal screw guide having a screw entrance portion and an internal bore portion,**"

Moskowitz 440 discloses this limitation. (*Supra*, Section X.A.1.iii, Ex. 1002, Appendix [19.c].)

- v) **[19.d] “wherein the screw entrance portion is larger than and coaxial with the internal bore and is formed at least partially in a top surface of the top wall as viewed from a top of the intervertebral cage,”**

Moskowitz 440 discloses this limitation. (*Supra*, Section X.A.1.iv; Ex. 1002, Appendix [19.d].)

- vi) **[19.e] “wherein the internal bore portion has an entry opening formed only in a top surface of the top wall as viewed from the top of the intervertebral cage and has an exit opening formed at least partially in a bottom surface of the top wall and at least partially in a side surface of the top wall;”**

Moskowitz 440 discloses this limitation. (*Supra*, Section X.A.1.v; Ex. 1002, Appendix [19.e].)

- vii) **[19.f] “a second internal screw guide having a second screw entrance portion and a second internal bore portion, wherein the second screw entrance portion is larger than and coaxial with the second internal bore and is formed at least partially in the top surface of the top wall as viewed from the top,”**

Moskowitz 440 discloses this limitation. (*Supra*, Section X.A.1.vi; Ex. 1002, Appendix [19.f].)

- viii) **[19.g] “wherein the second internal bore portion has a second entry opening formed only in the top surface of the top wall as viewed from the top of the intervertebral cage and has a second exit opening formed at least partially in the bottom surface of the**

top wall and at least partially in a second side surface of the top wall, and”

Moskowitz 440 discloses this limitation. (*Supra*, Section X.A.1.vii; Ex. 1002, Appendix [19.g].)

- ix) **[19.h] “wherein the internal screw guide and the second internal screw guide are angled to orient a first screw member and a second member bi-directionally in opposite directions;”**

Moskowitz 440 discloses this limitation. (*Supra*, Section X.A.1.viii; Ex. 1002, Appendix [19.h].)

- x) **[19.i] “a first slot extending at least partially into a first sidewall of the sidewalls;”**

Moskowitz 440 discloses this limitation. (*Supra*, Sections X.A.1.ix, X.A.8.ix; Ex. 1002, Appendix [19.i].)

- xi) **[19.j] “a second slot extending at least partially into a second sidewall of the sidewalls, wherein the second slot is positioned opposite of the first slot;”**

Moskowitz 440 discloses this limitation. (*Supra*, Sections X.A.1.x, X.A.8.x; Ex. 1002, Appendix [19.j].)

- xii) **[19.k] “wherein the first slot is positioned along a first centerline axis that bisects the first sidewall and is positioned nearer a top of the intervertebral cage than a bottom of the intervertebral cage,”**

Moskowitz 440 discloses this limitation. (*Supra*, Section X.A.1.xi; Ex. 1002, Appendix [19.k].)

- xiii) **[19.l] “wherein the second slot is positioned along a**

second centerline axis that bisects the second sidewall and is positioned nearer the top of the intervertebral cage than the bottom of the intervertebral cage,”

Moskowitz 440 discloses this limitation. (*Supra*, Section X.A.1.xii; Ex. 1002, Appendix [19.l].)

xiv) [19.m] **“wherein the side surface and the second side surface of the top wall are patterned with a plurality of surface features to create rough side surfaces,”**

Moskowitz 440 discloses this limitation. (*Supra*, Section X.A.1.xiii; Ex. 1002, Appendix [19.m].)

xv) [19.n] **“wherein at least some of the plurality of surface features are positioned on the side surface between the top wall and the exit opening, and”**

Moskowitz 440 discloses this limitation. (*Supra*, Section X.A.1.xiv; Ex. 1002, Appendix [19.n].)

xvi) [19.o] **“wherein the top wall, the bottom wall, and the sidewalls are integrally formed; and”**

Moskowitz 440 discloses this limitation. (*Supra*, Section X.A.1.xv; Ex. 1002, Appendix [19.o].)

xvii) [19.p] **“inserting a first screw into the internal screw guide of the intervertebral cage;”**

Moskowitz 440 discloses this limitation. (Ex. 1002, Appendix [19.p].) As discussed in Section X.A.1.xvi, Moskowitz 440 discloses **“a first screw”** that fits within **“the internal screw guide of the intervertebral cage.”** Moskowitz 440 further discloses that the “screw box incorporates built-in screw and/or drill guides

which allow the direct placement and insertion of two self drilling screws.” (Ex. 1005, [0010].)

xviii) [19.q] “inserting a second screw into the second internal screw guide of the intervertebral cage;”

Moskowitz 440 discloses this limitation. (Ex. 1002, Appendix [19.q].) As discussed in Section X.A.1.xvii, Moskowitz 440 discloses **“a second screw”** that fits within **“the second internal screw guide of the intervertebral cage.”** As discussed in Section X.A.13.xvii, Moskowitz 440 also discloses inserting **“a second screw into the second internal screw guide.”**

xix) [19.r] “screwing the first screw into the first vertebral body such that at least part of the first screw head is positioned in the screw entrance portion of the internal screw guide, at least part of the first screw shaft of the first screw is positioned in the internal bore, and at least part of the first screw threaded portion is positioned in the first vertebral body;”

Moskowitz 440 discloses this limitation. (Ex. 1002, Appendix [19.r].) Moskowitz 440 discloses “insertion of two self drilling screws which are driven in two opposing directions into superior and inferior vertebral bodies, respectively,” and that the “transvertebral screw is screwed into the vertebral body.” (Ex. 1005, [0010], [0089].) Moskowitz 440 thus discloses **“screwing the first screw into the first vertebral body.”** Additionally, as discussed in Section X.A.1.xvi, **“at least part of the first screw head is positioned in the screw entrance portion of the**

internal screw guide” and “at least part of the first screw shaft of the first screw is positioned in the internal bore.”

- xx) [19.s] “screwing the second screw into the second vertebral body such that at least part of the second screw head is positioned in the second screw entrance portion of the second internal screw guide, at least part of the second screw shaft of the second screw is positioned in the second internal bore, and at least part of the second screw threaded portion is positioned in the second vertebral body; and”**

Moskowitz 440 discloses this limitation for reasons similar to those discussed above for limitation [19.r]. (Ex. 1002, Appendix [19.s].)

- xxi) [19.t] “locking the first screw and the second screw in the intervertebral cage using a screw locking bracket coupled to the intervertebral cage by positioning a first end portion of the screw locking bracket in the first slot, a second end portion of the screw locking bracket in the second slot and a central portion of the screw locking bracket extending between the first end portion and the second end portion across at least part of the top surface of the top wall such that the central portion partially blocks the screw entrance portion and the second screw entrance portion so as to retain the first and second screws in the internal screw guide and the second internal screw guide while leaving at least a portion of each of the first and second screw heads at least partially visible through gaps between the screw locking bracket and the intervertebral cage.”**

Moskowitz 440 combined with Waugh discloses this limitation as discussed above for limitation [1.t]. (*Supra*, Section X.A.1.xxi; Ex. 1002, Appendix [19.t].)

Because the screw entrance portions are formed in the top surface of the top wall

(*see supra*, Sections X.A.1.iv, X.A.1.iv) and main body 128 covers the screw entrance portions (*see supra*, Section X.A.1.xxi), the Moskowitz-Waugh combination also discloses “**a central portion of the screw locking bracket extending . . . across at least part of the top surface of the top wall.**”

14. Claim 20

- i) “The method of claim 19, and further comprising press fitting the screw locking bracket to the intervertebral cage.”**

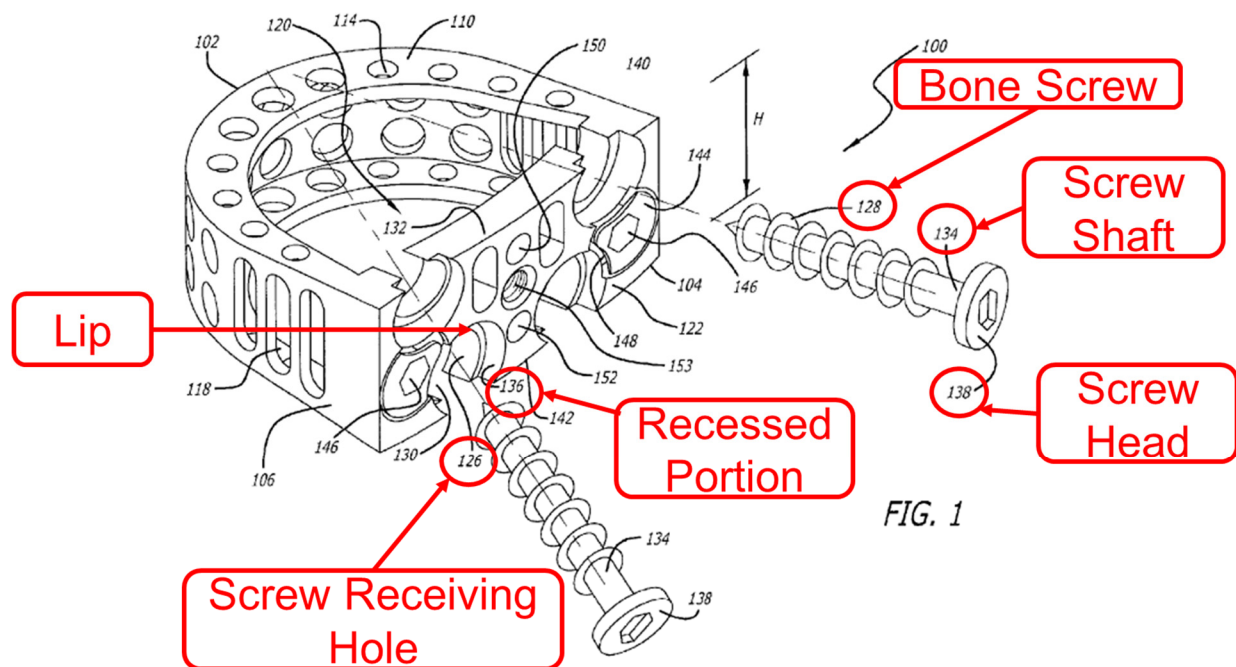
Moskowitz 440 combined with Waugh discloses and suggests this limitation.

(*Supra*, Section X.A.7.i; Ex. 1002, Appendix [20].)

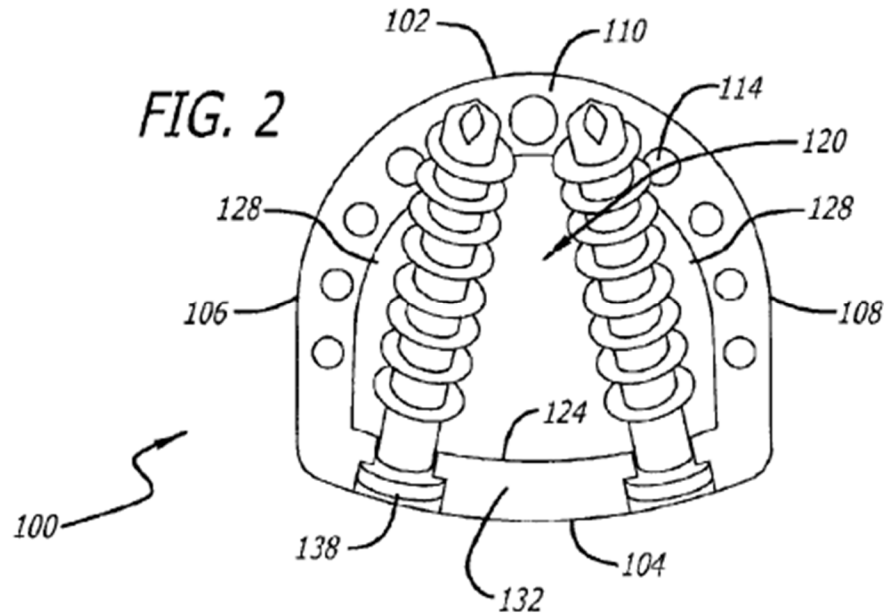
B. Moskowitz 440 in View of Waugh and Michelson 019 Render Obvious Claims 1-4, 6, 8, 10-14, and 18-20 of the '183 Patent

As discussed in Sections X.A.1.iv and X.A.1.vi, Moskowitz 440 discloses that “**the screw entrance portion is larger than and coaxial with the internal bore and is formed at least partially in a top surface of the top wall as viewed from a top of the intervertebral cage.**” Michelson 019 also discloses such a feature. (Ex. 1002, ¶¶65-68.) As shown in figure 1 below, Michelson 019 discloses bone screw receiving holes 126 (“**internal bore**”) for receiving bone screws 128. (Ex. 1049, 6:41-43.) Each of Michelson 019’s bone screws 128 have screw heads 138 that are larger in diameter than the screw shafts 134. (*Id.*, Fig. 2.) The screw heads sit inside recessed portion 136, which is a “**screw entrance portion.**” (*Id.*, 7:21-25.) As seen in figures 1 and 2, there is a lip separating the recessed portion 136

from the bone screw receiving hole 126. This lip engages with the shoulder of the bone screws to “stop the progress of a bone screw through the implant beyond a certain point along the bone screw.” (*Id.*, 7:17-20.) Given the lip, the screw entrance portion necessarily has a larger diameter than the internal bore in Michelson ’019 (to prevent the bone screw from going beyond a certain point).



(*Id.*, Fig. 1 (annotated).)



(*Id.*, Fig. 2.)

A POSITA would have been motivated to use a screw entrance portion that is larger than the internal bore, like in Michelson 019, with Moskowitz 440's implant because, without the lip, the screws could go through the implant beyond a position along the internal bore. (Ex. 1002, ¶¶69-70; Ex. 1049, 7:17-20.) The lip also secures the screws to the implant by *e.g.*, preventing the screw from moving past a certain position in the implant. (Ex. 1002, ¶70.) For example, without a lip ensuring that an internal bore portion is smaller in diameter than the screw head, over time, the screw could keep advancing through the body of the implant until the implant backs out of the disc space. (*Id.*) An implant without such a feature would go against the purpose of Moskowitz 440's screw box 200 to maintain disc space height and to link, interlock, and fuse the adjacent vertebrae (*Id.*; Ex. 1005, [0006], [0009].) A

POSITA would have had a reasonable expectation of success configuring Moskowitz 440's implant to have a lip that prevents a screw head from moving past a certain position in a structure because having a lip was common in the art and the Moskowitz 440 implant is structurally and functionally similar to Michelson 019's implant. (Ex. 1002, ¶71.) The Moskowitz 440-Michelson 019 combination thus discloses limitations [1.c] and [1.e].

As discussed in Section X.A.1.xvi, limitation [1.o] recites “**wherein the internal bore portion of the internal screw guide is sized with a smaller diameter than the screw entrance portion and is sized to receive the first screw shaft of the first screw.**” Moskowitz 440 in view of Michelson 019 also further renders obvious this limitation and similar limitations [1.p], [11.o], and [11.p] because as discussed above, Michelson 019's internal bores are smaller in diameter than its screw entrance portions. (Ex. 1002, ¶¶65-68.)

The analysis for all remaining claim limitations discussed in Section X.A with respect to the Moskowitz-Waugh combination remains the same except for the modifications discussed above.

XI. CONCLUSION

Petitioner requests institution of IPR for claims 1-4, 6, 8, 10-14, and 18-20 of the '183 patent.

Respectfully submitted,

Dated: March 2, 2026

By: /Naveen Modi/
Naveen Modi (Reg. No. 46,224)
Counsel for Petitioner

CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.24(d), the undersigned certifies that the foregoing
Petition for *Inter Partes* Review of U.S. Patent No. 10,603,183 contains, as
measured by the word-processing system used to prepare this paper, 13,765 words.
This word count does not include the items excluded by 37 C.F.R. § 42.24 as not
counting towards the word limit.

Respectfully submitted,

Dated: March 2, 2026

By: /Naveen Modi/
Naveen Modi (Reg. No. 46,224)
Counsel for Petitioner

CERTIFICATE OF SERVICE

I hereby certify that on March 2, 2026, I caused a true and correct copy of the foregoing Petition for *Inter Partes* Review of U.S. Patent No. 10,603,183 and supporting exhibits to be served via express mail on the Patent Owner at the following correspondence address of record as listed on Patent Center:

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