

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MEDTRONIC, INC.,
Petitioner,
v.

MOSKOWITZ FAMILY LLC,
Patent Owner

IPR2026-00162
Patent No. 12,011,367

PATENT OWNER'S RESPONSE

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TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	THE '367 PATENT	3
III.	SUMMARY OF THE ASSERTED REFERENCE—PALMATIER	5
IV.	LEVEL OF ORDINARY SKILL IN THE ART	10
V.	CLAIM CONSTRUCTION.....	11
VI.	PALMATIER IS NOT PRIOR ART BECAUSE THE CHALLENGED CLAIMS WERE CONCEIVED BEFORE DECEMBER 19, 2011, AND DILIGENTLY REDUCED TO PRACTICE	11
A.	The Inventors Conceived Each Limitation of Challenged Claims 8, 9, 13, and 17–21 Before December 19, 2011, and Constructively Reduced Each of Them to Practice in the October 25, 2012 Provisional Application.	13
B.	Claim 8	14
1.	“an expandable intervertebral device comprising: a first body extending from a first end to a second end, wherein the first body has first and second end portions positioned at the first and second ends, respectively, and has first and second side portions extending between the first and second end portions”.....	14
2.	“wherein the first body has a first vertebral body engagement surface and has a first interior surface positioned on an opposite side of the first body than the first vertebral body engagement surface, the first vertebral body engagement surface comprising a plurality of ridges for interfacing with a vertebral body surface, the first interior surface includes at least one angled housing surface protruding from the first interior surface”	17
3.	“a second body extending from a third end to a fourth end, wherein the second body has third and fourth end portions positioned at the third and fourth ends, respectively, and has third and fourth side portions extending between the third and fourth end portions”	22
4.	“wherein the second body has a second vertebral body engagement surface and has a second interior surface positioned on an opposite side of the second body than the second vertebral body engagement surface”	25

5.	“the first body configured to fit between the third and fourth side portions in a compressed configuration of the expandable intervertebral device”	28
6.	“a wedge having an angled wedge surface, wherein the wedge is positioned between the first body and the second body with the angled wedge surface facing the first interior surface of the first body and the at least one angled housing surface of the first body is positioned to engage the angled wedge surface of the wedge”	31
7.	“wherein the wedge is configured to slide within a space defined by the first body and second body in a direction toward the second and fourth ends of the first body and second body from a first wedge position in which the first body and the second body are in a substantially closed position to a second wedge position whereby the angled wedge surface presses against the first interior surface of the first body to move the first body relative to the second body from a compressed configuration to an expanded configuration without moving the second body”	33
8.	“whereby the wedge remains axially confined within the space defined by the first body and second body in the compressed and expanded configurations.”	37
C.	Claim 9: “The expandable intervertebral device of claim 8, wherein in the expanded configuration of the expandable intervertebral device the plurality of ridges on the first vertebral body engagement surface are configured to be in contact with the vertebral body surface.”	40
D.	Claim 13: “The expandable intervertebral device of claim 8 wherein the second interior surface is substantially parallel with the second vertebral body engagement surface such that the wedge is configured to move along a path parallel to the second vertebral body engagement surface when the wedge slides within the space against the second interior surface.”	41
E.	Claim 17	44
1.	“An expandable intervertebral device comprising: a first body extending from a first end to a second end wherein the first body has first and second end portions positioned at the first and	

- second ends, respectively, and has first and second side portions extending between the first and second end portions, wherein the first body has a first vertebral body engagement surface having a first plurality of ridges formed therein and has a first interior surface positioned on an opposite side of the first body than the first vertebral body engagement surface” 44
2. “a second body extending from a third end to a fourth end wherein the second body has third and fourth end portions positioned at the third and fourth ends, respectively, and has third and fourth side portions extending between the third and fourth end portions, wherein the second body has a second vertebral body engagement surface having a second plurality of ridges formed therein and has a second interior surface positioned on an opposite side of the second body than the second vertebral body engagement surface” 44
 3. wherein the first body is aligned with the second body such that the first end of the first body is axially aligned with the third end of the second body and the second end of the first body is axially aligned with the fourth end of the second body” 45
 4. “wherein the first end portion of the first body and the third end portion of the second body are hingedly interconnected such that the first body can pivot with respect to the second body so as to move the second end portion of the first body away from the fourth end portion of the second body” 47
 5. “a wedge extending from a fifth end to a sixth end and having an angled wedge surface extending along at least a portion of a distance between the fifth end and the sixth end,” 50
 6. “wherein the wedge is positioned between the first body and the second body with the angled wedge surface facing the first interior surface of the first body, wherein the first interior surface of the first body has an angled housing surface shaped to engage the angled wedge surface of the wedge, wherein the wedge is configured to slide within a space defined by the first body and second body in a direction toward the second and fourth ends of the first body and second body from a first wedge position that allows the first body and second body to pivot to a position that is substantially closed to a second wedge position whereby the angled wedge surface presses against the first

	interior surface of the first body to hingedly open the first body with respect to the second body whereby the wedge remains axially confined within the space defined by the first body and second body in the first and second wedge positions.”	52
F.	Claim 18: “The expandable intervertebral device of claim 17 wherein a first length of the first body from the first end to the second end is substantially equal to a second length of the second body from the third end to the fourth end and wherein the second end portion of the first body is smaller than the fourth end portion of the second body such that the second end portion of the first body is positionable between the third and fourth side portions of the second body at the fourth end of the second body.”	53
G.	Claim 19: “The expandable intervertebral device of claim 18 wherein the first body defines a first bone material receiving area between the first and second end portions and the first and second side portions, and the second body defines a second bone material receiving area between the third and fourth end portions and the third and fourth side portions, and wherein the first bone material receiving area is coupled to the second bone material receiving area when the wedge is in the second wedge position.”	56
H.	Claim 20: “The expandable intervertebral device of claim 19 wherein a distance from the fifth end to the sixth end of the wedge is less than a distance from the first end to the second end of the first body and is less than a distance from the third end to the fourth end of the second body.”	61
I.	Claim 21	65
	1. “A method of operating the expandable intervertebral device of claim 17, the method comprising: inserting the expandable intervertebral device in a target surgical location between two vertebrae of a human patient”	65
	2. “turning a rotation screw to actuate a movement of the wedge to pivot the first body away from the second body while the device is positioned between the vertebrae of the human patient.”	66
J.	The Record Establishes Conception of the Claimed Invention Months Before Palmatier.....	68

K.	The Inventors Exercised Reasonably Continuous Diligence from Before Palmatier Through the October 25, 2012 Provisional Filing.	69
1.	The '543 Work Counts Toward Diligence Because It Substantially Contributed to the October 25 Application and Directly Relates to the '367 Claimed Inventions.....	72
2.	The Contemporaneous Record Shows Reasonably Continuous Diligence from Before Palmatier Through the October 25 Filing.	78
L.	The October 25, 2012 Provisional Application Constructively Reduced the Invention to Practice.....	83
VII.	GROUND 1: PALMATIER FAILS TO ANTICIPATE OR RENDER OBVIOUS CLAIMS 8, 9, 13, 17-21	84
A.	Independent Claims 8 and 17.....	84
1.	Palmatier does not teach or suggest limitations 8[h] to 17[k]	84
B.	Dependent Claim 9	87
C.	Dependent Claim 13	87
D.	Dependent Claim 18	87
1.	Palmatier does not teach or suggest limitation 18[a]: “wherein a first length of the first body from the first end to the second end is substantially equal to a second length of the second body from the third end to the fourth end.”	87
2.	Palmatier does not teach or suggest limitation 18[b] “wherein the second end portion of the first body is smaller than the fourth end portion of the second body such that the second end portion of the first body is positionable between the third and fourth side portions of the second body at the fourth end of the second body”.....	98
E.	Dependent Claim 19	99
F.	Dependent Claim 20	99
G.	Dependent Claim 21	100
VIII.	PETITIONER’S EXPERT DECLARATION SHOULD BE GIVEN NO WEIGHT.....	100
IX.	CONCLUSION.....	102

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<i>ATI Technologies ULC v. Iancu</i> , 920 F.3d 1362 (Fed. Cir. 2019)	73, 82
<i>Bey v. Kollonitsch</i> , 806 F.2d 1024 (Fed. Cir. 1986)	72, 78
<i>Brown v. Barbacid</i> , 436 F.3d 1376 (Fed. Cir. 2006)	71
<i>Burroughs Wellcome Co. v. Barr Labs., Inc.</i> , 40 F.3d 1223 (Fed. Cir. 1994)	13, 69
<i>In re Jolley</i> , 308 F.3d 1317 (Fed. Cir. 2002)	72
<i>Perfect Surgical Techs., Inc. v. Olympus Am., Inc.</i> , 841 F.3d 1004 (Fed. Cir. 2016)	70, 71, 83
<i>Tyco Healthcare Group LP v. Ethicon Endo-Surgery, Inc.</i> , 774 F.3d 968 (Fed. Cir. 2014)	70, 71
<i>Xerox Corp. v. Bytemark, Inc.</i> , IPR2022-00624, Paper 9 (PTAB Aug. 24, 2022)	101

Regulations

37 C.F.R. § 42.65(a)	101
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PATENT OWNER'S EXHIBIT LIST

Exhibit	Description
2001	Pretrial Scheduling Order, <i>Moskowitz Family LLC v. Medtronic, Inc. et. al.</i> , No. 0:25-CV-00769-PJS-DLM, ECF No. 36 (Dist. Of Minn. September 10, 2025) (Micko, D.)
2002	Stipulation Extending Time For Defendants To Respond To Plaintiff's Complaint, <i>Moskowitz Family LLC v. Medtronic, Inc. et. al.</i> , No. 0:25-CV-00769-PJS-DLM, ECF No. 15 (Dist. Of Minn. March 19, 2025)
2003	Stipulation Extending Time For Defendants To Respond To Plaintiff's Complaint, <i>Moskowitz Family LLC v. Medtronic, Inc. et. al.</i> , No. 0:25-CV-00769-PJS-DLM, ECF No. 24 (Dist. Of Minn. May 22, 2025)
2004	First Amended Complaint, <i>Moskowitz Family LLC v. Medtronic, Inc. et. al.</i> , No. 0:25-CV-00769-PJS-DLM, ECF No. 27 (Dist. Of Minn. May 23, 2025)
2005	Stipulation to Amend Case Scheduling Concerning Contentions and Claim Construction, <i>Moskowitz Family LLC v. Medtronic, Inc. et. al.</i> , No. 0:25-CV-00769-PJS-DLM, ECF No. 42 (Dist. Of Minn. January 16, 2026)
2006	October 3, 2025 Update to USPTO Interim Director Discretionary Process
2007	March 24, 2025 Guidance on USPTO's rescission of "Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District court Litigation"

2008	USPTO FAQs for Interim Processes for PTAB Workload Management (Archived)
2009	Complaint, <i>Moskowitz Family LLC v. Zimvie Inc.</i> , No. 1:22-cv-01632-UNA, ECF No. 1 (D. Del. December 23, 2022)
2010	Information Disclosure Statement citing earlier publication (U.S. Pat. App. Pub. No. 2020/0138591) of '797 Patent (parent of the '367 patent) in Medtronic U.S. Patent Application No. 17/246,968 (May 3, 2021)
2011	Information Disclosure Statement citing '293 patent (great-great-great-great-grandparent of the '367 patent) in Medtronic U.S. Patent Application No. 17/246,968 (May 3, 2021)
2012	Notice of References Cited in Notice of Allowance citing earlier publication (U.S. Pat. App. Pub. No. 2008/0033440) of '903 patent (great-great-great-great-great-grandparent of the '367 patent) in Medtronic U.S. Patent Application No. 13/440,241 (September 3, 2015)
2013	Patent Trial And Appeal Board Standard Operating Procedure 1 (Revision 16) Assignment Of Judges To Panels
2014-2015	Reserved
2016	Amended Pretrial Scheduling Order, <i>Moskowitz Family LLC v. Medtronic, Inc. et. al.</i> , No. 0:25-CV-00769-PJS-DLM, ECF No. 44 (Dist. Of Minn. January 20, 2026)
2017	Complaint, <i>Moskowitz Family LLC v. Globus Medical, Inc.</i> , No. 6:19-cv-00672, ECF No. 1 (W.D. Tex. November 20, 2019)

2018	Second Amended Complaint, <i>Moskowitz Family LLC v. Medtronic, Inc. et al.</i> , No. 0:25-CV-00769-PJS-DLM, ECF No. 48 (Dist. Of Minn. January 29, 2026)
2019	Complaint, <i>Moskowitz Family LLC v. Medtronic, Inc. et al.</i> , No.0:25-cv-00769, ECF No. 1 (Dist. Of Minn February 28, 2025)
2020	Letter from Michael Fink, Counsel for Nathan Moskowitz to Newton Metcalf Jr., Director of Advanced Technologies Program for Medtronic, Inc., dated June 30, 2015
2021	Letter from Michael Fink, Counsel for Nathan Moskowitz to Brad Lerman, Senior Vice President and General Counsel for Medtronic, Inc., dated June 30, 2015
2022	Attachments to Notice Letters including Moskowitz Patent Portfolio and U.S. Patent No. 9,005,293
2023	Uniloc USA, Inc. v. Motorola Mobility LLC, Case No. 2:16-CV-00992-JRG, ECF No. 125 (E.D. Tex. Apr. 5, 2017)) (Gilstrap, J.)
2024	Declaration of Dr. Nathan C. Moskowitz in support of POPR
2025	Email correspondence between inventors Andy Moskowitz and Eric Sugalski regarding new prototyping project, dated April 11, 2011
2026	Certified File Wrapper for U.S. Patent No. 8,353,913
2027	Email correspondence between inventors Eric Sugalski, Andy Moskowitz, and David Schoon regarding wedge fusion device, dated May 3, 2011
2028	Email correspondence between inventors Eric Sugalski, Andy Moskowitz, and David Schoon regarding fusion devices, dated May 5, 2011

2029	Email correspondence between inventors Eric Sugalski, Andy Moskowitz, and David Schoon regarding fusion device prototyping, dated May 18, 2011
2030	Email correspondence between inventors Eric Sugalski and Andy Moskowitz regarding fusion device prototype revisions, dated May 19, 2011
2031	Email correspondence between inventors Eric Sugalski, Andy Moskowitz, and David Schoon regarding fusion device e-drawings, dated May 23, 2011
2032	Email correspondence between inventors Nathan Moskowitz, Andy Moskowitz, and Eric Sugalski regarding fusion device screws, dated May 25, 2011
2033	Email correspondence between inventors Eric Sugalski, Nathan Moskowitz, Andy Moskowitz, and David Schoon regarding design updates, dated May 31, 2011
2034	Email correspondence between inventors Nathan Moskowitz and Eric Sugalski confirming design updates, dated June 1, 2011
2035	Email correspondence between inventors Nathan Moskowitz and Eric Sugalski instructing prototyping to proceed, dated June 1, 2011
2036	Email correspondence between inventors Eric Sugalski and Nathan Moskowitz regarding design length, dated June 3, 2011
2037	Email correspondence between inventors Eric Sugalski, Nathan Moskowitz, and David Schoon regarding prototype pictures, dated June 22, 2011

2038	Email correspondence between inventors Eric Sugalski, Nathan Moskowitz, and Andy Moskowitz regarding prototype updates, dated July 24, 2011
2039	Email correspondence between inventors Eric Sugalski, Nathan Moskowitz, and Andy Moskowitz regarding prototype expansion evaluation, dated July 25, 2011
2040	Email correspondence between inventors Nathan Moskowitz, Eric Sugalski, and Andy Moskowitz regarding prototype expansion via screwdrivers, dated August 8, 2011
2041	Email correspondence between inventors Andy Moskowitz and Nathan Moskowitz regarding draft claims, dated October 11, 2011
2042	Email correspondence between inventors Nathan Moskowitz and Andy Moskowitz regarding expandable cage claims, dated November 7, 2011
2043	Email correspondence from inventor Andy Moskowitz requesting edrawings, dated November 11, 2011
2044	Email correspondence from inventor Andy Moskowitz detailing requested edrawings, dated November 13, 2011
2045	Email correspondence to inventor Andy Moskowitz with requested edrawings, dated January 2, 2012
2046	Email correspondence between inventors Andy Moskowitz and Nathan Moskowitz regarding received edrawings, dated January 2, 2012
2047	Email correspondence to inventor Andy Moskowitz regarding machining company inquiry, dated April 11, 2012

2048	Inventor calendar blocked out for prototyping, dated August 17, 2012
2049	Email correspondence from inventor Nathan Moskowitz to patent attorney regarding examiner interview, dated February 21, 2012 (attorney-client privilege portions redacted)
2050	Email correspondence from patent attorney to inventor Nathan regarding examiner interview, dated March 11, 2012
2051	Email correspondence between patent attorney and inventor Nathan regarding notice of allowance, dated September 13, 2012
2052	Email correspondence between inventors Andy Moskowitz and Eric Sugalski regarding keeping fusion device confidential until patenting, dated September 25, 2012
2053	File History for U.S. Provisional Patent Application No. 61/718,707, filed October 25, 2012
2054	Calendar of Dr. Nathan Moskowitz between March 1, 2012 and October 19, 2012 (irrelevant patient-identifying information redacted to comply with patient privacy laws)
2055	Dr. Nathan Moskowitz Emergency on Call Calendar for June, July, August, and December 2012
2056	Email correspondence between inventors Andy Moskowitz and Eric Sugalski regarding CAD drawings, dated April 15, 2011
2057	Email correspondence between inventors Nathan Moskowitz, Andy Moskowitz, and Eric Sugalski regarding maintaining ridges, dated April 17, 2011

2058	Email correspondence between inventors Andy Moskowitz and Eric Sugalski regarding side notches in final diagram, dated April 17, 2011
2059	Email correspondence between inventors Nathan Moskowitz and Eric Sugalski stressing importance of ridges and side notches, dated May 28, 2011
2060	Email correspondence between inventors Eric Sugalski and Nathan Moskowitz regarding prototype shipping, dated July 6, 2011
2061	Medtronic’s Memorandum of Law in Support of Motion to Stay, <i>Moskowitz Family LLC v. Medtronic, Inc. et. al.</i> , No. 0:25-CV-00769-PJS-DLM, ECF No. 61 (Dist. Of Minn. February 20, 2026)
2062	Moskowitz’ Opposition to Medtronic’s Motion to Stay, <i>Moskowitz Family LLC v. Medtronic, Inc. et. al.</i> , No. 0:25-CV-00769-PJS-DLM, ECF No. 65 (Dist. Of Minn. February 27, 2026)
2063	Transcript of Motion to Stay Hearing, <i>Moskowitz Family LLC v. Medtronic, Inc. et. al.</i> , No. 0:25-CV-00769-PJS-DLM (Dist. Of Minn. March 6, 2026)
2064	Declaration in Support of Jason M. Zucchi’s Notice of Intent
2065	Declaration in Support of William R. Woodford’s Notice of Intent
2066	Declaration in Support of Todd S. Werner’s Notice of Intent
2067	Declaration in Support of Shelleaha L. Jonas’s Notice of Intent
2068	Transcript of Deposition of Mr. Brad Culbert, August 19, 2026
2069	Declaration of Ken Gall, Ph. D
2070	Curriculum Vitae of Ken Gall, Ph. D.
2071	Declaration of Dr. Nathan C. Moskowitz in support of POR
2072	Declaration of Eric Sugalski in support of POR

2073-2126	Reserved
2127	Email correspondence between inventors Eric Sugalski, Andy Moskowitz, and David Schoon regarding wedge fusion device, dated May 3, 2011
2128-2139	Reserved
2140	Email correspondence between inventors Nathan Moskowitz, Eric Sugalski, and Andy Moskowitz regarding prototype expansion via screwdrivers, dated August 8, 2011
2141-2144	Reserved
2145	Email correspondence to inventor Andy Moskowitz with requested edrawings, dated January 2, 2012
2146-2155	Reserved
2156	Email correspondence between inventors Andy Moskowitz and Eric Sugalski regarding CAD drawings, dated April 15, 2011
2157-2158	Reserved
2159	Email correspondence between inventors Nathan Moskowitz and Eric Sugalski stressing importance of ridges and side notches, dated May 28, 2011

I. INTRODUCTION

Medtronic's challenge rests entirely on Palmatier. But Palmatier fails twice over: it is not prior art, and it does not disclose or render obvious the challenged claims.

First, the inventors conceived the claimed expandable intervertebral devices months before Palmatier's December 19, 2011 filing date. That is not merely the inventors' present recollection. Contemporaneous drawings, CAD files, technical descriptions, and communications document the claimed implant architecture by at least May 18, 2011—including the two implant bodies, internal wedge-based expansion mechanism, vertebral-engagement features, and associated instrumentation. The inventors then worked with reasonably continuous diligence through the October 25, 2012 provisional application, which constructively reduced the claimed inventions to practice. The record thus establishes priority over Palmatier, eliminating the only reference—and the only ground—asserted in the Petition.

Second, Palmatier does not disclose the claimed devices. Independent claims 8 and 17 require a wedge that “remains axially confined” within the space defined by the two implant bodies in both the compressed and expanded configurations. Palmatier shows the opposite. In the embodiment on which Medtronic relies, wedge 858 extends beyond the posterior ends of the piston and base components when the

implant is compressed (and also when partially expanded). Medtronic's expert admitted exactly that at deposition. The Petition neither confronts this missing limitation nor proposes any modification that would supply it.

Medtronic's challenge to claim 18 fares no better. Claim 18 requires first and second bodies of substantially equal length, with the end of the first body positionable between the sides of the second body at its end. Palmatier's relied-upon implant 840 concededly has bodies of different lengths because its base includes a protective wedge-shaped anterior end that extends beyond the piston. Unable to find the claimed arrangement in implant 840, Medtronic selectively borrows features from Palmatier's materially different implants 40 and 540 and proposes extending implant 840's piston. That redesign is unsupported and mechanically incoherent: the extension would intrude into implant 840's solid protective nose and prevent the piston from collapsing into the base. It would also impact the very structure Palmatier identifies as protecting the implant's internal components during insertion. Palmatier's three distinct embodiments are not a menu from which Medtronic may assemble the challenged claims with hindsight.

Nor does Medtronic's expert declaration cure these defects. It largely reproduces the Petition's assertions, at times nearly verbatim, without supplying the independent engineering analysis needed to explain how Palmatier satisfies the

missing structural limitations or how Medtronic’s proposed redesign could function. Repetition is not technical evidence.

The Petition therefore fails at every level. Palmatier is not prior art; its relied-upon embodiment lacks limitations of independent claims 8 and 17; and Medtronic’s attempt to reconstruct claim 18 from incompatible embodiments would defeat the operation of the device it proposes to modify. The Board should confirm the patentability of claims 8, 9, 13, and 17–21.

II. THE ’367 PATENT

The ’367 patent describes a family of expandable intervertebral implants designed to restore disc height, stabilize adjacent vertebral bodies, and promote spinal fusion while minimizing the need for bulky external fixation systems. Ex. 1001 at 3:29-52; Ex. 2069¹, ¶ 39.

The inventors of ’367 patent conceived of and reduced to practice multiple “zero-profile expandable intervertebral spacer” (ZP-EIS) implants at least as early as May 18, 2011. Ex. 2071, ¶¶ 15–46. These ZP-EIS embodiments, along with a tool for insertion and expansion of the same, were further documented and refined after conception and were ultimately described in the provisional application filed

¹ Patent Owner submits the declaration of Ken Gall, Ph.D. (Ex. 2069), an expert in medical implants and surgery. Ex. 2069 ¶¶ 6-14, 34-38.

on October 25, 2012. Ex. 2071, ¶¶ 47–123; Ex. 2053. That provisional application detailed how the various ZP-EIS implants could be introduced into the disc space and then expanded—via varying expansion mechanisms including scissor-jack linkages, threaded drive mechanisms, wedge-type actuators, or gear-driven expansion systems—to achieve controlled vertebral distraction and secure fixation. Ex. 2053, Figs. 1A-8H, ¶¶ 21-46. The '367 patent shares these disclosures, and the challenged claims of the '367 focus on ZP-EIS implants with the wedge-type expansion mechanism. Ex. 1001, Figs. 1A-8G², 7:1-12:5; Ex. 2069 ¶¶ 40-41.

The device body also includes cavities or openings configured to receive bone graft material or other osteoconductive substances. Ex. 2053 ¶¶ 4-5, 10, 13, 23, 26, 29, 31, 33, 35, 37, 45-46, Figs. 1A-7D; Ex. 1001 at 2:18-31, 4:14-17, 7:26-32, 7:64-8:2, 8:30-32, 8:56-58, 9:20-22, 9:45-47, 9:67-10:3, 11:53-55, Figs. 1A-7D; Ex. 2069, ¶ 42. Once implanted and expanded, these graft-receiving regions promote bone growth through and around the implant, facilitating fusion between the adjacent vertebral bodies. *Id.* Surface features such as ridges can further enhance fixation and

² The October 2012 provisional comprises the same figures, but errantly skipped over the label for Fig. 8E such that the numbers do not align even though the figures do.

reduce the risk of implant migration by gripping the vertebral endplates. Ex. 2053, ¶¶ 23, 26, Figs. 1A-2D; Ex. 1001 at 7:22-26, 7:60-61, Figs. 1A-2D; Ex. 2069 ¶ 42.

As noted above, the '367 patent discloses a specialized implantation tool designed to deliver and actuate the expansion of the ZP-EIS implants. Ex. 2053, ¶¶ 3, 7, 10, 38-46, Figs. 8A-8H; Ex. 1001 at 2:16-17, 2:54-58, 10:9-12:1, Figs. 8A-8G; Ex. 2069 ¶ 43. The tool can grasp the implant, position it within the intervertebral space, and drive the expansion mechanism through a rotation interface. *Id.* This integrated instrumentation allows the surgeon to both deploy and expand the device through a minimally invasive surgical corridor.

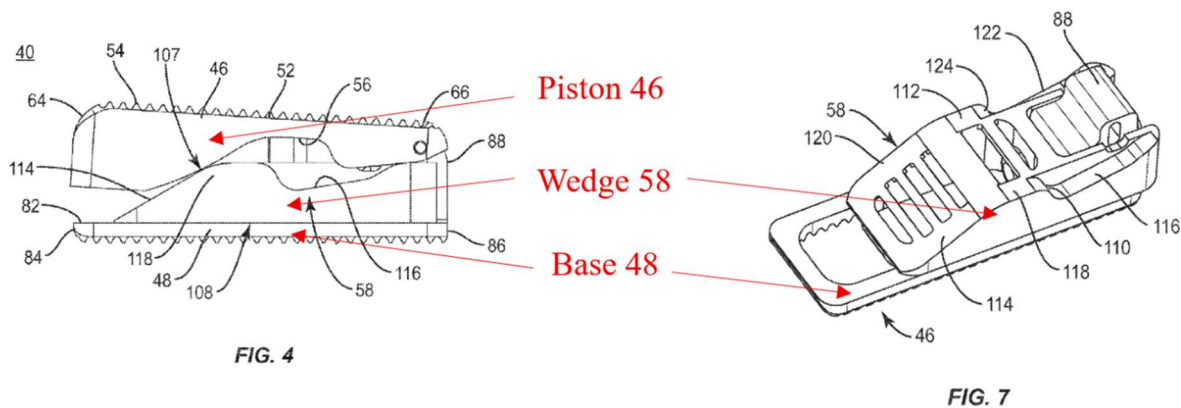
Taken together, the '367 patent describes a versatile expandable intervertebral implant system capable of restoring disc height, securing fixation to adjacent vertebral bodies, and promoting spinal fusion while maintaining a compact zero-profile design. Ex. 2069 ¶ 44. Through its expandable architectures, integrated fixation options, and dedicated implantation tools, the disclosed system seeks to reduce surgical trauma and improve the precision with which intervertebral implants can be deployed and adjusted within the spine. Ex. 2053 ¶¶ 43-48; Ex. 1001 at 11:26-12:27.

III. SUMMARY OF THE ASSERTED REFERENCE—PALMATIER

Palmatier (U.S. Patent 9,445,919, Ex. 1057) was filed on December 19, 2011, and does not claim priority to any other application. Palmatier describes three

expandable implant embodiments—implants 40, 540, and 840—that use materially different arrangements to expand an upper implant portion—called a piston component—relative to a lower implant portion—called a base component. Ex. 1057, Figs. 1–28; Ex. 2069 ¶ 47.

In implant 40, piston component 46 rests above base component 48 and is pivotably connected to it by hinge 50 near their posterior ends. Ex. 1057, Figs. 1–3, 12; Ex. 2069 ¶ 48.



Ex. 1057, Figs. 4 and 7 (Annotated)

There is a wedge 58 located between the piston component 46 and base component 48. In the compressed state, wedge 58 extends beyond the posterior ends of the base and piston components. Ex. 1057, Figs. 9, 12; Ex. 2069 ¶ 49.

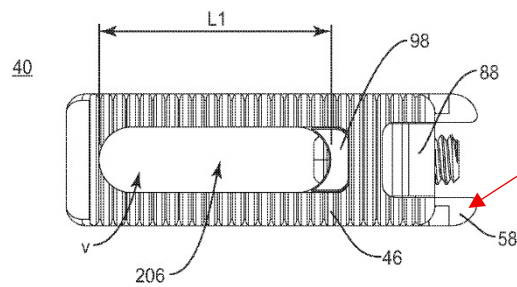


FIG. 9

Wedge 58

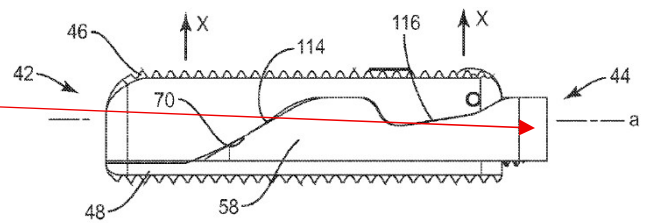
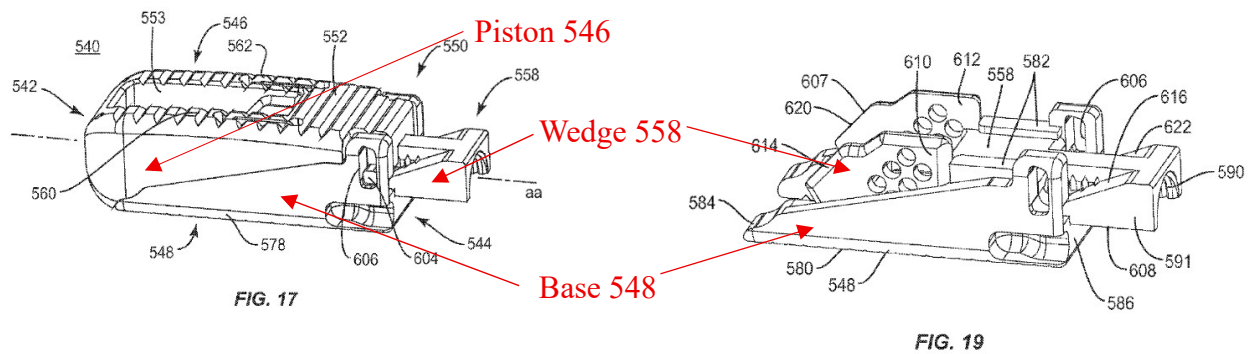


FIG. 12

Ex. 1057, Figs. 9 and 12 (Annotated)

Rotation of a screw 92 causes wedge 58 to move towards the anterior end of the implant, causing an anterior ramp 114 to raise the anterior portion of piston component 46 while the posterior portions of the base and piston components remain joined at the hinge. Ex. 1057 at 11:24-40, Figs. 7, 9, 12. Wedge 58 extends substantially across the width of the implant, because base component 48 does not include longitudinal sidewalls. Ex. 2068, 23:17–22. Base component 48 also lacks an anterior wall or other structure extending from the planar base. Ex. 2069 ¶ 49.

Implant 540 uses a different wedge and body arrangement. Ex. 2069 ¶¶ 50-51. As with embodiment 40, embodiment 540 includes a wedge 58 that extends beyond the posterior ends of the base and piston components. Ex. 1057, Figs. 17, 19; Ex. 2069 ¶ 51.



Ex. 1057, Figs. 17 and 19 (Annotated)

In response to rotation of a threaded member, wedge 558 moves longitudinally within the inner-surface boundary of base component 548 and engages multiple ramp surfaces to separate piston component 546 from base component 548. Ex. 1057, 16:1–3; Figs. 17, 19–20. Both base component 548 and piston component 546 include longitudinal sidewalls, with the sidewalls of the piston component 546 resting on the sidewalls of base component 548 when the implant is in a compressed state. *Id.*, Fig. 17. The sidewalls of the base component 548 are tapered such that at the anterior end of the base component 548 there are no longer any sidewalls. Piston component 546 also has an endwall that extends all the way to the bottom at the anterior end of the base component, such that neither the sidewalls nor the end of piston component 546 are nested inside the walls of base component 548. *Id.*, Figs. 17, 20; Ex. 2068, 40:19–41:7. Base component 548, like base component 48 of embodiment 40, also lacks a wall or other structure at its anterior end. Ex. 2068, 35:24–36:12, 41:8–14; Ex. 2069 ¶ 51.

Implant 840 includes a base component 848 having a posterior wall, sidewalls, and a rounded nose 884 at the anterior end. Ex. 1057, 18:45–46; Figs. 22–26; Ex. 2068, 40:14–18. The rounded nose 884 extends anteriorly beyond piston component 846. Ex. 2069 ¶ 52.

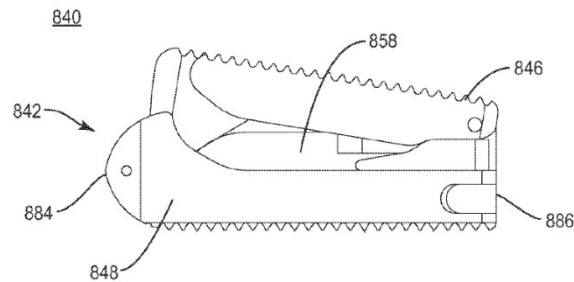
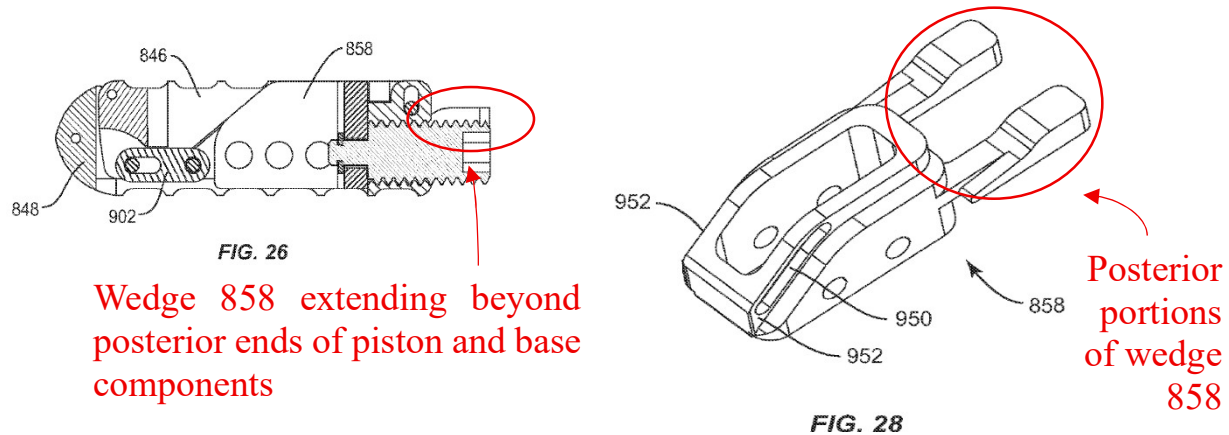


FIG. 22
Ex. 1057, Fig 22

Palmatier explains that insertion forces are transmitted to anterior end 842 and that base component 848, including its wedge-shaped anterior end, “protect[] wedge 858 and screw 892 as intervertebral implant 840 is inserted into an intervertebral disc space.” *Id.* at 18:45–52; Ex. 2069 ¶ 53. Piston component 846 has sidewalls extending down both sides of the piston. The anterior portion of the piston component 846 is narrower than the posterior portion and includes an anterior wall that terminates behind the rounded nose 884 of base component 848 and inside of the longitudinal sidewalls of base component 848 when the implant is in its compressed state. Ex. 1057, Figs. 22–27; Ex. 2068, 40:19–41:7. Due to the wedge-shaped anterior end 884, the base component 548 is longer than the piston component 546. Ex. 2069 ¶ 53.

Embodiment 840 also includes a wedge expansion mechanism that extends beyond the posterior ends of the piston and base components when the implant is in a compressed or partially expanded configuration. Ex. 1057, Figs. 25–26; Ex. 2068, 41:15–42:2; Ex. 2069 ¶ 54.



Ex. 1057, Figs. 26 and 28 (Annotated)

The implant includes a screw that can be rotated to cause the wedge to axially translate towards the anterior end of the implant and cause expansion. Ex. 1057, 18:42-45, Figs. 22-28. As screw 892 moves wedge 858 longitudinally, wedge 858 controls the separation of piston component 846 from base component 848. *Id.*, Figs. 24–28; Ex. 2069 ¶¶ 53-54.

IV. LEVEL OF ORDINARY SKILL IN THE ART

A person of ordinary skill in the art (“POSA”) at the time of the invention (e.g., the 2011-2012 time period) would have had a bachelor’s degree in mechanical engineering, biomechanical engineering, or similar discipline, and five years relevant industry experience relating to medical device design or manufacture; or a

master's degree in such disciplines, and either three years relevant industry experience or three years teaching at the collegiate level as a professor; or a doctorate in such disciplines; or a medical degree and residency training in neurosurgery or orthopedic surgery, and three to five years of post-residency spinal surgery and spinal instrumentation experience as a primary surgeon. Ex. 2069 ¶¶ 34-38. Someone with less technical education but more experience, or more technical education but less experience, could also meet this standard. *Id.*

Petitioner's definition of a POSA differs slightly, but the arguments below apply under either definition.

V. CLAIM CONSTRUCTION

All terms of the '367 Patent should be given their ordinary and customary meaning. *Id.* ¶ 45.

VI. PALMATIER IS NOT PRIOR ART BECAUSE THE CHALLENGED CLAIMS WERE CONCEIVED BEFORE DECEMBER 19, 2011, AND DILIGENTLY REDUCED TO PRACTICE

Palmatier does not qualify as prior art to challenged claims 8, 9, 13, and 17–21. Ex. 2069 ¶¶ 46, 55–57, Appendices A-B. The expandable implant system recited in claims 8, 9, 13, and 17–21 was conceived months before Palmatier's December 19, 2011 filing date, and the inventors continuously exercised reasonable diligence to constructively reduce that system to practice with the filing of the October 25, 2012 provisional application. *Id.*; Ex. 2071 (Moskowitz Decl.) ¶¶ 15–123.

The contemporaneous engineering drawings and communications from spring 2011 confirm that the inventors had already determined the structure and operation of the expandable implant embodiments by at least May 18, 2011. Those materials depict expandable intervertebral implants including implant bodies configured to engage adjacent vertebrae and wedge-based mechanisms that expand the implant after insertion into the disc space. *Id.* ¶¶ 23–46; Ex. 2072 ¶¶ 10–15; Exs. 2025, 2127, 2028, 2029, 2030, 2031, 2032, 2156, 2057, 2058, 2159. Together with testimony from two of the inventors, Dr. Moskowitz and Mr. Sugalski, the evidence demonstrates that the inventors had formed a definite and permanent understanding of the invention well before Palmatier’s filing date.

After conceiving the invention, the inventors continued working to develop, document, prototype, and protect the expandable implant system. That work included preparing and refining engineering drawings, fabricating and evaluating prototype designs, coordinating with engineers and collaborators regarding implant embodiments and associated instrumentation, and working with patent counsel concerning protection of the expandable implant system. Ex. 2071 ¶¶ 47–118; Ex. 2072 ¶¶ 23–46, 57–61. These activities occurred on a reasonably continuous basis until the filing of the October 25, 2012 provisional application. *Id.* ¶¶ 119–152.

The conception and reduction to practice of challenged claims 8, 9, 13, and 17–21 is described in detail below.

A. The Inventors Conceived Each Limitation of Challenged Claims 8, 9, 13, and 17–21 Before December 19, 2011, and Constructively Reduced Each of Them to Practice in the October 25, 2012 Provisional Application.

The challenged claims were conceived months before Palmatier's December 19, 2011 filing date, and the invention was later constructively reduced to practice in the October 25, 2012 provisional application. Palmatier therefore cannot qualify as prior art against claims 8, 9, 13, and 17–21.

Conception occurs when the inventors form a definite and permanent understanding of the invention—including each limitation of the claimed subject matter—such that a person of ordinary skill in the art could understand the structure and operation of the invention. *Burroughs Wellcome Co. v. Barr Labs., Inc.*, 40 F.3d 1223, 1228 (Fed. Cir. 1994). The evidence here shows that the inventors possessed that level of understanding by at least May 18, 2011. They had both created and exchanged drawings and design files depicting the expandable implant embodiments, and discussed the designs—including the implant bodies, the internal wedge-based expansion mechanism, and structural features such as bone-graft cavities, vertebral engagement ridges, and tool-engagement features required for implantation and actuation. Ex. 2071 ¶¶ 23–36; Ex. 2072 ¶¶ 8–25, 47–56; Exs. 2025, 2127, 2028, 2029, 2030, 2156, 2057, 2058.

The contemporaneous conception evidence—including May 3, 2011 drawings, subsequent iterations of CAD files, communications among the inventors,

and inventor testimony—demonstrates that the inventors had determined the structure and operation of the expandable implant embodiments before Palmatier’s filing date. Those same embodiments were later described in detail in the October 25, 2012 provisional application, which provides written support for the claimed subject matter and therefore constitutes a constructive reduction to practice of the invention.

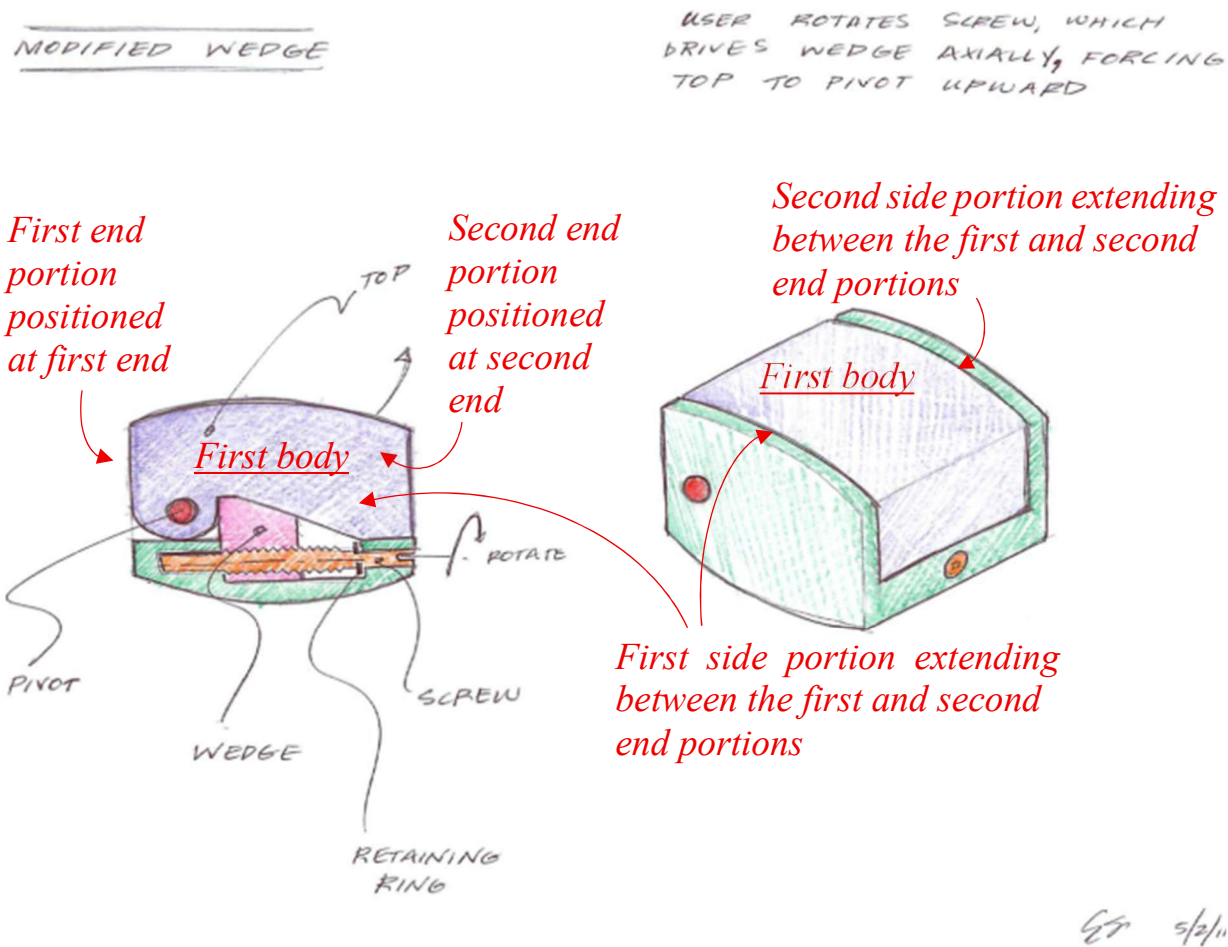
The subsections below map the conception evidence and the provisional disclosure to each limitation of challenged claims 8, 9, 13, and 17–21, showing that it was conceived and constructively reduced to practice before the December 19, 2011 priority date of Palmatier.

B. Claim 8

- 1. “an expandable intervertebral device comprising: a first body extending from a first end to a second end, wherein the first body has first and second end portions positioned at the first and second ends, respectively, and has first and second side portions extending between the first and second end portions”**

By at least May 18, 2011, the inventors had determined the structure of the implant body, including a body extending between opposing ends with end portions and side portions defining the overall structure of the expandable implant device. Ex. 2071 ¶¶ 24, 27, 31–35; Ex. 2072 ¶¶ 10–15, 19–22; Exs. 2127, 2029. This structure is depicted in the contemporaneous engineering drawing circulated on May 3, 2011, shown below. The image identifies the first body extending between

opposing ends and the corresponding end and side portions of the implant body. Ex. 2127; Ex. 2069, Appendix A, limitations 8[a]-8[b].



Ex. 2127 at 10 (Annotated)

Dr. Moskowitz confirms that these drawings reflect the expandable implant embodiments conceived during the development work occurring in spring 2011. Ex. 2071 ¶¶ 31–32; *see also* Ex. 2072 ¶¶ 10–15. These contemporaneous drawings therefore corroborate the inventors’ testimony that they had conceived of the

structural configuration of the expandable implant body before Palmatier's filing date.

The same structural configuration was later disclosed in the October 25, 2012 provisional application. Ex. 2071 ¶¶ 137–139, 150–152. For example, Figure 6D of the '707 provisional illustrates an expandable implant body extending between opposing ends with corresponding end and side portions forming the structural body of the implant device. Ex. 2053, Fig. 6D; Ex. 2069, Appendix B, limitations 8[a]-8[b].

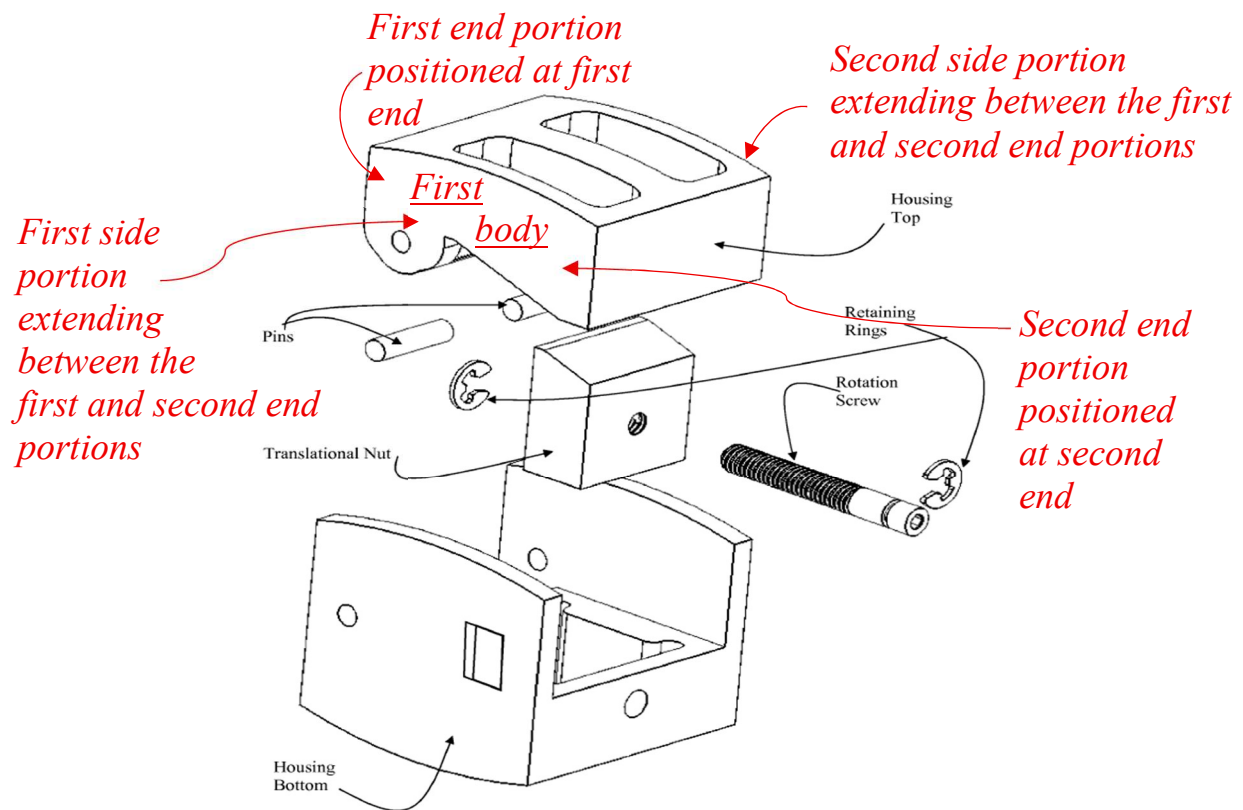


Fig. 6D

Ex. 2053, Fig. 6D (Annotated)

2. **“wherein the first body has a first vertebral body engagement surface and has a first interior surface positioned on an opposite side of the first body than the first vertebral body engagement surface, the first vertebral body engagement surface comprising a plurality of ridges for interfacing with a vertebral body surface, the first interior surface includes at least one angled housing surface protruding from the first interior surface”**

By May 18, 2011, the inventors had already determined that the expandable implant body would include (1) a vertebral body engagement surface comprising a plurality of ridges configured to contact a vertebral body and (2) an interior surface on the opposite side of the implant body that includes an angled housing surface configured to interact with an internal expansion mechanism. Ex. 2071 ¶¶ 27–34, 38; Ex. 2072 ¶¶ 10–15, 47–53, 57–59; Ex. 2127, 2156, 2057, 2159.

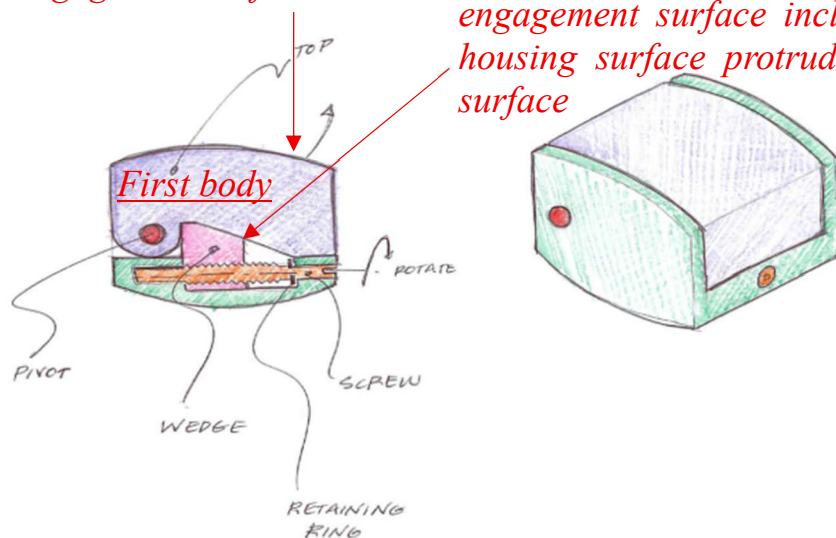
The May 3, 2011 drawing also shows these structural features. As shown below, the drawing shows the implant having a vertebral body engagement surface and a corresponding interior surface positioned on the opposite side of the implant body, including the angled housing surface used to interact with the expansion mechanism. Ex. 2127; Ex. 2069, Appendix A, limitation 8[c].

MODIFIED WEDGE

USER ROTATES SCREW, WHICH
DRIVES WEDGE AXIALLY, FORCING
TOP TO PIVOT UPWARD

*First vertebral body
engagement surface*

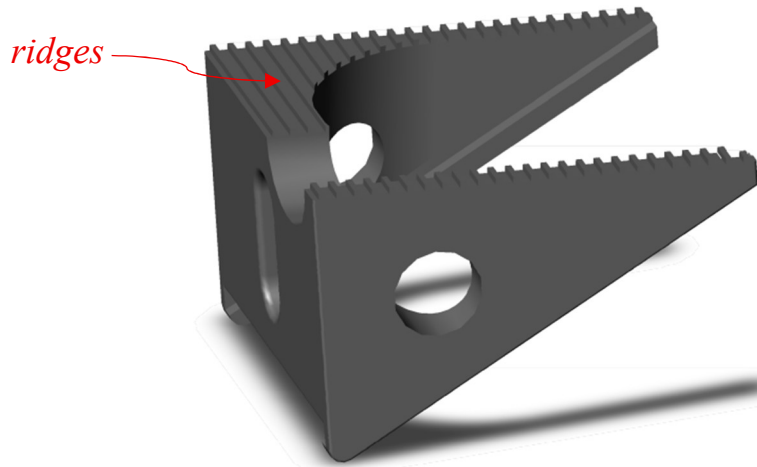
*First interior surface positioned on an opposite side
of the first body than the first vertebral body
engagement surface including at least one angled
housing surface protruding from the first interior
surface*



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Ex. 2127 at 10 (Annotated)

The inventors also conceived that the vertebral body engagement surface would include ridges configured to interface with the vertebral body surface. CAD drawings circulated among co-inventors on April 15, 2011 depict these ridged engagement surfaces on the implant body, and co-inventors discussed including “something like ridges to help engage bone” on April 17, 2011. Ex. 2156 at 7, 15, 17; Ex. 2057; Ex. 2028 at 2 (“[r]idges will also be placed on the top and bottom surfaces of the fusion wedges to maintain grip while inserted into spinal region.”); Ex. 2029 at 3, 5–7; Ex. 2069, Appendix A, limitation 8[c]. The CAD drawing from April 15, 2011 annotated below illustrates these ridges along the vertebral body engagement surface.



Ex. 2156 at 7 (Annotated)

These drawings corroborate Dr. Moskowitz's testimony that the inventors had already determined the structural configuration of the expandable implant bodies, including the vertebral engagement surfaces and interior angled housing surfaces, during the development work occurring in spring 2011. Ex. 2071 ¶¶ 27–34; Ex. 2072 ¶¶ 10–18. Dr. Gall explains that ridges were conventional and well-understood to provide increased engagement with vertebral endplate such that a POSA would have understood the vertebral surfaces to include such features despite a lack of explicit illustration. Ex. 2069, Appendix A, limitation 8[c].

The same structural configuration was later disclosed in the October 25, 2012 provisional application, which documented the previously conceived expandable implant embodiments. Ex. 2071 ¶¶ 137–140, 150–152. For example, Figures 1A–2D and 6A–6D of the '707 provisional application illustrate implant bodies having vertebral body engagement surfaces and interior housing structures consistent with

the designs shown in the earlier engineering drawings. Ex. 2053 at Figs. 1A–2D, 6A–6D; Ex. 2069, Appendix B, limitation 8[c].

First vertebral body engagement surface comprising a plurality of ridges for interfacing with a vertebral body surface

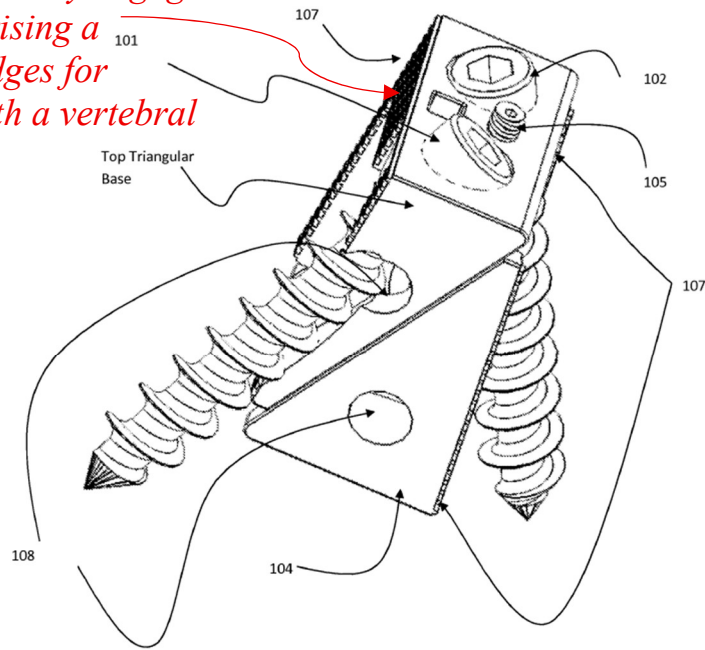


Fig. 1A

Ex. 2053, Fig.1A (Annotated)

first interior surface positioned on an opposite side of the first body than the first vertebral body engagement surface including at least one angled housing surface protruding from the first interior surface

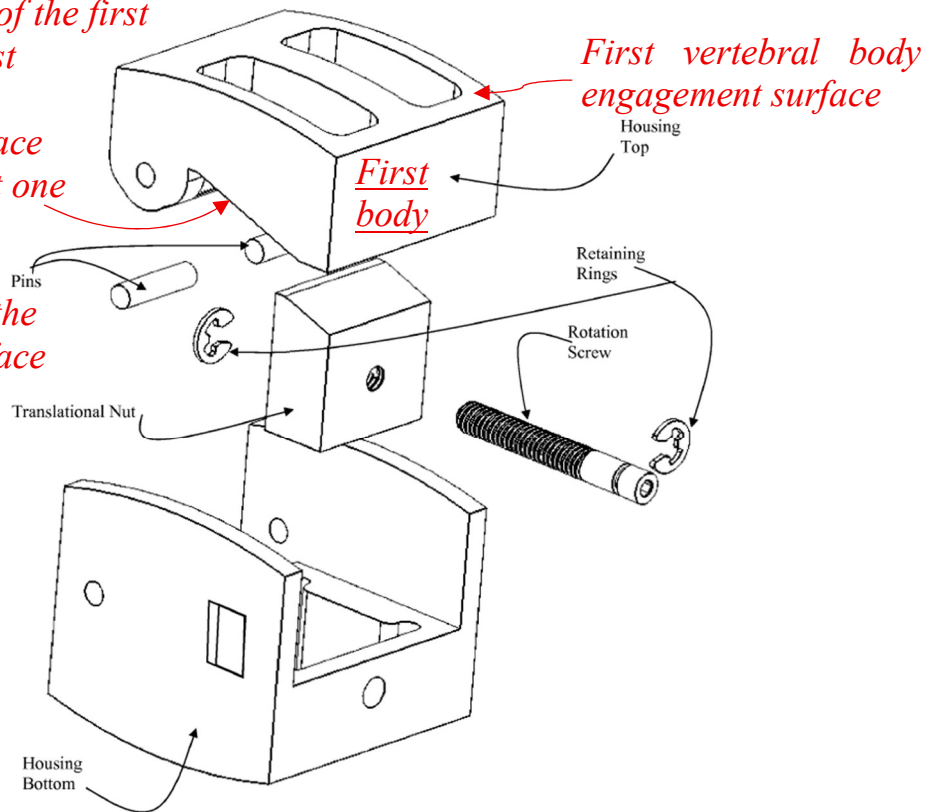


Fig. 6D

Ex. 2053, Fig. 6D (Annotated)

The provisional specification also explains that the implant bodies include ridged external surfaces configured to engage the vertebral bodies. *E.g.*, Ex. 2053 ¶¶ 23, 26 (“The external edges of the housing pieces in contact with vertebral body surfaces include ridges.”).

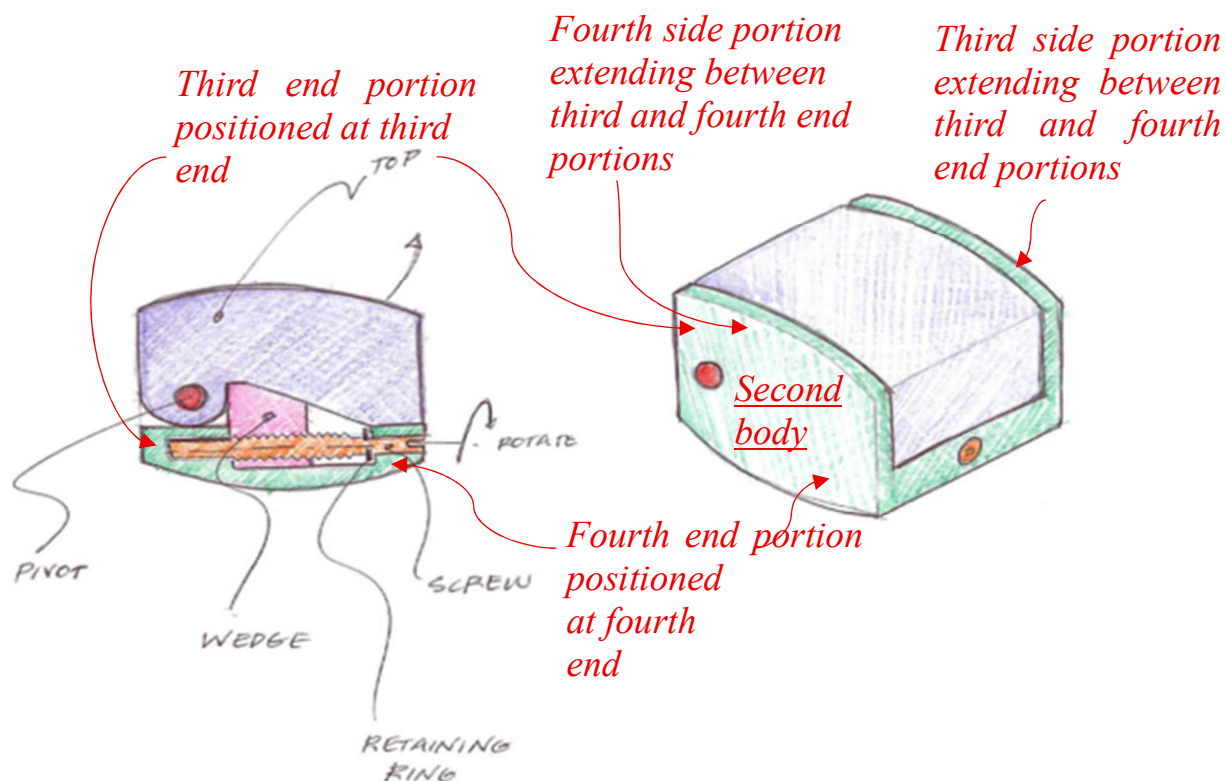
3. **“a second body extending from a third end to a fourth end, wherein the second body has third and fourth end portions positioned at the third and fourth ends, respectively, and has third and fourth side portions extending between the third and fourth end portions”**

By May 3, 2011, the inventors had determined that the expandable implant device would include a second implant body extending between opposing ends and having corresponding end portions and side portions forming the structural body of the implant. Ex. 2071 ¶¶ 24, 27, 31–35; Ex. 2072 ¶¶ 10–15, 19–22; Exs. 2127, 2029.

This structure is also illustrated in the May 3, 2011 drawing. As shown below, that drawing shows the second body extending between the third and fourth ends of the implant and the corresponding end and side portions that define the structural body of the expandable implant device. Ex. 2127; Ex. 2069, Appendix A, limitation 8[d].

MODIFIED WEDGE

USER ROTATES SCREW, WHICH
DRIVES WEDGE AXIALLY, FORCING
TOP TO PIVOT UPWARD



Ex. 2127 at 10 (Annotated)

Dr. Moskowitz confirms that these drawings reflect the claimed structures. Ex. 2071 ¶¶ 31–32; *see also* Ex. 2072 ¶¶ 10–15. These contemporaneous drawings therefore corroborate the inventors’ testimony that they had conceived of the claimed structural configuration of the second implant body before Palmatier’s filing date by May 3, 2011.

The same structural configuration was later disclosed in the October 25, 2012 provisional application. Ex. 2071 ¶¶ 137–139, 150–152. For example, Figure 6D of the '707 provisional illustrates a second implant body extending between opposing ends with corresponding end and side portions forming part of the expandable implant structure. Ex. 2053, Fig. 6D; Ex. 2069, Appx. B, limitation 8[d].

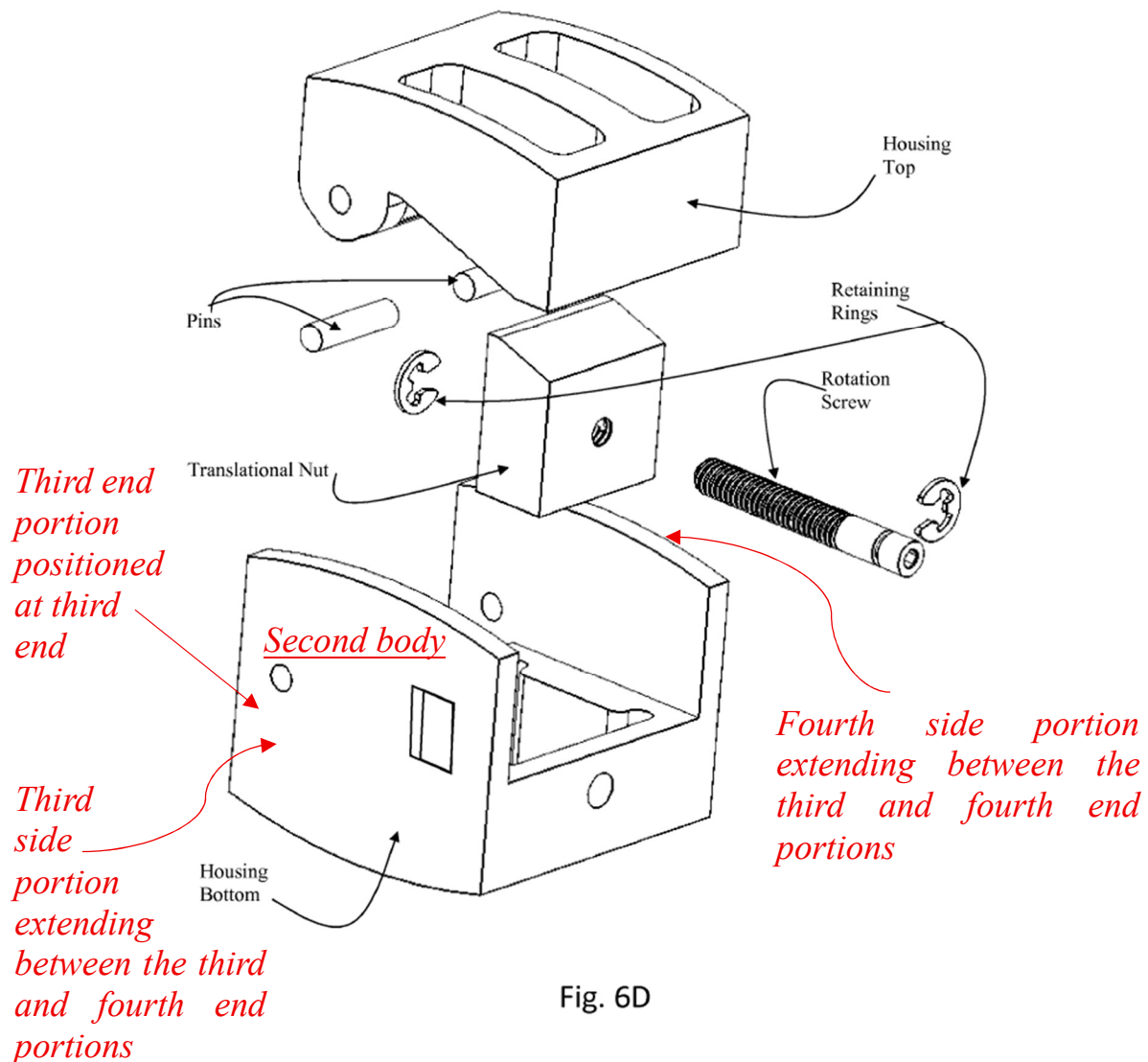


Fig. 6D

Ex. 2053, Fig. 6D (Annotated)

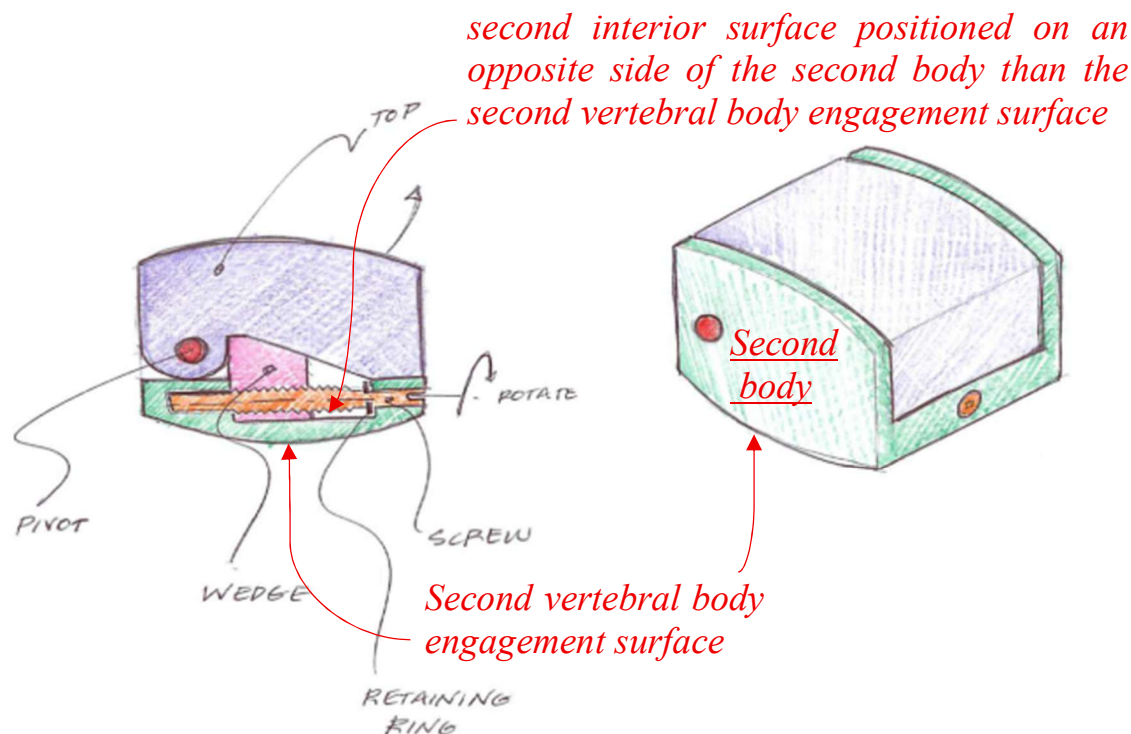
4. **“wherein the second body has a second vertebral body engagement surface and has a second interior surface positioned on an opposite side of the second body than the second vertebral body engagement surface”**

By May 3, 2011, the inventors had determined that the expandable implant device would include a second implant body having (1) a vertebral body engagement surface configured to contact a vertebral body and (2) a second interior surface positioned on the opposite side of the implant body that interacts with the internal expansion mechanism of the device. Ex. 2071 ¶¶ 27–34; Ex. 2072 ¶¶ 10–15, 47–53; Ex. 2127, 2156, 2057.

These structural features are depicted in the contemporaneous engineering drawing circulated on May 3, 2011, shown below. The annotated drawing identifies the vertebral body engagement surface of the second implant body and the corresponding interior surface positioned on the opposite side of that body. Ex. 2127; Ex. 2069, Appendix A, limitation 8[e].

MODIFIED WEDGE

USER ROTATES SCREW, WHICH
DRIVES WEDGE AXIALLY, FORCING
TOP TO PIVOT UPWARD



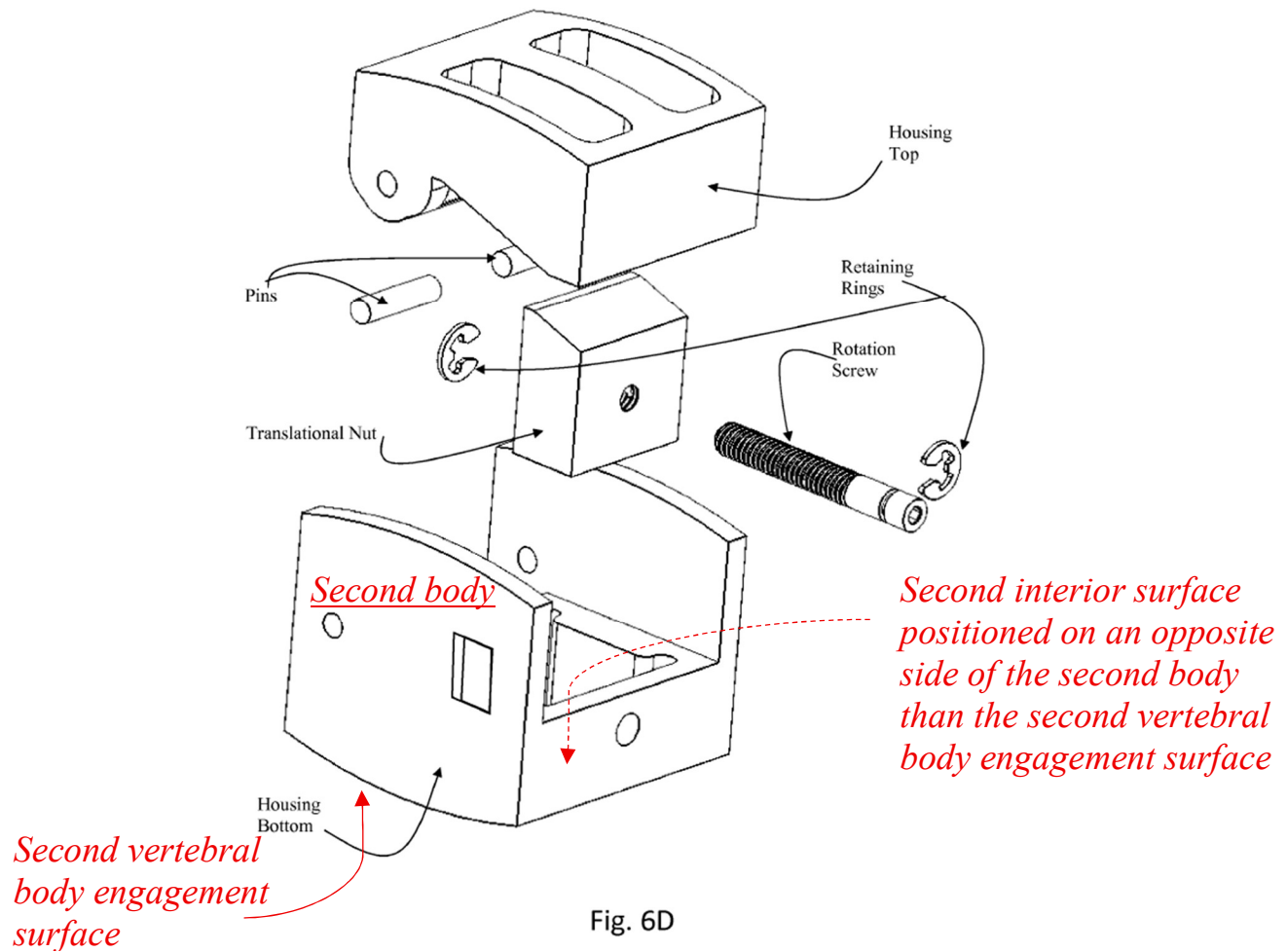
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Ex. 2127 at 10 (Annotated)

Dr. Moskowitz confirms that these drawings reflect the expandable implant embodiments conceived during the development work occurring in spring 2011. Ex. 2071 ¶¶ 31–32; *see also* Ex. 2072 ¶¶ 10–15. These contemporaneous drawings therefore corroborate the inventors' understanding of the structural configuration of the second implant body before Palmatier's filing date.

The same structural configuration was later disclosed in the October 25, 2012 provisional application, which documented the previously conceived expandable

implant embodiments. Ex. 2071 ¶¶ 137–139, 150–152. For example, Figure 6D of the '707 provisional illustrates the second implant body having a vertebral body engagement surface and a corresponding interior surface positioned on the opposite side of the body. Ex. 2053, Fig. 6D; Ex. 2069, Appendix B, limitation 8[e].



Ex. 2053, Fig. 6D (Annotated)

5. “the first body configured to fit between the third and fourth side portions in a compressed configuration of the expandable intervertebral device”

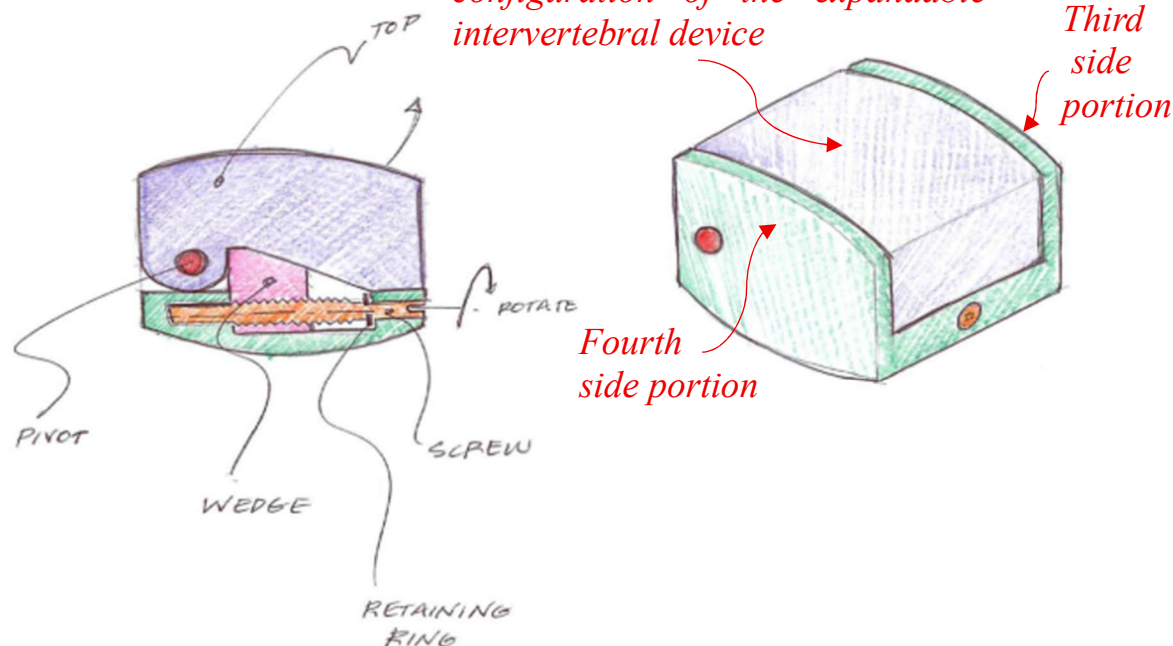
By May 3, 2011, the inventors had determined that the expandable implant device would include two cooperating implant bodies configured so that one body fits between structural portions of the other body when the implant is in a compressed configuration prior to expansion. Ex. 2071 ¶¶ 29–33; Ex. 2072 ¶¶ 10–15; Ex. 2127.

This structural relationship is depicted in the contemporaneous engineering drawing circulated on May 3, 2011, shown below. The image shows the first implant body positioned between side portions of the second implant body when the device is in its compressed configuration. Ex. 2127; Ex. 2069, Appendix A, limitation 8[e].

MODIFIED WEDGE

USER ROTATES SCREW, WHICH
DRIVES WEDGE AXIALLY, FORCING
TOP TO PIVOT UPWARD

*the first body configured to fit
between the third and fourth side
portions in a compressed
configuration of the expandable
intervertebral device*



Ex. 2127 at 10 (Annotated)

Dr. Moskowitz confirms that these drawings reflect expandable implant embodiments conceived during the development work occurring in spring 2011. Ex. 2071 ¶¶ 31–32; *see also* Ex. 2072 ¶¶ 10–15. These contemporaneous drawings therefore corroborate the inventors’ conception of the structural relationship between the implant bodies before Palmatier’s filing date.

The same structural relationship was later disclosed in the October 25, 2012 provisional application, which documented the previously conceived expandable

implant embodiments. Ex. 2071 ¶¶ 137–144, 150–152. For example, Figure 6A of the '707 provisional illustrates the expandable implant device in a compressed configuration in which the first implant body is positioned between structural portions of the second implant body. Ex. 2053, Fig. 6A; Ex. 2069, Appendix B, limitation 8[e].

The first body configured to fit between the third and fourth side portions in a compressed configuration of the expandable intervertebral device

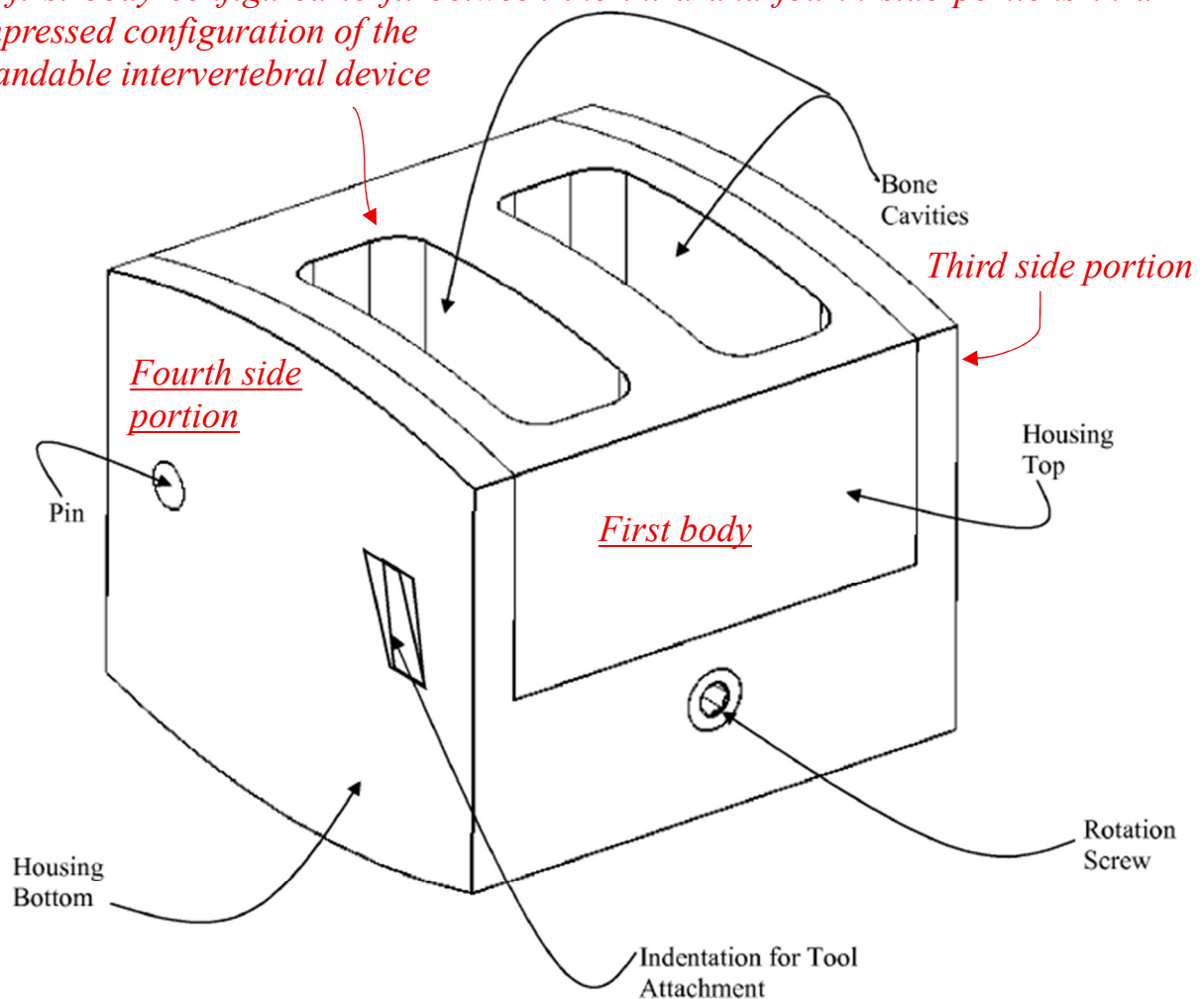


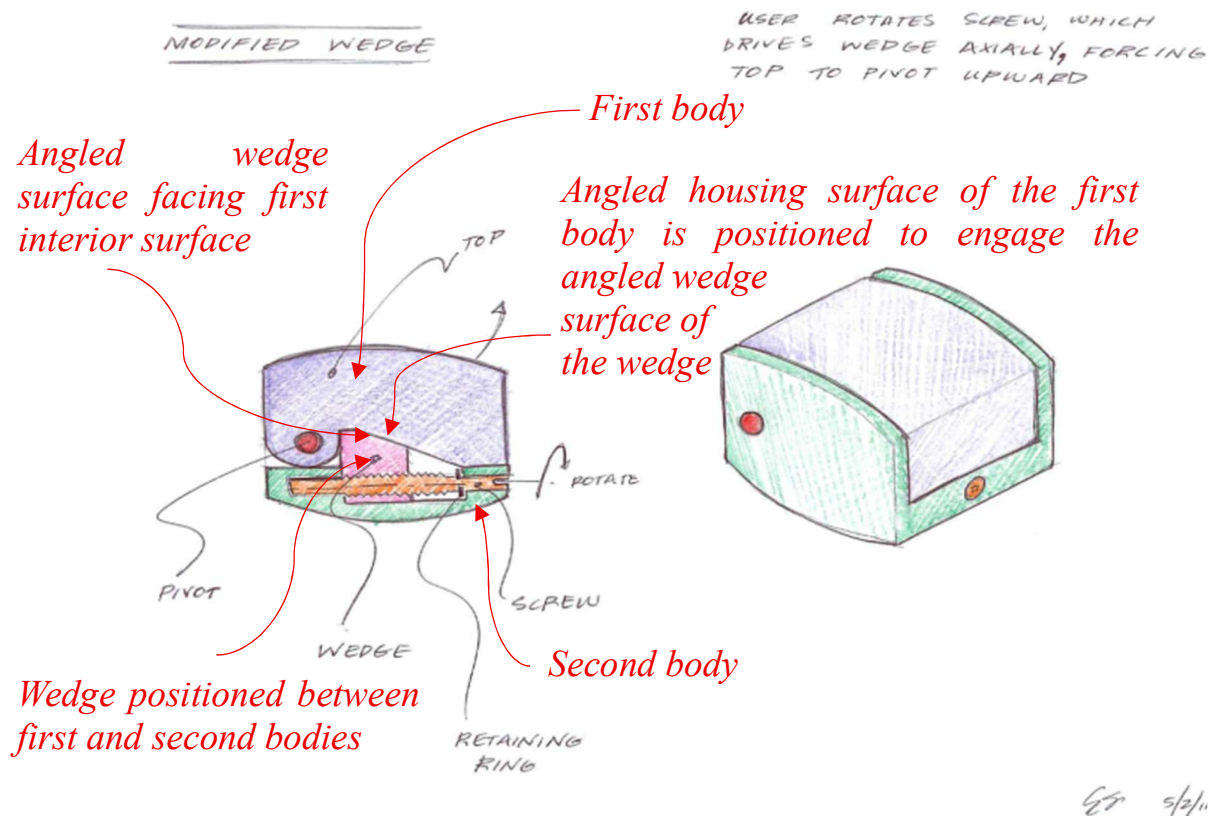
Fig. 6A

Ex. 2053, Fig. 6A (Annotated)

6. **“a wedge having an angled wedge surface, wherein the wedge is positioned between the first body and the second body with the angled wedge surface facing the first interior surface of the first body and the at least one angled housing surface of the first body is positioned to engage the angled wedge surface of the wedge”**

By May 3, 2011, the inventors had determined that the expandable implant device would include a wedge component positioned between the implant bodies and having an angled wedge surface configured to interact with an angled interior housing surface of the implant body to cause expansion of the device. Ex. 2071 ¶¶ 29–33; Ex. 2072 ¶¶ 10–15; Ex. 2127.

This wedge-based expansion mechanism is also shown in the May 3, 2011 drawing. The annotated image identifies the wedge positioned between the implant bodies and the corresponding angled wedge surface that engages the angled housing surface of the implant body during expansion. Ex. 2127; Ex. 2069, Appendix A, limitation 8[f].



Ex. 2127 at 10 (Annotated)

Dr. Moskowitz confirms that these drawings reflect the expandable implant embodiments conceived during the development work occurring in spring 2011. Ex. 2071 ¶¶ 31–32; *see also* Ex. 2072 ¶¶ 10–15. These contemporaneous drawings therefore corroborate the inventors’ understanding of the wedge-based expansion mechanism before Palmatier’s filing date.

The same wedge-driven expansion mechanism was later disclosed in the October 25, 2012 provisional application. Ex. 2071 ¶¶ 141–144, 150–152. For example, Figure 6D of the ’707 provisional illustrates a wedge component positioned between the implant bodies with an angled surface that interacts with a

corresponding interior housing surface to cause expansion of the implant. Ex. 2053, Fig. 6D; Ex. 2069, Appendix B, limitation 8[f].

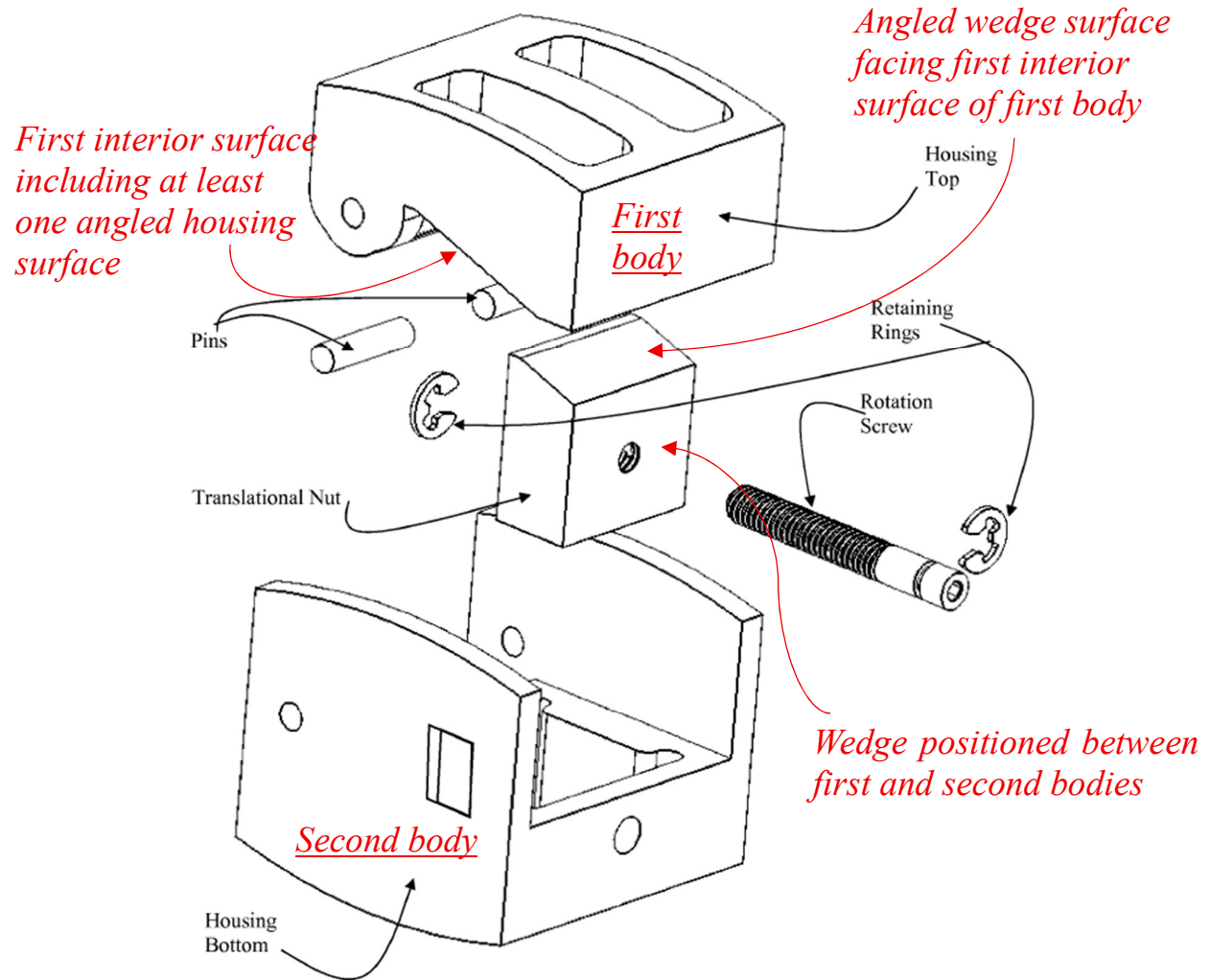


Fig. 6D

Ex. 2053, Fig. 6D (Annotated)

7. “wherein the wedge is configured to slide within a space defined by the first body and second body in a direction toward the second and fourth ends of the first body and second body from a first wedge position in which the first body and the second body are in a substantially closed position to a second wedge position whereby the angled

wedge surface presses against the first interior surface of the first body to move the first body relative to the second body from a compressed configuration to an expanded configuration without moving the second body”

By May 3, 2011, the inventors had determined that the wedge component positioned between the implant bodies would slide axially within the implant and interact with the angled interior housing surface to move the implant bodies from a compressed configuration to an expanded configuration. Ex. 2071 ¶¶ 29–33; Ex. 2072 ¶¶ 10–15; Ex. 2127.

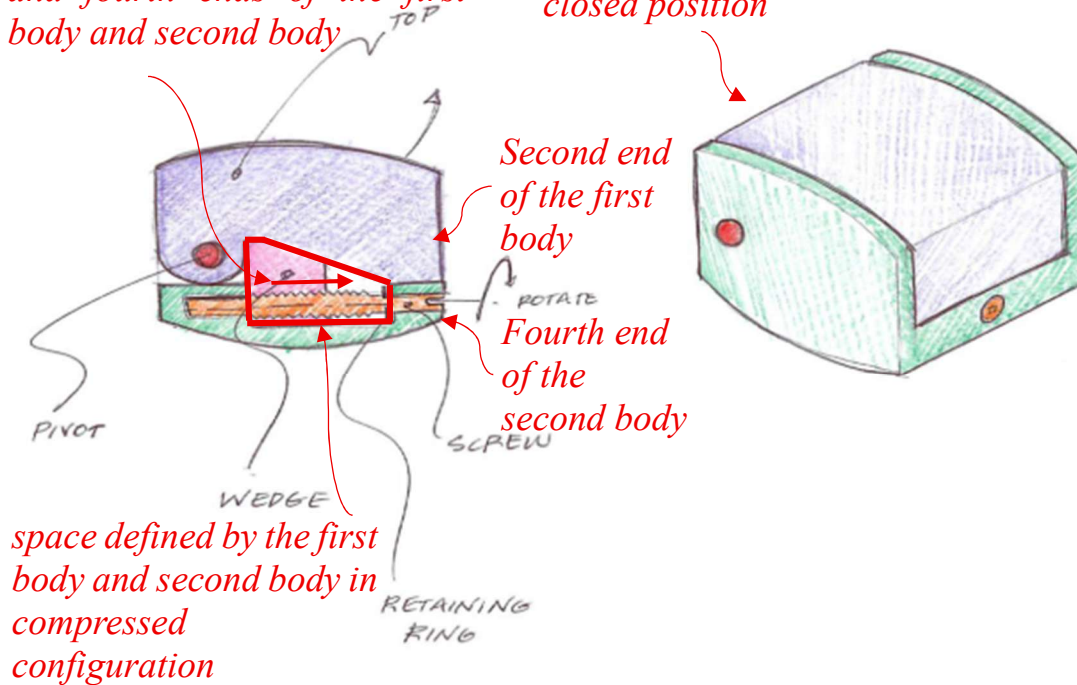
The May 3, 2011 drawing confirms this understanding. In the drawing, the inventors wrote that rotation of a screw drives the wedge axially, forcing the top housing of the implant to pivot upward. Ex. 2127. This description corresponds directly to the claim language requiring a second wedge position in which the angled wedge surface presses against the interior surface of the first body to move the first body relative to the second body from a compressed configuration to an expanded configuration. Ex. 2069, Appendix A, limitation 8[g]. The structural and operational features of this claimed mechanism are visually apparent in the drawing shown below.

MODIFIED WEDGE

USER ROTATES SCREW, WHICH
DRIVES WEDGE AXIALLY, FORCING
TOP TO PIVOT UPWARD

*Wedge in first wedge position
configured to slide in a
direction toward the second
and fourth ends of the first
body and second body*

*First and second bodies in substantially
closed position*



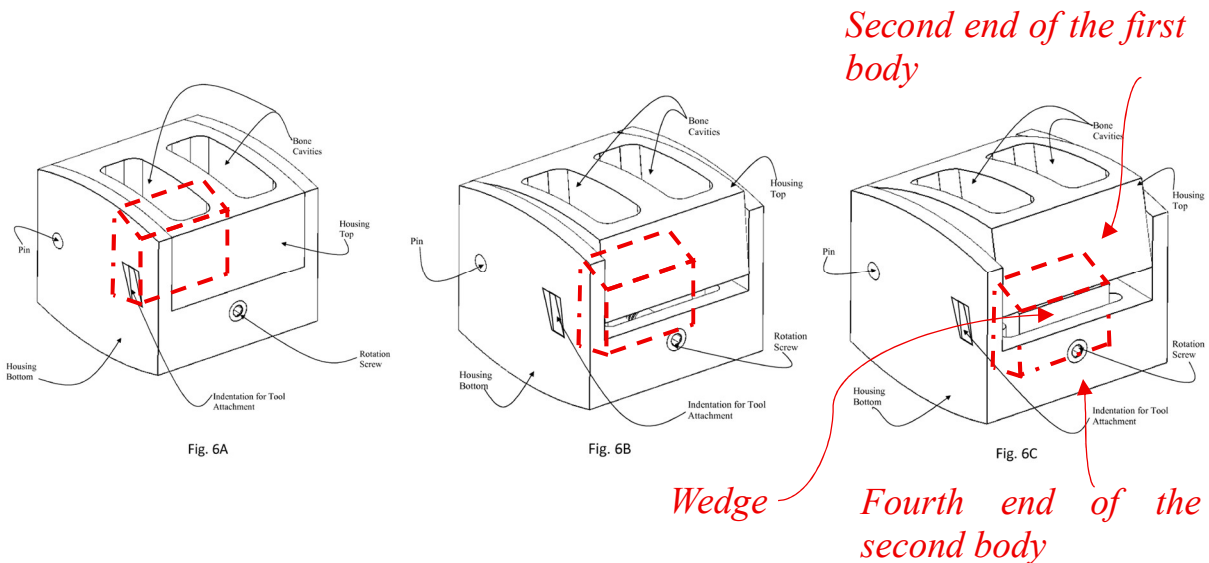
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Ex. 2127 at 10 (Annotated)

Dr. Moskowitz confirms that these drawings reflect the expandable implant embodiments conceived during the development work occurring in spring 2011. Ex. 2071 ¶¶ 31–32; *see also* Ex. 2072 ¶¶ 10–15. These contemporaneous drawings therefore corroborate the inventors’ understanding of the wedge-driven sliding expansion mechanism before Palmatier’s filing date.

The same mechanism and sequence of operation were later disclosed in the October 25, 2012 provisional application. Ex. 2071 ¶¶ 141–144, 150–152. Figures

6A–6C of the '707 provisional illustrate the operation of the wedge mechanism. Figure 6A depicts the implant in a first wedge position in which the device is in a substantially closed configuration. As the wedge moves axially toward the second end of the first body and the fourth end of the second body, the angled wedge surface presses against the interior housing surface of the implant body and forces the first body to move relative to the second body. This movement would have been understood by a POSA to be consistent with the annotated wedge locations included for the intermediary configuration shown in Figure 6B and the expanded configuration shown in Figure 6C, where the wedge can be seen axially driven to pivot the first body relative to the second body. Ex. 2053, Figs. 6A–6C; ¶¶ 34–35 (“As the screw is rotated by an external tool (Figure 8), it causes lateral motion of a wedge-shaped translation nut (). The nut () engages the inner tapered surface of the top housing () and forces the top housing piece () to rotate away from the bottom housing ().”); Ex. 2069, Appendix B, limitation 8[g]. Ex. 2069, Appendix B, limitation 8[g].



Ex. 2053, Figs. 6A-6C (Annotated)

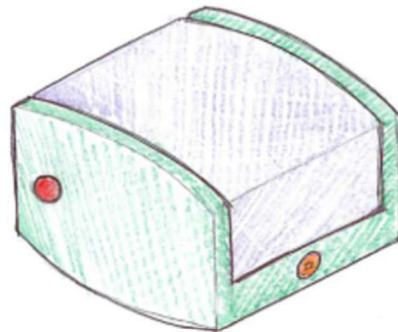
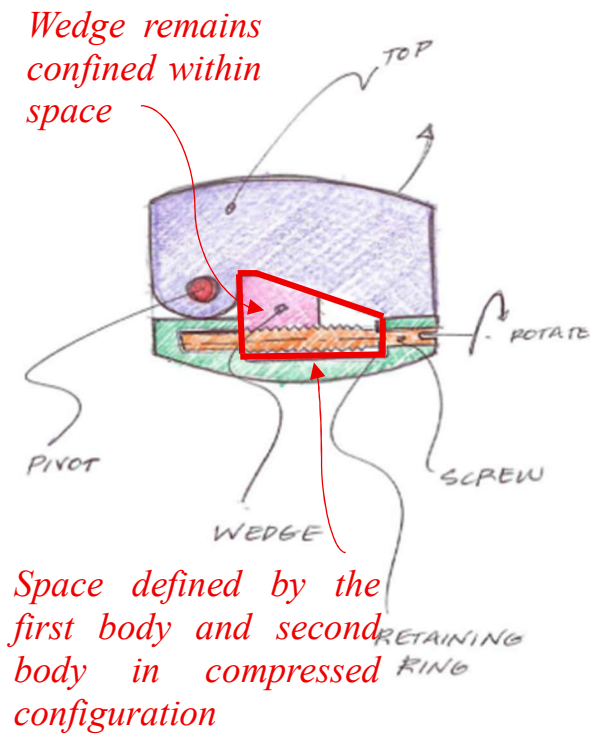
8. “whereby the wedge remains axially confined within the space defined by the first body and second body in the compressed and expanded configurations.”

By May 3, 2011, the inventors had determined that the wedge component positioned between the implant bodies would move axially within the space defined by the implant bodies while remaining confined within that space during operation of the device. Ex. 2071 ¶¶ 29–33; Ex. 2072 ¶¶ 10–15; Ex. 2127.

This configuration is depicted in the May 3, 2011 drawing. It shows the wedge positioned within the space defined by the first and second implant bodies. That space permits the wedge to move axially to drive expansion of the implant while remaining confined between the implant bodies during operation.

MODIFIED WEDGE

USER ROTATES SCREW, WHICH
DRIVES WEDGE AXIALLY, FORCING
TOP TO PIVOT UPWARD

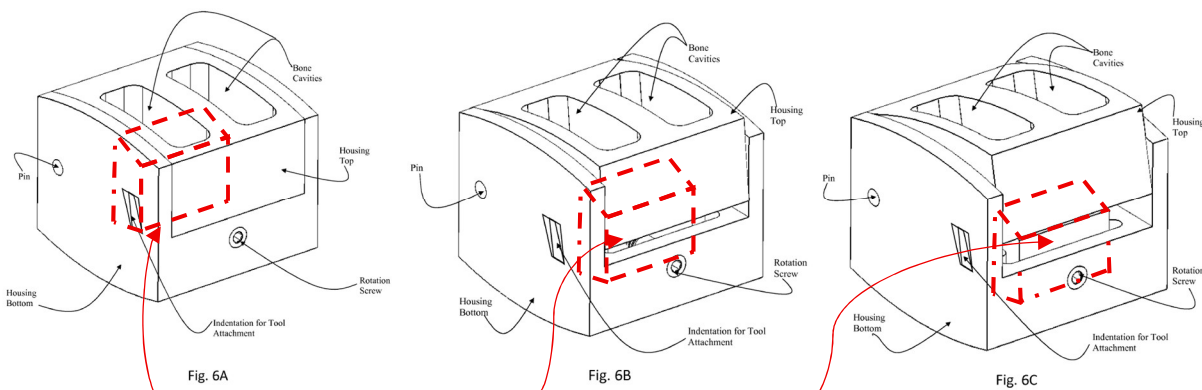


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Ex. 2127 at 10 (Annotated)

As illustrated in the drawing, the wedge is driven by a screw mechanism that is threaded through the second implant body and the wedge itself. Because the wedge remains engaged with this threaded mechanism and positioned within the space defined by the implant bodies, the wedge remains axially confined within that space even as the implant transitions from a compressed configuration to an expanded configuration. Ex. 2069, Appendix A, limitations 8[g]-8[h].

The same configuration was disclosed in the October 25, 2012 provisional application. Ex. 2071 ¶¶ 141–144, 150–152. Figures 6A–6C illustrates where a POSA would understand the wedge to be positioned, remaining confined within the space defined by the implant bodies throughout operation of the device. Ex. 2069, Appendix B, limitations 8[g]-8[h]. Figure 6A shows the implant in the compressed configuration, Figure 6B shows the intermediary configuration during expansion, and Figure 6C shows the expanded configuration. In each configuration, the wedge remains positioned within the space defined by the first and second implant bodies while moving axially to drive expansion of the implant. Ex. 2053, Figs. 6A–6C; Ex. 2069, Appendix B, limitations 8[g]-8[h].



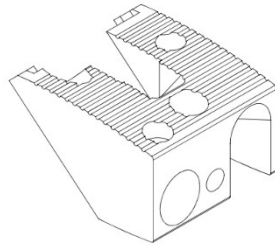
*wedge axially confined within space
defined by first and second bodies*

Ex. 2053, Figs. 6A-6C (Annotated)

C. Claim 9: “The expandable intervertebral device of claim 8, wherein in the expanded configuration of the expandable intervertebral device the plurality of ridges on the first vertebral body engagement surface are configured to be in contact with the vertebral body surface.”

As explained above in Section VI.B.2, by at least May 18, 2011 the inventors had determined that the vertebral body engagement surfaces of the expandable implant would include ridges configured to interface with the adjacent vertebral bodies. Ex. 2071 ¶¶ 27–34, 38; Ex. 2072 ¶¶ 10–22, 47–50; Ex. 2127, Ex. 2028 at 1–3; Ex. 2029 at 3–7, 2156, 2057 at 1; Ex. 2069, Appendix A, limitation 8[c], claim 9.

Contemporaneous CAD drawings dated May 18 and May 27, 2011, show ridges formed along the vertebral body engagement surfaces of the implant bodies. Exs. 2029, 2159. Those ridges are configured to engage the adjacent vertebral bodies when the implant is positioned between the vertebrae and expanded during implantation. Ex. 2028 (“Ridges will also be placed on the top and bottom surfaces of the fusion wedges to maintain grip while inserted into spinal region.”); Ex. 2029; Ex. 2071, ¶¶ 35, 38; Ex. 2072 ¶¶ 16–22, 57–59; Ex. 2069, Appendix A, limitation 8[c], claim 9.



Ex. 2029 at 7.

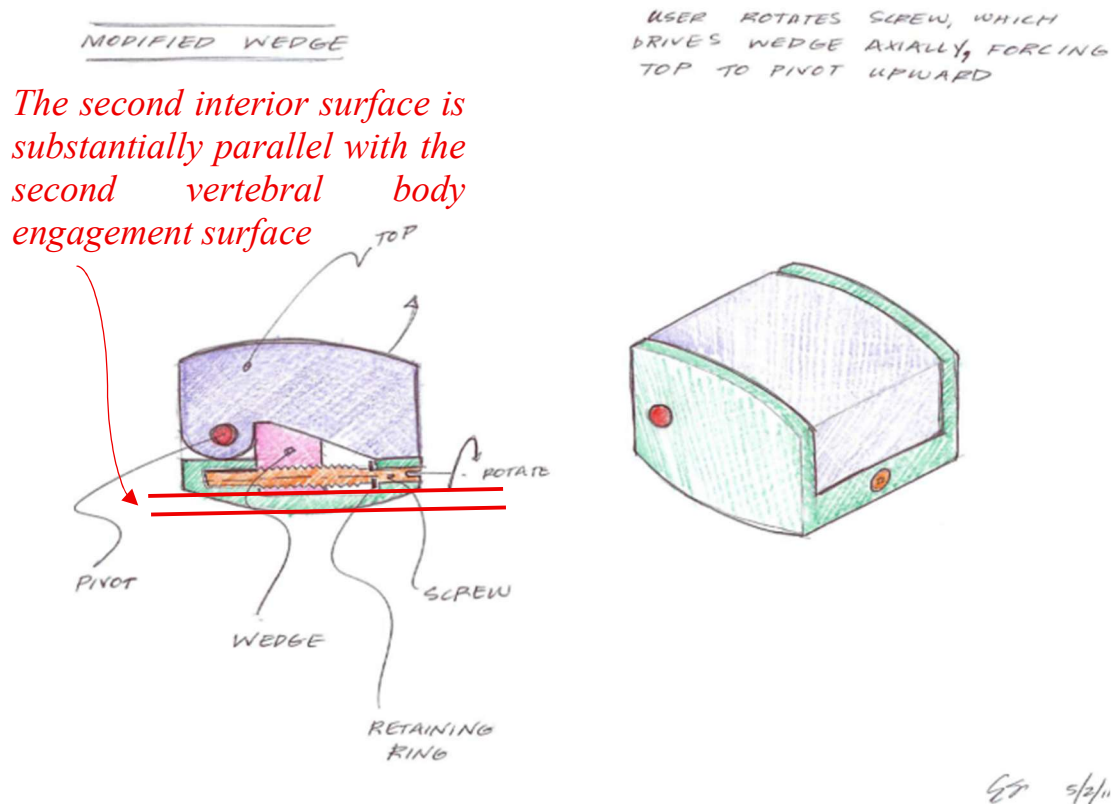
The same feature is disclosed in the October 25, 2012 provisional application, which explains that the implant bodies include external ridged surfaces configured to contact the vertebral bodies and facilitate fusion. Ex. 2053 ¶¶ 23, 26; Ex. 2071 ¶¶ 137–140. The provisional drawings likewise depict these ridged engagement surfaces on the implant bodies. Ex. 2053, Figs. 1A–2D; Ex. 2069, Appendix B, limitation 8[c], claim 9.

D. Claim 13: “The expandable intervertebral device of claim 8 wherein the second interior surface is substantially parallel with the second vertebral body engagement surface such that the wedge is configured to move along a path parallel to the second vertebral body engagement surface when the wedge slides within the space against the second interior surface.”

By May 3, 2011, the inventors had determined that the expandable implant would include an interior surface of the implant body configured so that the wedge travels along a defined path parallel to the vertebral body engagement surface during expansion. Ex. 2071 ¶¶ 29–33; Ex. 2072 ¶¶ 10–15; Ex. 2127.

This structural relationship is depicted in the May 3, 2011 drawing. The drawing shows the second interior surface of the implant body and the corresponding

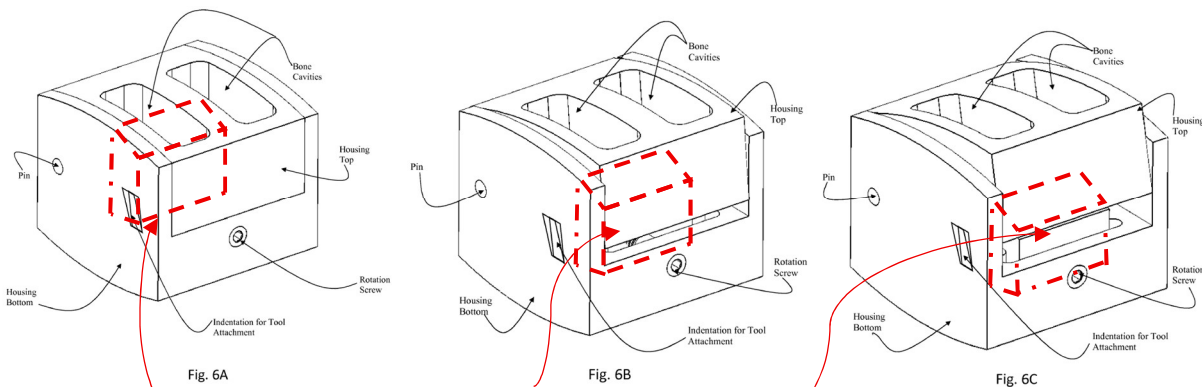
vertebral body engagement surface, which are oriented so that the wedge moves along a path parallel to the vertebral engagement surface as the wedge translates within the implant. Ex. 2127; Ex. 2069, Appendix A, claim 13.



Ex. 2127 at 10 (Annotated)

Dr. Moskowitz confirms that these drawings reflect the expandable implant embodiments conceived during the development work occurring in spring 2011. Ex. 2071 ¶¶ 31–32; *see also* Ex. 2072 ¶¶ 10–15. The drawings show that the wedge translates along a defined path within the implant while engaging the interior housing surfaces of the implant body to drive expansion of the device.

The same structural relationship was disclosed in the October 25, 2012 provisional application. Ex. 2071 ¶¶ 141–144, 150–152. Figures 6A–6C illustrate the wedge positioned between the implant bodies and moving along a defined path substantially parallel with the second vertebral body engagement surface during operation of the expansion mechanism. Ex. 2053, Figs. 6A–6D; *see also* ¶¶ 34–35; Ex. 2069, Appendix B, limitation 8[g], claim 13.



Wedge moves along path substantially parallel with second vertebral body engagement surface

Ex. 2053, Figs. 6A-6C (Annotated)

As Dr. Gall explains, a POSA would have understood that the second interior surface would have had a substantially parallel surface to allow the wedge, which has a flat bottom, to traverse within the implant without interference. Ex. 2069, Appendix B, limitation 8[g], claim 13. Dr. Gall further explains that the bottom surface remains aligned with—and does not extend at a materially different angle from—the path of the wedge or the interior surface. *Id.*

E. Claim 17

- 1. “An expandable intervertebral device comprising: a first body extending from a first end to a second end wherein the first body has first and second end portions positioned at the first and second ends, respectively, and has first and second side portions extending between the first and second end portions, wherein the first body has a first vertebral body engagement surface having a first plurality of ridges formed therein and has a first interior surface positioned on an opposite side of the first body than the first vertebral body engagement surface”**

The inventors conceived this structural configuration by at least May 18, 2011 and reduced them to practice for the same reasons set forth in Sections VI.B.1-VI.B.2 above. Ex. 2069, Appendices A-B, limitations 8[a]-8[c], 17[a]-17[c].

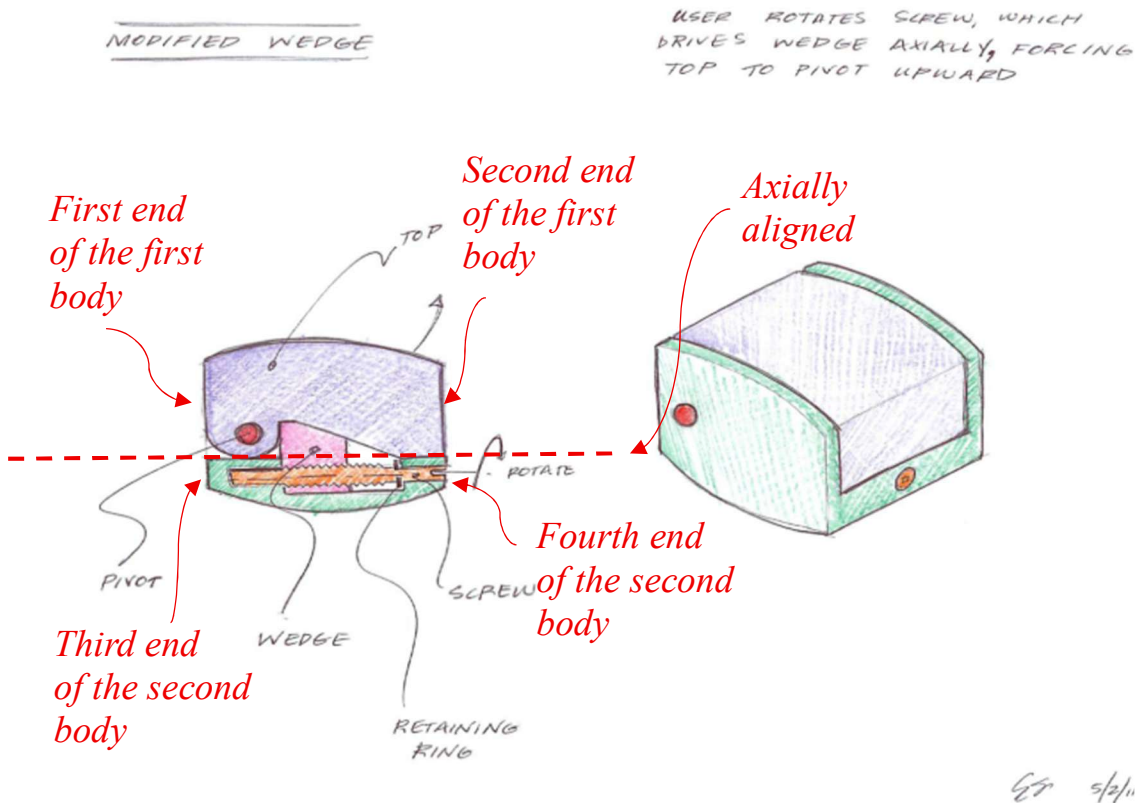
- 2. “a second body extending from a third end to a fourth end wherein the second body has third and fourth end portions positioned at the third and fourth ends, respectively, and has third and fourth side portions extending between the third and fourth end portions, wherein the second body has a second vertebral body engagement surface having a second plurality of ridges formed therein and has a second interior surface positioned on an opposite side of the second body than the second vertebral body engagement surface”**

The inventors conceived of these features at least as early as May 18, 2011, and reduced them to practice for the same reasons as set forth above in Section VI.B.2-VI.B.4. Ex. 2069, Appendices A-B, limitations 8[c]-8[e], 17[d]-17[e].

3. **wherein the first body is aligned with the second body such that the first end of the first body is axially aligned with the third end of the second body and the second end of the first body is axially aligned with the fourth end of the second body”**

By May 3, 2011, the inventors had determined that the expandable implant device would include two cooperating implant bodies positioned in axial alignment so that the corresponding ends of the implant bodies align along the longitudinal axis of the implant. Ex. 2071 ¶¶ 29–33; Ex. 2072 ¶¶ 10–15; Ex. 2127.

This structural alignment is shown in the May 3, 2011 drawing. It shows the first implant body and second implant body arranged so that the first end of the first body is axially aligned with the third end of the second body and the second end of the first body is axially aligned with the fourth end of the second body. Ex. 2127; Ex. 2069, Appendix A, limitation 17[f].



Ex. 2127 at 10 (Annotated)

Dr. Moskowitz confirms that these drawings reflect the expandable implant embodiments conceived during the development work occurring in spring 2011. Ex. 2071 ¶¶ 31–32; *see also* Ex. 2072 ¶¶ 10–15. These contemporaneous drawings therefore corroborate the inventors’ understanding of the axial alignment of the implant bodies before Palmatier’s filing date.

The same structural relationship was disclosed in the October 25, 2012 provisional application. Ex. 2071 ¶¶ 138, 141–143, 150–152. For example, Figure 6D of the ’707 provisional illustrates the first and second implant bodies arranged along the same longitudinal axis, with the corresponding ends of the implant bodies

aligned as recited in this limitation. Ex. 2053, Fig. 6D; Ex. 2069, Appendix B, limitation 17[f].

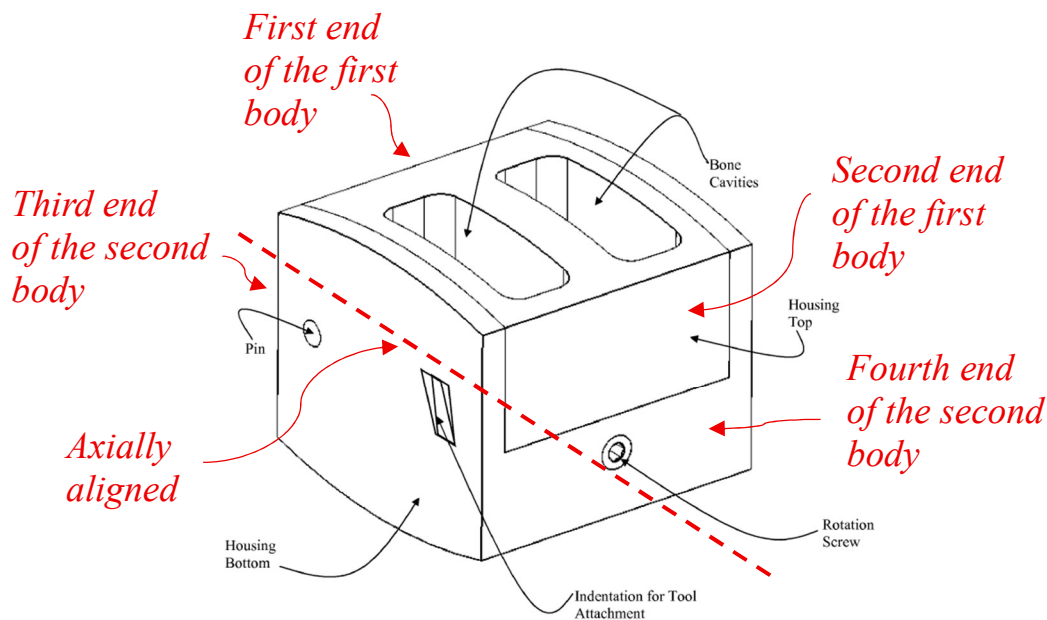


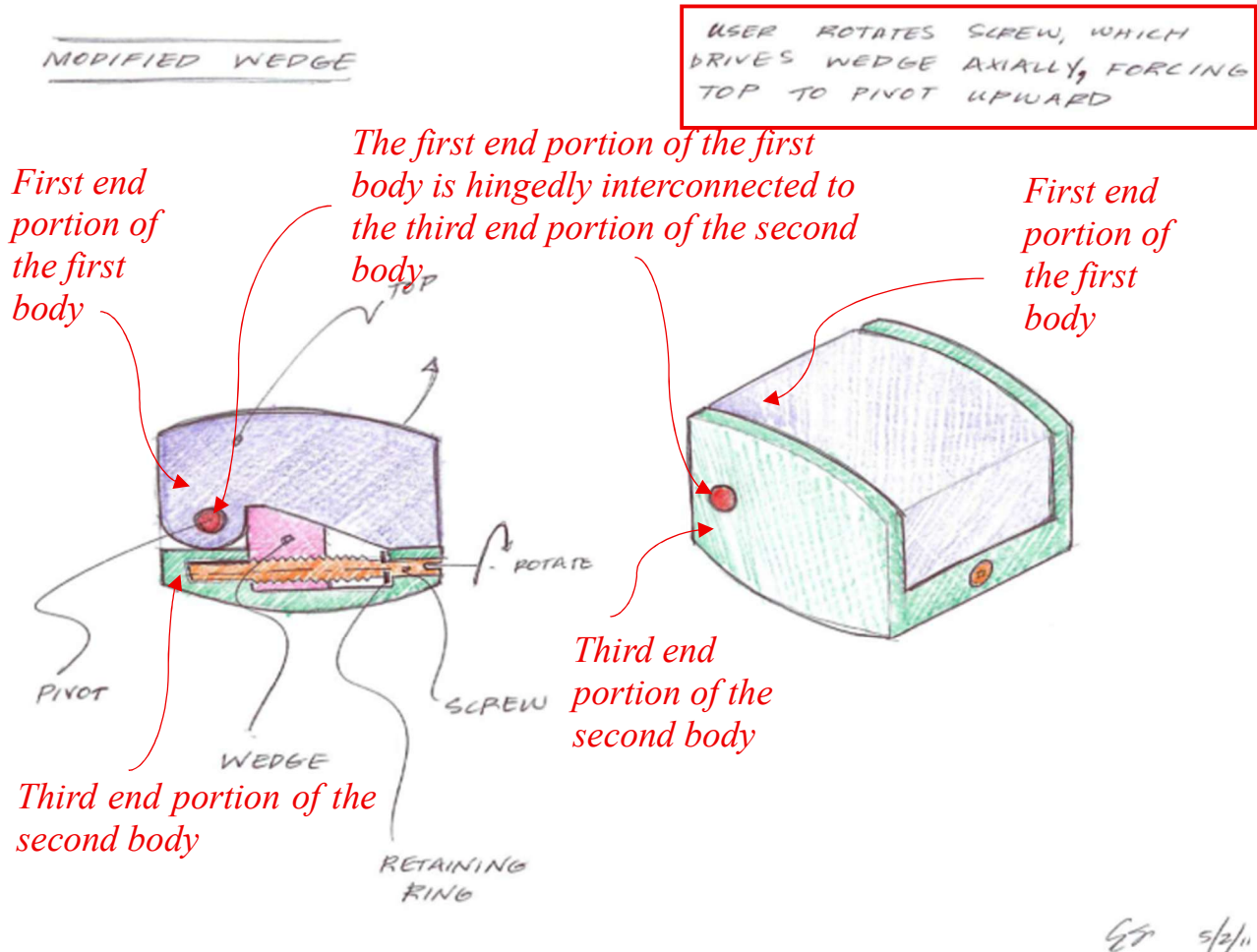
Fig. 6A

Ex. 2053, Fig. 6D (Annotated)

4. **“wherein the first end portion of the first body and the third end portion of the second body are hingedly interconnected such that the first body can pivot with respect to the second body so as to move the second end portion of the first body away from the fourth end portion of the second body”**

By May 3, 2011, the inventors had determined that the implant bodies would be hingedly interconnected at one end so that movement of the internal wedge mechanism causes one implant body to pivot relative to the other during expansion of the device. Ex. 2071 ¶¶ 29–33; Ex. 2072 ¶¶ 10–15; Ex. 2127.

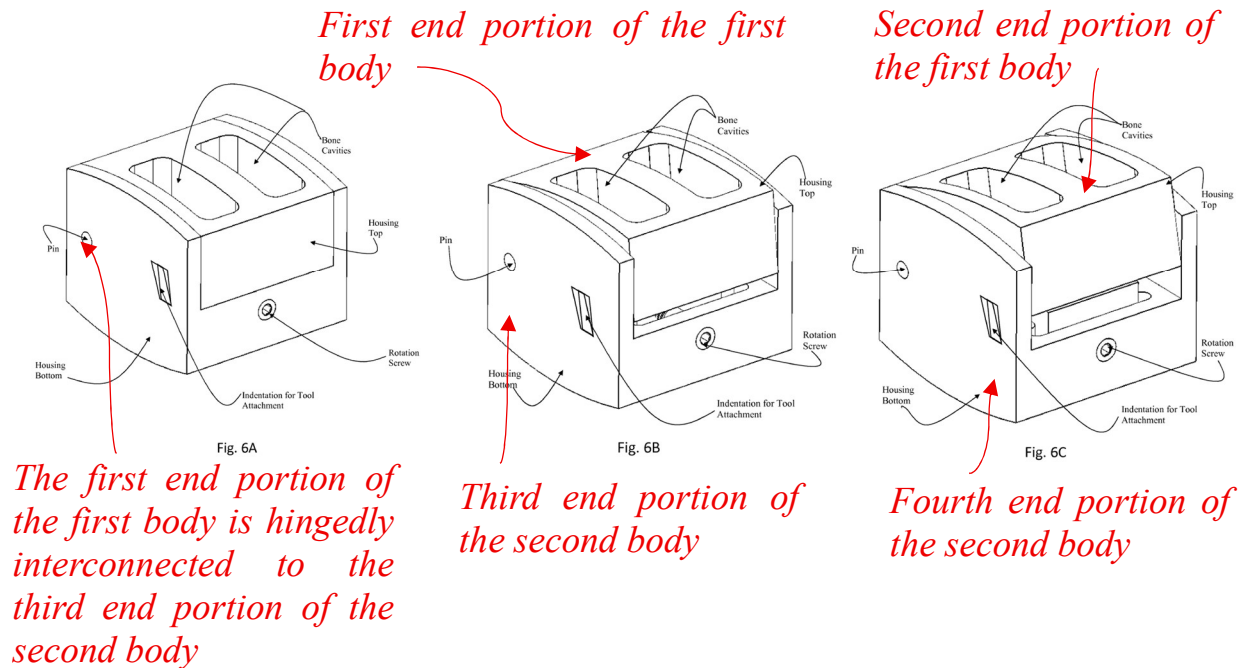
This hinged configuration and pivoting motion are shown in the May 3, 2011 drawing. In the drawing, the inventors explained that rotation of a screw drives the wedge axially, forcing the top housing of the implant to pivot upward. Ex. 2127; Ex. 2072 ¶¶ 10–15. This description corresponds directly to the claim language requiring that the first body pivot relative to the second body so that the second end portion of the first body moves away from the fourth end portion of the second body during expansion of the device. Ex. 2069, Appendix A, limitation 17[g].



Ex. 2127 at 10 (Annotated)

Dr. Moskowitz confirms that these drawings reflect the expandable implant embodiments were conceived during the development work occurring in spring 2011. Ex. 2071 ¶¶ 31–32; *see also* Ex. 2072 ¶¶ 10–15. These contemporaneous drawings therefore corroborate the inventors’ understanding of the hinged interconnection and pivoting operation of the implant bodies before Palmatier’s filing date.

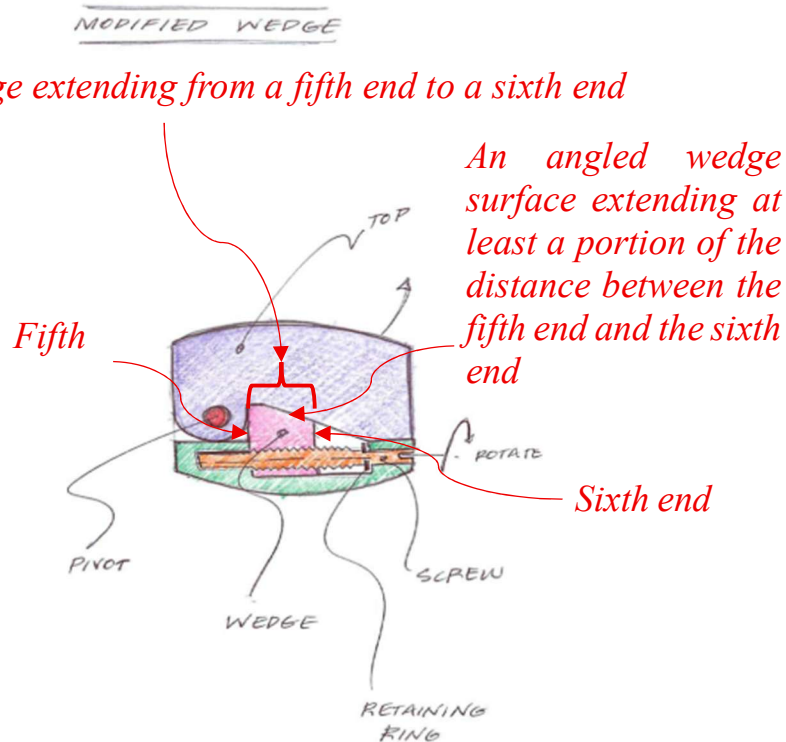
The same hinged configuration and pivoting expansion mechanism were disclosed in the October 25, 2012 provisional application. Ex. 2071, ¶¶ 138–144, 150–152. Figures 6A–6C illustrate the hinge structure and the resulting pivoting motion of the implant bodies during expansion. In those figures, a pin hingedly interconnects the first end portion of the first body with the third end portion of the second body, permitting the first body to pivot relative to the second body as the wedge is driven axially within the implant. Ex. 2053, Figs. 6A–6C; ¶¶ 34–35. Figure 6C in particular illustrates the pivoted configuration in which the second end portion of the first body moves away from the fourth end portion of the second body as the wedge drives expansion of the device. Ex. 2069, Appendix B, limitation 17[g].



Ex. 2053, Figs. 6A-6C (Annotated)

5. **“a wedge extending from a fifth end to a sixth end and having an angled wedge surface extending along at least a portion of a distance between the fifth end and the sixth end,”**

The inventors conceived of a wedge having an angled wedge surface at least as early as May 3, 2011, and reduced it to practice for the same reasons as set forth above in Section VI.B.6. By May 3, 2011, the inventors had also determined the geometry of the wedge and that it would have an angled wedge surface, as illustrated in the engineering drawing below. Ex. 2069, Appendix A, limitation 17[h].



Ex. 2127 at 10 (Annotated)

Dr. Moskowitz confirms that these drawings reflect the expandable implant embodiments that had already been conceived during the development work occurring in spring 2011. Ex. 2071 ¶¶ 31–32; *see also* Ex. 2072 ¶¶ 10–15. These contemporaneous drawings therefore corroborate that the inventors had already conceived the dimensional relationship of the wedge and the angled wedge surface recited in this limitation before Palmatier’s filing date.

The same structural relationship was disclosed in the October 25, 2012 provisional application, which documented the previously conceived expandable implant embodiments. Ex. 2071 ¶¶ 141–144, 150–152. For example, Figure 6D

illustrates the wedge having a distance between the fifth end to the sixth end, and the angled wedge surface being only a portion of that distance. Ex. 2053, Fig. 6D; Ex. 2069, Appendix B, limitation 17[h].

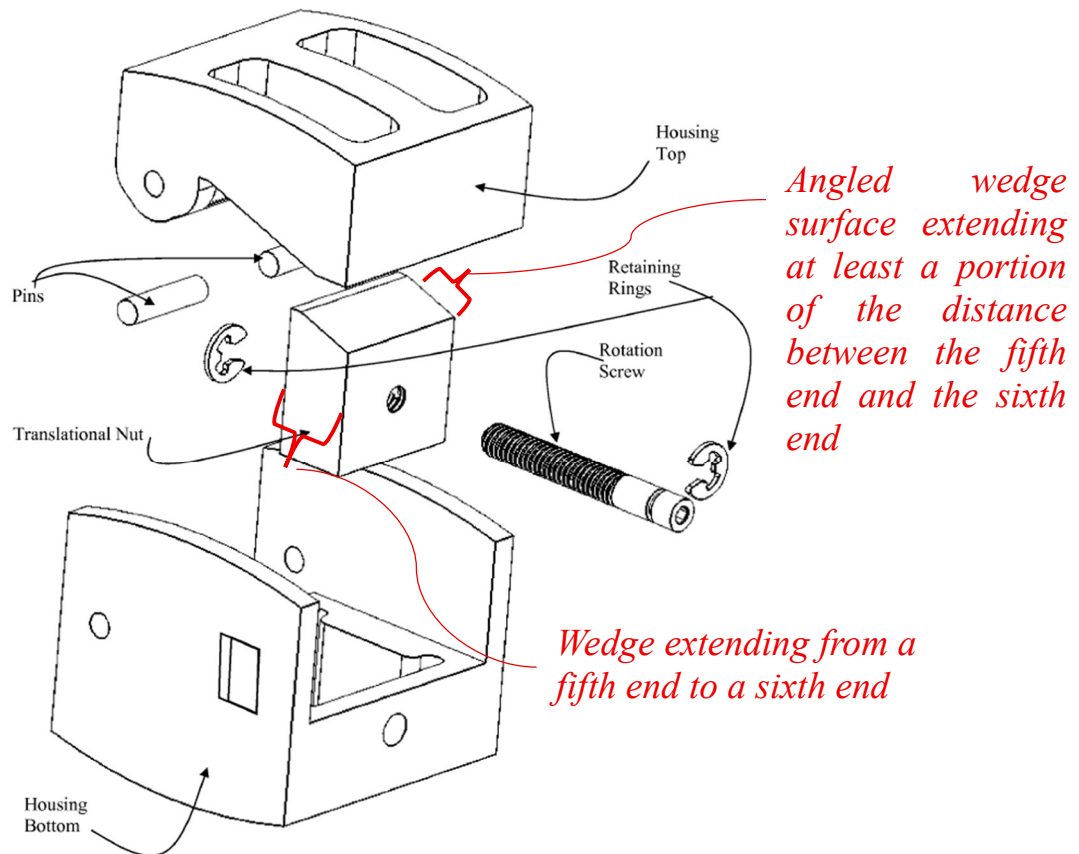


Fig. 6D

Ex. 2053, Fig. 6D (Annotated)

6. “wherein the wedge is positioned between the first body and the second body with the angled wedge surface facing the first interior surface of the first body, wherein the first interior surface of the first body has an angled housing surface shaped to engage the angled wedge surface of the wedge, wherein the wedge is configured to slide within a space defined by the first body and second body in a direction toward the second and fourth ends of the first body and

second body from a first wedge position that allows the first body and second body to pivot to a position that is substantially closed to a second wedge position whereby the angled wedge surface presses against the first interior surface of the first body to hingedly open the first body with respect to the second body whereby the wedge remains axially confined within the space defined by the first body and second body in the first and second wedge positions.”

The inventors conceived of these features at least as early as May 3, 2011, and reduced them to practice for the same reasons as set forth above in Sections VI.B.6-VI.B.8. Ex. 2069, Appendices A-B, limitations 8[f]-8[h], 17[i]-17[k].

F. Claim 18: “The expandable intervertebral device of claim 17 wherein a first length of the first body from the first end to the second end is substantially equal to a second length of the second body from the third end to the fourth end and wherein the second end portion of the first body is smaller than the fourth end portion of the second body such that the second end portion of the first body is positionable between the third and fourth side portions of the second body at the fourth end of the second body.”

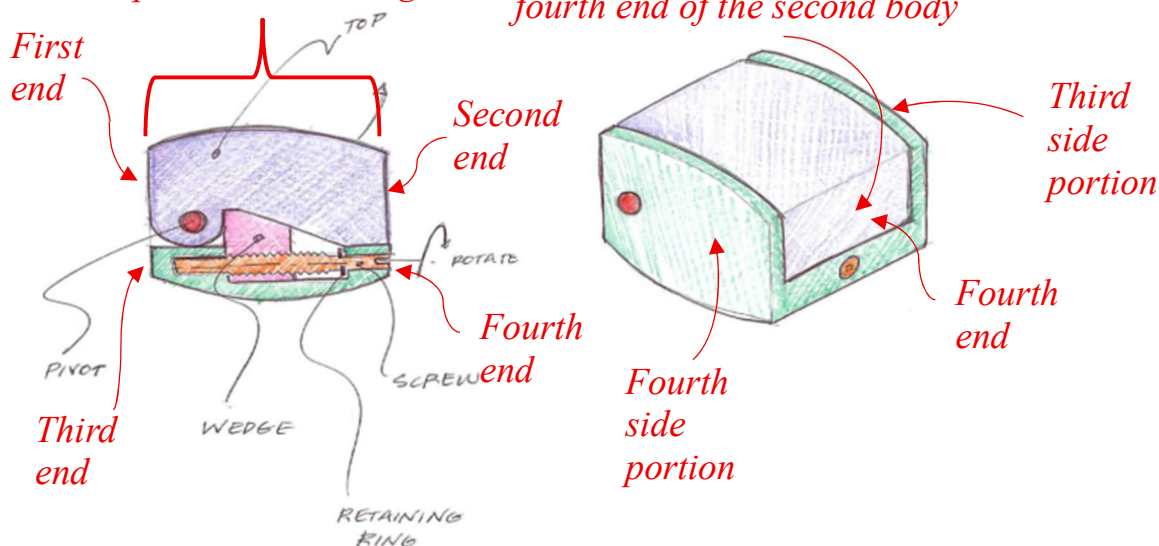
By May 3, 2011, the inventors had determined that the expandable implant device would include upper and lower implant bodies having substantially similar longitudinal lengths, while the distal portion of the upper body would be sized so that it could fit within the corresponding structure of the lower body during expansion of the device. Ex. 2071 ¶¶ 29–33; Ex. 2072 ¶¶ 10–15; Ex. 2127.

These structural relationships are depicted in the contemporaneous engineering drawing circulated on May 3, 2011, shown below. The annotated drawing illustrates that the first body extends substantially the same longitudinal

MODIFIED WEDGE

USER ROTATES SCREW, WHICH
DRIVES WEDGE AXIALLY, FORCING
TOP TO PIVOT UPWARD

*First length substantially
equal to second length*



LS 5/2/11

Dr. Moskowitz confirms that these drawings reflect the expandable implant embodiments that had already been conceived during the development work occurring in spring 2011. Ex. 2071 ¶¶ 31–32; *see also* Ex. 2072 ¶¶ 10–15. These contemporaneous drawings therefore corroborate that the inventors had already

conceived the dimensional relationship between the implant bodies recited in this limitation before Palmatier's filing date.

The same structural configuration was disclosed in the October 25, 2012 provisional application, which documented the previously conceived expandable implant embodiments. Ex. 2071 ¶¶ 138–143, 150–152. For example, Figure 6A illustrates the relative lengths and interfitting geometry of the implant bodies. As shown in the annotated figure below, the first and second bodies extend substantially the same longitudinal distance along the implant axis, while the second end portion of the first body is dimensioned to fit within the structure of the second body at the fourth end of the implant. Ex. 2053, Fig. 6A; Ex. 2069, Appendix B, claim 18.

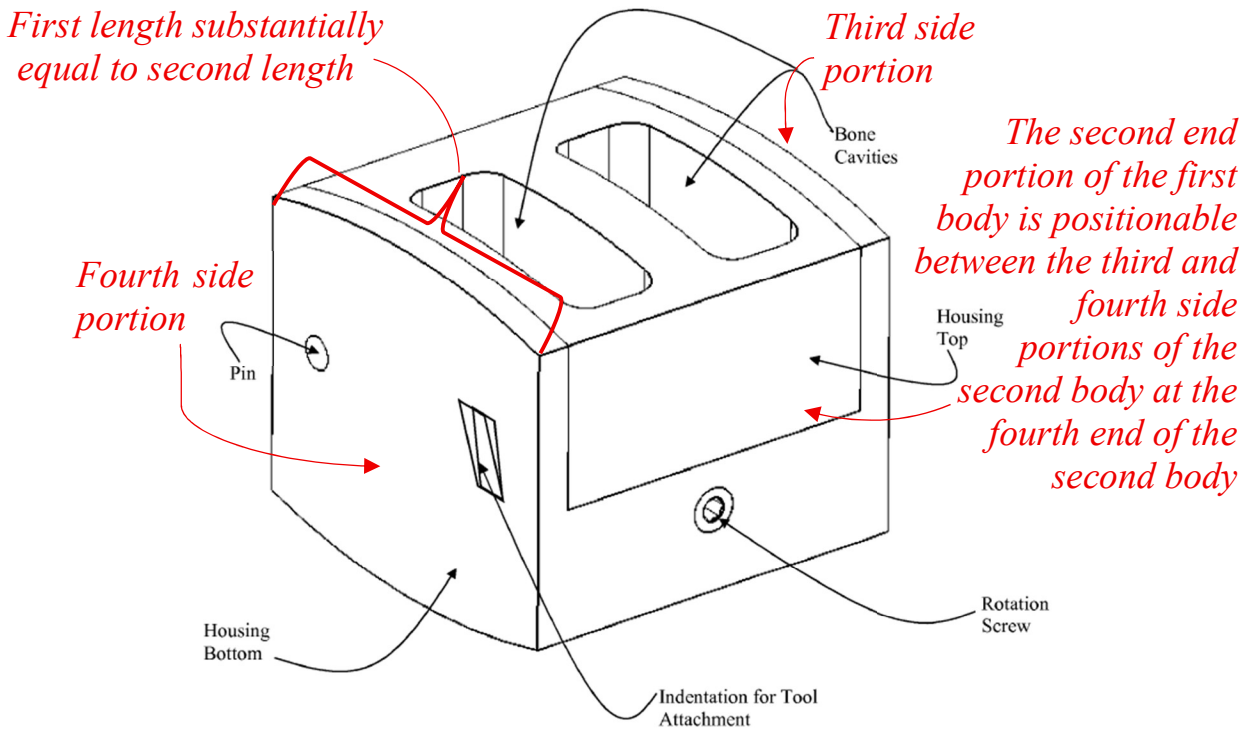


Fig. 6A

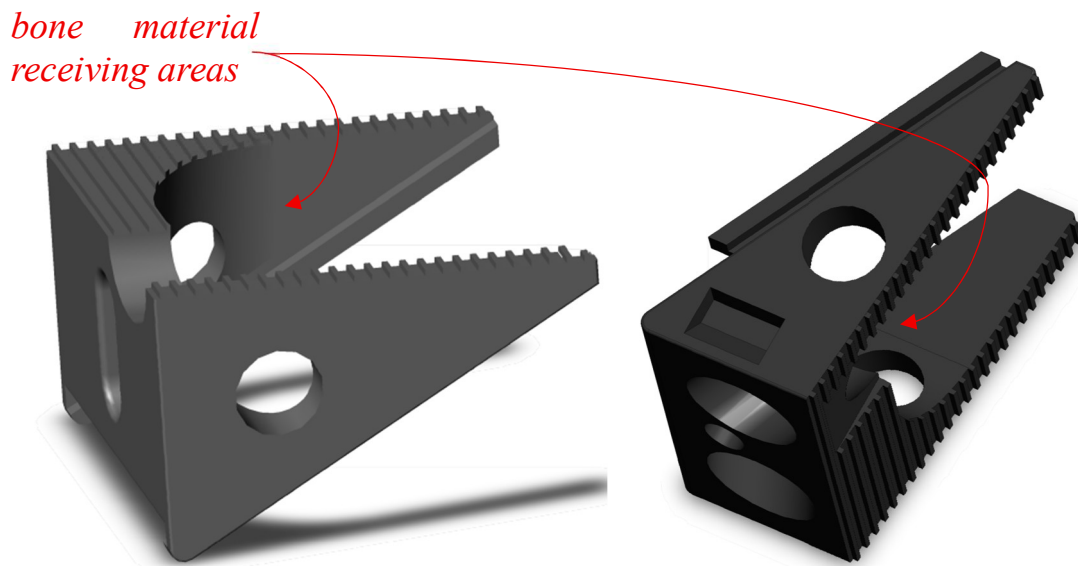
Ex. 2053, Fig. 6A (Annotated)

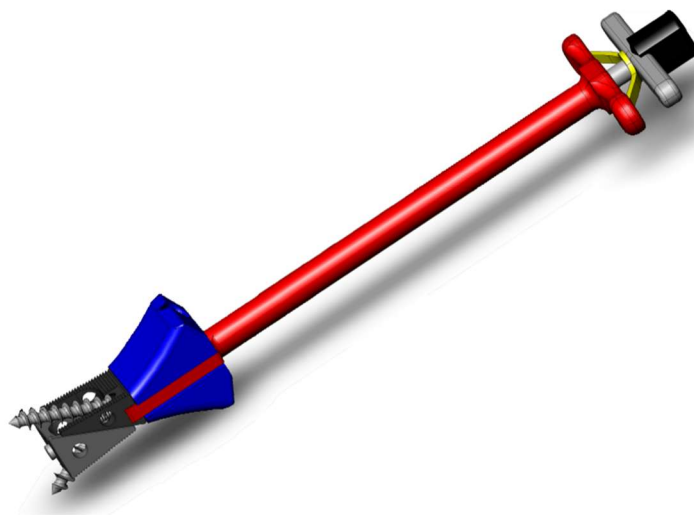
- G. Claim 19: “The expandable intervertebral device of claim 18 wherein the first body defines a first bone material receiving area between the first and second end portions and the first and second side portions, and the second body defines a second bone material receiving area between the third and fourth end portions and the third and fourth side portions, and wherein the first bone material receiving area is coupled to the second bone material receiving area when the wedge is in the second wedge position.”**

By at least May 18, 2011, the inventors had determined that the expandable implant bodies would include internal cavities configured to receive bone graft material for spinal fusion procedures. Exs. 2030, 2031; Ex. 2071 ¶¶ 27–29, 35–36; Ex. 2072 ¶¶ 23–28. Correspondence between inventors Mr. Sugalski and Dr.

Moskowitz confirmed their understanding of the importance of these feature for their implants. Ex. 2030 at 2-3; Ex. 2072 ¶¶ 23–25; Ex. 2069, Appendix A, claim 19.

The contemporaneous engineering drawings circulated on May 18, 2011 illustrate implant embodiments in which both the upper and lower implant bodies define internal cavities capable of receiving bone graft material. Ex. 2156 at 7, 15; Ex. 2072 ¶¶ 47–50. These cavities are positioned between the end portions and side portions of the implant bodies and therefore correspond to the claimed first and second bone material receiving areas. Exs. 2030, 2031; Ex. 2072 ¶¶ 23–28. The bone material receiving areas are coupled when the wedge is in the second wedge position.





Ex. 2156 at 7, 15, 17 (Annotated)

Dr. Moskowitz confirms that these drawings reflect the expandable implant embodiments conceived during the spring 2011 development work. Ex. 2071 ¶¶ 31–32; *see also* Ex. 2072 ¶¶ 10–15. These contemporaneous drawings therefore corroborate that the inventors had already conceived implant bodies having bone-graft receiving cavities before Palmatier’s filing date.

The same structural configuration was later disclosed in the October 25, 2012 provisional application. Ex. 2071 ¶ 145, 150–152. For example, Figures 1A-1B, 2D, 3A-7D all illustrate bone material receiving areas, with Figure 1B matching the engineering drawings identically and the other figures including this necessary feature.

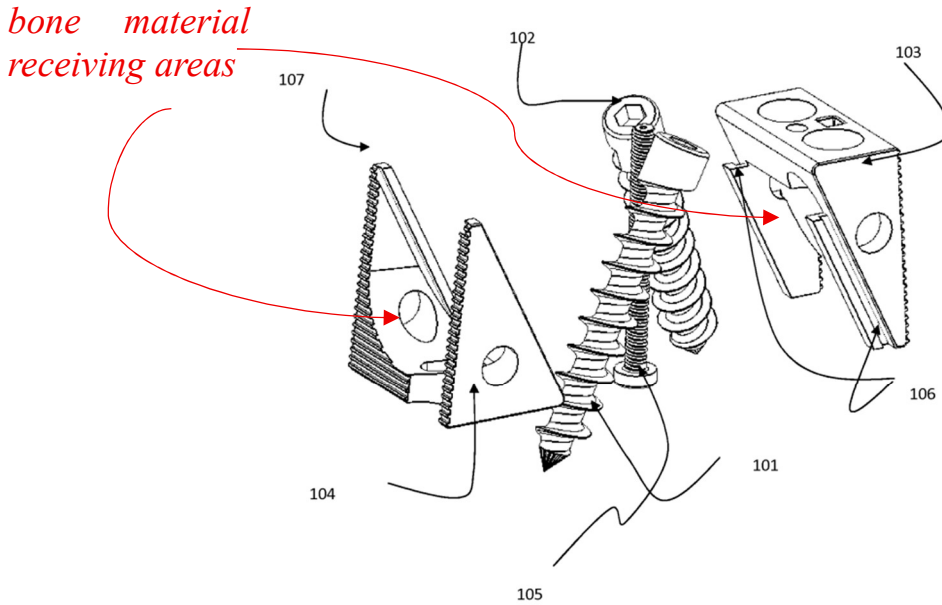


Fig. 1B

Ex. 2053, Fig. 1B (Annotated)

Figure 6A also illustrates the internal cavities defined within the upper and lower implant bodies for bone fusion. Ex. 2053, Fig. 6A. The provisional specification further explains that “[b]one cavities are incorporated into top and bottom housing for bone fusion.” *Id.* ¶¶ 10, 35.

As shown in the annotated figures below, when the wedge moves to the expanded position, the internal cavities of the upper and lower implant bodies form a continuous internal space within the implant, thereby coupling the bone-graft receiving areas of the two bodies. This structure corresponds directly to the claim language requiring that the first bone material receiving area is coupled to the second

bone material receiving area when the wedge is in the second wedge position. Ex.

2053, Fig. 6A; ¶ 35; Ex. 2069, Appendix A, claim 19.

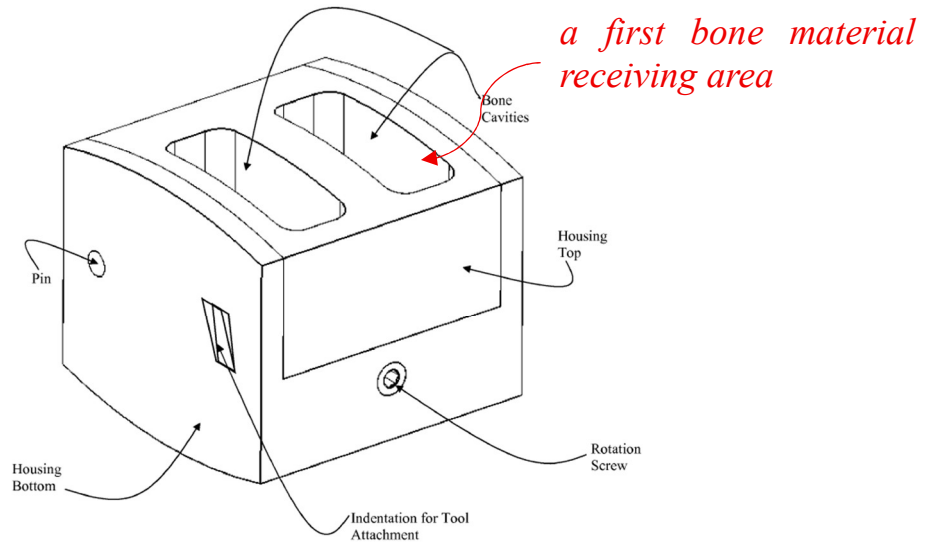


Fig. 6A

Ex. 2053, Fig. 6A (Annotated)

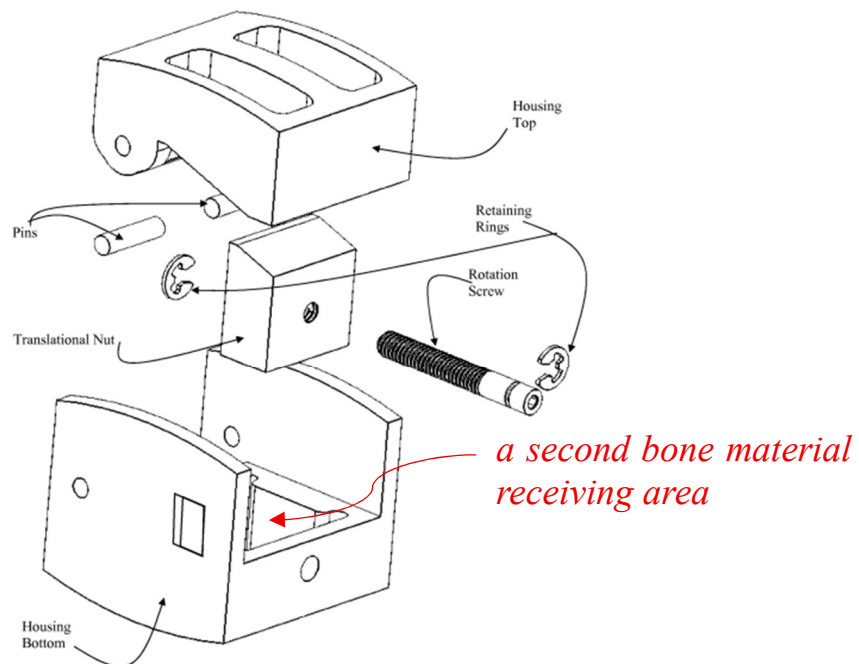
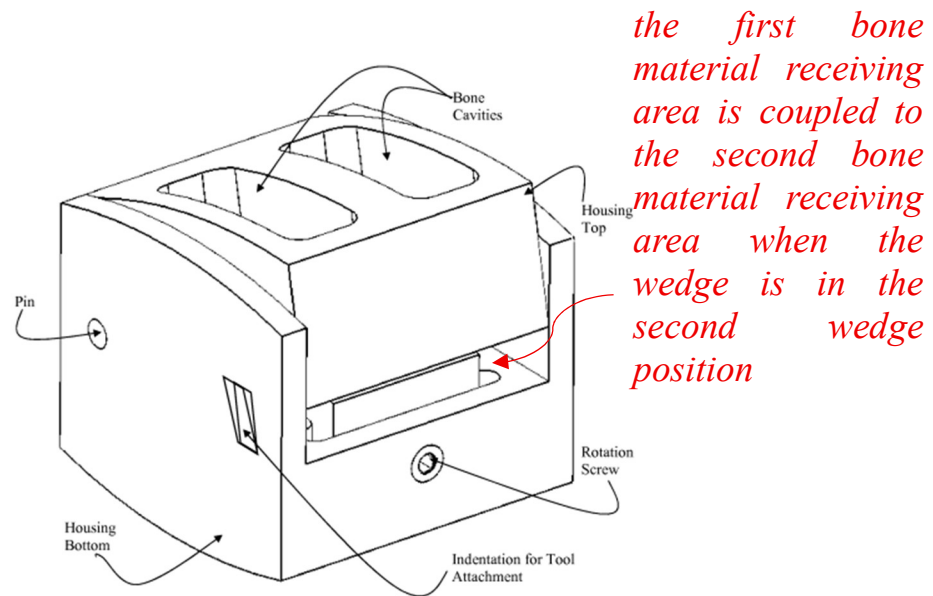


Fig. 6D

Ex. 2053, Fig. 6D (Annotated)



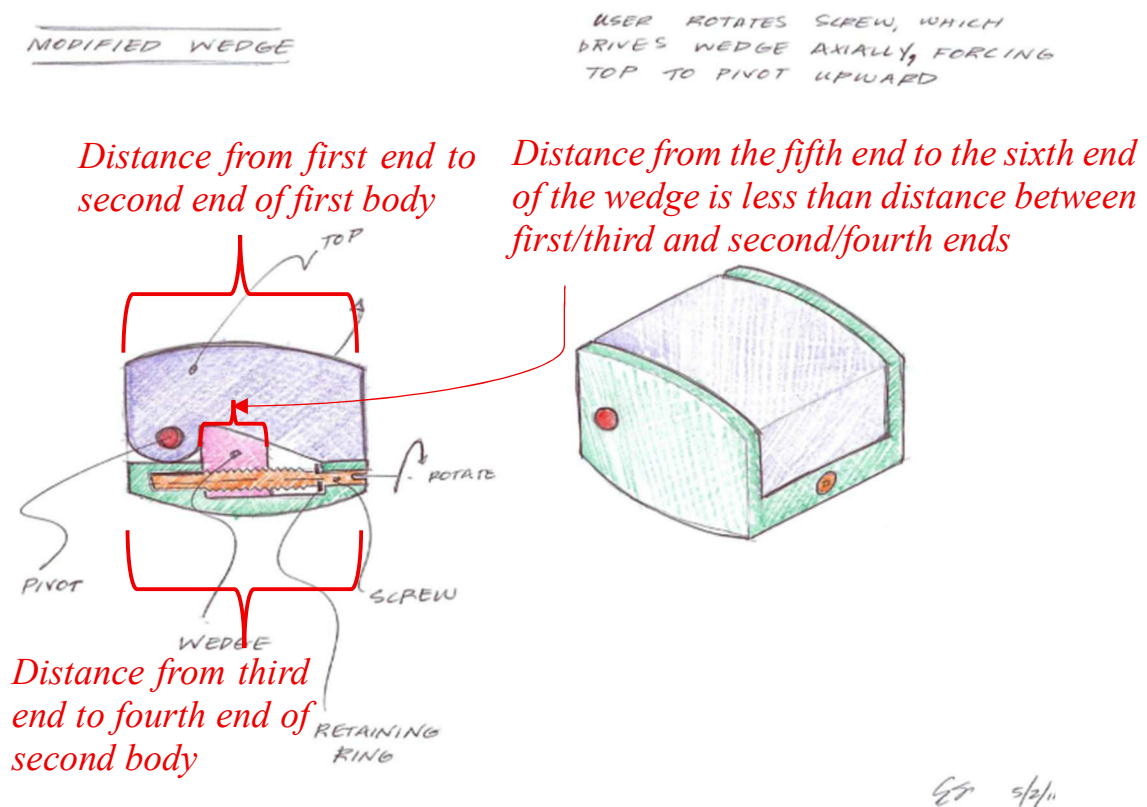
Ex. 2053, Fig. 6C (Annotated)

- H. Claim 20: “The expandable intervertebral device of claim 19 wherein a distance from the fifth end to the sixth end of the wedge is less than a distance from the first end to the second end of the first body and is less than a distance from the third end to the fourth end of the second body.”**

By May 3, 2011, the inventors had determined that the expansion mechanism would include a wedge component positioned between the implant bodies whose length is shorter than the longitudinal length of the implant bodies themselves, allowing the wedge to translate within the interior space of the implant during expansion. Ex. 2071 ¶¶ 29–33; Ex. 2072 ¶¶ 10–15; Ex. 2127.

This configuration is depicted in the contemporaneous engineering drawing circulated on May 3, 2011, shown below. The annotated drawing illustrates the

wedge positioned between the implant bodies and extending between a fifth and sixth end. As shown in the drawing, the wedge occupies only a portion of the longitudinal distance of the implant and is shorter than the distance between the first and second ends of the first body and shorter than the distance between the third and fourth ends of the second body, as recited in claim 20. Ex. 2127; Ex. 2069, Appendix A, claim 20.



Ex. 2127 at 10 (Annotated)

Dr. Moskowitz confirms that these drawings reflect the expandable implant embodiments conceived during the development work occurring in spring 2011. Ex. 2071 ¶¶ 31–32; *see also* Ex. 2072 ¶¶ 10–15. These contemporaneous drawings

therefore corroborate that the inventors had already conceived the dimensional relationship between the wedge and the implant bodies recited in this limitation before Palmatier's filing date.

The same structural relationship was later disclosed in the October 25, 2012 provisional application. Ex. 2071 ¶¶ 141–144, 150–152. For example, Figure 6D illustrates the wedge positioned between the implant bodies and occupying a shorter longitudinal distance than the implant bodies themselves, allowing the wedge to translate within the interior space of the device during expansion. Ex. 2053, Fig. 6D; Ex. 2069, Appendix B, claim 20.

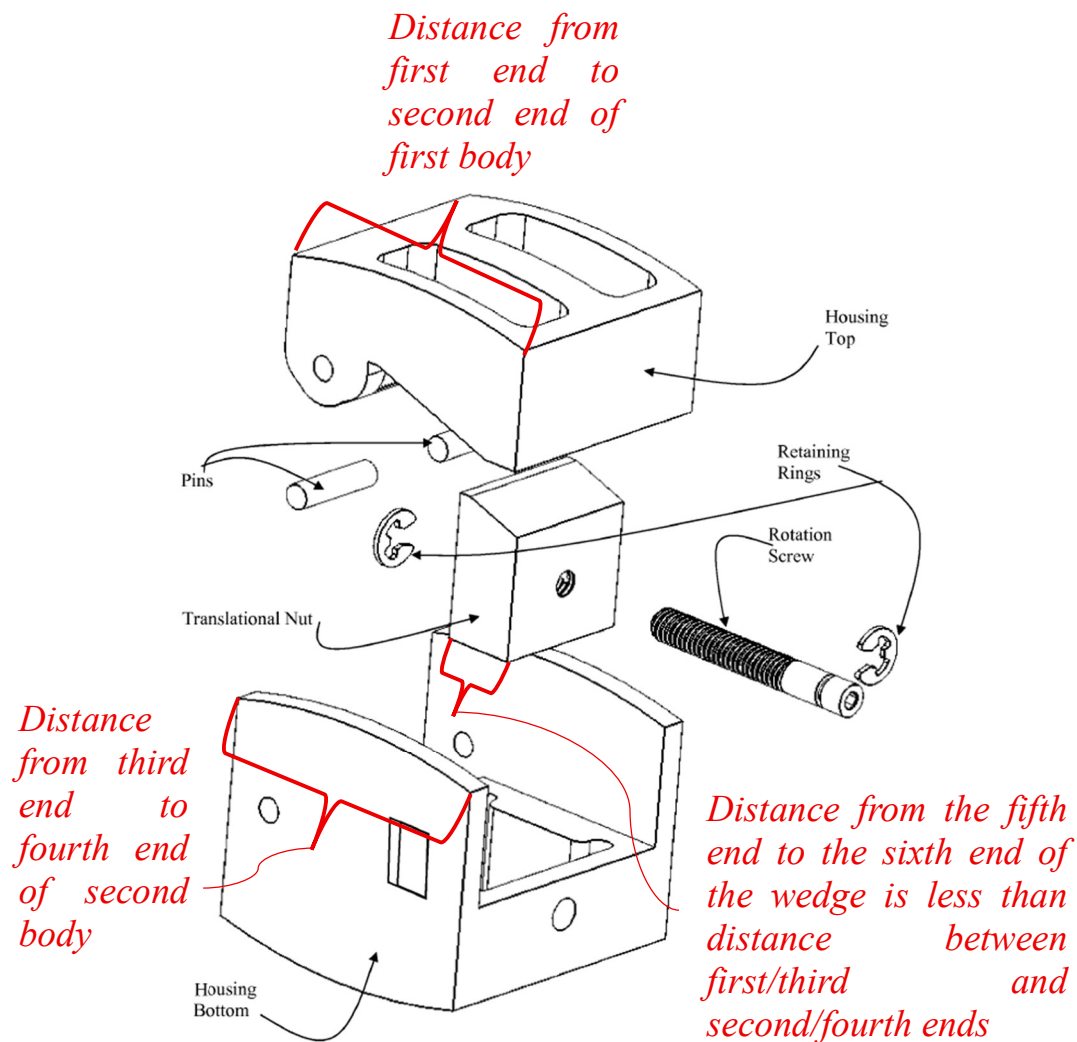


Fig. 6D

Ex. 2053, Fig. 6D (Annotated)

Accordingly, the contemporaneous May 3, 2011 drawings, Dr. Moskowitz's testimony, and the corresponding disclosure in the '707 provisional confirm that the inventors had already conceived the wedge dimensional relationship recited in this limitation of claim 20 before December 19, 2011.

I. Claim 21

1. **“A method of operating the expandable intervertebral device of claim 17, the method comprising: inserting the expandable intervertebral device in a target surgical location between two vertebrae of a human patient”**

The inventors had conceived this method of using the device well before Palmatier’s December 19, 2011 filing date. The device at issue is an expandable intervertebral device—that is, a spinal implant designed to be inserted into the intervertebral disc space between adjacent vertebrae and then expanded in that location. Ex. 2069, Appendix A, claim 21; Ex. 2071 ¶¶ 18–43. Dr. Moskowitz explains that, at least by May 18, 2011, the inventors had already formed a definite and permanent understanding of expandable intervertebral implant embodiments that could be inserted into the disc space in a compressed configuration and then expanded after placement between adjacent vertebrae. *Id.* ¶¶ 18–21, 41–46.

That intended use is also reflected in the contemporaneous design materials and the later provisional application. The provisional explains that the expandable implants are intervertebral spacer devices used within the disc space to achieve distraction and facilitate spinal fusion. Ex. 2053 ¶¶ [0003]–[0006]; Ex. 2071 ¶¶ 136–137. It likewise describes a universal surgical tool used to insert the expandable implant into the disc space and then actuate the implant’s expansion mechanism after insertion. *Id.* ¶¶ [0038]–[0042]; *see also* Ex. 2026, 73–74; Ex. 2053 at 46; Ex. 2069, Appendix B, claim 21.

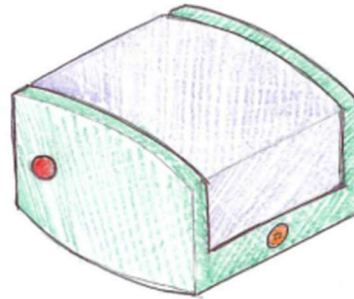
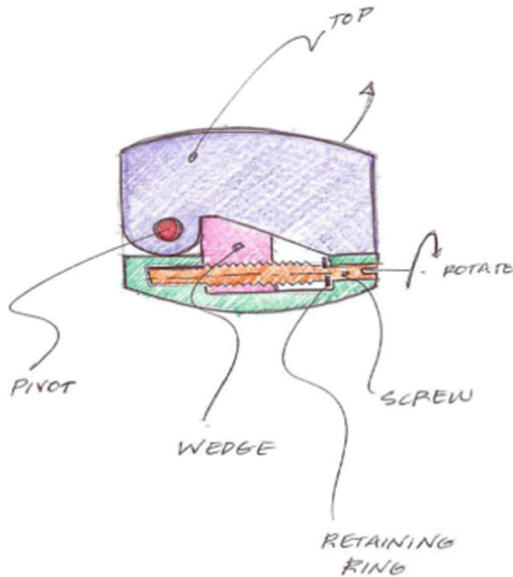
2. **“turning a rotation screw to actuate a movement of the wedge to pivot the first body away from the second body while the device is positioned between the vertebrae of the human patient.”**

By May 3, 2011, the inventors had determined that expansion of the implant would occur by rotating a screw that drives a wedge axially within the implant, causing the upper body of the implant to pivot relative to the lower body. Ex. 2071 ¶¶ 29–33; Ex. 2072 ¶¶ 10–15; Ex. 2127.

This mechanism is depicted and described in the May 3, 2011 drawing, in which the inventors wrote that when the user rotates a screw, it drives the wedge axially forcing the top to pivot upward. Ex. 2127; Ex. 2072 ¶¶ 10–15. This description corresponds directly to the claim language requiring turning a rotation screw to actuate movement of a wedge that pivots the first body away from the second body. Ex. 2069, Appendix A, claim 21.

MODIFIED WEDGE

USER ROTATES SCREW, WHICH
DRIVES WEDGE AXIALLY, FORCING
TOP TO PIVOT UPWARD



ES 5/2/11

Ex. 2127 at 10 (Annotated)

Dr. Moskowitz confirms that these drawings reflect expandable implant embodiments conceived during the development work occurring in spring 2011. Ex. 2071 ¶¶ 31–32; *see also* Ex. 2072 ¶¶ 10–15. These contemporaneous drawings therefore corroborate that the inventors had already conceived the screw-driven wedge expansion mechanism recited in this limitation before Palmatier’s filing date.

The same mechanism and method of operation were later disclosed in the October 25, 2012 provisional application. Ex. 2071 ¶¶ 141–144; 150–152. Figures 6A–6D illustrate the wedge-driven expansion mechanism in which rotation of a

screw causes the wedge to translate and pivot the upper implant body relative to the lower body. Ex. 2053, Figs. 6A–6D.

The provisional further explains that after the expandable intervertebral implant is inserted into the disc space between adjacent vertebrae, the expansion mechanism is actuated by rotating the screw:

For embodiments III–VII the ZP-EIS device is inserted into the disc space ... Once in the disc space the rotation screw is turned by rotating the Allen key of the tool expanding the device to the desirable disc height achieving the desirable intervertebral distraction deemed necessary for the individual patient and disc space.

Ex. 2053 ¶ 46; Ex. 2069, Appendix B, claim 21.

J. The Record Establishes Conception of the Claimed Invention Months Before Palmatier.

The detailed mapping above shows that the inventors had already conceived each limitation of challenged claims 8, 9, 13, and 17–21 before Palmatier’s December 19, 2011 filing date. The contemporaneous record includes May 3, 2011 and May 18, 2011 engineering drawings, CAD files, related communications among the inventors and engineers regarding specific features, and Dr. Moskowitz’s testimony confirming that those materials reflected expandable implant embodiments that had already been conceived. Ex. 2071 ¶¶ 15–46; Ex. 2072 ¶¶ 8–25, 47–56; Exs. 2025; 2028; 2029; 2030; 2156; 2057; 2058; 2159.

This evidence confirmed that the inventors has developed “a definite and permanent idea of the complete and operative invention.” *Burroughs*, 40 F.3d at 1228. The record here shows the actual structure and operation of the claimed devices: the implant bodies, the angled housing surfaces, the wedge-driven expansion mechanism, the hinged interconnection, the bone-graft receiving cavities, the screw-actuated method of expansion, and the ridged vertebral engagement surfaces. The inventors had already worked out those features in detail by May 18, 2011. Ex. 2071 ¶¶ 15–46; Ex. 2072 ¶¶ 8–25, 47–56; Exs. 2025; 2028; 2029; 2030; 2156; 2057; 2058; 2159.

The record also corroborates that understanding. The May 2011 drawings and CAD files do not depict vague concepts or aspirational sketches. They show concrete implant designs with enough detail to illustrate both the structure and operation of the devices. Dr. Moskowitz’s declaration confirms that those materials reflected embodiments that had already been conceived, and the October 25, 2012 provisional application in turn disclosed the same previously conceived embodiments. *Id.*; *see also id.* ¶¶ 134-152; Ex. 2053.

K. The Inventors Exercised Reasonably Continuous Diligence from Before Palmatier Through the October 25, 2012 Provisional Filing.

When Palmatier was filed on December 19, 2011, the inventors were already actively developing and documenting the expandable implant invention. In the preceding weeks, they had prepared patent claims and commissioned electronic

drawings and detailed technical descriptions of the previously conceived embodiments. After Palmatier, that work continued through direct implant development, prototype and patent-preparation work, and qualifying work on the tool used to insert and actuate the implants. The record traces that work through the October 2012 filing. Ex. 2071 ¶¶ 62–118.

The law does not require a dated act for every interval of the critical period. That period runs from just before the competing reference’s effective date through reduction to practice. *Perfect Surgical Techs., Inc. v. Olympus Am., Inc.*, 841 F.3d 1004, 1009–10 (Fed. Cir. 2016). Here, it begins before Palmatier’s December 19, 2011 filing date and ends with the October 25, 2012 constructive reduction to practice. The standard during that period is “reasonably continuous diligence,” not proof that the inventors “continuously exercised reasonable diligence.” *Id.* at 1007. Periods of inactivity do not automatically defeat diligence, and the Board may not “scour” the record for intervals without a documented act. *Id.* at 1009–10. It must instead consider the evidence as a whole and determine whether the invention was “abandoned or unreasonably delayed.” *Id.* In *Arctic Cat Inc. v. GEP Power Products, Inc.*, the Federal Circuit applied that rule in an IPR and rejected as “too rigid” an analysis that faulted the inventor for failing to account for roughly half of the days in a seven-month critical period. 919 F.3d 1320, 1331–32 (Fed. Cir. 2019). And in *Tyco Healthcare Group LP v. Ethicon Endo-Surgery, Inc.*, the court found

there had been “reasonable continuing activity” from April 1996 through an October 1997 constructive reduction to practice despite an asserted five-month gap in weekly records, because other contemporaneous evidence documented the ongoing work. 774 F.3d 968, 975 (Fed. Cir. 2014). The same whole-record approach governs corroboration: Patent Owner need not “corroborate every day” or “specify precisely what work was done.” *Perfect Surgical*, 841 F.3d at 1010–11.

Diligence here is measured across the technical, prototype, and patent work that moved the expandable implant invention toward the October 2012 filing. The Federal Circuit does not require any particular form of activity; diligence may be established through a “variety of activities,” and “[t]here is no rule requiring a specific kind of activity.” *Brown v. Barbacid*, 436 F.3d 1376, 1380 (Fed. Cir. 2006). Qualifying work by patent counsel counts as the inventor’s diligence as well. *Perfect Surgical*, 841 F.3d at 1010–11. And reasonable continuity is assessed in context. In *Perfect Surgical*, where the inventor was a practicing surgeon, the Federal Circuit directed the Board to consider whether the inventor and his attorney worked reasonably continuously “within the confines” of their occupations. *Id.* at 1012. Dr. Moskowitz likewise maintained an active neurosurgical practice and emergency-call responsibilities throughout the critical period. Ex. 2071 ¶¶ 124–133; Exs. 2054–2055. As shown below, the record documents direct development and patent

preparation for the expandable implants, prototype work, and qualifying work on the tool that substantially contributed to the October 2012 application.

1. The '543 Work Counts Toward Diligence Because It Substantially Contributed to the October 25 Application and Directly Relates to the '367 Claimed Inventions.

Federal Circuit precedent expressly permits diligence to be established through work on a related patent application. Such work counts when it “contribute[s] substantially to the ultimate preparation” of the application that reduces the invention to practice. *Bey v. Kollonitsch*, 806 F.2d 1024, 1029–1030 (Fed. Cir. 1986). *Bey* reversed the Board for failing to apply that rule and separately rejected its attempt to require that the related applications “had to be worked on as an integrated whole.” *Id.* The required connection likewise does not demand that every activity be confined to the precise claimed subject matter. *In re Jolley* held that a sufficient connection exists where the activity has a “direct point of attachment” to the claimed subject matter or, viewed in context, forms part of an “overall scheme of inventive activity” directed toward reduction to practice. 308 F.3d 1317, 1327–28 (Fed. Cir. 2002). And *Jolley* expressly rejected a rule excluding diligence evidence merely because the same work could also support an invention beyond the claims at issue. *Id.*

The Federal Circuit has applied the same flexible approach to diligence in the IPR context. In *ATI Technologies ULC v. Iancu*, the court reversed the Board’s

rejection of diligence and emphasized that “[d]iligence is not negated if the inventor works on improvements and evaluates alternatives while developing an invention.” 920 F.3d 1362, 1372–74 (Fed. Cir. 2019).

The documentary record establishes a connection between the expandable implants claimed in the ’367 patent and tools the inventors described in the related, contemporaneously prepared patent application—the ’543 application—from the outset. Months before Palmatier, the inventors had already designed the expandable implants to engage the universal tool. On April 11, 2011—the same day the inventors began engineering the new expandable implant embodiments—they filed the ’543 application directed to a universal surgical tool that could be used with the implants. Ex. 2071 ¶¶ 24–25. On April 17, the inventors instructed that the new implant drawings include indentations for engagement by that tool. *Id.* ¶ 28; Ex. 2058. And on May 28, after reviewing revised implant drawings, Dr. Moskowitz again emphasized that the implant’s “inserts [i.e., indentations] are important for tool application.” Ex. 2071 ¶ 38; Ex. 2159.

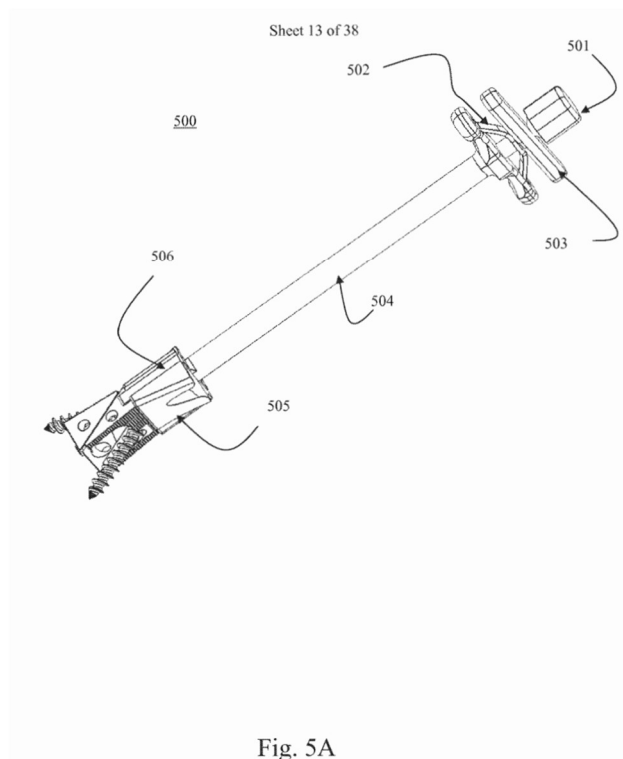
The ’543 application itself tied the tool directly to expandable implants. It described an expandable intervertebral device whose dimensions were changed by an internal screw adjuster operated with a combined positioning tool/screw guide/cage expander. Ex. 2026 at 22, ¶ [0011]. The tool included a gripper with prongs and a key “for controlling an adjustment device which controls the height”

of the implant, and it disclosed a driver for manipulating a screw of an “expandable or non-expandable” implant. *Id.* at 28–29, ¶¶ [0031]–[0032]; *id.* at 47–50, claims 16–17, 25. The specification further explained that the tool’s Allen key turned the implant’s screw adjuster while its gripper prongs aligned the tool with the implant. *Id.* at 36, ¶¶ [0069]–[0072].

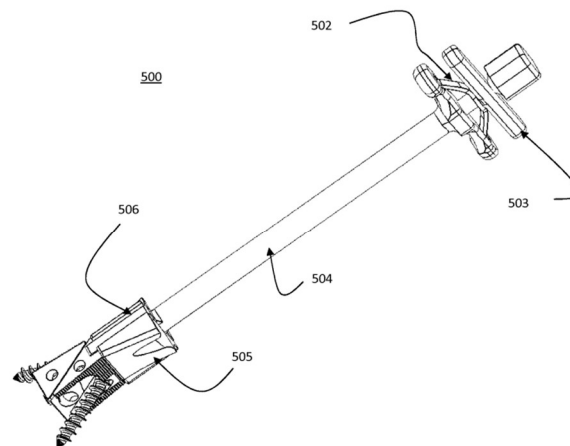
During the critical period, the ’543 prosecution directly addressed the same tool-to-implant interface built into the expandable implants. Dr. Moskowitz and Mosheh Moskowitz personally attended the March 12, 2012 examiner interview, where the applicants demonstrated how the device worked and argued that the prior art did not disclose tool prongs engaging “a respective slot or indentation of the intervertebral cage.” Ex. 2026 at 210–11. The examiner recorded that this argument appeared to overcome the cited rejection. *Id.* The applicants then amended the specification, claims, and drawings on March 21 to further define that same interface, explaining that protuberant extensions on the tool’s gripper prongs engage slots or indentations on the implant and expressly claiming that engagement. *Id.* at 213–215, 218–221. And that same month, after the examiner interview, Dr. Moskowitz provided counsel with draft text and figures describing expandable implant embodiments actuated by the universal tool “in preparation for a patent application directed to those embodiments.” Ex. 2071 ¶ 105.

The October 25 application itself confirms that the '543 work carried forward into the filing that constructively reduced the challenged invention to practice. Its cross-reference expressly identifies the '543 application and incorporates that application by reference. Ex. 2053 ¶ [0001]. Even the title joins the two parts of the development effort: “Zero-Profile Expandable Intervertebral Spacer Devices for Distraction and Spinal Fusion and a Universal Tool for Their Placement and Expansion.” *Id.* at 68. And the field of disclosure likewise describes both the expandable implant embodiments and “[a] universal tool for their intervertebral placement and device expansion.” *Id.* ¶ [0003].

The continuity was substantive, not merely bibliographic. The '543 application and October provisional depict the same basic tool architecture, down to the same component numbers for the Allen key (501), spring (502), handle (503), gripper (504), screw guide (505), and gripper prongs (506):



Ex. 2026, p. 64, Fig. 5A



Ex. 2053, p. 26, Fig. 8A.

The provisional also carries forward the tool’s function. It states that the same tool is used with all seven expandable embodiments; its prongs engage indentations in the implants to grasp and insert them, and its Allen key turns their rotation screws to expand them. Ex. 2053 ¶¶ [0038]–[0039]. Embodiment VI—the modified-wedge embodiment corresponding to the challenged claims—uses that same interface: it includes an “Indentation for Tool Attachment,” and rotation of its screw by the external tool moves the wedge-shaped translation nut and expands the implant. *Id.* ¶ [0034].

The ’367 claims make the connection to the challenged invention still more explicit. Challenged claim 21 recites a method of operating the expandable device

of claim 17 that includes “turning a rotation screw to actuate a movement of the wedge to pivot the first body away from the second body.” Ex. 1001, claim 21. The tool developed and prosecuted in the ’543 application was designed to perform that very operation: its Allen key or screwdriver turns the implant’s rotation screw while its gripper prongs engage the implant to grasp and position it. Ex. 2026 at 28–29, ¶¶ [0031]–[0032]; *id.* at 36, ¶¶ [0069]–[0072]. And in Embodiment VI of the October application—the modified-wedge embodiment reflected in challenged claim 17—the external tool turns rotation screw 610, which moves the wedge-shaped translation nut and pivots the implant open. Ex. 2053 ¶ [0034].

Other claims of the ’367 patent independently confirm that this tool-to-implant interface was part of the same claimed inventive system. Claim 6 expressly recites “indentations on opposing sides for engaging a positioning tool.” Ex. 1001, claim 6. Claim 14 then claims the implant and tool together as a system: the tool has first and second prongs positioned to engage those opposing indentations and a screwdriver “sized and configured for operating the threaded screw.” *Id.*, claim 14. Claims 15 and 16 further define that tool. *Id.*, claims 15–16. Those are the same features the inventors were developing before Palmatier and prosecuting in the ’543 application during the critical period—tool prongs engaging slots or indentations in the implant while the tool’s driver operates the implant’s screw.

That evidence satisfies both *Bey*'s substantial-contribution standard and the required connection of the '543 application to the invention at issue. The '543 work substantively contributed to the October 2012 filing, and it has a direct point of attachment to the challenged claimed invention: the tool was developed to turn the rotation screw that moves the wedge and expands the claim-17 implant—an operation expressly recited in challenged claim 21. The '367 patent's other claims further confirm the connection by expressly claiming the implant's tool-engagement indentations and the system comprising the implant and tool. Ex. 1001, claims 6, 14–16. This is not merely work on technology in the same field. It is work developing and prosecuting the very tool-to-implant interface by which the claimed expandable implant is positioned and actuated, work that “contributed substantially to the ultimate preparation” of the filing that constructively reduced the challenged invention to practice. *Bey*, 806 F.2d at 1030.

2. The Contemporaneous Record Shows Reasonably Continuous Diligence from Before Palmatier Through the October 25 Filing.

The Palmatier application was filed months after conception and in the middle of the inventors' ongoing patent-preparation work on the expandable implants. On October 11, 2011, Andy Moskowitz circulated draft patent claims directed to expandable implant devices and reported that drawings were being prepared. Ex. 2071 ¶ 62; Ex. 2041. On November 7, he circulated additional claims directed to

expandable implant cages for review. Ex. 2071 ¶ 62; Ex. 2042. Four days later, he engaged Keith Yeager to prepare electronic drawings and descriptions of the expandable implant embodiments, and on November 13 he provided instructions for drawings and mechanical descriptions covering multiple embodiments. *Id.* ¶¶ 71–74; Exs. 2043–2044. Palmatier’s December 19 filing date thus fell while the inventors were already converting their expandable implant designs into claims, drawings, and patent-ready technical descriptions.

The record continues immediately after Palmatier’s filing with further documentation of the already-conceived modified-wedge architecture. By January 2, 2012, drawings and written technical descriptions for multiple expandable implant embodiments had been completed and circulated for review. Ex. 2071 ¶¶ 75–80; Exs. 2046, 2145. Those materials included the modified-wedge embodiment central to the challenged claims. They described an external tool rotating a lead screw, causing lateral movement of a wedge-shaped translation component that engages the tapered inner surface of the upper housing and forces that housing away from the lower housing. Ex. 2071 ¶ 75; Ex. 2145 at 14. The inventors also continued preparing claim language and written descriptions for the expandable implants, including materials addressing bone-graft cavities and other structural features. Ex. 2071 ¶¶ 78–80; Ex. 2046.

By March, the record shows direct preparation of the expandable-implant application alongside the qualifying '543 work. In February and March, Dr. Moskowitz worked with counsel in response to an Office Action in the '543 application and personally participated in the March 12 examiner interview. Ex. 2071 ¶¶ 102–103; Exs. 2049–2050; Ex. 2026 at 210–211. The March 21 amendment then further developed the tool-to-implant interface addressed above. Ex. 2026 at 213–221. After the interview Dr. Moskowitz provided counsel with feedback concerning the expandable implant embodiments actuated using the universal tool “in preparation for a patent application directed to those embodiments.” Ex. 2071 ¶ 105. In April, the inventors also continued evaluating implementation of the designs: after a machining company contacted Andy Moskowitz, Andy discussed potential fabrication of additional expandable-implant prototypes. *Id.* ¶¶ 81–83; Ex. 2047.

The record continues through the summer. Counsel conducted another examiner interview in the '543 application on May 8, followed by a substantive response filed in June. Ex. 2026 at 443–447; Ex. 2071 ¶¶ 107–110. On August 17, Dr. Moskowitz reserved the day for “prototype” work and used it to review the expandable implant prototype and related patent materials in preparation for the contemplated filing. Ex. 2071 ¶¶ 84–85; Ex. 2048. Eleven days later, counsel conducted another examiner interview in the '543 application. Ex. 2026 at 500. And on August 31, counsel confirmed Dr. Moskowitz’s continued involvement: “Further

to our telephone conference today, I filed the Amendment this evening.” Ex. 2051; *see* Ex. 2026 at 472–495.

By September, the record shows a direct transition into the October filing. On September 13, counsel informed Dr. Moskowitz that the Patent Office had allowed the ’543 application in response to the August 31 amendment. Dr. Moskowitz immediately replied: “We have to start working on the Continuation as we discussed earlier.” Ex. 2051. The words “as we discussed earlier” confirm that the next application had already been under discussion before allowance; the response then directed that work to proceed.

Twelve days later, a separate contemporaneous email confirms that patenting remained the inventors’ focus and that the lumbar device was being kept confidential until its patent application was filed. When coinventor Mr. Sugalski asked whether he could feature the lumbar fusion device on his company’s website, Andy Moskowitz responded that the Moskowitz’s were focusing on patents for the past projects Mr. Sugalski collaborated on, but that they had “not yet filed a patent application for the lumbar fusion device,” and that they therefore did not want pictures of it published. Ex. 2052. Dr. Moskowitz also participated in prosecution-strategy teleconferences during September and October concerning the expandable implant system. Ex. 2071 ¶ 116. On October 25, 2012, the inventors filed the

provisional application disclosing the expandable implant embodiments together with the universal tool used to insert and actuate them. Ex. 2053; Ex. 2071 ¶ 117.

The inventors' decision to sequence the related patent filings does not defeat diligence. Dr. Moskowitz explains that, because he regarded the universal tool as integral to the expandable implant system, he believed it important to determine first whether strong patent protection could be obtained for the tool before filing the separate application directed to the expandable implants. Ex. 2071 ¶¶ 100, 106. But the implant work did not stop while the '543 application was being prosecuted. By March, Dr. Moskowitz had provided counsel with text and figures for an expandable-implant application; in April, the inventors explored fabrication of additional prototypes; and on August 17, Dr. Moskowitz devoted the day to prototype and patent review. *Id.* ¶¶ 81–85, 105. *ATI Technologies* rejected the argument that diligence failed because the patent owner could have filed sooner while qualifying development work continued. 920 F.3d at 1373–74. The Federal Circuit explained that “the purpose of the diligence requirement is to show that the invention was not abandoned or set aside.” *Id.* at 1373.

Taken as a whole, this record shows reasonably continuous diligence throughout the critical period. It begins with claims, drawings, and technical descriptions already underway when Palmatier arrived; documents direct implant work and qualifying '543 work through the spring and summer; and ends with

September correspondence leading directly into the October 25 filing. Under *Perfect Surgical* and *Arctic Cat*, the Board must “weigh the collection of evidence over the entire critical period,” rather than “scour” the record for intervals lacking evidence of a particular activity, applying a whole-record approach. 841 F.3d at 1009; 919 F.3d at 1331–32. Nothing in the record suggests abandonment, setting aside, or unreasonable delay.

L. The October 25, 2012 Provisional Application Constructively Reduced the Invention to Practice.

The detailed mapping above also shows that the inventors had constructively reduced to practice each limitation of challenged claims 8, 9, 13, and 17–21 in the October 25, 2012 provisional application. *See* Sections VI.B–VI.I; Ex. 2053; Ex. 2071 ¶¶ 134–152. That application disclosed multiple embodiments of expandable intervertebral implants and the associated tool used to insert and actuate them. Ex. 2053 ¶¶ [0003]–[0042].

For example, the provisional describes embodiments in which a wedge-shaped component moves within the implant and engages an angled housing surface to expand the device from a compressed configuration to an expanded configuration. *Id.* ¶ [0035]. It also describes the tool used to insert the implant into the disc space and actuate the expansion mechanism after insertion. *Id.* ¶¶ [0038]–[0042], [0046]. In short, the provisional application documented the invention the inventors

conceived before Palmatier's December 19, 2011 filing date and then diligently worked to reduce to practice.

Accordingly, Palmatier does not qualify as prior art. The record establishes that the inventors conceived the challenged claims before December 19, 2011 and then exercised reasonably continuous diligence from before December 19, 2011 until the invention was constructively reduced to practice in the October 25, 2012 provisional application. As all of Medtronic's grounds depend on Palmatier, the Petition fails.

VII. GROUND 1: PALMATIER FAILS TO ANTICIPATE OR RENDER OBVIOUS CLAIMS 8, 9, 13, 17-21

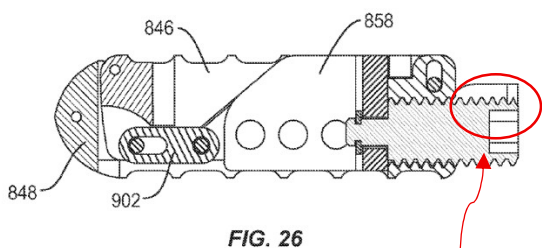
Even if Palmatier is prior art—it is not—Palmatier still fails to anticipate or render obvious the challenged claims.

A. Independent Claims 8 and 17.

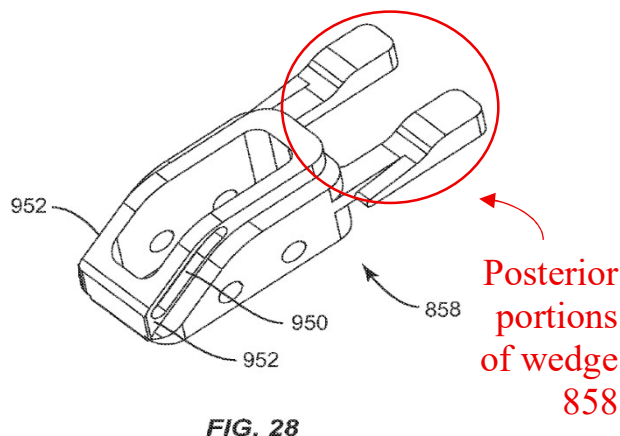
1. Palmatier does not teach or suggest limitations 8[h] to 17[k]

Limitations 8[h] and 17[k] require that “the wedge remains axially confined within the space defined by the first body and second body” in both collapsed/closed and expanded/open configurations. Petitioner relies on Palmatier's wedge 858 for the claimed “wedge,” but ignores “the axially confined” requirement in asserting wedge 858 satisfies limitations 8[h] and 17[k]. Pet. at 41. Palmatier's wedge 858 does not satisfy the “the axially confined” requirements of 8[h] and 17[k] because its posterior portions extend axially beyond the space defined by piston component

846 (which Petitioner maps to the first body) and base component 848 (with Petitioner maps to the second body) when implant 840 is collapsed. Pet. 38, Ex. 1057, Figs. 26, 28; Ex. 2069, ¶¶ 59-63.



Wedge 858 extending beyond posterior ends of piston and base components



Ex. 1057, Figs. 26 and 28 (Annotated)

As shown above, Figure 26 confirms that wedge 858 extends beyond the posterior ends of both the piston and base component in the collapsed configuration. Figure 28 shows the specific structure of wedge 858, revealing its longitudinally extending posterior portions. These images confirm that wedge 858 is not axially confined by ends of the piston and base components.

Petitioner's expert confirmed that the wedge extends beyond the posterior ends of the piston and base components at his deposition:

Q. If you could turn to Figure 26.

A. Okay.

Q. Does this figure show the wedge extending beyond the posterior ends of the base and piston in the unexpanded state?

A. Yes.

Q. And Figure 25 shows the implant in a partially expanded state; is that correct?

A. That is correct.

Q. And in that partially expanded state, the wedge still extends beyond the posterior ends of the base and piston, correct?

A. That is correct.

Ex. 2068, 41:15-42:2; Ex. 2069, ¶ 64. As such, Palmatier's wedge 858 does not remain axially confined within the space defined by the first body and the second body in its collapsed/closed configuration.

Medtronic labels wedge 858 "axially confined" without identifying what confines it in the axial direction. Nothing does. The wedge projects beyond both bodies at the posterior end, as Medtronic's expert admitted. Medtronic therefore proves only that part of the wedge lies vertically between the bodies—not that the wedge is axially confined within the space they define.

Petitioner ignored this problem, and never contends that a POSA would be motivated to modify wedge 858 in order to satisfy the axial confinement requirement of limitations 8[h] and 17[k]. Accordingly, for at least this reason the Petition fails to demonstrate that Palmatier anticipates or renders obvious claims 8 or 17. Ex. 2069, ¶¶ 65-66.

B. Dependent Claim 9

Dependent claims 9 depends from independent claim 8. Because Palmatier fails to teach or suggest independent claim 8, Palmatier necessarily fails to teach or suggest dependent claim 9. Ex. 2069, ¶ 67.

C. Dependent Claim 13

Claim 13 depends from independent claim 8. Because Palmatier fails to teach or suggest independent claim 8, Palmatier necessarily fails to teach or suggest dependent claim 13. Ex. 2069, ¶ 67.

D. Dependent Claim 18

Claim 18 depends from independent claim 17. Because Palmatier fails to teach or suggest independent claim 17, Palmatier necessarily fails to teach or suggest dependent claim 18. Ex. 2069, ¶ 68. Palmatier also fails to teach or suggest claim 18 for the additional reasons below.

1. **Palmatier does not teach or suggest limitation 18[a]: “wherein a first length of the first body from the first end to the second end is substantially equal to a second length of the second body from the third end to the fourth end.”**

- a. Palmatier does not disclose substantially equal body lengths in implant 840.*

Limitation 18[a] requires the first and second bodies to have substantially equal lengths. But the bodies of implant 840—the embodiment Petitioner relies upon for claim 17—indisputably do not. Ex. 2069 ¶¶ 69, 75-76.

Petitioner maps piston component 846 of implant 840 to the claimed first body and its base component 848 to the claimed second body. Pet. 23, 30. But, as shown in Figure 22 below, base component 848 of implant 840 extends anteriorly beyond piston component 846 due to the protective wedge-shaped anterior end 884. Ex. 2069 ¶ 74.

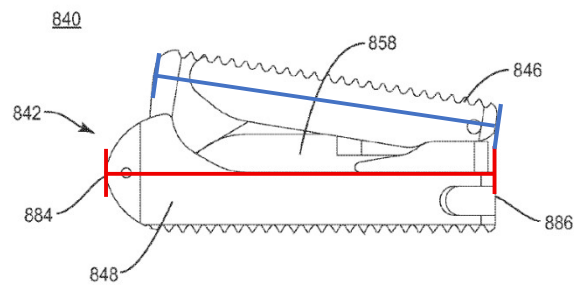


FIG. 22

Ex. 1057, Fig. 26 (Annotated)

Petitioner's expert agrees, acknowledging this fact both in his declaration and at deposition. Ex. 1002 ¶ 53 (“[I]n implant 840, the base and piston components have different lengths”); Ex. 2068, 40:14–18.

The base component for the 840 embodiment is the only one of the three alternatives Palmatier discloses that includes the wedge-shaped anterior end 884. Palmatier explains that the “wedge shaped anterior end 884” of base component 848 “protects wedge 858 and screw 892 as intervertebral implant 840 is inserted into an intervertebral disc space. It is contemplated that forces employed to introduce or deliver intervertebral implant 840 to the intervertebral disc space are transmitted through the inserter to an anterior end 842 of intervertebral implant 840.” Ex. 1057

at 18:45–52. As Dr. Gall explains, Palmatier’s wedge shaped anterior end 884 is included in implant 840’s design to protect its internal components. Ex. 2069, ¶ 81. It would also protect patient tissue during insertion. *Id.* But, due to this protective wedge of the base component 848, implant 840 fails to satisfy element 18[a] of claim 18.

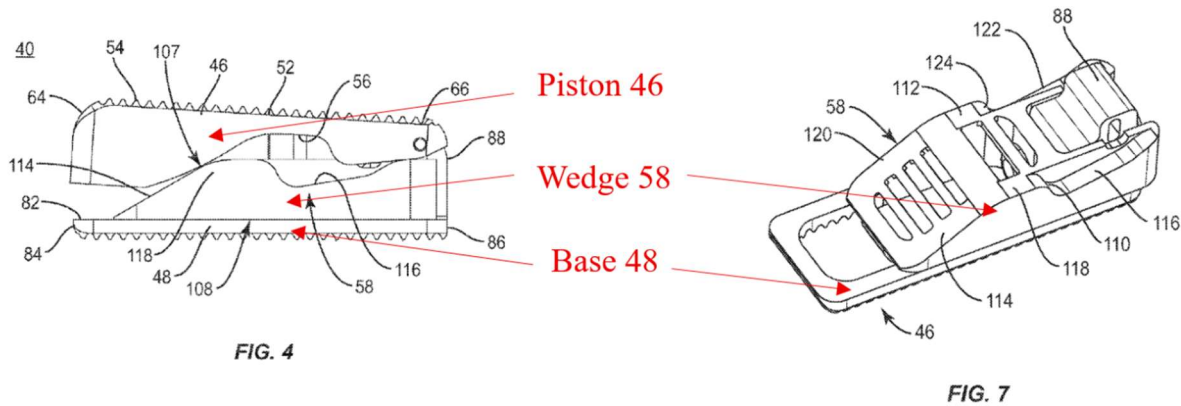
Consequently, Petitioner relies on an obviousness argument for claim 18.

b. Petitioner Improperly Points to Implant Embodiments 40 and 540

To support its obviousness argument, Petitioner refers to implants 40 and 540, alleging that their respective piston and base components are “largely the same length.” Pet. 50, 56. Petitioner never explains the relevance of those embodiments—which are different in material respects from embodiment 840—to its obviousness position, however, and its argument fails. Ex. 2069, ¶¶ 70-75.

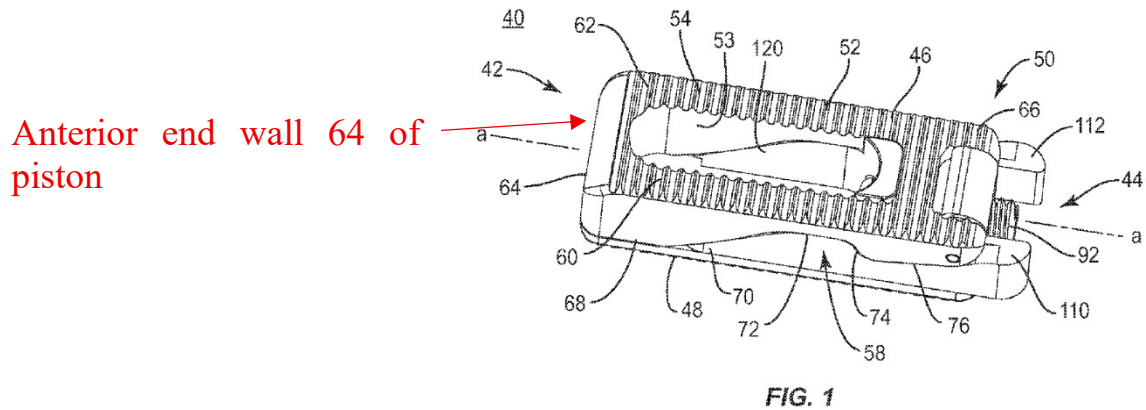
In addition, a POSA would not be motivated to modify the structure of the piston of implant 840 to match the structures of implants 40 or 540 because those implants involve materially different designs than implant 840 and the piston, base, and wedge components of those embodiments are not interchangeable with implant 840. Ex. 2069 ¶¶ 69-74.

Implant 40, which corresponds to Figures 1–16, has a base component 48 with an interior surface that is fully planar, devoid of any sidewalls or a wall or other structure at the anterior end. *Id.* ¶¶ 72-73.



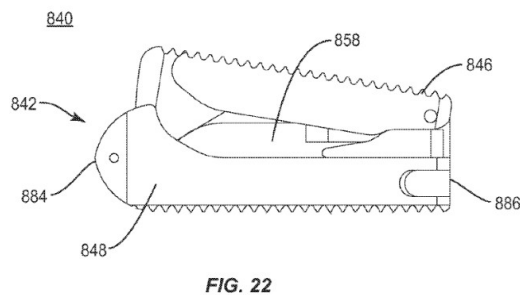
Ex. 1057, Figs. 4, 7 (Annotated)

The wedge 58 of implant 40 also has a materially different shape and engagement mechanism with piston 46. Ex. 2069, ¶ 70. Wedge 58 includes a single ramp 114 that spans the full width of the implant, with the sides of the wedge serving as sidewalls to the lower portion of the implant. *Id.* These sidewalls interface with corresponding sidewalls of piston 46. Piston 46 also has a wall at anterior end 64 that extends all the way to the planar interior surface of base component 48 when the implant is in its compressed state, as shown below.



Ex. 1057, Fig. 1 (Annotated)

Implant 840, on the other hand, uses a differently configured base component 848, wedge 858, and piston 846. Ex. 2069, ¶¶ 70-73. Base component 848 has sidewalls and the aforementioned protective structure at its anterior end. Ex. 1057, Figs. 7, 19, 28; 16:1-3; *see also* Ex. 2068, 23:17-22, 30:22-31:2, 35:24-36:12, 41:8-14; Ex. 2069, ¶ 73. Wedge 858 resides inside of the sidewalls of base component 848, and piston component 846 has a narrowed nose that nests within sidewalls of base component 848.



Ex. 1057, Fig. 22. Implant embodiment 540, which corresponds to Figures 17-21, similarly uses base, wedge, and piston components that materially differ from embodiment 840 on which Petitioner relies. Ex. 2069, ¶¶ 70-73. Base 548 of

implant 540 does have sidewalls along a portion of its sides, but the sidewalls taper from the posterior end to the anterior end, such that there is no longer a sidewall at the anterior end of base component 548. Piston 546 has the sidewalls that taper in the opposite direction, with the result being that piston 546 has a nose portion that forms the entire sidewall and end wall at the anterior end of the implant. Wedge 558 also has a different structure that engages with corresponding structures in piston 546.

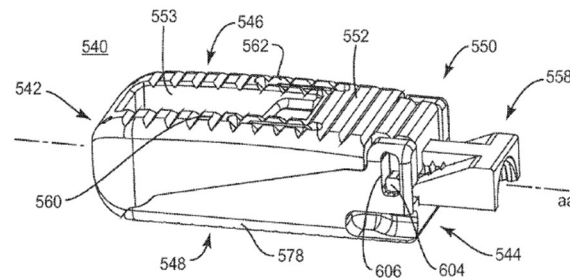


FIG. 17

Ex. 1057, Fig. 17

In addition, implant 840 uses pins 908, 912 at the anterior end to link the wedge and piston. Ex. 1057, Figs. 24-26.

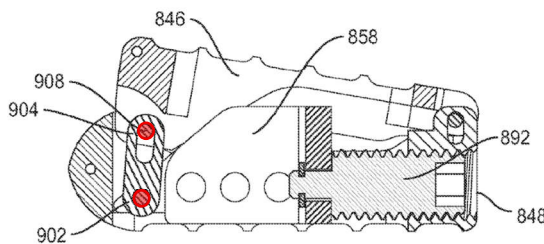


FIG. 24

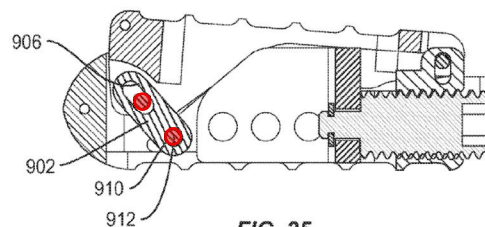


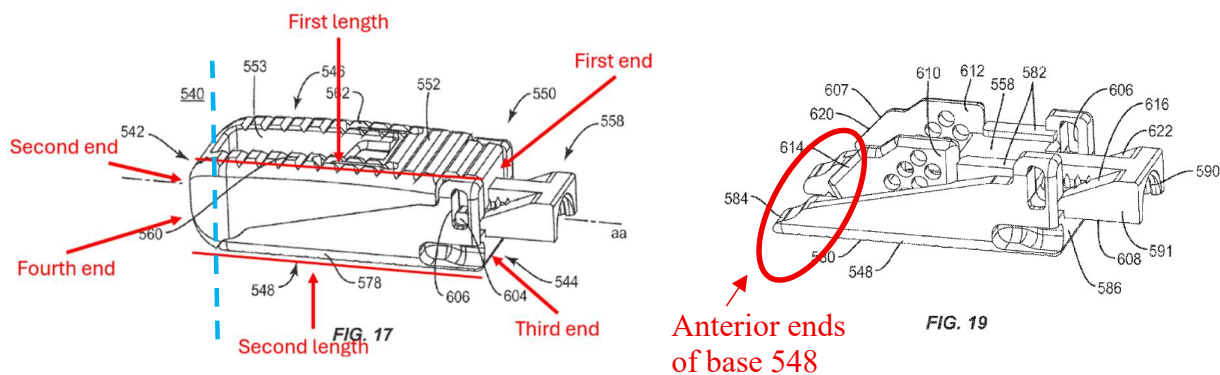
FIG. 25

Ex. 1057, Figs. 24-25 (Annotated)

Neither of implant 40 or 540 include such pin linkages. Ex. 2068 at 46:5–11; Ex. 2069 ¶ 71. And these pins dictate structural accommodations to the design of the wedge and piston.

As the above discussion shows, the structures of the anterior portions of the piston component 846 and base component 848 of implant 840 materially differ from the structures for those components in implants 40 and 540. For example, only implant 840 has a piston component 846 that nests within the sidewalls of base component 848 in implant 840. Petitioner’s expert agrees that this nesting “does not happen in embodiments 40 or 540.” Ex. 2068, 40:19–41:7. Thus, Petitioner’s reliance on embodiments 40 and 540 of Palmatier—which ignores these structural differences—fails to support the obviousness of claim 18.

Moreover, Petitioner’s factual premise is wrong even as to implant 540. Figure 17 does not show piston component 546 and base component 548 as substantially equal in length. Petitioner’s annotation extends the line purportedly marking base component 548 beyond that component’s actual boundary and across part of piston component 546, as shown by the dashed blue line in the annotated image from the Petition, along with the structure of the base component as shown in Figure 19. Pet. 57; Ex. 2069, ¶ 74.



The base component 546 of implant 540 ends at the dashed blue line, while the piston 546 extends beyond that distance, confirming the piston is not substantially the same length as the base. Thus, even if a POSA would have been motivated to adopt the structure of the piston from embodiment 540, it would still not satisfy the length requirements of element 18[a]. For this additional reason, embodiments 40 and 540 do not support the obviousness of the claimed invention.

c. Palmatier does not render claim 18 obvious because Petitioner’s proposed modification would prevent implant 840 from collapsing.

Petitioner also proposes extending the anterior end of piston component 846 until it aligns with the anterior end of base component 848. Pet. 50–52, 56–57. Petitioner then declares that implant 840’s existing nesting arrangement “could have been maintained.” Pet. 52. But Petitioner never shows the proposed configuration. It provides no drawing, dimensions, or explanation identifying how the extended piston component 846 would be shaped, or how it would be positioned when collapsed, and how it would align with the base component 848. Ex. 2069, ¶¶ 77-78.

Palmatier's figures answer that question—and contradict Petitioner's assertion. Figures 24–26 show piston component 846 moving downward into a slot in base component 848 as implant 840 collapses. Extending the length of piston component 846 as Petitioner proposes would therefore cause it to extend to the nose portion of base component 848, mechanically preventing the piston component from collapsing to achieve the collapsed configuration shown in Figure 26. *Id.*

Wedge-shaped anterior end 884 is not some incidental detail. As discussed, Palmatier explains that forces from inserting implant 840 are transmitted to its anterior end. Ex. 1057, 18:48–52. Palmatier specifically adds the wedge-shaped anterior end 884 to base component 848 to “protect[] wedge 858 and screw 892 as intervertebral implant 840 is inserted into an intervertebral disc space.” *Id.* at 18:45–48. Consistent with that disclosure, Figures 24–26 depict wedge-shaped anterior end 884 as solid material forming a protective structure in front of wedge 858 and screw 892. Petitioner ignores that structure when asserting that piston component 846 could simply be extended through the space it occupies.

Petitioner's extension of piston component 846 thus could not be made while “maintain[ing]” implant 840's arrangement. Ex. 2069, ¶¶ 80-82. And Petitioner offers no solution to this recognizable problem. Its reliance on implants 40 and 540 does not fill that gap because neither embodiment has implant 840's combination of a wedge-shaped anterior end 884 and nesting geometry. Ex. 2069, ¶ 79.

Nor does Palmatier’s generic statement that “various modifications may be made” supply the missing analysis. That boilerplate statement does not identify how piston component 846 could (much less would) be extended while also being able to maintain its collapsibility. Petitioner’s citation to that general statement cannot substitute for a technically coherent modification (with supporting motivation) of the particular embodiment on which its challenge depends. *Id.* Additionally, by failing to explain how the change would be made, Petitioner also fails to show that the modified structures would still satisfy other claim elements, such as element 18[b].

d. Petitioner’s asserted footprint benefit is illusory.

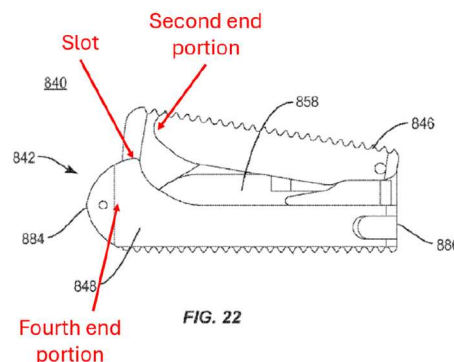
Petitioner’s proposed motivation also rests on the mistaken assumption that the shorter overall length piston component 846 produces a correspondingly smaller vertebral-engagement footprint. Pet. 50–51. Figures 22, 23, and 26 show otherwise. Although base component 848 extends farther anteriorly due to its wedge-shaped anterior end 884, its vertebral-engagement surface does not extend correspondingly farther. The upper and lower vertebral-engagement surfaces have substantially corresponding longitudinal lengths. The difference in the components’ overall lengths therefore reflects the protective anterior end of base component 848—not a disparity between their vertebral-engagement footprints. Ex. 2069, ¶¶ 83-84.

Thus, extending piston component 846 to the anterior extremity of base component 848 would cause the very problem Petitioner suggests the modification would resolve, it would result in the lower and upper vertebral engagement surfaces to be different lengths. Ex. 2069, ¶ 85. This reveals that Petitioner relies on hindsight, rather than a reasoned and articulated motivation, to suggest a POSA would have modified embodiment 840 to arrive at the claimed invention.

Petitioner therefore fails at every stage of its theory. Implant 840 concededly lacks substantially equal body lengths. The other embodiments do not disclose claim 18's arranged combination, and Petitioner misreads Figure 17 in asserting that implant 540 has substantially equal body lengths in any event. Its proposal to extend the length of piston 846 of implant 840 would create direct structural interference, prevent the illustrated collapse, and provide no demonstrated benefit. Because Petitioner has shown neither a reason to make that redesign nor a reasonable expectation that implant 840 would retain its structure and operation afterward, and instead uses hindsight to suggest a POSA would abandon the very wedge-shaped anterior end to base 840 that Palmatier touts and that differentiates it from the other embodiments, Petitioner has failed to show the obviousness of limitation 18[a]. Ex. 2069, ¶ 87.

2. **Palmatier does not teach or suggest limitation 18[b] “wherein the second end portion of the first body is smaller than the fourth end portion of the second body such that the second end portion of the first body is positionable between the third and fourth side portions of the second body at the fourth end of the second body”.**

Petitioner’s obviousness theory also fails because Palmatier’s embodiment 840 does not satisfy element 18[b], and Petitioner does not suggest a POSA would be motivated to pursue any modifications that would satisfy this element. Ex. 2069, ¶ 94. Claim element 18[b] requires “the second end portion of the first body” to be “positionable between the third and fourth side portions of the second body *at the fourth end of the second body*”. This element requires the nesting of the upper implant body to continue to the “*end*” of the lower implant body, not merely an “*end portion*.” Petitioner implicitly acknowledges this in its annotations to Figure 22 in which Petitioner points to the “fourth end portion” of the base component rather than the “fourth end.” Ex. 2069, ¶¶ 88, 91.



Pet. 59. Palmatier’s nested piston component 846 does not extend to the end of the base 848 and so does not satisfy this requirement. Ex. 2069, ¶¶ 92-95.

More specifically, limitation 18[b] does not merely require the anterior portion of piston component 846 to fit somewhere within the sidewalls of base component 848. Ex. 2069, ¶¶ 89. It requires the second end portion of the first body to be positionable between the third and fourth side portions of the second body “at the fourth end of the second body.” Confirming this understanding, claim 18 separately recites the second body’s “fourth end” and its “fourth end portion.” Ex. 2069, ¶ 90. Under Petitioner’s mapping, the relevant question is therefore whether the anterior end of piston component 846 is positionable between the sides of base component 848 at wedge-shaped anterior end 884. It is not, and Petitioner’s obviousness argument for claim 18 fails for this additional reason. Ex. 2069, ¶¶ 91-96.

E. Dependent Claim 19

Claim 19 depends from claim 18, which depends from independent claim 17. Because Palmatier fail to teach or suggest independent claim 17 as well as dependent claim 18, Palmatier necessarily fails to teach or suggest dependent claim 19. Ex. 2069, ¶ 97.

F. Dependent Claim 20

Claim 20 depends from claim 19, which depends from claim 18, which itself depends from independent claim 17. Because Palmatier fail to teach or suggest independent claim 17 as well as dependent claims 18 and 19, Palmatier necessarily fails to teach or suggest dependent claim 20. Ex. 2069, ¶ 97.

G. Dependent Claim 21

Claim 21 is a method of operating the device of independent claim 17. Because Palmatier fail to teach or suggest independent claim 17, Palmatier necessarily fails to teach or suggest dependent claim 21. Ex. 2069, ¶ 67.

VIII. PETITIONER’S EXPERT DECLARATION SHOULD BE GIVEN NO WEIGHT

Petitioner relies heavily on the Declaration of Brad Culbert as purported technical support for its anticipation and obviousness theories. But Culbert’s declaration does not supply independent technical analysis addressing the structural gaps identified above. Instead, it largely mirrors the Petition’s limitation-by-limitation mapping, repeating conclusions that the prior art “discloses” the claimed features, and relies on hindsight without explaining how the modified devices would be structured in order to satisfy the specific mechanical requirements of the claims.

A comparison of the Petition and Ex. 1002 confirms the redundancy. The Petition’s “Background” and “Overview of the Prior Art” is virtually identical to the declaration’s “Technical Background” and “The Prior Art.” *Compare, e.g.,* Petition §§ VI.A.1-VI.B.1, VIII.A *with* Ex. 1002 §§ V-VI, VIII.A.1. Likewise, the Petition’s “Detailed Explanation of Grounds” tracks the same limitation-by-limitation structure and substantive content contained in the declaration’s corresponding sections and appendices. *Compare, e.g.,* Petition § X *with* Ex. 1002, Appendix A, ¶¶

42-56. The declaration does not meaningfully expand on those assertions with engineering analysis or technical reasoning.

That absence is significant here. The disputed issues require explanation of mechanical interaction, structural relationships, and expected operation in a confined surgical environment.

Yet Culbert's Declaration primarily cites passages from the prior art followed by the same conclusory statements from the Petition that the limitation is "disclosed." *Compare, e.g.,* Pet. at 22-47, 52-66 *with* Ex. 1002, pp. 38-68, ¶¶ 42-51. The declaration does not supply any additional analysis as to how the cited structures satisfy the claim language under Petitioner's own mappings, or how a POSA would modify them to realize the hindsight-based outcomes that Petitioner proposes. Instead, the declaration merely duplicates the Petition.

The Board has made clear that expert testimony must provide reasoned technical support, not merely endorse counsels' argument. *See* 37 C.F.R. § 42.65(a); *Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper 9 (PTAB Aug. 24, 2022) (precedential). Where a declaration simply restates the Petition's assertions without independent analysis, it adds little evidentiary weight.

The near-verbatim correspondence in the alleged motivation to combine shows that Mr. Culbert's declaration does not supply meaningful technical analysis beyond the attorney argument in the Petition. *Compare* Pet. at 50-52 *with* Ex. 1002,

¶¶ 54-56. The only difference between the Petition and Declaration for the motivation to combine section is Petitioner’s citations to the declaration. The addition of which, however, create a mismatch with the “(id.)” citations within this section, causing them to no longer to track their original referents. This copying artifact confirms that the Petition and declaration present a single, shared analysis—not independent expert reasoning corroborating counsel’s argument. Mr. Culbert’s conclusory repetition therefore warrants little weight.

IX. CONCLUSION

Patent Owner requests the Board determine that Palmatier is not prior art, and even if it is, determine that claims 8, 9, 13, and 17-21 of the ’367 Patent are not unpatentable.

Date: August 31, 2026

Respectfully submitted,
AVANTECH LAW, LLP
80 S 8th St, Suite 900
Minneapolis, MN 55402
(312) 487-2185

/Eric A. Zelepugas/
Eric A. Zelepugas
Registration No. 73,302
Lead Counsel for Patent Owner

CERTIFICATE OF COMPLIANCE WITH WORD COUNT

I certify that this paper complies with the type-volume limitations of 37 C.F.R. §42.24(B)(2), which was increased to 20,000 words by the Board in Paper 22, because it contains 16,421 words (determined by the word-processing system used to prepare this paper), excluding the parts of the paper exempted by 37 C.F.R. §42.24(a).

Date: August 31, 2026

Respectfully submitted,

/Eric A. Zelepugas/
Eric A. Zelepugas
Registration No. 73,302
Lead Counsel for Patent Owner

CERTIFICATE OF SERVICE

The undersigned hereby certifies that the foregoing **PATENT OWNER'S RESPONSE** and associated exhibits (Exhibits 2068-2072, 2127, 2140, 2145, 2156, 2159) were served electronically via e-mail on August 31, 2026, in their entireties on the following counsel of record for Petitioner:

Naveen Modi (Lead Counsel)
Young Park (Back-up Counsel)
Chetan Bansal (Back-up Counsel)
naveenmodi@paulhastings.com,
youngpark@paulhastings.com,
chetanbansal@paulhastings.com,
PH-Medtronic-Moskowitz-IPR@paulhastings.com.

Date: August 31, 2026

Respectfully submitted,
AVANTECH LAW, LLP
80 S 8th St, Suite 900
Minneapolis, MN 55402
(312) 487-2185

/Eric A. Zelepugas/
Eric A. Zelepugas
Registration No. 73,302
Lead Counsel for Patent Owner