

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

STRAUMANN USA, LLC
Petitioner,

v.

SMART DENTURE CONVERSIONS, LLC,
Patent Owner.

Case No. PGR2025-00054

U.S. Patent No. 12,156,781

**DECLARATION OF KARL R. LEINSING, MSME, PE
IN SUPPORT OF PATENT OWNER'S RESPONSE**

April 1, 2026

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I, Karl R. Leinsing, declare as follows:

I. INTRODUCTION

1. I have been retained in this matter by Smith, Anderson, Blount, Dorsett, Mitchell & Jernigan on behalf of Patent Owner Smart Denture Conversions, LLC (“SDC”) to provide technical assistance in responding to the petition for post-grant review (“PGR”) of certain claims of U.S. Patent No. 12,156,781 (the “’781 Patent”). The ’781 Patent is generally directed to a screw-attached pick-up dental coping system and methods.

2. I understand that Petitioner Straumann USA, LLC (“Straumann”) petitions for post-grant review of the ’781 Patent and requests that the Patent Trial and Appeal Board (“Board”) cancel Claims 1–16 of the ’781 Patent.

3. This declaration is a statement of my opinions on issues related to the patentability of certain claims of the ’781 Patent.

II. BACKGROUND AND QUALIFICATIONS

4. In forming my opinions, I relied upon my education, knowledge, and experience and considered the level of ordinary skill in the art as discussed below. A copy of my current *curriculum vitae* has been previously filed in this proceeding as Exhibit 2019, and it provides a comprehensive description of my academic and employment history along with papers and books that I have published and patent and patent applications of which I am listed as an inventor.

5. I received a Bachelor of Science degree in mechanical engineering from the University of New Hampshire in 1988 and a Master of Science degree in mechanical engineering from North Carolina A&T State University in 1995. I am also a professional engineer in the state of New Hampshire (license no. 11437). I have worked as an engineer for more than 35 years and as a medical device engineer since 1992. Since 2006, I have worked as the president of ATech Designs, LLC, where I design and develop various medical devices.

6. I have experience with various types of implants and devices in the medical field. I have consulted on and have experience with bone anchors, bone screws, and bone plates. In particular, I have consulted on bone screw threads, fracture of bone screws, screw guides, drills, bone reamers, and inserters. I have invented, developed, and tested surgical anchors and other fixation devices used in the various tissues of the body and I have experience with training surgeons on use of the same.

7. I also have experience with other medical devices used during surgical intervention such as fasteners, tensioning members, and tissue anchors. I have further experience with devices that use electrodes for tissue ablation, sealing, or cutting, or to stimulate muscles such as pacemakers.

8. My experience with materials used in medical devices is quite extensive starting with my master's thesis on strength of medical thermoplastic female Luers exposed to chemicals.

9. I have significant experience with the development and life cycle of medical devices. This includes product conception and design, manufacturing, testing, sterilization, qualification, validation, verification, packaging, labeling, clinical trials, regulatory approval, marketing, and sales. I have worked as a senior product design engineer, as a manager of design engineering, and as a director of biomedical engineering. In my current role as president of ATech Designs, LLC, I have managed the development of various medical devices from conception to market. Many of my speaking engagements address the medical device product development process and include topics such as "The Science of Successful Medical Device Design."

10. Over my professional career, I have received several awards and honors. I have received a variety of awards for my medical product designs, with one design published on the cover of LIFE Magazine. One award, from Governor James B. Hunt of North Carolina, was presented for the design and development of a needle-free valve produced using completely automated manufacturing technology. In 1998, I won a Medical Design Excellence Award from the Medical Device & Manufacturing Conference and Exposition (Canon Communications). In

2000, I received a design award from the National Society of Professional Engineers for innovative use of engineering principles and materials. In 2001, I won a Prototype Design Award and in 2003, I was a Gold Winner for yet another Medical Design Excellence Award. I have been recognized as one of the top 100 medical device professionals in the country by MD&DI Magazine, and I have won awards from the MD&M Conference for my medical devices.

11. I am listed as an inventor on 42 U.S. Patents.

12. My company, ATech Designs, LLC, is being compensated for my time in connection with this matter at my standard consulting rate, which is \$600 per hour, plus reimbursement for actual expenses. My compensation is not dependent in any way upon the outcome of this matter.

III. MATERIALS CONSIDERED

13. In preparing this Declaration, I have reviewed the '781 Patent, the Petition for Post-Grant Review, and the Board's Decision Granting Institution of Post-Grant Review.

14. I have also considered the following documents in this proceeding in light of the general knowledge in the relevant art.

Ex. 1001	U.S. Patent No. 12,156,781 ('781 Patent)
Ex. 1002	Expert Declaration of John B. Brunski, Ph.D.
Ex. 1003	U.S. Patent Application Pub. No. US 2017/0202649 A1 (Bernhard)

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Ex. 1004	U.S. Patent No. 6,283,752 (Kumar)
Ex. 1005	U.S. Patent Application Pub. No. US 2016/0045290 A1 (Poovey)
Ex. 1006	A. Gracco et al., “Effects of Thread Shape on the Pullout Strength of Miniscrews,” 142 <i>Amer. J. Orthodontics & Dentofacial Orthopedics</i> 186–90 (2012) (Gracco)
Ex. 1007	Declaration of Lindsay Allen
Ex. 1008	PCT Patent Application No. WO 2013/030839 A1 (Derey)
Ex. 1009	U.S. Provisional Patent Application No. 62/742,942 (’942 Application)
Ex. 1010	U.S. Provisional Patent Application No. 62/774,402 (’402 Application)
Ex. 1011	U.S. Provisional Patent Application No. 62/818,082 (’082 Application)
Ex. 1012	U.S. Patent Application No. 16/596,361 (’361 Application)
Ex. 1013	U.S. Patent No. 11,311,354 (Kofford)
Ex. 1014	Smart Denture Conversions Webpage – Separable Fastener
Ex. 1015	Prosecution History of U.S. Patent Application No. 18/328,730
Ex. 1016	Smart Denture Conversions – Technique Guide
Ex. 1017	Complaint, D.I. 1 (April 23, 2024), <i>Smart Denture Conversions, LLC v. Straumann USA, LLC</i> , No. 1:24-cv-00507-JCB (D. Del.)
Ex. 1018	U.S. Patent Application No. 17/691,108 (’108 Application)
Ex. 1019	NeoConvert Brochure
Ex. 1020	Prosecution History of U.S. Patent Application No. 18/424,696
Ex. 1021	Supplemental Complaint, D.I. (February 4, 2025), <i>Smart Denture Conversions, LLC v. Straumann USA, LLC</i> , No. 1:24-cv-00507-JCB (D. Del.)

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Ex. 2001	First Supplemental Complaint, <i>Smart Denture Conversions, LLC v. Straumann USA, LLC</i> , No. 1:24-cv-00507-JCB (D. Del. Feb. 4, 2025), ECF No. 34
Ex. 2002	Docket sheet, <i>Smart Denture Conversions, LLC v. Straumann USA, LLC</i> , No. 1:24-cv-00507-JCB (D. Del.)
Ex. 2003	Complaint, <i>Smart Denture Conversions, LLC v. Straumann USA, LLC</i> , No. 1:24-cv-00507-JCB (D. Del. Apr. 23, 2024), ECF No. 1
Ex. 2004	Defendant Straumann USA, LLC's Opening Brief in Support of its Motion to Dismiss Plaintiff's Complaint for Failure to State a Claim for Relief under Fed. R. Civ. P. 12(b)(6), <i>Smart Denture Conversions, LLC v. Straumann USA, LLC</i> , No. 1:24-cv-00507-JCB (D. Del. July 29, 2024), ECF No. 13
Ex. 2005	Order, <i>Smart Denture Conversions, LLC v. Straumann USA, LLC</i> , No. 1:24-cv-00507-JCB (D. Del. Jan. 30, 2025), ECF No. 31
Ex. 2006	Stipulated Protective Order, <i>Smart Denture Conversions, LLC v. Straumann USA, LLC</i> , No. 1:24-cv-00507-JCB (D. Del. Mar. 4, 2025), ECF No. 44
Ex. 2007	Defendant Straumann USA, LLC's Initial Invalidation Contentions, No. 1:24-cv-00507-JCB (D. Del.) (served June 2, 2025)
Ex. 2008	Order Regulating Practice for civil cases assigned to The Honorable J. Campbell Barker, <i>Smart Denture Conversions, LLC v. Straumann USA, LLC</i> , No. 1:24-cv-00507-JCB (D. Del. Dec. 16, 2024), ECF No. 22
Ex. 2009	Notice of <i>Sotera</i> Stipulation, <i>Smart Denture Conversions, LLC v. Straumann USA, LLC</i> , No. 1:24-cv-00507-JCB (D. Del. June 4, 2025), ECF No. 57
Ex. 2011	Smart Denture Conversions, <i>Technique Manual</i> , available at https://shorturl.at/798cX
Ex. 2012	International Patent Application No. WO 96/2019 (Sept. 26, 1996) (Sutter 1996)

Ex. 2013	U.S. Patent No. 6,332,777 B1 (Dec. 25, 2001) (Sutter 2001)
Ex. 2014	U.S. Patent No. 3,115,804 (Dec. 31, 1963) (Johnson)
Ex. 2015	U.S. Patent No. 5,904,483 (May 18, 1999) (Wade)
Ex. 2016	U.S. Patent No. 6,517,543 B1 (Feb. 11, 2003) (Berrevoets)
Ex. 2017	U.S. Patent No. 9,568,037 B2 (Feb. 14, 2017) (Staniszewski)
Ex. 2018	U.S. Patent Publication No. U.S. 2002/0094255 A1 (July 18, 2002) (Neuhengen)
Ex. 2019	<i>Curriculum Vitae</i> of Karl Leinsing
Ex. 2020	Deposition Transcript of John B. Brunski, Ph.D. (February 13, 2026)

15. I have also considered other technical and engineering resources which are cited herein when relevant.

IV. LEGAL UNDERSTANDING

16. I am not an attorney, and I render no opinions on the law itself. My opinions are informed by my understanding of the relevant law as has been provided to me by counsel. I understand that the patentability analysis is conducted on a claim-by-claim and element-by-element basis.

17. I understand that Petitioner ultimately has the burden of proving that each challenged claim is unpatentable by a preponderance of the evidence in this PGR.

18. I understand that earlier patents and publications may render claims unpatentable as anticipated under 35 U.S.C. § 102 or obvious under 35 U.S.C. § 103.

19. I understand that Petitioner is making both anticipation and obviousness arguments in this proceeding.

A. Written Description

20. I understand that a patent claim is invalid if the patent does not contain an adequate written description of the claimed invention.

21. I understand that the test for an adequate written description is whether the specification would have objectively demonstrated to a POSA that the patent applicant actually invented, or “possessed,” the claimed subject matter when the patent application was filed.

22. I understand that the written description requirement does not require disclosure of examples or an actual reduction to practice of the claimed invention. However, it is my understanding that the specification must show possession of the invention on its face, and evidence of reduction to practice outside of the specification is not sufficient by itself to satisfy the written description requirement.

23. I understand that for a patent to claim priority to an earlier-filed application, the application’s specification must satisfy the written description requirement as to the patent’s claims.

B. Enablement

24. I understand that a patent claim is invalid if the specification does not teach a POSA how to make and use the full scope of the claimed invention without

undue experimentation. I also understand that enablement is determined from the point of view of a POSA at the time when the patent application was filed.

25. I understand that the following factors may be considered to determine whether any experimentation would have been undue:

- a. the amount of experimentation necessary;
- b. the amount of direction or guidance presented;
- c. the presence or absence of working examples;
- d. the nature of the claimed invention;
- e. the state of the prior art; the relative skill of those in the art;
- f. the predictability or unpredictability of the art; and
- g. the breadth of the claims.

C. Indefiniteness

26. I understand that a patent claim is invalid if it is indefinite. It is my understanding that to satisfy the definiteness requirement, a claim must inform a POSA of the claimed invention's scope with reasonable certainty when read in view of the specification and prosecution history.

27. It is also my understanding that definiteness of a claim is measured from the viewpoint of a POSA at the time when the patent application was filed.

D. Anticipation

28. I understand that a patent claim is unpatentable and invalid if the claim is anticipated by prior art. I understand that a claimed invention is not novel or is anticipated if:

- a. the invention was known or used by others in this country, or was patented or described in a printed publication in this or a foreign country, before the invention by the patent applicant; or
- b. the invention was patented or described in a printed application in this or a foreign country or in public use or on sale in this country more than one year prior to the date of the application for patent in the United States; or
- c. the invention was described in a published patent application by another filed in the United States before the invention by the applicant for patent; or
- d. the invention was described in a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the Patent Cooperation Treaty serves as prior art only if the international application designated the

United States and was published under the treaty in the English language.

29. I understand that anticipation requires a single piece of prior art to disclose every element of the claimed invention, either expressly or inherently, arranged in the same way as in the claim.

30. I understand that a dependent claim incorporates each and every limitation of the independent claim from which it depends. Thus, I understand that if a prior art reference fails to anticipate an independent claim, then that prior art also necessarily fails to anticipate all dependent claims that depend from the independent claim.

E. Obviousness

31. I understand that a patent claim is unpatentable and invalid if the subject matter of the claim as a whole would have been obvious to a person of ordinary skill in the art (“POSA”) of the claimed subject matter as of the time of the invention at issue. I understand that obviousness may be shown by considering and combining more than one item of prior art or the knowledge of a POSA. I also understand that, for a claim to be obvious, the prior art must disclose or suggest each limitation of that claim.

32. I understand that the following factors should be evaluated to determine whether the claimed subject matter is obvious: (1) the scope and content of the prior

art; (2) the difference or differences, if any, between each claim of the patent and the prior art; (3) the level of ordinary skill in the art at the time the patent was filed; and 4) the objective evidence of non-obviousness, also referred to as secondary considerations.

33. I understand that a prior art reference is proper to use in an obviousness analysis if the prior art is analogous art to the claimed invention. I understand that a prior art reference is analogous art if at least one of the following two considerations is met: (1) the prior art reference is from the same field of endeavor as the claimed invention, even if the prior art reference addresses a different problem and/or arrives at a different solution; or (2) the prior art reference is reasonably pertinent to the problem faced by the inventor, even if it is not in the same field of endeavor as the claimed invention.

34. I understand that, for a patent claim to be obvious, Petitioner must show that a POSA at the time of the invention would have had a reasonable expectation that a modification or combination of one or more prior art references would have succeeded. I understand that, to establish obviousness based on combining multiple embodiments from a single reference, there must be a motivation to make the combination and a reasonable expectation that such a combination would be successful.

35. I also understand that there should be a reason, suggestion, or motivation in the prior art that would lead a POSA to combine the prior art references, and that would also suggest a reasonable likelihood of success.

36. I understand the reasons for combining references stem (explicitly or implicitly) from, for example: (a) the prior art references themselves; (b) the prior art as a whole; (c) the knowledge, common sense, and creativity of those of ordinary skill in the art; (d) the nature of the problem to be solved; (e) the demands in the design community and/or the market place; (f) the simple and predictable substitution of one known element for another in accordance with their known functions; (g) the application of a known technique or method to a piece of prior art ready for improvement; (h) the obviousness of trying the combination; and/or (i) the general needs and problems in the field.

37. I understand that objective indicia of non-obviousness or secondary considerations may be considered when making an obviousness determination. I further understand that indicia of non-obviousness include commercial success; long-felt but unresolved need; failure of others to solve the problem that the inventor solved; unexpected results; copying of the invention by others; and industry recognition or expressions of disbelief by experts in the field of the claimed invention.

38. I also understand that a nexus, i.e., a tie, must exist between objective indicia of non-obviousness and the novel aspects of the claimed subject matter.

39. I understand that an obviousness determination requires that the claimed invention, when read in light of the specification and as a whole, would have been obvious to one of ordinary skill in the art as of the date of the invention in view of the prior art.

40. I understand that some hindsight is required to determine obviousness. However, I also understand that using the claimed invention as a roadmap to combine references is impermissible hindsight. Further, I understand that impermissible hindsight should be avoided when considering whether the claimed invention would have been obvious to a POSA.

41. I understand that in determining obviousness, a POSA is a person of ordinary creativity and not an automaton.

42. I understand that if a prior art reference or combination of prior art reference fails to render obvious an independent claim, then that prior art reference or combination of prior art references fails to render obvious all dependent claims that depend on that independent claim.

F. Claim Construction

43. I understand that a patent's claims define the scope of the claimed invention.

44. I also understand that a claim construction defines the meaning of a claim term in patented claim.

45. I understand that claim terms are generally given their ordinary and customary meaning, which is the meaning they would have to a POSA at the time of the invention, in light of the intrinsic record, including the patent's specification (written description, drawings, and claims) and file history.

46. I also understand that if a claim term is unclear or ambiguous, the Board may construe the claim term based on the understanding of a POSA at the time of the invention.

47. I understand that the Board may determine a claim construction based on many sources of information, including:

- a. the claims themselves,
- b. the specification,
- c. the prosecution history, and
- d. extrinsic evidence concerning scientific principles, the meaning of technical terms, and the state of the art.

48. I also understand that intrinsic evidence can carry more weight than extrinsic evidence, particularly if claim terms are given an express definition or if the inventors acted as their own lexicographer.

V. LEVEL OF ORDINARY SKILL IN THE ART

49. I have been asked to analyze the '781 Patent and the references discussed herein from the perspective of a POSA at the time of invention.

50. I understand that, for purposes of this PGR, the time of invention is assumed to be the '781 Patent's priority date, which is October 9, 2018.

51. I understand that a POSA of the '781 Patent is a hypothetical person who is presumed to be aware of pertinent art including knowledge in the art, thinks consistent with conventional wisdom in the art, and who is a person of ordinary creativity. I understand that this hypothetical POSA is considered to have the normal skills and knowledge of a person in the technical field.

52. I understand that factors that may be considered in determining the level of ordinary skill in the art include:

- a. the education level of the inventor;
- b. the types of problems encountered in the art;
- c. the prior art solutions to those problems;
- d. the rapidity with which innovations are made;
- e. the sophistication of the technology; and
- f. the education level of active workers in the field.

53. In my opinion, in the context of the subject matter of the '781 Patent, a POSA would have been an individual having a bachelor's degree in mechanical

engineering or an equivalent technical degree with at least three years of experience in the field, such as experience with the design of bone implants, anchors, and/or screws. A person with a higher technical engineering degree and two years of experience, in a related field, would also qualify as a POSA. A POSA may have consulted with a dentist, oral surgeon, prosthodontist, or periodontist who has experience with dental implants and prosthetics on patients.

54. Brunski defines a POSA to “have at least a bachelor’s degree in mechanical engineering, biomedical engineering, materials science engineering, or an equivalent degree, plus at least five years of experience working with (i.e. researching, developing and/or designing) dental implants and prostheses.” Ex. 1002 (Brunski Declaration) ¶ 127. In addition, Brunski states that a “POSA would also have some familiarity and experience with fasteners (threaded and otherwise) used to connect prostheses, implants and related components.” Ex. 1002 (Brunski Declaration) ¶ 127. Brunski also says a “POSA could also be a person with less formal education but commensurately more practical experience, or vice versa.” Ex. 1002 (Brunski Declaration) ¶ 127.

55. Notably, Brunski’s understanding of the prior art states that a “reference outside of the field of endeavor is reasonably pertinent if a POSA would have consulted it and applied its teachings when faced with the problem the inventor was trying to solve.” Ex. 1002 (Brunski Declaration) ¶ 31. But Brunski’s definition of a

POSA would have eliminated any need for a POSA to consult anyone because Brunski's POSA would already have "at least five years of experience working with (i.e. researching, developing and/or designing) dental implants and prostheses." Ex. 1002 (Brunski Declaration) ¶ 127.

56. I also note there are additional reasons why it is not necessary for a POSA to have direct experience "working with (i.e. researching, developing and/or designing) dental implants and prostheses," as Brunski proposed. Ex. 1002 (Brunski Declaration) ¶ 128. The problems faced in the '781 Patent's field of art are primarily mechanical in nature and are not specific or exclusive to dental applications. Rather, the problems faced in the '781 Patent's field of art are fundamentally the same or similar to those faced in other biomechanical applications, such as the design of bone implants, anchors, and/or screws. Ex. 1001 ('781 Patent), 7:32–33 ("The inventive systems disclosed are beneficially applicable to screw-attached prostheses.").

57. Additionally, mechanical engineering is a relatively predictable field of art and the same principles readily transfer across specific applications. Ex. 1001 ('781 Patent), 1:36–40 ("In order to simplify future modification or replacement needs, it is desirable to have reversable attachment between the implants and prostheses using mechanical systems as opposed to directly bonding these components together."). This is also demonstrated in several other references that are not specific to dental applications but come from biomechanical, surgical, or

other engineering applications more generally, including Exhibit 2014 (Johnson), Exhibit 2016 (Berrevoets), Exhibit 2017 (Staniszewski), and Exhibit 2018 (Neuhengen).

58. In my opinion, Brunski's definition of a POSA exceeds the level of knowledge and skill of person having ordinary skill in the art by October 2018.

59. Additionally, in my opinion, a POSA without specific experience in the dental industry could readily consult with a dentist, oral surgeon, prosthodontist, or periodontist who has experience with dental implants and prosthetics on patients, as necessary.

60. Such a POSA makes more sense in the context of the '781 Patent because, as I understand, neither of the '781 Patent's two inventors would qualify as a POSA under Brunski's definition. It is my understanding that Mr. Rudisill had no professional experience researching, developing, or designing dental implants or prostheses prior to his work with Dr. Kofford that led to the '781 Patent. It is also my understanding that Mr. Kofford is a dental practitioner and, prior to his work with Mr. Rudisill, had no experience in or qualifications relevant to mechanical engineering.

61. In either case, by October 9, 2018, I had a bachelor's degree in mechanical engineering, a master's degree in mechanical engineering, 26 years of biomedical engineering and design experience, 30 years of mechanical engineering

and design experience, and 34 years of mechanical equipment design experience. My 26 years of biomedical engineering and design experience, by October 2018, includes familiarity with fasteners and related components, such as tissue fasteners, tissue anchors, bone anchors, bone plates, bone screws, bone guides, bone drills, and bone inserters, among others.

62. I am qualified to provide opinions about how a POSA in October 2018 would have interpreted and understood the '781 Patent and the prior art in the Petition at the time of the invention under either definition.

63. I understand that the Board preliminarily found “little meaningful difference between the two proposed definitions.” Institution Decision at 19. However, for the reasons I described above, regarding the applicability of mechanical principles across numerous biomechanical applications, I believe Patent Owner’s definition of a POSA is correct.

64. While my opinions would not change under either definition, I believe the more appropriate definition of a POSA is the one that would have qualified the inventors of the '781 Patent as POSAs.

VI. THE '781 PATENT

A. The '781 Patent (Ex. 1001)

65. The '781 Patent describes a “temporary alignment system and method for holding a dental coping to an implant abutment using the same threads in the

abutment that are used for definitive attachment.” Ex. 1001 (’781 Patent), Abstract; Ex. 1012 (’361 Application), 59 (same). “The disclosed temporary fasteners initially orient and hold a coping against an abutment,” and then “[t]he aligned coping can be picked-up in a closed-tray impression process without unscrewing the temporary fastener.” Ex. 1001 (’781 Patent), Abstract; Ex. 1012 (’361 Application), 59 (same). “In this manner, the coping is held against the abutment for the pick-up process with a force oriented identically to that of the final screw mounting.” Ex. 1001 (’781 Patent), 4:63–5:1; Ex. 1012 (’361 Application), 66 (same).

66. The temporary fastener thus allows both axial and rotational attachment, which provides the same alignment force vector as the permanent (definitive) screw. Ex. 1001 (’781 Patent), Abstract (“Embodiments include threaded posts that release copings from the abutment through axial forces.”); Ex. 1001 (’781 Patent), 4:63–65; Ex. 1001 (’781 Patent), 7:33–34 (“Key benefits of screw-attachment are variable tightening torques and reversibility [for the temporary fastener]”); Ex. 1012 (’361 Application), 71 (same); Ex. 1001 (’781 Patent), 22:12–16 (“FIG. 69 shows an embodiment of a temporary alignment screw 58 having threaded portion 62, breakaway flange 160 and hex drive portion 61. The flange 10 pushes down on the top of the coping as the temporary alignment screw threads 62 are rotated into the implant abutment.”); Ex. 1001 (’781 Patent), 23:10–13 (“The inventive concepts disclosed are not meant to be restricted to a temporary attachment

post with standard screw threads that both engage and disengage the threads in the implant abutment through rotations.”); Ex. 1001 (’781 Patent), 23:21–30 (“FIG. 75 shows a temporary fastener 190 with a head 42 portion and an attachment post portion 39. The attachment post portion 39 is shown as having a slot 41 and asymmetric threads or serrations 40 that have proximal flank 183 and a distal flank 184. ***This asymmetric threading still allows the temporary attachment post portion 39 to be inserted through rotation like other temporary screw embodiments for alignment for coping pick-up. The post 39 may be subsequently extracted with a separation force in the axial direction.***”); Ex. 1001 (’781 Patent), 23:30–34 (“Although the threads could be designed to provide engagement with the implant abutment threads through axial motion in the opposite direction to the arrow shown in FIG. 75 , ***rotation to a design torque on engagement is generally preferred.***”).

67. “Embodiments” of these temporary fasteners “include threaded posts that release copings from the abutment through axial forces” as well as “a threaded post with separable cap that is picked-up with the coping.” Ex. 1001 (’781 Patent), Abstract; Ex. 1012 (’361 Application), 59 (same).

68. The claimed invention offers a method for converting dentures into permanent prosthesis that is significantly faster and easier than traditional open- and closed-tray techniques. Ex. 1001 (’781 Patent), 4:57–61 (“The inventive concepts disclosed facilitate easier installation and removal on multiple abutments that may

be oriented at different compound angles when compared to the conventional open-tray processes and long impression screws.”). It results in a stronger prosthesis by allowing smaller holes to be drilled than in traditional conversions. Ex. 1001 (’781 Patent), 24:21–23 (“FIG. 85 shows a slotted spring feature 79 formed in the temporary attachment post 76. The spring-features engage a smaller bore portion 90 of the coping 75.”). The resulting prostheses last longer and are less likely to fracture, delivering long-term value to patients. Ex. 1001 (’781 Patent), 19:14–23 (“Note that in the above procedure very little material is removed from the prosthesis during the coping pick-up installation process. The boring process in FIG. 39 need only be sufficient to provide clearance for the coping and temporary screw. Angular variation in the axes of the implant abutments does not appreciably increase the size of the cavity boring required in this closed tray process compared to the additional prosthesis material that must be removed with relatively long impression screws and sleeves in a conventional open tray conversion process for definitive screw attachment.”)

69. In my opinion, the ’781 Patent improves alignment through the use of threaded screws as temporary fasteners, the claimed invention allows practitioners to better position the denture in the mouth as compared to a conventional conversion procedure, resulting in a more functional, more comfortable, and better-looking end result. Ex. 1001 (’781 Patent), 4:31–35 (“A general need exists for systems that

improve clinical efficiency, implant to prosthesis alignment accuracy, application to a wide range of coping designs and sources and patient comfort over existing systems.”); Ex. 1001 (’781 Patent), 23:37–41 (“Since there is no processing impact on patient comfort, higher mechanical forces or a broader range of energy or chemical processing may be employed to remove the post 39 from the prosthesis 3 after coping 9 pick-up.”).

B. Priority Applications to the ’781 Patent

70. The inventors filed several provisional applications in late 2018 and early 2019 regarding their inventions. *See* Ex. 1009 (’942 Application); Ex. 1010 (’402 Application); Ex. 1011 (’082 Application).

71. On October 9, 2018, the inventors of the ’781 Patent filed provisional U.S. Patent Application No. 62/742,942 (“the ’942 Application”). Ex. 1009. The ’942 Application includes 49 figures, including Figure 43, which is largely identical to Figure 75 of the ’781 Patent, with the exception of some additional numbering on Figure 75 of the ’781 Patent. Ex. 1009 (’942 Application), FIG. 43; Ex. 1001 (’781 Patent), FIG. 75.

72. The ’942 Application discloses its temporary screw may have standard screw threads or different screw threads. Ex. 1009 (’942 Application), 21. For example, the ’942 Application states:

The invention is not restricted to a fastener with standard screw threads that engage the abutment. For

example, other separable fasteners are possible by providing features that allow the fastener to be removed by other means than a separable cap. For example, as shown in Fig. 43 a fastener 39 *may contain a separable threaded or serrated portion 30* that engages the screw in the abutment, but will release with axial force. *Fig. 43 shows a screw 39* having a slot 41 *and asymmetric threads or serrations 40* that allow the screw to be extracted in the axial direction.

Ex. 1009 ('942 Application), 21 (emphasis added).

73. Elsewhere, the '942 Application discloses the temporary screw may have male threads. Ex. 1009 ('942 Application), 17 (“Embodiments include a temporary fastener with a male-threaded bottom portion that is installed into standard abutments (various styles and systems of abutments and implants are commercially available), and a top portion, or cap feature, of the fastener that retains an insert onto an abutment, and the fastener having a separable portion to allow removal of the denture appliance without requiring mechanical access to the fastener.”).

74. On October 8, 2019, the inventors of the '781 Patent filed the non-provisional U.S. Application No. 16/595,361 ('361 Application) (Ex. 1012). As a result of this application, the Patent Office issued Kofford (Ex. 1013) on April 26, 2022.

75. On June 3, 2023, the inventors filed the non-provisional U.S. Application No. 18/328,730 ('730 Application), which claimed the priority dates of the provisional applications above. Ex. 1015. As a result of this application, the Patent Office issued the '992 Patent on March 26, 2024. Ex. 1015 ('992 Patent), Cover.

76. For purposes of this declaration, I refer to the '942 Application, '402 Application, '082 Application, '361 Application, and '730 Application collectively as the "Priority Applications."

C. Prosecution History of the '781 Patent (Ex. 1020)

77. On January 26, 2024, the inventors filed U.S. Application No. 18/424,696, which claims priority to the Priority Applications. Ex. 1020 ('781 Patent Prosecution History). As a result of this application, the Patent Office issued the '781 Patent on December 3, 2024. Ex. 1001 ('781 Patent), Cover.

78. The relevant documents indicate that the '781 Patent underwent a thorough review during prosecution. The Office issued a detailed non-final office action, which resulted in amendments to the claims. Ex. 1020 ('781 Patent Prosecution History), 986–1009, 1011–1017.

79. In an Information Disclosure Statement, SDC provided 122 prior-art references, all of which the Examiner considered. These included Bernhard (Ex. 1003) and Poovey (Ex. 1005), which are the basis for several Grounds in the Petition.

Ex. 1020 ('781 Patent Prosecution History), 881–893, 967–979. It also included Sutter (1996) (Ex. 2012), Sutter (2001) (Ex. 2013), Johnson (Ex. 2014), and Wade (Ex. 2015).

80. The Examiner also independently conducted her own detailed prior-art searches, which led her to (among other references) Berrevoets (Ex. 2016). Ex. 1015, 1034–1054. The Examiner rejected multiple claims for obviousness in light of prior art, including Berrevoets. Ex. 1020 ('781 Patent Prosecution History), 930–947, 949.

VII. PRIOR ART

A. Bernhard (Ex. 1003)

81. Bernhard discloses various snap-fit designs for fasteners that temporarily connect a coping to an abutment during the dental conversion process. The “provisional connection features” disclosed “can comprise one or more fingers and/or can comprise a spring,” “can be configured to be coupled via a snap fit and/or via a friction fit,” “can include an elongate member,” “can include a plurality of protrusions and slots,” “can also include a flange,” or “can include a plurality of grooves.” Ex. 1003 (Bernhard), [0012], [0013].

82. 66. To be clear, these “grooves” are not describing threaded fasteners. Rather, Bernhard describes “grooves” in two contexts. First, Bernhard describes “grooves, dimples, roughening, or the like to enhance the connection with the dental component.” Ex. 1003 (Bernhard), [0071]. This refers to surface features

that can be used to increase or decrease friction, an important consideration for a snap-fit connector like Bernhard's. Bernhard also describes "grooves" later in the context of "keyed features which correspond to keyed features of the implant 110," which "facilitate alignment of the abutment 120 with respect to the implant 110." Ex. 1003 (Bernhard), [0074]. Such features make sure that the coping maintains its desired rotational orientation with respect to the implant but do not themselves provide attachment force. Ex. 1003 (Bernhard), [0074] ("For example, the alignment feature 115 can have a plurality of external lobes or an external hex-shape. In some embodiments, the abutment 120 can include slots, grooves, or other protrusions which align with corresponding slots, grooves, or protrusions on the implant 110 to ensure proper alignment prior to fastening.").

83. Various figures in Bernhard graphically depict some (but not all) of these embodiments. For example:

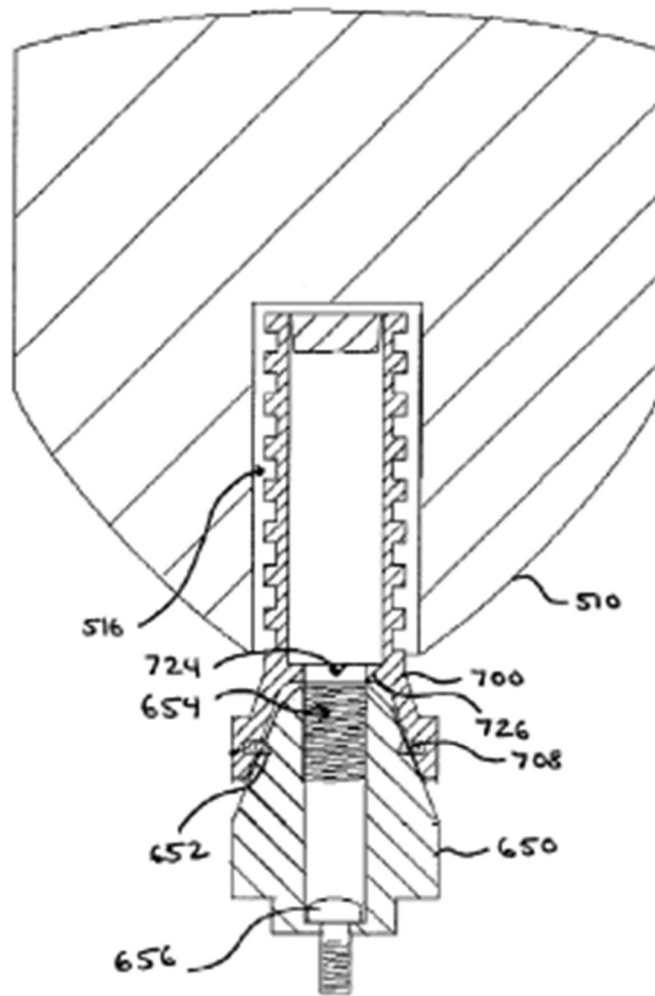


Figure 8

Ex. 1003 (Bernhard), FIG. 8.

84. Bernhard is a reference cited during prosecution of the '781 Patent and claims were likely granted over this reference because it does not describe or suggest a temporary alignment fastener with screw threading.

B. Poovey (Ex. 1005)

85. Poovey was also a reference cited during prosecution of the '781 patent. This patent discloses an “impression coping security screw” that temporarily connects a coping to an implant during the impression phase of a conversion procedure. This “impression coping securing screw comprises threads made of metal or plastic and coated with a heat labile plastic or silicone.” Ex. 1005 (Poovey), 12. This screw would be “threaded into the internal threading in a dental implant” (not an abutment) “by exerting a rotational force on the impression coping securing screw.” Ex. 1005 (Poovey), 12.

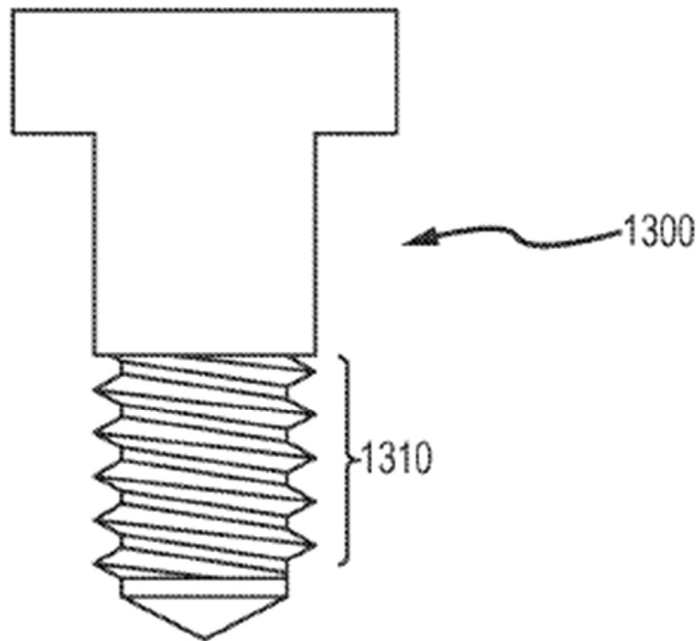


FIG. 13

Ex. 1005 (Poovey), 9.

86. Then, “[a]t the time of removal, the heat labile plastic, or silicone threads (or heal labile plastic, or silicone-coated threads) are activated to allow the impression coping, secured by the impression coping securing screw, to be disengaged from the implant and removed with the impression of the patient’s dentitia.” Ex. 1005 (Poovey), 12. This action “may include” heating the heat labile plastic or silicone threads enough “to dissolve or soften sufficiently the plastic or silicone material” to allow removal. Ex. 1005 (Poovey), 12.

C. Gracco (Ex. 1006)

87. Gracco is a study describing an experiment to measure the force required to pull orthodontic mini-screws with different thread designs out of synthetic bone. Ex. 1006 (Gracco), 186–187. The different thread profiles tested are depicted:

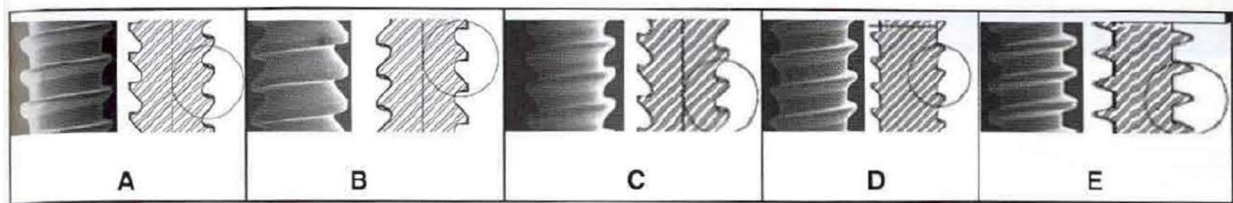


Fig 1. Schematic illustrations of miniscrew thread-designs: **A**, buttress reverse thread shape (control); **B**, buttress thread; **C**, 75° joint profile thread; **D**, rounded thread; **E**, trapezoidal thread.

Ex. 1006 (Gracco), 4.

88. Because the screws in the experiment were designed to cut into the bone itself, they were necessarily “self-drilling and self-tapping, with a cutting flute at their apex.” Ex. 1006 (Gracco), 187. Because they are self-cutting screws, by

definition the screw threading matches the female threads that the screws themselves cut into the synthetic bone material.

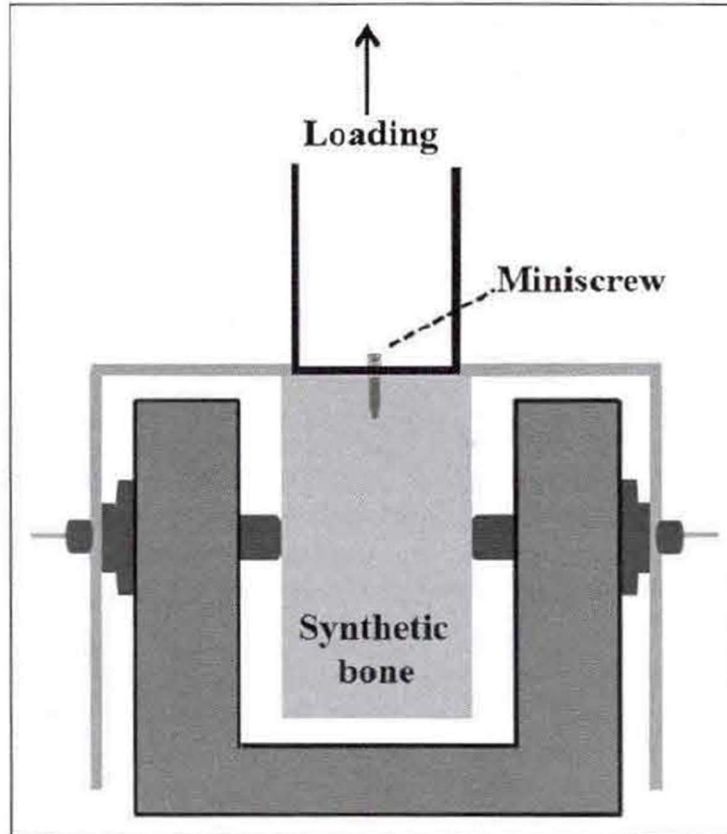


Fig 2. Configuration of testing setup.

Ex. 1006 (Gracco), 4.

D. Derey (Ex. 1008)

89. Derey teaches a plastic snap-in connector to temporarily hold elements to an implant or abutment during a denture conversion. Ex. 1008 (Derey), 1. Derey's snap-in connector has two legs that separate to hold the connector in the female threading of the implant or abutment. Ex. 1008 (Derey), 18–19.

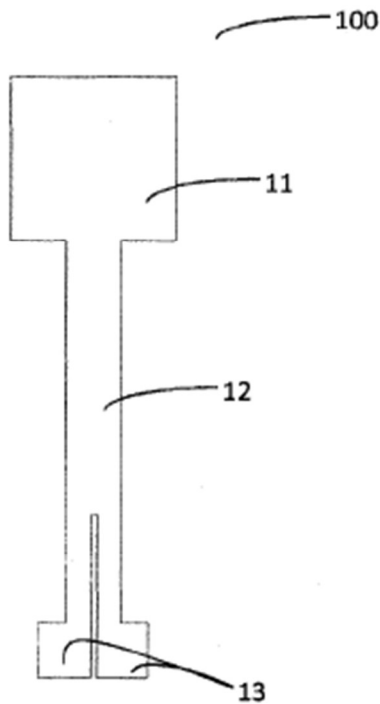


Fig. 5

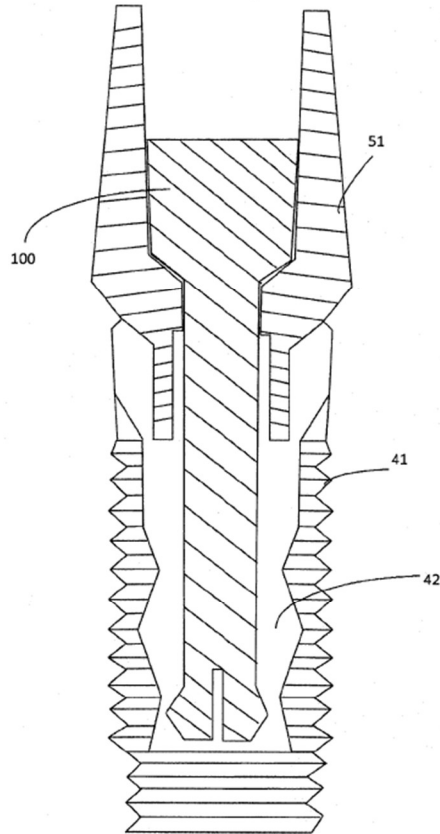


Fig. 6

Ex. 1008 (Derey), FIGS. 5–6.

VIII. SUMMARY OF MY OPINIONS

90. The following is a summary of my opinions regarding the patentability of the '781 Patent's claims.

91. Ground 1: Claims 6 and 10 are not indefinite. In my opinion, the '781 Patent discloses numerous examples that support the claim limitations of Claim 6, so it is not indefinite. Claims 10–16 are also not indefinite, in my opinion, because a POSA would have readily recognized that the claimed shaft threading contour “does not essentially match” merely indicates an area of the threading contour

exceeds a tolerance or deviation that is acceptable for the component. Tolerances, including thread tolerances or a total amount of deviation, are well-known in the mechanical arts.

92. Ground 2: The '781 Patent's specification and disclosures support and enable Claims 1–16. In my opinion, a POSA would have readily understood that the '781 Patent discloses several examples of the claimed invention and therefore adequately supports the full scope of its independent claims. The '781 Patent adequately supports dependent claims 2–5, 7, 9, and 11–15 for at least the same reasons.

93. Claims 1–9 require “securing the coping to the threads of the implant abutment,” which is also supported by the specification of the '781 Patent. No POSA would have read the claim limitation as proposed in the Petition. In addition, the '781 Patent specification supports the “does not engage the implant abutment threads continuously” limitation in claims 1–9 because a POSA would have recognized several examples that leave implant abutment threads empty above or below the separable fastener after the separable fastener is placed.

94. As to claim 5, the specification adequately supports the “outer surface ... deform” limitation because it discloses, among other embodiments, a temporary fastener with an interference fit, which requires deformation on at least one of the mating parts. The specification also adequately supports the “configured

to release” limitation of claim 6 because numerous embodiments disclosed in the ’781 patent meets this “release” limitation, which is one of the patented invention’s key advantages. Regarding claim 14, the “distal ... shaft configured to deform” limitation is adequately supported because the specification discloses elastic and inelastic deformation structures as illustrative mechanisms for attaching a temporary fastener.

95. Finally, claim 15’s “smaller maximal width” limitation is adequately supported because inherent geometry requires that the temporary fastener have a smaller major diameter than the permanent screw, so that it can be inserted in the same abutment as the definitive screw and then axially removed.

96. Ground 3: No POSA would have combined Bernhard, Poovey, and Gracco as the Petition proposes. In my opinion, claims 10, 12, 15, and 16 would not have been obvious based on Bernhard in view of Poovey and Gracco.

97. Ground 4: No POSA would have combined Bernhard, Poovey, Gracco, and Derey (4 prior art references) as proposed in the Petition. Claim 4 would not have been obvious in view of Derey because Derey discloses a snap-in system, not a screw-in system, and no POSA would look to modify Bernhard and Poovey’s snap-fit designs with Gracco’s miniscrews and then return to Derey’s snap-fit design—it does not make sense. In my opinion, claims 1–9, 11, 13, and 14 would not have been obvious based on Bernhard in view of Poovey, Gracco, and Derey.

IX. CLAIM CONSTRUCTIONS

98. I understand that the Board has not made any express claim constructions. Institution Decision at 19–20.

99. I also understand that the Board has implicitly construed the “release limitation” of the independent claims, which claims “wherein the temporary fastener is configured to release at least a portion of the temporary fastener and the coping from the implant abutment as a unit when an axial release force is applied.” Institution Decision at 37 (quoting Ex. 1001 (’781 Patent), 26:4–8 (claim 1)); Institution Decision at 37–41 (citing Ex. 1001 (’781 Patent), 26:66–27:5 (claim 6), 27:41–45 (claim 8), 28:33–37 (claim 10)).

100. The Board found the independent claims require “the temporary fastener to engage the abutment threads via rotary engagement, at an engagement depth, at a predetermined torque, suggesting the fastener is a screw or, at least, screwed in; and claims 1 and 10 are clear that the temporary fastener has threading.” Institution Decision at 39. The Board also found that the “temporary screw of Figure 75 and the related written description is the only disclosure of such a structure and function.”

101. I understand that the Board construed the release limitation to require the exact structure shown in Figure 75. Institution Decision at 40 (“Thus, it appears that the Specification describes *only a single structure* for being screwed in and then

released by axial force, i.e., pulled out, from an abutment, *which is shown at Figure 75*, but the claims cover broader subject matter, i.e., nearly any temporary fastener that can be pulled out.” (emphasis added) (citation omitted)).

102. I have been asked to review the Board’s implicit claim constructions and ascertain their meaning from the perspective of a POSA. My opinions on claim construction expressed in this declaration are from the perspective of a POSA as of October 9, 2018, the priority date of the ’781 Patent, and are consistent with my understandings stated above.

103. In my opinion, the Board’s implicit claim construction is incorrect in at least two ways.

A. The Board’s Implicit Claim Construction Overlooks the Language of the Claims

104. *First*, the Board’s implicit construction only addresses part of the claim language that describes the functionality of the temporary fastener. In doing so, the Board’s implicit construction overlooks other important aspects of the independent claims 1, 6, 8 and 10.

105. For example, claim 1 requires several additional limitations that further describe the temporary fastener. Ex. 1001 (’781 Patent), 25:45–26:24 (claim 1). Specifically, claim 1 recites:

a temporary fastener having an axis with a length measured along the axis and a lateral dimension providing

different widths along the axis measured perpendicular to the axis, the temporary fastener comprising:

a proximal portion with a width larger than the coping aperture; and

a shaft comprising *a distal shaft portion sized and configured for rotary engagement* with the implant abutment threads,

wherein the shaft of the temporary fastener extends through the aperture of the coping and *the distal shaft portion engages the implant abutment threads with an engagement depth at a predetermined torque and is configured* to cause the proximal portion of the temporary fastener *to hold the coping into alignment* with the implant abutment prior to attachment of the definitive screw,

wherein the temporary fastener *is configured to release* at least a portion of the temporary fastener and the coping from the implant abutment as a unit *when an axial release force is applied* in a proximal direction to the temporary fastener,

wherein *the distal shaft portion is sized and configured so that it does not engage the implant abutment threads continuously* between a most distal position of the distal

shaft portion and a proximal end of the implant abutment threads,

wherein the distal shaft portion of the temporary fastener comprises *threading which is sized and configured to make contact with the implant abutment threads over a first threading contact area* when to hold the coping against the implant abutment, wherein the distal post portion of the definitive screw is sized and configured to make contact with the implant abutment threads over a second threading contact area to hold the coping against the implant abutment, and wherein *the first threading contact area is less than the second threading contact area*.

Ex. 1001 ('781 Patent), 25:54–26:24 (claim 1) (emphasis added).

106. I agree with the Board that claim 1 requires the distal shaft portion of the temporary fastener to be sized and configured for rotary engagement. Institution Decision at 37–41; Ex. 1001 ('781 Patent), 25:54–62 (claim 1).

107. Additionally, and as I highlighted above, claim 1 further requires the distal shaft portion of the temporary fastener to: (1) engage the female abutment threads with an engagement depth at a specified torque, (2) hold the coping in alignment with the implant abutment, (3) release when an axial force is applied in the proximal direction, (4) engage the abutment threads discontinuously, and (5) make contact with the implant abutment threads over a contact area that is less

than the contact area of the definitive screw that will be placed after the temporary fastener is removed. Ex. 1001 ('781 Patent), 25:63–26:24 (claim 1).

108. The plain language of claim 1 should not be ignored. Ex. 1001 ('781 Patent), 25:45–26:24 (claim 1). And each of the independent claims 6, 8, and 10 recite similar claim limitations. Ex. 1001 ('781 Patent), 26:50–27:10 (claim 6), 27:24–60 (claim 8), 28:3–41 (claim 10).

109. In addition to the limitations of claim 1 discussed above, independent claims 6, 8, and 10 include additional claim limitations that were not considered by the Board. For example, claim 6 further requires that the “temporary fastener *is configured to release* at least a portion of the temporary fastener and the coping from the implant abutment as a unit *in response to an axial release force* that is applied only in a proximal direction to the temporary fastener *whereby the axial release force is applied without rotation* of the temporary fastener.” Ex. 1001 ('781 Patent), 26:50–27:10 (claim 6) (emphasis added). In other words, claim 6 further requires that the directionality of the axial release occurs without rotating the temporary fastener. Ex. 1001 ('781 Patent), 26:50–27:10 (claim 6).

110. As another example, claim 8 further requires that the distal post portion of the temporary fastener must a smaller volume that the volume of the definitive screw’s distal portion. Ex. 1001 ('781 Patent), 27:30–60 (claim 8). Specifically, claim 8 requires “wherein *a volume of definitive screw post material of the distal*

post portion of the definitive screw that is located distally of the proximal end of the implant abutment threads when in position to hold the against the implant abutment *is greater than a volume of temporary fastener shaft material of the distal shaft portion of the temporary fastener* that is located distally of the proximal end of the implant abutment threads when in position to hold the coping against the implant abutment.” Ex. 1001 (’781 Patent), 27:51–60 (claim 8).

111. Claim 10 adds several additional claim requirements. Ex. 1001 (’781 Patent), 28:3–41 (claim 10). Specifically, claim 10 requires:

a temporary fastener having a longitudinal axis with a length measured along the longitudinal axis and a width dimension measured perpendicular to the longitudinal axis, the temporary fastener comprising:

...

a distal portion having an outer surface comprising shaft threading having a shaft threading contour, wherein *the shaft threading contour does not essentially match the implant abutment threads contour*, and

...

wherein, the temporary fastener is configured so that *when the distal portion of the shaft extends through the central aperture of the coping and engages the threads of the*

implant abutment at a predetermined torque, the shaft threading engages the threads of the implant abutment whereby the shaft threading cooperates with the threads of the implant abutment *and is sized and configured to pull the coping into position with the implant abutment,*

wherein the temporary fastener *is configured so that in response to application of an axial release force above a predetermined value* in a proximal direction, the coping and the temporary fastener *are released as a unit* from the implant abutment, and

wherein the axial force above the predetermined value in the proximal direction *is configured to be applied in a pick-up process after the coping is adhesively bonded* to a prosthesis or in a closed tray impression process.

Ex. 1001 ('781 Patent), 28:3–41 (claim 10).

112. Indeed, the plain language of the independent claims show that Petitioner's characterizations of the claim scope of the claims of the '781 Patent are wrong. Petition, 46–47 (citing Ex. 1021 ¶ 50); Petition, 54–55 (citing Ex. 1021 ¶ 51). However, it appears that Petitioner's arguments have misled the Board. Institution Decision at 38–39 (discussing Petition, 47 (citing Ex. 1021 ¶ 50)).

113. For the same reasons discussed above, the Board's finding that "the claims cover broader subject matter, i.e., nearly any temporary fastener that can be pulled out" is plainly wrong. Institution Decision at 40.

114. These functional limitations are tightly connected to the geometry of the temporary fastener threads. The Board's implicit construction is incorrect because it fails to consider them.

B. The Board's Implicit Claim Construction Ignores Differences in the Dependent Claims

115. *Second*, the Board's construction ignores the claim differentiation of dependent claims 2, 7, 9, 11 and 14.

116. I understand that dependent claims can provide intrinsic evidence that informs the meaning of a more broadly recited claim from which it depends.

117. By requiring independent claims of the '781 Patent to have the same structure that is shown in Figure 75 of the '781 Patent, the Board's claim construction does not consider the claim limitations of the dependent claims. In doing so, the Board's implicit claim construction erases the meaning and differentiation of dependent claims 2, 7, 9, 11 and 14. Ex. 1001 ('781 Patent), claims 2, 7, 9, 11, and 14.

118. For example, dependent claim 2 depends from independent claim 1. Ex. 1001 ('781 Patent), claims 1–2. And dependent claim 2 requires "wherein the distal shaft portion of the temporary fastener comprises asymmetric threading." Ex. 1001

(’781 Patent), 26:25–27. Since claim 2 further requires asymmetric threading, claim 1 would have been understood to include symmetric threading. Ex. 1001 (’781 Patent), claims 1–2.

119. Similarly, dependent claim 7 depends from independent claim 6. Ex. 1001 (’781 Patent), claims 6–7. And dependent claim 7 recites “wherein the distal shaft portion of the temporary fastener comprises an open space, and wherein a portion of the axis is located within the open space.” Ex. 1001 (’781 Patent), 27:11–14. In my opinion, since claim 7 further requires the distal shaft portion to include an open space, claim 6 would have been understood such that the distal shaft portion could include a closed space, which would be a solid screw. Ex. 1001 (’781 Patent), claims 6–7.

120. Dependent claim 9 depends from independent claim 8 and recites “wherein the temporary fastener is polymeric, and wherein the distal shaft portion of the temporary fastener is hollow.” Ex. 1001 (’781 Patent), claims 8–9, 27:61 63. Since claim 7 further requires the distal shaft portion to include an open space, claim 6 would have been understood such that the distal shaft portion could include a closed space, which would be a solid screw. Ex. 1001 (’781 Patent), claims 8–9.

121. Dependent claim 11 depends from independent claim 10. Ex. 1001 (’781 Patent), claims 10–11. Claim 11 recites “wherein the shaft threading does not have a continuous threading contour along its path around the longitudinal axis.” Ex.

1001 ('781 Patent), 28:42–44. A POSA would have understood that this claim limitation indicates that independent claim 10 may include a shaft threading having a continuous threading contour. Ex. 1001 ('781 Patent), claims 10–11.

122. Dependent claim 14 also depends from independent claim 10. Ex. 1001 ('781 Patent), claims 10, 14. Claim 14 recites “wherein the distal shaft portion of the shaft of the temporary fastener is configured to deform” during pick-up. Ex. 1001 ('781 Patent), 28:49–54. As a result, a POSA would have readily recognized that independent claim 10 may include a distal shaft portion that is not configured to deform. Ex. 1001 ('781 Patent), claims 10, 14.

123. The Board’s claim construction, which requires the release limitations of the independent claims to describe *only* the split post and buttress threads shown in Figure 75, would render all of the dependent claims 2, 7, 9, 11 and 14 meaningless. None of the claim limitations of dependent claims 2, 7, 9, 11 and 14 would add any requirements beyond the limitations of each of the independent claims. The Board’s implicit claim construction simply adds additional limitations to claims 1, 6, 8 and 10 without a basis in the claim language for doing so.

124. These additional claim limitations recited in the dependent claims should not be ignored. The Board’s implicit construction is also incorrect because it fails to consider them.

C. The Board's Implicit Claim Construction Contradicts the Specification of the '781 Patent

125. *Third*, the Board's implicit claim construction contradicts the specification of the '781 Patent. The specification of the '781 Patent expressly contemplates alternate embodiments. Ex. 1001 ('781 Patent), 24:52–25:4 (“Although the descriptions above use rotational engagement of the bottom of the post with internal threads of the abutment as a preferred approach, this is not meant to be limiting. Alternate approaches for engaging a temporary attachment post with abutment threads through axial insertion without rotation are considered to be part of this disclosure. For example, the split post bottom structure shown in FIG. 75 which allows axial extraction can also be used for axial insertion.”). Similarly, an interference fit between the bottom of the post with the threads may also be designed to provide sufficient engagement to provide adequate alignment and fixing of the coping for the pick-up bonding process described earlier. Ex. 1001 ('781 Patent), 24:60–64 (“Similarly, an interference fit between the bottom of the post with the threads may also be designed to provide sufficient engagement to provide adequate alignment and fixing of the coping for the pick-up bonding process described earlier.”). For non-rotary extraction of the post, it is not necessary to have the extraction force of the post-abutment thread interface be greater than the force required for relative movement of the coping or cap with the upper end of the post. Ex. 1001 ('781 Patent), 24:2–6 (“The mechanical interface between the coping and

post may be tailored to provide equivalent rotational engagement and relative axial movement above a designed minimum axial force.”). Indeed, the ’781 Patent explains “[t]hat is, if the temporary attachment post remains fixed to the coping during the pick-up step, the post can be removed from the dental appliance after removal from the patient’s mouth.” Ex. 1001 (’781 Patent), 25:1–4.

126. The specification of the ’781 Patent clearly describes examples of alternate embodiments. The Board’s implicit construction is wrong because it directly contradicts the ordinary and customary language of the specification.

X. GROUND 1: CLAIMS 6 AND 10–16 ARE NOT INDEFINITE

127. Petitioner argues that claims 6 and 10–16 are indefinite. Petition, 31–40. Specifically, Petitioner argues that Claim 6 is indefinite because it “impermissibly recites only functional limitations at the alleged point of novelty.” Petition, 32. Petitioner also argues that Claim 10 is indefinite because the claim language—specifically, “does not essentially match”—does not give a POSA clear notice of the claimed invention. Petition, 35–36. In its institution decision, the Board found Petitioner’s arguments persuasive. Institution Decision at 34–37.

128. I disagree that the claims are indefinite because the claims, when read in view of the specification and prosecution history, inform a POSA of the claimed invention’s scope with reasonable certainty.

A. Claim 6 Recites Limitations That are Not Just Functional at the Point of Novelty

129. Claim 6 requires that a temporary fastener is “configured to release at least a portion of the temporary fastener and the coping from the implant abutment as a unit in response to an axial release force that is applied only in a proximal direction to the temporary fastener whereby the axial release force is applied without rotation of the temporary fastener.” Ex. 1001 (’781 Patent), 26:41–27:10 (claim 6).

130. Petitioner contends claim 6 “is indefinite because it impermissibly recites only functional limitations at the alleged point of novelty.” Petition, 32 (citing Brunski ¶¶ 132–37). Petitioner argues that the ’781 Patent includes no “structural limitations for the temporary fastener that relate to its ability to be pulled out of the abutment without being unscrewed.” Petition, 32. According to Petitioner, “[c]laim 6 says nothing about how this release function is accomplished, including what structural features of the temporary fastener enable it to be pulled out without being unscrewed.” Petition, 33. Petitioner further argues that “when it comes to the allegedly novel feature of enabling the temporary fastener to be pulled out without being unscrewed, claim 6 includes only a purely functional ‘wherein’ limitation.” Petition, 32.

131. I disagree because claim 6 informs a POSA of the claimed invention’s scope with reasonable certainty when read in view of the specification and prosecution history.

132. The claims of the '781 Patent include several interrelated structural limitations, which are recited in claims 1, 6, 8, and 10. The dental system recited in claim 6 requires structural limitations that are defined by its engagement with other structures in the claim. Ex. 1001 ('781 Patent), 26:41–27:10 (claim 6).

133. For example, claim 6 recites a “coping having a proximal end with an aperture.” Ex. 1001 ('781 Patent), 26:42. Claim 6 requires that the temporary fastener have “a proximal portion with a width larger than the coping aperture.” Ex. 1001 ('781 Patent), 26:54–55. Importantly, the relative size of the temporary fastener’s proximal portion being wider than the aperture of the coping is what enables the temporary fastener to hold the coping in position, which is also recited in the claims. Ex. 1001 ('781 Patent), 26:59–61 (“wherein ***the shaft of the temporary fastener*** is sized and configured to extend[] through the aperture of the coping.” (emphasis added)).

134. As another example, claim 6 recites the structure of “an implemented abutment having threads.” Ex. 1001 ('781 Patent), 26:43. Claim 6 then requires the temporary fastener to have a structure that has:

- a. “***a shaft comprising a distal shaft portion*** sized and configured for rotary engagement with the implant abutment threads,”
- b. “wherein ... ***the distal shaft portion*** ... engage[s] the implant abutment threads with an engagement depth at a

predetermined torque and is configured to cause the proximal portion of the temporary fastener *to hold the coping into alignment with the implant abutment,*”

- c. “wherein the temporary fastener is configured to release at least *a portion of the temporary fastener and the coping from the implant abutment* as a unit in response to *an axial release force that is applied only in a proximal direction* to the temporary fastener *without rotation of the temporary fastener,*” and
- d. “wherein *the distal shaft portion* *is sized and configured so that it does not engage the implant abutment threads* continuously *between a most distal position of the distal shaft portion and a proximal end of the implant abutment threads*” when it is screwed in.

Ex. 1001 (’781 Patent), 26:50–27:10. The claimed implant abutment threads, along with its relative size and types of engagement, further define the structure of the claimed temporary fastener, its shaft, and portions of the temporary fastener.

Ex. 1001 (’781 Patent), 26:41–27:10 (claim 6).

135. A POSA, reading the claims in light of the specification of the a’781 Patent, would have readily recognized that the temporary fastener limitations recited in claim 6 are not just functional limitations at the point of novelty. Instead, such a

POSA would have known that the claimed functional limitations are tightly connected to the geometry of the temporary fastener threads. As discussed below, the specification discloses three types of temporary fasteners: (1) temporary fasteners with asymmetric threads (with or without slots), (2) slotted temporary fasteners with symmetric threads, and (3) temporary fasteners with interference fits. Given the structure of the claimed temporary fastener, its shaft, and portions of the temporary fastener, and the claimed engagement with other claimed structures (*e.g.*, implant abutment, implant abutment threads, coping), claim 6 has more than sufficient specificity and interlocking characteristics to inform a POSA of the scope of the claimed invention with reasonable certainty. These interlocking characteristics include, as discussed above, that the fastener threading must engage with the abutment threads to a predetermined torque but then release with a sufficient axial force.

B. Claims 10–16 Provide Reasonable Certainty of the Claimed Invention

136. Claim 10 recites “a temporary fastener ... comprising ... a distal portion having an outer surface comprising shaft threading having a shaft threading contour, wherein the shaft threading contour does not essentially match the implant abutment threads contour.” Ex. 1001 (’781 Patent), 28:3–19.

137. Petitioner argues claims 10–16 are indefinite because of the “does not essentially match” claim language. Petition, 35–40. In its institution decision, the Board agreed with Petitioner. Institution Decision at 34–37.

138. I disagree because a POSA would have understood that thread tolerances are just acceptable dimensional requirements in mechanical engineering.

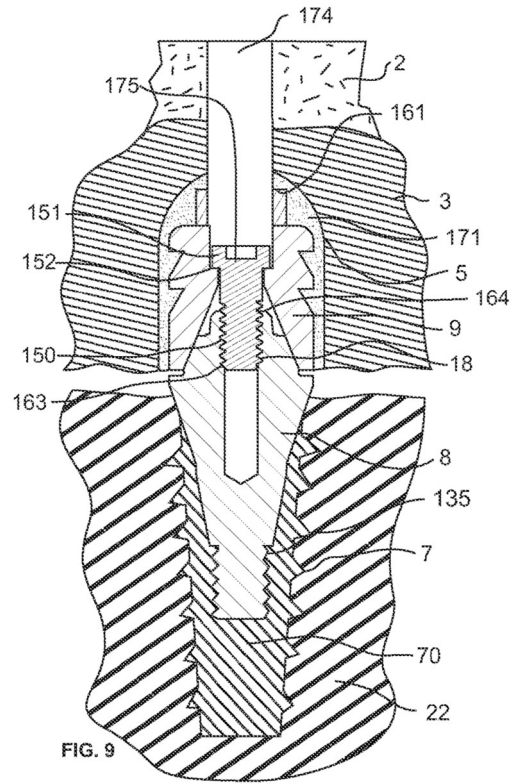
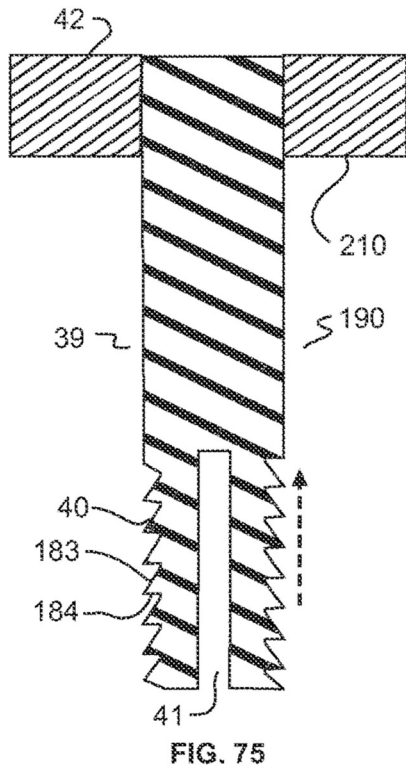
139. As an initial matter, a POSA would have understood this claim limitation in the context of the claim language itself. For example, claim 10 requires that the implant abutment threads have a certain “contour” along its longitudinal axis. Ex. 1001 (’781 Patent), 27:65–67 (“an implant abutment having threads having an implant abutment threads contour and an implant abutment longitudinal axis.”). Additionally, claim 10 requires that the shaft threading of the temporary fastener has a contour that “engages the threads of the implant abutment whereby the shaft threading cooperates with the threads of the implant abutment and is sized and configured to pull the coping into position with the implant abutment.” Ex. 1001 (’781 Patent), 28:16–32. Claim 10 further requires that during the pick-up process, the shaft threading of the temporary fastener has a contour that operates to release the coping and the temporary fastener as a unit from the implant abutment in response to an axial force. Ex. 1001 (’781 Patent), 28:32–37 (“wherein the temporary fastener is configured so that *in response to application of an axial release force* above a predetermined value in a proximal direction, *the coping and*

the temporary fastener are released as a unit from the implant abutment.”

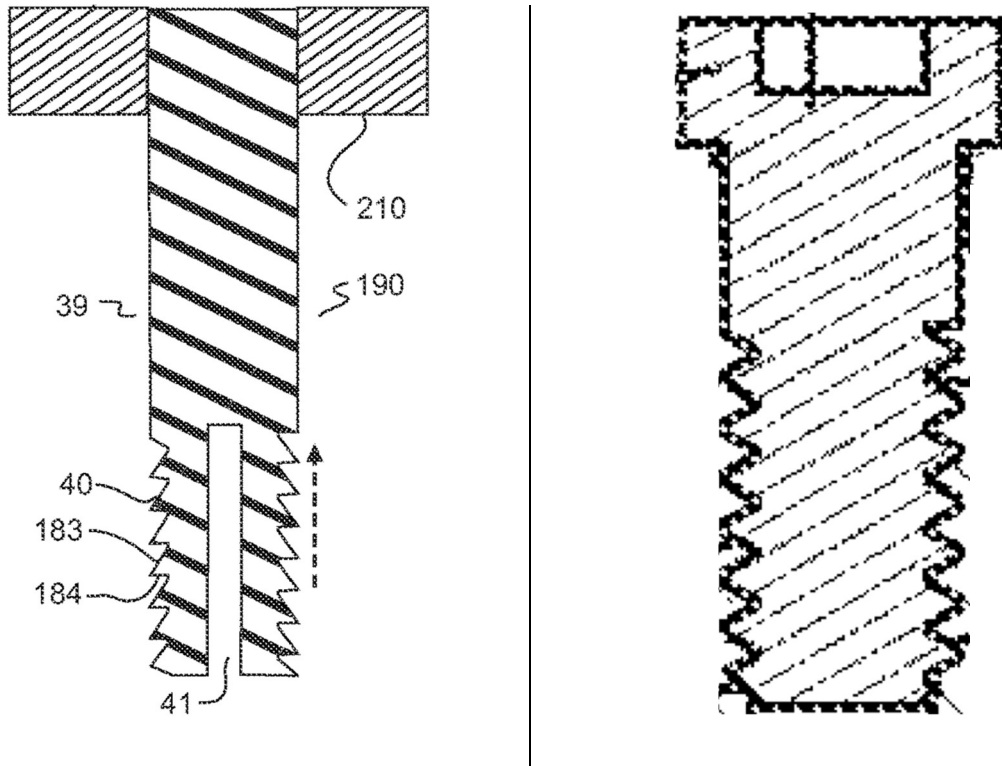
(emphasis added)).

140. In my opinion, a POSA would have understood that the claimed “shaft threading contour does not essentially match the implant abutment threads contour” if it is outside of an acceptable dimensional tolerances of the female threads of which it fits into. In other words, the major and minor diameters of the male temporary fastener can be smaller by -10% from the female thread specifications. Ex. 1001 ('781 Patent), 7:61–62. The thread angles can vary by +/- 10%. Ex. 1001 ('781 Patent), 7:61–62. The radius at the crest of the screw can be +10% that of the root of the female thread specification. Ex. 1001 ('781 Patent), 7:61–62. There can also be slots that cover -10% of the thread area, pitch diameter, or pitch circumference of the female thread. Ex. 1001 ('781 Patent), 7:61–62.

141. The specification of the '781 Patent supports this and describes an acceptable dimensional tolerance, which is based on its definition of “essentially” as being ± 10 percent. Ex. 1001 ('781 Patent), 7:61–62. The drawings of the '781 Patent also provides an example of a temporary fastener and abutment thread contours that do not essentially match. Ex. 1001 ('781 Patent), FIG. 75. Specifically, the asymmetric threading contour shown in Figure 75 is not an essential match for the abutment's standard symmetric thread contour that is shown in Figure 9.



Ex. 1001 ('781 Patent), FIGS. 75 and 9. I have enlarged the definitive screw 175 of Figure 9 in the side-by-side comparison below.

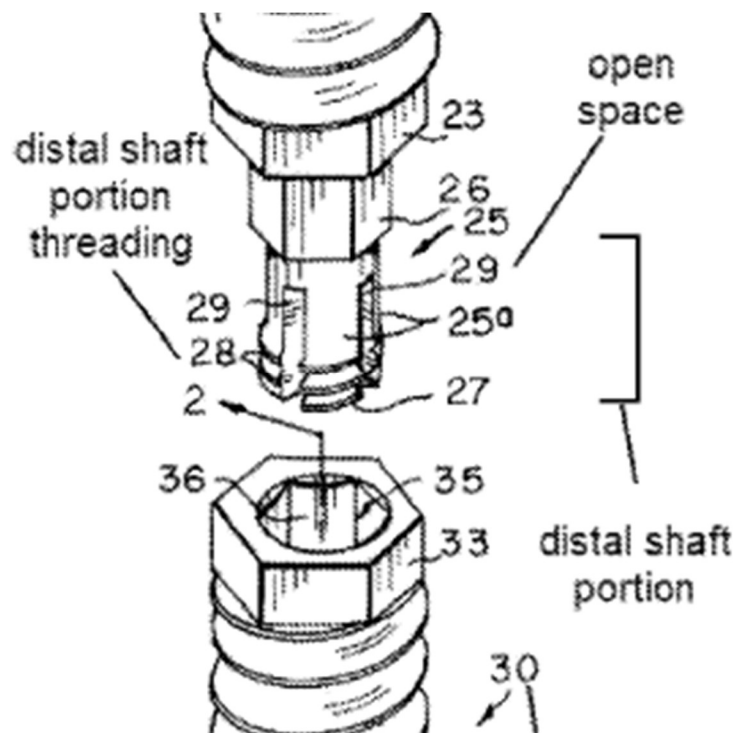


Ex. 1001 ('781 Patent), FIGS. 75 and 9 (modified).

142. As shown above, Figure 9 depicts a definitive screw 175 and abutment thread contours that are an essential match. Ex. 1001 ('781 Patent), FIG. 9. In fact, that is exactly how the specification of the '781 Patent describes the threading of the definitive screw 175 and abutment thread contours. Ex. 1001 ('781 Patent), 15:29–40 (“Once clearance hole 174 for the definitive screw has been made from the top of the prosthesis, the prosthesis is ready for mounting to the implant with definitive screw 175 as shown in FIG. 9. *The male threads 150 of the definitive screw are shown filling the female threads of the abutment over an engagement depth extending from a first end of the thread engagement 163 to the second end of abutment thread engagement 164 of the implant abutment threading 18.* Once the

most distal thread of the definitive screw 175 is engaged in an abutment thread, the engagement depth will increase by a distance equal to the thread pitch for each complete revolution of the definitive screw 175.” (emphasis added)).

143. The prosecution history gives helpful examples of how to apply this straightforward definition. In an office action, the examiner explained that “Berrevoets teaches an apparatus ... wherein the shaft threading contour does not essentially match the implant threads contour,” as shown in “Figs. 1–3.” Ex. 1020 (’781 Patent Prosecution History), 940. The examiner included an annotated version of Berrevoets’ Figure 1.



Ex. 1020 (’781 Patent Prosecution History), 934.

144. The fastener threads do not essentially match the implant's threading because, for example, because of (1) the slot 29, and (2) what the examiner labeled the Figure 1 fastener's "open space," which left empty space within the female threading. Both of these meant that the surface area of the male threading differed from the surface area of the female threading by 10 percent, and therefore did not "essentially match."

145. Furthermore, the examiner noted, "Lannan does not disclose" a configuration "wherein the shaft threading contour does not essentially match the implant threads contour," i.e., Lannan's configuration *did* essentially match the implant threads. Ex. 1020 ('781 Patent Prosecution History), 939–940. The shaft threading contour and the implant threading that it essentially matched are indicated with the yellow outline in the figure below.

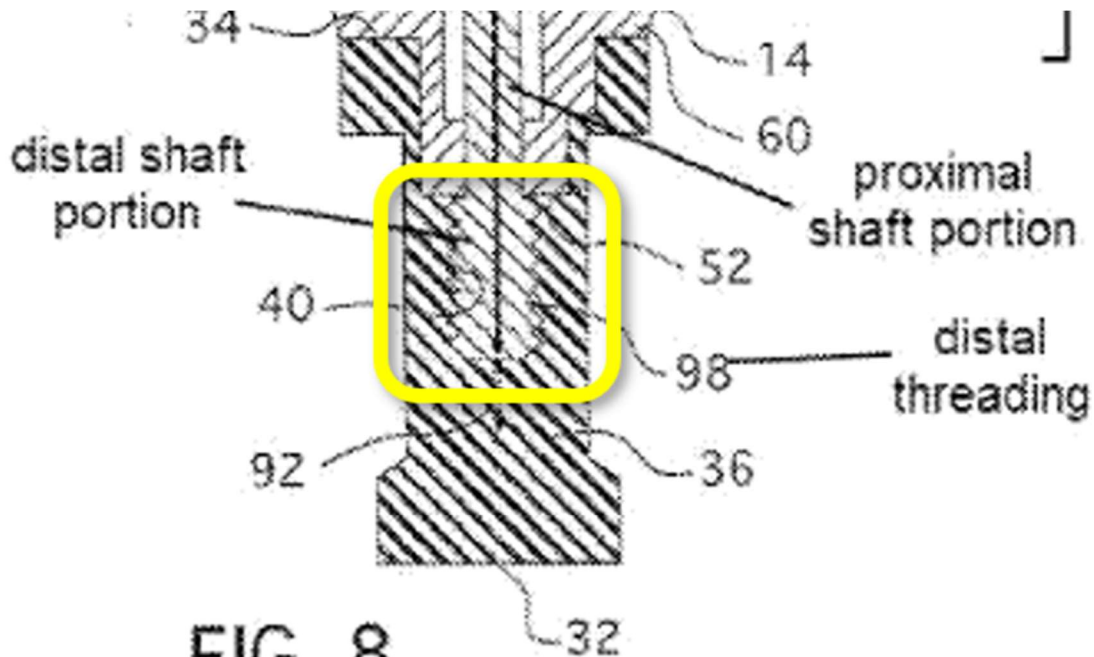


FIG. 8
(Lannan, annotated)

Ex. 1020 ('781 Patent Prosecution History), 932 (annotation added). The relevant differences between Lannan and Berrevoets are apparent to a POSA. Lannan's fastener threads filled all the volume of all the female threading, without any empty threading. Berrevoet's fastener threads did not and left empty threading areas formed by the fastener's slots.

146. These are the concepts that a POSA would have understood at the time of the invention. Indeed, engineering and manufacturing specifications commonly include tolerance requirements that are similar in function to this "essentially match" limitation.

147. Based on the above, the language of this limitation adequately informs a POSA of the scope of the claimed invention because it indicates a ± 10 percent difference in any one or all of several well-known properties of screw threads.

**XI. GROUND 2: THE SPECIFICATION AND DISCLOSURES
ADEQUATELY SUPPORT AND ENABLE CLAIMS 1–16**

148. The Petition argues that “[t]he ’781 Patent specification does not support th[e] broad claim scope” in Claims 1, 6, 8, and 10 “because it describes only one temporary fastener with a different thread pattern: the temporary fastener of Figure 75 with an ‘asymmetric’ buttress thread that is different from the symmetric thread of the definitive screw and the implant abutment of Figure 9.” Petition, 41.

149. A POSA would have understood the ’781 Patent’s specification supports the full scope of the thread pattern/profile limitations in independent claims 1, 6, 8, and 10. And a POSA would have understood the Priority Applications to support the full scope of the release limitations in those same claims.

**A. The Specification Supports the Thread Pattern and Thread Profile
Limitations in Independent Claims 1, 6, 8, and 10**

150. The Petition argues that “[t]he Priority Applications do not support this claim scope because they describe only one temporary screw embodiment with a different thread pattern: the temporary screw of Figure 75 with an ‘asymmetric’ buttress thread that is different than the symmetric thread of the definitive screw of Figure 9.” Petition, 41.

151. In its institution decision, the Board found that this argument “appears to be a remnant from related IPR2025-000956,” and that “no claim of the ’781 patent has this limitation” and “Petitioner does not address the actual claim language at issue in this proceeding.” Institution Decision at 38.

152. I agree with the Board.

B. The Specification Supports the Release Limitations in Independent Claims 1, 6, 8, and 10

153. Claim 1 recites “a temporary fastener ... configured to release at least a portion of the temporary fastener and the coping from the implant abutment as a unit when an axial release force is applied in a proximal direction to the temporary fastener.” Ex. 1001 (’781 Patent), claim 1.

154. Claim 6 recites a “temporary fastener” “configured to release at least a portion of the temporary fastener and the coping from the implant abutment as a unit in response to an axial release force that is applied only in a proximal direction to the temporary fastener whereby the axial release force is applied without rotation of the temporary fastener.” Ex. 1001 (’781 Patent), 26:50–27:10 (claim 6).

155. Claim 8 recites “a temporary fastener” “configured to release at least a portion of the temporary fastener and the coping from the implant abutment as a unit when an axial release force is applied in a proximal direction to the temporary fastener.” Ex. 1001 (’781 Patent), 27:41–45 (claim 8).

156. Claim 10 recites a “temporary fastener” “configured so that in response to application of an axial release force above a predetermined value in a proximal direction, the coping and the temporary fastener are released from the implant abutment.” Ex. 1001 (’781 Patent), 28:33–37 (claim 10).

157. The Petition argues that “the ’781 Patent specification does not support the full scope” of these claims because “the only disclosed embodiment” is a temporary fastener with “a split-post structure with deflecting legs that enable the fastener to be pulled out without being unscrewed.” Petition, 46, 51.

158. In its institution decision, the Board agreed with Petitioner, finding that “it appears that the Specification describes *only a single structure* for being screwed in and then released by axial force, i.e., pulled out, from an abutment, *which is shown at Figure 75*, but the claims cover broader subject matter, i.e., nearly any temporary fastener that can be pulled out.” (citations omitted). Institution Decision at 40. I understand that the Board’s finding is based on the written description requirement of the specification to disclose a representative number of species for a claimed genus. As I explained above, Petitioner’s arguments rely on an erroneous implicit claim construction that the Board should not accept. But even if the Board disagrees with the implicit claim construction, the written description requirement is still met because the ’781 Patent discloses multiple example species of the claimed invention.

159. The Petition argues the release limitations lack sufficient written description by ignoring the written portions of the '781 Patent's specification and focusing exclusively on Figure 75. Petition, 46–52. But no POSA would ignore the descriptions of the drawings themselves because the '781 Patent expressly states that these descriptions, including that of Figure 75, should not be read in such a limited way. Ex. 1001 ('781 Patent), 8:12–14. To the contrary, the '781 Patent explains that “[t]he drawings featured in the figures are for the purpose of illustrating certain convenient embodiments of the present invention and are not to be considered as limitation thereto.” Ex. 1001 ('781 Patent), 8:12–14. Instead, a POSA would have understood the specification discloses multiple embodiments of a one-piece temporary fastener that may or may not have a split post or deflecting-leg design. Ex. 1001 ('781 Patent), 8:22–25 (“*Other* objects, features, *embodiments* and/or advantages of the invention ***will be apparent from the following specification taken in conjunction with the following drawings.***” (emphasis added)).

160. A POSA would have understood the '781 Patent specification to disclose embodiments that do not require a “split-post structure with deflecting legs,” as the Petition describes them. Petition, 46. As I explained above, the mechanical arts are predictable, and a POSA would have readily recognized the invention of the '781 Patent includes differences between threads of the temporary and definitive screw. Such a POSA would have understood that these differences are

not a specific to one configuration that is shown in a single drawing because the '781 Patent describes other examples in writing. For example, the specification of the '781 Patent also includes (among other embodiments) examples with “an interference fit between the bottom of the [temporary fastener] post with the [abutment] threads.” Ex. 1001 ('781 Patent), 24:60–64.

161. The '781 Patent specification also does not describe a split-post structure as critical to the claimed invention's release limitations. To the contrary, the specification says that “[i]n *some* embodiments, the threaded end of the post portion of the temporary fastener has a deflecting feature that allows the post to engage or disengage the abutment threads through axial motion instead of a rotary screw motion.” Ex. 1001 ('781 Patent), 5:31–35 (emphasis added). Such a “deflecting feature” would include, but certainly would not be limited to, a split-post design.

162. Furthermore, the '781 Patent specification discloses using such a structure for both “axial extraction” as well as “axial insertion.” Ex. 1001 ('781 Patent), 24:52–60. Immediately after, the specification discloses using “an interference fit between the bottom of the post threads that may also be designed to provide sufficient engagement to provide adequate alignment and fixing of the coping for the pick-up bonding process described earlier.” Ex. 1001 ('781 Patent), 24:60–64. A polymeric post with an interference fit, as I explained above, would not

require a split-post or deflecting-legs structure to provide the attachment force necessary.

163. The '781 Patent describes an “attachment post portion 39” with “a slot 41 and asymmetric threads or serrations 40.” Ex. 1001 ('781 Patent), 23:22–25. Limiting the description only to an embodiment with both a slot and asymmetric threads, however, is inconsistent with the '781 Patent's own internal instructions. “The term ‘or’ as used herein is to be interpreted as an inclusive or meaning any one or any combination. Therefore, ‘A, B or C’ means any of the following: ‘A; B; C; A and B; A and C; B and C; A, B, and C.’” Ex. 1001 ('781 Patent), 8:5–9. Therefore, “a slot 41 and asymmetric threads or serrations 40” must be read to illustrate an attachment post portion (a) with only a slot, (b) with only asymmetric threads, (c) with only serrations, (d) with a slot and asymmetric threads, (e) with a slot and serrations, (f) with asymmetric threads and serrations, as well as (f) with a slot, asymmetric threads, and serrations.

164. These three disclosed features that allow axial extraction can thus work alone or together through sufficient elastic or inelastic deformation to allow axial movement. The description of Figure 75 does not say all three are essential for axial movement. Ex. 1001 ('781 Patent), 23:10–41, 24:52–25:4.

165. For these reasons, no POSA would have understood the '781 Patent specification to be limited to a temporary fastener with a split-post structure or

deflecting legs. No POSA would have understood Figure 75 of the '781 Patent, when read as a whole, as requiring such a structure or that structure being critical to the invention. It is therefore incorrect to say that the specification fails to describe or enable the full scope of the release limitations in independent claims 1, 6, 8, and 10. As I describe below, the specification adequately discloses at least three embodiments of temporary fasteners: (1) temporary fasteners with asymmetric threads (with or without slots), (2) slotted temporary fasteners with symmetric threads, and (3) temporary fasteners with interference fits.

1. Temporary Fasteners with Asymmetric Threads

166. The specification of the '781 Patent describes temporary fasteners with asymmetric threads that are different than the definitive screws' symmetric threads. Ex. 1001 ('781 Patent), 23:17–21 (“For example, as shown in FIG. 75 an alignment fastener post 39 may contain a separable threaded or serrated portion 40 that *engages the screw threads in the abutment* for pick-up, *but that will release with axial force after.*” (emphasis added)). Figure 75 of the '781 Patent depicts an example of this configuration, where asymmetric threads of the temporary fastener have the same pitch as the abutment threading to achieve “rotational engagement of the bottom of the post with internal threads of the abutment.” Ex. 1001 ('781 Patent), 24:53–54.

167. Importantly, the thread contours of the temporary fastener are different from the thread contours of the definitive screw, such that the threads of the

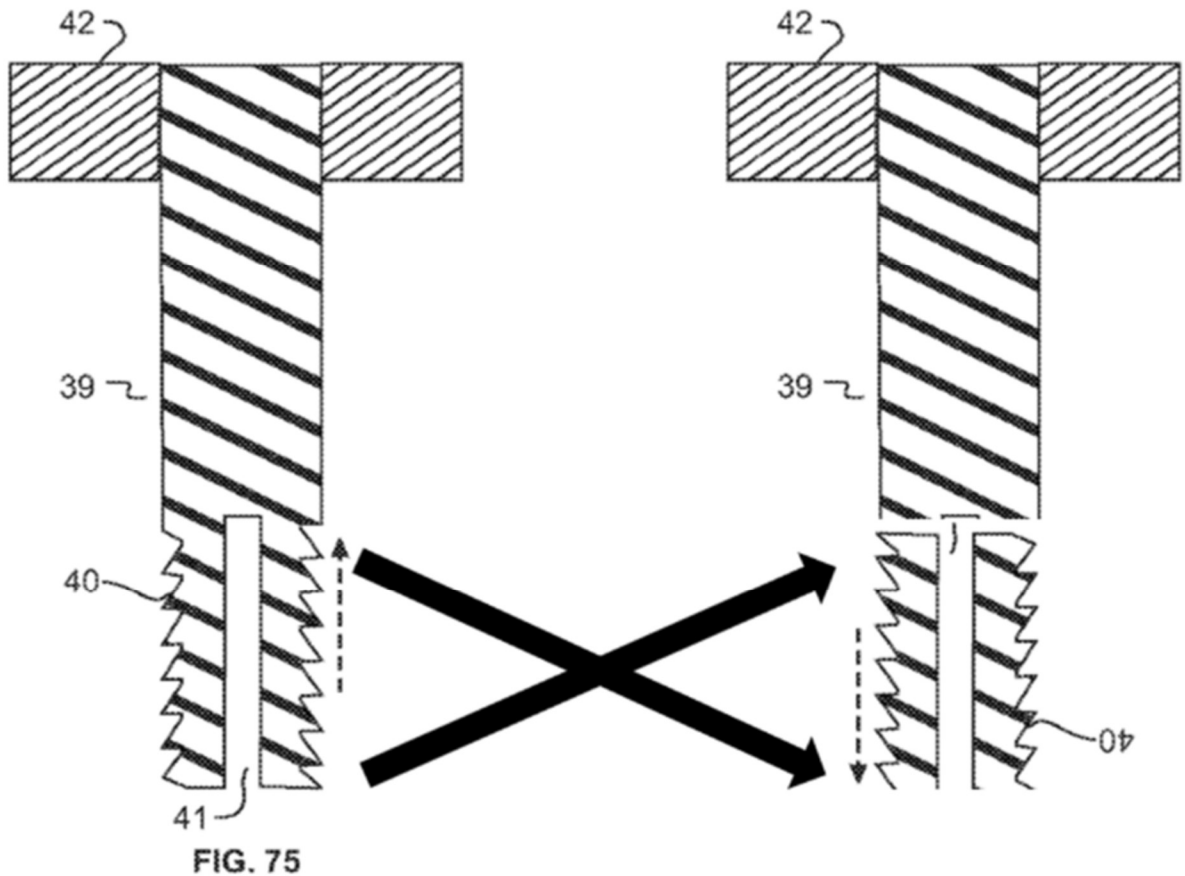
temporary fastener do not completely fill the female abutment threads. Ex. 1001 ('781 Patent), FIG. 75; Ex. 1001 ('781 Patent), 23:30–34 (“Although the threads could be designed to provide engagement with the implant abutment threads through axial motion in the opposite direction to the arrow shown in FIG. 75, rotation to a design torque on engagement is generally preferred.”). This type of engagement between the different thread contours of the temporary fastener and the definitive screw allows the temporary fastener to disengage the abutment threads during pick-up. Ex. 1001 ('781 Patent), 23:24–30 (“The attachment post portion 39 is shown as having a slot 41 and asymmetric threads or serrations 40 that have proximal flank 183 and a distal flank 184. This asymmetric threading still allows the temporary attachment post portion 39 to be inserted through rotation like other temporary screw embodiments for alignment for coping pick-up”).

168. The specification of the '781 Patent is clear that Figure 75 is not limited to the threads that are shown. Ex. 1001 ('781 Patent), 23:10–41; 24:52–25:4. In some examples, the '781 Patent describes threading “that engages the screw threads in the abutment for pick-up, but that will release with axial force after,” and later discusses “asymmetric threads” generally. Ex. 1001 ('781 Patent), 23:10–21, 24. In another example, the '781 Patent contemplates asymmetric threads in the opposite direction of the arrow shown in Figure 75. Ex. 1001 ('781 Patent), 23:30–34. These embodiments are expressly disclosed.

169. The '781 Patent explains that “[i]t is understood that the concept of the temporary attachment of the coping with the abutment with an axially separable temporary post is not dependent upon having a separate cap 11 or nut 63 on the post.” Ex. 1001 ('781 Patent), 23:62–65.

170. As a result, a POSA would have known that the inventive concepts described in the '781 Patent could be practiced using other well-known asymmetric screw profiles.

171. For example, “the threads could be designed to provide engagement with the implant abutment threads through axial motion in the opposite direction to the arrow shown in FIG. 75.” '781 Patent, 23:30–33. A POSA would have understood this to refer to at least one additional asymmetric thread profile contour.



Ex. 1001 ('781 Patent), FIG. 75 and FIG. 75 (modified). Designed correctly, these threads would screw into the abutment by engaging the abutment threading and, on a fastener made of plastic as disclosed, would also “release” the threading “with axial force after.”

172. The phrase “as shown in FIG. 75” does not limit this disclosure. Ex. 1001 ('781 Patent), 23:17. The '781 Patent depicts Figure 75 “for the purpose of illustrating” a “certain convenient embodiment[]” and not “as limitation thereto.” Ex. 1001 ('781 Patent), 8:13–15; 25:11 12 (“Various embodiments have been described to illustrate the disclosed inventive concepts, not to limit the invention.”).

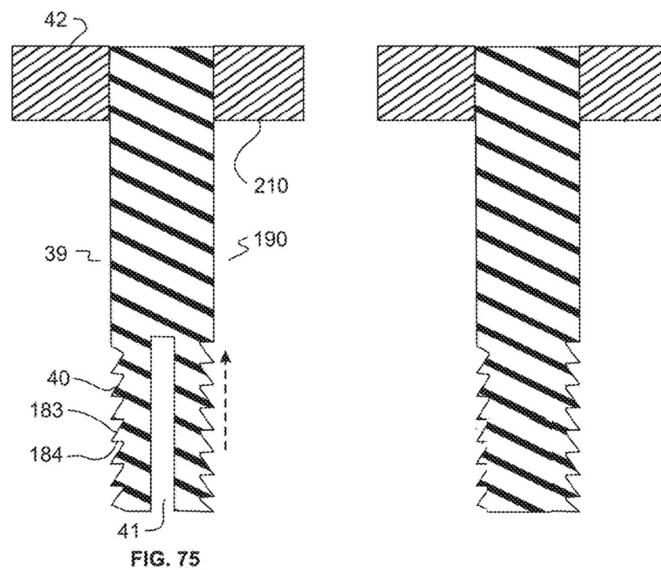
Asymmetric threads may include reverse buttress threads, just like the one that is described in the specification of the '781 Patent. Ex. 1001 ('781 Patent), 23:30–34.

173. Indeed, Petitioner's own expert admitted as much. Brunski Deposition, 114:14–15 (stating a POSA “would know that a reverse buttress is an asymmetric thread pattern”). Similarly, Petitioner admitted that “this is a predictable technology.” Petition 69. As a result, a POSA would have readily recognized that the full scope of “asymmetric threads” is included in this genus because it was a known category of thread contours. Ex. 1001 ('781 Patent), 23:24. Petitioner's expert confirmed this as well, admitting that an “asymmetric buttress thread” would be “[o]ne well known ... example.” Brunski ¶ 222.

174. The specification further discloses temporary fasteners with and without the slotted post shown in Figure 75. For instance, the '781 Patent states that “[i]n some embodiments, the threaded end of the post portion of the temporary fastener has a deflecting feature.” Ex. 1001 ('781 Patent), 5:31–32. While this “deflecting feature” may include the slotted post shown in Figure 75, the specification of the '781 Patent does not require the post to be slotted. In my opinion, a POSA would have known that the slotted post of Figure 75 is not essential to the design of the claimed invention. Such a POSA would have recognized that the claimed invention could be implemented without a slotted post.

175. Additionally, a POSA would have known that a slotted post is not necessary for axial release. Rather, the '781 Patent describes that fastener threads may be made of plastic or polymer material, which would deform when the clinician pulled out the fastener. Ex. 1001 ('781 Patent), 24:11–13 (“Metal, metal-reinforced, ceramic, and polymer copings, posts and fasteners may be included in this and other embodiments.”); 21:48–51 (“Temporary attachment posts and caps may be made from metal and polymer materials such as titanium, stainless steels, nylon and PEEK and other non-corrosive biocompatible materials.”). And a POSA would have readily recognized that a fastener with a slotted post would have threads with a different thread contour from a post that does not have a slot.

176. A slotted fastener with asymmetric threading, as shown below in Figure 75 (left) is clearly different from a fastener without a slot is shown below (right).

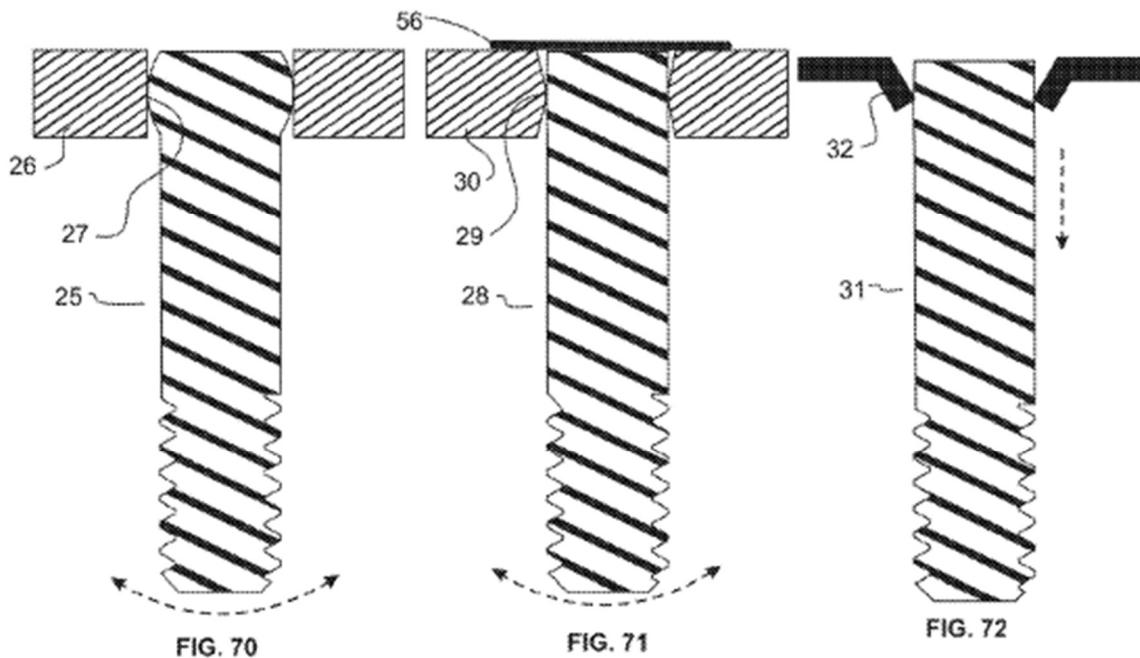


Ex. 1001, FIG. 75 and FIG. 75 (modified).

177. As shown, these two examples have different thread contours because one has continuous asymmetric threading, while the Figure 75's thread contour is interrupted by slot 41. The specification of the '781 Patent describes both. Ex. 1001 ('781 Patent), 23:10–41; 24:52–25:4.

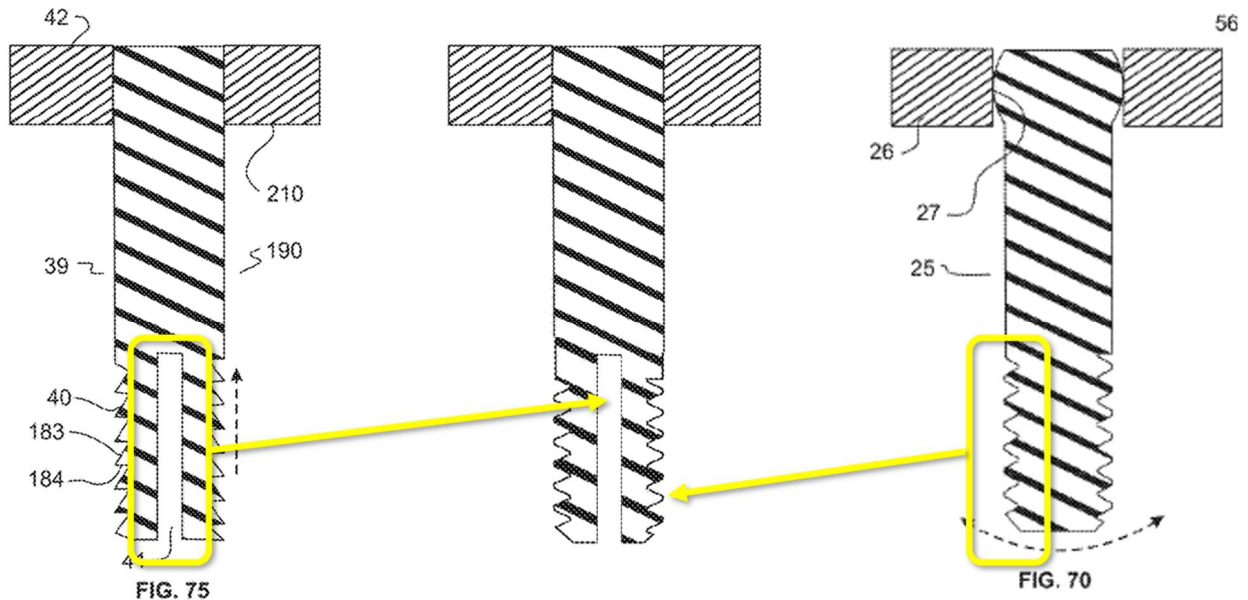
2. Slotted Temporary Fasteners with Symmetric Threads

178. The '781 Patent likewise discloses slotted temporary fasteners with symmetric threads, resulting in a thread contour different from the definitive screw's. Numerous drawings depict temporary fasteners with symmetric threads, including Figures 70–72, which are reproduced below.



Ex. 1001 ('781 Patent), FIGS. 70–72. Figures 73 and 74 provide additional examples. Ex. 1001 ('781 Patent), FIGS. 73–74.

179. A POSA would have understood that symmetrical threads can be combined with a slotted post. This embodiment would have a different contour from the definitive screw's continuous contour. One such combination is illustrated below (middle).



Ex. 1001 ('781 Patent), FIG. 75 (annotated); FIGS. 75 and 70 (combined and annotated); FIG. 70 (annotated).

180. A POSA would have understood how to combine disclosed features this way. Ex. 1001 ('781 Patent), 8:3–5 (“Furthermore, the particular features, structures, or characteristics may be combined in any suitable manner in one or more embodiments without limitation.”). Such a POSA would have known that the resulting fasteners would have included (a) a different thread contour from the definitive screw's continuous, symmetrical threads, (b) “engage[] the screw threads

in the abutment for pick-up,” and (c) “release with axial force after,” just like the buttress threads shown in Figure 75 and the reverse buttress threads. Ex. 1001 (’781 Patent), 23:17–21.

181. I note that Petitioner’s expert initially disagreed that a POSA would have understood how to combine these features. Apparently, Brunski ignored portions of the ’781 Patent, like the language in column 8, lines 3 to 5, because he saw them as “kind of a boiler plate statement that is kind of always there” in patents. Brunski Deposition, 67:25–68:4. But Petitioner’s expert admitted that following these types of instructions was “part of the process” that is required for reading disclosures. Brunski Deposition, 68:5–10.

182. In my opinion, the ’781 Patent discloses temporary fasteners that have symmetric threads and a slot, and a POSA would have readily recognized as much.

3. Temporary Fasteners with Interference Fit

183. The specification of the ’781 Patent further describes that temporary fasteners may use “an interference fit between the bottom of the post with the threads” that is “designed to provide sufficient engagement to provide adequate alignment.” Ex. 1001 (’781 Patent), 24:60–64.

184. In my opinion, a POSA would have known that an interference fit is “a mechanical friction fit that results from inserting a large first part into a smaller hole of a second part.” A POSA also would have known that a temporary fastener could

be designed to be pushed in or screwed in by rotation. In either case, the POSA would have recognized that the temporary fastener “engages the screw threads in the abutment for pick-up” through deformation (whether elastic or inelastic) Ex. 1001 (’781 Patent), 23:19–20.

185. A POSA would have understood that a temporary fastener with an interference fit has a threading profile that is different from that of the definitive screw. Even if designed as a plain cylindrical post (initially without threading), rotating or pressing a polymeric post large enough to produce an interference fit into the abutment’s female threading will result in the polymeric post’s deformation. Elastic relaxation away from the crests creates a shallow male thread in the post, which would not fill the female abutment threads. Thus, a POSA would have known that the thread contour of the temporary fastener is different from that of the definitive screw. One such example is shown below:



186. By deformation, a temporary fastener with an interference fit would also “release the coping” during pick-up. Ex. 1001 (’781 Patent), 5:17–18. Like other embodiments, the interference fit of the temporary fastener permits “easy removal of the dental prosthesis from the fastener post ... without the need for special tools or access to the fastener system to unscrew it.” Ex. 1001 (’781 Patent), 4:46–50. Using the interference fit, it can “be picked-up in a closed-tray impression process without unscrewing the temporary fastener.” Ex. 1001 (’781 Patent), Abstract.

187. In fact, Petitioner’s expert even admitted that identical language in the Priority Applications “certainly describe[ed]” an interference fit. Brunski Deposition, 59:4–5; 95:19–96:19 (“Q. And that would have a release mechanism that doesn’t include a split post, correct? A. That’s correct.”). Petitioner’s expert did not even consider interference fits because, as he said, “[t]hat particular kind of fit to me is difficult to imagine.” Brunski Deposition, 59:3–4. Petitioner’s expert also admitted that a cylindrical post without threads would have a thread profile that is “different from the thread profile shown in Figure 75.” Brunski Deposition, 62:16–18.

188. Even Petitioner’s expert agrees that temporary fasteners that utilize interference fits are disclosed by the ’781 Patent. Brunski Deposition, 59:5–7.

189. It is undisputed that the '781 Patent describes temporary fasteners with different release mechanisms—*i.e.*, at least the example shown in Figure 75 and the interference example that is described in the written description.

190. Thus, the '781 Patent adequately supports the release limitations.

XII. GROUND 2: THE SPECIFICATION SUPPORTS DEPENDENT CLAIMS 2–5, 7, 9, AND 11–16.

191. As I explained above, a POSA would interpret the '781 Patent specification to disclose numerous embodiments of the claimed invention and therefore adequately enable the full scope of the '781 Patent's claims. For the same reasons, they adequately enable dependent claims 2–5, 7, 9, and 11–16 as well.

192. The Petition also presents a few additional arguments for why certain claims should be found invalid. In my view and that of a POSA, these arguments are unpersuasive.

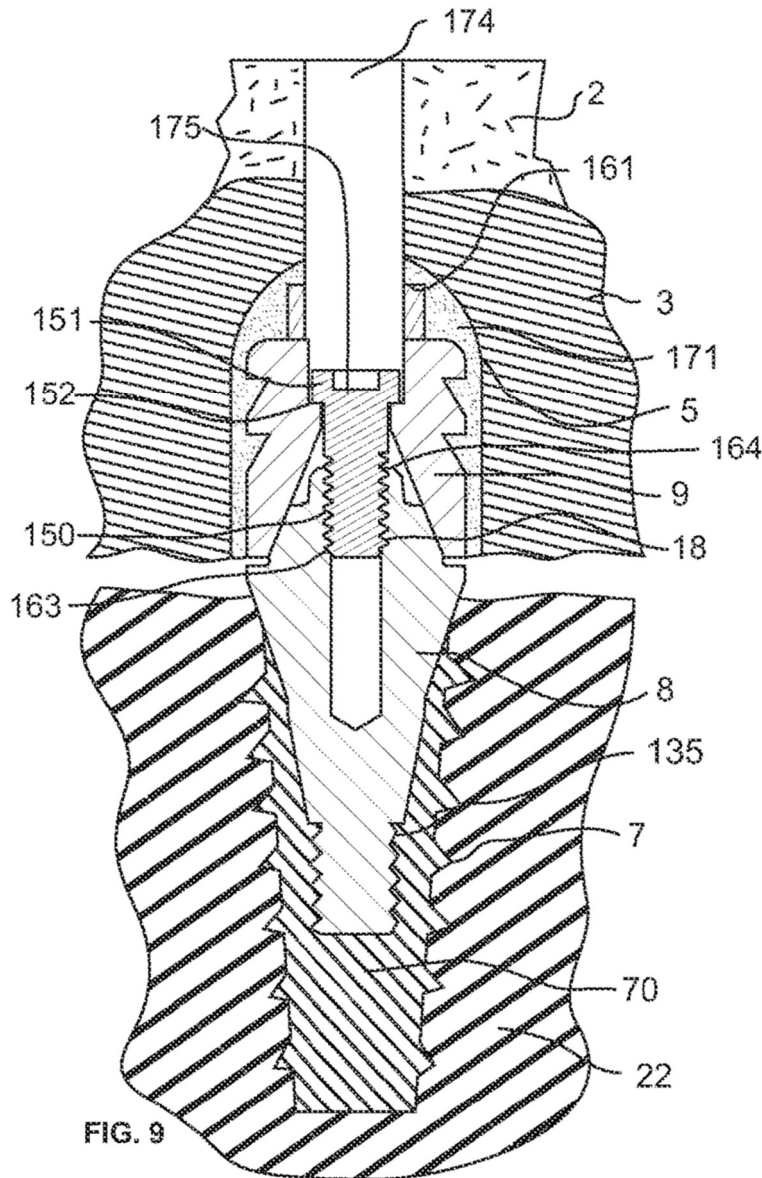
A. The Specification Supports the “Securing the Coping to the Threads of the Implant Abutment” Limitation Of Claims 1–9

193. Claim 1 describes “a definitive screw” with “threads configured to securing the coping to the threads of the implant abutment.” Ex. 1001 ('781 Patent), 42. Petitioner argues that Claims 1–9 are not supported because “[a]lthough the disclosed definitive screw threads secure the coping to the abutment, the definitive screw threads do not secure the coping to the threads of the abutment as recited.” Petition, 53.

194. I disagree. A POSA would have understood the claims when reading the specification of the '781 Patent as a whole. One inventive aspect of temporary fasteners claimed in the '781 Patent is that the temporary fasteners secure the coping to the abutment using the same abutment threading that the definitive screw will ultimately use.

195. Figure 9 of the '781 Patent shows how the definitive screw 175 holds the coping 9 (and attached prosthesis 3) to the implant abutment 8. Ex. 1001 ('781 Patent), FIG. 9. The '781 Patent describes that “[t]he male threads 150 of the definitive screw are shown filling the female threads of the abutment over an engagement depth extending from a first end of the thread engagement 163 to the second end of abutment thread engagement 164 of the implant abutment threading 18.” Ex. 1001 ('781 Patent), 15:32–36. The '781 Patent further describes that “[o]nce the most distal thread of the definitive screw 175 is engaged in an abutment thread, the engagement depth will increase by a distance equal to the thread pitch for each complete revolution of the definitive screw 175.” Ex. 1001 ('781 Patent), 15:36–40. The '781 Patent explains that “[a]fter the definitive screw 175 is torqued into position, the screw clearance hole 174 in the prosthesis 3 may be filled with Teflon tape and color-matching composite materials for aesthetic purposes.” Ex. 1001 ('781 Patent), 15:44–48. When read together, the '781 Patent describes that the definitive screw 175 is torqued into position based on an engagement with the abutment

threads using a rotational movement having an engagement depth that is determined based on thread pitch and a number of revolutions. Ex. 1001 ('781 Patent), 15:29–48.



Ex. 1001 ('781 Patent), FIG. 9.

196. A POSA would have readily recognized that the definitive screw threads into the implant abutment and thereby holds the coping against the implant

abutment by securing it to the implant abutment's threads. Such a POSA would have known that the definitive screw can secure the coping to the implant abutment's threads *or* that the definitive screw can secure the coping to the implant abutment.

B. The Specification Supports the “does not Engage the Implant Abutment Threads Continuously” Limitation of Claims 1–9

197. Claim 1 describes a temporary fastener where “the distal shaft portion is sized and configured so that it does not engage the implant abutment threads continuously between a most distal position of the distal shaft portion and a proximal end of the implant abutment threads.” Ex. 1001 ('781 Patent), 25:45–26:24 (claim 1). Claim 6 likewise includes an identical limitation. Ex. 1001 ('781 Patent), 26:66–27:5 (claim 6).

198. Petitioner argues that Claims 1–9 are unsupported because the '781 Patent specification “does not adequately describe or enable the ‘does not engage the implant abutment threads continuously’ limitation.” Petition, 54. “Patent Owner alleges that Petitioner’s NeoConvert ‘Pin Capture’ device satisfies this limitation ... on the ground that the device’s threads are threaded into only a portion of the abutment threads, such that abutment threads above and below the device threads are not engaged by the device threads.” Petition, 54. These claims are unsupported, according to Petitioner, because the '781 Patent specification “does not describe any temporary fastener with continuous threads that are threaded into only a portion of

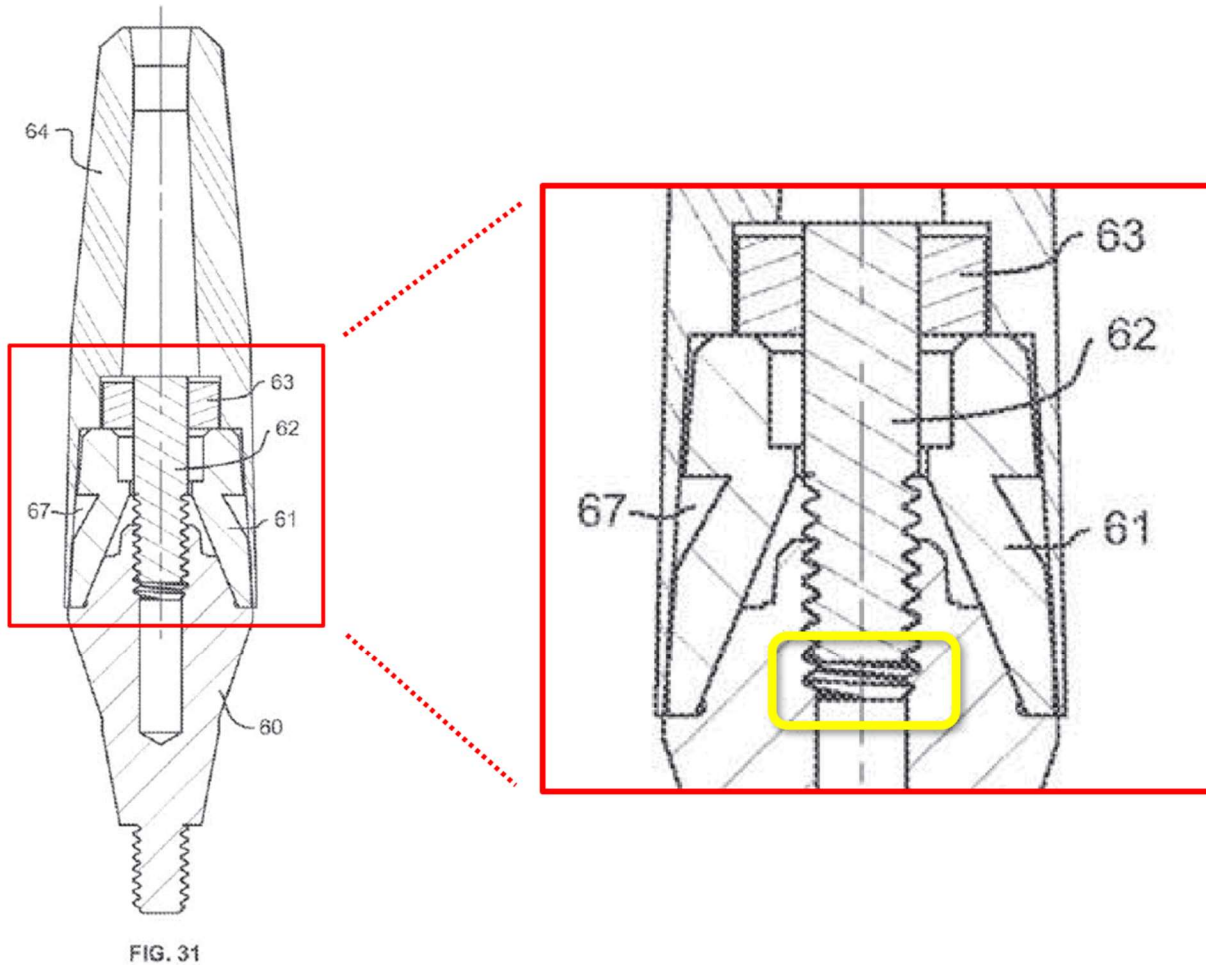
the abutment threads, leaving abutment threads above and/or below the temporary fastener empty.” Petition, 56.

199. I disagree. As discussed above, the specification discloses slotted posts with asymmetric threads as well as slotted posts with symmetric threads. **Both of these describe fasteners whose threads do not engage the female abutment threading continuously because the threading is interrupted by slots.** Ex. 1001 (’781 Patent), 23:21–28.

200. Moreover, the claim language speaks to “continuous” engagement, not to what Petitioner is describing (“leaving abutment threads above and/or below the temporary fastener empty” Petition, 56).

201. Regardless, Petitioner’s argument is factually incorrect because a POSA would have understood the ’781 Patent specification to describe temporary fasteners with continuous threads that are threaded into only a portion of the abutment threads, thus leaving abutment threads above and/or below the temporary fastener empty.

202. Figure 31 depicts precisely such an embodiment, with the yellow-outlined portion being (in Petitioner’s words) “abutment threads ... below the temporary fastener” left “empty.”



Ex. 1001 ('781 Patent), FIG. 31 (annotations added). Figures 82–90 show additional embodiments with abutment threads left empty below the temporary fastener's threads. Ex. 1001 ('781 Patent), FIGS. 82–90. A POSA would have understood the '781 Patent's specification to disclose such an embodiment because the specification itself directs that "the particular features, structures, or characteristics may be combined in any suitable manner in one or more embodiments without limitation." Ex. 1001 ('781 Patent), 8:2–5.

203. A POSA would have therefore understood the specification to describe multiple temporary fasteners with threads that engage the abutment threading continuously. Even if the specification needed to show a temporary fastener that left abutment threads above and/or below the temporary fastener empty (and, to be clear, I do not believe this is required), Petitioner is nevertheless factually incorrect to argue that no such fastener is disclosed.

C. The Specification Supports the “Outer Surface Which is Sized and Configured to Deform” Limitation of Claim 5

204. Claim 5 describes a temporary fastener in which “the distal shaft portion of the temporary fastener comprises an outer surface which is sized and configured to deform in response to the axial release force in the proximal direction whereby the at least [sic] a portion of the temporary fastener and the coping are released together as a unit.” Ex. 1001 ('781 Patent), 42.

205. Petitioner contends this limitation is not supported because the specification “does not describe any temporary fastener that has an ‘outer surface’ that ‘deform[s]’ when the coping and the temporary fastener are pulled out of the abutment without being unscrewed.” Petition, 57 (citing Brunski ¶ 192).

206. I disagree because Petitioner and Petitioner’s expert ignores important aspects of the specification. For example, a POSA would have understood the specification discloses at least one such example temporary fastener that uses “an interference fit between the bottom of the post with the threads [that] may also be

designed to provide sufficient engagement to provide adequate alignment and fixing of the coping.” Ex. 1001 (’781 Patent), 24:60–64. Conveniently, Petitioner and Petitioner’s expert fail to cite this sentence, which directly contradicts and immediately follows the sentence they did cite. Petition, 57 (citing Ex. 1001 (’781 Patent), 24:58–59); Brunski ¶ 192 (same).

207. A POSA would know that a temporary fastener with an interference fit described would need to be made of a polymeric material like PEEK or acetal so that the interference fit would not alter or degrade the female threading in the metal implant abutment. Ex. 1001 (’781 Patent), 21:48–51 (“Temporary attachment posts and caps may be made from metal and polymer materials such as titanium, stainless steels, nylon and PEEK and other non-corrosive biocompatible materials.”); 24:11–13 (“Metal, metal-reinforced, ceramic, and polymer copings, posts and fasteners may be included in this and other embodiments.”). Using the threads of the implant abutment to attach the temporary fastener *without* degrading or altering those threads is one of the key advantages of all embodiments of the claimed invention because it allows the temporary fastener to be torqued down with attachment force like that of the permanent screw, for a more accurate impression. The post and thread diameter of the polymeric post would need to be large enough to provide the interference fit but shallow enough to deform (whether elastically or inelastically) and then release. Pressing a polymeric post into the abutment’s female threading, inserting it by

rotating it in, or pulling it out will all result in the polymeric post's deformation. Even before the axial release force, a polymeric post within the range for an interference fit will inherently provide some level of thread deformation on the post (even if the deformation is temporarily small and elastic).

208. A POSA would have understood the '781 Patent specification to disclose at least such a fastener. For that reason, it is not correct to say that the Priority Applications do not enable Claim 5's surface-deformation limitation.

D. The Specification Supports the “Wherein the Temporary Fastener is Configured to Release” Limitation of Claim 6

209. Claim 6 describes a temporary fastener “configured to release at least a portion of the temporary fastener and the coping from the implant abutment as a unit in response to an axial release force that is applied only in a proximal direction to the temporary fastener whereby the axial release force is applied without rotation of the temporary fastener.” Ex. 1001 ('781 Patent), 26:41–27:10 (claim 6).

210. Petitioner argues that the '781 Patent specification does not support or enable this limitation. Petition, 58. The Board discussed the “release limitation” of claim 6 collectively in its institution decision, finding a lack of support. Institution Decision at 37–41.

211. I disagree. As I explained above, a POSA would have understood that the '781 Patent specification discloses several examples of a temporary fastener having a release mechanism. And as I explain above, a POSA would have

understood that the embodiments that the '781 Patent specification discloses a temporary fastener having asymmetrical threads with or without a slotted post, a temporary fastener with an interference fit, and a temporary fastener having symmetrical threads with or without a slotted post. All of these fasteners are releasable and a POSA would have known how they are releasable.

E. The Specification Supports the “Distal Portion of the Shaft of the Temporary Fastener is Configured to Deform” Limitation

212. Claim 14 describes a temporary fastener “wherein the distal portion of the shaft of the temporary fastener is configured to deform during the application of the axial force in the proximal direction to thereby release the coping and the temporary fastener as the unit from the implant abutment.” Ex. 1001 ('781 Patent), 28:49–53 (claim 14).

213. Petitioner argues that this limitation is inadequately supported because the '781 Patent specification does not “describe any temporary fastener that can be pulled out of the abutment without being unscrewed because its threads detach.” Petition, 60–61.

214. I disagree. First, the claim does not require the threads to detach. The claim requires the “temporary fastener is configured to deform.” Ex. 1001 ('781 Patent), 28:49–53 (claim 14) A POSA would have understood that axial force to release the temporary fastener will cause deformation of a polymer and/or slotted fastener. Ex. 1001 ('781 Patent), FIG. 75. A POSA would have understood that

deformable polymers, materials, or slotted temporary fasteners could be used to attach and/or release the temporary fastener's post to/from the implant abutment's threading and that these features can be added to any of the temporary fasteners described in the specification. Ex. 1001 ('781 Patent), 23:21–28; 25:38–42; FIG. 75. A POSA would have also understood this because the specification says “the particular features, structures, or characteristics may be combined in any suitable manner in one or more embodiments without limitation.” Ex. 1001 ('781 Patent), 8:3–5.

F. The Specification Supports the “Smaller Maximal Width” Limitation

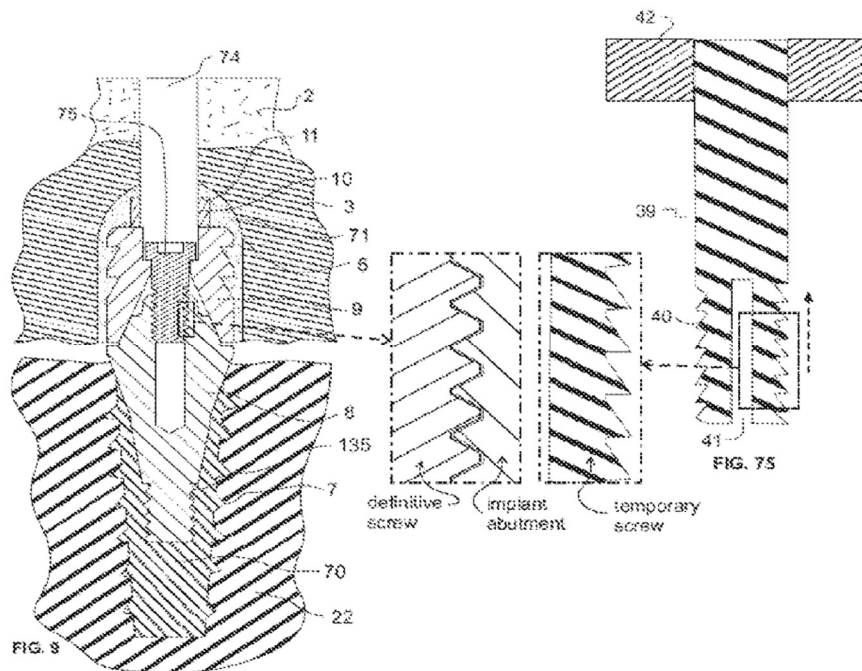
215. Claim 15 describes a temporary fastener “wherein a maximal width of the distal portion of the shaft of the temporary fastener is smaller than a maximal width of the threads of the definitive screw.” Ex. 1001 ('781 Patent), 43.

216. Petitioner argues that this limitation is not supported because the '781 Patent specification “does not describe any temporary fastener that can be pulled out without being unscrewed in which the distal portion of the shaft has a maximal width that is smaller than the maximal width of the definitive screw threads.” Petition, 62. “If anything,” according to Petitioner, “the thread peaks of the temporary fastener and the definitive screw to have the same diameter as the proximal unthreaded portion of the shaft.” Petition, 62.

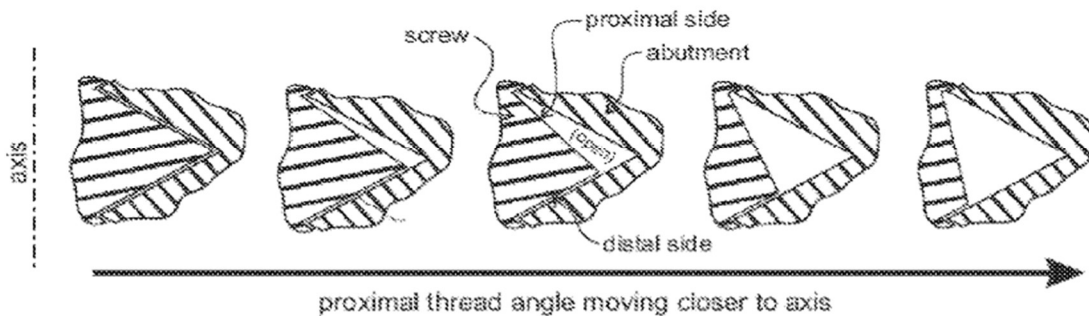
217. I disagree. In my opinion, a POSA would have understood that the maximal width (or maximum or major diameter) of a threaded temporary fastener configured like the embodiment in Figure 75 must be smaller than the maximal width (or maximum diameter) of the implant abutment's threads and the permanent screw that will fill them.

218. Inherent geometry shows that the temporary fastener in Figure 75 could not possibly have the same thread diameter as the permanent screw. It would not screw into the abutment if it did and even if it did, then it would be difficult or impossible to release upon application of an axial force.

219. Materials that SDC submitted during the parent '992 Patent's prosecution shows this:



Ex. 1015 at 296.



Ex. 1015 at 297.

220. In my opinion, a POSA would have understood that if a temporary fastener with the proximal thread angle shown in the three examples to the right of the above illustration had the same diameter as a permanent screw with the proximal thread angle shown on the far left, the temporary screw would not fit into the abutment threads.

221. Additionally, an interference thread, as shown by the red and black and female and male thread combination above, also inherently requires the temporary screw thread portion to have a major diameter smaller than both the major diameter of the female thread and the permanent screw.

XIII. GROUND 3: NO POSA WOULD HAVE COMBINED BERNHARD, POOVEY, AND GRACCO AS THE PETITION PROPOSES

222. None of the prior art references show the required male threads of the temporary fastener to be mismatched and different from the abutment's female

threads and the definitive screw's matching male threads. Claim 10 of the '781 Patent requires that the temporary fastener's shaft include:

a distal portion having an outer surface comprising shaft threading having a shaft threading contour, *wherein the shaft threading contour does not essentially match the implant abutment threads contour*

Ex. 1001 ('781 Patent), claim 10. In other words, claim 10 requires the temporary fastener to have a threading contour that does not essentially match the implant abutment thread contour into which it is screwed. Ex. 1001 ('781 Patent), claim 10.

223. Bernhard does disclose any temporary screw. Ex. 1003 (Bernhard).

224. Poovey's temporary screw for the impression coping has plastic threads with the same thread pattern as the threads of the fixation screw that affixes the implant to the jaw. Ex. 1005 (Poovey). Poovey does not disclose two screws with different thread patterns that are screwed into the same female thread pattern. Ex. 1005 (Poovey). Poovey does not disclose any screw that is screwed into female threading that does not match the screw's male threading.

225. Gracco does not disclose a temporary or definitive screw. Ex. 1006 (Gracco). Gracco does not disclose two screws with different thread patterns that are screwed into the same female thread pattern. Ex. 1006 (Gracco). Gracco does not disclose any screw with male threading that is screwed into female threading that does not match the screw's male threading. Ex. 1006 (Gracco). Gracco does not

disclose a dental system either. Ex. 1006 (Gracco). Gracco just discloses self-tapping screws that use well-known thread patterns that can be screwed into and pulled out of a synthetic bone. Ex. 1006 (Gracco). A self-tapping screw will create a female thread pattern that matches the thread pattern of the male screw, therefore, Gracco does not suggest a temporary screw with different pattern than the female thread or thread that is different than the definitive screw.

226. As a result, none of the references discloses the claim limitation "wherein the shaft threading does not essentially match the implant abutment threads contour." Ex. 1001 ('781 Patent), claim 10; Ex. 1003 (Bernhard); Ex. 1005 (Poovey); Ex. 1006 (Gracco). Because no reference or combination of references teaches this claim limitation, the Petition fails to show that claim 10 is obvious.

227. The Petition argues that "it would have been obvious in view of Bernhard, Poovey[] and Gracco to modify the system of Figures 8–12 of Bernhard to temporarily connect coping 700 to abutment 650 with a temporary screw with flexible threads in a buttress thread pattern, which would be threaded into bore 654 but pulled out of abutment 650 without being unscrewed when the prosthesis is removed." Petition, 65. According to Petitioner, a POSA would have been motivated to combine these teachings "to make the temporary connection ... more secure, reliable and stable than a snap-fit mechanism," and that this solution "would be simpler." Petition, 65–66.

228. No POSA would have combined Bernhard, Poovey, and Gracco as Petitioner proposes. And no POSA would have modified Bernhard's permanent bonded dental prosthetic that does not have a temporary screw with Poovey's temporary snap-fit fastener, and then modify that with Gracco's miniscrew testing. Ex. 1003 (Bernhard), Abstract, [0006] ("In one method, a provisional dental prosthetic system can be attached to the patient's jaw prior to fabrication and installation of a more permanent dental prosthetic system."); Ex. 1006 (Gracco). In my opinion, Petitioner's proposed combination would only be made by someone that is using the claims of the '781 Patent as a roadmap.

229. For these reasons, no POSA would have been motivated to combine Bernhard, Poovey, and Gracco as the Petition proposes.

XIV. GROUND 4: NO POSA WOULD HAVE ADDED DEREY TO THE PROPOSED COMBINATION OF BERNHARD, AND GRACCO

230. The Petition next argues that "it would have been obvious to modify Bernhard's system in view of Poovey and Gracco to use a temporary screw based on the design of threaded fastener 750 but with flexible buttress threads." Petition, 83. For the same reasons explained above, however, that is not the case because a POSA would not be motivated to combine these references nor would a POSA have a reasonable expectation of doing so.

231. Claim 1 of the '781 Patent requires:

wherein the distal shaft portion of the temporary fastener comprises threading which is sized and configured to make contact with the implant abutment threads over a first threading contact area when to hold the coping against the implant abutment, wherein the distal post portion of the definitive screw is sized and configured to make contact with the implant abutment threads over a second threading contact area to hold the coping against the implant abutment, and *wherein the first threading contact area is less than the second threading contact area.*

232. I explained above (as to Ground 3) why the proposed combination of Bernhard, Poovey, and Gracco does not satisfy claim 10's limitations. For similar reasons here, combining Bernhard, Poovey, Gracco, and Derey would not satisfy claim 1's limitations either.

233. Bernhard does disclose any temporary screw, much less one with a threading contact area that is less than the definitive screw's. Ex. 1003 (Bernhard).

234. Poovey's temporary screw for the impression coping has plastic threads with the same thread pattern as the threads of the fixation screw that affixes the implant to the jaw. Ex. 1005 (Poovey). Poovey does not disclose two screws with different thread patterns that are screwed into the same female thread pattern. Ex. 1005 (Poovey). Poovey does not disclose any screw that is screwed into female threading that does not match the screw's male threading. Ex. 1005 (Poovey).

Poovey therefore does not describe a temporary fastener with a threading contact area that is less than the definitive screw's. Ex. 1006 (Poovey).

235. Gracco does not disclose a temporary or definitive screw. Ex. 1006 (Gracco). Gracco does not disclose two screws with different thread patterns that are screwed into the same female thread pattern. Ex. 1006 (Gracco). Gracco does not disclose any screw with male threading that is screwed into female threading that does not match the screw's male threading. Ex. 1006 (Gracco). Gracco does not disclose a dental system either. Ex. 1006 (Gracco). Gracco therefore does not describe a temporary fastener with a threading contact area that is less than the definitive screw's. Ex. 1006 (Gracco).

236. Derey does not disclose a temporary or definitive screw. Ex. 1008 (Derey). Derey does not disclose two screws with different thread patterns that are screwed into the same female thread pattern. Ex. 1008 (Derey). Derey does not disclose any screw with male threading that is screwed into female threading that does not match the screw's male threading. Ex. 1008 (Derey). Derey therefore does not describe a temporary fastener with a threading contact area that is less than the definitive screw's. Ex. 1008 (Derey).

237. As a result, none of the references discloses the claim limitation "wherein the first threading contact area is less than the second threading contact area." Ex. 1001 ('781 Patent), claim 1; Ex. 1003 (Bernhard); Ex. 1005 (Poovey); Ex.

1006 (Gracco). Because no reference or combination of references teaches this claim limitation, the Petition fails to show that claim 1 is obvious.

238. Claim 6 of the '781 Patent requires:

wherein the distal shaft portion [of the temporary fastener's shaft] is sized and configured so that it does not engage the implant abutment threads continuously between a most distal position of the distal shaft portion and a proximal end of the implant abutment threads.

239. I explained above why the proposed combination of Bernhard, Poovey, Gracco, and Derey does not satisfy claim 1's limitations. For similar reasons, it would not satisfy claim 6's limitations either.

240. Bernhard does disclose any temporary screw, much less one that does not engage the abutment threads continuously. Ex. 1003 (Bernhard).

241. Poovey's temporary screw for the impression coping has plastic threads with the same thread pattern as the threads of the fixation screw that affixes the implant to the jaw. Ex. 1005 (Poovey). Poovey does not disclose two screws with different thread patterns that are screwed into the same female thread pattern. Ex. 1005 (Poovey). Poovey does not disclose any screw that is screwed into female threading that does not match the screw's male threading. Ex. 1005 (Poovey). Poovey therefore does not describe a temporary fastener that does not engage the abutment threads continuously. Ex. 1006 (Poovey).

242. Gracco does not disclose a temporary or definitive screw. Ex. 1006 (Gracco). Gracco does not disclose two screws with different thread patterns that are screwed into the same female thread pattern. Ex. 1006 (Gracco). Gracco does not disclose any screw with male threading that is screwed into female threading that does not match the screw's male threading. Ex. 1006 (Gracco). Gracco does not disclose a dental system either. Ex. 1006 (Gracco). Gracco therefore does not describe a temporary fastener that does not engage the abutment threads continuously. Ex. 1006 (Gracco).

243. Dery does not disclose a temporary or definitive screw. Ex. 1008 (Dery). Dery does not disclose two screws with different thread patterns that are screwed into the same female thread pattern. Ex. 1008 (Dery). Dery does not disclose any screw with male threading that is screwed into female threading that does not match the screw's male threading. Ex. 1008 (Dery). Dery therefore does not describe a temporary fastener that does not engage the abutment threads continuously. Ex. 1008 (Dery).

244. As a result, none of the references discloses the claim limitation “wherein the distal shaft portion is sized and configured so that it does not engage the implant abutment threads continuously between a most distal position of the distal shaft portion and a proximal end of the implant abutment threads.” Ex. 1001 ('781 Patent), claim 6; Ex. 1003 (Bernhard); Ex. 1005 (Poovey); Ex. 1006 (Gracco).

Because no reference or combination of references teaches this claim limitation, the Petition fails to show that claim 6 is obvious.

245. Claim 8 of the '781 Patent requires:

wherein the distal shaft portion is sized and configured so that it does not engage the implant abutment threads continuously between a most distal position of the distal shaft portion and a proximal end of the implant abutment threads,

wherein a volume of definitive screw post material of the distal post portion of the definitive screw that is located distally of the proximal end of the implant abutment threads when in position to hold the against the implant abutment is greater than a volume of temporary fastener shaft material of the distal shaft portion of the temporary fastener that is located distally of the proximal end of the implant abutment threads when in position to hold the coping against the implant abutment.

246. I explained above why the proposed combination of Bernhard, Poovey, Gracco, and Derey does not satisfy claim 6's *continuously engage* limitations. For similar reasons, it would not satisfy claim 8's *continuously engage* limitations either. Moreover, for similar reasons it would not satisfy claim 8's *greater volume* limitations either.

247. Bernhard does disclose any temporary screw, much less one with a shaft having a smaller volume than the definitive screw's. Ex. 1003 (Bernhard).

248. Poovey's temporary screw for the impression coping has plastic threads with the same thread pattern as the threads of the fixation screw that affixes the implant to the jaw. Ex. 1005 (Poovey). Poovey does not disclose two screws with different thread patterns that are screwed into the same female thread pattern. Ex. 1005 (Poovey). Poovey does not disclose any screw that is screwed into female threading that does not match the screw's male threading. Ex. 1005 (Poovey). Poovey therefore does not describe a temporary fastener with a shaft having a smaller volume than the definitive screw's. Ex. 1006 (Poovey).

249. Gracco does not disclose a temporary or definitive screw. Ex. 1006 (Gracco). Gracco does not disclose two screws with different thread patterns that are screwed into the same female thread pattern. Ex. 1006 (Gracco). Gracco does not disclose any screw with male threading that is screwed into female threading that does not match the screw's male threading. Ex. 1006 (Gracco). Gracco does not disclose a dental system either. Ex. 1006 (Gracco). Gracco therefore does not describe a temporary fastener with a shaft having a smaller volume than the definitive screw's. Ex. 1006 (Gracco).

250. Dery does not disclose a temporary or definitive screw. Ex. 1008 (Dery). Dery does not disclose two screws with different thread patterns that are

screwed into the same female thread pattern. Ex. 1008 (Derey). Derey does not disclose any screw with male threading that is screwed into female threading that does not match the screw's male threading. Ex. 1008 (Derey). Derey therefore does not describe a temporary fastener with a shaft having a smaller volume than the definitive screw's. Ex. 1008 (Derey).

251. As a result, none of the references discloses the claim limitations “wherein the distal shaft portion is sized and configured so that it does not engage the implant abutment threads continuously between a most distal position of the distal shaft portion and a proximal end of the implant abutment threads” or “wherein a volume of definitive screw post material of the distal post portion of the definitive screw that is located distally of the proximal end of the implant abutment threads when in position to hold the against [sic] the implant abutment is greater than a volume of temporary fastener shaft material of the distal shaft portion of the temporary fastener that is located distally of the proximal end of the implant abutment threads when in position to hold the coping against the implant abutment.” Ex. 1001 ('781 Patent), claim 6; Ex. 1003 (Bernhard); Ex. 1005 (Poovey); Ex. 1006 (Gracco). Because no reference or combination of references teaches these claim limitations, the Petition fails to show that claim 8 is obvious.

252. Petitioner further argues that “Claims 1–9, 11, 13, and 14” which require various configurations of the temporary fastener's threading and shaft,

“would have been obvious in further view of Derey.” Petition, 84. But a POSA would not have been motivated to combine these because Derey discloses a snap-in system, not a screw-in system. The prior art that the Examiner reviewed demonstrated numerous versions of snap-in systems. Yet “snap-on systems are generally physically larger than dental screws,” so “converting an existing denture may require large clearance cavities to be bored into the existing denture before it can be used as an impression tray in a pick-up coping process.” Ex. 1001 (’781 Patent), 30. “These large holes may significantly reduce the mechanical stability of the existing denture,” and “[t]he mechanical precision required of snap-on system elements generally makes them more expensive than screw-attached systems.” Ex. 1001 (’781 Patent), 30. Lastly, the snap-in systems do not provide the axial alignment of a screw because the cylindrical portion of the snap post is much shorter than the cylindrical portion of the female thread.

253. Furthermore, as the ’781 Patent notes, “hybrid systems that use a snap-on engagement for the pick-up coping during transfer and subsequent screw-attachment have also been proposed, but detailed information on the tradeoffs in precision and associated complexity or size required for equivalent performance to open-tray impression screw techniques have not been disclosed.” Ex. 1001 (’781 Patent), 4:25–31.

254. This combination would also not result in the claimed invention; a snap-in system does not have the key advantages of a screw-based temporary fastener system that can be removed with an axial release force. Specifically, it would not offer the ability to sufficiently torque the temporary fastener to achieve the same or similar fit as the definitive screw. Nor would it have the same stability, alignment, or resulting fit for the prosthesis. And just like Bernhard, Poovey, and Gracco, Derey also fails to disclose or suggest the claim limitation “wherein the first threading contact area is less than the second threading contact area.” Ex. 1003 (Bernhard); Ex. 1005 (Poovey); Ex. 1006 (Gracco); Ex. 1008 (Derey). Nor does it disclose or suggest claim 6’s *continuously engage* limitation, claim 8’s *continuously engage* limitation, or claim 8’s *greater volume* limitation. Ex. 1008 (Derey). And no combination of the prior art discloses or suggests these claim limitations either. Ex. 1003 (Bernhard); Ex. 1005 (Poovey); Ex. 1006 (Gracco); Ex. 1008 (Derey).

255. Derey does not disclose or suggest using any threads on temporary fasteners, much less teach or suggest the required thread mismatch. Derey describes a snap-in fastener, which is described in the context of prior art and as an alternative to a screw. Ex. 1008, 2–3 (Page 4 of 21–5 of 21); FIGS. 5–6. Derey merely discloses that convention screws were known in the prior art. Ex. 1008, 6–7 (Page 8 of 21–9 of 21); FIGS. 1–4 (labeled Prior Art). Indeed, Derey’s discloses a flexible dental device that is used instead of a screw. Ex. 1008, 8–9 (Page 10 of 21–11 of 21)

(“These flexible devices are designed *to be used instead of the screws* used for attaching the construction to the implants.... The device 100 is designed to fit in a construction, *instead of the designated screw*. Thus the device 100 may be inserted into the construction, legs 13 first - head 11 last, and *pushed to the limit*, i.e. until the head 11 gets stuck close to the end of the construction, above the lower opening, and the legs 13 dangle out.”); FIG. 5.

256. No POSA would modify Bernhard (which doesn't even have a temporary screw) with Poovey's snap-fit temporary fastener, and then with Gracco's miniscrew (with the same male and female thread contours), and then further modify such a thing with the push fit legs of Derey as Petitioner proposes. No POSA would combine this hodgepodge of misfit dental devices. Thus, the claims are not obvious over the prior art.

XV. CONCLUSION

257. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Date: April 1, 2026



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