

**UNITED STATES PATENT AND TRADEMARK OFFICE**

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**BEFORE THE PATENT TRIAL AND APPEAL BOARD**

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Straumann USA, LLC  
Petitioner,

v.

Smart Denture Conversions, LLC,  
Patent Owner.

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Case No. PGR2025-00054

Patent No. 12,156,781

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

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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 (“Smart Denture”) 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* is attached to this Declaration, 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 served 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 or tissue sealing/cutting devices, 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 gained significant experience with the development and life cycle of medical devices. This includes product conception/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, Manager of Design Engineering, and 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 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 forty-one (41) U.S. patents, and I am currently working on two new medical device inventions.

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 and considered the following documents in light of the general knowledge in the relevant art.

Exhibit	Description
1001	U.S. Patent No. 11,937,992
1002	Expert Declaration of John B. Brunski, Ph.D.
1003	U.S. Patent Application Pub. No. US 2017/0202649 A1 (Bernhard)

<b>Exhibit</b>	<b>Description</b>
1004	U.S. Patent No. 6,283,752 (Kumar)
1005	U.S. Patent Application Pub. No. US 2016/0045290 A1 (Poovey)
1006	A. Gracco et al., <i>Effects of Thread Shape on the Pullout Strength of Miniscrews</i> , 142 Amer. J. Orthodontics & Dentofacial Orthopedics 186–190 (2012) (Gracco)
1007	Declaration of Lindsay Allen
1008	PCT Patent Application No. WO 2013/030839 A1 (Derey)
1009	U.S. Provisional Patent Application No. 62/742,942
1010	U.S. Provisional Patent Application No. 62/774,402
1011	U.S. Provisional Patent Application No. 62/818,082
1012	U.S. Patent Application No. 16/596,361
1013	U.S. Patent No. 11,311,354 (Kofford)
1014	Smart Denture Conversions Webpage – Separable Fastener
1015	Prosecution History of U.S. Patent Application No. 18/328,730
1016	Smart Denture Conversions – Technique Guide
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.)
1018	U.S. Patent Application No. 17/691,108
1019	NeoConvert Brochure
1020	U.S. Patent No. 7,938,046 (Nino)
1021	German Published Patent Application (Offenlegungsschrift) DE 3808238 A1 (Ruetschi)
1022	Certified English Translation of German Published Patent Application (Offenlegungsschrift) DE 3808238 A1 (Ruetschi)
1023	U.S. Patent No. 1,725,109 (Starkey)
1024	U.S. Patent No. 2,626,029 (Gutterman)
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

Exhibit	Description
2002	Docket sheet, <i>Smart Denture Conversions, LLC v. Straumann USA, LLC</i> , No. 1:24-cv-00507-JCB (D. Del.)
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
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
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
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
2007	Defendant Straumann USA, LLC’s Initial Invalidation Contentions, No. 1:24-cv-00507-JCB (D. Del.) (served June 2, 2025)
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
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
2011	Smart Denture Conversions, <i>Technique Manual</i> , available at <a href="https://shorturl.at/798cX">https://shorturl.at/798cX</a>
2012	International Patent Application No. WO 96/2019 (Sept. 26, 1996) (“Sutter 1996”)
2013	U.S. Patent No. 6,332,777 B1 (Dec. 25, 2001) (“Sutter 2001”)
2014	U.S. Patent No. 3,115,804 (Dec. 31, 1963) (“Johnson”)
2015	U.S. Patent No. 5,904,483 (May 18, 1999) (“Wade”)
2016	U.S. Patent No. 6,517,543 B1 (Feb. 11, 2003) (“Berrevoets”)
2017	U.S. Patent No. 9,568,037 B2 (Feb. 14, 2017) (“Staniszewski”)

<b>Exhibit</b>	<b>Description</b>
2018	Pub. No. US2002/0094255 A1 (July 18, 2002) (“Neuhengen”)

#### **IV. LEGAL UNDERSTANDING**

14. 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.

15. I understand that, in this post-grant review, Petitioner ultimately has the burden of proving that each challenged claim is unpatentable by a preponderance of the evidence. I also understand that, for the Board to institute post grant review, Petitioner has the burden of showing that it is more likely than not that at least one claim is unpatentable.

##### **A. Written Description**

16. I understand that a patent claim is invalid if the patent does not contain an adequate written description of the claimed invention. The test for written description is whether the specification would have objectively demonstrated to a POSA that the patent owner actually invented, or “possessed,” the claimed subject matter when the patent application was filed. The written description requirement does not require disclosure of examples or an actual reduction to practice of the claimed invention. However, 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. I understand that Petitioner is presenting written-description arguments in this proceeding.

**B. Enablement**

17. 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. Enablement is assessed from the point of view of a POSA at the time the patent application (or priority application) was filed. I understand that Petitioner is asserting enablement arguments in this proceeding.

18. I further understand that any of the following may be considered to determine whether experimentation is “undue”: the quantity of experimentation necessary; the amount of direction or guidance presented; the presence or absence of working examples; the nature of the claimed invention; the state of the prior art; the relative skill of those in the art; the predictability or unpredictability of the art; and the breadth of the claims.

**C. Indefiniteness**

19. I understand that a patent claim is invalid if it is indefinite. 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. Claim definiteness is measured from the viewpoint of a POSA at the time the patent application (or priority application) was filed. I understand that Petitioner is asserting indefiniteness arguments in this proceeding.

**D. Obviousness**

20. I understand that earlier patents and publications may render a patent unpatentable as obvious under 35 U.S.C. § 103. I understand Petitioner is asserting obviousness arguments in this proceeding.

21. 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.

22. 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 (described below).

23. 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; (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.

24. I understand that it must be shown 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. Moreover, 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.

25. 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. 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. For example, when there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a POSA has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product is not of innovation but of ordinary skill and common sense. I also understand that, if a technique has been used to improve one device, and a POSA would recognize that it would improve similar devices in the same way, using the technique is obvious unless its application is beyond his or her skill.

26. I understand that so-called “objective indicia of non-obviousness,” also known as “secondary considerations,” are also to be considered when assessing obviousness if present. These 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. 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.

27. I understand that the test of obviousness is whether the claimed invention, as a whole, would have been obvious to one of ordinary skill in the art as

of the date of the invention in light of the prior art. I understand that the use of hindsight must be avoided when considering whether the alleged invention would have been obvious to the POSA.

28. I understand that in determining obviousness, the POSA is a person of ordinary creativity, not an automaton. I understand that, when there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a POSA has good reason to pursue the known options within his or her technical grasp.

29. 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. Similarly, 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 also necessarily fails to render obvious all dependent claims that depend on that independent claim.

#### **E. Claim Construction**

30. I understand that “claim construction” is the interpretation of the meaning of patent claims. I understand that claims in this post-grant review proceeding 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 specification and file history.

31. I understand that many sources can be used to assist in understanding the meaning of a claim including the claims themselves, the specification, the prosecution history, and extrinsic evidence concerning scientific principles, the meaning of technical terms, and the state of the art. 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 inventor(s) acted as their own lexicographer.

32. I have been asked to review the claims and ascertain the meaning of the claims from the perspective of one of ordinary skill in the art. 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 understanding as stated above with regards to this post-grant review.

33. Opposing expert states that he has “interpreted the language of claims 1–16 of the ’781 patent to have its ordinary meaning as it would be understood by a POSA after reading the ’781 patent,” and “do[es] not believe that any language in the claims needs to be further defined in order to conduct [his] analysis.” EX1002, ¶ 130. However, as I explain below, by failing to define certain claim terms, the opposing expert’s obviousness analysis overlooks certain claim limitations that are not met by the prior art.

## **V. LEVEL OF ORDINARY SKILL IN THE ART**

34. 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. I understand that, for purposes of this post-grant review, the time of invention is assumed to be the 781 Patent's priority date, which is October 9, 2018.

35. 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 along conventional wisdom in the art, and 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.

36. I understand that factors that may be considered in determining the level of ordinary skill in the art include: (1) the education level of the inventor; (2) the types of problems encountered in the art; (3) the prior art solutions to those problems; (4) the rapidity with which innovations are made; (5) the sophistication of the technology; and (6) the education level of active workers in the field.

37. In my opinion, a POSA relating to the subject matter of the 781 Patent would be an individual having a bachelor's degree in mechanical engineering or 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 person of skill in the art may consult with a dentist, oral surgeon, prosthodontist, or periodontist who has experience with dental implants and prosthetics on patients.

38. I believe that I am qualified to provide opinions about how one of ordinary skill in the art in October 2018 would have interpreted and understood the 781 Patent and the prior art relied upon by the Petitioner.

39. Dr. 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, ¶ 127.

40. Dr. 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, ¶ 127.

41. Finally, Dr. Brunski says that “[a] POSA could also be a person with less formal education but commensurately more practical experience, or vice versa.” Ex. 1002, ¶ 127.

42. My opinions would not change under either definition.

## **VI. THE 781 PATENT**

### **A. The 781 Patent (EX1001)**

43. 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.” EX1001, at 1. “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.” EX1001, at 1. “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.” EX1001, at 31. The temporary fastener thus allows both axial and rotational attachment, which provides the same alignment force vector as the permanent screw.

44. “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.” EX1001, at 1.

### **B. Prosecution History Of The 781 Patent (EX1003)**

45. The inventors filed several provisional applications (“Priority Applications”) in late 2018 and early 2019 regarding their inventions. *See* EX1009; EX1010; EX1011. The applicable priority date here is October 9, 2018.

46. On October 8, 2019, the inventors filed U.S. Application No. 16/596,361. EX1012. As a result of this application, the Patent Office issued the Kofford patent on April 26, 2022. EX1013.

47. On June 3, 2023, the inventors filed U.S. Application No. 18/328,730, which claimed the priority dates of the provisional Priority Applications. EX1015. As a result of this application, the Patent Office issued the 992 Patent on March 26, 2024. EX1015.

48. On January 26, 2024, the inventors filed U.S. Application No. 18/424,696, which claimed the priority dates of the provisional Priority Applications. EX1020. As a result of this application, the Patent Office issued the 781 Patent on December 3, 2024. EX1001.

49. The 781 Patent and its parent patents underwent thorough review during prosecution. There was a detailed non-final office action in which the examiner rejected multiple claims in light of prior art. EX1020 at 930–947, 949. In response to the office action, SDC submitted an amendment. EX1020, at 986–1009, 1011–1017.

50. In an Information Disclosure Statement, SDC provided 122 prior-art references, all of which the Examiner considered. These included Bernhard (EX1003) and Poovey (EX1005), which are the basis for several Grounds in the

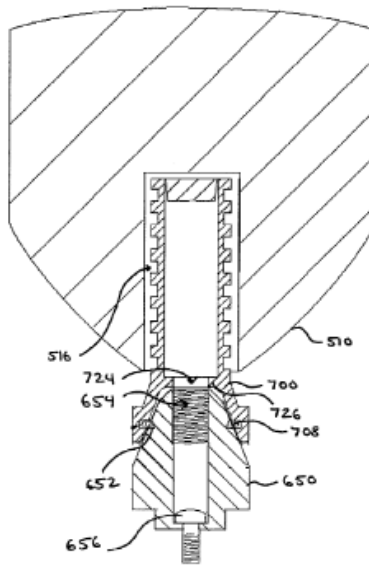
Petition. EX1020 at 881–893, 967–979. It also included Sutter (1996) (EX2012), Sutter (2001) (EX2013), Johnson (EX2014), and Wade (EX2015).

51. The Examiner also independently conducted her own detailed prior-art searches, which led her to (among other references) Berrevoets (EX2016). EX1015, at 1034–1054. The Examiner rejected multiple claims for obviousness in light of prior art, including Berrevoets. EX1020, at 930–947, 949.

## **VII. PRIOR ART**

### **A. Bernhard (EX1003)**

52. 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.” EX1013, at 28. Various figures in Bernhard graphically depict some (but not all) of these embodiments. For example:



**Figure 8**

EX1002, at 43.

53. According to the Petition, “Bernhard also explains that a threaded screw can be used to connect the coping to the abutment in order ‘to reduce the likelihood of inadvertent detachment.’” Petition at 15. Petitioner omits, however, that this teaching refers to the permanent screw that will ultimately hold the prosthesis to the abutment, not a temporary fastener used in the pick-up process.

54. 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 (EX1005)**

55. 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.” EX1005, at 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.” EX1005, at 12.

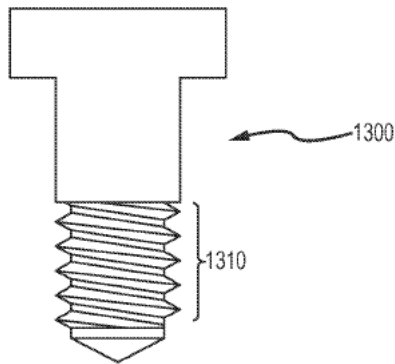


FIG.13

EX1005, at 9.

56. 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.” EX1005, at 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. EX1005, at 12.

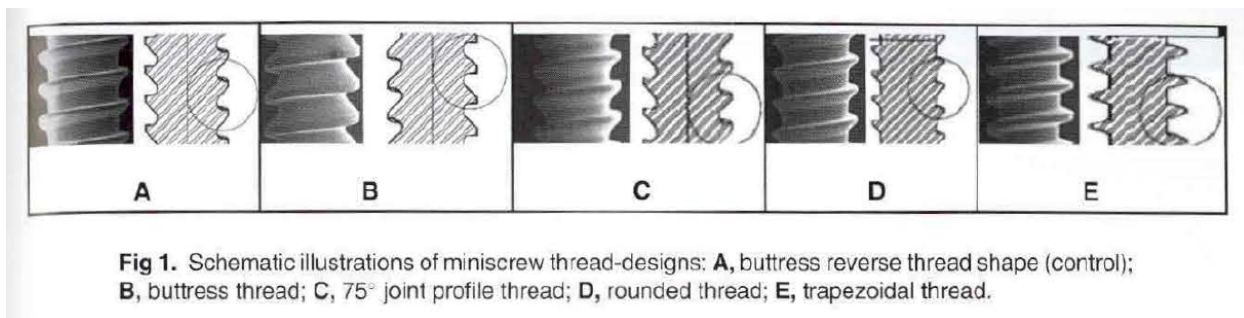
57. Poovey does not disclose any means of “activat[ing]” the “heat labile plastic” or “silicone threads” in the context of a dental implant procedure. In fact, using heat as a method of releasing the impression coping securing screw from the implant is impractical and likely uncomfortable for the patient. Heating the screw to “dissolve or soften the plastic or silicone sufficiently to allow removal ... without unscrewing the impression coping security screw” like Poovey describes, EX1005, at 12, would be unworkable in a clinical setting. It would also be difficult (if not impractical) to simultaneously activate multiple such temporary screws to remove the arch. Finally, heating the temporary screws to such a temperature would likely be painful or at least uncomfortable for the patient.

58. Poovey’s screws are also impractical. “[C]oat[ing]” metal or plastic threads “with a heat labile plastic or silicone” as Poovey describes, EX1005, at 12, is not practical and expensive for the extraordinary small screws used in dental implants. Poovey does not teach which type of medical grade plastic to use that could be softened at a low enough temperature to be comfortable for a patient and not degrade so much that plastic wouldn’t shear off and remain in the valleys of the female thread. Poovey discusses an alternate choice of using silicone, but making threads out of silicone or coating threads with silicone would impede the initial screw insertion, or prevent it altogether. Silicone is designed as a sealant, but it is not a strong material for securing fasteners against vibration and movement.

Silicone is known by a POSA to be very soft and flexible. It is also known to have very high heat resistance, which is why it is used in cookware. There is no teaching in Poovey on how these screws would be made or how they are made to be labile. Silicone rubber, depending on precise variety, usually degrades around 250°C.<sup>1</sup> Boiling point of water is 100°C, so this is a high temperature for a patient to endure during a procedure.

### C. Gracco (EX1006)

59. 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. EX1006, at 186–187. The different thread profiles tested are depicted:

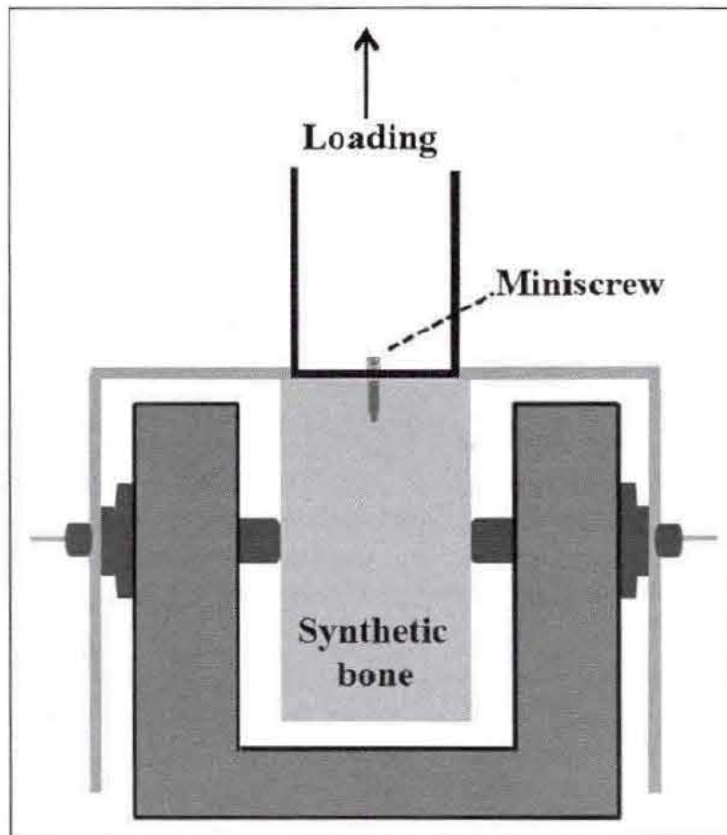


EX1006, at 4.

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<sup>1</sup> [https://wolife.international/blogs/news/melting-points-of-different-silicone-rubber-types?srsltid=AfmBOooQbx6ydi8RDD1\\_PzE2FuI94fMdEO5t1pADg8jxIYmWw1MUjaxU](https://wolife.international/blogs/news/melting-points-of-different-silicone-rubber-types?srsltid=AfmBOooQbx6ydi8RDD1_PzE2FuI94fMdEO5t1pADg8jxIYmWw1MUjaxU).

60. 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.” EX1006, at 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.



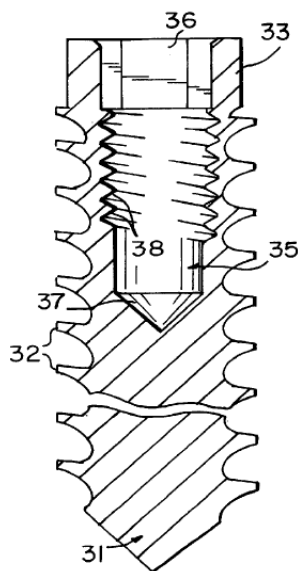
**Fig 2.** Configuration of testing setup.

EX1006, at 4.

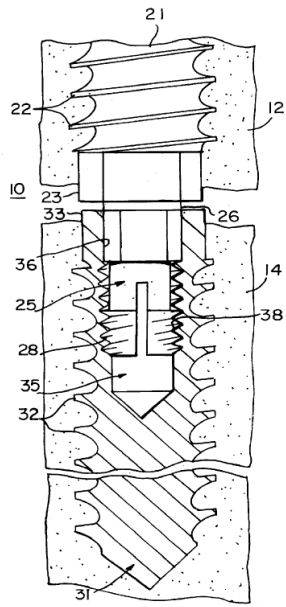
61. Gracco does not teach any method for extracting a screw through axial force that would not degrade the female threading around the screw. This is a critical feature for a temporary fastener.

62. As a POSA, I can first state that the principle that different thread profiles affect the pullout force required to disengage a screw is well-known and the natural result of inherent geometry. Second, Gracco does not disclose threads that don't damage the female threads as discussed in the 781 Patent. The 781 Patent discusses a temporary screw that does not damage the female threads such that a permanent screw may be used later in the same female threads.

63. Regardless, Gracco does not teach anything more than the other non-invalidating prior art and inherent geometry disclosed to the Examiner. For example, the implant to which Berrevoets' fastener is attached, which implant is screwed directly into bone, appears to show asymmetric threads 32 that the Petition and Gracco would (incorrectly) call 'reverse buttress threads.'



**FIG. 2**



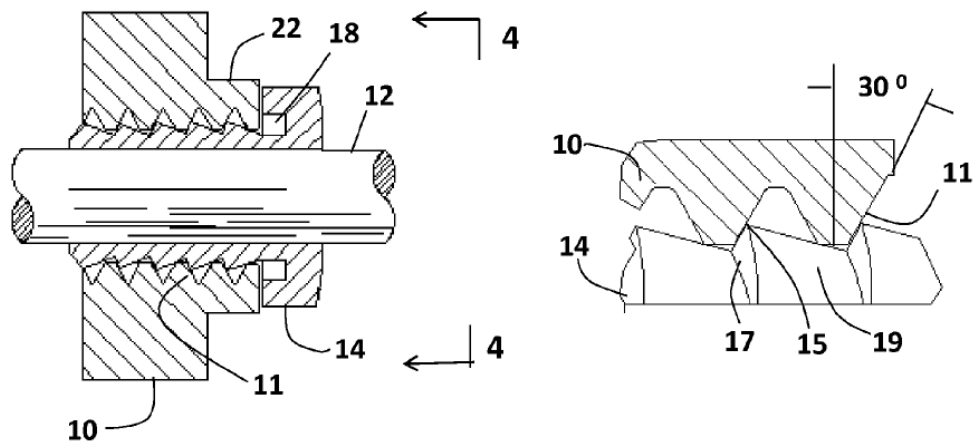
**FIG. 3**

EX2016, at 2–3. In common usage, these would be called buttress threads.<sup>2</sup> Berrevoets also discloses two embodiments of its push-in fastener, one (in Figure 3) with symmetric threads 28 and one (in Figure 5) with asymmetric buttress threads 67.

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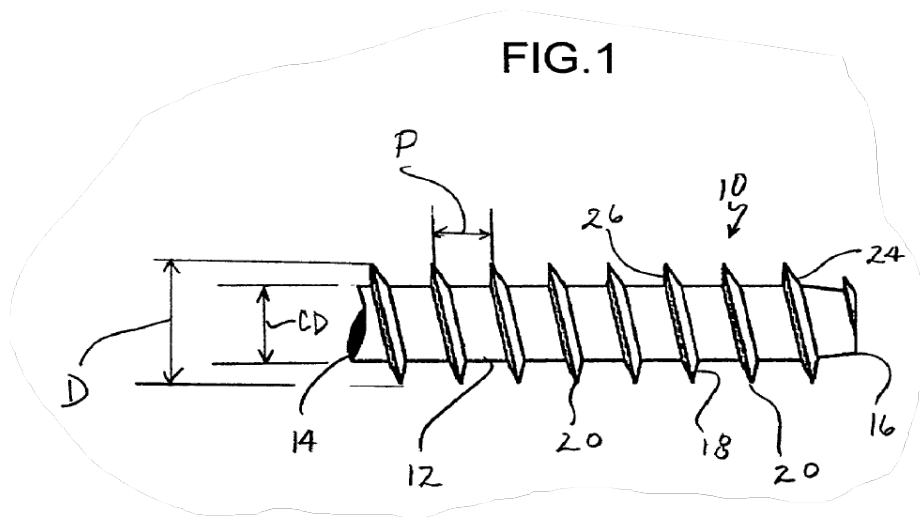
<sup>2</sup> Gracco identifies the control screws as “commercially available” screws from Ormco, called VectorTAS. EX1006, at 4. Ormco’s website (<https://ormco.com/en-us/vectortas-system>) describes the VectorTAS screws as having an “asymmetric buttress thread,” not a reverse buttress thread.





EX2017, at 1. Staniszewski was submitted to the examiner in an IDS; the examiner marked it “considered” on June 5, 2024. EX1020, at 1068–1069.

65. Neuhengen, which the Examiner identified and considered, likewise shows a screw with an asymmetric thread profile.



EX2018, at 2. Neuhengen explains that in “self-tapping or thread forming screws,” to “increase the amount of loosening torque required to remove the screw”—i.e., “to prevent unwanted unthreading”—the engineer can “make the thread of the screw

asymmetrical.” EX2018, at 3. Neuhengen explains that one “object of the present invention is to provide an improved thread forming screw which is designed to have increased resistance to pullout.” EX2018, at 3; *see also id.* at 4 (“It has been found that by providing the relatively smaller trailing angle  $\beta$ , that resistance to pullout is increased over prior configurations.”). The Examiner identified Neuhengen in a Notice of References Cited in March 2024. EX1020, at 949. She also rejected one claim based on a prior-art combination that included Neuhengen. EX1020, at 945. The examiner also marked an IDS disclosing Neuhengen as “considered” on June 5, 2024. EX1020, at 979, 979.

66. Comments that the patent owner submitted with proposed amendments during the parent 992 patent’s prosecution explain that “the standard definitive screw has a continuous symmetrical helical form as is well known to those of skill in the art.” EX1015, at 296. “In contrast, the thread profile 40 of the temporary screw of FIG. 75 is not the same as the illustrated profile ... of the definitive screw threading.” EX1015, at 297. “As a result of the open space from the different thread profile of the temporary screw compared to the definitive screw in FIG. 9, the temporary screw threading of FIG. 75 has less surface area contact with the female implant abutment threading.” EX1015, at 298. This smaller contact area and resulting smaller major diameter means that less axial pull-out force is required to remove the screw from female threading.

67. Gracco itself confirms that the inherent geometric characteristics of different screw profiles are well known and Gracco's experiment was not novel. "Measuring performance in pullout tests with axial forces is a well-established method to compare different screw designs, and the resulting pullout strength has been described in the orthopedic, maxillofacial surgery, and orthodontic fields as a fundamental biomechanical parameter contributing to the primary stability of screws." EX1006, at 3. The "buttress reverse" threaded screw was the "commercially available control design" against which Gracco's other configurations were measured. EX1006, at 4. Gracco attributes the "significant reduction in pullout force found between the buttress reverse and the buttress thread miniscrews" to "the geometry of the thread that was inclined toward the tip, thus reducing the resistance to removal in an axial direction." EX1006, at 6. "This finding was consistent with previous reports" as well. EX1006, at 6 nn. 38-40 (citing three other previous studies on mechanical properties of bone screws).

68. Gracco is therefore cumulative because it teaches nothing more than non-invalidating prior art and inherent principles already before the Examiner.

**D. Derey (EX1008)**

69. Derey teaches a plastic snap-in connector to temporarily hold elements to an implant or abutment during a denture conversion. EX1008, at 1. Derey's snap-

in connector has two legs that separate to hold the connector in the female threading of the implant or abutment. EX1008, at 18–19.

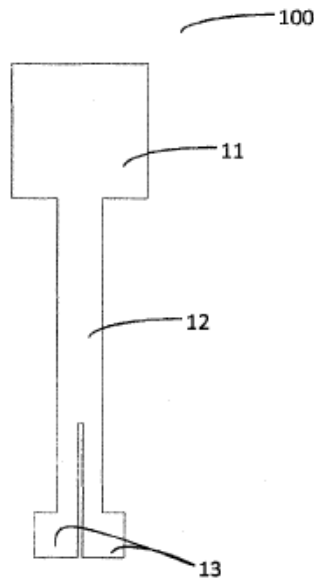


Fig. 5

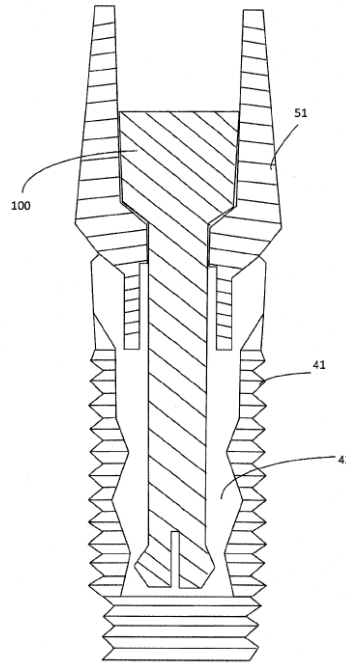


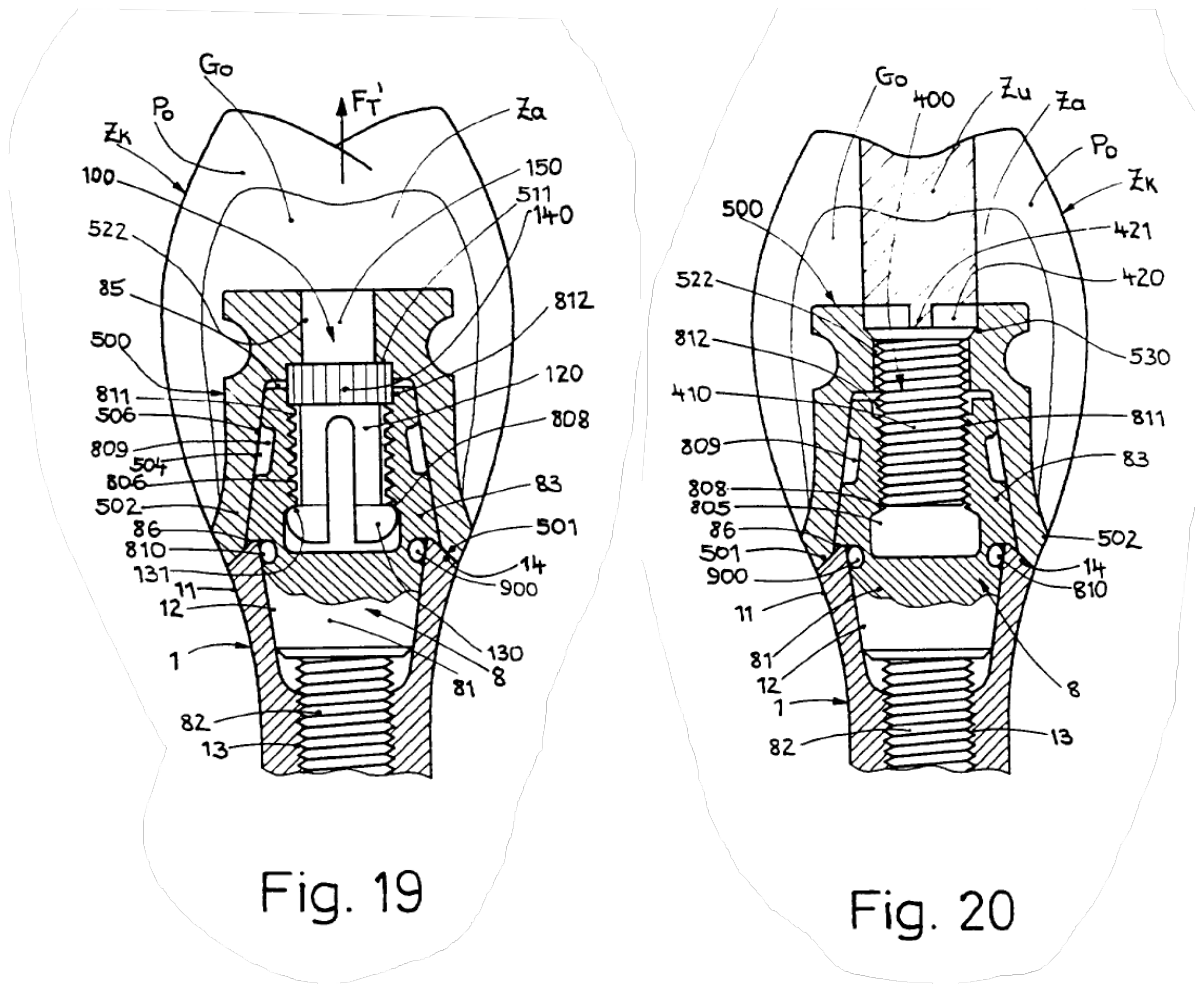
Fig. 6

EX1008, at 18, 19.

70. Dery's snap-in connector does not, however, have screw threads. Rather, the connector is pushed in and pulled out and so does not have the torquing or alignment benefits of a screw-threaded temporary fastener. Dery does not discuss rotation, a tool interface for rotation, or any threading on the fastener.

71. Based on the prosecution history, the examiner did not consider Dery. She did, however, consider several prior art references that are cumulative to Dery because they disclose fasteners that similarly use a split-post snap structure to grip the recess at the end of female threading of an implant abutment.

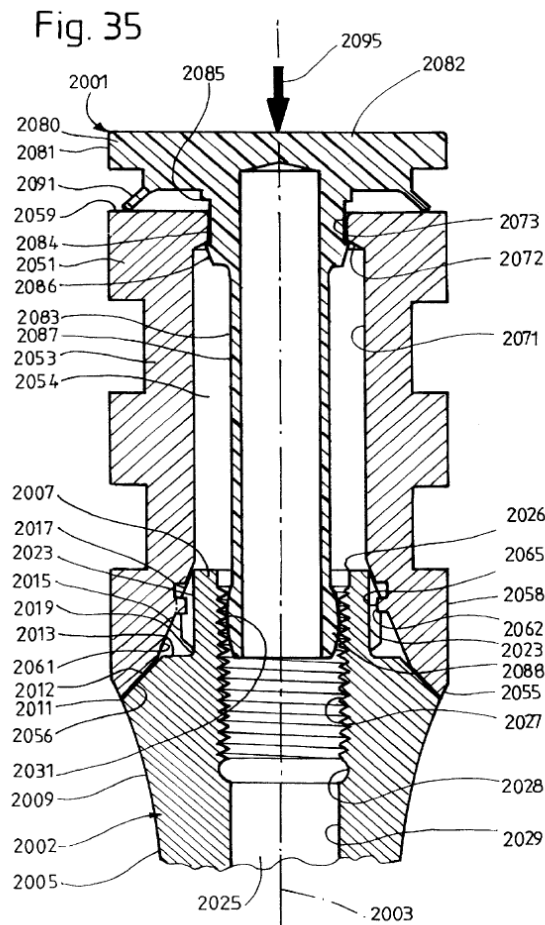
72. Sutter (1996) discloses such a fastener:



EX2012, at 76. In Figure 19, the temporary fastener has a deflecting split post which grips a circular recess below the threading of an implant abutment. This snap type fastener does not have the same rigidity, securement, alignment, and torquing benefits as a temporary screw as taught by the '781 patent. With the temporary snap fastener (not a screw) removed, in Figure 20 the definitive screw with threads matching the implant abutment permanently attaches the coping and prosthesis. The snap fastener is much different than the definitive screw, so the snap fastener lacks

the ability to fully mimic the definitive screw to reduce follow-up steps to prep and align the prosthetic for the definitive screw. Sutter (1996) was provided to the examiner in an IDS; she marked it “examined” on June 5, 2024. EX1020, at 977, 979.

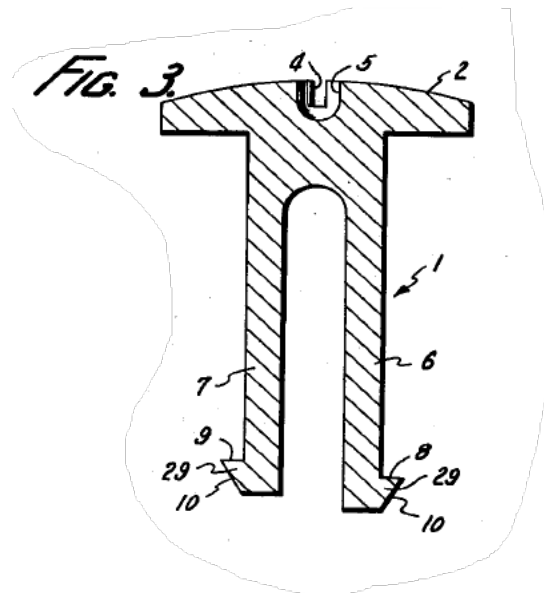
73. Sutter (2001)’s Figure 35 discloses a similar embodiment.



EX2013, at 13. In Figure 35, “[t]he anchoring part 2005 has a generally cylindrical section below, not visible, with an outer threading and a trumpet-shaped section 2009 which spreads out upwards from the generally cylindrical section.” EX2013,

at 26. The hollow fastener post attaches to the implant abutment by friction fit; “[t]he interior threading 2027 of the support thus forms a fixing section and/or attachment section 2031 on which, or in which, the fixing section 2088 of the connection element is detachably jammed fast.” EX2013, at 27. This type of fastener is sometimes called a “push-in” fastener and does not mimic a screw type fastener. Sutter (2001) was provided to the Examiner in an IDS; she marked it “examined” on June 5, 2024. EX1020 at 968, 979.

74. Johnson similarly discloses a push-in fastener with “two flexible legs or prongs” that “terminate in lips 29” that match the female threading of the base element. EX2014, at 2.

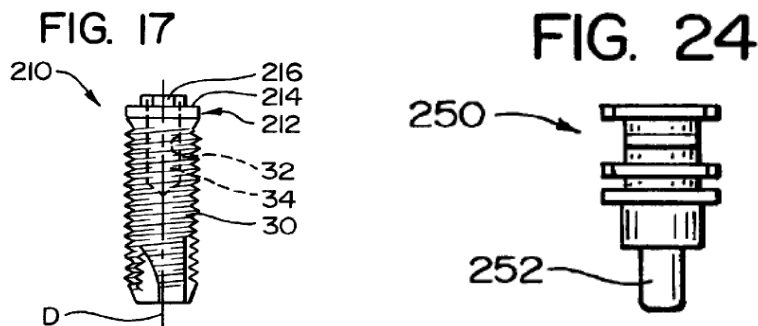


EX2014, at 1. Because the lips engage the base element’s female threading, the fastener can be torqued with screwing motion; because of the “flexible legs or prongs,” the fastener can be pushed in with an axial force. EX2014, at 2. Johnson

was provided to the examiner in an IDS; she marked it “examined” on June 5, 2024. EX1020, at 967, 979.

75. These push-in style fasteners may be quicker to use, but they generally lack the controlled axial alignment positioning capability and retention force of torqued fasteners because they only contact the threads at the very end of the prongs. Flexible prongs with only the end thread engagement also allow for this fastener to wobble or be loose in the female threads.

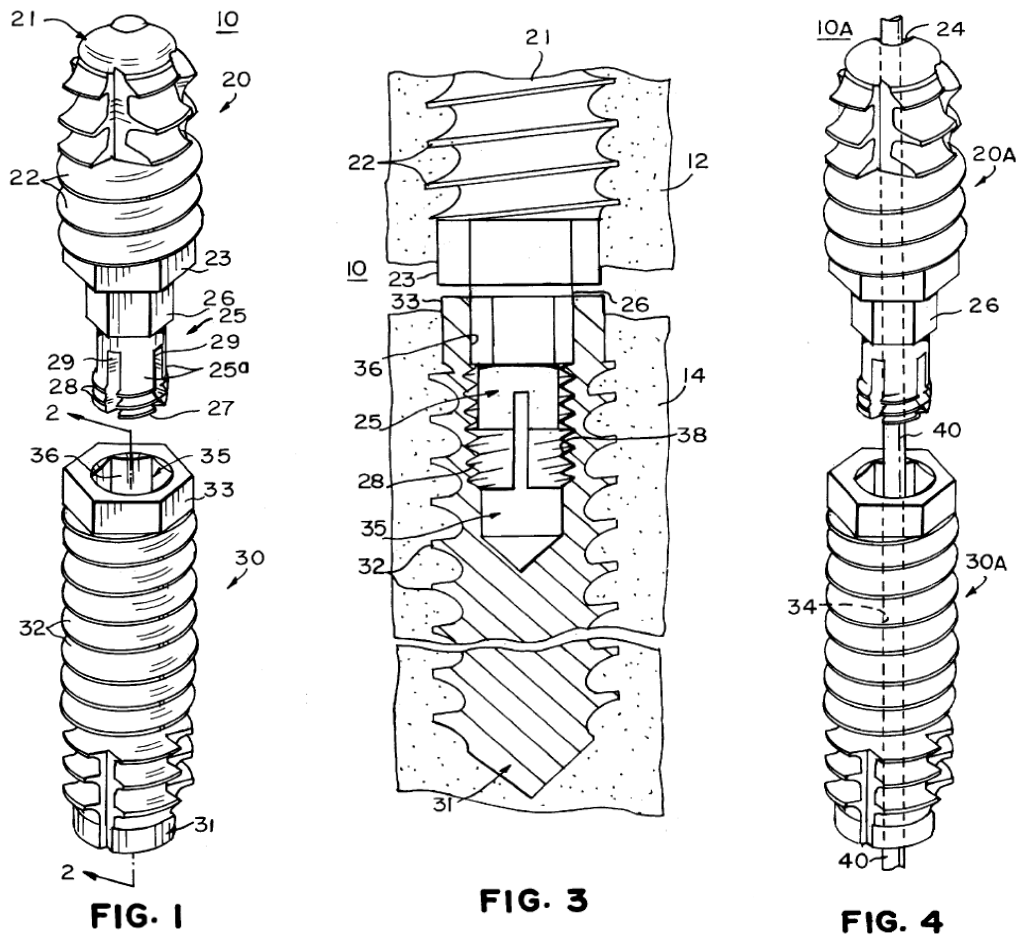
76. Prior art considered by the examiner also discloses temporary fasteners without a split-post structure that temporarily hold to the inside threading of a base element by friction fit. Wade’s Figure 24 discloses a “surgical impression feather” with “a lower post 252” that “enters the screw chamber 34 defined by the implant to form a friction fit that holds the feather 250 in place while the impression is being taken.”



EX2015, at 5, 7. Because “the post 252 is not threaded, however,” it “may be withdrawn when the impression is removed.” EX2015, at 16–17. Wade was

provided to the examiner in an IDS; she marked it “examined” on June 5, 2024. EX1020, at 972, 979.

77. Finally, prior art that the examiner herself identified (Berrevoets) discloses a push-in split-bottom fastener with screw threading that matably threaded into a bone implant, rather than using a friction fit.



EX2016, at 2–3. The examiner independently identified Berrevoets and rejected multiple claims for obviousness based on combinations of prior art that included

Berrevoets; after it was also submitted to the examiner in an IDS, the examiner marked it “considered” on June 5, 2024. EX1020, at 931–947, 949, 973, 979.

78. Finally, the 781 Patent itself discusses the trade-offs and disadvantages of existing snap-on options at length: “For snap-on systems, a closed impression tray pick-up technique may be done. ... However, it is desirable to ensure that the assembly of snap-on copings can be removed without patient discomfort. ... Some snap-on systems provide features to provide different retention levels, but this complicates the installation process. Special tools have been introduced to help separate impression trays or prostheses with snap-on systems but may still result in patient discomfort. Since snap-on systems are generally physically larger than dental screws, 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. These large holes may significantly reduce the mechanical stability of the existing denture. The mechanical precision required of snap-on system elements generally makes them more expensive than screw-attached systems.” EX1001, at 30.

79. Furthermore, “[o]ther 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 trade-offs in precision and associated complexity or size required for equivalent performance to open-tray impression

screw techniques have not been disclosed.” EX1001, at 31. “The simplicity of screw-attached systems provides some benefits over snap-on systems beyond fabrication cost,” including “axial tension control,” “self-aligning characteristics,” and “independence for removal since each coping can be loosened individually.” EX1001, at 30.

80. Based on the above, Derey is cumulative because it does not teach anything more than the prior art before the Examiner. It is therefore not invalidating prior art.

## **VIII. SUMMARY OF OPINIONS**

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

82. Ground 1: Claims 6 and 10 are not indefinite. My understanding is that 35 U.S.C. § 112(f) permits means-plus-function claims that cover the corresponding structures and materials disclosed in the patent and specifications. Because numerous embodiments are disclosed, Claim 6 is not indefinite as to any disclosed embodiments. Furthermore, Claims 10–16 are not indefinite because “does not essentially match” provides a POSA with clear notice of what is claimed and defines “does not essentially match.” This is equivalent to an engineering “fit” requirement meaning it is not a line-to-line or locational fit, which are well-known in the mechanical engineering field.

83. Ground 2: The 781 Patent’s specification and disclosures support and enable Claims 1–16. A POSA would interpret the 781 Patent to disclose numerous embodiments of the claimed invention and therefore adequately enable the full scope of its independent claims. For the same reasons, they adequately enable dependent claims 2–5, 7, 9, and 11–15 as well. Furthermore, the “securing the coping to the threads of the implant abutment” limitation in claims 1–9 is supported. The Petition’s argument otherwise reads the claims in an unnatural way that a POSA would not follow. As to the “does not engage the implant abutment threads continuously” limitation in claims 1–9, the specification adequately supports that limitation as well because a POSA would understand the 781 Patent to disclose several embodiments that, after the separable fastener is placed, leave implant abutment threads empty above or below the separable fastener. 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 every embodiment disclosed in the 781 patent meets this “release” limitation, which is one of the patented invention’s key advantages. As to claim 14, the “distal ... shaft configured to deform” limitation is adequately supported because the specification discloses elastic and inelastic deformation as well as fracturing structures as

illustrative mechanisms for attaching a two-piece fastener's post to its cap, and a POSA would understand the same feature could be used to attach the temporary fastener post to the abutment threading. 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.

84. Ground 3: A POSA would not have combined Bernhard, Poovey, and Gracco to arrive at the claimed invention. Such a combination would not have had a reasonable expectation of success because coating metal or plastic threads on the temporary fastener "with a heat labile plastic or silicone" or making the threads from those materials, as Poovey teaches, is not practical for the extraordinarily small screws used in dental implants. Nor does the Petition identify any problem to be solved with any of the asserted prior art that would have motivated a POSA to look to other prior art. Therefore, claims 10, 12, 15, and 16 would not have been obvious based on Bernhard in view of Poovey and Gracco.

85. Ground 4: A POSA would not have combined Bernhard, Gracco, and Derey to arrive at the claimed invention. For the same reasons I explain in my response to the Petition's Ground 3, such a combination would not have had a reasonable expectation of success. Furthermore, the claim 4 would not have been obvious in view of Derey because Derey discloses a snap-in system, not a screw-in system, which does not have the key advantages that the claimed invention's screw-

in system provides. Therefore, claims 1–9, 11, 13, and 14 would not have been obvious based on Bernhard in view of Poovey, Gracco, and Derey.

**IX. GROUND 1: CLAIMS 6 AND 10 ARE NOT INDEFINITE.**

86. Petitioner argues that Claim 6 is indefinite because it “impermissibly recites only functional limitations at the alleged point of novelty.” Petition at 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 at 35–36. I disagree with both arguments.

**A. Even if Claim 6 Contains a Functional Limitation, that Limitation Covers Numerous Embodiments of the Claimed Invention Disclosed in the Specification.**

87. 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.” EX1001 at 42–43.

88. Petitioner says that this is a functional limitation that is impermissibly indefinite because it “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 at 33.

89. I disagree. This limitation informs a POSA of the claimed invention's scope with reasonable certainty when read in view of the specification and prosecution history. As I explain below, the 781 Patent's specification discloses numerous embodiments of the claimed invention, including at least (1) a single-piece temporary fastener with what the Petition calls a reverse buttress thread, (2) a single-piece temporary fastener with a buttress thread, (3) a single-piece temporary fastener with an interference fit, and (4) a single-piece temporary fastener with symmetrical threads.

90. Every single embodiment disclosed in the specification satisfies this release limitation. Indeed, a POSA would understand from the 781 Patent's specification that the release function is one of the key advantages of the claimed invention; it is what leads to significant efficiency gains in the pick-up processing and denture conversion more generally. The various different embodiments disclosed all teach different ways to satisfy the release limitation.

**B. The “Does Not Essentially Match” Limitation in Claims 10–16 Gives a POSA Clear Notice of the Claimed Invention.**

91. Claim 10 describes a temporary fastener with “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.” EX1001 at 43.

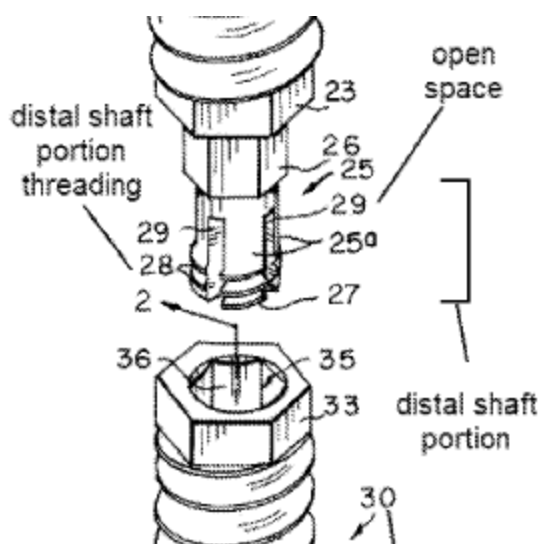
92. Petitioner argues that this “‘does not essentially match’ limitation is indefinite.” Petition at 35. Petitioner acknowledges that “[t]he ’781 patent specification states ... that ‘the term[] ‘essentially’ mean[s]  $\pm 10$  percent.’” Petition at 35. Yet Petitioner insists that “the specification does not set forth any standard or guidance that explains how to apply this definition to determine whether or not the thread ‘contours’ of the temporary fastener and the abutment ‘essentially match.’” Petition at 35.

93. I disagree. A POSA would be able to determine the scope of the claimed invention based on the definition provided, the application of that definition in the parent patent’s prosecution history, and in light of the use of tolerance requirements in the mechanical engineering field generally.

94. Screw-based fasteners with threading are well-known and commonly used in the mechanical engineering field. A POSA would understand that a screw’s threading contour can be described and measured using one or more of several well-known properties, including pitch, pitch angle, thread diameter (minor and major), proximal thread angle, and distal thread angle. A POSA would also understand that whether a screw’s threading contour matches female threading can be described and measured using the contact area between the screw and the female threads, or using the thread volume compared to the female threads.

95. The 781 Patent Specification explicitly defines “essentially” to be equivalent to “about,” both of which “mean  $\pm 10$  percent.” EX1001 at 33.<sup>3</sup>

96. 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.” EX1020 at 940. The examiner included an annotated version of Berrevoets’ Figure 1.



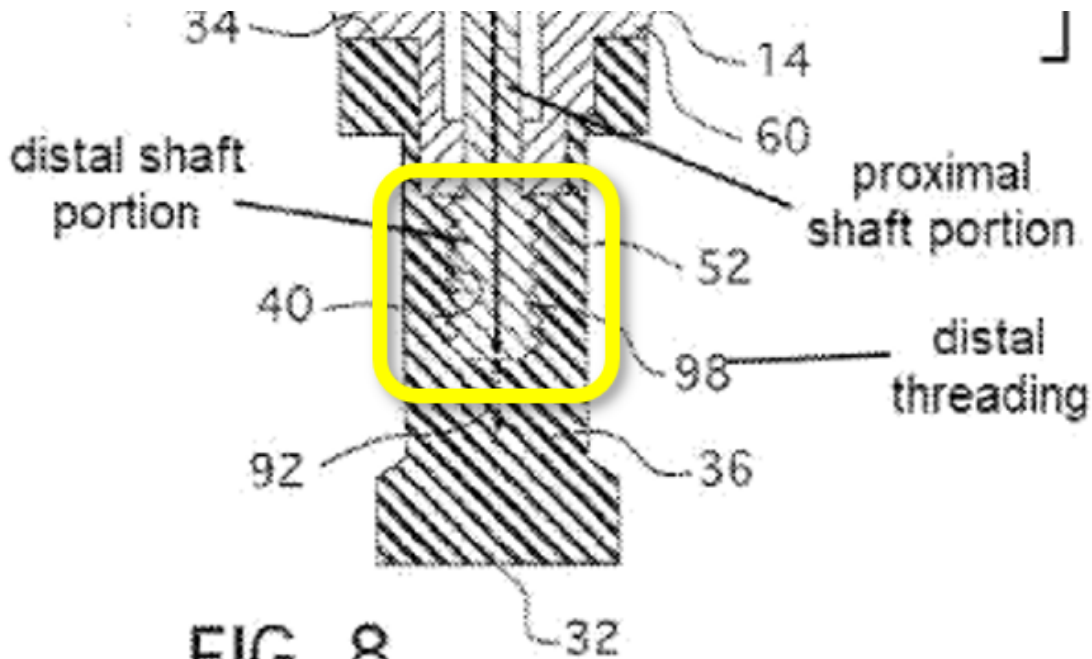
EX1020 at 934.

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<sup>3</sup> Petitioner seems to criticize the definition’s placement “in a paragraph that defines a long list of common words.” Petition at 35. This has no bearing on how a POSA would understand the written definition.

97. 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 on labeled the Figure 1 fastener's "open space," which left empty space in 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 more than  $\pm 10$  percent, and therefore did not "essentially match."

98. 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. EX1020 at 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)

EX1020 at 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 both empty threading above the fastener’s threads, as well as empty threading areas formed by the fastener’s slots.

99. These are not difficult concepts for a POSA to understand. Indeed, engineering and manufacturing specifications commonly include tolerance requirements that are similar in function to this “essentially match” limitation.

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

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

101. 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 ‘assymmetric’ buttress thread that is different from the symmetric thread of the definitive screw and the implant abutment of Figure 9.” Petition at 41.

102. A POSA would understand the 781 Patent’s specification, however, to support the full scope of the thread pattern/profile limitations in independent claims 1, 6, 8, and 10. Furthermore, a POSA would understand the Priority Applications to support the full scope of the release limitations in those same claims.

**A. A POSA Would Understand The Specification To Support The Full Scope Of The Thread Pattern / Profile Limitations In Independent Claims 1, 6, 8, and 10.**

103. Claim 1 describes “a temporary screw” that has a “distal shaft portion of the temporary fastener” with “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.” EX1001, at 26.

104. Claim 6 describes a temporary fastener with a “distal shaft portion ... 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.” EX1001 at 27.

105. Claim 8 describes a temporary fastener with a “distal shaft portion ... 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,” and “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.” EX1001 at 27.

106. Claim 10 describes a temporary fastener with “a distal portion having an outer surface comprising shaft threading having a shaft threading contour does not essentially match the implant abutment threads contour.” EX1001 at 28.

107. 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’

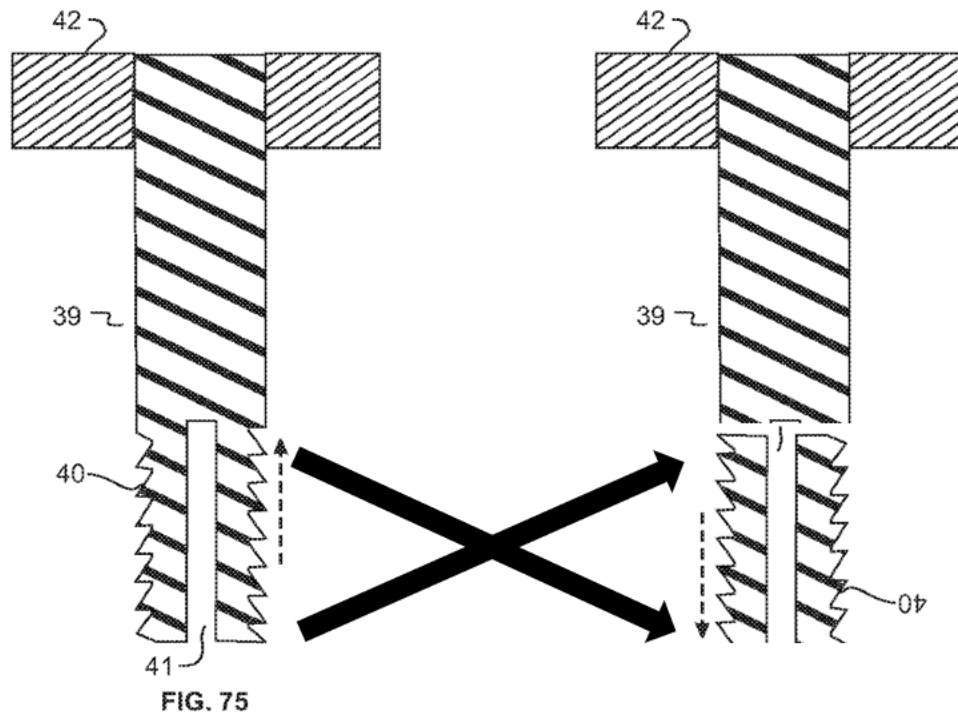
buttress thread that is different than the symmetric thread of the definitive screw of Figure 9.” Petition at 41.

108. I disagree. The Petition essentially ignores the written portions of the 781 Patent specification and focuses exclusively on Figure 75. A POSA would not do so because the descriptions themselves state that the descriptions should not be read that way: “[T]he drawings featured in the figures,” including Figure 75, “are for the purpose of illustrating certain convenient embodiments of the present invention and are not to be considered as limitation thereto.” EX1001 at 8. Rather, a POSA would understand the 781 Patent to disclose multiple embodiments of a one-piece temporary screw with a thread pattern or profile that is different from that of the permanent screw.

109. The 781 Patent specification, for example, says that “[t]he inventive concepts disclosed are not meant to be restricted to a temporary attachment post with standard screws that both engage and disengage the threads in the implant abutment through rotations.” EX1001 at 41. “For example, alternate separable temporary attachment posts embodiments are possible providing features that allow the post to removably hold the coping to the abutment by other means than a separable cap.” EX1001 at 41. “For example, as shown in FIG. 75 an alignment fastener 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.” EX1001 at 41. A

POSA would understand this to disclose any embodiment with a threaded or serrated portion that engages the threads in the implant abutment through rotations for insertion “but that will release” the threading “with axial after.” EX1001 at 41. A POSA would understand the disclosure this way because the 781 Patent specification specifically instructs the reader that “the 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.” EX1001 at 33. A POSA would therefore understand the phrase “as shown in FIG. 75” to be illustrative, not limiting of the written description that follows.

110. As another embodiment of such a fastener, 781 Patent specification says “the threads could be designed to provide engagement with the implant abutments threads through axial motion in the *opposite direction* to the arrow shown in FIG. 75.” EX1001 at 41 (emphasis added).



111. The illustration above left is the 781 Patent's Figure 75. EX1001 at 25. The illustration above right rearranges Figure 75 to show a thread pattern "designed to provide engagement with the implant abutments threads through axial motion in the *opposite direction* to the arrow shown in FIG. 75," as the 781 Patent specification describes. The Petition would call such a thread pattern a reverse buttress thread instead of the buttress thread pattern shown in Figure 75. Such an embodiment would be pushed into the abutment through axial motion in the opposite direction of the arrow in Figure 75, and its reverse buttress threads (with steep edge facing the screw head instead of the distal portion) would engage with the abutment's female threads to secure the temporary fastener.

112. Although the distal steep thread profile is preferred over the proximal steep thread profile, the 781 Patent implicitly teaches that both are suitable for practicing the claimed invention. A POSA would understand this language to disclose such an embodiment.

113. Because of the differences in these thread profiles, these two embodiments would likely require different levels of force for axial movement in the two directions. Tailoring these forces by adjusting the thread profile would not take undue experimentation. Such a thread profile could even be combined with the “split post bottom structure shown in FIG. 75,” which can be used both for “axial extraction” and “axial insertion.” EX1001 at 41. A POSA would understand that additional thread profiles between these two ‘extremes’ (buttress thread and reverse buttress thread) are also included within this disclosure. Furthermore, the thread profile could also be modified by serrating the thread without using a split-post structure. Removing half of the thread cresting through serration would be expected to roughly half the pullout force required.

114. This is not the only additional embodiment the 781 Patent specification discloses. For example, the specification says that “[a]lternative approaches for engaging a temporary attachment post with abutment threads through axial insertion

without rotation are considered to be part of this disclosure,” including “an interference fit between the bottom of the post with the threads.” EX1001 at 41.<sup>4</sup>

115. A POSA understands that an interference fit (sometimes called a press fit or friction fit) is a mechanical friction fit that results from inserting a large first part into a smaller hole of a second part.<sup>5</sup> In the case of a first part in the form of a

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<sup>4</sup> Interference fits are introduced earlier in the specification as one of the possible mechanical attachment techniques for attaching a temporary fastener’s post to the separable cap: “The cap can be attached to the post through a combination of known mechanical attachment means including but not limited to interference fits, adhesives, snap fits or other elastic and inelastically deforming retention elements.” EX1001 at 32.

<sup>5</sup> See, e.g., Volkan Kovan, *Separation frequency analysis of interference fitted hollow shaft-hub connections by finite element method*, 42 *Advances in Engineering Software* 644, 644 (2011) (“An interference fit is a fastening between especially cylindrical two parts which is achieved by friction.”); Seung Woo Lee, Dai Gil Lee, *Torque transmission capability of composite-metal interference fit joints*, 78 *Composite Structures* 584, 584 (2007) (“An interference fit is a mechanical retention mechanism which operates by interference of materials.”); James M. Leake et al., *Engineering Design Graphics: Sketching, Modeling, and Visualization* 258 (Wiley

cylinder making an interference fit with a circular hole in the second part, the outer diameter of the cylinder is larger than the inner diameter of the hole. The resulting compressive loading in the radial direction depends upon the magnitude of the physical size mismatch and the mechanical properties of the two parts. In some cases, for example attaching a wheel to a shaft with an interference fit, the wheel with the opening may be heated to temporarily enlarge the opening for assembling onto the shaft. Then, as the temperature returns to equilibrium, the compressive forces on the interface between the two parts increases. In less demanding cases, two parts at the same temperature are simply pressed together with elastic deformation of one or both parts at the interface providing the tensile and compressive forces and therefore increasing frictional holding for the interference fit. Because of the threading on the implant abutment, a POSA would understand that inserting a temporary fastener post with a diameter slightly larger than the abutment threads' diameter would result in an interference fit.

116. A POSA also understands that interference fits can be produced in parts without axial symmetry. The amount of elastic deformation necessary from the sizing mismatch, total contact surface area, surface finish and material properties of

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2022) (“In an interference fit, the internal member is always larger than the external member.”).

both interfering materials can be adjusted in a straightforward manner (without undue experimentation, in other words) to provide the desired mechanical retention force.

117. A POSA would understand that embodiments using an interference fit would need to be designed such that the temporary screw does not alter or degrade the female threading on the abutment, and by extension, the permanent connection of the definitive screw. That is necessary to preserve the geometric precision of the definitive screw's attachment, one of the principal advantages of the claimed invention.

118. A POSA understands that 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. Because of the helical nature of the thread, a screw thread does not have axial symmetry and so the interference pressure will be localized to the crests of the threads. If the amount of interference is not too high, the deformation will be essentially elastic; in other words, there will be essentially no permanent dimensional change to the polymeric post. It will be compressed as it passes the crest of each thread but will expand essentially back to its original diameter at a time or in the areas not in contact with the implant abutment thread. This means it will be squeezed at the crests of the threads and subsequently expand

radially outward to a least some extent into the open cavity of the implant abutment's threading, where the pressure is reduced, as shown below.



119. A POSA understands that this elastic relaxation away from the crests creates a shallow male thread in the post and is a fundamental characteristic of compressing a softer or more easily deformed material with a harder material, consistent with the interference fit described in the 361 Priority Application. Although the relaxation of the post between crests may be very small, it allows sufficient engagement of a polymeric cylindrical post to be rotated into a metal abutment with female threading. This is also possible regardless of whether the rotation begins at engagement or begins after partial axial insertion.

120. Thus, a POSA would know, an interference fit between a softer polymeric post and a harder metal female threading will inherently provide some level of thread formation on the post that minimally fills the open volume of the female threading. In this sense, the interference fit's polymeric post represents a

symmetric thread profile that does not match the female thread profile of the abutment that the post was inserted or screwed into.

121. It does not matter whether one considers the thread profile to be initially flat or formed by relaxation after press-fitting; the induced threads match the pitch of the implant abutment threading and can be advanced and ultimately torqued by rotation. A shallow thread (or even a flat thread) is a different threading profile than the asymmetric thread shown in Figure 75.

122. A POSA would understand that rotating the temporary screw into position to achieve the interference fit is preferred over axial insertion without rotation, to better approximate the alignment achieved when the definitive screw is used. Torquing the temporary screw in place will also provide more axial retention since there is less risk of shearing material off of the post or male or female threads.

123. By identifying additional embodiments of one-piece temporary fasteners a POSA would consider to be disclosed in the 781 Patent specification, I do not suggest that other or additional embodiments are not disclosed. I simply describe the additional embodiments above to show that the Petition is incorrect to say the 781 Patent specification “describe[s] only one temporary screw embodiment with a different thread pattern.” Petition at 41. A POSA would not understand the specification to describe only one temporary screw embodiment.

**B. A POSA Would Understand The Specification To Support The Full Scope Of The Release Limitations In Independent Claims 1, 6, 8, and 10.**

124. Claim 1 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 when an axial release force is applied in a proximal direction to the temporary fastener.” EX1001 at 42. 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.” EX1001 at 42–43. Claim 8 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 when an axial release force is applied in a proximal direction to the temporary fastener.” EX1001 at 43. Claim 10 describes 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.” EX1001 at 43.

125. 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 at 46.

126. I disagree. As with the Petition’s assertions about the thread pattern/profile limitations, these arguments essentially ignore the written portions of the 781 Patent specification and focus exclusively on Figure 75. A POSA would not do so because (as explained above) the descriptions themselves state that the descriptions should not be read that way: “[T]he drawings featured in the figures,” including Figure 75, “are for the purpose of illustrating certain convenient embodiments of the present invention and are not to be considered as limitation thereto.” EX1001 at 33. Rather, a POSA would understand the specification to disclose multiple embodiments of a one-piece temporary screw with and without a split post or deflecting-leg design.

127. A POSA would understand the 781 Patent specification to disclose embodiments that do not have a “split-post structure with deflecting legs,” as the Petition describes them. Petition at 46. The disclosure also includes (among other embodiments) those with “an interference fit between the bottom of the [temporary fastener] post with the [abutment] threads.” EX1001 at 41.

128. 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.” EX1001 at 32 (emphasis added). Such a “deflecting feature” would include, but certainly would not be limited to, a split-post design.

129. Furthermore, the 781 Patent specification discloses using such a structure for both “axial extraction” as well as “axial insertion.” EX1001 at 41. 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.” EX1001 at 41. A polymeric post with an interference fit, explained in detail above, would not require a split-post or deflecting-legs structure to provide the attachment force necessary.

130. The 781 Patent describes an “attachment post portion 39” with “a slot 41 and asymmetric threads or serrations 40.” EX1001 at 41. 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.’” EX1001 at 33. 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.

131. 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.

132. For these reasons, a POSA would not understand the 781 Patent specification's disclosures to be limited to a temporary fastener with a split-post structure or deflecting legs. A POSA would also not interpret such a structure as being critical to the invention. Even features that are preferred or illustrated would not be understood by a POSA to be critical or essential. 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.

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

133. 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.

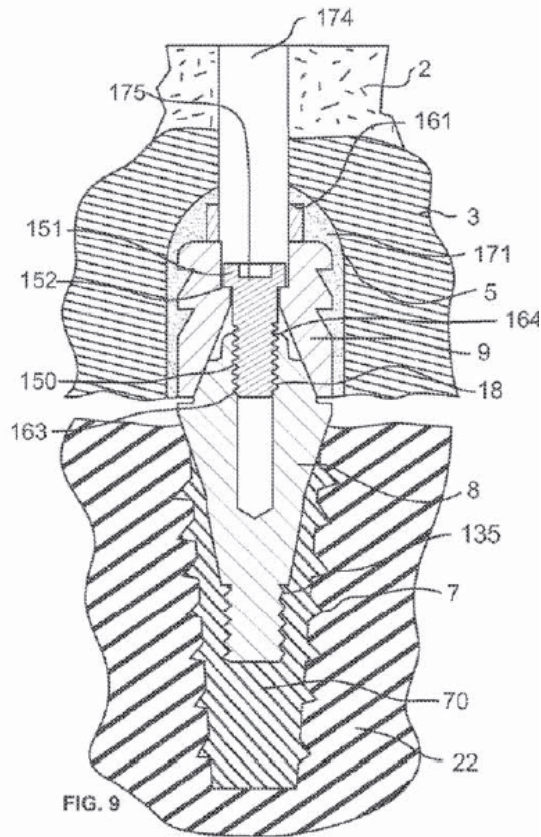
134. The Petition also presents a few additional arguments for why certain claims should be found invalid. In my view and that of a POSA, these arguments are unpersuasive.

**A. A POSA Would Understand The Specification To Support The “Securing The Coping To The Threads Of The Implant Abutment” Limitation Of Claims 1–9.**

135. Claim 1 describes “a definitive screw” with “threads configured to securing the coping to the threads of the implant abutment.” EX1001 at 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 at 53.

136. I disagree. A POSA would not understand the claims or specification this way. A key characteristic which make the 781 Patent’s temporary fasteners novel is that they secure the coping to the abutment using the same abutment threading that the definitive screw will ultimately use.

137. The 781 Patent’s Figure 9 clearly shows how the definitive screw 175 holds the coping 9 (and attached prosthesis 3) to the implant abutment 8. “The male threads 150 of the definitive screw are shown filing the female threads of the abutment” as “the definitive screw 175 is torqued into position.” EX1001 at 37.



EX1001 at 7. A POSA understands how this simple concept works: 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. A POSA, like any layman, could easily say that the definitive screw secures the coping to the implant abutment's threads *or* that the definitive screw secures the coping to the implant abutment.

**B. A POSA Would Understand The Specification To Support The “Does Not Engage The Implant Abutment Threads Continuously” Limitation Of Claims 1–9.**

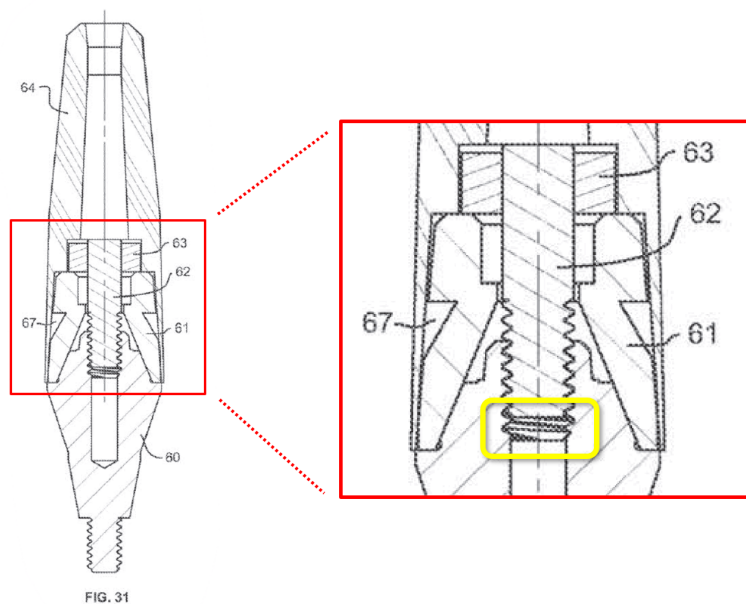
138. Claim 1 describes a temporary fastener where “the distal shaft portion is sized and configured so that it does not engage the implant abutment threads continuously between a most distal position of the distal shaft portion and a proximal end of the implant abutment threads.” EX1001 at 42. Claim 6 likewise includes an identical limitation. EX1001 at 43.

139. 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 at 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 at 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 at 56.

140. I disagree. A POSA would understand the 781 Patent specification to describe several 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.

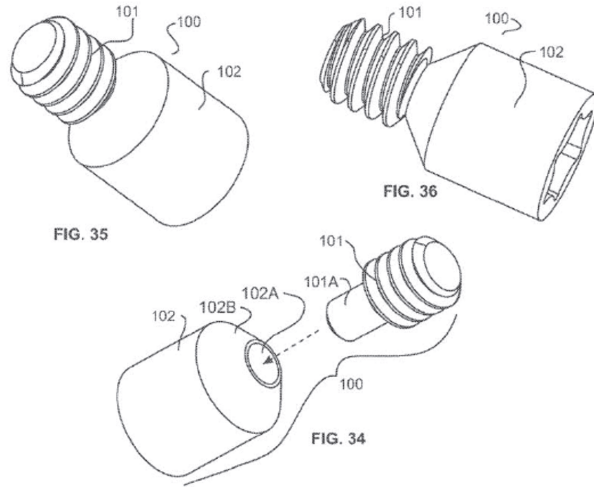
141. Figure 31 depicts precisely such an embodiment, with the yellow-outlined portion being (in Petitioner’s words) “abutment threads ... below the temporary fastener” left “empty.”



EX1001 at 13 (annotations added). Figures 82–90 show additional embodiments with abutment threads left empty below the temporary fastener’s threads. EX1001 at 27–28.

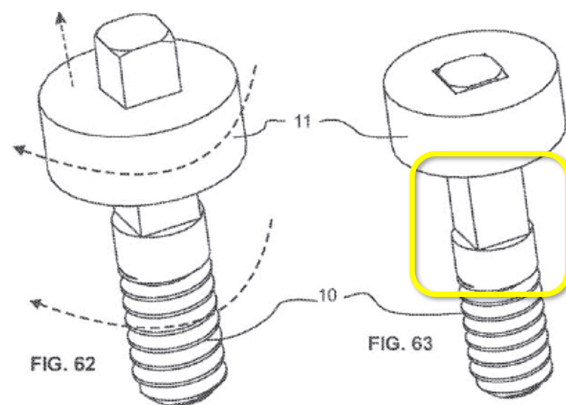
142. A POSA would also understand the specification to disclose several embodiments which leave abutment threads above the temporary fastener’s threading empty as well. Figures 34 through 36 show a temporary fastener with a proximal post portion 101A with a total diameter that is smaller than the diameter of

its threads 101, which allows the temporary fastener to be screwed in farther into the implant abutment, until the proximal end of the temporary fastener's threads have passed the proximal end of the implant abutment's threading.



EX1001 at 14.

143. A POSA would understand Figures 62 and 63 to show that in certain embodiments the temporary fastener's cap moves upward as the fastener is screwed further into the abutment.



EX1001 at 23 (annotation added). The portion outlined in yellow above, if configured like the smaller-diameter post of Figure 34, would therefore leave abutment threading empty above the temporary fastener's threads. A POSA would understand 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." EX1001 at 33.

144. A POSA would have therefore understood the specification to describe multiple temporary fasteners 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 (or unfilled).

**C. A POSA Would Understand The Specification To Support The "Outer Surface ... Deform" Limitation Of Claim 5.**

145. 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." EX1001 at 42.

146. Petitioner says that this "outer surface ... deform" 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.” EX1001 at 41.

147. I disagree. A POSA would understand the specification to disclose at least one such embodiment, a temporary fastener that uses “an interference fit between the bottom of the post with the threads,” which “[s]imilarly ... may also be designed to provide sufficient engagement to provide adequate alignment and fixing of the coping.” EX1001 at 41.

148. 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. 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 without threading before insertion, 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 small temporary and elastic).

149. A POSA would understand 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. A POSA Would Understand The Specification To Support The “Wherein The Temporary Fastener Is Configured To Release” Limitation Of Claim 6.**

150. 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.” EX1001 at 42–43.

151. Petitioner argues that the 781 Patent specification does not support of enable this limitation. Petition at 58.

152. I disagree. A POSA would understand that *every* embodiment the 781 Patent specification discloses meets this limitation. It is one of the patented invention's key advantages. As I explain above, a POSA would understand that the embodiments that the 781 Patent specification discloses include *at least* (1) a single-piece temporary fastener with what the Petition calls a reverse buttress thread, (2) a single-piece temporary fastener with a buttress thread, (3) a single-piece temporary

fastener with an interference fit, and (4) a single-piece temporary fastener with symmetrical threads. All of these fasteners are releasable and a POSA understands how they are releasable.

**E. A POSA Would Understand The Specification To Support The “Distal ... Shaft Configured To Deform” Limitation Of Claim 14.**

153. 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.” EX1001 at 43.

154. 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 at 60–61.

155. I disagree. A POSA would understand that detachment is a form of deformation, specifically inelastic deformation. The 781 patent specification discusses “elastic and inelastically deforming retention elements” as well as “fracturing structures” as illustrative mechanisms for attaching a two-piece fastener’s post to its cap. EX1001 at 32, 36. A POSA would understand that these same characteristics or features could be used to attach and/or release the temporary fastener’s post to/from the implant abutment’s threading. A POSA would understand that because, as the specification instructs, “the particular features, structures, or

characteristics may be combined in any suitable manner in one or more embodiments without limitation.” EX1001 at 33.

**F. A POSA Would Understand The Specification To Support the “Smaller Maximal Width” Limitation Of Claim 15.**

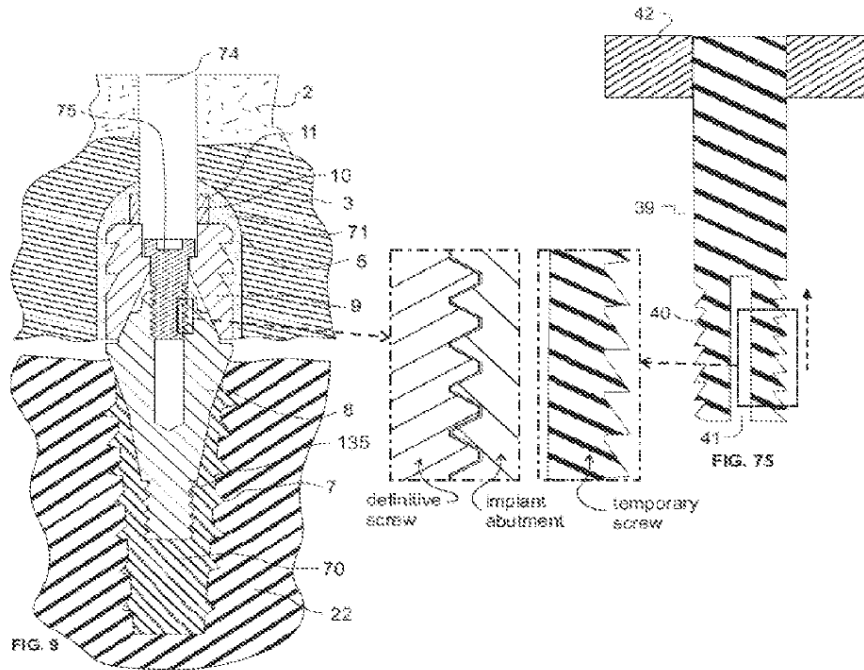
156. Claim 15 describes a temporary fastener “wherein a maximal width of the distal portion of the shaft of the temporary fastener is smaller than a maximal width of the threads of the definitive screw.” EX1001 at 43.

157. 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 at 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 at 62.

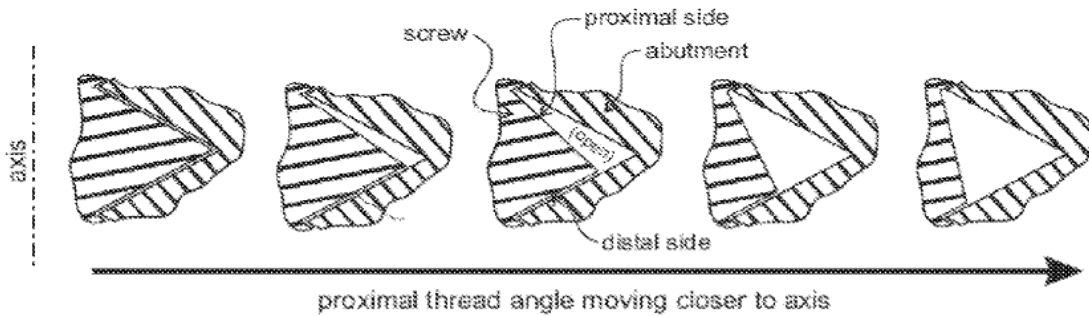
158. I disagree. A POSA would understand that the maximal width (or maximum or major diameter) of a threaded temporary fastener configured like the embodiment in Figure 75 must be smaller than the maximal width (or maximum diameter) of the implant abutment’s threads and the permanent screw that will fill them.

159. Inherent geometry shows that the temporary screw 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. A POSA would understand this.

160. Materials that SDC submitted during the parent 992 Patent's prosecution show this clearly:



EX1015 at 296.



EX1015 at 297.

161. A POSA would understand that if a temporary screw 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.

162. Additionally, an interference thread, as shown by the red/black female/male thread combination, 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.

**XII. GROUND 3: A POSA WOULD NOT HAVE COMBINED BERNHARD, POOVEY, AND GRACCO TO ARRIVE AT THE CLAIMED INVENTION.**

163. 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 at 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 at 65–66.

164. As explained above, I understand that for an obviousness argument of this kind to succeed, 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. Moreover, 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.

165. Based on this understanding, I do not agree that a POSA would be motivated to successfully combine Bernhard, Poovey, and Gracco to arrive at the claimed invention because such an invention would not have a reasonable expectation of success. There was also no mention of a problem to be solved with any of the asserted prior art to motivate a POSA to look to other prior art.

166. Specifically, “coat[ing]” metal or plastic threads on the temporary fastener “with a heat labile plastic or silicone” as Poovey teaches (EX1005, at 12) is not practical for the extraordinarily small screws used in dental implants. That is true for two reasons.

167. First, making the temporary fastener’s threads out of silicone or coating the threads from silicone would impede—or prevent altogether—the temporary fastener’s initial insertion, because of silicone’s inherent properties. It is not rigid enough to easily fit into the female threading, especially with the friction it would

create. Attempting to do so would be like trying to push a gummy worm into a pencil sharpener.

168. Second, making the temporary fastener's threads out of heat labile plastic or coating the threads with such plastic would not be successful either. For one thing, as the 781 Patent itself notes, Poovey does not teach a viable method for applying the heat necessary to sufficiently degrade the thread material or coating. *See* EX1001 at 31 (“the practicality of providing adequate alignment and seating forces with a screw diameter in the range of existing systems or overcoming the lack of disengagement independence required in melting all threads simultaneously without patient discomfort has not been documented.”). Applying enough heat to sufficiently degrade or dissolve the thread material or coating *through the prosthesis, coping, and/or implant abutment* is likely to be inefficient and perhaps even painful for the patient. That is especially true because all temporary screws holding the prosthesis to the abutments would need to be heated simultaneously to successfully carry out pick-up processing. Finally, Poovey does not teach how one could degrade or melt the threading or thread coating and then “remov[e] any residual material in the abutment threads or in the prosthesis after the pick-up process.” EX1001 at 31. Straumann's expert also doesn't describe this as a problem that requires a solution provided by the other references.

169. For these reasons, a POSA would not be motivated to combine Bernhard, Poovey, and Gracco to reach the claimed invention. Nor would a POSA have a reasonable expectation of successfully doing so.

**XIII. GROUND 4: A POSA WOULD NOT HAVE COMBINED BERNHARD, GRACCO, AND DEREY TO ARRIVE AT THE CLAIMED INVENTION.**

170. 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 at 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.

171. 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 at 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.” EX1001 at 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.” EX1001 at 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.

172. 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.” EX1001 at 31.

173. 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. 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.

#### **XIV. CONCLUSION**

174. 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: September 25, 2025

A handwritten signature in black ink, appearing to read 'KRL' followed by a stylized flourish.

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Karl R. Leinsing, MSME, PE