

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

STRAUMANN USA, LLC,
Petitioner,

v.

SMART DENTURE CONVERSIONS, LLC,
Patent Owner.

IPR2025-00956
Patent 11,937,992

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

March 13, 2026

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I, Karl R. Leinsing, declare as follows:

I. INTRODUCTION

1. I have been retained in this matter by Smith, Anderson, Blount, Dorsett, Mitchell & Jernigan on behalf of Patent Owner Smart Denture Conversions, LLC (“SDC”) to provide technical assistance in responding to the petition for *inter partes* review (“IPR”) of U.S. Patent No. 11, 937,992 (“the ’992 Patent”). The ’992 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 IPR of the ’992 Patent and requests that the Patent Trial and Appeal Board (“Board”) cancel claims 1–12 of the ’992 Patent.

3. This declaration is a statement of my opinions on issues related to the patentability of the ’992 Patent’s claims.

II. BACKGROUND AND QUALIFICATIONS

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

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

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

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

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

9. I have significant experience with the development and life cycle of medical devices. This includes product conception and design, manufacturing, testing, sterilization, qualification, validation, verification, packaging, labeling, clinical trials, regulatory approval, marketing, and sales. I have worked as a senior product design engineer, as a manager of design engineering, and as a director of biomedical engineering. In my current role as president of ATech Designs, 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 42 U.S. patents.

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

III. MATERIALS CONSIDERED

13. In preparing this Declaration, I have reviewed the '992 Patent, the Petition for *Inter Partes* Review, and the Board's Decision Granting Institution of *Inter Partes* Review.

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

Ex. 1001	U.S. Patent No. 11,937,992
Ex. 1002	Expert Declaration of John B. Brunski, Ph.D.
Ex. 1003	U.S. Patent Application Pub. No. US2017/0202649 A1 (Bernhard)

Ex. 1004	U.S. Patent No. 6,283,752 (Kumar)
Ex. 1005	U.S. Patent Application Pub. No. US 2016/0045290 A1 (Poovey)
Ex. 1006	A. Gracco et al., “Effects of Thread Shape on the Pullout Strength of Miniscrews,” 142 <i>Amer. J. Orthodontics & Dentofacial Orthopedics</i> , 186–90 (2012) (Gracco)
Ex. 1007	Declaration of Lindsay Allen re Gracco
Ex. 1008	PCT Patent Application No. WO 2013/030839 A1 (Derey)
Ex. 1009	U.S. Provisional Patent Application No. 62/742,942 (’942 Application)
Ex. 1010	U.S. Provisional Patent Application No. 62/774,402 (’402 Application)
Ex. 1011	U.S. Provisional Patent Application No. 62/818,082 (’082 Application)
Ex. 1012	U.S. Patent Application No. 16/596,361 (’361 Application)
Ex. 1013	U.S. Patent No. 11,311,354 (Kofford)
Ex. 1014	Smart Denture Conversions Webpage – Separable Fastener
Ex. 1015	Prosecution History of U.S. Patent Application No. 18/328,730
Ex. 1016	Smart Denture Conversions – Technique Guide
Ex. 1017	Complaint, D.I. 1 (April 23, 2024), <i>Smart Denture Conversions, LLC v. Straumann USA, LLC</i> , No. 1:24-cv-00507-JCB (D. Del.)
Ex. 1018	U.S. Patent Application No. 17/691,108 (’108 Application)
Ex. 1019	NeoConvert Brochure
Ex. 1020	U.S. Patent No. 7,938,046 (Nino)
Ex. 1021	German Published Patent Application (Offenlegungsschrift) DE 3808238 A1 (Ruetschi)

Ex. 1022	Certified English Translation of German Published Patent Application (Offenlegungsschrift) DE 3808238 A1 (Ruetschi)
Ex. 1023	U.S. Patent No. 1,725,109 (Starkey)
Ex. 1024	U.S. Patent No. 2,626,029 (Guttermann)
Ex. 1028	Declaration of George Koskinas re NeoConvert system
Ex. 1029	U.S. Patent App. Pub. 2002/0094255 A1 (Neuhengen)
Ex. 2001	First Supplemental Complaint, <i>Smart Denture Conversions, LLC v. Straumann USA, LLC</i> , No. 1:24-cv-00507-JCB (D. Del. Feb. 4, 2025), ECF No. 34
Ex. 2003	Complaint, <i>Smart Denture Conversions, LLC v. Straumann USA, LLC</i> , No. 1:24-cv-00507-JCB (D. Del. Apr. 23, 2024), ECF No. 1
Ex. 2004	Defendant Straumann USA, LLC's Opening Brief in Support of its Motion to Dismiss Plaintiff's Complaint for Failure to State a Claim for Relief under Fed. R. Civ. P. 12(b)(6), <i>Smart Denture Conversions, LLC v. Straumann USA, LLC</i> , No. 1:24-cv-00507-JCB (D. Del. July 29, 2024), ECF No. 13
Ex. 2007	Defendant Straumann USA, LLC's Initial Invalidity Contentions, No. 1:24-cv-00507-JCB (D. Del.) (served June 2, 2025)
Ex. 2010	Declaration of Karl Leinsing
Ex. 2011	Smart Denture Conversions, Technique Manual, available at https://shorturl.at/798cX
Ex. 2012	International Patent Application No. WO 96/2019 (Sept. 26, 1996) (Sutter 1996)
Ex. 2013	U.S. Patent No. 6,332,777 B1 (Dec. 25, 2001) (Sutter 2001)
Ex. 2014	U.S. Patent No. 3,115,804 (Dec. 31, 1963) (Johnson)
Ex. 2015	U.S. Patent No. 5,904,483 (May 18, 1999) (Wade)
Ex. 2016	U.S. Patent No. 6,517,543 B1 (Feb. 11, 2003) (Berrevoets)

Ex. 2017	U.S. Patent No. 9,568,037 B2 (Feb. 14, 2017) (Staniszewski)
Ex. 2018	Pub. No. US2002/0094255 A1 (July 18, 2002) (Neuhengen)
Ex. 2019	Curriculum Vitae of Karl Leinsing
Ex. 2022	Deposition Transcript of John B. Brunski, Ph.D. (Feb. 13, 2026)

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

IV. LEGAL UNDERSTANDING

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

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

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

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

A. Written Description

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

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

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

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

B. Enablement

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

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

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

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

C. Anticipation

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

- a. The invention was known or used by others in this country, or was patented or described in a printed publication in this or a foreign country, before the invention by the patent applicant; or

b. The invention was patented or described in a printed application in this or a foreign country or in public use or on sale in this country more than one year prior to the date of the application for patent in the United States; or

c. The invention was described in a published patent application by another filed in the United States before the invention by the applicant for patent; or

d. The invention was described in a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the Patent Cooperation Treaty serves as prior art only if the international application designated the United States and was published under the treaty in the English language.

27. I understand that anticipation occurs when a single piece of prior art describes every element of the claimed invention, either expressly or inherently, arranged in the same way as in the claim. I understand that, for inherent anticipation, it is required that the missing descriptive material be necessarily present in the prior art.

D. Obviousness

28. I further understand that a patent claim is unpatentable and invalid if the subject matter of the claim as a whole would have been obvious to a person of

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

29. 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, which I describe below.

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

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

32. I also understand that Petitioner must show 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 innovative but results from 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.

33. 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 (a) commercial success; (b) long-felt but unresolved need; (c) failure of others to solve the problem that the inventor solved; (d) unexpected results; (e) copying of the invention by others; and (f) 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 or connection, must exist between objective indicia of non-obviousness and the novel aspects of the claimed subject matter.

34. 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.

35. 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.

36. I understand that a dependent claim incorporates each and every limitation of the independent claim from which it depends. 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 references 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 from that independent claim.

E. Claim Construction

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

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

39. I understand that claim terms are generally given their ordinary and customary meaning, which is the meaning they would have to a POSA at the time of the invention, in light of the intrinsic specification and file history.

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

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

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

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

V. LEVEL OF ORDINARY SKILL IN THE ART

43. I have been asked to analyze the '992 Patent and the references discussed therein from the perspective of a POSA at the time of invention.

44. I understand that, for purposes of this IPR, the time of invention is assumed to be the '992 Patent's priority date, which is October 9, 2018.

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

46. I understand that the factors that may be considered in determining the POSA's skill level include

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

In my opinion, in the context of the subject matter of the '992 Patent, a POSA would be an individual having a bachelor's degree in mechanical engineering or an equivalent technical degree with at least three years of experience in the field, such as experience with the design of bone implants, anchors, and/or screws. A person with a higher technical engineering degree and two years of experience in a related

field would also qualify as a POSA. A POSA may consult with a dentist, oral surgeon, prosthodontist, or periodontist who has experience with dental implants and prosthetics on patients.

47. I am qualified to provide opinions about how a POSA in October 2018 would have interpreted and understood the '992 Patent and the prior art in the Petition at the time of the invention.

48. Brunski defines a POSA to “have at least a bachelor’s degree in mechanical engineering, biomedical engineering, materials science engineering, or an equivalent degree, plus at least five years of experience working with (i.e. researching, developing and/or designing) dental implants and prostheses.” Ex. 1002 (Brunski Declaration), ¶ 128. Brunski also states that a “POSA would also have some familiarity and experience with fasteners (threaded and otherwise) used to connect prostheses, implants and related components.” Ex. 1002 (Brunski Declaration), ¶ 128. Finally, Brunski says that a “POSA could also be a person with less formal education but commensurately more practical experience, or vice versa.” Ex. 1002 (Brunski Declaration), ¶ 129.

49. My opinions would not change under either definition.

50. I note, however, that it is not necessary for a POSA to have direct experience “working with (i.e. researching, developing and/or designing) dental implants and prostheses.” Ex. 1002 (Brunski Decl.), ¶ 128. The problems faced in

the '992 Patent's field of art are primarily mechanical in nature and are not specific or exclusive to dental applications. Rather, the problems faced in the '992 Patent's field of art are fundamentally the same or similar to those faced in other biomechanical applications, such as the design of bone implants, anchors, and/or screws. Furthermore, mechanical engineering is a relatively predictable field of art and the same principles readily transfer across specific applications. This is evidenced by several prior art references in the record here which are not specific to dental applications but come from biomechanical, surgical, or other engineering applications more generally, including Exhibit 1020 (Nino), Exhibits 1021/1022 (Ruetschi), Exhibit 1023 (Starkey), Exhibit 1024 (Guterman), Exhibit 2014 (Johnson), Exhibit 2016 (Berrevoets), Exhibit 2017 (Staniszewski), and Exhibit 2018 (Neuhengen).

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

52. This POSA standard makes more sense in the context of the '992 Patent because, as I understand, neither of the '992 Patent's two inventors would qualify as a POSA under Brunski's definition. It is my understanding that Mr. Rudisill had no professional experience researching, developing, or designing dental implants or prostheses prior to his work with Dr. Kofford that led to the '992

Patent and its related patents. It is my understanding that Mr. Kofford is a dental practitioner and, prior to his work with Mr. Rudisill, had no experience in or qualifications relevant to mechanical engineering.

53. I understand that the Board preliminarily found “little meaningful difference between the two proposed definitions.” Institution Decision at 13. I believe, however, that the caveat above regarding the applicability of mechanical principles across numerous biomechanical applications is relevant to the POSA standard. Regardless, as I stated, my opinions would not change under either definition.

VI. RELEVANT PATENT FILE HISTORY

A. U.S. Patent No. 11,937,992 (“the ’992 Patent”) (Ex. 1001)

54. The ’992 Patent describes a “temporary alignment system and method for holding a dental coping to an implant abutment using the same threads in the abutment that are used for definitive attachment.” Ex. 1001 (’992 Patent), Abstract; Ex. 1012 (’361 Application), 59 (same). “The disclosed temporary fasteners initially orient and hold a coping against an abutment,” and then “[t]he aligned coping can be picked-up in a closed-tray impression process without unscrewing the temporary fastener.” Ex. 1001 (’992 Patent), Abstract; Ex. 1012 (’361 Application), 59 (same). “In this manner, the coping is held against the abutment for the pick-up process with a force oriented identically to that of the final screw

mounting.” Ex. 1001 (’992 Patent), col. 4, ln. 61–63; Ex. 1012 (’361 Application), 66 (same). The temporary fastener allows both axial and rotational attachment, which provides the same alignment force vector as the permanent (or definitive) screw. Ex. 1001 (’992 Patent), col. 2, ln. 46–58. “Key benefits of screw-attachment are variable tightening torques and reversibility” for the temporary screw. Ex. 1001 (’992 Patent), col. 7, ln. 31–32; Ex. 1012 (’361 Application), 71 (same). The invention also makes the resulting prosthesis stronger, since the access holes for the definitive screws are much smaller than with traditional open-tray techniques. Ex. 1001 (’992 Patent), col. 3, ln. 9–15.

55. “Embodiments” of these temporary fasteners “include threaded posts that release copings from the abutment through axial forces” as well as “a threaded post with separable cap that is picked-up with the coping.” Ex. 1001 (’992 Patent), Abstract; Ex. 1012 (’361 Application), 59 (same).

56. The claimed invention offers a method for converting dentures into permanent prosthesis that is significantly faster and easier than traditional open- and closed-tray techniques. It results in a stronger prosthesis by allowing smaller holes to be drilled than in traditional conversions. The resulting prostheses last longer and are less likely to fracture, delivering long-term value to patients. By improving the alignment through the use of threaded screws as temporary fasteners, the claimed invention allows practitioners to better position the denture

in the mouth as compared to a conventional conversion procedure, resulting in a more functional, more comfortable, and better-looking end result.

B. Priority Applications to the '992 Patent

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

58. On October 9, 2018, the inventors of the '992 Patent filed provisional U.S. Patent Application No. 62/742,942 ("the '942 Application"). Ex. 1009. The '942 Application includes 49 figures, including Figure 43, which is largely identical to Figure 75 of the '992 Patent, with the exception of some additional numbering on Figure 75 of the '992 Patent. Ex. 1009 ('942 Application), FIG. 43; Ex. 1001 ('992 Patent), FIG. 75.

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

The invention is not restricted to a fastener with standard screw threads that engage the abutment. For example, other separable fasteners are possible by providing features that allow the fastener to be removed by other means than a separable cap. For example, as shown in Fig. 43 a fastener 39 ***may contain a separable***

threaded or serrated portion 30 that engages the screw in the abutment, but will release with axial force. **Fig. 43** *shows a screw 39* having a slot 41 *and asymmetric threads or serrations 40* that allow the screw to be extracted in the axial direction.

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

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

C. Prosecution History of the '992 Patent

61. On October 8, 2019, the inventors filed the non-provisional U.S. Patent Application No. 16/595,361 (Ex. 1012). As a result of this application, the Patent Office issued Kofford (Ex. 1013) on April 26, 2022. For purposes of this declaration, I refer to the '942 Application, '402 Application, '082 Application, and '361 Application collectively as the “Priority Applications.”

62. On June 3, 2023, the inventors filed U.S. Application No. 18/328,730 (Ex. 1015), which claimed the priority dates of the nonprovisional Priority Applications. As a result of this application, the Patent Office issued the '992 Patent on March 26, 2024. *See* Ex. 1001 ('992 Patent), Date of Patent.

63. The relevant documents indicate that the '992 Patent underwent a thorough review during prosecution. There were several office actions, both non-final and final, some of which resulted in amendments. Ex. 1015 (Prosecution History), 175, 200–31, 236, 283–302. In response to Examiner concerns, SDC explicitly addressed specification and disclosure issues related to those that the Petition now raises. Ex. 1015 (Prosecution History), 295–99.

64. In two Information Disclosure Statements, SDC provided 105 prior art references, all of which the Examiner considered. These included Bernhard (Ex. 1003) and Poovey (Ex. 1005), which are the principal references for several Grounds in the Petition. Ex. 1015 (Prosecution History), 274–75, 762–74, 1068–69, 1072–83. It also included Sutter (1996) (Ex. 2012), Sutter (2001) (Ex. 2013), Johnson (Ex. 2014), and Wade (Ex. 2015). The Examiner also independently conducted her own detailed prior art searches, which led her to Berrevoets (Ex. 2016). Ex. 1015 (Prosecution History), 1046–66. The Examiner rejected multiple claims for obviousness in light of the prior art, including Berrevoets. Ex. 1015

(Prosecution History), 224–36. The Examiner allowed the '992 Patent's claims 1–12 over that prior art, including over Bernhard and Poovey.

VII. PRIOR ART

A. Bernhard (Ex. 1003)

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

66. To be clear, these “grooves” are not describing threaded fasteners. Rather, Bernhard describes “grooves” in two contexts. First, Bernhard describes “grooves, dimples, roughening, or the like to enhance the connection with the dental component.” Ex. 1003 (Bernhard), [0071]. This refers to surface features that can be used to increase or decrease friction, an important consideration for a snap-fit connector like Bernhard's. Bernhard also describes “grooves” later in the context of “keyed features which correspond to keyed features of the implant 110,” which “facilitate alignment of the abutment 120 with respect to the implant 110.” Ex. 1003 (Bernhard), [0074]. Such features make sure that the coping maintains its

desired rotational orientation with respect to the implant but do not themselves provide attachment force. Ex. 1003 (Bernhard), [0074] (“For example, the alignment feature 115 can have a plurality of external lobes or an external hex-shape. In some embodiments, the abutment 120 can include slots, grooves, or other protrusions which align with corresponding slots, grooves, or protrusions on the implant 110 to ensure proper alignment prior to fastening.”). A POSA would not understand “grooves” to refer to screw threading.

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

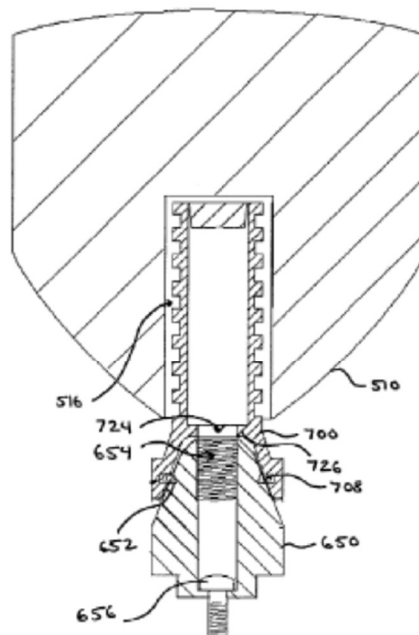


Figure 8

Ex. 1003 (Bernhard), FIG. 8.

68. 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.

69. Bernhard’s language on this point refers to the permanent (or definitive) screw that will ultimately hold the prosthesis to the abutment, not to a temporary fastener used during the pick-up process. Bernhard consistently refers to its temporary fastener mechanisms as a “provisional connection feature” or “provisional connection features,” a phrase that appears 134 times in the reference. *See* Ex. 1003 (Bernhard), [0009] (“The method can also include the step of temporarily coupling a coping to the abutment via a provisional connection feature. ... The method can also include the step of coupling the coping to the abutment via a second connection feature, the second connection feature being different from the provisional connection feature. In some embodiments, the step of coupling the coping to the abutment via a second connection feature can include the step of fastening the coping to the abutment using a threaded fastener.”); Ex. 1003 (Bernhard), Abstract, [0010], [0012]–[0016], [0067], [0075]–[0076], [0079]–[0080], [0090]–[0091], [0104], [0117], [0119], [0124], [0126]–[0127], [0135]–[0137], [0140], [0143]–[0145], [0147], [0152], [0154], [0156]–[0157], [0160], [0163]–[0164], [0166]–[0168], [0170]–[0173], [0177]–[0181], [0184]–[0185], [0188]–[0189], [0195], [0204], [0209], [0211], [0218], [0228], [0229]–[0232],

[0236]–[0237], [0239]–[0240], [0246]–[0248], [0255]–[0257], [0262]–[0264], [0267]–[0268], Claims 1–2, 5, 9, 18, 21, 23, 59, 63–65, 67.

70. Bernhard was a reference submitted to the examiner and cited during the '992 Patent's prosecution. *See* Ex. 1001 ('992 Patent), References Cited. The examiner allowed the claims over this reference. *See* Ex. 1001 ('992 Patent), claims 1–12.

71. Based on my experience, they were likely allowed over Bernhard because Bernhard does not describe or suggest a temporary alignment fastener with screw threading. As explained above, any reference to “grooves” would not disclose a temporary fastener with screw threading. Grooves would not have the same retention strength as threads in the context of a temporary fastener.

72. Bernhard's advantages centered on eliminating or minimizing screws from the pick-up process. Bernhard criticized existing open-tray techniques, because they “require use of devices, such as long processing screws, which interfere with the clinician's ability to determine and obtain a proper fit for the prosthesis with respect to opposing dentition.” Ex. 1003 (Bernhard), [0006]. It praised the advantages of minimizing the number of screw-based fasteners:

Certain embodiments of systems and methods can provide *an efficient workflow* execution post-surgery, which can *reduce the risk of site contamination and*

extensive tissue swelling, thus reducing healing time.

For example, systems and methods using a provisional connection feature as described herein can *reduce (e.g., substantially eliminate) the use of screwing and unscrewing components in patients which takes chair time*. In addition, certain embodiments described herein can provide a screw access hole which is easy to locate, but not too large.

Ex. 1003 (Bernhard), [0168] (emphasis added). Furthermore:

Advantageously, certain embodiments of the adaptor 3000 having a provisional connection feature 3006 can provide a system that is *relatively easy to use (e.g., having less parts such as less screws)*.

Ex. 1003 (Bernhard), [0171] (emphasis added).

73. Only at the end of the impression-taking process did Bernhard's system use a "prosthetic screw" to "reduce the likelihood of inadvertent detachment of the coping 130 from the abutment 120" and "thereby securely attaching the coping 130 to the abutment 120." Ex. 1003 (Bernhard), [00082]; Ex. 1003 (Bernhard), [0105] ("Accordingly, the entire provisional prosthetic system can be attached using threads thereby further reducing the likelihood that the components of the system will become inadvertently detached from each other."); Ex. 1003 (Bernhard), [0120] ("As shown in step 424, in order to more securely

fasten the prosthesis to the abutments, a clinician can use a fastener to fasten the prosthesis to the abutment. During this step, the clinician can insert a separate fastener, such as a screw or bolt, into the recently created through-hole.”). Nowhere does Bernhard teach using a threaded fastener as a “provisional connection feature” (temporary fastener).

74. Bernhard does not teach the use of any temporary screw with threads or a threading profile that is different from that of a definitive screw, or even different from female abutment (or implant) threading.

75. Bernhard does not teach the use of any screw with male threading that is different from the female threading into which it is inserted.

B. Poovey (Ex. 1005)

76. Poovey was also submitted to the examiner and cited during the ’992 Patent’s prosecution. *See* Ex. 1001 (’992 Patent), References Cited. The examiner allowed the claims over this reference. Ex. 1001 (’992 Patent), claims 1–12.

77. Poovey is a patent application that discloses an “impression coping security screw” that temporarily connects a coping to an implant during the impression phase of a conversion procedure. Ex. 1005 (Poovey), [0021]. This “impression coping securing screw comprises threads made of metal or plastic and coated with a heat labile plastic or silicone.” Ex. 1005 (Poovey), [0021]. 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 security screw.”

Ex. 1005 (Poovey), [0021].

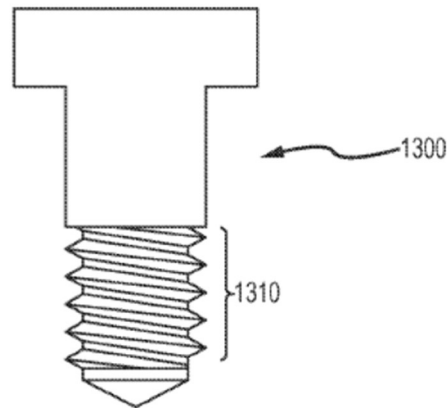


FIG.13

Ex. 1005 (Poovey), FIG. 13.

78. Then, “[a]t the time of removal, the heat labile plastic, or silicone threads (or heat labile plastic, or silicone-coated threads) are activated to allow the impression coping, secured by the impression coping securing screw, to be disengaged from the implant and removed with the impression of the patient’s dentitia.” Ex. 1005 (Poovey), [0021]. This action “may include” heating the heat labile plastic or silicone threads enough “to dissolve or soften sufficiently the plastic or silicone material” to allow removal. Ex. 1005 (Poovey), [0024]. Poovey states that “[b]y using a screw that is metal with flexible or heat labile plastic threads that are large enough to be screwed into the implant, but are able to be pulled out without much force, the impression coping is then used in a closed tray

method, which is easier for the dentist and more comfortable for the patient.” Ex. 1005 (Poovey), [0084]. “The threading and/or sleeve coating of the impression coping securing screw is preferably a plastic or silicone material with enough flexibility to be pulled out of the implant with low resistance such that it is not difficult for the dental professional and does not cause pain or stress to the patient.” Ex. 1005 (Poovey), [0084].

79. Poovey seems to describe two categories of threads, (1) threads which are “activated” (through heat or otherwise) and (2) threads that are flexible plastic or silicone.

80. It is my understanding that Brunski confirmed during his deposition that his proposed combination involved temporary screws or threads made of flexible silicone, not of heat labile plastic. *See* Ex. 2022 (Brunski Dep.), 189:15–190:5 (“Q. Would you agree this sounds impractical? A. It sounds clumsy to some degree. Q. Talking on an all on four configuration to be able to have the benefits of Bernhard, right, you’d have to heat them all up simultaneously, right, all four abutments? ... A. ... [M]y suggestion of using Poovey was not to do it this way. The idea I would get out of this is that it’s possible to make a flexible screw that doesn’t need to be heat activated, it could be just some correct formulation of the silicone polymer, maybe with a filler that has the properties that you want to be able to, you know, draw it out of the, you know, the abutment site the way, so – so I

would not even worry about the heat ‘cause that wouldn’t be my approach. *Q.*

Okay. So you would agree that wouldn’t be a practical approach? A. It sounds messy to me, yes.” (emphasis added)).

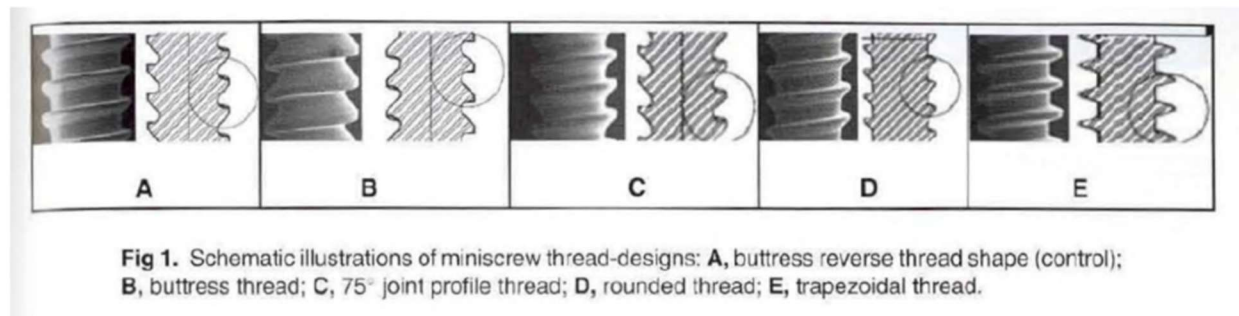
81. For this reason, I limit my analysis of Poovey (and arguments that rely on Poovey) solely to a proposed combination with flexible silicone or plastic threads that do not need to be heat-activated, since that is Brunski’s only suggested approach.

82. Poovey does not teach the use of any temporary screw with threads or a threading profile that is different from that of a definitive screw, or even different from female abutment threading. To the contrary, Poovey describes its “impression coping securing screw” as “engaging *corresponding threading* in the internal cavity of the implant in a *closely fitted engagement*.” Ex. 1005 (Poovey), [0082] (emphasis added). The “impression coping securing screw” is “configured to *cooperatively engage* the implant.” Ex. 1005 (Poovey), [0082] (emphasis added). There is no mention or suggestion of using thread profiles that are different from permanent screws or the abutment/implant threading.

83. Poovey does not teach the use of any screw with male threading that is different from the female threading into which it is inserted.

C. Gracco (Ex. 1006)

84. Gracco is an academic article describing an experiment to measure the force required to pull orthodontic mini-screws with different thread designs out of a synthetic bone material. Ex. 1006 (Gracco), 3–4. The different thread profiles tested were depicted in Gracco’s Figure 1:



Ex. 1006 (Gracco), Fig. 1.

85. The mini-screws in the experiment were designed to cut into the bone itself, meaning they were necessarily “self-drilling and self-tapping, with a cutting flute at their apex.” Ex. 1006 (Gracco), 4. Because they are self-cutting screws, by definition their threading *precisely matched the female threads of the surrounding bone material*; the screws themselves cut the threads into the material.

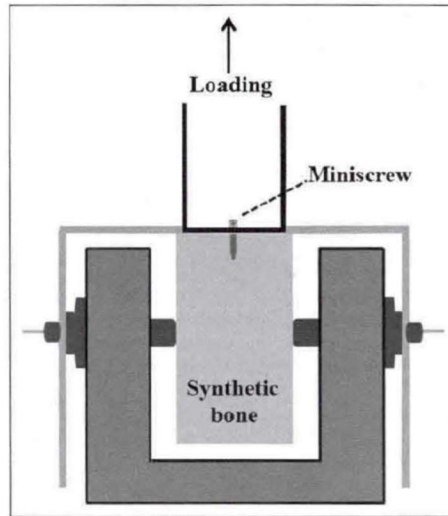


Fig 2. Configuration of testing setup.

Ex. 1006 (Gracco), FIG. 2.

86. The mini-screws at issue were made of titanium, which was harder and more durable than the synthetic bone material, identified as “1522-12 Cellular Rigid Polyurethane Foam” from “Sawbones Europe, Malmö, Sweden.” Ex. 1006 (Gracco), 4. This material, as shown on Sawbones’ website, is below:



Sawbones, *Block, Cellular Foam, 20 PCF, 40 MM Thick, SKU: 1522-12,*

<https://perma.cc/LB37-J58E>.

87. Each time the loading mechanism reached the force necessary to pull the mini-screw from the synthetic bone material, the mini-screw geometry was degrading the synthetic bone material around its threads to the point where the mini-screw could no longer remain attached to the bone. The titanium mini-screws did not deform or degrade to release the mini-screws; the synthetic bone material around the screws failed. That makes sense, because mini-screws designed to anchor into bone are not designed to be temporary screws that release easily with axial force. They are designed to permanently and securely attach to the bone until unscrewed.

88. The principle that different thread profiles affect the pullout force required to disengage a screw from surrounding softer materials is well-known and the natural result of inherent screw geometry. I have also performed research on titanium screw thread strength using different thread geometry in different levels of bone density while preventing bone or screw fracture. This is a similar test with wood screws and their retention in soft woods (like pine) or hard wood (like walnut or oak). The '992 Patent is completely different in that it teaches a temporary screw with different thread patterns or deformable posts that engage a much harder metal female thread through rotation or, in some cases, axial insertion.

89. Gracco does not teach any method for extracting a screw through axial force that would not degrade a harder female threading around the screw. This is a critical feature for a temporary fastener. Gracco also does not teach any method for extracting a softer temporary screw from harder female threading without degrading the temporary screw to the point of fracture, tearing, or leaving parts of the temporary screws behind in the female threaded bore or hole.

90. Gracco does not teach the use of any temporary screw with threads or a threading profile that is different from that of a definitive screw, or even different from female abutment (or implant) threading.

91. Gracco does not teach the use of any screw with male threading that is different from the female threading into which it is inserted.

D. Derey (Ex. 1008)

92. Derey teaches a plastic snap-in connector to temporarily hold elements to an implant or abutment during a denture conversion. Ex. 1008 (Derey), Abstract. Derey's snap-in connector has two legs that compress or flex inward to hold the connector in the female threading of the implant or abutment. Ex. 1008 (Derey), 5–6, 18–19.

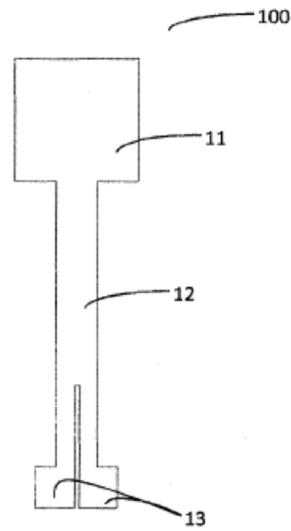


Fig. 5

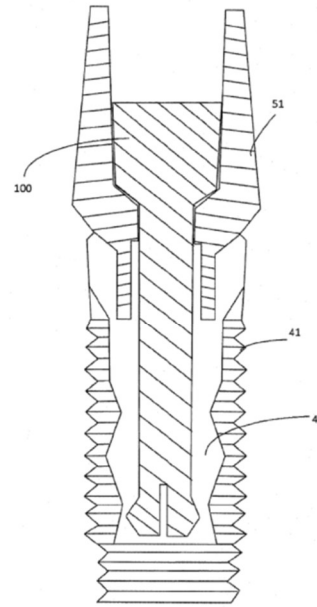


Fig. 6

Ex. 1008 (Derey), FIGS. 5–6.

93. Derey’s snap-in connector does not have screw threads. The connector is pushed in and pulled out. It does not have the torquing or alignment benefits of a screw-threaded temporary fastener. Derey does not discuss rotation, a tool interface for rotation, or any threading on the fastener. Derey does not discuss or teach any design or method that would let a temporary screw with threading release from the implant abutment’s threading.

94. Derey does not teach the use of any temporary screw with threads or a threading profile that is different from that of a definitive screw, or even different from female abutment (or implant) threading. *See* Ex. 1008 (Derey), Abstract.

95. Derey does not teach the use of any screw with male threading that is different from the female threading into which it is inserted. *See* Ex. 1008 (Derey), Abstract.

E. Nino (Ex. 1020)

96. Nino is a 2011 patent that teaches a “torque-limiting driver that disengages at a predefined torque limit,” including in “the installation of dental ... implants.” Ex. 1020 (Nino), col. 1, ln. 12–13, col. 5, ln. 21–22. Nino explained that “[t]orque-limiting drivers are widely used throughout the medical industry.” Ex. 1020 (Nino), col. 1, ln. 15–16. These drivers are either “[r]eusable” or “disposable.” Ex. 1020 (Nino), col. 1, ln. 19–20. “Reusable drivers require constant recalibration,” “a cumbersome task” that “must be done routinely.” Ex. 1020 (Nino), col. 1, ln. 23–26. “Disposable drivers,” on the other hand, “are easy to use and reliable” but “have been used for low torque applications” only. Ex. 1020 (Nino), col. 1, ln. 27, 34–35. Nino described a disposable driver capable of high-torque applications. Ex. 1020 (Nino), col. 5, ln. 18–28.

97. Nino does not describe any temporary screws that allow for stable axial positioning with the ability to withstand the necessary torque, which facilitates the alignment and creation of a prosthesis.

98. Nino does not teach the use of any temporary screw with threads or a threading profile that is different from that of a definitive screw, or even different from female abutment (or implant) threading. *See* Ex. 1020 (Nino), Abstract.

99. Nino does not teach the use of any screw with male threading that is different from the female threading into which it is inserted. *See* Ex. 1020 (Nino), Abstract.

F. Ruetschi (Ex. 1022)

100. Ruetschi is a patent application, published October 27, 1988, which teaches the use of a torque-limiting driver in “surgical applications” generally. Ex. 1022 (Ruetschi), Abstract. Previous iterations of screwing tools, Ruetschi explained, were “difficult” to handle “due to the small dimensions of the handle,” particularly when loosening screws. Ex. 1022 (Ruetschi), col. 2, ln. 2–6. Ruetschi’s driver was “easy to handle” and “ensure[d] by simple means that, on the one hand, a maximum tightening torque can be exerted for release.” Ex. 1022 (Ruetschi), col. 2, ln. 7–13.

101. Ruetschi does not describe any temporary screws that allow for stable axial positioning with the ability to withstand the necessary torque, which facilitates the alignment and creation of a prosthesis, and that can be removed with an axial pullout force. *See* Ex. 1022 (Ruetschi), Abstract.

102. Reutschi does not teach the use of any temporary screw with threads or a threading profile that is different from that of a definitive screw, or even different from female abutment (or implant) threading. *See* Ex. 1022 (Ruetschi), Abstract.

103. Reutschi does not teach the use of any screw with male threading that is different from the female threading into which it is inserted. *See* Ex. 1022 (Reutschi), Abstract.

VIII. SUMMARY OF OPINIONS

104. The following is a summary of my opinions regarding the patentability of the '992 Patent's claims.

105. Ground 1: Kofford is not prior art to the '992 Patent because the Priority Applications support and enable independent claims 1 and 9. The Priority Applications disclose the full genus of the temporary fastener thread profiles claimed in claims 1 and 9. Kofford does not anticipate claims 1–6, 8–9, or 11–12.

106. Grounds 2–3: Kofford is not prior art to the '992 Patent for the same reasons I explain in my response to the Petition's Ground 1. The Priority Applications disclose the full genus of the temporary fastener thread profiles claimed in claims 1 and 9. For the same reasons, they adequately support dependent claims 2–8 and 10–12 as well. The additional arguments that Grounds 2 and 3 include for specific dependent claims are not persuasive. The written

description of the Priority Applications support the limitations in dependent claims 2–8 and 10–12. Claims 4, 7, and 12 would not have been obvious based on Kofford in view of Poovey, nor does Kofford anticipate claims 7 and 10.

107. Ground 4: A POSA would not have combined Bernhard, Poovey, and Gracco to arrive at the claimed invention, for several reasons. First, such a combination would not satisfy all the limitations of independent claims 1 and 9. Second, there was no motivation to combine Bernhard, Poovey, and Gracco. Claims 1, 3, 5–7, and 9–12 would not have been obvious based on Bernhard in view of Poovey and Gracco.

108. Ground 5: A POSA would not have combined Bernhard, Poovey, Gracco, and Derey to arrive at the claimed invention, for several reasons. First, such a combination would not satisfy all the limitations of independent claim 1, from which claims 4 and 8 depend. Second, there was no motivation to combine Bernhard, Poovey, Gracco, and Derey. Claims 4 and 8 would not have been obvious based on Bernhard in view of Poovey, Gracco, and Derey.

109. Ground 6: This relies on obviousness arguments that are similar to those in Grounds 4 and 5. For the same reasons that I explained in my responses to Grounds 4, and 5, such a combination would not have satisfied all the limitations of independent claim 1, from which claim 2 depends. Similarly, there was no motivation to combine Bernhard, Poovey, Gracco, and Ruetschi in the way the

Petition describes. Claim 2 would not have been obvious based on Bernhard in view of Poovey, Gracco, and Ruetschi.

IX. CLAIM CONSTRUCTIONS

110. I have been asked to review the claims and ascertain their meaning from the perspective of a POSA. My opinions on claim construction expressed in this declaration are from the perspective of a POSA as of October 9, 2018, the priority date of the '992 Patent, and are consistent with my understandings stated above.

111. Brunski states that he has “interpreted the language of claims 1–12 of the '992 patent to have its ordinary meaning as it would be understood by a POSA after reading the '992 patent,” and “do[es] not believe that any language in the claims need to be further defined in order to conduct [his] analysis.” Ex. 1002 (Brunski Declaration), ¶ 131. However, as I explain below, by failing to define or misconstruing certain claim terms, Brunski’s obviousness analysis overlooks certain claim limitations that are not met by the prior art. As a result, Petitioner’s obviousness analysis suffers from the same deficiencies.

112. The Board’s Institution Decision states that, as a preliminary matter, it found “that the claim language itself, in view of how the terms are discussed in the written description, is sufficiently clear” and did “not expressly construe any claim terms.” Institution Decision at 14. It is my understanding, however, that Patent

Owner is arguing that the Board's Institution Decision implicitly construed certain claim terms and did so incorrectly.

113. I agree with Patent Owner's arguments that the Board's implicit claim constructions are incorrect in at least two ways.

A. The Board's Implicit Claim Construction of the *Different Thread* Limitations is Wrong

114. First, the Institution Decision construed what it calls the *different thread* limitations too broadly, finding that "the threads of the claimed temporary screw need only be 'different' in pattern or profile compared to the definitive screw. This is a broad concept and provides a generic claim element." Institution Decision at 28. However, that construction ignores critical functional limitations in the claims themselves relevant to the claim construction, as well as to the number of disclosed species necessary to understand the claimed genus claimed.

115. Specifically, claim 1 requires "threads in a pattern that is shaped differently from a pattern of the threads of the definitive screw," such that the temporary screw "engages the threads of the implant abutment to a predetermined torque" as well as that "an axial force in a proximal direction from pick-up processing releases the coping and the temporary screw from the implant abutment." Ex. 1001 ('992 Patent), col. 25, ln. 53–55, 58–59, 62–64. The definitive

screw has “threads configured to engage the threads of the implant abutment.” Ex. 1001 (’992 Patent), col. 25, ln. 42–43.

116. Similarly, claim 9 requires “a male threading profile that is different from the male profile of the shaft of the definitive screw,” such that the temporary screw “rotatably engage[] the ... female threading of the implant abutment” as well as “release from threads of the female threading of the implant abutment” axially during pick-up processing. Ex. 1001 (’992 Patent), col. 26, ln. 51–54, 63–64, 66–67. The definitive screw “has a male threading profile that matably threadably engages and which matches the female threading of the implant abutment.” Ex. 1001 (’992 Patent), col. 26, ln. 42–44.

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

B. The Board’s Implicit Claim Construction of the *Different Thread* and *Axial Force Release* Limitations is Wrong

118. The Board’s constructions for what it calls the *different thread* and *axial force release* limitations require the ’992 Patent’s independent claims to be limited to the asymmetrically threaded split post structure shown in Figure 75. This is incorrect in light of the intrinsic evidence.

119. Specifically, dependent claim 3 recites “wherein the pattern of the threads of the temporary screw threading is asymmetric.” Ex. 1001 (’992 Patent), col. 26, ln. 7–8. Dependent claim 8 recites “wherein the distal shaft portion of the temporary screw has a hollow portion, and wherein at least a portion of the distal shaft portion is configured to deflect inwardly into the hollow portion in response to the axial force in the proximal direction.” Ex. 1001 (’992 Patent), col. 26, ln. 29–33. Dependent claim 8 intends to add additional limitations on top of what is claimed in claim 1. If claim 1 were limited to the asymmetrically threaded split-post structure shown in Figure 75, the additional limitations in dependent claims 3 and 8 would be meaningless.

120. The claims speak of “different” thread profiles, not buttress thread profiles or even asymmetric thread profiles. By limiting the claim’s scope to the buttress thread of Figure 75, the Board’s implicit claim construction adds additional limitations into independent claim 1 and 9, without a basis in the claim language for doing so.

121. This construction is also inconsistent with the Priority Application specifications. For example, as I explain below, a POSA would understand the ’361 Application to disclose temporary fasteners with various features: (1) asymmetric threads, *see* Ex. 1012 (’361 Application), 97–98, FIG. 75, (2) symmetric threads that are different from the definitive screw’s symmetric threads (and different from

the abutment's female threading), *see* Ex. 1012 ('361 Application), 18, 27, 40, FIGS. 9, 36, 70–74, 76–78 and (3) an interference fit, *see* Ex. 1012 ('361 Application), 100, which each introduce different thread profiles and shapes.

122. The Board's implicit claim constructions were incorrect because they operate to add additional limitations to claims 1 and 9, without a basis in the claim language for doing so.

X. GROUNDS 1–3: THE PRIORITY APPLICATIONS SUPPORT AND ENABLE INDEPENDENT CLAIMS 1 AND 9

123. I understand that, for the Board to find any claims invalid based on the Petition's Grounds 1–3, the Board must first find that Kofford is prior art to the '992 Patent. That is the case, according to Petitioner, because "[n]one of the Priority Applications contain an adequate written description of or enable independent claims 1 and 9." Petition at 32.

124. I disagree. The Priority Applications support and enable the full scope of the genus of temporary fasteners claimed in claims 1 and 9.

A. The Written Description of the Priority Applications Support the Claimed Temporary Fasteners

125. Claim 1 describes "a temporary screw" that has "a distal shaft portion with threads in a *pattern that is shaped differently* from a pattern of the threads of the definitive screw," "*wherein* ... the temporary screw *engages the threads of the implant abutment to a predetermined torque* ... and *wherein an axial force* in a

proximal direction from pick-up processing *releases the coping and the temporary screw* from the implant abutment.” Ex. 1001 (’992 Patent), col. 25, ln. 48, 53–55, 56–59, 61–64 (emphasis added).

126. Claim 9 similarly describes “a temporary screw” with “a male *threading profile that is different* from the male threading profile of ... the definitive screw,” “*wherein* the male threading of the ... temporary screw is *configured to ... rotatably engage* the female threading of the implant abutment to a predetermined pick-up processing torque, and *wherein* threads of the male threading of the post *release* from threads of the female threading of the implant abutment with a *predetermined axial pick-up force* in a proximal direction.” Ex. 1001 (’992 Patent), col. 26, ln. 48, 52–54, 61–67, col. 27, ln. 1–2 (emphasis added).

127. Independent claims 1 and 9 claim a genus of temporary screws with a male threading profile that is different from that of the definitive screw, which engages the female abutment’s threads and can be screwed in to a predetermined torque, but releases the screw from the abutments threads upon application of an axial pullout force.

128. Petitioner argues that “[t]he Priority Applications do not support this claim scope because they describe only one temporary screw embodiment with a different thread or profile: 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 32–33. Petitioner also argues that the Priority Applications do not “support the full scope of claims 1 and 9 because the claims do not require the temporary screw to have deflecting legs that enable the screw to be pulled out without being unscrewed, as in the only disclosed embodiment.” Petition at 37.

129. I disagree. For one thing, as I explain above, the implicit claim constructions that underlie these arguments are incorrect. The Institution Decision improperly construed what it calls the *different thread* limitations too broadly, finding that “the threads of the claimed temporary screw need only be ‘different’ in pattern or profile compared to the definitive screw,” which it calls “a broad concept.” Institution Decision at 28. This ignores additional relevant limitations (that the temporary screw rotate into and engage the abutment threading, and then release during pick-up with an axial force, Ex. 1001 (’992 Patent), col. 25, ln. 48, 53–55, 56–59, 61–64, col. 26, ln. 48, 52–54, 61–67, col. 27, ln. 1–2. By limiting the claims to the asymmetrically threaded split post structure shown in Figure 75, the Institution Decision improperly added additional imitations to claims 1 and 9 and ignored the way that this construction would render the additional limitations in dependent claims 3 and 8 meaningless.

130. Petitioner’s arguments that there is only a single disclosed embodiment of the temporary screw are incorrect. The Petition essentially ignores

the written portions of the Priority Applications' descriptions and focuses exclusively on Figure 75. The descriptions themselves require that they 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." Ex. 1012 ('361 Application), 72; Ex. 1001 ('992 Patent), col. 8, ln. 10–12 (same).

131. The '361 Application, 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." Ex. 1012 ('361 Application), 97; Ex. 1001 ('992 Patent), col. 23, ln. 3–6 (same). "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." Ex. 1012 ('361 Application), 97–98; Ex. 1001 ('992 Patent), col. 23, ln. 6–10 (same). "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." Ex. 1012 ('361 Application), 97–98; Ex. 1001 ('992 Patent), col. 23, ln. 10–14 (same).

132. This discloses 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 force after.” Ex. 1012 (’361 Application), 97–98; Ex. 1001 (’992 Patent), col. 23, ln. 13–14 (same). The ’361 Application specifically instructs the reader that “[t]he drawings featured in the figures are for the purpose of illustrating certain convenient embodiments of the present invention and are not to be considered as limitation thereto.” Ex. 1012 (’361 Application), 72; Ex. 1001 (’992 Patent), col. 8, ln. 11–13 (same). The phrase “as shown in FIG. 75” is illustrative, not limiting of the written description that follows.

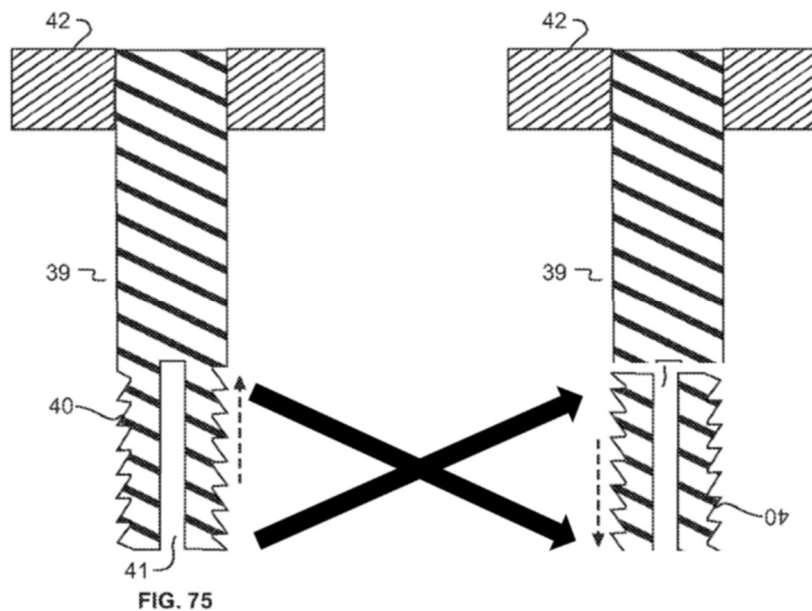
133. Specifically, the Priority Applications disclose at least three species of the broader genus claimed.

1. The Priority Applications Disclose Temporary Screws with Asymmetric Threads

134. The Priority Applications to disclose *a temporary screw with an asymmetric thread*, one example of which is shown in Figure 75. Asymmetric threads are a known category of thread profiles that could be used to screw into the abutment “but that will release” the threading “with axial force after.” Ex. 1012 (’361 Application), 97–98; Ex. 1001 (’992 Patent), col. 23, ln. 13–14 (same). The geometry of each of these broader categories of asymmetric thread profiles (buttress, reverse buttress, etc.) can also be easily adjusted to tailor the force necessary to release from the abutment threading. For example, the thread depths,

maximum thread diameters, proximal thread angle, distal thread angle, and pitch angle can all readily be made smaller or larger while still preserving the temporary fastener's ability to screw into the female abutment but release the threads after an axial force.

135. The '361 Application, for example, states that "the threads could be designed to provide engagement with the implant abutment[] threads through axial motion in the *opposite direction* to the arrow shown in FIG. 75." Ex. 1012 ('361 Application), 97 (emphasis added); Ex. 1001 ('992 Patent), col. 23, ln. 23–26 (same). This refers to *at least* one additional asymmetric thread profile beyond Figure 75's buttress thread, which is what the Petition would call a reverse buttress thread. Of course, other well-known thread profiles could also be used to accomplish this, all of which are included within the '361 Application's disclosure. I discuss the reverse buttress thread only as an example; I do not mean to suggest that this sentence refers exclusively to reverse buttress threads.



136. The illustration above left is the '361 Application's Figure 75. Ex. 1012 ('361 Application), FIG. 75; Ex. 1001 ('992 Patent), FIG. 75 (same); Ex. 1010 ('402 Application), FIG. 43 (same). The illustration above and to the 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 '361 Application explicitly describes. This creates what the Petition would call a reverse buttress thread instead of the buttress thread pattern shown in Figure 75. Such an embodiment could 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.

137. However, reverse buttress threads would not require push-in insertion. Rather, like the buttress threads, reverse buttress threads could be designed to screw into the abutment, i.e., engaging the female abutment threading through rotation. The geometry of such a reverse buttress thread could be readily designed to "release" the threading "with axial force after." Ex. 1012 ('361 Application), 97–98; Ex. 1001 ('992 Patent), col. 23, ln. 13–14 (same); Ex. 1010 ('402 Application), 16 (same). For example, making the thread depth smaller, as well as increasing the proximal thread angle, would both reduce the pull-out force necessary for axial removal. Making the temporary screws from plastic, as the Priority Applications describe (Ex. 1012 ('361 Application), 95; Ex. 1010 ('402 Application), 10 (same); *see also* Ex. 1001 ('992 Patent), col. 17, ln. 55–57 (same)), would also help facilitate the axial removal because the plastic threads would deform to facilitate axial release without degrading the female abutment's threading.

138. Although the distal steep thread profile (buttress thread) is preferred over the proximal steep thread profile (reverse buttress), the '361 Application implicitly teaches that both are suitable for practicing the claimed invention. Even a screw with a proximal steep thread profile (reverse buttress) would require less pull-out force than a screw with symmetric threading that matches and fills the

female abutment threading, because it would have less mechanical advantage due to lower tooth profile, thread angle pushing loads to end of peaks of threads, and/or reducing base thread profile width allowing for more deflection of threads.

139. If desired, both of these asymmetric thread profiles (buttress and reverse buttress) could be combined with the “split post bottom structure shown in FIG. 75,” which can be used both for “axial extraction” and “axial insertion.” Ex. 1012 (’361 Application), 100; Ex. 1001 (’992 Patent), col. 24, ln. 51–53 (same); Ex. 1010 (’402 Application), 20 (same). However, the disclosures do not **require** any split post structure, for two reasons.

140. First, as a mechanical matter, the temporary screw can properly function (screw in and then release the threads) without any split-post structure.

141. Second, the Priority Application do not require a split post structure, because of the way the disclosures themselves are written.

a. The Priority Applications do not identify the split or slotted post feature as critical to the claimed invention. The ’361 Application refers to “an alignment fastener 39” which “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.” Ex. 1012 (’361 Application), 97; Ex. 1001 (’992 Patent), col. 23, ln. 11–14 (same); Ex. 1010 (’402 Application), 16 (similar). This language does not even mention a split post, much less indicate that it is critical.

Rather, it explicitly connects the temporary screw's engagement-and-release functions *solely* to the "separable threaded or serrated portion." Ex. 1012 ('361 Application), 97; Ex. 1001 ('992 Patent), col. 23, ln. 11–12 (same); Ex. 1010 ('402 Application), 16 (same). As explained above, thanks to the specification's directions, the phrase "as shown in FIG. 75" does not limit that disclosure.

b. The '361 Application does not say the split post is critical to the invention anywhere else, either. To the contrary, it says that "[i]n *some* embodiments, the threaded end of the post portion of the temporary fastener has a deflecting feature that allows the post to engage or disengage the abutment threads through axial motion instead of a rotary screw motion." Ex. 1012 ('361 Application), 78 (emphasis added); Ex. 1001 ('992 Patent), col. 5, ln. 29–34 (same). Such a "deflecting feature" could include, but certainly would not be limited to, a split-post design. And that feature is present only "[i]n some embodiments" anyway. Ex. 1012 ('361 Application), 78; Ex. 1001 ('992 Patent), col. 5, ln. 29.

c. Similarly, the '361 Application's next sentence, which describes Figure 75, again connects the temporary screw's engagement-and-release functions to the threading: "FIG. 75 shows a temporary attachment post 39 having a slot 41 and asymmetric threads or serrations 40 that allow the temporary attachment post to be inserted through rotation for alignment for coping pick-up but may be

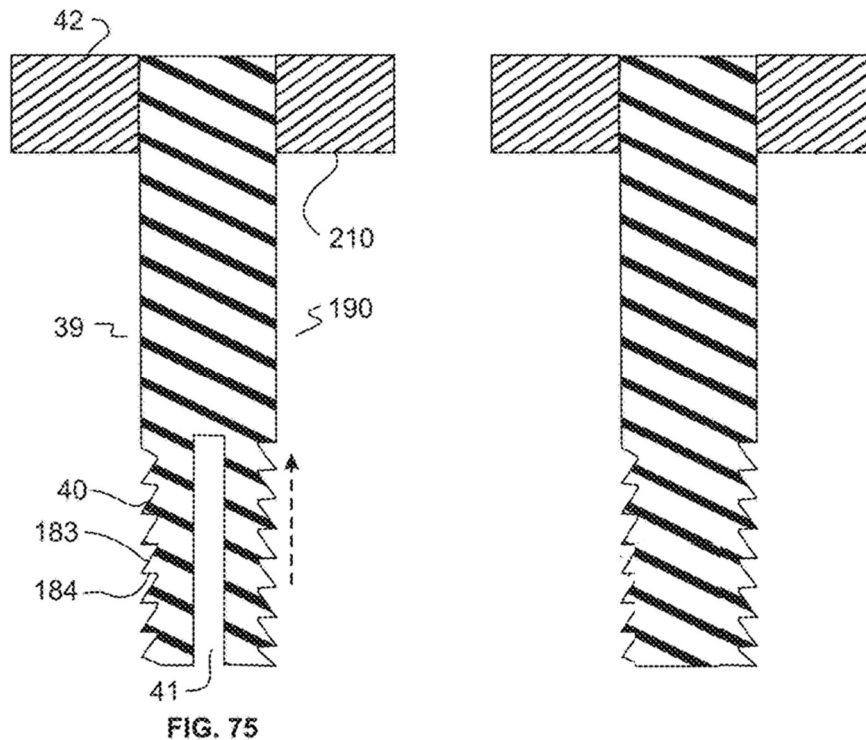
subsequently extracted with a separation force in the axial direction.” Ex. 1012 (’361 Application), 97; Ex. 1001 (’992 Patent), col. 24, ln. 9–13 (same); Ex. 1010 (’402 Application), 16 (similar). The last phrase (“that allow the temporary attachment post to be inserted through rotation but may be subsequently extracted”) refers to the “assymetric threads or serrations,” not the “slot,” because the slot does nothing to “allow” the screw “to be inserted through rotation.” Ex. 1012 (’361 Application), 97; Ex. 1001 (’992 Patent), col. 23, ln. 17–20 (same); Ex. 1010 (’402 Application), 16 (same). This paragraph is discussing different disclosed thread variations; the next sentence discusses redesigning the threads (and only the threads) “to provide engagement with the implant abutment threads through axial motion in the opposite direction to the arrow shown.” Ex. 1012 (’361 Application), 97; Ex. 1001 (’992 Patent), col. 23, ln. 23–26 (same). It says nothing about redesigning the post.

d. Similarly, the ’361 Application describes Figure 75 as “a cross-sectional view of a temporary screw embodiment incorporating a split post that has deflecting sections with screw threads shaped to facilitate axial separation without unscrewing the post threads.” Ex. 1012 (’361 Application), 78; Ex. 1001 (’992 Patent), col. 11, ln. 26–29 (same). Based on the rest of the ’361 Application, the phrase “shaped to facilitate axial separation without unscrewing the post threads” refers to the “screw threads,” not to “a split post with deflecting sections.” This

does not say the split-post structure is critical to the invention—and as a mechanical matter, such a structure is not in fact critical.

e. The '361 Application does not identify the “split post bottom structure shown in FIG. 75” as “allow[ing] axial extraction” until several pages later. Ex. 1012 ('361 Application), 100; Ex. 1001 ('992 Patent), col. 24, ln. 52–55 (same); Ex. 1010 ('402 Application), 20 (similar). This underscores that the disclosures at pages 78 and 97 are discussing the functions and possible designs of the asymmetric threads.

142. A split or slotted post is not required. Of course, the Priority Applications disclose a slotted or split post for temporary screws as a feature, which could be incorporated (or not) as desired. One example of a slotted post with asymmetric threading is Figure 75, shown below left; using Figure 75 as a starting point, I provide (below right) example of a post with asymmetric threading but without a slotted post.



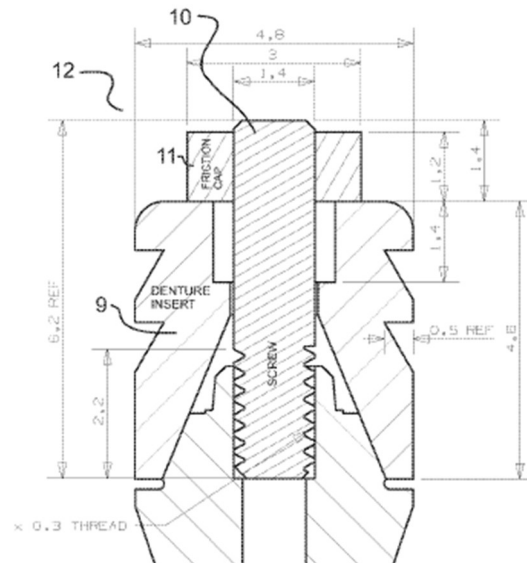
143. These embodiments have two different threading profiles or shapes. The example on the right has continuous asymmetric threading while the example on the left (Figure 75) has asymmetric threading broken up by slots. The Priority Applications disclose both.

2. The Priority Applications Disclose Temporary Screws with Different Symmetric Threads

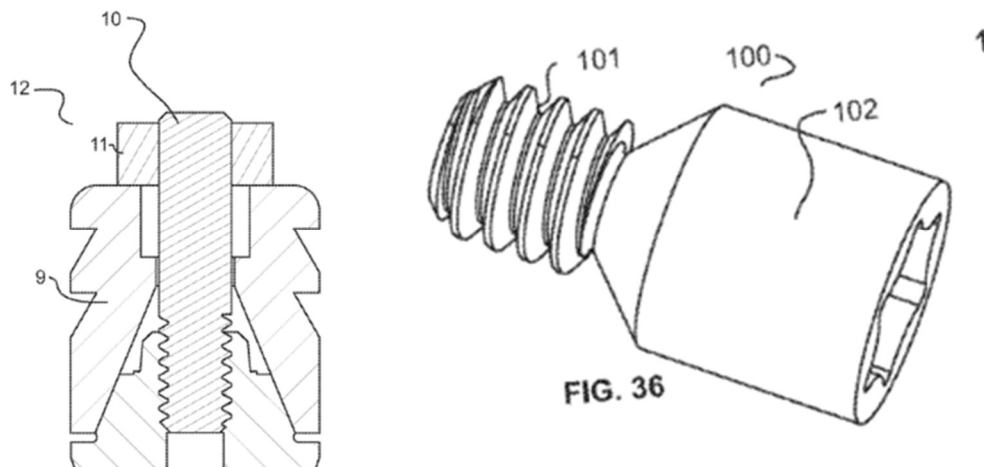
144. The Priority Applications disclose a *slotted temporary fastener with a symmetric thread that is different from the threads of the definitive screw*.

Symmetric threading is a category of known thread profiles that could be used to screw into the abutment “but that will release” the threading “with axial force after.” Ex. 1012 (’361 Application), 97–98; Ex. 1010 (’402 Application), 16

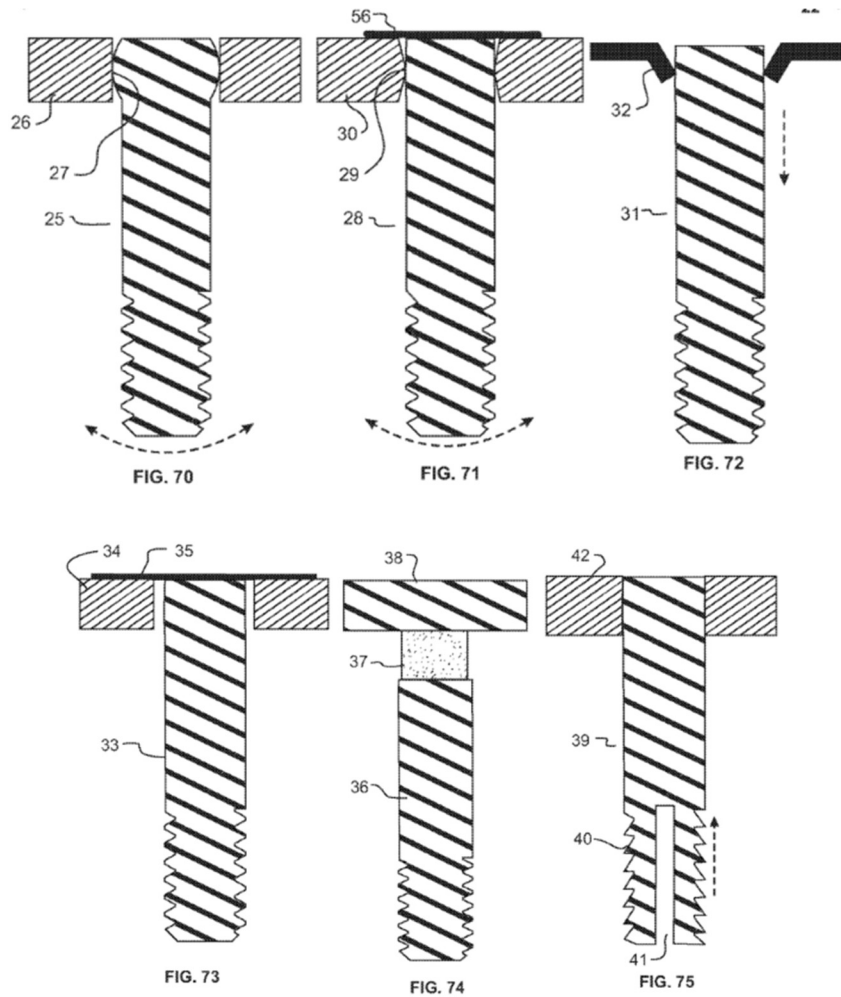
(same); Ex. 1001 ('992 Patent), col. 23, ln. 13–14 (same); *see also* Ex. 1001 ('992 Patent), col. 25 ll. 53–64 (claim 1), col. 26 ll. 59–67, col. 27 ll. 1–2 (claim 9). The Priority Applications themselves depict numerous temporary screws with symmetric threads, as shown below:



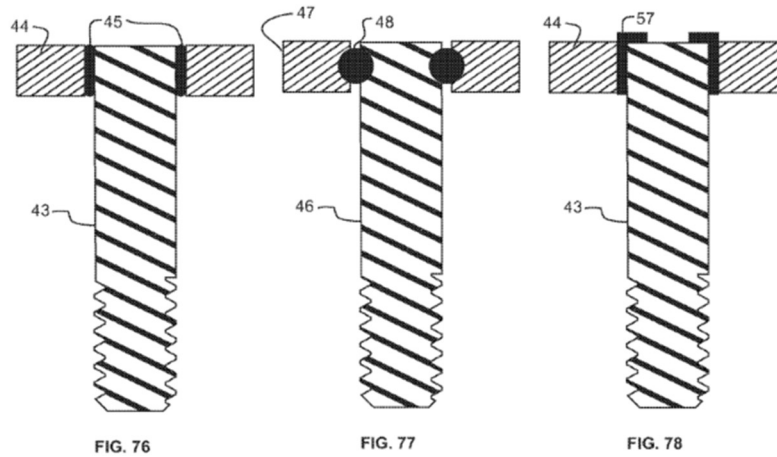
Ex. 1010 ('402 Application), FIG. 11.



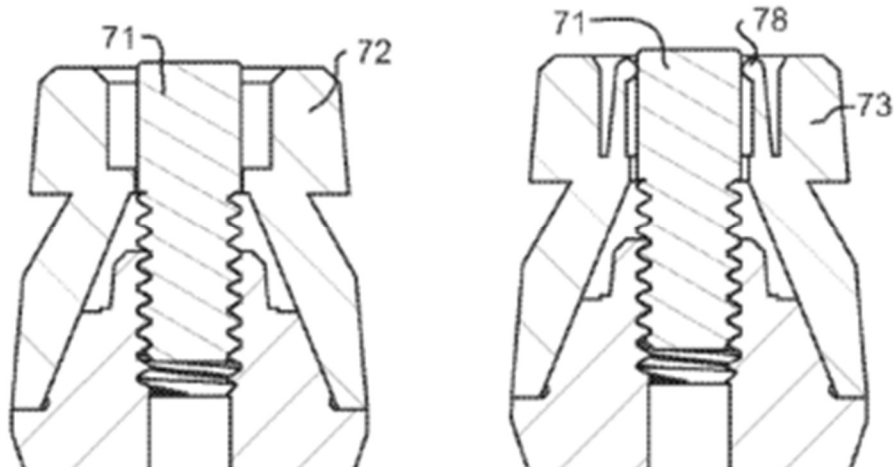
Ex. 1012 ('361 Application), FIGS. 4, 36.



Ex. 1012 ('361 Application), FIGS. 70–75; Ex. 1010 ('402 Application), FIGS. 38–43 (same). (Figure 75 in the above, of course, has asymmetric threads. The other five embodiments on that page, however, have symmetric threads.)



Ex. 1012 ('361 Application), FIGS. 76–78; Ex. 1010 ('402 Application), FIGS. 44–46 (same).



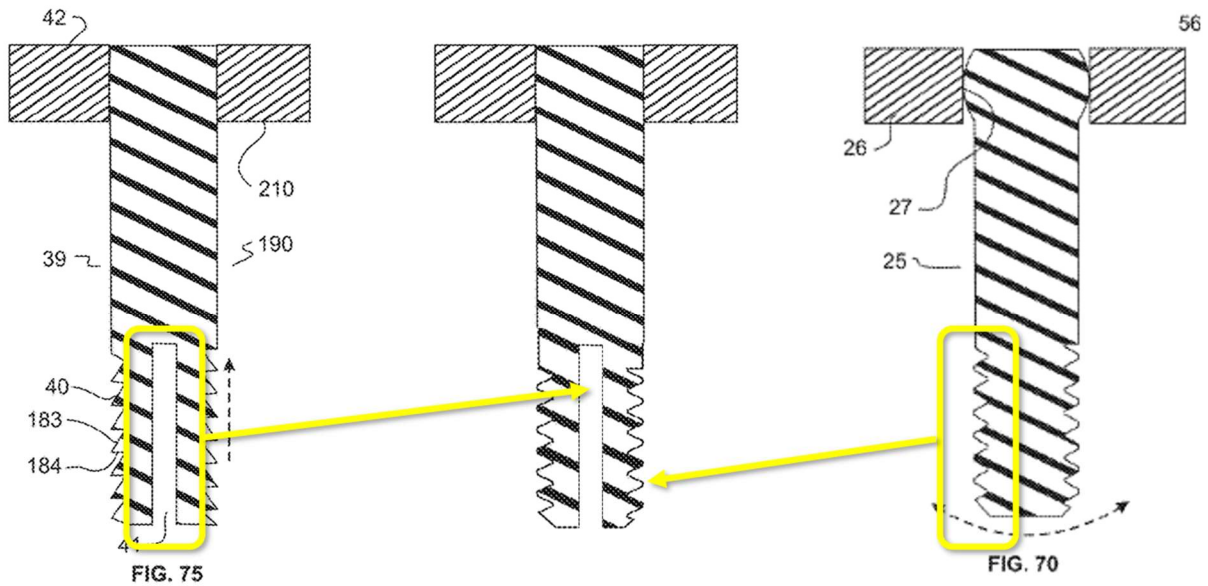
Ex. 1012 ('361 Application), FIGS. 82–83; Ex. 1010 ('402 Application), FIGS. 56–57 (similar).

145. These symmetrical thread profiles can be combined with the “split post bottom structure shown in FIG. 75,” which can be used both for “axial extraction” and “axial insertion.” Ex. 1012 ('361 Application), 100; Ex. 1001 ('992 Patent), col. 24, ln. 52–53 (same); Ex. 1010 ('402 Application), 20 (similar). To be

sure, for the same reasons explained above, the disclosures do not *require* any split post structure. First, as a mechanical matter, the temporary screw can properly function (and release the threads) without any split-post structure. Second, the Priority Applications do not require a split post structure, because of the way the disclosures themselves are written. Nevertheless, the Priority Applications disclose such a feature, and it could be incorporated into other embodiments as desired.

146. Such a slotted temporary screw with symmetric threads is disclosed by the Priority Applications because all of these features are explicitly disclosed and “the particular features, structures, or characteristics” of any given embodiment “may be combined in any suitable manner in one or more embodiments without limitation.” Ex. 1012 (’361 Application), 72; Ex. 1001 (’992 Patent), col. 8, ln. 1–3 (same).

147. Combining the symmetric threads disclosed in these various figures with the slotted post shown in Figure 75 would produce symmetrical threads that are different (and shaped differently) from those of the definitive screw, as illustrated below, middle.



148. These disclosed elements could be readily combined because the specification themselves direct a POSA to do so: “[t]he particular features, structures, or characteristics” of various embodiments “may be combined in any suitable manner in one or more embodiments without limitation.” Ex. 1012 (’361 Application), 72; Ex. 1001 (’992 Patent), col. 8, ln. 1–3 (same).

149. A temporary screw with symmetric threads and a slotted post would have threading shaped differently than (and with a thread profile that is different from) the threads of the definitive screw. That is because the definitive screw’s symmetric threads have a continuous helical shape not interrupted by any slots.

3. The Priority Applications Disclose Temporary Screws with Interference Fits

150. The Priority Applications also disclose *a temporary fastener that uses an interference fit* to engage the abutment threading and then release with an axial force. The '361 Application 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.” Ex. 1012 ('361 Application), 100; Ex. 1001 ('992 Patent), col. 24, ln. 48–51, 53–55 (same); Ex. 1010 ('402 Application), 20 (same).

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

152. In the case of a first part in the form of a cylinder making an interference fit with a circular hole in the second part, the outer diameter of the cylinder is slightly 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. Because of the threading on the implant abutment, inserting a temporary fastener post with a thread diameter slightly larger than the abutment shaft’s diameter would result in an interference fit.

153. Interference fits can also 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 both interfering materials can be adjusted in known ways in a straightforward manner (without undue experimentation) to provide the desired mechanical retention force.

154. 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 (well-matched, strong symmetric threads made of rigid, tough

materials), which preservation is one of the principal advantages of the claimed invention.

155. 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 abutment's female threads and subsequently expand radially outward to at least some extent into the open cavity of the implant abutment's threading where the pressure is reduced, as shown below.



156. 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, as is the case with the interference fit described in the '361 Application. Although the relaxation of the post between crests may be very small, it allows sufficient engagement of a polymeric cylindrical post to rotate the post 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.

157. A cylindrical post made of plastic, with the right diameter, could be screwed into the abutment's female threads and would deform to engage the abutment to a predetermined torque, and would then "release" the threading "with axial force after," similar to Figure 75. Ex. 1012 ('361 Application), 97–98; Ex. 1001 ('992 Patent), col. 23, ln. 13–14 (same); Ex. 1010 ('402 Application), 16 (same). This cylindrical post also has a threading profile that is different from that of the definitive screw. It does not matter whether one considers the thread profile to be an initially flat, smaller thread tooth profile (large root diameter with small major diameter), or instead formed by relaxation after press-fitting. Either way, 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 (which can be seen as a temporary screw with no threads at all) constitute

threading profiles that are different from the asymmetric thread shown in Figure 75.

158. Rotating the temporary screw into position to achieve this 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 from the post or the male or female threads.

159. Such embodiments are disclosed by the Priority Applications because all of these features are explicitly disclosed and “the particular features, structures, or characteristics” of any given embodiment “may be combined in any suitable manner in one or more embodiments without limitation.” Ex. 1012 (’361 Application), 72; Ex. 1001 (’992 Patent), col. 8, ln. 1–3 (same).

B. Kofford Does Not Qualify as Prior Art Because the Written Description of the Priority Applications Support the Claims

160. As I explained above, the Priority Applications disclose at least three species of temporary fasteners within the broader genus claimed. In my opinion, this is more than enough to disclose the broader genus of temporary fasteners. Based on these disclosures, I can readily visualize how to modify Figure 75’s asymmetric threads by combining or switching with other disclosed features, producing other symmetric and asymmetric thread profiles that would still, like

Figure 75, screw into the abutment and then release the threading in response to an axial pull-out force. I can visualize how to swap out these known threading profiles for different ones.

161. Because these are known thread profiles and because of the predictability of the mechanical arts generally, disclosing three species is enough to indicate that the inventors had possession of the broader genus. In fact, even if Figure 75 were the sole embodiment disclosed, that would still be enough to disclose the entire genus because it permits readers to visualize how the threads could be modified in known ways to adjust the necessary pull-out force while still retaining the invention's benefits (screwing in, then pulling out).

162. Because the Priority Applications disclose adequate written-description support for the claimed genus of temporary screws, Kofford is not prior art. Kofford cannot have anticipated any claims and cannot render any claims obvious (whether alone or in combination with other prior art).

XI. GROUNDS 1–3: THE PRIORITY APPLICATIONS SUPPORT DEPENDENT CLAIMS 2–8 AND 10–12

163. As I explained above, the Priority Applications disclose at least three species of temporary fasteners within the broader genus claimed. As discussed above, that is sufficient to support and enable independent claims 1 and 9. For the same reasons, they adequately enable dependent claims 2–8 and 10–12 as well.

164. Petitioner also presents a few additional arguments for why certain dependent claims should be found invalid. In my view, these arguments are unpersuasive.

A. The Written Description of the Priority Applications Supports the Thread Diameter and Thread Pitch Limitations

165. The Petition argues that the “[n]one of the Priority Applications contain an adequate written description of or enable dependent claims 2–8 and 10–12.” Petition at 41. I disagree. As I explain above, the written descriptions of the Priority Applications support the ’992 Patent’s claims. That is true for dependent claims 2–8 and 10–12 as well.

1. Claims 2, 4, 6–8, and 12

166. The written descriptions of the Priority Applications support dependent claims 2, 4, 6–8, and 12.

167. Claim 2 describes

The dental system of claim 1, further comprising a temporary screw torque driver, wherein the temporary screw torque driver comprises:

a spring friction cylinder, and

a drive cap, and

a coil spring,

wherein the temporary screw torque driver is configured to limit torque applied to the temporary screw to the predetermined torque.

Ex. 1001 ('992 Patent), col. 25, ln. 65–67, col. 26, ln. 1–6.

168. Claim 4 describes

The dental system of claim 1, wherein the temporary screw is polymeric, and wherein the distal shaft portion is hollow, and wherein the temporary screw is rotatably insertable into the implant abutment to the predetermined torque.

Ex. 1001 ('992 Patent), col. 26, ln. 9–12.

169. Claim 6 describes

The dental system of claim 1, wherein the distal shaft portion of the temporary screw has a first portion with a smaller width than a second portion of the distal shaft portion of the temporary screw comprising the threads, and wherein the first portion with the smaller width is located between the proximal head portion and the threads.

Ex. 1001 ('992 Patent), col. 26, ln. 20–25.

170. Claim 7 describes

The dental system claim 1 [sic], wherein the threads of the temporary screw deforms during the release of the temporary screw from the implant abutment.

Ex. 1001 ('992 Patent), col. 26, ln. 26–28.

171. Claim 8 describes

The dental system of claim 1, wherein the distal shaft portion of the temporary screw has a hollow portion, and wherein at least a portion of the distal shaft portion is configured to deflect inwardly into the hollow portion-in response to the axial force in the proximal direction.

Ex. 1001 ('992 Patent), col. 26, ln. 29–33.

172. Claim 12 describes

The dental system of claim 9, wherein the temporary screw comprises a polymeric material.

Ex. 1001 ('992 Patent), col. 27, ln. 15–16.

173. Petitioner argues that “[c]laims 2, 4, 6, 7, 8, and 12 are not supported for the same reasons as claims 1 and 9 because these claims add limitations that do not relate to the ‘threads in a pattern that is shaped differently’ or ‘threading profile that is different’ limitations.” Petition at 41.

174. I disagree. As I explain above, Claims 1 and 9 are supported by the written description of the Priority Applications. Dependent claims 2, 4, 6, 7, 8, and 12 are supported as well, for the same reasons.

2. Claims 3, 5, and 10

175. The written description of the Priority Applications support dependent claims 3, 5, and 10.

176. Claim 3 describes

The dental system of claim 1, wherein the pattern of the threads of the temporary screw is asymmetric.

Ex. 1001 ('992 Patent), col. 26, ln. 7–8.

177. Petitioner argues that “[t]his claim scope is not described or enabled because it encompasses many undisclosed asymmetric threads, including a reverse buttress thread.” Petition at 41.

178. I disagree. As I explain above, the written descriptions of the Priority Applications adequately support the claimed temporary fasteners, including those embodiments with asymmetric thread patterns or profiles.

179. Claim 5 describes

The dental system of claim 1, wherein the pattern of the threads of the temporary screw is configured to define an abutment threading contact area and/or volume with the threads of the implant abutment that is less than an

abutment threading contact area and/or volume with the threads of the implant abutment defined by the pattern of the threads of the definitive screw.

Ex. 1001 ('992 Patent), col. 26, ln. 13–19.

180. Petitioner argues that “[t]his claim scope is not described or enabled because it encompasses many undisclosed thread patterns, including a reverse buttress thread and a symmetric thread with truncated or rounded peaks and/or a smaller thread angle.” Petition at 42.

181. I disagree. As I explain above, the written descriptions of the Priority Applications adequately support the claimed temporary fasteners, including those embodiments with asymmetric and symmetric thread patterns and profiles.

182. Claim 10 describes

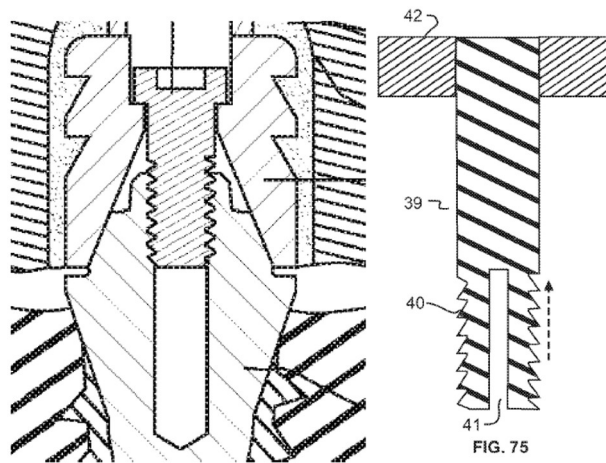
The dental system of claim 9, wherein the male threading profile of the post of the temporary screw comprises at least some threads that have a pitch angle that is different than a pitch angle of the threads of the female threading of the implant abutment and threads of the male threading profile of the shaft of the definitive screw.

Ex. 1001 ('992 Patent), col. 27, ln. 3–8.

183. Petitioner argues that Claim 10 is not supported “because the threads of the temporary screw of Figure 75 have the same maximum thread diameter and

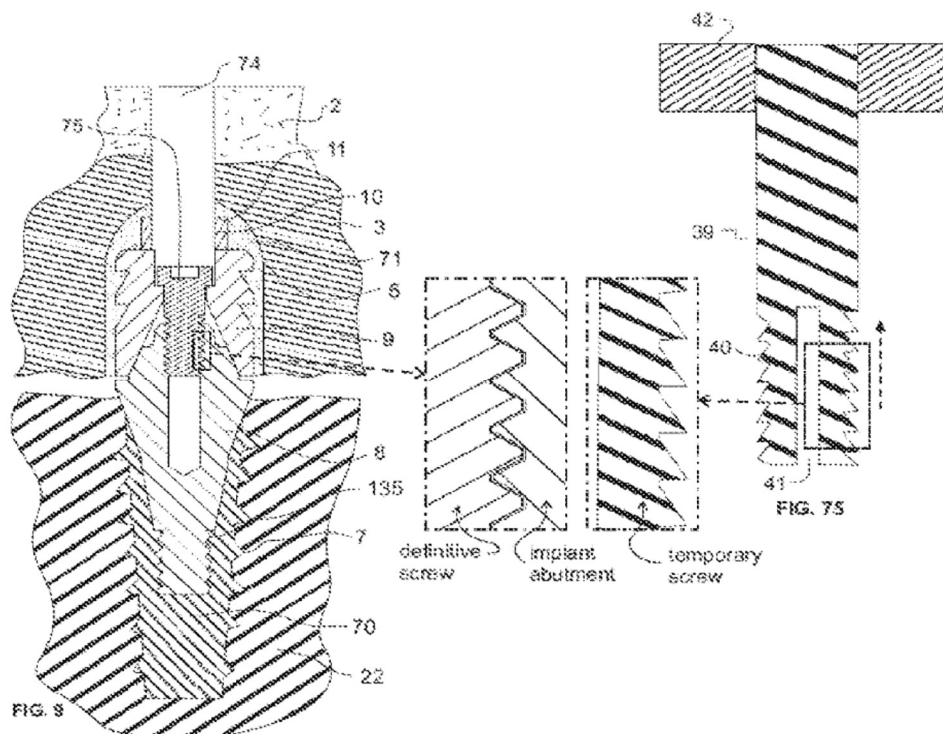
thread pitch, and therefore the same pitch angle, as the threads of the definitive screw and the abutment of Figure 9.” Petition at 42.

184. I disagree. The close-up of Figure 9 (below left) depicts a permanent screw with threads that match the abutment’s symmetric female threads. The asymmetric threads in Figure 75 (below right) do not match those symmetric female threads.

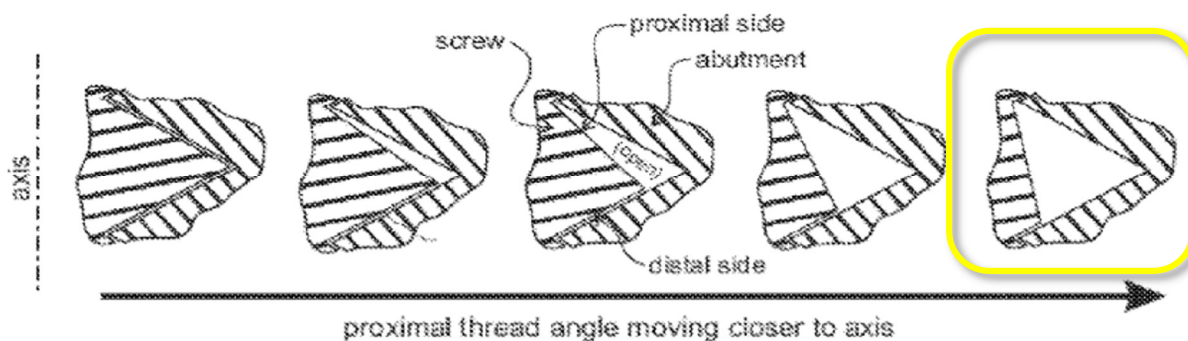


Ex. 1012 ('361 Application), FIGS. 9, 75; Ex. 1001 ('992 Patent), FIGS. 7, 75; *see also* Ex. 1010 ('402 Application), FIGS. 9, 43 (similar).

185. Figure 75’s temporary screw could not possibly have the same thread diameter as the permanent screw. Based on inherent geometric principles, the temporary screw would not screw into the abutment threading if it had the same thread diameter as the permanent screw that fills the abutment threads. Materials that the inventors submitted during prosecution illustrate this point:



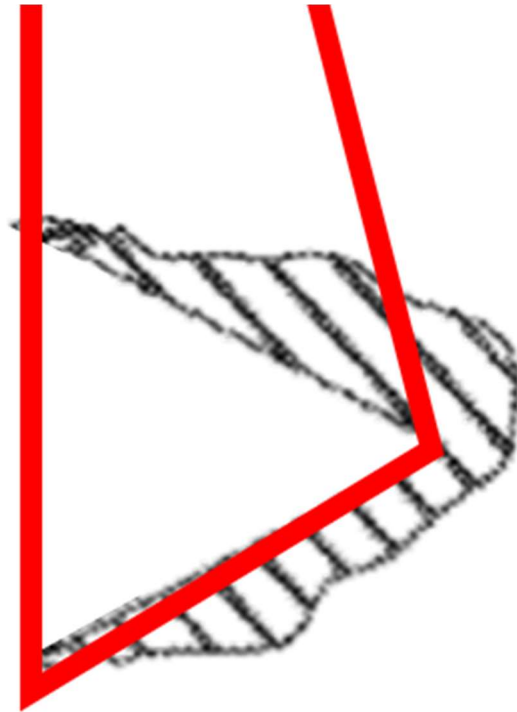
Ex. 1015 (Prosecution History), 296.



Ex. 1015 (Prosecution History), 297.

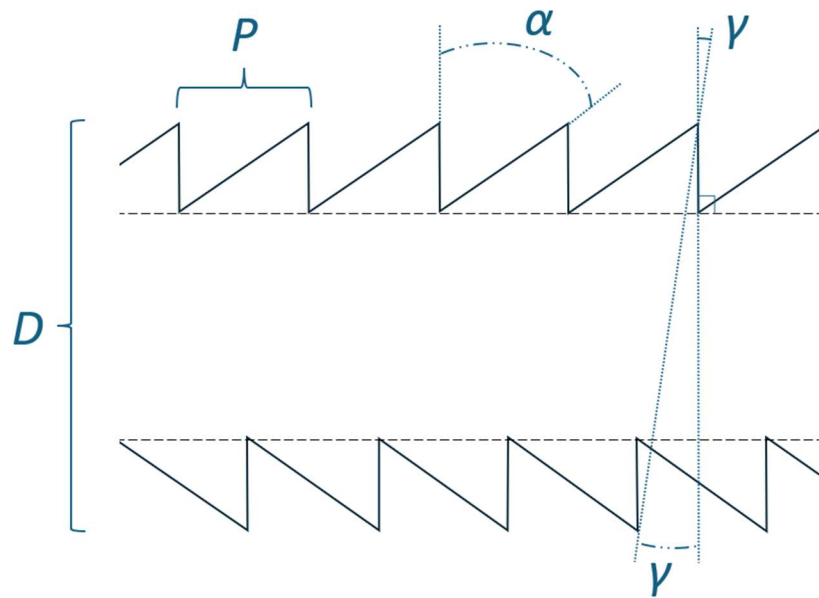
186. If a temporary screw had asymmetric threads with thread angles matching the male thread in the illustration above circled in yellow, but also had the same diameter as a symmetric-threaded screw that completely fills the female

threads, then the temporary screw threads would not fit into the abutment's female threading. The asymmetric thread of such a screw would be similar to the thread profile shown in red below.



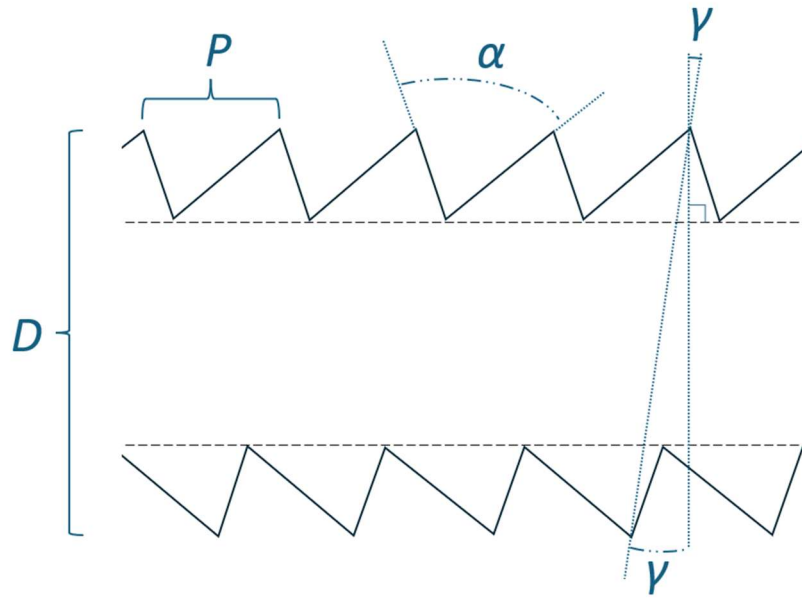
187. The illustration above shows a standard symmetrical female thread taken from the materials submitted during prosecution. Superimposed (in red) over the female thread is one thread of a hypothetical temporary screw with an asymmetric thread profile that has the same thread diameter as a definitive screw that fills the female abutment's threading. As is obvious, such a thread profile could not engage the female abutment threads because its thread angle is not the same as the definitive screw's male threading, which matches the female threading.

188. It is not accurate to say that the threads of the temporary screw with asymmetric threads and threads of the definitive screws with symmetric threads “have ... the same pitch angle.” Petition at 42. This is because the pitch-angle formula that Brunski uses, *see* Ex. 1002 (Brunski Declaration), ¶ 156, does not account for the asymmetric nature or thread angle of the temporary screw threads shown in Figure 75. The diagram below displays the diameter D , pitch P , thread angle α , and helix angle γ for a screw with asymmetric buttress threads like those in Figure 75.



In a screw with buttress threads like those shown in Figure 75, the helix angle γ is shown above.

189. For clarity, the diagram below displays the diameter D , pitch P , thread angle α , and helix angle γ for a screw with another asymmetric threads that have slightly different geometric characteristics.



190. The thread diameter for a Figure 75 temporary screw that fits into the symmetric female abutment threading is necessarily different or smaller from the definitive screw threading so that it fits into the female abutment threading. Then, by using the pitch angle formula that Brunski uses (shown below), the temporary screw must have a different pitch angle when the diameter D is less and pitch P is held constant.

For a screw with a maximum thread diameter D and a thread pitch P , the pitch angle lambda (λ) may be calculated by the following equation:

$$\tan (\text{pitch angle } \lambda) = P / \pi D$$

Ex. 1002 (Brunski Decl.), ¶ 156.

191. The Priority Applications disclose a temporary fastener with a different pitch angle from the female abutment threading and the definitive screw's threading. The written description of the Priority Applications support claim 10. Kofford is not prior art to claim 10.

B. The Written Description of the Priority Applications Support Claims 2–7 and 10–12

192. For the same reasons I explain above, the written description of the Priority Applications supports the claimed temporary fasteners, including those identified in dependent claims 2–7 and 10–12.

193. Petitioner argues that “[c]laims 2–3, 5–7, and 10–12 are not supported for the same reasons as claims 1 and 9 because these claims add limitations that do not require the temporary screw to have deflecting legs that permit the screw to be pulled out.” Petition at 42–43.

194. Petitioner also argues that “claim 4 is not described or enabled for the same reasons as claim 1” because its “limitations do not require the temporary screw to have a split post with deflecting legs.” Petition at 43.

195. I disagree. Petitioner's argument is based on an implicit claim construction that is incorrect, for the reasons I explained above. The written

description of the Priority Applications supports the claimed temporary fasteners in claims 2–7 and 10–12.

C. The Written Description of the Priority Applications Supports the *Thread Deformation* Claim Limitation

196. For the same reasons I explain above, the written description of the Priority Applications supports the claimed temporary fasteners, including those claimed in dependent claim 7.

197. Claim 7 describes

The dental system claim 1, wherein the threads of the temporary screw deforms during the release of the temporary screw from the implant abutment.

Ex. 1001 ('992 Patent), col. 26, ln. 26–28.

198. Petitioner argues that the Priority Applications do not support dependent claim 7's "threads deform" limitation "because they do not describe any differently-threaded temporary screw with threads that 'deform' during release." Petition at 43.

199. I disagree. The Priority Applications disclose a temporary screw made of plastic, which is deformable. The temporary screw's threads are designed to engage the female abutment threading (allowing the temporary screw to be screwed in) and then release. The split-post structure is not critical to the claimed invention. Taking, for example, an asymmetric threaded temporary screw made of

plastic **without** a slotted or split post, the threads of such a screw would deform upon axial pullout to facilitate removal, because the metal female threads of the abutment would be harder than the plastic temporary screw's threads.

200. The Priority Applications disclose 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.” Ex. 1012 ('361 Application), 100; Ex. 1001 ('992 Patent), col. 24, ln. 53–56 (same); Ex. 1010 ('402 Application), 20 (similar).

201. A temporary fastener that uses the 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. Threading a polymeric post into the abutment's female threading such that there is an interference fit between the two, will 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/or elastic). This is discussed above with the figure of the red temporary screw.

202. The '361 Application discloses such fasteners. The Priority Applications fully support dependent claim 7's thread-deformation limitation, and Kofford is not invalidating prior art.

XII. GROUND 4: A POSA WOULD NOT HAVE COMBINED BERNHARD, POOVEY, AND GRACCO

203. The Petition argues that "it would have been obvious in view of Bernhard, Poovey, and Gracco to modify the system of [Bernhard] Figure 8 to temporarily fasten 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 55. 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 56.

204. I disagree that these prior art references render the '992 patent's claims obvious, for several reasons. First, such a combination would not satisfy all the limitations of independent claims 1 and 9, or the dependent claims which depend from them. Second, there would not be motivation to combine Bernhard and Poovey in the first place, much less to combine Gracco on top of them as well.

Nor does the Petition identify any problem to be solved with any of the asserted prior art that would have encouraged or required looking to other prior art.

205. The specific arguments that Petitioner and Brunski make to reach their desired outcome (obviousness) signal to me that they are improperly relying on hindsight reasoning to recreate the '992 Patent's claims after-the-fact.

A. No Combination of Bernhard, Poovey, and Gracco Meets All the Claim Limitations

206. Petitioner argues that a POSA would (1) take Bernhard's snap-on system, then (2) switch out the snap-on connector for Poovey's temporary screw with flexible threads (or add the Poovey screw in addition to Bernhard's snap-on connector), before finally (3) adding Gracco's buttress threads. Petition at 54–62. Grounds 4, 5, and 6 all contain this combination; Grounds 5 and 6 add Derey and Ruetschi, respectively, on top of those.

207. Petitioner argues that “the temporary screw with flexible buttress threads used in Bernhard's system would have all the features of claims 1, 3, 5–7 and 9–12.” Petition at 62. Specifically, Petitioner argues that the combination would satisfy limitation 1(g):

As explained above, the temporary screw with flexible buttress threads would be based on the design of fastener 750 and include a threaded post like shaft 754 but with asymmetric buttress threads in a pattern shaped

differently from a pattern of the matching, symmetric threads of shaft 754 of fastener 750 and bore 654 of abutment 650.

Petition at 66.

208. Similarly, Petitioner argues that the combination would satisfy limitation 9(g):

As explained above, the temporary screw would be based on the design of fastener 750 and include a threaded post with male buttress threading with a male threading profile that is different from the symmetric, male threading profile of shaft 754 of fastener 750.

Petition at 74–75.

209. I disagree that this combination, based on the prior art, would satisfy limitations 1(g) and 9(g), even assuming motivation to combine Bernhard, Poovey, and Gracco as the Petition suggests.

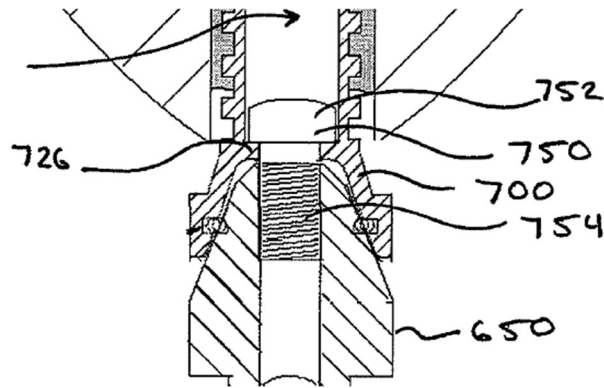
210. What the Petition refers to as limitation 1(g) describes “a distal shaft portion with threads in a pattern that is shaped differently from a pattern of the threads of the definitive screw.” Ex. 1001 (’992 Patent), col. 25, ln. 53–55. What the Petition refers to as limitation 9(g) describes “a post comprising male threading, wherein the male threading has a male threading profile that is different

from the male threading profile of the shaft of the definitive screw.” Ex. 1001 (’992 Patent), col. 26, ln. 51–54.

211. However, Petitioner’s argument merely assumes, without providing any justification for that assumption, that the “temporary screw with flexible buttress threads” produced by its Bernhard-Poovey-Gracco combination will be “shaped differently” from “the matching, symmetric threads” of the definitive screw. Petition at 66; Petition at 74–75 (similar). This assumption is unsound because nothing in Bernhard, Poovey, or Gracco teaches or suggests using a temporary screw with a thread profile that is different from a definitive screw or the abutment. Nothing in Bernhard, Poovey, or Gracco teaches or suggests using male threading on *any* screw of any kind that is different from the female threading it engages.

212. Bernhard does not teach or suggest any temporary screw. It discusses and illustrates only a definitive screw used after the temporary conversion process, to secure the prosthesis to the abutment or implant. Bernhard never refers to its definitive screw as a “provisional connection feature,” which is Bernhard’s terminology for the components analogous to a temporary screw.

213. Bernhard’s definitive screw has male threading that matches and “engages corresponding threading” in the abutment, Ex. 1003 (Bernhard), [0134], as shown below.

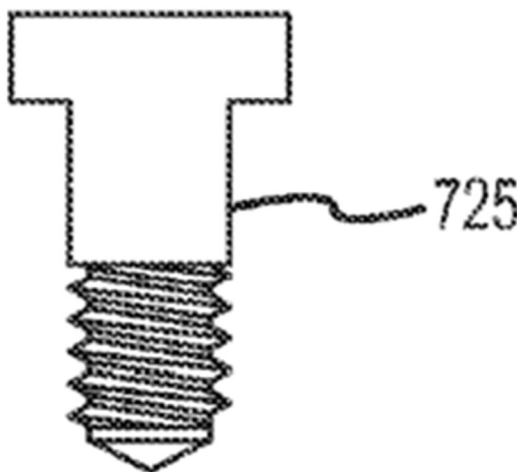


Ex. 1003 (Bernhard), FIG. 12. In the above, definitive screw 750 with a shaft 754 is inserted into the bore of abutment 650. Ex. 1003 (Bernhard), [0134]. It teaches that “shaft 754 can be threaded along an exterior surface such that it engages corresponding threading within bore 654,” so that “coping 700 and prosthesis 510 can be securely attached to the abutment 650 using the threaded screw.” Ex. 1003 (Bernhard), [0134]. Bernhard does not teach or suggest using a temporary screw with a thread profile that is different from a definitive screw or the female threading of the abutment. Nor does it teach or suggest using male threading on any screw of any kind that is different from the female threading it engages. To the contrary, Bernhard’s threaded definitive screw matches the “corresponding threading” on the abutment to create a secure, long-lasting attachment intended to remain attached until it is unscrewed. Ex. 1003 (Bernhard), [0134].

214. Poovey teaches a temporary screw with flexible silicone or plastic threads used during the conversion process. Nothing in Poovey, however, teaches

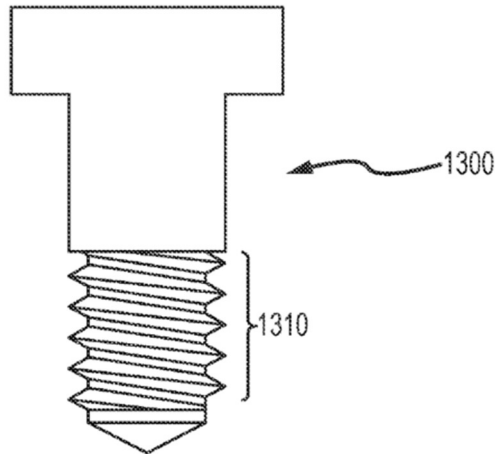
or describes a temporary screw with threading that is different from that of the definitive screw.

215. Poovey's Figure 7 depicts an optional definitive screw, which Poovey refers to as a "fixation screw," Ex. 1005 (Poovey), [0015], [0019], [0026], [0049], [0061], [0088]:



Ex. 1005 (Poovey), FIG. 7. Poovey describes using this fixation screw to further secure the implant to the jaw. Ex. 1005 (Poovey), [0049]. "The implant 700 has a circular opening in the apical end 710, the top end 720 having an abutment-receiving portion accessible from the top end 720 of the dental implant 700. The implant 700 has a circular opening in the apical end 710 adapted for receiving a fixation screw 725 that will pass through the abutment-receiving portion 720 and extend below the apical end of the implant 700, along dashed line A, and into the jawbone of the patient to further secure the implant 700 within the jawbone of a patient" Ex. 1005 (Poovey), [0049].

216. Poovey's Figure 13 depicts its temporary screw, which Poovey refers to as an "impression coping securing screw," Ex. 1005 (Poovey), [0021]:



Ex. 1005 (Poovey), FIG. 13. Poovey explains:

Conventional dental implants generally comprise a threaded exterior portion that attaches to the jawbone of a patient and interior threads designed to receive restorations or other fixtures, such as an impression coping. ... Similar to a conventional implant with internal threading, in at least one embodiment of the present disclosure, the implant 1220 may contain internal threading that allows a securing screw to pass through impression coping top 1160 and engage threads near the base 1240 of implant 1220. Thus, a related embodiment of the disclosure is an impression coping securing screw for securing an impression coping to an implant. The impression coping securing screw may be made of metal or other suitable hard material, while the threads of the

impression coping securing screw are made of a heat labile plastic, or silicone.

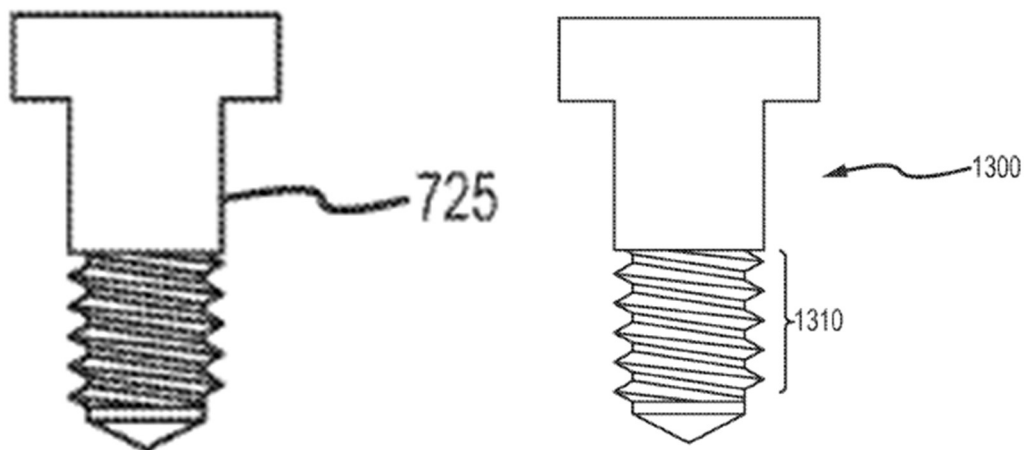
One such impression coping securing screw 1300 of this disclosure is depicted in FIG. 13. Threads 1310 may be composed of a heat labile plastic, or silicone. In related embodiments, threads 1310 may be made of metal or other suitable hard material, and coated with a heat labile plastic, or silicone. In use, the impression coping securing screw 1300 is threaded into the internal threading in a dental implant by exerting a rotational force on the impression coping securing screw. At the time of removal, the heat labile plastic, or silicone (or heat labile plastic, or silicone-coated threads) are activated to allow the impression coping secured by the impression coping securing screw 1300 to be disengaged from the implant and removed with the impression of the patient's dentitia.

Ex. 1005 (Poovey), [0078]–[0079].

217. To be clear, of course, Poovey does not describe a system in which the fixation screw is attached with the same female threading as the impression coping securing screw. The fixation screw goes through the implant 700's "circular opening in the apical end 710" "and into the jawbone of the patient to further secure the implant 700 within the jawbone of a patient." Ex. 1005 (Poovey),

[0049]. The impression coping securing screw, on the other hand, “secur[es] an impression coping to an implant.” Ex. 1005 (Poovey), [0021].

218. However, even assuming the temporary screw and definitive screw could be modified to somehow use the same female threading, Poovey does not suggest anywhere that the impression coping securing screw’s threads are, should be, or even could be different from the definitive screw. To the contrary, the temporary screw (impression coping securing screw) is depicted as identical to the definitive screw (fixation screw):



Ex. 1005 (Poovey), FIG. 7 (fixation screw); Ex. 1005 (Poovey), FIG. 13 (temporary screw).

219. Similarly, nothing in Poovey teaches or suggests using male threading on any screw of any kind that is different from the female threading it engages. Though Poovey does not directly describe or illustrate the female threading of the jawbone into which the fixation screw are inserted, the female threading in the

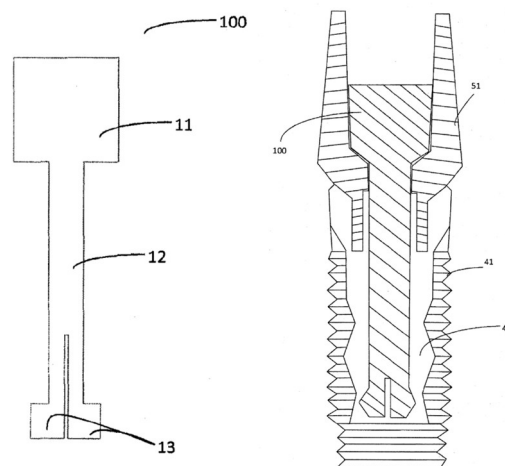
jawbone would match the fixation screw, because the purpose of inserting the fixation screw is to “secure the implant into a jawbone” or to “anchor[] the non-cylindrical implant to the jawbone with a fixation screw.” Ex. 1005 (Poovey), 10. Likewise, there is no indication that the impression coping security screw’s threads would be different from the implant threading.

220. To the contrary, Poovey teaches that the “impression coping securing screw” will “engag[e] *corresponding threading* in the internal cavity of the implant in a closely fitted engagement.” Ex. 1005 (Poovey), [0082] (emphasis added). Its temporary screw is “configured to *cooperatively engage* the implant.” Ex. 1005 (Poovey), [0024] (emphasis added). Poovey also describes “thread[ing]” the impression coping securing screw “into the internal threading in a dental implant” and then “activat[ing]” the male threads, allowing the impression coping “to be disengaged from the implant.” Ex. 1005 (Poovey), [0021]. Absent any indication of mismatched threads, Poovey cannot be understood to convey mismatched threads. The *sole* disclosed release mechanism here is the “dissolv[ing],” “soften[ing],” or flexibility of the threads; this does not disclose or teach mismatching the threads. Ex. 1005 (Poovey), [0023]–[0024], [0081]–[0082], [0084].

221. Similarly, nothing in Gracco teaches or suggests using a temporary screw with a thread profile that is different from a definitive screw or the abutment.

The mini-screws in Gracco's experiment were "self-drilling and self-tapping, with a cutting flute at their apex." Ex. 1006 (Gracco), 4. In other words, the mini-screws themselves cut the female threading in the bone material when they are screwed in. By definition, this means the mini-screw male threading will *perfectly* match the female threading in the bone material, because the male threading itself creates the surrounding female threading. Gracco does not teach or suggest using a temporary screw with a thread profile that is different from the surrounding female threading in the bone. And because Gracco does not disclose any definitive or permanent screw to be used in conjunction with the mini-screws, it necessarily does not disclose any permanent screw with threading different from the mini-screws.

222. Nothing in Derey teaches or suggests using a temporary screw with a thread profile that is different from a definitive screw or abutment. In fact, nothing in Derey teaches or suggests using any temporary screw at all. The snap-in fastener shown in Derey's Figures 5 and 6 is not a screw and has no threading:



Ex. 1008 (Derey), FIGS. 5–6. Derey teaches that its “flexible devices are designed to be used *instead of* the screws used for attaching the construction to the implants.” Ex. 1008 (Derey), 10 (emphasis added).

223. Limitations 1(g) and 9(g) are not disclosed in the prior art. Based on my review of the prior art that Petitioner has identified, the mismatch between the threading of the temporary and definitive screws is a novel concept in this application. So even assuming that a POSA would combine Bernhard, Poovey, Gracco, and Derey in the way that Petitioner suggests, the proposed combination still does not meet all the claim limitations.

224. It would not include “a temporary screw ... with threads in a pattern that is shaped differently from a pattern of the threads of the definitive screw,” as required by claim 1. Ex. 1001 (’992 Patent), col. 25, ln. 53–55.

225. It would not include “a temporary screw ... comprising male threading, wherein the male threading has a male threading profile that is different from the male threading profile of the shaft of the definitive screw,” as required by claim 2. Ex. 1001 (’992 Patent), col. 26, ln. 48, 51–54.

B. No POSA Would Add Gracco's Mini-Screw Testing to Modify the Petition's Proposed Combination of Bernhard and Poovey

226. Even assuming for these purposes that a POSA might combine Bernhard and Poovey, there would be no motivation to further modify the combination to incorporate Gracco's buttress threads.

227. Petitioner argues that incorporating Gracco would "make the screw easier to pull out while maintaining its secure, reliable and stable threaded connection." Petition at 59. But neither Petitioner nor Brunski have identified any issues with Poovey's flexible symmetric threads that would require or suggest looking beyond Bernhard-Poovey.

228. Brunski's own praise for Bernhard and Poovey contradicts this supposed motivation. He claims that "the central benefit of both Bernhard and Poovey *is the ease with which the impression components can be removed* by applying an axial force." Ex. 1002 (Brunski Declaration), ¶ 306 (emphasis added). Based on Brunski's own analysis, there would be no motivation to look beyond a Bernhard-Poovey combination to make the screw easier to pull out; such a combination would already include two references whose "central benefit" is "the ease" of removing the impression components. Ex. 1002 (Brunski Declaration), ¶ 306. Brunski provides nothing to suggest motivation to go beyond that. If both the technology in Bernhard and Poovey actually functions like Petitioner and

Brunski assume it would, individually and together they would provide the same advantage (ease of removal) which supposedly is the same reason for adding Gracco. That makes no sense.

229. In my opinion, the proposed combination with Gracco is a clear signal that Petitioner's obviousness analysis improperly relies on hindsight reasoning and cherry picking, and uses the '992 Patent as a template for retroactively combining the prior art. The main benefit of including Gracco in this proposed combination is not to improve the function of the Bernhard-Poovey combination, but instead is to give the resulting hypothetical invention asymmetric threads as shown in the '992 Patent's Figure 75, and to satisfy claim 3's limitation requiring asymmetric threads.

XIII. GROUND 5: A POSA WOULD NOT HAVE COMBINED BERNHARD, POOVEY, GRACCO, AND DEREY

230. The Petition next argues that "it would have been obvious to modify Bernhard's system in view of Poovey and Gracco to use a temporary screw based on the design of threaded fastener 750 but with flexible buttress threads." Petition at 78. For the same reasons explained above, however, that is incorrect. There would not be motivation to combine these references.

A. No Combination of Bernhard, Poovey, Gracco, and Derey Meets All the Limitations of Claims 4 or 8

231. For the same reasons described above in part XII.A, combining Bernhard, Poovey, and Gracco would not satisfy the limitations of independent

claim 1. Such a combination would also not satisfy the limitations of dependent claims 4 and 8, which depend from independent claim 1.

B. No POSA Would Combine Bernhard, Poovey, and Gracco as Petitioner Proposes

232. For the same reasons described above in part XII.B, a POSA would not have been motivated to combine Bernhard, Poovey, and Gracco.

C. No POSA Would Combine Bernhard, Poovey, Gracco, and Derey as Petitioner Proposes

233. Petitioner argues that “Claims 4 and 8,” which “require a portion of the distal shaft of the temporary screw to be hollow, would have been obvious in further view of Derey.” Petition at 78. Petitioner says that Derey’s “split-post structure with deflecting legs” would “make it easier to pull the screw out of the abutment while still ensuring that the temporary connection is stable and secure.” Petition at 79.

234. I disagree. Derey’s deflecting legs are part of a snap-on system with functions that, in a screw-based system, are redundant and needlessly complicated. Neither Petitioner nor Brunski identify any reason why a hypothetical Bernhard-Gracco-Poovey combination would not already offer this advantage and satisfy any need for a stable connector capable of being pulled out. There would be no need to look beyond that combination.

235. Specifically, Derey’s “flexible devices are designed to be used *instead of the screws* used for attaching the construction to the implants.” Ex. 1008 (Derey), 10. They engage the abutment through friction or tension by pushing against the abutment. But this engagement would be unnecessary in a Bernhard-Poovey-Gracco combination (assuming it would function as Petitioner and Brunski claim), because the screw’s male threading already engages the abutment. In Brunski’s own words, that combination already “make[s] the screw easier to pull out while maintaining its secure and stable threaded connection.” Ex. 1002 (Brunski Declaration), ¶ 272.

236. Similarly, Derey’s deflecting legs would be unnecessary, redundant, and needlessly complicated as a release mechanism in the proposed Bernhard-Poovey-Gracco combination. Brunski claims that “the central benefit of both Bernhard and Poovey is the ease with which the impression components can be removed by applying an axial force during pick-up processing.” Ex. 1002 (Brunski Declaration), ¶ 306. He also claims that the supposed motivation for incorporating Gracco’s buttress threads is “to make the screw easier to pull out while maintaining its secure and stable threaded connection.” Ex. 1002 (Brunski Declaration), ¶ 272. Neither Petitioner nor Brunski show how the Bernhard-Poovey-Gracco combination would be inadequate to accomplish this objective. To the contrary, Brunski’s opinion states that this was the precise purpose that would lead to the

Bernhard-Poovey-Gracco combination in the first place. *See* Ex. 1002 (Brunski Declaration), ¶ 272 (“Based on the foregoing, a POSA would have been motivated to design the temporary screw to have an asymmetric buttress thread with a shorter thread depth and a smaller (shallower) proximal thread angle, instead of a symmetric thread with a larger (steeper) proximal thread angle (as depicted in Figure 13 of Poovey below), in order to make the screw *easier to pull out* while *maintaining its secure and stable threaded connection*.” (emphasis added)).

237. In my opinion, the proposed combination with Derey is another clear signal that Petitioner’s obviousness analysis improperly relies on hindsight reasoning and cherry picking, and uses the ’992 Patent as a template for retroactively combining the prior art. The main benefit of including Derey in this proposed combination is not to improve the function of a Bernhard-Poovey-Gracco combination, but instead is to give the resulting hypothetical invention a slotted post as shown in the ’992 Patent’s Figure 75 and to satisfy claim 4 and claim 8’s additional limitations requiring that the temporary screw shaft be “hollow.”

XIV. GROUND 6: A POSA WOULD NOT HAVE COMBINED BERNHARD, POOVEY, GRACCO, AND REUTSCHI

238. Petitioner’s Ground 6 relies on obviousness arguments that are similar to those in Grounds 4 and 5. For the same reasons explained above, combining

Bernhard, Poovey, Gracco, and Ruetschi would not be obvious because there would not be motivation to combine these references.

A. No Combination of Bernhard, Poovey, Gracco, and Reutschi Meets All the Limitations of Claim 2

239. For the same reasons described above in part XII.A, combining Bernhard, Poovey, and Gracco would not satisfy the limitations of independent claim 1. Such a combination would also not satisfy the limitations of dependent claim 2, which depends from independent claim 1.

240. Ruetschi does not describe any temporary screws that allow for stable axial positioning with the ability to withstand the necessary torque, which facilitates the alignment and creation of a prosthesis, and that can be removed with an axial pullout force. *See* Ex. 1022 (Ruetschi), Abstract.

241. Reutschi does not teach the use of any temporary screw with threads or a threading profile that is different from that of a definitive screw, or even different from female abutment (or implant) threading. In fact, Reutschi does not teach the use of any screw with male threading that is different from the female threading into which it is inserted. *See* Ex. 1022 (Reutschi), Abstract.

242. This combination would not meet what the Petition calls limitations 1(g) and 9(g).

B. No POSA Would Combine Bernhard, Poovey, Gracco, and Reutschi as Petitioner Proposes

243. For the same reasons described above in part XII.B, a POSA would not have been motivated to combine Bernhard, Poovey, and Gracco, much less to then add Ruetschi to that combination.

XV. CONCLUSION

244. 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 18 U.S.C. § 1001.

Dated: March 13, 2026

A handwritten signature in dark ink, appearing to read 'KRLZing', is positioned above a horizontal line.

Karl R. Leinsing, MSME, PE