

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Wellmatics, LLC, GR Energy Services Management, LP, GR Energy Services
Operating GP, LLC, and GR Wireline, L.P.,

Petitioners,

v.

Canatex Completion Solutions, Inc.,
Patent Owner.

Case No. IPR2023-01149
U.S. Patent No. 10,794,122

**DECLARATION OF GARY WOOLEY, Ph.D. REGARDING U.S.
PATENT NO. 10,794,122**

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Declaration of Gary Wooley, Ph.D. Regarding U.S. Patent No. 10,794,122

I, Gary Wooley, Ph.D., hereby state and declare as follows:

I. QUALIFICATIONS

1. My name is Gary Wooley. I submit this Declaration in connection with Petitioners' Petition for Inter Partes Review ("IPR") of U.S. Patent No. 10,794,122 ("the '122 Patent") and the cancellation of claims 1, 4-13, and 15-19 (the "Challenged Claims") under 35 U.S.C. §§ 102 and/or 103.
2. I have been retained on behalf of Petitioners GR Energy Services Management, LP; GR Energy Services Operating GP, LLC; GR Wireline, L.P.; and Wellmatics, LLC (collectively "Petitioners").
3. I have been asked to provide my expert opinions and testimony about certain issues in the above styled IPR. Specifically, I have been asked to address the issue of validity of the '122 Patent. My opinions on this issue are set forth in this Declaration.
4. I have a 50-year history working in the oil and gas industry, with a varied background in onshore and offshore oilfield work, oil and gas industry operations, research, and engineering consulting involving all aspects of the oil and gas industry, primarily upstream activities of drilling, completion, production, and workovers. My experience in the petroleum industry includes downhole well completions, such as the subject release tools, and consulting on patent infringement issues akin to those involved in the related pending litigation styled *Canatex Completions Solutions, Inc. v. Wellmatics, LLC et al*, 4:22-cv-3306 (S.D. Tex.), served on Petitioners on September 28, 2022.
5. I am President of Wooley & Associates, Inc., a petroleum and mechanical engineering consulting firm with offices at 3100 South Gessner Road, Suite 325, Houston, Texas 77063. I am a registered Professional Engineer in the State of Texas (#40049). I have a B.S. degree in Mechanical Engineering (1969), an M.S. degree in Engineering Mechanics

(1970), and a Ph.D. degree in Engineering Science with minors in Applied Mathematics and Mechanical Engineering (1972), from Louisiana State University. As part of my undergraduate training I studied stress analysis, fluid mechanics, heat transfer, machine design, and material science including metallurgy that relate to downhole tools and release mechanisms. As a graduate student I was an instructor for undergraduate engineering mechanics classes commonly called statics, dynamics and strength of materials, and I did substitute teaching in undergraduate and graduate classes including fluid mechanics and material science.

6. At the beginning of my career in the petroleum industry, I worked for four major oil companies: Shell, Chevron (twice), Humble Oil (Exxon), and Atlantic Richfield Company (Arco) in various engineering positions. While working as an employee of a major oil and gas operator I worked on drilling, completion, production, and workovers, including selecting and running wirelines and coiled tubing with release mechanisms.
7. Since 1978, I have served as a petroleum and mechanical engineering consultant to the oil and gas industry. My clients include all the major oil and gas operating companies and many independents and smaller operators, all the major and many smaller oilfield service contractors, and manufacturers and suppliers of oilfield equipment, including many drilling contractors. The majority of this consulting work has been on upstream activities such as drilling, completion, production, and workovers, including selecting and running wireline and coiled tubing with release mechanisms. I have helped clients with designing, selecting proposals, and supervision of fracture stimulations in horizontal wells since the late 1980s. I have also helped clients with evaluating the suitability of downhole and surface equipment for specific wells, and with analyzing the causes of

problems encountered in wellbores, including failure analyses. At times, that work included computer modeling and laboratory and field testing.

8. I have taught seminars and professional short courses that relate to oil and gas well drilling, completion, production and workovers. I have been a member, invited speaker, technical committee chair, and/or Standardization Committee member for trade organizations such as the ASME (American Society of Mechanical Engineers), SPE (Society of Petroleum Engineers), API (American Petroleum Institute), and ASM International.
9. I have served as an expert witness for operators, contractors, and suppliers in various litigations involving drilling, completion, production, and workover equipment and procedures. A copy of my résumé is attached to this Declaration as Exhibit A. Also attached in Exhibit B is a list of testimony in the last four years.

II. COMPENSATION

10. My firm is billing for my time at my standard rate of \$620 per hour. This compensation does not depend on the outcome of this Petition or any IPR proceeding.

III. MATERIAL CONSIDERED

11. In formulating my opinions I considered my own knowledge, skill, and experience that is outlined above and the materials cited in this Declaration, including the '122 Patent and its prosecution history, U.S. Patent 6,571,879 to Bebak, U.S. Patent No. 4,776,393 to Forehand, the Hunting Titan Wireline Hardware Brochure, the January 31, 2023 Deposition of Jeffrey R. Golinowski taken in the parties' co-pending district court litigation, and all other materials cited in this Declaration. I also considered Patent Owner's arguments and evidence presented in its Motion for Preliminary Injunction in

the co-pending district court proceeding, as well as the associated attachments, declarations, and expert analysis.

IV. PRELIMINARY STATEMENT

12. According to the '122 Patent, the field of the invention relates to releasable connections in a downhole tool string used in the oil and gas industry. Based on my education and experience, I am an expert in the field of downhole tool strings, including release tools, in the oil and gas industry, and have been an expert in these fields since before August 30, 2016, the earliest claimed priority date.¹ In the parties' co-pending district court litigation, Patent Owner has claimed entitlement to the priority date of August 30, 2016. *See* EX1017, 3.
13. I offer my opinions below based on the understanding of a person of ordinary skill in the art (defined below) as of the August 30, 2016, filing date of the Provisional Application No. 62/381,083 to which the '122 Patent claims priority. I do not express any opinion about the proper priority date at this time, but reserve the right to do so in the future. Regardless, whether it is ultimately determined that the proper priority date of the '122 Patent is August 2016 or August 2017, my opinions below would not change.
14. This Declaration represents only those opinions I have formed to date based on the information available and the work I have conducted at this time. I reserve the right to revise, supplement, and/or amend my opinions stated herein based on new information and on my continuing analysis of the materials already provided. I also reserve the right to revise, supplement, and/or amend my opinions stated herein based on Patent Owner's

¹ August 30, 2016 is the filing date of Provisional Application No. 62/381,083. I have not conducted a priority analysis to determine whether the claims of the '122 Patent are supported by this provisional application. But I reserve the right to do so if the need arises in this proceeding. For my analysis, I have assumed the priority date is August 30, 2016.

briefing and/or any reports or declarations provided by an expert on behalf of Patent Owner.

V. BACKGROUND AND TECHNOLOGY

15. The technology at issue in Petitioners' Petition, and the issues on which I have been asked to testify, concern oil and gas release tools, and specifically releasable connections for a downhole tool string as disclosed in the '122 Patent.

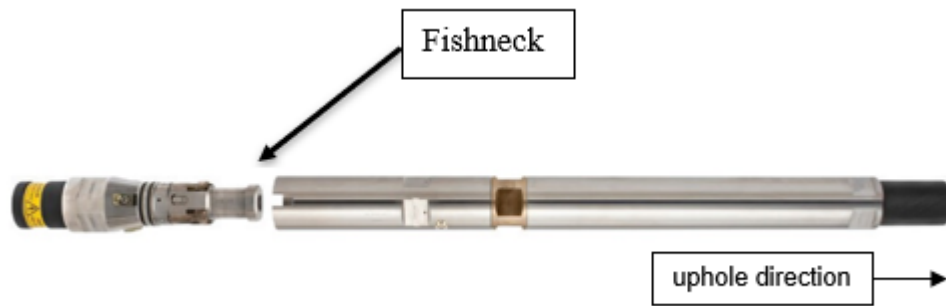
A. Oil and Gas Completion Generally

16. The technology at issue in Petitioners' Petition involves release tools for downhole tool strings. A tool string, often comprised of perforation guns, plays a role in the completion of an oil and gas well. After an oil and gas well is drilled, the well must be completed. Generally speaking, completion of a well is the process by which the well is prepared for production of oil and gas. There are many ways that a well can be completed. The completion method is usually chosen by the oil and gas operating company based on the characteristics of the formation and well.
17. The typical well in North America is drilled to a desired depth where hydrocarbons are expected to be present. The hydrocarbons at this depth may be contained in what is referred to as the "production zone." During drilling and once the depth of the production zone is reached, steel casing is lowered into the hole and is usually cemented in place. The steel casing and cement provide structural support for the wellbore and seal off the production zone. However, now the well bore and the formation are separated by steel and cement, so production fluid will not flow from the formation into the well. To provide a flow path from the hydrocarbon bearing formation to the wellbore, the steel casing and cement need to be perforated.

18. Perforating is the process whereby explosive shaped charges are used to punch a hole in the casing, cement, and formation. This process allows fluid to flow into the well from the formation. Typically, shaped charge perforators are placed in a perforating gun. The gun is lowered into the well bore to the desired depth. Once the depth is reached, the explosive shaped charges in the gun are detonated. This detonation blasts a hole through the casing and cement and into the formation, allowing fluid to travel from the wellbore into the formation and from the formation into the wellbore.

B. Release Tools

19. The process described above can be accomplished by sending a tool string of perforation guns, or other tools, downhole by way of a wireline that is fed down the hole by a wireline truck. In an ideal situation, all will go as described above. But, in any well, there is the potential that the tool string can get stuck. If the tool string gets stuck, and the string has been run with a release tool, the operator can activate the release tool, detach from the tool string, and allow the entire wireline to be removed from the hole. Then, a retrieval or fishing run can occur where the stuck tool string is removed from the well.
20. Ideally, the release tool is never used, but if and when it is used, it saves the operator time and money by allowing the wireline to be completely removed from the tool string, leaving the tool string behind and exposed for a clean extraction.
21. The goal of a release tool, if released, is to leave behind an attachment point that can be grabbed and easily fished out of the well. As seen in the tool depicted below (a Baker



Hughes tool that is not at issue in this case), there is a fishneck that is left behind to attach to and remove the tool string.

VI. LEVEL OF ORDINARY SKILL IN THE ART

22. I understand that a person having ordinary skill in the art (“POSA”) may be defined by factors such as: (a) the levels of education and experience of the inventor and other persons actively involved in the field; (b) the types of problems encountered in the field; (c) prior art solutions to those problems; (d) rapidity with which innovations are made; and (e) the sophistication of the technology.
23. I understand that the perspective of one of ordinary skill in the art is used in analyzing both infringement issues and invalidity issues.
24. I believe that the subject matter of the ’122 Patent falls generally within the skill level of a person with either: (1) a Bachelor of Science Degree in an engineering or science discipline, or similar field, who has at least two years of experience designing, working with, selecting, or running downhole completion tools, or (2) 3-4 years of work experience designing, working with, selecting, or running downhole completion tools. I am a POSA under this definition.
25. A POSA would have known at least the following:

- There are a finite number of ways of actuating a downhole tool including electrically, hydraulically, mechanically (e.g. motors, tension, percussion, etc.), combustibles, and ingestion of wellbore pressure. These would all be viewed as design alternatives by a POSA. *See, e.g.*, U.S. Patent No. 5,984,006 (EX1005), 1:59-66, 6:44-67; U.S. Patent No. 7,373,974 (EX1012), 1:21-36; U.S. Patent No. 4,776,393 (EX1008), 1:18-25, 1:51-54; U.S. Patent Application Publication US 2006/0048940 (EX1013), [0008]; U.S. Patent No. 6,571,879 (EX1007), 1:39-42; U.S. Patent No. 6,408,946 (EX1014), 2:67-3:8.
- Downhole tools can be placed, set, or released via wireline, coil tubing, tubing, and drill pipe, and the connections, engagement mechanisms, release mechanisms, and general mechanics used in downhole tools could be applicable regardless of type of deployment. *See, e.g.*, EX1005, 1:10-51; EX1014, 1:14-51; EX1013, [0005]; Hunting Titan Brochure (EX1009), 2 (*see also* EX1010, 18); EX1007, 1:31-51; EX1012, 1:12-22.
- It was well known that downhole tools can have internal cavities and outer housings. *See, e.g.*, EX1007, Fig. 1, 2:32-33, 4:35-42; U.S. Patent No. 4,771,827 (EX1015), Fig. 2, 4:8-24, 6:15-20, 8:4-10; EX1012, Fig. 1, 3:10-16, 3:35-37; EX1008, Figs. 3A-3B, 3:10-13, 3:20-29; EX1013, [0026], [0029], Claim 7; EX1014, 3:52-56, 5:51-57, 6:2-21.
- Internal chambers, pistons, collets, locking sleeves, slips, pins, equalization ports, and fishnecks are all common components in downhole releasable engagements and their functions and uses were well known. These components would be viewed as interchangeable design choices. *See, e.g.*, EX1007, 2:40-54, Fig. 3;

EX1015, 5:29-57; EX1012, 7:63-64, 9:4-29; EX1008, 3:45-50, 7:37-8:20, 6:27-34; EX1013, Claims 3-4; EX1014, 1:52-2:54, 6:2-26; EX1005, 19:28-45.

- Combustion and hydraulics are interchangeable ways of actuating releasable connections. *See, e.g.*, EX1005, 1:59-66, 6:44-67; EX1008, 5:38-47.
- Threaded concentric connections are the way tool strings are created. *See, e.g.*, U.S. Patent Application Publication US 2013/0008669 (EX1016), Figs. 1, 2A, 3, 6, 9, 10, 16-20A, 26, 28, 30-31C, Hunting Titan Brochure (EX1009), 2, 5, 18-19, 21-22, 24-25 (*see also* EX1010, 5-6, 8, 11-12, 14, 16, 18); EX1014, 3:48-65, Fig. 1; EX1012, 3:48-53; EX1008, 3:3-29, 5:15-34, Figs. 2A-3B.
- Concentric electrical connections were ubiquitous and well known ways to transfer electricity to downhole tools. *See, e.g.*, Hunting Titan Brochure (EX1009), 2-5, 18-19, 22, 25 (*see also* EX1010, 6, 8, 11-12, 16, 18-20); EX1016, Figs. 3-10A, 12-20A, 22-31C; EX1005, Figs. 1B-E, 7:54-62.
- Radially expanding collets were well known. *See, e.g.*, EX1007, 2:64-67; EX1015, 5:44-47, 5:62-68; EX1012, 3:42-44, 5:10-12.

26. All pieces of the references cited above qualify as prior art, as they predate the August 30, 2016 priority date of the '122 Patent. This determination is based on my understanding of the legal standards regarding prior art, discussed below in Section VII, and on my understanding of the priority dates as identified in Section IV above.

27. I understand from the Declaration of Patent Owner's expert John Rodgers in the co-pending district court litigation (Exhibit 4 to Patent Owner's Motion for Preliminary Injunction) that he defines the POSA as follows at paragraph 20:

It is my opinion that someone would be a POSITA regarding the technology of the '122 Patent in either of two circumstances. First, they have at least a

bachelor's degree in petroleum or mechanical engineering or the like and at least 2 years of exposure to electromechanical downhole tools, such as perforating guns or release tools. Alternatively, they would have at least a high school diploma and 5 years of hands-on or design experience with such electromechanical downhole tools under the guidance of a mechanical or petroleum engineer with at least 2 years' experience with such systems.

Canatex Completions Solutions, Inc. v. Wellmatics, LLC et al, 4:22-cv-3306 (S.D. Tex.), Plaintiff's Mtn. for Preliminary Inj. (Dkt. No. 47), Ex. 4 (Dkt. No. 47-3) at ¶ 20. I am also a POSA under Dr. Rodger's definition, and my opinions would not change if his definition of a POSA were adopted.

28. I have based my opinions on my own knowledge and experience in the art as well as my investigation and study of relevant materials. In formulating my opinions, I have reviewed the '122 Patent, its file history, and the prior art cited herein as well as the materials referenced above at paragraph 11.

VII. UNDERSTANDING OF LEGAL STANDARDS

A. Claim Construction

29. I understand that certain legal principles are applicable to the proper construction of patent claims. In conducting my analysis set forth in this Declaration, I have been guided by these principles.
30. I understand that claim construction is a matter of law. I understand that patent claim terms are generally given their ordinary meaning as they would be understood by a person of ordinary skill in the art as of the earliest claimed priority date. I understand that a person of ordinary skill in the art is deemed to have read the claim terms in the context of the specific claim in which the term appears, as well as in the context of the entire intrinsic record (which includes the claim language, the patent specification, and the prosecution history).

31. In construing a term, I understand that courts and the PTAB look at (1) the words of the claims themselves, (2) the remainder of the patent specification, (3) the prosecution history, and (4) extrinsic evidence, such as learned treatises, dictionaries, or articles, concerning relevant scientific principles, the meaning of technical terms, and the state of the art.
32. I understand that the specification and prosecution history can limit the interpretation of claim terms so as to exclude any interpretation that was disclaimed during prosecution. I further understand that a disclaimer must be clear and unequivocal, which can be express or by implication.
33. I understand that there is a strong presumption against a claim construction that excludes an embodiment disclosed in the specification. I am informed that this presumption can be overcome if the claim language requires the exclusion of the embodiment, or the embodiment is clearly disclaimed in the intrinsic evidence.
34. I understand that a patent applicant can exclude a feature from the meaning of a claim term if the applicant, in the specification or prosecution history, clearly and unequivocally (1) describes the invention as lacking that feature, (2) distinguishes the claim from the prior art based on the absence of that feature, or (3) disparages the prior art based on the presence of that feature in the prior art.

B. Invalidity

35. I am informed by counsel that a patent claim is presumed to be valid, and that the defendant has the burden of proving the patent claim is invalid, such as due to anticipation or obviousness, by clear and convincing evidence. I understand that several legal standards in patent law were changed under the Leahy-Smith America Invents Act (“AIA”). The new standards in the AIA only apply to applications filed on or after

March 16, 2013. Because the '122 Patent claims priority to applications that were filed after March 16, 2013, the applicable anticipation and obviousness inquiries are governed by AIA 35 U.S.C. §§ 102 and 103. I understand that at least the following sources qualify as prior art under AIA 35 U.S.C § 102:

- the claimed invention was patented, described in a printed publication, or in public use, on sale, or otherwise available to the public before the effective filing date of the claimed invention (§ 102(a)(1)); or
- the claimed invention was described in a patent issued under section 151, or in an application for patent published or deemed published under section 122(b), in which the patent or application, as the case may be, names another inventor and was effectively filed before the effective filing date of the claimed invention (§ 102(a)(2)).

36. I understand that the documents that qualify as prior art under 35 U.S.C. § 102(a)(1) include an issued patent, a published application, and a non-patent printed publication, and that the documents that qualify as prior art under 35 U.S.C. § 102(a)(2) are U.S. patent documents only.

37. I understand that there are exceptions to the categories of prior art listed above in § 102(a)(1) and (a)(2). Specifically, with respect to § 102(a)(1), a disclosure made 1 year or less before the effective filing date of a claimed invention shall not be prior art to the claimed invention under subsection (a)(1) if:

(A) the disclosure was made by the inventor or a joint inventor or by another who obtained the subject matter disclosed directly or indirectly from the inventor or a joint inventor; or

(B) the subject matter disclosed had, before such disclosure, been publicly disclosed by the inventor or a joint inventor or another who obtained the subject matter disclosed directly or indirectly from the inventor or a joint inventor.

38. With respect to § 102(a)(2), a disclosure shall not be prior art to a claimed invention under subsection (a)(2) if:

(A) the subject matter disclosed was obtained directly or indirectly from the inventor or a joint inventor;

(B) the subject matter disclosed had, before such subject matter was effectively filed under subsection (a)(2), been publicly disclosed by the inventor or a joint inventor or another who obtained the subject matter disclosed directly or indirectly from the inventor or a joint inventor; or

(C) the subject matter disclosed and the claimed invention, not later than the effective filing date of the claimed invention, were owned by the same person or subject to an obligation of assignment to the same person.

39. I understand that while these sources of prior art are only described with reference to anticipation, I understand that they are proper sources of prior art for both anticipation and obviousness. In analyzing whether prior art renders a patent claim invalid for anticipation or obviousness, I understand that first, a determination must be made regarding what constitutes prior art to a claimed invention. I understand that the determination of what constitutes prior art is assessed on a claim-by-claim basis, and that a threshold determination of whether a claim is entitled to an earlier effective filing date may be required.
40. My analysis of whether certain references constitute prior art to the Challenged Claims is based on my understanding of the priority dates as identified in Section IV above.

C. Anticipation

41. I understand that claims of a patent are anticipated (and therefore invalidated) by a prior art reference if each and every element of the claim, as properly construed, is found either explicitly or inherently in a single prior art reference, and the anticipatory reference is enabling to a person of ordinary skill in the art. I understand that the prior art elements must be arranged or combined in the same way as recited in the claim, although this is not a strict word by word analysis. I understand that a limitation not explicitly present in a reference may nevertheless be inherently disclosed if a person of ordinary skill in the

art would recognize that the missing limitation is necessarily or implicitly present in the prior art reference.

42. I understand that material not explicitly contained in a single prior art document may still be considered for purposes of anticipation if that material is incorporated by reference into the document. I understand that incorporation by reference provides a method for integrating material from various documents into a host document—a patent or printed publication in an anticipation determination—by citing such material in a manner that makes it clear to a person of ordinary skill in the art that the material is effectively part of the host document as if explicitly contained therein.
43. Although anticipation cannot be established through a combination of prior art references, I understand that additional references may be used to explain what the anticipating reference would have meant to a person of ordinary skill in the art before the effective filing date of the claimed invention. For a patent claim to be anticipated, these other references must make clear that the missing descriptive matter in the claim is necessarily or implicitly present in the allegedly anticipating reference. I also understand that a person of ordinary skill in the art may recognize the inherent features disclosed by an anticipating reference even if the prior art is silent about the disclosure of the inherent features. In addition, I understand that an anticipatory reference must enable a person of ordinary skill in the art to make the invention without undue experimentation. In the event that the prior art reference is to a single system, I understand that multiple documents describing that single prior art system may be considered together for purposes of demonstrating anticipation by that system. As long as the combination of

references is being used to describe or recreate a single prior art system, I understand that the use of multiple documents is appropriate.

D. Obviousness

44. I understand that a claimed invention in a patent may be invalid even if each and every element of the claim is not found in a single prior art reference or system, but would have been obvious to a person of ordinary skill in the art in view of the prior art teachings of a single reference or a combination of references. Unlike anticipation, a reference need not be enabling to render a patent claim invalid for obviousness. I further understand that the obviousness inquiry should not be done in hindsight. Instead, the obviousness inquiry should be done through the eyes of a person of ordinary skill in the art before the effective filing date of the claimed invention.
45. A claim may be invalid if the differences between the invention and the prior art are such that the differences would have been obvious to a person of ordinary skill in the art to which the subject matter pertains before the effective filing date of the claimed invention.
46. I understand that obviousness is based on the scope and content of the prior art, the differences between the prior art and the claim, the level of ordinary skill in the art, and secondary indicia of obviousness and non-obviousness, to the extent they exist. The obviousness of an invention is assessed by balancing these considerations and viewing the invention as a whole.
47. I understand that for prior art references to be combined for purposes of an obviousness analysis under 35 U.S.C. § 103, there must be some motivation for a person of ordinary skill in the art to combine the references and a reasonable expectation of success in doing so. I also understand that for a motivation to combine to exist, there need not be an explicit suggestion to combine references. Rather, a motivation to combine may exist if,

for example, the references are directed to addressing problems of a common nature, or are based on common sense and/or ordinary creativity. I understand that motivations to combine are generally motivations to make a product or process that is more desirable. This may include, among other things, making the product or process stronger, cheaper, cleaner, faster, lighter, smaller, safer, more durable, or more efficient.

48. I also understand that a combination of elements from prior art using known techniques may be obvious if it yields predictable results.
49. I also understand that if a technique exists in the prior art that has been used to improve one device, system, or method, and a person of ordinary skill in the art would have recognized that it would likewise improve similar devices, systems, or methods, then using the technique in similar devices would have been obvious unless doing so would have been beyond the abilities of a person of ordinary skill in the art.
50. I understand that a claim may be obvious in light of a single prior art item if the elements of the claim that are not found explicitly or inherently in the prior art item can be supplied by the knowledge or common sense of a person of ordinary skill in the art. I understand that for a single prior art reference to render a claim obvious, there must be a showing of a suggestion or motivation to modify the teachings of that reference to the claimed invention in order to support the obviousness conclusion. I understand that this suggestion or motivation may be derived from the prior art reference itself, from the knowledge or common sense of a person of ordinary skill in the art, or from the nature of the problem to be solved.
51. I understand that, furthermore, in considering obviousness, one may look to interrelated teachings of multiple prior art references, to demands in the design community or in the

marketplace, and to the background knowledge possessed by a person of ordinary skill in the art at the time to combine known prior art elements in the claimed manner, so long as what is employed is not “hindsight analysis.” I understand that one way, but not the only way, to avoid hindsight analysis is to provide a reason for combining the features of separate references with a teaching, suggestion, or motivation in the prior art, the nature of the problem solved, or the knowledge of a person of ordinary skill in the art to combine the prior art elements in the manner claimed. I further understand that an obviousness analysis recognizes that market demand, rather than scientific literature, often drives innovation, and that a motivation to combine references may be supplied by the direction of the marketplace.

52. I also understand that practical and common sense considerations should guide a proper obviousness analysis, because familiar items may have obvious uses beyond their primary purposes. I further understand that a person of ordinary skill in the art looking to overcome a problem will often be able to fit the teachings of multiple publications together like pieces of a puzzle. I also understand that these puzzle pieces need not fit together perfectly for a person of ordinary skill in the art to have the ability to combine the teachings of multiple publications. I understand that obviousness analysis takes into account the inferences and creative steps that a person of ordinary skill in the art would employ under the circumstances.
53. I understand that a particular combination of elements may be proven obvious merely by showing that it was obvious to try the combination. 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 person of ordinary skill has good reason to pursue the known

options within his or her technical grasp, meaning that the end result is likely not the product of innovation, but of ordinary skill and common sense.

54. The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results. When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill in the art can implement a predictable variation, I understand that doing so was likely obvious.
55. It is further my understanding that a proper obviousness analysis focuses on what was known or obvious to a person of ordinary skill in the art, not what was known or obvious to the patentee. Accordingly, I understand that any need or problem known in the field of endeavor and addressed by the patent can provide a reason for combining the elements in the manner claimed.
56. I understand that a person of ordinary skill in the art could have combined two pieces of prior art or substituted one prior art element for another if the substitution can be made with predictable results, even if the swapped-in element is different from the swapped-out element. In other words, the prior art need not be like two puzzle pieces that must fit together perfectly or be bodily combined. The relevant question is whether prior art techniques are interoperable with respect to one another, such that a person of ordinary skill in the art would view them as a design choice, or whether a person of ordinary skill in the art could apply prior art techniques into a new combined system.
57. In sum, my understanding is that prior art teachings are properly combined where a person of ordinary skill in the art having the understanding and knowledge reflected in the prior art and motivated by the general problem facing the inventor, would have been

led to make the combination of elements recited in the claims. Under this analysis, the prior art references themselves, or any need or problem known in the field of endeavor at the time, can provide a reason for combining the elements of multiple prior art references in the claimed manner.

58. I understand that whether a prior art reference “teaches away” from the claimed invention is a fact to be considered in determining obviousness. I also understand that a reference only “teaches away” from the invention when a person of ordinary skill in the art, after reading the reference, would be led in a different direction from the claimed path or would be discouraged from following the path that the claimed invention sets out. I understand that it is improper to combine references if the references teach away from their combination. However, I understand that the nature of the teaching is highly relevant and must be weighed in substance – a known or obvious combination does not become patentable simply because it has been described as somewhat inferior to some other product for the same use. Furthermore, I understand that the prior art’s mere disclosure of more than one alternative does not constitute a teaching away from any of these alternatives because such disclosure does not criticize, discredit, or otherwise discourage the solution claimed.

59. I understand that secondary indicia of non-obviousness (also referred to as objective indicia of non-obviousness or secondary considerations) should be considered when evaluating whether a claimed invention would have been obvious to a POSA before the effective filing date of the claimed invention. These secondary indicia may include, for example:

- a long-felt but unmet need in the prior art that was satisfied by the claimed invention;

- commercial success of processes covered by the patent as a result of the merits of the claimed invention, rather than the result of design needs, market-pressure advertising, or similar activities;
- unexpected results achieved by the invention;
- praise of the invention by others skilled in the art;
- the taking of licenses under the patent by others;
- whether others had tried and failed to make the invention;
- whether persons of ordinary skill in the art expressed surprise, skepticism, or disbelief regarding the invention;
- whether the inventor proceeded contrary to accepted wisdom; and
- deliberate copying of the invention.

60. I understand that there must be a particular and specific relationship or nexus between any such secondary indicia and the claimed invention. I further understand that independent contemporaneous invention by others is a secondary consideration supporting an obviousness determination.

61. I also understand that these secondary considerations can indicate that there existed some incentive to develop the patented technology such that if the patented technology were obvious, a person of ordinary skill in the art would have developed the technology. Accordingly, for secondary considerations to support non-obviousness, I understand that the secondary considerations must be the result of the patent's inventive aspects. For example, if commercial success of a product embodying a patent is attributable to an unpatented feature, I understand that the commercial success is not indicative of non-obviousness. I understand that it is the plaintiff's burden to establish both the existence of secondary considerations and the causal relationship, or nexus, between the secondary considerations and the purportedly inventive aspects of the claimed inventions, though

the ultimate burden of proving obviousness by clear and convincing evidence always remains on the defendant.

VIII. THE '122 PATENT

62. The '122 Patent describes a specific implementation of a downhole releasable connection. The releasable connection of the '122 Patent is generally described as follows:

A releasable connection for a downhole tool string is provided, having a first part with a connection profile and a second part with a releasable engagement profile that releasably engages the connection profile of the first part. The second part also has a locking piston, the locking piston moving axially along the second part between a locking position that locks the releasable engagement profile into engagement with the connection profile of the first part and a release position that permits the releasable engagement profile to release the connection profile of the second part, an expansion chamber in fluid communication with the locking piston, and a source of fluid pressure in communication with the expansion chamber, wherein, upon activation, the source of fluid pressure applies fluid pressure to move locking piston from the locking position toward the release position.

'122 Patent (EX1001), Abstract.

63. Challenged Claims 1, 4-13, and 15-19 of the '122 Patent are as follows (I have appended letters to each claim element for ease of discussion):

1. [preamble] A releasable connection for a downhole tool string, comprising

[A] a first part comprising an external connection profile; and

[B] a second part comprising:

[B1] an outer housing;

[B2] a releasable engagement profile which internally engages the connection profile of the first part and which is configured to expand radially to release the connection profile of the first part;

[B3] a locking piston positioned within an internal cavity of the second part, the locking piston configured to move axially along the second part between a locking position that directly constrains the releasable engagement profile into

engagement with the connection profile of the first part and a release position that permits the releasable engagement profile to expand radially to release the connection profile of the second part;

*[B4] an expansion chamber in fluid communication with the locking piston;
and*

[B5] a source of fluid pressure in communication with the expansion chamber, wherein, upon activation, the source of fluid pressure is configured to apply fluid pressure to move the locking piston from the locking position toward the release position.

4. The releasable connection of claim 1, wherein the outer housing of the second part comprises a pressure equalization ports, the locking piston configured to close the pressure equalization ports in the locking position, and open the pressure equalization ports in the release position.

5. The releasable connection of claim 1, wherein the locking piston comprises a piston section and a sleeve section that depends from the piston section, the sleeve section overlying the releasable engagement profile, and the fluid pressure is applied to the piston section.

6. The releasable connection of claim 1, wherein the first part comprises a fishneck that attaches to a fishing tool when disconnected from the second part.

7. [preamble] A releasable connection for a downhole tool string, comprising:

[A] a first part comprising an external connection profile; and

[B] a second part comprising:

[B1] a releasable engagement profile which internally engages the connection profile of the first part and which is configured to expand radially to release the connection profile of the first part;

[B2] a locking piston, the locking piston configured to move axially along the second part between a locking position that directly constrains the releasable engagement profile into engagement with the connection profile of the first part and a release position that permits the releasable engagement profile to expand radially to release the connection profile of the second part;

[B3] an expansion chamber in fluid communication with the locking piston;

[B4] a combustible disposed within the expansion chamber, wherein, upon combustion, the combustible applies gas pressure to the locking piston to move the locking piston from the locking position toward the release position.

8. *The releasable connection of claim 7, wherein the expansion chamber comprises a first volume that contains the combustible, and a second volume that encloses at least a portion of the locking piston, the first volume being in fluid communication with the second volume.*

9. *The releasable connection of claim 7, wherein the combustible is configured to be detonated by an electrical signal.*

10. *The releasable connection of claim 7 wherein the second part comprises an outer housing and the locking piston is positioned within an internal cavity of the second part.*

11. *The releasable connection of claim 7, wherein the locking piston comprises a piston section and a sleeve section that depends from the piston section, the sleeve section overlying the releasable engagement profile, and the fluid pressure is applied to the piston section.*

12. *The releasable connection of claim 7, wherein the first part carries a first electrical connection, and the second part carries a second electrical connection, the first and second electrical connection being electrically connected when the releasable engagement profile of the second part engages the connection profile of the first part, and becomes disconnected when the releasable engagement profile disengages the connection profile.*

13. *[preamble] A releasable connection for a downhole tool string, comprising*

[A] a first part comprising an external connection profile; and

[B] a second part comprising:

[B1] a releasable engagement profile which internally engages the connection profile of the first part and which is configured to expand radially to release the connection profile of the first part;

[B2] a locking piston, the locking piston configured to move axially along the second part between a locking position that directly constrains the releasable engagement profile into engagement with the connection profile of the first part and a release position that permits the releasable engagement profile to expand radially to release the connection profile of the second part;

[B3] an expansion chamber in fluid communication with the locking piston; and

[B4] a source of fluid pressure in communication with the expansion chamber, wherein, upon activation, the source of fluid pressure is

configured to apply fluid pressure to move the locking piston from the locking position toward the release position.

[C] wherein the first part carries a first electrical connection, and the second part carries a second electrical connection, the first and second electrical connection being electrically connected when the releasable engagement profile of the second part engages the connection profile of the first part, and becomes disconnected when the releasable engagement profile disengages the connection profile.

15. The releasable connection of claim 13, wherein the first electrical connection and the second electrical connection are concentrically disposed within the connection profile and the releasable engagement profile.

16. The releasable connection of claim 10, wherein the outer housing of the second part comprises a pressure equalization ports, the locking piston configured to close the pressure equalization ports in the locking position, and open the pressure equalization ports in the release position.

17. The releasable connection of claim 13, wherein the locking piston comprises a piston section and a sleeve section that depends from the piston section, the sleeve section overlying the releasable engagement profile, and the fluid pressure is applied to the piston section.

18. The releasable connection of claim 13 wherein the second part comprises an outer housing and the locking piston is positioned within an internal cavity of the second part.

19. The releasable connection of claim 18, wherein the outer housing of the second part comprises a pressure equalization ports, the locking piston configured to close the pressure equalization ports in the locking position, and open the pressure equalization ports in the release position.

IX. CLAIM CONSTRUCTIONS FOR THE '122 PATENT

64. In addition to my general understanding of claim construction described above, I also understand that claim terms are generally given their ordinary meaning in the context of the patent as understood by a POSA. 37 C.F.R. § 42.100(b). Claim construction

proceedings are currently underway in the co-pending district court proceeding and

Petitioners have requested construction of the following terms:²

“releasable engagement profile which internally engages the connection profile of the first part”

65. I have been informed by counsel that the parties dispute the meaning of this claim term in the district court, but the dispute is irrelevant to the art presented in Petitioners’ Petition.

66. I understand that Petitioners’ asserted construction is: An engagement mechanism that has an internal cavity which receives and latches onto a male connector forming a connection independently of the locking piston.

67. I also understand that Patent Owner’s asserted construction is either, (1) plain meaning or (2) a releasable engagement profile with an inner portion that engages the connection profile of the first part.

68. In my opinion, the collet mechanisms disclosed in the prior art used in all asserted invalidity grounds meets all three proposed definitions.

69. I have provided my opinion on the construction of this claim term in the co-pending district court litigation and reserve all rights to argue the proper construction in the district court claim construction process. For purposes of this Petition only, as instructed by counsel, I apply plain meaning of this term in the analysis herein.

“source of fluid pressure”

70. It is my opinion that this term is amenable to construction based solely on the intrinsic record. Specifically, the ’122 Patent makes clear that its operation is based on fluid

² In the district court proceeding, Petitioners are also seeking a determination that “the connection profile of the second part” is indefinite as it lacks antecedent basis and renders the claim ambiguous. However, for purposes of this IPR only, I have applied Patent Owner’s proposed construction for this term while reserving all rights to provide my opinions on the indefiniteness of the term in the district court claim construction process.

pressure applying force to move the locking piston to the release position. The specification unequivocally explains that “[f]luid pressure may include pressure applied by a liquid or a gas, which may be communicated to expansion chamber 38 in various ways. For example, there may a gas cylinder that releases gas pressure upon activation, a fluid line that provides gas or liquid to expansion chamber 38 from surface, etc.”

EX1001, 3:53-58. The specification later refers back to this very language as “sources of fluid pressure discussed above.” *Id.*, 4:10. Thus, by the specification’s express language, the definition of “source of fluid pressure” must include all of the specific examples provided in column 3, i.e., a gas cylinder or fluid lines that provide pressure from the surface. Therefore, the correct construction of “source of fluid pressure” should be “component(s) that communicate(s) fluid pressure.”

71. I understand that in the co-pending district court litigation, Patent Owner has proposed that the term “source of fluid pressure” mean “origin of fluid pressure.” EX1019, 1. It is my opinion that Patent Owner’s proposed construction is incorrect at least because the construction’s requirement that the “source” of the fluid pressure be the “origin” is not supported by, and is in fact contrary to, disclosures in the specification. As explained above, the specification of the ’122 Patent does not limit the “source of fluid pressure” to sources that actually create the fluid pressure at the desired location. That said, in light of the open-ended claim language itself and the specification, a POSA would understand the claimed “source of fluid pressure” to include both sources that actually create fluid pressure at the desired location and sources that guide fluid pressure created elsewhere to the desired location, including fluid lines running from the surface.

72. Subject to footnote 2 above, it is my opinion that all other terms of the '122 Patent should be given their plain and ordinary meaning.

X. OPINIONS CONCERNING INVALIDITY OF CLAIMS 1, 4-13, and 15-19

73. In my opinion, Claims 1, 4-13, and 15-19 of the '122 Patent are invalid.

74. Challenged Claims 1, 5, 6, 13, 17, and 18 are invalid because they are anticipated by U.S. Patent No. 6,571,879 ("Bebak") (EX1007). Challenged Claims 4 and 19 are invalid because those claims would have been obvious based on Bebak alone considered with the knowledge of a POSA. In addition, Claims 4, 7, 8, 9, 10, 11, 12, 16, and 19 are also obvious based on Bebak in view of U.S. Patent No. 4,776,393 ("Forehand") (EX1008). Finally, Claim 15 is invalid based on Bebak in view of the Hunting Titan Brochure ("HTB") (EX1009).

75. The Patent Office did not consider Bebak, Forehand, or HTB when it examined the '122 Patent. It is my opinion that these prior art references are material, and had the patent office considered them it would have denied Claims 1, 4-13, and 15-19 of the '122 Patent.

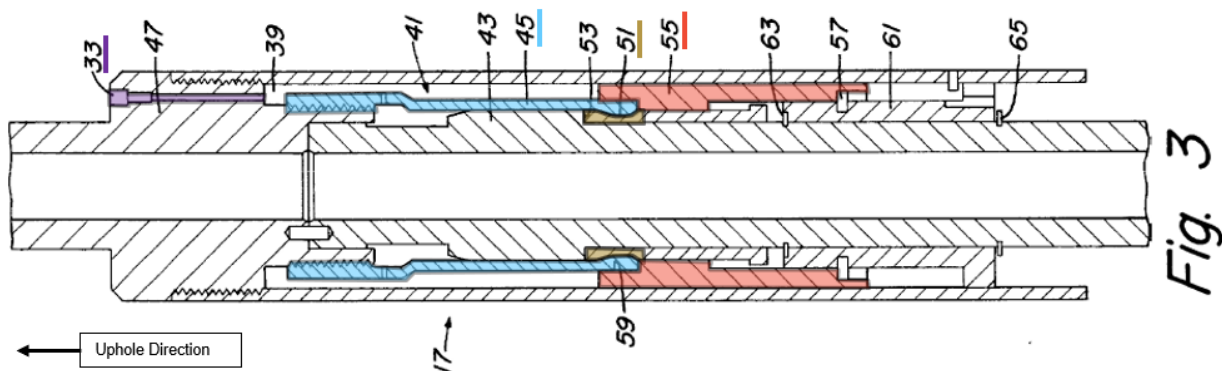
A. Overview of the Prior Art

1. Bebak (EX1007)

76. Bebak issued as U.S. Patent 6,571,879 on June 3, 2003, many years prior to the '122 Patent's alleged August 30, 2016 priority date. I understand that Bebak therefore qualifies as prior art.

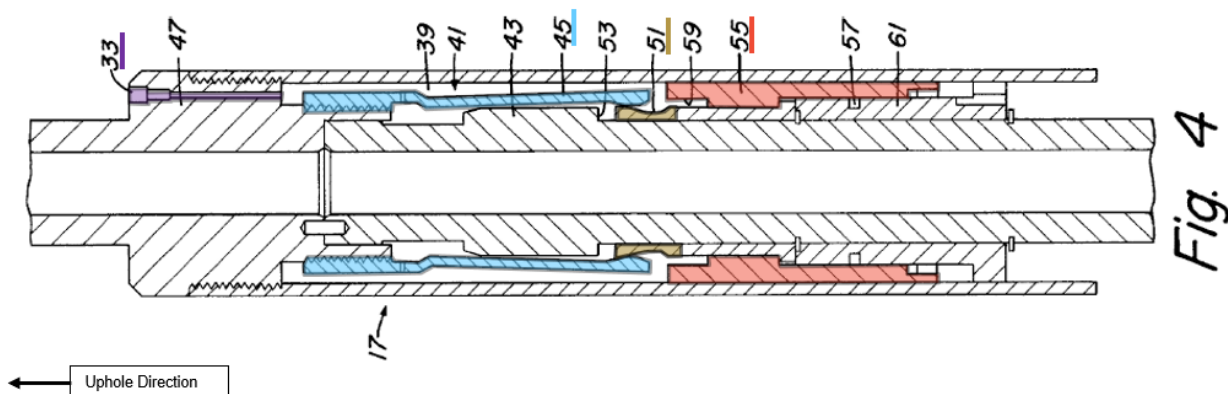
77. Bebak describes a release tool for letting go of a submersible pump assembly in an oil well. EX1007, Abstract. As shown in Figure 3, in the locked position, the release tool holds onto the pump assembly with a collet 45 that engages with a groove on the pump assembly's fishing neck. *Id.*, 1:35-37, 2:43-48. The collet 45 is held down by a locking

piston 55, and the locking piston 55 is held in place by shear pins 57. *Id.*, 1:38-39, 2:49-54.



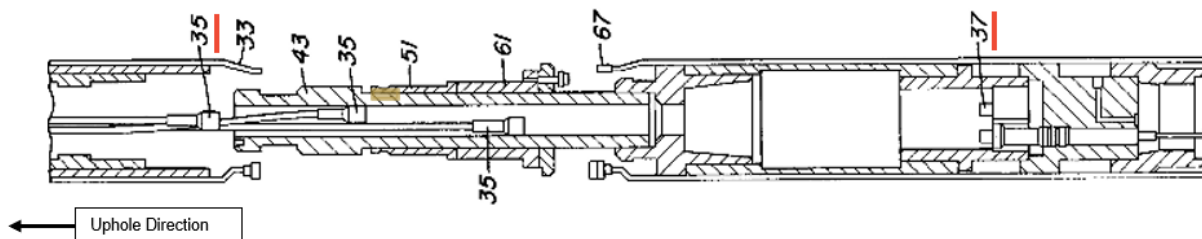
Id., Fig. 3 (annotated).

78. As shown in Figure 4, to activate the release tool, hydraulic fluid is pumped into “chamber” 39 via capillary tube 33. *Id.*, 2:58-60. The pressure from the hydraulic fluid causes the piston 55 to break through the shear pins 57 and move downward until the piston 55 is no longer holding down the collet 45. *Id.*, 2:60-64. With piston 55 out of the way, the collet 45 springs radially outward so that the release tool can be pulled away from the pump assembly. *Id.*, 2:64-3:3.



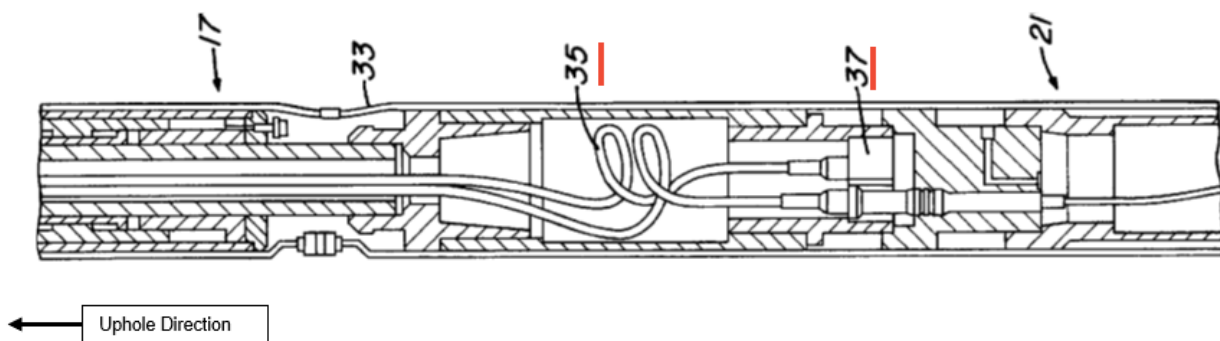
Id., Fig. 4 (annotated).

79. Figure 5B illustrates the pump assembly after the release tool is pulled away. *See id.*, 2:19-22.



Id., Fig. 5B (annotated).

80. Bebak also shows how electrical power is provided to the pump assembly in Figure 2B. Bebak uses wires 35 that pass through the release adapter 17 down to a connector 37 on the underlying pump assembly. The wires 35 are automatically disconnected when the tool is disengaged, as shown above in Figure 5B.

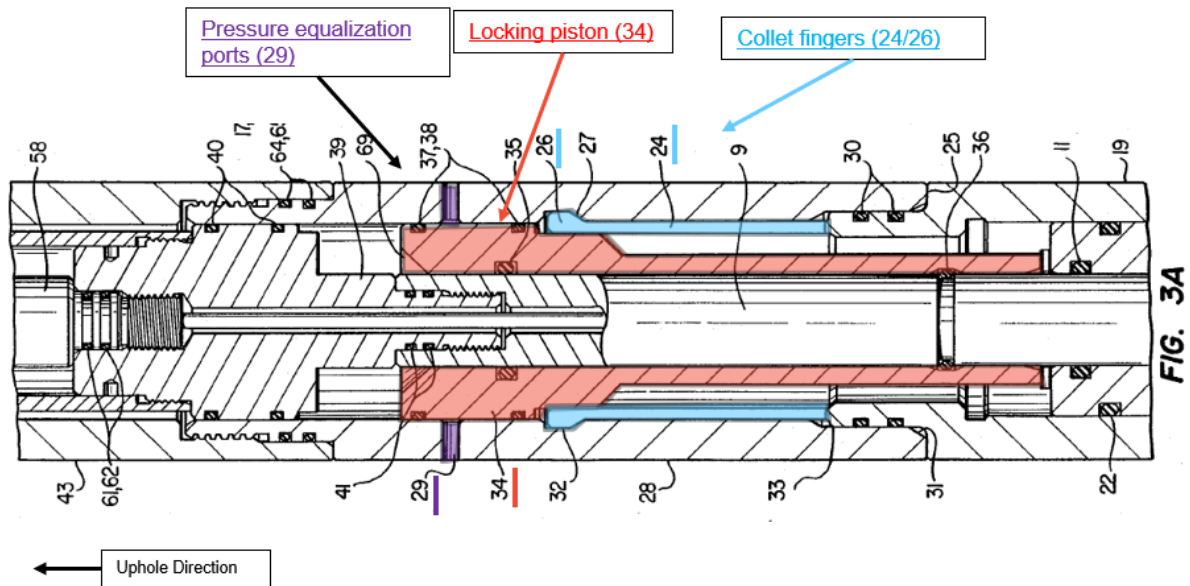


Id., Fig. 2B (annotated).

2. Forehand (EX1008)

81. Forehand is a patent that was filed in February 1987 and issued in October 1988, many years prior to the '122 Patent's alleged August 2016 priority date. I understand Forehand is therefore prior art to the '122 Patent.
82. Forehand describes a downhole oilfield gun release system. In Forehand's design, the pressure of the gun firing automatically activates a release mechanism. This allows the

gun to fall off the tool string down into the well. *See* EX1008, Abstract. As shown in Figure 3A, Forehand's release mechanism has many similarities to both Bebak and the '122 Patent. Forehand uses a sleeve/piston 34, which keeps the device locked by pinning collet fingers 24 in place against a groove in the housing of the device, and it uses pressure to move the sleeve/piston 34 and release the collet fingers.



Id., Fig. 3A (annotated).

83. More specifically, Forehand describes a perforating gun automatic release mechanism wherein the perforating gun is linked to the drilling string by a coupling member. *Id.*, Abstract. The coupling member includes a plurality of collet fingers. *Id.* Forehand also describes a locking sleeve that is displaced by a slidable piston in response to detonation of an explosive charge that allows the collet fingers to disengage and disconnect the perforating gun from the drilling string. *Id.*

3. Hunting Titan Brochure (EX 1009)

84. The Hunting Titan Brochure ("HTB") is a product brochure from the Hunting Titan Company detailing their wireline tool and connection offerings. All relevant pages were

published on the internet no later than May 2015, as confirmed by the Internet Archive.

EX1010, 1, 4, 7, 9, 15, 17 (Internet Archive affidavit of Nathaniel E. Frank-White).

Therefore, HTB was published before the earliest possible priority date of the '122 Patent and therefore I understand it is prior art under 35 U.S.C. §102(a).

85. The HTB illustrates that it was conventional in wireline tools to electrically connect a first and second electrical connection concentrically as to each other and the overall tool with the connection taking place where separate parts connect to one another, such as two components on a tool string connected together. *See, e.g.*, EX1009, 2-5, 19, 25; EX1010, 6, 12, 16, 18-20.
86. Specifically, the HTB references various applications that its tools can be used for and one of the listed applications is “perforating.” *See* EX1009, 2, 5, 17; EX1010, 10, 16, 18. Moreover, the HTB shows a concentrically located electrical connection on its cable head that is utilized as a release mechanism. Specifically the cable head is claimed to be able to “ensure[] clean release of a stuck tool string.” EX1009, 2; EX1010, 18. The HTB depicts the tool as follows, with the electrical connection circled in red:



EX1009, 2 (annotated); *see also* EX1010, 18.

87. Below I address the elements of Claims 1, 4-13, and 15-19 one by one and show how each is disclosed by the prior art and combinations thereof. As can be seen from a review of the claim language, there is significant overlap and near identity in much of the language across many claims. Where convenient and efficient, I address claims that are

substantially similar together in my analysis. I have noted where there are differences in the claims and how that impacts my analysis.

B. Bebak Anticipates Claims 1, 5, 6, 13, 17, and 18

1. Claims 1 and 13

88. Claims 1 and 13 can be analyzed together as they share virtually every claim limitation, with Claim 1 adding an outer housing limitation that Claim 13 lacks, and Claim 13 adding an additional electrical connection limitation that Claim 1 lacks. The analysis below will identify where there are differences between the claims. If no difference is pointed out, then the claim language between the two claims is identical.

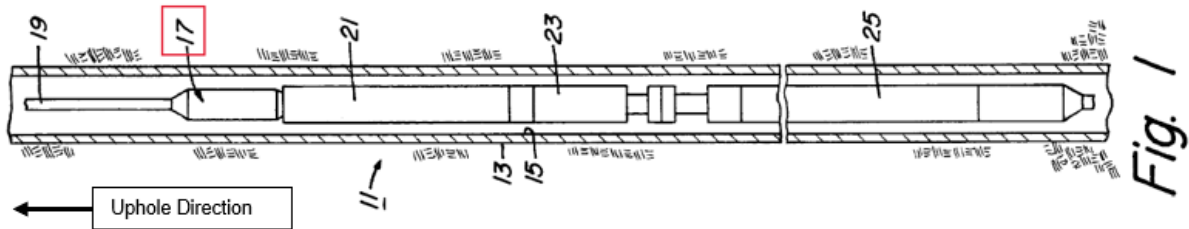
a. [1/13-Preamble] “A releasable connection for a downhole tool string”

89. I understand that the preamble of a claim is not limiting—and need not be disclosed by the prior art for invalidity purposes—unless it is necessary to give life, meaning, and vitality to the claim. I understand that a preamble is not limiting if it merely recites an intended use of the invention, and the body of the claim recites a structurally complete apparatus.

90. In my opinion, the preamble language of Claims 1 and 13 is not limiting. The preamble states a purpose or intended use for the alleged invention, whereas the body of the claims describes the complete structure of the claimed apparatus.

91. But if the preamble of Claims 1 and 13 were limiting, Bebak discloses it. That is, Bebak discloses “*a releasable connection for a downhole tool string.*” *See, e.g.,* EX1007, Abstract, 2:29-33. For example, the title of Bebak is “Surface-actuated **release tool** for submersible pump assemblies.” *Id.*, Title [54]. Bebak Figure 1 shows “a side view of a submersible pump bottom hole assembly” with a release adapter 17. *Id.*, 2:3-5; *see also*

id., 2:26-41. The componentry below the release adapter 17 is a “*downhole tool string*,” here a submersible pump assembly.

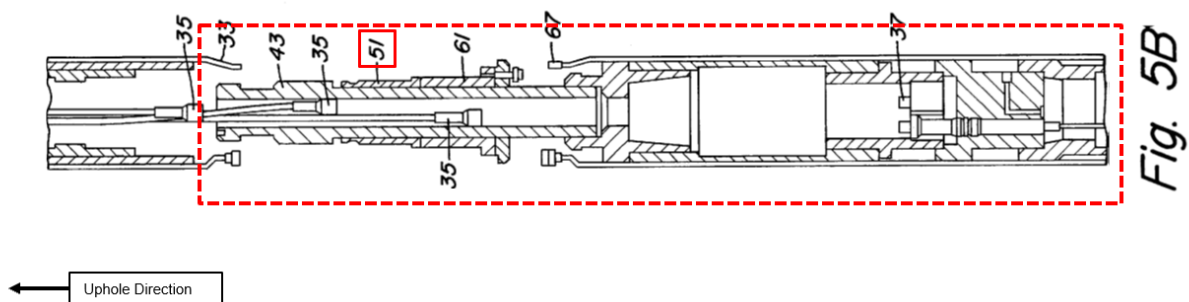


Id., Fig. 1 (annotated).

b. [1/13-A] “a first part comprising an external connection profile;”

92. Bebak discloses element [1-A] and [13-A].

93. Bebak Figure 5B, annotated below, shows the claimed “*first part*” (dashed red box) after it has been pulled away from the release adapter 17. This *first part* comprises “an *external connection profile*,” (solid red box) namely “outer profile 51 located on the exterior of neck 43 below a shoulder 53.” *Id.*, 2:48-49.



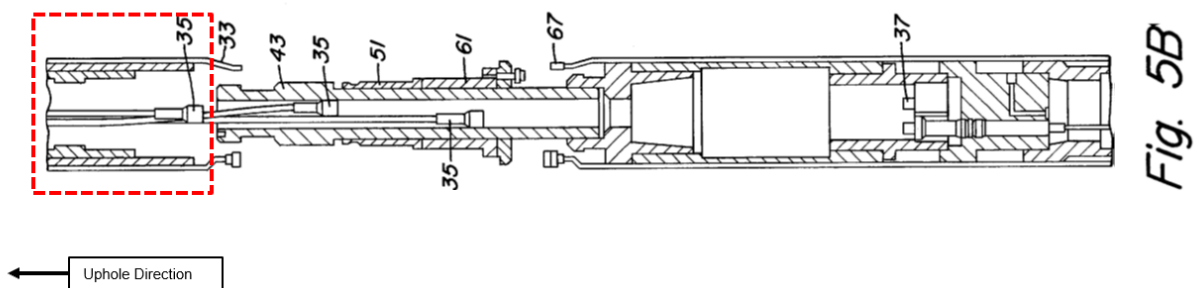
Id., Fig. 5B (annotated).

94. I note that Bebak’s disclosure of this element is like embodiments in the ’122 Patent specification. This further supports my opinion that Bebak discloses the element. The ’122 Patent specification describes the *first part* as a component that is let go by the releasable connection and retrieved by a fishing tool. EX1001, 3:1-5. Similarly, the first

part in Bebak is the “fishneck component” that can be retrieved from the hole after it has been released and left behind—“After the unplugged assembly is raised to the surface, a fishing tool may be lowered to retrieve the remaining assembly on the clean and clear fishing neck.” EX1007, 1:48-51. The ’122 Patent also describes a connection profile 16 that “is a lip that extends radially outward from fishneck 24.” EX1001, 3:1-5, Fig. 1. Bebak similarly describes a fishing neck 43 with “an outer profile 51 located on the exterior of neck 43 below a shoulder 53.” EX1007, 2:48-49. Moreover, Bebak makes clear in its specification that outer profile 51 is a connection profile because that is where the collet connects to the second part—“Collet 45 is latched in an outer profile 51 located on the exterior of neck 43 below a shoulder 53.” *Id.*, 2:48-49.

c. [1/13-B] “a second part comprising”

95. Bebak discloses “a second part comprising” the elements [1-B1] through [1-B5] and [13-B1] through [13-B4]. For example, Figure 5B below depicts a portion of the second part on the left (red dashed box).



Id., Fig. 5B (annotated).

96. The second part in Bebak includes at least the release adapter 17 and includes certain componentry shown in Figures 3-4, as well as the electrical wiring shown in Figures 2A-2B and 5A-5B. Moreover, to the extent it is argued that Bebak’s hydraulic pump at the

surface providing hydraulic pressure down to the capillary 33 constitutes the claimed “source of fluid pressure,” it is my opinion that a POSA would also consider the hydraulic pump to “comprise” the claimed “second part.” *See id.*, Fig 5B.

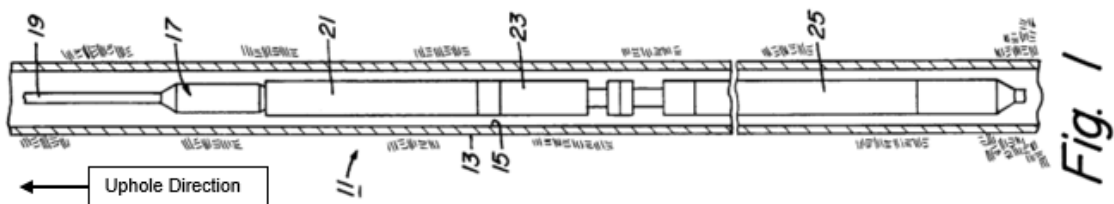
97. I also refer to my analysis of elements [1-B1] through [1-B5] and [13-B1] through [13-B4] below, which explains how Bebak has a *second part* comprising those elements. I note that there are some slight language differences between Claim 1 and Claim 13 when describing the second part and I have noted them in the below analysis.

a. [1-B1] “an outer housing;”

98. The outer housing element is in Claim 1 but not present in Claim 13. The outer housing element is added to Claim 13 via dependent Claim 18.

99. Bebak discloses element [1-B1].

100. For example, in Figure 1, release adapter 17 has a housing, and the other components of the tool string also have a housing.



Id., Fig. 1.

101. Bebak describes Figure 1 and expressly describes release adapter 17 (e.g., the second part) as having a housing: “Referring to FIG. 1, a side view of a submersible pump bottom hole assembly 11 constructed in accordance with the present invention is shown in a well 13 having a bore 15. Assembly 11 is suspended from a release adapter 17 located at the end of a string of coiled tubing 19 extending into bore 15. In the

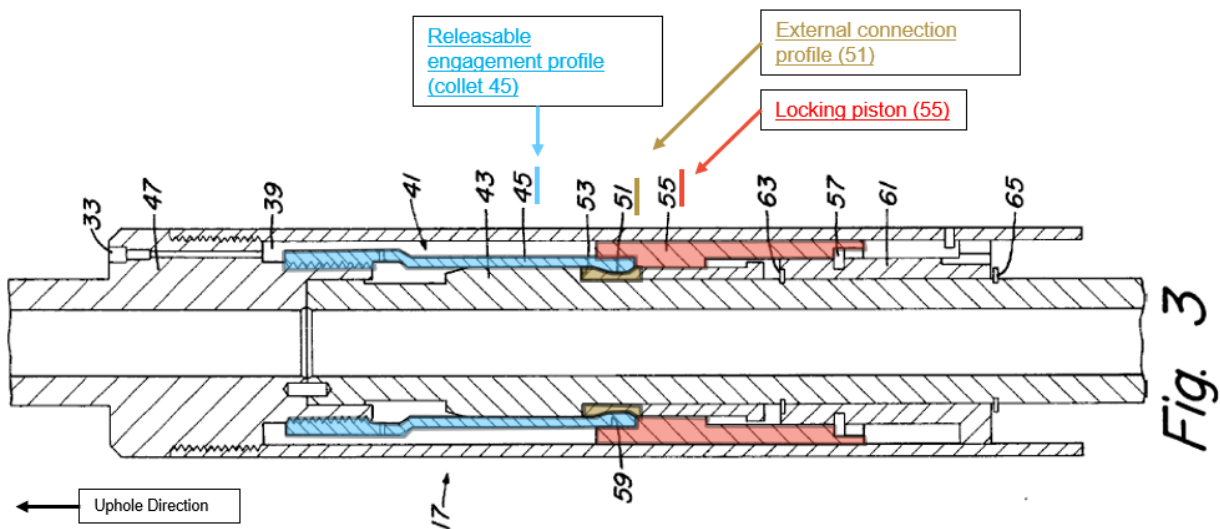
embodiment shown, a submersible pump 21 is secured to a housing or release adapter 17 and has a seal section 23 at its lower end.” *Id.*, 2:26-33. Additionally support for this limitations can be found in Bebak at 1:30-39; 2:36-57; 2:3-5, Title, Abstract, and Figs. 2A-5B.

- b. [1-B2 & 13-B1] “a releasable engagement profile which internally engages the connection profile of the first part and which is configured to expand radially to release the connection profile of the first part;”

102. Bebak discloses element [1-B2 and 13-B1] as these claim elements are identical.

103. Like in the '122 Patent specification, the “*releasable engagement profile*” of Bebak is a collet that internally engages the connection profile and expands radially to release it.

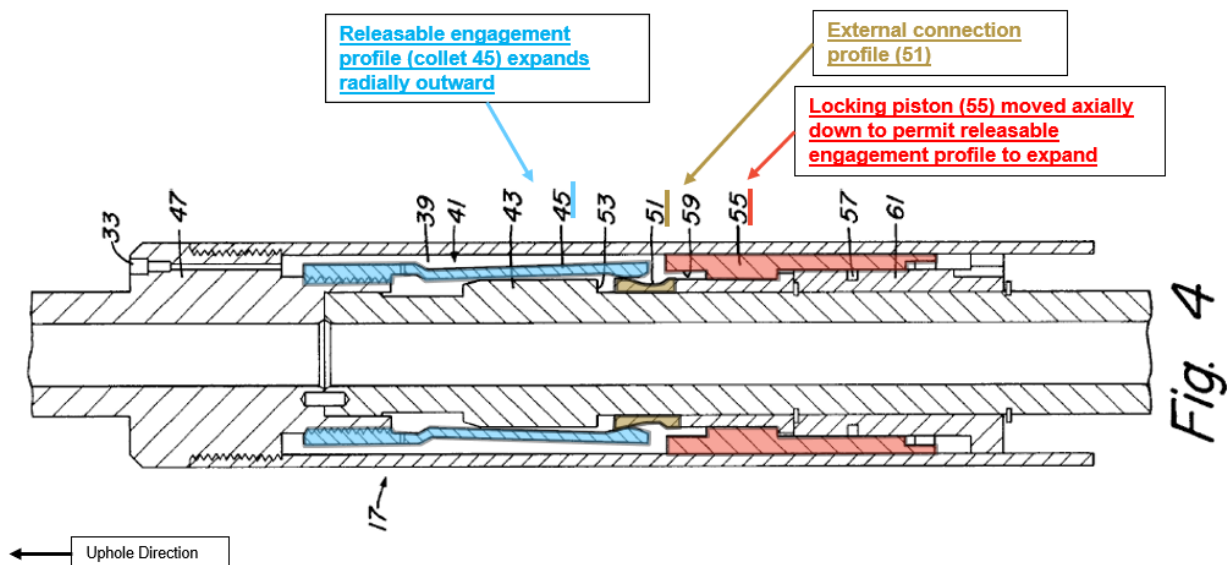
104. In Figure 3, Bebak shows the collet 45 “*internally engages the connection profile of the first part*” because the collet 45 “is latched in an outer profile 51 located on the exterior of neck 43 below a shoulder 53.” *Id.*, 2:48-49, Fig. 3.



Id., Fig. 3 (annotated).

105. Bebak’s collet 45 is also “*configured to expand radially to release the connection profile of the first part.*” Figure 3 shows collet 45 in the locked position, whereas Figure 4

shows collet 45 in the released position after it has expanded radially away from the outer profile 51. *See id.*, Figs. 3-4. As Bebak explains: “When chamber 39 is pressurized, piston 55 strokes downward as shown and shears pins 57. With piston 55 in its lower position, the lower end of **collet 45 is released from** profile 59 and of piston 55 and **outer profile 51. Collet 45 springs open or radially outward** as shown and is free to be retracted axially upward into the wellbore toward the surface (FIG. 5A).” *Id.*, 2:60-67 (emphasis added).



Id., Fig. 4 (annotated).

106. Bebak further discloses this claim element at Bebak Claim 9, “The downhole tool of claim 7 wherein the lock member comprises a collet that is movable between the locked and unlocked positions in response to the piston being stroked from the surface.” *Id.*, 4:57-60.

- c. [1-B3] “a locking piston positioned within an internal cavity of the second part, the locking piston configured to move axially along the second part between a locking position that directly constrains the releasable engagement profile into engagement with the connection profile of the first part and a release position that

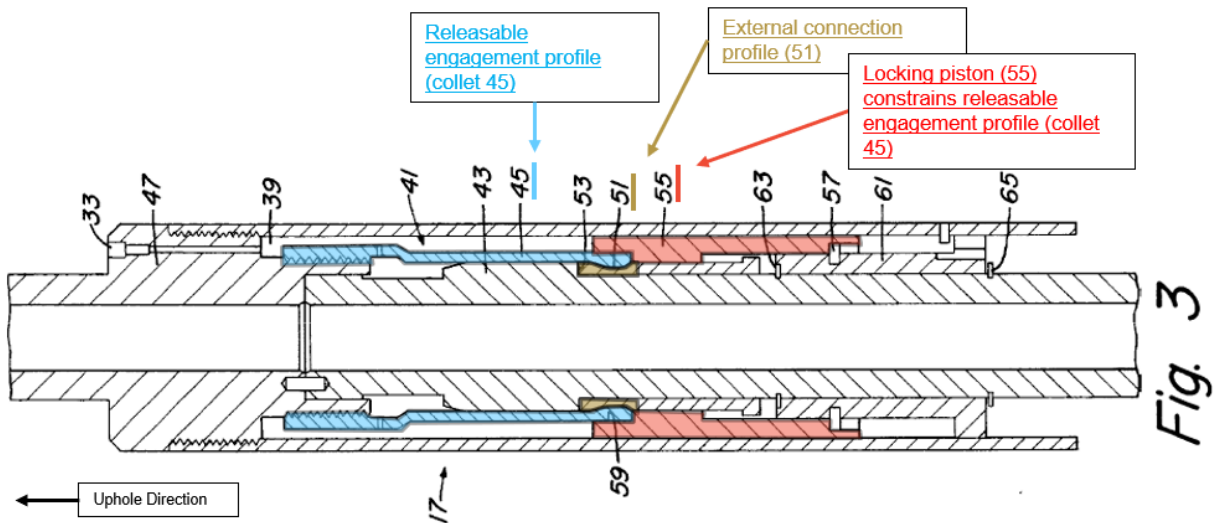
permits the releasable engagement profile to expand radially to release the connection profile of the second part³,”

[13-B2] “a locking piston, the locking piston configured to move axially along the second part between a locking position that directly constrains the releasable engagement profile into engagement with the connection profile of the first part and a release position that permits the releasable engagement profile to expand radially to release the connection profile of the second part;”

107. Bebak discloses element [1-B3] and [13-B2].
108. This claim element is almost identical between Claims 1 and 13, except that Claim 1 contains the language, “positioned within an internal cavity of the second part” that is not present in Claim 13, and gets added to Claim 13 via dependent Claim 18. As such a disclosure of this element for Claim 1 is more than sufficient to disclose the same element of Claim 13 and dependent Claim 18.
109. In Figures 3-4, Bebak shows a piston 55 , which is “*a locking piston positioned within an internal cavity of the second part.*” *Id.*, 2:49-52 (“In FIG. 3, a piston 55 is shown in its upper position”). As can be seen below the piston is located inside the cavity that is inside the outer housing.
110. Bebak Figure 3 shows locking piston 55 in “*a locking position that directly constrains the releasable engagement profile into engagement with the connection profile of the first part.*” In this locking position, locking piston 55 holds the collet 45 in place against the outer profile 51 located on the fishing neck 43, just like the collet and piston assembly

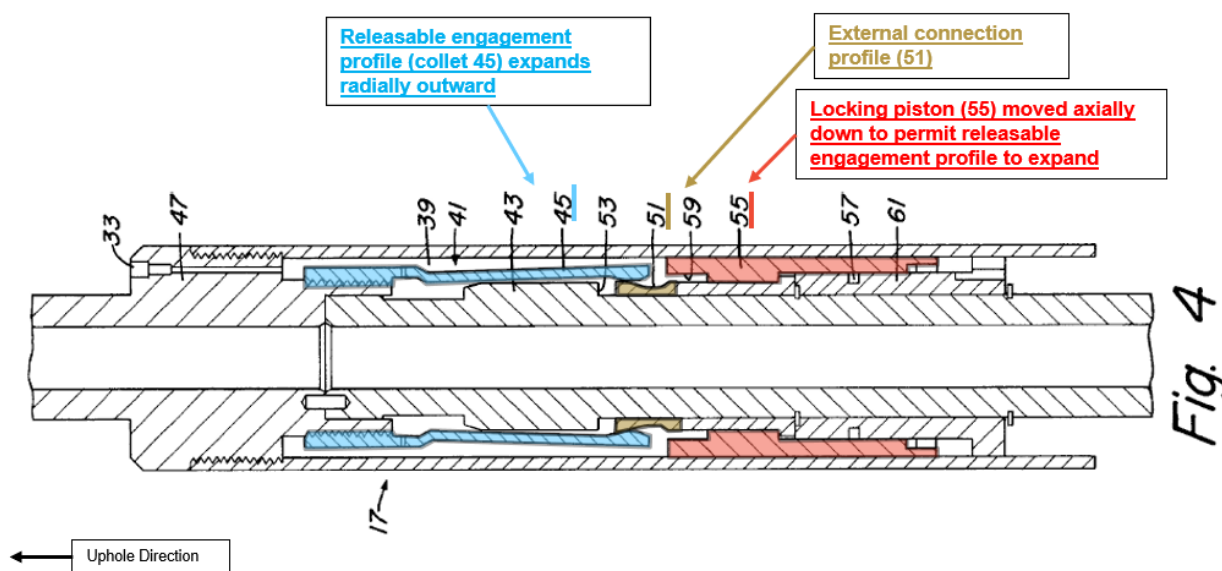
³ I understand that Patent Owner contends there is an error in this element that is readily apparent to a POSA and that the Petitioner entities dispute that claim. Patent Owner’s claim is that the last two words of the element (i.e., the phrase “second part”) should say “first part.” My understanding is that this issues persists through all of the independent claims and therefore through all of the claims in the patent. For purposes of my analysis in this IPR, I have been asked to view the claim using Patent Owner’s view of the dispute. This is an assumption I have adopted here and reserve my right to render an opinion on this dispute if requested to do so.

described in the '122 Patent specification. *See id.*, 1:38 (“A piston captures the collet against the neck”); *id.*, 2:48-54 (“Piston 55 has an interior profile 59 at its upper end that captures and abuts the lower end of collet 45 in outer profile 51.”).



Id., Fig. 3 (annotated).

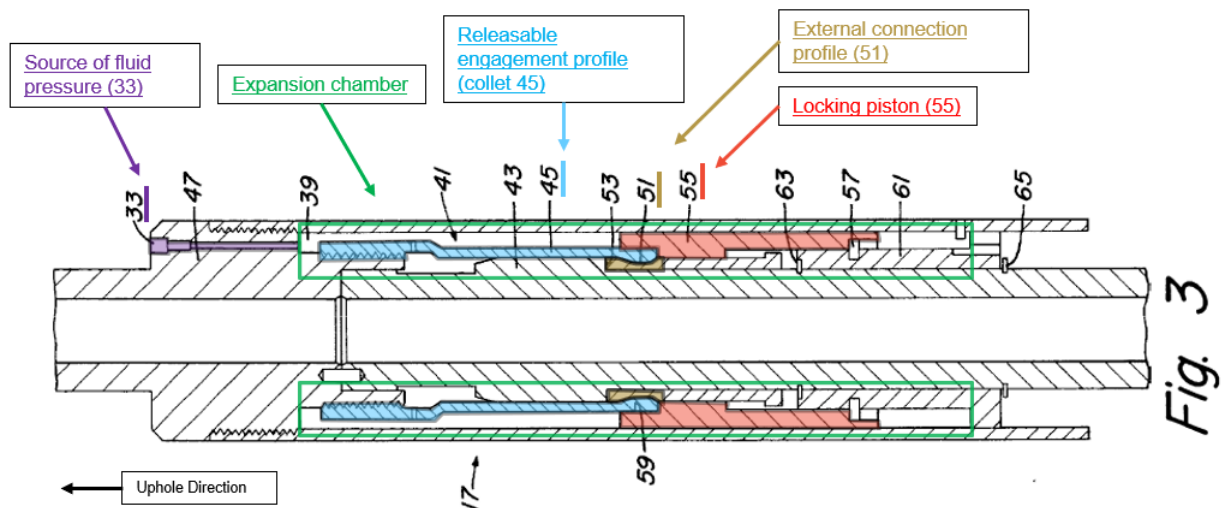
111. Figure 4 shows that Bebak’s locking piston 55 is “configured to move axially along the second part between a locking position . . . and a release position that permits the releasable engagement profile to expand radially to release the connection profile of the second part.” In the release position, the locking piston 55 has moved axially away from collet 45, so that the fingers of collet 45 can spring open radially to release. *Id.*, 2:60-67.



Id., Fig. 4 (annotated).

112. Bebak's disclosure mirrors the '122 Patent specification, which depicts a collet that expands when a piston moves out of the way. *See* EX1001, 3:12-16 ("releasable engagement profile 26 is a collet with a series of resilient fingers 28 . . . such that when the piston moves, they move out of engagement").
 - d. [1-B4] & [13-B3] "an expansion chamber in fluid communication with the locking piston"
113. Under the reading of the claims that Plaintiff uses to argue infringement, Bebak discloses "*an expansion chamber in fluid communication with the locking piston.*"
114. Having reviewed Patent Owner's infringement contentions and proposed claim constructions in the co-pending district court litigation, Patent Owner identifies the "expansion chamber" as "one or more volumes that fluid expands into," (EX1019, 1) which when applied to the description in the '122 Patent or Bebak is the space occupied by a locking piston, as well as the space behind, around, and in front of it, in the locked position. For purposes of my analysis for this IPR I have been asked to use Patent

Owner's interpretation of this language.⁴ Applying the logic of Patent Owner's position to Bebak, then Bebak would have an *expansion chamber* as outlined claimed in the '122 Patent and shown in the figure below in the green box. The green box covers space behind, around, and in front of the locking piston when viewed from the locked position, consistent with how Patent Owner defines the alleged *expansion chamber* in its theory of infringement. As such, the *expansion chamber* is in *fluid communication with the locking piston* because capillary 33 provides hydraulic fluid pressure to "chamber" 39 that builds up behind piston 55.



EX1007, Fig. 3 (annotated).

115. The following statements from Bebak describe the fluid communication between the expansion chamber and the *locking* piston:

- “Referring now to FIG. 4, locking mechanism 41 is actuated from the surface of the well by pumping hydraulic fluid down through capillary tube 33 to chamber

⁴ I reserve the right to express my opinion on the term “expansion chamber” in the claim construction proceedings in the district court litigation.

39. When chamber 39 is pressurized, piston 55 strokes downward as shown and shears pins 57.” *Id.*, 2:58-62

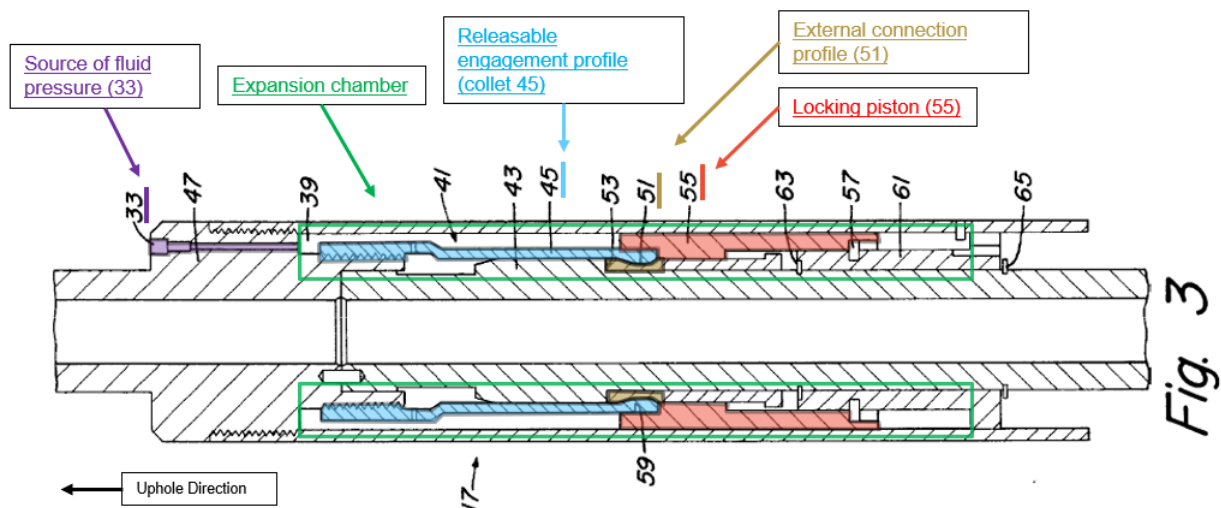
- “The locking mechanism is actuated from the surface by pumping hydraulic fluid down through the capillary tube to the chamber to stroke the piston downward and shear the pins.” *Id.*, 1:39-42

- “a hydraulically-actuated lock member mounted to the housing and having a piston located in the chamber” *Id.*, 4:45-46

- e. [1-B5] & [13-B4] “a source of fluid pressure in communication with the expansion chamber, wherein, upon activation, the source of fluid pressure is configured to apply fluid pressure to move the locking piston from the locking position toward the release position”

116. Bebak discloses element [13-B4]. My opinion that Bebak discloses this element is again contingent on applying the understanding of “*expansion chamber*” that Patent Owner relies upon to argue infringement in the co-pending district court litigation.

117. Applying that understanding, Bebak discloses “*a source of fluid pressure in communication with the expansion chamber,*” namely, “Capillary tube 33 is hydraulically coupled to an annular chamber 39 containing hydraulic fluid.” *Id.*, 2:40-42.



Id., Fig. 3 (annotated).

118. Bebak's *source of fluid pressure*, upon activation, "*is configured to apply fluid pressure to move the locking piston from the locking position toward the release position.*" As Bebak explains with reference to Figures 3 and 4: "locking mechanism 41 is actuated from the surface of the well by pumping hydraulic fluid down through capillary tube 33 to chamber 39. **When chamber 39 is pressurized, piston 55 strokes downward as shown** and shears pins 57. With piston 55 in its lower position, the lower end of collet 45 is released from profile 59 and of piston 55 and outer profile 51. Collet 45 springs open or radially outward as shown and is free to be retracted axially upward into the wellbore toward the surface (FIG. 5A)." *Id.*, 2:60-67 (emphasis added).
119. I note that the '122 Patent, like Bebak, discloses an embodiment where a hydraulic fluid line is the claimed *source of fluid pressure*, which further supports my opinions. In that passage, the '122 Patent specification states: "Locking piston 32 is in fluid communication with an expansion chamber 38 to which fluid pressure is applied in order to apply a force that moves locking piston 32 toward the release position. ***Fluid pressure may include pressure applied by a liquid or a gas, which may be communicated to expansion chamber 38 in various ways. For example,*** there may be a gas cylinder that releases gas pressure upon activation, ***a fluid line that provides gas or liquid to expansion chamber 38 from surface,*** etc." EX1001, 3:50-58 (emphasis added).
120. Further discloser of this element can be found in Bebak as follows:
- "The locking mechanism is actuated from the surface by pumping hydraulic fluid down through the capillary tube to the chamber to stroke the piston downward and shear the pins. When the piston moves, the lower end of the collet releases the

fishing neck and is free to be retracted axially upward into the wellbore toward the surface.” EX1007, 1:39-44

- “[A] hydraulically-actuated lock member mounted to the coiled tubing, the lock member having a locked position wherein the submersible pump assembly is secured to the lock member, and a released position wherein the submersible pump assembly is released from the lock member such that the lock member is lifted away from the submersible pump assembly”. *Id.*, 4:21-28

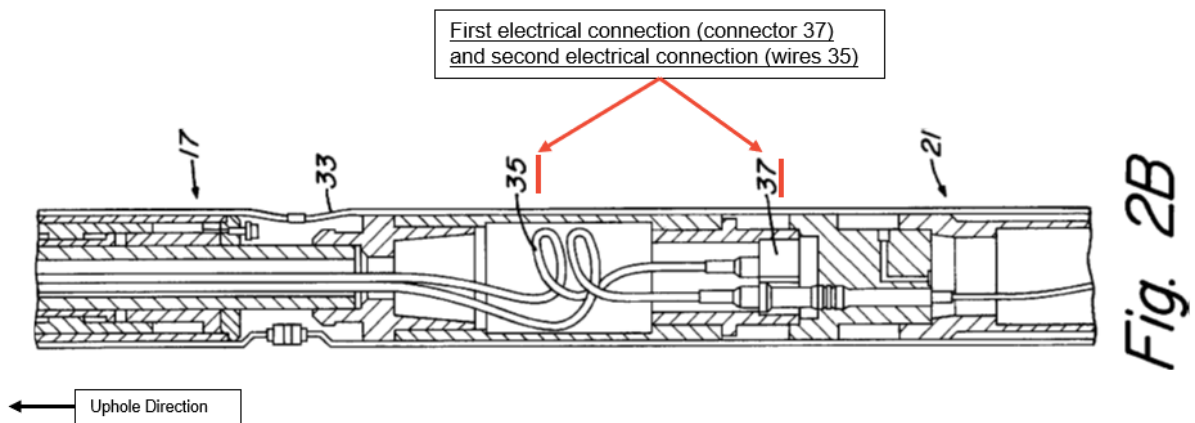
121. I understand that, in the co-pending district court litigation, Petitioners have proposed that “source of fluid pressure” means “component(s) that communicate(s) fluid pressure,” whereas Patent Owner is arguing that it means “origin of fluid pressure.” EX1019, 1. In my opinion, Patent Owner’s construction is incorrect for reasons discussed above, but nonetheless Bebak satisfies either construction by its disclosure of capillary tube 33, which both “communicate(s) fluid pressure” and is an “origin of fluid pressure” in the second part. Alternatively, the surface hydraulic pump, with capillary tube 33, is a “source of fluid pressure” because it “communicate(s) fluid pressure” and is an “origin of fluid pressure” in the second part, and a POSA can consider the hydraulic pump and capillary tube to “comprise” the claimed “second part.”
122. I also understand that in the district court preliminary injunction proceedings, Patent Owner argued that this element is absent from Bebak because the “source of fluid pressure” in Bebak was supposedly the hydraulic pump at the surface and therefore excluded from the claimed “second part.” EX1018, 4-5. In my opinion, this argument fails because, (as explained in Section IX above), it excludes a specification embodiment.

It also fails because the hydraulic pump can also be viewed by a POSA as comprising the claimed “second part.”

123. Patent Owner’s position also contradicts the understanding of “source of fluid pressure” set forth in the prosecution history. During prosecution, the examiner found this element was disclosed by prior art that likewise used hydraulic pressure pumped from the surface through a fluid line. EX1004, 101-02 (rejecting claims over EX1020—U.S. Patent No. 6,095,583 to Beeman); EX1020, 10:19-23, 36-42, Fig. 7A (“introduction of fluid (e.g. pumped from the surface down through a tubular string to which the tool 100 is connected”)). The applicant did not dispute the examiner’s position.
124. If this element is not found to be anticipated by Bebak, it is my opinion that it would have been obvious to combine Bebak with Forehand, as discussed below in Section X.E. The analysis for this element is fully described below in the discussion of the combination of Bebak and Forehand applied to Claim 7. In that combination, a combustible serving as a source of pressure originating inside the tool is presented.
 - f. [13-C] “wherein the first part carries a first electrical connection, and the second part carries a second electrical connection, the first and second electrical connection being electrically connected when the releasable engagement profile of the second part engages the connection profile of the first part, and becomes disconnected when the releasable engagement profile disengages the connection profile”
125. This element is not present in Claim 1 of the ’122 Patent but is an added element in Claim 13.
126. Bebak discloses element [13-C].
127. As shown in Figure 2B, Bebak discloses a power cable 31 that extends through “release adapter 17 to pump 21.” *Id.*, 2:36-37. The power cable 31 contains “electrical wires 35

that interconnect with connectors 37 located at the upper end of pump 21” to provide electrical power to the pump assembly, through the releasable connection. *Id.*, 2:36-40.

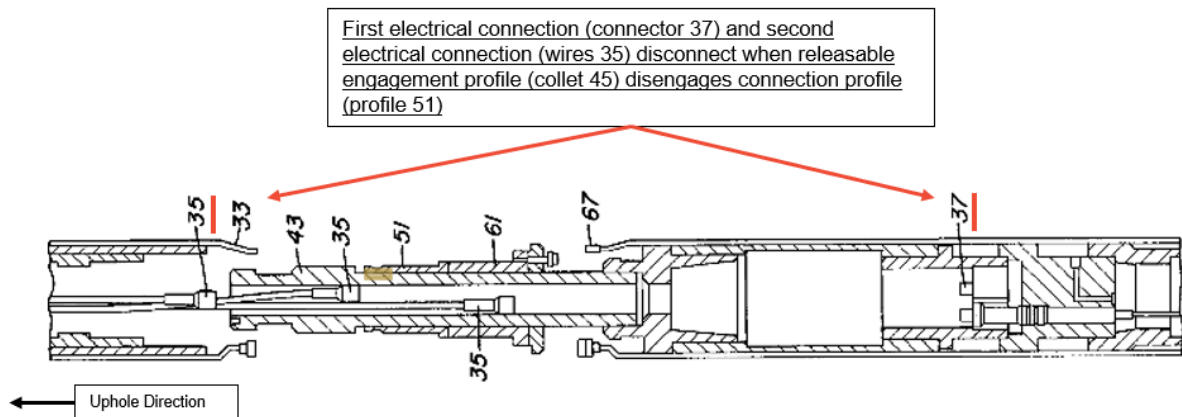
128. Therefore, the connector 37 on the pump shows that “*the first part carries a first electrical connection.*” And the wires 35 show “*the second part carries a second electrical connection.*”



Id., 2B (annotated).

129. Bebak Figure 2B shows that the wires are connected when the releasable connection is in a locked position and thus shows “*the first and second electrical connection being electrically connected when the releasable engagement profile of the second part engages the connection profile of the first part.*”
130. Bebak also discloses that these electrical connections “*become[] disconnected when the releasable engagement profile disengages the connection profile.*” As shown in Figure 5B, when the releasable connection is activated and the collet is pulled into disengagement, the wires 35 also disconnect. *See id.*, Fig. 5B. “As coiled tubing 19 lifts release adapter 17 and locking mechanism 41 away from fishing neck 43, tension develops in wires 35 and tubing 33 until those components automatically detach or unplug (FIG. 5B) from their respective couplings 37, 67.” *Id.*, 2:64-3:5. Claims 7 and 8

of Bebak also describe “*a released position wherein the piston releases the lock member such that the housing and the lock member are lifted away from the mandrel and the submersible pump assembly,*” and that “*the power cable and the hydraulic tube automatically detach from the submersible pump when the housing is lifted.*” *Id.*, 4:49-52, 4:54-56 (emphasis added).



Id., Fig. 5B (annotated).

131. In district court preliminary injunction proceedings, Patent Owner made multiple arguments that Bebak does not meet this element. It is my opinion that those arguments are incorrect for several reasons. *See* EX1018, 5-6.
132. Patent Owner argued that Bebak’s connector 37 (the “first electrical connection”) does not meet the claim because it is not part of the “releasable connection.” EX1018, 5-6. This argument fails for multiple reasons. First, “releasable connection” is from the non-limiting preamble and is not part of this claim element. Second, in any case connector 37 is part of the releasable connection. Indeed, connector 37 is disconnected when Bebak’s release mechanism is actuated. *See* EX1007, Figs. 2B, 5B. Moreover, connector 37 and the fishneck that is released are both described as being “at the upper end of pump 21.” *Id.*, 1:33-38, 2:38-40, 43-45.

133. Patent Owner also argued that wires 35 (“second electrical connection”) and connector 37 (“first electrical connection”) do not meet this limitation because they are not electrically connected within the release adapter 17, and the claim supposedly requires the engagement of the two first and second electrical connection to occur within the “releasable connection.” EX1018, 6. This argument also fails in my opinion. First, Patent Owner again relied on the non-limiting preamble and non-existent limitations. The claim requires that “the first part *carries* a first electrical connection” and “the second part *carries* a second electrical connection.” EX1001, 6:64-66 (emphasis added). Bebak meets the claim language because the first part “carries” connector 37 (“first electrical connection”), and the second part comprises a release adapter 17 that “carries” the wires 35 (“second electrical connection”). *See* EX1007, Fig. 2B. Second, Bebak in any event, meets Patent Owner’s proposed construction in the district court—“the first and second electrical connections are connected together within the releasable connection”—because Bebak’s wires 35 and connector 37 are both part of the releasable connection as shown in Figs. 2B and 5B.

2. Claims 5 and 17

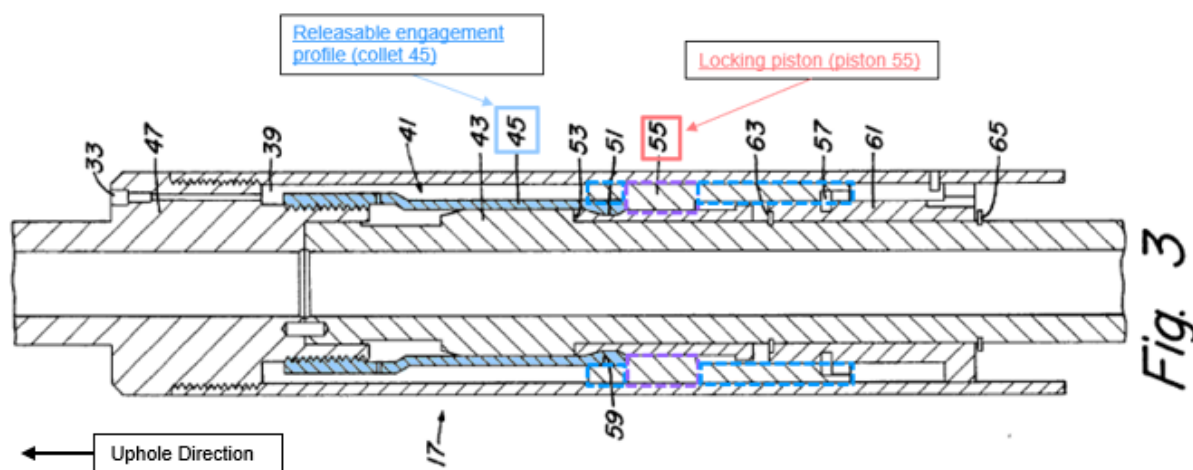
- a. [5 & 17] “The releasable connection of claim [1 or 13], wherein the locking piston comprises a piston section and a sleeve section that depends from the piston section, the sleeve section overlying the releasable engagement profile, and the fluid pressure is applied to the piston section.”

134. Dependent Claims 5 and 17 have identical language except for their respective reliance on either Claim 1 or Claim 13.

135. In my opinion, Bebak anticipates Claims 5 and 17.

136. I showed that Bebak discloses all elements of both Claims 1 and 13 in the preceding sections. Bebak also discloses the added limitation of wherein the locking piston (e.g.,

piston 55) comprises a piston section (purple box below) and a sleeve section (blue boxes below, each of which is a separate sleeve section) that depends from the piston section, the sleeve section overlying the releasable engagement profile (e.g., collet 45), and the fluid pressure is applied to the piston section is disclosed by Bebak.



See, e.g., *id.*, Fig. 3 (annotated).

137. As shown above the piston and its function is described in Bebak, “Collet 45 is latched in an outer profile 51 located on the exterior of neck 43 below a shoulder 53. In FIG. 3, a piston 55 is shown in its upper position and restrained there from downward movement by (preferably) brass shear pins 57. Piston 55 has an interior profile 59 at its upper end that captures and abuts the lower end of collet 45 in outer profile 51.” *Id.*, 2:48-54. And Bebak also makes clear that fluid pressure is applied to the piston when it says, the “piston captures the collet against the neck, and is restrained from movement by shear pins. The locking mechanism is actuated from the surface by pumping hydraulic fluid down through the capillary tube to the chamber to stroke the piston downward and shear the pins. When the piston moves, the lower end of the collet releases the fishing neck and is free to be retracted axially upward into the wellbore toward the surface.” *Id.*, 1:37-44.

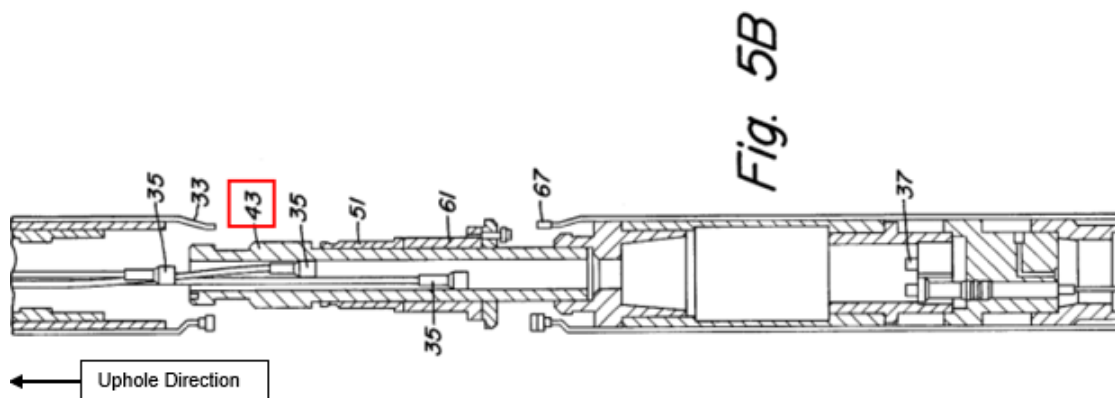
138. This element is fully presented in Bebak, but if the “source of fluid pressure” element is found not to be anticipated, then this element would be obvious based on the combination of Bebak and Forehand as described in Section X.E. below in the discussion of Claim 7.

3. Claim 6

- a. [6] “The releasable connection of claim 1, wherein the first part comprises a fishneck that attaches to a fishing tool when disconnected from the second part.”

139. In my opinion, Bebak anticipates Claim 6.

140. I showed that Bebak discloses all elements of Claim 1 in the preceding sections. Bebak discloses the releasable connection of Claim 1, wherein the first part comprises a fishneck (e.g., fishing neck 43) that attaches to a fishing tool when disconnected from the second part.



See, e.g., id., Fig. 5B (annotated).

141. “After the unplugged assembly is raised to the surface, a fishing tool may be lowered to retrieve the remaining assembly on the clean and clear fishing neck 43.” *Id.*, 3:4-6. The referenced “unplugged assembly” is the disconnected second part and fishneck 43 is located on the first part as shown above.

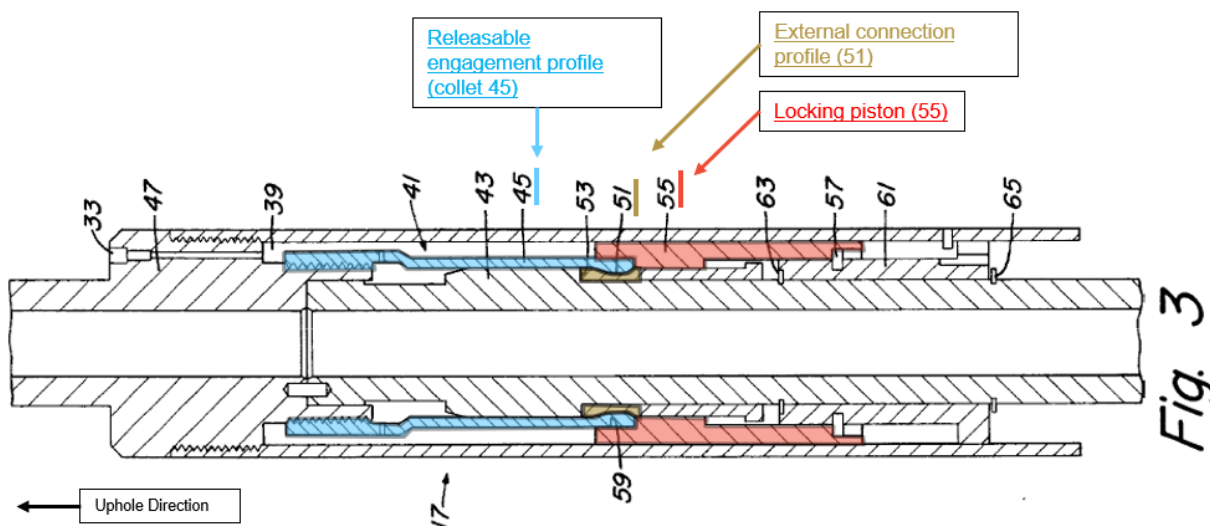
142. This element is fully present in Bebak, but if the “source of fluid pressure” element is found not to be anticipated, then this element would be obvious based on the combination of Bebak and Forehand as described in Section X.E. below in the discussion of Claim 7.

4. Claim 18

- a. [18] “The releasable connection of claim 13 wherein the second part comprises an outer housing and the locking piston is positioned within an internal cavity of the second part.”

143. In my opinion, Bebak anticipates Claim 18.

144. I showed that Bebak discloses all elements of Claim 13 in the preceding sections. Bebak also discloses that its releasable connection includes an outer housing and thus “*the second part comprises an outer housing.*” EX1007, 2:32-33 (“submersible pump 21 is secured to a housing or release adapter 17”). Figure 1 of Bebak shows the release adapter 17 having an outer housing, and Figures 3-4 show the piston 55 inside a cavity of the release adapter 17’s outer housing. *See id.*, Figs. 1, 3-4. Therefore, “*the locking piston is positioned within an internal cavity of the second part.*”



Id., Fig. 3 (annotated).

145. Moreover, I fully described this claim element in my discussion of Claim 1. The “outer housing” limitation is contained in Claim 1 and fully described above in my discussion of claim element [1-B1]. The “locking piston is positioned within an internal cavity of the second part” limitations is also contained in Claim 1 and fully described above in my discussion of claim element [1-B3]. The discussion of Claim 18 above also applies to claim elements [1-B1] and [1-B3].
146. This element is fully present in Bebak, but if the “source of fluid pressure” element is found not to be anticipated, then this element would be obvious based on the combination of Bebak and Forehand as described in Section X.E. below in the discussion of Claim 7.

C. Bebak Renders Claims 4 and 19 Obvious

1. Claims 4 and 19

- a. [4 & 19] “The releasable connection of claim [1 or 18], wherein the outer housing of the second part comprises a pressure equalization ports, the locking piston configured to close the pressure equalization ports in the locking position, and open the pressure equalization ports in the release position.”
147. Claims 4 and 19 depend from Claims 1 and 18 respectively and add the identical limitation with the following language, “wherein the outer housing of the second part comprises a pressure equalization ports, the locking piston configured to close the pressure equalization ports in the locking position, and open the pressure equalization ports in the release position.”
148. In my opinion, Bebak renders obvious Claims 4 and 19 when read with the knowledge of a POSA.
149. As I showed above, Bebak discloses all elements of Claims 1 and 18. But Bebak is silent about the *pressure equalization ports* of Claims 4 and 19. However, pressure equalization ports are common devices used by engineers to equalize pressures, and a

POSA would have known to use *pressure equalization ports* opened by a locking piston as described in these claims to solve the known problem of pressure differentials in releasable connections, and would have found it obvious to employ that feature in Bebak, thereby rendering Claims 4 and 19 obvious.

150. Specifically, if the internal pressure of the releasable connection is lower than the wellbore pressure—as would be typical and understood by a POSA—the pressure differential can resist release, potentially preventing the tool from releasing. A POSA would have known this was an issue with releasable connections because a POSA would have known that a pressure differential could bind components and resist release. That is basic mechanical engineering design. The '122 Patent also recognizes this problem, as does the Forehand patent I will discuss in the next section. EX1001, 4:51-55 (“If first part 12 is sealably received within second part 14, as would be the case in the depicted example, a lower pressure with second part 14 relative to the wellbore would result in a vacuum that would resist the release of first part 12. Pressure equalization ports 56 help reduce this possibility.”); EX1008, 6:23-27 (“Release of the collet finger heads 26 from groove 32 is also encouraged by neutralizing the upward pressure of the fluid in the lower casing annulus 5 against the bottom of the perforating gun 8.”).
151. Moreover, one of the named inventors, Mr. Golinowski, as expected testified during the parties’ preliminary injunction proceedings that using pressure equalization ports to ensure a releasable connection equalizes and separates was a known idea. *See* EX1011 (Jan. 31, 2023 Dep. Tr. of Jeffrey R. Golinowski). Mr. Golinowski testified that someone with experience would know to ensure this “vacuum lock scenario did not occur,” and agreed that using pressure equalization ports would be “in the toolkit of an experienced

engineer who has worked on downhole tools.” *Id.*, 199:8-22. While I have reached my opinions independently and do not depend on Mr. Golinowski for my conclusions, Mr. Golinowski’s testimony is further support for my opinion that a POSA would have found adding *pressure equalization ports* to Bebak’s locking piston as stated in Claim 19 was obvious.

Q. (By Mr. Aurentz) You would agree that having
9 equalization ports in the release tool to ensure that it
10 equalizes and therefore separates, is not a new idea
11 that you came up with in the context of designing this
12 tool. Right?
13 MR. CABELLO: Objection, form.
14 A. No, it is not a new idea. Because if you have
15 experience, you would be exposed to ensuring you don’t
16 have this vacuum lock scenario.
17 Q. (By Mr. Aurentz) Putting equalization ports
18 into the design would basically be a tool that would be
19 in the toolkit of an experienced engineer who has worked
20 on downhole tools. Fair?
21 MR. CABELLO: Objection, form.
22 A. Fair. Yeah, fair statement to put that in.

Id.

152. A POSA would also have been motivated by the POSA’s recognition that pressure equalization ports would make a releasable connection design safer, more reliable, and cheaper for several reasons. For example, with releasable connections that use hydraulics to create fluid pressure, like Bebak, the hydraulic pressure necessary to overcome wellbore pressure could be so great that the hydraulics can fail at the surface, causing an unsafe situation for workers, or requiring more expensive pumping equipment. It was known that these problems could be avoided by simply including pressure equalization ports. Moreover, without a way to equalize pressure buildup within a releasable connection, the pressure can create a vacuum, binding the components and preventing

release. The inclusion of pressure equalization ports would result in a more reliable and safe releasable connection, providing another motivation to employ this technique.

153. Additionally, a POSA would have been motivated to modify Bebak by drilling pressure equalization ports into its housing that are opened when Bebak's locking piston 55 moves into the release position because it would reliably equalize pressure. A POSA would also have recognized that the modifications necessary would be trivial, involving no more than removing material from the housing of the device and placing O-rings in appropriate locations so that the locking piston would seal off wellbore pressure when locked and unseal it when moving into the release position.
154. A POSA would also have been motivated to open equalization ports by Bebak's locking piston because a POSA would have recognized that the locking piston—an existing moving part—could be used to open the ports instead of introducing new moving parts to the design. A POSA would also have been motivated because a POSA would have recognized that locking pistons ordinarily use O-rings to form pressure seals.
155. Moreover, a POSA would have been motivated to modify Bebak by drilling pressure equalization ports into its housing that are opened when Bebak's *locking piston 55* moves into release position because it would reliably equalize pressure. It is also amounts to using known prior art methods according to their established functions to yield predictable results. A POSA would have had a reasonable expectation of success as this is a predictable application of known methods, thereby rendering Claims 4 and 19 obvious.

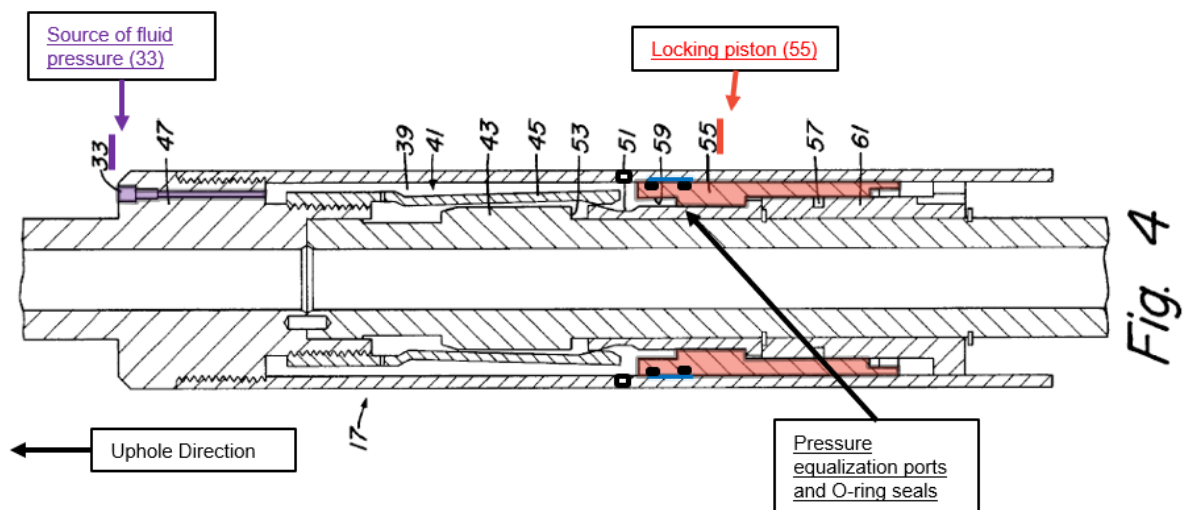
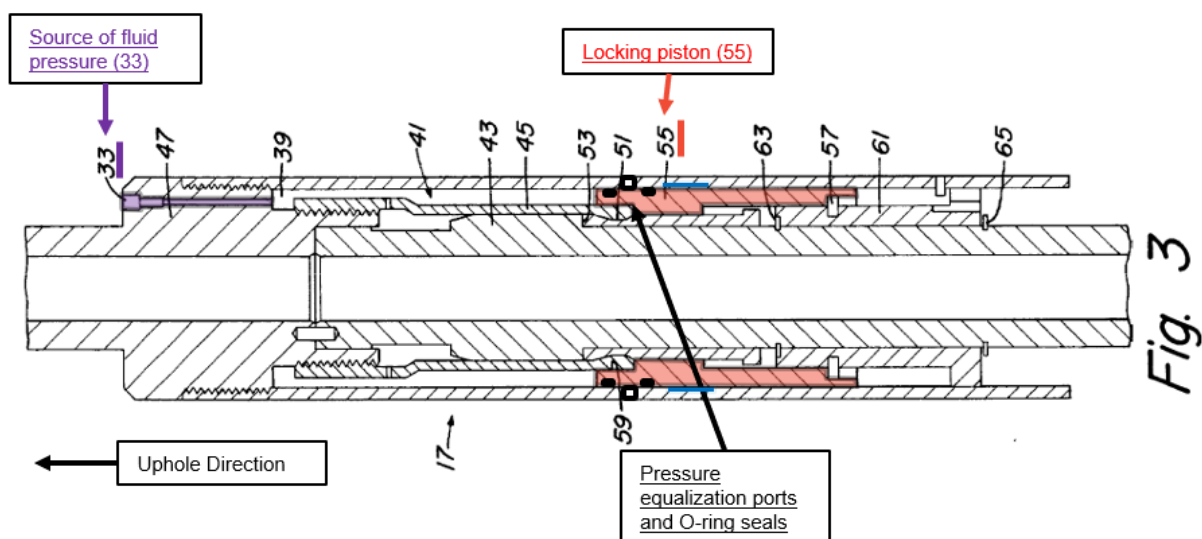
D. Bebak and Forehand Render Claims 4 and 19 Obvious

1. Claims 4 and 19

- a. [4 & 19] “The releasable connection of claim [1 or 18], wherein the outer housing of the second part comprises a pressure equalization ports, the locking piston configured to close the pressure equalization ports in the locking position, and open the pressure equalization ports in the release position.”

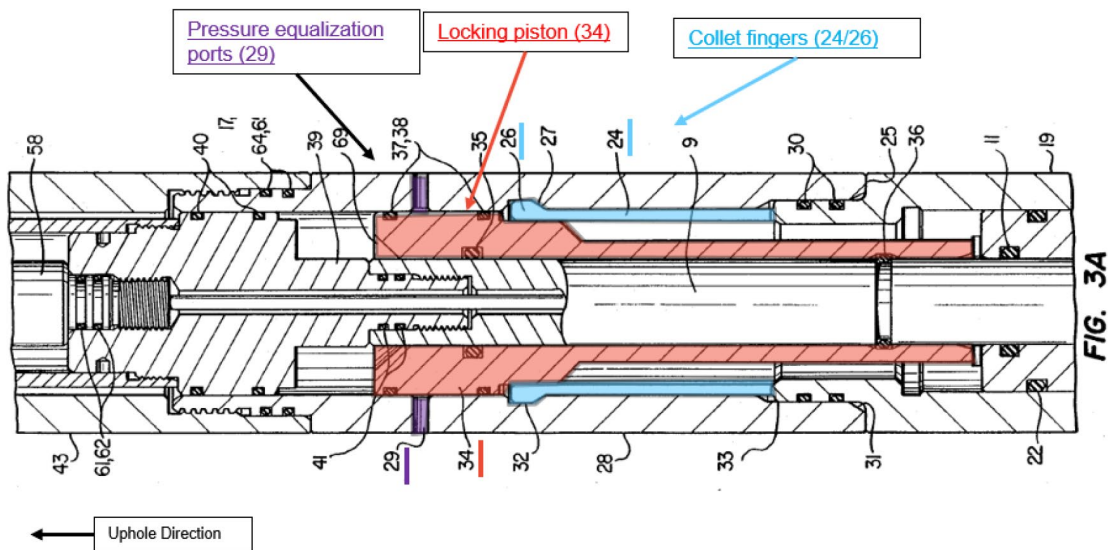
156. In my opinion, the combination of Bebak and U.S. Patent No. 4,776,393 (“Forehand”) also renders obvious Claims 4 and 19.
157. In Forehand’s design, the pressure of the gun firing activates the release mechanism. This allows the gun to fall off the tool string down into the well. *See* EX1008, Abstract. Additionally, Forehand’s release mechanism is a piston-collet mechanism that has many similarities to both Bebak and the ’122 Patent. For instance, Forehand uses a sleeve/piston 34, which keeps the device locked by pinning collet fingers 24 in place against a groove in the housing of the device, and it uses pressure to move the sleeve/piston 34 and release the collet fingers. *See id.*, Fig. 3A, 6:14-23.
158. As I showed above, Bebak discloses all elements of Claims 1 and 18. But Bebak is silent about the *pressure equalization ports* of Claims 4 and 19. Forehand, however, discloses the pressure equalization mechanism contemplated by these claims. A POSA would have found it obvious to modify Bebak based on Forehand’s teaching about pressure equalization features, thereby producing a device that satisfies all elements of Claim 19. Accordingly, in my opinion Claims 4 and 19 would have been obvious to a POSA.
159. An illustration of this simple modification to Bebak based on Forehand is shown below with Bebak Figures 3 and 4. In this simple modification, *pressure equalization ports* are drilled into the housing of Bebak and sealed on both sides by O-rings on the *locking piston* 55. During release, the *locking piston* moves the O-rings to break the seal around

the pressure equalization ports, allowing wellbore pressure to flood into the tool and equalize it. The O-rings come to rest in a groove in the housing (blue) that leaves the O-ring seal broken, facilitating wellbore pressure to flood downward past the O-ring seals for further equalization.



EX1001, Figs. 3-4 (annotated).

160. Applying Forehand in Figure 3A below, Forehand shows that ports 29 are spaced around the housing of the device. These are *pressure equalization ports*.



EX1008, Fig. 3A (annotated).

161. In the locked position, sleeve 34 (*locking piston*) keeps the ports 29 closed by sealing them with O-rings on either side of the ports (*the locking piston configured to close the pressure equalization ports in the locking position*). Forehand refers to the O-rings as seal members 37 and 38. *Id.*, 4:28-29. When the gun explosion is set off, the sleeve 34 (*locking piston*) is pushed upwards into a release position. In the release position, the sleeve 34 moves up so it is no longer blocking the ports 29 (*the locking piston configured to . . . open the pressure equalization ports in the release position*). This allows wellbore pressure to flood in through the *pressure equalization ports* into the tool, thereby equalizing pressure and facilitating tool release.
162. Forehand explains this process: “Release of the collet finger heads 26 from groove 32 is also encouraged by **neutralizing the upward pressure** of the fluid in the lower casing annulus 5 against the bottom of the perforating gun 8. ***This is accomplished when locking sleeve 34 is pushed up against bulkhead 39 which places the upper, full-diameter portion of locking sleeve 34 above ports 29.*** The borehole fluid is thereupon

free to enter the interior of reentry sub 28 where it pushes down on release sub 19, displacing what was essentially atmospheric pressure inside reentry sub 28 prior to detonation.” *Id.*, 6:19-34 (emphasis added).

163. A POSA would have been motivated to modify Bebak as I describe for multiple reasons. First, Bebak and Forehand are analogous art and both are in the field of the '122 Patent. Both involve releasable connections for downhole oilfield tools. Thus, a POSA would have looked to both references when considering how to design releasable connections.
164. Second, a POSA would have recognized that modifying Bebak to use a *pressure equalization port* feature as I describe would reliably equalize pressure. It would make Bebak's design safer, more reliable, and cheaper, for several reasons.
165. As noted above in my discussion of obviousness based on Bebak alone (Section X.C), a POSA would have known about the pressure differential problem that the '122 Patent's *pressure equalization ports* are intended to solve, and that pressure equalization ports opened by a locking piston are a common way to solve it. The modification of Bebak I propose, involving implementing the equalization ports with O-rings and a groove to keep the O-ring seal broken in release, is simple application of mechanical engineering principles to break O-ring seals for pressure equalization and is no more than applying known methods according to established functions to yield predictable results.
166. The *pressure equalization ports* of Forehand provide equalization as Claim 19 contemplates—a locking piston that opens a hole in the device housing that is exposed to the wellbore. Bebak, however, uses a hydraulic system, and is silent about *pressure equalization ports*. Therefore, to neutralize wellbore pressure using hydraulic pressure only, Bebak's design would have to pump a great deal of hydraulic pressure downhole

into the releasable connection. Wellbore pressures are frequently above 10,000 PSI and can exceed 30,000 PSI. The system of Bebak would have to apply an equal amount of pressure inside the releasable connection to neutralize the wellbore pressure. But in my experience, hydraulic systems are typically not built to operate above 10,000 PSI, and significantly more expensive pumping mechanisms would be needed at higher pressures.

167. If the hydraulics do fail, it will could occur at the surface and cause an unsafe situation for workers. A hydraulic pump failure can expel high pressure fluid, like a pressure washer, along with the potential of dangerous shrapnel or other projectiles. On the other hand, if the hydraulic failure occurs downhole, then it will mean that the operators were attempting to release the tool but did not achieve the necessary pressure buildup. Which means now an additional operation would have to be undertaken to recover the stuck toolstring.
168. A POSA would have recognized that these problems could be avoided by simply modifying Bebak as described. That way, the releasable connection of Bebak would only need to apply enough hydraulic pressure to move the locking piston clear of the *pressure equalization ports*—an amount of pressure that could be far less than wellbore pressure and that would not be subject to change (unlike wellbore pressure, which can vary significantly). At that point, wellbore pressure would flood the tool through the *pressure equalization ports* and equalize it to facilitate release. As a result, the tool would operate more reliably and more safely, and would require less and more predictable hydraulic pressure to release, and could utilize lower cost hydraulic systems that operate at lower pressure.

169. Third, nothing in Bebak or Forehand would have discouraged a POSA from combining their teachings.
170. Fourth, this combination of Bebak and Forehand would have been a combination of familiar elements according to known methods, yielding predictable results. In this case, the pressure equalization feature of Forehand would be easily and predictably applied to Bebak. As noted above, the named inventor Mr. Golinowski gave testimony regarding the known use of pressure equalization ports and the reasons for them that is consistent with my independent conclusions.
171. Finally, a POSA would have had a reasonable expectation of success in making this combination of Bebak and Forehand's features. Releasable connections are a long established and very predictable art, and the modification I have described is simple, involving no more than removing material from Bebak's housing and placing O-rings at the appropriate locations. Nothing about the combination of Bebak and Forehand I have discussed would have caused a POSA to doubt success. A POSA would have been confident in success.

E. Bebak and Forehand Render Claim 7 Obvious

172. Claim 7 is as follows:

7. (preamble) A releasable connection for a downhole tool string, comprising:
 (A) a first part comprising an external connection profile; and
 (B) a second part comprising:
 (B1) a releasable engagement profile which internally engages the connection profile of the first part and which is configured to expand radially to release the connection profile of the first part;
 (B2) a locking piston, the locking piston configured to move axially along the second part between a locking position that directly constrains the releasable engagement profile into engagement with the connection profile of the first part and a release position that permits the releasable engagement profile to expand radially to release the connection profile of the second part;

(B3) an expansion chamber in fluid communication with the locking piston;

(B4) a combustible disposed within the expansion chamber, wherein, upon combustion, the combustible applies gas pressure to the locking piston to move the locking piston from the locking position toward the release position.

173. Claim 7 is identical to Claim 13 except for two differences. First, unlike Claim 13, there is no electrical connection limitation in Claim 7. Second, the “source of fluid pressure” limitation from Claim 13 changes to a “combustible” in Claim 7.
174. In my opinion, the combination of Bebak and Forehand renders obvious Claim 7.
175. To address Claim 7, only a discussion of the combustible limitations (7-B4) is necessary because the other limitations have already been fully addressed in my analysis of Claims 1 and 13. All other elements in 7-A to 7-B3 of Claim 7 (including the preamble) are fully discussed above and incorporated herein in the analysis of Claims 1 and 13 in Section X.B.1. My opinion is the same for Claim 7 as it is for Claims 1 and 13 for these elements. They are obvious.
176. Focusing on element 7-B4, “a combustible disposed within the expansion chamber, wherein, upon combustion, the combustible applies gas pressure to the locking piston to move the locking piston from the locking position toward the release position.” Utilizing Patent Owner’s understanding of this element, it is my opinion that this element is rendered obvious by Bebak and Forehand.
177. Utilizing Patent Owner’s reading of this element, Bebak combined with Forehand renders obvious “a combustible disposed within the expansion chamber, wherein, upon combustion, the combustible applies gas pressure to the locking piston to move the locking piston from the locking position toward the release position.” Forehand describes an automatic gun release mechanism that uses a piston and collet locking

mechanism actuated by pressure from the firing of the gun (detonation of combustibles).

See EX1008, Abstract. Because a POSA would readily know that a combustible generates internal pressure in a perforation gun, the release mechanism of Forehand actuated by combustible pressure would have suggested to a POSA that the piston and collet locking mechanism used by Bebak could likewise use pressure from a combustible placed in the expansion chamber instead of hydraulic pressure carried to the expansion chamber by a capillary tube.

178. A POSA would also have been motivated because Forehand and Bebak both relate to systems for releasable connections. A POSA would also have been motivated because the system of Forehand automatically releases gun strings when they fire, whereas Bebak's modified system could release as desired (such as if the string were stuck) without firing the gun or if there were other tools but no gun. The combination of prior art references to include a combustible would have had a reasonable expectation of success because this was a highly predictable art, implementing the feature would be simple, and there would be no reason for a POSA to doubt success. It also amounts to using known prior art methods according to their established functions to yield predictable results. Furthermore, all of the above-mentioned motivations within the common sense and knowledge of a POSA would also have applied to this combination of Bebak and Forehand.
179. A POSA would have been motivated to combine a combustible reference like Forehand with Bebak because there were a finite number of ways to generate force to move a release mechanism, which include hydraulics, combustibles, electric motors, ingestion of wellbore pressure, and tension. A POSA would have viewed these as obvious design

alternatives, each with certain advantages and disadvantages. A POSA would have been motivated to modify, for example, the hydraulic system of Bebak to use a combustible like Forehand's because it would not require the use of hydraulic pumps and lines to actuate the release tool, but instead would allow for the tool to be actuated by an electrical signal to detonate and release the pressure from the combustible. Such electrical detonation systems were well known in the art for both firing perforation guns and releasing tool strings. This is evidenced by Forehand (EX1008) and HTB (EX1009).

180. A POSA would also have been motivated to implement a "combustible disposed within the expansion chamber" because it would place the combustible directly in the path of the component that needed to be moved by the pressure from the combustible, as opposed to a more indirect path such as the embodiments depicted in the figures of the '122 Patent that rely on multiple chambers to communicate pressure from the combustible to the locking piston. A POSA would also have been motivated because a POSA would have known that pressure from an explosion dissipates as it passes through a volume. Furthermore, under Patent Owner's reading of the claims, any path from the combustible to the locking piston suffices to meet the "combustible disposed within the expansion chamber" limitation regardless of whether the combustible is disposed in an entirely separate chamber from the expansion chamber. Moreover, all the reasons discussed for combining Bebak and Forehand discussed above apply equally here.

181. Finally, a POSA would have had a reasonable expectation of success in making this combination of Bebak and Forehand's features. Releasable connections are a long established and very predictable art, and the modification described amounts to replacement of one known pressure source with another. A POSA would have been

confident in success of this approach. Thus, a POSA would understand that Claim 7 is obvious due to the combination of Bebak and Forehand.

F. Bebak and Forehand Renders Claim 8 Obvious

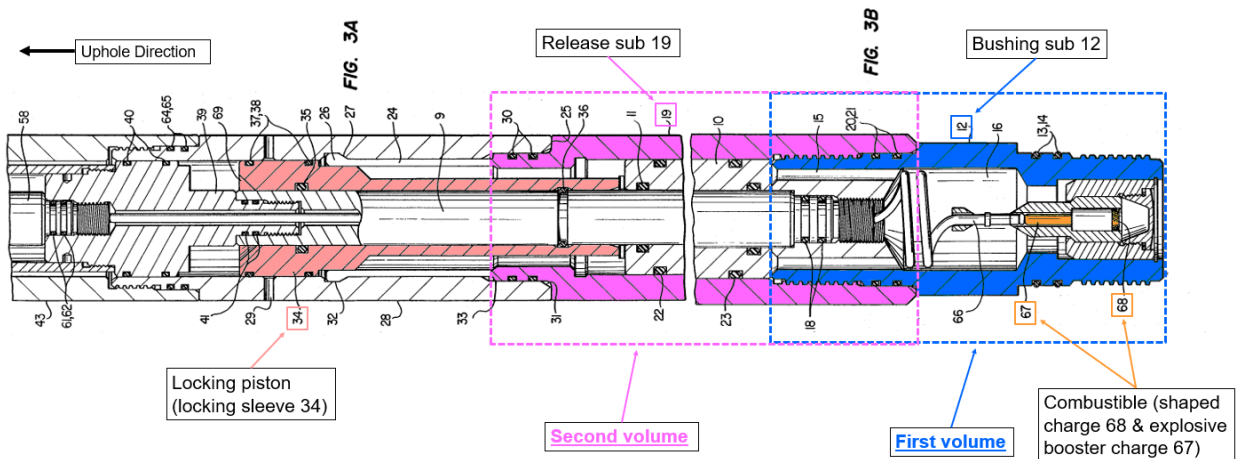
- 1. “[8] The releasable connection of claim 7, wherein the expansion chamber comprises a first volume that contains the combustible, and a second volume that encloses at least a portion of the locking piston, the first volume being in fluid communication with the second volume.”**

182. In my opinion, the combination of Bebak and Forehand renders obvious Claim 8.

183. As I showed above, Bebak and Forehand render obvious all elements of Claim 7.

184. Utilizing Patent Owner’s reading of Claim 8, Bebak combined with Forehand renders obvious “wherein the expansion chamber comprises a first volume that contains the combustible, and a second volume that encloses at least a portion of the locking piston, the first volume being in fluid communication with the second volume” for at least the exemplary reasons provided in the discussion of the combustible limitation of Claim 7 discussed above. The obvious combination described for Claim 7, concerning a combustible disposed within the expansion chamber, would also include “wherein the expansion chamber comprises a first volume that contains the combustible, and a second volume that encloses at least a portion of the locking piston, the first volume being in fluid communication with the second volume.” Using Patent Owner’s broad definition of expansion chamber being any volume where fluid expands into it, meeting this element is shown by the portion of the expansion chamber that includes the combustible and a second portion of the expansion chamber that includes the locking piston, because fluid expands into both areas of Bebak and Forehand. In turn, these portions would be bordering one another or would be connected and thus the volumes are in fluid communication with one another.

185. Moreover, a review of the discussion and figures in Forehand shows the combustible as oriented as required by Claim 8. For example, when the Forehand tool is intact (not in the release position), release sub 19 and bushing sub 12 share the same internal cavity (expansion chamber) that houses both the explosive charge (combustible) and the piston (locking piston). See EX1008, Figs. 3A-B. Forehand makes clear that these two volumes comprise the expansion chamber and are in fluid communication with each other because the detonations of the explosive charges provide an “upward explosive shock wave” that “is sufficient to shift the piston and thus the sleeve upward within the coupling member to an extent sufficient to allow the collet finger heads the inward radial movement necessary to disengage the groove.” *Id.*, 2:15-20. The following annotated figures depict the two volumes and component locations in the Forehand tool that meet all the elements of Claim 8:



Id., Figs. 3A-B (annotated).

186. Applying the motivations already discussed with regard to Claim 7, a POSA would have combined Bebak and Forehand therefore rendering Claim 8 obvious.

G. Bebak and Forehand Renders Claim 9 Obvious

1. “[9] The releasable connection of claim 7, wherein the combustible is configured to be detonated by an electrical signal.”

187. In my opinion, the combination of Bebak and Forehand renders obvious Claim 9.

188. As I showed above, Bebak and Forehand render obvious all elements of Claim 7.

189. Applying the motivations already discussed with regard to Claim 7, a POSA would have combined Bebak and Forehand therefore rendering Claim 9 obvious. Specifically, Forehand explicitly discloses detonation by electrical signal, “It will be recognized by those skilled in the art that the firing assembly 51 used need not be of the impact or percussion type, as shown, but may be of the type which is electrically or hydraulically activated.” *Id.*, 5:43-47. Moreover, one additional motivation to combine Bebak and Forehand as to activating the combustible is express in the quote above from Forehand—electrical and hydraulic activation are described as interchangeable ways to activate movement of the locking piston. *See id.*

H. Bebak and Forehand Renders Claim 10 Obvious

1. “[10] The releasable connection of claim 7 wherein the second part comprises an outer housing and the locking piston is positioned within an internal cavity of the second part.”

190. In my opinion, the combination of Bebak and Forehand renders obvious Claim 10.

191. As I showed above, Bebak and Forehand render obvious all elements of Claim 7.

192. Applying the motivations already discussed with regard to Claim 7, a POSA would have combined Bebak and Forehand therefore rendering Claim 10 obvious. Bebak discloses the releasable connection of Claim 7, wherein the second part comprises an outer housing and the locking piston is positioned within an internal cavity of the second part. The “outer housing” limitation is contained in Claim 1 and fully described above in my

discussion of Claim 1 as well as Claim 18. The “locking piston is positioned within an internal cavity of the second part” limitation is also contained in Claim 1 and fully described above in my discussions of Claim 1 and Claim 18.

I. Bebak and Forehand Renders Claim 11 Obvious

1. **“[11] The releasable connection of claim 7, wherein the locking piston comprises a piston section and a sleeve section that depends from the piston section, the sleeve section overlying the releasable engagement profile, and the fluid pressure is applied to the piston section.”**

193. In my opinion, the combination of Bebak and Forehand renders obvious Claim 11.
194. As I showed above, Bebak and Forehand render obvious all elements of Claim 7.
195. Applying the motivations already discussed with regard to Claim 7, a POSA would have combined Bebak and Forehand therefore rendering Claim 11 obvious. Bebak discloses the releasable connection of Claim 7, “wherein the locking piston comprises a piston section and a sleeve section that depends from the piston section, the sleeve section overlying the releasable engagement profile, and the fluid pressure is applied to the piston section.” The “locking piston” limitation is contained in Claims 5 and 17 and is fully described above in my discussion of those claims.

J. Bebak and Forehand Renders Claim 12 Obvious

1. **“[12] The releasable connection of claim 7, wherein the first part carries a first electrical connection, and the second part carries a second electrical connection, the first and second electrical connection being electrically connected when the releasable engagement profile of the second part engages the connection profile of the first part, and becomes disconnected when the releasable engagement profile disengages the connection profile.”**

196. In my opinion, the combination of Bebak and Forehand renders obvious Claim 12.
197. As I showed above, Bebak and Forehand render obvious all elements of Claim 7.

Applying the motivations already discussed with regard to Claim 7, a POSA would have combined Bebak and Forehand therefore rendering Claim 12 obvious. Bebak discloses the releasable connection of Claim 7, “wherein the first part carries a first electrical connection, and the second part carries a second electrical connection, the first and second electrical connection being electrically connected when the releasable engagement profile of the second part engages the connection profile of the first part, and becomes disconnected when the releasable engagement profile disengages the connection profile.” The “electrical connection” limitation is contained in Claims 13 and is fully described above in my discussion of Claim element 13C.

K. Bebak and Forehand Renders Claim 16 Obvious

- 1. “[16] The releasable connection of claim 10, wherein the outer housing of the second part comprises a pressure equalization ports, the locking piston configured to close the pressure equalization ports in the locking position, and open the pressure equalization ports in the release position.”**

198. In my opinion, the combination of Bebak and Forehand renders obvious Claim 16.
199. As I showed above, Bebak and Forehand render obvious all elements of Claim 7.
200. Applying the motivations already discussed with regard to Claim 7, a POSA would have combined Bebak and Forehand therefore rendering Claim 16 obvious. Claim 16 depends from Claim 10 which depends from Claim 7. Both Claims 10 and 7 have already been described in detail above. The added pressure equalization limitation of Claim 16 is the exact limitation that has already been fully described above in my discussions of Claims 4 and 19. Therefore Claim 16 is invalid due to Bebak combined with Forehand for all the same reasons previously discussed.
201. In addition, the modification of Bebak’s pressure source to be a combustible based on the teachings of Forehand—as discussed for Claim 7—would have also suggested to a POSA

to apply Forehand's pressure equalization ports feature to Bebak, since Forehand also used a combustible and taught benefits of using pressure equalization ports. This further demonstrates that Claim 16 would have been obvious.

L. Bebak and HTB Renders Claim 15 Obvious

- 1. "[15] The releasable connection of claim 13, wherein the first electrical connection and the second electrical connection are concentrically disposed within the connection profile and the releasable engagement profile."**

202. In my opinion, the combination of Bebak and Hunting Titan Brochure (EX1009) renders obvious Claim 15.

203. As I showed above, Bebak anticipates all elements of Claim 13.

204. A POSA would have combined Bebak and HTB rendering Claim 15 obvious. Claim 15 depends from Claim 13 and adds the limitation "wherein the first electrical connection and second electrical connections are concentrically disposed within the connection profile and the releasable engagement profile." This added element would have been known to a POSA for a number of reasons.

205. First, HTB disclosed many different adapters. Under the heading "Wireline Hardware," HTB discloses various adapters that provide concentric electrical connections intended for the connection of wireline tools, which could include both a Bebak release tool and other downhole tools. These ubiquitous concentric electrical connections are common modes of transmitting electricity down a wireline tool string and would have been well known to a POSA. A POSA using common electrical connections in the oil field would have readily employed the same feature for forming the electrical connection between the first and second part of a Bebak release tool—which in turn could utilize a similar electrical connection on a sub for connecting to other downhole tools.

206. The HTB also disclosed that cable heads were used to “provide mechanical and electrical connections between the wireline cable and tool string” and depicts a concentric electrical connector for connection to downhole tools on the tool string, also suggesting to a POSA to use such an electrical connector configuration at the separation point in the release tool and further at the electrical connection on a sub for other downhole tools. EX1009, 2; EX1010, 18.
207. A POSA would have looked to the HTB because it concerned connections for downhole tools, including releasable and electrical connections. HTB states, “Cable heads play a vital role in all logging and perforating operations as they provide mechanical and electrical connections between the wireline cable and tool string. A weak point inside the cable head bears the entire load of the tool string weight. Hunting Titan cable heads are constructed of high quality, high strength steel (H2S resistant upon request) ensuring mechanical durability. The electric bulkhead protects the electrical connections from all types of corrosive wellbore fluids. Contact assemblies can be changed out for high power loads demanded by tractor operations. Cable mechanical integrity is guaranteed by the high quality weak point incorporated inside the head ensuring clean release of a stuck tool string.” EX1009, 2; EX1010, 18.
208. Moreover, various pages of the HTB show examples of concentrically located electrical connections used on downhole releasable tools that were common in the industry and would have been well known to a POSA (the electrical connections are the yellow components with pins protruding from the end).



Declaration of Gary Wooley, Ph.D. Regarding U.S. Patent No. 10,794,122

Electrical Cable Heads

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ASSEMBLY PART NUMBERS

The following table lists the assembly part numbers of electrical cable heads that are compatible with the most common electric wireline diameters. Contact your local Hunting Titan representative for the availability of cable heads not listed.

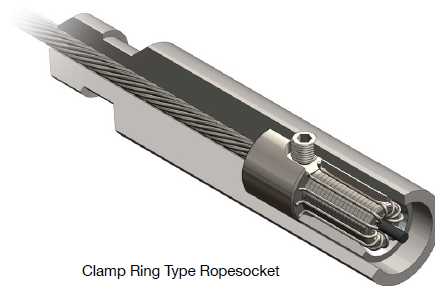
O.D. (in)[mm]	Type	Contact Kit	Electric Wireline Diameter (in)[mm]				
			7/32 [6]	0.288 [7]	5/16 [8]	15/32 [12]	0.474 [12]
1 [25]	Clamp Ring	3001-000-002	3010-22-030i 3010-22-035i	3010-28-040	3010-31-043	-	-
1-7/16 [37]	Cone Type II	3003-000-002	3016-22-030i 3016-22-035i	3016-28-040	3016-31-043	3016-47-049	3016-474-065
	4 Piece Cone Type II ⁱⁱ		3046-22-030i 3046-22-035i	3046-28-040	3046-31-043	3046-47-049	3046-474-065
1-11/16 [43]	Cone Type II	3003-000-002	5016-22-030i 5016-22-035i	5016-28-040	5016-31-043	5016-47-049	5016-474-065
	4 Piece Cone Type II ⁱⁱ		5046-22-030i 5046-22-035i	5046-28-040	5046-31-043	5046-47-049	5046-474-065

* Use "0" for standard service; "N" for H₂S service

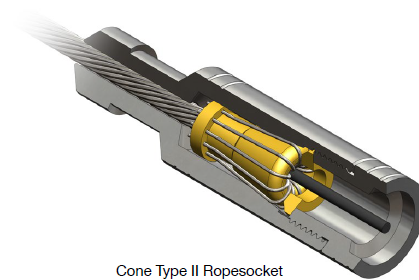
[†] Weight bars need to be ordered separately

* 0.030" strand diameter

* 0.035" strand diameter



Clamp Ring Type Ropesocket



Cone Type II Ropesocket

P:\Hardware-Catalog\2012\2013_Indd_091320130465

Right Tools. Right Location. Right Time.
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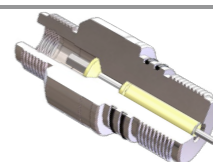
3

Sinkers/Eccentered Weights

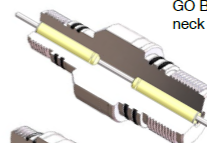
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ADAPTERS FOR STANDARD AND ECCENTERED SINKER BARS

O.D. (in)[mm]	Assembly Part Number	Contact Kit	Upper Contact Head Assembly	Weight (lbm)[kg]
2-3/4 [70]	3885-000-080	0318-000-022	1-3/16"-12 GO Box with 2"-6 Acme fishing neck thread	7 [3]
	3885-000-150	3885-000-152	1-5/8"-6 Acme Pin	8 [4]
	3885-000-070	3890-000-222	2-3/4" O.D. CCL Assembly	8 [4]
	3885-000-110	3890-000-112	2-3/4" O.D. GO Quick-Change Assembly	11 [5]
	3885-000-140	3890-000-142	2-3/4" O.D. SIE Quick-Change Assembly	10 [5]
	3885-000-020	3885-000-022	Tandem connector sub assembly	10 [5]
	3885-000-120	3890-000-352	Lock collar tandem connector sub assembly	12 [5]
3-1/8 [70]	3890-000-170	0318-000-022	1-3/16"-12 GO Box with 2"-6 Acme fishing neck thread	8 [4]
	3890-000-240	3890-000-242	1-5/8"-6 Acme Pin	9 [4]
	3890-000-340	3890-000-222	2-3/4" O.D. CCL Assembly	9 [4]
	3890-000-110	3890-000-112	3-1/8" O.D. GO Quick-Change Assembly	13 [6]
	3890-000-220	3890-000-222	3-1/8" O.D. CCL Assembly	10 [5]
	3890-000-140	3890-000-142	3-1/8" O.D. SIE Quick-Change Assembly	11 [5]
	3890-000-150	3933-000-002	Tandem connector sub assembly	9 [4]
	3890-000-350	3890-000-352	Lock collar tandem connector sub assembly	12 [5]
	Lower Contact Head Assembly			
2-3/4 [70]	3885-000-050	0318-000-022	1-5/8"-6 Acme Box	9 [4]
	3885-000-060	3885-000-062	2-3/4" O.D. CCL Assembly	7 [3]
	3890-000-120	0318-000-122	1-5/8"-6 Acme Box	11 [5]
3-1/8 [70]	3890-000-330	3885-000-062	2-3/4" O.D. CCL Assembly	9 [4]
	3890-000-130	5401-000-032	3-1/8" O.D. CCL Assembly	7 [3]



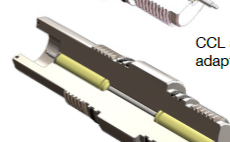
GO Box with fishing neck thread adapter



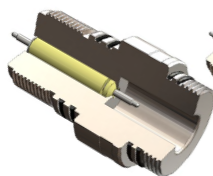
Acme pin adapter



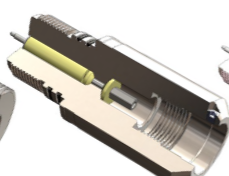
CCL assembly adapter (upper head)



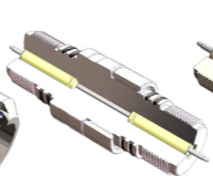
GO Quick-Change assembly adapter



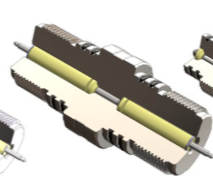
CCL assembly adapter (lower head)



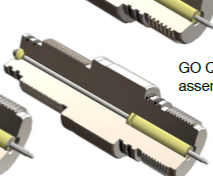
Acme box adapter



Lock collar tandem connector



Tandem connector



SIE Quick-Change assembly adapter

Right Tools, Right Location, Right Time.
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EX1009, 2, 3, 19; *see also* EX1010, 12, 18, 19. In my opinion, these disclosures would have motivated a POSA to make the cited combination.

209. Looking to HTB and Bebak, a POSA would have had a reasonable expectation of success because the art of downhole release tools was a highly predictable art and there was no reason to doubt success of using existing and well known methods of achieving electrical connections. To that end, a POSA would have been very confident in success at using the usual configuration of a concentrically disposed electrical connector at a connection point in a downhole tool such as Bebak.
210. In addition to the disclosure of this added limitation of Claim 15 in the HTB, showing it was already known in the art, the prosecution history of the '122 Patent itself discloses it as well. The patent examiner in the '122 Patent prosecution history found that U.S.

Patent No. 5,984,006 (“Read”) disclosed “wherein the first part carries a first electrical connection (Read 14:25-32), and the second part carries a second electrical connection (Read 14:25-32), the first and second electrical connection being electrically connected when the releasable engagement profile of the second part engages the connection profile of the first part, and becomes disconnected when the releasable engagement profile disengages the connection profile. Read teaches conductor cable connector 38, wherein the cable’s individual electrical conductors (not shown) pass through the longitudinal bores 244 and into the longitudinal bore 220 of the flow tube 40. When separated at least 38 is removed with the first part while connector 165 remains on the second part. . . . Read teaches: The releasable connection of claim 10, wherein the first electrical connection and the second electrical connection are concentrically disposed (Read 14:25-32) within the connection profile and the releasable engagement profile.” EX1004, 64-65 (’122 Patent File History, 2019-06-27 Office Action).

211. As was readily apparent to the patent examiner when using the Read reference to reject the ’122 Patent, a POSA would have known the teachings of Read and its concentric connections and would have been motivated to use those teachings to combine the similar teachings of HTB and Bebak because both concern releasable connections for downhole applications.
212. Utilizing the knowledge of a POSA—who would know what the examiner identified in the Read reference—the HTB and Bebak, Claim 15 is obvious.

M. Secondary Considerations

213. I am also informed that an obviousness analysis should consider any secondary considerations of non-obviousness, if present.

214. I am informed that Patent Owner has not presented positions on secondary considerations yet, and I am not otherwise aware of any secondary considerations at present. I do not believe the Challenged Claims 1, 4-13, and 15-19 filled any long-felt but unmet need in the prior art, or achieved unexpected results. I am unaware of anyone licensing the '122 Patent, failures by others to make the claimed invention, skepticism or disbelief by POSAs about the claimed invention, or deliberate copying of the claimed invention. In my opinion, the inventor did not proceed contrary to accepted wisdom. I understand that Patent Owner contends its product—the BRT—practices the claimed invention. The BRT does not seem to have been particularly successful—it is one of various release tools on the market and I understand a Petitioner stopped using it because of its poor performance. Moreover, even if Patent Owner's releasable connections were successful, there is no evidence that such success results from the particular type of connection mechanism in the claimed releasable connection.
215. I also understand that in the co-pending district court litigation, Patent Owner contends that the BRT has been nominated for two awards. EX1021, ¶¶ 22-23. I note that these are apparently nominations, not awards, and that the documents Mr. Golinowski provided in his declaration about those nominations do not say anything in particular about the elements of the Challenged Claims, so these nominations lack any nexus to the claimed invention. *See id.*, Exs. C-D. Mr. Golinowski also cites a website article, but any discussion about the BRT is limited to quotes from Mr. Golinowski himself, and does not reflect industry praise for the invention from a POSA's perspective. *See id.*, Ex. B. Even if the nominations, article statements, and sales of the BRT could be attributed to the

claimed invention, in my view it would come nowhere close to overcoming the evidence that the Challenged Claims would have been obvious to a POSA.

216. In addition, I understand that to be relevant, a secondary consideration must be shown to have a nexus to the claimed invention as opposed to the prior art or other extraneous factors. Here, everything in Claims 1, 5, 6, 13, 17, and 18 is in the prior art because it is anticipated by Bebak. And the added elements in Claims 4, 7-12, 15, 16, 19 were well known in the art and would have been obvious to a POSA based on Bebak alone, Bebak and Forehand, and/or Bebak and HTB. Additionally, I see nothing in the award nominations or article cited by Mr. Golinowski that refers to any particular elements of the Challenged Claims, and, therefore, these nominations lack any nexus to the claimed invention. Nothing Patent Owner has presented ties to any alleged invention, but is instead tied to the prior art.
217. For these reasons, in my opinion all the claims I detail above as invalid as obvious would have been obvious to a POSA.

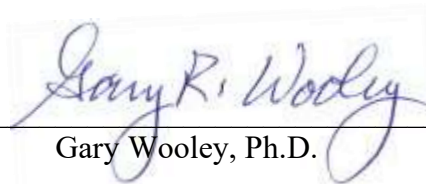
N. Conclusions on Invalidity

218. For the reasons described above the Challenged Claims of the '122 Patent are invalid because most are anticipated by Bebak, and the remaining claims would have been obvious based on Bebak, as well as a combination of Bebak and Forehand or Bebak and HTB.

Declaration of Gary Wooley, Ph.D. Regarding U.S. Patent No. 10,794,122

219. I declare under the penalty of perjury that the foregoing is true and correct.

Dated: June 29, 2023.



Gary Wooley, Ph.D.

EXHIBIT A

Technical Resumé for Gary R. Wooley

Personal

Born New Orleans, Louisiana
Married with three children, three grandchildren
Member, director, board member or officer of
various educational, civic, and religious
organizations



Education

Louisiana State University:

BS: Mechanical Engineering, January 1969

MS: Engineering Mechanics, May 1970

PhD: Engineering Science, December 1972, with Minors in
Applied Mathematics and Mechanical Engineering

Honors: NSF Fellow, LSU Dissertation Fellow, Dean's List, Phi
Kappa Phi (Phi Beta Kappa), Sigma Xi, Tau Beta Pi, Pi
Tau Sigma

Various Petroleum Professional Short Courses

Technical Experience

1966-68	Shell Oil and Chevron Oil - Summer Engineer
1969	Humble Oil (Exxon) - Offshore Field Engineer
1969-72	Louisiana State University - Instructor
1972-78	Atlantic Richfield Co. - Senior Research Engineer
1978-86	Enertech Engineering - Vice President
1986-Present	Wooley & Associates, Inc. - President

Professional

ASME, SPE, API, ASM: Member, Invited Speaker, Technical
Committee Chairman, Standardization Committees.

Registered Professional Engineer in State of Texas 40049
Registered Professional Engineer in State of Oklahoma 31627
Numerous publications in professional literature
Advisory Council for LSU Dean of Engineering
2010 LSU Engineering Hall of Distinction
2010 LSU ME Alumni Achievement Lecture Club
2020 LSU Alumni Association HOD and Alumnus of the Year
Listed in various publications of Who's Who

28 June 2023

EXHIBIT B

Recent Wooley Testimony

28 June 2023

The following list of recent testimony by Gary R. Wooley is compiled from available information. It is possible there may be additional testimony not included in this list:

1. 5/8/2019 deposition, Houston, Texas, Smith International, Inc. (Michele Replogle, Winston & Strawn) vs. Baker Hughes, A GE Company, LLC, No. 16-56-ER, U. S. District Court for the District of Delaware.
2. 10/2/2019 deposition, Houston, Texas, and 1/23/2020 trial, McAlester, Oklahoma, Julie Smith, et al, vs. National Oilwell Varco, LP, et al (Robert Gum, Gum, Puckett, Kevin Leyendecker, AZA), No. CJ-2018-60, District Court of Pittsburg County, State of Oklahoma.
3. 10/17/2019 deposition, and 3/4/2020 trial, Houston, Texas, Daewoo International (America) Corp., vs. Atlas Tubular, LLC and Atlas Tubular, LP (Tim Hightower, Hightower - Capellan), No. 2015-68733, 113th Judicial District Court of Harris County, Texas.
4. 10/31/2019 deposition, Houston, Texas, Ultra Premium Services, LLC (Erik Hawes, Morgan Lewis) vs. OFS International, LLC, et al, No. 4:19-cv-2277, U. S. District Court for the Southern District of Texas, Houston Division.
5. 2/21/2020 deposition, Houston, Texas, Nitro Fluids, LLC vs. Cameron International Corporation (William Logan, Winston), No. IPR2019-00852, Patent 9,932,800, US PTO, PTAB.
6. 10/22/2020 hearing, 12/17/2020 deposition, 3/4/2021 deposition, 3/8/2021 hearing, 4/19/2021 trial, Houston, Texas, FMC Technologies, Inc. (Weining Bai, AZA) vs. Richard Murphy and Dril-Quip, Inc., No. 2020-63081, 127th Judicial District Court of Harris County, Texas.
7. 4/27/2021 deposition, Tubular Rollers, LLC, et al, (Phil Free, Phillip Free Law) vs. Maximus Oilfield Products, LLC, et al, No. 4:19-cv-03113-ASH-FHS, U. S. District Court for the Southern District of Texas, Houston Division.

8. 5/11/2021 deposition, 9/7/2021 and 9/8/2021 trial, Houston, Texas, Hunting Energy Services, Inc. (Brandon Renken, Locke Lord) vs. Borusan Mannesmann Pipe, U.S., Inc., No. 2020-38984, 80th Judicial District Court of Harris County, Texas.
9. 5/19/2021 deposition, Houston, Texas, Enventure Global Technology, Inc. (Lisa Meyerhoff, Seyfarth Shaw) vs. Weatherford U.S. L.P., et al, No. 4:19-cv-02397, U. S. District Court for the Southern District of Texas, Houston Division.
10. 7/22/2021 deposition, Houston, Texas, Forum US, Inc. vs. Odessa Separator, Inc. (Jeff Tinker, Bell Nunnally & Martin), No. 6:20-cv-00150-ADA, U.S. Western Dist. of Tx., Waco Division.
11. 9/2/2021 deposition, Houston, Texas, Dynaenergetics Europe GMBH, et al, vs. SWM International, LLC (Erik Hawes, Morgan Lewis), No. 3:21-cv-00192-G, U. S. District Court for the Northern District of Texas, Dallas Division.
12. 9/16/2021 deposition, Houston, Texas, Weatherford US LP vs. Enventure Global Technology, Inc. (Lisa Meyerhoff, Seyfarth Shaw), Inter Partes Review No. IPR2020-01648 on Patent No. 7,290,616, USPTO before the Patent Trial and Appeal Board, regarding declaration in Inter Partes Review No. IPR2020-01684 on Patent No. 7,240,729, and Inter Partes Review No. IPR2020-01700 on Patent 6,892,819.
13. 9/21/2021 deposition, Houston, Texas, Enventure Global Technology, Inc. (Lisa Meyerhoff, Seyfarth Shaw) vs. Weatherford US LP, Civil Action No. 4:19-cv-02397, U.S. District Court for the Southern District of Texas, Houston Division, regarding declaration in Inter Partes Review No. IPR2020-01648 on Patent No. 7,290,616, and Inter Partes Review No. IPR2020-01580 on Patent No. 6,409,175.
14. 11/2/2021 deposition, Houston, Texas, Weatherford US LP vs. Enventure Global Technology, Inc. (Lisa Meyerhoff, Seyfarth Shaw), Inter Partes Review No. IPR2020-00107 on Patent No. 6,604,763, USPTO before the Patent Trial and Appeal Board.
15. 12/9/2021 deposition, Houston, Texas, U.S. Well Services, LLC vs. VoltaGrid LLC, Nathan Ough (Erik Hawes, Morgan Lewis), Certarus (USA) Ltd., and Jared Oehring, Case No. 4:21-cv-3441, U.S. District Court, Southern District of Texas, Houston Division.

16. 3/15/2022 deposition, Houston, Texas, SWM International (Erik Hawes, Morgan Lewis), et al, petitioner vs. DynaEnergetics Europe GmbH, patent owner, Case No. PGR2021-00097, Patent 10,844,697, U. S. Patent and Trademark Office, Before the Patent Trial and Appeal Board.
17. 3/29/2022 deposition, Houston, and 8/25/2022 trial, Waco, Texas, NCS Multistage Inc., et al vs. TCO AS (Jonathan Spivey, Posinelli), Case No. 6:20-cv-00622-ADA, U. S District Court for the Western District of Texas, Waco Division.
18. 12/7/2022 deposition, Houston, Texas, Kerr Machine Co., vs. SPM Oil & Gas, et al, (T. J. Gohn, McGuire Woods), Case No. 4:21-cv-1191-O, U. S. District Court for the Northern District of Texas, Fort Worth Division.
19. 1/24/2023 deposition, Houston, Texas, COG Operating LLC vs. Borusan Mannesmann Pipe, and Hunting Energy Services, Inc. (Darryl Vereen, Mounce Green), Case No. CV57699, 441st Judicial District, Midland County, Texas.
20. 6/5/2023 deposition, Houston, Texas, US Well Services, Inc. (Rich McCarty, Winston & Strawn LP) vs. Halliburton Company and Cimarex Energy Co., Case No. 6:21-cv-367-ADA, US District Court, Western District of Texas, Waco Division.