

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

PETITION FOR INTER PARTES REVIEW

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I. INTRODUCTION

Petitioners respectfully request *Inter Partes* Review (“IPR”) of U.S. Patent No. 10,794,122 (“the ’122 Patent”) (EX1001) and the cancellation of claims 1, 4-13, and 15-19 (the “Challenged Claims”) under 35 U.S.C. §§ 102 and/or 103. The ’122 Patent claims a releasable connection for a downhole tool string that has been widely known for many years. This Petition presents two prior art patents and a technical brochure that anticipate or render obvious every Challenged Claim. The claimed invention is not new and nonobvious, and the Challenged Claims should be held unpatentable.

II. COMPLIANCE WITH REQUIREMENTS FOR A PETITION FOR *INTER PARTES* REVIEW

A. Certification the ’122 Patent May Be Contested by Petitioners

Petitioners certify they are not barred or estopped from requesting *inter partes* review of the ’122 Patent. Neither Petitioners, nor any party in privity with Petitioners, has filed a civil action challenging the validity of any claim of the ’122 Patent. *See* 35 U.S.C. § 315(a). The ’122 Patent has not been the subject of a prior *inter partes* review by Petitioners or a privity of Petitioners. Petitioners also certify this Petition for *inter partes* review is filed within one year of the date of service of a complaint alleging infringement of the patent, September 28, 2022. Further, the ’122 Patent was issued on October 6, 2020, which is more than nine months prior

to the date of this Petition. Petitioners therefore certify this patent is available for *inter partes* review.

B. Fee for *Inter Partes* Review (§ 42.15(a))

The Director is authorized to charge the fee specified by 37 CFR §42.15(a) to Deposit Account No. 50-1597.

C. Mandatory Notices (§ 42.8(b))

1. Real Party-in-Interest (§ 42.8(b)(1))

The real parties in interest of this Petition are: Wellmatics, LLC; GR Energy Services, LLC;¹ GR Energy Services Management, LP; GR Energy Services Operating GP, LLC; and GR Wireline, L.P.

2. Related Matters (§ 42.8(b)(2))

The '122 Patent issued on October 6, 2020, and is the subject of a 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.

3. Lead and Backup Counsel (§ 42.8(b)(3))

Lead Counsel is Joseph A. Micallef (Reg. No. 39,772), GRESidleyTeam@sidley.com, (202) 736-8492.

¹ GR Energy Services, LLC is being listed here because it was named as a defendant in the related lawsuit by Patent Owner, but it was a defunct entity prior to that lawsuit.

Backup Lead Counsel is Phillip M. Aurentz (*pro hac vice* motion to be filed), GRESidleyTeam@sidley.com, (214) 981-3399.

Service on Petitioners may be made by mail or hand delivery to: Sidley Austin LLP, 1501 K Street, N.W., Washington, D.C. 20005. The fax number for lead and backup counsel is (202) 736-8711.

D. Proof of Service (§§ 42.6(e) and 42.105(a))

Proof of service of this Petition is provided in **Attachment A**. Petitioners consent to service by electronic mail to lead and backup counsel at the e-mail addresses listed above.

III. IDENTIFICATION OF THE CLAIMS BEING CHALLENGED

Claims 1, 4-13, and 15-19 of the '122 Patent are unpatentable as follows:

Ground	Claims(s) Challenged	35 U.S.C. §	References/Basis
1	1, 5, 6, 13, 17, 18	102	Bebak
2	4, 19	103	Bebak
3	1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 16, 18, 19	103	Bebak, Forehand
4	15	103	Bebak, Hunting Titan Brochure

Petitioners' evidence relied upon and the precise reasons why the claims are unpatentable are discussed below. The evidence relied upon in this Petition is listed in **Attachment B**.

IV. RELEVANT INFORMATION CONCERNING THE CONTESTED PATENT

A. Background and Technology

1. Oil and Gas Completion Generally

The technology at issue in this case involves releasable connections 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 based on the characteristics of the formation and well. EX1002 (Decl. of Gary Wooley), ¶ 16.

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.” 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 that the wellbore and the formation are separated by steel and cement, 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 must be perforated. *Id.*, ¶ 17.

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 wellbore 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. *Id.*, ¶ 18.

B. Release Tools

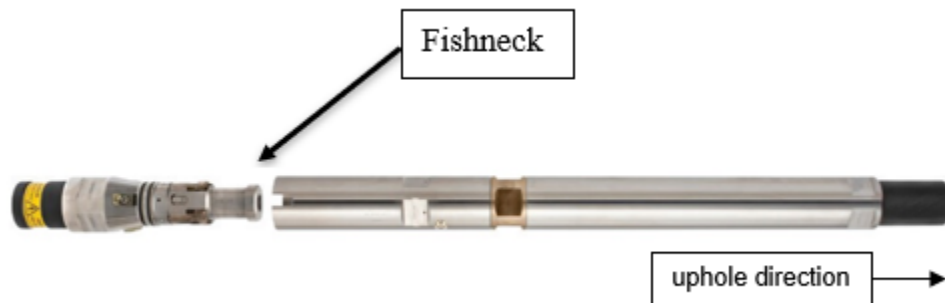
The process described above can be accomplished by sending a tool string of perforation guns downhole by way of a wireline that is fed down the hole by a wireline truck. However, in any well, there is the potential that the tool string can get stuck. If the tool string has been run with a releasable connection, the operator can activate the releasable connection, 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. *Id.*, ¶ 19.

Ideally, the releasable connection is never used, but if 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.

Id., ¶ 20.

A releasable connection can be designed so that, when activated, it will leave behind an attachment point that can be grabbed and easily fished out of the well. As seen in the tool depicted below (a 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. *Id.*, ¶ 21.



C. Effective Filing Date of the '122 Patent

The '122 Patent was filed on Aug. 30, 2017 and issued on Oct. 6, 2020. EX1001, Face. It claims priority to a provisional application filed on Aug. 30, 2016 (No. 62/381,083, "083-Provisional"). EX1003, Face. In co-pending district court litigation, Patent Owner has claimed entitlement to the date of the 083-Provisional. EX1017, 3. The prior art references relied on in this Petition were published before the 083-Provisional's filing date of August 30, 2016 and before any public disclosure by the inventor of the '122 Patent. Therefore, the references

relied upon in this Petition are prior art under the America Invents Act (which governs the '122 Patent). 35 U.S.C. § 102(a).

D. Person of Ordinary Skill in the Art

A person of ordinary skill in the art at the time of filing of the '122 Patent (“POSA”) falls generally within the skill level of a person with either: (1) a B.S. 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. EX1002, ¶ 24.

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.
- 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.

- It was well known that downhole tools can have internal cavities and outer housings.
- 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.
- Combustion and hydraulics are interchangeable ways of actuating releasable connections.
- Threaded concentric connections are the way tool strings are created.
- Concentric electrical connections were ubiquitous and well known ways to transfer electricity to downhole tools.
- Radially expanding collets were well known.

Id., ¶ 25.

E. Overview of the '122 Patent

The '122 Patent describes a specific implementation of a downhole releasable connection. The releasable connection of the '122 Patent is described in the Abstract 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.

EX1001, Abstract.

Independent Claim 13 is an example of the claimed releasable connection:

13. A releasable connection for a downhole tool string, comprising:

a first part comprising an external connection profile; and

a second part comprising:

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;

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;

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

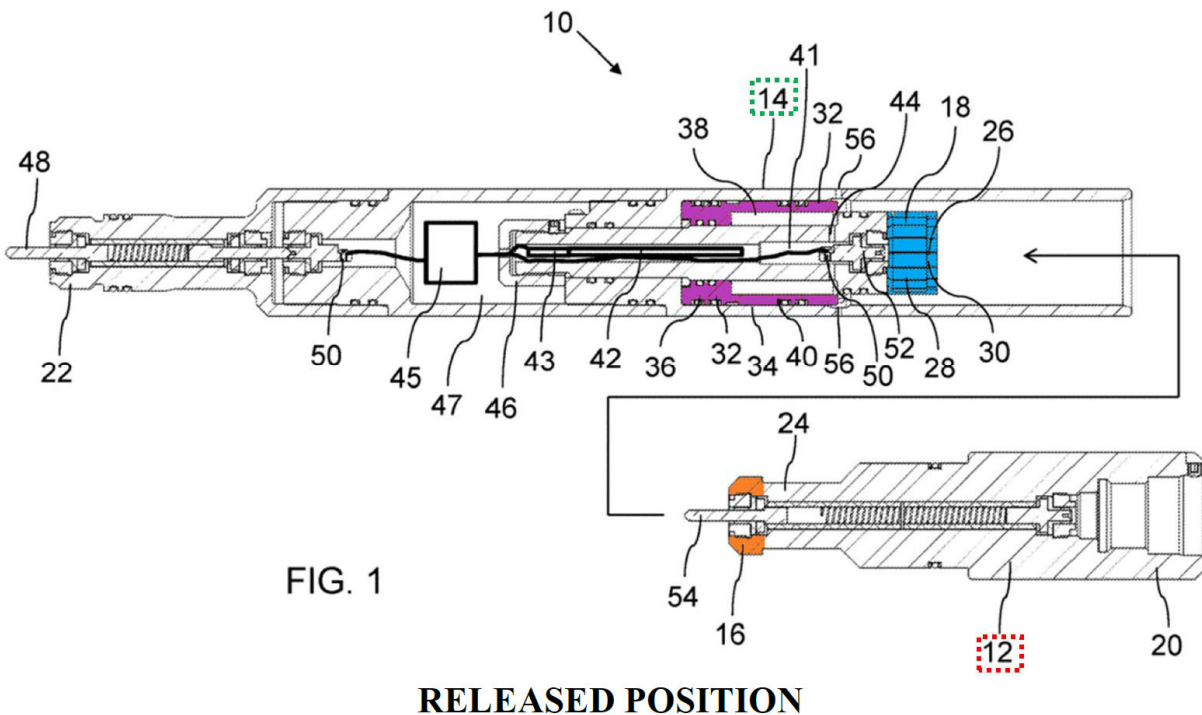
a source of fluid pressure in communication with the expansion chamber, wherein, upon activation, the source of fluid pressure is configured to apply fluid pressure to move the locking piston from the locking position toward the release position,

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.

Id., 6:41-7:4.

Independent Claim 1 is nearly identical to Claim 13, but omits the electrical connection limitation and adds the limitation of the second part comprising “an outer housing.” *Id.*, 5:16-40. Independent Claim 7 is similar to Claim 13, but it too omits the electrical connection limitation and requires a “combustible disposed within the expansion chamber” instead of a “source of fluid pressure in communication with the expansion chamber.” *Id.*, 5:60-6:15.

Figure 1, color annotated below, shows the characteristics identified in Claim 13. The releasable connection 10 is shown in its “released position,” where a first part 12 (red box) is separated from a second part 14 (green box).



Id., Fig. 1 (annotated). The first part 12 may be connected to the upper end of a gun string via connector 20, and the second part 14 may be coupled to a wireline via connector 22, such that separation of the first and second parts releases the gun string from the wireline. *Id.*, 2:59-62, 3:10-11. The first part 12 has a connection profile 16, which is designed to be received within releasable engagement profile 18 of the second part 14. *Id.*, 2:56-59. The engagement profile 18 is an outwardly-spring biased collet with resilient fingers 18 and the connection profile 16 is a lip that extends radially around fishneck 24 such that the collet can grab the lip. *Id.*,

3:3-5, 12-20. The releasable connection 10 is actuated from the lock position to the release position by axially shifting piston 32. *See, e.g., id.*, 1:28-34, 3:12-20. This actuation is further explained below.

Figure 3 depicts the releasable connection in the “locked position,” where the engagement profile 18 of the upper part 14 fully engages the connection profile 16 of the lower part 12 such that the two parts are secured together. *Id.*, 3:25-32. In the locked position (Figs. 2-3), the lower part’s electrode 54 contacts the upper part’s electrode 52 to provide an electrical pathway, which is severed in the release position (Fig. 1). More broadly, the upper and lower parts provide an electrical pathway (*see* Fig. 1) from electrode 48 at the top of upper part, through electrode 54 at the top of lower part, and through the lower part to the point where the tool string would be connected at tubing connector 20. *Id.*, 4:21-26. The electrical connection allows electrical signals to be communicated through the tool and to the gun string for gun activation. *Id.*, 4:12-36.

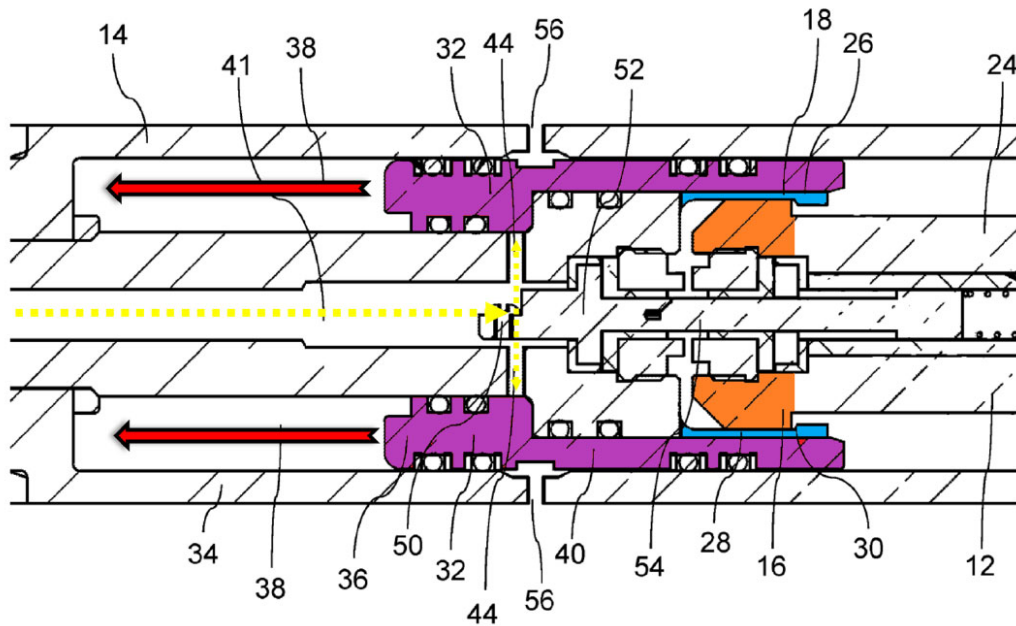


FIG 3
LOCKED POSITION

Id., Fig. 3 (annotated).

In the locked position, piston 32 forces the engagement profile into engagement with the connection profile. *Id.*, 3:25-29, 39-41. When the need arises to activate the releasable connection, an operator may send an electrical signal down to the releasable connection to cause combustible 42 (visible in Fig. 1) to combust, which creates fluid pressure (dashed yellow arrow) that enters ports 44 and then expansion chamber 38 to cause piston 32 to axially shift to the left (red arrows). *Id.*, 3:50-65.

This axial shifting of the piston allows for the engagement profile 18 (blue) to radially expand into the space previously occupied by the piston 32, thereby releasing the connection profile 16 and disconnecting the electrical connection

between the upper and lower parts, as shown in Figure 3 above. *Id.*, 4:42-46, 62-65. The wireline and second part can then be pulled to surface.

F. Prosecution History

The '122 Patent claims priority to the 083-Provisional. EX1001, Face. The application was initially rejected for being indefinite due to mixed apparatus and method claims. EX1004, 60. That same office action rejected all claims as either anticipated or obvious. *Id.*, 62-67. These rejections included a rejection over the Read prior art (EX1005), after which the Patent Owner chose to narrow its claims to overcome the prior art. EX1004, 62-67, 89-90. The Patent Owner amended the sole independent claim then pending as well as many of the dependent claims and presented argument in support of allowance. *Id.*, 89-90, 96-97. The examiner then rejected the claims again on anticipation and obviousness grounds, but advised that if some of the dependent claims were re-written in independent form, that they would be allowed. *Id.*, 101-03. The Patent Owner amended the claims again pursuant to the examiner's advice, added two more independent claims and various dependent claims, and argued for allowance. *Id.*, 122-27. The application was then allowed. *Id.*, 128-29.

G. Discretionary Denial is Inappropriate

1. 35 U.S.C. § 325(d) Is Not a Basis for Denial

In *Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6 (PTAB Feb. 13, 2020) (precedential), the Board explained that a two-part framework is used to determine whether to exercise discretion under § 325(d), considering first, whether the same or substantially the same art or arguments were presented to the Office, and second, whether the Office materially erred in its patentability review. *Advanced Bionics*, IPR2019-01469, Paper 6 at 8. Discretionary denial is inappropriate under the *Advanced Bionics* framework because none of Bebak, Forehand, nor the Hunting Titan Brochure were considered by the Office during prosecution of the '122 Patent, nor substantially similar art. In turn, the arguments made in this Petition were not and could not have been considered previously during the examination of the '122 Patent.

H. Sotera Stipulation Renders Denial Under *Fintiv* Improper

Institution is consistent with the Director's recent guidance on applying the *Fintiv* Factors. EX1006 (providing guidance regarding *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (precedential)).

First, the merits of this Petition are “compelling” because the evidence presented—including a new independent anticipation challenge for almost every

independent Challenged Claim and compelling invalidity grounds for each remaining Challenged Claim— “would plainly lead to a conclusion that one or more claims are unpatentable by a preponderance of the evidence,” which “alone demonstrates that the PTAB should not discretionarily deny institution under *Fintiv*.” *Id.*, 3-5.

Second, upon institution, Petitioners will be bound by 35 U.S.C. § 315(e)(2) and will not pursue, in any parallel district court proceeding, any ground barred by that section. *See Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 at 18-19 (PTAB Dec. 1, 2020) (precedential as to Section II.A). This stipulation mitigates any concerns of duplicative efforts and potentially conflicting decisions, and is, by itself, sufficient for the Board to decline to deny the Petition under *Fintiv*. *Id.*, 19; EX1006, 7-8. Institution is proper in this case.

I. Claim Construction

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

² In the district court proceeding, Petitioners are also seeking a determination that “the connection profile of the second part” is indefinite as lacking antecedent basis and renders the claim ambiguous. However, for purposes of this IPR only, Petitioners will apply Patent Owner’s proposed construction for this term—which

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

The parties dispute the meaning of this claim term in the district court, but the dispute is irrelevant to the art presented in this Petition.

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.

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.

The collet mechanisms disclosed in the prior art used in all asserted invalidity grounds meets all three proposed definitions. For purposes of this Petition only and reserving all rights in the district court, Petitioners apply plain meaning in the analysis herein.

2. “source of fluid pressure”

The ’122 Patent makes clear that its operation is based on fluid pressure applying force to move the locking piston to the release position. The specification 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

is “the connection profile of the *first* part”—while reserving all rights to maintain its indefiniteness challenge in the district court.

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, a construction 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.” EX1002, ¶ 70.

In district court preliminary injunction proceedings, Patent Owner argued that the Challenged Claims exclude art like Bebak where hydraulic fluid is pressure pumped down from the surface. *See* EX1018, 4-5. This is legal error because the plain language of Claims 1, 13, and their dependents does not exclude such a configuration, and the specification describes “fluid lines that provide pressure from the surface” as an embodiment. EX1001, 3:53-58, 4:10; *Immunex Corp. v. Sanofi-Aventis U.S. LLC*, 977 F.3d 1212 (Fed. Cir. 2020) (“There is a strong presumption against a claim construction that excludes a disclosed embodiment.”); *see also Nobel Biocare Servs. AG v. Intradent USA, Inc.*, 903 F.3d 1365, 1381 (Fed. Cir. 2018); *In re Katz Call Processing Pat. Litig.*, 639 F.3d 1303, 1324 (Fed. Cir. 2011). Nor has Patent Owner ever identified any clear

definition or clear and unambiguous disclaimer that would justify departing from the ordinary meaning of the claim language.

Patent Owner has proposed that the term “source of fluid pressure” means “origin of fluid pressure.” EX1019, 1. As explained below, this 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. EX1002, ¶ 71.

The specification does not limit the “source of fluid pressure” to sources that actually create the fluid pressure at the desired location. In fact, the specification expressly precludes such a narrow interpretation of this term. 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. EX1002, ¶ 71.

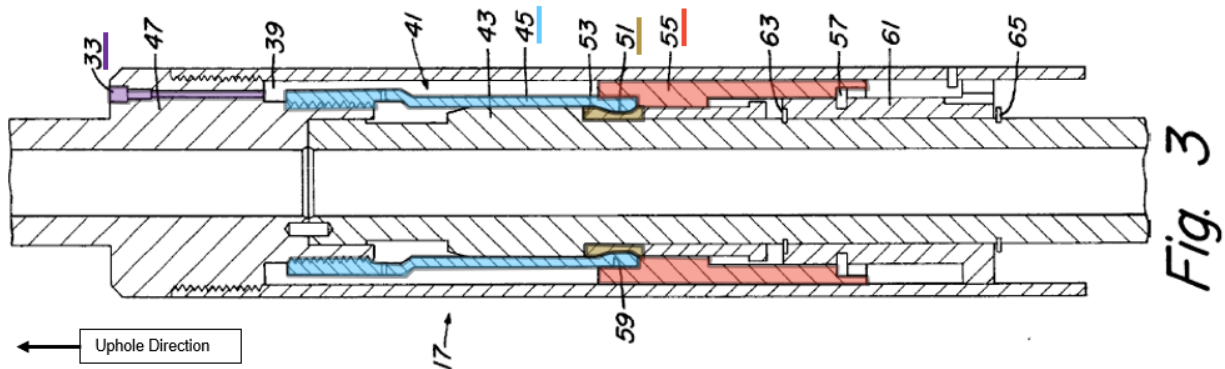
Petitioners submit that all other terms of the ’122 Patent should be given their plain and ordinary meaning.

V. THE PRIOR ART

A. Bebak (EX1007)

Bebak is U.S. Patent 6,571,879, filed by Baker Hughes Inc., naming Kenneth Bebak, John Mack, Earl Brookbank, and Don Cox as inventors. EX1007, Face. Bebak was filed on Nov. 8, 2000 and issued on June 3, 2003. *Id.*, Face. Bebak was published long before the earliest possible priority date of the '122 Patent, and is therefore prior art under 35 U.S.C. §102(a).

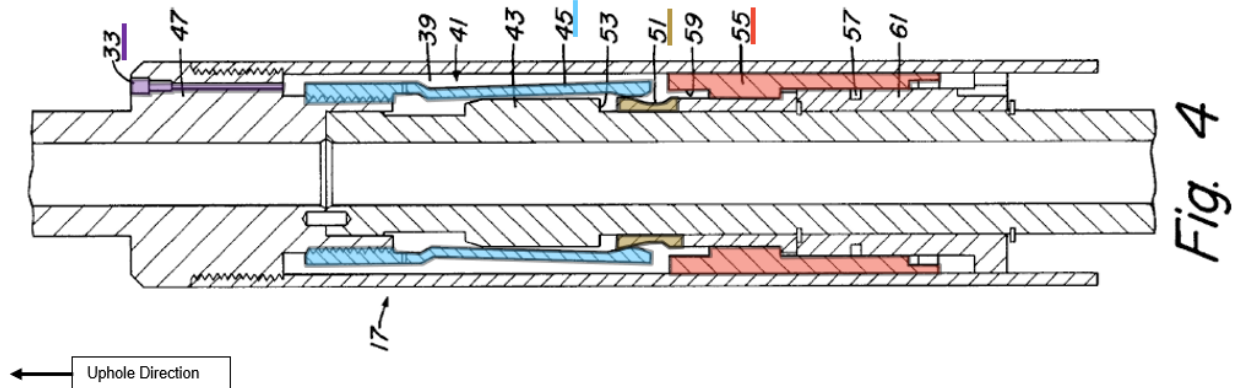
Bebak describes a releasable connection for a submersible pump assembly in an oil well. *Id.*, Abstract. As shown in Figure 3 below, in the locked position, a collet 45 engages with a groove on the pump assembly's fishing neck. *Id.*, 1:35-37, 2:43-48. The collet 45 is held down by a locking piston 55, and the locking piston 55 is held in place by shear pins 57. *Id.*, 1:38-39, 2:49-54.



Id., Fig. 3 (annotated).

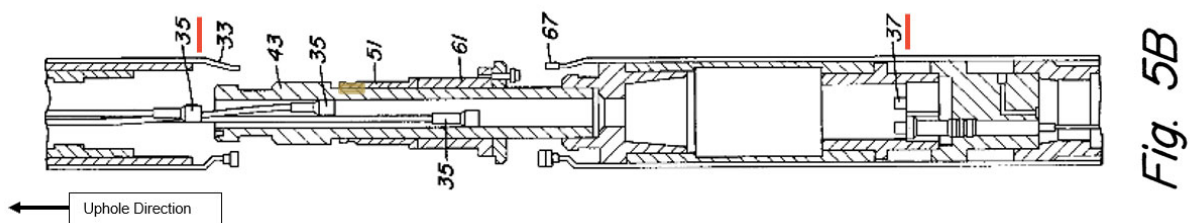
As shown in Figure 4 below, to activate the releasable connection, hydraulic fluid is pumped into “chamber” 39 via capillary tube 33. *Id.*, 2:58-60. The

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 adapter 17 can be pulled away. *Id.*, 2:64-3:3.



Id., Fig. 4 (annotated).

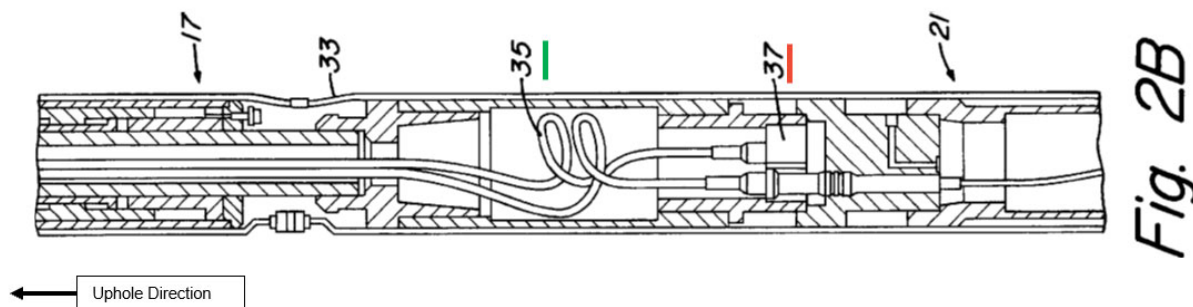
Figure 5B illustrates the retrievable pump assembly as the release adapter is pulled away. *Id.*, 2:19-21.



Id., Fig. 5B (annotated).

In Figure 2B below, Bebak also shows how electrical power is provided to the pump assembly. Bebak uses wires 35 that pass through the release adapter 17 down to a connector 37 on the upper end of pump 21. *Id.*, 2:38-40. The wires 35

are automatically disconnected when the releasable connection is disengaged, as shown above in Figure 5B. *Id.*, 2:67-3:4.



Id., Fig. 2B (annotated).

B. Forehand (EX1008)

“Forehand” issued as U.S. Patent 4,776,393, filed by Dresser Industries, naming Donald Forehand, Max Murray, and Thomas Ricles as inventors. EX1008, Face. Forehand was filed on Feb. 6, 1987 and issued on Oct. 11, 1988. *Id.*, Face. Forehand was published long before the earliest possible priority date of the ’122 Patent, and is therefore prior art under 35 U.S.C. §102(a).

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.*

C. Hunting Titan Brochure (EX1009)

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 is prior art under 35 U.S.C. § 102(a).

The Hunting Titan Brochure 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.

VI. PRECISE REASONS FOR RELIEF REQUESTED

The references analyzed below disclose the elements of the Challenged Claims as set forth below. Additional arguments that incorporate and build on that basic analysis, addressing arguments Patent Owner may raise, are also provided below.

A. Ground 1: Bebak Anticipation

1. Claims 1 and 13 Are Anticipated by Bebak

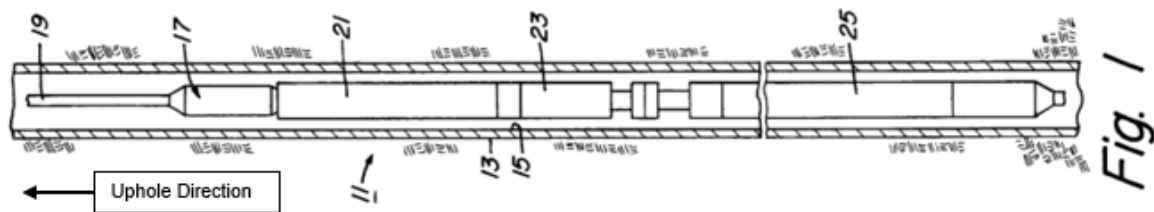
Claims 1 and 13 can be analyzed together as they share virtually every claim limitation, with Claim 1 adding an outer housing limitation that Claim 13 lacks, and Claim 13 adding additional electrical connection limitations that Claim 1 lacks. The analysis below will identify where there are differences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

- i. *Preamble: “A releasable connection for a downhole tool string, comprising:”*

The preamble of Claims 1 and 13 is not limiting because it recites an intended use, whereas the body of the claim recites the complete structure of the claimed apparatus without reliance on the preamble. *Pacing Techs., LLC v. Garmin Int’l, Inc.*, 778 F.3d 1021, 1023 (Fed. Cir. 2015). But to the extent the preamble were found to be limiting, Bebak discloses the preamble. EX1002, ¶ 91.

Bebak discloses a releasable connection that occurs between what Bebak refers to as release adapter 17 and the upper end of pump 21. *See, e.g.*, EX1007, 2:29-33. Indeed the title of Bebak is “Surface-actuated release tool for submersible pump assemblies”. *Id.*, Title [54]. Bebak discloses the preamble with its description of Figure 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. A motor 25 is mounted to seal section 23 and extends further down into the well bore.” *Id.*, 2:26-41.



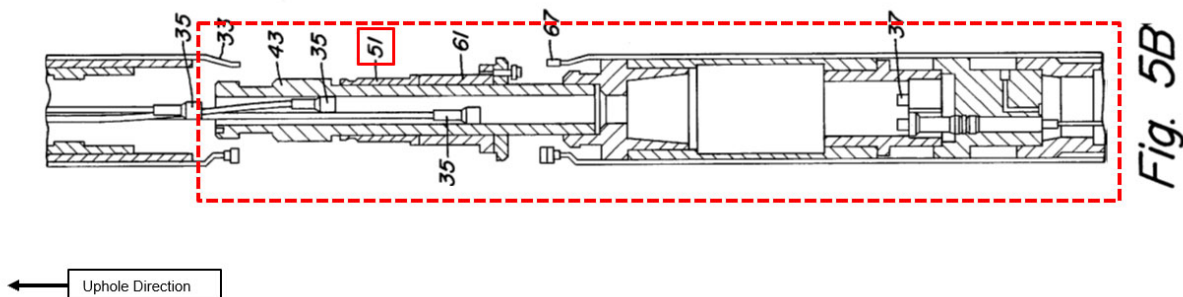
Id., Fig. 1.

- ii. “a first part comprising an external connection profile;
and”

Bebak discloses “a first part comprising an external connection profile.”

The external connection profile is outer profile 51 (solid red box) and the “first part” is shown in the dashed red box below. Just as shown in the ’122 Patent, the first part shown in the red dashed box below 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 43.” EX1007, 1:48-51; EX1002, ¶¶ 93-94. Moreover, Bebak makes clear in its specification that

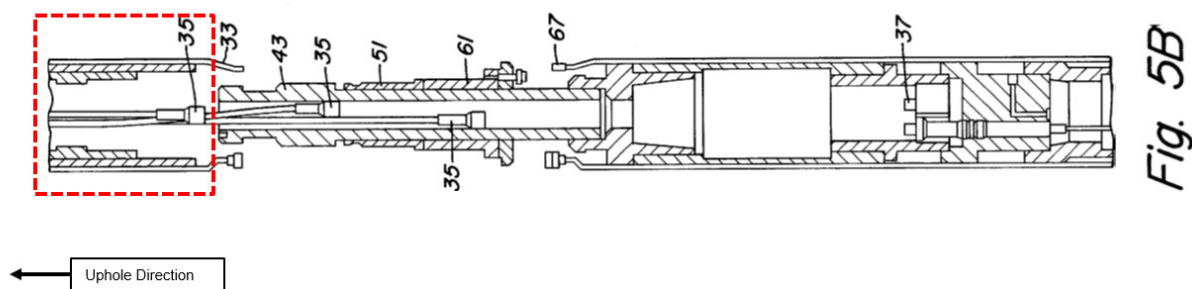
outer profile 51 is a connection profile because that is where the collet connects to the second part—“Collet 45 is latched in an outer profile 51 located on the exterior of neck 43 below a shoulder 53.” EX1007, 2:48-49; EX1002, ¶ 94.



EX1007, Fig. 5B (annotated).

iii. *“a second part comprising”*

Bebak discloses “a second part” that comprises the various elements that will be described subsequently. For example, Bebak Figure 5B below depicts a portion of the second part on the left (red dashed box).



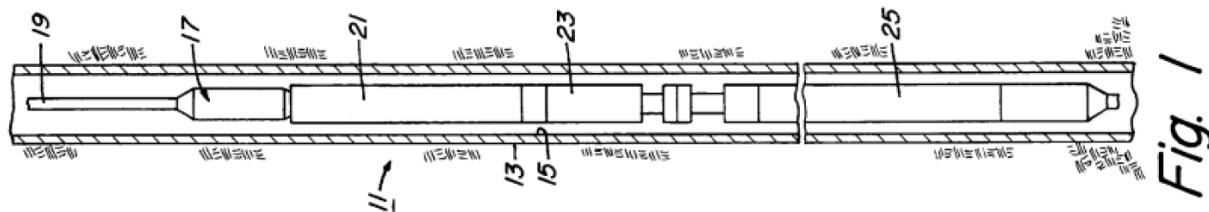
Id., Fig 5B (annotated).

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," a POSA would also consider the hydraulic pump to "comprise" the claimed "second part." *See id.*, Fig 5B; EX1002, ¶¶ 95-97.

iv. "an outer housing"

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. Bebak teaches an outer housing of the second part. For example, in Figure 1, release adapter 17 has a housing, and the other components of the tool string also have a housing. EX1002, ¶¶ 99-100.



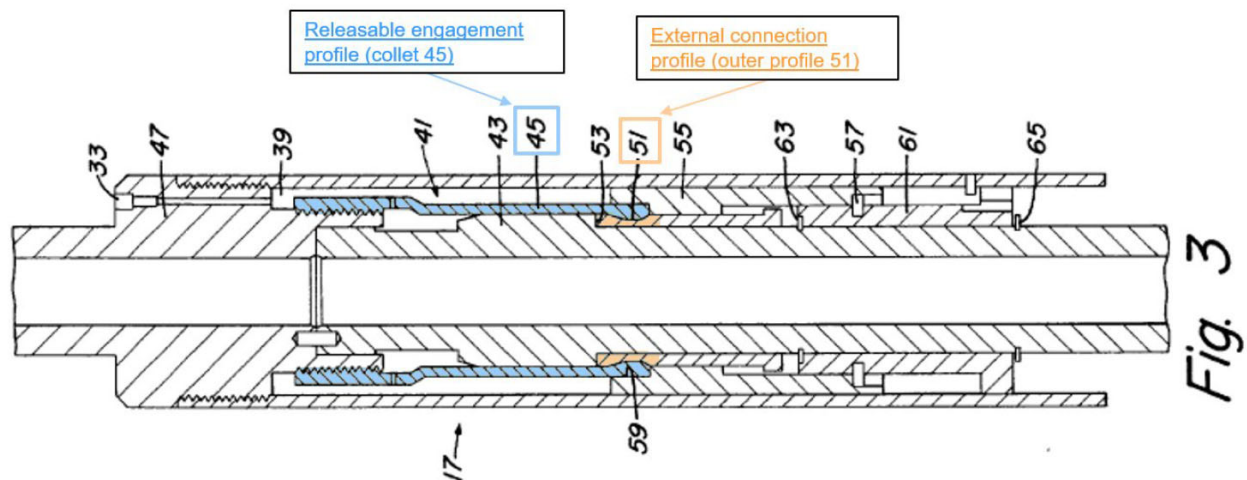
EX1007, Fig. 1.

The following description in 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.

- v. *“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”*

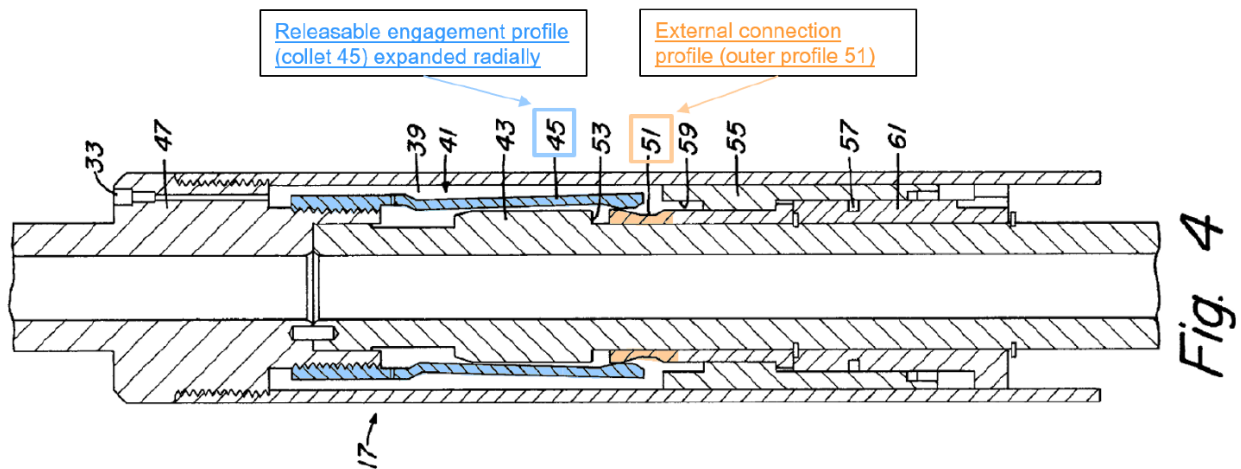
Bebak discloses a releasable engagement profile (e.g., collet 45) which internally engages the connection profile of the first part (e.g., outer profile 51, neck 43) and which is configured to expand radially to release the connection profile of the first part (e.g., comparing Figure 3 to Figure 4 shows collet 45 has expanded radially away from outer profile 51). EX1002, ¶¶ 102-06. As can be seen below in Figure 3, collet 45 is a releasable engagement profile that internally accepts outer profile 51 which is an external connection profile.



EX1007, Fig. 3 (annotated).

Bebak describes Figure 3 as follows: “As best shown in FIG. 3, a locking means or mechanism 41 is located in chamber 39 and is shown locked to a mandrel or fishing neck 43 at the upper end of pump 21. Locking mechanism 41 comprises a collet 45 that is threaded to and extends from the lower end of a tubular member 47. Collet 45 is latched in an outer profile 51 located on the exterior of neck 43 below a shoulder 53.” *Id.*, 2:43-49.

Figure 4 below shows the releasable connection in the release position and collet 45 is shown expanding radially to release outer profile 51.



Id., Fig. 4 (annotated).

Bebak describes Figure 4 as follows: “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 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 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.*, 2:58-67.

- vi. *“a locking piston [claim 1: 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;”*

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 discloses the corresponding element of Claim 13 and dependent Claim 18.

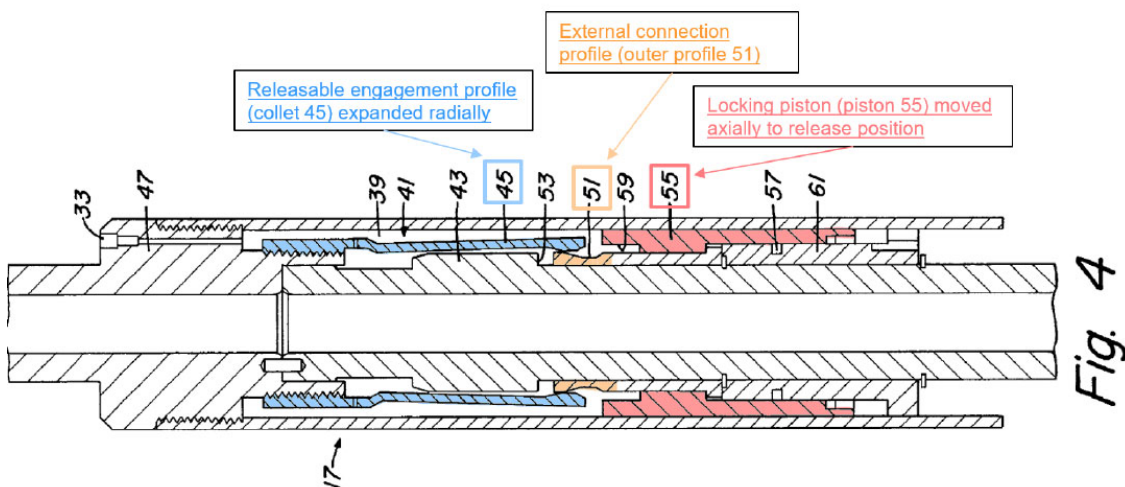
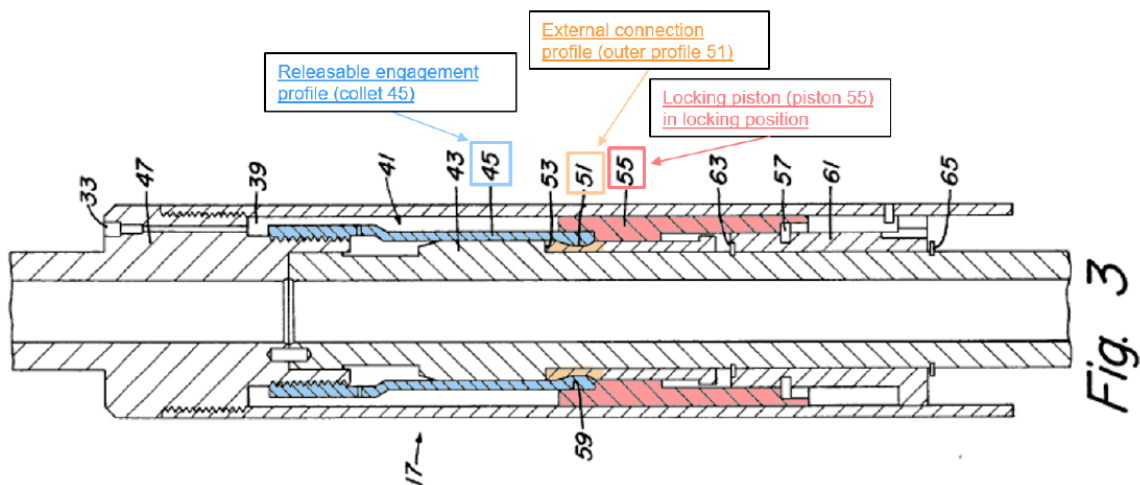
Bebak discloses a locking piston (e.g., piston 55) positioned within an internal cavity of the second part, the locking piston configured to move axially along the second part between a locking position (*see* Fig. 3) that directly constrains the releasable engagement profile (e.g., collet 45) into engagement with the connection profile (e.g., outer profile 51, neck 43) of the first part and a release position (*see* Fig. 4) that permits the releasable engagement profile (e.g., collet 45) to expand radially to release the connection profile (e.g., outer profile 51) of the second part. EX1002, ¶¶ 107-12.

Bebak succinctly describes this element, “. . . 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; wherein the lock member is actuated from a surface of the well; and the lock member comprises a collet that is located in a chamber and is movable between the locked and unlocked positions in response to a piston that is stroked from the surface.” EX1007, 4:21-32.

In reference to Figures 3 and 4 shown below, Bebak describes the collet being restrained by the piston, “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.*, 2:49-54. Bebak also describes how the collet attaches to the fishing neck when it is restrained by the piston, “The locking mechanism has a collet that is latched to the fishing neck. A piston captures the collet against the neck, and is restrained from movement by Shear pins.” *Id.*, 1:35-38.

Bebak describes how the disclosed releasable connection moves from the locked to the released position, “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 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 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.*, 2:58-67. The above description of the components in the locked and released positions is shown in the following annotated Figures 3 and 4:



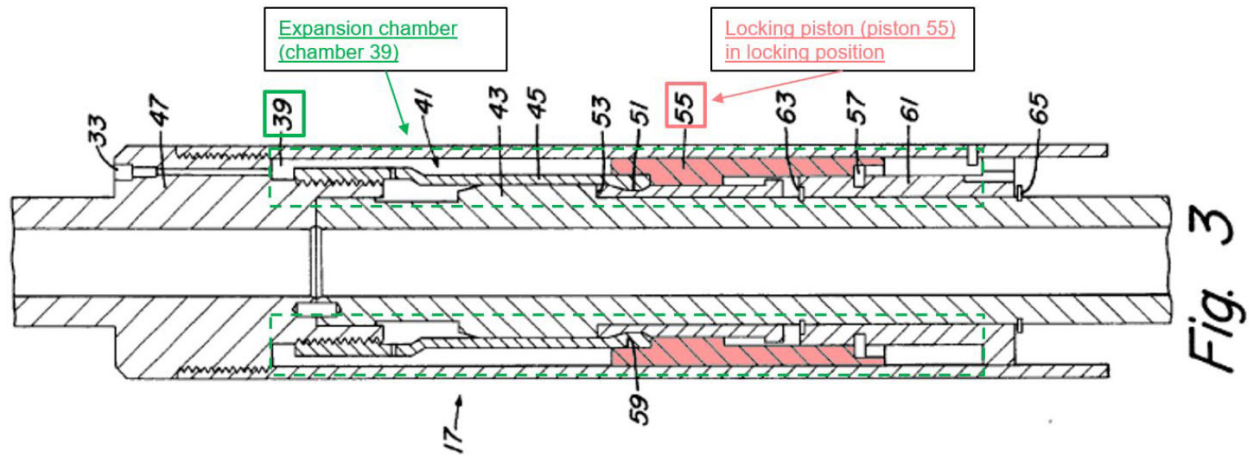
Id., Figs. 3-4 (annotated).

The above figures make clear that the “locking piston positioned within an internal cavity of the second part” element is satisfied by piston 55 being positioned inside a “chamber” inside the outer housing 17 (the second part) of the Bebak releasable connection.

vii. *“an expansion chamber in fluid communication with the locking piston; and”*

In the co-pending litigation, Patent Owner identifies the “expansion chamber” as “one or more volumes that fluid expands into.” EX1019, 1. This construction would include the space occupied by a locking piston, as well as the space behind, around, and in front of it, in the locked position.³ Utilizing Patent Owner’s reading of this element (which Petitioner does throughout), Bebak discloses an expansion chamber (e.g., chamber 39 – green dashed box) in fluid communication with a locking piston (e.g., piston 55). EX1002, ¶¶ 113-15.

³ Petitioners have disputed this construction in the district court, but apply Patent Owner’s broad view for purposes of this IPR only and reserve all rights to maintain its positions and objection in the co-pending litigation.



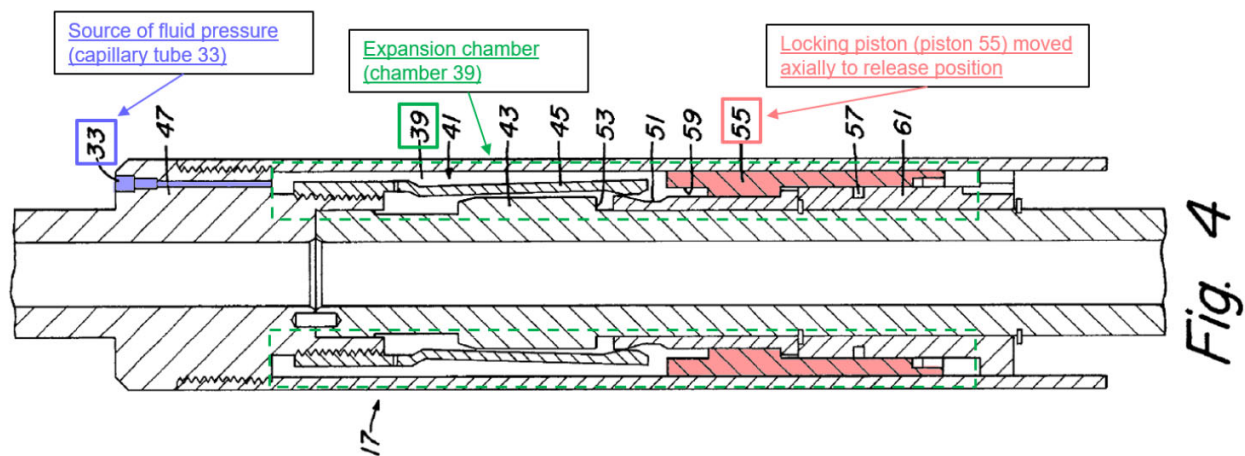
See, e.g., EX1007, Fig. 3 (annotated).

Bebak discloses that this expansion chamber is in fluid communication with the locking piston because fluid is transmitted from the surface, through the expansion chamber and to 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 39. When chamber 39 is pressurized, piston 55 strokes downward as shown and shears pins 57.” EX1007, 2:58-62; EX1002, ¶¶ 114-15.

- viii. *“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.”*

Utilizing Patent Owner’s reading of “expansion chamber” in this element (as Petitioner does throughout when that term is used), Bebak discloses a source of fluid pressure (e.g., capillary tube 33 or, alternatively, hydraulic pump with

capillary tube 33) in communication with the expansion chamber (e.g., chamber 39, (green dashed boxes)), wherein, upon activation (e.g., the pumping of hydraulic fluid through capillary tube 33 to chamber 39), the source of fluid pressure (e.g., capillary tube 33 or, alternatively, hydraulic pump with capillary tube 33) is configured to apply fluid pressure to move the locking piston (e.g., piston 55) from the locking position (*see* Fig. 3) toward the release position (*see* Fig. 4). EX1002, ¶¶ 116-20.



See, e.g., EX1007, Fig. 4 (annotated).

Bebak describes this element in numerous locations in its disclosure. In addition to Bebak at 2:58-62 as quoted above, Bebak also states, “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.*, 1:39-44.

As noted in the claim construction section, in district court Petitioners contend that the “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. 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.” EX1002, ¶ 121.

In district court proceedings, Patent Owner argued 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. This argument is legal error because, as explained in Section IV.I.2), it excludes a specification embodiment. EX1002, ¶ 122. It also fails because the hydraulic pump can also be viewed by a POSA as comprising the claimed “second part.” *Id.*

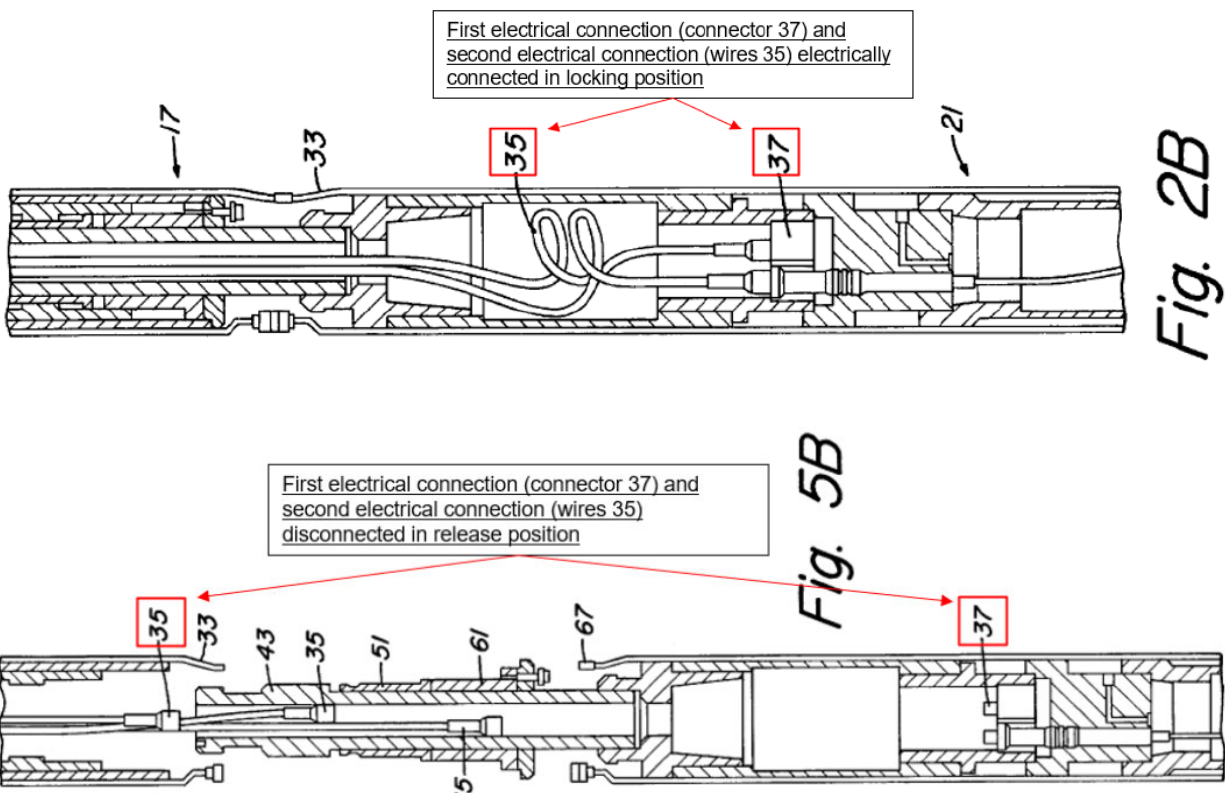
Patent Owner's position also contradicts the understanding of "source of fluid pressure" set forth in the prosecution history. During prosecution, the examiner found this element was disclosed by prior art that likewise used hydraulic pressure pumped from the surface through a fluid line. EX1004, 101-02 (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.

If this element is not found to be satisfied by Bebak, it would have been obvious to combine Bebak with Forehand as discussed below in ground 3 and thereby satisfy this claim element. EX1002, ¶ 124. 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.

- ix. *"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."*

This element is not present in Claim 1 of the '122 Patent but is in Claim 13. Bebak discloses wherein the first part carries a first electrical connection (e.g.,

connectors 37), and the second part carries a second electrical connection (e.g., wires 35), the first and second electrical connection being electrically connected when the releasable engagement profile (e.g., collet 45) of the second part engages the connection profile (e.g., outer profile 51) of the first part (*see* Fig. 2B), and becomes disconnected when the releasable engagement profile (e.g., collet 45) disengages the connection profile (e.g., outer profile 51) (*see* Fig. 5B). *Id.*, ¶¶ 126-33.



See, e.g., EX1007, Figs. 2B, 5B (annotated).

As can be seen above, the first and second electrical connections are carried by their respective first and second parts, which is evident in Figure 5B when those

connections remain with their respective first and second parts. Moreover, Bebak specifically describes this element when it describes what happens to the electrical connections when the Bebak releasable connection goes from the locked position to the release position. “With piston 55 in its lower position, the lower end of collet 45 is released from profile 59 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). 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.*, 2:62-3:4. 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).

In district court preliminary injunction proceedings, Patent Owner made multiple, incorrect arguments that Bebak does not meet this element. *See* EX1018, 5-6.

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.” *Id.* 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. EX1002, ¶ 132. 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.” EX1007, 1:33-38, 2:38-40, 43-45.

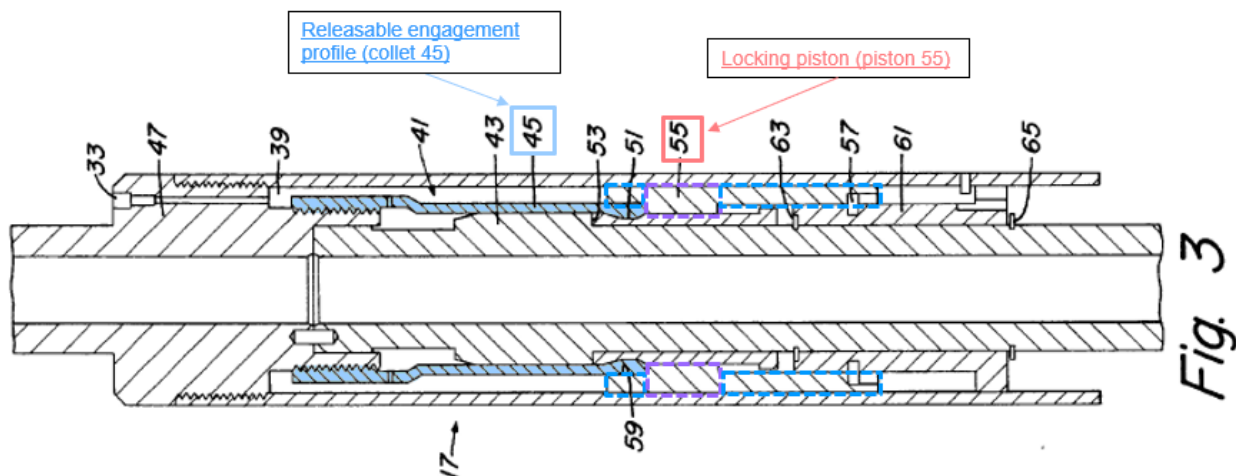
Patent Owner also argued that wires 35 (“second electrical connection”) and connector 37 (“first electrical connection”) do not meet this limitation because they are not electrically connected within the release adapter 17, and the claim supposedly requires the engagement of the two first and second electrical connection to occur within the “releasable connection.” EX1018, 6. This argument also fails. 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; EX1002, ¶ 133. 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. EX1002, ¶ 133.

2. Claims 5 and 17 Are Anticipated by Bebak

- i. *“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.”*

Dependent Claims 5 and 17 have identical language except for their respective reliance on either Claim 1 or Claim 13. Bebak discloses the added elements of Claims 5 and 17, 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. EX1002, ¶¶ 135-37.



See, e.g., EX1007, Fig. 3 (annotated).

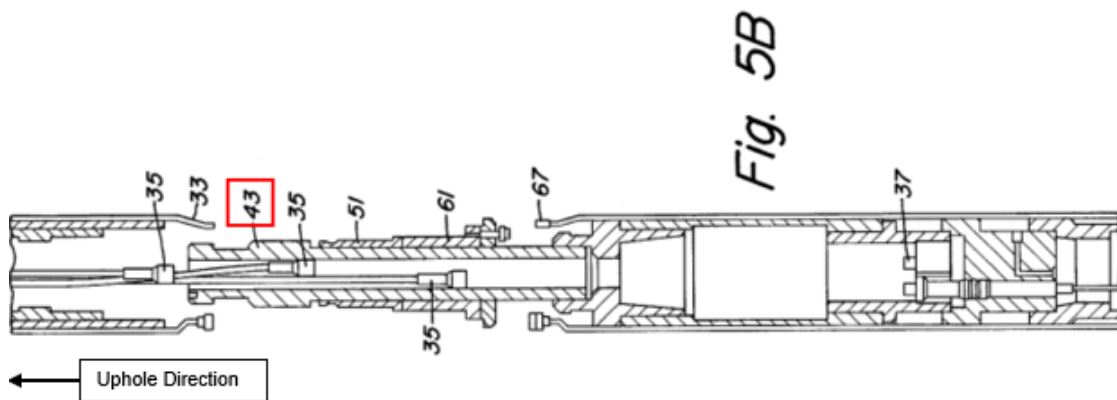
As shown above the piston and its function is described in Bebak, “Collet 45 is latched in an outer profile 51 located on the exterior of neck 43 below a shoulder 53. In FIG. 3, a piston 55 is shown in its upper position and restrained there from downward movement by (preferably) brass shear pins 57. 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.

This element is fully present in Bebak, but if the “source of fluid pressure” element is found not to be satisfied by Bebak, then this element would have been obvious based on the combination of Bebak and Forehand as described below in the discussion of Claim 7. EX1002, ¶ 138.

3. **Claim 6 Is Anticipated by Bebak**

- i. “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.”

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. EX1002, ¶¶ 139-41.



See, e.g., EX1007, Fig. 5B (annotated). Bebak discloses that “[a]fter 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 “unplugged assembly” is the disconnected second part and fishneck 43 is located on the first part as shown above.

This element is fully present in Bebak, but if the “source of fluid pressure” element is found not to be satisfied by Bebak, then this element would have been

obvious based on the combination of Bebak and Forehand as described below in the discussion of Claim 7. EX1002, ¶ 142.

4. Claim 18 Is Anticipated by Bebak

- i. *“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.”*

The “outer housing” limitation is contained in Claim 1 and addressed above at Section VI.A.1.iv. The “locking piston is positioned within an internal cavity of the second part” limitations is also contained in Claim 1 and addressed above at Section VI.A.1.vi.

This element is fully present in Bebak, but if the “source of fluid pressure” element is found not to be satisfied by Bebak, then this element would have been obvious based on the combination of Bebak and Forehand as described below in the discussion of Claim 7. EX1002, ¶ 146.

B. Ground 2: Bebak Obviousness (Single Reference)

1. Claims 4 and 19 Were Obvious Based On Bebak

- i. *“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.”*

Claims 4 and 19 depend from Claims 1 and 18 respectively and add this identical limitation. Bebak renders Claims 4 and 19 obvious when read with the knowledge of a POSA. EX1002, ¶¶ 148-55. As described above, Bebak discloses all of the elements of Claims 1 and 18, but Bebak is silent about the pressure equalization limitation added in Claims 4 and 19. *Id.*, ¶ 149. However, a POSA would have known to use pressure equalization ports opened by a locking piston to solve the known problem of pressure differentials in a releasable connection, and would have been motivated to do so for that reason. *Id.* A POSA would have found it obvious to employ that feature in Bebak, rendering Claims 4 and 19 obvious. *Id.*

The purpose and function of pressure equalization ports was well-known at the time and the inclusion of such ports in a releasable connection requires no more than the simple application of well-known mechanical engineering principles. *Id.*, ¶ 150. For example, pressure equalization and the use of pressure equalization ports is described in the Forehand reference described below which evidences that

this simple engineering principle would be familiar to a POSA. *Id.* Specifically, if the internal pressure of the releasable connection is lower than the wellbore pressure—as would be typical—the pressure differential can resist release, potentially preventing the tool from releasing. *Id.* 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. *Id.* That is basic mechanical engineering design. *Id.* The '122 Patent also recognizes this problem. 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.”).

Moreover, one of the named inventors, Mr. Golinowski, testified during the parties’ preliminary injunction proceedings that using pressure equalization ports to ensure a releasable connection equalizes and separates was a known idea. 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.” EX1011, 199:8-22; EX1002, ¶ 151.

Q. (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. (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.

EX1011, 199:8-22.

As Dr. Wooley explains, 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. EX1002, ¶ 152. 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. *Id.* It was known that these problems could be avoided by simply including pressure equalization ports. *Id.* Moreover, without a way to equalize pressure buildup within a releasable connections, the pressure can create a vacuum, binding the

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

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. *Id.*, ¶ 153. 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. *Id.*

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. *Id.*, ¶ 154. A POSA would also have been motivated because a POSA would have recognized that locking pistons ordinarily use O-rings to form pressure seals. *Id.*

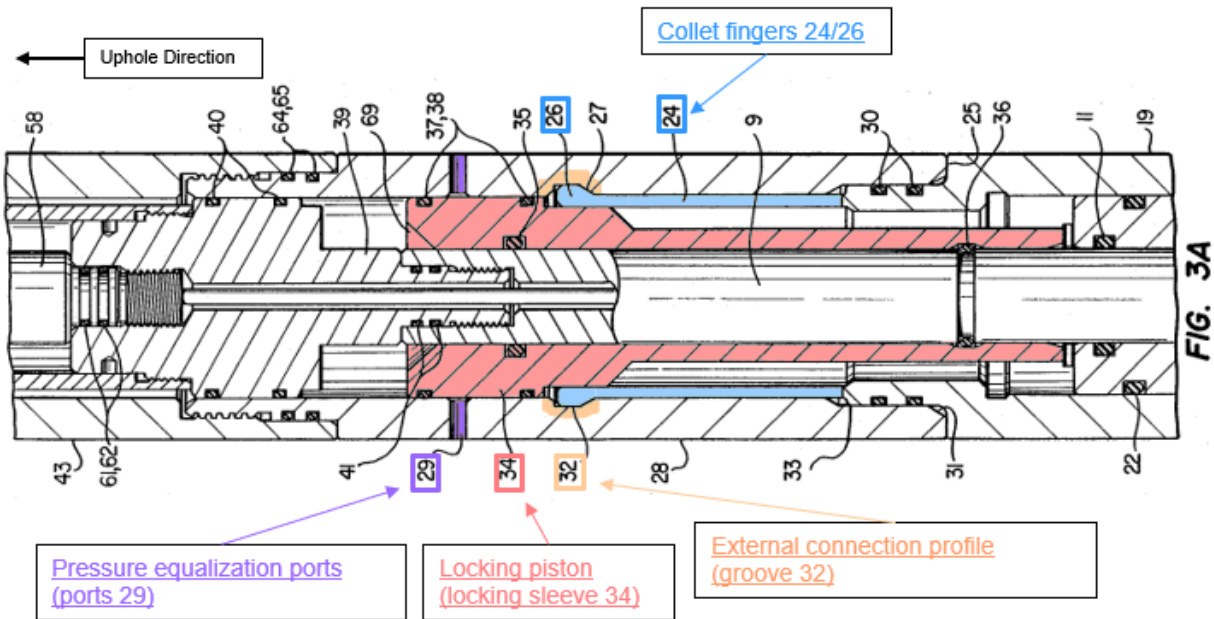
A POSA would have had a reasonable expectation of success because this was a highly predictable art, implementing the feature would be simple, and there would be no reason for a POSA to doubt success. *Id.*, ¶ 155. It also amounts to

using known prior art methods according to their established functions to yield predictable results. Thus, using the teachings in Bebak and the knowledge of a POSA, Claims 4 and 19 are obvious. *Id.*

C. Ground 3: Bebak and Forehand Obviousness

1. Claims 4 and 19 Were Obvious Based On Bebak Combined With Forehand

Forehand describes a downhole oilfield gun release system. In Forehand's design, the pressure of the gun firing activates a release mechanism. *Id.*, ¶ 157. This allows the gun to fall off the tool string down into the well. *See* EX1008, Abstract. As shown in Figure 3A below, Forehand's piston-collet 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. EX1002, ¶ 157; *see* EX1008, Fig. 3A, 6:14-23.



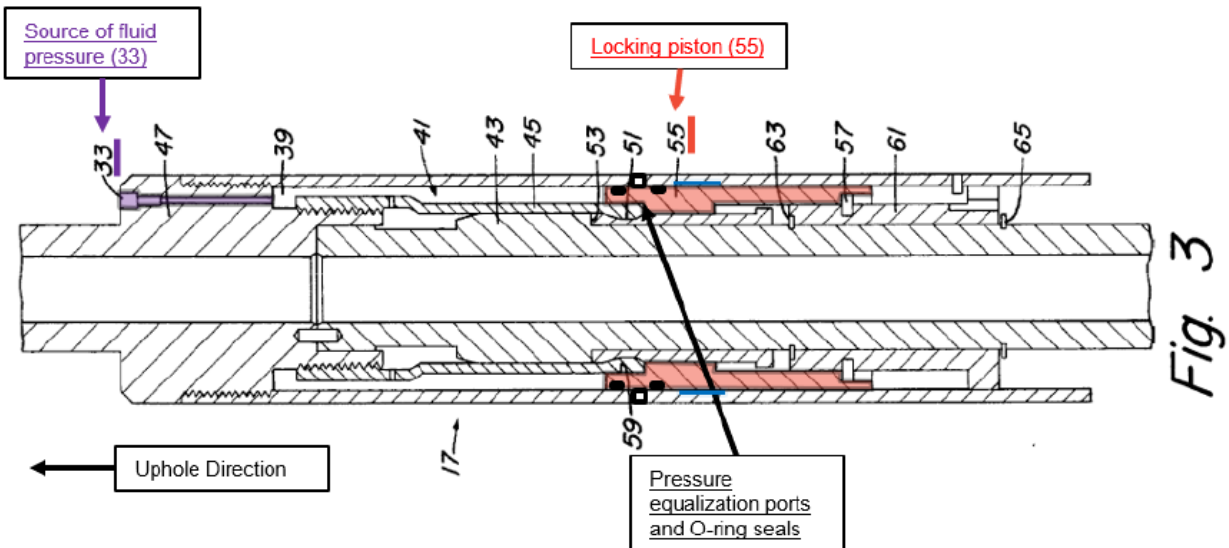
EX1008, Fig. 3A (annotated).

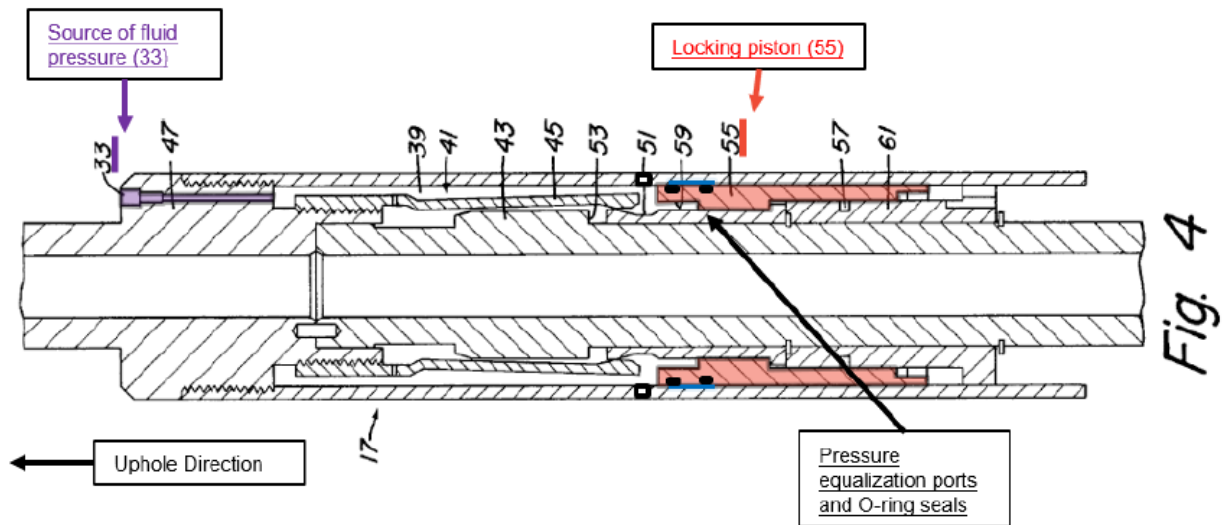
- i. *“The releasable connection of claim [1 or 18], wherein the outer housing of the second part comprises a pressure equalization ports, the locking piston configured to close the pressure equalization ports in the locking position, and open the pressure equalization ports in the release position.”*

As shown above, Bebak discloses all elements of Claim 18. But Bebak is silent about the pressure equalization ports of Claims 4 and 19. Forehand, however, discloses the pressure equalization mechanism contemplated by Claims 4 and 19. 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 Claims 4 and 19. EX1002, ¶ 158.

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. *Id.*, ¶ 159. 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 releasable connection and equalize it. *Id.* 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. *Id.*





EX1007, Figs. 3-4 (annotated).

Figure 3A of Forehand shows that ports 29 are spaced around the housing of the device. EX1008, Fig. 3A; EX1002, ¶ 160. These are pressure equalization ports. 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).

EX1002, ¶ 161; *see* EX1008, Fig. 3A; 7:5-13, 8:5-12. Forehand refers to the O-rings as seal members 37 and 38. EX1008, 4:28-29. When the gun explosion is set off, the sleeve 34 (locking piston) is pushed upwards into a release position.

Id., 5:63-67; EX1002, ¶ 161. 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). EX1008, 6:19-30, 8:10-12; EX1002, ¶ 161. This allows wellbore pressure to flood in through the pressure

equalization ports into the releasable connection, thereby equalizing pressure and facilitating tool release. EX1002, ¶ 161. 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.” EX1008, 6:23-34.

A POSA would have been motivated to modify Bebak for multiple reasons. EX1002, ¶ 163. First, Bebak and Forehand are analogous art and in the field of the ’122 Patent. Both involve releasable connections for downhole oilfield tools. *Id.* Thus, a POSA would have looked to both references when considering how to design releasable connections. *Id.* Second, a POSA would have recognized that modifying Bebak to use a pressure equalization port feature would reliably equalize pressure. *Id.*, ¶ 164. It would make Bebak’s design safer, more reliable, and cheaper, for several reasons. *Id.* As noted above in the discussion of obviousness based on Bebak alone (Section VI.B), 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 way to solve it. *Id.*, ¶ 165. The modification of Bebak, 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. *Id.*

The pressure equalization ports of Forehand provide equalization as Claims 4 and 19 contemplate—a locking piston that opens a hole in the device housing that is exposed to the wellbore. *Id.*, ¶ 166. 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. *Id.* Wellbore pressures are frequently above 10,000 PSI and can exceed 30,000 PSI. *Id.* The system of Bebak would have to apply an equal amount of pressure inside the releasable connection to neutralize the wellbore pressure. *Id.* Hydraulic systems are typically not built to operate above 10,000 PSI, and significantly more expensive pumping mechanisms are needed at higher pressures. *Id.* If the hydraulics do fail, it will typically occur at the surface and cause an unsafe situation for workers. *Id.*, ¶ 167. A hydraulic pump failure can expel high pressure

fluid along with the potential of deadly projectiles. *Id.* 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. *Id.* Which means now an operation would have to be undertaken to recover the stuck toolstring. *Id.*

A POSA would have recognized that these problems could be avoided by simply modifying Bebak as described, and would have been motivated to do so. *Id.*, ¶ 168. 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). *Id.* At that point, wellbore pressure would flood the releasable connection through the pressure equalization ports and equalize it to facilitate release. As a result, the releasable connection would operate more reliably, more safely, would require less and more predictable hydraulic pressure to release, and could utilize lower cost hydraulic systems that operate at lower pressure. *Id.*

The third reason a POSA would have combined Bebak and Forehand is that nothing would have discouraged combining their teachings. *Id.*, ¶ 169.

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. *Id.*, ¶ 170. Indeed, as described above, one of the '122 Patent inventors gave testimony regarding the known use of pressure equalization ports and the reasons for them that is consistent with this discussion. *Id.*

Finally, a POSA would have had a reasonable expectation of success in making this combination of Bebak and Forehand's features. Release tools are a long established and very predictable art, and the modification described is simple, involving no more than removing material from Bebak's housing and placing O-rings at the appropriate locations. *Id.*, ¶ 171. A POSA would have been confident in success of this approach. *Id.*

As seen from the discussion above about the obviousness of Claims 4 and 19 based on Bebak alone or Bebak combined with Forehand, Claims 4 and 19 were obvious. *Id.*, ¶¶ 148-71.

2. Claim 7 Was Obvious Based On Bebak and Forehand

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 in communication with the expansion chamber"

limitation from Claim 13 changes to a “combustible disposed within the expansion chamber” in Claim 7. Therefore, to address Claim 7, only a discussion of the combustible limitations is necessary. All of the other elements of Claim 7 (including the preamble) are fully discussed above in the analysis of Claims 1 and 13 in Ground 1, Section VI.A.1.i-vii. Specifically, refer to the discussion of Claims 1 and 13 for the following elements of Claim 7:

7. **(preamble)** A releasable connection for a downhole tool string, comprising: (*see supra* pp. 24-25)

(a) a first part comprising an external connection profile; and (*see supra* pp. 25-26)

(b) a second part comprising: (*see supra* pp. 26-27)

(c) 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; (*see supra* pp. 28-30)

(d) 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; (*see supra* pp. 30-33)

(e) an expansion chamber in fluid communication with the locking piston; (*see supra* pp. 33-34)

- i. *“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 reading of “expansion chamber” in this element (as Petitioner does throughout), 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.” EX1002, ¶ 176. 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; EX1002, ¶ 177. 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. EX1002, ¶ 177.

A POSA would also have been motivated because Forehand and Bebak both relate to releasable connections for downhole applications. *Id.*, ¶ 178. A POSA

would also have been motivated because the system of Forehand automatically releases gun strings when they fire, whereas Bebak's modified system has the advantage of releasing as desired (such as if the string were stuck) without firing the gun or if there were other tools but no gun. *Id.* 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. *Id.* It also amounts to using known prior art methods according to their established functions to yield predictable results. *Id.*

A POSA would also have been motivated to combine Forehand's combustible pressure feature 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. *Id.*, ¶ 179. A POSA would have viewed these as obvious design alternatives, each with certain advantages and disadvantages. *Id.* 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 releasable connection, but instead would allow for the releasable connection to be actuated by an electrical signal to detonate and release the

pressure from the combustible. *Id.* Such electrical detonation systems were well known in the art for both firing perforation guns and releasing tool strings. *Id.*

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. *Id.*, ¶ 180. 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 from basic physics principles. *Id.* Furthermore, under Patent Owner’s reading of the claims in district court, any path for pressure 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. *Id.* Moreover, all the reasons discussed for combining Bebak and Forehand discussed above in Section VI.C.1 apply equally here.

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. *Id.*,

¶ 181. A POSA would have been confident in the success of this approach. *Id.*

Thus, a POSA would understand that Claim 7 is obvious due to the combination of Bebak and Forehand. *Id.*

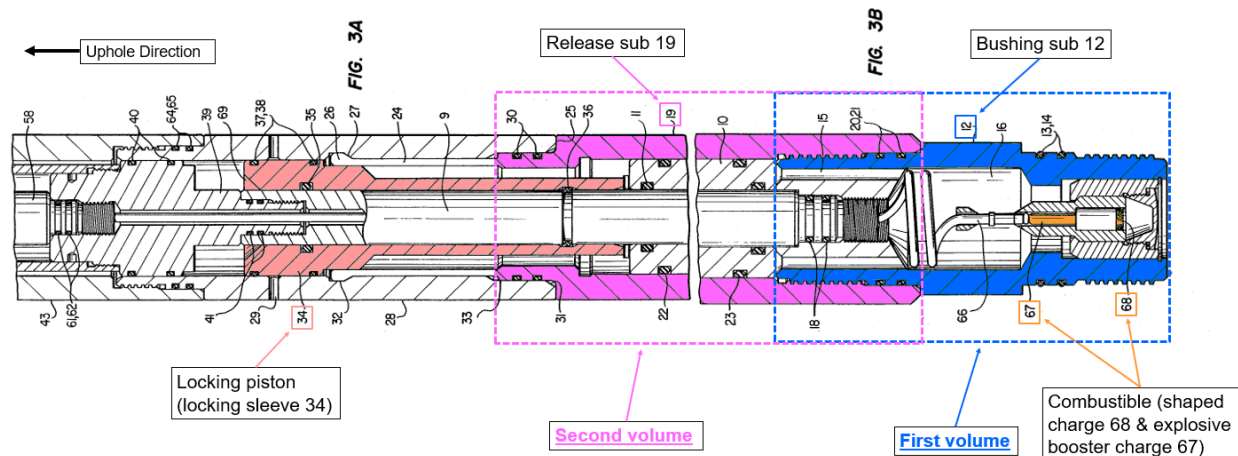
3. **Claim 8 Was Obvious Based On Bebak and Forehand**

- i. *“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.”*

Utilizing Patent Owner’s reading of “expansion chamber” in this claim, 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. *Id.*, ¶¶ 182-86. 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.” *Id.*, ¶ 184. 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. *Id.*

Moreover a review of the discussion and figures in Forehand shows the combustible as oriented as required by Claim 8. *Id.*, ¶ 185. For example, when the Forehand releasable connection 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 charges (combustibles) and the locking sleeve (locking piston). *Id.* 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.” EX1008, 2:15-20; EX1002, ¶ 185. The following annotated figures depict the two volumes and component locations in the Forehand releasable connection that meet all the elements of Claim 8:



EX1008, Figs. 3A-B (annotated).

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

EX1002, ¶ 186.

4. Claim 9 Was Obvious Based On Bebak and Forehand

- i. *“9. The releasable connection of claim 7, wherein the combustile is configured to be detonated by an electrical signal.”*

Applying the motivations already discussed with regard to Claim 7, a POSA would have combined Bebak and Forehand therefore rendering Claim 9 obvious.

Id., ¶ 189. 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.” EX1008, 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.*

5. Claim 10 Was Obvious Based On Bebak and Forehand

- i. *“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.”*

The elements added by Claim 10 also appear in Claim 1. As explained in Sections VI.A.1.iv & vi, Bebak discloses these elements. Therefore, the combination of Bebak and Forehand that renders obvious Claim 7 also renders obvious dependent Claim 10. EX1002, ¶ 192.

6. Claim 11 Was Obvious Based On Bebak and Forehand

- i. *“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.”*

The element added by Claim 11 also appears in Claims 5 and 17. As explained in Section VI.A.2.i, Bebak discloses this element. Therefore, the combination of Bebak and Forehand that renders obvious Claim 7 also renders obvious dependent Claim 11. *Id.*, ¶ 195.

7. Claim 12 Was Obvious Based On Bebak and Forehand

- i. *“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. ”*

The elements added by Claim 12 also appear in Claim 13. As explained in Section VI.A.1.ix, Bebak discloses these elements. Therefore, the combination of Bebak and Forehand that renders obvious Claim 7 also renders obvious dependent Claim 12. *Id.*, ¶ 197.

8. Claim 16 Was Obvious Based On Bebak and Forehand

- i. *“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. ”*

As shown in Sections VI.C.2 and VI.C.5, Claims 7 and 10 would have been obvious based on a combination of Bebak and Forehand. *Id.*, ¶ 200. In the combination, Bebak’s hydraulic source of fluid pressure is replaced with a combustible source of fluid pressure disposed within the expansion chamber.

Claim 16 adds a pressure equalization element that also appears in Claims 4 and 19, and Petitioners explained why it would have been obvious to modify

Bebak to include pressure equalization ports discussing those claims in Sections VI.B.1 and VI.C.1. Therefore Claim 16 is invalid due to Bebak combined with Forehand for all the same reasons previously discussed. *Id.* 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. *Id.*, ¶ 201. This further demonstrates that Claim 16 would have been obvious. *Id.*

D. Ground 4: Bebak Combined With Hunting Titan Brochure (HTB) Obviousness

1. Claim 15 Is Obvious Based On Bebak and HTB

- i. *“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.”*

As described above, Bebak discloses a first and second electrical connection and that element is fully discussed at Section VI.A.1.ix. Claim 15 adds the concept of the electrical connections being “concentrically disposed within the connection profile and the releasable engagement profile.” This added limitation was already known in the art, not only as shown by the HTB reference, but within the prosecution history of the ’122 Patent itself. *Id.*, ¶¶ 204-12. The patent examiner

found that U.S. Patent No. 5,984,006 (“Read”) (EX1005) 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. Note: 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. 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. EX1002, ¶ 211.

For example, the Hunting Titan Brochure disclosed many different adapters under the heading Wireline Hardware to provide concentric electrical connections intended for connection to wireline tools, which could include both a Bebak releasable connection and other downhole tools. *Id.*, ¶ 205. 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. *Id.* 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 releasable connection—which in turn could utilize a similar electrical connection on a sub for connecting to other downhole tools. *Id.* The Hunting Titan Brochure 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 releasable connection and further at the electrical connection on a sub for other downhole tools. EX1009, 2; EX1010, 18; EX1002, ¶ 206. A POSA would have looked to the Hunting Titan Brochure because it concerned connections for downhole tools, including releasable and electrical connections. EX1002, ¶ 207. 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. Moreover, various pages of the HTB show concentrically located electrical connections that can be used on downhole releasable connection (the electrical connections are the yellow components with pins protruding from the end).



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.

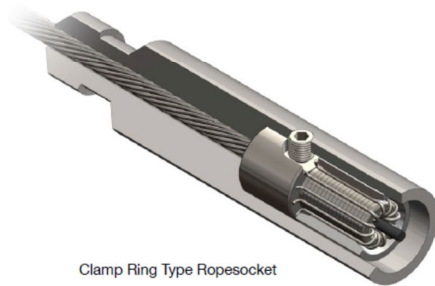
O.D. (in)[mm]	Type	Contact Kit	Electric Wireline Diameter (in)[mm]				
			7/32 [6]	0.288 [7]	5/16 [8]	15/32 [12]	0.474 [12]
1 [25]	Clamp Ring	3901-000-002	3910-"22-030" ¹ 3910-"22-035" ¹	3910-"28-040	3910-"31-043	-	-
1-7/16 [37]	Cone Type II	3903-000-002	3916-"22-030" ¹ 3916-"22-035" ¹	3916-"28-040	3916-"31-043	3916-"47-049	3916-"474-065
	4 Piece Cone Type II ²		3946-"22-030" ¹ 3946-"22-035" ¹	3946-"28-040	3946-"31-043	3946-"47-049	3946-"474-065
1-11/16 [43]	Cone Type II	3903-000-002	5916-"22-030" ¹ 5916-"22-035" ¹	5916-"28-040	5916-"31-043	5916-"47-049	5916-"474-065
	4 Piece Cone Type II ²		5946-"22-030" ¹ 5946-"22-035" ¹	5946-"28-040	5946-"31-043	5946-"47-049	5946-"474-065

¹ Use "D" for standard service; "N" for H₂S service

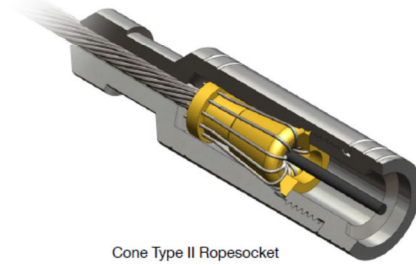
² Weight bars need to be ordered separately

³ 0.030" strand diameter

⁴ 0.036" strand diameter



Clamp Ring Type Ropesocket

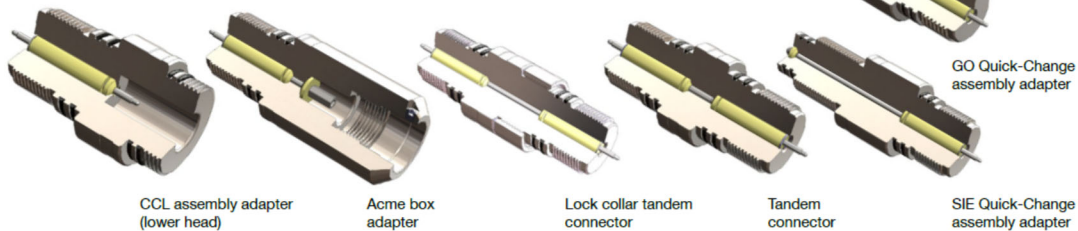
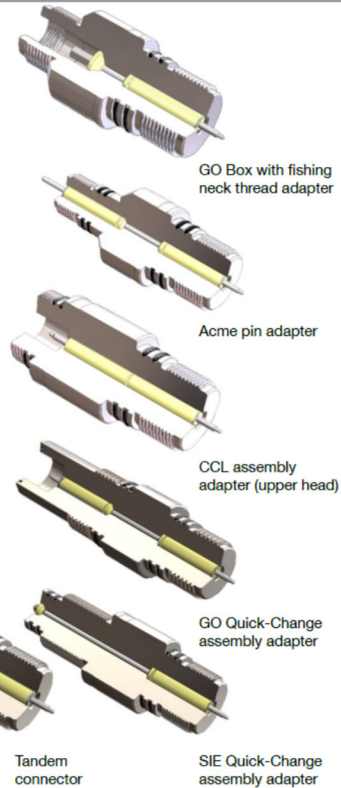


Cone Type II Ropesocket

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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]
3-1/8 [79]	3885-000-120	3890-000-352	Lock collar tandem connector sub assembly	12 [5]
	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 [5]
	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]
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]
3-1/8 [79]	3890-000-120	0318-000-122	1-5/8"-6 Acme Box	11 [5]
	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]



Right Tools. Right Location. Right Time.
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EX1009, 2, 3, 19; *see also* EX1010, 12, 18, 19. These disclosures would have motivated a POSA to make the cited combination. EX1002, ¶ 208.

Looking to HTB and Bebak, a POSA would have had a reasonable expectation of success because the art of downhole releasable connections was a highly predictable art and there was no reason to doubt success of using existing and well known methods of achieving electrical connections. *Id.*, ¶ 209. 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. *Id.*

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. *Id.*, ¶ 212.

E. Secondary Considerations

Petitioners do not know what arguments about secondary considerations Patent Owner may make, but Petitioners are unaware of any evidence that could offset the compelling evidence of unpatentability. *Id.*, ¶ 214. The Patent Owner’s tool—the BRT—that is alleged to practice the ’122 Patent does not seem to have been particularly successful—it is one of various releasable connections on the market, and a Petitioner ceased using that releasable connection after a short period of use due to the BRT’s poor performance in field operations. *Id.* 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. *Id.* There is no evidence of long and unfulfilled need for the claimed invention, as seen from the readily available teachings in the prior art of releasable connections that invalidate the Challenged Claims. *Id.* Nor is there evidence that others failed to develop a viable releasable connection, or of skepticism that releasable connections as claimed in the ’122 Patent would work. *Id.* There is no evidence of unexpected results for the alleged invention of the Challenged Claims. *Id.* Rather, the evidence confirms that the results were readily

predictable as seen from the prior art discussed in this Petition. There is no evidence of copying. *Id.*

In the co-pending litigation, Patent Owner contends that the BRT has been nominated for two awards. It should be noted that these are apparently nominations, not awards, and that the documents evidencing those nominations do not say anything in particular about the elements of the Challenged Claims, so those nominations lack any nexus to the claimed invention. *Id.*, ¶ 215. There is also citation to a website article about the BRT, but any discussion of it is limited to quotes from one of the '122 Patent inventors, and does not reflect industry praise for the invention from a POSA's perspective. *Id.* Even if the nominations, article statements, and sales of the BRT could be attributed to the claimed invention, it would come nowhere close to overcoming the evidence that the claims challenged were obvious. *Id.*

Any alleged secondary considerations are insufficient to overcome the strong case of obviousness presented here. *See Leapfrog Enters., Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157, 1162 (Fed. Cir. 2007).

VII. CONCLUSION

Petitioners therefore request Trial be instituted and the Challenged Claims be canceled as unpatentable.

Dated: June 29, 2023

Respectfully Submitted,

/Joseph A. Micallef/

Joseph A. Micallef

Registration No. 39,772

Sidley Austin LLP

1501 K Street N.W.

Washington, DC 20005

*Attorney for Petitioners GR Energy
Services Management, LP; GR Energy
Services Operating GP, LLC; GR
Wireline, L.P.; and Wellmatics, LLC*

EXHIBIT LIST

Exhibit #	Reference Name
1001	U.S. Patent No. 10,794,122 (the “122 Patent”)
1002	Declaration of Gary Wooley, Ph.D.
1003	U.S. Provisional App. No. 62/381,083 (the “083-Provisional”)
1004	File History of U.S. Patent No. 10,794,122
1005	U.S. Patent No. 5,984,006 (“Read”)
1006	USPTO Memorandum: Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation (June 21, 2022), available at https://www.uspto.gov/sites/default/files/documents/interim_proc_discretionary_denials_aia_parallel_district_court_litigation_memo_20220621_.pdf
1007	U.S. Patent No. 6,571,879 (“Bebak”)
1008	U.S. Patent No. 4,776,393 (“Forehand”)
1009	Hunting Titan Wireline Hardware Brochure, V.9.1 (2012) (“HTB”)
1010	Internet Archive Affidavit of Nathaniel E. Frank-White (May 18, 2023)
1011	Deposition Transcript of Jeffrey R. Golinowski (January 31, 2023)
1012	U.S. Patent No. 7,373,974
1013	U.S. Patent Application Publication US 2006/0048940
1014	U.S. Patent No. 6,408,946
1015	U.S. Patent No. 4,771,827
1016	U.S. Patent Application Publication US 2013/0008669

Exhibit #	Reference Name
1017	<i>Canatex Completions Solutions, Inc. v. Wellmatics, LLC et al</i> , 4:22-cv-3306 (S.D. Tex.), Plaintiff's Preliminary Infringement Contentions
1018	<i>Canatex Completions Solutions, Inc. v. Wellmatics, LLC et al</i> , 4:22-cv-3306 (S.D. Tex.), Plaintiff's Reply in Support of its Motion for Preliminary Injunction [Dkt. 66]
1019	<i>Canatex Completions Solutions, Inc. v. Wellmatics, LLC et al</i> , 4:22-cv-3306 (S.D. Tex.), Joint Claim Construction and Prehearing Statement, Exhibit A [Dkt. 78-1]
1020	U.S. Patent No. 6,095,583 ("Beeman")
1021	<i>Canatex Completions Solutions, Inc. v. Wellmatics, LLC et al</i> , 4:22-cv-3306 (S.D. Tex.), Plaintiff's Motion for Preliminary Injunction, Exhibit 2 (Declaration of Jeffrey Golinowski) [Dkt. 45-3]

CERTIFICATE OF COMPLIANCE

I hereby certify that this brief complies with the type-volume limitations of 37 C.F.R. § 42.24, because it contains 13,870 words (as determined by the Microsoft Word word-processing system used to prepare the brief), excluding the parts of the brief exempted by 37 C.F.R. § 42.24.

Dated: June 29, 2023

Respectfully Submitted,

/Joseph A. Micallef/
Joseph A. Micallef
Registration No. 39,772
Sidley Austin LLP
1501 K Street N.W.
Washington, DC 20005

*Attorney for Petitioners GR Energy
Services Management, LP; GR Energy
Services Operating GP, LLC; GR
Wireline, L.P.; and Wellmatics, LLC*

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e), I hereby certify that on this 29th day of June, 2023, I caused to be served a true and correct copy of the foregoing and any accompanying exhibits by Federal Express on the following counsel for Patent Owner:

Litigation Counsel

J. David Cabello
Attorney-in-Charge
Texas Bar No. 03574500
Stephen D. Zinda
Texas Bar No. 24084147
James H. Hall
Texas Bar No. 24041040
Munira A. Jesani
Texas Bar No. 24101967
Cabello Hall Zinda, PLLC
801 Travis Street, Suite 1610
Houston, TX 77002

USPTO Correspondence Address

Bennett Jones LLP
Patents Edmonton
3200 Telus House, South Tower
10020 - 100 Street
Edmonton, Alberta, Ab
Canada

Patent Owner

Canatex Completions Solutions, Inc.
3018 W. County Road 127, Midland,
TX 79706

Dated: June 29, 2023

Respectfully Submitted,

/Joseph A. Micallef/
Joseph A. Micallef
Registration No. 39,772
Sidley Austin LLP
1501 K Street NW
Washington, DC 20005

*Attorney for Petitioners GR Energy
Services Management, LP; GR Energy
Services Operating GP, LLC; GR
Wireline, L.P.; and Wellmatics, LLC*