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(54) **FRACTURING PUMP PINION ROTATION ASSEMBLY**

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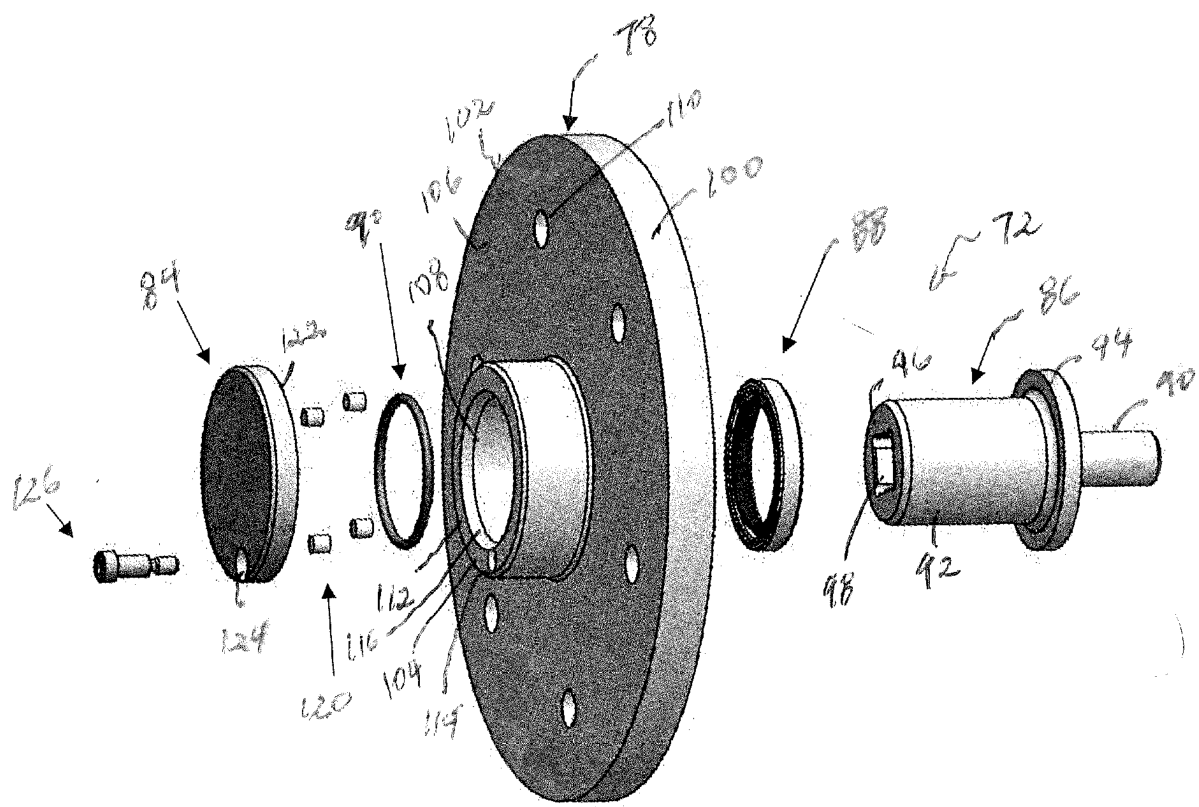
(57) **ABSTRACT**

A fracturing pump pinion rotation assembly has a stem having a portion adapted to be threaded to or bolted to a non-drive side of the pinion shaft, and a cover having an opening therein. The stem has a socket or extension adapted to be manipulated by a tool such that the rotation of the stem causes a corresponding rotation of the pinion shaft. The cover is adapted to be affixed to a wall of a non-drive side of the fracturing pump. The opening overlies the socket or extension of the stem such that the socket or extension is accessible from an exterior of the fracturing pump. A cap is removably or pivotally connected to an end of the annular portion of the cover.



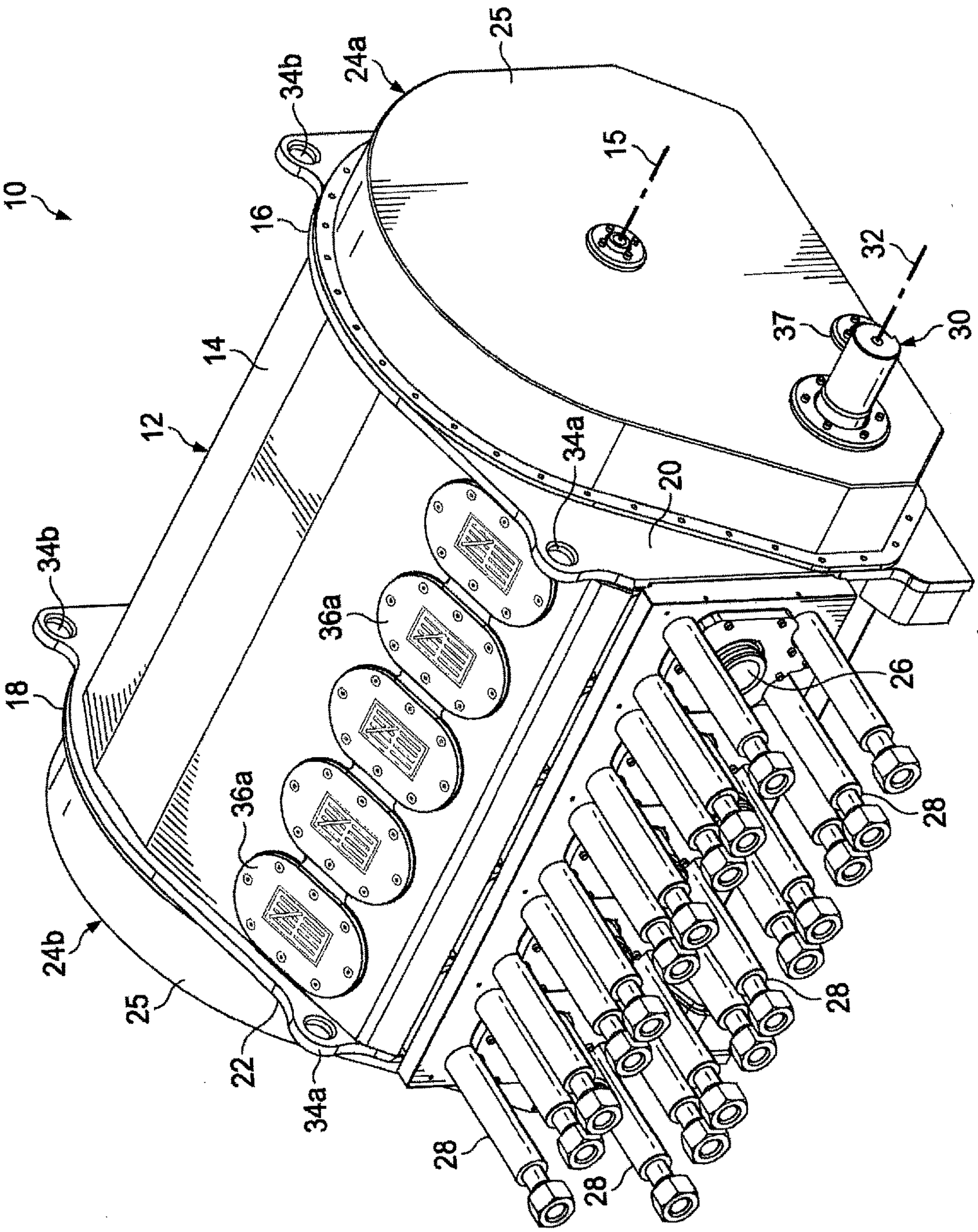


FIG. 1
PRIOR ART

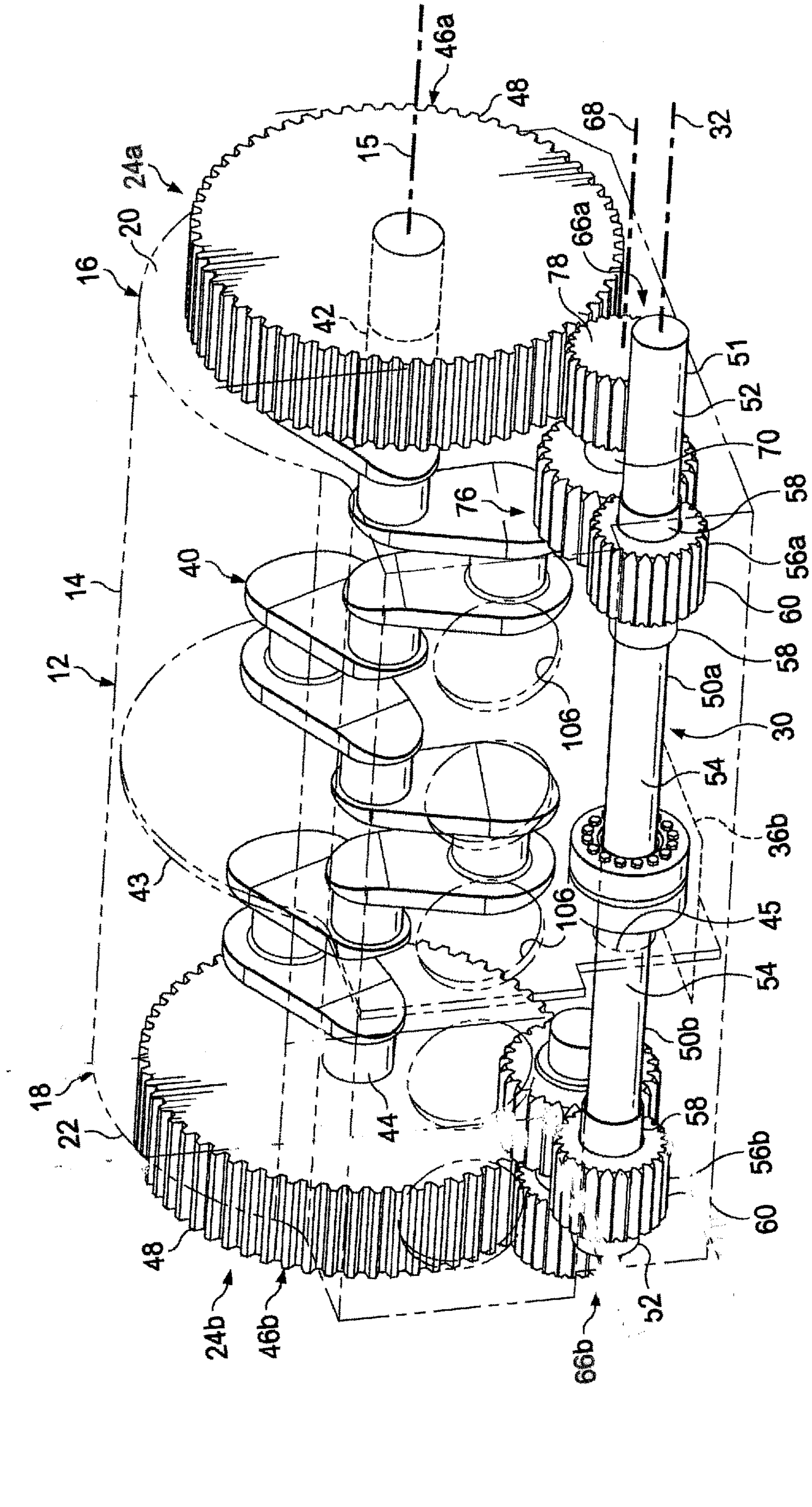


FIG. 2
PRIOR ART

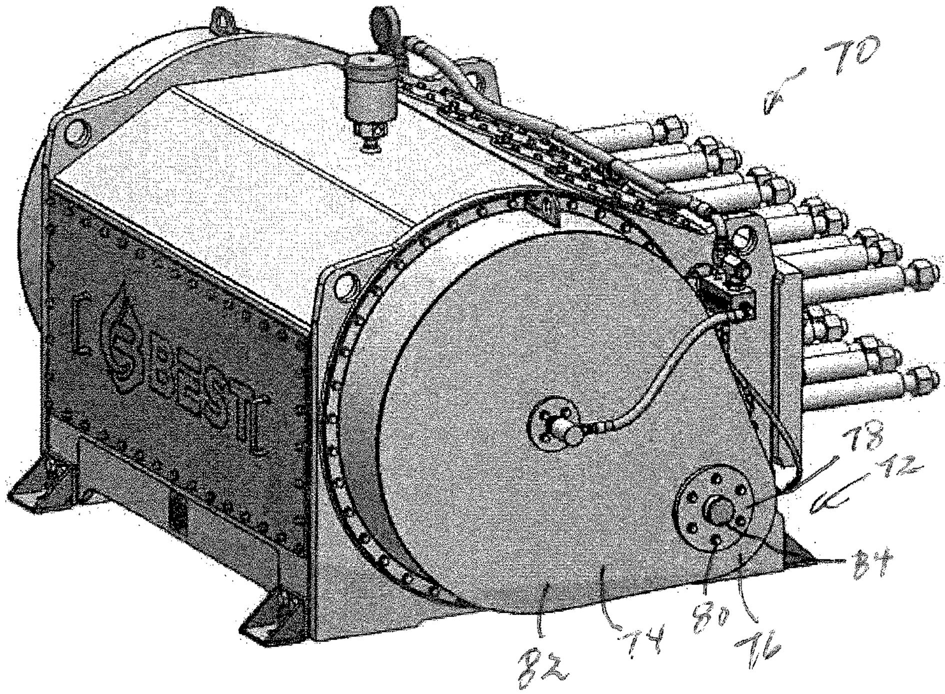

70
BEST
78
72
84
82
74
80
76

FIG. 3

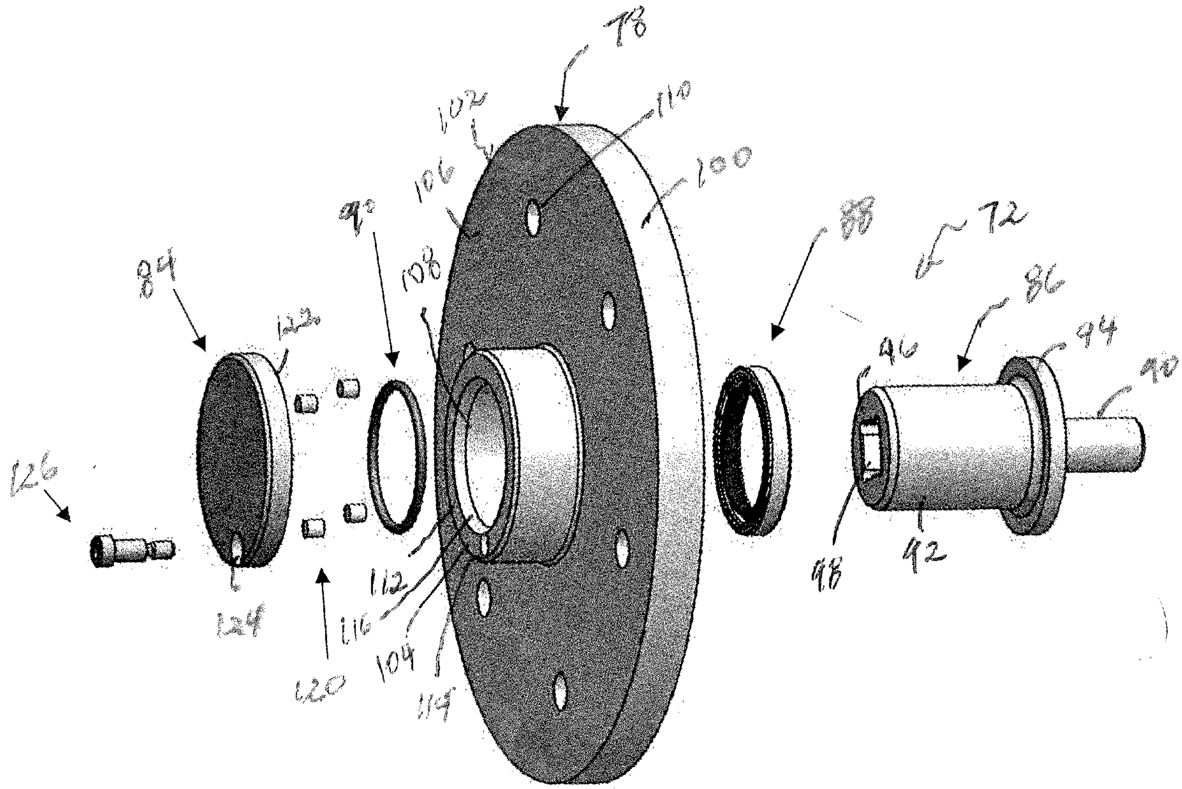

78
102
110
106
100
90
88
72
86
84
122
108
96
94
90
126
98
92
112
116
124
120
104
114

FIG. 4

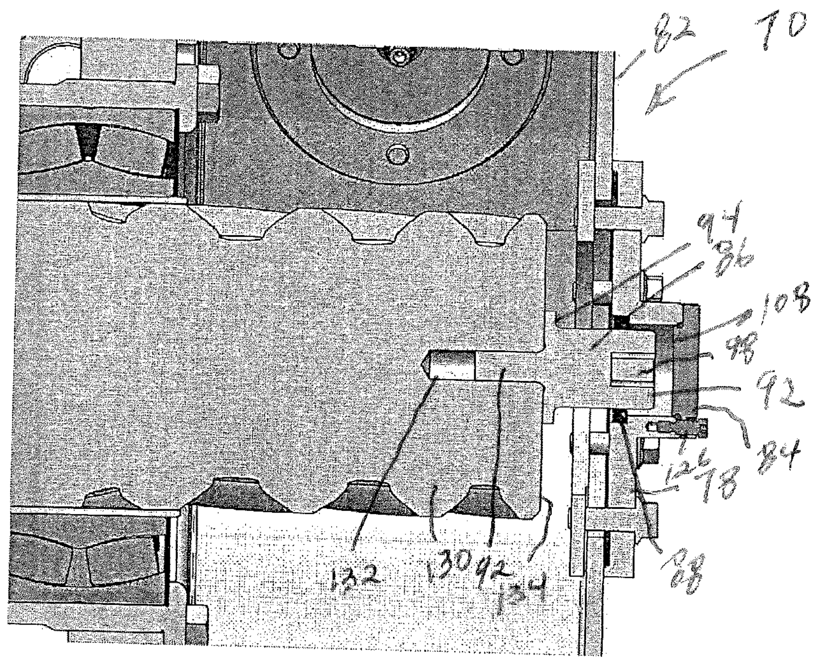

82
70
94
86
108
98
92
84
126
78
88
132
130
92
134

FIG. 5

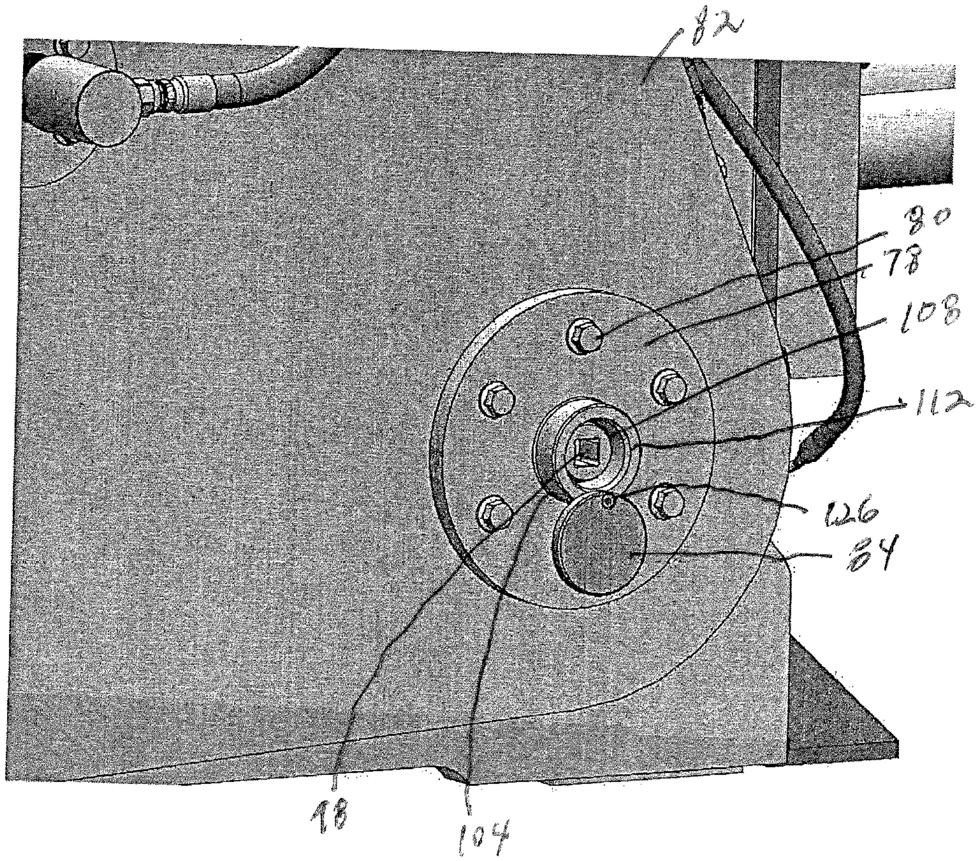

82
80
78
108
112
126
84
98
104

FIG. 6

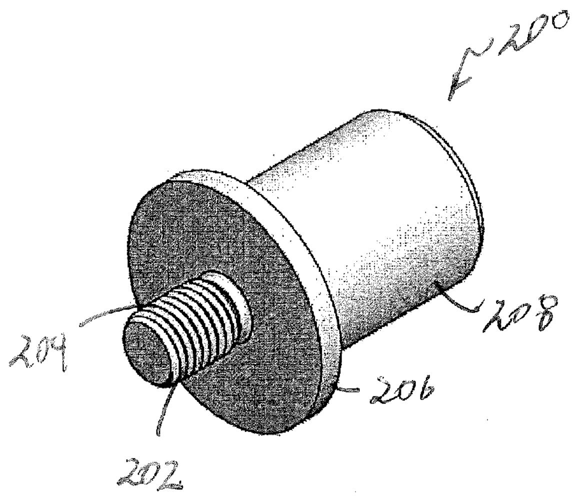


FIG. 7A

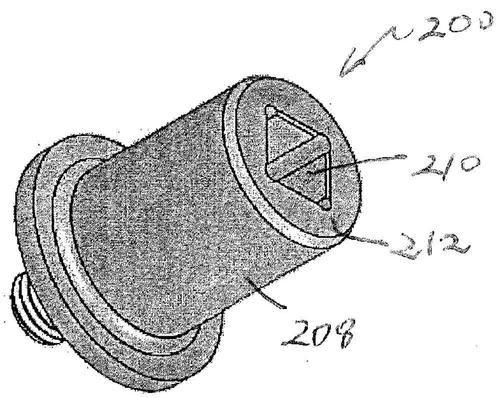


FIG. 7B

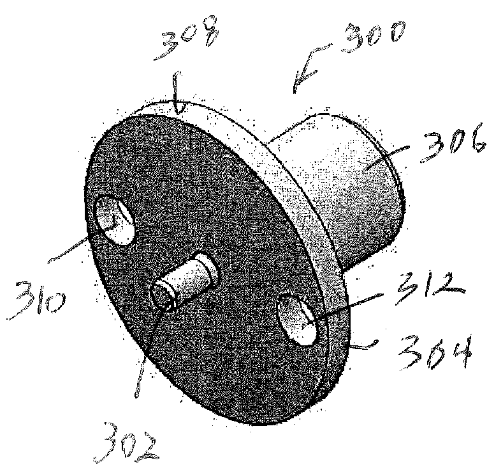


FIG. 8A

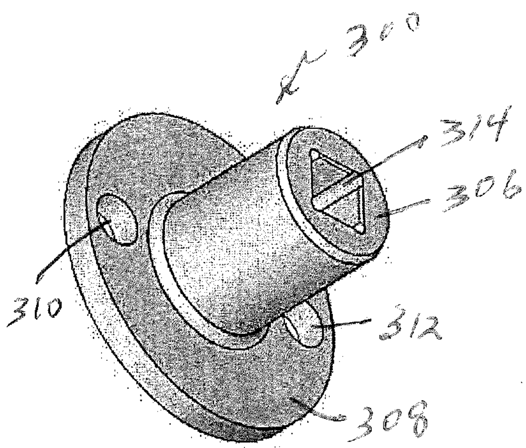


FIG. 8B

FRACTURING PUMP PINION ROTATION ASSEMBLY

FIELD OF THE INVENTION

[0001] The present invention relates to fracturing pumps. The present invention further relates to the pinion used in a fracturing pump. More particularly, the present invention relates to a fracturing pump pinion rotation assembly whereby the pinion can be rotated from an exterior of the fracturing pump.

BACKGROUND OF THE INVENTION

[0002] It is difficult to economically produce hydrocarbons from low-permeability reservoir rocks. Oil and gas production rates are often boosted by hydraulic fracturing, a technique that increases rock permeability by opening channels through which hydrocarbons can flow to recovery wells. Hydraulic fracturing has been used for decades to stimulate production from conventional oil and gas wells. The practice consists of pumping fluid into a wellbore at high-pressure (sometimes as high as 50,000 p.s.i.). Large quantities of proppants are carried in suspension by the fracture fluid into the fractures. When the fluid enters the formation, it fractures, or creates fissures, in the formation. Water, as well as other fluids, and some solid proppants, are then pumped into the fissures to stimulate the release of oil and gas from the formation. When the pressure is released, the fractures partially closed on the proppants, leaving channels for oil and gas to flow.

[0003] Fracturing rock in a formation requires that the fracture fluid be pumped into the wellbore at very high pressures. This pumping is typically performed by high-pressure, hydraulic fracturing pumps. This pumping is carried out with the diesel engine used to power the operation of the pump in order to deliver fracture fluids at sufficiently high flow rates and pressures to complete a hydraulic fracturing procedure or "frac job". These pumps are generally comprised of a power end and a fluid end. The fluid end of such a pump that is utilized to pressurize a working fluid may include a fluid suction manifold, a fluid discharge manifold, a fluid cylinder and a plunger. The power end of such a pump may include a crankcase in which a crankshaft is rotated in order to drive a plurality of piston arms. These piston arms in turn reciprocate crossheads. These crossheads are attached to the plungers of the fluid end to drive the plungers within the fluid cylinder. A power source, such as a diesel engine, is utilized to drive the crankshaft via a pinion shaft having a pinion gear integrally formed at each end. Each pinion gear, in turn, engages a separate bull gear carried on the crankshaft and secured on the crankshaft by a key joint. The key joint of the bull gear may be manipulated to adjust for backlash between the meshed gears.

[0004] Generally, the power end of a hydraulic fracturing pump includes a crankcase in which is mounted a crankshaft, a pinion assembly, and one or more spaced apart intermediate assemblies. The pinion assembly extends along a pinion axis and has a first pinion shaft and a second pinion shaft coupled together by a coupler. Each pinion shaft includes an input pinion gear mounted on one end of the pinion shaft. The crankshaft is disposed along a crankshaft axis that is parallel with and spaced apart from the pinion axis and includes a crankshaft gear mounted on each end of the crankshaft. Each crankshaft gear is interconnected to the pinion gear by an intermediate gear assembly. Each intermediate gear assembly extends along an intermediate axis parallel with, but spaced apart from, the crankcase axis and the pinion axis. Each intermediate assembly has an intermediate shaft with a first intermediate gear meshed with a pinion gear and a second intermediate gear meshed with the bull gear. Rotation of the crankshaft drives a plurality of piston arms which, in turn, cause reciprocation of a plurality of crossheads mounted in the crankshaft housing. Each crosshead has a crosshead axis along with the crosshead reciprocates. Each crosshead axis is generally perpendicular to the crankshaft axis.

[0005] FIG. **1** shows a perspective view of a power end **10** of a hydraulic fracturing pump of the prior art. Power end **10** generally includes a crankcase **12** formed of a crankcase housing **14** extending along a crankcase axis **15**. The crankcase housing **14** has a first end **16** and a second end **18** with a first side **20** enclosing the crankcase housing **14** at the first end **16** and a second side **22** enclosing the crankcase housing **14** at the second end **18**. A gearbox assembly **24** may be attached to at least one of the ends **16**, **18** of the crankcase housing **14**. Each gearbox assembly **24** includes a gearbox housing **25** attached at first and second ends **16**, **18**. A first gearbox assembly **24***a* is attached to the first end **16** of crankcase **12** and a second gearbox assembly **24***b* is attached to the second end **18** of the crankcase **12**. A plurality of crosshead extension rods **26** are shown extending from crankcase housing **14**. A plurality of stay rods **28** may also extend from crankcase housing **14** generally adjacent to and parallel with crosshead extension rods **26**.

[0006] The power end **10** includes a pinion assembly **30** having a pinion axis **32** and generally extending at least partially between the first side **20** and the second side **22** of crankcase housing **14**. Pinion axis **32** is parallel with, but spaced apart from, the crankcase axis **15**. The pinion assembly **30** may be coupled to a power source (not shown) to drive the power and **10**.

[0007] The crankcase **12** may include one or more eye flanges **34**. Each first side **20** includes a forward eye flange **34***a* and a rear eye flange **34***b*, and second side **22** likewise includes a forward eye flange **34***a* and a rear eye flange **34***b*. Crankcase **12** may further include one or more access covers **36**. Five upper access covers **36***a* are shown. An oil port **37** is shown formed in gearbox housing **25**.

[0008] FIG. **2** shows that the prior art has a crankshaft **40** extending along the crankcase axis **15** from a first crankshaft end **42** to a second crankshaft end **44**. FIG. **2** illustrates additional details of the gearbox assembly **24** and the pinion assembly **30** of the prior art. Gearbox assembly **24** includes a crankshaft gear **46** mounted on each end **42**, **44** of crankshaft **40**. Crankshaft gear **46** is a bull gear. The first crankshaft gear **46***a* is mounted on the first end **42** of crankshaft **40** and a second crankshaft gear **46***b* is mounted on the second end **44** of the crankshaft **40**.

[0009] Pinion assembly **30** is shown as having a first pinion shaft **50***a* and a second pinion shaft **50***b* extending along pinion axis **32** so as to be coaxial with one another. The first and second pinion shafts **50***a*, **50***b* are parallel with but spaced apart from crankcase axis **15**. As such, first and second pinion shafts **50***a*, **50***b* may also pass through ribs **43**. Ribs **43** may have apertures **45** through which first and second shafts **50***a*, **50***b* pass. Each pinion shaft has a first end **52** and a second end **54** with an input pinion gear **56** disposed along each pinion shaft **50** adjacent the first end **52**

of each pinion shaft **50**. Input pinion gear **56** is disposed along pinion shaft **50***a* and input pinion gear **56***b* is disposed along pinion shaft **50***b*. The pinion gear **56** may be integrally formed as part of the pinion shaft **50**.

[0010] Pinion assembly **30** also includes a coupler **64** coupling together the first and second pinion shaft **50***a*, **50***b* at their respective second ends **54**. Coupler **64** may have a first coupler portion **64***a* that can engage end **54** of pinion shaft **50***a* and a second coupler portion **64***b* can engage end **54** of pinion shaft **50***b*. This allows the two pinion shafts **50***a* and **50***b* to be coupled together.

[0011] During the maintenance of such frac pumps, mechanics have had to rotate the pump using a large pry bar inserted into the universal joint of the driveshaft connecting the transmission to the pump. This maintenance can include the changing of fluid end valves, plungers or other various tasks. This is an unsafe, difficult and usually damages the grease fittings on the universal joint. As such, a need has developed to be able to manipulate the pinion shaft from the exterior of the fracturing pump so that the pump to be easily turned using a ratchet or other tool that can engage with the pinion shaft.

[0012] In the past, various patents have issued relating to the pinion assembly used in such fracturing pumps. For example, U.S. Pat. No. 10,190,718, issued on Jan. 29, 2019 to Weinstein et al., teaches an accumulator assembly and a pump assembly having the accumulator assembly. The accumulator assembly is arranged to fluidically connect to a flowline between a blender and a fracturing pump of the pump system. The accumulator assembly includes a tank configuration to contain pressurized fluid and a control valve fluidically connected between a discharge end of the tank and the flowline. The control valve opens connects the tank to the flowline when a pressure on the flowline is less than a target pressure. The control valve closes and fluidically blocks communication between the tank and the flowline when the pressure on the flowline is greater than or substantially the same as the target pressure.

[0013] U.S. Pat. No. 10,227,854, issued on Mar. 12, 2019 to C. Glass, describes a pumping system for use in hydraulic fracturing. This pumping system is self-contained on a transportable system, such as a trailer. The system components include a diesel generator, a cooling radiator, a variable-frequency drive and a cooling system. An AC induction motor and a high capacity pump are also provided in the system.

[0014] U.S. Pat. No. 11,009,024, issued on May 18, 2021 to C. P. Buckley, shows a hydraulic fracturing pump that includes a power end with a plurality of torsion tubes extending between sides of a crankcase housing in which a crankshaft is rotatably mounted. The crankshaft is coupled by piston arms to crossheads disposed to reciprocate along crosshead axes that are perpendicular to the crankshaft. A plurality of ribs generally perpendicular to the crankshaft are disposed within the crankcase housing. This plurality of ribs extend from the base of the crankshaft housing to an upper surface of the crankshaft housing. The torsion tubes are generally adjacent the upper surface of the crankcase housing and pass perpendicular through each of the plurality of ribs that are attached to the ribs provide rigidity to the power end.

[0015] U.S. Pat. No. 11,168,681, issued on Nov. 9, 2021 to Boguski et al., teaches a drive system for a hydraulic fracturing pump. This hydraulic fracturing pump includes a pinion assembly extending along a pinion axis and mounted in a crankcase. The pinion assembly has a first pinion shaft and a second pinion shaft coupled together by a keyless coupler. Each pinion shaft includes an input pinion gear mounted at one end of the pinion shaft. A crankshaft is disposed along a crankshaft axis and is mounted in the crankcase parallel with but spaced from the pinion axis. The crankshaft includes a bull gear mounted on each end of the crankshaft with each bull gear interconnected to an input pinion gear by an intermediate gear assembly. Each intermediate gear assembly extends along an intermediate axis parallel with, but spaced apart from, the crankcase and pinion axis. Each intermediate assembly has an intermediate shaft with a first intermediate gear meshed with a pinion gear and a second intermediate gear meshed with the bull gear.

[0016] U.S. Pat. No. 11,643,915, issued on Mar. 9, 2023 to Yeung et al., describes drive equipment for mobile hydraulic fracturing power units. The mobile power units include a gas turbine engine that provides mechanical power to a driveshaft which is connected to the drive equipment such that the drive equipment is driven by the engine. The drive equipment can include a hydraulic fracturing pump or an electrical generator. The driveshaft is rotated at a speed suitable for the hydraulic fracturing pump and the electrical generator includes a step-up gearbox to increase a rotational speed of the driveshaft for use by the electrical generator.

[0017] U.S. Pat. No. 11,686,305, issued on Jun. 27, 2023 to C. P. Buckley, teaches a hydraulic fracturing pump including a power end with a plurality of torsion tubes extending between sides of a crankcase housing in which a crankshaft is rotatably mounted. The crankshaft is coupled by piston arms to crossheads disposed to reciprocate along crosshead axes that are perpendicular to the crankshaft. A plurality of ribs are disposed within the crankcase housing generally perpendicular to the crankshaft and extend from the base of the crankshaft housing to an upper surface of the crankshaft housing. The torsion tubes are generally adjacent the upper surface of the crankcase housing and pass perpendicularly through each of the plurality of ribs and are attached to the ribs to provide rigidity to the power end.

[0018] U.S. Patent Application Publication No. 2014/0147291, published on May 29, 2014 to B. C. Burnette, describes a reciprocating pump assembly that includes a first fluid assembly, a second fluid assembly, and a power assembly operable by a prime mover. The prime mover includes either an engine or a motor. The power assembly is interposed between and shared by the first fluid assembly and the second fluid assembly. The power assembly includes at least one rotatable crankshaft operating the first and second fluid assemblies.

[0019] U.S. Patent Application Publication No. 2017/0370525, published on Dec. 28, 2017 to B. Wagner, provides a power frame and lubrication system for a reciprocating pump assembly. The reciprocating pump assembly includes a block having bores formed therethrough and crossheads disposed in the bores and adapted to reciprocate therein. A lubrication pump is in fluid communication with the bores. The pump is operable to pump lubrication fluid into each of the bores so that the crossheads are lubricated as they reciprocate within their respective bores. The power end includes a crosshead block and a power frame connected thereto. The frame includes rib plates and supporting the crosshead block.

[0020] U.S. Patent Application Publication No. 2022/0220952, published on Jul. 14, 2022 to M. I. Louzon, teaches a fracturing pump assembly that is reconfigurable on site. A closed-loop oil feed system provides constant and reliable lubrication under heavy loads. A sealing system is utilized so as to reduce leaks and thermal stresses.

[0021] It is an object of the present invention to provide a fracturing pump pinion rotation assembly that makes it easier to turn the pinion of the fracturing pump.

[0022] It is another object of the present invention to provide a fracturing pump pinion rotation assembly that is easily accessible.

[0023] It is another object of the present invention to provide a fracturing pump pinion rotation assembly that is very safe.

[0024] It is another object of the present invention to provide a fracturing pump pinion rotation assembly that can reduce on-site injuries to personnel.

[0025] It is another object of the present invention provide a fracturing pump pinion rotation assembly that is easy-to-use.

[0026] It is a further object of the present invention to provide a fracturing pump pinion rotation assembly that avoids damaging grease fittings associated with the pump assembly.

[0027] These and other objects and advantages of the present invention will become apparent from a reading of the attached specification and appended claims.

BRIEF SUMMARY OF THE INVENTION

[0028] The present invention is a fracturing pump pinion rotation assembly that comprises a stem having a portion adapted to be threaded to or bolted to a non-drive side of a pinion shaft, and a cover having an opening therein. The stem has a socket or an extension adapted to be manipulated by a tool such that the rotation of the stem causes a corresponding rotation of the pinion. The cover is adapted to be affixed to a wall of the non-drive side of the fracturing pump. The opening overlies the socket or extension of the stem such that the socket or extension is accessible from an exterior of the fracturing pump.

[0029] The cover has an annular portion extending outwardly away from the wall of the non-drive side of the fracturing pump. The opening of the cover is defined by an interior of the annular portion of the cover.

[0030] A cap is removably or pivotally connected to an end of the annular portion of the cover. The cap is movable between a first position covering the opening of the annular portion and a second position exposing the socket or extension of the stem through the opening of the annular portion of the cover. The annular portion of the cover has a bolt hole formed at an end thereof. The cap has a bolt hole formed adjacent a periphery of the cap. A shoulder bolt extends to the bolt hole of the cap and is affixed within the bolt hole of the annular portion of the cover. The cap is pivotable around the shoulder bolt so as to move between the first position and the second position.

[0031] A magnet is affixed to either a surface of the cap that faces the annular portion of the cover or to an end of the annular portion of the cover. The magnet is adapted to releasably affix the cap over the opening of the annular portion of the cover. In an embodiment of the present invention, the magnet comprises a plurality of magnets arranged in spaced relation to each other around the surface of the cap. In an alternative embodiment, the magnet comprises a plurality of magnets arranged in spaced relation at the end of the annular portion of the cover. An O-ring seal is positioned between the cap and the annular portion of the cover. The O-ring seal is adapted to seal the opening of the annular portion of the cover.

[0032] The stem has a narrow diameter portion and a wide diameter portion with a flange formed between the narrow diameter portion and the wide diameter portion. The narrow diameter portion of the stem has an end opposite the wide diameter portion of the stem that is adapted to engage with the pinion shaft. The wide diameter portion of the stem extends away from the pinion shaft. The flange bears against an end of the pinion shaft. The wide diameter portion of the stem extends into the opening of the cover.

[0033] A retaining seal is interposed between the wide diameter portion of the stem and the wall of the non-drive side of the fracturing pump. The rotary seal is adapted to allow the stem to rotate in relation to the wall of the non-drive side of the fracturing pump. The cover has a discoidal portion with an opening formed centrally through this discoidal portion. The discoidal portion has a plurality of holes formed in spaced relation radially outwardly of the opening of the cover. A plurality of fasteners extend through the plurality of holes to engage with the wall of the non-drive side of the fracturing pump.

[0034] In the preferred embodiment of the present invention, the socket or extension is a drive socket. This drive socket is adapted to be engageable with the tool. This tool can be either a wrench or a ratchet. In an embodiment of the present invention, the narrow diameter portion of the stem is threaded. In an alternative embodiment of the present invention, the narrow diameter portion is a pin. The cap is pivotally connected to the end of the annual portion of the cover. The cup is slidable along a shoulder bolt secured to the annular portion of the cover so as to separate from the annular portion of the cover.

[0035] This foregoing Section is intended to describe, with particularity, the preferred embodiments of the present invention. It is understood that modifications to this preferred embodiment can be made within the scope of the present claims. As such, this Section should not to be construed, in any way, as limiting of the broad scope of the present invention. The present invention should only be limited by the following claims and their legal equivalents.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0036] FIG. **1** is an upper perspective view of a prior art hydraulic fracturing pump.

[0037] FIG. **2** is a view of the mechanisms within the hydraulic fracturing pump of FIG. **1** of the prior art.

[0038] FIG. **3** is a perspective view showing the fracturing pump pinion rotation assembly as secured to the fracturing pump of the present invention.

[0039] FIG. **4** is an exploded view of the fracturing pump pinion rotation assembly.

[0040] FIG. **5** is a cross-sectional view of the fracturing pump pinion rotation assembly of the present as applied to the pinion shaft of the fracturing pump.

[0041] FIG. **6** is a perspective view, in close detail, of the fracturing pump pinion rotation assembly of the present invention as applied to the fracturing pump.

[0042] FIG. **7**A is a bottom perspective view of the stem of the fracturing pump pinion rotation assembly of the present invention.

[0043] FIG. **7**B is an upper perspective view of one embodiment of the stem of the fracturing pump pinion rotation assembly of the present invention.

[0044] FIG. **8**A is a bottom perspective view of an alternative embodiment of the stem of the fracturing pump pinion rotation assembly of the present invention.

[0045] FIG. **8**B is an upper perspective view of the alternative embodiment of FIG. **8**A of the stem of the fracturing pump pinion rotation assembly of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0046] As shown in FIG. **3**, there is a hydraulic fracturing pump **70** to which the pinion rotation assembly **72** of the present invention can be applied. The fracturing pump pinion rotation assembly **72** is illustrated as mounted to a non-drive side **74** of the hydraulic fracturing pump **70**. FIG. **3** further shows that the fracturing pump pinion rotation assembly **72** of the present invention will be generally secured to the pinion shaft adjacent a lower end **76** of the hydraulic fracturing pump **70**. In particular, the fracturing pump pinion rotation assembly **72** will include a cover **78** that is secured by fasteners **80** to the wall **82** of the non-drive side of the fracturing pump **70**. A cap **84** will overlie an opening in an annular portion of the cover **78**. The cap **84** can be removed or pivoted so as to expose the interior of the annular portion of the cover **78** and to allow access to the stem that allows for the pinion shaft to be manipulated such that a rotation of the stem causes a corresponding rotation of the pinion shaft. In FIG. **3**, cap **84** is illustrated as extending over the opening of the cover **78**.

[0047] FIG. **4** is an exploded view showing the fracturing pump pinion rotation assembly **72** of the present invention. In particular, the fracturing pump pinion rotation assembly **72** includes the stem **86**, a rotary seal **88**, the cover **78**, O-ring seals **90** and the cap **84**. These components are assembled together so as to provide the fracturing pump pinion rotation assembly **72** of the present invention.

[0048] In FIG. **4**, the stem **86** is illustrated as having a narrow diameter portion **90** and a wide diameter portion **92**. A flange **94** is formed between the narrow diameter portion **90** and the wide diameter portion **92**. The end **96** of the wide diameter portion **92** has a socket **98** formed therein. The socket **98**, as illustrated, is a three-quarter inch square socket. However, within the present invention, the socket **98** can be in the form of an extension extending outwardly of the end **94** or it can be a socket of various geometric configurations and sizes. The narrow diameter portion **90** is adapted so as to engage with the end of the pinion shaft (to be described hereinafter). As shown in FIG. **4**, the narrow diameter portion **90** is a pin (without threads). If the interior of the pinion shaft is threaded, then the narrow diameter portion **90** of the stem **86** can be suitably threaded so as to engage with the threads of the pinion shaft.

[0049] The rotary seal **88** will bear against the flange **94** of the stem **86** so as to allow the stem **86** to be rotatable in sealed relationship with the cover **78** and with the wall **82** of the non-drive side **74** of the hydraulic fracturing pump **70**. As will be described hereinafter, the rotary seal **88** can be received within a notch formed in the surface of the cover **78**.

[0050] The cover **78** has a discoidal portion **100** having an outer periphery **102**. An annular portion **104** extends outwardly of the surface **106** of the discoidal portion **100**. Annular portion **104** includes an opening **108** formed centrally therein. The opening **108** is adapted to receive the wide diameter portion **92** of the stem **86** therein. As such, once installed, the wide diameter portion **92** of the stem **86** will be exposed at the opening **108**. A plurality of holes **110** are formed radially outwardly of the annular portion **104**. These holes **110** are adapted to receive the fasteners **80** (shown in FIG. **3**) so as to allow the cover **78** to be secured to the wall **82** of the non-drive side **74** of the hydraulic fracturing pump **70**.

[0051] The annular portion **104** has an end the surface **112**. End surface **112** is generally planar and includes a bolt hole **114** therein. A notch **116** is formed adjacent to the end **112**. Notch **106** is adapted to receive the O-ring seal **90** therein.

[0052] FIG. **4** shows that there are a plurality of magnets **120** that are positioned between the cap **84** and the end **112** of the annular portion **104**. These magnets **120** can be placed upon, or adjacent to, the end **112** or placed on or adjacent to the inner surface **122** of the cap **84**. In normal use, the magnets **120** will be arranged in spaced relationship around the surfaces and serve to magnetically secure the cap **84** over the opening **108**. As such, the magnets **120** will allow a user to maintain the cap **84** over the opening **108** or to release the cap **84** from the opening **108** so as to expose the socket **98** at the end **96** of the wide diameter portion **92** of stem **86**.

[0053] The cap **84** has a bolt hole **124** formed adjacent a periphery thereof. Shoulder bolt **126** will extend through the bolt hole **124** and be engaged with the bolt hole **114** at the end **112** of the annular portion **104** of the cover **78**. As such, the cap **84** will cover the opening **84** in one position or can rotate about the shoulder bolt **126** to rotate or pivot with respect to the shoulder bolt **126** so as to expose the opening **108**.

[0054] FIG. **5** illustrates the assembly shown in FIG. **4** as used in association with the pinion shaft **130** of the hydraulic fracturing pump **70**. The pinion shaft **130** has a receptacle **132** at end **134** thereof. Receptacle **132** can be either threaded or non-threaded. The narrow diameter portion **92** of stem **86** is received within the aperture **132**. The wide diameter portion **92** of the stem **86** will extend outwardly from the end **134** of the pinion shaft **130**. The flange **94** is illustrated as bearing against the end **134** when the narrow diameter portion **92** is installed within the aperture **132**. The wide diameter portion **92** extends into the opening **108** of the cover **78**. The socket **98** also faces outwardly of the wall **82** of the non-drive side of the hydraulic pump **70**.

[0055] FIG. **5** shows that the cap **84** is pivoted about the bolt **126** so as to close the opening **108**. As such, the socket **94** will avoid any introduction of foreign materials or debris. This will maintain the end of the stem **86** in a closed environment. The magnets (described herein previously) will secure the cap **84** in this closed position. The rotary seal **88** will allow the wide diameter portion **92** of the stem **86** to rotate with respect to the wall **82** of the non-drive side of the hydraulic fracturing pump **70**.

[0056] FIG. **6** illustrates the movement of the cap **84** to its open position. As can be seen, the cap **84** is pivoted about shoulder bolt **126**. This is accomplished by pulling the cap **84** away from the magnets **120** and then allowing the cap **84** to drop and rotate. In an alternative embodiment of the present invention, the cap **84** can simply be lit lifted and removed from the end **112** of the annular portion **104**. In either of the embodiments, the interior **108** of the annular portion **104** of the cover **78** is exposed.

[0057] In FIG. **6** shows that the socket **98** is exposed when the cap **84** is rotated to this position. As such, a worker can utilize a tool, such as a wrench or a ratchet, to rotate the stem **86**. Since the stem **86** is affixed to the pinion shaft **130** (as illustrated in FIG. **5**), the rotation of the stem **86** (as a result of the use of a wrench or ratchet in the socket **98**) will cause a corresponding rotation of the pinion shaft **130**.

[0058] After use, the wrench or ratchet tool can simply be removed from the socket **98**. The cap **84** can then be rotated so as to overlie the opening **108** and reside in magnetically-secured relation with the end **112** of the annular portion **104** of the cover **78**.

[0059] FIG. **6** further shows that the discoidal portion **100** of the cover **78** is affixed by fasteners **80** to the wall **82** of the non-drive side of the hydraulic fracturing pump **70**.

[0060] FIGS. **7**A and **7**B show lower and upper views, respectively, of a stem **200** of one embodiment of the present invention. In FIG. **7**A, the narrow diameter portion **202** has external threads **204** formed thereon. A flange **206** is formed between the narrow diameter portion **202** and the wide diameter portion **208**. The external threads **204** will engage with the internal threads formed in the aperture **132** of the pinion shaft **130**.

[0061] FIG. **7**B shows that there is a socket **210** formed in the end of **212** of the wide diameter portion **208** of the stem **200**. The socket **204** is a square socket that is adapted to receive a square tool therein. Alternatively, within the concept of the present invention, an extension can be used in place of the socket **210** so that a wrench, or similar tool, can be used so as to achieve the necessary rotation.

[0062] FIG. **8**A shows an alternative embodiment of the stem **300** as used in the present invention. The stem **300** includes a narrow diameter portion **302**, a flange **304** and a wide diameter portion **306**. The narrow diameter portion **302** is simply a pin that is inserted into the aperture **132** of the pinion shaft **130**. In order to achieve sufficient rotation, the discoidal portion **308** of the stem **300** includes holes **310** and **312**. Suitable fasteners can extend through the holes **310** and **312** so as to affix the stem **300** to the end of the pinion shaft **130**.

[0063] FIG. **8**B illustrates the opposite end of the stem **300**. As can be seen, the wide diameter portion **306** has a socket **314** formed therein. The holes **310** and **312** are illustrated as extending through the thickness of the flange **308**.

[0064] The present invention utilizes a stem that engages with the pinion shaft, along with a cover that houses a rotary seal. The cover has a magnetic cap with the O-ring seal. The cover attaches in place over the pinion access port of the pump's non-drive side bull gear cover. The stem has, in the preferred embodiment, a three-quarter inch square drive socket at an end that can be engaged with a wrench or ratchet. The stem is either threaded or bolted to the non-drive side of the pinion shaft of the pump. The threaded-style stem will center itself in the lifting eye hole of the pinion shaft. The bolt-on stem would use a centering lug.

[0065] To use the assembly of the present invention, the operator will pull on the cap until the magnets release. The cap is then released so that it swings down on the shoulder bolt. The operator can then insert a three-quarter inch square drive extension in the tool and can turn the pump using a ratchet or other tool that engages with the square drive.

[0066] The foregoing disclosure and description of the invention is illustrative and explanatory thereof. Various changes in the details of the illustrated construction can be made is the scope of the present invention without departing from the true spirit of the invention. The present invention should only be limited by the following claims and their legal equivalents.

We claim:

1. A fracturing pump pinion rotation assembly comprising:

a stem having a portion adapted to be threaded to or bolted to a non-drive side of a pinion shaft, said stem having a socket or an extension adapted to be manipulated by a tool such that a rotation of the stem causes a corresponding rotation of the pinion shaft; and

a cover having an opening therein, said cover adapted to be affixed to a wall of the non-drive side of the fracturing pump, the opening overlying the socket or extension of said stem such that the socket or extension is accessible from an exterior of the fracturing pump.

2. The fracturing pump pinion rotation assembly of claim **1**, said cover having an annular portion extending outwardly away from the wall of the non-drive side of the fracturing pump, the opening of said cover being defined by an interior of the annular portion of said cover.

3. The fracturing pump opinion rotation assembly of claim **2**, further comprising:

a cap removably or pivotally connected to an end of the annular portion of said cover, said cap being movable between a first position covering the opening of the annular portion and a second position exposing the socket or extension of said stem through the opening of the annular portion of said cover.

4. The fracturing pump opinion rotation assembly of claim **3**, the annular portion of said cover having a bolt hole formed at an end thereof, the cap having a bolt hole formed adjacent a periphery of said cap, the fracturing pump pinion rotation assembly further comprising:

a shoulder bolt extending through the bolt hole of said cap and affixed within the bolt hole of the annular portion of said cover.

5. The fracturing pump opinion rotation assembly of claim **4**, said cap being pivotable around said shoulder bolt so as to move between the first position and the second position.

6. The fracturing pump opinion rotation assembly of claim **5**, further comprising:

a magnet affixed to either a surface of said cap that faces the annular portion of said cover or to the end of the annular portion of said cover, said magnet adapted to releasably affix said cap over the opening of the annular portion of said cover.

7. The fracturing pump pinion rotation assembly of claim **6**, said magnet comprising a plurality of magnets arranged in spaced relation to each other around the surface of said cap.

8. The fracturing pump pinion rotation assembly of claim **6**, said magnet comprising a plurality of magnets arranged in spaced relation at the end of the annular portion of said cover.

9. The fracturing pump pinion rotation assembly of claim **3**, further comprising:

an O-ring seal positioned between said cap and the annular portion of said cover, said O-ring seal adapted to seal the opening of the annular portion of said cover.

10. The fracturing pump pinion rotation assembly of claim **1**, said stem having a narrow diameter portion and a wide diameter portion with a flange formed between the narrow diameter portion and the wide diameter portion.

11. The fracturing pump pinion rotation assembly of claim **10**, the narrow diameter portion having an end opposite the wide diameter portion adapted to engage with the pinion shaft.

12. The fracturing pump pinion rotation assembly of claim **11**, the wide diameter portion of said stem extending away from the pinion shaft, the flange bearing against an end of the pinion shaft.

13. The fracturing pump pinion rotation assembly of claim **12**, the wide diameter portion of said stem extending into the opening of said cover.

14. The fracturing pump pinion rotation assembly of claim **13**, further comprising:

a rotary seal interposed between the wide diameter portion of said stem and the wall of the non-drive side of the fracturing pump, said rotary seal adapted to allow the stem to rotate in relation to the wall of the non-drive side of the fracturing pump.

15. The fracturing pump pinion rotation assembly of claim **1**, said cover having a discoidal portion, wherein the opening is formed centrally through the discoidal portion, the discoidal portion having a plurality of holes formed in spaced relation radially outwardly of the opening of said cover, the fracturing pump pinion rotation assembly further comprising:

a plurality of fasteners extending through the plurality of holes and engaging with the wall of the non-drive side of the fracturing pump.

16. The fracturing pump pinion rotation assembly of claim **1**, wherein the socket or extension is a drive socket.

17. The fracturing pump pinion rotation assembly of claim **16**, wherein the drive socket is adapted to be engageable with the tool, the tool being a wrench or a ratchet.

18. The fracturing pump pinion rotation assembly of claim **10**, wherein the narrow diameter portion of said stem is threaded.

19. The fracturing pump pinion rotation assembly of claim **10**, wherein the narrow diameter portion is a pin.

20. The fracturing pump pinion rotation assembly of claim **3**, wherein said cap is pivotally connected to the end of the annular portion of said cover, said cap being slidable along a bolt secured to the annular portion of said cover so as to separate from the annular portion of said cover.

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