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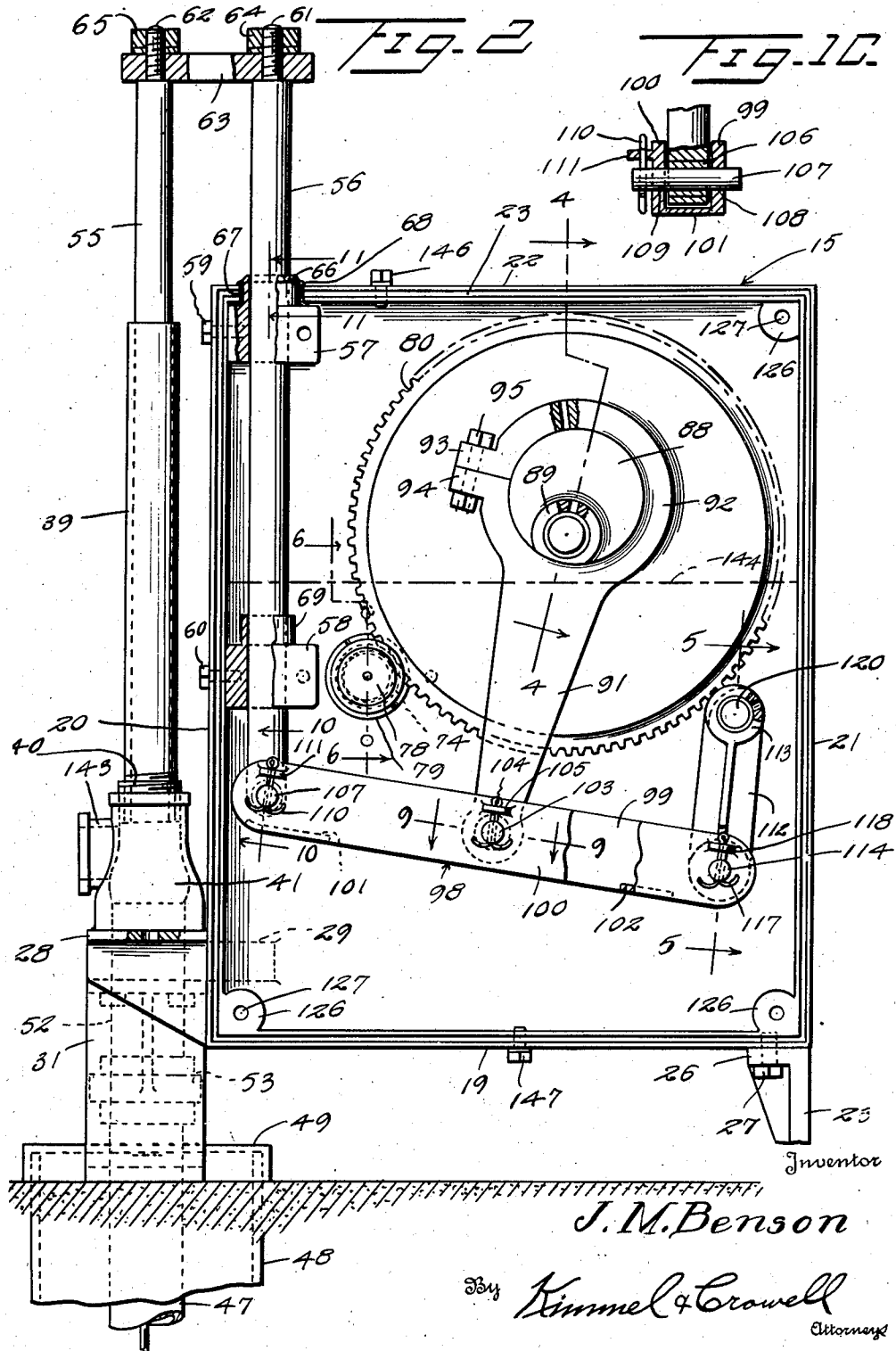
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WATER PUMP

Filed Feb. 10, 1941

3 Sheets-Sheet 2



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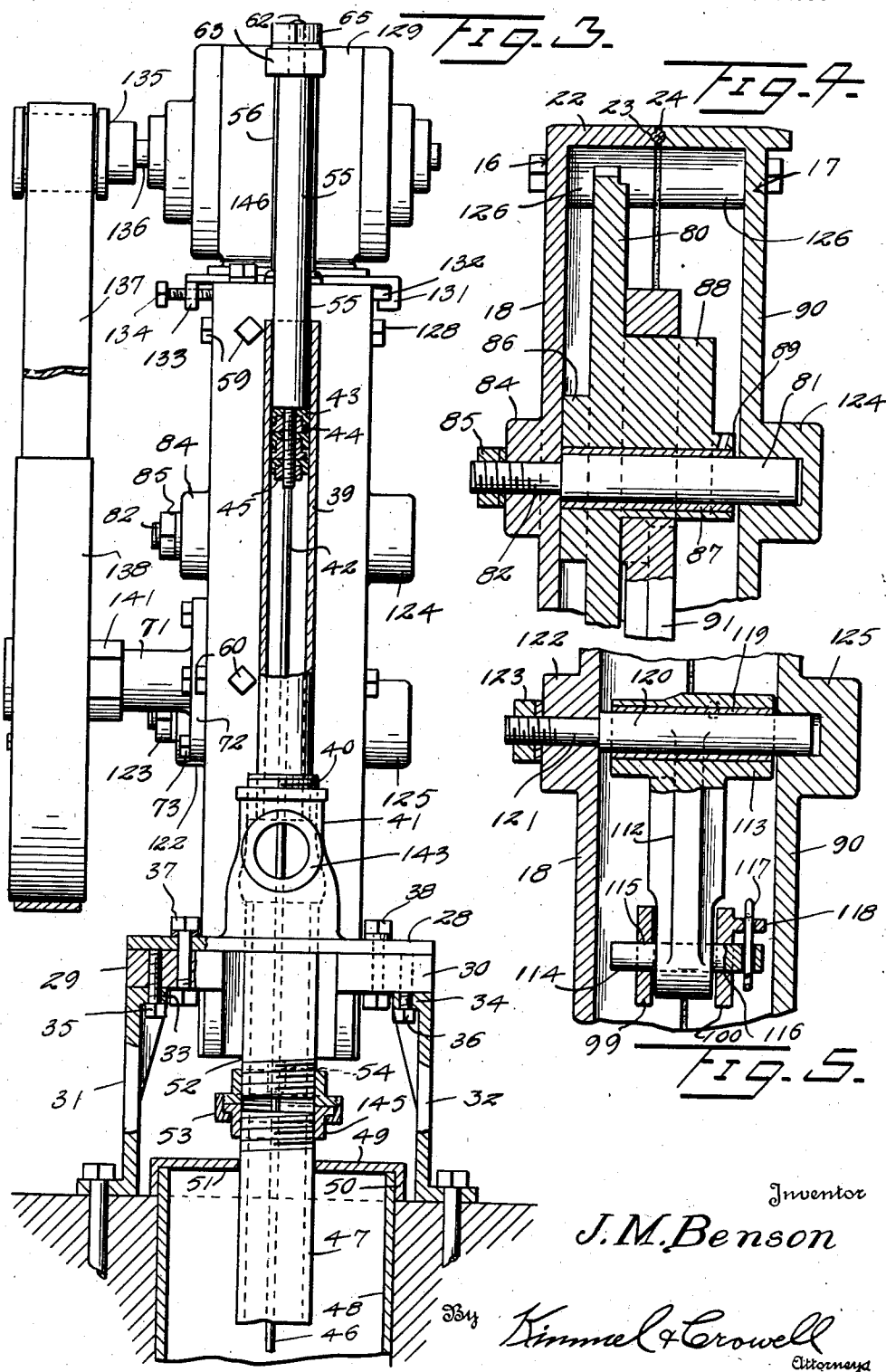
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WATER PUMP

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5 Claims. (Cl. 103—205)

This invention relates to reciprocating pumps.

An object of this invention is to provide a pump structure wherein the operating features of the pump are enclosed in a lubricant chamber so that there is no possibility of water entering the chamber.

Another object of this invention is to provide a pump structure wherein the major portions thereof may be formed of cast metal requiring a minimum of machining.

A further object of this invention is to provide a pump structure which is simple in construction and wherein the pulling force on the pump rod is parallel with the length of the rod.

A further object of this invention is to provide a pump in which the power means for the pump is positioned in offset relation to the pump rod and in which the pumping cylinder is not connected with the operating means for the rod so that water or other fluid leaking out of the pumping cylinder will not work its way into the oil-sealed pump operator housing.

A still further object of this invention is to provide a pump structure which is so constructed that it may be quickly connected to the well pipe and may also be quickly disconnected therefrom, the well pipe and pumping rod connections being positioned closely together and also including a separable coupling and a casing cap for preventing dropping of the well pipe after the pump is disconnected.

A further object of this invention is to provide a pump structure including a power member in the form of an electric motor and an improved means for mounting the motor on the pump housing so that the motor may be adjusted to provide the desired tension on the driving belt, and so that the motor may be quickly removed or replaced.

A further object of this invention is to provide an improved means for coupling the pitman with the driving lever and the pump rod operator.

Embodying the objects aforesaid and others which may hereinafter appear, the invention consists of the novel construction, combination and arrangement of parts to be more specifically referred to and illustrated in the accompanying drawings, wherein is shown an embodiment of this invention, but it is to be understood that changes, variations and modifications may be resorted to which fall within the scope of the invention as claimed.

In the drawings:

Figure 1 is a detail side elevation of a pump

constructed according to an embodiment of this invention,

Figure 2 is a side elevation partly in section of the housing with the cover or one side removed,

Figure 3 is a detail front elevation partly broken away and in section,

Figure 4 is a fragmentary sectional view taken on the line 4—4 of Figure 2,

Figure 5 is a fragmentary sectional view taken on the line 5—5 of Figure 2,

Figure 6 is a fragmentary sectional view taken on the line 6—6 of Figure 2,

Figure 7 is a sectional view taken on the line 7—7 of Figure 6,

Figure 8 is a side elevation of the driving gear bearing structure,

Figure 9 is a sectional view taken on the line 9—9 of Figure 2,

Figure 10 is a sectional view taken on the line 10—10 of Figure 2,

Figure 11 is a fragmentary sectional view taken on the line 11—11 of Figure 2, and

Figure 12 is a fragmentary side elevation of the mounting for the power member.

Referring to the drawings, the numeral 15 designates generally a housing which is constructed of complementary housing members 16 and 17. The housing member 17 comprises a removable cover by means of which the operating parts in the housing member 16 may be exposed for repair or replacement when necessary.

The housing member 16 comprises a vertical side wall 18, a bottom wall 19, front and rear end walls 20 and 21 respectively, and a top wall 22. The bottom, end and top walls of the housing member 16 are provided along their inner edges with a groove or channel 23 within which a sealing gasket or element 24 is adapted to engage. The housing member 17 is constructed similar to the housing member 16 including side, end and bottom walls complementary to the housing member 16 so as to form a rectangular housing.

The housing 15 is supported by means of a rear leg 25 having an upper flange 26 which is secured by a fastening device 27 to the bottom wall 19 of the housing member 16. A horizontally disposed plate 28 is fixed relative to the front wall 20 of the housing member 16, being supported forwardly from the front wall 20 by means of bracing members 29 and 30 which are cast integral with the housing member 16 and the housing member 17. A pair of front supporting legs 31 and 32 having upper flanges 33 and 34, respectively, are secured by fastening devices 35 and

36, respectively, to the plate supporting members 29 and 30. The plate 28 is fixedly secured to the supporting members 29 and 30 by fastening devices 37 and 38 which engage through the supporting members 29 and 30.

A pumping cylinder 39 is disposed forwardly of the forward wall 20 of the housing member 16 and is secured at its lower end in a reducing connector 40 which engages in a substantially T-shaped connection 41 which is fixed at its lower end to the plate 28. A pumping rod 42 is disposed axially of the cylinder 39 and has secured thereto a plurality of cup-shaped washers 43 which are held in spaced apart relation by means of washers 44 and tightly secured on the pumping rod 42 by means of a lower nut 45. The pumping rod 42 at its lower end is adapted to be connected to a pumping rod member 46 which extends downwardly through the well pipe 47. The pipe 47 is disposed axially of a well casing 48 which is extended into the ground and preferably, a cap 49 having an outer cylindrical flange 50 engages over the top of the well casing 48 and is provided with an axial opening 51 through which the well pipe 47 extends. A relatively short section of pipe 52 is connected to the T or coupling member 41 and is also connected to the well pipe 47 by means of a conventional union 53. The pumping rod 42 is adapted to be connected to the rod 46 by means of a coupling 54 which, when the rod 42 is in its uppermost position, is adapted to be disposed adjacent the union 53 so that when the union 53 is uncoupled from the well pipe 47, the rod 42 may also be uncoupled at substantially the same point from the rod 46.

The pumping cylinder 39 at its upper end is open and a vertically slidable shaft 55 is formed integral with the pumping rod 42 and slidably extends into the pumping cylinder 39. In practice the pumping rod 42 is formed as a reduced extension of the shaft 55.

A vertically slidable shaft 56 is slidable in a pair of spaced apart bearings 57 and 58 which are secured to the housing member 16 by fastening devices 59 and 60 respectively. The upper end of the shaft 56 is provided with a reduced extension 61 and the upper end of the shaft 55 is also provided with a reduced extension 62. A cross head 63 engages the reduced extensions 61 and 62 and is tightly secured thereon by nuts 64 and 65. The bearing or guide member 57 is an upper guide member and is provided with a cylindrical guide extension 66 which extends through an arcuate recess 67 and the guide extension 66 is sealed in the recess 67 by a sealing means 68. The guide member 58 is a lower guide member and is also provided on its upper side with a cylindrical guide bushing 69 through which the shaft 56 slidably engages.

A drive shaft 70 is rotatably mounted in a cylindrical bearing 71 which is provided with an annular flange 72 secured by fastening devices 73 to the outer side of the side wall 18 of the housing member 16. The shaft 70 inwardly from the side wall 18 has secured thereto or formed integral therewith a driving gear 74. The bearing member 71 is formed with a cylindrical extension 75 which extends into the housing member 16 through an opening 76. The bearing extension 75 is formed with an arcuate cutout 77 intermediate its ends, and preferably, the gear 74 is also provided with a shaft extension 78 rotatably engaging in a cylindrical bearing 79 which ex-

tends inwardly from the bearing or housing member 75.

A relatively large driven gear 80 is adapted to mesh with the driving gear 74 and is rotatably mounted on a stationary shaft 81. The shaft 81 is formed with a reduced extension 82 extending through the wall 18 and also through a boss 84. A nut 85 is threaded onto the reduced extension 82 so as to fixedly secure the shaft 81 relative to the wall 18. The gear is provided with a hub 86 which spaces one side of the gear 80 from the side wall 18. A bushing or bearing sleeve 87 is mounted within the hub 86 and extends through the gear 80 and rotatably engages the stationary shaft 81. An eccentric 88 is fixed to or formed integral with the inner side of the gear 80 and the bearing sleeve 86 extends through the eccentric 88 as shown in Figure 4. A reduced hub 89 is formed with the inner side of the eccentric 88 and is disposed closely adjacent the side wall 90 of the housing member 17.

A pump operating lever 91 which is formed with a split ring 92 is disposed in the housing 15, the ring 92 engaging the eccentric 88. The ring 92 is provided with a pair of ears 93 and 94 which are secured together by a fastening device 95. In this manner the ring 92 may be drawn together so as to provide the desired bearing surface on the periphery of the annular eccentric 88.

The lever 91 at its lower end is provided with an enlarged boss 96 having a bearing sleeve 97 extending therethrough. A pitman generally designated as 98 is adapted to be connected to the lever 91 and the pitman 98 comprises a pair of elongated flat bars 99 and 100, which at their lower edges are secured together by means of a pair of spacing plates 101 and 102. The plates 101 and 102 are adapted to be welded to the bars 99 and 100. A pin 103 extends through the two pitman bars 99 and 100 and through the bushing 97 and is held against endwise movement by means of a cotter pin 104 which extends through a lug 105 fixed to the outer side of the pitman bar 100.

The lower end of the vertically slidable shaft 56 as shown in Figure 10 is provided with a transversely extending opening in which a bearing sleeve 106 is mounted. A pin 107 extends through openings 108 and 109 which are formed in the pitman bars 99 and 100 respectively and a cotter pin 110 is extended through the pin or shaft 107 and also extends through an outstanding lug 111 which is welded to the outer side of the pitman bar 100.

A rock arm 112 which at its upper end is formed with a cylindrical bearing 113 is connected to the opposite end of the pitman 98 by means of a pin or shaft 114. The pin 114 extends through openings 115 and 116 formed in the pitman bars 99 and 100 and a cotter pin 117 engages through one end of the pin or shaft 114 and also through a lug 118 which is secured in outstanding relation to the outer side of the pitman bar 100. The bearing 113 has mounted therein a bearing sleeve 119 which engages a stationary shaft 120. The shaft 120 is provided with a reduced stub shaft 121 engaging through the side wall 18 and also through a boss 122 carried by the side wall 18. A nut 123 is threaded onto the stub shaft 121 and tightly holds the shaft 120 relative to the side wall 18.

The side wall 90 is provided with a bearing boss 124 within which an end of the stationary shaft 81 engages. The boss 124 is closed at its outer end so that no lubricant or other liquid may leak out

from the housing 15. A bearing boss 125 is carried by the side wall 90 of the housing member 17 and one end of the stationary shaft 120 engages within the boss 125 as shown in Figure 5.

The two housing members 16 and 17 have fixed in the corners thereof lugs or plugs 126 provided with holes 127 through which fastening devices 128 engage so as to hold the two housing members 16 and 17 tightly together. A power member 129 in the form of an electric motor is mounted on top of the housing 15 and the base of the motor 129 is provided with a base plate 130. The plate 130 on one edge thereof has fixed thereto a pair of L-shaped slide members 131 which engage over an outstanding flange 132 carried by the housing member 17 at the upper end of the side wall 90. The base 130 on the edge thereof opposite from the slide members 131 has fixed thereto a nut 133 through which a set screw 134 engages. In this manner the power member 129 may be adjusted lengthwise of the upper end of the housing 15. The motor 129 has a driving pulley 135 mounted on the shaft 136 thereof and an endless belt 137 is trained about the driving pulley 135. A driven pulley 138 is fixed to a stub shaft 139 by means of a set screw 140. The stub shaft 139 is formed integral with the shaft 70. A packing gland 141 is threaded onto the bearing 71 and a packing 142 is disposed within the gland member 141 so as to prevent any lubricant or other liquid from leaking out of the bearing member 71.

In the use and operation of this pump, the motor 129 is adapted to be connected to a suitable source of electric current supply and upon operation of the motor 129 the driven pulley 138 will be rotated. Rotation of the pulley 138 will effect rotation of the driven gear 80 through the driving gear 74. As the gear 80 rotates the cam 88 will rotate so as to vertically reciprocate the pitman operating lever 91. Rocking of the pitman 98 will effect vertical reciprocation of the shaft 56 which through the cross head 63 will reciprocate the plunger shaft 55. The water which is pumped from the well pipe 47 will be ejected through the branch 143 formed as part of the T 41. The housing 15 is adapted to be filled with a lubricant, such as oil or the like, and the quantity of lubricant in the housing 15 is substantially greater than one-half of the housing 15, the level of the lubricant being defined by the line 144 in Figure 2.

In the event it is desired to disconnect the pumping structure from the well pipe 47, the union 53 is uncoupled from the pipe member 52 which is carried by the pump structure and the rod coupling member 54 is uncoupled from the two rod members 42 and 46. The lower portion 145 of the union 53 is retained on the pipe 47 so that when the union 53 is uncoupled from the pump, the union part 145 will contact with the top of the cap 49 so as to thereby prevent the well pipe 47 from dropping down into the casing 48 below the upper end of the casing 48.

It will be apparent from the foregoing that no water from the pumping cylinder 39 will be able to enter the housing 15 so that the operating parts of the pump will be thoroughly sealed against the entrance of water, and the sealing of the pump structure in the housing 15 will not depend on any gland between the pump cylinder 39 and the housing 15. The operating elements of the pump structure will, therefore, be able to freely operate in a liquid lubricant so that these

elements will not become deteriorated by contact with any water from the pump. Furthermore, by providing the housing 15 in two complementary parts and by supporting the operating elements from only part, the housing may be readily uncoupled to expose the operating parts by merely removing the cover or one side 17 of the housing. A filling plug 146 is threaded into the top wall 22 of the housing member 16 so that the lubricant may be discharged into the housing 15 and a drain plug 147 is threaded into the bottom wall 19 of the housing member 16.

What I claim is:

1. In a well pumping means having a closed housing, a vertically disposed cylinder exteriorly of the housing, a reciprocatory sectional pumping rod operating in and depending from the cylinder, a piston attached to the rod and means within and extending from the housing for operating said rod; a horizontally disposed apertured plate exteriorly of and fixed relative to said housing, said plate being arranged below and spaced from the cylinder, a substantially T-shaped upstanding coupling connection on and fixed at its lower end to said plate, a tubular reducing connection between the upper end of said coupling connection and the lower end of the cylinder for maintaining the latter vertical and for establishing communication between the cylinder and T-coupling connection, supporting means for said plate, a sectional well pipe attached to said T-coupling connection and depending through the aperture in said plate, and said supporting means formed with openings to provide for access to said pipe and rod.

2. In a well pumping means, a cylinder, a pumping rod operating in said cylinder, a piston attached to said rod, means for operating said rod, a horizontally disposed plate fixed to the housing of said pump, a T-shaped coupling connection fixed to said plate, a reducing connection for establishing communication between the cylinder and T-coupling connection, a well pipe attached to said T-coupling connection, and means including a casing and a casing cap for preventing dropping of the well pipe into the casing after the same is disconnected.

3. A pump structure including a well pipe, a pump rod, means whereby the pump structure may be connected to and disconnected from well pipe, said means for connecting said well pipe and pump rod being positioned closely together, and including a separable coupling, a casing, and means whereby dropping of the well pipe into said casing after the pump is disconnected therefrom may be prevented.

4. A pumping mechanism comprising a pump cylinder, a piston slidable in said cylinder, a pump rod secured to said piston, a pair of spaced apart bearings in which said shaft is slidable, a horizontally disposed plate and a T-shaped coupling connected to said plate, means for establishing communication between said cylinder and said T-coupling connection, a well pipe attached to said T-coupling connection, and means whereby said well pipe may be held in fixed position after it has been disconnected.

5. In combination a pump, including a housing, a horizontally disposed plate fixed to said housing, a cylinder disposed exteriorly of said housing, a pumping rod operating in said cylinder, a piston attached to said rod, and a power member for operating said pump.

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