Aug. 19, 1941. A. J. LAGESON 2,252,773

PUMP FOR PITLESS WELLS

Filed Aug. 25, 1938 2 Sheets-Sheet 1

Fig. 1.

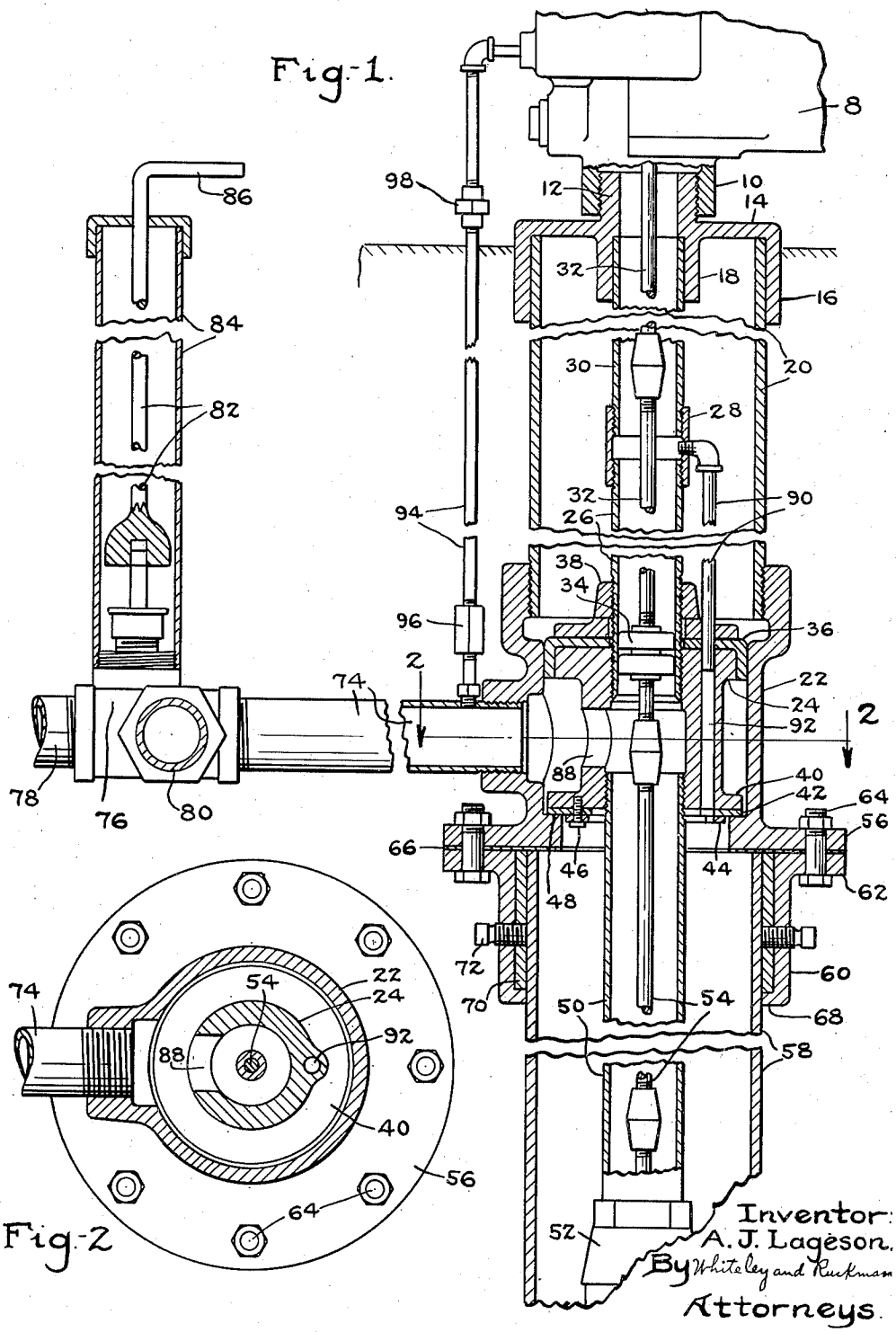


Fig. 2

Inventor:
A. J. Lageson.
By Whiteley and Ruckman
Attorneys.

Aug. 19, 1941. A. J. LAGESON 2,252,773

PUMP FOR PITLESS WELLS

Filed Aug. 25, 1938 2 Sheets-Sheet 2

Fig. 3

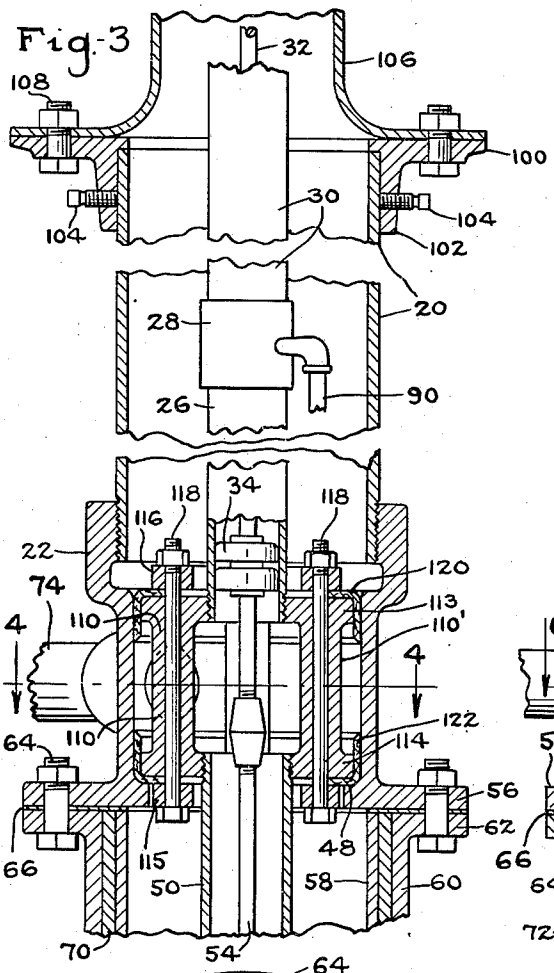


Fig. 5

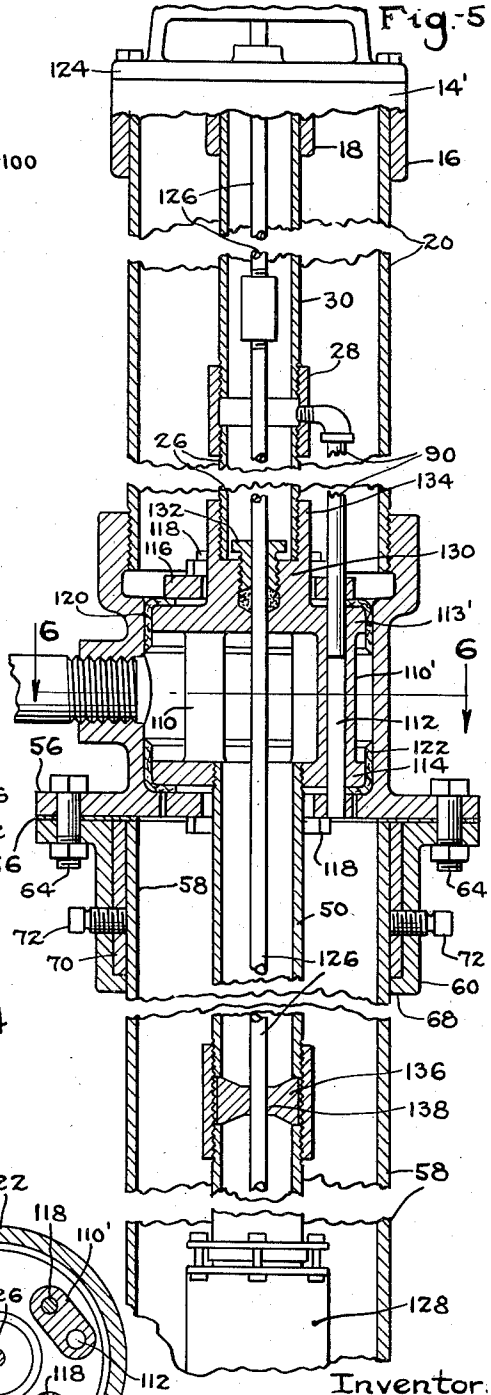


Fig. 4

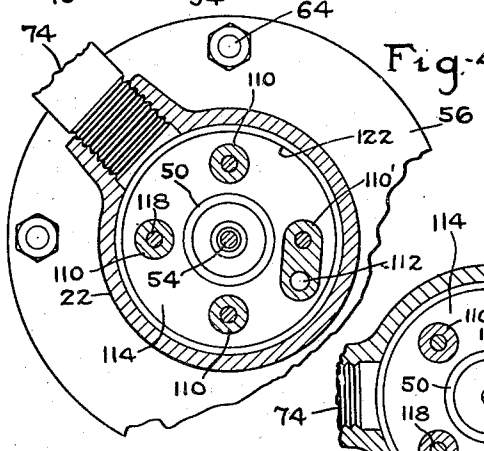
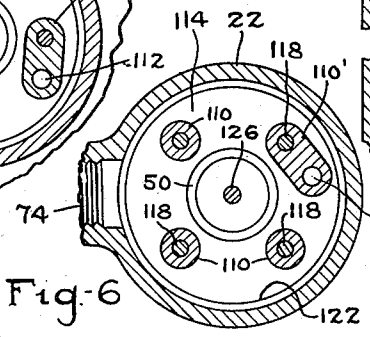


Fig. 6



Patented Aug. 19, 1941

2,252,773

UNITED STATES PATENT OFFICE

2,252,773

PUMP FOR PITLESS WELLS

Arnold J. Lageson, Minneapolis, Minn., assignor to R. R. Howell Company, Minneapolis, Minn., a corporation

Application August 25, 1938, Serial No. 226,726

3 Claims. (Cl. 103—179)

My invention relates to pumps for pitless wells. It relates more particularly to pumps for pumping water from pitless wells. The provision of the common well pit has been one of the chief objections to the use of an underground pump, because in many cases the pit becomes partly filled with seepage and dirty or contaminated water which is apt to find its way into the well. An object therefore of the invention is to provide a pump in connection with which the customary pit is done away with in order to meet the requirements of health authorities. Another object is to provide a pump which will have the advantages of underground discharge without danger of freezing. Another object is to provide a pump in which the internal parts thereof may be readily withdrawn from the well for repairs or other purposes. Another object is to provide in connection with the underground discharge, a drain for the upper portion of the well pipe in order that any small leakage which might occur thereinto will drain back into the well. Another object is to provide in connection with the underground discharge, an outer casting which remains permanently in place after the installation has been completed and an inner casting seated therein which latter casting together with the pump pipe may be readily withdrawn when it becomes necessary to replace the packing or to pull out the pump pipe for any reason.

The novel features which I believe to be characteristic of my invention are set forth with particularity in the appended claims. The invention itself, however, both as to its organization and method of operation, together with additional objects and advantages thereof will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings, in which,

Fig. 1 is a view in central vertical section showing one form of the invention.

Fig. 2 is a view in section on the line 2—2 of Fig. 1.

Fig. 3 (Sheet 2) is a view in central vertical section of a modification.

Fig. 4 is a view in section on the line 4—4 of Fig. 3.

Fig. 5 is a view in central vertical section showing another form of construction.

Fig. 6 is a view in section on the line 6—6 of Fig. 5.

Referring first particularly to the form of invention shown in Figs. 1 and 2, the numeral 8 designates a deep well head upon which may be mounted any suitable motor for operating the pump. The head 8 carries a depending internally threaded annular flange 10 for engagement with an externally threaded annular flange 12 extending up from a casting 14. This casting embodies a depending outer annular flange 16 and a depending inner annular flange 18. The top of an upper well casing 20 fits snugly inside of the flange 16, the lower end of this casing being externally threaded for engagement with internal threads formed in the upper enlarged portion of a casting 22. The casting 22 remains stationary after the installation has been completed and is smoothly machined on the inside to permit seating of an inner casting 24. The casting 24 is hollow and secured in the upper end thereof is the lower end of a pipe section 26, the upper end of which is connected by a sleeve coupling 28 with the lower end of a pipe section 30 whose upper end fits into the flange 18. The upper member 32 of a pump rod attached at its upper end to the pump operating mechanism extends down through the pipe sections 30 and 26 and carries a differential plunger 34 which works in the lower portion of the pipe section 26 which constitutes a cylinder therefor.

A seal is provided between the two castings 22 and 24. As shown in Fig. 1 a lead packing 36 is placed on top of the casting 24 and the peripheral portion of this packing extends down between the two castings. The packing 36 is held securely in place by a flanged and internally threaded lock nut device 38 which engages external threads on the lower portion of the pipe section 26. The lower end of the casting 24 is provided with a peripheral flange 40 fitted with a washer type lead packing 42 held in place by a ring 44 and screw bolts 46 passing therethrough and threaded into the casting 24. The ring 44 and screw bolts 46 may be of brass to prevent rusting. The packing 42 rests upon an internal shoulder 48 with which the lower end of the casting 22 is provided. The inner portion of the casting 22 is preferably treated with a compound to prevent excessive rust. The upper end of a drop pipe 50 is screwed into the lower end of the inner casting 24 and the lower end of the pipe 50 carries a cylinder 52 for the plunger provided on the lower end of the lower member 54 of the pump rod, the upper end of this member 54 being secured to the bottom of the differential plunger 34. The shoulder 48 in the bottom of the fixed casting 22 provides a resting place for the inner removable casting 24. Since the drop pipe 50 is screwed into the bottom of the casting 24, a com-

plete seal at both top and bottom between the two castings is made because the weight of the drop pipe 50, cylinder 52 and pump rod will act to keep the inner casting 24 in proper sealing position. Furthermore the upper portion of the pump pipe is extended from the differential cylinder 26 up into the above ground pump, thus eliminating any possibility of the casting 24 changing its position during the up and down pumping action of the pump rod to which the differential plunger 34 is attached. There is preferably a slight inward taper in the casting 22 so that the packing 36 will fit snugly in place.

The bottom of the casting 22 is provided with an outwardly extending annular flange 56 to which the lower well pipe or casing 58 is secured in suitable manner. As shown in Fig. 1 a collar 60 is employed, the top of this collar having an outwardly extending peripheral flange 62 which is secured to the flange 56 by bolts 64 with a gasket 66 interposed between the two flanges. The bottom of the collar 60 is provided with an inwardly extending annular flange 68 which fits around the upper portion of the casing 58, the upper end of this casing butting against the gasket 66 and the space between the body of the collar 60 and the casing being filled with packing 70. Set screws 72 passing through the collar 60 bear upon the casing 58.

The casting 22 is tapped to receive an underground discharge pipe 74 which it will be understood is located below the frost line. The pipe 74 contains a two way discharge valve indicated at 76 for controlling the discharge through the two outlets indicated at 78 and 80 whereby the liquid being pumped may be delivered to a tank or other desired place. A shut off rod 82 attached to the valve 76 extends up through a tube 84 and at its upper end is provided with a handle 86. A port 88 in the casting 24 provides for passage of the liquid from the drop pipe 50 into the discharge pipe 74. A drain pipe 90 is connected at its upper end through the coupling 28 with the pipe section 26 and its lower end extends down into a vertical passageway 92 passing through the casting 24. Any small leakage which might occur past the differential plunger 34 drains back into the well through the drain pipe 90. An air line pipe 94 containing an upwardly closing check valve 96 connects the top of the pump with the discharge pipe 74. The pipe 94 includes a coupling 98 which may be disconnected in order that the inside parts may be withdrawn from the well casing through the outer casting 22 for repair or other purposes.

The form of invention shown in Figs. 3 and 4 is similar in some respects to the form just described and hence the same reference numerals so far as applicable are used. An annular member 100 is provided with a depending annular flange 102 into which the upper well casing 20 fits snugly, these two members being secured together by set screws 104. A pump frame 106 which may carry hand operating mechanism is secured to the member 100 by bolts 108. An outer casting 22 like that previously described is provided but inside of this casting, there is a casting which includes four pillars spaced 90° apart around an axial line. Three of these pillars are designated by the numeral 110 while the other pillar is designated 110'. This latter pillar is made broader than the others and contains a vertical passageway 112 which receives the lower end of the drain pipe 90. The four pillars are cast integrally with upper and lower annular heads 113 and 114 which are internally threaded. A ring 115 is positioned adjacent the lower head 114 while a ring 116 is positioned adjacent the upper head 113. Bolts 118 pass through these two rings and through vertical passages in the four pillars. A packing member 120 which may be of leather or other suitable material is held at its inner margin between the head 113 and the upper ring 116. The outer margin of the packing 120 extends downwardly in contact with the inner surface of the casting 22. A similar packing member 122 is held at its inner margin between the lower head 114 and the lower ring 115. The outer margin of the packing 122 extends upwardly in contact with the inner surface of the casting 22. The upper end of the drop pipe 50 is screwed into the lower head 114 while the lower end of the pipe section 26 is screwed into the upper head 113. The construction may otherwise be similar to that disclosed in Fig. 1.

The form of invention shown in Figs. 5 and 6 is similar in many respects to that described in connection with Figs. 3 and 4 and hence the same reference numerals so far as applicable are used. The casting 14' is made flat on top upon which is secured the base 124 of a motor whose shaft is secured to a pump shaft 126 extending down to and operating a turbine pump 128 located near the bottom of the well casing 58. In this form of the invention the casting head 113' instead of being flat on top is provided with an inner upwardly extending annular flange 130 internally threaded to receive a packing gland 132 for the pump shaft 126. The head 113' is also provided with an outer upwardly extending annular flange 134 internally threaded to receive the lower end of the pipe section 26. The drop pipe 50 contains at least one spider 136 which carries a bearing 138 for the pump shaft 126.

I claim:

1. In combination a pump head, a casing connected therewith, a cylindrical casting connected with the casing and having an underground discharge pipe leading from the space therein, a second casting formed with spaced top and bottom closure members held together by posts forming part of the castings and bolts running through openings in said posts, said second casting forming in conjunction with the first named casting a substantially open transfer chamber, a well pipe above and secured to the upper closure of said second casting, a well pipe below and secured to the lower closure of said second casting, a differential sealing plunger working in said upper well pipe above said transfer chamber, and pumping means connected therewith for causing delivery of liquid up the lower well pipe to said transfer chamber and thence to the discharge pipe.

2. In combination a pump head, a casing connected therewith, a cylindrical casting connected with the casing and having an underground discharge pipe leading from the space therein, a second casting formed with spaced top and bottom closure members held together by posts forming part of the castings and bolts running through openings in said posts, said second casting forming in conjunction with the first named casting a substantially open transfer chamber, a well pipe above and secured to the upper closure of said second casting, a well pipe below and secured to the lower closure of said second casting, a differential sealing plunger working in said upper well pipe above said transfer chamber, pump-

ing means connected therewith for causing delivery of liquid up the lower well pipe to said transfer chamber and thence to the discharge pipe, and a drainage tube having connection with the upper well pipe above the sealing plunger and continued through one of said posts to discharge into the casing below the chamber for permitting escape of water which may become trapped above the sealing plunger.

3. In combination a pump head, a casing connected therewith, a cylindrical casting connected with the casing and having an underground discharge pipe leading from the space therein, a second casting formed with spaced top and bottom closure members held together by posts forming part of the castings and bolts running through openings in said posts, means for holding said second casting within the first named casting, packing strips associated with said holding means for sealing the top and bottom closures to the walls of the first named casting whereby said second casting forms in conjunction with the first named casting a substantially open transfer chamber, a well pipe above and secured to the upper closure of said second casting, a well pipe below and secured to the lower closure of said second casting, a differential sealing plunger working in said upper well pipe above said transfer chamber, and pumping means connected therewith for causing delivery of liquid up the lower well pipe to said transfer chamber and thence to the discharge pipe.

ARNOLD J. LAGESON.