Feb. 23, 1926. 1,574,292

F. C. KELLEY

PUMP

Filed July 8, 1924

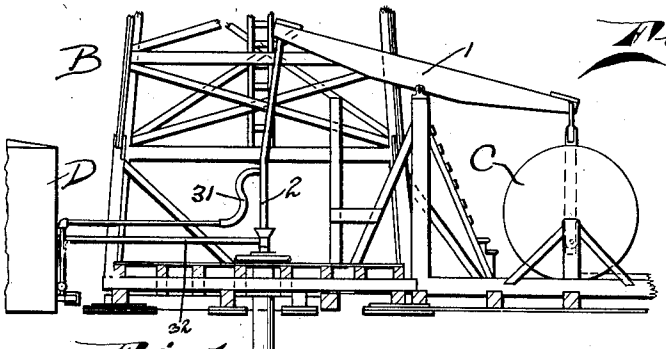


Fig. 1

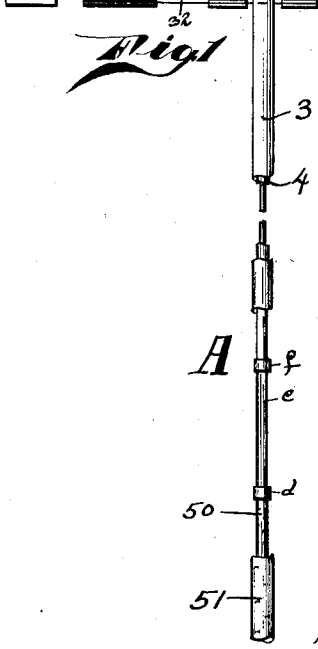


Fig. 4

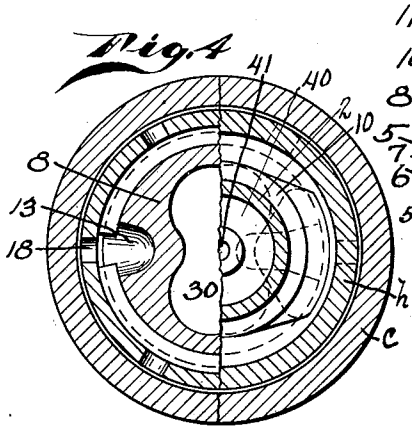
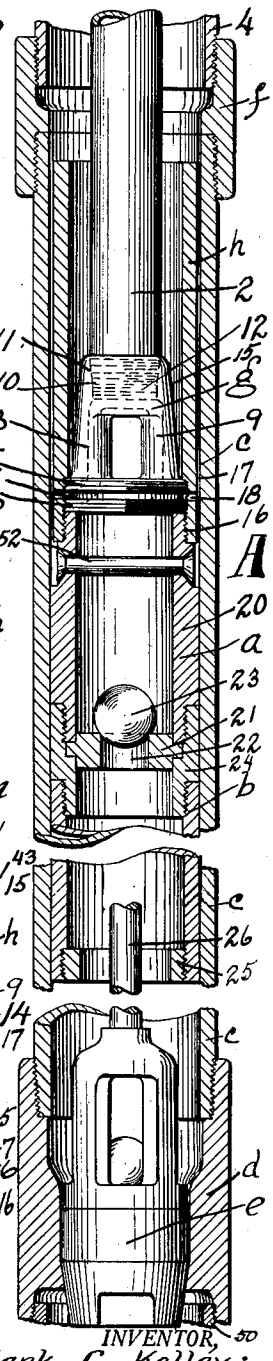


Fig. 2



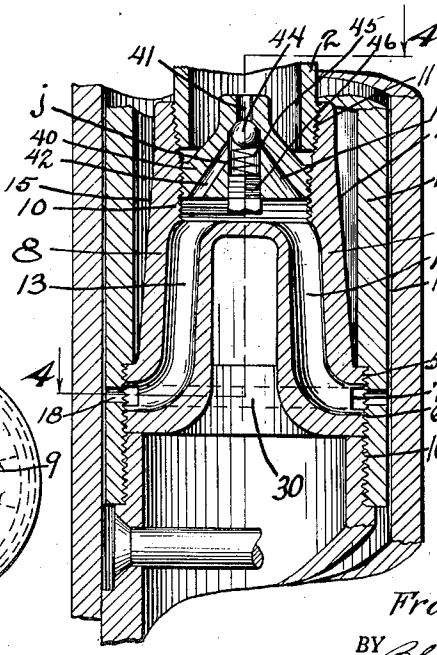


Fig. 5

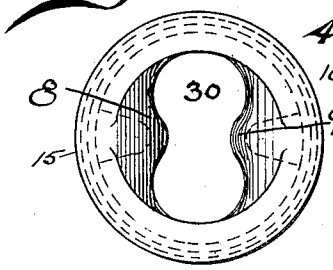


Fig. 3

INVENTOR,
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Patented Feb. 23, 1926. 1,574,292

UNITED STATES PATENT OFFICE.

FRANK C. KELLEY, OF LONG BEACH, CALIFORNIA, ASSIGNOR OF ONE-HALF TO ELMER W. RIGGLE, OF LOS ANGELES, CALIFORNIA.

PUMP.

Application filed July 8, 1924. Serial No. 724,776.

To all whom it may concern:

Be it known that I, FRANK C. KELLEY, a citizen of the United States, residing at Long Beach, in the county of Los Angeles and State of California, have invented new and useful Improvements in Pumps, of which the following is a specification.

This invention relates to pumps, and it has for objects the provision of an improved pump which will be superior in point of simplicity, inexpensiveness, durability and general serviceability. The pump particularly has to do with that type of pump in which a hollow plunger is adapted for reciprocation within a working barrel, the plunger being in close working fit with such working barrel, it being intended by the invention to lubricate the co-acting working surfaces of the plunger and the working barrel and likewise to prevent sand or other detritus or deleterious substances from in any manner sanding up the plunger during a pumping action.

The invention consists in the novel and useful provision, formation, construction, association, relative arrangement of parts, members and features, as well as the method of use of such parts, members and features, all as disclosed in certain of its embodiments in the accompanying drawing, described generally and more particularly pointed out in claims.

In the drawing:

Figure 1 is a fragmentary side elevation showing a portion of a well derrick and pumping elements thereon, as well as a string of casing reaching down to oil-bearing sand, the casing including within its length the novel invention;

Figure 2 is a fragmentary longitudinal cross sectional view, on an enlarged scale, illustrating features of the invention;

Figure 3 is a fragmentary longitudinal sectional view on an enlarged scale illustrating specific features associated with the working valve;

Figure 4 is a fragmentary cross sectional view on the line 4—4 of Figure 3; and,

Figure 5 is a bottom view of a member embodying a feature of the invention, and through which member oil is forced.

Referring with particularity to the drawing, the improved pump is designated as an entirety and in one embodiment by A, a derrick by B upon which is mounted pumping means C, and at one side of such derrick, means D for supplying fluid under pressure to certain portions of the pump. In accordance with the invention the pumping means C may include a walking beam 1 secured to the pump rod 2, which pump rod extends down within several strings of casing as 3 and 4, to where it is connected with the working valve *a*, which working valve in turn is secured to a hollow plunger *b*. Said plunger and working valve are received within the confines of a working barrel *c*, and coupled to the foot of such working barrel is a union *d* adapted to carry the standing valve *e*. The working barrel is connected by a union *f* to casing 4. The pump tubing 2 is hollow, and is ordinarily known as a hollow sucker rod, and such sucker rod or hollow pump tubing may be screw-threaded to a member *g* which is associated with the working valve *a*. This member *g* is of cage-like formation, in that it includes an annulus 5 provided with screw threads 6 and with a centrally disposed peripheral groove 7. Adapted to be attached to such annulus are two leg members 8 and 9 carrying at their upper extremities a curved member 10 provided with a curved chamber 11 the wall surrounding which bears screw threads and which screw threads are adapted to engage with screw threads on the extremity of the sucker rod or pump tubing 2, all as illustrated in Figure 2 at 12. The two legs are provided with ports 13 and 14 respectively communicating with the chamber in the member 10 and with the groove 7 as illustrated in Figure 3. The side walls of the legs taper from the annulus 5 upwardly and inwardly as illustrated at 15 so as to present a space between such legs and the inner surface of a tubular member *h*, which tubular member is screw-threaded as at 16 to the working valve *a*, and the external diameter of such tubular member *h* is such as to present a small space between its periphery and the inner surface of the working barrel, as illustrated at 17. The tubular member *h* is provided with one or more transverse ports 18 which, when said member *h* is in screw-threaded engagement with the working valve *a*, will register with the peripheral groove 7 on the member *g*. From the description just given it is evident that if fluid were forced

through the pump tubing 2 it would be forced through the ports 13 and 14 in the legs 8 and 9 respectively, and into the peripheral groove 7 and from thence out through the ports 18 and into the space 17 included between the member *h* and the pump barrel. The working valve includes a tubular member 20 carrying a part 21 formed with an opening 22 therein, and a ball valve 23 adapted to seat at the opening of such member 21. A coupling 24 connects such part 20 of the working valve *a* with the plunger *b*, which plunger, as has been stated, is of the hollow type. The lowermost extremity of such plunger carries an internal ring 25, and a Garbut rod 26 associated with the standing valve is passed up within the hollow plunger, and when it is desired to pull the pump for any reason whatsoever, a T carried by such rod will contact with the ring 25 and pull the standing valve from the member *d*. It is noted that the two legs 8 and 9 are spaced apart and that oil pumped past the standing and working valves resultant upon reciprocation of the plunger will be passed through the central opening 30 in the annulus 5 and through the space included between the legs 8 and 9 and into the space included between the pump tubing 2 and the inner surface of the tubular member *h*, and from thence into the casing 4, on up to the surface of the well; from thence it is conducted through means as illustrated at 31 to a sump or storage tank. In order to keep sand from collecting above the plunger resultant upon a pumping, fresh oil is forced under pressure or by gravity from the device D through a suitable pipe 32 down the pump tubing 2 to where it is passed into the space included between the tubing *h* and the inner surface of the working barrel, and the pressure of the oil forced from between the surfaces of the last named members is sufficient to keep the oil being pumped and which is heavy laden from sand, from entering between such tubular member and the working surface of the barrel, so that the plunger at all times contacts with a lubricated surface and does not have to contact with sand, which of course allows a close fitting plunger and one in which freezing is completely overcome. The inventor is aware that there are now on the market certain pumps designed to overcome the effect of sanding up and freezing, but such pumps must employ, because of their construction, a loose fitting plunger with resultant loss in the pumping efficiency.

A back pressure valve *j* is included within the chambered portion of the member 10 and the said valve includes a housing 40 provided with a central port 41 and two branch ports 42 and 43 opening from such central port and in direct communication with the ports 13 and 14. A ball valve member 44 is adapted to close the port 41 at its zone of association with the ports 42 and 43, such ball valve 44 seating against the wall surrounding the port, such seating being accomplished by means of a spring 45 having means 46 for regulating tension. Thus oil may be passed through the port 41 from the pump tubing 2 and into the ports 42 and 43, but back pressure of the oil upwardly within the ports 42 and 43 is prevented by the ball valve seating and preventing such back flow of the oil. It is simply a difference of cross sectional areas, as the pressure exerted by the oil or other fluid forced through the pump tubing and outwardly as between the member *h* and the inner surface of the working barrel is great enough to prevent the oil being lifted from the oil-bearing sand from entering therebetween and consequently sand is prevented from entering such space 17. The union *d* of course is connected with a perforated casing 50 received within a screen 51 in the oil-bearing sands. The working valve *a* likewise includes the usual stop pin 52 limiting the upward play of the ball 23.

It is obvious that various changes and modifications and variations may be made in practicing the invention, in departure from the particular showing, without departing from the true spirit of the invention.

Having thus disclosed my invention, I claim and desire to secure by Letters Patent:

1. In a pump of the character disclosed, a working valve, an annular plunger carried by the working valve at one end thereof, and a tubular member carried by the said working valve at the other end thereof; said working valve permitting communication between the annular plunger and the tubular member during certain movement thereof; a working barrel adapted to confine the plunger, working valve and tubular member; an annulus within the tubular member and pump tubing secured to said annulus, and in part confined in the tubular member, said annulus being formed with a port of communication with said pump tubing, and said tubular member being formed with a port in communication with the port in the annulus.

2. In a pump of the character disclosed, an annulus formed with a leg portion having a port therein, a socket portion joined with the leg portion and in communication with the port, and valve means closing entrance between the socket portion and the port of the leg portion.

3. In a pump of the character disclosed, an annulus formed with two leg portions, and a member carried by the leg portions, said member being formed with a socket portion, said leg portions being provided

with ports extending to the socket portion, and valve means within the socket portion normally closing communication between the ports in the leg portions and such socket portion.

4. In a pump of the character disclosed, an annulus formed with two leg portions, and a member carried by the leg portions, said members being formed with a socket portion, said leg portions being provided with ports extending to the socket portion, and valve means within the socket portion normally closing communication between the ports in the leg portions and such socket portion; said annulus being provided with a peripheral groove and said ports in the leg portions communicating with said groove.

In testimony whereof, I have signed my name to this specification.

FRANK C. KELLEY.