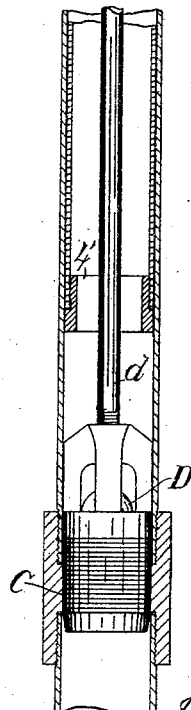
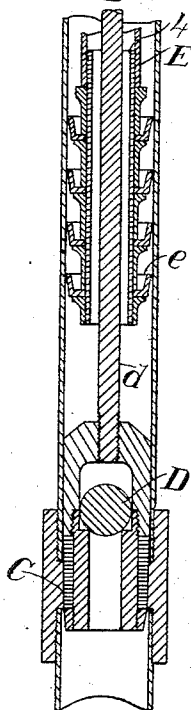
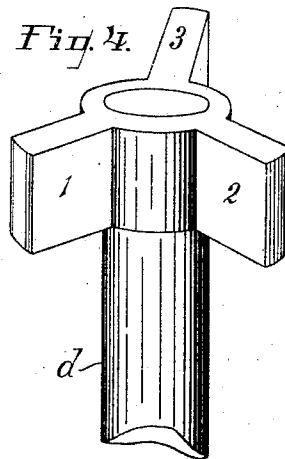
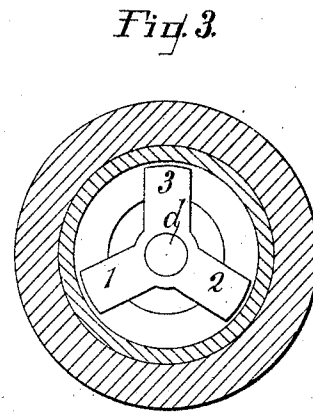
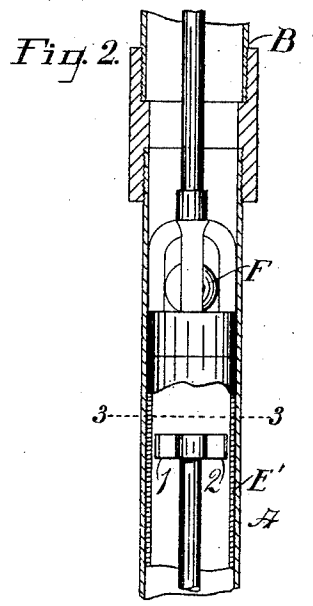
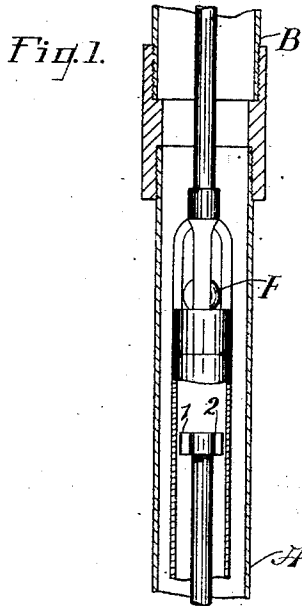


(No Model.)

F. A. GARBUTT,
OIL WELL PUMP.

No. 586,707.

Patented July 20, 1897.



Witnesses

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UNITED STATES PATENT OFFICE.

FRANK A. GARBUTT, OF LOS ANGELES, CALIFORNIA.

OIL-WELL PUMP.

SPECIFICATION forming part of Letters Patent No. 586,707, dated July 20, 1897.

Application filed May 5, 1896. Serial No. 590,280. (No model.)

To all whom it may concern:

Be it known that I, FRANK A. GARBUTT, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Oil-Well Pumps, of which the following is a specification.

My invention relates particularly to those pumps for pumping oil from deep wells. It is fully understood by those versed in the art that where oil is pumped from a depth of from six hundred to one thousand feet or more the passages in the pump through which the oil flows should be as large as possible in order to avoid restricting the flow of the oil, which restriction interferes materially in pumping. Furthermore, in the oil-fields in Los Angeles, California, where my invention is now in extensive use, some of the oils are very thick and heavy and a considerable quantity of sand is often mixed therewith, so that if the passages are at all restricted clogging is very apt to result. Heretofore, owing to the means which have been employed for connecting the standing valve with the working valve, satisfactory results could not be obtained by using such devices, and consequently, before my invention, it was necessary, when the valves became clogged, to first withdraw the working valve and to afterward run down a standing-valve tap, or pull the tube in order to get at the standing valve. Pulling the valve usually costs about seven dollars for a well one thousand feet deep. The object of my invention is to provide for deep-well pumps strong and thoroughly practical means for drawing the standing valve of an oil-well pump and allowing the pump to be flushed and cleaned without the necessity of withdrawing the working barrel or working valve from the well, and at the same time to provide a large passage for the free and unrestricted flow of oil through the pump while the pump is working, thus to avoid as much as possible liability of clogging.

In deep-well oil-pumps the pressure upon the piston is very great, and special construction is required to keep the oil from leaking through between the working barrel and the piston, and two forms of piston are used. In one of these the piston is very long and fits

the working barrel tightly throughout its whole length and is provided at the top with a ball-valve, and the oil passes up through the hollow piston. In the other form the piston is long and hollow and is provided at the top with the ball-valve, but flexible sucker-cups are arranged as packing between the main body of the piston and the inner walls of the working barrel.

An object of my invention is to provide very cheap, simple, and effective means by which these pumps can be adapted for drawing the standing valve, as above specified, and in this connection my invention comprises, in an oil-pump, a piston, hollow from end to end, to form the oil-passage, and internally screw-threaded at its lower end, with a collar screwed into such lower end and forming the oil-inlet to the other end of the piston, and also forming an annular inwardly-projecting shoulder, and a standing-valve rod fastened to the standing valve of the pump and working through the collar, and provided at its top with a cross-head having arms to be engaged by the shoulder when the piston is withdrawn from the working barrel, and to allow the oil to pass freely up through the piston around the standing-valve rod and the cross-head within the collar and the piston, and the collar may or may not be extended below the piston body and provided with cup suckers. By this arrangement I am enabled, at very slight expense, to adapt an ordinary deep-well pump-piston, of either type, for drawing the standing valve, and I provide very cheap and convenient means for applying sucker-cups to a hollow piston.

My invention comprises the various features of construction and combinations of parts whereby I provide a device in which the passage of oil through the pump is unrestricted, and as far as practical to avoid all liability of clogging by reason of sand catching in the oil-passages.

My invention comprises the various features of construction and combinations of parts hereinafter fully set forth and claimed.

The accompanying drawings illustrate my invention.

Figure 1 is a fragmental vertical section showing my invention applied in a pump with packing around the lower end of the piston.

Fig. 2 is a fragmental vertical section showing my invention applied with an ordinary plunger-piston. Fig. 3 is an enlarged sectional plan on line 3 3, Fig. 2. Fig. 4 is a perspective detail of the upper end of the standing-

valve pulling-rod in its preferred form.

A indicates the working barrel, and B indicates the well-tubing above the working barrel. It is to be understood that the inner diameter of the tubing is ordinarily about a quarter-inch greater than the inner diameter of the working barrel, so that when the working valve and standing valve are withdrawn from the working barrel into the tubing a passage is allowed between the valves and the tubing, through which passage the liquid above the valves will rush down into the bottom of the well, thus to wash the said valves whenever they are withdrawn from the working barrel.

C indicates the standing-valve seat at the bottom of the working barrel.

D indicates the standing valve provided with the standing-valve pulling-rod *d*, which is provided at the top with the lateral projections, preferably in the form indicated at 1 2 3.

E indicates the working-valve piston, which is closely fitted in the working barrel, either by means of any suitable packing, as at *e*, or throughout its length fitting the barrel, as shown in the plunger form *E'*, Fig. 2. The hollow piston is provided on the inside at its lower end with a shoulder 4, (4'), which extends to engage the lateral top extension of the pulling-rod *d*.

In order to provide for the unrestricted passage of oil through the piston, I provide the lower end of the piston with internal screw-threads, and into such lower end I screw a collar, which forms the shoulder 4 in Fig. 1 and 4' in Fig. 2. The rod D, which is secured to the standing valve, is much smaller in diameter than the passage through the collar, thus providing for the free upward flow of oil therethrough, and by reason of the projections or arms 1, 2, and 3 of the cross-head upon the rod the oil is allowed free passage between the arms; but when the working valve is pulled upward beyond its normal stroke the collar engages with the cross-head and will draw the standing valve from its seat. In Fig. 1 the collar projects below the upper portion of the piston, which is smaller in diameter than the working barrel A, and upon the projecting portion of this collar the valve cups or leathers *e* are secured. The upper part of the piston may be fitted to work as a plunger in the working barrel in addition to the cup-leathers, if desired. Thus the collar in this instance serves a double purpose, that of forming the shoulder to engage the cross-head and of forming the support for the leathers *e*.

The parts are arranged to allow the piston to work freely through the full extent of its pumping stroke without causing any engage-

ment between the shoulder and the lateral extension of the pulling-rod, but when the piston is drawn a determined distance above its normal stroke the shoulder will engage with the lateral extensions thus to draw the pulling-rod upward to raise the standing valve from its seat.

F indicates the lifting-valve at the top of the piston of the working valve.

When it is desired to cleanse the standing valve or working valve from accumulations of sand or from any obstruction, the piston is drawn upward until the shoulder engages the lateral arms 1 2 3 or other equivalent projections at the head of the pulling-rod, and if the standing valve is wedged in its seat so that it cannot be drawn easily the piston can then be worked down and up to act like a jar on the rod and thus jar the standing valve free from its seat. When the standing valve is loose, so it can be drawn, the piston is drawn up until the standing valve is above the working barrel. Then the oil or water above the working barrel will rush down between the valve and the tubing and flush the valves.

If desired, the working valve and standing valve can be drawn out of the well for any required repairs and then readily replaced.

While the ordinary ball and cage shown is deemed preferable as the stopping device for the valve, it is to be understood that my invention is not limited to the use of the same. Any suitable lifting-valve stopper may be substituted without departing from my invention.

I am aware that it is not new to draw the standing valve of a pump by connecting such valve with the working valve by means of a rod, and I do not broadly claim such construction, since my invention relates to the improved features whereby I am enabled to allow practically as free a flow of oil through the pump as has heretofore been possible with those pumps in which the standing valve is not connected with the working valve. In the only device of this kind of which I am aware which is applicable for use in oil-wells the oil has been admitted into the piston through perforations in the sides thereof. My invention is to be distinguished therefrom in that with my device the oil enters the open lower end of the hollow piston and passes up between the walls of the piston and the rod, enabling me to provide a large passage instead of small perforations, and to use the body of the piston as a chamber in which to chamber the cross-head instead of securing an extra length of pipe below the piston for this purpose, as has heretofore been proposed. The cross-head engages with the walls of the piston and holds the rod centrally in the collar as the working valve reciprocates in the working barrel.

A further advantage is that in my device the course of the oil in entering the piston is not abruptly changed, while in the device re-

ferred to it enters the piston through passages practically at right angles to the passages in the working barrel and the piston, thus interfering materially with the free flow
5 of oil.

A further advantage is that all liability of pulling apart the piston and standing-valve rod is avoided, and there can be no clogging by sand that will necessitate pulling the rod.

10 Now, having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a deep-well oil-pump, a piston in the working barrel and hollow from end to end
15 to form the oil-passage of the pump and internally screw-threaded at its lower end, with a collar screwed into such lower end and forming the oil-inlet into the lower end of the piston and also forming an annular inwardly-
20 projecting shoulder; and the standing-valve rod fastened to the standing valve of the pump and working through the collar and provided at its top with the cross-head having arms to be engaged by the shoulder when
25 the piston is withdrawn, and to allow the oil to pass up through the piston.

2. A deep-well oil-pump, comprising a working barrel, a hollow piston having an oil-passage from end to end therethrough and in-
30 ternally screw threaded at the lower end, a collar having its upper end screwed into the lower end of the piston and projecting in-

wardly to form an annular shoulder and having below the piston, cup-packings which fit the working barrel; and a standing-valve rod
35 attached to the standing valve and extending through the collar and provided with the cross-head having arms to be engaged by the collar and to allow the free passage of oil up through the collar and piston around the rod
40 and cross-head.

3. In a deep-well pump, the piston with oil-passage therethrough from end to end and internally screw-threaded at its lower end
45 and provided with a collar screwed thereinto with oil-passage therethrough and forming an inward projection to engage the head of the standing-valve rod to lift it.

4. The combination of the piston with oil-passage therethrough from end to end and
50 provided at its lower end with an inwardly-projecting annular shoulder with the said oil-passage extending therethrough; and the standing-valve rod working through said oil-passage in the annular shoulder and provided
55 at its top with a cross-head having arms to be engaged by the shoulder when the piston is withdrawn and to allow the oil to pass up through the piston.

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Witnesses:

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