March 31, 1925. 1,531,697

R. F. HOPKINS ET AL

PUMP FOR OIL WELLS

Filed March 21, 1924

Fig. 1.

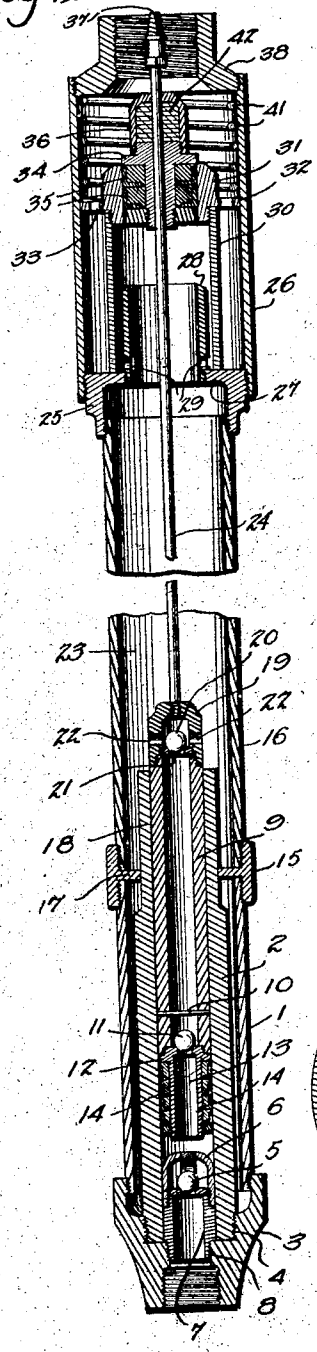


Fig. 2.

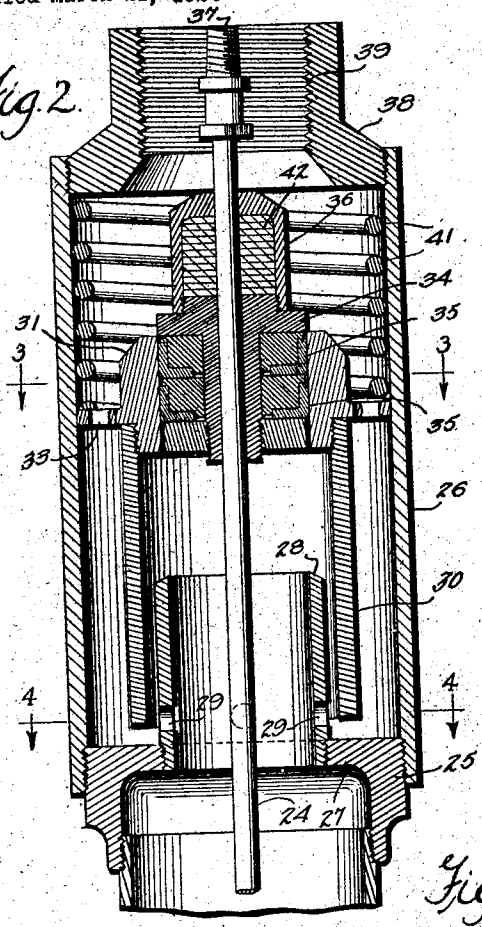


Fig. 3.

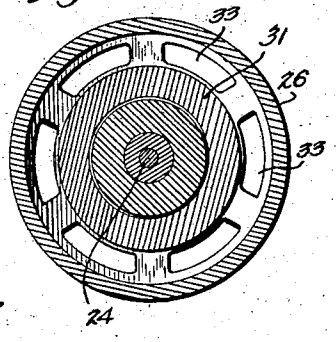
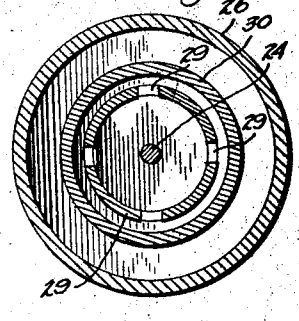


Fig. 4.



Inventors
R. F. Hopkins
O. F. Devolld

By Chas. Parker

Attorney

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UNITED STATES PATENT OFFICE.

RICHARD F. HOPKINS AND ORIAN F. DEVOLLD, OF BARTLESVILLE, OKLAHOMA.

PUMP FOR OIL WELLS.

Application filed March 21, 1924. Serial No. 700,915.

To all whom it may concern:

Be it known that we, RICHARD F. HOPKINS and ORIAN F. DEVOLLD, citizens of the United States, residing at Bartlesville, in the county of Washington and State of Oklahoma, have invented certain new and useful Improvements in Pumps for Oil Wells, of which the following is a specification.

This invention relates to pumps, and more particularly to pumps for oil wells.

An object of the invention is the provision of a pump having a sand trap provided with means for preventing the sand from returning to the barrel when the pump is at rest.

A further object of the invention is the provision of a sand trap comprising a cylindrical or tubular member which is adapted to be raised by the pressure of the oil being pumped to permit passage of the oil upwardly into the casing and which is normally retained in a lowered closed position by means of a coil spring.

In the accompanying drawings, we have shown one embodiment of the invention. In this showing:

Figure 1 is a vertical sectional view,

Figure 2 is a similar view of the sand trap on an enlarged scale,

Figure 3 is a horizontal sectional view on line 3—3 of Figure 2, and,

Figure 4 is a similar view on line 4—4 of Figure 2.

Referring to the drawings, the reference numeral 1 designates the lower section of the outer casing having a cast iron barrel 2 mounted therein. A casting 3 is threaded to the lower end of the casing and this casting is provided with an interiorly threaded portion to which the barrel is adapted to be secured, as at 4. A standing valve 5 is mounted in a cage 6 at the bottom of the barrel and this cage is supported on a tubular member 7, which snugly fits the bottom of the barrel and secured to the casting 3 by means of screw-threads, as at 8. A plunger 9 is mounted in the barrel, the plunger being ground to fit the barrel. A pin 10 is arranged transversely of the plunger adjacent its lower end, and a traveling valve 11 is arranged below this point, adapted to engage a valve seat 12. The valve seat is formed on the upper end of the valve member 13, which is provided with valve cups 14 to prevent leakage between the plunger and the barrel. The upper end of the casing section which is connected to a casting 15 and the next section 16 of the casing is also connected to this casting. A choker ring 17 is formed on the casting and this ring engages an upper reduced portion 18 of the barrel to properly support the barrel in the outer casing. A traveling valve is arranged at the top of the plunger. As shown, the traveling valve comprises a cage 19 having a valve 20 arranged therein and adapted to engage a valve seat 21. The cage is provided with perforations 22 through which the fluid is adapted to pass into a chamber 23 in the casing section 16. The top of the cage is provided with a threaded opening for the reception of a polish rod 24.

The upper end of the casing section 16 is secured in the casting 25. A casing section 26 of slightly larger diameter extends upwardly from the casting. The casting is further provided with a ring 27 having a central threaded opening for the reception of a tube 28. This tube is provided with openings 29 adjacent its lower end. A second tube 30 of slightly larger diameter rests on the ring 27. The upper end of this tube is secured in a casting 31. This casting is provided with a flange or ring 32 fitting snugly within the casing 26 and provided with perforations 33. A stuffing box 34 is secured to the casting 31 and the polish rod passes through this stuffing box. The stuffing box is provided with suitable cup valves 35, engaging the interior of the casting 31 to retain the stuffing box in position. A cap 36 is arranged on the top of the stuffing box. Above the stuffing box, a sub 37 is connected to the polish rod. A casting 38 is connected to the upper end of the casing section 26, and this casting is provided with a reduced threaded opening 39 for the reception of a section of ordinary well casing. The lower face 40 of the casting is adapted to be engaged by the upper end of a spring 41. The opposite end of this spring engages the flange 32 to normally retain the lower end of the tube 30 in engagement with the face of the ring 27. The tubular member 36 forms a packing gland for the reception of suitable packing 42.

In operation, the plunger is reciprocated in the barrel in the usual manner and the upstroke creates a suction lifting the standing valve from its seat and allowing oil to pass into the barrel. On the down-stroke, the traveling valves 11 and 20 are lifted

from their seats and the oil passes into the chamber 23. This creates a pressure on the lower face of the casing 31, tending to move the casting and its associated elements, upwardly against the tension of spring 41. When this pressure is sufficient to compress the spring, the tube 30 is raised from the face of the ring 27, permitting the oil to pass through the perforations 29 in the tube 28 and beneath the tube 30 into the casing 26. The upper face of the casting 25 at the bottom of the casing 26 forms a sand trap. The oil passes through the casting 38 and then upwardly through the sections of the well casing in the usual manner. As soon as the pump is stopped, the pressure on the lower face of the casting 31 is removed and the spring 41 assumes its normal position, forcing the lower end of the tube 30 into engagement with the face of the ring 27, as shown in Figure 1 of the drawings, thus preventing the sand from passing downwardly through the chamber 23 to the top of the barrel.

It is to be understood that the form of our invention herewith shown and described is to be taken as a preferred example of the same, and that various changes in the shape, size, and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

We claim:

1. In an oil well pump, a casing, a barrel mounted in the casing, a plunger adapted to reciprocate in the barrel, a partition arranged in the casing above the barrel and provided with a central opening, and a tube normally resting on the partition and adapted to be raised by the pressure of the oil.

2. In an oil well pump, a casing, a barrel mounted in the casing, a plunger adapted to reciprocate in the barrel, a partition arranged in the casing above the barrel and provided with a central opening, a tube normally resting on the partition and adapted to be raised by the pressure of the oil, and a spring engaging said tube to retain it in position on said partition.

3. In an oil well pump, a casing, a barrel mounted in the casing, a plunger adapted to reciprocate in the barrel, a partition arranged in the casing above the barrel and provided with a central opening, a tube extending upwardly from the opening in the partition, a larger tube surrounding said first tube and resting on said partition, and means for closing the upper end of said second tube.

4. In an oil well pump, a casing, a barrel mounted in the casing, a plunger adapted to reciprocate in the barrel, a partition arranged in the casing above the barrel and provided with a central opening, a tube extending upwardly from the opening in the partition, a larger tube surrounding said first tube and resting on said partition, means for closing the upper end of said second tube, and a spring engaging said second tube to retain it in normal position.

5. In an oil well pump, a casing, a barrel mounted in the casing, a plunger adapted to reciprocate in the barrel, a pair of spaced partitions arranged in the casing above the barrel, the lower partition being provided with a central opening, a tube extending upwardly from said opening, an outer tube secured to said upper partition and extending downwardly, said upper partition being provided with openings arranged exteriorly of said outer tube, and means for normally maintaining said outer tube in engagement with the upper surface of said lower partition.

6. In an oil well pump, a casing, a barrel mounted in the casing, a plunger adapted to reciprocate in the barrel, a pair of spaced partitions arranged in the casing above the barrel, the lower partition being provided with a central opening, a tube extending upwardly from said opening, an outer tube secured to said upper partition and extending downwardly, said upper partition being provided with openings arranged exteriorly of said outer tube, and a spring to normally retain said outer tube in lowered position.

In testimony whereof, we affix our signatures in presence of two witnesses.

RICHARD F. HOPKINS.
ORIAN F. DEVOLLD.

Witnesses:
JOHN M. HOLLIMAN,
DALE C. DILLON.