C. W. BELL.

PUMP FOR OIL AND LIKE WELLS.

APPLICATION FILED OCT. 15, 1909.

974,342.

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FIG. 2

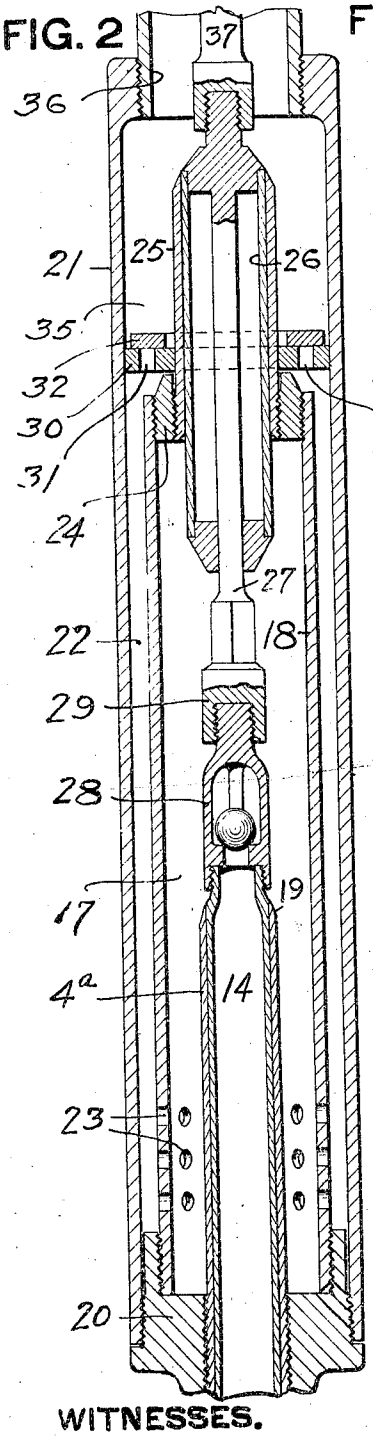


FIG. 1

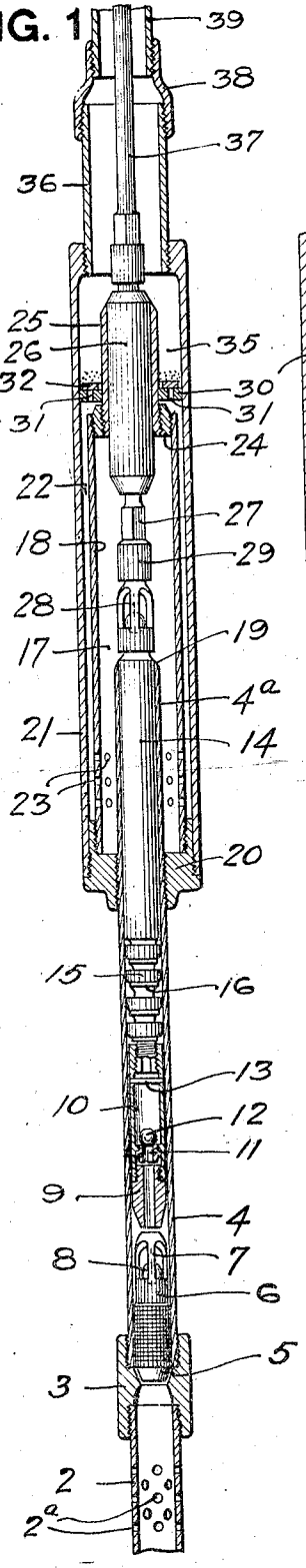


FIG. 3

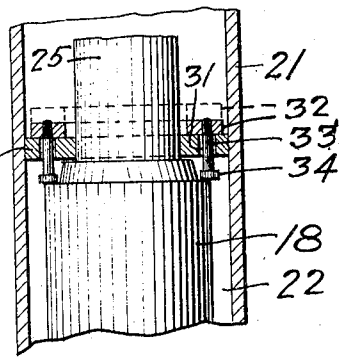


FIG. 4

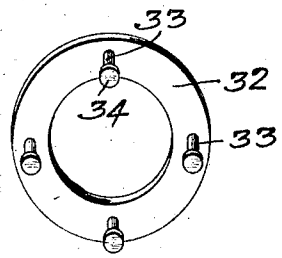
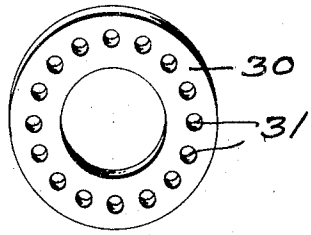


FIG. 5



WITNESSES.

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PUMP FOR OIL AND LIKE WELLS.

974,342. Specification of Letters Patent. Patented Nov. 1, 1910.

Application filed October 15, 1909. Serial No. 522,842.

To all whom it may concern:

Be it known that I, CHARLES W. BELL, a resident of Bartlesville, in the State of Oklahoma, have invented a new and useful Improvement in Pumps for Oil and Like Wells; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to pumps for oil and like wells.

In the pumping of oil great difficulty is experienced due to the wearing away of the cups, pistons, and plungers, due to the flowing sand that rises in the pump and remains in suspension as long as the fluid is agitated. Just as soon as the pump stops this sand settles down around the working parts of the pump and tends to cause them to stick.

The object of my invention is to provide a pump in which the parts are so constructed and arranged that the cups, pistons and other working parts are so protected from the lodgment of sand in and about same that the wear on such parts is reduced to a minimum; and furthermore to provide for the retention of the sand in a pocket or other receptacle when the pump is stopped, so that the sand cannot work down into the working parts of the pump.

To these ends my invention comprises the novel features hereinafter set forth and claimed.

In the drawings, Figure 1 is a vertical section of a well showing my improved pump applied thereto; Fig. 2 is an enlarged detail of a portion of the pump; Fig. 3 is an enlarged view of the valve for retaining the sand in the pocket above the sand; and Figs. 4 and 5 are details of the valve.

Referring to the drawings, the numeral 2 designates a perforated pipe which extends from the pump to the bottom of the well. The coupling 3 connects the working barrel 4 with the pipe 2 and said coupling forms the seat 5 for the stand-valve 6 which may be of the ordinary construction provided with the cage 7 and the ball 8. A bushing 9 is screwed to the main body of the valve 10. Valve seat 11 supports the ball 12. A pin 13 passing through the body of the valve 10 forms a stop for the ball 12. Threaded into the main body 10 of the valve is the discharge tube 14. This tube is provided with the ordinary leather cups 15 and cup-rings 16 engaging the inner face of the working-barrel 4. The upper section 4^a of the working-barrel 4 extends up into the chamber 17 formed by the tube 18. The upper edge of the section 4^a of the working-barrel is chamfered or beveled at 19 for the purpose more fully hereinafter set forth. The bushing 20 is screwed on to the working-barrel 4 and the lower end of the tube 18 is screwed into said bushing. The outer tube 21 is screwed on to the bushing 20 and the annular space 22 is formed between the inner tube 18 and the outer tube 21. The inner tube 18 is provided with the orifices 23 which open communication between the chamber 17 and annular chamber 22. The upper end of the inner tube 18 is connected to the threaded bushing 24 and the cylinder 25 is also connected to said bushing. The piston 26 moves in the cylinder 25 and said piston is connected at its lower end to the piston rod 27, which in turn is connected to an ordinary ball and seat valve 28 by the pin and box 29.

A ring 30 rests upon the upper end of the bushing 24, said ring having the openings 31 formed therein. The valve 32 has the pins 33 with the heads 34. These pins 33 engage the openings 31 in the ring 30 and the valve 32 is adapted to be raised and lowered to admit of the passage of the fluid and said valve drops by gravity in position to close the openings 31 to prevent the return of the sand, which collects in the pocket 35 above said valve and formed by the cylinder 25 and the outer tube 21.

The tubular extension 36 is connected to the outer tube 21^a and the pump rod 37, which is connected to the upper end of the piston 26 passes up through said extension and through the reducer 38 into the tubing 39 which extends up to the top of the well.

Having described several parts which go to make up my improved pump, I will now describe its method of operation.

The upper end of the pump rod 67 is connected to a suitable mechanism to give a reciprocating movement to pump-rod, and as said pump-rod is raised the parts connected thereto will be raised within the working-barrel 4. The fluid is drawn in through the openings 2^a in the pipe 2 and said fluid, together with sand or any gritty material in suspension is drawn up through the valve 7 and discharged into the working-barrel 4, below the bushing 9 and filling the space between said bushing and the valve 7. Upon

the descent of the pump-rod, the parts just raised will be lowered and accordingly the fluid contained within the working-barrel 4 will be forced up through the valve 12 on up through the discharge tube 14 and out through the valve 28 into the chamber 17. The displacement caused by the down stroke of the piston 26 will force the fluid down between the upper end 4^a of the working-barrel and the inner tube 18, through the perforations 23 into the annular space 22. From the annular space 22 the fluid and sand in suspension passes through the valve 32 which is lifted by the pressure of the fluid. As the piston rises again the fluid is forced up into the tubing 39 to the top of the well. As all wells of this character pump more or less gas with the oil, the gas rises and fills the chamber 17 from the top thereof down to the perforations 23. Accordingly, the upper end 4^a of the working barrel which extends up within the chamber 17, is surrounded by gas. By bringing the fluid up through the discharge tube 14 and discharging it from the top of the working-barrel 4^a and forcing it down away from the working point at the top of the working-barrel, the sand has little chance to get in between the working-barrel and discharge tube 14 so that the cups 15 are protected from the sand. Furthermore, the top of the working-barrel being beveled off to a sharp edge, the sand is deflected by this edge and does not have an opportunity to collect and find its way between the working-barrel to the discharge tube. The valve 32, which is lifted by the upward movement of the fluid and sand, drops back into position and prevents the return of the sand so that the sand is pocketed or held in the pocket 35 and when the pump is stopped this sand remains in said pocket. When the pump is started again the action of the fluid lifts the sand and carries it on out of the pocket and through the tube to the top of the wall. In this manner I provide for the retention of the sand when the pump stops in a position where it cannot find its way down into the working parts of the pump and cause the same to stick and increase the wear of same. Furthermore the reciprocating parts of the pump can be drawn up through the cylinder 25 without having to remove the valve 32 or its seat 30.

What I claim is:

1. In pumping apparatus for oil or like wells, the combination of a valve-controlled working-barrel, a valve-controlled discharge tube in said working-barrel, a piston connected to said discharge-tube, means for reciprocating said piston, and a chamber communicating at its lower end with the tubing leading to the top of the well, said working-barrel extending into said chamber.

2. In pumping apparatus for oil or like wells, the combination of a valve-controlled working-barrel, a discharge-tube in said working-barrel, a valve at the upper end of said discharge-tube and above said working-barrel, a piston connected to said discharge-tube, means for reciprocating said piston, and a chamber communicating at its lower end with the tubing leading to the top of the well, said working-barrel extending up into said chamber.

3. In pumping apparatus for oil or like wells, the combination of a valve-controlled working-barrel, a discharge-tube in said working-barrel, a valve in said discharge-tube above said working-barrel, the upper end of said working-barrel being beveled, a piston connected to said discharge-tube, means for reciprocating said piston, and a chamber communicating with the tubing leading to the top of the well, said working-barrel extending up into said chamber.

4. In pumping apparatus for oil or like wells, the combination of a valve-controlled working-barrel, a valve-controlled discharge-tube in said working-barrel, a piston connected to said discharge-tube, means for reciprocating said piston, a chamber, said working-barrel extending up within said chamber, an outer chamber communicating with said chamber, and a valve between said outer chamber and the tubing leading to the top of the well.

5. In pumping apparatus for oil or like wells, the combination with a valve-controlled working-barrel, a valve-controlled discharge-tube in said working-barrel, a piston connected to said discharge-tube, means for reciprocating said piston, a chamber, said working-barrel extending up within said chamber, an outer chamber communicating with said chamber at the lower end thereof and a valve-controlled connection between said outer chamber and the tubing leading to the top of the well.

6. In pumping apparatus for oil and like wells, the combination of a valve controlled working-barrel, a valve controlled discharge tube in said working-barrel, a piston, a cylinder within which said piston operates, a sand-pocket surrounding said cylinder, and a valve controlling the entrance to said sand-pocket, said valve being in the path of the ascending fluid.

7. In pumping apparatus for oil or like wells, the combination of a valve-controlled working-barrel, a valve-controlled discharge-tube in said working-barrel, means for reciprocating same, a sand-pocket above said discharge-tube, a chamber, said working-barrel extending up within said chamber, and a valve controlling communication between said chamber and said sand-pocket.

8. In pumping apparatus for oil or like wells, the combination of a valve-controlled working-barrel, a valve-controlled discharge-

tube in said working-barrel, a piston connected to said discharge-tube, means for reciprocating said piston, an inner-tube forming a chamber into which said working-barrel extends, an outer-tube forming an annular chamber between said inner and outer tube, said chamber communicating with said annular chamber, and an automatically working valve controlling the flow of fluid from said annular chamber to a sand-pocket above the same.

9. In pumping apparatus for oil or like wells, the combination of a suitable shell or casing, the reciprocating working parts therein, a sand pocket constructed to shut off its contents from said working parts, and a valve controlling the entrance to said pocket, said valve being in the path of the ascending fluid.

10. In pumping apparatus for oil or like wells, the combination of a suitable shell or casing, the reciprocating working parts therein, a ring within said shell or casing forming a sand-pocket above the same, said ring having openings therein, a valve resting on said ring controlling said openings, and means for lifting said valve by the ascending fluid.

11. In pumping apparatus for oil or like wells, the combination of a suitable shell or casing, the reciprocating parts working therein, a sand pocket formed by said shell and a cylinder through which the reciprocating working parts pass, and a valve controlling the entrance to said pocket, said valve being in the path of the ascending fluid.

In testimony whereof, I the said CHARLES W. BELL have hereunto set my hand.

CHARLES W. BELL

Witnesses:
A. W. BAXTER,
J. T. SHIPMAN.