Sept. 4, 1923. 1,466,685

W. W. WARNER

WORKING BARREL

Filed July 12, 1922 2 Sheets-Sheet 1

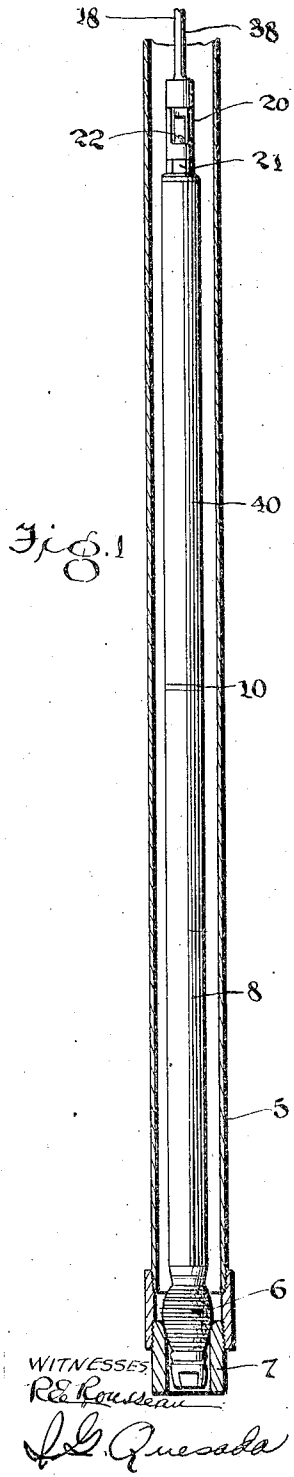


Fig. 1.

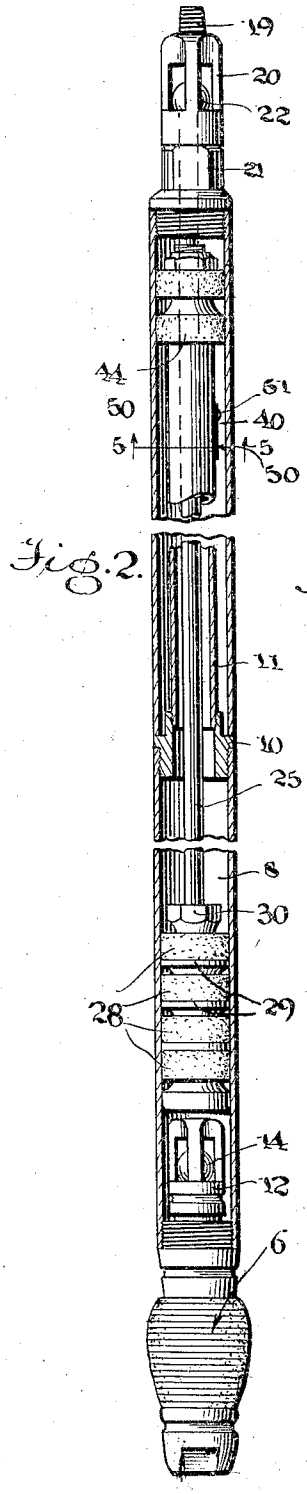


Fig. 2.

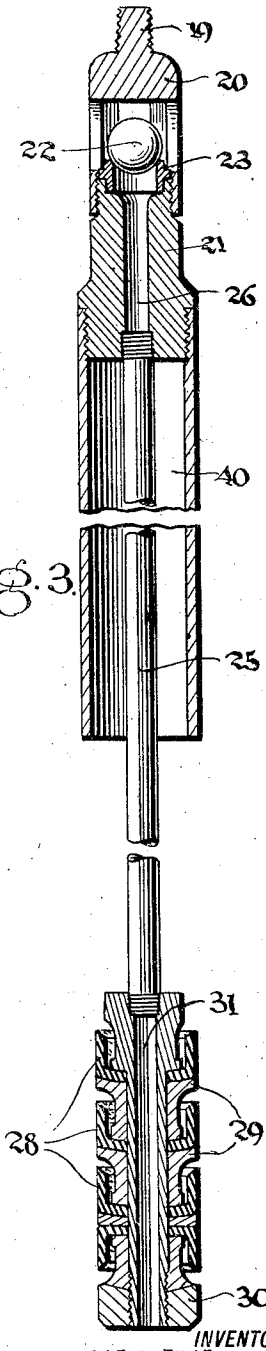


Fig. 3.

WITNESSES
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WORKING BARREL

Filed July 12, 1922 2 Sheets-Sheet 2

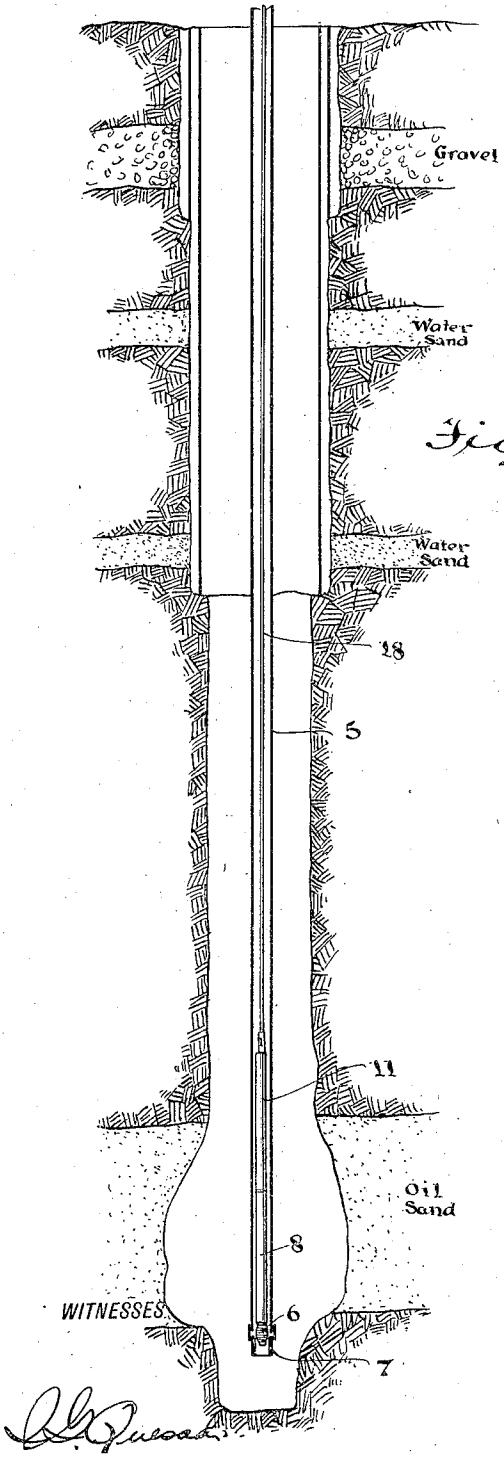


Fig. 4.

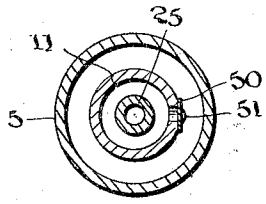


Fig. 5.

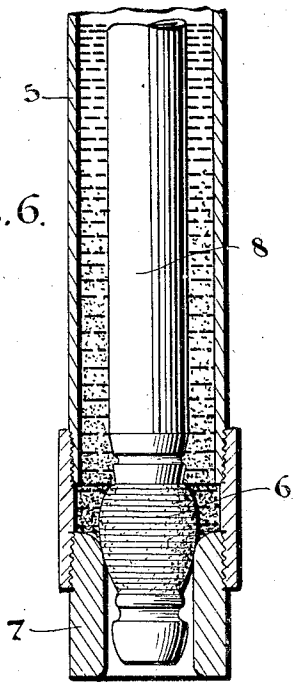


Fig. 6.

WITNESSES

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Patented Sept. 4, 1923. 1,466,685

UNITED STATES PATENT OFFICE.

WILLIAM W. WARNER, OF NOWATA, OKLAHOMA.

WORKING BARREL.

Application filed July 12, 1922. Serial No. 574,534.

To all whom it may concern:

Be it known that I, WILLIAM W. WARNER, a citizen of the United States, and resident of Nowata, in the county of Nowata and State of Oklahoma, have invented certain new and useful Improvements in Working Barrels, of which the following is a specification.

This invention relates to working barrels especially adapted for pumping oil and water from wells.

Briefly stated, an important object of this invention is to provide a working barrel for wells having novel means whereby sand or other granular material suspended in the liquid is prevented from settling on the pumping cups, thereby greatly prolonging the period of usefulness of the cups and preventing the loss of oil incident to the frequent replacing of the cups.

Further the invention forming the subject matter of this application aims to provide a working barrel, which by reason of increasing the period of usefulness of the pumping cups will greatly reduce the labor and expense necessary to pump the well.

Also the invention aims to provide a working barrel wherein the stationary and movable parts may be pulled to the surface as a unit for the purpose of renewing the cups or any other parts which may happen to be worn thereby dispensing with the necessity of entirely pulling the tubing together with the standing valve.

A further aim is to provide a working barrel which is double acting and therefore pumps the liquid both on its up and down strokes. By reason of this arrangement the oil can be pumped from the well in a shorter period of time, thereby reducing the fuel necessary and the wear on the machinery.

A further object is to provide a working barrel which is of highly simplified construction, durable in use and cheap to manufacture.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawing, forming a part of this application, and in which like numerals are employed to designate like parts throughout the same,

Figure 1 is a side elevation of the improved working barrel inserted into an oil well tubing.

Figure 2 is a vertical sectional view through the same.

Figure 3 is a view of the movable member of the improved working barrel, parts being shown in section.

Figure 4 is a diagrammatic view illustrating the well casing, the tubing and the working barrel.

Figure 5 is a horizontal sectional view taken on line 5—5 of Figure 2.

Figure 6 is an enlarged detail sectional view through the working barrel.

In the drawing wherein for the purpose of illustration is shown a preferred embodiment of the invention, the numeral 5 designates a well tubing which may consist of a plurality of sections detachably connected in the usual and well known manner. The improved working barrel is as illustrated in Figure 1 received within the tubing and has its lower end provided with a standing valve 6 which contacts with a seat nipple 7 threaded on the lower portion of the tubing. It will be observed that the nipple 7 is less in internal diameter than the internal diameter of the tubing and therefore limits the downward movement of the standing valve 6 and associated parts. Specifically the standing valve 6 closes the lower end of the tubing 5 and thereby prevents the oil which has been pumped into the tubing from returning to the shot hole in the lower portion of the well. Of course the tubing and the working valve extends to a point near the bottom of the well or it may extend into the hole shot in the lower end of the well by the nitro-glycerin or other explosive.

The improved working barrel comprises a lower tubular section 8 having its upper end connected to a coupling 10. As illustrated in Figure 2 an oil conducting pipe 11 somewhat less in diameter than the pipe 8 is threaded into the upper side of the coupling 10 and therefore has communication with the pipe 8 so as to receive the liquid pumped up from the well.

It might be stated that the standing valve 6, the pipe 8, the coupling 10 and the pipe

11 are all stationary during the operation of the improved working barrel and the stationary parts rest upon and are supported by the seat nipple 7. It will be observed that the leather rings which surround the standing valve 6 and which are securely connected to the same bulge between the ends of the standing valve and thereby provide a liquid tight connection between the valve and the tubing so that the oil cannot return to the shot hole.

Figure 2 illustrates that a valve cage 12 is connected to the upper portion of the standing valve 6 within the pipe 8 and a spherical valve 14 is arranged within the cage for preventing the return of the liquid through the standing valve. That is to say the ball valve 14 engages a seat within the cage 12 and due to its weight and the pressure of the column of liquid prevents the return of the liquid which has been pumped into the pipe 8. However, when a suction is created within the pipe 8 the ball valve 14 is elevated to allow the liquid to enter the pipe.

The reciprocating or movable members of the two working barrels are operated by the sucker rod 18 connected at its lower end to the attaching shank 19 of a valve cage 20. As illustrated particularly in Fig. 3 the valve cage 20 is threaded onto the upper portion of a coupling member 21 and encloses a spherical valve 22. The spherical valve 22 is mounted upon an annular seat 23 and when the movable member, which is illustrated as a unit in Figure 3 is moved downwarlly the ball valve 22 is elevated so as to allow the liquid which has previously entered the pipe 8 to be discharged into the tubing.

Figure 3 plainly illustrates that a hollow plunger 25 is threaded into the lower portion of the coupling 21, which coupling is provided with a longitudinal passage 26 which establishes communication between the hollow plunger 25 and the interior of the tubing 5. The lower portion of the hollow plunger 25 is provided with a valve in the nature of a plurality of leather cups 28 between which a plurality of brass followers or spacing members 29 are located. One of the leather cups 28 is engaged by a nut 30 threaded on the lower portion of the stem 31 upon which the followers and the leather cups are mounted. It will be seen that the hollow plunger 25 is located within the pipe 8 and that the leather cups 28 when drawn upwardly will create a suction between the nut 30 and the standing valve which suction will draw a quantity of liquid into the pipe 8. On the subsequent downward movement of the hollow plunger 25 and the leather cups 28 the liquid previously drawn into the lower portion of the pipe 8 will pass up through the stem 31, the pipe 25 and into the tubing 5. As previously stated, on the downward movement of the hollow plunger 25 the valve 22 is unseated to allow the escape of the liquid into the tubing.

In summarizing it will be seen that the improved working barrel is introduced into the tubing 5 and that the standing valve 6 is engaged with the nipple 7 so as to limit the downward movement of the working barrel. Of course, the standing valve 6 is hollow so that the oil may pass through the same when the suction is created by the action of the sucker rod. When it is desired to pump, the hollow plunger 25 is elevated so as to move the cups 28 upwardly whereupon a quantity of liquid is drawn into the lower portion of the pipe 8. On the subsequent downward movement of the plunger 25 oil or other liquid thus drawn into the lower portion of the pipe 8 passes upwardly through the hollow plunger 25 and out through the valve cage 20. The continued operation of the plunger 25 causes additional oil to enter the tubing 5 and consequently the oil or other liquid flows out through the upper end of the tubing.

It will be observed that the oil which is drawn up through the plunger 25 and the sand which is suspended in the oil cannot return to the cups 28. That is to say the sand or other granular matter which is pumped up through the pipe 8 and the plunger 25 cannot settle and lodge on the cups 28. Any granular matter which is in the oil will pass out with the oil through the cage 20 and settle exteriorly of the pipe 8. This positively prevents the rapid wearing of the leather cups 28.

By thus preventing the cups 28 from wearing rapidly the frequent pulling of the working barrel is overcome, and consequently the labor necessary to operate the well is greatly decreased and wear on the machinery necessary to pull the working barrel is also reduced.

The movable member of the working barrel is as illustrated in Figure 3 provided with a depending traveling tube 40 which contacts with the shoulder of the coupling 10 and thereby limits downward movement of the movable member. However the principal function of the depending tube 40 is to keep sand from working around tube 25 into cups 28, and also to provide pumping of oil or water on the down stroke of the sucker rods. Figure 2 illustrates that the upper portion of the relatively stationary pipe 11 is provided with a valve in the nature of a pair of cups 44, which cups contact with the interior of the traveling tube 40 and thereby causes the oil within the depending traveling tube 40 to pass up through the tubing 5.

Figure 2 also illustrates that the stationary pipe 11 is provided with a leaf spring 50 held in position by an attaching device 51.

When the pressure of the gas within the pipe 11 exceeds a predetermined point the spring 50 uncovers an opening in the stationary pipe 11 and therefore permits the gas to escape into the tubing.

I claim:—

1. The combination of upper and lower pipe connections and a combined coupling and stop member connecting the same, a hollow plunger having a piston movable in one of said pipe sections and adapted to pump the fluid therein through said hollow plunger, a valve carrying member communicating with and having rigid connection with said plunger, a tubular sand baffle depending from said valve carrying member and having its upper end entirely closed thereby, said combined stop and coupling being in the path of travel of said baffle and limiting downward movement of the same, and a piston fixed on one of said pipe sections and having a working fit with said baffle whereby the last named piston and said baffle constitute a pump.

2. The combination of upper and lower pipe sections and a combined coupling and stop member connecting the same, a hollow plunger having a piston movable in one of said pipe sections and adapted to pump the fluid therein through said hollow plunger, a valve carrying member communicating with and having rigid connection with said plunger and a hollow tubular sand baffle depending from said valve carrying member and having its upper end entirely closed thereby, said combined stop and coupling being in the path of travel of said baffle and limiting the downward movement of the same.

3. The combination of upper and lower pipe sections and a combined coupling and stop member connecting the same, a hollow plunger having a piston movable in one of said pipe sections and adapted to pump the fluid therein through said hollow plunger, a valve carrying member communicating with and having rigid connection with said plunger, a hollow tubular sand baffle depending from said valve carrying member and having its upper end entirely closed thereby, said combined stop and coupling being in the path of travel of said baffle and limiting the downward movement of the same, and a standing valve having connection with the lower pipe section.

4. The combination of upper and lower pipe sections and a combined coupling and stop member connecting the same, a hollow plunger having a piston movable in one of said pipe sections and adapted to pump the fluid therein through said hollow plunger, a valve carrying member communicating with and having rigid connection with said plunger, a hollow tubular sand baffle depending from said valve carrying member and having its upper end entirely closed thereby, said combined stop and coupling being in the path of travel of said baffle and limiting the downward movement of the same, a standing valve having connection with the lower pipe section, and a tubing receiving said pipe sections.

5. A working barrel for well tubings comprising a pipe, a coupling member connected to the upper end of the pipe and a second pipe connected to said coupling member, a hollow plunger slidable through said first and second named pipes and having a piston movable in said first named pipe, said hollow plunger being adapted to receive the liquid in said first named pipe, a coupling member connected to the upper portion of said hollow plunger, an outlet valve associated with said second named coupling member, said outlet valve being adapted to prevent the return of the liquid through the plunger whereby the sediment in the liquid will settle exteriorly of the pipe and within the tubing, a one-way valve arranged at the inlet end of the first-named pipe, a depending traveling tube connected to said second named coupling and surrounding said plunger, and a stationary piston carried by said second named pipe and received in said depending traveling tube.

6. A working barrel for well tubings comprising a pipe, a coupling member connected to the upper end of the pipe and a second pipe connected to said coupling member, a hollow plunger slidable through said first and second named pipes and having a piston movable in said first named pipe, said hollow plunger being adapted to receive the liquid in said first named pipe, a coupling member connected to the upper portion of said hollow plunger, an outlet valve associated with said second named coupling member, said outlet valve being adapted to prevent the return of the liquid through the plunger whereby the sediment in the liquid will settle exteriorly of the pipe and within the tubing, a one-way valve arranged at the inlet end of the first-named pipe, a depending traveling tube connected to said second named coupling and surrounding said plunger, a stationary piston carried by said second named pipe and received in said depending traveling tube, said first named coupling member being arranged in the path of travel of said depending tube whereby to limit the movement of the same.

WILLIAM W. WARNER.