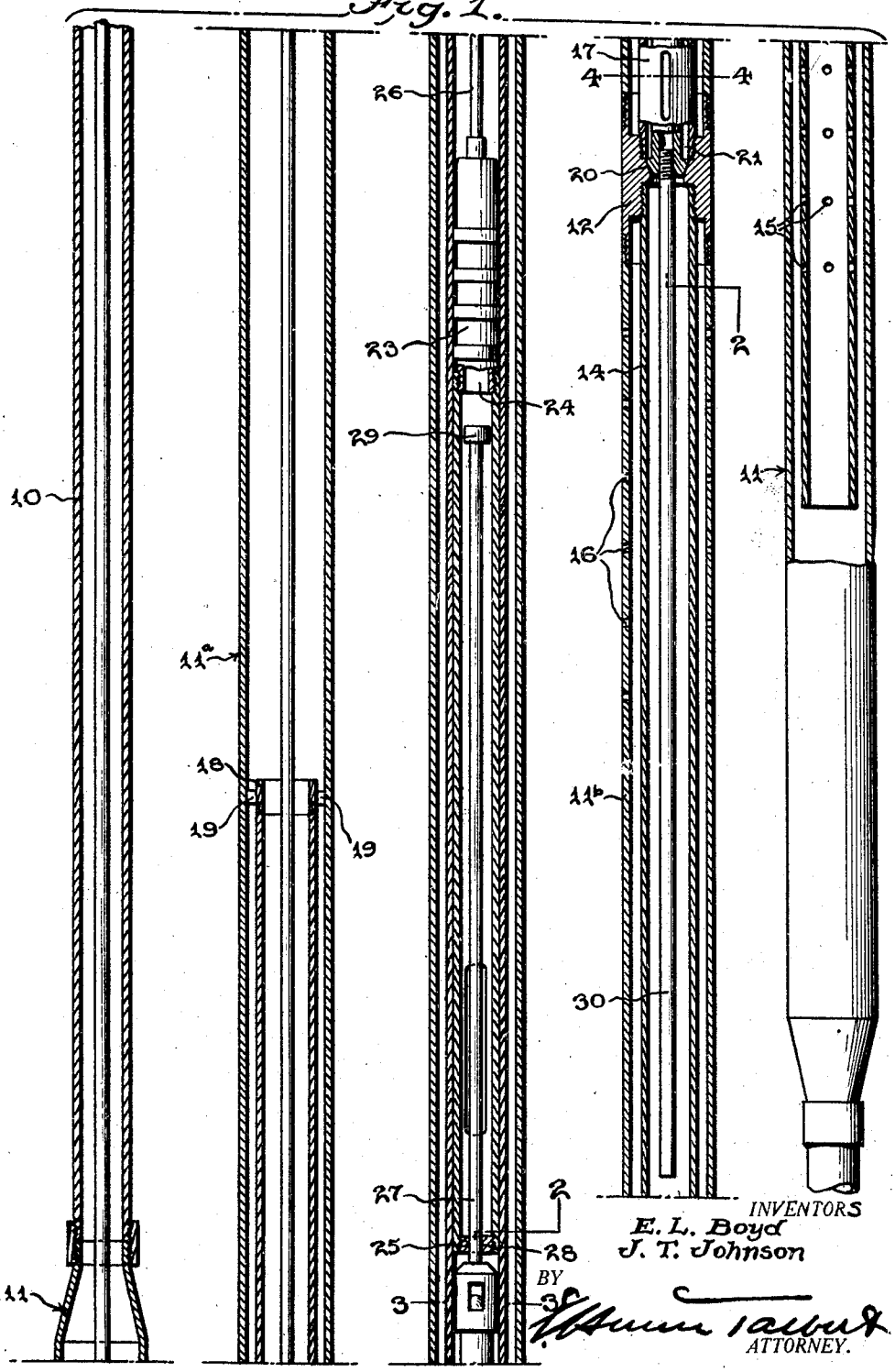
Sept. 11, 1928. 1,684,295

E. L. BOYD ET AL

COMBINATION WORKING BARREL AND SAND TRAP

Filed Oct. 18, 1927 2 Sheets-Sheet 1

Fig. 1.



INVENTORS
E. L. Boyd
J. T. Johnson
BY
ATTORNEY.

Sept. 11, 1928. 1,684,295

E. L. BOYD ET AL

COMBINATION WORKING BARREL AND SAND TRAP

Filed Oct. 18, 1927 2 Sheets-Sheet 2

Fig. 2.

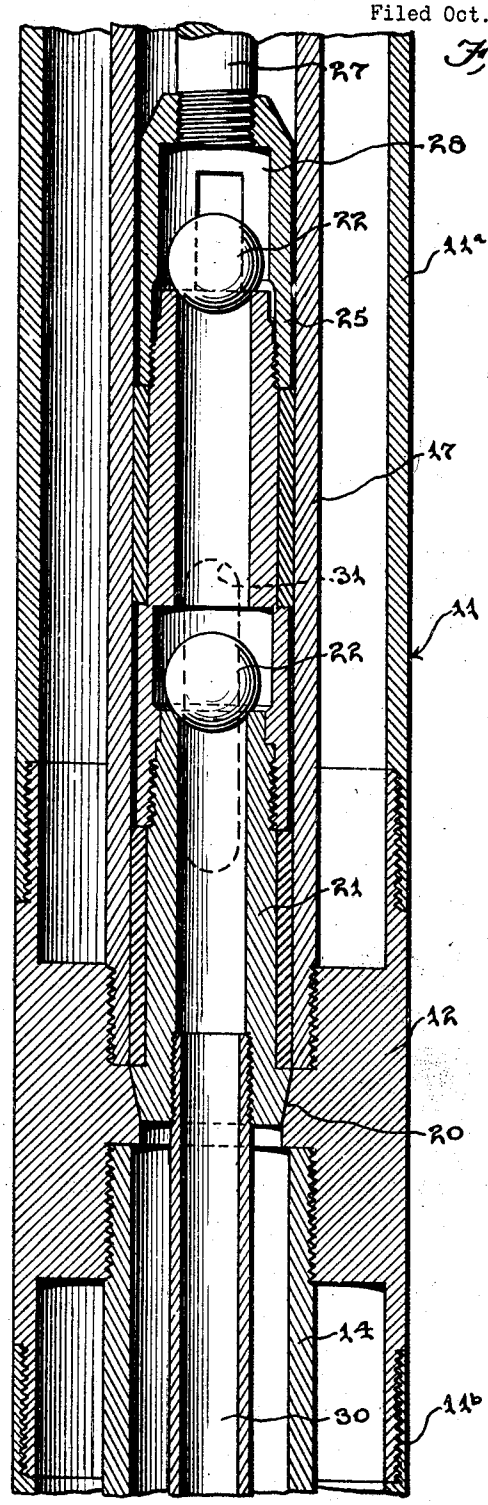


Fig. 3.

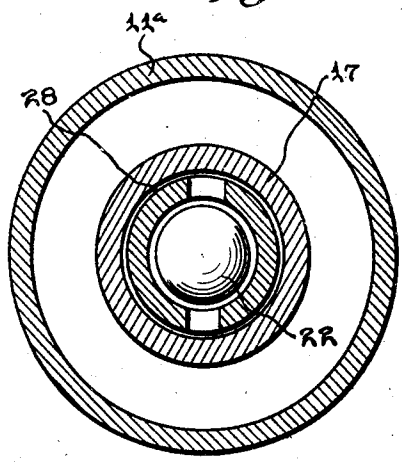
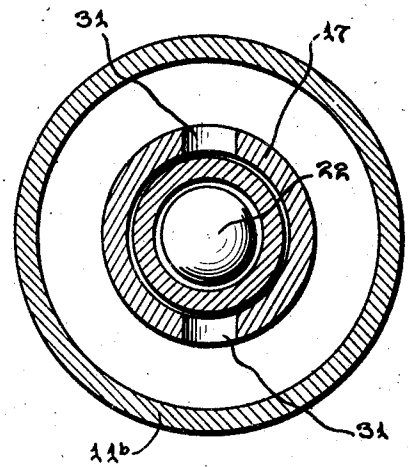


Fig. 4.



INVENTORS
E. L. Boyd
J. T. Johnson

BY

ATTORNEY.

Patented Sept. 11, 1928. 1,684,295

UNITED STATES PATENT OFFICE.

ELTON L. BOYD AND JAMES T. JOHNSON, OF HEALDTON, OKLAHOMA.

COMBINATION WORKING BARREL AND SAND TRAP.

Application filed October 18, 1927. Serial No. 226,393.

The object of the invention is primarily to modify the conventional working barrel employed in oil wells, so that provision may be made for trapping the sand which attends the pumping or raising of the oil to prevent it, as far as possible, from reaching the standing and working valves with its deleterious effect on the same; to provide a construction wherein such sand as may pass the valves may be separated from the oil and deposited in a secondary or supplemental trap; and to provide a construction in which it will be possible, without pulling the valves, to discharge and thoroughly clean such supplemental trap periodically, so that the pumping operation, once started, may be made substantially continuous.

With this object in view, the invention consists in a construction and combination of parts of which a preferred embodiment is illustrated in the accompanying drawing, wherein:

Figure 1 is a central vertical sectional view through the invention.

Figure 2 is an enlarged vertical sectional view on the plane indicated by the line 2—2 of Figure 1.

Figures 3 and 4 are respectively transverse sectional views on the planes indicated by the lines 3—3 and 4—4 of Figure 1.

In the well tubing 10 is interposed an enlarged tube 11 of substantially twice the diameter of the well tube. This enlarged tube comprises two sections 11^a and 11^b united by a coupling 12 into the lower end of which is threaded a tubing 14 of substantially the same diameter as the well tubing, this tube 14 being concentric with the tubular section 11^b but terminating short of the lower end of the latter. The tube 14 is open at its lower end but adjacent said end is provided with series of perforations 15 while the tubular section 11^b is provided with perforations 16 adjacent its upper end which connects with the coupling 12. Similarly above the coupling 12 and threadingly engaged with the latter is a tube 17 concentric with the tubular section 11^a, this tube 17 connecting with a collar 18 provided with radial spacer arms 19 engaging the interior wall of the section 11^a. The space between the tube 17 and the tubular section 11^a defines a supplemental sand trap.

The coupling 12 is formed with a conical seat 20 on which the lower conical end of the cage 21 rests, the latter together with the ball valves 22 which it carries constituting the standing valve. The working valve 23 consisting of a series of superposed suction heads is provided with a lower tubular extension 24 into the lower end of which is threadingly engaged a ring nut 25. The working valve is actuated by the conventional sucker rod 26 and the standing valve cage 21 is provided with an upstanding rod 27, the latter extending through the central opening 28 in the ring nut and being provided at its upper end with a head 29 engaging the ring nut in the uppermost working position of the working valve.

Depending from the standing valve cage 21 is a guide tube 30 of slightly greater length than the rod 27.

In the normal seated position of the working valve cage, it closes the axial slots 31 formed in the tube 17, these slots constituting discharge openings for the supplemental sand trap when the valve cage is raised.

In the operation of the invention, the working valve is reciprocated through the instrumentality of the sucker rod, the stroke of the working valve being slightly less than the length of the rod 27. Upon each upstroke of the working valve, the oil in the well is taken in through the perforations 16 and 15, entering the tube 14 and thence the tube 30, raising the ball valves 22 in such operation, the downstrokes of the working valve seating the ball valves 22. A large portion of the sand that may be contained in the oil drops by gravity through the lower end of the tube section 11^b and down through the lower end of the well tube. Such sand as may remain in the oil is carried past the working valve, settling into the supplemental trap defined by the tube 17 and tubular section 11^a. After a specified interval when it is assumed that the supplemental trap has received enough sand to make necessary its discharge, the sucker rod is drawn up four or five feet above the normal stroke, this operation resulting in the valve cage 21 being lifted from its seat because of the engagement of the ring nut with the head 29 of the rod 27. The weight of the oil above the sand will then result in the ejection of the latter through the slots 31 and into the tube 14 from which it drops to the bottom of the well. The lowering of the sucker rod will then permit the valve cage 21 to return to its seat 20, the tube

30 acting as a pilot guiding the cage to its seat.

The invention having been described, what is claimed as new and useful is:

1. Apparatus for the purpose indicated comprising concentric tubular members of which the intervening space between the two constitutes a sand trap, a working valve operating in the inner tubular member, a bodily movable standing valve of which the body portion in one position closes openings of communication between said sand trap and the interior of the inner tubular member, and operative connections between the working valve and the body portion of the standing valve to effect movement of said body portion only when the stroke of the standing valve exceeds its normal stroke.

2. Apparatus for the purpose indicated comprising concentric tubular members of which the intervening space between the two constitutes a sand trap, a working valve operating in the inner tubular member, a bodily movable standing valve of which the body portion in one position closes openings of communication between said sand trap and the interior of the inner tubular member, operative connections between the working valve and the body portion of the standing valve to effect movement of said body portion only when the stroke of the standing valve exceeds its normal stroke, and a guide tube on the body portion of the standing valve.

3. Apparatus for the purpose indicated comprising concentric tubular members of which the intervening space between the two constitutes a sand trap, a coupling at the lower ends of said members and having a valve seat, a standing valve comprising cage and valve members of which the former engages a seat formed in said coupling, the inner tubular member having openings adjacent said coupling effecting communication betwen its interior and said sand trap, a working valve operating in the inner tubular member, and operative connections between the working valve and said cage member to effect movement of the latter only when the stroke of the standing valve exceeds its normal stroke, said cage member when seated closing said openings.

4. Apparatus for the purpose indicated comprising concentric tubular members of which the intervening space between the two constitutes a sand trap, a working valve operating in the inner tubular member, a member disposed at the lower ends of said tubular members and having a valve seat, a working valve comprising cage and valve members of which the former engages a seat formed upon said coupling, the inner tubular members having openings effecting communication between its interior and the sand trap and closed by said cage when the latter is engaged with its seat, the working valve and said cage having cooperative sliding connections permitting movement of the former without movement of the latter during normal stroke, said connections interlocking to unseat the cage upon the stroke of the standing valve exceeding its normal stroke.

5. Apparatus for the purpose indicated comprising concentric tubular members of which the intervening space between the two constitutes a sand trap, a working valve operating in the inner tubular member, a member disposed at the lower ends of said tubular members and having a valve seat, a standing valve comprising cage and valve members of which the former engages a seat formed upon said coupling, the inner tubular members having openings effecting communication between its interior and the sand trap and closed by said cage when the latter is engaged with its seat, said cage having an upstanding rod within said tubular member and terminating in a head and the working valve having depending tubular extensions closed at its lower end with a ring nut having an opening formed therein of greater diameter than said rod but of less diameter than said head, the ring nut being in surrounding relation to said rod.

In testimony whereof they affix their signatures.

ELTON L. BOYD.
JAMES T. JOHNSON.