

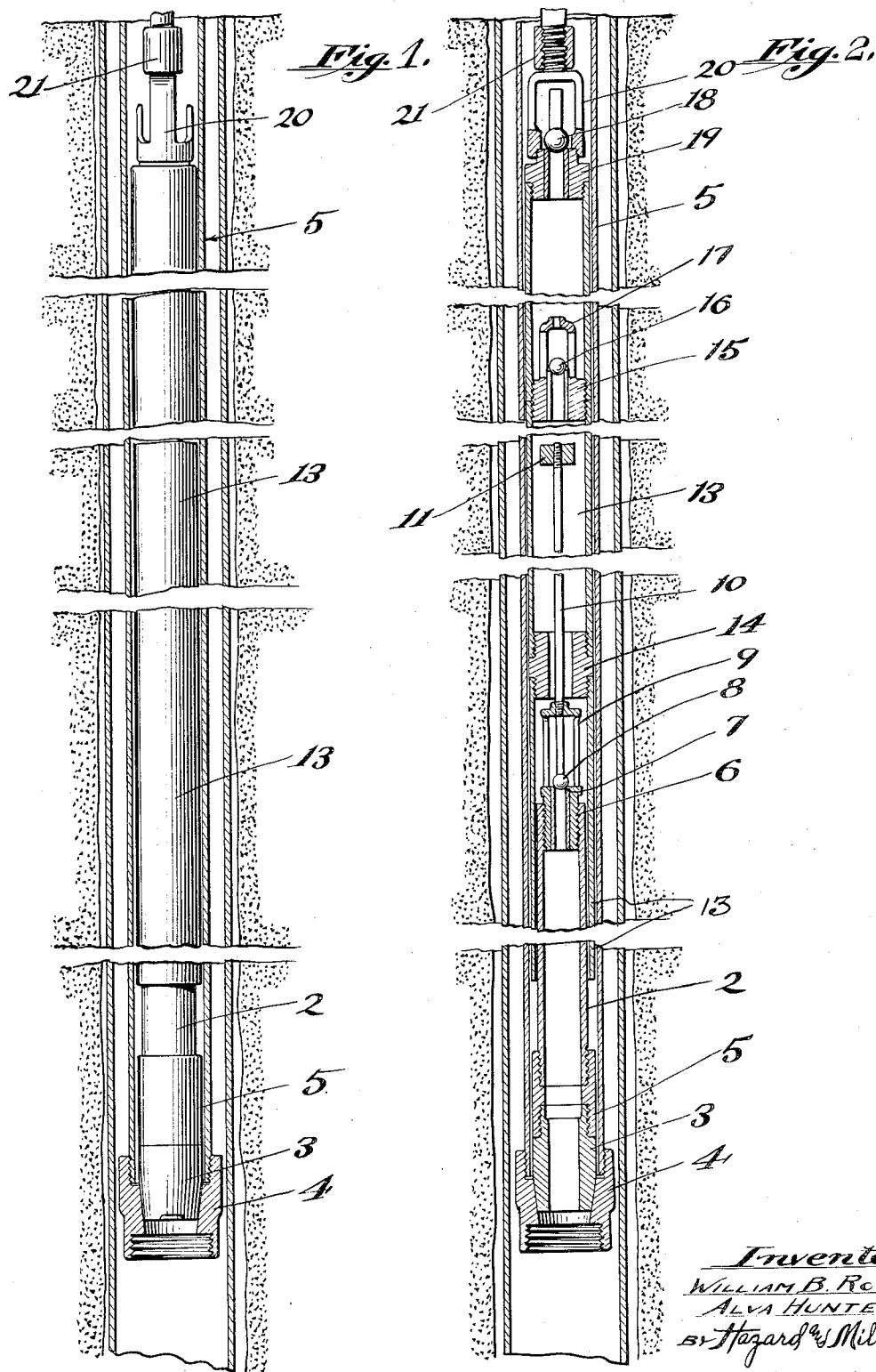
Nov. 18, 1924.

1,516,470

W. B. ROBB ET AL

PUMP PLUNGER

Filed July 28, 1922



Inventors
WILLIAM B. ROBB.
ALVA HUNTER.
BY Hazard & Miller
Attorneys.

UNITED STATES PATENT OFFICE.

WILLIAM B. ROBB AND ALVA HUNTER, OF BAKERSFIELD, CALIFORNIA.

PUMP PLUNGER.

Application filed July 28, 1922. Serial No. 578,088.

To all whom it may concern:

Be it known that we, WILLIAM B. ROBB and ALVA HUNTER, citizens of the United States, residing at Bakersfield, in the county of Kern and State of California, have invented new and useful Improvements in Pump Plungers, of which the following is a specification.

This invention relates to pumps and more particularly to deep well pumps.

It is an object of the present invention to provide a pump of such construction as to eliminate the usual pump barrel that is applied to the lower end of the string of pump tubing.

Another object is to provide a pump plunger that is devoid of mechanical packing rings and elements and which consists substantially of a standing valve section and a reciprocating shell section, each of these being of elongated or extended form and telescopically cooperating with a snug fit sufficiently close to eliminate the requirement of packing elements mounted in either of the parts.

Likewise an object of the invention is to provide a pump plunger which will have a sufficiently snug working fit directly in the standard pump tubing so that the liquid being pumped will form a liquid seal or packing eliminating mechanical packing elements.

From actual construction and use of pumps of the type involved in the present invention it has been found that there is a production of fluid fifty per cent higher than that obtained by ordinary barrel and plunger pumps. It has been found also that by pumps of the type herein disclosed the necessity for pulling the plunger is materially decreased as the tendency of sanding up is practically overcome. Again, the pump operates with greater ease of action and uniformity and balance of stroke, the ordinary jerking motion of plunger pumps operated by walking beams being eliminated. The pump operates with smoother action and decreased wear on rods and rig and it is found that the life of the pump plunger is greatly increased since there is no direct friction bearing in the mechanism.

An object is to design and provide a pump plunger of such construction and arrangement of parts that there will be maintained between the plunger parts and be-

tween the shell of the plunger and the well tubing a comparatively thin skin or body of liquid in the well hole, which of itself will operate by surface or skin friction to pack the pump plunger against leakage.

Another object is to provide a moving plunger having a plurality of valves, thus insuring the effective action of the plunger on its pumping stroke by the seating promptly of at least one of the valves and therefore assuring positive action of the pump.

Other objects and advantages of the invention will be made manifest in the following specification of an embodiment of the invention illustrated in the accompanying drawings, wherein:

Figure 1 is a longitudinal section of a pump tube and the shoe arranged on the bottom thereof; the plunger being shown in elevation in the tube.

Figure 2 is a longitudinal central section of the improved plunger, it being shown in lower position as to the standing valve and tubing in the well.

The invention is shown as consisting of a pump plunger of greatly elongated form as compared to the usual or standard plungers of deep well pumps which operate in pump barrels attached to the foot of a string of tubing sections. The present pump plunger consists of a standing valve section 2 having on its lower end a shoe section or plug 3 which is designed to seat on a complementary shoe or seat forming coupling 4 that is attached to the lower section 5 of a string of pump tubing sections. Thus when the plunger is lowered into the tubing the standing valve tube becomes stationary in the bottom of the pump tube and rests on its seat 4. The plunger section 2 is of elongated form and at its upper end is provided with a suitable valve device which may consist of a plug member 6 having a seat 7 upon which may rest a ball or other valve 8 which may or may not be confined in a cage structure 9. Upwardly extending from the cage structure is the usual garbutt rod 10 and this is provided with a cross head 11 at its upper end.

Slidably fitting with a suitable degree of looseness upon the periphery of the standing plunger section 2 is a lower section or contiguous portion of the plunger shell. This shell may be built up of any suitable material and number of pieces 13, the con-

tiguous ends of which pieces may be connected together by any appropriate form of coupling as 14. The coupling is of tubular form having exteriorly threaded ends to
5 take the threads of the plunger shell sections 13 and the garbutt rod 10 passes upwardly through the coupling so that while the plunger is being lowered the garbutt head 11 rests on the lowermost coupling 14, Fig-
10 ure 2.

When the standing valve section 2 engages the shoe or seat member 4 at the bottom of the tubing, then the plunger shell 13 is adapted to slide down along upon the
15 stationary standing section 2.

Preferably, the standing section 2 is of such length that the operating plunger may be carried for its full or maximum stroke as when operated by a walking beam and
20 leakage of material between the stationary standing section 2 and the inner surface of the plunger shell 13 is prevented by the skin or film of oil that is compressed between the operating parts which are provided for free
25 sliding movement and the space being formed of sufficient proportions to receive and contain a skin of oil or other liquid.

The plunger shell 13 is provided at any suitable point with a valve seat 15 to receive a complementary valve 16 which may
30 be confined in a cage 17.

Above the valve 16 there is provided a top valve 18 having a seat 19 attached to the top section of the plunger shell and this
35 valve may play in a cage 20 to which is adapted to be attached in any suitable or the usual manner a plunger operating pump rod 21.

The plunger shell 13 is designed to have a
40 free working fit in the pump tube 5 and there is formed during operation a skin or film of oil between the jacket 13 and the inner surface of the pump tube 5 and it has been found by constant use for a considerable
45 period of time of a number of pumps constructed involving the present invention

that the film of liquid forms a substantial packing, the resistance of which is sufficient to prevent leakage of fluid around and past the operating parts.

Plungers constructed according to this invention are made in length of from thirty to forty feet and it will be seen that because of the great resistance of the skin of oil surrounding the pump shell that it is effective
55 in the packing of the pump and eliminates the provision of other mechanical packing elements attached to the plunger parts.

In the removal of the plunger from the well the upward movement of the shell as
60 to the standing valve brings coupling 14 up against the garbutt 11 and this results in the pulling of the valve.

Further embodiment, modifications and changes in combination of parts may be
65 resorted to within the spirit of the invention as claimed.

What is claimed is:

A plunger pump comprising a shoe, a
70 standing plunger section extending upwardly from the shoe, a standing valve at the upper end of the standing plunger section, a plunger shell having a lower section telescoping upon the standing section, an inside
75 coupling in the upper end of the lower section, a second plunger shell connected to the inside coupling, a stem extending from the standing valve through the inside coupling, a cross head upon the stem to engage the inside coupling and lift the stand-
80 ing valve, a second inside coupling connected to the second plunger shell, a plunger valve carried by the second inside coupling, a third plunger shell connected to the second
85 inside coupling and a plunger valve connected to the upper end of the third plunger shell and adapted to be connected to a sucker rod.

In testimony whereof we have signed our names to this specification.

WILLIAM B. ROBB
ALVA HUNTER