Nov. 30, 1926.

1,608,947

G. B. MAEGLY

PUMP FOR OIL WELLS

Filed July 20, 1922

FIG. 1

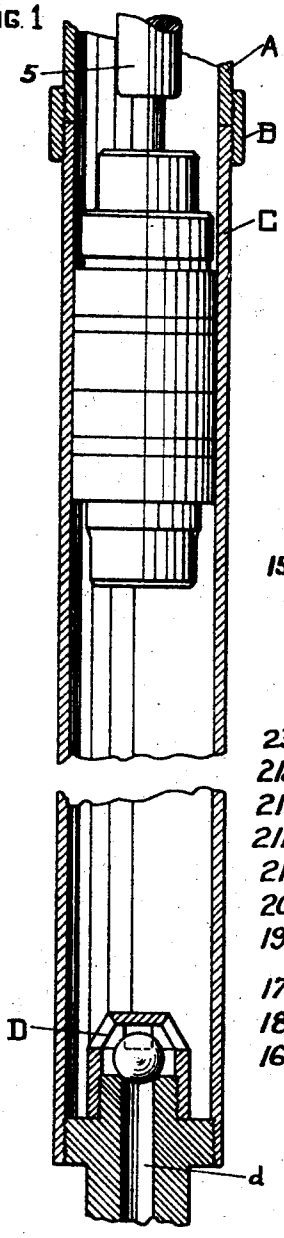


FIG. 2

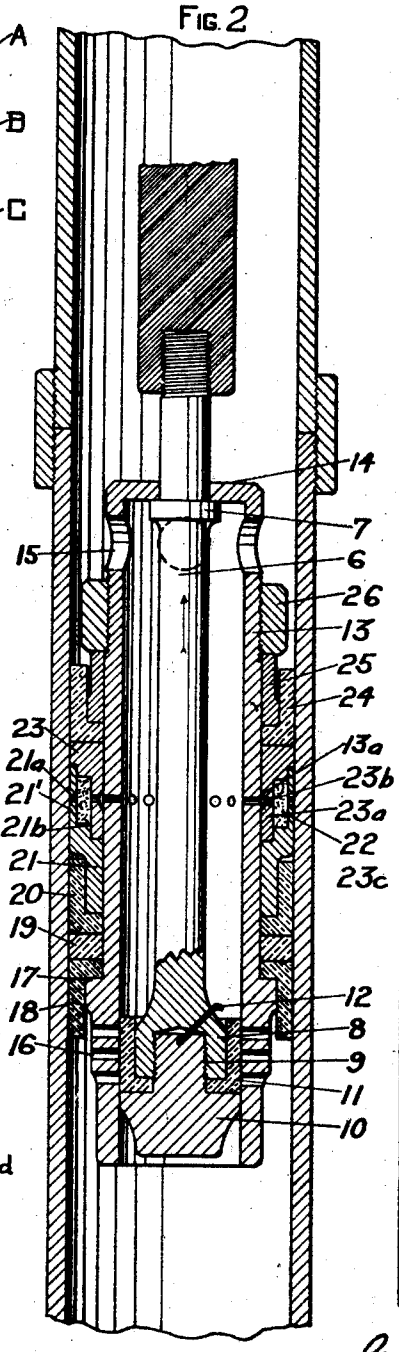
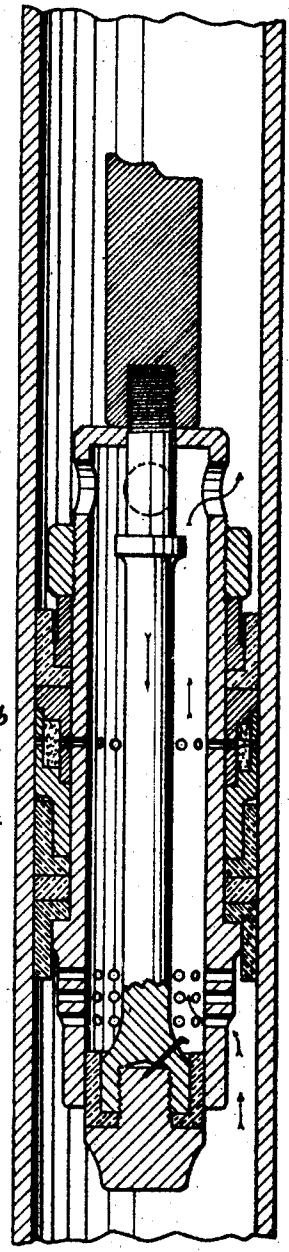


FIG. 3



INVENTOR.

George B. Maegly

by W. G. Dobbins

Attorney.

Patented Nov. 30, 1926. 1,608,947

UNITED STATES PATENT OFFICE.

GEORGE B. MAEGLY, OF HOUSTON, TEXAS.

PUMP FOR OIL WELLS.

Application filed July 20, 1922. Serial No. 576,172.

This invention is for an improvement in pumps for oil wells, and relates particularly to an improved plunger for such pumps.

The present invention has for its principal object to provide a plunger having a positively operated valve for passing the oil on the downward stroke of the plunger from the pump barrel to the well tubing, and to provide an improved plunger structure in which the valve operates, having the parts so arranged as to reduce to a minimum any liability of the parts working loose and falling off into the pump barrel, and so arranged as to be easily replaced.

Another important object is to provide a sand wiper for keeping that portion of the interior surface of the pump barrel over which the plunger travels relatively free of sand.

These and other objects are attained by my invention which is illustrated in the accompanying drawings, in which:

Fig. 1 represents a vertical section through the pump barrel, showing the plunger in elevation;

Fig. 2 is a vertical section on a larger scale through the pump barrel and plunger, showing the position of the parts when the plunger is in its uppermost position in the well, or is traveling upward to this position;

Fig. 3 is a similar view of the plunger, showing the parts in the position which they assume with the downward travel of the plunger.

In the drawing, A represents the well tubing connected at its lower end through coupling B with the pump barrel C. The pump barrel is of the usual cylindrical construction, having an inwardly opening ball or check valve D of any known or preferred construction for trapping the fluid drawn into the pump barrel through opening *d*.

The lower end of the pump rod is designated 5. Screwed into the lower end of this rod is a plunger carrying rod 6 of less diameter than rod 5. Spaced downwardly from the upper end of plunger carrying rod 6 is a shoulder 7. At the lower end of this plunger carrying rod is an enlarged portion 8 having a threaded recess 9 therein. A threaded extension on end nut 10 is screwed into this recess. Clamped between the end of the rod and the nut 10 is a cup leather or packing member 11 which extends upwardly around the enlarged portion 8. A pin 12 may be used to prevent end nut 10 from turning relatively to the rod. This arrangement on the lower end of rod 6 provides a valve whose action will be hereinafter more fully explained.

Surrounding the plunger carrying rod 6 is a hollow cylindrical plunger shell 13 having a closed upper end 14, through which the upper part of rod 6 extends, the arrangement being such that the shell is normally suspended from shoulder 7, but is free to move upwardly, relatively to rod 6, as hereinafter described, such relative movement being confined between shoulder 7 and the end of rod 5.

In the side walls of the shell, near the top thereof, are ports 15. Near the lower end of the shell are a plurality of smaller ports 16. The shell is of such length that when the top 14 is in contact with shoulders 7, the cup-leather or packing 11 on the lower end of the plunger carrying rod 6 is inside the shell and covers the holes 16. When the shell has moved upwardly relatively to the rod 6, as before mentioned, parts 16 are above the packing 11, and the packing 11 is then at the extreme lower end of the shell.

Above ports 16 is a shoulder 17, on which rests the inturned part of an inverted cup leather or packing 18. This packing is held in place by means of washer 19, on which rests a second packing member or cup-leather 20. Packing member 20 is held in place by means of a metal sleeve member 21 which has an outwardly flared flange 21′ having small openings 21^a therein. On the inside face of this flange is a shoulder 21^b, on which rests a filter ring of felt or other fibrous substance 22. A co-acting sleeve 23 rests on the top of member 21 and is so shaped as to hold filter ring 22 in place, this sleeve 23 having an extension 23^a which extends down around the shell inside of the fibrous ring. In some instances, it may be desirable to omit the filter ring and leave the annular space empty.

This sleeve is perforated, as indicated at 23^b, and these perforations open into an annular channel 23^c on the inside face of the extension 23^a. This channel registers with perforations 13^a in the plunger body or shell. This annular channel serves to establish communication between the ports 23^b and the perforations 13^a, so that the ports need not be set in register, and also pro-

vides a sand trap in which sediment may be collected as some of the oil being pumped flows through these small passageways.

Resting on this member 23 is a packing member or wiper 24 which is held in position by sleeve 25. A nut 26 threaded on to the shell just below ports 15 hold all the removable parts on the shell between it and shoulder 17 in compression to prevent relative movement thereof and insure efficient action.

On the beginning of the upstroke of the rod 5 and plunger carrying rod 6, the plunger temporarily remains stationary until the shoulder 7, contacting with end 14 of the plunger, begins to lift it. This slight movement of the rod relatively to the plunger moves the valve on the lower end of rod 6 into position to close ports 16. The continued upward movement of rod 5 thus moves the plunger up, drawing oil into the lower part of the pump barrel.

During this upward movement, the plunger is operating against the weight of the column of oil in the tubing above it. At all times, the pressure of this column of oil is communicated to the interior of the plunger through ports 15. Some of the oil inside the plunger is thereby forced out through openings 13^a into groove 23^c, through the filter, and out onto the inside of the pump barrel, whereby the barrel is lubricated with strained oil. Pressure between the upper and lower sides of upper packing 24 is equalized through this lubricating passage, so that the packing 24 will always be held against the walls of the cylinder when the plunger is moving in either direction, to wipe away any sand and dirt, and sand and dirt will have no opportunity to work in between the upper packing or wiper and the walls of the pump cylinder. The oil thus supplied as a lubricant will also increase the effectiveness of the two lower packings on the plunger.

On the beginning of the down stroke of rod 5, the rod will move downwardly relatively to the plunger until part 14 contacts with rod 5. When this happens, ports 16 will be open and the oil, which is trapped in the lower part of the pump cylinder, may escape through openings 16, the interior of the plungers, and the ports 15.

The construction thus described provides a positively acting valve for the plunger, which is not liable to be rendered inoperative by the presence of dirt or grit, as may easily happen with the valves usually employed in pumps of this kind. By reason of the plunger having the shoulder 17 at its lower end, all parts are removable from the upper end of the shell, and consequently cannot lose off into the pump barrel. The parts are also all so arranged as to make them readily replaceable when necessary.

I claim as my invention:

1. A plunger for pumps for oil wells comprising a cylindrical body having a longitudinal passage through its interior, packing members on the outside of said body, means for holding said packing members in proper spaced relation, and means for filtering some of the oil which is being pumped and conducting it to the exterior of the plunger between some of said packing members.

2. A plunger for oil pumps for oil wells comprising a cylindrical body having a longitudinal passage therethrough, packing members on the exterior of said body, a filtering means on the exterior of the body between certain of said packing members, means surrounding the body for holding said filtering means and maintaining the packing members in proper relation, transverse passages through the body and communicating with the filtering means, whereby some of the oil being pumped may escape to said filtering means, and means for conducting filtered oil to the exterior of the plunger.

3. A plunger for oil pumps comprising a hollow cylindrical shell, a shoulder on the exterior of said shell near the lower end thereof, a pair of spaced apart packing members on the shoulder, a sleeve surrounding the shell above the packing members, said sleeve having an outwardly flared flange at its top to provide a filter receiving recess, means in said recess providing a filter, a second sleeve on said shell above the first sleeve for retaining the filtering means in place, a packing member above said second sleeve, a nut for holding all of said members on the shell between it and the shoulder in compression, and passages extending through said shell and communicating with the filtering means, and means whereby filtered oil may be conducted to the exterior of the plunger above said lower packing members and below the upper packing member.

In testimony whereof I affix my signature.

GEORGE B. MAEGLY.