

June 9, 1925.

1,541,166

O. MOWERS

PUMP PLUNGER

Filed Dec. 6. 1924

2 Sheets-Sheet 1

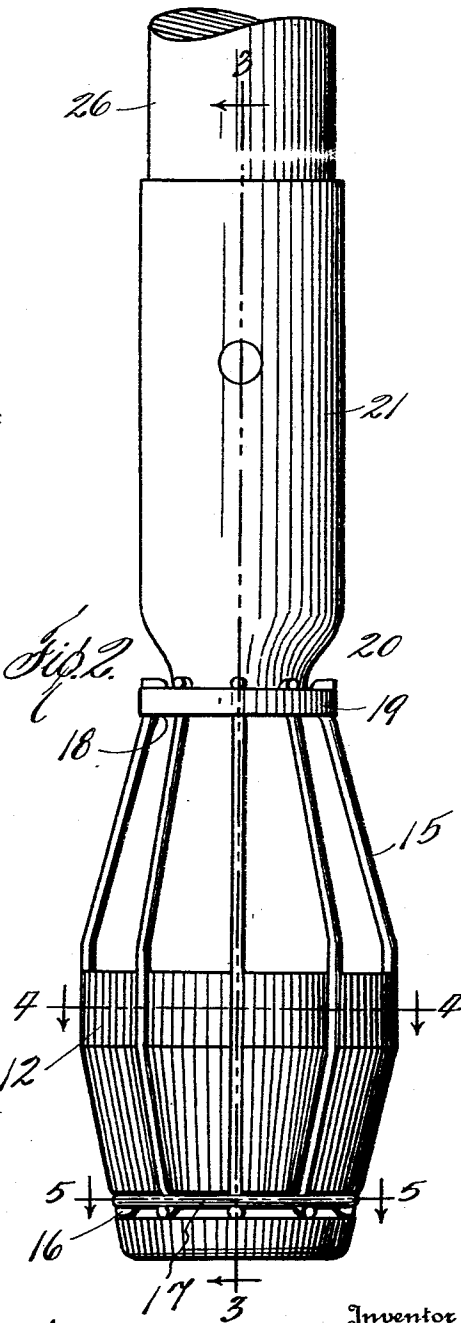
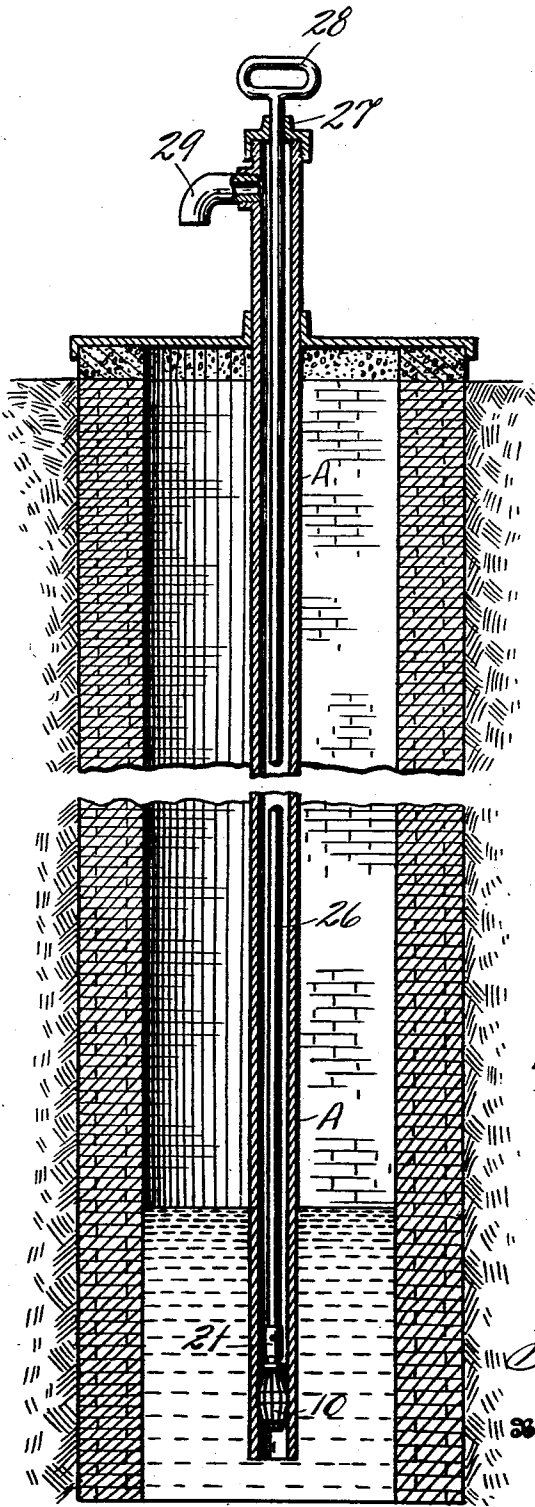


Fig. 1.

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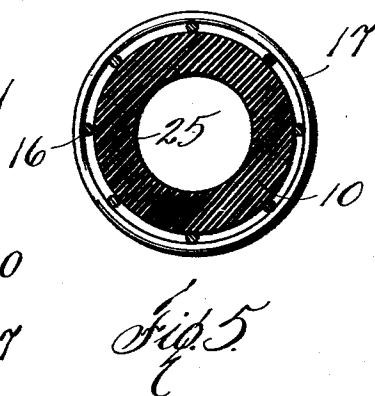
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2 Sheets-Sheet 2



UNITED STATES PATENT OFFICE.

OSMYN MOWERS, OF DALLAS, TEXAS, ASSIGNOR OF ONE-HALF TO THE GUIBERSON CORPORATION, OF DALLAS, TEXAS, A CORPORATION OF DELAWARE.

PUMP PLUNGER.

Application filed December 6, 1924. Serial No. 754,434.

To all whom it may concern:

Be it known that I, OSMYN MOWERS, citizen of the United States of America, residing at Dallas, in the county of Dallas and State of Texas, have invented certain new and useful Improvements in Pump Plungers, of which the following is a specification.

This invention relates to new and useful improvements in pump plungers.

The object of the invention is to provide a plunger which will conform to uneven or out-of-round side walls and at the same time afford an efficient contact.

Another object is to provide a reinforced yieldable plunger having elements for taking the wear and reducing the friction.

A further object is to provide a plunger having a soft or yieldable valve seat for receiving a ball valve, whereby an efficient seat is had and one which wears longer in sand and upon which sand has very little effect.

A still further object is to provide a plunger which may be attached to a rod and the latter reciprocated by hand and a direct pull, thus obviating a pump lever and affording a longer stroke.

A construction designed to carry out the invention will be hereinafter described, together with the other features of the invention.

The invention will be more readily understood from a reading of the following specification and by reference to the accompanying drawings, in which an example of the invention is shown, and wherein:

Fig. 1 is a vertical sectional view of a well showing a plunger constructed in accordance with my invention in position therein,

Fig. 2 is an enlarged elevation of the plunger,

Fig. 3 is a vertical sectional view on the line 3—3 of Fig. 2,

Fig. 4 is a cross-sectional view on the line 4—4 of Fig. 2 and

Fig. 5 is a cross-sectional view on the line 5—5 of Fig. 2.

In the drawings the numeral 10 designates a frustro-conical head or cup preferably made of soft rubber so as to yield. However the degree of flexibility of the head may vary and it may be made more elastic at some points than others, if necessary. At the upper end the head or cup may be reduced to an annular lip 11. Immediately

below the lip is formed the cup with a circumferential band or contact panel 12 which engages with the wall of the tubing A. From the band the cup is tapered downwardly. Near its bottom the cup has an external circumferential groove 13. From the groove longitudinal seats or grooves 14 extend upwardly in the outer surface of the cup to the lip thereof.

The cup is enclosed in a cage composed of longitudinal wires or rods 15. The lower portion of the cage is bent to conform to the shape of the cup, whereby the rods may be seated in the grooves 14. Each rod has its lower end formed into a hook 16 which lies in the grooves 13. A retaining ring 17 is slipped over the lower end of the cup and engaged in the hooks, whereby the latter are held in the groove 13. The lower ends of the rods may be fastened in any other suitable manner and the invention is not limited to the manner or means of fastening the rods.

The rods just above the lip 11 are bent inwardly and have their upper ends 18 crimped and inserted through an annular spider or collar 19. The rods are fastened by bending their tips 20 down onto the spider. The spider is formed integral with the lower contracted end of a tubular socket 21. The cage has a general elliptical shape and at its central portion or at the point of greatest diameter the rods contact with the walls of the tubing A. In making the plunger it may have an external diameter slightly in excess of the internal diameter of the tubing and thus when the plunger is inserted in the tubing the cage will be compressed so that the lip 11 will contact with the wall of the tubing between the rods of the cage, but the rods being of resilient metal will engage the tubing and take the wear.

The cup 10 being formed of rubber or equivalent material, has inner walls 22 inclined downwardly from the lip 11, and intersecting with an annular shoulder 23 forming a valve seat for a ball valve 24 confined in the cup. The cup has an axial bore 25 extending downward from the seat. The ball is free to move upwardly but can not escape through the cage. A plunger rod 26 has its lower end fastened in the socket 21 and its upper end extending through a cap 27 on the upper end of the

tube. A handle 28 may be formed on the upper end of the rod.

A tubing A is extended down into the water in the well. When the plunger is forced downward the valve 24 unseats and permits the liquid to pass up the bore 25 and through and above the cup. When the down stroke is stopped the valve seats and holds the liquid which has been trapped. Now upon the next upward stroke the cup 10 lifts the column of liquid in the tube and discharges it through the spout 29. It will be seen that no liquid is lost and the length of the stroke depends upon the person operating the handle 28. Of course the rod 26 could be attached to any form of surface pump and operated in the usual way.

It is to be noted that no central mandrel or rod is attached to the cup but the pull or lift is exerted through the medium of the cage. The wires 15 being suspended from the socket 21 form a basket or cradle in which the cup 10 is supported. When the plunger is pulled upwardly the lift starts equally from all sides of the cup and there is a tendency to elongate the cage which reduces the frictional contact with the tubing, thus making for easy pumping.

A distinct advantage of the ring 17 and the groove 13 is that a restive plane is formed past which the ball 24 cannot be forced. This enables the use of a soft rubber cup and prevents the load from forcing the ball 24 down through the bore 25.

Various changes in the size and shape of the different parts, as well as modifications and alterations may be made within the scope of the appended claims.

What I claim, is:

1. In a pump plunger, a rubber cup having a valve seat, a valve in the cup engaging the seat, and a foraminous reinforcing cage enclosing the cup.

2. In a pump plunger, a rubber cup having a valve seat, a valve in the cup engaging the seat, and a reinforcing cage surrounding the cup and formed of rods embedded in the surface of the cage.

3. In a pump plunger, an elongated elliptical cage, a plunger socket from which the cage is suspended, a rubber cup supported in the lower portion of the cage, and a valve in the cup.

4. In a pump plunger, an elongated elliptical cage, a plunger socket from which the

cage is suspended, a rubber cup confined within the lower portion of the cage and having an annular lip at the largest diameter of the cage, and a valve in the cup.

5. In a pump plunger, a rubber cup having a valve seat, a valve engaging the seat, an annular lip at the upper end of the cup, and a reinforcing cage surrounding the cup.

6. In a pump plunger, a rubber cup having a valve seat, a valve engaging the seat, an annular lip at the upper end of the cup, and a reinforcing cage surrounding the cup and comprising longitudinal rods embedded in the cup.

7. In a pump plunger, a rubber cup having an annular lip at its upper end and provided with an axial bore, a valve seat surrounding the bore, a ball valve in the cup engaging the seat, and a support in which the cup is enclosed.

8. In a pump plunger, a rubber cup having an annular lip at its upper end and provided with an axial bore, a valve seat surrounding the bore, a ball valve in the cup engaging the seat, and a cage surrounding the cup and including rods embedded in the surface of the cup.

9. In a pump plunger, a frustro-conical rubber cup, an elliptical cage comprising longitudinal rods embedded in the surface of the cup, means for fastening the lower ends of the rods, means for fastening the upper ends of the rods, a socket from which the cage is suspended, and a valve in the cup.

10. In a pump plunger, a frustro-conical rubber cup having a circumferential groove near its bottom, vertical grooves in the outer surface of the cup extending from the circumferential groove, rods seated in grooves, a retaining ring engaging the lower ends of the rods in the circumferential groove, a valve in the cup and a spider to which the upper ends of the rods are connected.

11. In a pump plunger, a soft rubber cup having a vertical opening and a valve seat, a reinforcing cage surrounding the cup, and a retaining ring seated in the outer wall of the cup relatively below the valve seat and fastening the lower end of the cage.

In testimony whereof I affix my signature.

OSMYN MOWERS.