D. A. DECROW.

PUMP PLUNGER.

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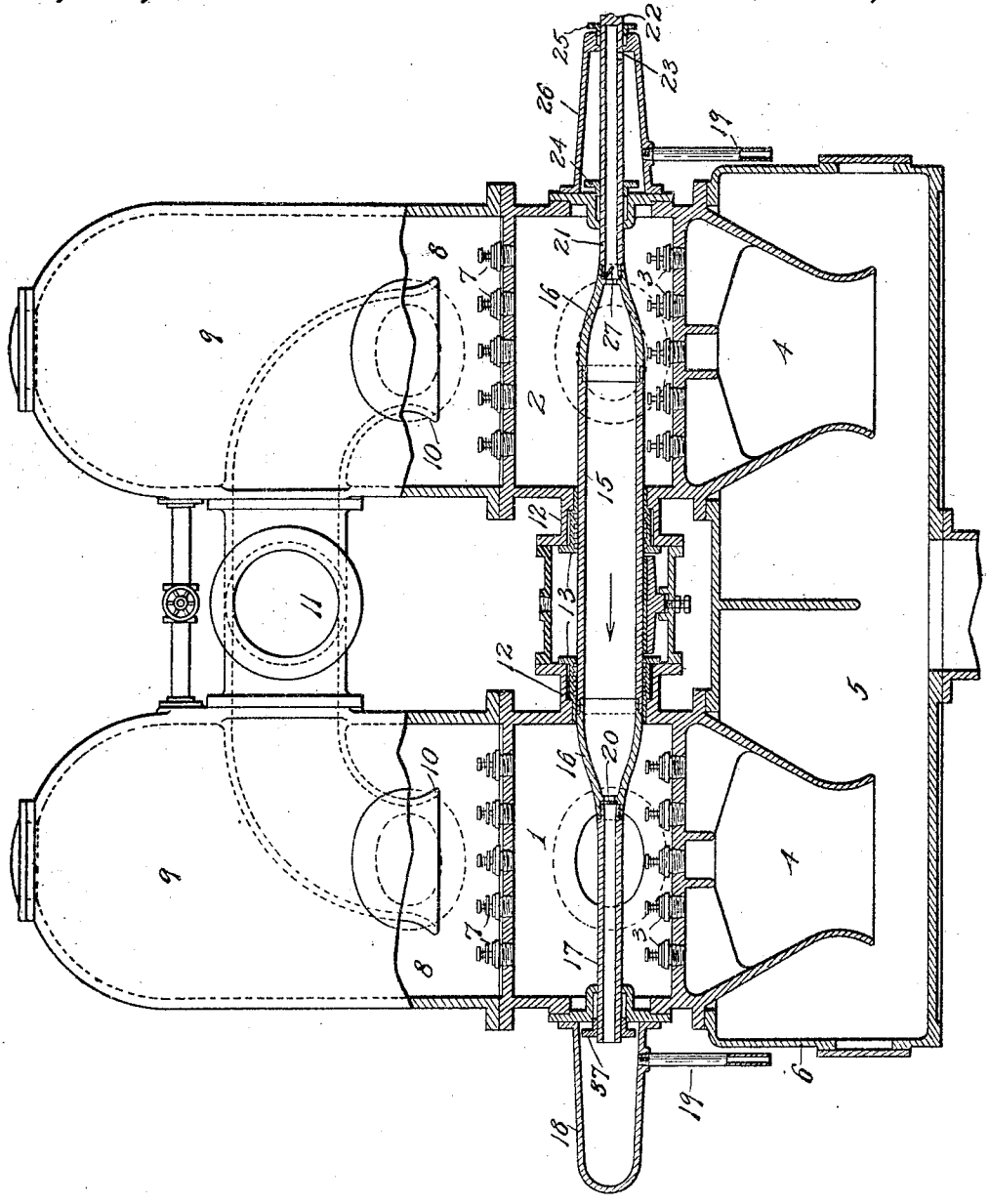
1,380,363. **Patented June 7, 1921.**



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UNITED STATES PATENT OFFICE.

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PUMP-PLUNGER.

1,380,363. Specification of Letters Patent. Patented June 7, 1921.

Application filed April 3, 1918. Serial No. 226,506.

To all whom it may concern:

Be it known that I, DAVID A. DECROW, a citizen of the United States, residing at Buffalo, county of Erie, and State of New York, have invented certain new and useful Improvements in Pump-Plungers, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

In pumps of the hollow plunger type, owing to the heavy pressures involved, more or less water finds its way into the plunger and must be removed. This water has been removed in various ways which have involved considerable inconvenience and interruption in the operation of the pump.

It is the object of the present invention to provide a pump of the hollow plunger type, such that any water collecting in the plunger is automatically removed as the pump operates.

The following specification describes and the accompanying drawing illustrates a pump constructed in accordance with the invention, it being understood that changes may be made in the form, construction and arrangement of the parts without departing from the invention, the form herein shown being a preferred embodiment thereof.

The drawing shows a view in side elevation with parts in vertical section, of a pump embodying the invention.

The pump illustrated as an example is a double acting center packed pump with a hollow plunger acting in both pulsation chambers 1, 2, with the usual suction valves 3 and suction passages 4 in suction chamber 5 in casing 6, and the usual discharge valves 7 connecting with discharge chambers 8 having the usual air chambers 9 and discharge pipes 10 connecting with the common delivery pipe 11. The cylinders are provided with the usual brackets 12 carrying the stuffing boxes 13 and the usual center plunger bearing. Any other suitable construction may be used for embodying the present invention.

Referring now especially to the present invention, the plunger is hollow and the construction such that the plunger is self-emptying of any water that may collect in it. This is accomplished by so connecting the plunger with the outside of the pulsation chamber that any water in the plunger is caused to be discharged outside the chamber by the movement of the plunger. Although capable of various constructions, in structures embodying the invention to the best advantage there is provided a tubular member on the plunger extending through the pulsation chamber and having an opening outside the latter, this tubular member being shown as an extension of the hollow plunger. As shown, the central cylindrical plunger portion 15 has a tapered end portion or cap 16. The cap 16 in chamber 1 is open at the end and provided with a tubular extension 17, which extends through a stuffing box 37 and opens outside the chamber into a chamber formed by closed cap 18 having drain pipe 19. When the plunger moves in a direction opposite to the arrow in the drawing, any water in the interior will be displaced by this movement outwardly through the extension 17 and so escapes.

The present embodiment includes, as a feature which may be utilized if desired, means for preventing any back flow of the water when the plunger reverses its direction. As shown, there is inserted in the inner end of the tubular extension 17, an ordinary check valve 20. This valve is arranged to open outwardly for passage of the outwardly displaced water, and to close when the plunger reverses its direction, and thus shut off back flow.

Discharge at one end of the plunger will be sufficient in many cases, but structures embodying the invention in its most complete form include provision for displacement of water in each direction so that the plunger empties on both the forward and return stroke. As shown, the cap on the end of the plunger in pump chamber 2 also connects with a tubular extension 21 which may be part of or connected with the plunger rod 22, a bottom opening 23 being provided for the escape of the water between stuffing boxes 24 and 25 and within cap 26, having drain pipe 19. A check valve 27 may be inserted to prevent back flow as before described. The action is the same as described in connection with extension 17.

The invention provides for the removal of any water in the hollow plunger by the plunger's movement and there is no necessity for tapping or removing the plunger,

and no interruption to the pump's operation, while the structure is very simple and inexpensive.

The term "plunger" in the specification and claims means a pumping piston through which the fluid pumped does not pass, but which acts only by displacement of the fluid in the cylinder, as distinguished from a bucket or valved piston receiving the fluid at one side and passing it through the bucket for delivery at the other side.

What is claimed is:

1. A liquid pump having a cylinder, a hollow plunger closed to the cylinder, and a connection between the interior of the plunger and the outside of the cylinder whereby any leakage into the plunger is displaced therefrom by the reciprocation of the plunger.

2. A liquid pump having a cylinder, a hollow plunger closed to the cylinder and reciprocating therein, and a hollow extension on the plunger having an opening outside the cylinder whereby any leakage into the plunger is displaced therefrom by the reciprocation of the plunger.

3. A liquid pump having a cylinder, a hollow plunger reciprocating therein, a hollow extension on the plunger having an opening outside the cylinder whereby any leakage into the plunger is displaced therefrom by the reciprocation of the plunger, and a valve in the hollow extension to prevent back flow into the plunger.

4. A liquid pump having a cylinder, and hollow plunger 15 therein provided at opposite ends with tubular extensions 17 and 21 having openings outside the cylinder whereby any leakage into the plunger is displaced therefrom by the reciprocation of the plunger, substantially as described.

5. A liquid pump having a cylinder, hollow plunger 15 therein provided at opposite ends with tubular extensions 17 and 21 having openings outside the cylinder whereby any leakage into the plunger is displaced therefrom by the reciprocation of the plunger, and valves 20 and 27 respectively in the tubular extensions 17 and 21 to prevent back flow into the hollow plunger, substantially as described.

In testimony whereof, I have hereunto set my hand.

DAVID A. DECROW.