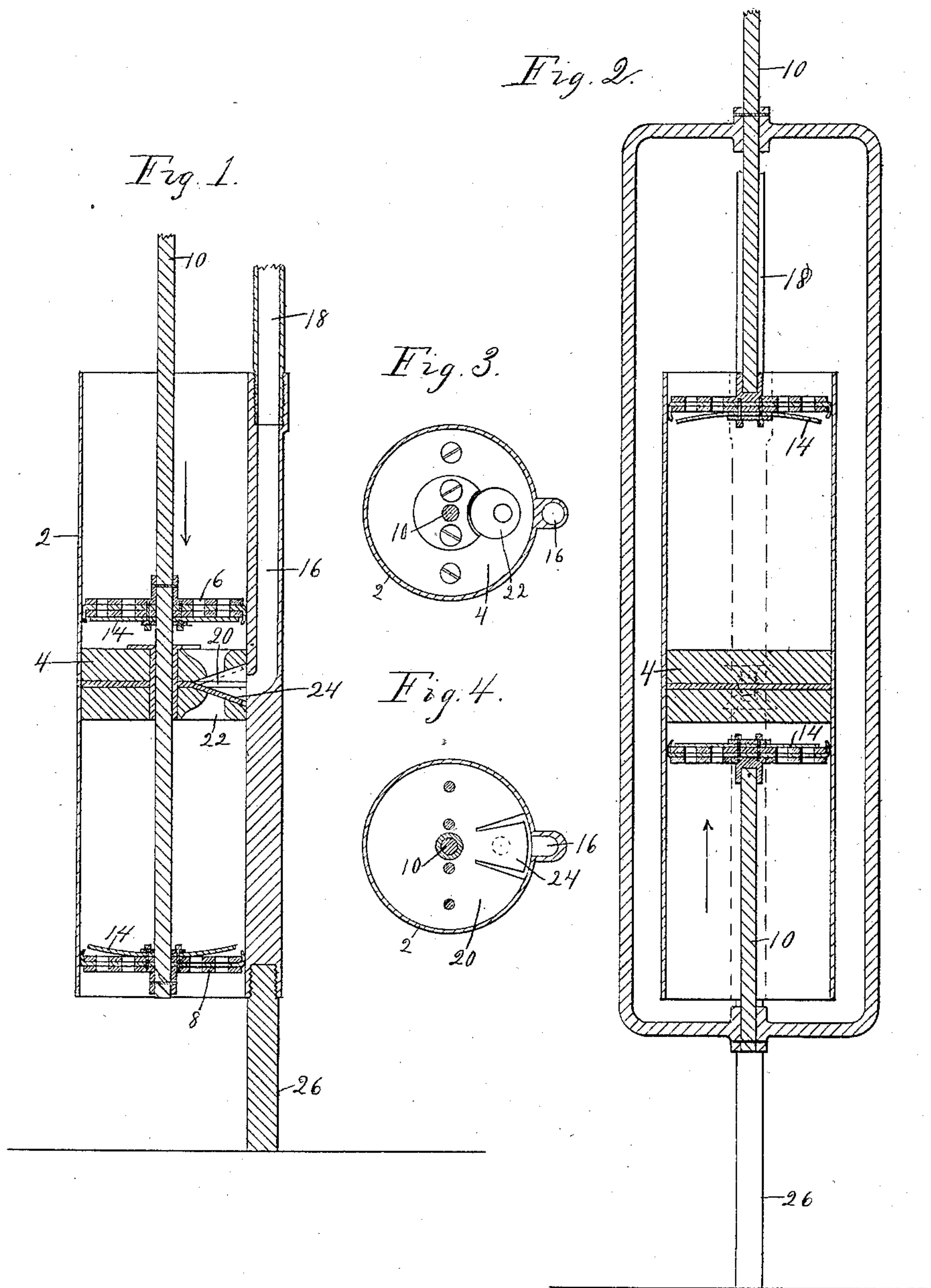


(No Model.)

L. C. FARMER.
DOUBLE ACTING FORCE PUMP.

No. 374,400.

Patented Dec. 6, 1887.



Witnesses.
S. J. Beardslee.
R. H. Sanford

Inventor.
Luther C. Farmer
By *R. C. Paul, atty*

UNITED STATES PATENT OFFICE.

LUTHER C. FARMER, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR OF ONE-HALF TO MINNA VAN NORMANN AND HENRY L. EGELL, BOTH OF SAME PLACE.

DOUBLE-ACTING FORCE-PUMP.

SPECIFICATION forming part of Letters Patent No. 374,400, dated December 6, 1887.

Application filed April 30, 1887. Serial No. 236,712. (No model.)

To all whom it may concern:

Be it known that I, LUTHER C. FARMER, of Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Double-Acting Force-Pumps, of which the following is a specification.

My invention relates to improvements in submerged double-acting force-pumps; and it consists in constructing a pump of this class with a double set of plungers or pistons placed tandem in an open-ended cylinder, having an abutment partition located centrally therein, dividing it between the two plungers or pistons, and containing an automatically-operated valve, which is common to both divisions of the cylinder and to the discharge-pipes.

My invention further consists in the combination and arrangement hereinafter described, and particularly pointed out in the claim.

In the drawings which form a part of this specification, Figure 1 is a central vertical section of my improved pump. Fig. 2 is a similar section showing a modified means for connecting the plungers. Fig. 3 is a cross-section on line X X of Fig. 1. Fig. 4 is a cross-section on line Y Y of Fig. 1.

2 represents the barrel or cylinder of the pump, the ends of which are open to the water. A division, 4, is constructed in the center of this barrel to divide it into two cylindrical compartments. A piston, 6, is located in one of these compartments and fits closely to the interior surface thereof. A similar piston, 8, is located in the opposite compartment. These pistons may be mounted upon one common piston-rod, 10, which passes through them and through the division 4, as shown in Fig. 1; or they may be connected, as shown in Fig. 2, by means of a yoke, 12, which passes outside of the barrel and connects the two piston-rods together. The advantage of this latter means of connection is that it does away with the wear at the point where the rod passes through the division 4.

The pistons 6 and 8 are provided with valves 14, which open inwardly, and are closed by the pressure of the water between the piston and the division 4.

16 is an outlet-opening, which preferably

extends down the side of the cylinder to a point opposite the division 4. The outer end of this opening is connected to the discharge-pipe 18, and the inner end is connected to the two compartments of the cylinder by means of openings 20 and 22. A valve, 24, is arranged to operate between these openings in such a manner that the flow of water through the opening 20 to the outlet shall cause the valve to seat itself over the opening 22, and vice versa.

The operation is as follows: The whole cylinder being submerged, power is applied to the piston-rod 10, and the pistons 6 and 8 are forced downward in the cylinder. The valves 14 in the piston 6 are closed by the pressure of water between the piston and the central division, 4, and this water is forced out through the opening 20 and closes the valve 24 over the opening 22. This leaves an unobstructed passage for the water in the upper compartment of the cylinder to the discharge-pipe. While the operation is being performed in the upper compartment, the downward movement of the piston 8 causes the valves 14 in this piston to open by the pressure of the water from without, and the water is allowed to pass through these valves and fill this compartment, and when this is completed the water in the upper compartment will have been forced out through the discharge-pipe. The motion is now reversed. The valves 14 close in the piston 8, and the pressure of the water in the lower compartment forces the valve 24 off from its seat over the opening 22, and causes it to close the opening 20, and the water in this compartment is forced out through the opening 22 into the discharge-pipe 18. The reciprocating motion of the pistons thus gives a constant forced discharge to the water alternating from each compartment of the cylinder.

A rest or support, 26, may be secured to the lower portion of the cylinder, in order to keep it sufficiently above the bottom of the well or other receptacle in which it is located to allow for the free operation of the piston-rods.

I prefer to cast the cylinder with the opening 16 extending from its center to its end, and at the end of the opening to provide an

internal screw-thread to receive the threaded end of the discharge-pipe 18. The discharge-pipe may, however, be secured to the cylinder in any suitable manner. The support 26
5 is also preferably secured to the lower part of of the cylinder by having its threaded end screwed into a socket in the cylinder. The central partition in the cylinder is preferably formed of two parts secured together with a
10 rubber plate, 30, between them. The valve is formed by cutting two slits in the rubber plate, thus leaving a small part that is free to move in the space between the openings in the partition. (See Fig. 4.)
15 I may form a number of holes instead of one through each part of the partition, so that the valve cannot be forced through the opening by the pressure of the water upon it.

I claim as my invention—

The combination, in a pump of the class de- 20 scribed, of the cylinder 2, open at both ends and provided with the discharge-opening 16 in its wall, the removable partition 4, formed of two parts secured together, the packing-plate 30, arranged between the two parts of 25 said partition, with the valve 24 formed in said plate, the openings 20 and 22, communicating with said opening 16, and the pistons 6 and 8, arranged in said cylinder, substantially as described. 30

In testimony whereof I have hereunto set my hand this 19th day of April, 1887.

LUTHER C. FARMER.

In presence of—

R. H. SANFORD,

A. M. GASKELL.