(No Model.) 2 Sheets—Sheet 1.

J. NORTH.

PUMP.

No. 385,319. Patented June 26, 1888.

Fig. 1.

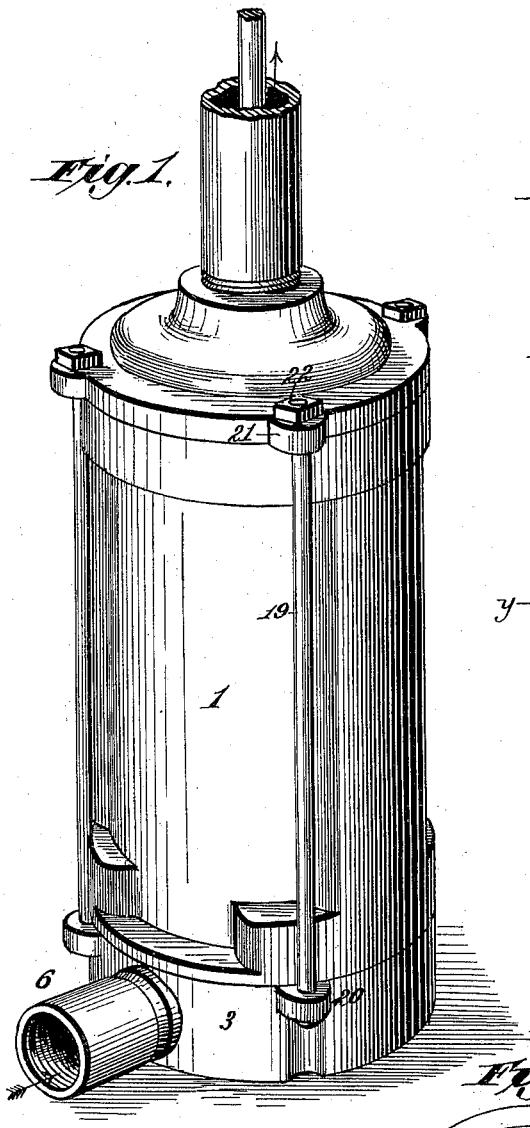


Fig. 2.

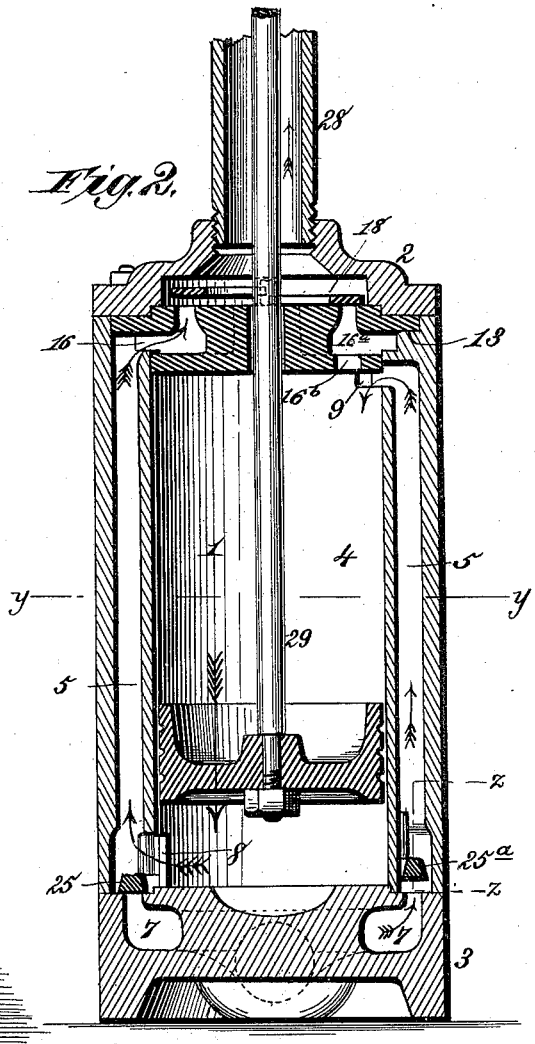
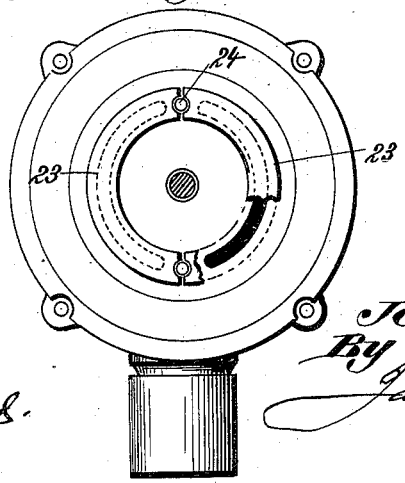


Fig. 3.



Witnesses.
Robert Everett,
J. A. Rutherford.

Inventor:
John North.
By James L. Norris.
Atty.

(No Model.) 2 Sheets—Sheet 2.

J. NORTH.

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Fig. 5.

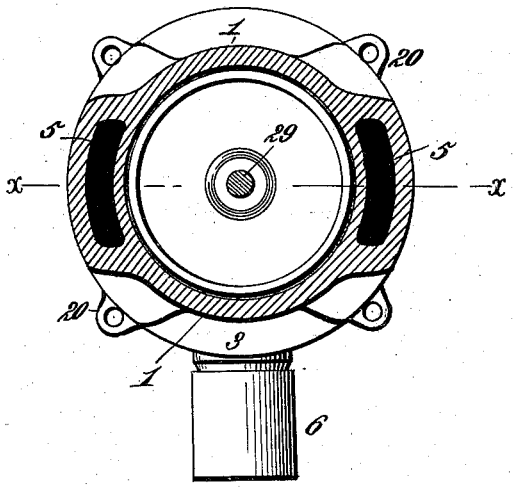


Fig. 4.

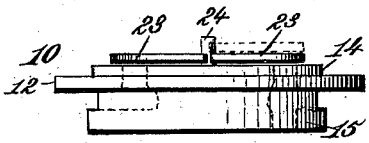


Fig. 6.

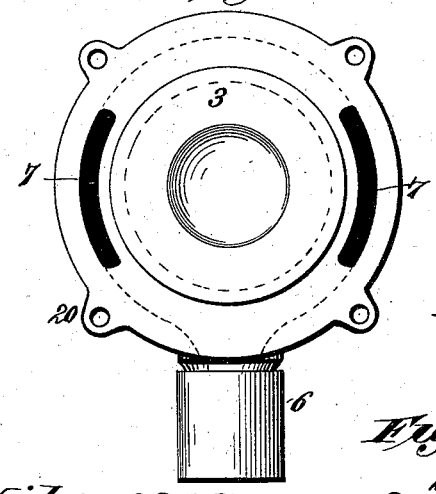


Fig. 7.

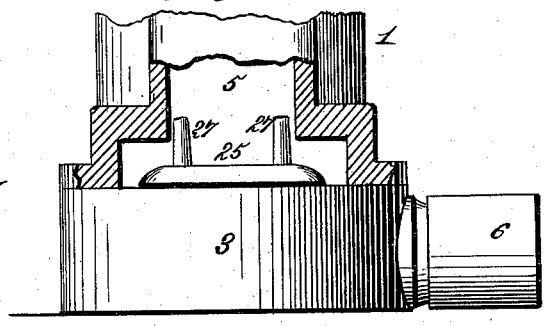
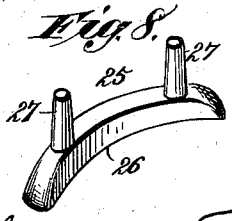


Fig. 8.



Witnesses.
Robt Ewalt.
J. A. Rutherford

Inventor.
John North.
By James L. Norris.
Atty.

UNITED STATES PATENT OFFICE.

JOHN NORTH, OF MIDDLETOWN, CONNECTICUT.

PUMP.

SPECIFICATION forming part of Letters Patent No. 385,319, dated June 26, 1888.

Application filed December 6, 1887. Serial No. 257,133. (No model.)

To all whom it may concern:

Be it known that I, JOHN NORTH, a citizen of the United States, residing at Middletown, in the county of Middlesex and State of Connecticut, have invented new and useful Improvements in Pumps, of which the following is a specification.

My invention relates to pumps of the class in which the current or flow of water is produced by the action of a directly-reciprocated plunger, and the purpose is to dispense with any packing of the valve-seats or pistons and to provide a novel, simple, and superior form of valve for controlling the inflow and outflow to and from the cylinder.

The invention consists of the several novel features of construction and new combinations of parts, hereinafter fully set forth, and definitely pointed out in the claims.

In the accompanying drawings, Figure 1 is a perspective view of the pump-cylinder with the inlet and outlet pipes attached. Fig. 2 is a central vertical section taken in the plane *x x*, Fig. 5. Fig. 3 is a plan view of the cylinder, the cap being removed. Fig. 4 is a detail view in side elevation of the valve-plate removed from the upper end of the cylinder. Fig. 5 is a transverse section of the cylinder in the line *y y*, Fig. 2. Fig. 6 is a plan view of base of the cylinder, the superimposed parts being removed. Fig. 7 is a sectional view in the plane 2 2, Fig. 2. Fig. 8 is a detail perspective of one of the valves controlling the inlet and outlet through the water-ways of the cylinder-base.

In the said drawings, the reference-numeral 1 denotes the cylinder, which is composed substantially of three parts—a cap, 2, a base, 3, and a barrel, 4, interposed between the two. The barrel 4 is formed with oppositely-thickened walls, in which are formed water ports or passages 5, extending from end to end of said barrel. The inlet to the cylinder is by way of a pipe, 6, entering the base 3, the latter being provided with passages 7, one of which communicates with the interior of the cylinder through an opening, 8, Fig. 2, and the other with one of the water-ways 5. The latter passage opens into the cylinder by way of a port, 9, (shown in Fig. 2,) cut through the inner wall of the water-way 5.

In the upper end of the barrel 4 is arranged a valve-seat plate, 10. (Shown in detail in Fig. 4.) This plate has a flange, 12, which lies just within the end of the barrel and rests upon a rib, 13, on the inner face of the barrel. A circular offset, 14, rises slightly above the plane of the flange 12, and the body 15 of the said plate lies below said flange and is of the same or substantially the same diameter as the offset 14. In the body of the plate I form ports 16 and 16^a, passing inward or toward the center and then upward through the offset portion 14. One of these ports, 16, communicates directly with one of the water-ways 5, and the other port, 16^a, opens directly into the top of the cylinder by a passage, 16^b, in proximity to the port 9, by which the water-way 5 enters the cylinder.

Surmounting the upper end of the barrel 4 is a cap, 2, having a valve-chamber, 18, and attached to the base-piece by means of the rods 19, passing through lugs 20 on the base and through similar lugs, 21, on the cap, nuts 22 being turned on the ends of said tie-rods above the lugs 21, as shown in Fig. 1.

In the valve-chamber 18, I place two semi-annular valves, 23, closing the ports 16 and 16^a. These valves are similar in form, and their ends are brought into juxtaposition, as shown in Fig. 3, and each has an end bearing upon a pin, 24, set in the offset 14. By this construction the semi-annular valves are caused to rise and fall vertically, as shown in Figs. 2 and 4, the function of the pins 24 being to prevent the valves from circular displacement.

The water-passages 7 are opened and closed by valves 25 and 25^a. (Shown in detail in Fig. 8.) This valve consists of a section of an annulus having a seating-surface, 26, and provided with guiding-pins 27, rising from its upper surface. These pins lie against the inner walls of the water-ways 5 and serve to guide the valves 25, lifting squarely and directly upward from the valve-seat.

The outlet or exit by which the water is conducted from the water-ways of the cylinder is a pipe, 28, leading from the center of the cap 2. The piston-rod 29 passes freely through a central opening in the valve-seat plate at the top of the cylinder and through the outlet-pipe, as shown in Figs. 1 and 2, and is connected to

any suitable mechanism whereby the rod may be reciprocated.

In operation the downward stroke of the piston, as shown in Fig. 2, closes the valve 25, which is adjacent to the opening 8, and opens the valve 25ª, thereby driving the current through the water-way 5 in the direction of the arrows, Fig. 2, and into the cylinder above the piston. At the same time, the other and similar valve 25 being closed, the water passes from beneath the piston through the opening contiguous to the valve 25, and thence into the water-way 5, raising one of the semi-annular valves 23 and closing the other, thereby directing the current from the interior of the cylinder and beneath the piston through the outlet-pipe. Upon the reverse movement of the piston the action is exactly the reverse of that described, the outlet-current passing through the other branch or water-way 5 and the cylinder filling below the piston by way of the opposite passage.

In this pump, as well as in all others constructed on similar principles, the water in the outlet or exit pipe will gradually run off after the pump ceases working by reason of the slight escape openings in the valve-seat plate between said plate and the piston-rod. The pump is for this reason always free from danger of freezing.

This pump may be submerged or it may be located at any point exterior to the cistern or other reservoir, provided that the inlet-pipe is below the level of the water in the reservoir.

Inasmuch as this pump is double acting, a ring-valve could not obviously be used upon the valve-seat plate, as there must be alternation in action on the up-and-down stroke. I therefore have devised the semi-annular valves, which afford largely increased water-ports, as shown in Fig. 3, and lie around the piston in the chambered cap.

What I claim is—

1. The combination, with the cylinder having opposite water-passages 5, opening into the cylinder at opposite ends thereof, of the valve-seat plate having ports, one of which communicates directly with one of said water-passages and the other with the interior of the cylinder, and the semi-annular valves having their ends abutting against guide-pins, substantially as described.

2. A pump having a valve seat plate located in the end of the cylinder and provided with semi-annular valves lying loosely upon said plate and having their ends abutting against guide-pins, and a piston-rod passing centrally through the valve-seat plate, substantially as described.

In testimony whereof I have affixed my signature in presence of two witnesses.

JOHN NORTH.

Witnesses:
JAMES L. NORRIS,
J. A. RUTHERFORD.