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Inventor
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UNITED STATES PATENT OFFICE.

GEORGE MARSHALL, OF NEW YORK, N. Y.

IMPROVEMENT IN PUMPS.

Specification forming part of Letters Patent No. 47,652, dated May 9, 1865.

To all whom it may concern:

Be it known that I, GEORGE MARSHALL, of No. 392 Bleecker street, in the city, county, and State of New York, have invented a new and useful Improvement in Double-Acting Pumps; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical central section of a pump constructed according to my invention. Fig. 2 is a horizontal section on the line *x x*.

Similar letters of reference indicate corresponding parts in both figures.

This invention consists in the employment of a single-disk valve in a hollow piston attached to the lower end of a central discharge-pipe, which passes through the upper end of the pump-cylinder and serves as the rod for working the piston, whereby I obtain a double-acting pump of very simple construction.

To enable others skilled in the art to make and use my invention, I will proceed to describe it with reference to the drawings.

A is the upright cylinder of the pump, cast with an upright side pipe, A', which always communicates with the cylinder by an opening, *a*, close to the top thereof. This cylinder is placed on the top of the inlet-chamber B of the pump, with which the suction-pipe is connected at *b*. This inlet-chamber communicates with the cylinder by an inlet-valve, *c*, and with the side pipe by an inlet-valve, *d*. These valves may be of any suitable kind.

C is the hollow piston, fitted to the cylinder A, and having openings or ports *ee* in the top and similar openings or ports, *ff*, in the bottom.

D is the central discharge-pipe, to the lower end of which the piston is attached, and which is always in free communication with the interior of the piston. This pipe passes through a stuffing-box, *g*, in the cylinder-cover E in such manner that by a suitable connection outside of the said cover it will be made to serve as the piston-rod for working the piston.

F is the single-disk valve contained within the hollow piston C, and serving as the discharge-valve of the pump in both the upward and downward stroke of the piston. This valve consists simply of a plate of metal or

other suitable material of circular or other form, and of such size as to be capable of moving up and down with perfect freedom within the interior of the piston and of closing either the ports *ee* in the top of the piston or the ports *ff* in the bottom thereof, the interior surfaces of the top and bottom of the cylinder being faced to form seats for it. The said valve has a central opening, *h*, of a size not less than the internal caliber of the central discharge-pipe, D, so that when it is in contact with the upper surface of the interior of the piston it does not obstruct the passage of water into the said pipe.

The operation is as follows: In the upward stroke of the piston the valve F is at the bottom of the piston, closing the ports *ff* and leaving *ee* open, the valve *c* is open, and the valve *d* closed. The water enters the cylinder by the valve *c*, and follows the piston upward, while the water with which the cylinder has been previously filled above the piston is forced on through the ports *ee*, the interior of the piston and the central discharge-pipe. In the downward stroke of the piston the valve *c* is closed, the valve F is forced against the top of the piston, closing the ports *ee* and leaving *ff* open, and the valve *d* is closed. The water enters the cylinder through the side pipe, A', and opening *a*, and follows the piston downward, while the water with which the cylinder has been previously filled below the piston is forced out through the ports *ff*, the interior of the piston, and the central discharge-pipe.

I do not claim, broadly, the construction of the piston of a pump with a hollow rod and a valve-chamber having inlet-ports above and below closed alternately by a single valve; but

What I claim as my invention, and desire to secure by Letters Patent, is—

The combination of a perforated hollow piston, C, tubular piston-rod D, centrally-perforated disk-valve F, and a pump-cylinder which is constructed with a chamber, B, beneath it and a valve, *c*, leading into it beneath the piston, substantially as described.

GEORGE MARSHALL.

Witnesses:

HENRY T. BROWN,
GEO. W. REED.