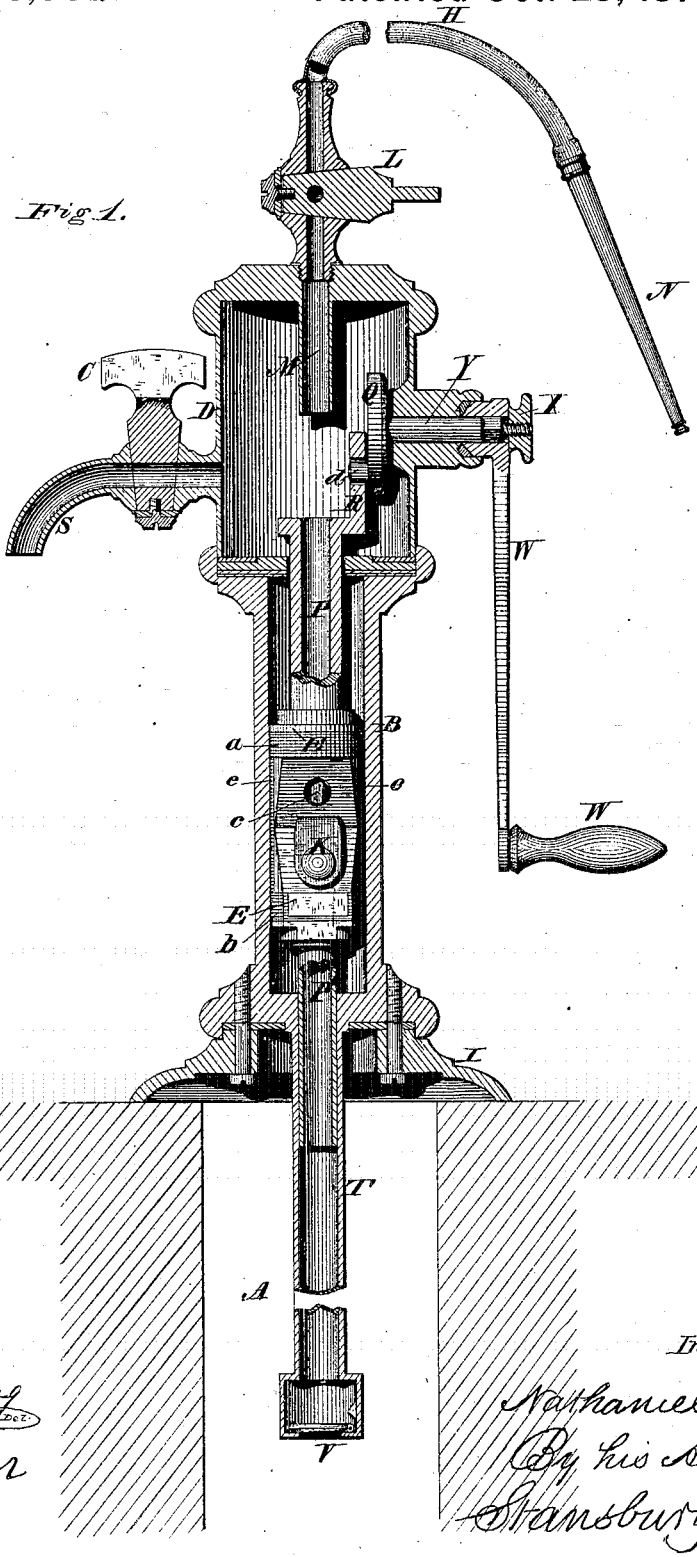
2 Sheets—Sheet 1.

# N. MARSHALL.

## Double-Action Pump.

No. 196,302. Patented Oct. 23, 1877.

Fig. 1.




Witnesses.

Harry King

E. R. Tyler

Inventor.

Nathaniel Marshall.

By his Attorneys,

Shansbury & Munn

2 Sheets—Sheet 2.

# N. MARSHALL.
## Double-Action Pump.

No. 196,302. Patented Oct. 23, 1877.

Fig 2.

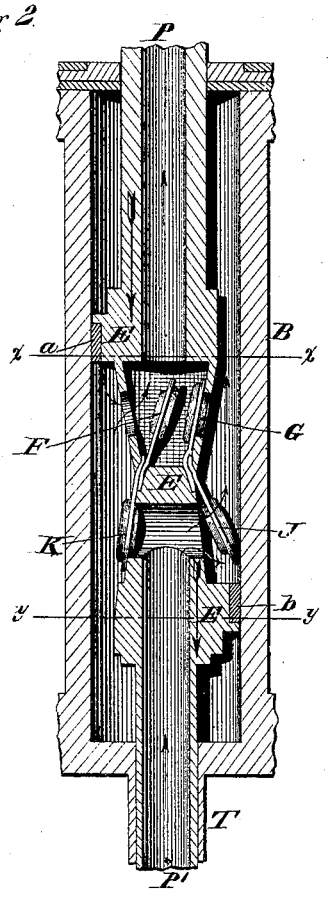



Fig 4.

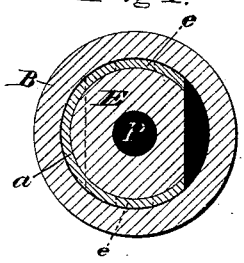



Fig 5.

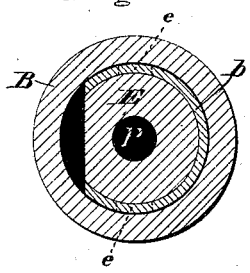
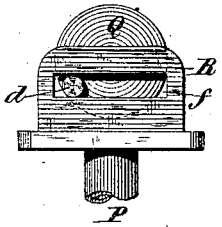



Fig 3.




Witnesses.

Harry King

E. R. Tyler

Inventor.

Nathaniel Marshall,

By his Attorneys,

Stansbury & Munn.

# UNITED STATES PATENT OFFICE.

NATHANIEL MARSHALL, OF PLATTSBURG, NEW YORK, ASSIGNOR TO SMITH M. WEED, OF SAME PLACE.

## IMPROVEMENT IN DOUBLE-ACTION PUMPS.

Specification forming part of Letters Patent No. **196,302**, dated October 23, 1877; application filed September 7, 1877.

*To all whom it may concern:*

Be it known that I, NATHANIEL MARSHALL, of Plattsburg, in the county of Clinton and State of New York, have invented certain new and useful Improvements in Pumps; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification

Figure 1 is a vertical central section of my improved pump. Fig. 2 is a vertical central section of the pump-barrel at right angles to the section shown in Fig. 1. Fig. 3 is a detail view of crank and head of piston-rod. Fig. 4 is a section, on line *x x* of Fig. 2, of upper head of piston E. Fig. 5 is a similar section, on line *y y* of Fig. 2, of lower head of piston E.

The same letter is used to mark the same part wherever it occurs in the drawings.

The nature of my invention consists in the construction of a pump which will draw and discharge a continuous stream of water with one barrel and one valve-box receiving the water in solid column through the center of the piston or valve box, dividing it between the two sides of the cylinder, uniting it again, and discharging it, through hose or spout, in a continuous stream, all in the manner hereinafter more specifically set forth.

In the drawings, A marks the well or receptacle from which the water is to be pumped. T is the tube connecting the well with the pump-barrel B, and V an ordinary check-valve, opening upward.

The pump-barrel B is shown bolted to a base, I, covering the top of the well or reservoir. In it is inserted a piston or valve box, E, of peculiar construction, connecting, by hollow piston-rods P P′, with the well below, and with the discharging-chamber D above. The piston E is provided with vertical strips of packing *e e* on its sides, by which the barrel B is divided into two semi-cylindrical compartments, communicating, through the valve-ports of the piston, with the hollow piston-rods P P′. The piston E is provided with four ports, covered by the four valves F G J K, the upper valves, F G, opening inward, and the lower ones, J K, opening outward, as shown in Fig. 2.

The upper end of the piston-rod P is connected with a cross-head, R, provided with a horizontal slot, *f*, which receives the friction wrist-pin *d*, projecting from the face of the crank-wheel Q. A winch, W, is fixed by a nut, X, to the outer end of the shaft Y of crank-wheel Q. The revolution of the winch W imparts a vertical reciprocating motion to the piston E.

The upper segmental head of the piston E (see Fig. 4) is cut away on the side opposite to the packing *a*, so as to form an opening upward water-way on that side of the barrel B, and the lower head (see Fig. 5) is cut away on the side opposite the packing *b*, to form a downward water-way on the other side of the barrel. This construction is clearly shown in Figs. 2, 4, and 5. By it the packed portion of the upper head prevents the water from passing upward on its side of the barrel, and the similar part of the lower head prevents the water from passing downward on the opposite side, so that in whichever direction the piston is moving the water is forced to escape upward, through the ports of the valves F and G, into the pipe P and chamber D.

S, Fig. 1, marks a spout connected with the chamber D, and controlled by the cock C. M is a pipe projecting down into the same chamber, and opened and closed by cock L. This pipe is connected with a hose, H, and nozzle N, so that the pump can be used for throwing water, when desired, by opening cock L and closing cock C.

The operation is as follows: When the piston E rises, the water enters the tube T, and, passing up hollow piston-rod P′ and under valve K, fills one side of the barrel B. When the piston descends, the water in the barrel is driven up through the port *c* of the valve F into piston-rod P and chamber D, and the water in T enters, under valve J, the other side of the pump-barrel. During the descent of the piston, valves K and G are closed by the fluid-pressure, and valves J and F are open, as shown in Fig. 2, where the course of the piston and of the water is indicated by the arrows. During the upward movement of the piston, valves K and G are open and F and J closed, and

during both movements, owing to the alternate action of the piston-heads upon it, the water is continuously rising from the well and being delivered into chamber D, whence it is driven through the spout S, when that is open, or through the hose-pipe M, as may be preferred.

It will be observed that, by the combination of my peculiarly-constructed piston with the pump-barrel, the latter becomes converted, practically, into two pumps, acting alternately in drawing and delivering water from the reservoir, the operation being thus made continuous, and a result is obtained by the use of a single barrel and a single piston which has hitherto been attained by the use of two barrels and pistons, thus simplifying the construction, diminishing friction, and effecting a saving in the original cost of the apparatus.

I claim—

1. The combination, with the pump-barrel B, of the compound piston E, having segmental heads, side packing *e e*, hollow piston-rods P P′, valves F G J K, and the device for operating the same, all constructed and operating substantially in the manner described, for the purpose specified.

2. A pump in which, by means of one barrel, B, and one piston or valve box, E, constructed as described, and packed to divide the barrel longitudinally, a continuous stream of water is drawn and delivered, both the exhaust and force being double-acting, the whole constructed and operating as specified.

In testimony that I claim the foregoing as my own invention I affix hereto my signature in presence of two witnesses.

NATHANIEL MARSHALL.

Witnesses:

BENJ. NORTON,

JOHN B. RILEY.