P. M. BARKER.

Double Acting Pumps.

No. 139,650. Patented June 10, 1873.

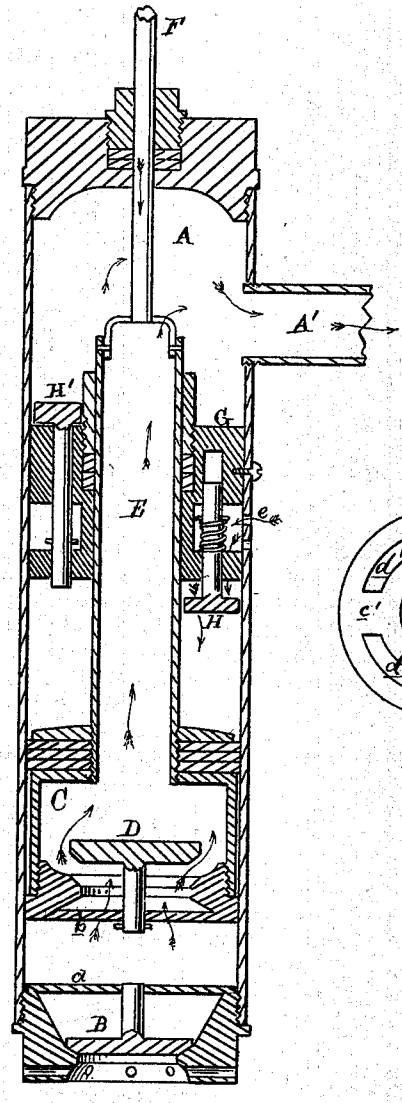

Fig. 1.

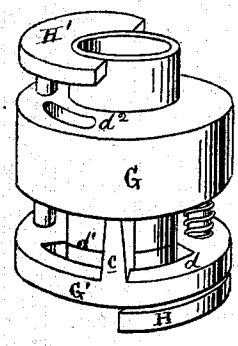

Fig. 2.

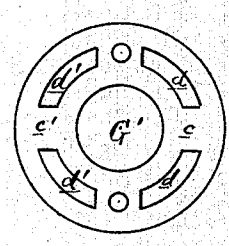

Fig. 3.

ATTEST:
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PHILANDER M. BARKER, OF GRAND HAVEN, MICHIGAN.

IMPROVEMENT IN DOUBLE-ACTING PUMPS.

Specification forming part of Letters Patent No. **139,650**, dated June 10, 1873; application filed March 8, 1873.

To all whom it may concern:

Be it known that I, PHILANDER M. BARKER, of Grand Haven, in the county of Ottawa and State of Michigan, have invented a new and useful Improvement in Double-Acting Pumps; and I do declare that the following is a true and accurate description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon and being a part of this specification, in which—

Figure 1 is a vertical section of my pump. Fig. 2 is a perspective view of the diaphragm and its two valves. Fig. 3 is a bottom plan of the same without the lower segment-valve.

Like letters refer to like parts in the several figures.

The nature of my invention relates to an improvement in the construction of lift and force pumps, and has for its object to so arrange a pair of supplementary valves in the cylinder, above the moving piston or bucket, and providing the latter with a hollow piston-rod which plays through the diaphragm of the supplementary valves, as that the otherwise single-acting is converted into a powerful double-acting pump without the employment of external water-ways or valves, making it peculiarly adapted for use in deep wells. The invention consists in providing the bucket of an ordinary single-acting pump with a hollow piston-rod, and placing a stationary diaphragm in the cylinder above the stroke of the bucket, through which the hollow piston-rod plays, which diaphragm is provided with peculiary-arranged valves and water-ways, communicating with the water outside the cylinder through openings made in the side of the latter, and operating in the manner more fully hereinafter set forth.

In the drawing, A is a pump-cylinder, in the foot of which there is a check or foot valve, B, whose stem is guided by passing through the center of a spider, *a*, in the usual manner. C is a hollow or inverted cup-shaped piston or bucket, having a valve, D, seated in its lower part, its spindle being guided by passing through the center of a spider, *b*. A hollow piston-rod, E, is screwed into the top of the bucket, and to its upper end is secured the lower end of the rod F by a bail. At a point above the stroke of the bucket, I secure in the cylinder a metallic diaphragm-plug, G, having a central opening through it, which the hollow piston-rod E plays through, it being provided with a stuffing-box at the top for packing it to prevent leakage between it and said rod. There is a lower ring, G′, to the plug, leaving an annular space between it and the upper portion, connected by the central tube through which the piston-rod plays. The annular space between the upper and lower rings is divided into two segmental chambers by the vertical partitions *c c*. In the side of the cylinder is cut a series of apertures, *e*, which open into the segmental chamber seen at the right half of the plug in Fig. 1. In the right half of the lower ring are cut ports or passages *d*, which may be closed by a segment-valve, H, seating itself against the under face of that half of the ring. In the downward movement of the bucket, water is drawn through the openings *e*, and, flowing through the ports *d*, fills the space between the plug and the bucket; a reverse movement of the bucket would close the valve H against the ports *d*. At the other side of the partitions *c c*, ports d^1 are formed in the lower ring, and directly above them others, d^2, in the upper part of the plug; these last may be closed by a segment-valve, H′, seating downwardly on top thereof. In the upward stroke of the bucket the water contained in the cylinder between the plug and the bucket, being displaced by the latter, flows through the ports d^1 d^2, lifting the valve H′, and thence out at the top of the cylinder, or through the delivery-pipe A′. In the down-stroke of the bucket the water below the bucket flows up through the hollow piston-rod, and thence out of the cylinder. In this manner I am enabled to double the capacity of the single-acting pump.

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

The construction and arrangement, with relation to the cylinder A and check-valve B, of the piston C, provided with the valvé D and hollow piston-rod E, and the diaphragm-plug G G′, provided with the partitions *c c*, passages *d* d^1 d^2, and valves H H′, arranged, with relation to the apertures *e* in the cylinder, as and for the purpose set forth.

PHILANDER M. BARKER.

Witnesses:
H. F. EBERTS,
THEO. S. DAY.