J. S. BEAL.

Pump.

No. 203,814. Patented May 21, 1878.

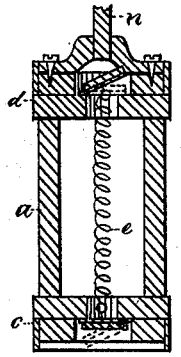

FIG. 1.

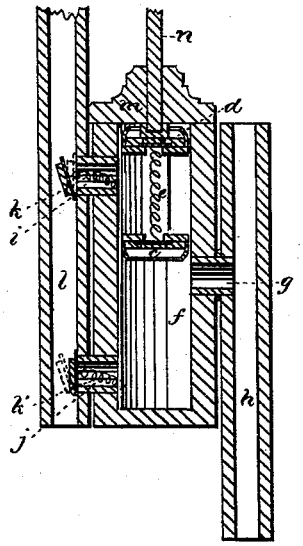

FIG. 2.

WITNESSES:

Chas. H. Kimball.

Charles E. Clifford

INVENTOR:

James S. Beal,

Per atty.

William Henry Clifford.

UNITED STATES PATENT OFFICE.

JAMES S. BEAL, OF POLAND, MAINE.

IMPROVEMENT IN PUMPS.

Specification forming part of Letters Patent No. **203,814**, dated May 21, 1878; application filed February 16, 1878.

To all whom it may concern:

Be it known that I, JAMES S. BEAL, of Poland, in the county of Androscoggin and State of Maine, 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 drawing, and to letters of reference marked thereon, which form a part of this specification.

Figure 1 is a side sectional elevation of the piston. Fig. 2 is a sectional elevation of the pump.

Same letters show like parts.

My invention relates to certain improvements in pumps. The kind of pump to which my improvements relate is one wherein the water is first raised a certain height by suction or atmospheric pressure, and then forced or lifted to the farther height desired.

a is the piston, having the two parts *c d*, in each of which is a valve. The valve in *d*—the upper part—opens upwardly. The valve in *c*—the lower part—opens downwardly. Extending from one to the other of these two valves is the spring *e*. This spring secures the prompt action or closing of the valves when opened. Their prompt closing is essential to the exact action of the pump.

When the piston *a* rises the upper valve in the same is closed, and thus delivers and forces out the water through the upper of the two openings or outlets *i j*. The spring, extending from one to the other of the two piston-valves, aids in the prompt shutting of this valve as the piston rises. The same cause operates in like manner in combination with the lower of the two openings *i j* when the piston descends.

The valve in the part *d* is to admit the water up through and over the part *d*, and then by promptly closing insure the delivery of the water through the upper of the two outlets *i j*. The valve in the part *c* is both to admit of the flow of the water up through it, and by closing at the time of the descent of the piston to aid in forcing the water out through the lower one of the two outlets *i j*. The two parts of the piston thus act, in combination with the piston and the two outlets *i j*, to promote the flow of the water alternately, first through one and then the other of the said two outlets.

The springs in the four valves named secure improved promptitude of action.

f shows the barrel of the pump in which the piston *a* works. This barrel has the aperture *g* communicating with the feed-pipe *h*, through both of which the water flows and enters into the barrel. The barrel has the two horizontal outlets *i j*, each provided with a valve opening outwardly, as illustrated in the drawing. These valves each have springs, whose operation is to instantly close the valves when the force or pressure that opens them has ceased. The springs are represented at *k k'*. One of these valved openings is at or near the top and the other at the bottom, at one side of the barrel *f*. These openings lead into the pipe *l*, which conducts to the spout or outlet of the pump. The top of the barrel is covered by the metal cap *m*.

In double-acting pumps of the kind to which my invention relates difficulty is experienced from the lack of a prompt closing of the valves, in order to hold the water which rises by the action of the atmospheric pressure after a stroke of the pump. As a result of this want of prompt action, a portion of the water falls or returns, and thus impedes the effective as well as easy action of the pump.

My invention, so far as it embraces the spring-valves, aims to obviate this difficulty and defect.

It is obvious that the springs described and shown in the drawing will accelerate the valve-action, and thus prevent any return of the water raised in the pump.

The operation is as follows: When the piston rises in the barrel the water is forced up through the feed-tube *h* and into the space left open by the ascent of the piston. The descent of the piston then forces the water through the valve-opening *j* into the pipe *l*, and through it out of the spout. The descent of the piston and its succeeding upstroke operates in the same way the valve-opening *i*, and throws another volume of water into the pipe *l*. After each of these operations the valves, and especially the valves in the openings *i* and *j*, close

promptly, owing to the operation of their springs, and thus secure a thorough action and saving of all the water raised.

My invention embraces the valves thus provided with springs and the arrangement of the parts and openings with said valves.

The barrel is separate from the upper part, where the spout is placed, and communicates with it by the pipe *l*, before described. The piston-rod *n* works through the cap *m*.

I do not claim the double action of the pump or the piston having the two valves.

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

The combination of the feed-pipe *h*, barrel *f*, pipe *l*, arranged as described, with the horizontal openings *i j*, having valves, with springs *k k*, and piston *a*, having the upper and lower valves and spring *e*, and proper feed-apertures in said barrel *f*, as herein set forth.

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

JAMES S. BEAL.

Witnesses:
L. A. BEAL,
I. W. HANSON.