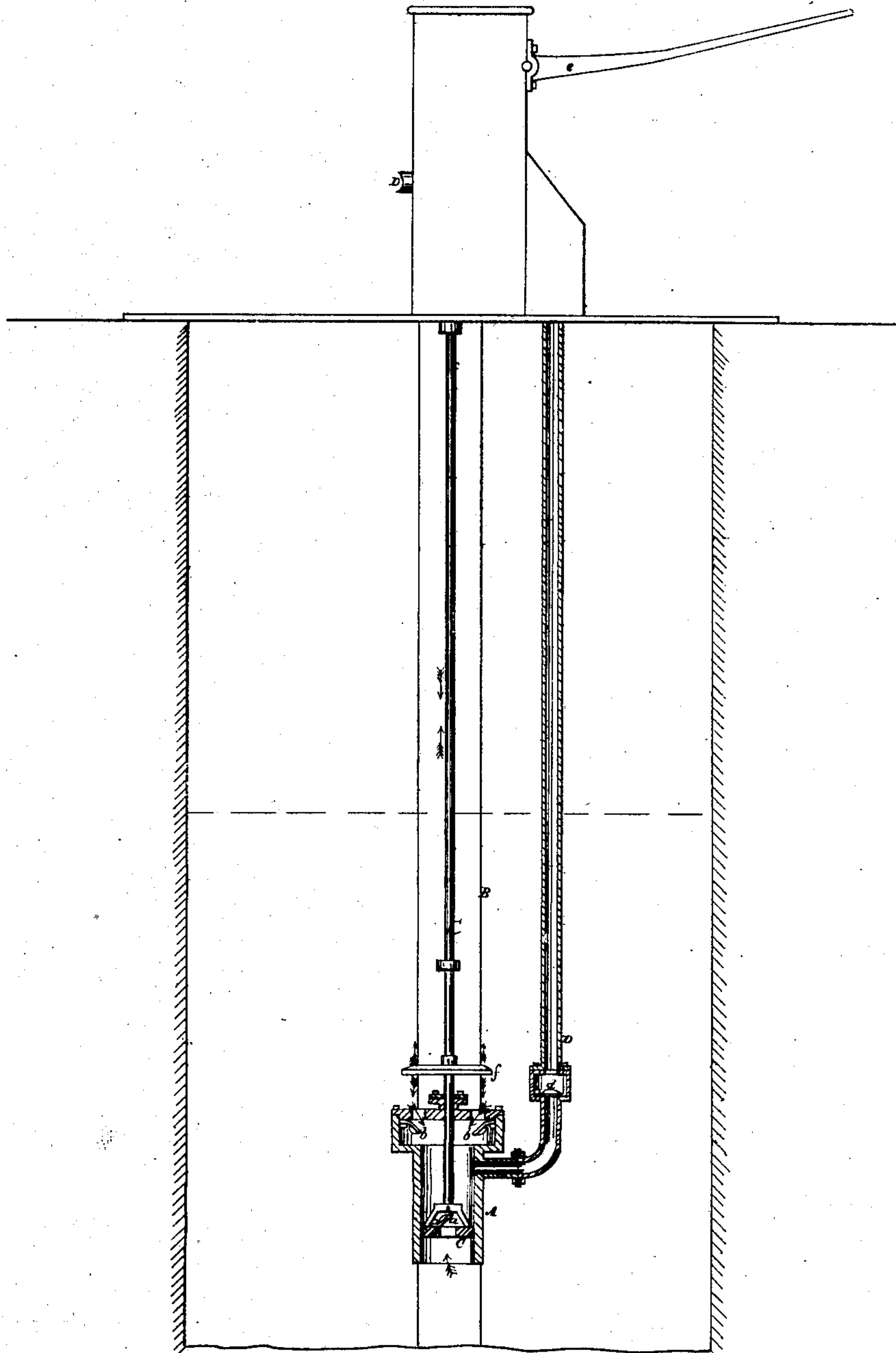


No. 27,996.

PATENTED APR. 24, 1860.

L. MATTHEWS.
PUMP.



Witnesses
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UNITED STATES PATENT OFFICE.

LEVI MATTHEWS, OF ANTRIM, OHIO.

PUMP.

Specification of Letters Patent No. 27,996, dated April 24, 1860.

To all whom it may concern:

Be it known that I, LEVI MATTHEWS, of Antrim, in the county of Guernsey and State of Ohio, have invented a certain new and useful Improvement on Submerged Pumps; and I do hereby declare that the following, taken in connection with the accompanying drawing, is a sufficiently full and clear description thereof as to enable others skilled in such matters to make and use the same.

In the accompanying drawing which represents a sectional elevation of a submerged pump having my improvement applied to it, the pump barrel (A) is shown as occupying a vertical position in the well, which position I prefer to adopt as being more advantageous in certain respects, but which position is not imperative. This pump cylinder or barrel may be arranged at any desired depth in the well below the usual level of water therein, and may be supported by securing it to a beam (B) run down the side of the well, or in any other suitable manner. It is provided with a plunger (C) having a valve (a) opening upward, and the cylinder lid or cover or, in other words, upper portion of the vertical barrel, is likewise furnished with valves (b, b) arranged to open inward and so as to constitute, in common with the plunger valve, receiving valves, and opening and closing simultaneously with the plunger valve or thereabout. The bottom of the barrel is provided with an opening, or left open, for the passage of water to and through the plunger in the descent of the latter.

In case of the position of the pump barrel being reversed so as to bring the cylinder lid or cover undermost, of course many of the actions or positions of parts would also be reversed, but the general operation would be the same. It is scarcely necessary to observe either, that the number of valves may be changed without altering the general action, thus the cylinder lid may have but one valve, or more than two; and the plunger more than one. The delivery pipe (D) of the pump is also shown as furnished with a valve (d) near its junction with the barrel, said valve being arranged to open when the receiving valves (a and b b) close, and vice versa.

The plunger (c) may have its up and down motion given to it by means of the usual gear, consisting of a pump rod (c)

and lever (e). Across the pump rod (c), at a point thereon below the usual level of water in the well and preferably, when the plunger is down, in close proximity to the stationary receiving valves (b b), is arranged or projects, so as to lie over or facing said valves, a cap-board (f) that, being attached to the pump rod, moves up and down with it. This cap-board not only serves to form a covering over the outer or exposed receiving valves (b b) to protect them from injury by anything dropping into the well, but it has other important uses in connection with said valves, and not dependent upon its horizontal position or vertical direction of play as its serving as a protector in the manner described implies. These additional and distinct uses of the cap-board (f), as well as the special and general operations of the several parts, will be sufficiently explained by the following description of the action of the pump as it and its valves are shown arranged in the accompanying drawing.

The plunger (C) being set in motion, its descent causes the valve (a) in it to open and also the valves (b b) in the cylinder cover, so that water rushes in at both ends of the barrel or cylinder to fill the barrel (A) during the descent of the plunger. Water rushing in and upwardly through the plunger valve causes a downward movement or tendency to settlement of the water in the well which quickens the rush of water through the upper receiving valves where the water is less dense. In or during the ascent of the plunger, both the plunger and stationary receiving valves (a and b b) are necessarily closed and the water in the barrel is discharged by the action of the plunger through the delivery valve (d) into and up the discharge pipe (D). Where a mere lift of the water is required to an inconsiderable height, the delivery valve (d) might be dispensed with, as by the joint area of the receiving openings to the barrel being greater than the area of the discharge, water would not fall back as rapidly as it was lifted especially during a quick working of the pump. And where a delivery valve is used it may be desirable to construct it so as to admit of a slight leakage when closed and the plunger in the barrel also so fitted as to admit of a slow passage of water back through or past it so that when the pump has ceased to be worked the water in the discharge pipe will return till it arrives at

the level of the water in the well which will prevent freezing of the water in the discharge pipe. But whether this provision be made or not and whether there be a delivery valve or none, though more especially under a leaky construction of the delivery valve and plunger or absence of a delivery valve, it is a matter of no small moment that the stationary receiving valve or valves (*b b*) should open and close quick at their appointed times, alike to supply the barrel (*A*) with water the moment the plunger begins its movement to receive water, as to prevent the escape of water back to the well by its return from the discharge elbow or pipe the moment the plunger begins its lifting or forcing stroke, and more or less return of water from the delivery is always to be expected on the reversal of the plunger's stroke to effect a lift. Now, it will be obvious that no difficulty in this respect is to be met with in the plunger valve (*a*) as it, traveling with the plunger, immediately feels the effect of the water's resistance to open or close it. But such is not the case with the stationary receiving valve or valves (*b b*), especially when arranged uppermost where the water is less dense. Accordingly, I construct and arrange the cap-board (*f*) and employ it for the express purpose, by its reciprocating action with the plunger, of giving an additional force or pressure on the stationary receiving valve or valves to open and close it or them at the proper times, by causing said cap-board to lift on the water in the well or urge it away from the receiving valve or valves, and in close proximity thereto, the instant the plunger begins its closing action of said valve or valves; and, further, by said cap-board pressing on the water in the well to urge it against said valve or valves the moment the

plunger commences its reverse stroke to open the receiving valve or valves. In this way, the cap-board (*f*) serves alternately to create opposite currents or actions of the water in the well to draw the stationary receiving valve or valves to, when they should be closed, and to force them open when they should be opened, and likewise to urge the water through them when open. By this means the stationary receiving valve or valves are made to open and close quicker and are shut to tighter than they otherwise would do.

The arrangement of the stationary receiving valves in the cylinder cover affords great facility in the construction of the pump and is an advantage in case of necessary repair.

In using the term cap-board (*f*), I do so without restriction of the device to the precise meaning of that term. Disk or vane would be equally as applicable, especially as the construction or shape of the device may be varied.

I claim, as new and useful in submerged pumps,

The employment of a reciprocating cap-board, disk, or vane, immersed in the water of the well and operating conjointly with the plunger, in combination with a stationary receiving valve or valves to the pump arranged to face said cap-board, or thereabout, and so that the cap-board plays to and from said valve or valves substantially in the manner and for the purpose or purposes herein specified.

In testimony whereof, I have hereunto subscribed my name.

LEVI MATTHEWS.

Witnesses:

WM. A. LAWRENCE,

WM. A. KNOUFF.