(No Model.)

J. M. NORMAND.

PUMP.

No. 422,535. Patented Mar. 4, 1890.

Fig. 3

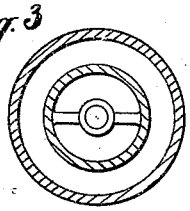


Fig. 2

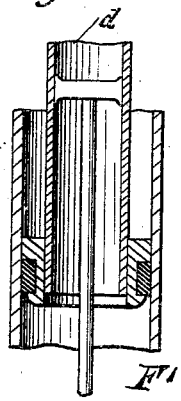


Fig. 1

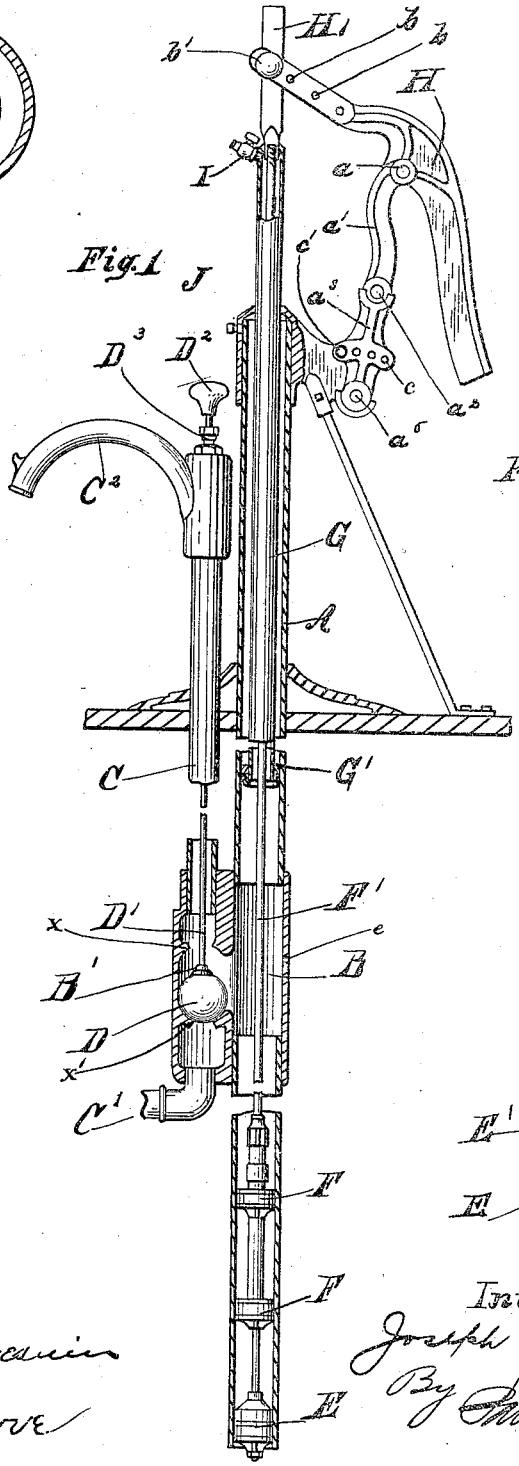
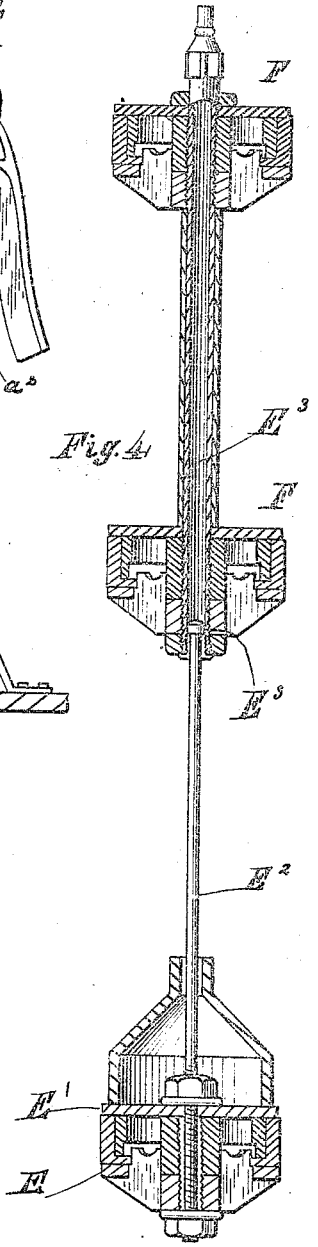


Fig. 4



Witnesses

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UNITED STATES PATENT OFFICE.

JOSEPH M. NORMAND, OF SPRINGFIELD, OHIO, ASSIGNOR OF ONE-HALF TO J. K. MOWER, OF SAME PLACE.

PUMP.

SPECIFICATION forming part of Letters Patent No. 422,535, dated March 4, 1890.

Application filed July 12, 1888. Serial No. 279,723. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH M. NORMAND, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Pumps, of which the following is a specification.

My invention relates to improvements in pumps.

The object of my invention is to provide a pump particularly adapted for deep wells and other wells where, for reasons connected with the construction of the well, but a single pipe can be inserted—such, for example, as driven or bored wells.

My invention consists in the various constructions and combinations of parts, hereinafter described and claimed.

In the accompanying drawings, Figure 1 is an elevation view of a pump, partly in section, embodying my invention. Fig. 2 is a detail view in section of the hollow plunger, showing a modification in the manner of attaching the lower plunger-rod. Fig. 3 is a transverse sectional view of the same. Fig. 4 is a sectional elevational view of the lower plunger and the lower valve.

Like parts are indicated by similar letters of reference throughout the several views.

In the said drawings, A represents the main pipe and outer casing of the pump, which also forms the pumping-cylinder. This pipe A is of a uniform diameter throughout and extends from the top to the bottom of the well. A three-way chamber B is preferably connected in the pipe to form a discharge-opening from said pipe. This three-way chamber B is preferably provided with an auxiliary chamber B′, parallel with the main pipe A, to the bottom and top, respectively, of which are attached exit-pipes C C′. The upper exit-pipe C extends upwardly along the main pipe or stock A, and is provided in the usual manner with a discharge pipe or spout C^2, the lower exit-pipe C′ being adapted to act as a distributing-pipe to carry the water to any convenient point desired. A valve D, located in the auxiliary chamber B′ and connected to a valve-stem D′, is adapted when in one position to close the lower exit-pipe C′ at the same time the upper exit-pipe is left open, and adapted when in another position to close the upper exit-pipe and at the same time open the lower one. The valve-stem D′ extends upwardly through the upper exit-pipe C and out through the discharge-pipe C^2, and is provided with a knob or handle D^2, a suitable stuffing-box connection D^3 being provided in the discharge-pipe C^2 to prevent leakage and at the same time furnish means for holding the valve in different positions of adjustment. The auxiliary chamber B′ is provided with valve-seats x x', formed integral with the main casting of the three-way chamber and on either side of the opening between the main chamber and the auxiliary chamber B′. By this construction the valve-seats are independent of the pipe-connections from the exit-openings, which are located above and below the said valve-seats.

The lower main valve of the pump is formed in the nature of a plunger E, adapted to fit tightly into the pipe A, and provided, in the usual manner, with a central disk-valve E′. The outer or plunger portion E of the valve is secured on the end of a short stem E^2, which extends upwardly into a sleeve E^3, formed on the main plunger-rod, the plunger-rod being so constructed as to admit of a limited longitudinal movement on the stem E^2, the said stem E^2 being provided with a head E^3, which prevents the stem from being withdrawn from said chamber, so that when the main plunger-rod is moved upwardly for an unusual distance the lower plunger and valve E will be withdrawn from its place and may be carried upwardly through the main pipe A with the said plunger-rod, the construction of the lower valve E being substantially as set forth in my Letters Patent No. 378,848, of February 28, 1888.

F F represent the main plunger, which is preferably constructed with two pistons, so as to secure a better bearing in the main pipe. This plunger is secured to the lower valve E, as above described, and is connected to the main plunger-rod F′, which extends upwardly through the main pipe and is connected to

the handle H in the manner hereinafter more fully described.

Extending downwardly through the top of the pipe A to within a short distance of the three-way chamber B is a hollow plunger-rod G. This hollow plunger-rod G is closed at the top and connected to the main plunger-rod F in such a manner that they both move together. It is preferably made of pipe of a suitable size so that the internal area of said pipe is equal to about half the area of the main pipe A. The hollow plunger-rod G carries at the bottom a plunger G', which fits snugly in the main pipe A. An air-cock I is provided at the top of the hollow plunger-rod G, as shown in Fig. 1. The main plunger F and the hollow plunger G are preferably connected together at the top, as shown in Fig. 1, and are connected by a single stem H' to the handle H. The handle H is pivoted at a to a vibrating link-connection a', which is in turn pivoted at a^2 to an adjustable stand a^3 on the main bracket J, which also furnishes a cap for the main pipe A. The handle H is provided at its outer end with a series of openings b, through which a connecting-pin b' may be inserted for connecting the said handle to the stem H'. The standard a^3 is pivoted to the bracket J at a^5, and is also provided with a series of openings c, adapted to receive a connecting-pin c', by means of which the said standard is secured in different positions on the bracket J. Means are thus provided for securing a greater or less length of stroke to the plunger-rod by connecting the said plunger-rod closer to or farther from the fulcrum, while at the same time the link a' may be adjusted so as to assume the most suitable position to secure a parallel movement of the said plunger. It is obvious that the main plunger-rod F', instead of being carried through the hollow plunger-rod G and connected at the top, as shown in Fig. 1, may be connected to the hollow plunger-rod at any convenient point by a bridge d secured therein, as shown in Fig. 2.

The operation of the pump as described is as follows: The lower plunger and the lower main valve are inserted through the pipe A until said valve is in proper position for operation. The upper hollow plunger stands just above the three-way chamber B, the lower main plunger being located a suitable distance above the main valve E. The handle is connected at the top to the plunger-rod, and as the same is moved up and down the lower plunger F and hollow plunger G are caused to reciprocate in the main pipe A, the lower plunger operating upon the main stem E^2 of the main valve, which always remains in place in the bottom of the main pipe A. The water is drawn through the main valve E and forced up through the lower-plunger F' in the usual manner to the outlet-opening formed by the three-way chamber B. If the air-valve I is left open at the top of the hollow plunger G, a portion of the water at each successive stroke is forced into the said hollow plunger, the remaining portion being forced into the exit-pipe C, the water standing at an equal height in both of said pipes. When the water has been elevated sufficiently to be discharged through the discharge-pipes C^2, the water in the hollow plunger G serves as a stand-pipe, into which about half the water of each stroke is forced on the downstroke of the plunger, and by its own weight is forced out of the discharge-pipe C^2 on the upstroke of the plunger, thus forming a substantially continuous discharge at the discharge-pipe C^2.

When it is desired to operate the pump as a force-pump, the valve I is closed and the column of water is replaced by a column of air, which fills the hollow plunger, forming an air-cushion, against which the water is forced at each successive stroke and from which it is expelled by the air-column, thus forming substantially a continuous discharge. An ordinary vent e, preferably located in the three-way chamber B, permits the water to escape from the stand-pipe and the hollow plunger to prevent freezing and to allow the water-column in said hollow plunger to be replaced by an air-column in order that the functions thereof may be successfully performed.

Having thus described my invention, I claim—

1. In a pump, a main pipe of uniform diameter adapted to form a pump-stock and pumping-cylinders, upper and lower plungers of equal external diameter adapted to fit and reciprocate in said pipe, a discharge-pipe leading from between said plungers, a hollow plunger-rod connected to said upper plunger, said hollow plunger-rod being extended above the discharge-opening of said discharge-pipe and provided with an orifice therein above said discharge-opening, substantially as specified.

2. The combination, with the pump-stock, of a lower plunger located therein, an upper hollow plunger having a hollow plunger-rod leading therefrom, a discharge-pipe leading from said pump-stock between said plungers, said hollow plunger-rod being extended above the top of the discharge-pipe and provided with a valve to open or close the same, whereby said plunger-rod may act as a stand-pipe or air-chamber, substantially as specified.

3. The combination, in a main pipe of a uniform diameter, of the lower plunger and valve, the lower plunger adapted to reciprocate on the stem attached to said valve, the upper hollow plunger and the hollow plunger-rod extending above the discharge-pipe which leads from between the said plungers, and a valve in the upper part of said plunger-rod, substantially as specified.

4. The combination, with a pump-stock and plunger-rod, of a handle pivoted to a fulcrum composed of two parts a' and a^3, said parts

being pivoted together and to the pump-stock, respectively, at a^2 and a^5, a series of openings b in said handle, and a series of openings c in said fulcrum, and connecting-pins adapted to connect said handle and plunger and said fulcrum and stock in different positions of adjustment through said openings, substantially as specified.

In testimony whereof I have hereunto set my hand this 5th day of July, A. D. 1888.

JOSEPH M. NORMAND.

Witnesses:
CHASE STEWART,
PAUL A. STRALEY.