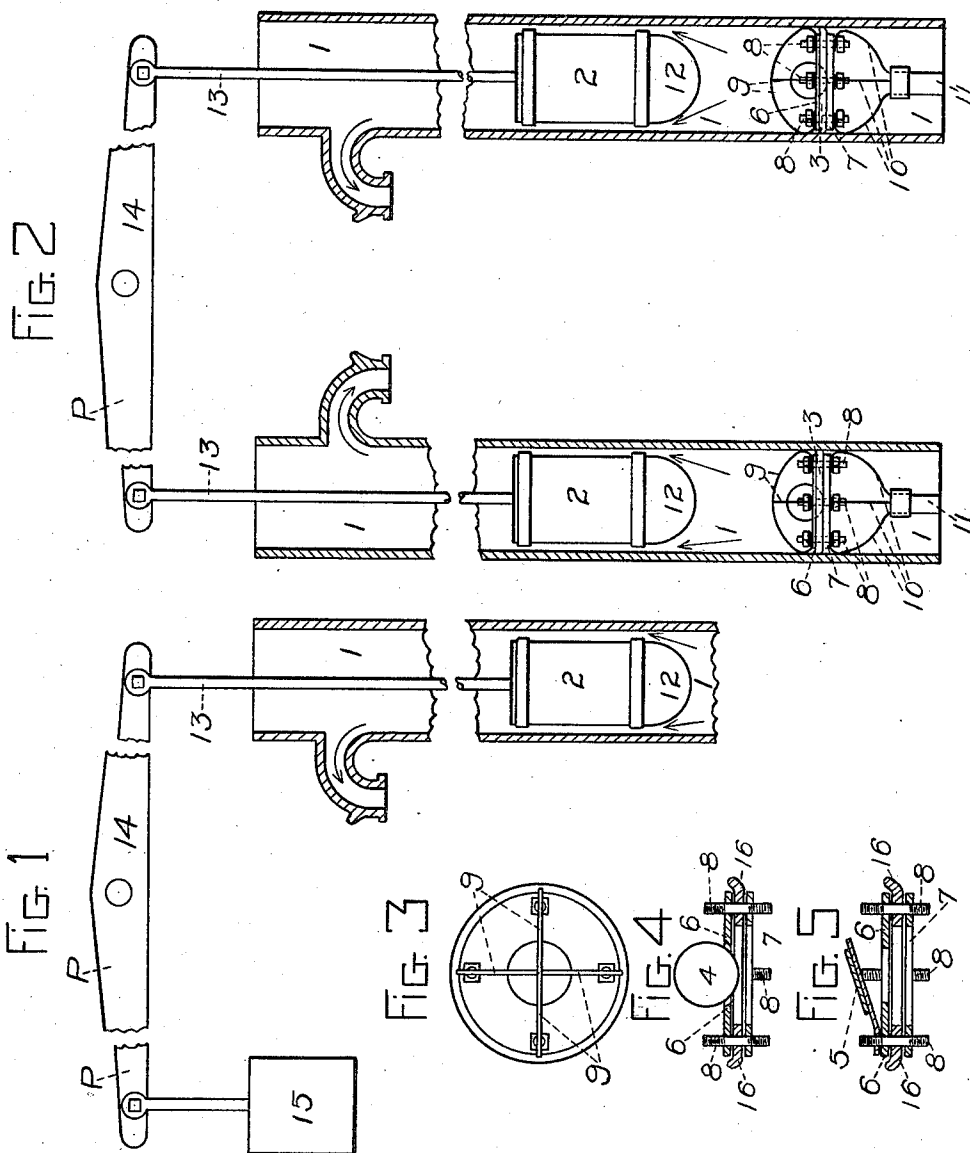


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PUMP FOR LIQUIDS.
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PUMP FOR LIQUIDS.

1,031,133.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, BENJAMINE B. MARSHALL, a citizen of the United States, residing at 406 South Ninth street, in the city of Colorado Springs, in the county of El Paso and State of Colorado, have invented a new and useful Pump for Liquids, of which the following is a specification.

My invention relates to improvements in pumps for liquids in which a plunger 2, is forced up and down within a casing or pipe and below the liquid to be raised thereby. The said plunger is loosely mounted within said casing leaving a space between its outer surface and the inner surface of the said casing for the liquid to rise above the plunger when the plunger is forced down toward the bottom of the casing and in which casing there is permanently secured below said plunger 2, an anchored foot valve 3, provided to allow the liquid to rise up through it when the plunger is raised and to prevent the liquid from escaping below the said foot valve 3, when the said plunger 2, is depressed; and the objects of my invention are to obviate the necessity of a valve in the plunger; second, to avoid friction of the plunger on the casing which casing serves as a cylinder in a common force pump; third, to avoid the wearing by foreign matters coming into contact with the plunger and casing; fourth, to obviate the necessity of a cylinder in a pump; fifth, to obviate the wear caused by the friction of a piston in a cylinder; sixth, to provide a pump that may be operated by either slow or rapid motion of the plunger without injury to the machinery or necessitating an adjustment; seventh, to provide means for adjusting the anchored foot valve to any desired position in the casing; eighth, to provide for a duplicity of pumps properly balanced and operated by the same power. I attain these objects by the mechanism illustrated in the accompanying drawing, in which:

Figure 1, is a sectional view of the pump casing showing the plunger 2, and the broken part of the walking beam 14, having a counter weight 15, opposite to the plunger 2; Fig. 2, is an upright view of two pumps in section showing the plungers on the same level and below the surface of the water and connected by the walking beam 14, and showing the anchored foot valve 3, below the plunger in each casing; Fig. 3, is a top view of the foot valve 3, showing the

lifting arches 9, 9; Fig. 4, is an upright sectional view of part of the foot valve 3, showing the clamping bolts 8, 8, 8, with the lifting arches 9, and the supporting arches 10, 10, removed and showing a ball valve 4, in place and a section of the cup gasket 16; Fig. 5, is an upright section of Fig. 4, omitting the ball valve 4, and substituting therefor the clapper valve 5.

The plunger 2, working loosely within the pump casing below the surface of the liquid and above an anchored foot valve of peculiar construction, as shown in the accompanying drawing, constitutes the principal part of my invention.

Similar figures refer to similar parts through the several views.

At the bottom end of the plunger rod is secured the plunger 2, consisting usually of a wooden block of the form of the inside of the pump casing being rounding at the bottom end and rectangular across the top end and being bound by a metal band near each end of said plunger and being of a size to slide loosely within the said casing. This plunger is to be located always so as to extend below the surface of the water in said casing 1, so that when it is raised up suddenly it will cause a suction at the foot valve 3, by removing the pressure from the body of the water between the plunger 2, and the foot valve 3, and again when the plunger 2, is forced downwardly the foot valve 3, will prevent the escape of the liquid downward by closing either the ball valve 4, or the clapper valve 5.

The top end of the plunger may be constructed to extend above the surface of the liquid but the lower half of the plunger must remain below the surface at all stages of its operation. When the upper half of the plunger extends above the surface of the liquid the depression of the plunger will cause a rise of the liquid to the spill-way in proportion to the displacement caused by the upper part of the plunger being forced below the surface of the liquid. This pump is especially applicable for pumping of muddy or gritty water for irrigation purposes or for draining mines or for similar purposes but would operate successfully for the pumping of any form of liquid. When the plunger is depressed the liquid is forced upwardly between the surface walls of the plunger and the inner walls of the pump casing. The amount of space between the

largest part of the plunger and the inner walls of the pump casing depending upon the size of the plunger and the speed of its operations.

5 The anchored foot valve 3, may be provided with a ball valve 4, as shown in Fig. 4, or with a clapper valve as shown in Fig. 5. The object of this valve being that of a check valve to prevent the escape of the
10 liquid downward. To support this anchored foot valve 3, from being forced lower farther than desired in the pump casing 1, I have provided the supporting post 11, which may consist of a small pipe or rod the lower
15 end of which rests on the bottom of the well or on some other permanent support and having supporting arches 10, projecting upwardly from its upper end and secured to the under side of the foot valve 3, by means
20 of the clamping bolts 8. To the top of the anchored foot valve 3, are secured the lifting arches 9, by means of the clamping bolts 8, and are provided to be grappled by means of some instrument lowered from above and
25 within the pump casing 1, for the purpose of lifting the anchored foot valve 3, to any desired position or removal entirely from the pump casing 1.

In using my appliance on a single pump casing I may balance the weight of the plunger 2, by having it constructed of some material lighter than water so as to cause it to have an upward buoyancy, or by providing a balancing weight at 15, on the opposite end
30 of a walking beam 14, from that upon which is secured the plunger rod 13.

As illustrated in Fig. 2, of the drawing, in using my appliance on a plurality of pumps I obviate the necessity of a balancing weight
40 by having the plunger rods 13, attached to opposite ends of a walking beam 14.

The power to operate my pump may be connected directly with the plunger 13, or to any desired part of the walking beam 14,
45 and may be continuous or intermittent, as that of a wind-mill, without requiring adjustment.

I, therefore, do not claim this combination broadly; but

I claim:

1. In a pump of the class described, an anchored foot valve located below the plunger within the pump casing and near the bottom thereof and having a supporting post extending from supports attached to the under side of said foot valve and secured thereto, said supporting post being adapted to rest on the bottom of the well or on some other suitable support, means adapted to grasp said foot valve by some instrument lowered from above to move and remove it, all substantially as set forth and for the purposes specified. 50 55 60

2. In a pump of the class described, an anchored foot valve located below the plunger within the pump casing and near the bottom thereof and having a supporting post extending from supports attached to the under side of said foot valve and secured thereto, said supporting post adapted to rest on the bottom of the well or on some other suitable support, lifting arches secured to the top of said foot valve and extending upwardly and provided to be grasped by some instrument lowered from above to move or remove said foot valve, substantially as set forth and for the purposes specified. 65 70 75

3. In a pump of the class described, an anchorable foot valve having two disk shaped rings clamped together by means of clamping bolts, an annular cup shaped gasket between said rings and extending outwardly and upwardly past the annular edge of the upper one of said rings and adapted to be pressed against the inner surface of the pump casing by being compressed by said rings by means of tightening said clamping bolts, and having lifting arches secured to the top of said upper ring, and having a supporting post secured to the under side of the under ring, all substantially as set forth and for the purposes specified. 80 85 90

BENJAMINE B. MARSHALL.

Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."