R. A. McCauley.

Force Pump,

No. 51,736 Patented Dec. 26, 1865.

Fig: 1.

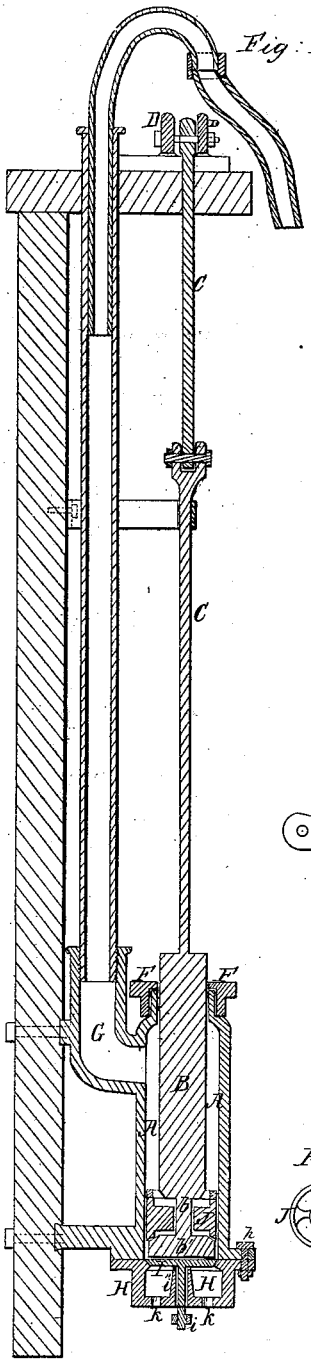


Fig: 2.

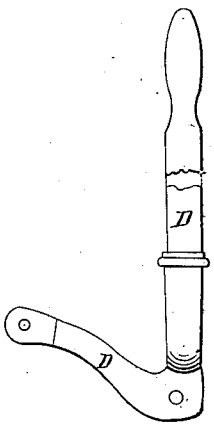
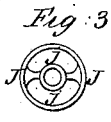


Fig: 3.



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UNITED STATES PATENT OFFICE.

REUBEN A. McCAULEY, OF BALTIMORE, MARYLAND.

IMPROVEMENT IN PUMPS.

Specification forming part of Letters Patent No. **51,736**, dated December 26, 1865.

To all whom it may concern:

Be it known that I, REUBEN A. McCAULEY, of the city and county of Baltimore, and State of Maryland, have invented a new and Improved Force-Pump; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The nature of my invention consists in so constructing my piston and valve above it, as also that part of the rod or piston which passes through the stuffing-box of the chamber or cylinder or top of pump, that the power is equalized and the labor of working is lessened, while a regular constant flow of fluid is obtained.

In the drawings, Figure 1 is a vertical section through the pump; Fig. 2, an elevation of the handle, and Fig. 3 a top view of valve on the piston.

A represents the ordinary chamber or cylinder in which the piston and valves work.

B is the piston; C, its rod, connecting with rock-handle D. The top F or stuffing-box F of cylinder through which piston B works is secured as usual.

G is the side pipe through which the water is forced.

H is the lower valve-box, secured to bottom of cylinder by bolts and nuts *h*.

I is the lower valve, made of metal, whose up-and-down play is regulated by a nut, *i*, or other equivalent device on the lower end of central stem, which slides in a hollow central projection, *i''*, of box H. This box has holes *k* in its bottom to admit water. The circular head of valve I fits nicely in its bed or seat in top of box H, and on the upstroke of piston B rises in the cylinder A and lets the water into it from below and around its outer edge, below the head *b''* of the piston.

J is an open or ring valve, which slides on the contracted part *b'* of piston and can rotate around it. On the upstroke it rests on head *b''* of piston, cutting off the water above it while valve I is letting in the water below. On the down-stroke J rises, as represented in red lines, permitting the water to pass through openings *j* in it. Thus it will be seen that on either stroke, or on both, water or fluid is being forced upward through pipe G, the flow not being intermittent, as is usually or always the case; and this arrangement at the same time equalizes the power of working the pump, making it uniform, or as nearly so as possible, on the up and down stroke.

My piston I make of metal, as also its head *b''* and the open ring-valve J, whose width serves to center that end of piston. I use no packing, although some may be put around valve J, if desired; but with nice fitting it is not at all necessary. The upper end of piston passing through stuffing-box is centered and the little friction there is all that is to be overcome.

I have found by experiment the best size for the piston working inside of the cylinder to be such as to occupy one-half the cubic contents of such cylinder, displacing about one-half the water. Under varying circumstances, however, it may be made a little larger or smaller; but when the pump is submerged the size mentioned is found to be best, as it secures a uniform constant flow and equal power on both strokes.

In using my pump as a suction and force pump (not submerged) I think it would be found advisable to increase slightly the size of the piston B to equalize the power on each stroke. By experiment I found in a three-inch cylinder-pump it was capable of raising nine hundred gallons of water per hour with but little exertion, forcing the same through fifty feet of hose and throwing the stream some fifty feet high.

My pump has no air-chamber, and the piston B may be hollow.

The valve and piston used are adapted to double-acting pumps by the application of another valve and piston-head, similar to those described, by connecting them together. This obviates the necessity of shoulders on the piston-rod to check the valves on the lift. This valve and piston is adapted to all kinds of force and lifting pumps.

What I claim as new and as of my invention, and desire to secure by Letters Patent of the United States, is—

1. The piston-head *b''* and the sliding valve J, as arranged in relation to the cylinder and piston-rod, all substantially as described, for the purpose set forth.

2. Enlarging the piston-rod above the play of the valve and throughout the extent of the cylinder when used in connection with head *b''* and valve J.

Witnesses: REUBEN A. McCAULEY.

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