G. Ketchum,

Force Pump,

No. 5,401, Patented Dec. 18, 1847.

Fig. 4.

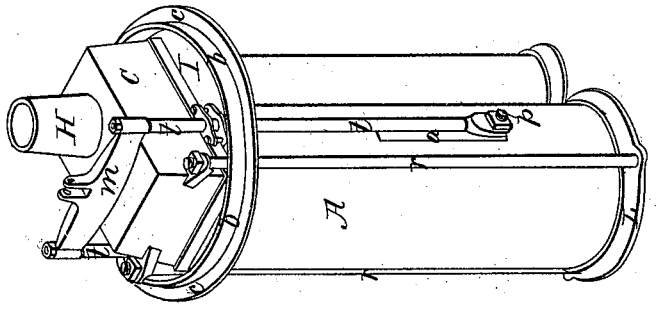


Fig. 3.

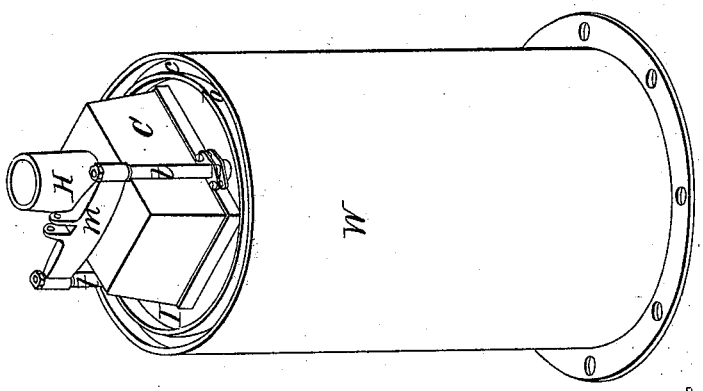


Fig. 2.

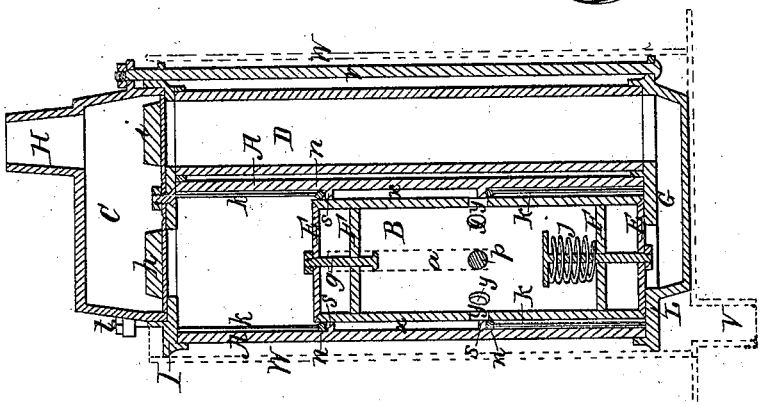
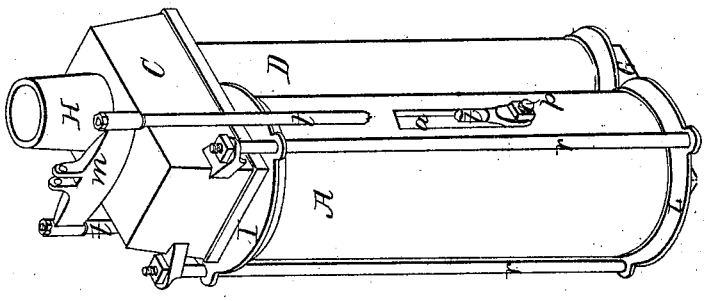


Fig. 1.



UNITED STATES PATENT OFFICE.

GEORGE KETCHUM, OF MARSHALL, MICHIGAN.

PUMP FOR RAISING WATER.

Specification of Letters Patent No. 5,401, dated December 18, 1847.

To all whom it may concern:

Be it known that I, GEORGE KETCHUM, of Marshall, in the county of Calhoun and State of Michigan, have invented a new and Improved Pump; and I do hereby declare the following to be a full, clear, and exact description of the construction and operation thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1, is a perspective view, and Fig. 2, is a vertical section of my improved pump, as arranged to be used as a submerged double action force pump. Figs. 3 and 4, are perspective views showing the manner of arranging my improved pump to be used as a double acting suction and force pump.

Similar letters refer to corresponding parts in all the figures.

A, is the pump cylinder; B, is a tubular valve plunger, placed within the pump cylinder; C, is the discharging water chamber, communicating with the top of the pump cylinder by means of the valve *h;* D, is a side pipe communicating with the chamber C, by means of the valve *i*, and with the lower end of the pump cylinder, through the medium of the chamber G.

I, is the head of the pump, and L, is the base of the same.

r, *r*, *r*, are rods connecting the head of the pump to the base of the same, and also connecting the chamber C, to the head I, as represented.

Vertical slots *a*, are formed opposite each other in the central portion of the pump cylinder A, through which project the ends of the rod *p* passing transversely through the tubular plunger B; *t*, *t*, are vertical rods connecting the projecting ends of the transverse rod *p*, with the cross head *m*, to which the lever is connected that operates the plunger.

E, E, are conical valves having their seats in each end of the plunger B; *g*, *g*, are the stems of the valves, working through the transverse guiding bars F, F; *j*, is a helical spring connected to the stem of the valve at the lower end of the plunger for the purpose of balancing the same.

s, *s*, are rings, or ledges, projecting from the inner surface of the pump cylinder, at about one third the distance from each end of the same; the plunger B, being of less diameter than the pump barrel, is made to fit accurately within the rings *s*, *s*, by which it is guided. The upper side of the upper ring *s*, and the under side of the lower one, are dished, for the purpose of receiving the leather packing rings *n*, *n*.

k, *k*, are metallic tubes placed in the space between the plunger and pump, between the rings *s*, *s*, and the heads of the cylinder, for the purpose of keeping the packing rings *n*, *n*, in their places. A series of apertures *y*, *y*, are formed in the center of the plunger, extending entirely around the same.

The operation of my improved submerged pump is as follows: The pump being entirely submerged, the water flows through the slots *a*, into the annular space *x*, *x*, (between the pump barrel and the plunger,) and through the apertures *y*, *y*, into the central portion of the plunger. When the plunger is elevated, the lower valve E, opens and allows the water to pass below and fill the lower end of the pump cylinder; when the plunger descends, the lower valve closes and forces the water at the lower end of the pump through the chamber G, and side pipe D, into the discharging chamber C. The plunger in descending, causes the upper valve E, to open, allowing the water to pass above it, filling the upper end of the pump; when the plunger is again raised, the upper valve E, closes and forces the water in the upper end of the pump cylinder through the valve *h*, into the discharging chamber C.

The operation of the packing rings *n*, *n*, is as follows: The pressure of the water in the ends of the pump cylinder, toward which the plunger is propelled, forces the ring (at that end) against the sides of the plunger so powerfully as to make a water tight packing between the sides of the same and the ring *s*, the opposite packing ring at the same time being subjected to no pressure, exerts no friction on the plunger.

When I desire to use my pump as a double acting suction and force pump, I inclose it in a cylindrical casing W, as represented in Fig. 3. In this modification, the upper head I, of the pump is of a circular form, having a vertical flange *b*, on its upper side near its periphery, as represented in Figs. 3, and 4. The casing W, is open at the top and bolted to a platform at its base; the pump barrel A is placed within the casing W,—the top of the flange *b*, (on the pump head I,) being on a level with the top of casing; a tight joint is formed between the head I, and the casing by packing the space between the flange *b*,

and the sides of the top of the casing. The induction pipe V, may be connected to the base or the sides of the casing W, as may be most convenient.

When thus arranged and combined with an outside casing, my improved pump will serve as a suction and force pump, as will readily be perceived. The water will be drawn through the induction pipe V, (Fig. 2) into the chamber between the pump barrel and the casing W, and pass into the pump barrel through the slots *a*, *a*, in the manner herein set forth. The many advantages my pump possesses are so apparent, that it is scarcely necessary to point them out; viz., simplicity of construction, absence of friction in working the same, the great length of time it can be operated without requiring repairs, and the ease with which repairs can be made, when required.

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

1. The tubular plunger B,—having valves combined with each end, and a series of apertures in its central portion—combined and operating with the pump cylinder A, side pipe D, water chamber G, and discharging chamber C, substantially in the manner herein described.

2. I also claim the manner of packing the tubular plunger (B,) by means of the annular ledges *s*, *s* (on the inner surface of the pump cylinder), the leather—or other suitable—rings, *n*, *n*, and the metallic tubes *k*, *k*, combined and operating substantially as herein set forth.

3. I also claim the combination of my improved double acting submerged forcing pump, with an inclosing casing W, for the purpose of converting the same into a suction and force pump, substantially as herein set forth.

GEO. KETCHUM.

Witnesses:

Z. C. ROBBINS,

GUY C. HUMPHRIES.