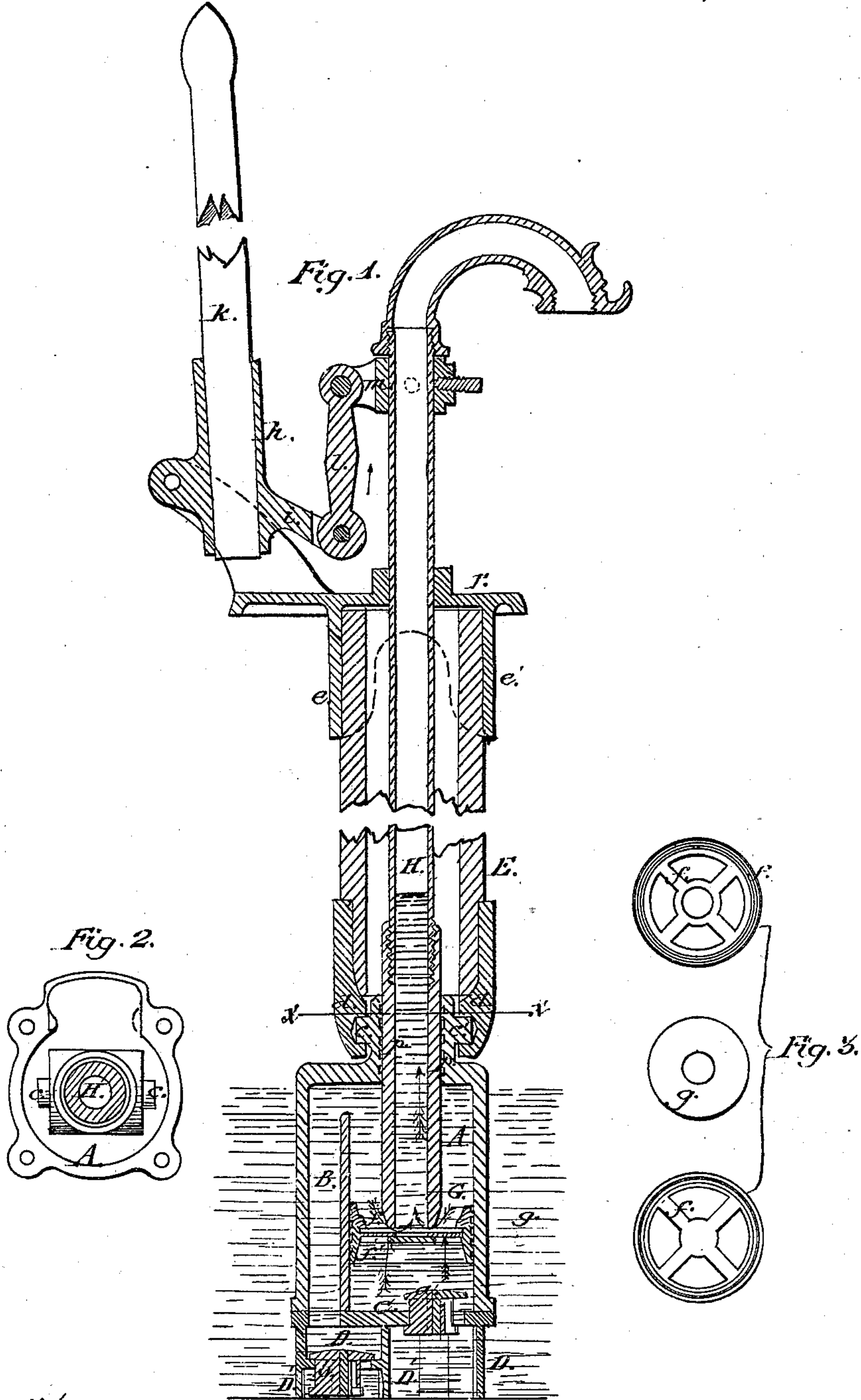


*A. C. Bletten,*

*Submerged Pump.*

*No. 88,538.*

*Patented Apr. 6. 1869.*



*Witnesses:*  
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# United States Patent Office.

ALONZO C. BLETHEN, OF LYNN, MASSACHUSETTS.

Letters Patent No. 88,538, dated April 6, 1869.

## IMPROVEMENT IN SUBMERGED PUMPS.

The Schedule referred to in these Letters Patent and making part of the same.

### To all whom it may concern:

Be it known that I, ALONZO C. BLETHEN, of Lynn, in the county of Essex, and State of Massachusetts, have invented a new and improved "Submerged Pump," of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a vertical longitudinal section of the pump embodying my inventions.

Figure 2 is a horizontal transverse section of the pump-barrel, on the line *x x*, fig. 1.

Figure 3 are detailed views of the piston and piston-valves.

The object of my invention is to produce a double-acting force-pump, the pump-barrel and valves of which being entirely submerged in the liquid, and the whole completed, and all the parts connected before setting the same; further, to simplify the delivery-valves and piston in their construction, and to arrange the pump-barrel, suction-passage, and valves, in such a manner as to economize in space and material; also, to give a simple and effective brake for working the pump; and

My invention consists in placing the pump-barrel near the bottom of the well, and attaching it to the lower end of the box, which thus connects the pump-barrel with the platform on top of well, by means of two lugs, on the upper portion of the barrel, pivoted into two corresponding projections fixed to the box. The upper portion of the box is enclosed by a flanged socket of top plate, and firmly secured to the same. Two ears, or projections on top plate, serve as bearings to the hand-lever, for operating the piston-rod.

My invention consists also, in providing the hollow piston with two perforated partitions, or diaphragms, placed a certain distance apart, and a plate, with a central orifice, between them. The piston-rod is formed of a hollow tube, and is attached to the upper diaphragm, these two diaphragms and plate forming the delivery-valves. The suction-valves are placed at the foot of the pump, so that the transverse section of the pump-barrel is not increased by the arrangement of the suction-valves. And

My invention consists further, in dispensing with a stuffing-box at the entrance of the piston-rod with the pump-barrel, and instead fit the piston-rod snugly in the cylindrical projection, and provide the latter with a series of annular grooves, which, during the working of the cylinder, get filled with the liquid, which cannot escape with the velocity of the piston-rod, but is retained, and thus forms a packing sufficient for the working of pumps of this kind. And in the arrangement of working the pump, by providing a socket holding the handle, with two projections in opposite directions to one another, to the one of which the pin forming the fulcrum passes through, attaching it to the top plate.

The other is, by means of a link, connected with a collar on piston-rod.

Referring to the drawings—

A is the pump-barrel, with suction-passage B.

To the bottom of the pump-barrel is attached a plate, C, with chamber D and legs D' D' D', said plate C containing the suction-valve *a*, opening directly into the barrel A, and the valve *b*, opening into the chamber D, directly under the suction-passage B.

The pump-barrel A is attached, by means of axles *c c'*, to projections *d d'* of box E, thus giving the former freedom to adjust itself, when misplaced while setting the pump, and prevent binding of the piston and piston-rod.

The square box E, extending the whole length of the well, whatever that may be, whether on a ship or on land, is held at its upper portion by socket-flanges *e e'* of plate F, and bolts to plate F, which latter rests and is firmly secured to the platform covering the top of well.

Within the pump-barrel moves the piston G, which is composed of two cylinders, screwed or connected together, the outer surface of which is provided with annular grooves, for the purpose of allowing the liquid to form the packing.

Each of the cylinders is provided with a perforated diaphragm, *f f'*, which, when said cylinders are connected, are placed a certain distance apart, for the purpose of allowing the valve-plate *g* to play between them. Fig. 3 shows the two cylinders *f f'* and plate *g* in plan views, and a proper arrangement of the openings in the same.

To the upper cylinder is attached the piston-rod H, which is tubular, and communicates with the under surface of the upper cylinder *f*. To the upper portion of said tubular piston-rod H is secured the nozzle, or mouth, of curved or other suitable form.

On suitable projections of plate F, is pivoted the socket *h*, for holding the lever K, and by means of which, arm *i*, link *l*, and collar *m*, motion is imparted to the tubular pump-rod and piston. This arrangement of lever and arm secures an even perpendicular movement to the hollow piston-rod H in operating the pump, which is very desirable and new.

The operation is as follows:

After the apparatus is set into the well, and the lower portion submerged, and the plate F secured to the platform of the well, the pump is set in operation.

At the upward movement of the piston, the suction-valve *a* will be lifted from its seat, and the liquid enters the space vacated by the piston, while the plate *g* closes at the same time the openings of the lower diaphragm of piston, and thus communication is opened between passage B and tube H for the delivery of the liquid.



At the downward movement of the piston, the valve *b* will be lifted, the apertures in diaphragm *f* closed by plate *g*, and valve *a* shut down upon its seat, and communication is now opened through central orifice of plate *g*, and openings in diaphragm *f'*, between tube *H* and the lower portion of pump-barrel, and the liquid contained therein forced upward through the tube *H*, and delivered through the nozzle.

Thus, a double-acting force-pump, of great simplicity, submerged and protected from freezing, and capable of carrying the liquid for a great distance, is produced with small expense and labor. There is no wearing out or disarrangement of valves, nor is anything likely to interfere with the same and stop its operation.

This construction for a submerged pump is valuable as a ship-pump, both on account of the quantity of water it will throw and the simplicity of its setting, and one of the greatest objections of ordinary ship-pumps is effectually overcome; that is, in leaving some fixture, projection, or apparatus above the deck, which is a most serious objection. My pump entirely overcomes this, as all that is necessary is to have the proper-sized openings in the floor of the deck, and the pump,

which is ever ready, can be set in a moment, and when not in use the openings can be covered by a flat trap, or hatch. And it is this method of setting my pump, that is, by the box *E* and flange *F*, as has been described, with the peculiar valve, water-packing, and lever-brake, that constitutes its distinctive features, as the action is like many pumps, and the lower valves old, as well as the tubular piston-rod *H*.

Having thus fully described my invention,

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

The combination of valve-plate *g*, perforated diaphragms *f f'*, piston *G*, tubular piston-rod *H*, pump-barrel *A*, valves *a* and *b*, chamber *D*, legs *D' D' D'*, box *E*, arms *d d'*, socket-flanges *e e'*, link *l*, and arm *i*, socket *h*, and handle *k*, all arranged and operating, relatively to each other, substantially as described.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

ALONZO C. BLETHEN.

Witnesses:

CARROLL D. WRIGHT,  
JOSIE G. BLETHEN.