

T. C. WORKMAN.
Submerged Rotary-Pumps.

No. 157,956.

Patented Dec. 22, 1874.

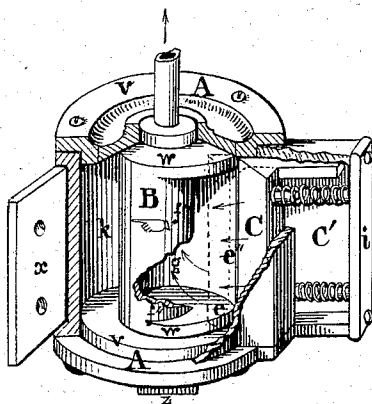


Fig. 1.

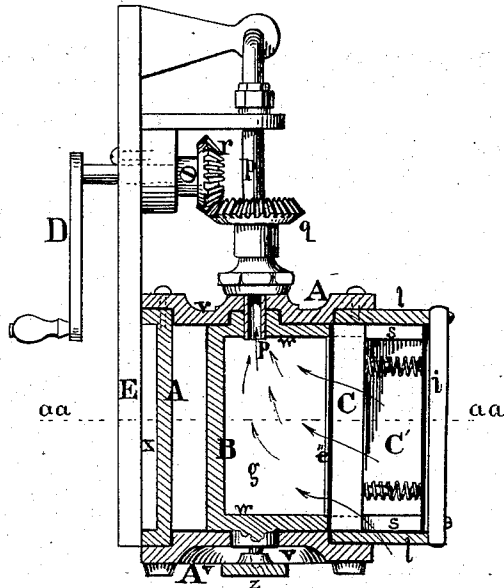


Fig. 2.
 (Vert. Sec. on lines bb-bb fig 2)

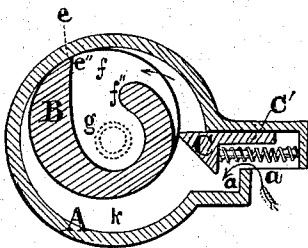


Fig. 5.
 (Another form.)

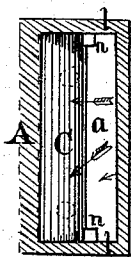


Fig. 4.
 (Vert. sec. across "port"
 on line cc-cc fig. 3.)

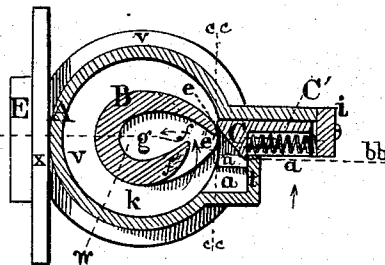


Fig. 3.
 (Hor. Sec. on line "aa" fig 2.)

Witnesses
J. A. K. Reptelle
J. M. Muehau

Thomas C. Workman
by E. Thurlow, his atty.

UNITED STATES PATENT OFFICE.

THOMAS C. WORKMAN, OF METAMORA, ILLINOIS, ASSIGNOR OF ONE-HALF HIS RIGHT TO MRS. SIDNAH R. WHITMIRE, OF SAME PLACE.

IMPROVEMENT IN SUBMERGED ROTARY PUMPS.

Specification forming part of Letters Patent No. **157,956**, dated December 22, 1874; application filed October 20, 1874.

To all whom it may concern:

Be it known that I, THOMAS C. WORKMAN, of Metamora, in the county of Woodford and in the State of Illinois, have invented a Rotary Submerged Force-Pump; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the annexed drawings, making a part of this specification, in which like letters of reference refer to like parts, and in which—

Figure 1 represents a perspective view, partly sectional, to show the interior; Fig. 2, a vertical section through the center of the pump and the water-port, on line *b b*, Fig. 3; Fig. 3, a horizontal section through line *a a*, Fig. 2; Fig. 4, a vertical section of the inner end of the water-port, with valve, on line *c c*, Fig. 3; Fig. 5, a horizontal section of pump, having another form of forcer or piston.

The piston or forcer is cylindrical, with an opening or lip extending into its interior, throughout one side from top to bottom, between its cam-shaped heads, one lip projecting to the full extent of the eccentricity of the cams, the opposite lip being shorter. The upper end of the forcer is connected with the eduction water-pipe, rotating together within the pump-case, the longest lip working water-tight against the circular interior of the case, and the heads against the upper and lower ends of said case. The heads work within sockets within the respective ends of the case or outer cylinder. The diameter of the forcer is sufficiently smaller than that of the latter to give room for a water-chamber between the two. The case has a vertical opening from top to bottom into the interior, closed by a valve which is in continual contact with the edges of each of the cam-heads of the rotary forcer, and moves within a recess or extension of the water-port, and is actuated alternately, by the revolution of the cams of the forcer, to force it within its recess, and by springs behind it to keep it in contact with said cams, or forcing it out of its recess to admit and to cut off water at the port alternately.

In the drawings, illustrating one of the forms of this pump, A represents the case or receiver, cylindrical in shape, with two

heads, A *v* A *v*, closing the respective upper and lower ends, and securely bolted or screwed thereto; and a water-port, *a a*, extending from top to bottom, covered by an angular partition, *t*, partially, and partially at the outer extremity by a plate, *i*, which serves as the base of the socket of the valve C, which works in this water-port. Behind the case is a flange or lug, *x*, by which the pump is fastened to a proper point under the water. B represents the rotary forcer or piston, a hollow cylinder, with each head formed by a cam, *w w*, at top and at bottom, on the outer sides of which, to form the bearings of the forcer, is a hub, each of which works within a corresponding recess in the heads of the case or receiver. The lower end of the forcer is stepped upon the bearing *z*, beneath the lower head A *v*. Through the upper hub passes a pipe, *p*, which is at once the spindle by which the forcer is rotated, and also the eduction-passage for water, the power being applied to the pinion *g*, at the top of the well or cistern, or beneath the water, as desired. A vertical narrow opening extends along the forcer between the points *e e* of the cams *w w*, one edge, *e''*, of which is extended entirely to the points of said cams, and sweeps the interior of the case A. The other edge or lip, *f''*, does not extend beyond the limits of the general cylindrical form of the forcer. (See plan, Fig. 3.)

C C' represent the valve, having a prismatic head, C, extending the whole length of the water-port *a a*, one edge of which is constantly in contact with the edges of the upper and lower cams *w w* of the forcer B, and the rear edge is alternately brought against the inner angle of the wall *t* of the water-port in cutting off and supplying water through the port to the chamber *k* of the pump. The prism-shaped head of the valve is connected in the rear to a block or plate, C', which fills and slides, with the head, within the back part of the water-port *a a*, in which it is confined by means of the shoulders *s s* at top and bottom of said valve, which abut against the guides *n n*, running parallel with the same behind the short wall *t*. The valve is pressed constantly against the surface of the cams *w w* of the forcer B

by the springs between the head of the valve and the rear plate *i* of the valve-socket, one above and one below. The springs each are coiled upon a pin or pins projecting from the rear of the head of the valve *C* and from the plate *i*, and the valve is closed, to stop influx of water, by the shoulder at the rear of the head *C* closing upon the wall *t*.

The operation of this submerged rotary force-pump is as follows: The power is applied to the pinion *q*, or the shaft *p*, which is also the discharge-pipe, and is screwed into the hub of the forcer *B*. By the revolution of the latter in the direction of the "hand," water is caught or scooped, on its entrance, by the lip *e''*, the valve *C C'* forming an abutment or stop to prevent its return, by its pressure, by means of the springs against the surface of the forcer, the water being forced through the orifice *f* of the latter into the chamber *g*, and thence up the discharge-pipe and shaft or spindle *p* to any height. The valve *C C'* is thus alternately opened and closed to admit water and to prevent its return from confinement within the chamber *k* of the case or receiver *A*, the latter being always full.

I also construct this pump with the valve within the body of the forcer so placed as to sweep the circular interior of the pump, and force water through a vertical opening next to it into the interior of the forcer, and thence to the discharge-pipe, each time that

the valve passes over a projection or intruding portion of the interior surface of the receiver or pump, the water-port being placed on that side of the projection last left by the valve or piston. I also use, in cases where necessary, a check-valve at the origin of the pipe *p* in the forcer.

What I claim as my invention is—

1. The rotary water-forcer *B*, constructed with cams *w w*, port *f*, and lips *e'' f''*, vertical water-passage *g*, in combination with the case or receiver *A*, having a port, *a a*, and port-valve *C*, or similar cut-off, which works within the port, or the specified equivalent working within the forcer itself, substantially as and for the purposes set forth.

2. The combination of the receiver *A*, water-port *a a*, valve *C C'*, wall *t*, guides *n*, substantially as set forth.

3. The combination of the rotary forcer *B* with the hollow shaft or pipe *p*, substantially as and for the purposes set forth.

4. The combination of the valve *C C' s s*, and guides *n n*, and wall *t* of the port *a a*, substantially as and for the purposes described.

In testimony that I claim the foregoing submerged rotary force-pump I have hereunto set my hand this 12th day of October, 1874.

THOMAS C. WORKMAN.

Witnesses:

G. H. KETTELLE,

ANDREW RUNSTETTER.