

No. 661,623.

Patented Nov. 13, 1900.

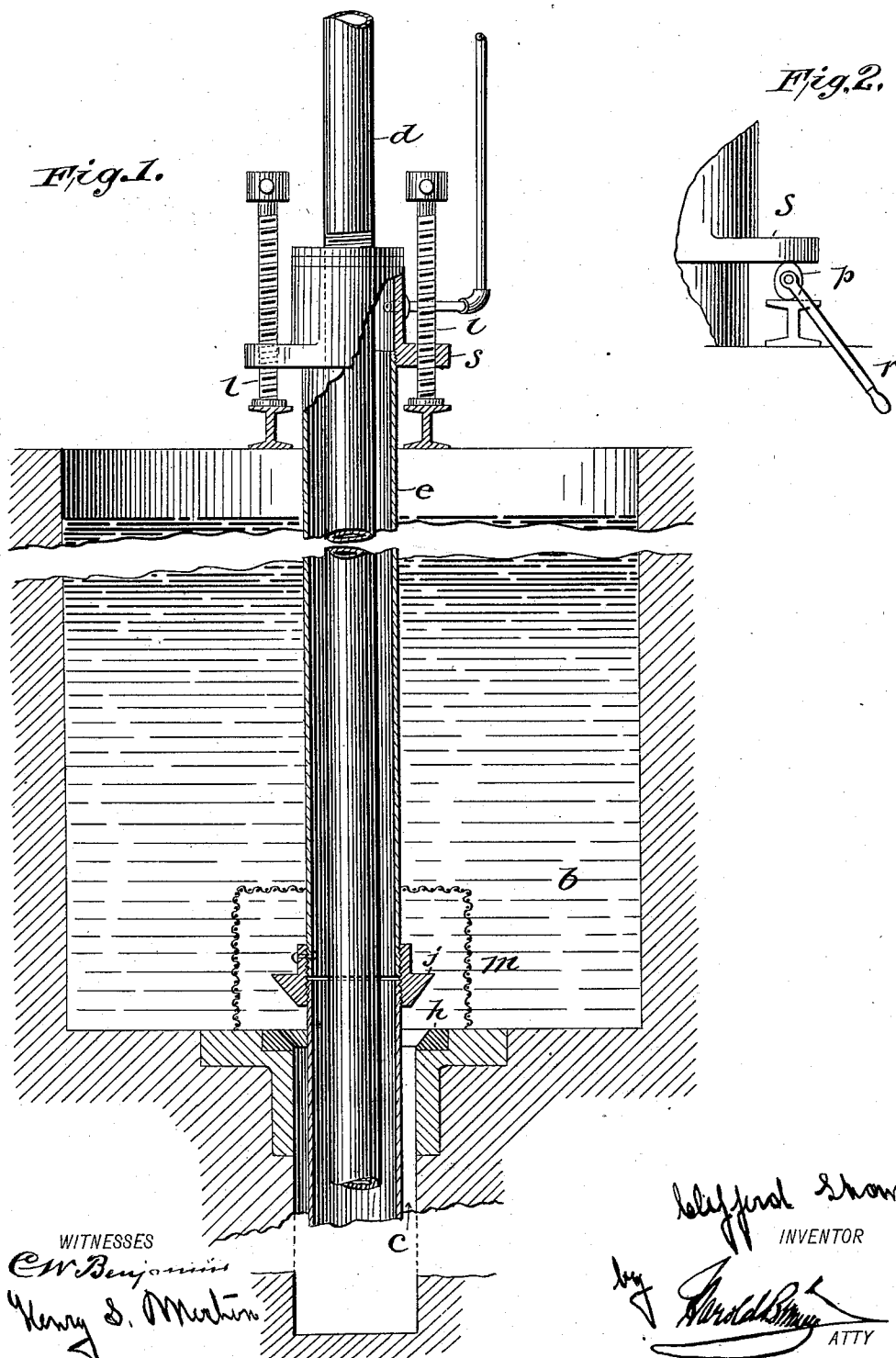
C. SHAW.

APPARATUS FOR LIFTING WATER.

(Application filed Mar. 22, 1900.)

(No Model.)

2 Sheets—Sheet 1.



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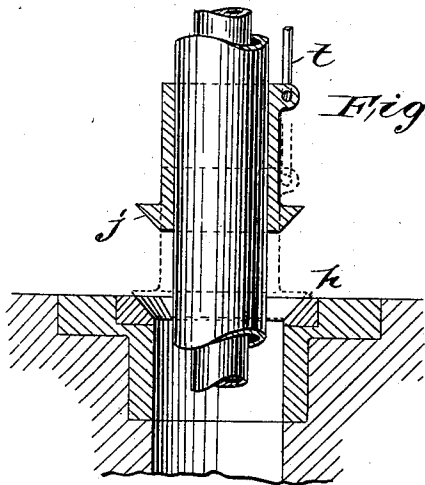


Fig. 3.

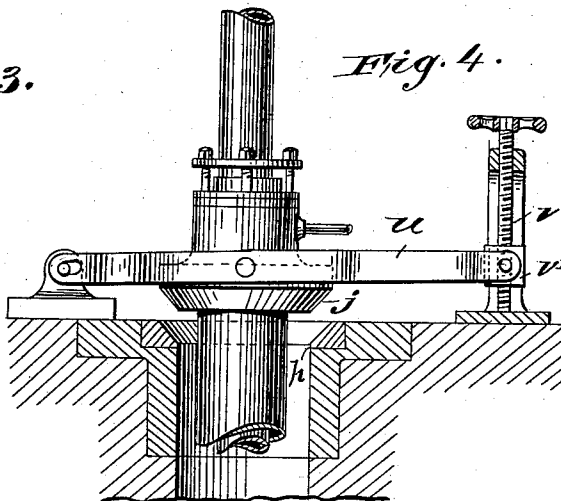


Fig. 4.

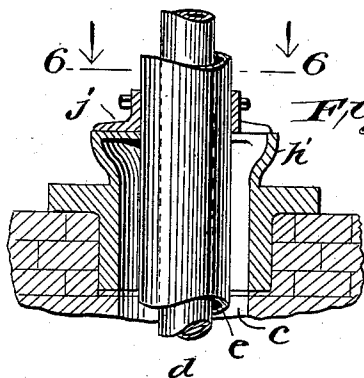


Fig. 5.

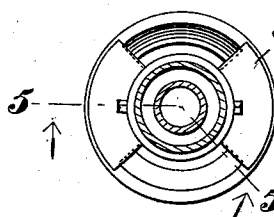


Fig. 6.

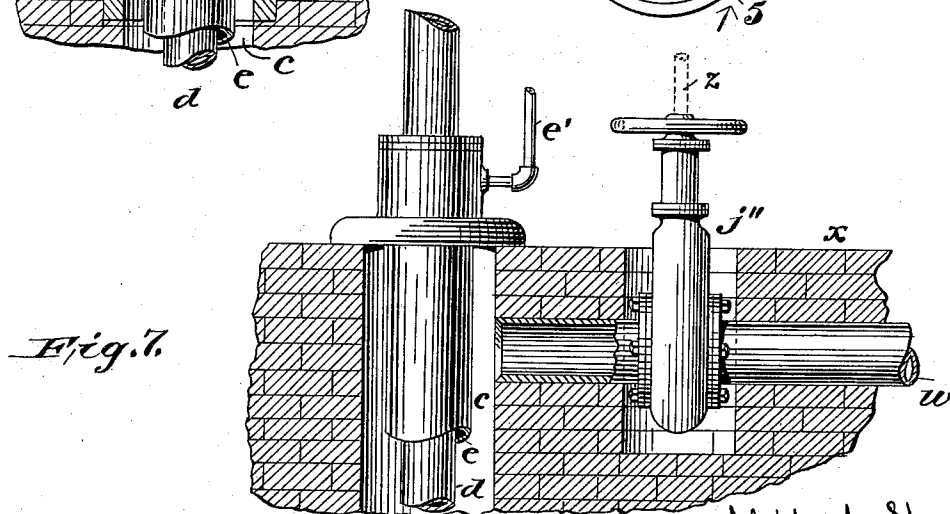


Fig. 7.

WITNESSES  
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ATTY

# UNITED STATES PATENT OFFICE.

CLIFFORD SHAW, OF NEW YORK, N. Y., ASSIGNOR TO THE BACON AIR LIFT COMPANY, OF SAME PLACE.

## APPARATUS FOR LIFTING WATER.

SPECIFICATION forming part of Letters Patent No. 661,623, dated November 13, 1900.

Application filed March 22, 1900. Serial No. 9,696. (No model.)

*To all whom it may concern:*

Be it known that I, CLIFFORD SHAW, hydraulic engineer, of No. 100 Broadway, in the city and State of New York, have invented certain new and useful Improvements in Apparatus for Lifting Water, of which the following is a specification.

One way of lifting water has been to deliver the water into a reservoir well or pit in which water-lifting mechanism is placed. Where the system known as the "Bacon air-lift" is employed for raising water, the reservoir well or pit will have a depth proportionate to the height to which the water is to be raised, as will be understood by every one skilled in the art. Where such reservoir-wells are used for elevating water or other liquids that contain sediment, there is always danger of the mechanism becoming so clogged when out of use that it will not start again properly.

The object of the present invention is to provide means for preventing the excessive settling of sediment in or around the water-lifting mechanism. This object I attain by inclosing the lower portions of the apparatus entirely when out of use—as, for example, by gates or valves, which either close the mouth of the well or close the well farther down, near the intake-mouth of the pump or uptake mechanism employed.

In the preferred forms of the invention an air-lift is employed, and the valve or gate should be placed so far above the intake-opening of the uptake-pipe that such sediment that may have accumulated above the valve or gate will not clog the mechanism when the valve or gate is open. As a matter of convenience I prefer to place the valve or gate either just beneath the lowest level at which the water stands in the well or else (where the pit is a comparatively large reservoir having an eight or ten inch immersion-well or smaller pit extending downward to give the necessary depth of immersion) at the head of the immersion pit or well.

To these ends the invention consists in the apparatus or combinations as hereinafter claimed and as illustrated and described in some of its preferred forms in the following description.

Figure 1 is a sectional view showing the most approved form of the invention. Fig. 2 is a detailed view showing a slight modification. Figs. 3, 4, 5, 6, and 7 show other modifications.

In Fig. 1 the larger portion of the reservoir or pit is shown at *b*; but this might also be taken as illustrating a shaft in a mine or, indeed, any open space, because the immersion pit or well proper is at *c*, the uptake-pipe for the air and water shown at *d*, and the air-pipe at *e*. I have shown the air-pipe *e* surrounding the uptake-pipe; but it is not even necessary that either pipe should be within the other. At *h* is a valve-seat, with which the valve *j* coöperates. The water or other liquid flows into the well *c* through the valve-seat *h* when the valve is open. The valve *j* is secured to the outer pipe *e*, so as to be moved with it. Screws *l* are provided for raising the outer pipe *e*, either with or without the inner pipe *d*. Consequently the screws *l* control the valve *j*. The operation of this form of the invention is as follows: When the well is in use—that is to say, is operating—the valve *j* is open, as in Fig. 1. The water or the liquid passes through the open valve down into the well *c* and thence up through the uptake *d*. So far as the present invention is concerned the depth of water above the valve *j* is unimportant. The screen *m* serves to prevent logs and other obstructions from getting into the valve and well. When the well is stopped and the air shut off, the valve *j* is lowered into place and may so remain until the operation is resumed. When not in operation, only the sediment within the well *c* and beneath the valve can settle about the inlet-opening in the pipes *d* and *e*. Any mud or other sediment settling from the water above the valve *j* is prevented from entering the well *c*. When the operation is resumed, the flow of water through the valve *j* carries with it some of the sediment that has settled above the valve; but this does no harm, as it cannot settle when the well is in operation.

In Fig. 2, *p* is a cam controlled by the lever *r* and operating, when turned, to raise or lower the collar *s*, which corresponds to the collar *s* in Fig. 1, and therefore controls the valve.

Many other means of controlling the valve have suggested themselves to me, but are not essential in matters of detail to the invention.

In Fig. 3 the valve  $j$  is shown movable independently of the air-lift mechanism, a controlling-rod  $t$  being provided to act directly on the valve.

In Fig. 4 the valve  $j$ , either with or without the water-raising mechanism, may be raised and lowered and supported at one or more points by levers  $u$  and adjusting-screw  $v$ , which operates upon a screw-threading nut  $v'$  to raise and lower the nut and the end of the lever  $u$ , as shown.

In Figs. 5 and 6 a rotary valve  $j'$ , having several leaves or vanes of segmental or fan shape, is shown cooperating with a similar valve  $h'$ . The valve  $j'$  is secured to the outer pipe of the water-raising mechanism, so that by turning the pipe the valve may be opened and closed.

In Fig. 7 the valve is in the form of a gate-valve  $j''$  and is entirely dissociated from the air-lift pipes. Such form is desirable where the water is delivered to the well  $c$  through a pipe or conduit  $w$  and where the brickwork or other flaw  $x$  in the vicinity of the valve is dry, or at least readily accessible. In dotted lines, however, at  $z$  I show that the valve-stem may extend upward to any desired height, so as to control the valve from above. The specific subjects-matter of Figs. 3, 4, and 7, so far as they cannot be claimed herein, form the subject of specific divisional applications filed hereafter.

I have described only the preferred forms of the invention as adapted for special uses.

The invention is in principle equally well adapted to a great many other conditions, which I will not attempt to enumerate.

The novel and characteristic features which I believe distinguish my invention from the prior art are set forth in the following claims.

I claim—

1. In combination in apparatus for raising liquid of the type employing a submergence pit or well and an air-lift mechanism, a valve-seat through which liquid is admitted to the air-lift mechanism, and a valve connected to and actuated by the air-lift mechanism, substantially as set forth.

2. In combination in apparatus for raising liquid of the type employing a submergence pit or well and an air-lift mechanism, a valve-seat through which liquid is admitted to the air-lift mechanism, and a valve connected to and movable with the air-lift mechanism, substantially as set forth.

3. In combination in apparatus for raising water, wherein the water to be raised is first delivered into a reservoir well or pit, air-lift mechanism for raising the water from the well or pit, combining an uptake and a downtake

pipe, and a valve secured to one of said pipes for closing the well or pit, substantially as set forth.

4. In combination in apparatus for raising water, wherein the water to be raised is first delivered into a reservoir well or pit, air-lift mechanism for raising the water from the well or pit, combining an uptake and a downtake pipe one within the other, a valve secured to the outer pipe and movable therewith, and a valve-seat therefor through which the water passes to the well or pit, and means for moving the said outer pipe and valve to open and close the well or pit, substantially as set forth.

5. In combination in apparatus for raising water, wherein the water to be raised is first delivered into a reservoir well or pit, air-lift mechanism for raising the water from the well or pit, combining an uptake and a downtake pipe one within the other, a valve secured to the outer pipe and movable therewith, and a valve-seat therefor through which the water passes to the well or pit, and means for raising, lowering, and supporting the said outer pipe and valve to open and close it, substantially as set forth.

6. In apparatus for raising water of the type employing a submergence pit or well and air-lift mechanism therein, the combination of the uptake and downtake pipes placed one within the other and adapted to maintain a continuous flow as distinguished from an intermittent flow, the submergence pit or well therefor, and valve mechanism for opening and closing said submergence pit or well at will and maintaining it open continuously during the operation of the said air-lift mechanism, substantially as set forth.

7. In apparatus for raising water of the type embodying a submergence pit or well and air-lift mechanism, the combination of a valve-seat through which the water passes into said well or pit and through which the said air-lift mechanism extends, a valve therefor encircling the said mechanism, and means for actuating the said valve, substantially as set forth.

8. In apparatus for raising water of the type embodying a submergence pit or well and air-lift mechanism, the combination of a valve-seat through which the water passes into said well or pit and through which the uptake and downtake pipes of said mechanism extend, one of them being within the other, and an annular valve encircling the outer of said pipes and adapted to be seated on said valve-seat, substantially as set forth.

Signed this 21st day of March, 1900, at New York, N. Y.

CLIFFORD SHAW.

Witnesses:

HENRY T. MARTIN,  
EDWARD A. FRESHMAN.