J. E. OSMER.

WATER LIFT.

APPLICATION FILED FEB. 3, 1910.

981,301. Patented Jan. 10, 1911.

2 SHEETS—SHEET 1.

Fig. 1.

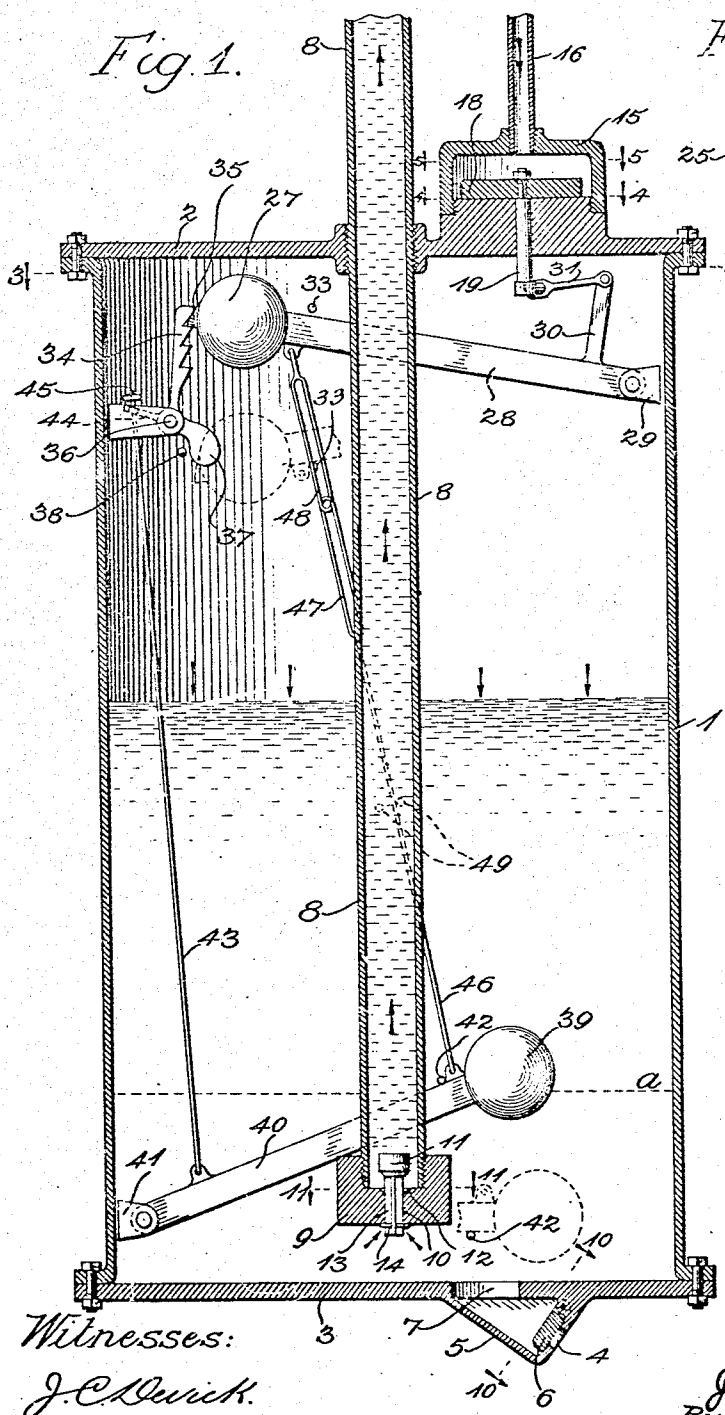



Fig. 8.

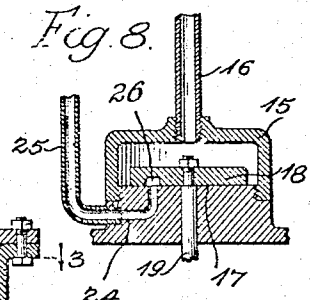



Fig. 9.

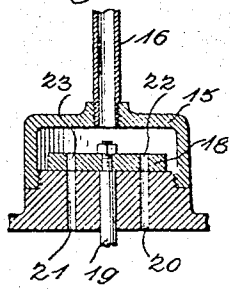



Fig. 10.

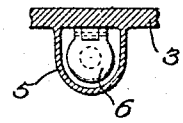
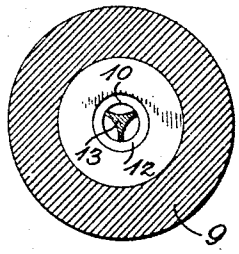



Fig. 11.




Witnesses:

J. C. Derrick.

George L. Chindahl

Inventor:

John E. Osmer

By Luther L. Hill

Attorney.

J. E. OSMER.

WATER LIFT.

APPLICATION FILED FEB. 9, 1910.

981,301. Patented Jan. 10, 1911.

2 SHEETS—SHEET 2.

Fig. 2.

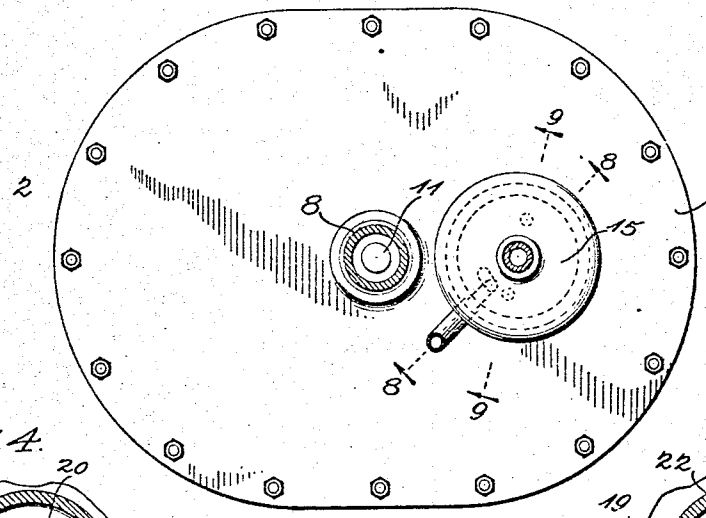



Fig. 4.

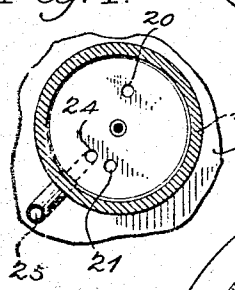



Fig. 5.

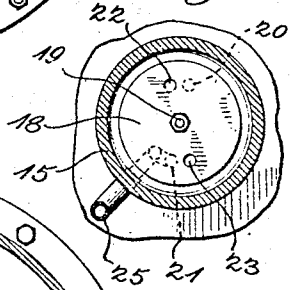



Fig. 3.

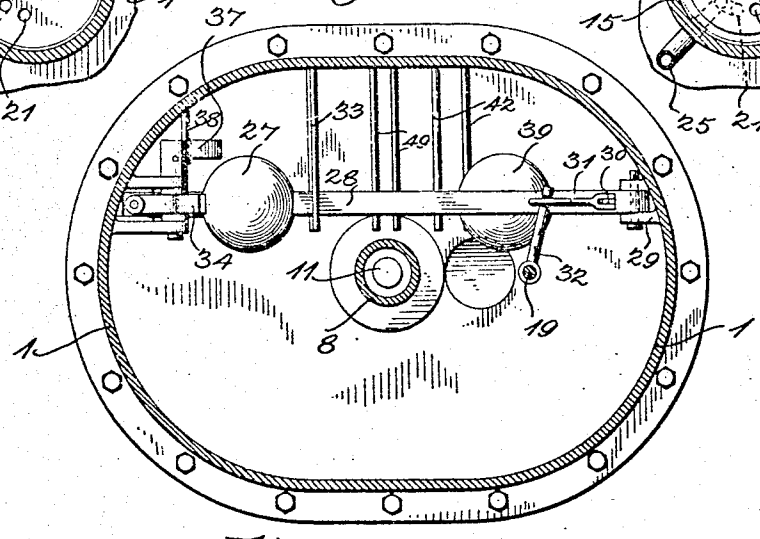



Fig. 6.

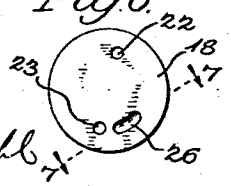
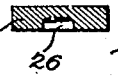



Fig. 7.




Witnesses:

J. C. Devick.

George L. Chrisdahl

Inventor:

John E. Osmer

By Luther L. Miller

Attorney.

# UNITED STATES PATENT OFFICE.

JOHN E. OSMER, OF CHICAGO, ILLINOIS.

## WATER-LIFT.

981,301. Specification of Letters Patent. **Patented Jan. 10, 1911.**

Application filed February 9, 1910. Serial No. 542,859.

*To all whom it may concern:*

Be it known that I, JOHN E. OSMER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Water-Lifts, of which the following is a specification.

This invention relates to apparatus for forcing water by means of fluid pressure, and is especially applicable to apparatus intended to be submerged in a body of water for forcing the water to an elevated tank or distributing system.

The object of this invention is to simplify and improve the construction of apparatus of this class.

In the accompanying drawings, Figure 1 is a vertical central section through an apparatus embodying the features of my invention. Fig. 2 is a top plan view thereof. Fig. 3 is a section on line 3 3 of Fig. 1. Figs. 4 and 5 are sections on lines 4 4 and 5 5, respectively, of Fig. 1. Fig. 6 is an underside view of an oscillatory valve member employed in the construction. Fig. 7 is a section on line 7 7 of Fig. 6. Figs. 8 and 9 are sections on lines 8 8 and 9 9, respectively, of Fig. 2. Figs. 10 and 11 are sections on lines 10 10 and 11 11, respectively, of Fig. 1.

The embodiment herein shown of my invention comprises a casing 1 of any suitable form, said casing having an upper head 2 and a lower head 3. The casing 1 is intended to be submerged in a well or other body of water. Water is admitted to the interior of the casing 1 through an inlet opening 4 formed in a small chamber 5 upon the under side of the lower head 3. Said opening is arranged to be closed by a gravity valve 6. The chamber 5 communicates with the interior of the casing 1 through an opening 7.

Water is forced from the casing 1 to an elevated tank or distributing system (not shown) through a pipe 8 attached, in this instance, to the upper head 2. The lower end of the pipe 8 extends to a point adjacent to the bottom of the casing 1 and is there provided with a closing cap 9 having an opening 10 therein, said opening being arranged to be closed by a check valve 11 of any suitable construction. I have herein shown a valve member adapted to seat upon the conical valve seat 12 and having a fluted stem 13 (Fig. 11) which is slidable in the opening 10 of the closing cap 9. Pressure within the casing 1 in excess of pressure in the pipe 8 will unseat the valve 11 to permit the entrance of water to said pipe, the unseating movement of the valve being limited by suitable means, such as a pin or collar 14.

The pressure fluid employed to force water from the casing 1 into and through the pipe 8 may be compressed air or steam. The means for controlling the flow of the pressure fluid comprises, in this instance, a valve chest 15 communicating with a suitable supply of pressure fluid through a pipe 16. In this instance the lower side of the valve chest 15 is integral with the upper casing head 2. Upon a valve face 17 in said pressure chest is positioned an oscillatory valve member 18, which member is rigidly mounted upon the upper end of a valve spindle 19 extending through the lower wall of the valve chest 15 and the casing head 2 into the interior of the casing 1. I have herein shown two ports 20 and 21 extending between the valve face 17 and the interior of the casing 1, the valve member being provided with two ports 22 and 23 adapted to register with the posts 20 and 21, respectively. In the valve face 17 is a port 24 communicating with the exhaust pipe 25 for the pressure fluid. In the lower side of the valve member 18 is formed a groove or recess 26 adapted to connect the port 21 with the port 24 in order to afford an outlet for the pressure fluid in the casing 1.

The valve member 18 is arranged to be oscillated to place the interior of the casing 1 alternately in communication with the interior of the valve chest 15 and the outlet pipe 25. The means herein shown for thus moving the valve member 18 comprises a float 27 carried by an arm 28 which is pivotally supported at one end upon lugs 29 upon the side wall of the casing 1 near its upper end. Upon the float arm 28 is a projection 30 which is connected by means of a link 31 with an arm 32 fixed to the lower end of the valve spindle 19. It will be seen that as the float 27 is moved up and down, the valve member 18 will be oscillated to connect the interior of the casing 1 with the pressure supply pipe 16 or the exhaust pipe 25. The movements of the float arm 28 are limited by stop pins 33.

In order to hold the float 27 elevated after it has actuated the valve member 18 to connect the interior of the casing 1 with the pressure supply pipe so that the water level

in the casing may be lowered without immediately lowering the float, I provide a detent 34 having teeth thereon which are arranged to be engaged by a tooth 35 on the float. The detent 34 is pivotally supported at 36 upon the side wall of the casing 1. A weighted arm 37 fixed to the detent tends to tilt said detent into position to engage the tooth 35. 38 is a stop pin for limiting the pivotal movement of the detent 34 in one direction.

To operate the detent 34 to release the float 27 when the water level in the casing 1 has been reduced to a desired point, I provide a float 39 fixed upon an arm 40 which is pivoted at one end upon lugs 41 upon the side wall of the casing 1 near the lower end thereof. The lugs 41 are, in this instance, positioned upon the opposite side of the casing from the lugs 29 which support the upper float arm 28. Stop pins 42 limit the pivotal movement of the lower float arm 40. A rod 43 connected at its lower end to the float arm 40 extends loosely through an arm 44 fixed to the detent 34 and has at its upper end a head or other projection 45. It will be seen that when the lower float 39 descends, the head 45 will engage the arm 44 and tilt the detent away from the float 27, thereby permitting said float to descend and operate the valve 18 to place the casing in communication with the outlet pipe 25. It will be seen that the float 39 will operate the detent 34 and thus cause an operation of the valve member 18 before the water level in the casing 1 has fallen below the level of the lower end of the outlet pipe 8.

To assist the float 27 and the arm 28 in operating the valve 18 to close communication between the pressure supply pipe and the interior of the casing 1, I provide a connection between the float arm 28 and the float arm 40. Said connection may be of any suitable character. I have herein shown a wire 46 having a loop 47 upon its upper end, which loop passes through a wire loop 48 connected to the float arm 28. Pins 49 serve as guides for the wire 46. If excessive pressure, friction or other causes should prevent the float 27 from dropping as soon as the detent 34 is disengaged from said float, the weight of the float 39 and the arm 40 will shortly thereafter exert its force upon the float 27 through the connections 46, 47 and 48, and cause the float 27 to descend.

Assuming the parts to be in the position shown in Fig. 1, with the valve member 18 in the position indicated in Fig. 9 and the upper part of the casing 1 to be filled with pressure fluid, the operation is as follows: The fluid pressure in the upper part of the casing 1 will cause the water in said casing to be forced through the opening 10 into and through the outlet pipe 8. The pressure in the casing 1 will, of course, hold the valve 6 seated. As soon as the level of the water has fallen to about the level indicated by the dotted line *a* in Fig. 1, the float 39 will begin to descend. As said float descends, the head upon the rod 43 operates to disengage the detent from the float 27, which thereupon falls to the position indicated in the dotted lines in Fig. 1, thereby turning the valve member 18 into the position shown in Figs. 5 and 8. In this position the valve ports 20 and 21 are blanked and the port 21 is connected with the port 24 through the medium of the groove 26. The pressure fluid in the casing 1 now exhausts through the port 21, the groove 26, the port 24, and the outlet pipe 25, whereupon the water outside the casing 1 opens the valve member 6 and enters the casing 1. When the level of the water in the casing 1 has risen to such a height as to raise the float 27 into the position shown in Fig. 1, the valve member 18 will have turned into the position indicated in Fig. 9, thereby permitting the entrance of pressure fluid to the casing 1 and causing the discharge of water from said casing into and through the pipe 8.

I would have it understood that I do not limit myself to the exact construction herein shown and described, for various modifications will occur to those skilled in the art.

I claim as my invention:

1. In a water lift, in combination, a casing having an inlet opening in its lower portion; a gravity valve for said inlet opening; a pipe extending into said casing and terminating near the bottom thereof; a check valve preventing the return of water from said pipe to said casing; an inlet for pressure fluid in the upper part of said casing; an outlet for pressure fluid adjacent said inlet; a valve arranged to place said casing alternately in communication with said inlet and said outlet; an arm pivotally mounted in the upper end of said casing; a float carried by said arm; a connection between said arm and said valve for moving the latter; a detent pivoted in said casing and arranged to engage said arm to hold it elevated; a second arm pivoted in the lower part of said casing; a float carried by said second arm; a rod connecting the lower arm with said detent for disengaging the detent from the upper arm; and a connection between said arms for adding the weight of the lower float arm and float to the upper float arm and float to assist in lowering the latter.

2. In a water lift, in combination, a casing having a valved inlet in its lower portion; a pipe extending into said casing; a check valve preventing the return of water from said pipe to the casing; a source of pressure-fluid communicating with the upper end of said casing; an outlet for the

pressure-fluid; a valve controlling both the inlet and the outlet for the pressure fluid; a float in said casing; connections between said float and said valve for actuating the latter; a second float in said casing; and a connection between said floats whereby the second float assists the first in operating said valve.

3. In a water lift, in combination, a casing having a valved inlet in its lower portion; a pipe extending into said casing; a check valve preventing the exit of water from said pipe to said casing; an inlet and an outlet for pressure fluid in the upper part of said casing; valve means controlling said pressure fluid inlet and outlet; an arm pivoted in the upper part of said casing; a float carried by said arm and always free to rise as the water level rises; connections between said arm and said valve means; a detent pivoted in said casing and arranged to support said float in its elevated position; an arm pivoted in the lower part of said casing; a float carried by said second mentioned arm; and a connection between said lower float-arm and said detent for disengaging said detent from the first mentioned float.

4. In a water lift, in combination, a casing having a valved inlet in its lower portion; a pipe communicating with the lower part of said casing; a check valve preventing the exit of water from the pipe to the casing; an inlet and an outlet for pressure fluid in the upper part of the casing; valve means controlling said pressure-fluid inlet and outlet; an arm pivoted in the upper part of and at one side of said casing; an arm pivoted in the lower part of and at the opposite side of said casing; floats carried one by each of said arms; an operating connection between the upper float and said valve means; a gravity detent pivoted in the upper part of said casing; a locking projection on the upper float for engagement by said detent; and a connection between said detent and the lower float-arm for disengaging the detent from the upper float when the lower float descends.

5. In a water lift, in combination, a casing having a valved inlet in its lower portion; a valved water-outlet pipe communicating with the lower part of the casing; a valve chest upon the outer side of the upper end of the sacing, said chest having a valve face therein; a source of pressure fluid in communication with said valve chest; an outlet means for pressure fluid; an oscillatory valve member resting upon said valve face and held against said face by the pressure in said chest, said valve member and said valve face having suitable ports therein; a spindle fixed to the valve member; an arm fixed to the lower end of said spindle; a float-carrying arm pivoted in said casing; a projection on said float-carrying arm; and a link connecting said projection to the arm on said spindle.

6. In a water lift, in combination, a casing having a valved inlet in its lower portion; a pipe extending into said casing; a check valve preventing the return of water from said pipe to the casing; a source of pressure-fluid communicating with the upper end of said casing; an outlet for the pressure-fluid; a valve controlling both the inlet and the outlet for the pressure-fluid; a float pivotally mounted in the upper end of said casing; connections between said float and said valve for actuating the latter; a second float pivotally mounted in the lower end of said casing; and a link connecting said floats whereby the weight of the lower float is exerted to assist the upper float in moving the valve in one direction.

JOHN E. OSMER.

Witnesses:
C. PAUL PARKER,
GEORGE L. CHINDAHL.