(No Model.)

J. B. ERWIN.

PNEUMATIC WATER ELEVATOR.

No. 387,711. Patented Aug. 14, 1888.

FIG. 1.

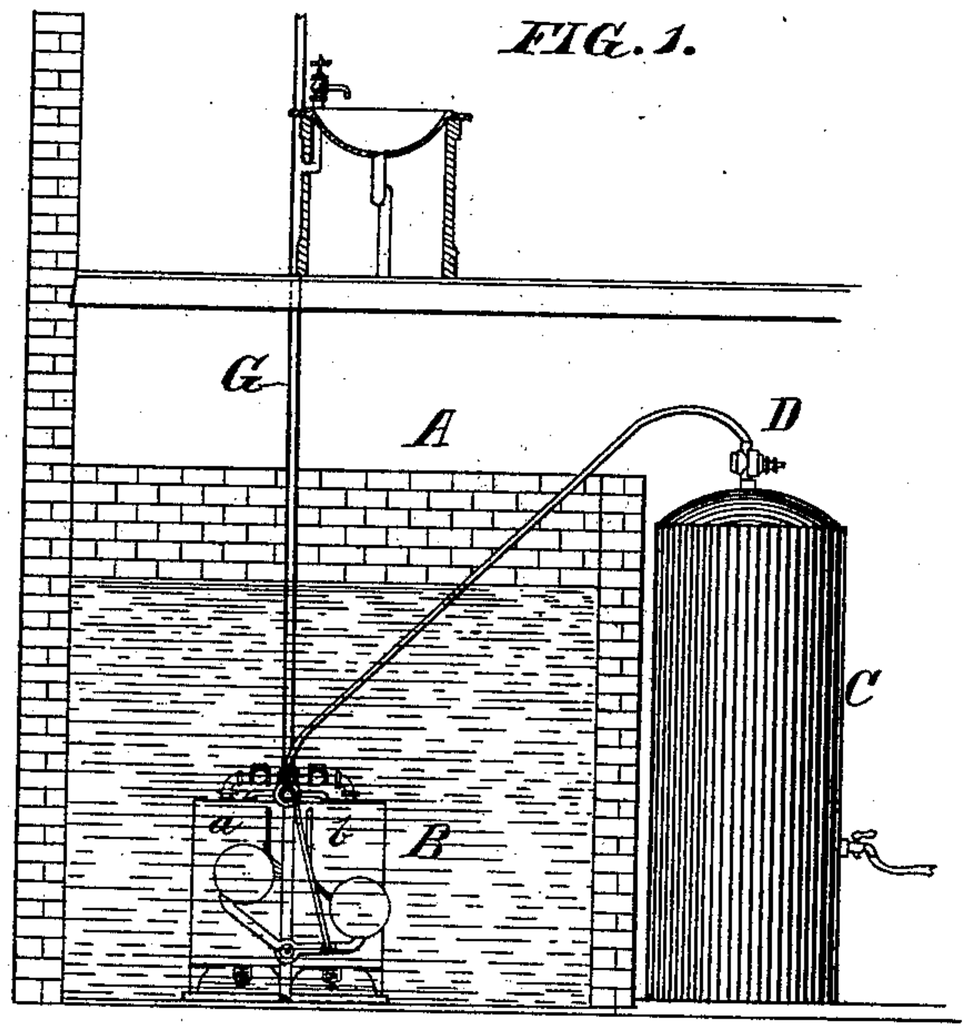


FIG. 2.

FIG. 3.

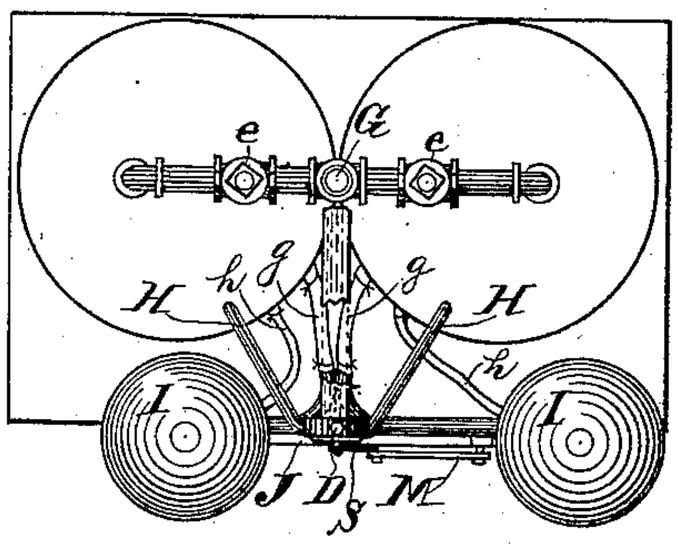
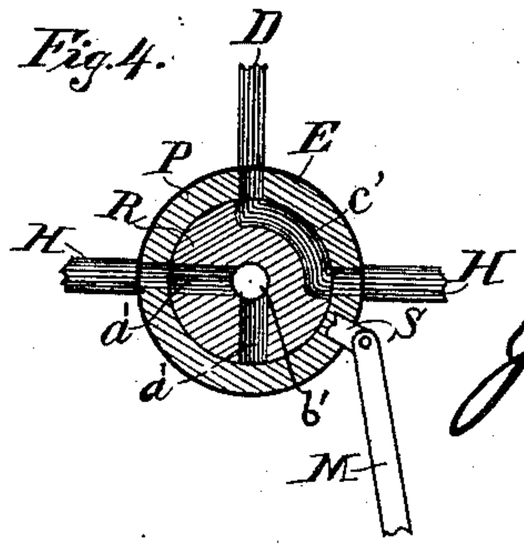


Fig. 4.



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UNITED STATES PATENT OFFICE.

JAMES B. ERWIN, OF MILWAUKEE, WISCONSIN.

PNEUMATIC WATER-ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 387,711, dated August 14, 1888.

Application filed March 21, 1887. Serial No. 231,685. (No model.)

To all whom it may concern:

Be it known that I, JAMES B. ERWIN, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented new and useful Improvements in Pneumatic Water-Elevators; and I do hereby declare the following to be a full, clear, and exact description of said invention, reference being had to the accompanying drawings, and to the letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in devices for raising water by pneumatic pressure, with which a person is enabled by a few minutes' work with an air-condenser to thereafter draw a continuous stream of water from any one of a large number of faucets in a building, at intervals from time to time as may be required, with the same ease as from an ordinary city water-supply.

The system and arrangement of devices embodying my invention are further explained by reference to the accompanying drawings, in which—

Figure 1 represents a side view thereof, showing the water-receiver located in the cistern beneath the dwelling. Fig. 2 represents an enlarged view of the water-receiver shown in Fig. 1, part in section. Fig. 3 is a top view, and Fig. 4 represents a section, of the air-controlling cock.

Like parts are represented by the same reference-letters throughout the several views.

Located beneath the surface of the water in the cistern A is a two-chambered water-receiver, B. The chambers *a* and *b* are constructed alike, and each are provided with separate inlet check-valves, F F, both of which communicate alike directly with the surrounding water of the cistern, through which check-valves said chambers *a* and *b* are filled with the surrounding water as soon as submerged beneath the surface of the same. Both of said chambers *a* and *b* are alike provided with water-discharging branch pipes *d d*, which are connected together at and communicate with the single water-pipe G, through which water-pipe G and its branches water is conducted to the several places of discharge throughout a building. Both of said chambers *a* and *b* are also provided with branch air-tubes H H, which communicate between the respective chambers *a b* and the receiver C through the air-controlling cock E and the single air-tube D. The receiver B being filled with water the water is elevated from said chambers *a* and *b* alternately by the compressed air received from the reservoir C, the water passing up through the branch pipes *d d*, check-valves *e e*, and the single water-pipe G, through the several connecting branches and cocks, to the places of discharge in the building.

The course of the air to the respective chambers *a* and *b* is governed by the air-controlling cock E, which cock as it admits the air to one chamber through one of the branch pipes H opens the exhaust from the other chamber through the other duct H, and consequently permits one chamber to fill with water as the other is being emptied. Thus, as the air passes from the pipe D through the passage *c'* of the cock E into the chamber *b*, the water therein is forced therefrom through the branch pipe *d* and main pipe G, while the air in the chamber *a* is permitted to escape therefrom through the exhaust-ducts of said air-cock E, thus permitting said chamber *a* to fill with water.

By turning the cock E and reversing the position of the air-ducts air is admitted to the chamber *a* while it exhausts from the chamber *b*, thus permitting the chamber *b* to fill with water while the chamber *a* is being emptied, whereby it is obvious that by thus permitting one chamber to fill as the other is emptied a continuous stream of water may be drawn so long as the supply of compressed air is maintained.

The outlet check-valves *e e* and the inlet check-valves F F are of the ordinary construction and they operate automatically in the ordinary manner, the course of the water through them being determined by the direction of the air-pressure, which is entirely controlled by the air-cock E.

Motion is communicated to the cock E from two separate oscillating floats, I I, through the two-armed lever J and connecting-rod M. The lever J is centrally supported upon the pivot L, which pivot is rigidly connected with the receiver B by the standard or bracket K. The floats I I are each connected with the wa-

ter-chambers in rear of them, respectively by flexible water-tubes *g g* and flexible air-tubes *h h*. Thus it is obvious that as the chambers *a* and *b* are filled, the water rises to the same level in the tubes *g* and floats I I, and the respective floats I I are consequently filled, the water entering said floats I through the flexible tubes *g*, while the air in said receiver escapes therefrom into the chambers through the tubes *h*, and when the water is elevated from either of said chambers *a* or *b* the water in the floats I, connected with such chamber, flows into and is elevated from said chamber, and consequently it follows that when elevating water one of said floats is filled as the other is emptied, and the empty float is buoyed up by the surrounding water while the full float descends; or, in other words, the excess of buoyancy of the empty float over the full one, which is counterbalanced thereby on the same lever, causes the empty float to rise and the full one to descend. Thus the floats I I and lever J are caused to oscillate upward and downward as the water-chambers are alternately filled and emptied, and the required movement is produced for operating the air-controlling mechanism.

The air-cock E consists of the cylinder P and closely-fitting central plug, R. The air in exhausting enters the cock, as stated, through the pipes H, and from thence passes out through one of the radial ducts *a'* and the central longitudinal duct, while the air simultaneously enters the cock through the pipe D and from thence through the duct *c'* and one of the pipes H into one of the water-receiving chambers.

It is obvious that by rotating the plug R a quarter of a turn toward the left the air-tube D will be brought into communication with the branch pipe H upon the left through said duct *c'*, while the branch H upon the right will be brought into communication with the exhaust-ducts. Thus by the same movement of the handle S of the cock the inlet and exhaust ducts of the faucet are simultaneously operated.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a pneumatic water-elevator, the combination, with two direct receiving water-chambers, each provided with direct inlet and outlet water and air ducts and passages and air and water controlling valves, of two water-receiving valve-controlling floats respectively counterbalanced by each other upon a two-armed lever and connected with the respective water-chambers by flexible air and water tubes, through which tubes they are alternately filled with air and water from the respective chambers with which they are connected, whereby the gravity of the water in one float and the buoyancy of the air in the other float co-operate to move the valve mechanism, substantially as and for the purpose specified.

2. In a pneumatic water-elevator, the combination of two water-chambers, *a* and *b*, each alike provided with water and air inlet and outlet ducts, passages, and valves, two water-receiving floats, I I, counterbalanced by each other upon a two-armed lever, J, lever J, two flexible air or vent tubes, *h h*, and two flexible water-tubes, *g g*, said tubes *g g* and *h h* being adapted to permit the water to enter one of said water-receiving floats I as it is withdrawn from the other float I, substantially as and for the purpose specified.

3. In a pneumatic water-elevator, the combination of two water-chambers, *a* and *b*, of like construction, each provided with inward-opening check-valves F F, for the direct admission of the exterior surrounding water, two outlet branch water-pipes, *d d*, both communicating with the same single water-pipe G, single air-pipe D, communicating from the air-receiver through the two branch pipes H H, two valve-actuating water-receiving floats, I I, counterbalancing each other upon the respective ends of an oscillating lever, J, an air-controlling cock or valve, E, and connecting-link M, communicating motion from the oscillating floats I I to said air-controlling valve or cock, all substantially as and for the purpose specified.

4. In a pneumatic water-elevator, the combination of two direct-receiving water-chambers, *a* and *b*, each provided with inlet check-valves F F, inlet check-valves F F, through which the surrounding water enters into the respective chambers *a* and *b*, two outlet branch water-pipes, *d d*, and single water-pipe G, said branch pipes *d d* communicating between said chambers *a* and *b* and said single pipe G, outward opening check-valves *e e*, located, respectively, in said branch water-pipes *d d*, single air-tube D, air-controlling cock E, and branch air-tubes H H, said single air-tube D, cock E, and branch tubes H H serving to control the admission of compressed air from the air-reservoir to and from the respective chambers *a* and *b*, centrally-pivoted two-armed lever J, water-receiving floats I I, supported, respectively, upon the respective arms of said lever J, flexible inlet-water tubes *g g* and air-tubes *h h*, communicating, respectively, between said floats I I and said water-chambers *a* and *b*, and connecting-bar M, communicating between said two-armed lever J and said air-controlling cock E, all substantially as and for the purpose specified.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES B. ERWIN.

Witnesses:

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