(No Model.) 2 Sheets—Sheet 1.

R. W. TINSLEY.

WATER ELEVATOR.

No. 486,002. Patented Nov. 8, 1892.

Fig. 1.

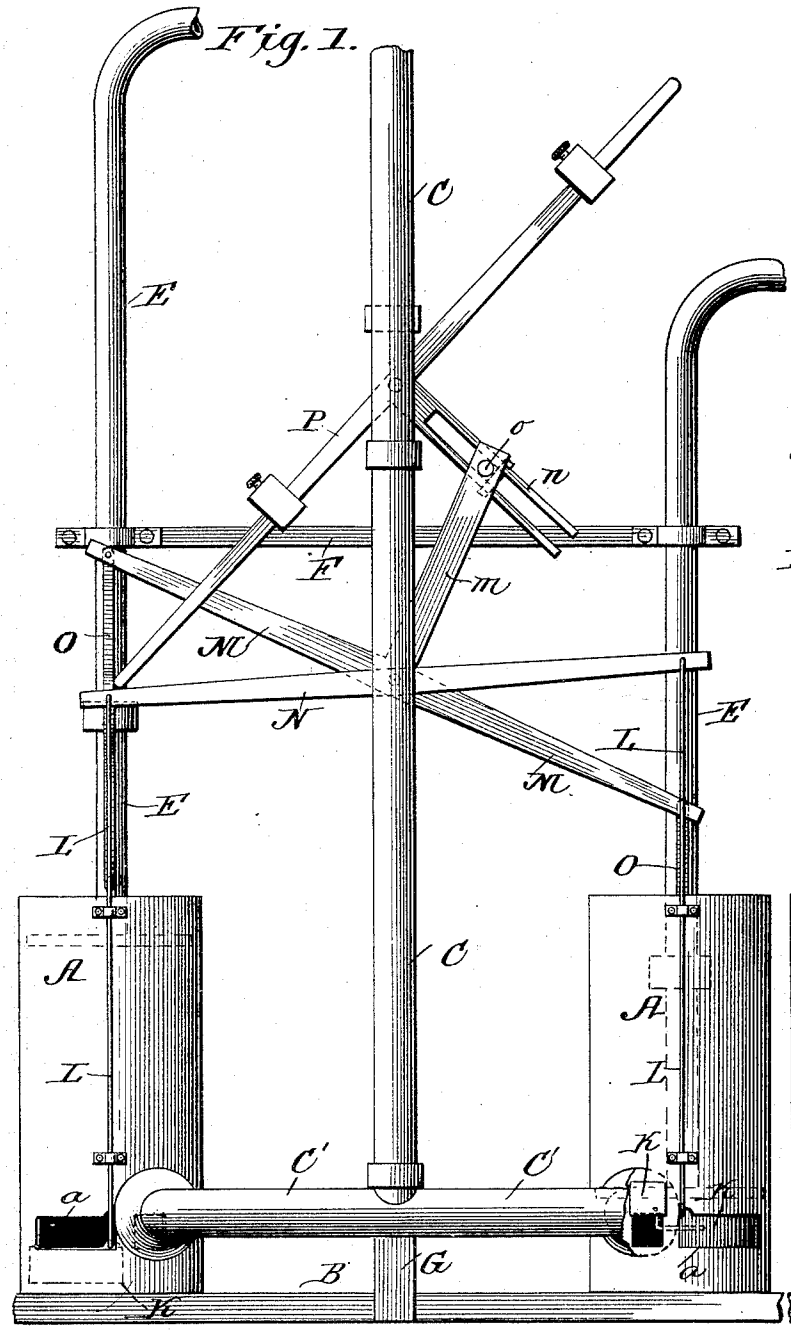
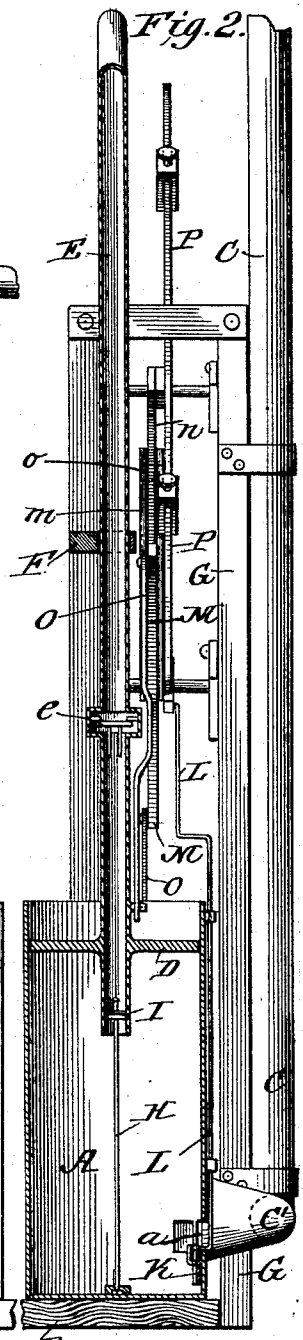


Fig. 2.



WITNESSES:
Fred G. Dieterich
Amos W. Hart

INVENTOR:
R. W. Tinsley.
BY Munn & Co
ATTORNEYS

(No Model.) 2 Sheets—Sheet 2.

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Fig. 4.

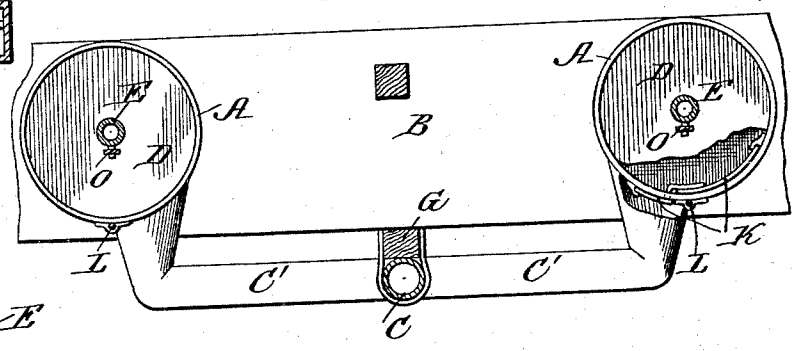


Fig. 3.

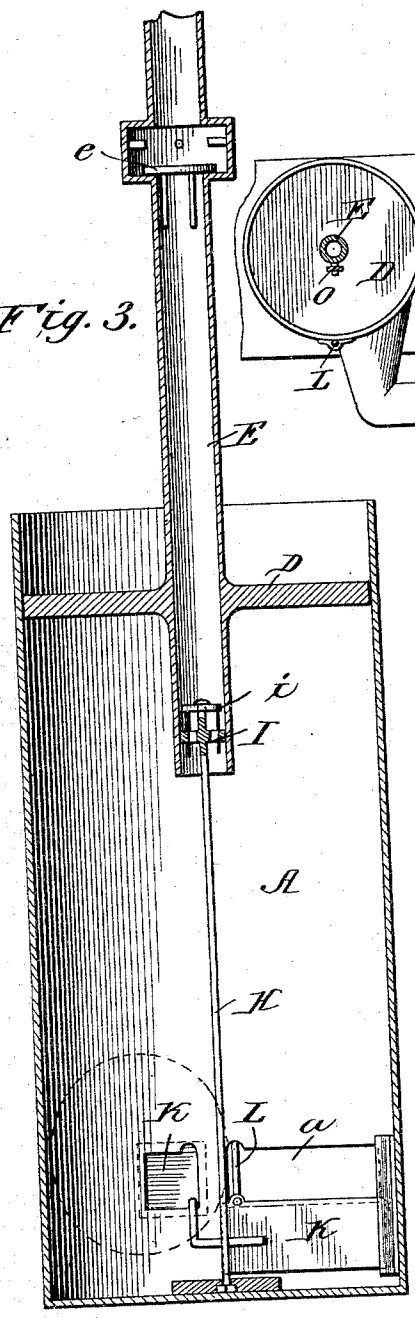


Fig. 5.

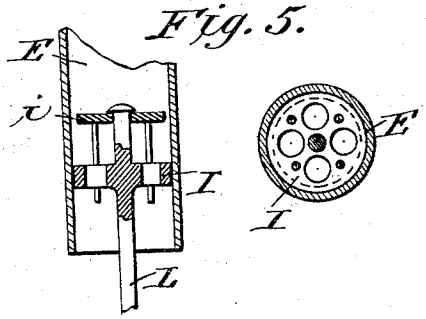


Fig. 6.

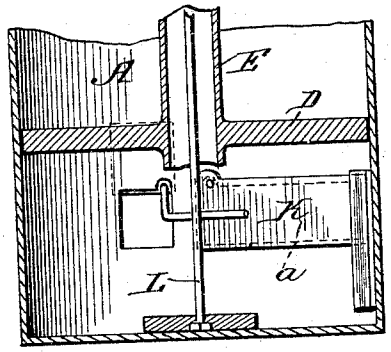
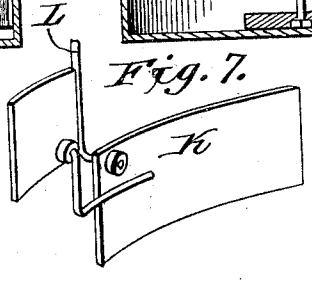


Fig. 7.



WITNESSES:

Fred G. Dieterich

Amos W. Stark

INVENTOR:

R. W. Tinsley.

BY Munn & Co

ATTORNEYS

UNITED STATES PATENT OFFICE.

RUFUS W. TINSLEY, OF UNION, SOUTH CAROLINA.

WATER-ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 486,002, dated November 8, 1892.

Application filed February 11, 1892. Serial No. 421,209. (No model.)

To all whom it may concern:

Be it known that I, RUFUS W. TINSLEY, of Union, in the county of Union and State of South Carolina, have invented a new and Improved Water-Elevator, of which the following is a specification.

My invention is an apparatus adapted for raising water by automatic pressure of the same within two cylinders, each containing a reciprocating piston having a valved water-conducting tube of less diameter attached to its upper side, through which tubes water is forced up as the piston descends. Water is alternately admitted to and cut off from the respective cylinders, and is thus forced alternately up the respective piston-tubes.

The details of construction, arrangement, and operation are as hereinafter described and shown in accompanying drawings, in which—

Figure 1 is a side elevation of the apparatus. Fig. 2 is a vertical section. Fig. 3 is a vertical section, enlarged, of one of the cylinders and the water-conducting tube connected with its piston. Fig. 4 is a horizontal section of the apparatus. Figs. 5, 6, and 7 are detail views.

The two equal-sized cylinders A A are set vertical upon a suitable horizontal base B. The pipe C, through which the water to be elevated is conducted from any source of supply, is branched at the lower end and the branches C′ C′ connected with the respective cylinders, as best shown in Fig. 4. A piston D is fitted and reciprocates in each cylinder A, and a vertical water-conducting tube E, of relatively-small diameter, is attached to each piston. These tubes are guided vertically in a cross-piece F, supported on a standard G, which is fixed equidistant between the cylinders A A. The upper ends of the tubes E may be curved laterally to form discharge-nozzles; or in case the water is to be conducted to any point removed from the apparatus, then supplemental conducting-pipes (not shown) may be connected with the said tubes E by means of flexible hose-section. A short distance above its piston D each tube E is enlarged and provided with a check-valve *e*, which opens upwardly. A rigid rod or stem H is fixed to the center of the bottom of each cylinder and projects up into the tube E. A disk or piston I is affixed to its upper end and constructed with ports or passages to permit water to flow through it. A check-valve *i* is mounted on each such fixed piston I and opens upwardly. Each cylinder has an outlet-port *a* on the side near the bottom and adjacent to but lower than the point where a branch or inlet tube C′ is attached. The outlet-port *a* is, however, about three times larger than the inlet. A sliding gate or valve K, Fig. 7, is so constructed, with two wings, as to apply to both ports and thus (since they are in different horizontal planes) they are adapted to open one port as they close the other, and vice versa. A small rod L is affixed to each gate K and attached at its upper end to a pivoted vibrating lever M, so that the two gates K are moved in opposite direction simultaneously, thereby opening one inlet as the other is closed, and conversely closing one outlet as the other is opened.

The gate or valve lever M is pivoted in the bifurcated standard G on the same shaft as the lever N, that is connected with the piston-tubes E. This connection is by means of links O pivoted to the outer ends of the lever N and the lower portion of said tubes E. There is a third lever P pivoted in said standard G a short distance above the other two levers M and N, and it is operatively connected with the piston-lever N by means of slotted arms *m n*. One of said arms *m* is rigidly attached to the piston-lever M and projects upward at a right angle thereto, while the other arm *n* is similarly attached to the wiper-lever P and projects downward. A pin *o*, fixed in the upper end of the arm *m*, works in the lengthwise slot of the arm *n*. Weights are attached to the wiper-lever and clamped by screws, so that they may be adjusted along the lever, as required. They aid in throwing the latter down on the gate-lever more forcibly than would be otherwise practicable.

The operation of the apparatus is as follows: Suppose it to be set as shown in Fig. 1—that is to say, the piston D of the right-hand cylinder being at the lowest point, the other of course being at the highest point in consequence of their connection through the medium of the lever M. The wiper-lever N is thrown to its greatest angle opposite to the that of the piston-lever M, and has thus

caused the valve or gate lever K to assume the same relative position, so that the gates K are so adjusted that the inlet of the right-hand cylinder is open while its outlet is closed, whereas the contrary is true of the left-hand gate and cylinder. Any water contained in the latter therefore escapes immediately, owing to the large outlet-port *a*, while water from the supply-pipe C enters the right-hand cylinder and forces up the piston D and the tube E attached to it. At the same time the water thus acts on the piston D it enters and passes upward in the tube E, through and past the stationary piston I. When the piston D approaches the upward limit of its movement, the arm *m* of the piston-lever N throws the wiper-lever into the reverse position, so that the end contiguous to the right-hand piston strikes upon the adjacent end of the gate-lever M and forces it down, thereby shifting the gates or valves so that the water is cut off from the right-hand cylinder and smultaneously admitted to the left-hand one, and the outlets are correspondingly opened for the right-hand and closed for the left-hand cylinder. It will be noted that the water forced up one of the piston-tubes E is prevented from returning by means of the check-valve *i* of the stationary piston I, seating on the latter, and as the tube descends the valve *e* in the tube E rises to allow water to pass it and again seats downward, thus preventing its return. Thus as the water alternately fills the two cylinders and raises the pistons D, it alternately fills the respective tubes E and is alternately forced up each, so that it is raised to the required height. In other words, as a piston and tube rise the water enters the latter, and as they descend the valve of the fixed piston will close and the body of water confined between the two valves will be forced up past the upper valve and into the upper portion of the tube. The weight of the column of water in each tube above its valve balances the column in the other tube, whether the tubes are rising or falling.

In practice the pistons D may be made as hollow drums instead of mere flat disks.

I propose to use the apparatus for raising water from a stream or from a spring or well. It will of course be situated at a lower point than that from which the supply is taken, the lower the better, since the force of the current of water will correspond. The water may be taken from a stream to operate the apparatus, and the water to be elevated may be taken from an adjacent spring or well, and in such case the cylinder that receives the spring or well water may be made separate from those that receive the stream of water.

What I claim is—

1. In a water-elevator, the combination of two cylinders having inlets and outlets near the bottom, pistons working in the cylinders, tubes affixed to said pistons and provided with check-valves, stationary pistons held in the lower open ends of said tubes and provided with check-valves, gates for closing the inlets and outlets, and lever mechanism for connecting the pistons and gates and operating the latter, substantially as shown and described.

2. In a water-elevator, the combination of the cylinders having inlets and outlets near the bottom, pistons working in the cylinders, tubes affixed to said pistons and provided with check-valves, stationary pistons held in the lower open ends of said tubes and provided with check-valves, gates for closing the inlets and outlets, levers connecting the said pistons and gates, respectively, a two-armed wiper or lever for depressing the piston-lever, and means for connecting the piston and gate levers, substantially as shown and described.

3. In a water-elevator, the combination, with cylinders, movable pistons, and connecting-lever, the valved tubes, valved stationary pistons, and sliding gates for controlling water inlets and outlets, of the pivoted oscillating lever connected with and actuating the said gates and a wiper or second oscillating lever adapted to actuate the gate-lever intermittingly, substantially as shown and described.

4. In a water-elevator, the combination, with the cylinders, of pistons reciprocating therein, fixed apertured pistons having valves that seat downward, and tubes attached to the pistons and working on the fixed pistons and having valves that seat downward, as shown and described.

RUFUS W. TINSLEY.

Witnesses:
JAMES MUNRO,
JOHN A. FANT.