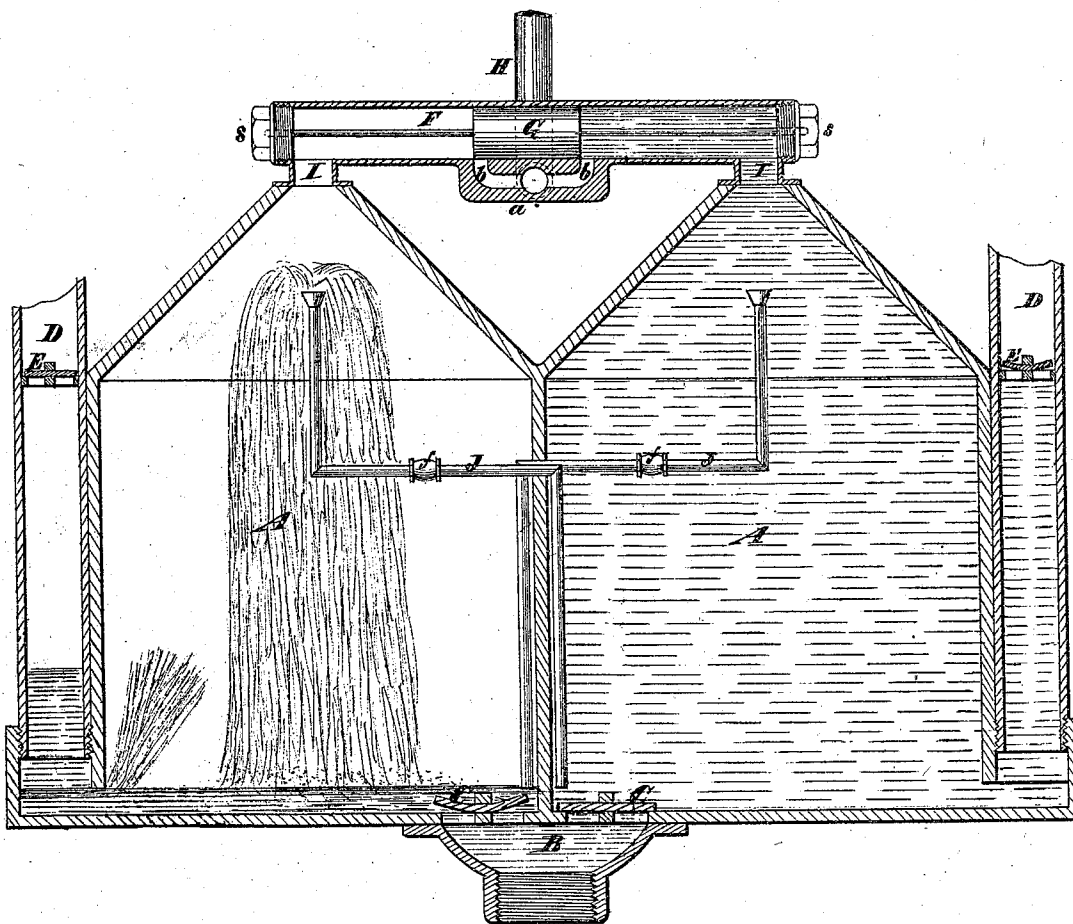


W. BURDON.

Steam Water-Elevators.

No. 133,748.

Patented Dec. 10, 1872.



Witnesses:

Friedrich Harnes
R.R. Rabeau

Inventor.

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UNITED STATES PATENT OFFICE.

WILLIAM BURDON, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN STEAM WATER-ELEVATORS.

Specification forming part of Letters Patent No. **133,748**, dated December 10, 1872; antedated December 4, 1872.

H'

To all whom it may concern:

Be it known that I, WILLIAM BURDON, of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Apparatus for Raising and Forcing Water by the Condensation and Pressure of Steam; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing forming a part of this specification.

This invention relates to apparatus, for raising and forcing water, of that class in which a vacuum is formed in two adjacent chambers alternately by the condensation of steam, and water raised into them by atmospheric pressure is afterward expelled by the pressure of steam that is subsequently condensed to form a vacuum for the repetition of the operation. The improvement consists in the combination, with its valve-box, valve, and chambers of pipes, each leading from the lower portion of one chamber to the upper part of the other, whereby, on the discharge of the water from one chamber and the filling of the other chamber and adjacent portion of the valve-box, the necessary movement of the valve for shutting off steam from the discharged chamber and admitting it to the filled one is effected.

The accompanying drawing represents a central vertical section of an apparatus constructed according to my invention.

A A are the main chambers of the apparatus. They may be arranged, as represented, side by side, or in any other suitable manner, and may be of any desired form. Each communicates, through a valve, C, in its bottom, with a suction-pipe, B, and is provided near its bottom with a discharge-pipe, D, furnished, at some distance from its bottom, with a valve, E. The valve-box F is of horizontal cylindrical form, and arranged above the chambers A A, and communicates at its ends through pipes I I with the chambers A A. On its under side is a passage, *a*, with which a pipe, H, from a steam-generator communicates, and which communicates at its ends by two ports, *b b*, with the interior of the valve-box. G is the valve, which consists of a single piston

fitted to the interior of the box F, and of suitable length to cover either of the ports *b b* and uncover the other. It is secured to a stem, *c*, whose ends work within guides in screw-plugs *s s*, in the ends of the valve-box. J J are pipes which lead, each from the lower part of one of the chambers A A to the upper part of the other, and are provided with check-valves *f f*, which are capable of opening only toward the upper ends of their respective pipes.

To start the apparatus, the chambers A A are first filled with water, either by pouring it through suitable openings that are afterward closed, or by bringing the valve, by suitable hand-gear, first to a position to admit steam to one chamber, and then to admit it to the other, and afterward allowing such steam to condense and form vacuums in the chambers into which water will be raised by atmospheric pressure. The valve is then brought to a position to admit steam to one chamber—which, for convenience, I will suppose the right—and shut it off from the other. The steam thus acting on the water in the right chamber expels it through the discharge-pipe D, and at the same time forces some through the pipe J leading from the lower part of said chamber to the upper part of the left chamber, and thereby produces an overflow of water from the latter into that part of the valve-box F to the left of the valve G, where said water presses against the valve; but this pressure is balanced by the pressure of steam on the right side of the valve, until the right chamber has been discharged to the level of the bottom of its discharge-pipe D, when the water in the said pipe below the valve E flows back into the chamber and condenses a portion of the steam therein, and thereby reduces the pressure on the right side of the valve, and so enables the pressure of the water on its left side to push over toward the right and shut off the supply of steam from the right chamber, and admit it to the left to discharge it. Water now flowing into the right chamber through the pipe J, leading into the upper part thereof, perfects the condensation of the steam therein, and forms a vacuum in the latter chamber into which water is raised by atmos-

pheric pressure. The steam employed in discharging the water from the left chamber while the right one is filling forces some of the water from the left chamber into the right one through the pipe J leading into the upper part of the latter, and so produces an overflow therefrom into the right-hand end of the valve-box. This water, pressing against the right side of the valve, is balanced by the pressure of steam on its left side until the completion of the discharge of the left chamber, water flows back from its discharge-pipe D, and by condensing some of the steam causes a reduction of pressure in that chamber and on the left side of the valve, and enables the water on the right side of the valve to push it over toward the left, and so shut off the supply of steam from the left chamber and again admit it to the right. The flowing of water to the left chamber through the proper pipe J perfects the condensation of the steam therein and forms a vacuum into which water flows through the suction-pipe. Thus the operation

is kept up, each chamber alternately filling and discharging as the other discharges and fills, and the valve being thrown by the overflow of water which is produced in each chamber by water entering it from the other through the proper pipe J.

I do not here confine myself to the use of any particular kind of valve for admitting and shutting off the steam to and from the chambers A A; but

What I claim as my invention, and desire to secure by Letters Patent, is—

The combination of the two chambers A A, the steam-inlet valve, and the pipes J J, leading each from the lower portion of one of the latter to the upper portion of the other, whereby the shifting of the said valve is effected by the flow of water from one chamber to the other, substantially as herein set forth.

WM. BURDON.

Witnesses:

FRED. HAYNES,

FERD TUSCH.