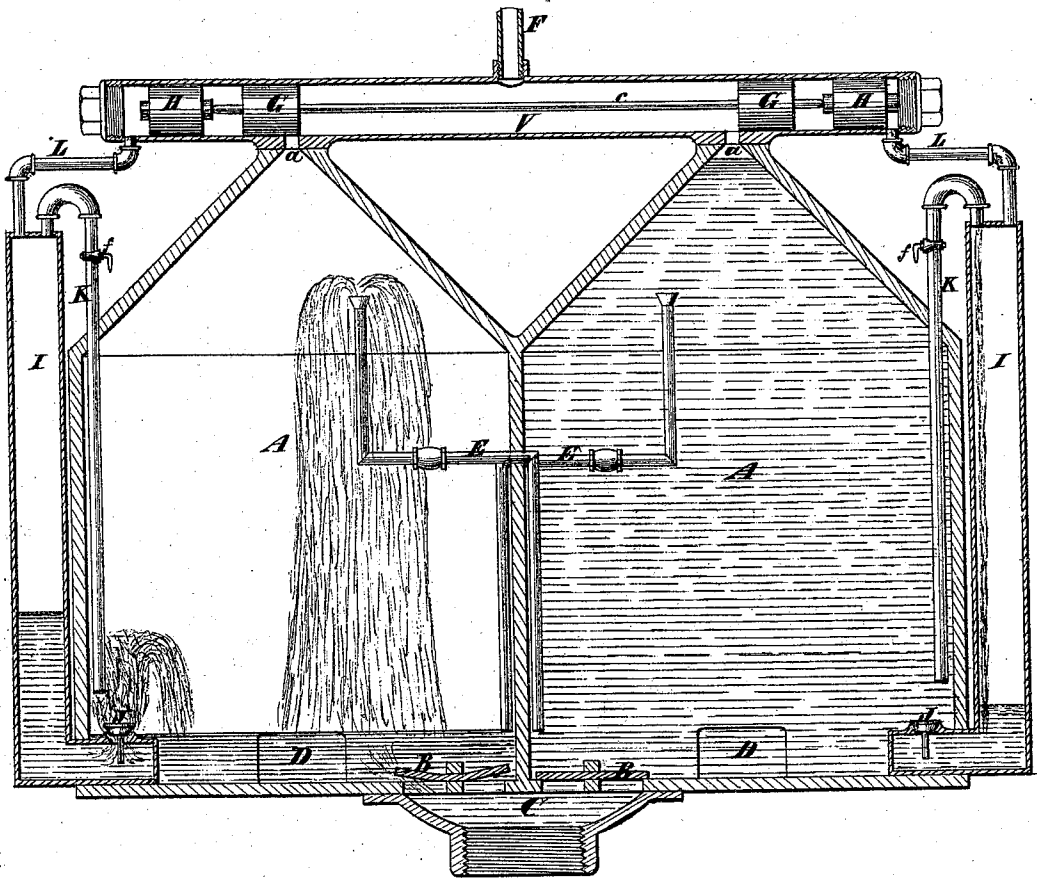


W. BURDON.

Steam Water-Elevators.

No. 133,750.

Patented Dec. 10, 1872.



Witnesses:

Fred Haynes
R. R. Rabeau

Inventor:

W. M. Burdon

UNITED STATES PATENT OFFICE.

WILLIAM BURDON, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN STEAM WATER-ELEVATORS.

Specification forming part of Letters Patent No. **133,750**, dated December 10, 1872; antedated December 4, 1872.

Y

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 do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing forming a part of this specification.

This invention relates to an apparatus, for raising and forcing water, of that class in which a vacuum is formed in one end and the other of two adjacent chambers, alternately, and from which water raised into them by atmospheric pressure is afterward expelled by steam, which is subsequently condensed to form a vacuum for the repetition of the operation. The improvement consists in a novel system of receivers, pipes, and valves whereby water collected in the said receiver during the discharges of the chambers is made to effect both the necessary movements of the steam valve or valves for admitting steam to and shutting it off from the chambers, and the condensation of the steam in the chambers.

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

A A are the two main chambers of the apparatus. They are represented as being arranged side by side, but may be in any other suitable relation to each other, and may be of any shape desired. Each communicates, through a suction-valve, B, with a pipe, C, and is provided near its bottom with a discharge-opening, D, the latter being fitted with a valve, which is not shown. The said chambers are provided with condensing-pipes E E, which communicate, each, from the lower portion of one chamber to the upper portion of the other, and each of which is fitted with a check-valve opening only toward its upper end. The valve-box V is of horizontal cylindrical form, and communicates with the chambers A A through ports *a a*, and has communicating with it a pipe, F, from a steam-generator. The valves consist of two pistons, G G, secured to the same stem *c*, at such distance

apart that when either uncovers the port *a* of its respective chamber A the other covers the port *a* of the other chamber. In the valve-box, beyond the valves, are loose pistons H, which are caused to abut against the ends of the valve-stem *c*, and so reverse the valves. I I are upright receivers, one for each chamber A, arranged outside of the chambers, and communicating with them close to their bottom. These receivers are furnished, at their communications with their respective chambers, with puppet-valves J J, opening toward the chamber. Connected with the tops of these receivers are siphon-like pipes K K, which communicate with the lower portions of the chambers and pipes L L, which communicate with the valve-box outside of the piston H. The receivers I I fill through the pipes K K, and these latter are fitted outside of the chambers with cocks *f f* to provide for regulating the time occupied in filling the receiver so that it may coincide with that occupied in discharging the chamber.

The apparatus is started by filling the chambers A A with water, either by pouring it in through openings that are afterward closed, or by shifting the steam-valves and admitting steam to the chambers, and allowing it to condense and form vacuums into which water will be caused to enter through the suction-pipe by atmospheric pressure. When the chambers are full of water the steam-valve is brought by suitable hand-gear to a position to admit steam to one of the chambers, which, for convenience, I will suppose to be the right. The steam thus admitted, acting on the water, expels it from the chamber through the discharge-pipe D, but at the same time forces some up the pipe K into the receiver I, and, after this is filled, up the pipe L into the valve-box V, where, acting on the right piston H, it causes it to abut against the valve-stem *c* and move the valves. The slight reduction of pressure which takes place in the right chamber when the steam is shut off causes its receiver I to commence emptying itself by gravitation into the said chamber through its puppet-valve J, and thereby condenses the steam therein. Water flowing from the condensing-pipe E, the upper end of which is in

that chamber, assists in this operation, and a vacuum is formed in the said chamber into which water is then raised by atmospheric pressure. The steam admitted to the left chamber by the shifting of the valves expels the water from that chamber and forces some into its receiver I, and, when this is full, through its pipe L into the valve-box V, where, acting on the left-hand piston H, it causes the latter to abut against the valve-stem *c* and move the valves to the right, thereby shutting off steam from the left chamber and admitting it to the right one. Condensation is then produced in the left chamber by water from its respective receiver I and pipe E, and a vacuum is formed therein, so that it will be filled through its pipe D by atmospheric pressure, while the right chamber is again discharging. In this way the operation of the apparatus continues to perform itself automatically, each chamber alternately filling and discharging simultaneously with the discharging and filling of the other.

In case, in the operation of the apparatus, the discharge of either chamber A, down to the bottom of its respective pipe K, should occur before its respective receiver I should

have been filled with water, steam will rush from the chamber A through the pipe K, and through the upper part of the receiver, and through the pipe L, and thus produce the operation of the piston H and valves G G in the same way as such operation has been described as produced by the water.

I do not confine myself to the use of the particular kind of valve represented for admitting and shutting off the steam; but

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

1. The combination, with the chambers A A and the steam valve or valves of the water-receivers I I, pipes K K and L L, and valves J J, the whole arranged for operation substantially as herein described, for the purpose set forth.

2. The regulating-cocks *f f*, in combination with the pipes K K, chambers A A, and receivers I I, substantially as and for the purpose herein described.

WM. BURDON.

Witnesses:

FRED. HAYNES,
R. E. RABEAU.