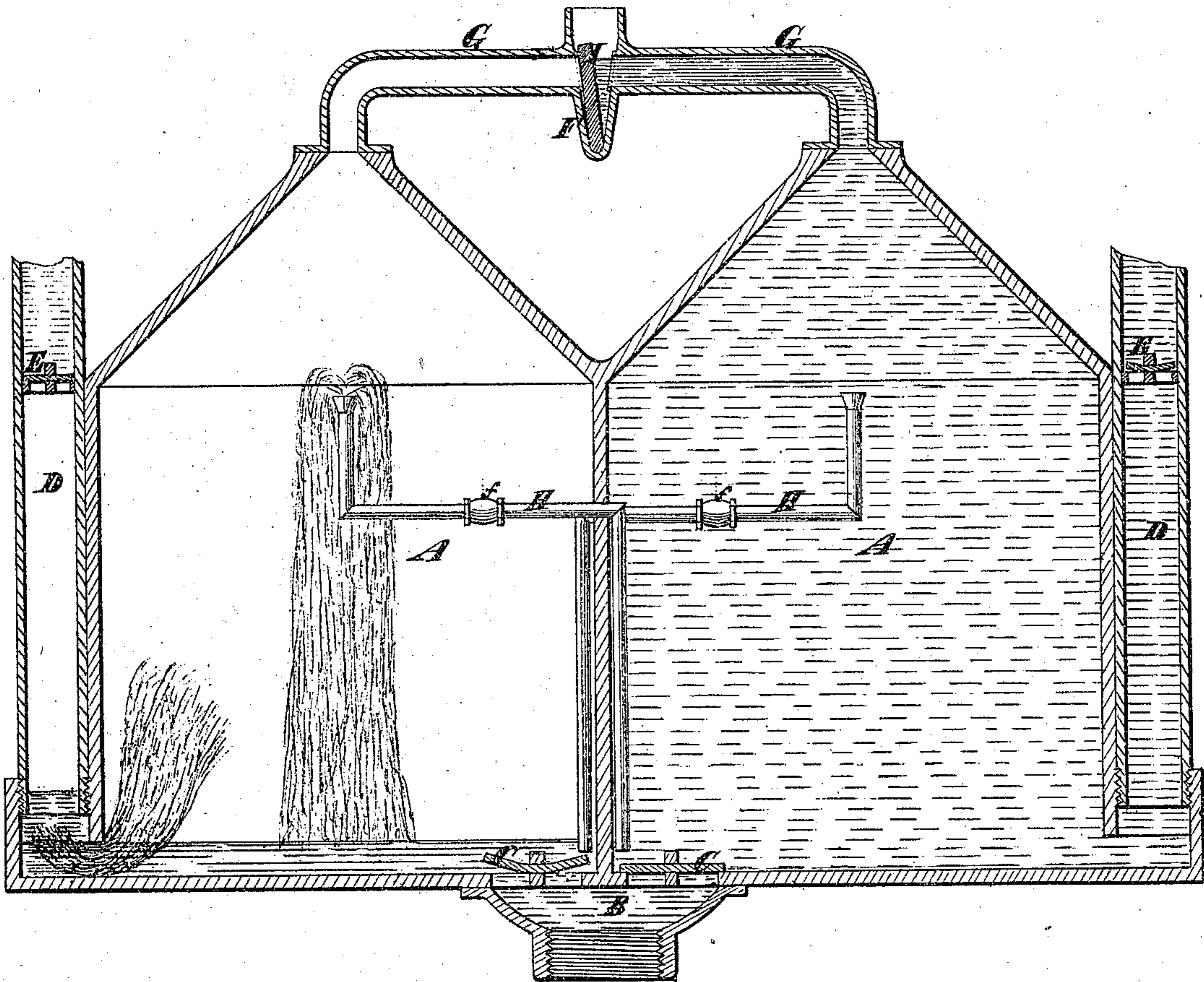


W. BURDON.

Steam Water-Elevators.

No. 133,749.

Patented Dec. 10, 1872.



Witnesses:

Geo. Hume
R. E. Rabreau

Inventor.

Wm. Burdon

UNITED STATES PATENT OFFICE.

WILLIAM BURDON, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN STEAM WATER-ELEVATORS.

Specification forming part of Letters Patent No. **133,749**, dated December 10, 1872; antedated December 4, 1872.

E'.

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 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 therein, and water raised into them by atmospheric pressure is afterward expelled by the pressure of steam, which is subsequently condensed to form vacuums for the repetition of the operation. The improvement consists in the combination, with the chambers and their steam-inlet pipes, and pipes forming a communication between the lower part of one chamber and the upper part of the other, of a valve, having a swinging motion between the said inlet-pipes, whereby, on the filling of one chamber and adjacent inlet-pipe and a slight reduction of pressure in the other, the valve is shifted so as to reverse the supply of steam from one to the other.

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 arranged in any other convenient relation to each other, and may be of any suitable form. They communicate with a suction-pipe, B, through valves C C, and are provided with discharge-pipes D D, furnished at some distance from their communication with valves E E. F is the steam-valve box, made of upwardly-flaring form and flattened transversely by two branch pipes, G G, that connect its opposite sides with the chambers A A. The box F is intended to receive steam above the valve through a pipe connecting it with a boiler. The valve I consists of a flat disk or plate having its

lower edge rounded or V-shaped to fit a bearing of corresponding form in the narrow bottom of the valve-box, that it may swing or vibrate between the ends of the inlet-pipes G G, and so shut off communication between one or the other and the interior of the valve-box. The ends of the inlet-pipes slightly project into the valve-box to form narrow annular seats for the valves, either of such seats being surrounded by live steam from the boiler when the valve closes against it, and thereby having the pressure of steam on the other side partly counterbalanced. H H are pipes which lead each from the lower part of one chamber to the upper part of the other, and are provided with check-valves *f f* capable of opening only toward their upper ends.

To start the apparatus, the chambers A A are first filled with water, either by pouring it in through openings, which are afterward closed, or by shifting the steam-valve by suitable hand-gear, and so admitting steam to them, and allowing it to condense and form vacuums, into which water will flow by atmospheric pressure. The valve is then brought by the hand-gear to a position to shut off steam from one pipe, G, and admit it to the other and to its chamber A. I will suppose, for example, that the steam is admitted to the right chamber, from which by its pressure it forces the water through the discharge-pipe D, but at the same time forces some into the left chamber, through the pipe H leading into the upper part of the latter, and so fills the inlet-pipe G of the latter. The pressure is now nearly equal on both sides of the valve, until, on the completion of the discharge of the right chamber, the water in its discharge-pipe D falls back and condenses a portion of the steam in the said chamber, and effects a slight reduction of pressure in it and on the right side of the valve, thereby enabling the pressure of water on its left side to throw it over against the right pipe G, and thereby shut off the supply of steam from the right chamber and admit it to the left. The flowing of water into the right chamber from the pipe H, leading into the upper part thereof, completes the condensation of steam in said

chamber and perfects the vacuum therein, causing it to fill through the suction-pipe while the left chamber is being discharged by the steam admitted to it. Besides discharging the water from the left chamber, the steam at the same time forces a stream of water therefrom into the right chamber through the pipe H, leading into the upper part of the latter, and so fills the right inlet-pipe G entirely up to the valve. When the discharge of the left chamber is completed the water in its discharge-pipe D below the valve E flows back into the chamber, and, by condensing a portion of the steam therein, causes a reduction of pressure on the left side of the valve, and so enables the water on its right side to push it over toward the left, shutting off the supply of steam from the left chamber and again admitting it to the right. Water flowing from

the right chamber into the left through the proper pipe H completes the condensation of the steam in the latter chamber, and, by forming a vacuum therein, causes it to be filled with water by atmospheric pressure while the other chamber discharges. Thus the operation is kept up, each chamber alternately filling and discharging simultaneously with the discharging and filling of the other.

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

The combination of the chambers A A, valve-box F, inlet-pipes G G, and pipes H H of the swinging valve I, arranged, substantially as herein described, for operation as herein set forth.

Witnesses: WM. BURDON.

FRED. HAYNES,
R. E. RABEAU.