

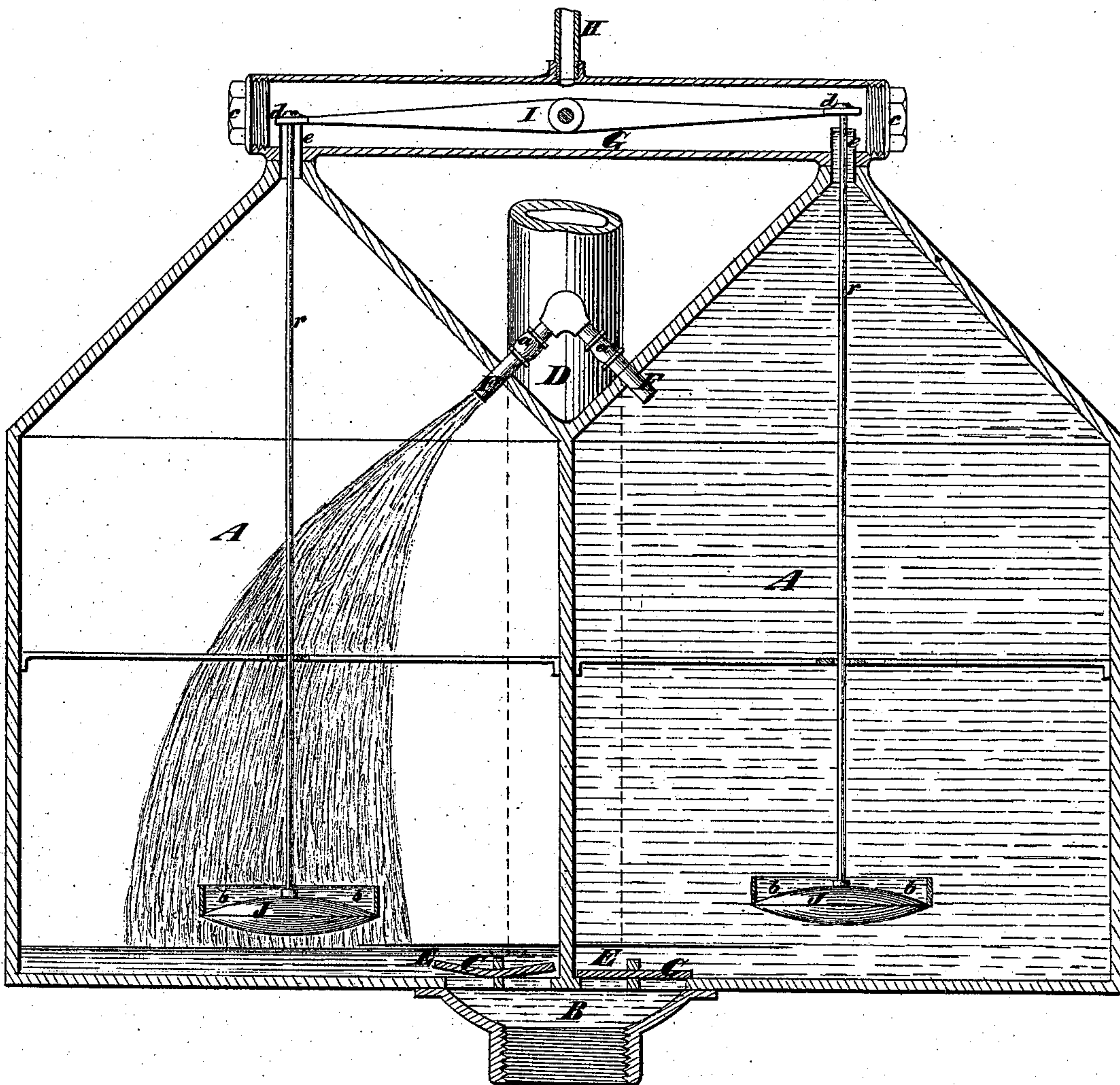
W. BURDON.

Steam Water-Elevators.

No. 133,747.

Patented Dec. 10, 1872.

*Fig: 1*



*Witnesses:*  
*Fred. H. H. H. H.*  
*R. R. H. H. H.*

*Inventor:*  
*W. M. Burdon*

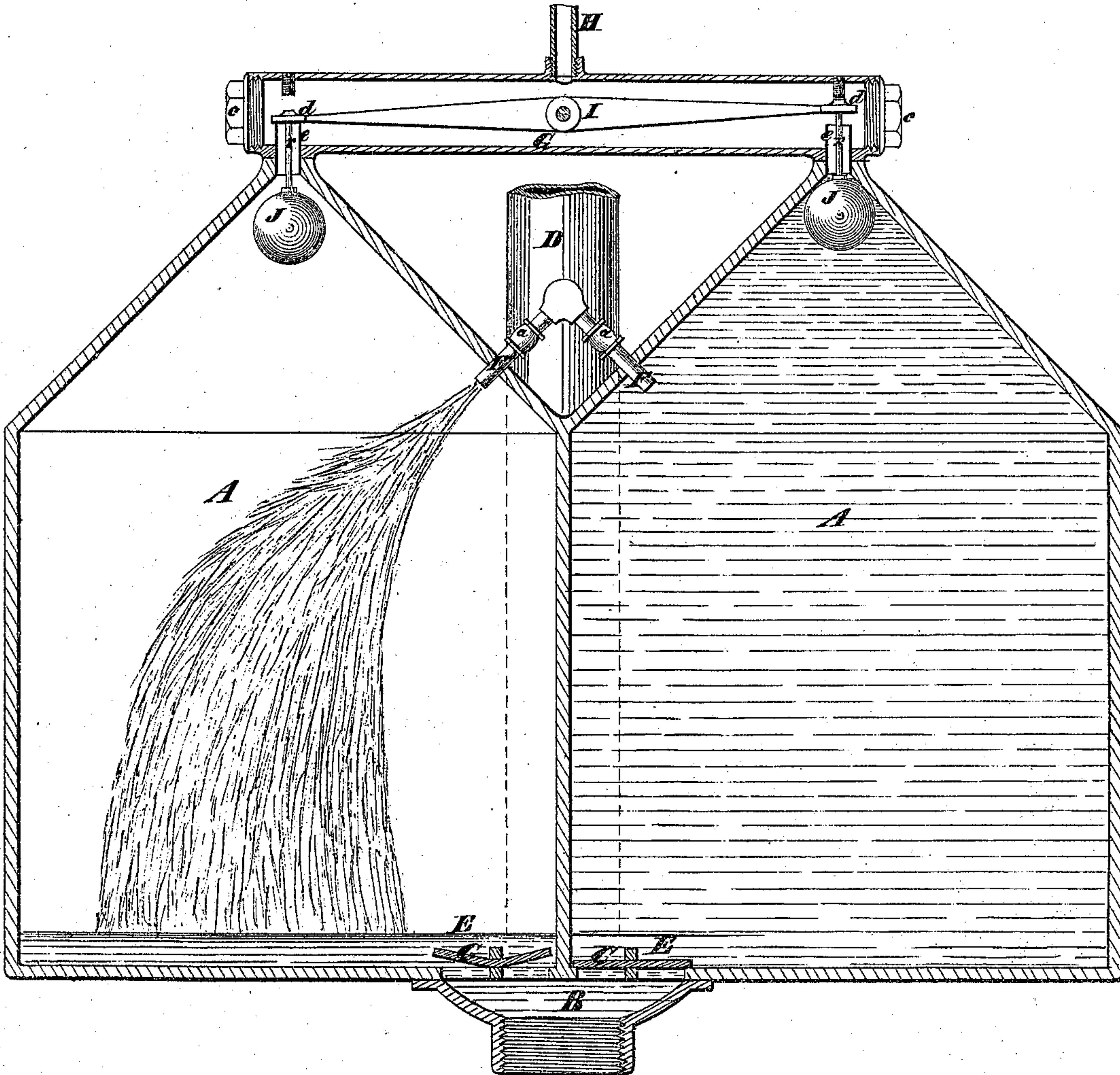
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Steam Water-Elevators.

No. 133,747.

Patented Dec. 10, 1872.

*Fig: 2*



Witnesses:

*Fred Hayner*  
*R. E. Kaban*

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. **133,747**, dated December 10, 1872; antedated December 4, 1872.

G'

*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 thereof, reference being had to the accompanying drawing forming a part of this specification.

This invention relates to that class of apparatus for raising and forcing water, in which a vacuum is alternately formed in two adjacent chambers by the condensation of steam, and water raised in 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 such apparatus, of a rocking-beam arranged in the valve-chest, and having valves formed on its ends and floats attached to said valves whereby, on the lowering of the water in one chamber and rising of that in the other chamber, the shifting of the valve to admit steam to the latter and shut it off from the former is effected, and vice versa.

In the accompany drawing, Figure 1 is a central vertical section of an apparatus constructed according to my invention, and Fig. 2 is a like view of the apparatus in a slightly modified form.

Similar letters of reference indicate corresponding parts in both figures.

Referring to Fig. 1, A A are the main chambers of the apparatus. They may be arranged side by side, as represented, or in any other suitable relation to each other. Both communicate, with a suction-pipe, B, through valves C C, and with a discharge-pipe, D, through outlets E E furnished with valves, not visible in the drawing. The upper portion of this discharge D communicates with the chambers through pipes F F, leading one to each chamber, provided with check-valves *a a*, capable of opening only toward the chambers. G is a

valve-box, which is of cylindrical form, and has its ends closed by removable plugs *c c*. The valve-box is supplied with steam by a pipe, H, leading from a steam-generator. The valves *d d* are formed on the ends of a rocking-beam, I, pivoted in the middle of the valve-box, and they close and open ports *e e*, consisting of short tubes or pipes leading from the chambers to the valve-box, and projecting into the latter some distance. The valves have attached to them, by long rods *r r*, floats J J, which are situated in the lower parts of the main chamber, and have formed on their sides open-topped water-receptacles *b b*.

To start the apparatus, its main chambers A A are first filled with water by any convenient means, and the valves are then shifted to admit steam to one chamber, which I will suppose to be the right. The water in this chamber is expelled by the steam admitted to it, and when its level gets below the float J in that chamber, said float lowers with the receding water, and its weight, combined with that of the water in its water-receptacle, draws down the valve on the right-hand end of the beam I, and at the same time the float on its left end by its buoyancy, pushes up the left end of the beam, and the right-hand valve C is thereby closed and the left opened, and the supply of steam is shut off from the right chamber and admitted to the left. On a slight reduction of pressure in this right chamber the check-valve in the pipe F leading to it opens, and a stream of water issues from the pipe and condenses the steam in the chamber and forms a vacuum, causing it to fill again by atmospheric pressure. Acting on the water in this chamber the steam expels it, and when the level reaches the float J the latter lowers with it, and at the same time the float in the right chamber, which is by this time about full, rises by its buoyancy, and the two together shift the beam and close the left valve and open the right, thereby shutting off the supply of steam from the left chamber and admitting it to the right, which is thereby again discharged. A slight reduction of pressure takes place in the left chamber almost imme.



diately after the supply is shut off, and the check-valve of the pipe F leading to the left chamber opens and permits the escape of water into the chamber from the discharge-pipe, and the steam is thereby condensed and a vacuum formed, into which water flows by atmospheric pressure. The apparatus continues to operate in this manner, each chamber filling and discharging while the other discharges and fills.

The apparatus illustrated in Fig. 2 is substantially the same as the one described; but instead of having its floats J J arranged near the bottom of its chambers it has them arranged in their upper portion. In consequence of this the operation is reversed, the shifting of the valves to admit steam to the filled

chamber being effected by the rising of the float on the completion of the filling of said chamber instead of by the lowering of the float at or near the completion of the discharge of the other chamber.

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

The combination, with an apparatus like that described, of a rocking-beam, arranged in the valve-chest and having its ends formed to constitute valves, and floats attached to said valves, substantially as and for the purpose set forth.

WM. BURDON.

Witnesses:

FRED. HAYNES,  
R. E. RABEAU.