

(No Model.)

C. R. FRANKLIN.  
STEAM TRAP.

No. 602,657.

Patented Apr. 19, 1898.

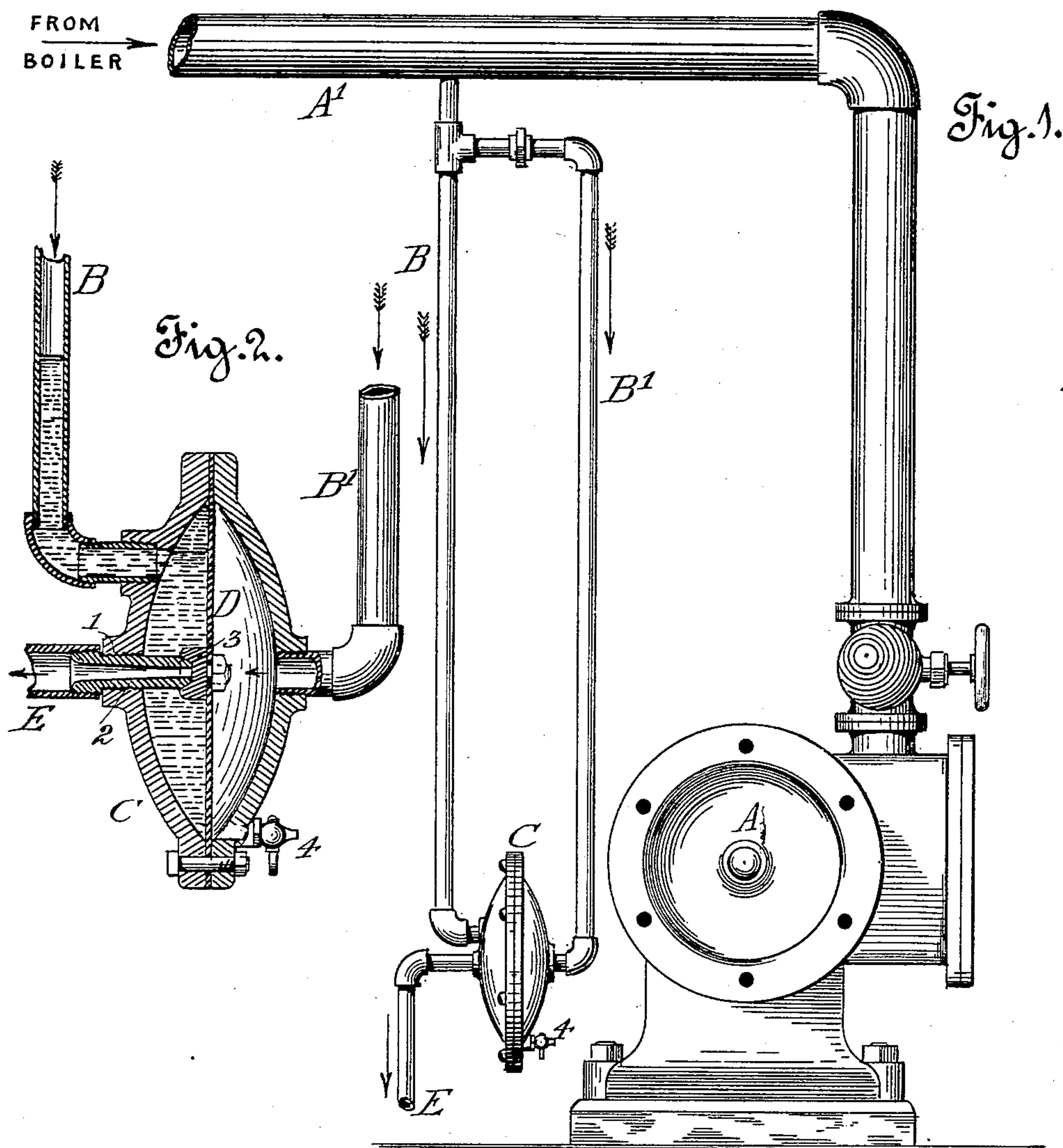
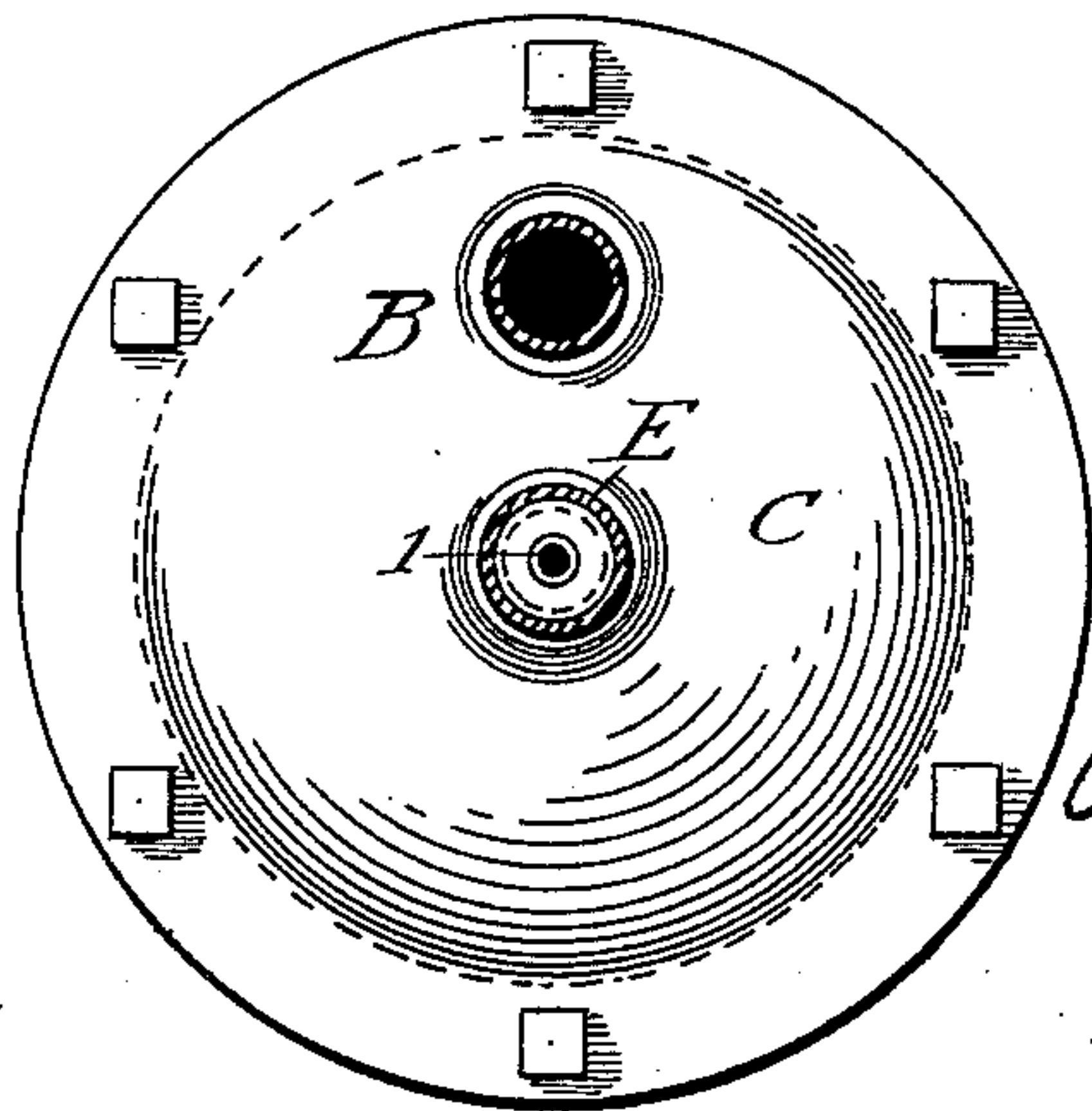


Fig. 3.



Witnesses.

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# UNITED STATES PATENT OFFICE.

CHARLES RODERICK FRANKLIN, OF SAN FRANCISCO, CALIFORNIA.

## STEAM-TRAP.

SPECIFICATION forming part of Letters Patent No. 602,657, dated April 19, 1898.

Application filed June 18, 1897. Serial No. 641,328. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES RODERICK FRANKLIN, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Steam-Traps; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to steam-traps; and its object is to trap and eject the water or condensed steam carried in the steam-supply pipe extending from a boiler toward an engine or other steam-actuated apparatus where dry steam is essential or desirable in the proper working of said apparatus.

My invention consists, first, in a method of producing and maintaining a balanced steam-pressure on opposite sides of a flexible diaphragm, which balance is periodically disturbed by an accumulation of water of condensation upon one side of such diaphragm, this disturbing resulting in the automatic ejecting of the accumulated water and the automatic reestablishment of the balanced steam-pressure, the operation being automatically carried on without the use of overbalancing-weights, springs, or like devices which have heretofore been used and depending entirely upon a normally-balanced steam-pressure overcome periodically by water-pressure.

My invention also consists in an apparatus for carrying out the above method and in the construction and arrangement of such apparatus and its parts, all as fully herein described.

In the accompanying drawings, Figure 1 is an end elevation of an engine and the steam-supply pipe connected to it with my steam-trap attached. Fig. 2 is a vertical cross-section of my steam-trap. Fig. 3 is an elevation of the discharge side of said trap.

A represents an engine, and A' the steam-supply pipe supposed to lead from a boiler. Opening into the bottom of the pipe A', at a point near the engine, is a pipe B, having coupled to it below the steam-pipe a parallel branch B', the communication between said pipes and with the supply-pipe being always open. The pipe B has a direct fall and enters the upper part of one side of a shell or

chamber C, while the branch pipe B' enters the other side, Fig. 2. The chamber is formed of two convex plates, between which is clamped or held a flexible diaphragm D. A discharge-opening 1 is made in the chamber, on the side where the pipe B connects, in which is secured a hollow nipple 2, which communicates with a waste-pipe E. Mounted upon the diaphragm is a recessed stud 3, which in normal position fits over and closes the discharge-nipple. This normal position is produced by balanced steam-pressure through the parallel pipes B and B' and upon both sides of the diaphragm, holding the latter in a central vertical position with the valve just described closed. The water of condensation enters the pipe B from the steam-pipe and falls directly into the chamber C, where it accumulates upon one side of the diaphragm until its weight and pressure, in addition to the steam-pressure, disturbs the balance or equilibrium, overcomes the steam-pressure on the empty side of the chamber, moves the diaphragm, and opens the discharge-nipple. The steam-pressure above the accumulated water immediately ejects the latter through the waste-pipe until the weight of water is relieved sufficiently to permit the balance of steam-pressure to be restored on both sides of the diaphragm. The water of condensation having a clear straight fall in the pipe B cannot enter the pipe B', and could not unless it rose to the height of the coupling of said pipe B'. Before this could happen, however, the weight of water would have destroyed the balance of pressure in the diaphragm-chamber and it would have been ejected, as just described.

At the lowest practicable point of the steam side of the chamber C, I place a petcock 4, the object of which is to remove any slight amount of condensation taking place only in the pipe B'. This is entirely independent of condensation from the main supply-pipe, from which the pipe B' is entirely free.

It will be observed that my method of operation depends entirely upon the balanced pressure of steam overcome by that of water and that the apparatus for accomplishing such operation is of the simplest character.

Having thus described my invention, what I claim is—

1. In a steam-trap, the combination with a chamber having a flexible diaphragm which divides it into two parts, of a steam-inlet to one part of said chamber, and a steam and  
5 water inlet to the other part, a discharge-opening from said chamber, and a valve or stud carried by the diaphragm for opening and closing the said discharge, substantially as described.
- 10 2. In combination with a chamber divided by a flexible diaphragm, a steam-inlet to one side of said chamber, a steam and water inlet to the other side, a discharge-opening from said chamber having a hollow nipple projecting into said chamber, and a stud upon the  
15 diaphragm adapted to close and open the end of said nipple, substantially as described.
- In testimony whereof I affix my signature, in presence of two witnesses, this 10th day of June, 1897.
- CHAS. RODERICK FRANKLIN.
- Witnesses:  
F. E. MONTEVERDE,  
W. H. NOLAN.