

No. 740,435.

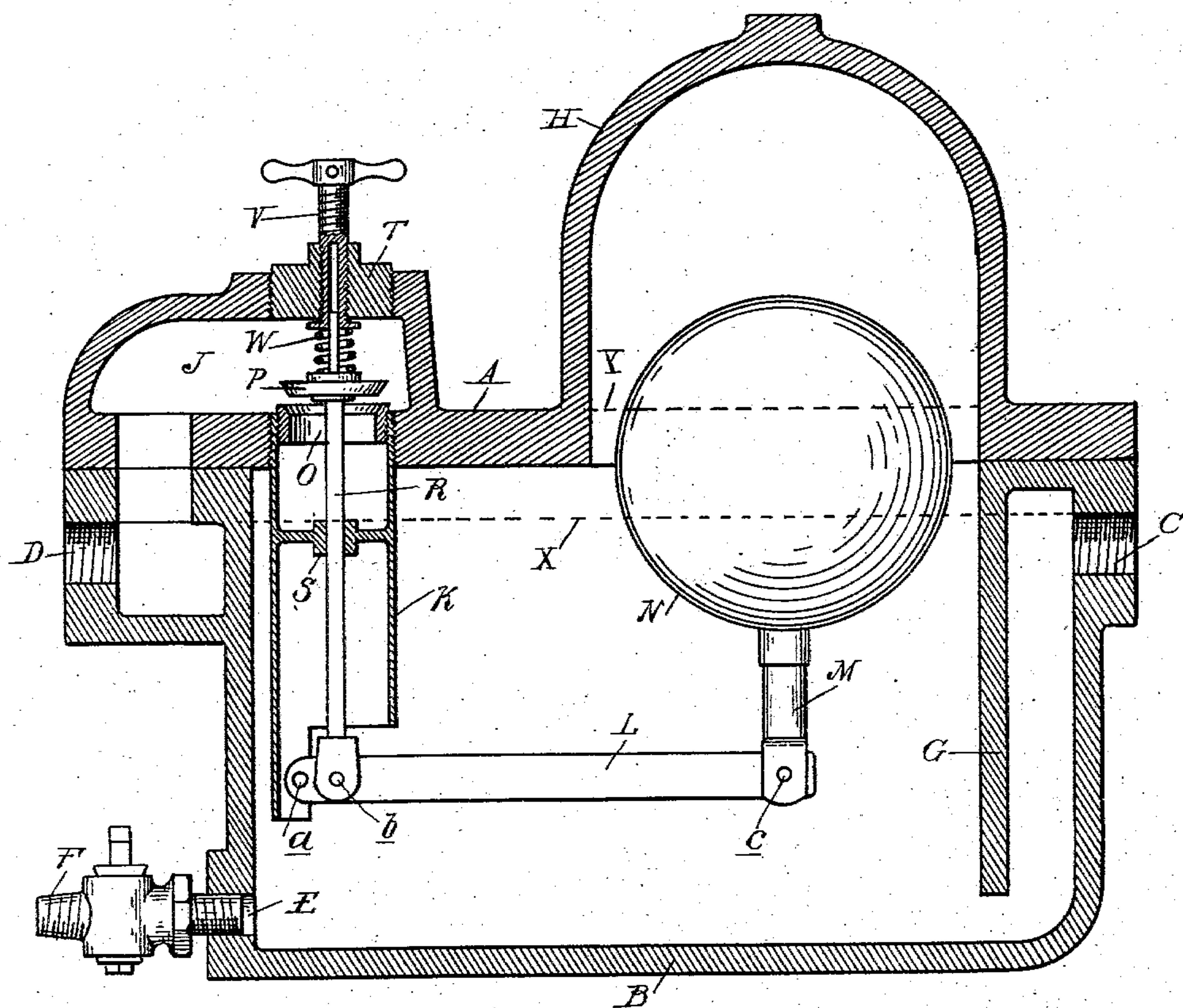
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H. H. HUMPHREY.

## STEAM TRAP.

APPLICATION FILED MAY 12, 1903.

NO MODEL.



*Inventor*

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# UNITED STATES PATENT OFFICE.

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## STEAM-TRAP.

SPECIFICATION forming part of Letters Patent No. 740,435, dated October 6, 1903.

Application filed May 12, 1903. Serial No. 156,734. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY H. HUMPHREY, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Steam-Traps, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to steam-traps, especially designed for use in breweries, sugar-refineries, and other manufactories having a large amount of condensation to dispose of; and the objects of my improvement are to provide a trap having a discharge-valve opening of substantially the same area as the inlet-pipe and also to provide a trap having a discharge-valve opening outward whose operation may be assisted by the pressure of the water in the trap. I attain these objects by the construction illustrated in the accompanying drawing, which is a sectional view of the trap.

In construction the trap comprises two parts or sections A and B, which form the casing. The part B has the opening C for the inlet-pipe, an opening D for the discharge-pipe, and the opening E, into which is screwed the blow-off valve F. The depending wall or screen G extends across the lower part B of the casing and downward to near the bottom, thus causing the water of condensation to enter the main part of the casing at its lowest point, and thus insure a water seal sufficient to prevent the passage of steam.

The part A is secured to the part B to form a water-tight joint. It is provided with the dome H and the outlet-passage J. Secured in the section A, preferably by screw-threads, is the pipe K, into the lower end of which at *a* is pivoted the lever L. To the outer end of this lever at *c* is pivoted the rod M, at the upper end of which is the hollow float N, preferably spherical in form. Threaded in the upper end of pipe K is the valve-seat O. The valve P engages this seat, being supported by the rod R, which at its lower end is pivoted to the lever L at *b*. Intermediate the valve and pivotal point the rod R is guided in the guide S, attached to the inside of the pipe or made integral with the same.

The passage J connects with the outlet-opening D in the part B.

It will be noticed that the distance from the fulcrum *a* of the lever L to the point *c* is many times greater than from *a* to *b*. The result of this is that for low pressures of steam the weight of the lever L and of the float N will be sufficient to keep the valve closed. For example, a float four inches in diameter two-thirds submerged will displace one pound of water. The weight of this float acting on a lever of twelve to one will exert a downward pressure of fifteen pounds of steam against the valve when the valve-seat opening is one inch in diameter. For higher pressures the weight of the float N is slightly increased, the increase in diameter not being necessary, the slight lack of buoyancy being compensated by the pressure of the water against the valve.

For very high pressures the following mechanism is provided: The plug T screws through the casing A at a point just over the valve P. An adjusting-screw V passes through this plug and has a flange at its lower end. The rod R is extended upward above the valve and guides the spring W, which rests on the valve and has its tension adjusted by the adjusting-screw, as shown. If advisable, the adjusting-screw may be made hollow and the upper end of rod R made small enough to pass up into the same and be guided thereby.

The operation of the trap is as follows: To the opening C is connected the drip or waste pipe of the steam system to be drained. The combined steam and water pass down around the bottom of wall G until the trap is filled with water up to the bottom line of said wall, when no more steam can enter. The water continues to enter until its height reaches the upper water-line Y, when its pressure against the valve and the buoyancy of the float lift the valve from its seat and permit the discharge of the accumulated water. On account of the construction of the passage J and the position of the pipe K a siphon-like action is obtained and the water is drained down to the lower water-line X, or until the water falls far enough to permit the weight of the float to exert a closing force on the valve. The



blow-off F is provided, so that all impurities may be easily removed.

Having now explained my construction, what I claim as my invention, and desire to secure by Letters Patent, is—

1. In a steam-trap, the combination of a casing, a valve-seat, a valve resting on said seat, and means operable by the water in the casing for raising said valve off the seat, in combination with adjustable means for resisting the opening of said valve.

2. In a steam-trap, the combination of a casing, a valve-seat, a valve resting on said seat, and means operable by the water in the casing for holding said valve down on said seat, in combination with adjustable means for resisting the opening of said valve.

3. In a steam-trap, the combination of a casing, a valve-seat, a valve resting on said seat, and means operable by the water in the casing for holding valve down on seat and for raising it off said seat, in combination with adjustable means for resisting the opening of said valve.

4. In a steam-trap, the combination of a casing, a valve-seat, a valve resting on said seat, and means operable by the water in the casing for raising said valve off said seat and for holding said valve down on said seat, and auxiliary means for holding down said valve comprising a spring, and means whereby the tension of said spring is adjusted.

5. In a steam-trap, the combination of a casing having inlet and outlet openings, a valve-seat having approximately the same area as said inlet-opening, a valve resting on said seat, and means operable by the water in the casing for raising said valve off its seat, in combination with adjustable means for resisting the opening of said valve.

6. In a steam-trap, the combination of a casing having inlet and outlet openings, a valve-seat having approximately the same area as said outlet-opening, a valve resting on said seat and means operable by the water in the casing for raising said valve off its seat, in combination with adjustable means for resisting the opening of said valve.

7. In a steam-trap, the combination of a casing having an inlet-opening, a tube screwed into a part of said casing, a valve-seat screwed into the end of said tube and having an opening approximately the same area as the inlet-opening, a valve resting on said seat, a lever pivoted at one end in the other end of said tube, a float for raising the other end of said lever, and a rod connected to said valve and pivoted to said lever, the weight of the float and the position of the pivots in the lever being such that the valve will be held down against the seat until the float is raised by the accumulated water, in combination with adjustable means for resisting the opening of said valve.

8. In a steam-trap, the combination of the casing, a tube supported therein, a valve-seat secured at one end of the tube, a valve resting on said seat, a lever pivoted at one end in the end of the tube, a rod attached to said valve and pivoted to said lever near its pivoted end, a guide for said rod attached to the inside of said tube, a float attached to the free end of the lever, and auxiliary adjustable means for holding the valve on its seat.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY H. HUMPHREY.

Witnesses:

H. C. SMITH,  
JAS. P. BARRY.