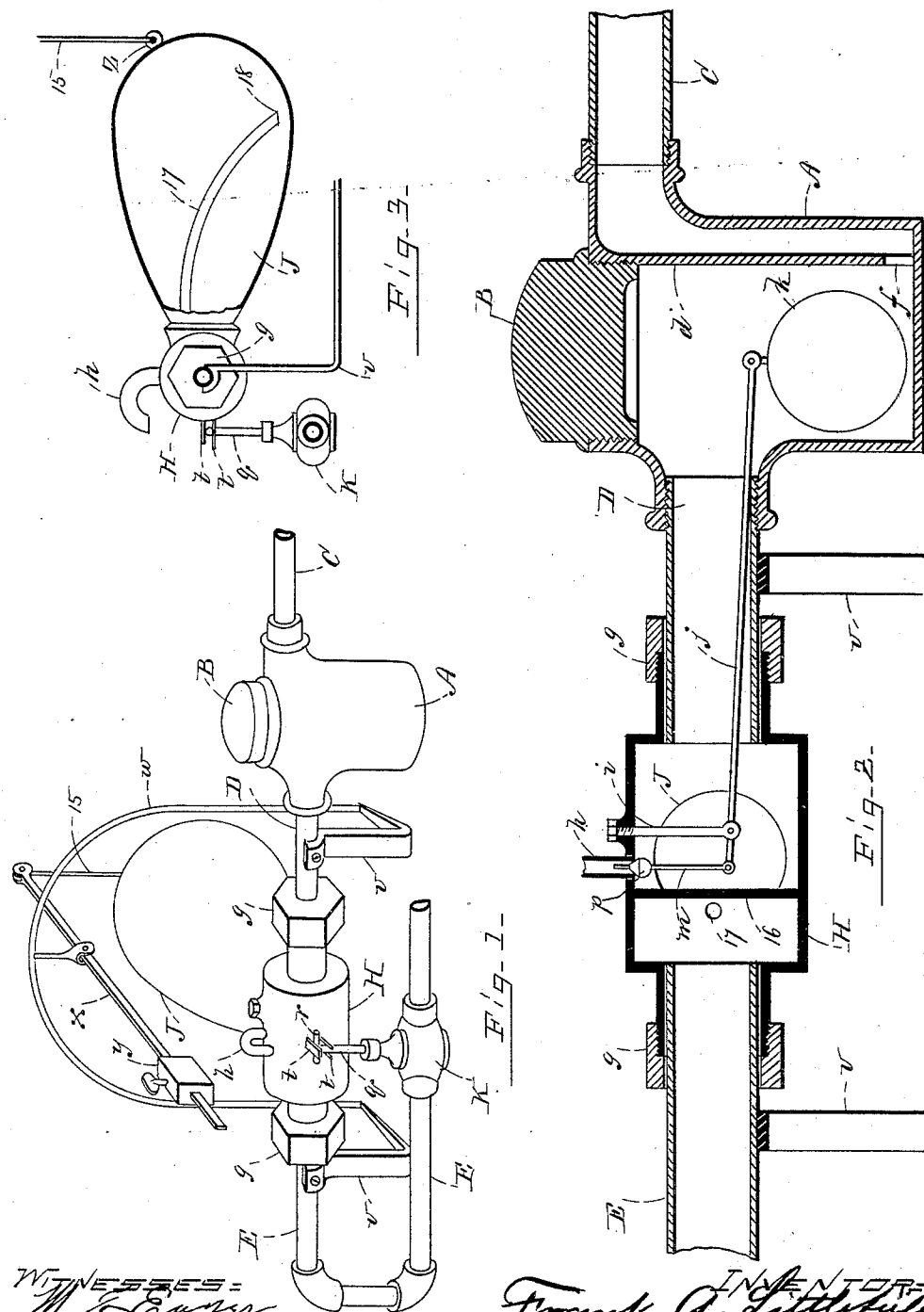


(No Model.)

F. A. LITTLEFIELD.
STEAM TRAP.

No. 460,143.

Patented Sept. 29, 1891.



WITNESSES:
J. E. Sawyer
G. D. Dwyer

INVENTOR:
Frank A. Littlefield
BY Chas. Shaw ATT'Y-S.

UNITED STATES PATENT OFFICE.

FRANK A. LITTLEFIELD, OF EAST PEPPERELL, MASSACHUSETTS.

STEAM-TRAP.

SPECIFICATION forming part of Letters Patent No. 460,143, dated September 29, 1891.

Application filed June 1, 1891. Serial No. 394,647. (No model.)

To all whom it may concern:

Be it known that I, FRANK A. LITTLEFIELD, of East Pepperell, in the county of Middlesex, State of Massachusetts, have invented certain new and useful Improvements in Steam-Traps, of which the following is a description sufficiently full, clear, and exact to enable any person skilled in the art or science to which said invention appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a perspective view showing my improved steam-trap and connecting-pipes; Fig. 2, a vertical longitudinal section of the same, and Fig. 3 a sectional elevation showing the receiving-chamber of the balance mechanism.

Like letters and figures of reference indicate corresponding parts in the different figures of the drawings.

My invention relates, especially, to an automatic balance steam-trap; and it consists in certain novel features hereinafter fully set forth and claimed, the object being to produce a simpler, cheaper, and more effective device of this character than is now in ordinary use.

The nature and operation of the improvement will be readily understood by all conversant with such matters from the following explanation.

In the drawings, A represents the body or tank of the trap, which is closed at its top by a metallic screw-cap B, and into one side of which at the top the supply inlet-pipe C enters. A vertical partition *d* is disposed within the tank A and extends across the mouth of the inlet C, terminating a short distance from the bottom of the tank, leaving a duct or passage from said pipe C into the tank. The outlet D opens into the opposite side of the tank A in a horizontal vertical plane lower than the plane of the pipe C.

A hollow cylindrical casting H is connected with the outlet D at one end and a pipe E at the opposite end by suitable coupling-nuts *g*, the ends of said casting being reduced to fit tightly over the pipes D E, upon which said casting is fitted to rock. Through one side of said casting a bulb or receiving-chamber J opens.

In the top of the casting H a curved air-

vent tube *h* is disposed, the inner end of said tube forming a valve-seat. A rod *i* is disposed within the cylindrical casting H and is pendent from the top thereof. Pivoted on the lower end of said rod there is a horizontally-arranged lever *j*, which projects through the pipe D into the interior of the tank A, a float *k* being pivoted to the end of said lever within said tank.

A vertically-arranged lever *m* is pivoted to the opposite end of the lever *j* and bears a valve *p* on its upper end, adapted to seat in the mouth of the tube *h*.

In the pipe E, which is bent to return under the casting H, a common outlet-valve K is disposed. Said valve being of the ordinary form and construction, it is not deemed essential to describe the same particularly herein. The stem *q* of said valve has a cross-bar or T-piece *r* on its upper end, which is held between lugs *t* on the side of the cylinder H opposite the receiving-bulb J.

Two arms *b* are secured, respectively, to the pipes E D and are connected by an arch *w*. Centrally on said arch a horizontally-arranged graduated beam *x* is pivoted and provided with a counterbalance-weight *y*. In an eye *z* on the bulb J a vertical lever 15 is secured by an end, its upper end being pivoted to the beam *x*. A partition 16 divides the cylinder H at one side of the mouth of the bulb J and directs steam and water into said bulb from the pipe D. A vertically-curved outlet-pipe 17 for the bulb has one end 18 opening in said bulb near the bottom thereof, (see Fig. 3.) its opposite end opening into the cylinder H between the partition 16 and outlet E.

In the use of my improvement the steam-pipes drain through the inlet C into the tank A, said inlet being higher than the outlet E. Steam from the pipe D is deflected downwardly by the partition *d* and enters the tank A through the port *f*. Water from condensation when steam is shut off gathering in the tank A elevates the float *k*. This raises the lever *j*, opening the valve *p* and permitting air to escape from the cylinder H through the pipe *h*. When steam is on in the pipe C, its pressure passing through the port *f* forces the water from the tank A through the pipe E and cylinder H into the receiving-bulb J. The cylinder being mounted to rock as de-

scribed, the bulb or chamber J is balanced by means of the beam x and weight y to receive an amount of water sufficient to cover the mouth 18 of its outlet 17. This closes
 5 said outlet against the passage of steam into the discharge E. As the amount of water increases in the bulb J, the weight thereof reaching the limit set on the scale-beam over-
 10 balances the weight y and causes the bulb J to descend, locking the cylinder H. As said cylinder thus moves, the stem q on the outlet-valve K is drawn upward, opening said valve and permitting the escape of water through the outlet 17 and discharge E. The water in
 15 the bulb being thus reduced sufficiently from said bulb, the weight y again acts to elevate the bulb and close the valve K.

The mechanism described enables the bulb or chamber J to be balanced with great accuracy in insuring perfect automatic working
 20 of the steam-trap and reducing the liability of leakage of steam or water to a minimum.

Having thus explained my invention, what I claim is—

25 1. In a steam-trap mechanism, the combination of a steam-pipe with a rocking cylinder interposed therein, a bulb, as J, opening into said cylinder, a partition 16, dividing said cylinder and transecting the mouth of
 30 said bulb, the curved pipe 17, leading from said bulb into one of the cylinder-chambers, and a counter-balance for said bulb, all being arranged to operate substantially as described.

35 2. In a steam-trap of the character described, a tank provided with an inlet and outlet opening therein at different levels, a vertical partition in said tank for directing the flow from said inlet to the bottom thereof,
 40 a cylinder mounted to rock in said discharge-

pipe and provided with an air-vent, a float-actuated valve for said vent and a receiving-chamber opening into said cylinder, a counter-balance for said cylinder, a discharge for
 45 said chamber, and an outlet-valve actuated by the rocking of said cylinder, all being combined and arranged to operate substantially as described.

3. In a steam-trap of the character described, the tank A, provided with the partition
 50 d and port f , in combination with the pipes C D, the pipe E, provided with the outlet-valve K, the rocking cylinder H and a float-actuated air-valve therefor, the bulb J, opening into said cylinder, the discharge 17
 55 for said bulb, a counter-balance for said cylinder, and the partition 16 in said cylinder, separating the bulb and discharge mouths, substantially as described.

4. In a steam-trap mechanism, the pipes E
 60 D and rocking cylinder H, provided with the partition 16, in combination with the bulb J, opening into said cylinder at one side of said partition, the pipe 17, connecting said bulb and the opposite cylinder-compartment, and
 65 a counter-balance for said bulb, substantially as set forth.

5. In a steam-trap mechanism, the pipes E
 70 D and rocking cylinder H, provided with the partition 16, in combination with the bulb J, opening into said cylinder at one side of said partition, the pipe 17, connecting said bulb and the opposite cylinder-compartment, a counter-balance for said bulb, and the valve
 75 K, having its stem connected with said cylinder, substantially as described.

FRANK A. LITTLEFIELD.

Witnesses:

GEORGE G. TARBELL,
 GEORGE JENKS.