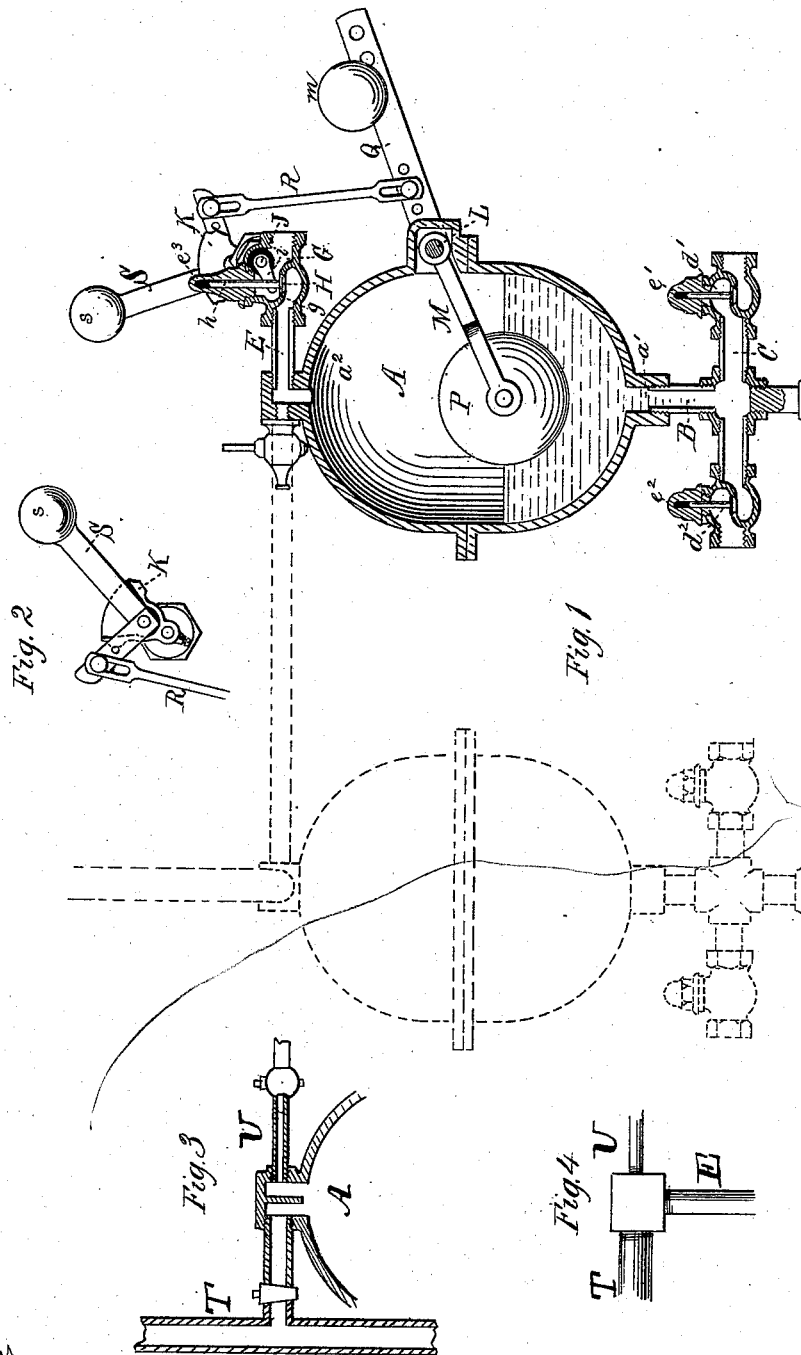


T. KIELEY.  
Steam-Trap.

No. 218,885.

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# UNITED STATES PATENT OFFICE.

TIMOTHY KIELEY, OF NEW YORK, N. Y.

## IMPROVEMENT IN STEAM-TRAPS.

Specification forming part of Letters Patent No. **218,885**, dated August 26, 1879; application filed January 11, 1879.

*To all whom it may concern:*

Be it known that I, TIMOTHY KIELEY, of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Steam-Traps; and that the following is a full, clear, and exact description thereof.

My invention relates to that class of apparatus known as "return steam-traps and automatic boiler-feeders," in which a float is employed, in connection with levers and valve mechanism, for operating a steam-valve in order to admit or cut off the passage of steam from the boiler to the trap.

The invention consists in certain novel details of construction, arrangement, and combination of the float-lever, valves, and valve mechanism, and an auxiliary device connected with the float-lever and valve mechanism, whereby the operation of the entire apparatus is facilitated.

The accompanying drawings illustrate the manner of carrying out my invention.

Figure 1 is a vertical sectional view of an apparatus embodying my improvements. Fig. 2 is a detail view of a portion of the auxiliary device for assisting in the operation of the valve mechanism. Figs. 3 and 4 are detail views, hereinafter referred to.

The receiver A may be of any suitable shape and dimensions. It is here shown as of spherical form and made in two parts, and it may be supported by a pedestal, or in any other suitable manner.

At the bottom of the receiver is an opening,  $a^1$ , which receives the upper end of a vertical pipe, B, the lower end of which communicates with a horizontal pipe, C, provided with check-valves  $d^1 d^2$ . These valves are provided with vertical stems, which work in and are guided by caps  $e^1 e^2$ .

One end of the pipe C connects with a pipe leading from the source of water-supply, and the other end connects with a pipe leading to the boiler.

At the top of the receiver is an opening,  $a^2$ , which receives one end of a pipe, E, leading from the steam space or dome of the boiler.

The pipe E is provided with a valve-chamber, G, in which works a valve, H, opening upward, and provided with a vertical stem,  $h$ , working in and guided by a cap,  $e^3$ .

The valve H is of tapering form, and the valve-seat  $g$  is of corresponding form, and is located in an inclined partition in the valve-chamber G.

In the upper portion of the valve-chamber is journaled a rock-shaft, J, from which extends an arm,  $i$ , the end of which engages with the slot in the valve-stem  $h$ , for the purpose of raising and lowering the valve when the rock-shaft is oscillated, as hereinafter described.

One end of the rock-shaft J extends through its bearing to the outside of the valve-chamber, and has attached to it a plate, K, which, with the shaft J and arm  $i$  thus arranged with relation to each other, form virtually a lever of the first kind.

The plate K has on one side a V-shaped recess, in which works an elbow-lever, S, which is pivoted to said plate so as to oscillate freely on its pivot.

The oscillation of the lever independently of the plate K is limited by the sides of the recess, so that when the lever passes a vertical line in either direction and strikes the side of the recess it carries the plate with it and causes it to oscillate in the same direction.

One arm of the lever S carries a weight,  $s$ , and the other arm is connected as hereinafter more particularly described.

On one side of the receiver A is a stuffing-box, in which works a rock-shaft, L, from which an arm, M, extends to the interior of the receiver, and carries a float, P. The float may be connected to the arm by a yoke, as shown in Fig. 1, or may be attached in any other suitable manner. One end of the rock-shaft L extends outside of the stuffing-box, and has an arm, Q, attached to it, which arm may be provided with a set-screw, so that it may be adjusted rectilinearly or at any desired angle with relation to the arm or float-beam M. The arm Q, shaft L, and arm M thus arranged also form virtually a lever of the first kind. The arm Q is provided with an adjustable counterbalance-weight,  $m$ .

The arm Q and lever S are connected by a rod, R, so as to cause them to move simultaneously at the proper times. The points of connection of the rod R with the arm Q and lever S are slotted, for the purpose presently to be described.

The operation is as follows: The parts being

in the position shown in Fig. 1; the water from the source of supply passes through the pipe C and valve  $d^1$ , and rises through the pipe B into the receiver A, causing the float P to rise and the arm Q to descend. As said arm Q descends the rod R pulls downward on the lever S, with a tendency to cause its weighted arm to move in the direction of the right-hand side of the drawing. As soon as said weighted arm passes a vertical line it descends with a sudden motion until it strikes the opposite side of the V-shaped recess, and then carries the plate K with it in the same direction, so as to cause the arm  $i$  to raise the valve H and allow steam to pass into the receiver. The steam forces the water from the receiver through the pipe C and valve  $d^2$ , and thence it passes to the boiler. As the water falls in the receiver the float P follows it down, and the arm Q rises, and, by means of the rod R, causes the weighted arm of the lever S to move in the direction of the left-hand side of the drawing. The parts are so adjusted with relation to each other that when the water is all forced out of the receiver the weighted arm passes a vertical line and drops suddenly against the opposite side of the V-shaped recess, carrying the plate K in the same direction with it, and causing the arm  $i$  to close the valve and hold it firmly to its seat. The points of connection of the rod R being slotted, the connecting-pins work in said slots, so that when the rising or falling of the float-lever has moved the weighted lever S beyond the vertical line in either direction, said weighted lever is free to drop suddenly to open and close the valve without affecting the position of the float-lever by said sudden motion.

The plate K and weighted lever S are not only applicable to traps constructed as herein described, but may be applied for a similar

purpose to an apparatus of any suitable construction.

In some cases a rolling ball may be substituted for the weighted lever.

An apparatus constructed as herein described may be made in duplex form when desired, by duplicating the receiver and the receiving and delivering pipes and valves, as illustrated by the dotted lines in Fig. 1, and by arranging the steam-valves and connecting mechanism so that while one receiver is collecting water the other will be delivering it.

Figs. 3 and 4 represent a mode of utilizing the exhaust-steam from an engine in connection with the receiver. T represents the exhaust-pipe, and U a cold-water jet, both entering the receiver A close to each other. By this means cold water may be used for feeding the boiler, and it will be warmed by the exhaust-steam on entering the receiver.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the plate K, provided with the V-shaped recess, the weighted lever S, pivoted to said plate, the rock-shaft J and its arm  $i$ , and the steam-valve H, constructed and arranged as shown and described, for the purpose specified.

2. In a steam-trap, the combination, with the receiver A, of the rock-shaft L and its arm M, carrying the float P, the arm Q, adjustably attached to said rock-shaft, the connecting-rod R, having its points of connection slotted, and the weighted lever S, carrying the plate K, constructed and arranged as shown and described, for the purpose specified.

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Witnesses:

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