E. FOX.

STEAM-TRAP AND BOILER-FEEDER.

No. 186,820. Patented Jan. 30, 1877.

Fig. 1.

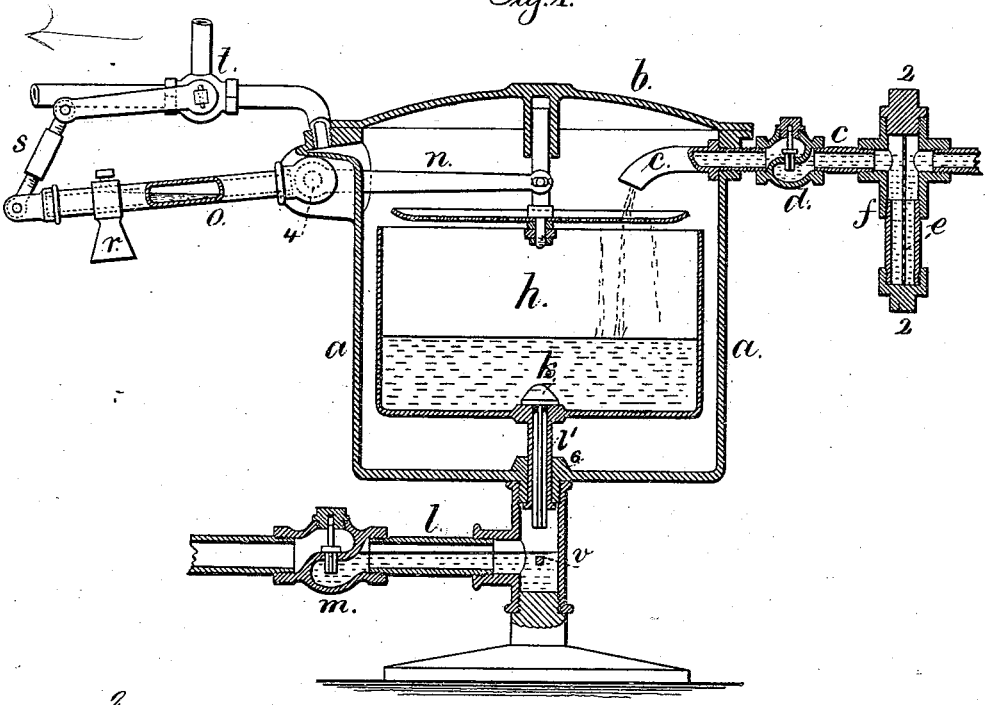


Fig. 2.

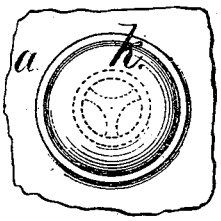
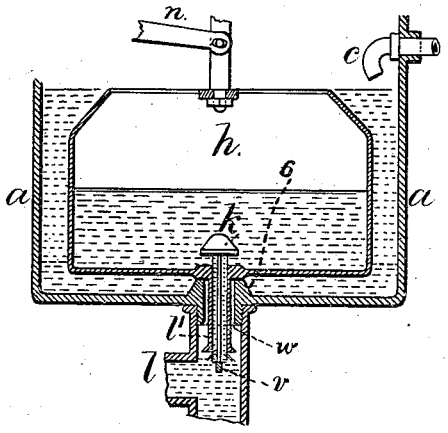


Fig. 3.



Witnesses,

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EDWARD FOX, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN STEAM-TRAPS AND BOILER-FEEDERS.

Specification forming part of Letters Patent No. **186,820**, dated January 30, 1877; application filed December 26, 1876.

To all whom it may concern:

Be it known that I, EDWARD FOX, of Brooklyn, in the county of Kings and State of New York, have invented an Improvement in Steam-Traps and Boiler-Feeders, of which the following is a specification:

This invention relates to a vessel containing an open float that operates the valves for the delivery of the water of condensation either into the external air or into a boiler. In the one instance the apparatus becomes a boiler-feeder, and in the other instance a trap for the delivery of water of condensation from a heating apparatus or coil.

I provide a valve at the bottom of the float, which opens the discharge-pipe as the float sinks, and the said valve is closed as the float rises, and I combine with these parts a balancing-lever and a moving weight that increases the power of the lever to sustain the weight of the float, and also serves to hold the float down when moved in the other direction. Thereby the movement of the float is rendered rapid and reliable in either direction, and the valves are fully opened or fully closed.

In the drawing, Figure 1 is a vertical section of the steam-trap, and Fig. 2 is a section of a modification thereof, and Fig. 3 is a plan, in larger size, of the valve employed at the bottom of the float.

The vessel *a* is of the proper size and shape, and it is provided with a cover, *b*. At one side of the vessel *a* is the inlet-pipe *c*, which, by preference, is provided with the check-valve *d*, and there is a strainer, *e*, placed within the vertical cross-pipe *f*, at the ends of which are plugs 2, so that the strainer can be removed and the cross-pipe cleaned at either the top or bottom thereof without disturbing the connections of the tubes. This strainer retains any particles of solid matter that might obstruct the valves of the apparatus.

The float *h* is hollow and open at top; and it is guided so as to move vertically, and it is provided with a valve, *k*, at the bottom opening to the discharge-tube *l* that, by preference, is provided with the check-valve *m*. The float is jointed to the lever *n*, that moves upon the fulcrum-spindle 4, which passes through the case or vessel *a;* and upon the outside it is provided with a lever, *o*, balance-weight *r*, and connection *s*, to the relief valve or cock *t*. This lever *o* is, by preference, a tube partially filled with mercury, so that when the lever is descending and the outer end passes below the center the mercury runs to the outer end, giving a preponderance of weight and leverage to lift the float suddenly, and, when on the reverse movement, the lever *o* is again brought to a slight elevation, the mercury runs toward the fulcrum-spindle 4, lessening the weight and leverage, and allowing the float to descend suddenly. At the bottom of the float the valve *k* is made to close upon a seat inside the float, and it slides through the opening from the vessel *a* into the delivery-pipe *l;* and there is a stop, *v*, that holds the valve up as the float and seat descend, and hence the valve is opened.

Where the water of condensation runs by the pipe *c* into the float *h* there should be a tubular guide, *l'*, from the bottom of the float to the pipe *l*. There will be little or no water in the vessel *a*, and this tubular guide *l'* is sufficiently loose to allow any such water to run away by the discharge-pipe *l*.

The float will descend rapidly as soon as the necessary weight of water has run in, and in so doing the valve *k* is opened and the water runs out by the discharge-pipe *l* until the float again rises and the counterpoise completes the upward movement of the float suddenly, as aforesaid, and closes the valve, and the operations are repeated. The relief-valve *t* allows the steam in the trap to escape, so that it will not delay the flow of the water of condensation. If the water of condensation runs into the vessel *a* outside the float *h*, then the valve *k* is to be made, as shown in Fig. 3, to close at the bottom of the thimble *w*, as well as at the inside of the float *h*, to retain the water in the vessel *a* and in the float, and when the float falls the water of the vessel *a* flows rapidly over its upper edge and increases the weight of the float, and the valve *k* is opened, allowing the water to discharge rapidly from inside the float *h* until the weight of the float is counterpoised sufficiently for it to be raised by the lever, when the valve *k* is closed both inside the float and at the discharge-pipe, and the water running in accumulates and flows over into the float until it

finally sinks, opening the valves and allowing the water to pass off, as before.

The float, when it falls, rests upon the seat 6 around the upper end of the discharge-pipe *l*, so that there is but little water escaping from the vessel *a* while the float is being emptied.

I claim as my invention—

1. The combination of the open float *h*, vessel *a*, and valve *k*, within the float, closing upon the seat at the bottom of such float, and the discharge-pipe *l*, and counterpoise-lever *o*, substantially as set forth.

2. The combination of the lever *o*, shifting-weight *r*, relief-cock *t*, float *h*, valve *k*, vessel *a*, and delivery-pipe *l*, substantially as set forth.

3. The inlet-pipe *c* of the steam trap or feeder, and the cross-pipe *f*, in combination with the flat or nearly flat strainer *e*, inserted lengthwise within the pipe *f*, and the cap or plug 2, substantially as and for the purposes set forth.

Signed by me this 20th day of December, A. D. 1876.

EDWARD FOX.

Witnesses:
GEO. T. PINCKNEY,
CHAS. H. SMITH.