

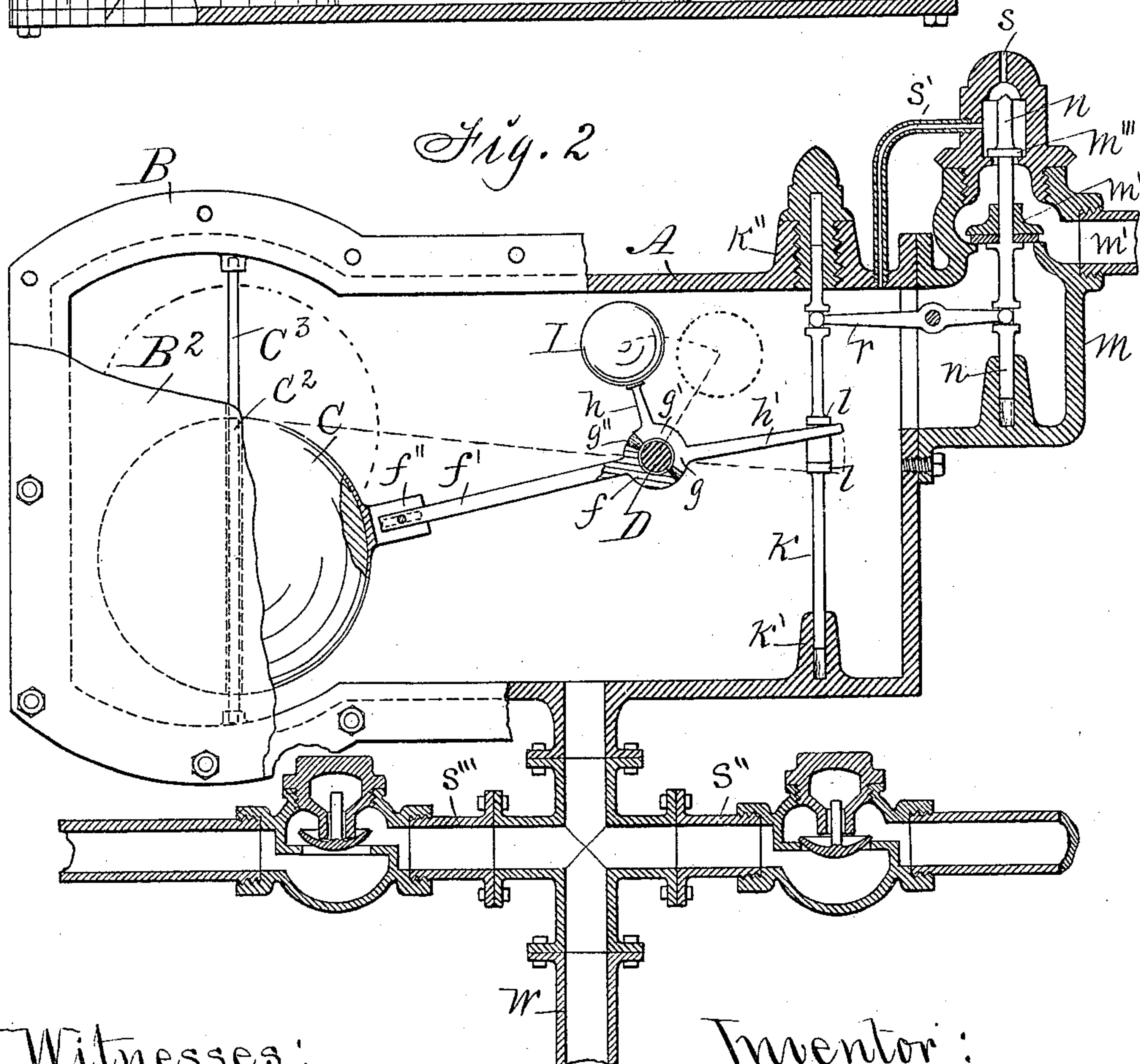
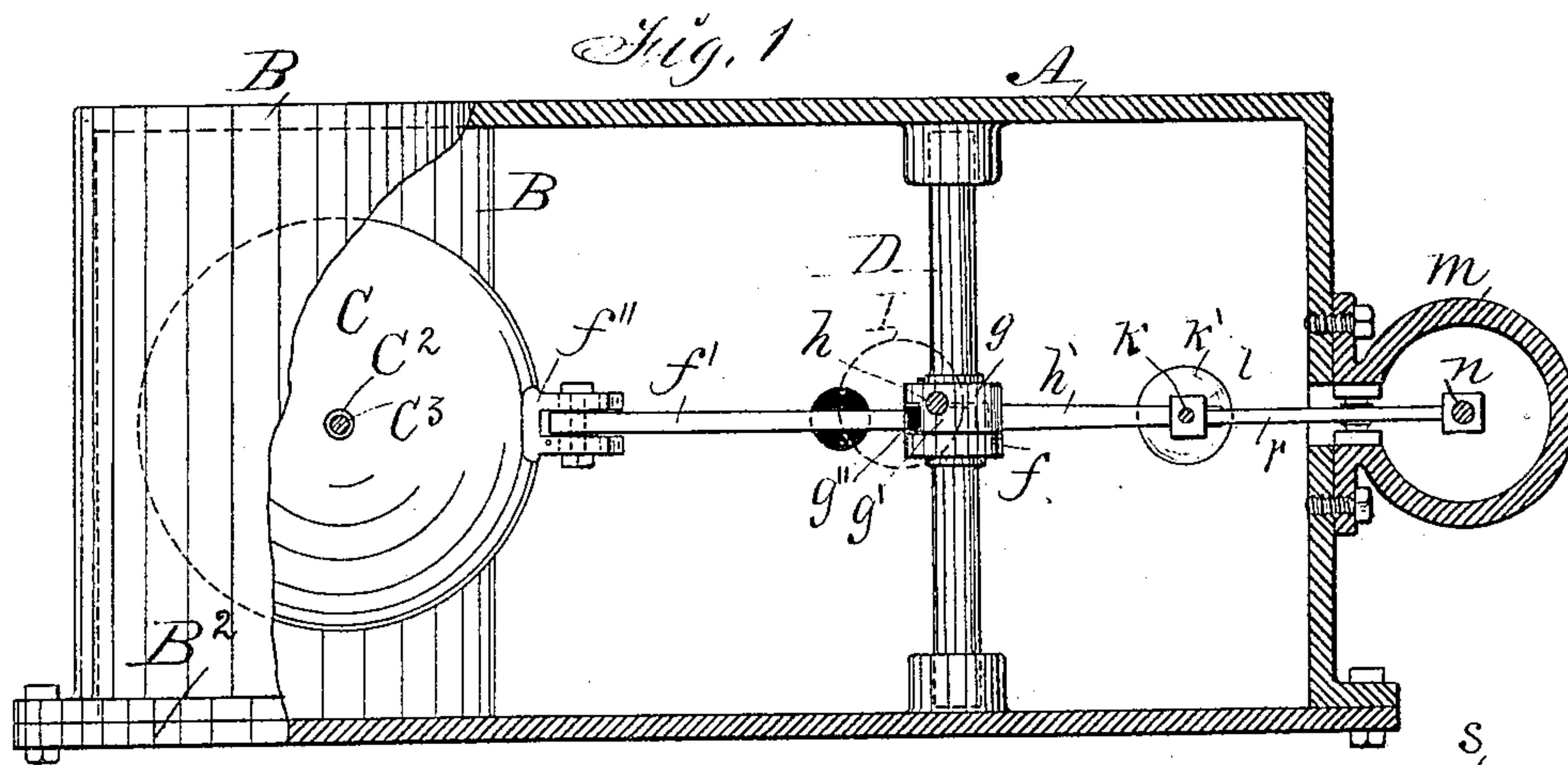
(No Model.)

J. COLLIS.

### STEAM TRAP AND BOILER FEEDER.

No. 270,638.

Patented Jan. 16, 1883.



Witnesses:  
R. H. Orrig,  
H. B. Stoltenberg

Inventor:  
John Collis,  
By Thomas G. Orwig,  
Attorney.



# UNITED STATES PATENT OFFICE.

JOHN COLLIS, OF DES MOINES, IOWA.

## STEAM-TRAP AND BOILER-FEEDER.

SPECIFICATION forming part of Letters Patent No. 270,638, dated January 16, 1883.

Application filed November 14, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN COLLIS, of Des Moines, in the county of Polk and State of Iowa, have invented an Improved Steam-Trap and Boiler-Feeder, of which the following is a specification.

My invention relates to that class of steam-traps that are designed to automatically drain condensed steam from distributing-pipes and radiators and return it to the boiler:

It consists, first, in forming, arranging, and combining a trap case or box, a float, valves, and trip mechanism in such a manner that all the operative elements will be inclosed, concealed, and protected in the box, and made accessible for examination, cleaning, and repairing by simply removing screw-bolts and lifting the side face and cover from the box, without disconnecting the trap from the induction and eduction tubes, radiators, and boiler; second, in combining an air tube and vent with the trap-box and water-reservoir and the steam-induction tube, to facilitate the removal of steam-pressure from the trap-box and reservoir after water has been expelled therefrom by steam-pressure direct from the boiler, and to thereby avoid the delay of the operation of the trap incident to the slow cooling of the walls of the trap-box, as heretofore required, to relax the pressure of the steam confined therein after the steam induction or equalizing tube has been closed, all as hereinafter fully set forth.

Figure 1 of my accompanying drawings is a top view of my trap, showing the roof or top wall removed. Fig. 2 is a vertical and longitudinal view of the complete trap, showing the side cover broken away to disclose the relative positions of all the parts inclosed within and attached to the trap-box. Together these figures clearly illustrate the construction and operation of my complete invention.

A represents the main portion of the trap-box, made of cast metal in quadrangular form; and B, an enlarged end of the same box, conforming in shape with the spherical float C retained therein.

B<sup>2</sup> is a detachable side and cover, fixed to the side of the box A B by means of screw-bolts and a flange at the outside edge of the box.

The float C is preferably made of hard wood and covered with copper-plate. A bore, C<sup>2</sup>, through the diameter of the spherical float, is also lined by means of a copper tube in such a manner that the wood will be protected and prevented from absorbing water.

C<sup>3</sup> is a post fixed to the bottom of the enlarged end B of the box in such a manner that it will extend through the bore C<sup>2</sup> in the float and prevent it from lateral movement, but allow it to rise and fall.

D is a rock-shaft mounted in bearings fixed against the insides of the walls of the box.

f is a collar fixed to the shaft D.

f' is an arm rigidly fixed to the collar f to extend into the bore of a branch, f'', that extends from the float C, in such a manner that the complete arm f' f'' will lengthen and shorten as the float rises and falls on the post C<sup>2</sup>.

g is a collar placed loosely upon the shaft D. It has a lateral extension, g', on its inside face, that extends into an enlarged opening, g'', formed in the inside face of the collar f.

h is an arm extending from the loose collar g.

I is a ball-weight fixed to the end of the arm h.

h' is an arm extending horizontally from the collar g.

k is a sliding shaft, retained in a vertical position in the trap-box by means of a socket and bearing, k', fixed to the top surface of the bottom of the trap-box, and a detachable bearing, k'', fixed in the cover B<sup>2</sup>.

l l are collars or projections on the shaft k, with which the free end of the arm h' comes in contact as it is vibrated by means of the ball I. The upward motion of the arm h' lifts the shaft k, and a downward motion lowers it.

m is a valve-chamber fixed to the end and top portion of the box A.

m' is a steam-induction tube, designed to connect the valve-chamber and trap with a steam-boiler.

m'' is a valve of common form. m''' is an auxiliary valve in the top of the valve-chamber, connected with and operated by the same valve-stem, n, that operates the lower valve, m''.

r is a lever pivoted to the trap-box or valve-chamber in such a manner that its long arm can be readily connected with the reciprocating



ing shaft *k* and its short arm with the valve-stem *n* to transmit motion.

*s* is a vent in the top of the valve-chamber, that is closed by the top end of the valve-stem *n* when the auxiliary valve *m'''* is opened.

*s'* is a tube that connects the upper portion of the valve-chamber with the trap-box in such a manner that when the valve *m''* is opened the vent *s* and tube *s'* will be closed while steam-pressure is required in the trap-box to expel water therefrom and force it through the discharge-pipe *s''* into the boiler, and also in such a manner that when the water is expelled, and the valve *m''* closed, the vent *s* and tube *s'* will be opened to admit steam to pass through from the trap-box, to facilitate the cooling of the trap and the condensation of the steam confined therein as required to prevent delay in the flowing of water from the receiving-tube *s'''* and the radiators connected therewith.

*w* in Fig. 2 represents a post to support the complete trap upon a fixed base.

In the practical operation of my trap, the float *C* rises as the water accumulates in the box, and, by means of the extensible arm *f f'*, turns the shaft *D* and collars *f* and *g*, and thereby brings the arm *h*, carrying the ball *I*, into a perpendicular position, and the instant it gets past the perpendicular line the ball will be released from the trip mechanism and drop, and by means of the arm *h'*, the shaft *k*, and lever *r*, its force of gravity will elevate the valve-stem *n*, to thereby open the valve *m''* to admit steam into the trap-box, and to close the vent *s* and tube *s'* until the water is expelled by steam-pressure and forced into the boiler; and as the water sinks in the trap

and the float *C* descends it will elevate the ball *I*, which is lighter and on the short arm of the complete lever, to its former position, as shown in Fig. 2, and as required to operate the valves when the float is again elevated by the accumulation of water in the trap.

I claim as my invention—

1. The shaft *D*, having an arm extending horizontally to carry a float, a fixed collar with an opening in its side face, and a loose collar having a projection adapted to move in the opening of the fixed collar, a rigid vertical arm carrying a weight at its end, and a horizontal arm to form an elbow-crank of the complete collar and its arms, arranged and combined in a trap-box, with valve-operating mechanism, substantially as set forth, for the purposes specified.

2. The air-tube *s'*, in combination with the valve-chamber having a vent at its top, two valve-seats, and two valves on one stem, substantially as shown and described, for the purposes specified.

3. The improved steam-trap and boiler-feeder, composed of the trap-box *A B*, the removable cover *B²*, the float *C C²* on the post *C³*, the shaft *D*, the trip device and valve-operating mechanism *f g g' g''*, the elbow-crank or arms *h h'* and ball *I*, the shaft *k*, the valve-chamber *m*, having two valve-seats and one valve-stem carrying two valves and a vent and air-tube, *s s'*, and a lever *r*, substantially as shown and described, to operate in the manner set forth, for the purposes specified.

JOHN COLLIS.

Witnesses:

THOMAS G. ORWIG,  
H. A. STOLTENBERG.