(No Model.) 2 Sheets—Sheet 1.

J. R. HANLON.

FEED APPARATUS FOR HEATING BOILERS.

No. 454,733. Patented June 23, 1891.

Fig. 1.

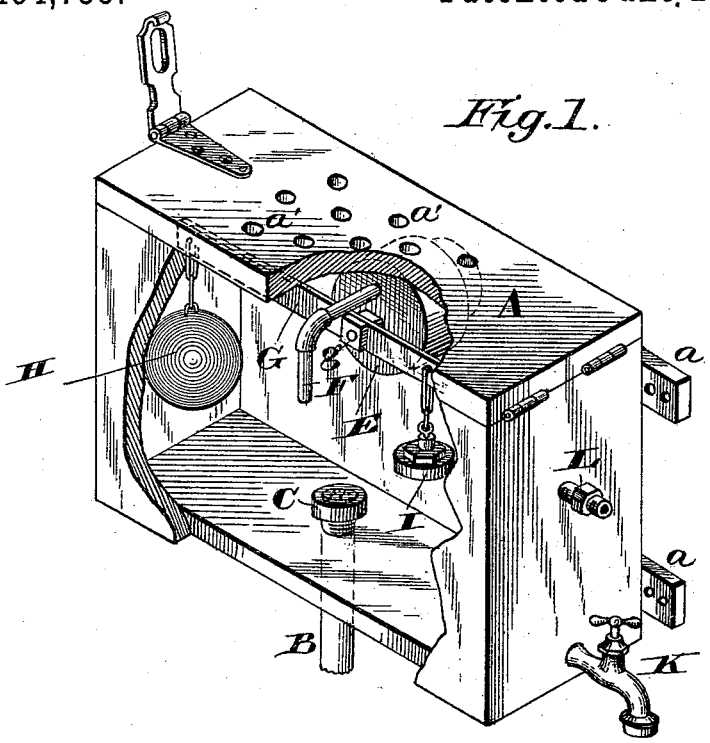
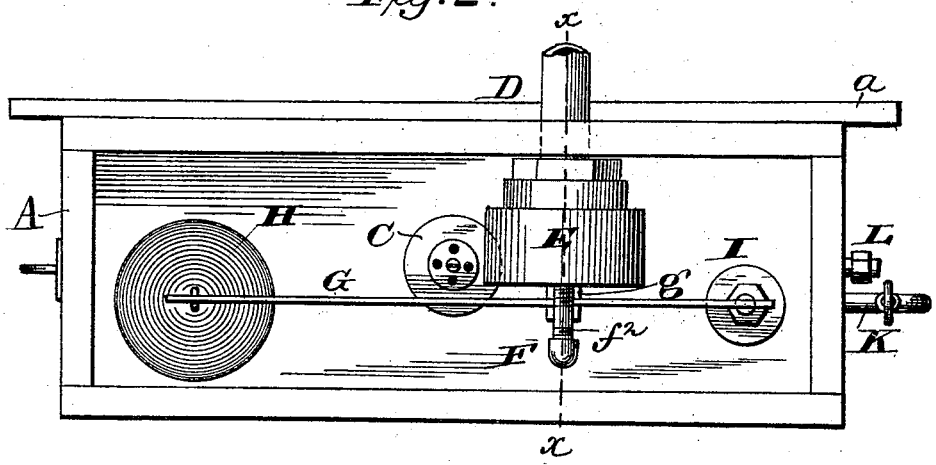


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

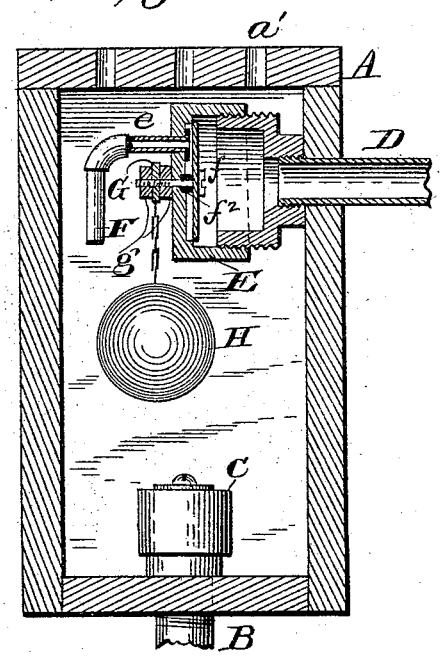

Fig. 6.

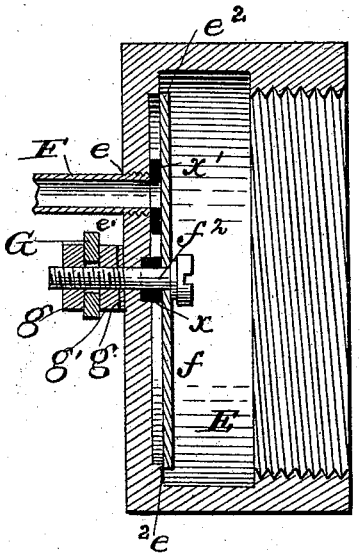

Fig. 4.

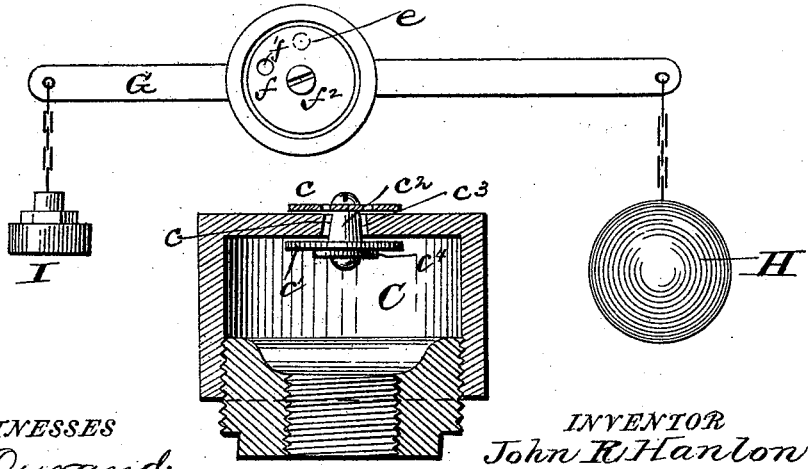

Fig. 5.

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UNITED STATES PATENT OFFICE.

JOHN RUSSELL HANLON, OF PENNINGTON, NEW JERSEY.

FEED APPARATUS FOR HEATING-BOILERS.

SPECIFICATION forming part of Letters Patent No. 454,733, dated June 23, 1891.

Application filed February 28, 1891. Serial No. 383,211. (No model.)

To all whom it may concern:

Be it known that I, JOHN RUSSELL HANLON, a citizen of the United States, residing at Pennington, in the county of Mercer and State of New Jersey, have invented certain new and useful Improvements in Feed Apparatus for Heating-Boilers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Figure 1 is a perspective view with one side of box broken away. Fig. 2 is a top plan view, cover removed. Fig. 3 is a transverse section through the box and operative parts. Fig. 4 is a detail in section of valve on water-outlet pipe. Fig. 5 is an inside view of the valve on pipe leading to the boiler. Fig. 6 is a detail in section to show rabbets and washers inside the inlet-valve.

In supplying water to boilers, particularly those used in steam-heating, it has heretofore been customary for the engineer now and then to turn the cock in the pipe leading to the water-main, and thus let on the requisite amount. The regularity and accuracy of a supply of water in this way depended on the vigilance and watchfulness of the engineer or man in charge. It is therefore the aim of this invention to produce mechanism and means whereby a regular and proper supply of the water to the boiler is at all times automatically secured.

I will now proceed to describe my invention in detail, as well as to point out in the claims the salient points of novelty.

In the accompanying drawings, A denotes any ordinary box or case of suitable shape and size and made of wood or metal or any desired material. This box is fastened to the wall of the boiler-room or otherwise in suitable proximity to the boiler and at a height regulated by the desired water-level in the boiler. As now illustrated this is done by means of the cross-pieces *a*, which are attached to the box, and whose projecting ends afford a point to insert nails or screws by which the box is held in place. The connection with the boiler is by pipe B, extending from the valve C in the bottom of the box to the boiler. (Not shown.) This valve C has in its crown the movable pieces *c* and *c'*, respectively, at the top and bottom of bolt c^2, the one piece outside the valve and on top and the other inside. Thus the said pieces will have some up-and-down movements. The box is fastened to the wall of the boiler-room at such a height that the water-level in the box when the inlet-valve ceases flowing is at a height desired for the water-level in the boiler. This valve in the bottom of the box is never closed, unless by the steam-pressure in the boiler forcing the water against it with sufficient force to lift it. The steam-pressure closing the valve tight, no water can enter the box from the boiler so long as this pressure is on. When this pressure is off, the valve falls of its own weight and opens. If then the water-level in the boiler is below the established level in the box, the water begins to flow from the box through this valve into the boiler and the flow of the inlet-valve begins. This continues until the two established levels in the box and the boiler are again attained. In a word, this lower valve is never closed unless by the pressure of steam in the boiler. Thus the piece *c'* will be forced upward and the valve closed when the steam-pressure in the boiler is sufficient to overcome the weight of the valve; but when this pressure is off the piece *c'* will drop down and the valve is opened. This brings the perforated piece *c* over the orifice c^3, in which the stem or bolt c^2 moves, and thus an inflow of water through said orifice is permitted. It will be perceived that the inner piece *c'* is doubled or weighted, and this is for the purpose of steadying it, thus insuring a true vertical movement and a horizontal position of the piece as it moves up, and thus a surer fit when it closes the inlet-aperture; so also in the downward movement this weight makes the movement more active. Yet it must be borne in mind that this arrangement of mine is for steam-heating boilers, in which the loss of water per day, for instance, through the escape of steam and evaporation is comparatively slight—so slight, in fact, that the fireman does not feed the boiler with fresh water more than once a day. Now the fire in the boiler will be allowed to go down at least once a day, as when the fire-drafts are turned off for the night. Thus the steam is condensed, and, the

pressure being removed, the valve C falls of its weight. The water from the box begins to flow through this valve C into the boiler and will continue until the established limit is reached. Thus the boiler is well supplied with water for the next day. In fact, in the vast majority of cases the fires during the day, through the turning off of the drafts of the fire-box, will be lowered at least three or four times, sufficiently to so diminish the steam-pressure that the valve is allowed to fall of its weight, and thus a continued equilibrium of levels of the water in the boiler and box is maintained.

The connection with the water main or supply is by the side pipe, and the water thus inflowing comes first into the valve E at the inner end of said pipe. Its exit thence is regulated by the movement of the plate *f* on the inner end of bolt f^2, passing through the central hole *e'* in the base of the valve. This plate is so placed as to come close over the washer and about the opening *e* in the base of the valve E, and thus shut said opening; or, on being moved so as to bring its opening *f'* in conjunction with the opening *e* in the base of the valve, it will give a water-way for the water through said holes and the pipe F. This pipe is preferably bent so that the water will flow easily down into the box. The movement of the disk or cut-off is regulated by means of the lever G, which is fastened to the shaft f^2 by nuts *g g*, one on each side. On the inner end of this shaft is fixed the shield *f*. The movement of the lever G is regulated by the float H and weight I, attached at the respective ends of it by chains or otherwise.

As regards the valve E in the side of the box, when the wooden ball H, by the receding of the water-level in the box, begins to fall, the hole *f'* in the plate *f* of the valve approaches the hole *e* in the base of the valve-chamber, and when the two holes are opposite or in conjunction the flow of water begins. As the water-level rises the ball H begins to float, the iron weight I on the other end of the lever falls down, and thus the hole *f* in the plate moves away from the hole *e* in the base of the valve-chamber, and, finally, the flow of water ceases. By reason of the water-pressure the plate is brought to bear closely upon the washer *x x'*, the former about the center hole, the latter about the pipe-hole. Thus the possibility of leakage is prevented. This washer, extending slightly above the base of the valve-chamber, prevents the plate *f* from binding too closely upon this base of the valve, and thus diminishes the friction between the plate and base. Thus the weights necessary to turn the arm are least possible. The inner surface of the base is countersunk about the pipe-hole and the center hole for the purpose of receiving and holding the washers in place. The distance of the hole in the arm through which the valve-screw passes to the end holding the iron weight is, say, half as great as the distance to the end holding the wooden ball or float, so that the ball when not floating may lift the iron weight without being unduly large—in fact, without being heavier than this iron weight. The lever G, being between two nuts *g g* on the outside of the valve-chamber E, is thoroughly secured without anything in connection with the valve-screw binding upon the outer surface of the valve-chamber. At the same time the amount of horizontal play of the valve-plate is regulated by the nut and iron washer *g'* between the arm of the weights and the outer surface of the valve-chamber. In this way nothing on the outside of the valve-chamber can unduly press upon the outside surface of the base of the chamber. It is highly important that this be the case; otherwise the arm of the weights would be prevented from readily turning. The inner surface of the base of the valve-chamber is rabbeted slightly at *e'* to receive the plate *f*. The plate is fastened securely to the valve-screw by means of a screw-thread arrangement.

The spigot K and nipple L at the end of the box are connected with the waste-water pipe. The spigot arrangement is for convenience in letting the water from the box. The nipple arrangement is for an overflow from the box.

The lid of the box is perforated with holes *a'* to allow the atmospheric pressure to act readily on the surface of the water in the box, while at the same time the entrance of dirt is prevented.

Having thus described my invention, I claim—

1. In a feed-water apparatus, the combination of the following elements: a box or receptacle for the water, having a connection with the water-main and with the boiler, the former by an automatically-regulated valve and the latter by a valve automatically regulated by the steam-pressure in the boiler.

2. In a feed-water apparatus and in combination with the water-receptacle provided with a suitable outlet, the valve E inside the box and connecting with the water-supply pipe and provided at its base with an exit passage or outlet, which exit is automatically regulated by means of the disk *f* through the agency of the lever G, having a float and weight at its respective ends.

3. In combination with the water-receptacle having a suitable water-inlet, the outlet-valve C, connecting with the boiler and having the outlet c^3, provided with bolt c^2, having at its ends the piece *c* outside the valve-chamber and the weighted piece *c'* inside the valve-chamber, substantially as described.

4. In a feed-water apparatus, the water-receptacle having a perforated cover, whereby the atmospheric pressure will readily act on the water-surface and at the same time dirt is excluded from the inside.

5. The combination of the valve E, having central opening *e'* and water-exit opening *e* and provided with washers *x x'*, each in a rab-

bet, respectively, about the central opening and the water-exit opening, with the disk *f*, perforated at *f'* and actuated substantially as set forth.

6. The valve C, combined with the bolt c^2 and pieces *c* and *c'* at its respective ends, the latter weighted, whereby in the action of the valve the movements of said pieces in the opening or closing of it are steady and the said pieces while in a horizontal position are moved in true vertical line, thus insuring a quick and full opening or a quick closure.

7. The combination of the box A, the valve E, constructed substantially as described and adapted to be automatically operated by the water, and the valve C, constructed substantially as described and adapted to be automatically operated by the steam in the boiler, all as and for the purposes set forth.

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

JOHN RUSSELL HANLON.

Witnesses:

CHARLES E. WETTON,

J. A. LARCOMBE.