

L. SWENSON.

Automatic Boiler-Feeds and Regulators.

No. 147,079.

Patented Feb. 3, 1874.

Fig. 1.

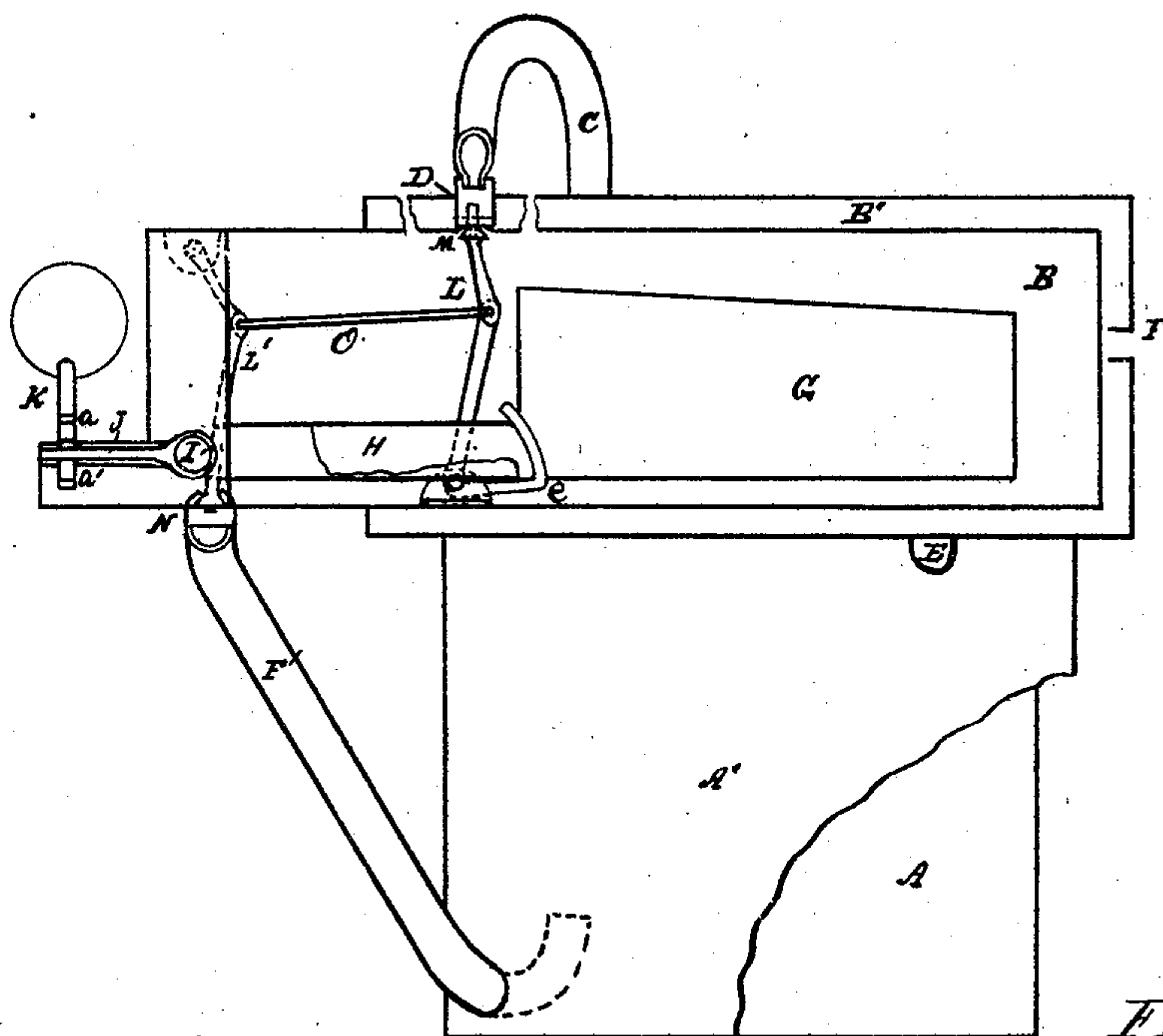


Fig. 2.

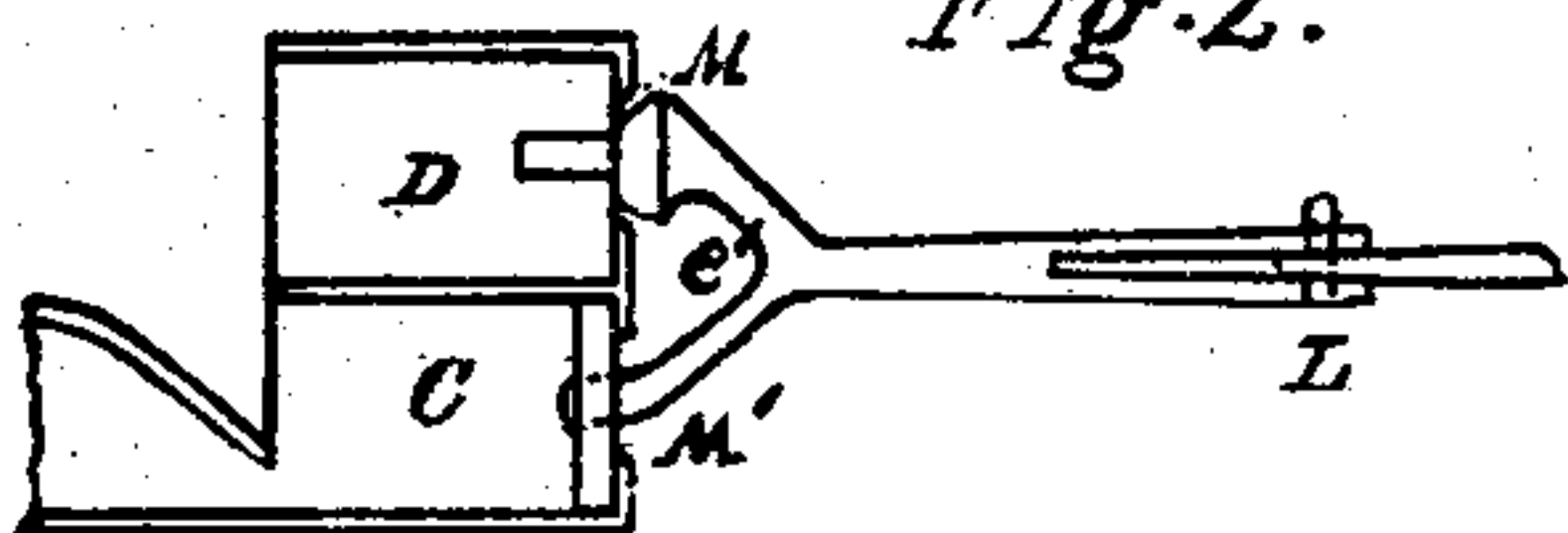
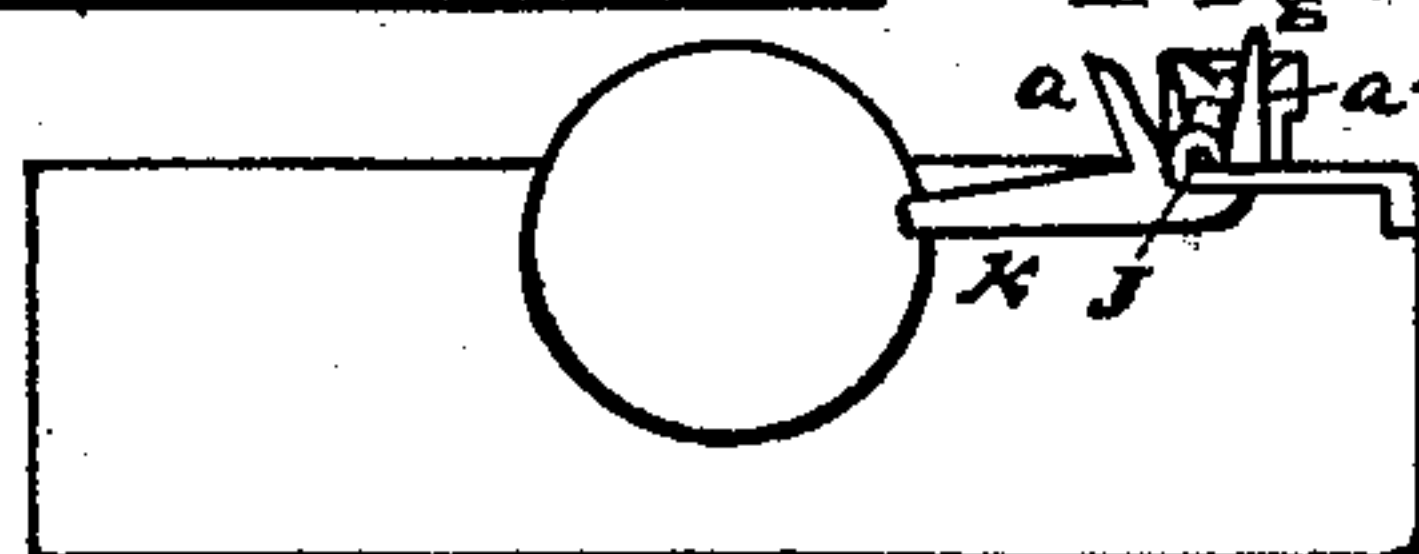


Fig. 3.



WITNESSES.

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IMPROVEMENT IN AUTOMATIC BOILER FEEDS AND REGULATORS.

Specification forming part of Letters Patent No. **147,079**, dated February 3, 1874; application filed May 24, 1873.

To all whom it may concern:

Be it known that I, LORENS SWENSON, of North Cape, in the county of Racine and State of Wisconsin, have invented a new, useful, and Improved Automatic Boiler Feed and Regulator, of which the following is a full, clear, and exact description, which will enable others skilled in the art to which my invention appertains to make and use the same, reference being had to the accompanying drawing forming a part hereof, and in which—

Figure 1 represents a side elevation of my improved feed and regulator, a part of which is shown in section; Fig. 2, an enlarged view of the steam-valve and the water-valves, showing their connection with their respective pipes; and Fig. 3, an enlarged view of the weighted lever, and the parts operating directly in connection with it.

In practice, the weighted lever is arranged vertically, as shown in Fig. 1, instead of horizontally, as shown in Fig. 3.

Like letters of reference indicate like parts.

In the drawing, A represents the boiler. A' is a wall or case surrounding the boiler, and forming a steam-tight flue or chamber about it. B is a water chamber or tank, arranged upon or near the boiler. B' is a steam-tight flue or chamber surrounding the water-chamber B. C is a steam-pipe entering the chamber B and the boiler. D is a water-pipe entering the chamber B and a water-tank, from which water is supplied to the chamber B. E is a pipe entering the chamber B' and the chamber around the boiler. F is a flue entering the chamber B' and communicating with the exhaust of the engine. F' is a flue entering the chamber B and the boiler, and its lower end is curved upward, as shown. G is an air chamber or float, made as nearly air-tight as may be practicable without great care and expense. H is a flue entering the float G, and rigidly attached thereto. I is a hollow trunnion entering the flue H, and rigidly attached to it, and having bearings in the walls of the chambers B, through which it passes. The float is supported in such a manner that its floor will either lie in a horizontal plane, or decline gradually toward the trunnion I. J is an arm rigidly attached to the trunnion I. K is a pivoted and weighted lever, provided with

the extensions or arms *a* and *a'*, arranged to engage the arms J. L is a toggle-joint, the lower part of which is so bent as to constitute a lever, as shown at *e*, and the end of this lever is attached to the float G. The lower part of the toggle L is pivoted, at its junction with the lever *e*, to the floor of the chamber B. The upper end of the toggle L is forked, as shown at *e'*, Fig. 2. M is a valve arranged on one of the forked arms *e'*; and this valve is constructed and arranged to operate in connection with a valve-seat arranged at the junction of the pipe D and the chamber B, and said valve is open when there is not sufficient water in the chamber B to support the float G. M' is a valve arranged on the other forked arm of the toggle L, and operating in connection with a valve-seat arranged at the junction of the pipe C and chamber B. The valve M' is closed when the valve M is open. The valves M and M' are so arranged, with respect to their respective seats, that, when one valve is carried to its seat, the other will be carried away from its seat, and vice versa, as shown in Fig. 2. L' is also a toggle-joint, one end of which is provided with a valve, N, which rests on a seat at the junction of the pipe F and chamber B, and this valve rests on its seat when the valve M' is closed. O is a connecting-rod attached to the toggles L and L', so that the toggles will be moved simultaneously.

When the float G is not supported by water in the chamber B, the valves are in the position indicated in Figs. 1 and 2. The water then flows from a tank or reservoir, through the pipe D and valve M, into the chamber B. As soon as sufficient water enters the chamber B to support the float G, the latter rises, and in rising moves the toggles L and L' and the valves attached thereto. The weighted lever K is also then being moved into a vertical line by reason of the contact of the arm J against the projection *a'*. As soon as the lever passes a vertical line it falls forward, and the arm *a* strikes the arm J, and throws the float G upward suddenly. By this means the valve M is closed, and the valves M' and N are opened. The water then runs from the chamber B, through the valve N and pipe F', into the boiler, and the steam from the boiler enters the chamber B through the valve M', and allows the water to

enter the boiler. The exhaust steam from the engine also enters the chamber B' through the induction F, and passes into the flue or chamber around the boiler through pipe E. While the water is passing from the chamber B the float descends, and thus reverses the valves, and the operation is the same as first described. In case the float should leak, the water which enters it will flow out through the flue H and trunnion I.

It will be perceived from the foregoing description that the operation of the parts herein described is automatic, and that the boiler will be supplied with water at intervals, the supply being regulated according to the rapidity with which the water in the boiler is converted into steam.

It will also be perceived that the water is first warmed or heated before it enters the boiler, and that the boiler is protected and warmed by reason of the steam which enters the flue by which the boiler is surrounded. By this means the water is not only automatically fed into the boiler at the proper time, but there is a gain of steam force and a saving of fuel. When the steam enters the chamber B, the water passes out freely through the pipe F', and the water which enters through the valve M' condenses the steam in the said chamber, thus tending to suck the water through the said valve until the float is sufficiently raised to reverse the valves.

Having thus described my invention, what

I claim as new, and desire to secure by Letters Patent, is—

1. An automatic boiler feed and regulator, provided with a hollow float in the water-chamber of the feed device, and turning on a hollow trunnion extending through the device and connected with the interior of the float by a drainway, substantially as and for the purposes specified.

2. An automatic boiler feed and regulator wherein the water-chamber of the device is either wholly or partly surrounded by a chamber communicating with the exhaust-pipe of the engine, substantially as and for the purpose specified.

3. The combination, in an automatic boiler feed and regulator, of the float G, toggle L and valves M and M', toggle L' and valve N, and connecting-arm O, all arranged and operating substantially as and for the purposes specified.

4. In an automatic boiler feed and regulator wherein the valves of the device are operated by means of a pivoted float arranged in the water-chamber of the device, the weighted and pivoted lever K, provided with the arms a and a', arranged to engage the arm or lever J, rigidly attached to the said float, substantially as and for the purposes specified.

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Witnesses:

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