2 Sheets—Sheet 1.

J. M. SIMPSON.

Automatic Boiler-Feeder.

No. 210,365. Patented Nov. 26, 1878.

Fig. 1.

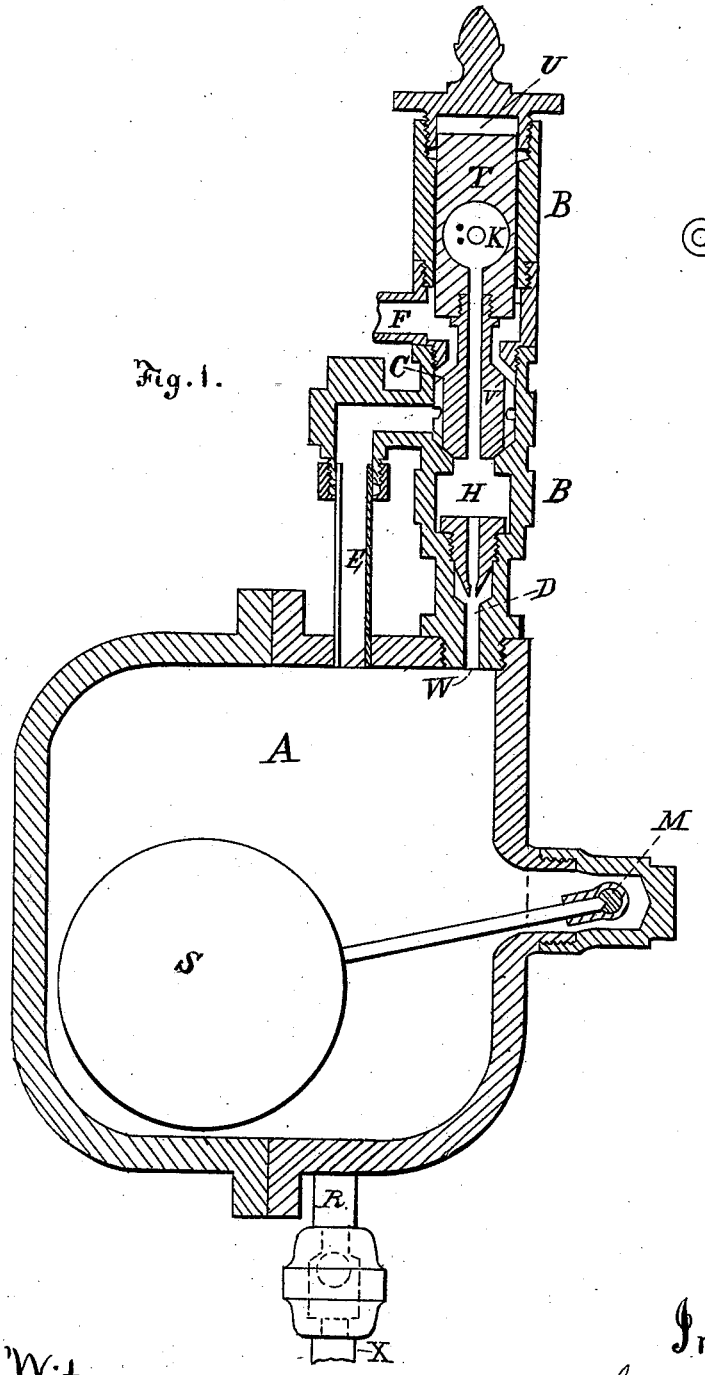
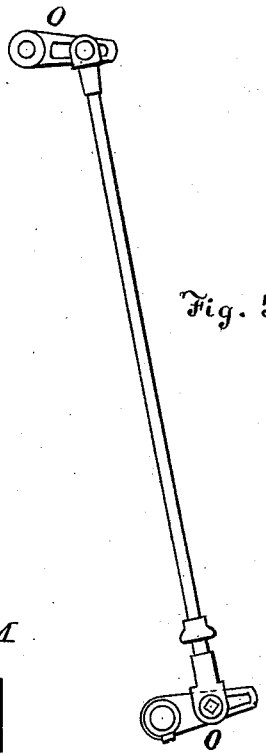


Fig. 5.



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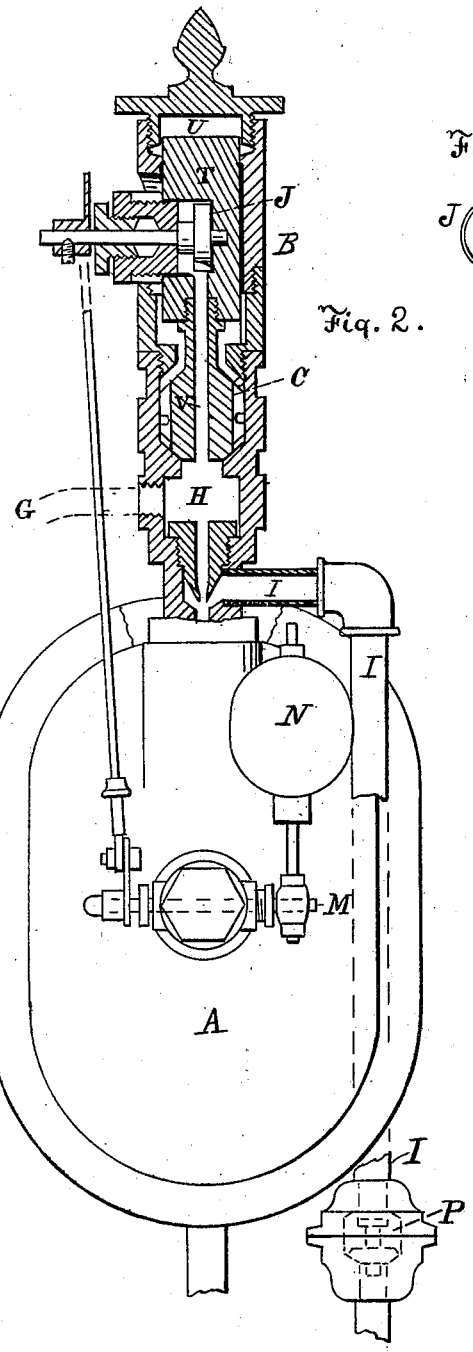


Fig. 2.

Fig. 4.

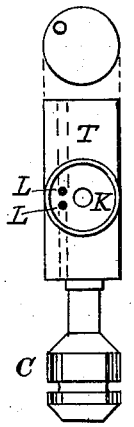
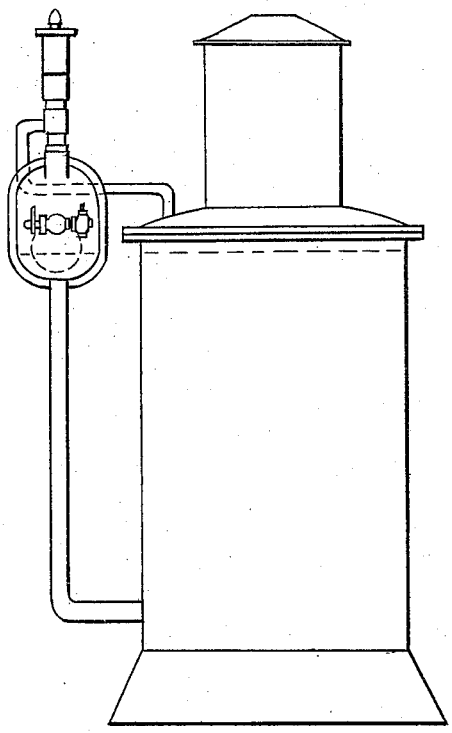


Fig. 3.

Fig. 6.



Witnesses :

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UNITED STATES PATENT OFFICE.

JOSIAH M. SIMPSON, OF OSHKOSH, WISCONSIN.

IMPROVEMENT IN AUTOMATIC BOILER-FEEDERS.

Specification forming part of Letters Patent No. **210,365**, dated November 26, 1878; application filed August 8, 1878.

To all whom it may concern:

Be it known that I, JOSIAH M. SIMPSON, of Oshkosh, in the county of Winnebago and State of Wisconsin, have invented certain new and useful Improvements in Automatic Steam-Boiler Feeders; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, making a part of this specification, in which—

Figure 1 is a vertical sectional view of an automatic steam-boiler feeder embodying the improvements in my invention. Fig. 2 is a vertical sectional view of all except the water-chamber. Fig. 3 is a view of the main steam-valve and stem. Fig. 4 is a view of the auxiliary steam-valve. Fig. 5 is an elevation, showing the connection between the auxiliary steam-valve and the rock-shaft, which is operated by the float in the water-chamber; and Fig. 6 shows the method of connecting the boiler-feeder with an upright boiler.

This invention relates to improvements in boiler-feeders for steam-boilers; and consists, first, of a double-faced steam-valve, having a steamway up through its center, in connection with a stem provided with a steam-chamber, having an auxiliary steam-valve and steam-ports; secondly, of a case or standard for inclosing the aforesaid valves and stems, and a siphon provided with steam inlet and outlet and water-inlet, in connection with a water-chamber having a float which operates a rock-shaft connected with the auxiliary steam-valve.

It further consists in improvements in the construction of the boiler-feeder, all of which will be hereinafter fully described, and particularly pointed out in the claims.

In the accompanying drawing similar letters of reference indicate like parts of the invention.

The double-faced steam-valve C has the steamway V up through its center, and is provided with a stem, T, in which is a steam-chamber, K, having an auxiliary-valve, J. The stem T is also provided with steam-ports L L.

The case or standard B contains, in addition to the stem T and valves C and J, the siphon D, and is provided with the steam-inlet G, steam-outlets E and F, and water-inlet I.

The steam-inlet G leads from the boiler to the steam-chamber H. The steam-outlet E leads from the water-chamber A to the double-faced valve-chamber C, and thence, when the valve C is open, to the open air through the exhaust F. The water-inlet I leads from the well or reservoir, through check-valve P, to siphon D, thence to the water-chamber A.

The float S is secured by a stem to the rock-shaft M by an adjustable rod and cranks, O O.

The water-chamber A has an inlet, W, from the siphon D, and an outlet, R, to the water-space in the boiler.

The steam-passage E acts as both inlet and outlet for the steam to the water-chamber A. A counter-balance, N, for the float S is connected to one end of the rock-shaft M, as shown.

Fig. 6 shows the manner of connecting the boiler-feeder with a common upright boiler. The same plan applies equally well when the connection is made with any other kind of a boiler.

It will be observed that, when the feeder is connected with the pipes leading to the boiler, it should stand at such a height with relation to the surface of the proper water-line in the boiler that the float S will float a little more than clear of the bottom of the water-chamber A.

The operation of the invention is as follows, starting with steam-pressure in the boiler: As the water is converted into steam, the water-surface line in both the boiler and the water-chamber A of the boiler-feeder descends. The float S descends with the water in the chamber A. A trifling descent of the float S, starting at the level above described, causes it, through its connections O O, to so move the auxiliary valve J as to open steam-communication from the steam-chamber H through the upper port, L, in the valve-stem T to the steam-chamber U. The area of the top of the valve-stem T exposed to pressure in the steam-chamber U being greater than the area of the double-faced valve C at either seat, with steam admitted to the chamber U, the main valve C will close down upon its lower seat and cut off communication between the steam-

chamber H and water-chamber A, and at the same time will open communication between the water-chamber A and the exhaust E, and permit the steam contained in the water-chamber A to escape to the open air, thus relieving the water-chamber A from boiler-pressure. At the instant that the steam exhausts, as above described, the check-valve R in the outlet-pipe X, between the feeder and the boiler, closes, and as the steam-pressure is out the siphon D commences to operate to fill the water-chamber A from the well or reservoir, drawing its supply through the pipe I. As the water-chamber A fills up the float S ascends with the water until, when nearly at the top, it has so moved the auxiliary valve J that it closes communication between the steam-chambers H and U, and opens communication between the upper and lower ports, L L, in the valve-stem T, thus permitting the steam to exhaust from the chamber U to the open air by way of the principal exhaust-pipe F. The pressure is now removed from the top of the valve-stem T, and, as pressure always exists upon the lower side of the double-faced valve C when the feeder C is in operation, it will force the valve C up and close it upon its upper valve-seat, thus opening communication between the steam-chamber H and the water-chamber A and renewing the boiler-pressure in the water-chamber A, and permitting the water contained in the chamber A to flow through the pipe X and check-valve R into the boiler, as it necessarily seeks its level.

When the float has fallen to the line first described the operation is repeated as frequently as the boiler needs water. The variation of the height of the water in the boiler is but trifling. The auxiliary valve J is arranged, with relation to its connections and ports L L, so that when it has opened the upper port L sufficiently to admit steam enough to drive the main valve C down, the said valve C in its descent will open the port still farther, permitting freer passage of the steam. The same result is obtained with relation to the exhaust from the steam-chamber U in the upward movement of the main valve C.

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

1. In a boiler-feeder, the double-faced valve C, provided with steam-passage V and stem T, having ports L L, in combination with the auxiliary valve J, connecting-rod O O, and rock-shaft M, constructed and operating substantially as and for the purposes set forth.

2. In a boiler-feeder, the steam-valve and siphon-case B, provided with the steam-chambers H and U, steam and water inlets and outlets F, G, E, and I, constructed and operating substantially as and for the purposes set forth.

3. The combination, with the water-chamber A, provided with the float S, inlet W, and outlet R X, of the rock-shaft M, counter-balance N, connecting-rod O O, the stem T, valves J C, and case B, having steam and water inlets and outlets, constructed and operating substantially as and for the purposes set forth.

4. In a boiler-feeder, the siphon D and water-pipe I, having check-valve P, in combination with the water-chamber A, having float S, case B, having steam and water inlets and outlets E F G I, valves C J, steam-chambers H U, and cranks and rods O O, constructed and operating substantially as and for the purposes set forth.

In testimony that I claim the foregoing improvements, as above described, I have hereunto set my hand and seal this 26th day of June, 1878.

JOSIAH M. SIMPSON. [L. S.]

Witnesses:
O. H. HARRIS,
J. B. MCLERAN.