(No Model.)

J. A. ADAMS.

STEAM BOILER FEEDER.

No. 345,355. Patented July 13, 1886.

Fig. II.

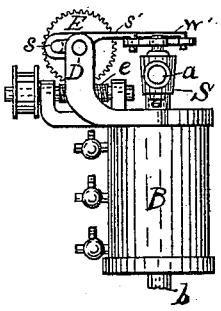


Fig. I.

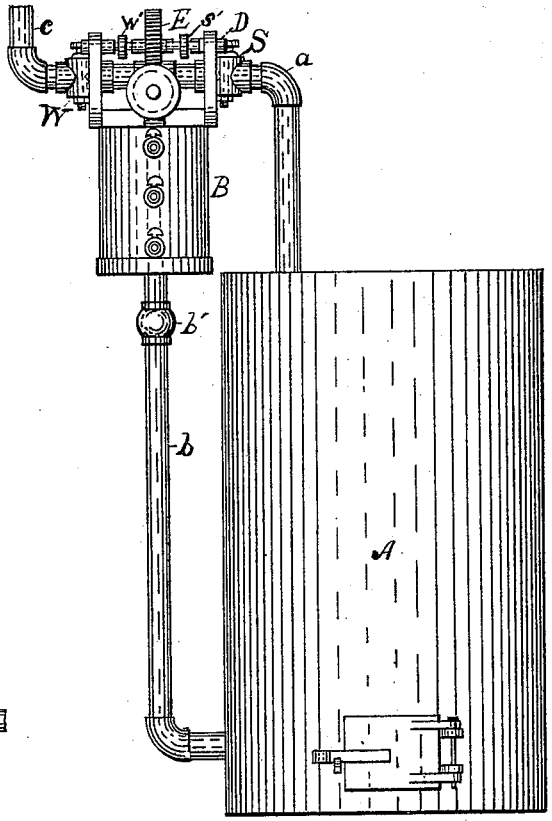


Fig. III.

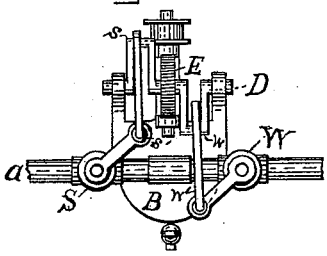


Fig. IV.

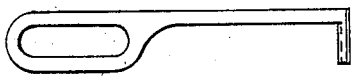
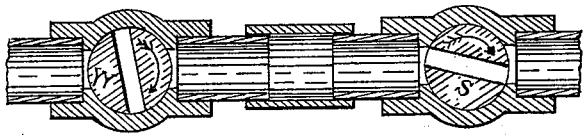


Fig. V.



Witnesses.

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UNITED STATES PATENT OFFICE.

JAMES A. ADAMS, OF ATLANTA, GEORGIA, ASSIGNOR OF ONE-HALF TO LOUIS NEWELT, OF SAME PLACE.

STEAM-BOILER FEEDER.

SPECIFICATION forming part of Letters Patent No. 345,355, dated July 13, 1886.

Application filed May 12, 1886. Serial No. 202,006. (No model.)

To all whom it may concern:

Be it known that I, JAMES A. ADAMS, a citizen of the United States, residing at Atlanta, in the county of Fulton and State of Georgia, have invented certain new and useful Improvements in Steam-Boiler Feeders; and I do 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, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention is a device for filling boilers by isolating the desired quantity of water and giving it a free passage to the boiler, the back-pressure from which is counterbalanced by a pressure of steam, allowing the water to flow in by gravitation; and it consists in a reservoir, pipes, and valves and the necessary machinery to operate these valves, as will be hereinafter fully set forth.

In the accompanying drawings, Figure I is a side view showing a boiler with the feeder attached. Fig. II is a side view of the feeder, showing the worm-gear. Fig. III is a top view of the device, showing the cranks, connections, and valve-levers. Fig. IV is a view of one side of the connection from the cranks to the valve-lever. Fig. V is a horizontal section through the valves, showing their positions.

In the figures, A represents a steam-boiler; B, a reservoir connected with the boiler by the steam-pipe *a*, and the boiler feed-pipe *b*, provided with a check-valve, *b'*, and with the water-tank by the pipe *c*. The steam-pipe *a* is provided with a valve, S, and the pipe *c* with a valve, W. Journaled on suitable brackets is the shaft D, having cranks *w* and *s*, which are connected to levers of the valves by the connecting-rods *w'* and *s'*. On the shaft D is a worm-gear, E, which is driven by the screw *e*, the screw *e* deriving its motion from any convenient connection.

p p p are petcocks.

The operation of this device is as follows: On opening the valve W the cylinder B fills with water, by gravitation from either a tank or other supply at a higher elevation, after which the valve W is closed. The reservoir B being placed higher than the level of the water in the boiler, the water would flow into the boiler by gravitation but for the pressure against the check-valve *b'*, to counterbalance which steam is admitted by opening the valve S, thus allowing the water to flow to the boiler. The steam-valve S is then closed and the water-valve W is opened. The expansion of steam in the reservoir forces a portion of it into the water-pipe *c*, where it is immediately condensed, and allows the water to flow into and fill the reservoir, after which the valve W, being again closed, the water is caused to flow into the boiler by the means that has already been described. These valves are actuated by the cranks *w* and *s*, each revolution of which completes the operation of putting a reservoir full of water into the boiler. The connecting-rods having a slot in one end provide for a sufficient lost motion, so that the valves are allowed to stand open and closed each for a portion of a revolution. These valves are preferably of a kind that are opened and closed by a partial rotary movement, and are set in such a way that either will close before the other opens. This result is accomplished by setting them as shown in Fig. V. The abutment of the valves on their sides being considerably greater than the breadth of the opening through them, and each valve turning in the direction indicated and at the same time, it is obvious that the valve S will have closed before the valve W commences to open, and as it is intended that these valves shall have about a quarter-turn, the same would result from their reverse movement. As it is found that the water flows with only a moderate speed into the reservoir or out of it, it is desirable to run the crank-shaft D at a very slow velocity, and the worm-gear and screw, substantially as shown, are found to be a convenient arrangement for reducing an ordinary speed to the speed required. The heat of the steam being absorbed by the water entering the boiler, its loss, as used in pumps, as well as the uncertainty of injectors, is avoided. Whenever it is desirable to know whether the speed of the cranks is right, to allow the reservoir to fill and discharge it can be ascertained by the petcocks.

Having thus described my invention, what

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

1. In a steam-boiler feeder, a reservoir having pipe-connection with the boiler from its bottom by a descending pipe provided with a check-valve and from its top by a steam-pipe, and with a water-tank by an ascending water-supply pipe, the steam and water supply pipes each having a valve to be opened and closed alternately, for the purpose of allowing feed-water to flow into a steam-boiler by gravitation, substantially as described.

2. In a steam-boiler feeder, the combination of a reservoir having a pipe-connection in which there is a check-valve from its bottom to the boiler, and a steam-pipe connection from its top to the boiler in which is a semi-rotary valve which is actuated by a lever, and a pipe-connection provided with a semi-rotary valve actuated by a lever to the water-tank, and the crank-shaft and connecting-rods by which the semi-rotary valves are operated, substantially as shown, and for the purpose specified.

3. In a steam-boiler feeder, the combination of the reservoir B, the feed-pipe *b*, having check-valve *b'*, the steam-pipe *a*, having semi-rotary valve S, the water-pipe *c*, having semi-rotary valve W, the cranks *s* and *w*, connecting-rods *s'* and *w'* from the cranks to the lever on the semi-rotary valves, and the worm-gear E and screw *e*, arranged substantially as described, and for the purpose specified.

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

JAMES A. ADAMS.

Witnesses:
H. N. WYLIE,
LEWIS REDWINE.