

No. 683,630.

Patented Oct. 1, 1901.

H. H. WESTINGHOUSE.
FEED WATER REGULATOR.

(Application filed Oct. 22, 1900.)

(No Model.)

Fig. 1.

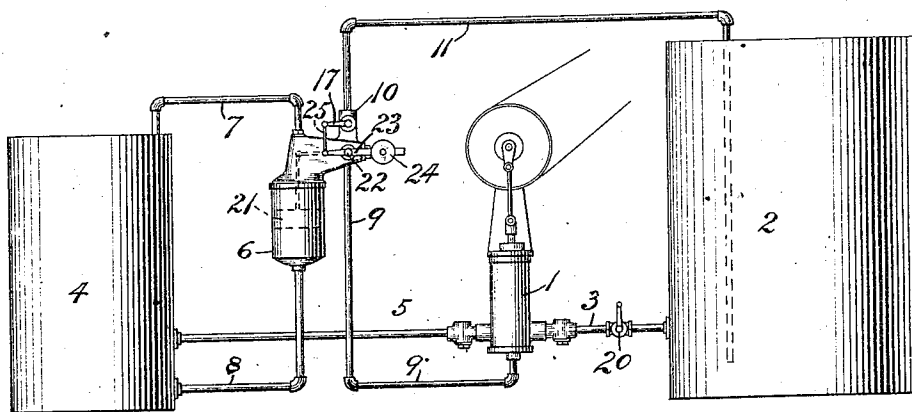


Fig. 2.

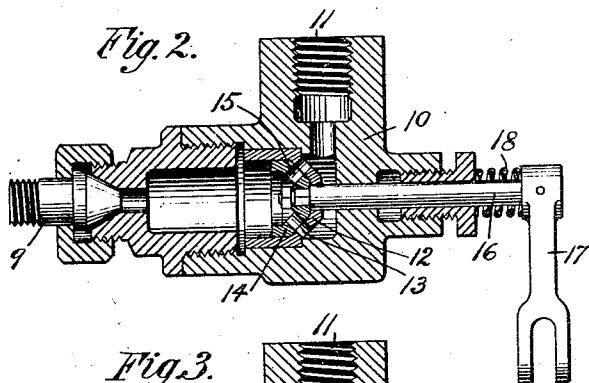
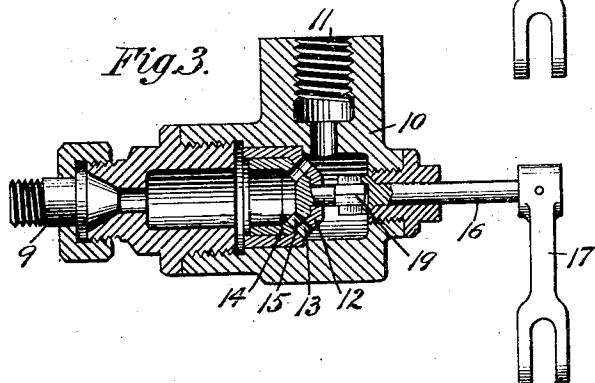


Fig. 3.



WITNESSES:

E. Wright
J. Custer

INVENTOR,

H. H. Westinghouse,
by T. J. Hogan, Att'y.

UNITED STATES PATENT OFFICE.

HENRY HERMAN WESTINGHOUSE, OF EDGEWOOD PARK, PENNSYLVANIA.

FEED-WATER REGULATOR

SPECIFICATION forming part of Letters Patent No. 683,630, dated October 1, 1901.

Application filed October 22, 1900. Serial No. 33,860. (No model.)

To all whom it may concern:

Be it known that I, HENRY HERMAN WESTINGHOUSE, a citizen of the United States, residing at Edgewood Park, county of Allegheny, State of Pennsylvania, have invented or discovered a certain new and useful Improvement in Feed-Water Regulators, of which improvement the following is a specification.

My invention relates to feed-water regulators for boilers, and has for its object to provide an improved form of regulating-valve which will not stick to its seat, but one which will always be free to move under the action of a float or other means controlled by the water-level in the boiler.

Heretofore regulating-valves have been used which were held against their seats by a continuous pressure and it was found that such valves very soon became stuck to their seats, owing to the friction and accumulation of sediment, so that the valves would not open and close properly under the action of a float to regulate the supply of water to the boiler.

My invention consists in an improved form of regulating-valve so located in a water-pipe connected to the pump that the suction-stroke of the pump tends to draw the valve from its seat and means controlled by the water-level in the boiler for moving said valve on its seat or parallel with its seat, whereby the valve will be opened or closed according to the height of the water in the boiler. By this means the valve is loosened from its seat at each stroke of the pump and is thereby balanced, so that there will be no friction or sticking of the valve; but the same may be freely operated by the float or other means governed by the water-level in the boiler to open and close the valve.

I have illustrated my improvement in the accompanying drawings, in which—

Figure 1 is a diagram showing the boiler, feed-pump, supply-tank, and the various pipe connections; Fig. 2, a sectional view showing my improved form of regulating-valve, and Fig. 3 a sectional view showing a modified construction of valve adapted to be used as a suction-valve of the pump.

As shown in Fig. 1, the feed-pump 1 is connected to the supply-tank 2 by the suction-

pipe 3 and to the boiler 4 by the delivery-pipe 5, these pipes being supplied with the usual check-valves. The pump may be operated in any convenient way, as by a belt-pulley and crank-shaft, or in case my device is applied to an automobile the pump may be operated from a wheel or axle of the carriage. Another pipe 9 is connected directly to the pump and leads to the regulating-valve casing 10, from which the outlet or return pipe 11 leads to the bottom of the supply-tank 2. As a means for controlling the regulating-valve according to the height of water in the boiler I have shown a float 21, located in a float-chamber 6, which is connected to the boiler by pipes 7 and 8. The float is adapted to rock the shaft 22, which extends outside the chamber and is provided with an arm 23, on one end of which is located the balance-weight 24, the other end being connected to the arm of the valve by means of the rod 25. It is obvious that other means controlled by the water-level in the boiler may be used for operating the regulating-valve.

In the valve-casing 10, as shown in Figs. 2 and 3, is located the valve-seat 12, having openings or ports 13 and provided with a cylindrical extension or bushing which fits within the casing. In the bushing the regulating-valve 14 is located, which is also provided with ports 15. I have shown the valve and valve-seat of conical form, as this gives a tight joint between the valve and its seat at the downstroke of the pump; but it is evident that the valve might be in the form of a flat disk or some other form adapted to move on its seat or parallel with its seat to open and close the ports therein. The stem 16 of the regulating-valve 14 extends out through the casing and is provided at its outer end with an arm 17, by which the valve may be rotated. The valve 14 is in direct communication with the pump, so that each suction-stroke of the pump tends to draw the valve away from its seat, while at each downward stroke the valve is forced against its seat by the water-pressure.

In Fig. 2 is shown a light spring 18, which may be used to partially counteract the effect of the suction on the valve and prevent the same from moving away from its seat; but

even when the spring is used the valve will be loosened from its seat at each stroke of the pump, so that it will be balanced as to pressure and there will be no friction between the valve and its seat to cause the same to stick or to prevent its free rotation under the action of the float.

In Fig. 3 I have illustrated a slightly-modified form in which a sliding joint 12 is provided in the valve-stem 16, whereby the valve 14 may reciprocate to and from its seat at each stroke of the pump, but at the same time adapted in all positions to be rotated by the arm 17, which is operated by the float. It will be seen that by this construction when the valve is drawn away from its seat by the suction-stroke of the pump there will be a free opening for the passage of water from the tank or pipe 11 through the ports of the valve to the pipe 9, whether the ports 13 and 15 in the valve and its seat happen to be in register or not, and the water will be drawn into the pump. Then at the downward stroke of the pump the water will be forced into the boiler or back into the tank according as the ports in the regulating-valve 14 are held closed or open by means of the float. In this way the regulating-valve may be used as a suction-valve of the pump and the shut-off cock 20 in the suction-pipe 3 may be closed, or said suction-pipe may be dispensed with altogether.

The operation of my device is as follows: When the water becomes low in the boiler, the float rotates the valve 14 to close the same, so that the ports 15 do not register with the ports 13 in the valve-seat. Consequently the pressure at each downward stroke of the pump forces the valve 14 against its seat and prevents any water from returning to the tank through pipe 11. Then the feed-pump 1, which is operating continuously or when the carriage is running, draws water from the supply either through pipe 3 and its check-valve or through pipe 11 and the regulating-valve and forces it into the boiler through pipe 5. As the water in the boiler rises to a point at or above the normal water-level the float rotates the valve 14, so as to open the ports through the valve-seat. Then the water from the pump will be discharged back into the tank through pipe 11, and no more water will enter the boiler until the water-level therein has lowered sufficiently to allow the float to close the ports of the regulating-valve. The water will then be supplied to the boiler again, as before described.

The valve is free to be rotated by the float at all times, since it is loosened from its seat at each suction-stroke of the pump, and this loosening of the valve from its seat at each stroke of the pump not only balances the valve as to pressure, but prevents the accumulation of sediment or corrosion, which would tend to cause a sticking of the valve.

Having now described my invention, what

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

1. In a feed-water regulator for boilers, the combination with a feed-pump and a pipe or passage in open communication therewith, of a regulating-valve so located in the said passage that the suction of the pump tends to draw the valve away from its seat, and means controlled by the water-level in the boiler for moving said valve parallel with its seat to open and close said valve.

2. In a feed-water regulator for boilers, the combination with a pump for supplying water to the boiler, of a pipe or passage in open communication with the pump, a regulating-valve so located in said passage that the pressure from the pump forces the valve against its seat while the suction of the pump tends to draw the valve from its seat, and means controlled by the water-level in the boiler for moving said valve parallel with its seat to open and close the valve.

3. In a feed-water regulator for boilers, the combination with a feed-pump and a pipe or passage in open communication therewith, of a regulating-valve so located in said passage that the suction of the pump tends to draw the valve from its seat, and means controlled by the water-level in the boiler for rotating said valve.

4. In a feed-water regulator for boilers, the combination with a feed-pump and a pipe or passage in open communication therewith, of a regulating-valve so located in said passage that the suction of the pump tends to draw the valve from its seat, a valve-seat having ports therein, and means controlled by the water-level in the boiler for moving said valve to open and close said ports.

5. In a feed-water regulator for boilers, the combination with a feed-pump and a pipe or passage in open communication therewith, of a conical regulating-valve and a conical valve-seat therefor, the said valve being so located in said pipe that the suction of the pump tends to draw the valve from its seat, and means controlled by the water-level of the boiler for rotating said valve.

6. A boiler feed-water regulator, comprising a tank, a feed-pump, a suction-pipe connecting the pump with the tank, a delivery-pipe connecting the pump with the boiler, a return-pipe connecting the pump with the tank, a regulating-valve so located in said return-pipe that the suction of the pump tends to draw the valve from its seat, and a float for said rotating valve.

7. In a feed-water regulator for boilers, the combination, of a feed-pump for supplying water to the boiler, a pipe connected to the pump, a conical valve-seat having ports therein, a conical regulating-valve, so located in the pipe that the suction of the pump tends to draw the valve from its seat and pressure from the pump forces the valve to its seat, said valve also having ports therein, and

means controlled by the water-level of the boiler for rotating said valve.

8. In a feed-water regulator for boilers, the combination, of a feed-pump for supplying
5 water to the boiler, a pipe or passage in open communication with the pump, a regulating-valve so located in said passage that the suction of the pump tends to draw said valve from its seat, a spring which tends to hold
10 the valve to its seat, and means controlled by the water-level in the boiler for operating said valve.

9. In a feed-water regulator for boilers, the combination with a feed-pump having the
15 usual suction and discharge passages, of a separate outlet pipe or passage communicating with the pump, a regulating-valve so located in said outlet-passage that the suction of the pump tends to draw the valve away

from its seat, and means controlled by the 20 water-level in the boiler for operating said valve.

10. In a feed-water regulator for boilers, the combination with a feed-pump having suction and discharge passages, of a separate 25 outlet pipe or passage communicating with the pump, a valve-seat in said outlet-passage, a regulating-valve located on the side of said seat toward the pump, and means controlled by the water-level in the boiler for operating 30 said valve.

In testimony whereof I have hereunto set my hand.

HENRY HERMAN WESTINGHOUSE.

Witnesses:

R. F. EMERY,

E. A. WRIGHT.