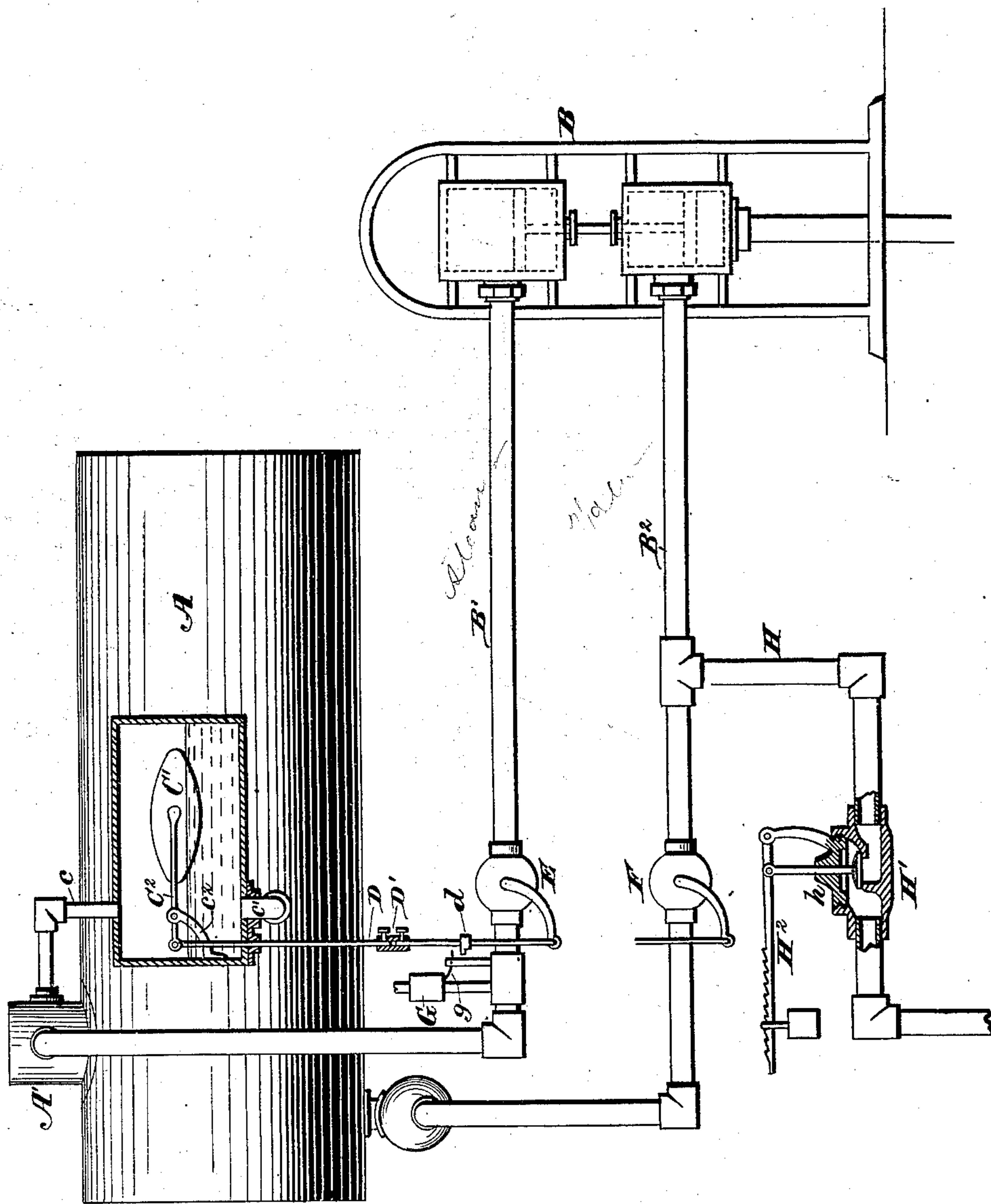


(No Model.)

J. BALL.  
FEED WATER REGULATOR.

No. 278,077.

Patented May 22, 1883.



Witnesses.  
*Robert Everett.*  
*A. H. Norris.*

Inventor.  
*Jacob Ball.*  
*By Wells W. Leggett.*  
*Atty*

# UNITED STATES PATENT OFFICE.

JACOB BALL, OF GREENVILLE, MICHIGAN, ASSIGNOR OF ONE-HALF TO  
J. S. CHASE, OF SAME PLACE.

## FEED-WATER REGULATOR.

SPECIFICATION forming part of Letters Patent No. 278,077, dated May 22, 1883.

Application filed August 24, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, JACOB BALL, of Greenville, county of Montcalm, State of Michigan, have invented new and useful Improvements in Feed-Water Regulators for Boilers; and I declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawing, which forms a part of this specification.

My invention consists in the combinations of devices and appliances hereinafter specified, and more particularly pointed out in the claims.

In the drawing the figure is a side elevation of a device embodying my invention, showing parts in section.

Heretofore, in the use of steam-boilers, much difficulty has been experienced in overcoming the danger of low water in the boiler.

It is the object of my invention to provide devices, which may be secured to any steam-boiler, which will insure a certain depth of water therein continually, and prevent any hazard attending the operation of steam-boilers for lack of sufficient water being supplied thereto. I accomplish this result by constructing a chamber or vessel, which may be attached to the boiler by steam and water pipe connections, said chamber or vessel containing a float, which operates a suitable lever when the water is below a given depth, this lever connecting with and operating suitable valves located in the steam and water pipes, connecting the main boiler and the pump in such a manner as to set the pump in operation when the water falls below the required depth in the boiler. Should the pump fail to respond for any reason, I provide means by which a signal-whistle is given.

In the drawing, A represents a boiler of any ordinary construction. A' is the steam-drum connected therewith.

B is any ordinary pump. B' is the steam-pipe, and B<sup>2</sup> the water-pipe connecting said pump to the boiler A.

C is a chamber or vessel of any suitable size and shape. c is a steam-pipe connecting the chamber or vessel to the steam space or drum

of the boiler A. c' is a water-pipe appropriately connecting the chamber to the boiler. The chamber C may be attached to the boiler A by its steam and water pipe connections, sidewise or endwise, either to the side or end of the main boiler. I do not limit myself to any given position, as it may have any suitable location without departing from the principle of my invention. Said chamber is provided with an interior float, C', and float-lever C<sup>2</sup>. c<sup>2</sup> is the arm to which the lever is pivoted.

D is a rod secured to the end of the lever C<sup>2</sup>, and connecting it with the valve or steam cock E in the steam-pipe B', and with the valve F in the water-pipe B<sup>2</sup>. This rod is preferably provided with a set-screw connection, D', for the purpose of lengthening or shortening the rod, if desired. The valve or steam cock E may be of any suitable construction, as may also the valve F.

The operation of the device will now be understood. It is evident that the float in the chamber C will rise and fall with the water in the boiler. When the water falls below the desired gage the float will fall with it and open the valve E in the steam-pipe B', letting on steam to start the pump. The falling of the float at the same time opens the valve F in the water-pipe B<sup>2</sup>, through which water is forced into the main boiler from the pump. When the boiler has been filled to the required depth the float rises to the proper level, closing the valves and stopping the pump. To guard against any liability of the pump failing to operate, for any cause whatever, I provide the rod D with a dog, d, located in such a position that when the float has fallen sufficiently to open the valve E and let steam upon the pump, should it fail to work, a slight fall of the float farther would cause the dog d to engage against a lever, g, opening the alarm-whistle G. This whistle may have any suitable location.

The valve F in the water-pipe serves to control communication between the water-pump-cylinder and the boiler, and when in its closed position prevents the water in the boiler from flowing back to the pump.

I am aware that floats have been located in the main boiler to give an alarm when the



water is low, but in my invention the alarm is given when the pump fails to operate.

H is a waste-pipe connected with the water-pipe B<sup>2</sup>. H' is a suitable escape-valve located therein, provided with a weighted lever, H<sup>2</sup>, gaged to the amount of pressure desired to hold the valve down when valve F is open to the boiler. I prefer to construct the valve with a head, h, which can be taken out, if necessary. I also prefer to construct the chamber C with a removable head to permit of access to the inside of said attachment, if necessary.

It is evident that the distance the float will have to fall to open the valves E and F may be regulated as desired.

I would have it understood that I do not confine myself to any definite location of any of the parts herein described. As it is designed for attachment to any boiler and pump, the location of the parts embodied in my invention will have to vary somewhat with the varying positions of boilers and pumps and their connecting steam and water pipes.

For the operation of the valves E and F the rod D may have to be provided with branches connected to each. It may be the case that the rod D may have to be located in a different position from that shown in the drawings in order to connect my invention with boilers and pumps already located.

It will be seen that with this device attached to a steam-boiler and pump the danger of accidents from boiler explosion will be done away, either from the carelessness of the engineer or from other causes.

Many pumps are run continuously by a suitable power and are not shut off when the boiler is full. It is for such cases that the waste-pipe and valve located therein is provided, so that my device is adapted to be used with any pump, whether it works continuously or not.

When the pump works continuously the valve E may be disconnected from the rod D.

What I claim is—

1. A feed-water regulator for steam-boilers, consisting of a chamber having proper steam and water pipe connections with the boiler, said chamber provided with a float-lever mechanism, and in combination therewith suitable valves located in the steam and water pipes, uniting the pump and boiler, said valves provided with suitable connections with said float-lever, substantially as described.

2. A feed-water regulator for steam-boilers, consisting of a chamber having proper steam and water pipe connections with the boiler, said chamber provided with a float-lever mechanism, and in combination therewith suitable valves located in the steam and water pipes uniting the boiler and pump, said valves con-

nected with the float-lever mechanism by an intervening rod, and an alarm-whistle adapted to be operated by the float-lever mechanism, substantially as described.

3. A feed-water regulator for steam-boilers, consisting of a chamber-boiler having proper steam and water pipe connections with the boiler, said chamber provided with a float-lever mechanism, and in combination therewith suitable valves located in the steam and water pipes uniting the boiler and pump, said valves connected with the float-lever mechanism by an intervening rod, an alarm-whistle adapted to be operated by the float-lever mechanism, a waste-pipe leading from the water-pipe uniting the boiler and pump, said waste-pipe provided with a suitable valve, substantially as described.

4. The combination, with a steam-boiler and any ordinary pump, of a chamber united to said boiler by suitable steam and water pipe connections, said chamber provided with a float-lever mechanism, and suitable valves located in the steam and water pipes uniting the boiler and pump, said valves connected with the float-lever mechanism, substantially as described.

5. The combination, with a steam-boiler and any ordinary pump, of a chamber united to said boiler by suitable steam and water pipe connections, said chamber provided with a float-lever mechanism, suitable valves located in the steam and water pipes uniting the boiler and pump, said valves connected with the float-lever mechanism, an alarm-whistle adapted to be operated by the float-lever mechanism, a waste-pipe leading from the water-pipe uniting the boiler and pump, said waste-pipe provided with a suitable relief-valve, substantially as described.

6. The combination, with a steam-boiler and any ordinary pump, of a chamber united to said boiler by suitable steam and water pipe connections, said chamber provided with a float-lever mechanism, suitable valves located in the steam and water pipes uniting the boiler and pump, said valves connected with the float-lever mechanism in such a manner that the valve in the steam-pipe may be disconnected therefrom, a waste-pipe leading from the water-pipe uniting the boiler and pump, said waste-pipe provided with a suitable valve, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

JACOB BALL.

Witnesses:

J. EDWARD WARREN,  
N. S. WRIGHT.