

UNITED STATES PATENT OFFICE.

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FEED-WATER REGULATOR.

SPECIFICATION forming part of Letters Patent No. 683,359, dated September 24, 1901.

Application filed April 18, 1901. Serial No. 56,418. (No model.)

To all whom it may concern:

Be it known that I, JAMES E. WALSH, a citizen of the United States, residing at Hudson, county of Middlesex, and State of Massachusetts, have invented an Improvement in Feed-Water Regulators, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention is an automatic mechanism for regulating the supply of feed-water to a boiler according to the height of the water in the water-column or in the boiler, and it comprises, stated in general terms, a float rising and falling according to the changing level of water in the boiler and operating to automatically open or close a valve controlling the water-supply and also preferably to regulate correspondingly the steam-supply leading to the pump.

In the drawings, in which I have shown a preferred embodiment of my invention, Figure 1 is a vertical sectional view of one form of the apparatus, parts being broken away for convenience of illustration. Fig. 2 is a similar sectional view taken at right angles thereto. Fig. 3 is an enlarged sectional view of the float, showing also the automatic steam-controller.

For convenience of illustration and description I have herein shown my invention as applied externally to a boiler A in connection with a water-column A'; but it will be understood that it may be otherwise located according to the requirements of the plant or convenience of the structure. The water-column A' is connected in usual manner to the boiler A by a lower water-pipe a and an upper steam-pipe a' and supplied with water through a pipe a^2 by any suitable means, a pump B being herein shown for the purpose, said pump being preferably driven by steam supplied through a pipe a^3 . Within the water-column A' is a float a^4 of any suitable construction, said float having at a convenient place (herein shown as at a^5) a steam-inlet, preferably consisting of a loose joint a^6 , surrounding the steam-pipe a^3 , so that as the steam flows through the pipe a' and into the upper portion of the water-column it enters freely within the float and passes through ports a^7 , provided in a guide-column or tubu-

lar slide a^8 , standing centrally within the drum, into the pipe a^3 , which depends from the top of the water-column, and enters within the float and tube a^8 . This is the preferred construction, although it will be understood that the requirement is merely that the pipe a^3 shall have means for regulating the flow of steam therethrough, said means being operated by the rising and falling of the float, and the construction preferably requires that one of these members shall have ports to be closed by the reciprocating movement between them, and together they really constitute a slide-valve. As the float rises and falls, according to the varying height of water in the column A', the lower end of the pipe a^3 serves to open or close correspondingly the ports a^7 , thereby permitting the steam to pass with more or less freedom through said ports into the pipe a^3 for running the pump B or performing such other work as may be required in the operation of the plant. Also as the float rises and falls it serves automatically to cut off or open the passage through the pipe a^2 . For the latter purpose a valve C (herein shown as a balanced valve) is provided below the float, being contained in a casing c , having a stuffing-box c' at its upper end, through which passes a rod c^2 , rigidly depending from the float, to the lower end of which is secured the valve proper, c^3 , operating against opposite ways c^4 c^5 in a well-known manner.

As more or less water will condense from the steam inside of the float, I provide drip-tubes a^9 in the bottom of the float, connecting with each other at a^{10} and provided with a spiral or extensible portion a^{12} in the lower part of the column and passing out at a^{13} , a valve a^{14} being contained at any suitable location, so that the condensed water may be permitted to run off at any time desired.

In operation as the pump B forces water through the pipe a^2 into the boiler, thereby gradually raising the level thereof, the float a^4 correspondingly rises and automatically cuts off the steam-supply, which enters into the pipe a^3 through the ports a^7 and passes thence to the pump, so that in this manner the pump is gradually slowed down until the boiler gets full, when it is stopped, and at the same time the passage of the water through the pipe a^2 is gradually shut off, thereby pre-

venting any back pressure therefrom on the engine or connected parts.

The apparatus, as will be readily understood without further description, operates automatically as the water descends, permitting more steam to pass through the ports a^7 into the pipe a^3 , thereby starting up the pump, while at the same time the valve C is operated to permit the water to flow readily into the boiler.

I am aware that many changes in arrangement and combination of parts may be resorted to without departing from the spirit and scope of my invention.

For ordinary day service, and especially in large plants, the apparatus will ordinarily be used as shown, employing both the steam-cut-off valve and the water-cut-off valve; but in other situations, and particularly at night, it is sometimes desirable simply to turn on the said water from the hydrant instead of depending upon the pump and deliver the steam from the boiler to any portion of the office or building which it may be desired to keep warmed at a low temperature through the night. This change from day service to night service is required in some plants, and my apparatus makes it extremely easy of accomplishment, while during the day or work time both the steam and water valve may be used in the regular way, as above explained.

My invention is capable of various other adaptations and uses, and accordingly I do not limit myself otherwise than as specified hereinafter in the claims.

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

1. In a feed-water regulator for a boiler, a float arranged to rise and fall automatically as the water-level changes, a steam-delivery pipe, said pipe terminating within said float, a steam-inlet in said float permitting the steam to enter freely, and a device within said float and against which said pipe slides, one being provided with ports for the passage of steam into said pipe from said float, said ports being opened and closed by said sliding movement.

2. In a feed-water regulator for a boiler, a float arranged to rise and fall automatically as the water-level changes, a steam-delivery pipe, said pipe extending within said float, a steam-inlet in said float permitting the steam to enter freely, a device within said float and against which said pipe slides, one being provided with ports for the passage of steam into

said pipe from said float, said ports being opened and closed by said sliding movement, and a drip-pipe secured to the bottom of said float and provided with an extensible connection for conducting away drippings.

3. In a feed-water regulator for a boiler, a float arranged to rise and fall automatically as the water-level changes, said float having a guide-column extending vertically therein, and a steam-delivery pipe terminating in said float, the latter being guided thereon by said guide-column, said steam-pipe freely receiving steam from said float.

4. In a feed-water regulator for a boiler, a float arranged to rise and fall automatically as the water-level changes, said float being freely open to the entrance of steam at its upper side, a guide-column within the float, a steam-pipe terminating within the float, and cooperating with said guide-column, a drip-pipe for collecting the condensations from said float and from said steam-pipe, and means for conducting away the drippings from said drip-pipe.

5. In a feed-water regulator for a boiler, a float arranged to rise and fall automatically as the water-level changes, said float being freely open to the entrance of steam at its upper side, a guide-column within the float, and cooperating with said guide-column, opposite drip-pipes symmetrically secured to the bottom of said float, and a coil of pipe connected to said drip-pipes at one end and passing at its other end through the inclosure of the regulator for conducting the condensation away.

6. A feed-water regulator comprising a water-column containing a float, said float being open at its top to the free entrance of steam, a steam-pipe passing through the wall of said water-column and terminating within said float, a drip-pipe secured to the bottom of said float for catching the drippings from said steam-pipe and float and conducting the same from said water-column, a water-pipe passing across said water-column, a valve in said pipe, and a connection from said float to said valve for operating the latter by the movement of said float, thereby regulating the flow of water according to the position of the float.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES E. WALSH.

Witnesses:

ALTON B. SMALL,
OLIVE C. FLAGG.