W. E. GUISE.

BOILER FEED WATER REGULATOR.

APPLICATION FILED JULY 17, 1919.

1,383,936.

Patented July 5, 1921.

Fig. 1.

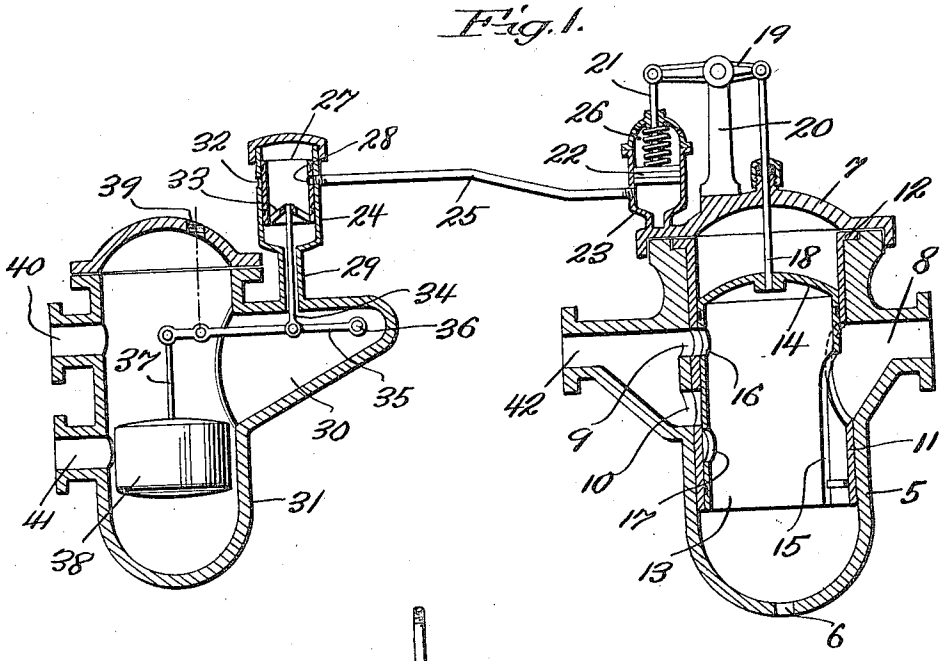


Fig. 2.

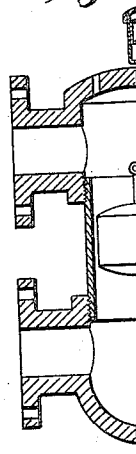


Fig. 3.

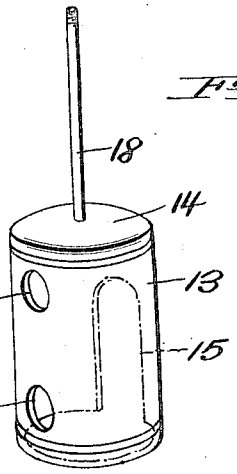
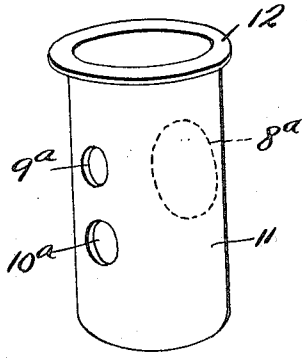


Fig. 4.



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BOILER-FEED-WATER REGULATOR.

1,383,936. Specification of Letters Patent. Patented July 5, 1921.

Application filed July 17, 1919. Serial No. 311,476.

To all whom it may concern:

Be it known that I, WILLIAM E. GUISE, a citizen of the United States, residing at Rittman, in the county of Wayne and State of Ohio, have invented certain new and useful Improvements in Boiler-Feed-Water Regulators. of which the following is a specification.

This invention has for its object to provide an improved automatic regulator for the water feed valve of a steam boiler in which the feed or supply valve is automatically opened when the quantity of water in the boiler becomes dangerously low by the pressure of the water acting directly upon the valve, assisted by adequate spring means thus permitting the water to flow into the boiler.

Another object is the provision of a regulator of this character in which the feed valve is automatically returned to closed position after the water in the boiler has been brought up to normal level, by admission of steam to a cylinder receiving a piston which is connected with the feed valve to actuate the latter.

A still further object resides in the provision of a steam valve controlling the admission of steam to the cylinder of the valve operating piston which is controlled directly by a float arranged to float upon the surface of the water in the boiler.

With these and other objects in view as will appear as the description proceeds the invention comprises the novel features of construction, combination of elements and arrangement of parts which will be more fully described in the following specification and set forth with particularity in the claims appended hereto.

Figure 1 represents a longitudinal sectional view through the improved regulator.

Fig. 2 represents a perspective of the water feed valve removed from the case.

Fig. 3 represents a perspective of the bushing which is arranged internally of the valve case.

Fig. 4 is a detail sectional view showing a modification in the arrangement of the steam valve.

Referring to the drawing in detail, wherein similar reference numerals designate parts throughout the several views, the numeral 5 indicates a cylindrical valve case or housing having a closed lower terminal in which is formed a drain port 6 and provided with an open terminal receiving a removable cap 7. An inlet port 8 is formed at one point in the side wall of the case 5 and at its diametrically opposite point superposed outlet ports 9 and 10 are formed therein, the port 9 being of relatively small diameter and normally open so as to normally admit a predetermined quantity of water to flow into the steam boiler. A bushing 11 is fitted in the bore of the valve case 5 and is formed with ports 8^a, 9^a and 10^a which register with the ports 8, 9 and 10 in the valve case 5. The upper terminal of the bushing is flanged as at 12 and is anchored in a seat formed in the valve case 5 beneath the demountable cap 7, being held seated by said cap.

A hollow cylindrical valve 13 having a closed upper terminal 14 and an open lower terminal is mounted for vertical reciprocation in the bushing 11 of the valve case and is provided at one side with a relatively long opening or port 15 which permanently registers with the inlet port 8 of the valve case admitting water to the interior of the cylindrical valve at all times. The side of the valve 13 opposite the port 15 is formed with relatively small and large longitudinally spaced ports 16 and 17 adapted for alternate registration with the ports 9 and 10 whereby the water contained in the valve is permitted to alternately flow into the ports 9 and 10, according to the position of the valve. As stated, the relatively small port 9 is normally covered by registration of the relatively small port 16 in the valve therewith but when the water supply in the boiler becomes below normal the valve 13 is elevated so as to move the relatively large port 17 thereof into registration with the port 10 so as to admit a greater quantity of water to the boiler and thus bring the water level up therein.

A stem 18 is fastened to the closed top 14 of the valve, extends through the cap 7 and is pivotally connected with one terminal of a rocker arm 19 pivotally supported in a post 20 secured upon the cap 7 and having pivotal connection at its opposite terminal with the stem 21 of a piston 22.

The piston 22 is reciprocably mounted in the cylinder 23 adequately supported upon the valve cap 7 and having connection with the interior of a steam valve case 24 by a steam pipe 25 which latter communicates with the lower portion of the cylinder 23 so as to admit steam thereto below the piston 22. The upper portion of the cylinder 23

is formed with a vent preventing back pressure above the piston 22 and an expansion coiled spring 26 is confined between the piston and the upper part of the cylinder so as to normally tend to depress the cylinder and thus elevate the valve 13 through its connection with the piston by the rocker arm 19.

An open ended sleeve-like valve 27 having a port 28 therein movable into registration with the terminal of the steam pipe 25 is slidably mounted in the valve case 24 and the latter is connected by a tubular extension 29 with a lateral hollow extension 30 of the float receiving receptacle 31. At a point diametrically opposite to the connection of the steam pipe 25 with the valve case 24, the latter is provided with an outlet port 32 while the passage of bore of the extension 29 is restricted to prevent rapid escape of the steam therethough, so that when port 32 is opened the steam will escape therethrough faster than it enters through the restricted passage 29 and hence relieve the pressure in cylinder 23 sufficiently to permit the piston 22 to descend under the action of its spring 26.

An internal spider 33 is formed in the lower terminal of the valve 27 and is connected by a rod 34 with an arm 35 pivotally supported at 36 in the lateral extension 30 of the float receptacle and carrying a depending stem 37 to which the float 38 is attached. If preferred, the upper part of the float receiving receptacle 31 may be formed with a port 39 for the reception of a signal operating device (not shown) which may be extended therethrough and connected at one terminal with the arm 35.

The upper portion of the receptacle 31 is formed with a steam port 40 and the lower portion thereof is provided with a water port 41 and the ports 40 and 41 are adapted for connection by suitable pipes (not shown), with the lower and upper portion of the boiler to which the automatic regulator is applied whereby steam and water are admitted to the receptacle.

In operation, the valve 13 is normally disposed in the position shown in Fig. 1 permitting a limited supply of water to flow through the relatively small ports 9 and 16 into the boiler through a suitable connection (not shown) from the hollow extension 42 of the valve case 5 to the boiler. The valve 13 is maintained in normal position by the steam acting upon the bottom of the piston 22, being admitted to the lower portion of the cylinder 23 through the valve port 28 and pipe 25. However, as the level of the water in the boiler lowers, the float 38 descends moving the arm 35 downwardly causing the valve 27 to uncover the port 32 and permitting the steam in the lower portion of the cylinder 23 and the pipe 25 to escape therethrough thereby reducing the pressure in cylinder 23 under piston 22. As the pressure in the lower portion of the cylinder 23 is relieved the pressure of the water acting upon the bottom of the valve head 14, assisted by the tension of the spring 26, elevates the valve 13 thus moving the relatively large port 17 into registration with the port 10 in the valve case and increases the water supply to the boiler so as to bring the level of the water therein to normal. As the level of the water in the boiler rises a corresponding movement of the float 38 is effected causing the valve 27 to return to its initial position registering the port 28 with the terminal of the pipe 25, and closing port 32 thus increasing the steam pressure in the lower portion of the cylinder 23. The pressure acting upon the bottom of the piston 22 elevates the latter against the tension of the spring 26 returning the main feed valve 13 to its initial position thereby covering the port 10 and reëstablishing communication between the ports 16 and 9.

As shown in the modification of the invention illustrated in Fig. 4, the float 38^a may be located entirely within the receptacle 31^a and the steam valve casing 24^a attached directly to the top of the receptacle.

What I claim is:

1. The combination of a valve casing having an inlet and an outlet port, a sleeve valve mounted to reciprocate in said casing and having an inlet port always in register with the inlet port of the casing and an outlet normally out of register with the outlet of the casing, pressure controlled means for holding said valve in normal position, a receptacle having a float, a valve connected to reduce the pressure in said means on the lowering of the float to a predetermined point thereby moving the sleeve valve to bring its outlet port into register with the outlet of the casing.

2. The combination of a valve casing having an inlet and an outlet port, a sleeve valve mounted to reciprocate in said casing and having an inlet port always in register with the inlet port of the casing and an outlet normally out of register with the outlet of the casing, a fluid tight cylinder having a spring projected piston therein, a connection between said piston and valve whereby the projection of the piston opens the valve, a steam pipe opening into said cylinder in advance of said piston to admit steam for holding the piston retracted against the tension of its spring, and float controlled means for cutting off steam from said pipe.

3. The combination of a valve casing having an inlet and an outlet port, a sleeve valve mounted to reciprocate in said casing and having an inlet port always in register with the inlet port of the casing and an outlet normally out of register with the outlet of

the casing, a fluid tight cylinder having a spring projected piston therein, a connection between said piston and valve whereby the projection of the piston opens the valve, a steam pipe opening into said cylinder in advance of said piston to admit steam for holding the piston retracted against the tension of its spring, another valve casing having an outlet in one side wall communicating with said steam pipe and an outlet opening to the atmosphere with a steam inlet in one end, an open end sleeve valve slidable in said casing with an outlet positioned to normally register with said steam pipe outlet and a float connected to open the outlet to the atmosphere when said float drops below a predetermined point.

In testimony whereof, I affix my signature hereto.

WILLIAM E. GUISE.