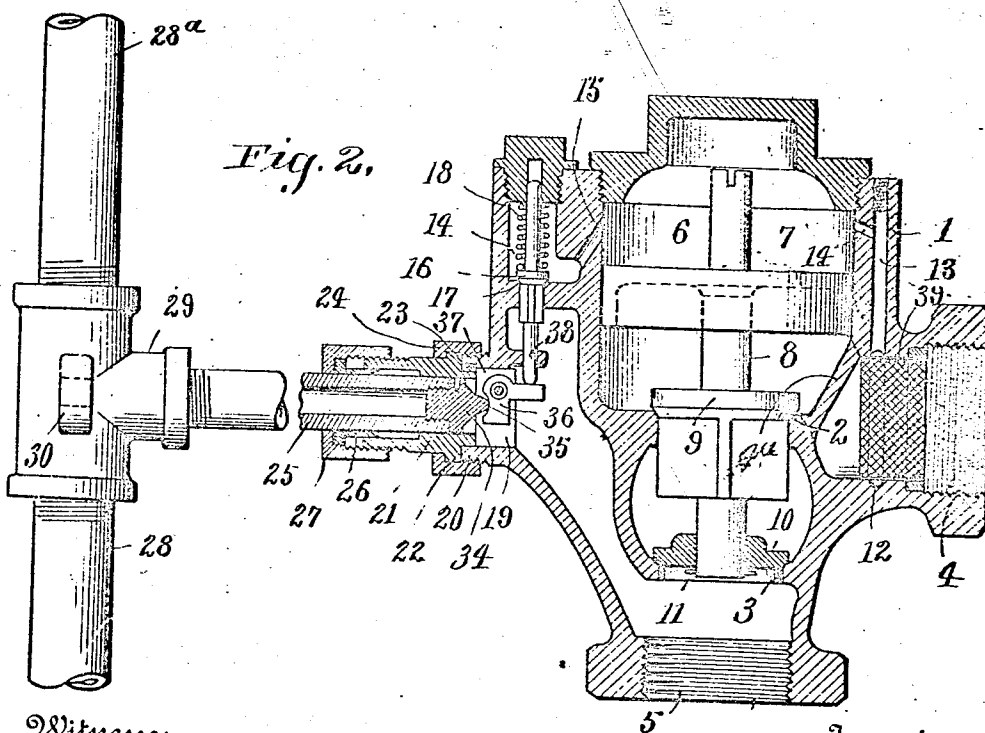
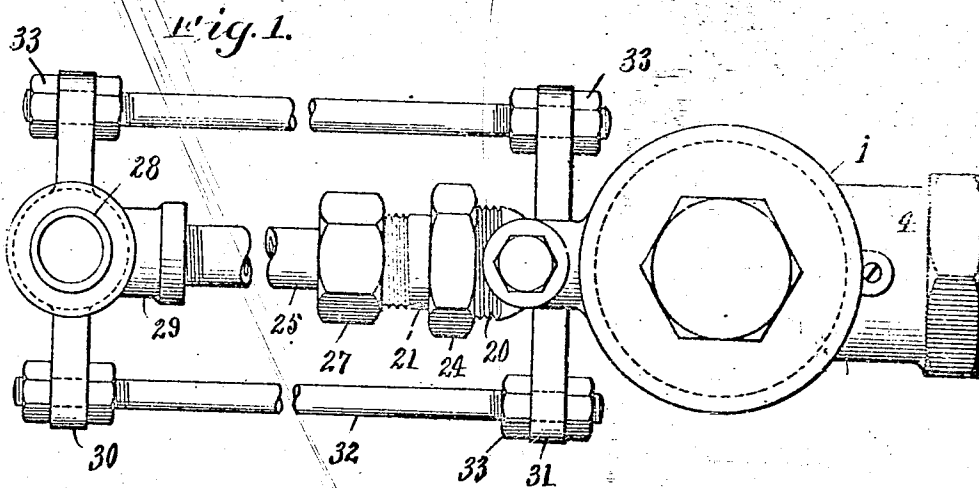


No. 895,342.

PATENTED AUG. 4, 1908.

G. W. COLLIN.  
BOILER FEED VALVE.  
APPLICATION FILED AUG. 17, 1907.



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# UNITED STATES PATENT OFFICE.

GEORGE W. COLLIN, OF MANSFIELD, OHIO.

## BOILER FEED-VALVE.

No. 895,342.

Specification of Letters Patent.

Patented Aug. 4, 1908.

Application filed August 17, 1907. Serial No. 389,061.

### *To all whom it may concern:*

Be it known that I, GEORGE W. COLLIN, a citizen of the United States, and resident of Mansfield, in the county of Richland and State of Ohio, have invented certain new and useful Improvements in Boiler Feed-Valves, of which the following is a specification.

This invention has relation to automatic thermostatically-operated boiler feed valves, and it consists in the novel construction and arrangement of its parts as hereinafter shown and described.

The object of the invention is to provide a boiler feed valve with a thermostat which is connected up with the boiler and which is operated by variations of temperature due to the element that it contains and which in turn operates the valve for automatically feeding water to the boiler.

The valve consists of a casing which is connected up with a water supply and which is also connected with the boiler. An auxiliary valve casing is attached to the aforesaid valve casing and is connected with the piston chamber thereof by a by-pass. A lever is located under the lower end of the stem of the auxiliary valve, which is located in the auxiliary valve casing, and thermostat is arranged to operate said lever. The thermostat consists primarily of a horizontal pipe or a pipe nearly in such position which is arranged to slide longitudinally in a gland and bushing or hub attached to the valve casing. Said pipe is located in alinement with the normal water line in boiler. The end of the said pipe located within the bushing is closed by a plug, the end of which is in engagement with one end of the lever which in turn is fulcrumed between extensions of the said bushing.

In the accompanying drawings,—Figure 1, is a top plan view of the valve, and connected up with a water column which would be piped to a boiler as in practice. Fig. 2, is a vertical sectional view of the same.

The valve consists of a casing 1, which is provided with a valve seat 2 and a port 3 located below the seat and in alinement with the same. The water inlet 4 is located at the side of the casing 1 and is in alinement, or substantially so, with the valve seat 2. Across the inner end of this inlet is a vertically disposed narrow web or splitter 4<sup>a</sup> which is in line with valve and serves to divert the impact of water on the valve. The casing 1 is provided with an outlet 5, which

is in alinement with the seat 2 and port 3. The upper portion of the casing 1 is formed into a piston chamber 6. The piston 7 is located in the chamber 6 and is connected by means of a stem 8 with the valve 9. The valve 9 is adapted to operate over the seat 2. The sliding valve 10 is located in the cushion chamber and upon the lower portion of the stem 8 and operates over the port 3. The lower end of the stem 8 is provided with a cross pin 11, which is adapted to elevate the valve 10 when the said stem is raised. The interior of the water inlet 4 is provided with a circumferential groove 12, which is connected by means of a by-pass 13 with the upper portion of the piston chamber 6.

The auxiliary valve-casing 14 is attached to the casing 1 and is connected by means of a by-pass 15 with the upper portion of the piston chamber 6. The auxiliary valve 16 is located in the casing 14 and operates over the valve seat 17 thereof. The spring 18 bears upon the top of the valve 16 and is under tension to normally hold the same closed against the seat 17. The side of the casing 1 is provided with an aperture or opening 19, which is surrounded by a threaded boss 20. The sleeve or bushing 21 fits in the aperture 19 and is provided with a shoulder 22 which bears against the end of the boss 20. The said sleeve is held against rotation in the boss 20 by the key 23. The union 24 engages the thread of the boss 20 and holds the shoulder 22 in close contact with the edge thereof. The pipe 25 serves as a thermostat and would be made of a composition that is especially sensitive to changes in temperature, it is slidably connected with the bushing 21 and is surrounded by the packing gland 26, which is held in position by means of a union 27 screw threaded upon the end of the bushing 21. The pipe 28 also connects with the lower part of the boiler, while the pipe 28<sup>a</sup> is connected with the upper part of a boiler. The pipes are connected with the T 29 which stands in the same relation to the boiler as an ordinary water column. The thermostatic pipe 25 connects with the T-connection 29 and its center is on a line with the normal water line of boiler. The T 29 is provided with the laterally extending arms 30, and the valve casing 1, is provided with similar arms 31. The spacing rods 32 connect the arms 30 and 31 together and are held in proper position by means of the clamp nuts 33, which are screw threaded upon the ends of the said

rod and which bear against opposite sides of the arms 30 and 31. The spacing rods 32 and the clamp nut hold the valve casing 1 at a proper distance from the T 29 which distance remains constant after the clamp nuts 5 33 have been properly adjusted. The pipe 25 is horizontal, or nearly so. In some instances it may dip toward the T 29 in order to prevent a trap, but other means for preventing a trap may be employed. The inner 10 end of the pipe 25 is closed by a plug 34, which is provided with a pointed end 35. The lever 36 is fulcrumed between the extension 37 of the hub 21. The pointed end 35 of the plug 34 engages one end of the bell crank 15 lever 36, while the opposite end of the said lever lies directly under the lower end of the stem 38 of the auxiliary valve 16. The water inlet 4 is provided with a foraminous cylinder 39 which prevents solid matter from 20 entering the groove 12 and by-pass 13.

The operation of the valve is as follows: So long as the water in the boiler is at its proper level the pipe 25 is filled with water. 25 The feed water enters the inlet 4 and a small portion of it passes through the by-pass 13 into the top of the piston chamber 6, and moves the piston down and holds the valve 9 closed against the seat 2. The water also 30 passes from the chamber 6 through the by-pass 15 into the auxiliary casing 14 and the valve 16 is held closed against the seat 17 by the spring 18. When the water in the boiler falls sufficiently to allow the steam to enter 35 the pipe 25, and the temperature of the steam being higher than that of the water the said pipe 25 expands longitudinally causing the free end thereof to slide in the bushing 21. The pointed end 35 of the plug 40 34 swings the lever 36 upon its fulcrum and the end of the lever located under the valve stem 38 moves the said stem up, which carries with it the valve 16. Thus the water in the casing 14 is permitted to escape there- 45 from through the seat and port 17, and through the casing and outlet 5. This flow for the time being is continuous allowing more water to pass from the chamber 6 to the chamber 14 and through outlet 5 than is 50 admitted through the by-pass 13 which is relatively smaller than 15, thus releasing the water pressure in chamber 6 and permitting the greater pressure on underside of chamber to force the piston 7 up opening the valve 9 55 and the lower valve 10, thus permitting water to flow from the inlet 4 past the splitter 4\*, seat 2, and port 3 of the casing 1 and out through the outlet 5 thereof into the boiler. As the water in the boiler assumes its normal level it also rises in the pipe 25 and the steam previously contained therein is forced out and the water being of lower temperature contracts the pipe 25, and the operation 60 above described is reversed, releasing the lever 36, permitting spring 18 to force valve 16

closed cutting off the escape of water from chamber 6, which establishes the initial pressure in the chamber 6 which pressure thereon forces the piston and valve closed. By reason of the valve 10 being slidable upon its 70 stem it is permitted to seat slightly in advance of the upper valve 9, thus cutting off the flow of water therethrough as the said valve nears its seat and consequently preventing it from being cut. Thus, it will be 75 seen that an automatic thermostatically-operated boiler feed valve is provided and that the parts are of simple construction and arrangement and positive and efficient in their operation and action. 80

What is claimed is:—

1. A feed valve connected with a boiler, a bushing attached to the valve casing, an auxiliary valve, a lever fulcrumed to the casing and having an end for engaging the stem 85 of the auxiliary valve, a thermostat also connected with the boiler and being located at the normal water level thereof, and slidably engaging said bushing and having contact with the power end of said lever. 90
2. A valve casing connected with a boiler and having both a piston primary valve and an auxiliary valve within said casing, a thermostat connected with the boiler and being 95 located at the normal water level thereof and having sliding connection with the valve casing, a lever mounted within the valve casing and forming an operating connection between the thermostat and the auxiliary valve. 100
3. A valve casing connected with a boiler and having both a piston primary valve and an auxiliary valve within the casing, a lever fulcrumed within the casing and having a working end for engagement with the stem 105 of the auxiliary valve, a thermostat connected with the boiler and being located at the normal water level thereof and engaging the power end of said lever and a sleeve connected intermediate the casing and thermostat. 110
4. In a boiler feed valve, the combination of a casing having a piston chamber, a cushion chamber and auxiliary valve chamber, a piston valve mounted in the piston chamber, a second valve slidably connected with the 115 piston valve and operatively mounted within the cushion chamber, an auxiliary valve, a thermostat with boiler connections for effecting the same to operate the auxiliary valve for the control of the piston valve, 120 ducts leading to and from the piston chamber, and a screen for covering the duct leading to said piston chamber.

Signed at Mansfield, in the county of Rich- land, and State of Ohio, this 29th day of 125 July, A. D. 1907.

GEORGE W. COLLIN.

Witnesses:

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