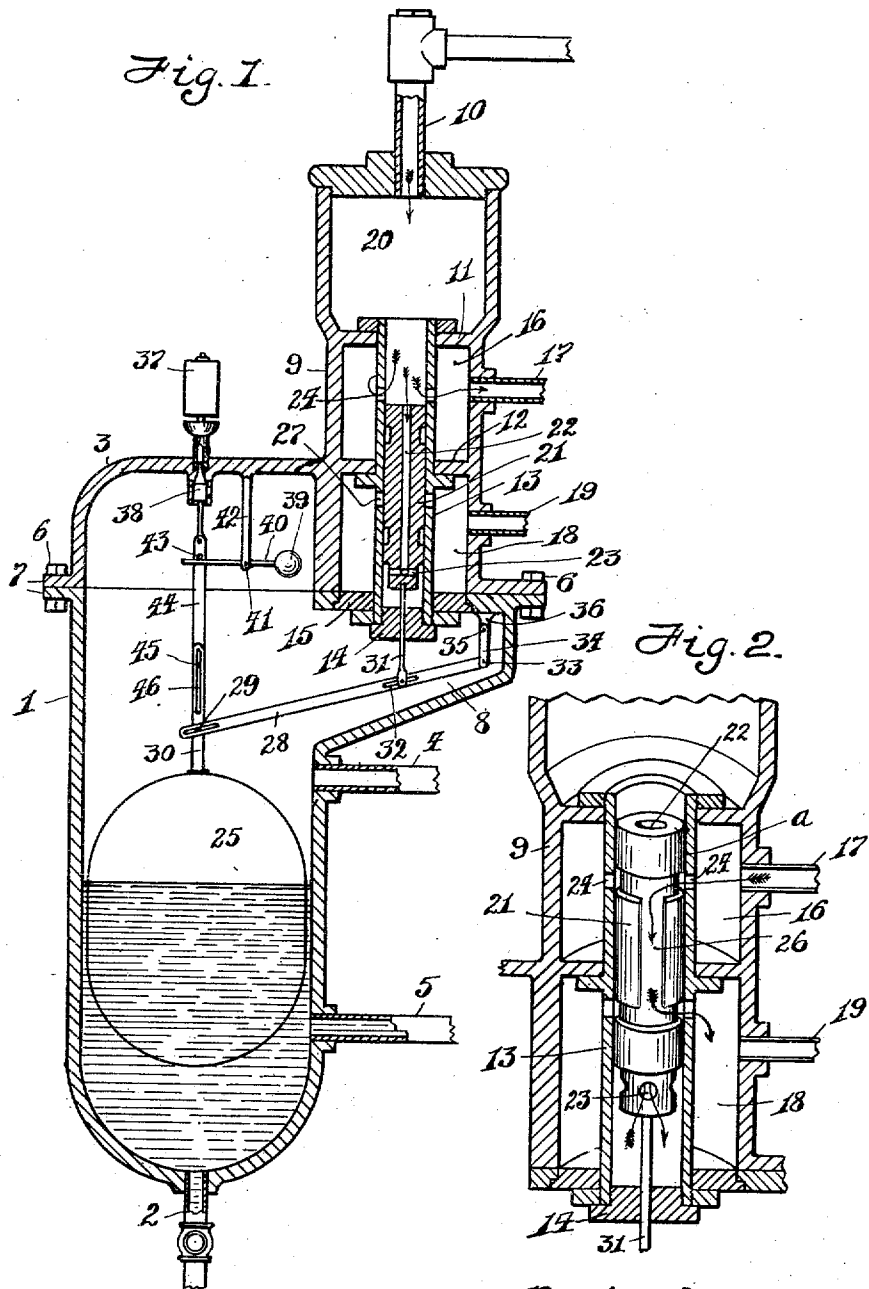


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 FEED WATER CONTROLLER FOR BOILERS.
 APPLICATION FILED JULY 30, 1909.

962,050.

Patented June 21, 1910.



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UNITED STATES PATENT OFFICE.

REUBEN M. REYNOLDS, OF SOUTH BEND, INDIANA.

FEED-WATER CONTROLLER FOR BOILERS.

962,050.

Specification of Letters Patent. Patented June 21, 1910.

Application filed July 30, 1909. Serial No. 510,421.

To all whom it may concern:

Be it known that I, REUBEN M. REYNOLDS, a citizen of the United States, residing at South Bend, in the county of St. Joseph and State of Indiana, have invented certain new and useful Improvements in Feed-Water Controllers for Boilers, of which the following is a specification.

This invention relates to feed water controllers for steam boilers.

The object of the invention is to provide a feed water controller embodying such characteristics that it will operate to efficiently perform the functions of devices of its nature, guarding against all conditions which would in anywise likely result in danger.

With the above and other objects in view, the present invention consists in the combination and arrangement of parts hereinafter more fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that changes may be made in the form, proportion, size and minor details without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawing:—Figure 1 is a vertical sectional view of the column of a steam boiler having my improved controller attached thereto. Fig. 2 is an enlarged fragmentary view illustrating the controller.

Referring now more particularly to the accompanying drawings, the reference character 1 indicates a water column provided at its lower end with a drain 2 and at its upper end with a crown 3 and also having steam and water pipes 4 and 5, respectively, which lead to the boiler (not shown). The crown 3 is secured to the column 1 through the instrumentality of suitable bolts 6 which pass through the flanges 7 so that the crown may be removed, if desired, and it will be observed that the column has an offset portion 8 at its upper end for a purpose presently understood.

Secured to the crown 3 of the column is a casing 9 having a steam inlet pipe leading thereinto at its upper end and which has communication with the boiler (not shown). The casing 9 is also provided with inwardly directed flanges 11 and 12, respectively, designed to support the valve casing 13, whose lower end is closed by a plug 14, the lower end of the casing 9 being also closed by a closure 15. The said flanges 11 and 12 co-

operate with the walls of the casing 9 and with the valve casing 13 to provide a steam chamber 16 which has communication with the steam pump (not shown) by way of the pipe 17 and also to provide the exhaust chamber 18 which has a discharge outlet pipe 19, as shown, there being a receiving chamber 20 at the upper end of the casing 9 which has communication with the steam chamber 16 through a source hereinafter explained, and which also has direct communication with the valve casing 13.

Slidably mounted in the valve casing 13 is a cylindrical shaped valve 21 provided with a central longitudinal bore 22 which leads to the radially directed ports 23 at the lower end of the valve, so that when the steam from the boiler enters the chamber 20 by way of the pipe 10, it may pass downwardly through the bore 22 and outwardly through the ports 23 into the lower end of the valve casing for the purpose of balancing the valve because of an equal pressure at both ends thereof at one time. The steam entering the chamber 20 also passes outwardly through the ports 24 into the steam chamber 16 and thence by way of the pipe 17 to the steam pump (not shown). The ports 24 are shown as open because the water level in the water column is shown at its normally lowest point, together with the valve 13, by virtue of its connection hereinafter explained between it and the float 25, being also at its lowest position, resulting in the ports 24 being opened, as stated, and the steam permitted to pass therethrough and to the steam pump, which latter supplies the boiler with water.

As the water level in the boiler rises, and with it the water in the water column, the valve is caused to rise, which results in a gradual closing of the ports 24, shutting off the steam from the steam pump. This movement of the valve 13 causes the by-pass 26, which is in the form of a groove formed in the valve, coincident with the ports 24, permitting the steam remaining in the pipe 17 which leads to the steam pump and the steam which may also be in the chamber 16 to escape by passing through the ports 24 down through the by-pass to the ports 27 formed in the valve casing 13 below the aforesaid ports 24, such steam passing into the exhaust chamber 18 and out through the exhaust pipe 19, minimizing the condensation of steam in the controller. A further

object in providing means for permitting such steam to exhaust is to guard against the operation of the steam pump by a leakage of steam which might occur between the upper side wall of the valve and the cylinder in which it operates, such upper side wall of the valve and its casing being indicated at *a* in Fig. 2. A leakage at this point would allow the steam to pass through the ports 24 and thence to the pump, which would, in some instances, continue to operate and completely fill the boiler. By virtue of the by-pass, such leakage is passed downwardly and outwardly through the exhaust pipe 19.

The aforesaid operation of the valve 21 is caused through the movement of the float 25 in the column 1, as has already been stated, and such movement of the valve upon movement of the float is accomplished by virtue of the link 28, which has slidable connection at one end with a pin 29 on the stem 30 of the float and by the rod connection 31 between the valve 21 and the slot 32 of the link 28, the link projecting into the offset portion 8 of the column, and having pivotal connection 33 at one end with a link 34 pivotally suspended at 35 on the lug 36 of the column 1. It is obvious that upon movement of the float 25 the connection between the float and the valve will effect corresponding operation of the latter.

The water column is provided with an alarm whistle 37, a pin-valve 38 being normally held on its seat by a small weight 39 carried at one end of a lever 40 pivoted at 41 on the bracket 42 and which lever 40 has one end arranged to contact with a pin 43 on the stem 44 of the pin valve 38, bearing upwardly against the same and holding the pin-valve on its seat. The lower end of the pin valve stem is provided with a pin 45 which is slidably embraced by the slot 46 formed in the stem 30 of the float 25. Thus if the float could continue to fall because of the failure of the steam pump to operate for any reason, after the valve 21 has been lowered sufficiently by the float to open the ports 24, the pin 45 will contact with the end of the slot 46 in the float stem 30 and the weight of the float will consequently overcome the weight 39, thus opening the pin valve and permitting the steam to operate the emergency whistle.

What is claimed is:—

1. In a feed water controller for steam boilers, a column, a casing secured to the column and provided with upper and lower internal flanges, a valve casing engaging said flanges and cooperating therewith and with the sides of the first mentioned casing to provide a steam chamber and an exhaust chamber, each chamber having an outlet, the valve casing having upper and lower sets of ports, a valve slidably mounted in the valve casing to open and close said sets of

ports, the valve having a central longitudinal bore and radially directed ports to convey steam through the valve and into the valve casing at the lower end of the latter, a float in the column, and a connection between the valve and the float whereby the former may be moved upon operation of the float. 70

2. In a feed water controller for steam boilers, a column, a casing secured to the column and provided with upper and lower internal flanges, a valve casing engaging said flanges and cooperating therewith and with the sides of the first mentioned casing to provide a steam chamber and an exhaust chamber, each chamber having an outlet, the valve casing having upper and lower sets of ports, a valve slidably mounted in the valve casing to open and close said sets of ports, the valve having a central longitudinal bore and radially directed ports to convey steam through the valve and into the valve casing at the lower end of the latter, a float in the column, a connection between the valve and the float whereby the former may be moved upon operation of the float, an alarm, and connections between the alarm and float. 85 90

3. In a feed water controller for steam boilers, a column, a casing secured to the column, a valve casing disposed within the aforesaid casing with the casings constructed to provide a steam chamber and an exhaust chamber, each chamber having an outlet, the valve casing having upper and lower sets of ports, a valve slidably mounted in the valve casing to open and close said sets of ports, the valve having a central longitudinal bore and apertures at one end thereof forming ports having communication with said bore to convey steam through the valve and into the valve casing at the lower end of the latter, a float in the column, and means between the valve and float whereby the former may be moved upon operation of the float. 95 100 105 110

4. In a feed water controller for steam boilers, a column, a casing secured to the column, a valve casing disposed within the aforesaid casing and cooperating therewith to provide a steam chamber and an exhaust chamber, each chamber having an outlet, the valve casing having upper and lower sets of ports, a valve slidably mounted in the valve casing to open and close said sets of ports, the valve having a longitudinal bore and radially directed ports to convey steam through the valve and into the valve casing at the lower end of the latter, a float in the column, and means between the valve and the float whereby the former may be moved upon operation of the float. 115 120 125

5. In a feed water controller for steam boilers, a column, a float in the column, a casing secured to the column and provided with internal flanges, a valve casing disposed in 130

the first mentioned casing and coöperating with said valves and walls of the first named casing to provide a steam chamber and an exhaust chamber, each chamber having an outlet and the valve casing having ports establishing communication between the interior of the valve casing and said chambers, a valve slidably mounted in the valve chamber and provided with a central bore communicating and with ports to provide for the passage of steam into the lower end of the valve casing to balance the valve, the valve also having a by-pass to permit steam to flow from the steam chamber to the exhaust chamber, and connections between the valve and the float whereby the by-pass may be shifted into and out of registration with the ports of the valve casing upon movement of the float.

6. In a feed water controller for steam boilers, a column, a casing secured to the column and provided with a steam outlet and an exhaust outlet, a valve casing disposed

within the aforesaid casing and coöperating therewith to provide a steam chamber and an exhaust chamber, the valve casing having upper and lower sets of ports, a valve slidably mounted in the valve casing to open and close said sets of ports, the valve having a by-pass to permit steam to flow from the steam chamber to the exhaust chamber, said valve also having a central longitudinal bore and radially directed ports at one end to convey steam through the valve and into the valve casing at the lower end of the latter, a float in the column, and connections between the valve and the float whereby the former may be moved upon operation of the float.

In testimony whereof I affix my signature, in presence of two witnesses.

REUBEN M. REYNOLDS.

Witnesses:

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G. M. COLE.