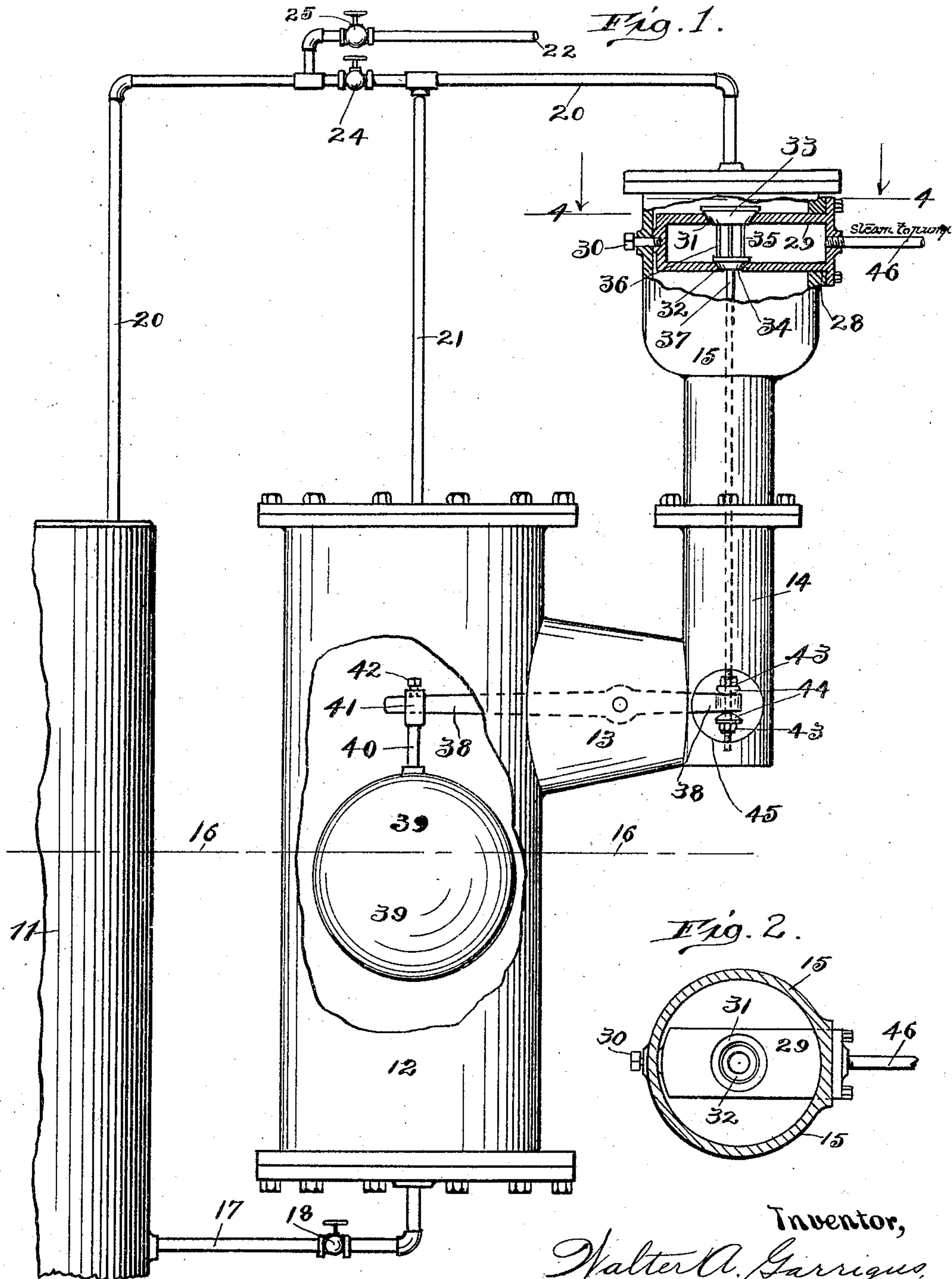


No. 775,396.

PATENTED NOV. 22, 1904.

W. A. GARRIGUS.
FEED WATER REGULATOR.
APPLICATION FILED DEC. 26, 1903.

NO MODEL.



Witnesses:

S. S. Noble,
A. Gustafson

Inventor,

Walter A. Garrigus,

By *Chas. C. Tillman*
Att'y.

UNITED STATES PATENT OFFICE.

WALTER A. GARRIGUS, OF CHATTANOOGA, TENNESSEE.

FEED-WATER REGULATOR.

SPECIFICATION forming part of Letters Patent No. 775,396, dated November 22, 1904.

Application filed December 26, 1903. Serial No. 186,667. (No model.)

To all whom it may concern:

Be it known that I, WALTER A. GARRIGUS, a citizen of the United States, residing at Chattanooga, in the county of Hamilton and State of Tennessee, have invented certain new and useful Improvements in Feed-Water Regulators, of which the following is a specification.

This invention relates to improvements in an apparatus to be used in connection with steam-boilers for regulating and maintaining the water-level therein; and it consists in certain peculiarities of the construction, novel arrangement, and operation of the various parts thereof, as will be hereinafter more fully set forth and specifically claimed.

The principal object of the invention is to provide means for maintaining the water-level in the boiler at a uniform point, no matter what the degree of evaporation, inflow, or the use of the water may be, to the end that explosions will thereby be prevented and the boiler will be properly supplied with water at all times.

Other objects and advantages of the invention will be disclosed in the subjoined description and explanation.

In order to enable others skilled in the art to which my invention pertains to make and use the same, I will now proceed to describe it, referring to the accompanying drawings, in which—

Figure 1 is a view, partly in section and partly in elevation, of a portion of a boiler of the vertical type, showing the water-regulator connected therewith; and Fig. 2 is a plan sectional view taken on line 4 4 of Fig. 1 looking in the direction indicated by the arrows.

Like numerals of reference refer to corresponding parts throughout the different views of the drawings.

The apparatus is applicable to boilers of different types; but I have shown it in connection with a vertical boiler 11, a portion of which only is illustrated. A cylinder 12 of any suitable size is located and suitably supported near the boiler. This cylinder communicates through a hollow extension 13 with the lower portion of another cylinder, 14, which carries and communicates with an enlargement 15 on its upper end. The cylinder

12, extension 13, and portion 15 are preferably formed integral, but may be separate pieces, if desired. Communicating at one of its ends with the boiler below the upper surface of the water or below the water-line 16 therein is a pipe 17, which communicates at its other end with the lower end of the cylinder 12 and is provided with an ordinary globe-valve 18 to shut off or control the flow of water therethrough.

Extending from the steam-compartment of the boiler is a pipe 20, which communicates at its other end with the upper portion of the enlargement 15, which with the portion 14 forms an auxiliary cylinder. Leading from the pipe 20 and communicating with the upper portion of the cylinder 12 is another pipe, 21, for the passage of steam from the boiler to said cylinder. Leading from the pipe 20, at a point between the juncture of the pipe 21 and the boiler, is a branch pipe 22, which communicates at its other end with a pump (not shown) and supplies steam thereto from the boiler. As shown in Fig. 1 of the drawings, the pipe 20 is provided between the junctures of the pipes 21 and 22 therewith with a valve 24 to shut off or control the flow of steam therethrough, and the pipe 22 is also provided with a valve 25 for a like purpose. Leading from the pump to the boiler is a pipe (not shown) for the supply of water, and this pipe is provided at a suitable point with a check-valve to regulate or control the flow therethrough.

The enlargement 15 is provided in its wall with an opening 28 to receive a steam-box 29, which extends horizontally across the enlargement and may be supported at its inner end by means of a set-screw 30, located in the wall of said enlargement. By reference to the drawings it will be seen that the box 29 is considerably smaller than the enlargement 15, in which it is seated, and is provided in its upper and lower portions with openings 31 and 32, which form seats for the upper and lower portions 33 and 34 of the valve 35, which is preferably of the type known as "bird-cage" valve—that is, the plugs or valves 33 and 34 are connected together by rods or bars 36. Extending downwardly from the lower por-

tion of the valve 35 is a rod 37, which at its lower portion passes through an opening in one end of a lever 38, which is fulcrumed within the hollow extension 13, and carries
 5 on its other end a float 39, of copper or other suitable material, which float is provided with an upwardly-extending stem 40, having at its upper end a clip 41 to receive the lever, which clip may be fixed thereon at any suitable point
 10 by means of a set-screw 42, which it carries. The other end of the lever 38 is adjustably connected to the rod 37 by means of nuts 43 and convex washers 44, which may be reached through a suitable opening 45 in the portion
 15 14 of the auxiliary cylinder, which opening may be closed by any suitable means. Leading from the outer end of the steam-box 29 is a pipe 46, which communicates with the pump and is provided with a valve to control
 20 the flow of steam thereto.

It will be understood that the pump, as well as the main cylinder 12 and auxiliary cylinder 14, may be located at any suitable points; but I have shown said cylinders as being situated near the boiler at its side and prefer to
 25 so locate them for the sake of convenience.

From the foregoing and by reference to the drawings it is evident that the float 39 will be supported by the water, so as to cause the
 30 valve 35 to normally close the openings in the steam-box 29; but should the water-line become lowered by reason of evaporation or otherwise the float 39 will be lowered therewith, which will depress the end of the lever
 35 38 within the cylinder 12 and correspondingly elevate its other end, which operation, through the rod 37, will open the valve 35, so as to admit steam to the steam-box 29, from whence it will be conducted through the pipe 46 to
 40 the pump and set the same in operation, thereby forcing water through the pipe which connects the pump with the boiler into the latter, and thus automatically maintain the water-line at a uniform level. It is further
 45 evident that the upper portion of the cylinder 12, as well as the auxiliary cylinder 14 and

enlargement 15 thereof, will be filled with steam unless it is desired to cut the regulator out, which may be done by closing the valves 18 and 24, when by opening the valve 25
 50 the pump may be caused to operate, so as to fill the boiler or prevent the operation of the pump when the boiler is being blown out.

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

1. The combination with a boiler, of a main cylinder in communication with the steam and water compartments thereof, an auxiliary cylinder communicating with the main cylinder
 60 and with the steam-compartment of the boiler, a steam-box located in the upper portion of the auxiliary cylinder and having openings in its top and bottom, a valve located in said openings, a lever extending at its ends
 65 into said cylinders, a float on the lever within the main cylinder, a rod adjustably connected at one of its ends to the lever within the auxiliary cylinder and at its other end to said valve, and a pipe connecting the steam-box
 70 and a pump, substantially as described.

2. The combination with a boiler, of a main cylinder in communication with the steam and water compartments thereof, an auxiliary cylinder communicating with the main cylinder
 75 and with the steam-compartment of the boiler and having an opening in the upper portion of its wall, a steam-box removably located in said opening and extending into the auxiliary cylinder, said box having open-
 80 ings in its top and bottom, a valve located in said openings, a lever extending at its ends into said cylinders, a float on the lever within the main cylinder, a rod adjustably connected
 85 at one end of its ends to the lever within the auxiliary cylinder and at its other end to said valve, and a pipe connecting the steam-box and a pump, substantially as described.

WALTER A. GARRIGUS.

Witnesses:

CHAS. C. TILLMAN,
 A. GUSTAFSON.