

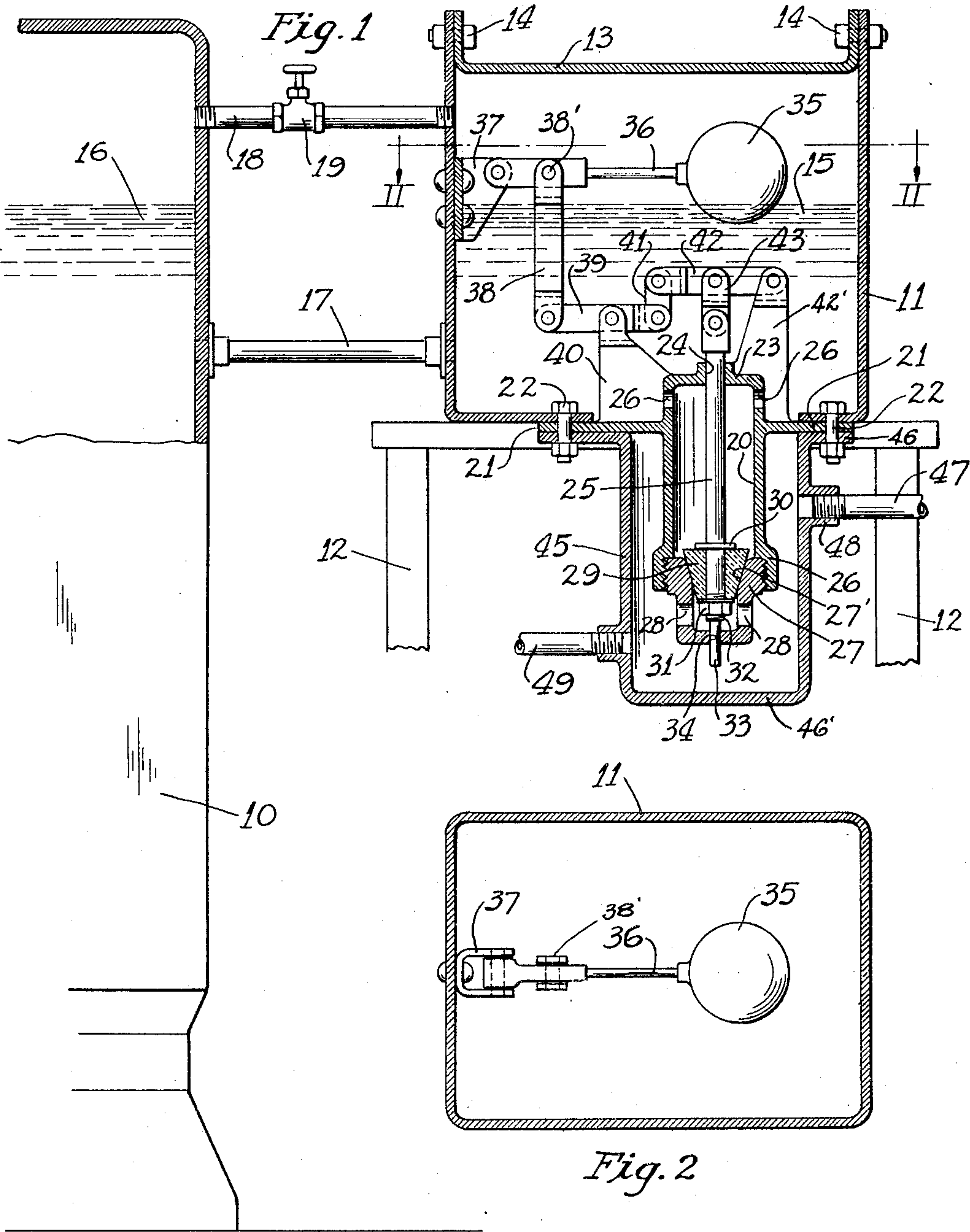
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WATER SUPPLY SYSTEM

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WATER SUPPLY SYSTEM

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This invention relates to water supply systems and more particularly to means for automatically maintaining a constant water level in boilers, although certain features thereof may be employed with equal advantage for other purposes.

It contemplates more especially the provision of an automatically operable valve remotely arranged from the boiler confines subjected to elevated temperatures which impair the operation of known devices.

Numerous devices have heretofore been proposed for regulating the water supply, but these have not proven entirely satisfactory in the regulation thereof over extended periods in that the instrumentalities were subjected to the intense temperatures of the system with which they were associated, thereby being soon rendered inoperative or at least unsatisfactory.

It is generally recognized that the water level in boilers should be maintained constant in order to insure the highest possible efficiency as well as preclude injury to the boiler occasioned by the total or partial absence of water. Water usually constitutes the heat carrying medium or in other systems in the form of steam conveys heat or energy for any desired purpose. In view thereof, it is essential or at least highly desirable that the quantity of water be maintained substantially constant to render the absorption of heat from the combustion chamber most efficacious.

One object of the present invention is to simplify the construction and improve the operation of devices of the character mentioned.

Another object is the provision of an automatically operable valve disposed remote from confines subjected to elevated temperatures.

Still another object is the provision of a water system which is subjected to boiler pressure to enable the introduction of water without auxiliary injecting means.

A further object is the provision of an automatically operable valve which is jacketed by the water supply which effects the cool-

ing thereof and simultaneously constitutes the control means therefor.

A still further object is the provision of a float operated valve which is remotely associated from the confines of the supply tank in order to insure the operation thereof.

Still a further object is the provision of a water supply system for boilers wherein the pressure thereof is exposed to the system to reduce the water supply pressure necessary to effect the introduction thereof.

Other objects and advantages will appear from the following description of an illustrative embodiment of the present invention.

In the drawing:

Figure 1 is a fragmentary sectional view in elevation of a device embodying features of the present invention.

Figure 2 is a plan view of the water regulating instrumentalities with the cover thereof removed to clarify the showing.

The structure selected for illustration is shown in association with a steam boiler 10 of standard construction, although other forms of boilers are equally susceptible for such adaptation including hot water boilers which are generally low pressure heat generators.

A water supply tank 11 is supported on a suitable standard 12 adjacent the boiler 10 in proximity to the top thereof in order to constitute a water reservoir therefor. The tank 11 has a closure 13 which is maintained steam tight in association therewith by means of fasteners 14 of standard construction. Water 15 in the tank 11 is in communication with the water 16 confined within the boiler 10 through a conduit 17 which is disposed in proximity of the bottom of the tank 11.

Further, the interior of the tank 11 is subject to the steam pressure within the boiler 10 owing to a conduit 18 disposed above the conduit 17, there being shown a manually operated steam valve 19 interposed within the conduit 18 to regulate the flow there-through. Thus it will be apparent that the pressures in both the boiler 10 and the tank 11 are equal so that the water injection pressure need not be unusually high to overcome

the steam pressure within the boiler 10. This is highly advantageous from a standpoint of commercial economy in that standard injectors or pumping instrumentalities are not
 5 necessary, for the pressure in the water main is sufficient to effect its introduction within the boiler via the tank 11.

Valve means are employed to control the introduction of the water 15 within the tank 10, there being provided a cylindrical valve body 20 having a peripheral flange 21 thereon for securing it to the bottom of the tank 11 in communication therewith by means of the studs 22. The valve body 20 terminates
 15 in an end face 23 having an axial bore 24 therein to slidably receive a valve stem 25 therethrough. Ports 26 are provided in the valve body 20 within the tank 11 to admit water thereto. The valve body 20 terminates
 20 in an interiorly threaded mouth portion 26 which detachably receives a threaded valve seat body 27 having ports 28 provided therein for establishing circulation from a suitable water supply source to the tank 11. A valve
 25 29 shaped to conform with the seat 27', is secured to the valve stem 25 and maintained in fixed position thereon by means of a peripheral shoulder 30 which cooperates with a nut 31 in threaded engagement with the
 30 threaded portion 32 of the stem 25. It is to be noted that the stem 25 has a reduced portion 33 at the extremity thereof which reciprocates within an axial apertures 34 provided in the valve seat casing 27 to guide the valve
 35 stem 25 vertically.

The position of the valve 29 with respect to its seat 27' is controlled by means of a float 35 of standard construction which is carried by an arm 36 having the free extremity there-
 40 of pivoted to the tank 11 at 37, there being a link 38 pivoted thereto as at 38' to actuate a lever 39 operatively connected therewith. The lever 39 is pivotally carried by a bracket 40 to impart movement to a toggle 41 which
 45 is in rigid association with a member 42 to effect the elevation or descension thereof. The member 42 which is pivoted to a lug 42' engages a boss 43 which is suitably associated with the extremity of the valve stem 25 so as
 50 to impart movement thereto responsive to motion of the float 35 occasioned by a variance in the level of the water 15 which effects the control thereof. The linkage constituting the operative connection between the float
 55 35 and the valve rod 25 is of the toggle type which is productive of the desired purchase for controlling the position of the valve 29 so that slight variations in water level will operate the valve 29 to supply the necessary
 60 water, to maintain a constant supply therein.

In order to protect the valve 29 and its associated parts from the effect of the high temperature prevalent in the tank 11, a casing 45
 65 having a closed end 46 is positioned concentrically of the valve body. The casing 45 has

a peripheral flange 46' to cooperate with the flange 21 of the valve body 20 which is in sealed contact owing to the studs 22, supra.

A water supply source is conducted to the interior of the casing 45 through a conduit 70 47 which is in threaded engagement with a boss 48 provided in the casing 45 near the top thereof. Another conduit 49 communicates with the casing 45 near the bottom thereof oppositely of the conduit 47, so as to
 75 establish complete circulation therein for communication with the ports 28 which lead to the interior of the valve body 20. With the valve 29 in its closed position, the conduit 49 constitutes an outlet which returns the
 80 water to the supply source so that a constant pressure is maintained within the casing 45 which surrounds the valve body 20 to constitute a water jacket therefor. Obviously this serves to maintain the valve instrumen-
 85 talities at a decreased temperature to preclude warping or other injury thereto occasioned by elevated temperatures prevalent within the tank 11.

The water level in the boiler is maintained 90 constant by means of the float 35 which is operatively connected with the valve 29 to govern the position thereof with reference to its valve seat 27'. The lowering of the level of the water 16 within the boiler 10 will
 95 cause the float 35 to descend, thereby removing the valve 29 from its seat 27' to admit water within the valve body 20 through the ports 26 for passage to the tank 11 which supplies water to the boiler 10 through the
 100 conduit 17.

With the arrangement of parts above described it will be apparent that a simple and effective device has been provided to main-
 105 tain a constant water level within heat generating apparatus, thereby insuring safe operation, high efficiency and low cost of maintenance.

It is to be noted that all of the water from the supply source entering the boiler 10,
 110 passes through and around the valve cooling chamber 45, which is remote from the high temperature regions. Of course, the valve chamber 26 may be so arranged as to further
 115 remove the valve 29 and its seat 27' from the reservoir or tank 11 than is illustrated on the accompanying drawing, thereby maintaining the valve 29 free from the injurious effects
 120 occasioned by high temperatures prevalent within the tank 11.

Various changes may be made in the embodiment of the invention herein specifically described without departing from or sacrific-
 125 ing any of the advantages thereof as defined in the appended claims.

I claim:

1. In a device of the character described, the combination with a boiler, of a water tank, a steam connection between said tank and boiler, a water connection between said
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5 tank and boiler, a valve body having an aperture in communication with said tank, a casing enveloping said valve body and providing a water jacket therefor, a water supply source communicating with and adapted to fill said casing, a poppet valve in said valve body, and a float in said tank operatively connected to said valve to permit of water flowing from said casing into said boiler through said tank, through said valve body aperture and intermediate said valve and valve body.

10 2. In a device of the character described, the combination with a boiler of a water tank, a steam connection between said tank and said boiler, a water connection between said tank and said boiler, a chambered valve body having apertures in communication with said chamber and said tank and covered at one exterior side by the water in said tank, a casing enveloping said valve body and providing a water jacket therefor, a water supply source communicating with said valve body through said casing and covering said valve at its other side, a valve seat in said valve body, a poppet valve reciprocable within said valve body and adapted to engage said valve seat, a float pivoted within said tank, and an operable connection between said float and valve to lift said valve from said valve seat to admit water to said boiler by way of said tank, said valve chamber, said apertures, and said water jacket between said valve and said valve body.

35 3. In a device of the character described, the combination with a boiler, of a water tank, a steam connection between said tank and said boiler, a water supply connection between said tank and said boiler, a chambered valve body having apertures in communication with said tank and said chamber, a casing enveloping said valve body and providing a water jacket therefor, there being intake and outlet ducts in said casing, a valve seat in said valve body a valve reciprocable in said valve body adapted to register with said valve seat and covered on one side by the water in said chamber and on the other by the water in said jacket, and means in said tank for regulating said valve to admit water from said casing into said valve chamber to flow through said apertures into said tank and thence into said boiler.

40 4. In a device of the character described, the combination with a boiler, of a water tank, a steam connection between said tank and said boiler, a water supply connection between said tank and said boiler, a valve body below said tank and having apertures, a chamber in said valve body in communication with said tank by means of said apertures, a casing enveloping said valve body and providing a water jacket thereabout, there being intake and outlet ducts in said casing, a valve seat in said body a valve reciprocable in said valve body adapted to cover said seat and covered at one side by the water in said chamber and at the other by the water in said casing, and a float in said tank connected to said valve to control the flow of water into said boiler by way of said tank, said apertures, said valve body, said valve and said casing.

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