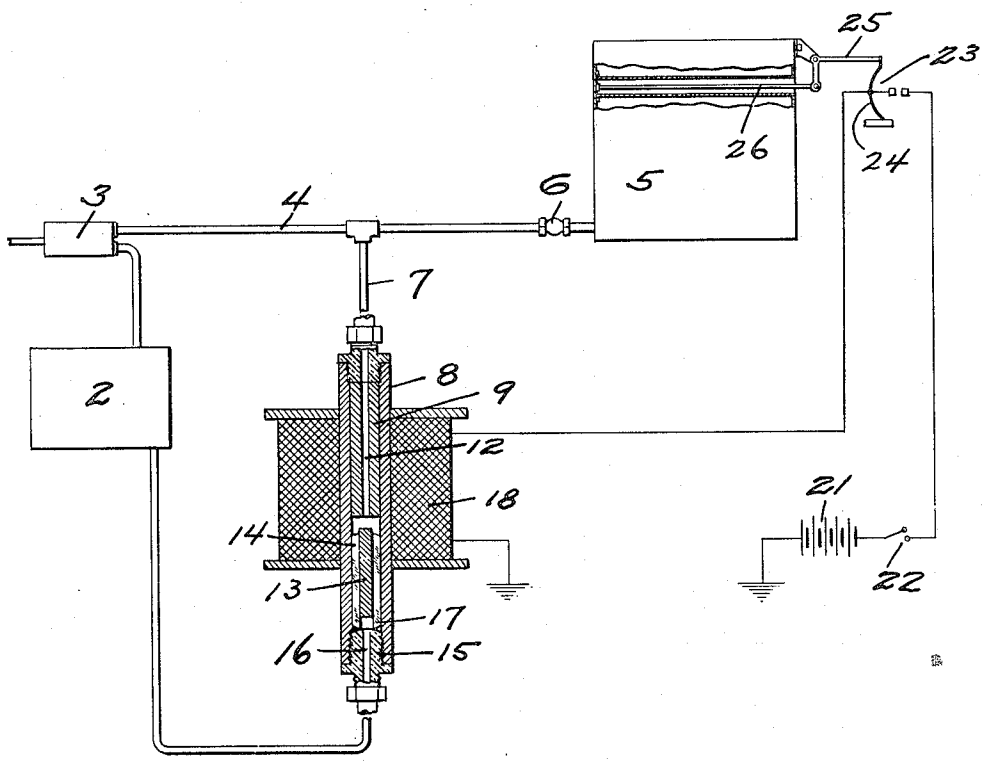
J. A. DOBLE.

APPARATUS FOR CONTROLLING THE FLOW OF WATER TO BOILERS.

APPLICATION FILED MAY 15, 1918.

1,423,759. Patented July 25, 1922.



WITNESS

J. B. Gardner

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UNITED STATES PATENT OFFICE.

JOHN A. DOBLE, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR TO DOBLE LABORATORIES, OF SAN FRANCISCO, CALIFORNIA, A CORPORATION OF CALIFORNIA.

APPARATUS FOR CONTROLLING THE FLOW OF WATER TO BOILERS.

1,423,759. Specification of Letters Patent. Patented July 25, 1922.

Application filed May 15, 1918. Serial No. 234,769.

To all whom it may concern:

Be it known that I, JOHN A. DOBLE, a citizen of the United States, and a resident of the city and county of San Francisco and State of California, have invented certain new and useful Apparatus for Controlling the Flow of Water to Boilers, of which the following is a specification.

The invention relates to apparatus for controlling the flow of water to boilers in accordance with temperature conditions within the boiler, and especially to boilers provided with a continuously driven feed water pump.

An object of the invention is to provide means for stopping the supply of feed water to the boiler when the temperature therein reaches a predetermined minimum and for starting the supply of feed water when the temperature reaches a predetermined maximum.

A further object of the invention is to control the flow of feed water to the boiler without producing an excessive pressure in the feed water line.

The invention possesses other advantageous features, some of which, with the foregoing, will be set forth at length in the following description where I shall outline in full, that form of the invention which I have selected for illustration in the drawing accompanying and forming part of the present specification. In said drawing I have shown one form of the apparatus of my invention, but it is to be understood that I do not limit myself to such form, since the invention, as expressed in the claims, may be embodied in a plurality of forms. The drawing is a partly diagrammatic representation of the apparatus of my invention.

The apparatus of my invention is particularly applicable for use on steam propelled automobiles or trucks, where it is desirable that the flow of feed water to the boiler or steam generator be automatically controlled to maintain a substantially constant temperature within the boiler. The feed water is drawn from the supply tank 2 by the pump 3 and is forced through the pipe 4 into the boiler 5, the pipe 4 being provided with a check valve 6 to prevent a reverse flow of the feed water. The pump is usually connected to the steam engine or to the running gear of the vehicle so that it is continually in operation when the vehicle is in motion. The amount of steam consumed by the engine varies with difference in load, roadbed and conditions of traffic and with this varying steam consumption, means must be provided for controlling the supply of feed water to the boiler. The capacity of the pump, if operated continuously during the operation of the engine, is in excess of the requirements of the boiler, so that under the heaviest conditions of operation it can be relied upon to provide sufficient feed water. With smaller steam consumption, the amount of feed water introduced into the boiler would be in excess of the requirements and the boiler would soon become cold due to the excess of water. In accordance with my invention I provide means for starting and stopping the supply of feed water to the boiler when certain predetermined maximum and minimum temperatures are reached within the boiler, thereby maintaining the proper amount of water in the boiler.

Connected to the pipe 4, between the pump 3 and the check valve 6, is a by-pass conduit 7 which is connected at its other end to the supply tank 2 and means are provided for opening and closing the by-pass in accordance with variations in temperature within the boiler. Arranged in the by-pass conduit, is a shell 8, made of brass or other non-magnetic material and fixed in the shell and in tight contact therewith is a core 9 of iron or steel having a passage 12 therethrough in communication with the by-pass conduit, so that the by-passed water passes through the passage. The lower end of the core 9 is finished smooth so that it forms a valve seat. Arranged in the shell below the core is an iron or steel plunger or valve 13 having a solid center portion and a ribbed or grooved periphery, the longitudinal grooves 14 forming passages for the water. The shell is closed at the bottom by a nipple 15 and the nipple or the plunger are so constructed that the grooves 14 are always in communication with the passage 16 in the nipple. In the present construction the lower face of the plunger is provided with a plurality of spaced projections 17 which hold the body of the plunger above the nipple. Surrounding the shell 8 is a solenoid 18, which when energized, causes the plunger to rise and seat against the lower end of the core 9 and prevent the flow of water through the core.

When the plunger is in its lower position, the by-pass is open and the pumped water passes from the pump to the supply tank and when the plunger is raised, the by-pass is closed and the pumped water passes into the boiler.

Means are provided for opening and closing the solenoid circuit in accordance with temperature conditions within the boiler. Arranged in the solenoid circuit is a battery 21, a hand operated switch 22 and a temperature operated switch 23. The temperature operated switch comprises a resilient flexible element 24 fixed at one end and engaging at its other end, a lever 25 which is operated by an expansible metallic rod 26 extending into the boiler. As the length of the rod varies, the lever is moved to vary the flexure of the element 24 and thereby open and close the solenoid circuit. An increase in temperature to a predetermined degree causes the solenoid circuit to be closed, closing the by-pass and causing the water to be pumped into the boiler and the subsequent lowering of boiler temperature causes the solenoid circuit and the by-pass to be opened, stopping the flow of water to the boiler.

I claim:—

1. An apparatus for controlling the temperature within a steam generator comprising means for introducing a liquid into the generator and a by-pass for the liquid, characterized by the fact that the by-pass is opened or closed solely by variations in the temperature of the steam whereby this temperature is kept within definite limits.

2. In an apparatus for controlling the temperature within a steam generator, means for introducing a liquid into the generator, means for by-passing the liquid and means controlling the latter means arranged to permit the entry of liquid at a definite temperature and to prevent entry of the liquid at a lower temperature.

3. In an apparatus for controlling the temperature within a steam generator, a liquid supply tank, means for drawing liquid from the tank and for forcing it into the generator, a by-pass for the liquid for allowing it to re-enter the tank, and means for entirely opening and entirely closing the by-pass, this means being responsive solely to temperature of the steam and so arranged that the by-pass is opened when the steam has a relatively low temperature and closed for a higher temperature.

In testimony whereof, I have hereunto set my hand at San Francisco, California, this 2nd day of May, 1918.

JOHN A. DOBLE.

In presence of—
H. G. PROST.