





# UNITED STATES PATENT OFFICE.

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## AUTOMATIC HOT-WATER REGULATOR.

SPECIFICATION forming part of Letters Patent No. 299,740, dated June 3, 1884.

Application filed June 28, 1883. (No model.)

*To all whom it may concern:*

Be it known that we, WILLIAM S. CLARK and EDWARD B. CLARK, citizens of the United States, residing at Philadelphia, in the county  
5 of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Automatic Hot-Water Regulators; and we do hereby declare the following to be a sufficiently full, clear, and exact description  
10 thereof as to enable others skilled in the art to make and use the said invention.

This invention relates to that class of boilers arranged to heat water in conjunction with  
15 stoves for culinary and other domestic uses, and has for its object the automatic protection of the water-heating apparatus from injury by excessive heat, (incident to the strong firing requisite for other operations, such as baking,  
20 or heating of smoothing-irons,) generating steam therein and expelling water therefrom.

The nature of this invention consists in the combination of an apparatus operating by the  
25 expansion of metals by heat with one of the lower tubes or an equivalent vessel through which the water circulates during the heating operation, and connecting the said expansion apparatus with an opening, a pipe leading  
30 from the upper part of the hot-water reservoir, so that whenever the lower pipe of the circulating apparatus becomes unduly heated the valve opens and permits the hot water to escape and run to waste and be replaced by  
35 cooler water from the supplying-reservoir or water-main.

In the following more full and particular description of this invention reference is had  
40 to the drawing annexed, and the letters of reference marked thereon, showing the apparatus as applied to bath-boilers set in conjunction with a kitchen-range.

The figure shows the invention in section as applied to a kitchen-range having a "water-back" connected by pipes to a vertical cylinder-boiler forming what is known as a "circulating-boiler."  
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Referring to the figure, A represents the boiler; B, the furnace; C, the water-back forming a part of the furnace-wall; D, a pipe leading from the bottom of the boiler A to the bottom of the water-back C. E is a pipe leading  
50 from the upper part of the water-back C to

the boiler A at a point above, but not far from the bottom thereof. F is a pipe entering at the top of the boiler A and extending downward nearly to the level of the insertion of the  
55 pipe E in the boiler A. The function of the pipe F is to introduce a supply of cold water, and is usually connected with a street main or conduit leading from a reservoir for the purpose of replacing the heated water either used  
60 or wasted, as the case may be, as will hereinafter appear. G is a pipe leading from the top of the boiler A to the faucet H, from which the hot water is to be drawn for use. The circulation of the water in the boiler A, pipes D  
65 and E, and water-back C is indicated by the arrows. The pipe D is preferably made of brass or other metal having considerable expansive properties. At the end of the pipe D nearest to the water-back C is fastened a yoke,  
70 J, to which rods K, of iron or other metal not having high expansive properties, are attached by screw-threads passing through said yoke J and having nuts L thereon. The opposite  
75 ends of the rods K are secured to the shorter arms of the levers M, each of which have a fulcrum, N, securely fastened to the pipe D, near the bend thereof, and the longer arms of the levers M are attached to a cross-bar, O',  
80 on the stem O<sup>2</sup> of a valve, O, in a pipe, P, leading from the delivery-pipe G. The body of the valve O is secured firmly to the bend of the pipe D and to the fulcrum N of the levers N'.

The operation of the invention is as follows: The boiler A, pipes D and E, and water-back  
85 C, and also the pipes F, G, and P being filled with water under pressure from the reservoir through the pipe F, when heat is applied to the water-back C by making a fire in the furnace B, circulation of the water takes place in the  
90 direction of the arrows before steam is generated in the boiler A. The pipe D becomes heated to such an extent that it expands more than the rods K, partly because of the greater degree of the expansibility of its material, and  
95 partly by reason of its more direct exposure to heat than the rods K, and the levers M multiply and transmit the motion thus produced to the stem O<sup>2</sup> of the valve O and open it, permitting a portion of the hot water to  
100 escape through the pipes G and P, and cooler water entering through the pipe F, the tem-



perature is reduced in all parts of the apparatus, and the pipe D contracting more than the rods K, the valve O closes and remains closed, the operation being repeated whenever the temperature rises unduly in the water contained in the pipe D.

Having described this invention, what we claim is—

1. In an apparatus for heating water by a fire adapted to be used and regulated for other purposes, the combination of an expansible tube through which water circulates by heat near the lower part of said heating apparatus, with a valve arranged to be automatically opened by the expansion of said tube and connected with a pipe for wasting hot water from the upper portion of the said water-heating apparatus, and thereby permitting an influx of cold water and automatically moderating

and regulating the temperature of the water in said apparatus, substantially as set forth.

2. The combination of the boiler A and water-back C, connected therewith by circulating-tubes E and D, and arranged to be heated by the culinary-furnace B, with a cold-water-supplying pipe, F, hot-water-delivery pipe G, an expansible circulating-pipe, D, and fulcrums N, levers M, rods K, and valve O, arranged to automatically close and open in a waste-pipe, P, and regulate the temperature of the water in the apparatus, substantially as set forth.

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