(No Model.)

J. C. NORTON.

HOT WATER CIRCULATING SYSTEM.

No. 500,268. Patented June 27, 1893.

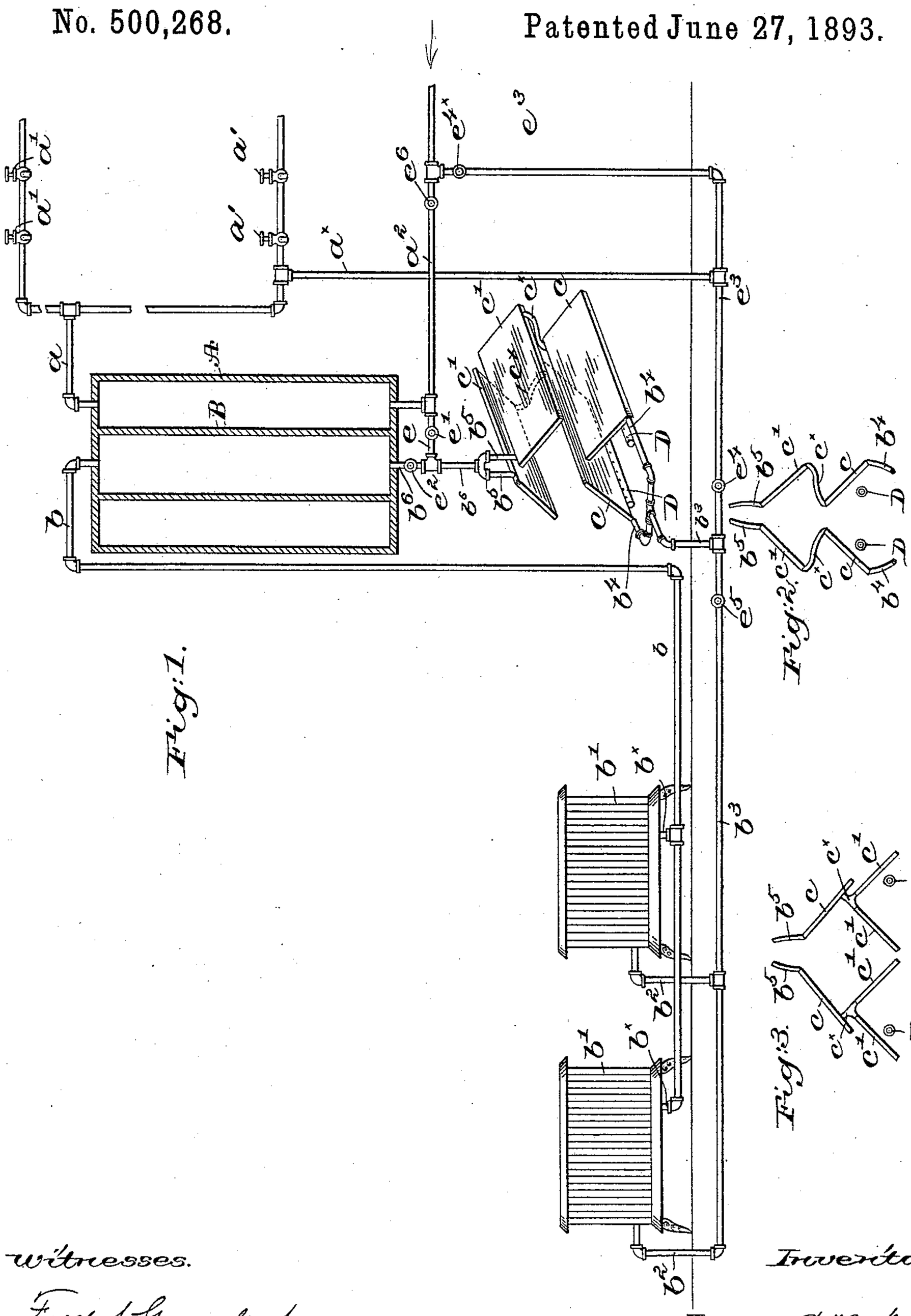

Fig: 1.

Fig: 2.

Fig: 3.

Witnesses.

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HOT-WATER CIRCULATING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 500,268, dated June 27, 1893.

Application filed September 9, 1892. Serial No. 445,395. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH C. NORTON, of Lynn, county of Essex, State of Massachusetts, have invented an Improvement in Hot-Water Circulating Systems, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to hot water circulating systems.

The principal object of the invention is to provide such a system or systems as will permit the use of a single heater, both to heat the water in a house-heating system and also the water in an independent distributing system.

In carrying out this invention I employ two boilers, one of which is connected in circuit with a house-heating system and the other in circuit with a distributing system, a suitable heater being provided which is connected with one or the other of said boilers direct, the other boiler being heated by radiation therefrom. Suitable connections and valves are provided by which the heater may be thrown into direct communication with either boiler or system desired. The said heater may be of any desired kind or type, though I prefer to employ one containing two or more thin reservoirs or tanks through which the water is passed in a thin film or sheet to be heated, it being more readily heated when in film form than when in a body form.

Figure 1, of the drawings represents in diagram a circulatory system embodying this invention; Fig. 2, an end view of the heater shown in Fig. 1; and Fig. 3, a heater of slightly modified construction.

In the system chosen to illustrate this invention, A and B represent two concentric cylindrical boilers, constructed in suitable manner, one of the boilers A, having connected with its upper end a circulating or distributing pipe a, provided with faucets or other valves or distributing devices a'. A supply pipe a^2 leading from any suitable supply enters the boiler A near its bottom, as shown, to supply water to the distributing system. A pipe b leading from the upper end of the inner boiler B, has branches leading to one or more radiators b' of suitable kind or construction and located at desired points, the return pipes b^2 from the radiators being connected with a common return b^3, which leads to the heater.

Any heater may be employed to raise the temperature of the water in the circulatory system, but I prefer to employ a heater embodying the principle of operation illustrated in the drawings, wherein c, c, c', c', Figs. 1 and 2, are inwardly inclined thin reservoirs, preferably rectangular in shape and in which the water is carried in a thin sheet or film so that it may be quickly heated. These reservoirs are arranged in pairs, one pair above another, as shown, and the return pipe b^3 of the heating system is connected by branches b^4 with each of the reservoirs of the lower pair c, c, at one end. The said reservoirs at their ends opposite the inlet pipes b^4, are connected respectively with the rear ends of the upper pair of reservoirs c', c', by pipes $c^\times$, $c^\times$, as shown, the upper front ends of said reservoirs c', being connected by branches b^5 with the return pipe b^6 leading to the bottom of the inner boiler B.

D, D, represent fuel supply pipes either oil or gas, perforated along their upper sides, as shown in Fig. 1, said pipes serving as one means of supplying fuel for combustion to heat the reservoirs and the water therein, but I desire it to be understood that the said reservoirs may be heated in any other manner desired and may even be placed in a furnace or ordinary range. The products of combustion from the flames are diverted inwardly by the converging sides of the reservoirs c, and pass upwardly between the same into the space between the upper reservoirs c' to heat the latter.

The operation of the system is as follows, viz:—The flames from the fuel act to heat the water in the two pairs of reservoirs c, c', and thereby cause a circulation of hot water to be established from the heating reservoirs upwardly through the branches b^5, pipe b^6, to the boiler B, thence to the radiators through the pipes b^4, returning to the heater again through the pipe b^3. This system constitutes a heating system and may be utilized for heating purposes. The water for the distributing system derives its heat by the radiation of heat from the boiler B, a single heater suf-

ficing for both. In cold weather both the heating and the distributing systems are required, but in warm weather only the distributing system may be necessary. I have, therefore, connected the pipes b^6 and a^2 by a short connecting pipe e fitted with a valve e', the pipe b^6 having a valve e^2 between the connection e and the boiler; I have also connected the pipe a^2 with the pipe b^3 by a pipe e^3 provided with valves e^4 and $e^{4\times}$, the pipes a^2 and b^3 being also fitted with valves e^5, e^6, as shown.

In the usual operation of the system, the valves e^4, $e^{4\times}$ and e' only are closed, the circulation being then as bereinbefore described, but by opening the valves e', e^4 and $e^{4\times}$, and closing the valves e^5, e^6, the boiler B and its heating system and radiators are cut out entirely, and the water entering through the pipe a^2 is caused to flow through the branch e^3, pipe b^3, through the heater and then through pipe b^6 and branch e to the boiler A, and thence to the distributing system. The distributing system thus derives its heat directly from the heater and not from the boiler B as before.

I have shown a pipe $a^\times$ leading from the pipe a, to and joining the pipe e^3 between the valves e^4 and $e^{4\times}$ so that when the heater is turned into the distributing system as described, a constant circulation is established from the heater through the pipes b^5, b^6, e, a^2, boiler A, pipes a, $a^\times$, e^3, and b^4 to the heater again.

This invention is not limited to the particular heater shown; and in a heater employing the thin reservoirs, the same need not necessarily be of the shape shown nor arranged in the manner shown. For example, in Fig. 3, the pairs of reservoirs are staggered to thereby secure the greatest heating effect with a given fuel supply, and the reservoirs may be otherwise grouped in batteries as desired, to secure the best results.

In the present illustration of my invention, I have shown heating and distributing systems as connected with the two boilers, but the circulatory systems may be employed for other purposes if desired.

I claim—

1. A hot water circulating system, containing two hot water boilers, and a heater for one of the boilers only; a pipe-distributing system connected with and supplied from one of the boilers, a house-heating system connected with and supplied from the other of said boilers, and connecting pipes, and valves therein, whereby either of the said boilers with its connected circulating system may be thrown into connection with and heated directly from or by the said heater, the other boiler with its system being heated by radiation from the boiler deriving its heat directly from the heater, substantially as described.

2. The combination with a circulatory system, of a heater therefor provided with two vertically arranged pair of independent thin reservoirs, the reservoirs of each pair being inclined upwardly and inwardly toward each other, but separated to leave an opening between them for the passage of products of combustion, connections between the tops of the lowest pair of reservoirs and the bottoms of the upper pair of reservoirs, whereby water entering the bottom of the lowest reservoirs has a continuous upward flow to and leaving the tops of the upper reservoirs, passing through said reservoirs in thin sheets or films, and heating devices arranged between the inclined inner sides of the reservoirs of the lower pair, the heat therefrom ascending between the reservoirs of both pair in succession, substantially as described.

3. The combination with a circulatory system, of a heater therefor provided with two vertically arranged pair of independent thin reservoirs, the reservoirs of each pair being inclined upwardly and inwardly toward each other, but separated to leave an opening between them for the passage of products of combustion, connections between the tops of the lowest pair of reservoirs and the bottoms of the upper pair of reservoirs, whereby water entering the bottom of the lowest reservoirs has a continuous upward flow to and leaving the tops of the upper reservoirs, passing through said reservoirs in thin sheets or films, and fuel supply pipes arranged between the inclined inner sides of the reservoirs of the lower pair and provided with perforations arranged along the said reservoirs, whereby the products of combustion from the fuel issuing through said perforations comes in contact with the inclined inner sides of the reservoirs of the lower pair, rising therefrom to, and in contact with the inner inclined sides of the reservoirs of the upper pair, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOSEPH C. NORTON.

Witnesses:

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EMMA J. BENNETT.