(No Model.)

J. A. BRETT.

HOT WATER CIRCULATION SYSTEM.

No. 553,448. Patented Jan. 21, 1896.

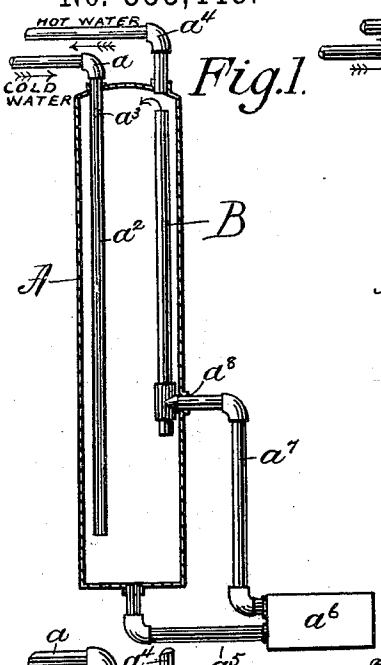

Fig. 1.

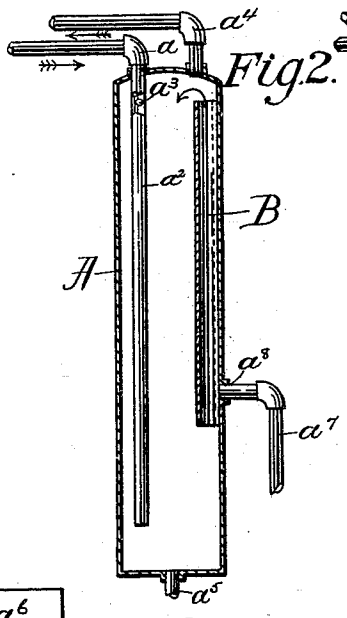

Fig. 2.

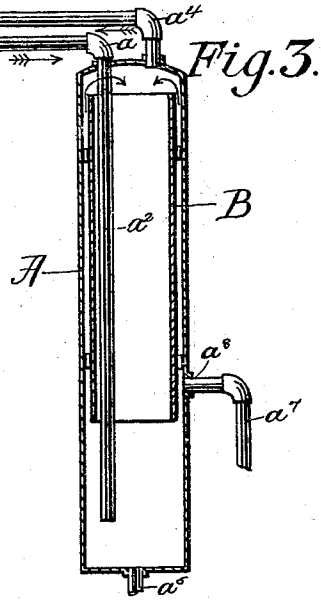

Fig. 3.

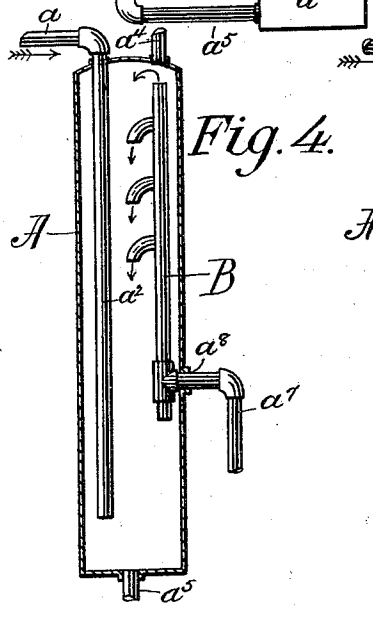

Fig. 4.

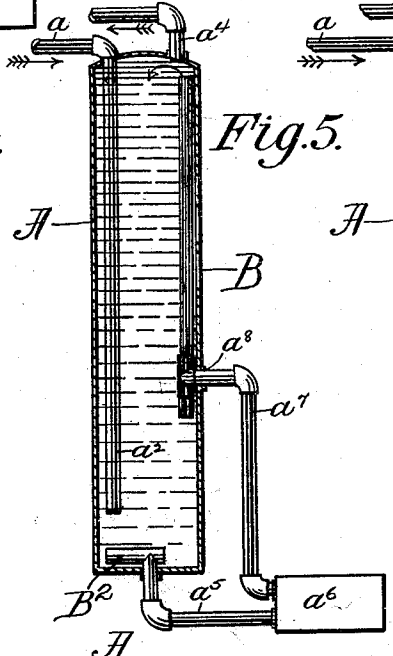

Fig. 5.

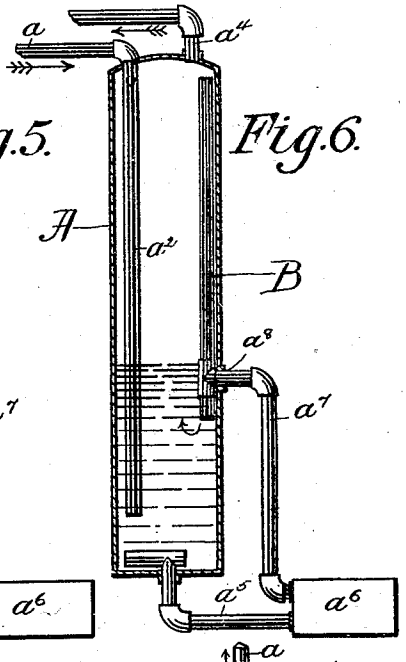

Fig. 6.

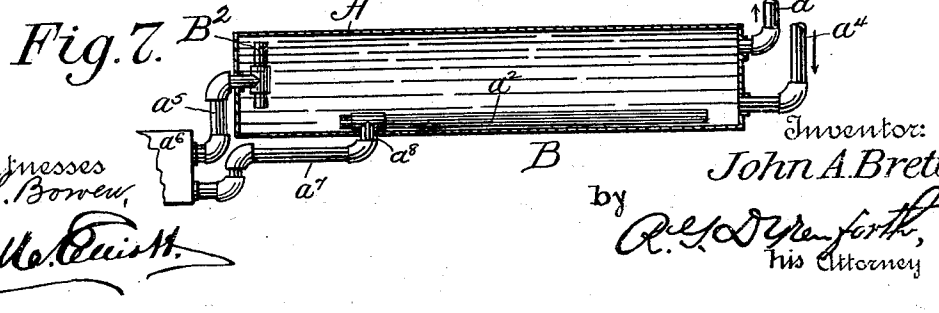

Fig. 7.

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UNITED STATES PATENT OFFICE.

JOHN A. BRETT, OF WASHINGTON, DISTRICT OF COLUMBIA.

HOT-WATER-CIRCULATION SYSTEM.

SPECIFICATION forming part of Letters Patent No. 553,448, dated January 21, 1896.

Application filed January 29, 1895. Serial No. 536,612. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. BRETT, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Hot-Water-Circulation Systems; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to hot-water-circulation systems.

The object is in a ready, efficient, and comparatively inexpensive manner to insure a more immediate and large supply of hot water from the reservoir, commonly called the "boiler" of a range or other furnace; furthermore, to insure an immediate and large supply of hot water from the said boiler without rendering futile the device ordinarily employed to obviate danger of explosion when the water-level in the said boiler sinks; furthermore, to insure a large supply of hot water from the so-called "boiler," under perfect safety, without any change in the structure of the said boiler itself or material increase of cost of manufacture thereof, and without any change in the ordinary and usual manner of setting up and connecting the ordinary so-called "boilers," and, finally to adapt the improvement to said boilers in such manner that the function thereof will be performed whether the boiler be set upright or horizontally.

With these objects in view the invention consists in the combination, with the reservoir or so-called "boiler" of a range or other furnace, of a branch pipe or conduit, open at both ends into the boiler and provided between its ends with an opening for a pipe connecting it with the heater; furthermore, in the combination, with the reservoir or so-called "boiler" of a range or other furnace, of a branch pipe or conduit, open at both ends into and placed within the boiler in the direction of the height thereof and provided between its ends with an opening or connection for junction with a pipe connecting it with the heater.

In the accompanying drawings, forming part of this specification, and in which like letters of reference indicate corresponding parts, I have shown a few of many different forms of embodiments of my invention, and in these drawings—

Figure 1 is a view in vertical longitudinal section of the ordinary so-called "boiler" set upright, with the other parts appearing in elevation, showing the improvement as a hot-water conduit formed by a pipe, and here, as in all the other figures, as the preferable but not the only manner, located within the boiler, the pipe being open at both ends and the lower end dipping below the entrance of the pipe connecting it with the heater, so that there will always be circulation even should the water fall below the top of the conduit. Fig. 2 is a similar view, the hot-water conduit appearing as an open-sided tube or semi-cylinder, with its open side set against and closed by the side of the boiler. Fig. 3 is a similar view showing the conduit formed by the space between the sides of an open-ended cylinder, less in cross-diameter than the boiler, set within the boiler, and the sides of the boiler. Fig. 4 is a similar view showing the hot-water conduit in the form of a pipe, with hot-water-discharge openings below the top. Fig. 5 is a similar view with the boiler full, showing my improved open-ended branch pipe or conduit applied to the cold-water-supply pipe of the heater as well as to the hot-water-return pipe therefrom, so that should it be desired to set the boiler horizontally this pipe will present a lower portion opening into the water. Fig. 6 is a similar view showing the boiler partly empty and the lower end of the branch pipe open into the water, so that there will always be circulation; and Fig. 7 is a similar view of the so-called "boiler," showing the construction under Figs. 5 and 6 and possible omission of the delivery-tube or long extension of the cold-water pipe into the boiler with the boiler set horizontally.

The ordinary range or "stand-boiler," so called, is, in common use, in most instances provided with four openings, two of which are located at its top, one at its bottom, and one at a side. Of the top openings one is to receive the cold-water-supply pipe leading into the delivery-tube, which extends down to a point half-way between the side opening and the bottom of the boiler, and this tube is provided

with a small vent near its top to prevent water from being siphoned through the tube out of the boiler to a low level, should the water-supply be shut off and water be drawn from some lower faucet. The other top opening is for the hot-water-discharge pipe. The opening in the bottom is for a pipe to convey the water to the water-back or other heater. The opening in the side is for a return-pipe connecting the top of the water-back or heater with the boiler to convey the water from the heater back to the boiler. The heater or water-back being at the lowest point in the circuit or system, and the cold water passing into it from the bottom of the boiler, as commonly connected, the hot water passes from the heater into the boiler at the beforementioned side opening. The objection to this manner of connection is that in its employment heating and subsequent circulation is, to a considerable extent, impeded, owing to the fact that the hot water is discharged into a large body of water of low temperature which it has to heat entire before any hot water can be drawn from the discharge-pipe; and in order to overcome this defect the return-pipe is sometimes carried upward on the exterior of the boiler-shell to the discharge-pipe just above the boiler-top, by which arrangement hot water may be drawn from the boiler as fast as it is heated by the heater; but this is objectionable, since even where the cold-water-supply pipe is vented, so that the water in the boiler can sink no lower than the vent on siphoning, still there would be steam-space at the top with no possibility of circulation of water through the boiler and heater, owing to the fact that the opening of the return-pipe is then above the water-level. The defect has also been sought to be overcome by having the return-pipe lead from the heater to the boiler, as usual, and carrying a branch from this return-pipe upward, outside, to the top of the boiler or into the discharge-pipe; but this remedy is also objectionable for the reason that in this case entrance of hot water from the heater into the boiler is liable to take place directly through the side opening thereof, as the direction of least resistance, considering the friction of the rising branch, and thus confine the circulation to the lower portion of the boiler, thereby practically nullifying or destroying the function of the extension.

The standard boilers, as now made, are the result of years of study and experiment, and are constructed with a view to meeting the varied requirements arising from different existing kinds of ranges, heaters, &c. Any radical departure from the structural arrangement of these boilers and their attachments would materially increase the cost of their production and meet with objections on the part of the manufacturer as well as on that of the user, while such departure might also necessitate the employment of an unusually high order of skill, involving a departure from the common existing methods of connection. It follows, therefore, that changes, to be practicable as well as efficient, must be simple and inexpensive and readily applicable by the manufacturer, and involve no complication of connection in which the plumber has to be specially instructed—in fact, should involve no change whatever from the ordinary method.

In the hot-water-circulating system characterized by my invention I employ in connection with the usual return-pipe leading from the water-back or heater a branch pipe or conduit open at both ends into and preferably within the boiler, the return-pipe from the heater connecting with this between its ends. The upper end of the conduit extends to a point near the top of the boiler, and the lower end thereof extends to a point below the opening of the return-pipe into it. By thus arranging the conduit, the water is always led from the heater direct to near the top of the boiler, (and to a point lower therein than that led to by the ordinary branch connection hereinbefore described,) when the boiler is full, thereby providing an immediate and constant supply of hot water for use, the lower limb presenting a seal between the entrance to the heater and the bottom opening of the conduit, thereby preventing or checking any flow into the bottom or lower part of the boiler, until such time as the water therein shall, from any cause, have sunk below the opening of the upper limb, when flow will take place through the lower limb, thus insuring continued circulation and prevention of explosion, of damage to the connections, and of noises, where the conduit leads up inside the boiler, there being no loss of heat from the conduit, since the heat radiated from the same will be to the very body, to the water to be heated, which is thus also given circulation by convexion, and the joints and connections of the conduit being shielded from strain and consequent liability to breakage or leakage.

Referring to the drawings, A indicates an ordinary so-called "boiler" of a range, having the usual cold-water pipe a, with extension a^2, vented at a^3, a hot-water-discharge pipe a^4, there being, also, the usual cold-water pipe a^5 to a heater a^6, and the usual return-pipe a^7 to the boiler through the ordinary side opening a^8 thereof.

B indicates a branch pipe or conduit open at both ends and which, in the case of boilers to be set vertically, I apply to the opening of the return-pipe in such manner that the upper limb thereof will be the longer and extend to near the top of the boiler. As shown, the form of this conduit may be greatly varied.

In the case of boilers to be set either vertically or horizontally an open-ended branch pipe B^2 may be placed upon the cold-water pipe leading to the heater, as well as upon the hot-water-return pipe therefrom, and in case of boilers intended only for horizontal setting the branch pipe upon the hot-water-

return pipe may be omitted, as well as the vented tube from the cold-water-supply pipe into the boiler.

In case of setting a boiler horizontally with my improvement the connections with the pipes at the induct and discharge end will be changed, so that the cold water will still come in at the bottom and the hot water be discharged at the top.

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

1. The combination with the reservoir or so-called boiler of a range or other furnace, provided with the usual cold water supply-pipe and hot water service-pipe, of a pipe or conduit open at both ends into the boiler, one end thereof opening near the plane of the hot water service-pipe, and the other end opening at a point below the connection leading from the heater, substantially as described.

2. The combination with the reservoir or so-called boiler of a range or other furnace, provided with the usual cold water supply-pipe and hot water service-pipe, of an open-ended pipe or conduit arranged within the boiler, one end thereof opening near the plane of the hot water service-pipe, and the other end opening at a point below the connection leading from the heater, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN A. BRETT.

Witnesses:
R. G. DYRENFORTH,
R. M. ELLIOTT.