A. B. CLAY.

HOT WATER SERVICE APPARATUS.

APPLICATION FILED JUNE 19, 1915.

1,173,484. Patented Feb. 29, 1916.

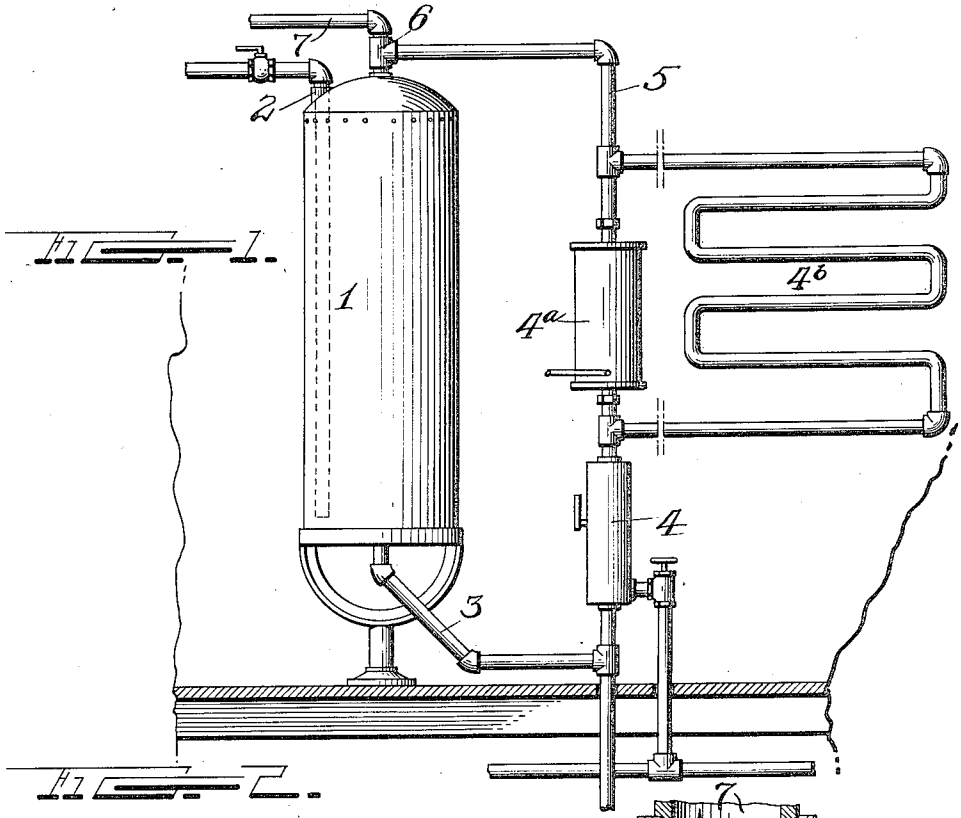

FIG. 1.

FIG. 2.

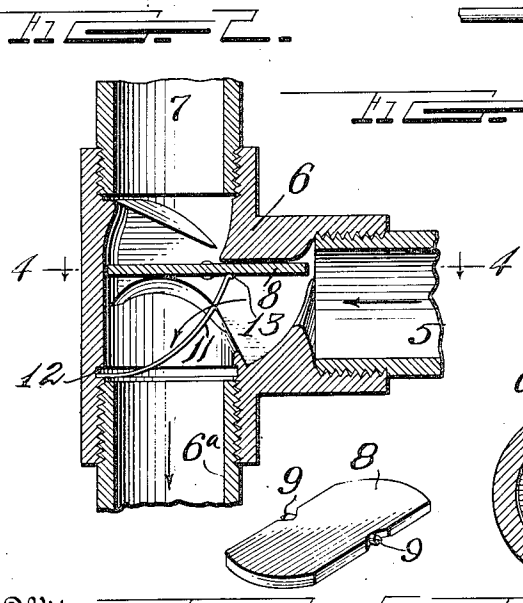

FIG. 3.

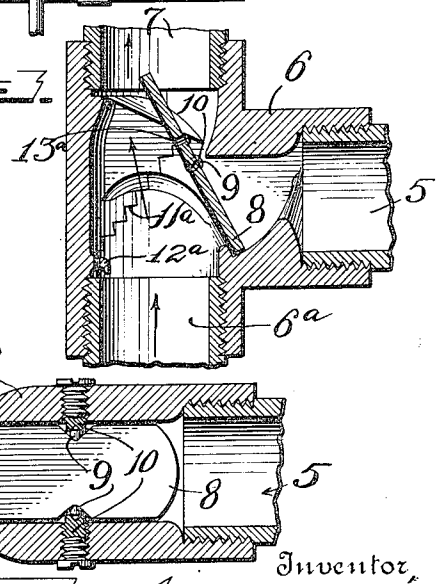

FIG. 5.

FIG. 4.

Witness

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UNITED STATES PATENT OFFICE.

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HOT-WATER-SERVICE APPARATUS.

1,173,484. Specification of Letters Patent. Patented Feb. 29, 1916.

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To all whom it may concern:

Be it known that I, ALBERT B. CLAY, a citizen of the United States, residing at Scranton, in the county of Lackawanna and State of Pennsylvania, have invented certain new and useful Improvements in Hot-Water-Service Apparatus, of which the following is a specification.

This invention relates to an apparatus for supplying hot water, for instance, for domestic purposes, in which means are provided for passing the water from a suitable container to a heating device and thence back to the container in such manner that the contents of the container, by continued circulation, becomes thoroughly heated. In systems of this kind as usually constructed, there is a cold water supply under a head of pressure developed at some suitable source, and a hot water distributing pipe leading to one or more places of consumption, this distributing pipe being connected to the top of the container in order to insure delivery of hot water, while the circulation through the heater is from the bottom of the container to the heater, and thence to the top of the container, where communication is usually made through the same connection as the hot water distributing pipe. This system is frequently found objectionable, because of the tendency to set up a flow from the cold water supply through the outlet pipe to the heater, and from the heater, through the return pipe, directly to the hot water distributing pipe, at a rate of flow too rapid to permit raising the temperature, and with the result that a comparatively large body of previously heated water remains undisturbed in the container.

The present invention overcomes this difficulty by providing a valve which normally assumes a position in which it offers no material obstruction to the circulation of the water through the heater to the container, but will automatically shift to and temporarily retain a position to cut off flow of water from the heater whenever water is drawn through the service pipe.

The invention will be fully understood upon reference to the accompanying drawing, in which—

Figure 1 is a general view of a system of known construction; Fig. 2 is a vertical section of a portion of Fig. 1, on an enlarged scale, showing the automatic valve in normal position; Fig. 3 is a view similar to Fig. 2, showing the automatic valve in the position to which it is moved by the flow of water through the service pipe; Fig. 4 is a horizontal section on the line 4—4 of Fig. 2, and Fig. 5 is a perspective view of the valve detached.

Referring to Fig. 1, 1 represents a known type of container having a cold water feed pipe 2, which usually extends down within the container to a delivery point sufficiently low to avoid disturbance of heated water accumulating in the upper part of the container, also a pipe 3 leading to some suitable form of heater which may be the steam injector heater 4, or the gas heater 4^a, or the furnace coil 4^b, or all three of these heaters, as may be desired, and a return pipe 5 connected through the T-connection 6 with the top of the container 1, which connection also serves to connect the service pipe 7. Inasmuch as delivery of water through pipe 7 is dependent upon the pressure communicated through incoming water in the pipe 2, it frequently happens that the pipe 7 will be supplied directly from the lower part of the container, through pipe 3, heater 4, or 4^a, or 4^b, and return pipe 5, so that cold water is delivered, notwithstanding there may be a sufficient quantity of heated water accumulated by its levity in the upper part of the container 1. To overcome this difficulty, I construct the connection 6 as illustrated in Figs. 2 to 5. That is to say, it is provided with a suitable valve 8 adapted to assume normally, the position shown in Fig. 2, in which it permits the free return of water from the heater to the container, but which is automatically moved to the position shown in Fig. 3, when water flows outward through the pipe 7 and thereby cuts off any substantial flow of water through the return pipe 5.

The valve 8 may assume any one of a number of different forms; hence the details of construction which will now be described, while embodying the best method now known to me in which to embody the invention in operative form, are not to be taken as indicating the full scope of the invention, but merely as an illustration of the structural and coöperative relationship of the parts.

In the particular embodiment of the valve 8 selected for purposes of illustration, 9 represents trunnions by which the valve is rotatably held between the bearing screws 10 located in the connection 6 at points to permit the valve to swing to either of its two posi-

tions already described; and 11, Fig. 2, is a leaf spring bearing at 12 upon the connection 6 and at 13 upon the valve 8, adapted to hold the valve in its normal position. As suggested in Fig. 3, this latter function may be insured by a tension spring 11^a connected at one end to a horn 12^a, and having its other end secured to the valve at 13^a. In some instances, it may be preferred to counter-balance one end of the valve instead of using a spring.

From the foregoing description, it will be obvious that when the pressure is reduced above the valve 8, by opening an outlet communicating with the pipe 7, pressure of water beneath the upwardly swinging end of the valve will raise said end and move the valve to the position shown in Fig. 3, in which position it will be held as long as water is flowing through the pipe 7. So long as the valve is in this position, the flow through the pipe 5 is only sufficient to act as a safety valve, or escape for water superheated while the normal flow is stopped, but not to any objectionable extent. As soon as flow through the pipe 7 is interrupted, the valve returns to the position of Fig. 2, and circulation from the container through the heater may proceed in the normal way.

I claim:—

1. In a water heating system comprising a container, a service pipe and circulating connections including a return pipe communicating with the container near the service pipe; means for preventing flow from the return pipe directly to the service pipe, comprising a valve adapted to obstruct return flow in the return pipe; said valve being automatically movable to obstructing position, under the pressure of water flowing through the service pipe.

2. In a water heating system comprising a container, a service pipe and circulating connections including a return pipe communicating with the container near the service pipe; means for preventing flow from the return pipe directly to the service pipe, comprising a connection serving in common for the return pipe and the service pipe, and a valve constructed with a portion adapted to assume a position obstructing the return pipe, and a portion lying in the path of and automatically movable to obstructing position by water flowing into the service pipe.

3. In a water heating system comprising a container, a service pipe and circulating connections including a return pipe communicating with the container near the service pipe; means for preventing flow from the return pipe directly to the service pipe, comprising a T-connection having three openings connected, respectively, to the container, the return pipe, and the service pipe, and a plate valve located at the intersection of said openings and normally assuming a position with one end projecting longitudinally into the return pipe opening, and its other end extending transversely of the service pipe opening; said valve being adapted to swing automatically under pressure of water flowing out through the service pipe to a position which presents one end across the return pipe opening and the other end approximating longitudinal position in the service pipe opening.

4. In a water heating system comprising a container, a service pipe and circulating connections including a return pipe communicating with the container near the service pipe; means for preventing flow from the return pipe directly to the service pipe, comprising a T-connection having three openings connected, respectively, to the container, the return pipe, and the service pipe, and a plate valve located at the intersection of said openings and normally assuming a position with one end projecting longitudinally into the return pipe opening, and its other end extending transversely of the service pipe opening; said valve being adapted to swing automatically under pressure of water flowing out through the service pipe to a position which presents one end across the return pipe opening and the other end approximating longitudinal position in the service pipe opening; said valve being trunnioned in said T-connection.

5. In a water heating system comprising a container, a service pipe and circulating connections including a return pipe communicating with the container near the service pipe; means for preventing flow from the return pipe directly to the service pipe, comprising a T-connection having three openings connected, respectively, to the container, the return pipe, and the service pipe, and a plate valve located at the intersection of said openings and normally assuming a position with one end projecting longitudinally into the return pipe opening, and its other end extending transversely of the service pipe opening; said valve being adapted to swing automatically under pressure of water flowing out through the service pipe to a position which presents one end across the return pipe opening and the other end approximating longitudinal position in the service pipe opening; said valve being trunnioned in said T-connection and having a spring yieldingly holding it in its first-named position.

The foregoing specification signed at Scranton, Pennsylvania, this 29th day of May, 1915.

ALBERT B. CLAY.