

J. FOSTER.
WATER HEATER.

(Application filed Jan. 22, 1902.)

(No Model.)

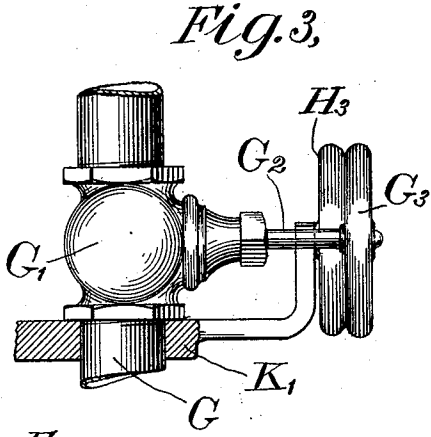
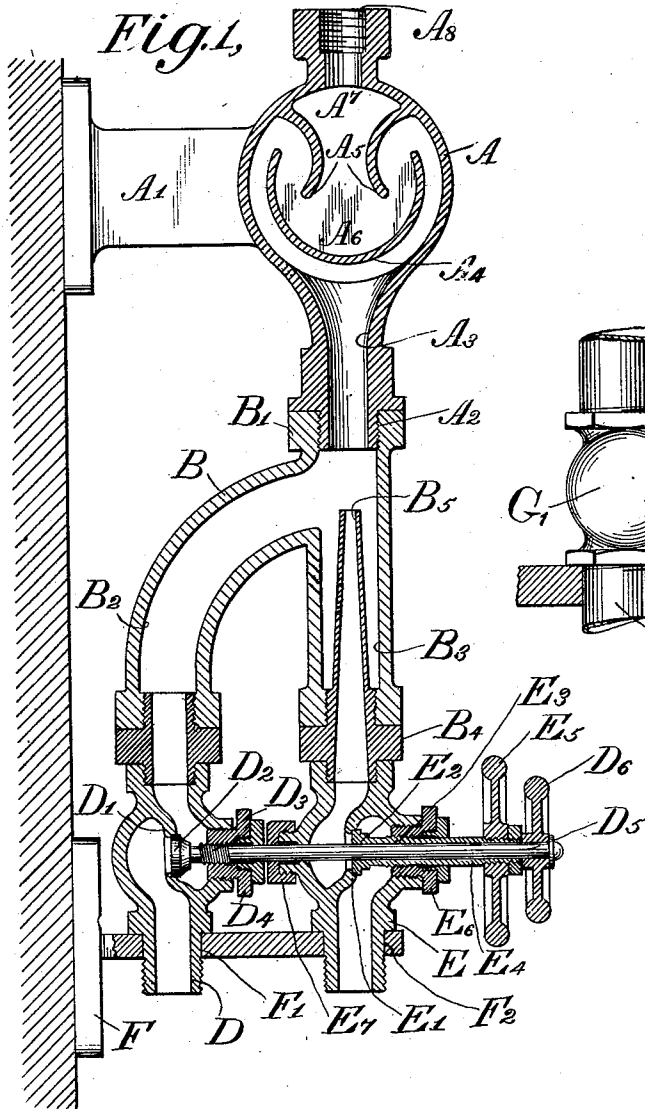
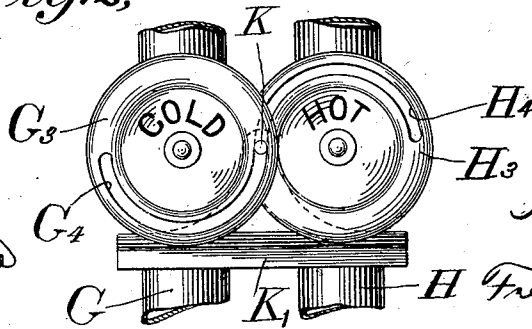


Fig. 2.



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WATER-HEATER.

SPECIFICATION forming part of Letters Patent No. 705,335, dated July 22, 1902.

Application filed January 22, 1902. Serial No. 90,742. (No model)

To all whom it may concern:

Be it known that I, JOSEPH FOSTER, a citizen of the United States, and a resident of New York city, in the borough of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Water-Heaters, of which the following is a specification, taken in connection with the accompanying drawings, forming part of the same.

This invention relates to water-heaters which are especially adapted for heating water for bathing and other similar purposes, by which a uniform stream of water of any desired temperature may be readily obtained.

In the accompanying drawings, in which the same reference characters refer to similar parts in the several figures, Figure 1 is a vertical sectional view of one form of apparatus embodying my invention. Fig. 2 is a detail showing a modification. Fig. 3 is a side view of the same.

In general terms this water-heater comprises interlocking valves by which the cold water and heating fluid are admitted to an injector. From this point the heated water passes into a mixing-chamber, in which it is thoroughly mingled to give a uniform temperature throughout all parts of the stream of water. The mixing-chamber A is formed of metal in any desired way and has the generally circular form indicated in Fig. 1. The chamber is formed with a supporting-bracket A', secured to one side of the same, by which the heater may be supported. The lower end of the chamber is formed with a screw connection A², by which it is joined to the collar B' at the upper end of the injector B. The inlet A³ of the mixing-chamber is flared outward, as indicated, and the deflecting-plate A⁴ is provided opposite this inlet. This deflecting-plate is given the substantially circular form indicated, this plate being shown substantially concentric with the outer wall of the mixing-chamber. The two guiding-plates A⁵ are also formed in the mixing-chamber and are given a curved form, so as to extend downward from the upper end of the chamber and curve around the upper ends of the deflecting-plate A⁴. The lower ends of these guiding-plates A⁵ curve outward, so as to guide the water into contact with the de-

flecting-plate and to cause the impingement of the water against this plate at a considerable angle. In this way violent eddies are set up within the space A⁶, and the mass of water passes out between the two guiding-plates into the upper space A⁷. From thence the thoroughly-mixed and uniformly-heated water is led off through the outlet A⁸, diametrically arranged with respect to the inlet A³, to a shower-bath or any other desired device. It will be understood that the deflecting-plates and guiding-plates form partitions which extend the entire depth of the circular mixing-chamber, although, if desired, sinuous passages might be formed in the mixing-chamber by employing partitions of different shape.

The support F is arranged at the lower end of the heater, and the holes F¹ F² in this support are engaged by the water-valve D and by the heating-valve E. It will be of course understood that in using this water-heater the water-valve is connected with a water-pipe to give a continuous flow of water, and the heater-valve E is connected with a source of hot water or preferably with a source of steam. The water-valve D is of ordinary construction, being formed with the valve-seat D', against which the valve-plug D² acts, this valve-plug being secured to the water-valve stem D³, having the threaded portion D³ upon it and having the water-handle D⁶ rigidly secured to the outer end of the same. The threads on the valve-stem govern the position of the valve, and a suitable packed joint is provided at D⁴, as is usual in this art. The water-valve D is secured to the injector B, so as to supply water to the curved passage B² of the injector. The heating-valve E is also secured to this injector to supply heating fluid to the heating-nozzle B⁵, screwed into the straight passage B³ of the injector, so as to be substantially in line with the inlet A³ of the mixing-chamber. The heating-valve is formed with a valve-seat E', upon which the heating-plug E² acts, this plug being secured to the tubular heating-valve stem E⁴, having the threads E³ formed upon it. Upon the outer end of this heating-valve stem is rigidly secured the heating-handle E⁵. The packed joint E⁷ is provided at the rear end of the heating-valve, so as to prevent any leakage

about the stem of the water-valve, which, as is seen, passes through the heating-valve and through the hole in the heating-valve stem. The water-handle is formed smaller than the heating-handle, so that either one may be readily grasped to operate the valves, and it will be seen, furthermore, that the central shoulders of these handles abut when both valves are closed. In this way it will be apparent that a very simple and desirable form of interlocking valve is provided for this purpose, since the threads on both the valve-stems are right-handed, as indicated, and thus in the closed position of the valves (indicated in the drawings) the heating-handle is locked, and the heating-valve cannot be opened until the water-handle is operated to open the water-valve. Also the heating-valve must be closed before the water-valve can be completely closed. Thus it is impossible to waste the heating fluid or to get unduly hot water from the water-heater.

The operation of the heater in case steam is used tends to increase the force of water issuing from the heater, since the steam as it issues from the heating-nozzle B³ is entirely condensed by the cold water in the injector, and the force of the steam operates to urge the water through the inlet to the mixing-chamber, so that a very considerable increase of head is thus secured.

In Figs. 2 and 3 a modified form of interlocking valves is indicated. The water-pipe G is controlled by the globe-valve G' of ordinary construction, the valve-stem G² of this valve having rigidly secured upon it the water-handle G³. This water-handle is provided with a circumferential slot G⁴, which extends substantially half round the same, the threads upon the valve-stem being of a coarse pitch, so that the valve is entirely open after the valve-stem has revolved through a half-revolution. The stop-pin K engages the groove G⁴, and this stop-pin is mounted upon the bracket K', secured to the water-pipe G and the heating-pipe H. The heating-pipe is governed by a similar valve having the heating-handle H³, which is underneath the water-handle G³, there being a slight overlap, as is indicated in Fig. 2. The heating-handle is also provided with a similar circumferential groove H⁴, with which the stop-pin K engages. It will of course be understood that this arrangement of valves is connected with the injector B or with some similar mixing device. In operating these interlocking handles the water-handle is turned to any desired extent up to a half-revolution, and thereafter the handle H³ may be turned to admit the heating fluid to the heater. After the water-handle has been turned to admit water to the injector the heating-handle may be turned to the extent desired to admit the requisite amount of heating fluid to the injector, so that the water is heated to any desired extent. It will be seen that in this manner the interlocking handles govern the

admission of fluids to the injector in varying proportions. In closing the valves it is necessary to turn the heating-handle first, and thereby to close the heating-valve. Thereafter the water-valve may be closed. Many other modifications of this water-heater may be made, and, furthermore, parts of this apparatus may be used without employing all of the same. I do not, therefore, wish to be limited to the disclosure which I have made in this case; but

What I claim as new, and wish to secure by Letters Patent, is set forth in the appended claims:

1. In a water-heater, a circular mixing-chamber having oppositely-arranged inlet and outlet, a deflecting-plate parallel to the wall of said mixing-chamber opposite said inlet, curved guiding-plates extending outward from the wall of said mixing-chamber on either side of said outlet, said guiding-plates extending around the ends of said deflecting-plate to cause impingement of water against said deflecting-plate, an injector connected with the inlet of said mixing-chamber and provided with a heating-nozzle in line with said inlet to discharge water against said deflecting-plate, a curved water-passage communicating with said heating-nozzle, and interlocking water and heating valves controlling the supply of fluids to said injector.

2. In a water-heater, a circular mixing-chamber having diametrically-arranged inlet and outlet, a deflecting-plate concentric with the wall of said mixing-chamber opposite said inlet, curved guiding-plates extending outward from the wall of said mixing-chamber on either side of the outlet of the same, said guiding-plates extending around the ends of said deflecting-plate to cause impingement of the water against said deflecting-plate, an injector connected with the inlet of said mixing-chamber and interlocking valves to govern the admission of water and heating fluid to said injector.

3. In a water-heater, a circular mixing-chamber having diametrically-arranged inlet and outlet, there being a concentric deflecting-plate in said mixing-chamber opposite said inlet and curved guiding-plates extending from the wall of said mixing-chamber around the ends of said deflecting-plate, a water-valve and a heating-valve connected to said mixing-chamber and an interlocking water-handle and heating-handle to govern said valves.

4. In a water-heater a circular mixing-chamber having a concentric deflecting-plate opposite the inlet of said chamber and guiding-plates extending out from the wall of said mixing-chamber around the ends of said deflecting-plate to cause eddies in the space between said guiding-plates, the outlet of said mixing-chamber being situated between said guiding-plates and an injector connected with the inlet of said mixing-chamber and provided with a heating-nozzle in line with said inlet.

5. In a water-heater, a mixing-chamber, an injector in line with the inlet of said mixing-chamber and interlocking apparatus for the admission of fluids to said injector in varying proportions.

6. In a water-heater a circular mixing-chamber having diametrically-arranged inlet and outlet, a deflecting-plate concentric with the wall of said mixing-chamber opposite said inlet, curved guiding-plates extending outward from the wall of said mixing-chamber on either side of the outlet of the same, said guiding-plates extending around the ends of said deflecting-plate to cause impingement of water against said deflecting-plate and an injector connected with the inlet of said mixing-chamber the heating-nozzle of said injector being in line with said inlet.

7. In a water-heater, a mixing-chamber provided with an inlet and an outlet, an injector connected with the inlet of said mixing-chamber and provided with a heating-nozzle in line with said inlet, adjustable valves to control the supply of fluids to said injector, an incurved deflecting-plate opposite the inlet of said mixing-chamber against which the fluid from said injector impinges and guiding-plates extending around the ends of said de-

flecting-plate to cause eddies in the space between said guiding-plates to thoroughly mix the fluid issuing from the outlet of said mixing-chamber.

8. In a water-heater, a mixing-chamber having an inlet and outlet, an injector connected to said inlet and having a heating-nozzle in line with the same, an incurved deflecting-plate opposite the inlet in said mixing-chamber against which fluid from said injector impinges and guiding-plates extending around the ends of said deflecting-plate to thoroughly mix the fluid issuing from the outlet of said mixing-chamber.

9. In a water-heater, a mixing-chamber having an inlet, a curved deflecting-plate opposite said inlet and guiding-plates cooperating with said deflecting-plate to produce eddies in said mixing-chamber, an injector connected to said inlet and having a steam-nozzle in line with the same to cause hot water to impinge upon said deflecting-plate, and interlocking valves to control the supply of steam and water to said injector.

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