No. 759,603. PATENTED MAY 10, 1904.

J. FOSTER.

WATER HEATER.

APPLICATION FILED JULY 11, 1902.

NO MODEL.

Fig. 1.

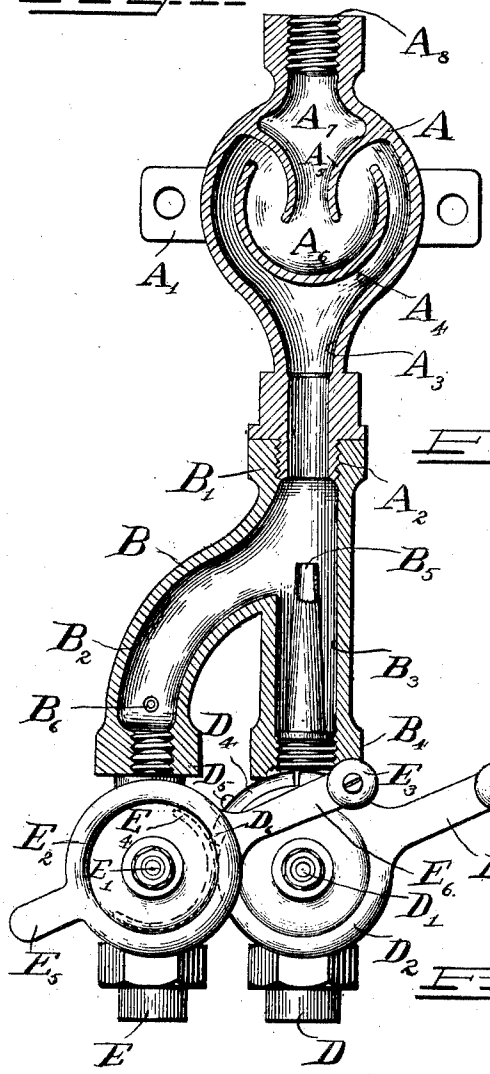


Fig. 3.

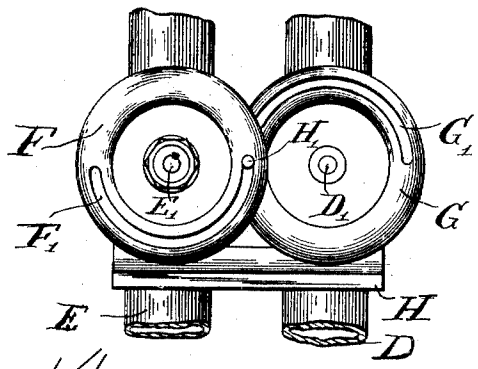


Fig. 4.

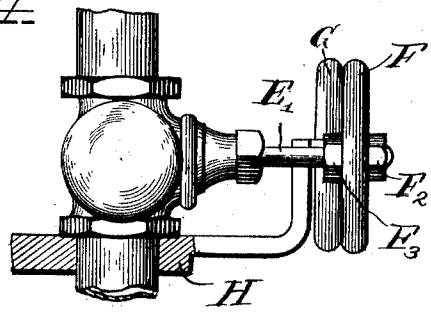
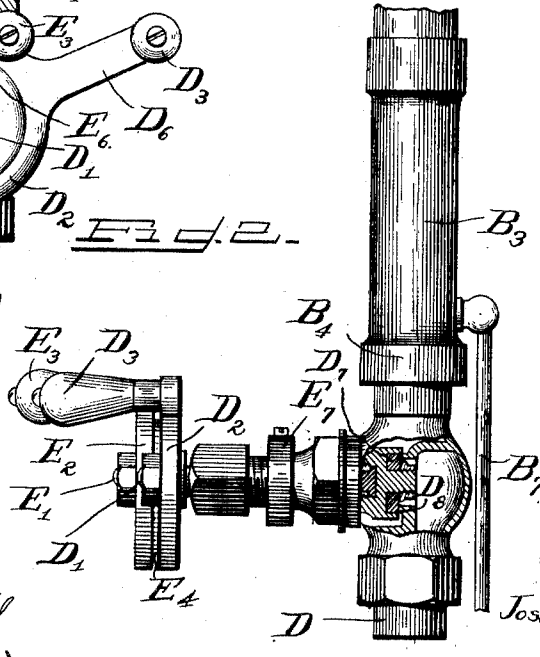


Fig. 2.



WITNESSES:

Alexander Mitchell

INVENTOR

Joseph Foster

By Frederick S. Duncan

ATTORNEY

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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UNITED STATES PATENT OFFICE.

JOSEPH FOSTER, OF BROOKLYN, NEW YORK.

WATER-HEATER.

SPECIFICATION forming part of Letters Patent No. 759,603, dated May 10, 1904.

Original application filed January 22, 1902, Serial No. 90,742. Divided and this application filed July 11, 1902. Serial No. 115,189. (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; and it relates especially to interlocking valves for use in such heaters.

This application is a division and continuation of my copending application, Serial No. 90,742, filed January 22, 1902, which has subsequently matured into Patent No. 705,335, of July 22, 1902.

In the accompanying drawings, in which the same reference character refers to similar parts in the several figures, Figure 1 is a partial sectional view of a water-heater embodying this invention. Fig. 2 is a side view of the same, partly in section. Fig. 3 is a view showing a different form of valve mechanism. Fig. 4 is a side view of the same.

The form of heater illustrated in Figs. 1 and 2 of the drawings comprises a mixing-chamber A, an injector B, having its heating-nozzle B^5 in line with the inlet of the mixing-chamber, and interlocking valves for the admission of fluids to the injector in varying proportions. The mixing-chamber A, which is secured to the wall or any desired support by the bracket A′, comprises the curved deflecting-plate A^4 opposite the inlet A^3 of the mixing-chamber and extending substantially parallel to the circular wall of the mixing-chamber. The two guiding-plates A^5 extend outward from the wall of the mixing-chamber, preferably on either side of the outlet A^8, and have the curved formation indicated, so that they project within the deflecting-plate A^4. In this way it will be evident that heated fluids entering the mixing-chamber and impinging upon the deflecting-plate are divided and are by means of the guiding-plates made to impinge on the inner side of the deflecting-plate and are thoroughly mixed before issuing from the outlet A^8, eddies being formed in the spaces A^6 A^7 within the mixing-chamber. The mixing-chamber is rigidly secured to the injector B by the screwed extension A^2 of the chamber, which fits within the upper end B′ of the injector-casing. As is indicated, the injector is provided with the curved passage B^2, through which water is supplied from the water-pipe E. The heating-nozzle B^5 is located within the straight passage B^3 and substantially in line with the inlet of the mixing-chamber, so that when steam is used in the heating-nozzle the force of the steam-jet assists in discharging the fluids from the injector and produces a greater pressure in the discharge than would otherwise be the case. The curved portion of the injector is formed with the drain-aperture B^6, which connects with a suitable drain-pipe B^7. By this means any water which may remain in the injector, mixing-chamber, and adjacent parts is drained off after the heater has been used, and the pipes are kept free in this manner. The valves which are used in this case for governing the admission of fluids to the injector are provided with interlocking handles, so that it is necessary to open the water-valve before the heating-valve can be operated. Thereafter the heating-valve may be opened to any desired extent to admit any amount of the heating fluid to the injector and to properly regulate the temperature of the water. In closing the valves it is necessary to entirely close the heating-valve before the water-valve can be operated. This is effected by the interlocking members on the handles secured to the valves. The heating-valve, which is secured, as is indicated in Fig. 2, to the heating-pipe D, is provided with the seat D^8, with which the valve-plug D^7 of standard construction coöperates in a well-known manner. This valve-plug is mounted in the ordinary way on the valve-stem E′ and is positively moved by the same toward and away from its seat. Upon the stem is also rigidly secured the heating-handle D^2, which may, if desired, be formed with the extension D^6 and with the grip D^3 for more readily operating the same.

The heating-handle is provided with the adjustable stop D^4, secured firmly to the handle by the screws or bolts D^5, so as to properly coact with the water-handle. The seat and valve-plug of the water-valve are similarly constructed, and the valve-plug in this instance is also mounted on the valve-stem E'. The water-handle is firmly secured to this valve-stem and is in like manner preferably provided with the extension E^6 and with the grip E^3. This water-handle is also preferably formed with the projection E^5. As will be seen in Fig. 1, the water-handle is formed on its under surface with the interlocking member or cam E^4, which projects into the path of the stop D^4 on the heating-handle. The two valve-stems are preferably maintained at all times in proper alinement by the yoke E^7, which embraces both of the valves, as indicated in Fig. 2, and holds them rigidly in alinement. These adjustable interlocking members operate as follows in regulating the admission of fluids to the injector: In the position indicated in Fig. 1 both valves are completely closed, and it will be seen that the stop D^4 engages the cam E^4, so that the movement of the heating-handle in a left-handed direction, so as to open the heating-valve, is prevented. The water-handle may, however, be rotated in a left-handed direction, so as to admit water to the injector, and in operating the heater this water-handle is rotated until the projection E^5 comes into contact with the nut upon the end of the valve-stem D' or with a contiguous part. In this position it will be seen that the cam E^4 has moved out of contact with the stop D^4, so that the heating-handle is free to move in a left-handed direction, and the heating-valve may thereupon be opened to any desired extent to properly regulate the temperature of the water. The extension D^8 operates to limit the movement of the heating-handle, since this extension comes into contact with the valve-stem E'. In closing the valves the heating-valve is first moved back into the closed position indicated in Fig. 1, so that the stop B^4 moves out of the path of the cam E^4. Thereafter the water-handle is moved into the closed position indicated. As the valve wears to some extent during the normal operation of this device, it is desirable from time to time to adjust the position of the stop D^4 so that it operates to insure the complete closure of the heating-valve. This is effected by releasing the adjusting-screws D^5 and setting the stop in any desired position and securing it in that position by tightening the screws, these screws passing through suitable slots in the stop. This arrangement has proved very effective in practice, and, furthermore, allows the employment of the standard form of valve, which is mounted directly on the valve-stem and while positively actuated thereby at the same time entirely prevents the opening of the heating-valve before the water-valve has been opened to the proper extent, so that unduly hot water cannot be delivered from the heater.

In the form of interlocking valve shown in Figs. 3 and 4 the structure of valve-seat and plug are the same as has been described, the plugs being secured in each instance to the valve-stems D' and E', so as to control the admission of water and heating fluid from the pipes D and E to the injector. The heating-handle G is rigidly secured upon the valve-stem D' and is formed with the slot G' and with an interlocking member or flange around its periphery. The yoke H is rigidly secured to the pipes and is provided with the stop-pin H', which projects through the slot G', and thereby limits the movement of the heating-valve. The water-handle F is adjustably secured upon the valve-stem E' by the nuts F^2 F^3 or by any other desired means, so that it may be adjusted longitudinally of this stem. This handle is provided with an interlocking member or flange around its periphery and with the slot F', through which the stop-pin H' also passes and which operates to limit the movement of this valve. As is seen in Fig. 4, the interlocking members of these handles F and G come into close contact, so that in the position indicated when both valves are closed a movement of the handle G in a left-handed direction, so as to open the heating-valve, is prevented until the water-handle F has been turned. The movement of the valves in either case is limited to substantially half a revolution, which is sufficient with the quick-acting valves used to secure the desired valve opening. In closing the valve it is apparent that the heating-handle G must be turned into the position indicated in Fig. 3, when the heating-valve is completely closed before the water-handle F can be turned into its closed position. The adjustability of the water-handle F upon the stem F' serves to allow for any wear that may occur and secures the complete closure of the heating-valve under all conditions. If desired, the heating-handle and water-handle may in this instance be formed with extensions and grips similar to those that are indicated in Fig. 1, although this is not necessary in every instance.

Many modifications may be made in this device without departing from the spirit of this invention. Any desired form of valve may be used, and it is not necessary to employ the exact form which has been disclosed. Furthermore, parts of this invention may be used without employing all of the same. I do not, therefore, wish to be limited to the disclosure which has been made in this case; but

What I claim as new and what I wish to

secure by Letters Patent is set forth in the appended claims:

1. In interlocking valves for a water-heater, valve-stems having valve-plugs secured thereto and coacting with seats to control the admission of fluids to said heater, a heating-handle and a water-handle secured to said stems, said water-handle formed with a circular cam and said heating-handle being provided with an adjustable stop to engage said cam, a projection on said water-handle to prevent the excessive operation of the same and extensions and grips on said handles.

2. In interlocking valves for a water-heater, valve-stems to operate valve-plugs to control the admission of fluids to said water-heater, a water-handle and a heating-handle secured to said stems, a cam on said water-handle and an adjustable stop on said heating-handle to engage said cam.

3. In interlocking valves for a water-heater, an injector, valve-stems provided with valve-plugs to govern the admission of fluids to said injector, a water-handle and a heating-handle provided with adjustable interlocking members secured to said stems, means to limit the extent of movement of said handles and a drain-pipe connected to said injector.

4. In interlocking valves for a water-heater, valve-stems having valve-plugs mounted thereon to control the admission of fluids to said water-heater, a water-handle and a heating-handle having adjustable interlocking members secured to said stems and means to limit the movement of said handles.

5. In interlocking valves for a water-heater, valve-stems, valves actuated thereby to govern the admission of fluids to said heater, a water-handle and a heating-handle secured to said stems and adjustable interlocking members on said handles to govern the movement of the same.

6. In interlocking valves for a water-heater, valve-stems to operate valves to govern the admission of fluids to said heater, and adjustable interlocking members secured to said stems to govern the movement of the same.

JOSEPH FOSTER.

Witnesses:
JAMES N. CATLOW,
JESSIE B. KAY.