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TEMPERATURE CONTROL DEVICE

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Fig. 1.

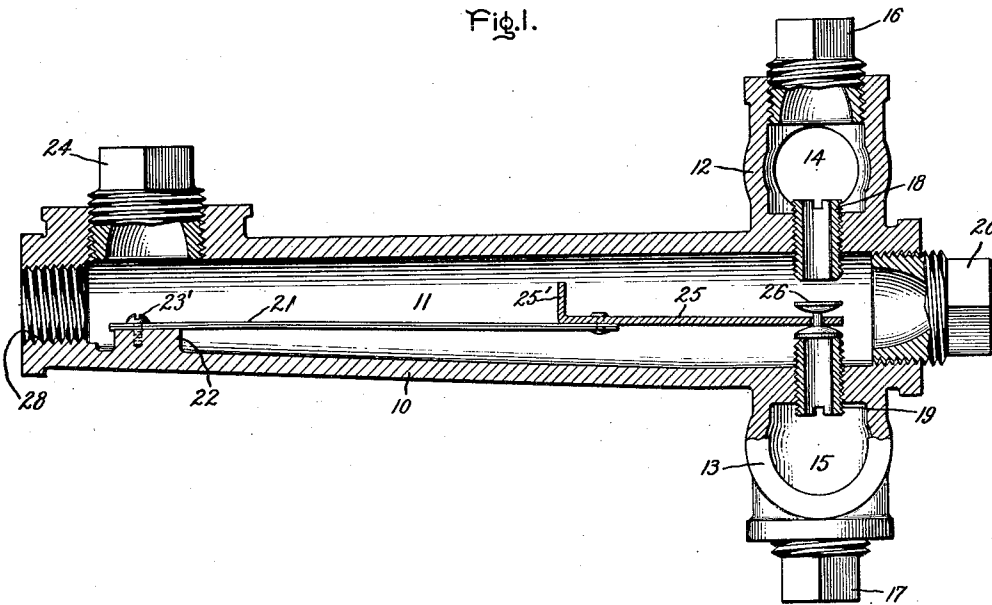
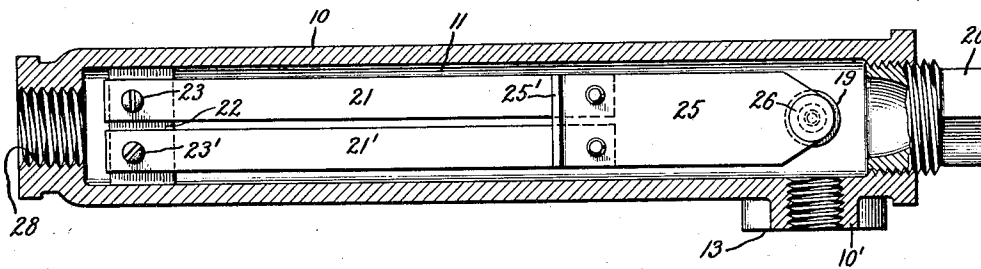


Fig. 2.



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TEMPERATURE CONTROL DEVICE

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8 Claims. (Cl. 236—12)

My invention relates to a temperature control device, more particularly to an improved mixing valve for automatically controlling the temperature of fluids.

justment of the orifices and for permitting ready removal of the thermostatic strips and valves from the interior of the casing. This permits easy cleaning of the strip and of the interior of the mixing device.

In previous devices of the kind referred to thermostatic coils and levers have been commonly used for controlling the action of the valves in such devices. Such coils readily accumulate sediment in the water and their operation is very soon impaired, rendering the mixing device ineffective. The embodiment of levers and the like for actuating valves complicates the internal structure and assists in a rapid accumulation of sediment. The usual type of mixing device is bulky and is not readily disassembled for the purposes of cleaning. The hot and cold fluids are as a rule introduced into the mixing chamber of the device without any provision for insuring an even mixture, whereby stratification is not prevented.

By having the inlets oppositely disposed at right angles to the mixing chamber, mixing is assisted. The flow of the mixture from the inlet end to the outlet end tends to carry away with it solids and sediment and tends to keep the thermostatic strips clean, thereby increasing the length of time which the device can remain in service without the necessity of cleaning.

Hence, it is the principal object of my invention to provide a mixing device which will not readily accumulate sediment and which is simple and can be readily disassembled for purposes of cleaning.

Flat valve faces are provided and the double faced valve is slidably mounted in its support so that the valve faces will be self-aligning with the orifices. The thermostatic strips carrying the valve at their free ends eliminate the necessity of levers for operation of the valve, thereby simplifying the structure and making the mixing device less liable to clog. The use of the straight strip permits a housing which does not have excessive outside diameter and permits sufficient space for mixing around the thermostatic element.

It is another object of my invention to provide a device of the above character which shall be of standard diameter and have a balanced control valve and means for insuring an even mixture of the fluids within the mixing chamber.

Referring to the drawing, Fig. 1 shows a sectional view of my mixing device taken along one axis, and Fig. 2 shows a cross-section of my mixing device taken along an axis perpendicular to that shown in Fig. 1.

Another object of my invention is to provide a mixing device in which the temperature of the mixture can be readily controlled.

A casing 10 inclosing the mixing chamber 11 is provided at one of its ends with the tubular inlet members 12 and 13 provided with openings 14 and 15 for the admission of hot and cold fluids. The tubular member 12 is connected to the interior of the mixing chamber 11 by means of the adjustable threaded member 18 which provides an orifice. A similar member 19 provides an adjustable orifice between the tubular member 13 and the interior of the mixing chamber 11. Plugs 16 and 17, which are readily removable, permit adjustment of the orifice members 18 and 19. The internally threaded tubular member 10' is for the purpose of providing a connection with a tank, but is not pertinent to the present invention.

These and other objects will appear hereinafter. The preferred embodiment of my invention includes a mixing device having a long tubular casing of dimensions not exceeding standard diameter pipes. At one end of the casing are a pair of tubular inlet members perpendicular to the casing for connecting to the cold and hot fluid supplies. These members have elements which are adjustable for providing orifices into the interior of the casing, one of said members introducing cold fluid into said casing and the other hot fluid into said casing.

A pair of thermostatic strips which are flat are fastened to the interior of the casing at the end opposite from the tubular inlet members and carry at their free ends a valve movable between the orifices. When the mixing device is not operating, the valve is closed on the cold fluid inlet. The thermostatic strips support a baffle for deflecting the flow of the hot fluid into the cold fluid stream to insure an even mixture of the fluids in the mixing chamber.

Removable plugs are provided in the casing and in the tubular members for permitting ad-

Mounted within the mixing chamber 11 at one end of the casing upon an abutment 22 are the bimetallic thermostatic strips 21 and 21' fastened to said abutment member by means of screws 23 and 23'. These thermostatic strips carry the member 25 supporting the valve 26 and the baffle member 25'. It will be noted that the faces of the valve member 26 are flat and that the valve is loosely supported permitting a slight sliding action, thus rendering the valve self-aligning with respect to the orifices. A plug 24 is pro-

vided for permitting the ready removal of the screws 23 and 23', and when the plug 20 is removed the thermostatic strips and valve may be easily removed from the casing 10 to be cleaned.

5 The outlet for the mixed fluid is shown at 28.

When not in operation, the valve 26 maintains the orifice 19 closed. By varying the position of the orifice member 19 the temperature of the mixture within the chamber 11 may be varied, since the thermostatic strip 21 will then open the valve 26 to admit cold fluid at different temperatures.

In operation, when there is a demand, hot fluid flows into the mixing chamber through the orifice 18, affecting the bi-metallic strips which in turn cause the valve 26 to move to admit cold fluid. The valve assumes a floating balanced position between the orifices when the ratio of hot and cold fluid is such as to deliver mixed fluid at the predetermined temperature. The baffle 25' diverts the flow of hot fluid into the cold fluid stream, thus insuring an even mixture.

The opposed inlets being at right angles to the mixing chamber assist materially in providing an even mixture. The flow of fluid along the mixing chamber has a tendency to wash the strip clean and to reduce the rate of accumulation of solids and sediment within the casing. As pointed out, adjustments and removals are rendered easy to accomplish by the removal of the plugs and the interior arrangement of the valve structure.

While I have described my invention as embodied in concrete form and as operating in a specific manner in accordance with the provisions of the Patent Statutes, it should be understood that I do not limit my invention thereto, since various modifications thereof will suggest themselves to those skilled in the art without departing from the spirit of my invention, the scope of which is set forth in the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States, is:

1. A mixing device for hot and cold fluids, including a casing having a mixing chamber provided with hot and cold fluid inlets at one end of said chamber, said inlets being oppositely disposed and having adjustable means providing orifices for connecting said inlets with said mixing chamber, a thermostatic strip removably mounted in said mixing chamber, a valve supported thereby, said valve controlling one of said fluid inlets and movable between said cold fluid and hot fluid inlets by the action of said thermostatic strip in response to the temperature of the fluid mixture in said mixing chamber to regulate the admission of one of said fluids to said mixing chamber to provide a mixture of a predetermined temperature, and removable plugs carried by said casing for permitting adjustment of said orifice means and removal of said thermostatic strip and valve.

2. A mixing device for hot and cold fluids, including a casing having a chamber provided with hot fluid and cold fluid inlets at one end of said chamber, said inlets being oppositely disposed, a thermostatic strip in said mixing chamber, a valve and a baffle member supported thereby, said thermostatic strip in response to the temperature of the fluid mixture in said mixing chamber operating said valve to control the admission of one of said fluids to said mixing chamber to provide a mixture of a predetermined temperature, said baffle being mounted perpendicular to the floor of fluid through said mixing cham-

ber for diverting the flow of one of the fluids into the flow of the other fluid to bring about an even mixture of said fluids in said mixing chamber.

3. A mixing device for hot and cold fluids adapted to be connected to a fluid-circulating system, including a casing of tubular form having a mixing chamber therein, a pair of inlet members at one end of said casing oppositely disposed and perpendicular to said casing, and adjustable means carried by said inlet members for providing orifices for cold and hot fluids to the interior of said casing, a thermostatic strip mounted within said casing and substantially parallel thereto and supported at the opposite end of said casing from said inlet members, a valve supported by said thermostatic strip and movable between the inlets for the hot and cold fluids, said thermostatic strip in response to the temperature of the mixture within said mixing chamber moving said valve to regulate the flow of one of said fluids to said mixing chamber to provide a mixture of a predetermined temperature, and removable plugs carried by said casing and inlet members for permitting adjustment of said orifices while said mixing device is connected in said circulating system.

4. A mixing device for hot and cold fluids, including a casing of tubular form having a mixing chamber therein, said chamber having a pair of inlets at one end of said casing oppositely disposed and perpendicular to said casing for providing inlets for cold and hot fluids to the interior of said casing, a thermostatic strip mounted within said casing and substantially parallel thereto and having one end free to move, a valve supported by said thermostatic strip at its free end and movable between the inlets for the hot and cold fluids, said thermostatic strip in response to the temperature of the mixture within said mixing chamber moving said valve to regulate the flow of one of said fluids to said mixing chamber to provide a mixture of a predetermined temperature, and a baffle carried by said thermostatic strip perpendicular to the flow of fluid through said mixing chamber for deflecting the flow of one of said fluids to insure even mixing of said fluids within said mixing chamber.

5. A mixing device for hot and cold fluids, including a casing having a mixing chamber provided with hot and cold fluid inlets at one end of said chamber, tubular members provided with orifices between said inlets and said mixing chamber, a thermostatic strip in said mixing chamber, a valve supported thereby with a lost motion connection therebetween, said valve being provided with flat faces for cooperating with said orifices, said flat faces insuring self-alignment of said valve during operation, said valve controlling one of said fluid inlets and movable between said inlets by the action of said thermostatic strip in response to temperature of the fluid mixture in said mixing chamber to regulate the admission of one of said fluids to said mixing chamber to provide a mixture of a predetermined temperature.

6. A mixing device for mixing hot and cold fluids, including a tubular casing having a mixing chamber, a pair of inlet members mounted at one end of said casing and perpendicular thereto and having means providing orifices connecting the interior of said mixing chamber and said tubular members whereby hot and cold fluids may be introduced into said mixing chamber, one of said orifice means being adjustable, a thermostatic strip in said casing, a valve supported thereby and

movable between said orifices in said inlet members, a removable plug in one of said inlet members for permitting access to said adjustable orifice means, said adjustable orifice means permitting adjustment of the orifice with respect to said valve whereby the operation of said thermostatic strip may be varied to vary the predetermined temperature of the mixture.

16 7. A mixing device for hot and cold fluids, including a tubular casing having a mixing chamber, a pair of inlet members at one end thereof and perpendicular to said casing, a pair of adjustable tubular members providing an orifice between the interior of said casing and said inlet members, removable plugs in said inlet members for permitting adjustment of said orifice members, a thermostatic strip mounted at the other end of said mixing chamber and extending along said casing, a valve supported by said thermostatic strip adjacent the orifices in said tubular members, said thermostatic strip responding to the temperature of the fluid in said mixing chamber for regulating the flow of hot and cold fluids to said mixing chamber to provide a fluid mixture of a predetermined temperature, a plug adjacent the supported end of said thermostatic strip for permitting releasing of said strip from said casing, and a plug in the end of said casing for permitting ready removal of said thermostatic strip and valve from said casing for purposes of cleaning.

8. A mixing valve for hot and cold fluids, including a tubular casing having a mixing chamber, a pair of inlet members at one end thereof and perpendicular to said casing, a pair of tubular members providing an orifice between the interior of said casing and said inlet members, removable plugs in said inlet members for permitting adjustment of said orifice members, a thermostatic strip mounted at the other end of said mixing chamber from said inlet members and extending along said casing, a valve supported by said thermostatic strip adjacent to the orifices in said tubular orifice members and movable therebetween, said thermostatic strip responding to temperature changes of the mixture in said mixing chamber for regulating the flow of hot and cold fluid to said mixing chamber to provide a fluid mixture of a predetermined temperature, a baffle carried by said thermostatic strip for diverting the flow of one of said fluids to insure thorough mixing thereof, a plug adjacent the supported end of said thermostatic strip for permitting releasing of said strip from said casing, and a plug in the end of said casing for permitting removal of said thermostatic strip and valve, one of said orifice members being adjustable to vary the operation of said thermostatic strip to provide a fluid mixture of a different predetermined temperature.

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