July 30, 1946. M. O. THRUSH 2,404,996

ADJUSTABLE SUPPLY TEE

Filed July 24, 1944

Fig. 1.

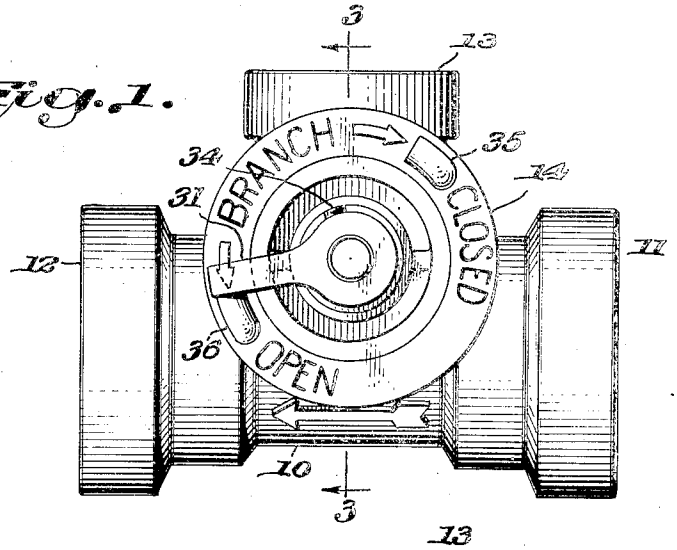


Fig. 2.

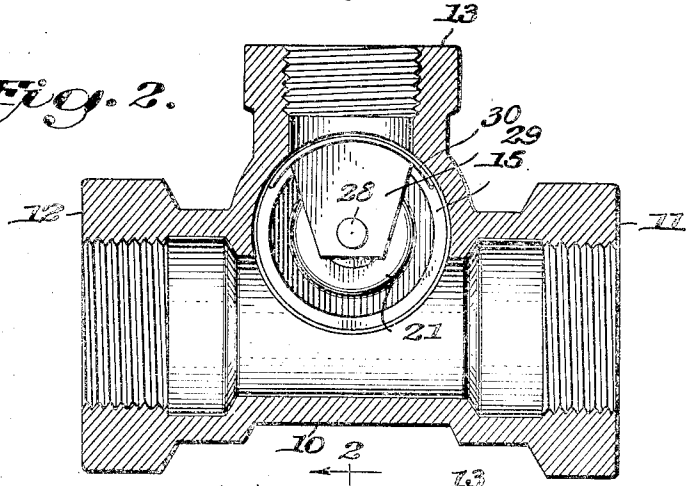
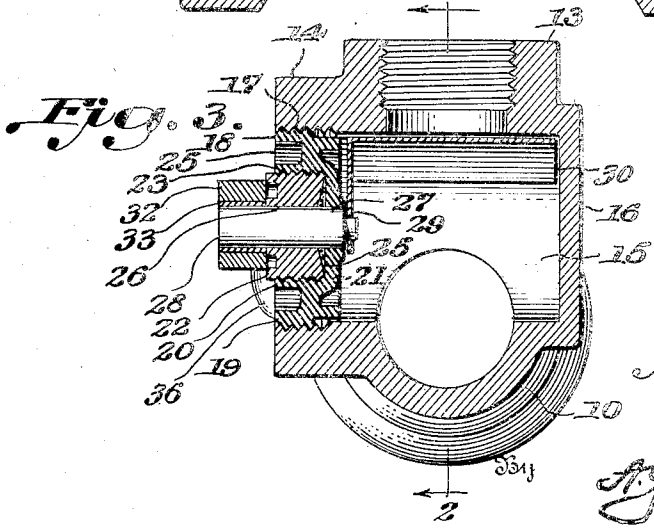


Fig. 3.



Inventor

M. O. Thrush,

Attorney

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ADJUSTABLE SUPPLY T

Marquis O. Thrush, Peru, Ind., assignor to H. A. Thrush & Company, Peru, Ind.

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6 Claims. (Cl. 137—89)

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This invention relates to fluid systems, for example, hot water heating systems, particularly of the type disclosed in Patent No. 1,931,419 of October 17, 1933, reissued as No. 19,873 of February 25, 1936, or the like, in which it is desired to control the flow of water or other heat transmitting vehicle or fluid.

This invention particularly relates to a control in the form of a variable valve or adjustable supply valve or T for location in the line through which the heated water or other heating medium passes to the house heating radiators.

In hot water heating systems hot water heated in the boiler of the furnace circulates through a pipe and after heat has been extracted, is finally returned to the boiler of the furnace for reheating. Water is taken from the supply line through a riser pipe to each of the radiators and returned from each of the radiators to the supply line, or to the return line where separate return pipe is used.

Due to physical conditions it is desirable to supply a greater amount of hot water through some of the radiators than through others in order to obtain the desired heating and uniform temperature in different parts of a building and to avoid one room of a building being cold while another is hot. While control devices of this general character are old in the art, they have been subject to criticism for various reasons including cost, difficulty of manufacture, their complicated or cumbersome construction, as well as unsatisfactory operation.

It is therefore an object of the present invention to provide a variable control for the amount of heating fluid diverted from the supply line of a heating system made of simple, inexpensive, easily accessible materials, simple to manufacture, and efficient and dependable in operation.

A further object of the invention is to provide an adjustable supply T for use between the supply line of a heating system and each branch by means of which the diversion of heating fluid may be accurately controlled or completely shut off.

A further object of the invention is to provide an adjustable supply T which requires no special skill to install and is simple in adjustment so that the ordinary home dweller can make the adjustment.

A further and very important object of the invention is to provide an adjustable T of a casting of low-grade, inexpensive metal on which few machine operations are necessary, and with the movable valve element of sheet metal thus avoiding any ground joints.

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Further objects and advantages of the invention will be apparent from the following description taken in conjunction with the accompanying drawing, wherein:

Figure 1 is a side elevation of an adjustable T in accordance with the invention;

Fig. 2, a vertical, longitudinal section on the line 2—2 of Fig. 3 showing the branch outlet closed by the valve; and

Fig. 3, a vertical, longitudinal section on the line 3—3 of Fig. 1.

Referring to the drawing, the adjustable supply T comprises a body 10 of low-grade, inexpensive iron or other material cast in a conventional manner. The body is provided with a horizontal bore adapted to form part of the supply line of a hot water heating system. The bore is provided with threaded or other inlet and discharge connections 11 and 12 respectively and an upright or vertical branch connection 13 through which water from the horizontal supply line may be diverted for heating a radiator.

Between the horizontal bore and the vertical branch connection the cast body is provided with a substantially horizontally disposed cylindrical portion 14 forming within the same cylindrical valve chamber 15. The cylindrical valve chamber 15 has its axis at right angles to both the horizontal bore and the vertical branch connection or in other words is disposed transversely at the intersection of the bore and the branch connection and communicates therewith. A portion of the body which encloses the valve chamber 15 is preferably of two outside diameters, the smaller of which is the closed end 16 of the cylindrical chamber and the opposite end of which is provided with screw threads 17 for reception of a closure plug 18 having screw threads 19 for engaging the screw threads 17. On the threaded end face of the body 14 are spaced stops 35—36 for a purpose to be described.

The closure plug 18 is of a size to afford full access to the valve chamber and is of a different and slightly higher grade type of metal such as brass or bronze in order that it will not corrode and may be easily screwed into place or removed. The closure plug 18 has a central boss 20 provided with a threaded counterbore therein, the bottom wall of which counterbore is integral with the closure plug 18. A plug or bushing 22 with screw threads 23 on its circumference is threadedly mounted in the counterbore of the closure plug 18.

The inner end of the bushing 22 forms in cooperation with the bottom wall 21 of the counterbore, a space for packing 24 when the bushing

is in operative position. On its outer face the bushing has diametrically spaced holes 25—25 for engagement by a suitable wrench to facilitate insertion in and removal of the bushing from the counterbore in the closure plug 13. The bushing 22 and the closure plug 18 are formed with aligned bores 26 and 27 of the same diameter and in which there is journalled a stub shaft 28.

A radial valve mounting arm 29 of sheet metal is attached to the inner end of the stub shaft 28 in any suitable manner, such as by forming a shoulder on the stub shaft, a hole in the arm, placing the shaft through the hole and peening over the protruding end of the shaft. An arcuate deflector valve 30 is carried by, and if desired may be formed integrally with, the radial arm 29. This arcuate deflector valve 30 extends throughout the length of the cylindrical valve chamber 15 and is wide enough to close the passageway through the branch opening 13, as shown in Figures 2 and 3, when it is in closed position. The length of the radial arm 29 is slightly less than the radius of the cylindrical valve chamber 15, the transverse curvature of the valve corresponding to that of the valve chamber. In adjustable T valves of this character for use in hot water heating systems, it is not material whether or not there be slight leakage past the movable valve member since such leakage is negligible and if the temperature of the atmosphere is low enough to have the heating system in operation it is usually not objectionable to have some of the heating medium circulating through any given radiator.

Thus it is possible to use the sheet metal valve construction here disclosed and thereby to avoid the skilled labor and time consuming operations necessary to provide a ground joint between the movable valve member and the body.

The arcuate valve member 30 and integral arm 29 may be stamped with a tongue to form the arm 29 from sheet metal usually brass or bronze of suitable diameter and then the tongue bent to form such arm, or the valve may be formed from tubing. The arm 29 may be provided with an aperture for the stub shaft 28 or such aperture may be punched in the blank simultaneously with the stamping operation.

On the outer end of the stub shaft 28 there is mounted an operating arm 31 having a circular boss or hub 32 with a hole therethrough for receiving the stub shaft. A bushing 33, preferably of brass, is mounted concentrically with and intermediate the stub shaft 28 and the boss or hub 32 of the operating arm. A set screw 34 extends radially through the hub or boss 32 of the operating arm and serves to secure the latter to the stub shaft 28.

As previously described, the outer face of the boss 14 on the valve body 10 is substantially plane and has formed integrally thereon arcuately spaced stops 35 and 36 with flat front faces and rounded rear portions. Each of these stops is arranged to limit rotative movement of the operating arm 31 in one direction.

On the face of the boss 14 and intermediate the plane faces of the stops 35 and 36 there is cast the legend "Branch" with adjacent arcuate arrows pointing toward the plane face of each stop. Adjacent the rounded rear portion of the stop 35 there is formed the legend "Closed" and similarly adjacent the rounded rear portion of the stop 36 there is formed the legend "Open." Below the boss 14 there is formed on the body 10 an arrow to indicate to the plumber or steam fitter installing the adjustable supply T how the latter is to be connected in the supply main with respect to the direction of flow of the heating medium therethrough.

It should be noted that, while the primary function of the arcuate valve member 30 is to interrupt the flow through the branch connection 13 when desired, it can also be set by suitable adjustment of the operating arm 31 to some position between the indicated "open" and "closed" positions to apportion the volume of the heating medium by-passed through the branch connection 13 with respect to the volume received in the supply connection 11. In such intermediate position the leading edge of the valve member 30 will operate as a scoop or deflector baffle to divert heating medium from the line of flow through the supply main and the entrance and discharge connections 11 and 12, respectively, and into the branch connection 13.

It will be obvious to those skilled in the art that various changes may be made in the invention without departing from the spirit and scope thereof and therefore the invention is not limited by that which is described in the specification and shown on the drawing but only as indicated in the appended claims.

What is claimed is:

1. An adjustable supply T for a hot water heating system for controlling diversion of hot water from the supply line to a radiator, and comprising a valve body of a low grade casting with a horizontal bore for location in the supply line of a heating system, said body having a branch outlet extending upwardly therefrom and with a transversely disposed substantially cylindrical body portion between said horizontally bored portion and said upstanding outlet at the intersection of the same, said transversely disposed cylindrical body portion being provided with a valve chamber the axis of which is above said horizontal bore, said chamber communicating therewith and with said branched outlet, the upper half of said valve chamber being substantially semi-cylindrical in form, said valve chamber being closed at one end and having its opposite end provided with an opening affording access to the valve chamber, the material of said body being thickened about said access opening for reinforcement, and with limiting stops on the face of said body around said opening, a closure plug for said opening, a stub shaft journalled in said closure plug, an operating member on the end of said stub shaft exteriorly of said chamber and disposed in a manner to engage said stops for limiting the movement of said stub shaft, a valve in the upper portion of said valve chamber curved similarly to the curvature of the wall of the chamber and movable to vary and interrupt flow through said branch outlet, said valve having an integral mounting arm at one end fixed to said stub shaft and having a relatively narrow extension at the opposite end of the valve of substantially less length than the width of the valve for forming a bearing contact between the valve and the closed end of the valve chamber.

2. In a fluid flow system including a supply main, adjustable valve means for location in said supply main operable to divert fluid from said supply main, said adjustable valve means comprising a body of a low grade, inexpensive casting having a cylindrical valve chamber with aligned supply and discharge connections and a branch connection, a valve chamber being disposed transversely of said body open at one end

and closed at the other end by an integral wall of said body, the axis of said cylindrical valve chamber transversely intersecting said branch connection and said supply and discharge connections and spaced above said supply and discharge connections, said valve chamber being open in its upper portion to said branch connection and being open in its lower portion to said supply and discharge connections, a closure of higher grade easily machinable metal for the open end of the valve chamber, cooperating screw threads on the periphery of the closure and the wall of the bore forming the valve chamber for fastening said closure therein, a stub shaft mounted in said concentric closure, a radial arm mounted on the inner end of said stub shaft and of slightly less length than the radius of the valve chamber, an arcuate sheet metal deflector valve integral with said radial arm and positioned concentrically of the valve chamber, said arcuate deflector valve being of sufficient arcuate width to close the passageway through the branch connection in one position and being operable in another position to have its leading edge in the line of flow of the heating medium from the supply to the discharge connection to divert fluid from the line of flow into said branch connection an operating arm on the outer end of said stub shaft, a hub on said operating arm, a bushing between the stub shaft and the hub of the operating arm, and stops formed on the valve body in the path of movement of the operating arm for limiting the travel of the latter in either direction.

3. In a fluid flow system including a supply main, adjustable valve means for location in said supply main operable to divert fluid from said supply main, said adjustable valve means comprising a body of a low grade, inexpensive casting having a cylindrical valve chamber with aligned supply and discharge connections and a branch connection, a valve chamber being disposed transversely of said body open at one end and closed at the other end by an integral wall of said body, the axis of said cylindrical valve chamber transversely intersecting said branch connection and said supply and discharge connections and spaced above said supply and discharge connections, said valve chamber being open in its upper portion to said branch connection and being open in its lower portion to said supply and discharge connections, a closure of higher grade easily machinable metal for the open end of the valve chamber, cooperating screw threads on the periphery of the closure and the wall of the bore forming the valve chamber for fastening said closure therein, a central boss in said closure, a counter bore in the central boss, a bearing bushing mounted therein in said counter bore, a packing gland between the bearing bushing and the bottom wall of the closure, concentric aligned apertures in the bearing bushing and the closure, a stub shaft mounted in said concentric aligned apertures, a radial arm mounted on the inner end of said stub shaft and of slightly less length than the radius of the valve chamber, a sheet metal deflector valve integral with said radial arm and positioned concentrically of the valve chamber, said arcuate deflector valve being of sufficient arcuate width to close the passageway through the branch connection in one position and being operable in another position to have its leading edge in the line of flow of the heating medium from the supply to the discharge connection to divert fluid from the line of flow into said branch connection, and operating member for said stub shaft and valve carried thereby, and stops for limiting the movement of said operating arm.

4. An adjustable supply T for a fluid flow system comprising a valve body of a low-grade casting, a fluid passage through said body through which fluid is adapted to enter and be discharged, a branch outlet from the upper portion of said body, a substantially cylindrical horizontally disposed chamber the axis of which is located at an elevation above said passage, said chamber communicating with said passage and said branch outlet and having a closed end and an open end through which access is afforded to said chamber, a closure for said open end, a valve in said chamber extending longitudinally of the same and having a transverse curvature corresponding substantially to the curvature of the wall of the valve chamber, said valve having a radial arm by means of which it is supported, a stub shaft journalled in said closure and mounting said valve, and a member for operating said valve to adjustably control flow through said branch outlet.

5. An adjustable supply T for a hot water heating system for controlling the diversion of hot water from a supply line to a radiator and comprising a valve body of a low-grade casting having substantially horizontally disposed inlet and outlet orifices and a vertically disposed branch outlet, a horizontally disposed body portion providing an elongated transversely disposed valve chamber the axis of which is above the axis of said inlet and outlet orifices, said chamber communicating therewith and with said branch outlet, said valve chamber being closed at one end and open at the other and a closure plug removably secured in said open end and having a stub shaft extending therethrough and a sheet metal valve member carried by said stub shaft and extending along in snug relation of the cylindrical portion of the chamber adjacent said branch outlet and operable from the exterior of said valve body for interrupting the flow through said branch outlet or varying the volume of flow therethrough.

6. An adjustable supply T for fluid flow system comprising a valve body, a passage through said body through which fluid is adapted to enter and be discharged, a branch outlet from the upper portion of said body, a substantially cylindrical horizontally disposed valve chamber having its axis located at an elevation above said passage, said chamber communicating with said passage and also having communication with said branch outlet, a valve in said chamber having a transverse casting curvature corresponding substantially to the curvature of the wall of the valve chamber, and a member for operating said valve to adjustably control flow through said branch outlet.

MARQUIS O. THRUSH.