July 19, 1927. 1,636,461

W. A. COLBURN

RADIATOR VALVE

Filed Nov. 6, 1925

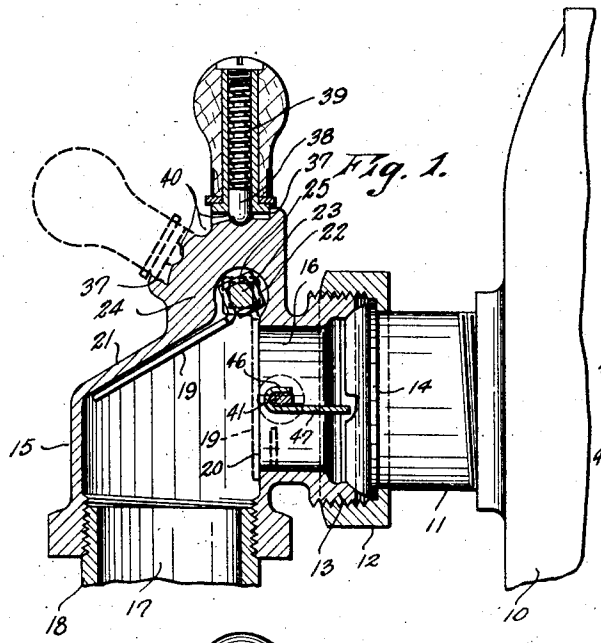


Fig. 1.

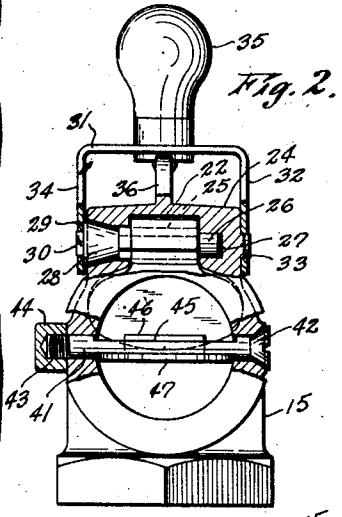


Fig. 2.

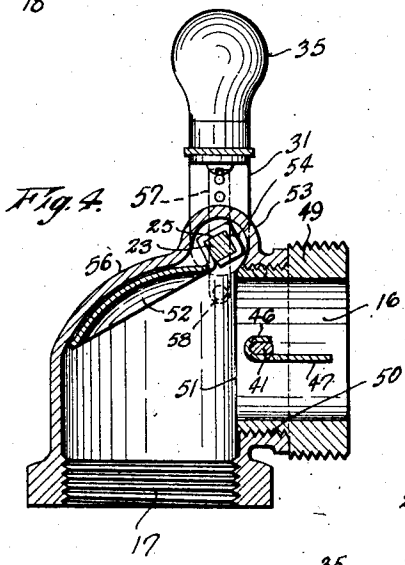


Fig. 4.

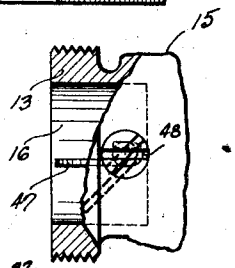


Fig. 3.

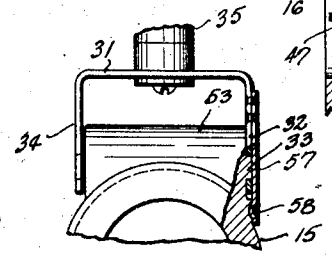


Fig. 5.

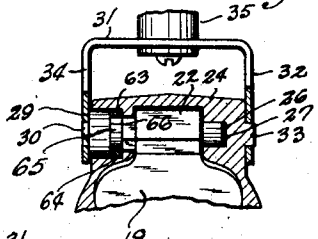


Fig. 6.

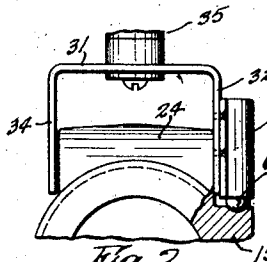


Fig. 7.

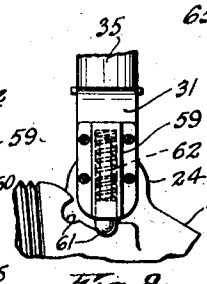


Fig. 8.

Inventor

Walter A. Colburn

By Wooster & Davis

Attorneys.

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UNITED STATES PATENT OFFICE.

WALTER A. COLBURN, OF BRIDGEPORT, CONNECTICUT.

RADIATOR VALVE.

Application filed November 6, 1925. Serial No. 67,329.

This invention relates to a radiator valve for hot water heating systems, and has for an object to provide a valve which will be very simple in construction and thus involve a minimum number of parts, and which will require a much smaller amount of material than is required by the valves now generally in use.

It is also an object of the invention to so construct and arrange the valve as to greatly reduce the resistance to the flow of water therethrough, and to therefore interfere as little as possible with the circulation of the water.

It is a further object of the invention to provide a valve of this type which will be entirely packless. It is a still further object of the invention to provide improved operating means for the valve which may be operated either by the hand or foot, and which will indicate at a glance, even from a considerable distance, whether the valve is open or closed, and it is also an object of the invention to provide an improved modulator for this type of valve.

With the foregoing and other objects in view, I have devised the construction illustrated in the accompanying drawing forming a part of this specification, similar reference characters being employed throughout the various figures to indicate corresponding elements. In this drawing,

Fig. 1 is a vertical central section through my improved radiator valve showing a portion of the radiator and adjusting means therefor in elevation.

Fig. 2 is an elevation looking from the right of Fig. 1 with parts broken away to more clearly show the construction.

Fig. 3 is a detail showing in elevation a portion of the casing and the adjusting means for the modulator with a portion broken away for clearer illustration.

Fig. 4 is a vertical longitudinal section through a valve of slightly different construction.

Fig. 5 is a view of a portion of the casing and the valve operating yoke showing a slightly modified means for holding the valve in different positions.

Fig. 6 is a vertical section showing a modified construction of the valve supporting and operating means.

Fig. 7 is a view similar to Fig. 5 showing a still further different holding means, and Fig. 8 is an elevation thereof looking from the right of Fig. 7.

Referring to Figs. 1 to 3, 10 represents a portion of a radiator having a connection 11 to which my improved valve may be connected in the usual manner by the union nut 12 threaded on the extension 13 of the valve body and engaging the shoulder 14 on the connection to clamp the rounded head in a seat in the extension 13. The valve comprises the body 15 having the side outlet opening 16 and the bottom inlet opening 17 which may be connected to any suitable supply pipe 18 from the heating device. A valve disc 19 is mounted to swing about a horizontal axis above the outlet opening and to and from the upright seat 20 surrounding this opening. As shown in Fig. 1, when in the open position the valve rests against the inclined wall 21 in the upper part of the body member and swings to an upright position on the valve seat 20 to close the passage as shown in dotted lines. The valve as shown in this figure comprises a substantially flat disc with an extension 22 at one side wrapped around a non-circular portion of the shaft or stem 23. The valve body is provided with a hub 24 in which this shaft is mounted to rotate about a horizontal axis. This shaft has a squared portion 25 intermediate its ends about which the extension 22 of the valve is wrapped so that the valve disc will be mounted to rotate with this shaft. At its inner end the shaft has a circular portion 26 mounted to rotate in the recess 27 in the hub and at its outer end has a circular tapered portion 28 seated in a correspondingly tapered opening in this end of the barrel. The taper shown is straight but it may of course be curved if found more desirable. The outer end of the shaft projects somewhat beyond the face of the hub and is reduced to form a shoulder 29 and a non-circular or squared lug 30. The valve is operated through this shaft by means of a spring yoke 31. One arm 32 of this yoke has a circular opening to receive a circular stud 33 on the opposite end of the hub 24 and on which this arm of the yoke may swing. The other arm 34 of the yoke has a squared opening to receive the squared lug 30 on the shaft. It will thus be apparent that as this yoke is swung on its pivot it will rotate the shaft 23 and swing the valve disc to and from the valve seat. The yoke 31 is

made of resilient metal such as temperate steel, and the arms thereof when in position on the valve body tend to move toward each other. The reaction of the arm 34 on the shoulder 29 tends to force the shaft 23 inwardly and by means of the taper 28 acting against the walls of the tapered opening will make a tight connection which will prevent leakage, but at the same time will allow rotation of the shaft for opening or closing the valve. It will be apparent that this tapered bearing will automatically maintain itself tight and will automatically adust itself for wear under the action of the spring yoke. Therefore, no packing is required for this shaft. The yoke may be operated by any suitable means such as a handle 35 which preferably includes a wooden knob so that it will not become heated. The hub is provided with a rib 36 having stop shoulders 37 to limit the movements of the yoke in opposite directions, and a reciprocating plunger 38 may be held by a spring 39 against the edge of this rib, which may be provided with recesses 40, to yieldingly hold the valve in different positions.

It will be apparent from the foregoing description that the valve swings to and from the valve seat about an axis located above the outlet opening, and that it may be swung to the open or closed position by merely swinging the handle 35. It will be obvious that this is a very quick acting valve as a relatively small movement of the handle will swing the valve either to the full open or fully closed position. It will also be apparent that the valve may be operated either manually or by the foot and that the position of the handle will indicate at a glance, even from some distance from the valve as across the room, whether the valve is open or closed. The valve disc may be dismounted by spreading the arms of the yoke 31 and removing the arm 34 from the end of the shaft 23 after which the yoke and handle may be removed from the valve body. The shaft may then be slid out of the body allowing removal of the valve disc. The assembly will be a mere reversal of these operations, which, as will be apparent, will be a simple one.

I have also provided a modulator in the outlet opening to regulate the flow of water through the valve. It has been found desirable to provide such a device because various conditions inherent in the installation, such as the relative positions of the radiators with respect to the heater and the lengths of the supply and return pipes, causes a better circulation to some radiators than to others, and this modulator is adapted to be set independently of the valve 19 to regulate the flow to the various radiators and cause a uniform heating by these radiators. My improved modulator comprises a pin 41 extending transversely through the extension 13 of the valve body. At one end it is tapered as shown at 42 and fits a correspondingly tapered opening in the valve body, and at its opposite end is threaded as shown at 43 to receive a nut 44. Intermediate its ends this pin is flattened as shown at 45 which flattened portion is embraced by an extension 46 on a semi-circular plate 47. Thus the plate is mounted to rotate with the pin. The pin is provided in its tapered end with a transverse slot 48. By loosening the nut 44 the pin may be rotated by means of a screw driver to locate the plate 47 in any desired position between the full line position shown in Fig. 1 to the vertical dotted line position, and after adjusting to the proper position may be clamped permanently in this position by the nut 44. The tapered construction and clamping of the nut against the outer wall will prevent leakage. It is to be noted that as this plate is semi-circular it can never cut off the entire outlet opening from the valve body but only the lower half thereof. It is also mounted to swing away from the valve seat 20 so as not to interfere with the control valve 19. It is to be noted that this modulator may be adjusted entirely from the outside of the casing so that it is not necessary to disconnect any portion of the installation to adjust this modulator, and the slot 48 will function as an indicator to indicate the position of the plate 47.

With the form of valve shown in Fig. 1 the body 15 is a casting whereas in Fig. 4 it is so constructed that it may be drawn. It is difficult, however, in drawing this valve body to make the valve seat as shown in Fig. 1. The valve body is, therefore, made in two sections with the extension 49 threaded into the main section of the body as indicated at 50, and the inner end of this extension forms a valve seat 51. The valve disc 52 is mounted in the same manner as in the first form, that is, on a shaft 23 mounted in the hub 53 in exactly the same manner as the first form, and this disc is secured to this shaft by the extension 54 wrapped around the squared portion of the shaft as in the first form. In the form shown in Fig. 1 the top wall 21 of the body is preferably substantially flat and inclined as shown so that the valve disc 19 will lie flat against the same when in the open position. Thus it will be apparent that there is no air pocket above the valve to retard the flow of water through the valve body, and in the form shown in Fig. 4 it is preferred to make the corresponding top wall 56 slightly rounded or dome shape and the disc 52 slightly concavo-convex to correspond, but it will be equally apparent that in this form there is no air pocket above the valve the same as in the first form, and

that in both forms the water entering through the lower inlet opening is deflected by the valve disc and the top wall of the casing directly into the outlet opening so there is practically no retardation thereof and a minimum resistance to this flow. Thus in this valve there is practically no more resistance to flow of the water than there would be in the ordinary elbow. In the form shown in Fig. 4 the outlet opening may be provided with the modulator 47 the same as in the first form.

However, as it is not feasible to draw a rib 36 on the hub 53 as in the cast body the yoke 31 may be held in different positions by a spring arm 57 secured to the arm 32 of the yoke and having a projection 58 to seat in suitable spaced recesses in the valve body. This spring arm may be used, of course with the cast body if desired, or in either case instead of mounting the plunger 38 in the handle a separate casing 59 may be secured to the arm 32, as shown in Figs. 7 and 8, to carry a plunger 60 projecting through the lower end thereof and yieldingly held in suitably located notches or recesses 61 in the wall of the body by a spring 62.

In Fig. 6 is shown a slightly different construction of shaft for carrying the valve disc. In this form instead of using the taper 28 as in Fig. 1, a shoulder 63 is formed in the hub about the shaft opening by counter boring this opening. A fibre washer 64 is then placed against this shoulder about the shaft 65 which is provided with a shoulder 66 which is pressed against the washer 64 by the spring yoke 31 to provide a tight connection and prevent leakage.

Having thus set forth the nature of my invention, what I claim is:

1. In a radiator valve, a body member having a side outlet opening adapted to be connected to a radiator and a bottom inlet opening for connection to a supply pipe, said body member being provided with an upright seat in substantially a single plane about said outlet opening, and a valve pivoted in the body to swing about a horizontal axis above said outlet toward and from said seat, said valve being arranged when in open position close to the wall of the body over the inlet opening in an inclined position to deflect the flowing water toward the outlet and having a continuous surface adjacent its outer edge to engage the seat throughout its periphery when the valve is in closed position.

2. In a radiator valve, a body member having a side outlet opening adapted to be connected to a radiator and a bottom inlet opening for connection to a supply pipe, said body member being provided with an upright seat about said outlet opening and with an inclined top wall over the inlet opening, and a valve disc pivoted to swing about a horizontal axis above said seat to and from said seat, said valve when in open position lying in front of the inclined wall closely adjacent thereto and in an inclined position to deflect the flowing water to said outlet and when in closed position to engage the seat throughout its periphery.

3. In a valve, a body member having a valve seat, a valve mounted to swing toward and from said seat, a rotatable shaft on which the valve is mounted, cooperating means carried by the body and shaft to prevent leakage about the shaft, a resilient yoke pivoted to the body and connected to the shaft for operating the same, said yoke being mounted to press the shaft into the body to maintain said cooperating means in engagement, and an operating handle for the valve.

4. In a valve, a body member having a fluid passage therein and an internal valve seat, a movable valve member in said passage movable toward and from said seat to control flow of fluid through said passage, a supporting member for said valve comprising a shaft having a tapered portion, said body being provided with an opening communicating with the passage having a corresponding tapered portion, a resilient yoke pivoted to the body and connected to the shaft for operating the same, said yoke being arranged to react against the body and said shaft to press the inclined surfaces together, and an operating handle on said yoke.

5. In a valve, a body having an internal valve seat, a shaft mounted in said body at one side of said seat, a valve disc mounted on said shaft and movable by operation thereof to and from said seat, said shaft and body being provided with cooperating surfaces to prevent leakage, a resilient yoke pivoted to the body and connected to said shaft for operating the same, said yoke having arms reacting against the body and said shaft to press said surfaces together, and an operating handle on said yoke.

6. In a valve, a body member having an internal valve seat, said body being provided with a hub at one side of said seat, a shaft mounted in said hub, a valve member mounted on said shaft and movable toward and from the seat by operation of the shaft, said hub having a bearing for the inner end of the shaft, said shaft having a tapered wall adjacent its other end engaging a similarly tapered wall in the hub, a resilient yoke straddling said hub one arm of which is connected to the shaft for operating the same and the other arm being pivoted to the other end of the hub, said yoke tending to force the shaft inwardly to press said tapered surfaces together, and an operating handle on said yoke.

7. In a valve, a valve body having a fluid passage therein, an internal valve seat and a hub at one side thereof, said hub being provided with a transverse opening leading from one end thereof having a tapered wall and communicating with said passage, a shaft mounted in said opening having a correspondingly tapered portion to engage said wall, a valve disc in the passage carried by said shaft and movable toward and from said seat, the hub being provided with a pivot lug on the outer side of its closed end, a resilient yoke having arms at the opposite ends of said hub tending to move toward each other, one arm being pivoted on said lug, said shaft being provided with a shoulder at its outer end and a non-circular lug outside said shoulder, the other arm of the yoke engaging said shoulder and having a correspondingly shaped opening to receive said lug, and an operating means on said yoke.

8. A radiator valve provided with a side outlet opening, a modulator in said opening for regulating flow of water therethrough comprising a transversely extending pin having a tapered head seated in a corresponding tapered opening in the body, said head having means for rotating the pin, a control member mounted on the pin for varying the effective area of said outlet, the opposite end of the pin extending through the wall of the body, and a clamping nut threaded on said latter end.

In testimony whereof I affix my signature.

WALTER A. COLBURN.