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RADIATOR VALVE

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Fig. 1.

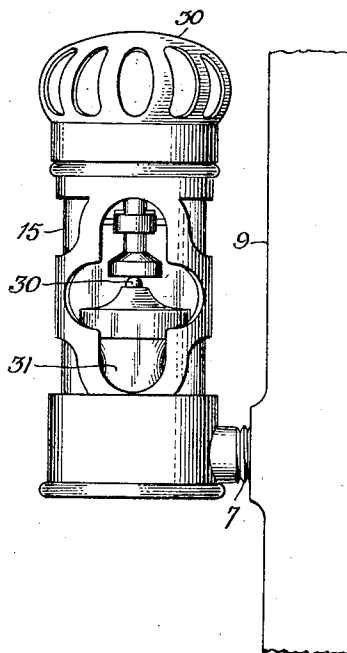


Fig. 2.

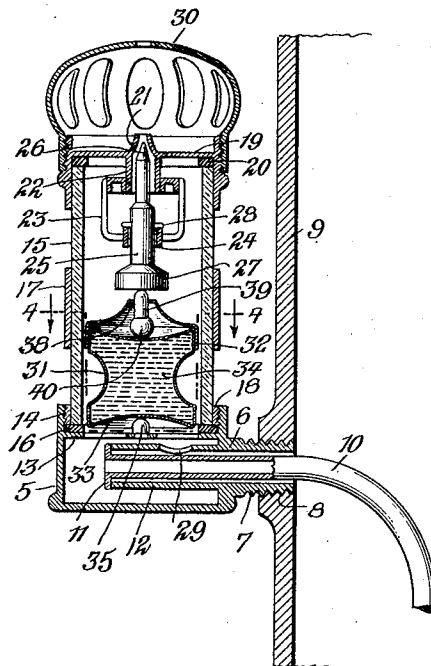


Fig. 3.

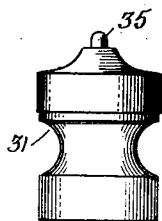
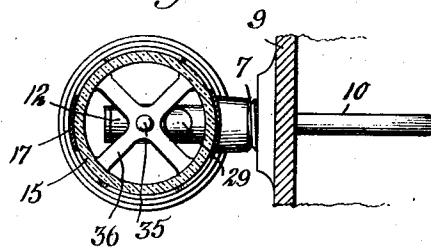


Fig. 4.



WITNESSES

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RADIATOR VALVE

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This invention relates to valves, and has particular reference to valves for radiators of steam, hot water or other analogous types, which function to automatically rid the radiators of air by the pressure or heat of the heating medium as the heating medium enters the radiators and valves.

The present invention aims for one of its objects to provide broadly, thermostatically operable means for closing the valve by the entrance of the heating medium to the valve casing from the radiator and, conversely, to permit the valve to open when the heating medium recedes from the valve casing.

More specifically, the invention contemplates in a radiator valve of the character set forth having a needle valve core which gravitationally moves to an open position, thermostatically operable means for controlling the valve which is in the nature of a hollow fluid tight element containing a thermal fluid, and which element is provided with a flexible portion constituting a diaphragm which is adapted upon expansion of the fluid caused by the heating medium from the radiator entering the valve, to coact with the needle valve core for seating the same to close the valve.

The invention aims for a still further object to provide a radiator valve in which at least a portion of the valve casing is transparent, whereby the functioning of the internal valve elements may be preserved at all times.

Other objects reside in the comparative simplicity of construction of the valve, the economy with which it may be produced and the general efficiency derived therefrom.

With the above recited and other objects in view, reference is had to the following description and accompanying drawing, in which there is exhibited one example or embodiment of the invention, while the claims define the actual scope of the same.

In the drawing:

Figure 1 is a side view of the improved valve in applied position.

Figure 2 is a vertical sectional view thereof showing the valve in opened condition.

Figure 3 is an enlarged side view of the thermostatic controlling element.

Figure 4 is a horizontal sectional view taken approximately on the line indicated at 4-4 in Figure 2.

Referring to the drawing by characters of reference, 5 designates the base portion of the valve, which is of substantially cylindrical form and is formed with an integral horizontally disposed sleeve 6 extending through the upstanding wall of the base, the outwardly projecting portion 7 thereof being externally threaded to constitute a nipple which is engaged in the threaded opening 8 of the radiator 9. A drain tube 10 extends through the sleeve 6 and has a flanged inner end 11 bearing against the inwardly projecting portion 12 of the sleeve so that the drain tube is mounted for further relative turning movement with respect to the sleeve whereby the curved end of the drain tube which extends into the radiator 9 will gravitationally move to a downwardly extending position.

The base 5 is formed with an inwardly projecting annular flange 13 spaced below the upper end, and the inner periphery of the sleeve above the flange is internally threaded as at 14. A cylindrical transparent valve casing 15 of non-breakable glass or any other suitable transparent material has its lower end positioned within the upper end of the base and seated on a gasket 16 resting on the flange 13. An openwork ornamental metal guard 17, generally of cylindrical form, fits over the casing 15, and the lower end of the guard is externally threaded as at 18 to engage with the internal threads 14 of the base. The upper end of the guard is provided with a top wall 19, between which and the upper end of the casing 15 a gasket 20 is interposed. The top wall 19 of the guard is formed with a conical axially disposed nipple 21 from which a tubular portion 22 depends, which tubular portion in turn supports a spider or cage 23 provided with an annular bearing 24 through which the enlarged medial portion 25 of a needle valve core 26 is movable. At its lower end, the needle valve core 26 is formed with an enlarged head 27 which functions as a weight for gravitationally

moving the needle valve core downwardly until the stop element or pin 28 engages with the ring bearing 24, in which position the valve is open to the atmosphere. The inwardly projecting portion 12 of the sleeve 6 is formed with an upwardly disposed opening 29 and, if desired, an ornamental open-work cap 30 may be threadedly engaged over the upper end of the guard 17.

In order to provide means for thermostatically controlling the movement of the needle valve core 26, a fluid tight container 31 is arranged within the casing 15 below the needle valve element, and, preferably, said container is formed with flexible upper and lower walls or portions 32 and 33 which act in the capacity of diaphragms. A thermal fluid 34 fills the container 31 when it is contracted to the absolute minimum whereby it functions to immediately effect the expansion of the flexible walls or portions 32 and 33 when the heated steam enters the valve casing from the radiator through the outlet 29 in the sleeve 6. In practice, the container 31 is preferably supported by an upwardly projecting axially disposed teat 35 which is carried by a spider 36, and which teat engages the lower flexible wall or portion 33, whereby the container 31 is mounted within the valve casing with its lower end directly over the upwardly disposed opening 29. This permits the pressure of the heating fluid to be impinged upon the lower end of the container 31 for raising the container bodily to effect the closing of the venting outlet 21. The container 31 is provided with a cover 37 which is telescopically arranged thereover and which is provided with an axially disposed central opening 38 through which the shank of an element 39 extends and by which it is guidedly carried, the lower end of which shank being formed with an enlarged head 40.

In operation, with the parts in the position illustrated in Figure 2, air in the radiator will be expelled through the sleeve 6, thence upwardly through the casing 15 and through the open needle valve outlet until such time as the steam or other heating medium enters the valve casing from the radiator. The heat of the said medium will act upon the thermal fluid 34 to expand the same and move the upper and lower walls or portions 32 and 33 respectively upwardly and downwardly, thereby, through the medium of the element 39 exerting a pressure upon the needle valve core 26 to elevate and cause the same to seat in the conical nipple 21. This will prevent the escape of the heating medium from the valve and insure proper operation of the heating system.

What is claimed is:

1. A radiator valve including a casing having a venting outlet and an inlet communicating with the radiator, a vertically mov-

able needle valve in the upper portion of the casing for controlling the venting outlet, a fixed ring in the casing constituting a guide through which the needle valve is movable, a pin extending through said valve for engaging the ring to limit the downward movement of the valve, said valve having an enlarged lower end constituting a weight for normally effecting the movement of the needle valve to an open position with respect to the venting opening, a support in the lower portion of the casing and means normally resting upon said support and spaced from the enlarged lower end of the valve, said means permitting air to escape around the same and movable by pressure of the heating fluid to engage with and move the valve to a closed relation to the venting outlet.

2. A radiator valve including a casing having a venting outlet and an inlet communicating with the radiator, a vertically movable needle valve in the upper portion of the casing for controlling the venting outlet, a fixed ring in the casing constituting a guide through which the needle valve is movable, a pin extending through said valve for engaging the ring to limit the downward movement of the valve, said valve having an enlarged lower end constituting a weight for normally effecting the movement of the needle valve to an open position with respect to the venting opening, a support in the lower portion of the casing, a hollow fluid tight container filled with a thermal fluid disposed within the lower portion of the casing and normally resting upon said support, said container having a flexible portion, and an element guidedly carried by said container, engaging with the flexible portion thereof and operable upon expansion of the thermal fluid by the heat of the incoming heating fluid from the radiator to be impinged against the valve for moving the same to closed relation to the venting outlet.

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