P. MIRK.

THERMOSTATIC AIR VALVE.

APPLICATION FILED JAN. 19, 1921.

1,408,121. Patented Feb. 28, 1922.

Fig. 1.

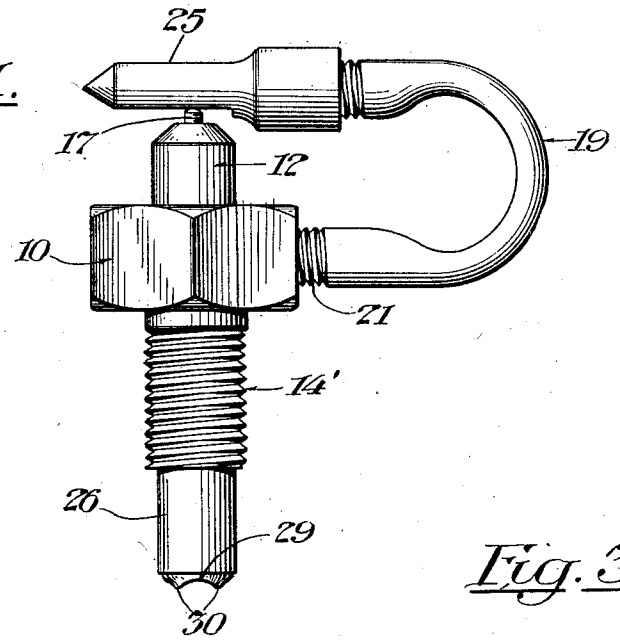


Fig. 2.

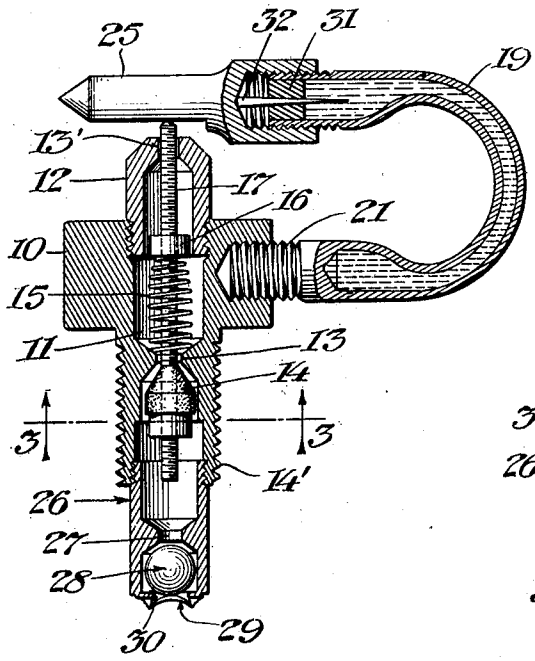


Fig. 3.

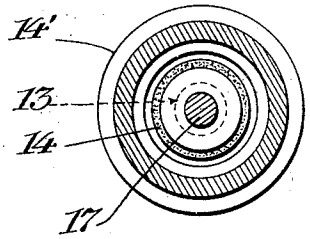
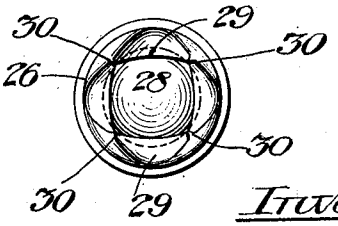


Fig. 4.



Inventor
Paul Mirk
by his Attorney
John F. Nolan

UNITED STATES PATENT OFFICE.

PAUL MIRK, OF NEW YORK, N. Y.

THERMOSTATIC AIR VALVE.

1,408,121. Specification of Letters Patent. Patented Feb. 28, 1922.

Application filed January 19, 1921. Serial No. 438,271.

To all whom it may concern:

Be it known that I, PAUL MIRK, a citizen of the United States, and resident of the city of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Thermostatic Air Valves, of which the following is a specification.

This invention relates to thermostatic air valves for radiators and analogous structures, having reference more especially to an improvement in the valve device set out in my Letters Patent of the United States No. 1,341,016 dated March 25, 1920.

The patented device embodies a body having a port, a radiator-engaging portion and a screw-threaded thermostatic supporting portion, said latter portion being in angular relation to the longitudinal axis of said body; a valve head confined within the body and arranged to open and close the port; a pin extending through said port from the valve head, and a thermostatic element comprising a U-tube containing a thermal liquid, one end of the tube being closed and having a screw-threaded portion for engagement with the supporting portion of the valve body, and the opposite end of said tube also being closed and having a terminal piece which bears against the outer end of the pin in a manner to maintain the valve head normally in an open condition to permit the escape of air from the radiator. When the thermal member is influenced by the heat from the radiator, the valve head is released sufficiently to permit it to assume its closed position and thus preclude the escape of steam from the radiator; all as will more fully appear by reference to said Letters Patent.

In the practical operation of the patented structure there is a liability of the ejection of water therefrom under certain conditions; that is to say, the water of condensation which accumulates within the radiator when the usual manually-operative steam controlling valve at the receiving end of the radiator is closed, is sometimes driven through the radiator with great force when the steam, under high pressure, is again delivered to the radiator, and, in consequence, such water is momentarily splashed through the open air-valve device with the escaping air. To overcome this objection is the main object of my present invention; and to that end I provide the air-valve device with a supplemental valve of novel construction which is arranged to intercept and effectually check the flow of any advancing water before it can reach the discharge port of the air-valve, and yet permit the free escape of the air from the radiator.

The invention also comprises novel structural features which will be hereinafter described and claimed.

In the drawings—

Figure 1 is a side elevation of a thermostatic air-valve embodying my improvement.

Fig. 2 is a longitudinal vertical section of the same.

Fig. 3 is a transverse section on the line 3—3 of Fig. 2.

Fig. 4 is a bottom view of the supplemental valve.

Referring to the drawings, 10 designates a metal body having a central bore 11 which, in the form shown, is constricted intermediate its ends to provide a port 13 with a lower conical valve seat. On the upper end of the body is a hollow projection 12 which is preferably, though not necessarily, a separate piece screwed into the bore of the body. The outer end of the projection is constricted to form a port 13′ in axial alinement with the port 13, such ports, in conjunction with the intervening bore of the body, constituting, in effect a single port. The lower end of the body comprises a reduced screw-threaded portion 14′ adapted to be entered into a tapped orifice in the wall of a radiator or other steam-heated metal structure. Within the body is loosely fitted a valve-head 14 which is movable toward or from the inner or lower end of the port 13 in a manner to close or open the latter as desired. The valve head is carried by a stem, preferably a screw-threaded pin 17, the upper extremity of which protrudes slightly through and above the port 13′ of the projection 12. Encircling the stem is a spring 15 which bears at its respective ends against a screw collar 16 on the stem and against the shouldered portion of the bore at the port 13, the spring thus tending to maintain the valve seated and the port 13 closed. The upper protruding end of the stem contacts with the terminal piece 25 on the free end of the U-shaped thermostatic element 19, the other end of which element is screw-

threaded, as at 21, and fitted to a tapped socket in the side of the body 10. The terminal piece normally bears against the end of the stem 17 in a manner to hold the valve head 14 in down or open position against the stress of the spring; but when the thermostatic element is subjected to a predetermined temperature its free leg and terminal are deflected upward or outward sufficiently to permit the spring to move the valve head to its seat and thus close the port 13. When the radiator, for example, is below a predetermined effective temperature the port 13 is open, and the air, under the pressure of advancing steam, is permitted to escape through the ports 13, 13′; but when such temperature is reached the thermostatic element, being heated by conduction, is actuated to release the valve head 14 and permit it to close the port 13; thereby preventing the escape of the steam to the atmosphere. When the temperature of the radiator again drops the thermostatic element resumes its normal or contracted condition and thus effects the opening of the valve port 13 as before.

In accordance with my present invention I provide the body with a supplemental valve construction which is below and in spaced relation to the valved port so as to prevent the expulsion of water of condensation through the device when steam is initially delivered to the radiator as previously mentioned. This construction comprises a nipple 26, which is screwed into and constitutes in effect a detachable continuation of the projection 14′. Within this nipple is formed a restricted axial port 27 having a lower conical seat for a metal ball valve 28, which is confined within the chamber below the port 27 by a series of inwardly extending lips 29, and is freely movable to close or open the port 27. The lips 29, which are formed by splitting and crimping the outer end of the nipple, are slightly curved or dished inwardly as shown, so as to support the ball at separated points, and thus provide spaced air-vents 30 leading into the valve chamber.

By the construction above described it will be seen that any water of condensation that may be carried through the radiator in the initial impulse of the incoming steam, strikes the ball valve 28 and forces it to its seat, thus closing the port 27 and precluding the entrance of the water into the bore of the supporting body. The water when its advance is thus checked immediately backs into the radiator and the valve 28 moves from its seat and opens the port 27, whereupon the air confined in the radiator passes through the vents into the proximate valve chamber and thence through the open port 27 into the bore of the body 10. The port 13 being open, the air passes therethrough and escapes to the atmosphere. When the radiator is heated sufficiently the thermostatic element is actuated as previously described to release the valve-head 14 and thus close the port 13 in a manner to prevent the escape of the steam to the atmosphere.

It is to be noted that the nipple 26 together with its permanently contained ball-valve 28 can be readily removed from the main body of the device in order to permit the cleaning, repair or renewal of the valve parts within said body, or for the replacement of said nipple and ball-valve, as may be required.

It is also to be noted that the ports 27, 13, 13′ are in axial alinement with each other and with the bore of the main supporting body, thus ensuring a direct unobstructed path for the air from the radiator when the ports are functioning.

In the present instance the free end of the U-tube is provided with a centrally-perforated plug 31 which, after the tube is filled with thermal liquid, is hermetically sealed by a tapering pin 32. The socketed screw-threaded end of the terminal piece 25 is then screwed on the threaded end of the tube so as to enclose the projecting end of the pin and lock it securely in place.

I claim—

1. In a thermostatic air-valve for radiators, a body having a longitudinal bore, including an axial port, and having also a radiator-engaging portion at one end, a valve-head in operative relation to said port, a valve-stem extending loosely through said port and protruding beyond the opposite end of said body, a U-shaped thermostatic element having one leg thereof secured to the body and the other leg positioned normally to limit the outward movement of the valve-stem and thus maintain the valve-head in open position, and a nipple detachably secured to the said radiator-engaging portion, said nipple having a port therein, a ball-valve loosely supported adjacent the latter port, said nipple having means for supporting the valve and providing air vents exteriorly of the valve.

2. In a thermostatic air-valve for radiators, a body having a longitudinal bore, including an axial port, and having also a radiator-engaging portion at one end, a valve-head in operative relation to said port, a valve-stem extending loosely through said port and protruding beyond the opposite end of said body, a U-shaped thermostatic element having one leg secured to the body and the other leg positioned normally to limit the outward movement of the valve-stem and thus maintain the valve-head in open position, and a nipple detachably secured to the said radiator-engaging portion, said nipple having a port therein, a ball-valve, and inwardly-turned

curved lips which loosely support said valve adjacent the latter port and provide spaced air-vents.

3. In a thermostatic air-valve for radiators, a body having a longitudinal bore constricted between the ends of the body to form an intermediate port, one end of the body being constricted to form a port in communication with the intermediate port, and the opposite end of the body being provided with a radiator-engaging portion, a nipple detachably secured to said radiator-engaging portion having an interior port in axial alinement with the other ports, a valve-head for the first named port, a stem extending therefrom through the first and second named ports, a spring tending to move the valve-head to its seat, a U-shaped thermostatic element having one leg thereof secured to the body and the other leg positioned normally to limit the outward movement of the valve-stem and thus maintain the valve-head in open position, and a ball-valve loosely confined within the nipple, said nipple providing air vents exteriorly of the valve.

Signed at New York, in the county and State of New York, this 18th day of January, A. D. 1921.

PAUL MIRK.