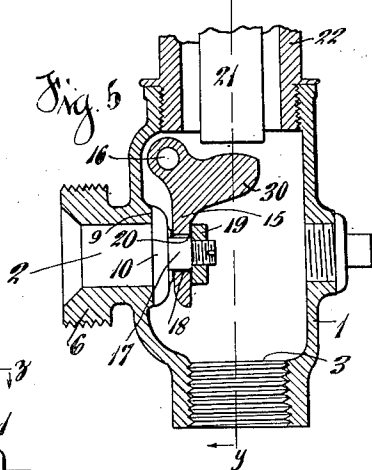
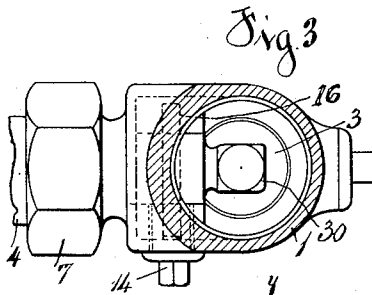
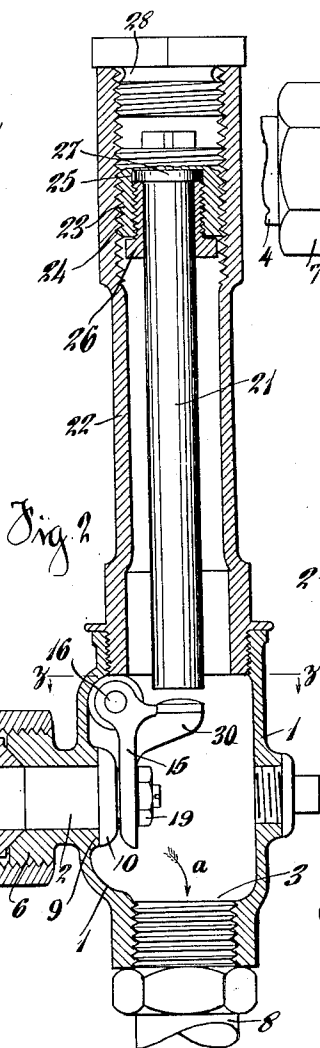
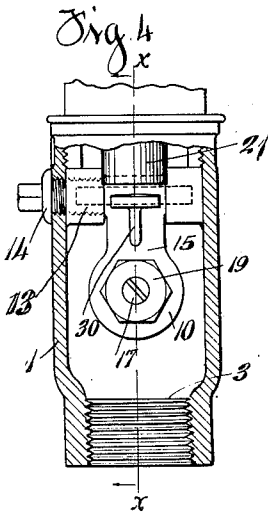
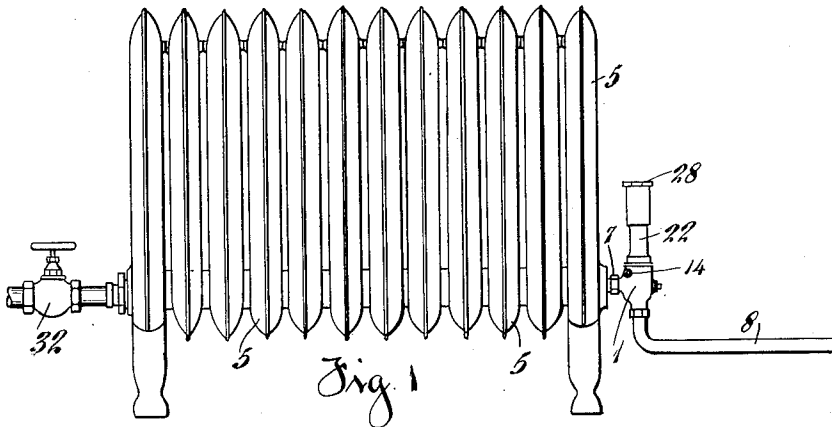


R. S. MAYER.
THERMOSTATIC VALVE.
APPLICATION FILED MAY 23, 1910.

1,063,564.

Patented June 3, 1913.



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UNITED STATES PATENT OFFICE.

ROBERT S. MAYER, OF NORWOOD, OHIO.

THERMOSTATIC VALVE.

1,063,564.

Specification of Letters Patent.

Patented June 3, 1913.

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To all whom it may concern:

Be it known that I, ROBERT S. MAYER, a citizen of the United States, residing at Norwood, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Thermostatic Valves, of which the following is a specification.

My invention relates to thermostatic valves and is especially applicable as controlling mechanism between the return-pipe and the radiators in steam heating apparatus, primarily in two pipe systems.

In two pipe systems as usually employed, the steam is received into one end of the radiator from the supply pipe through an ordinary form of manually operated supply valve, which is used to control the amount of steam desired to be admitted to the radiator. The bottom of the opposite end of the radiator is connected to the return pipe through a return-valve of the same general type as that on the supply end. Both these valves must be operated by hand and substantially in unison or trouble will result. For instance, if the return-valve is left open when the supply-valve has been turned off, the steam and water will be drawn into the radiator from the return-pipe, causing noise and discomfort.

The invention will be readily understood from the following description and claims, and from the drawings, in which latter:

Figure 1 is a side elevation of my improved device shown in connection with a radiator in a two-pipe system. Fig. 2 is a central axial section of my improved device, the valve and expansion-member being shown in side elevation. Fig. 3 is a cross-section of my improved device taken on the line $z-z$ of Fig. 2. Fig. 4 is an axial section of the same taken on the line $y-y$ of Fig. 5. Fig. 5 is an axial section of the same taken on the line $x-x$ of Fig. 4.

1 represents the casing of my improved device, which may be of suitable form. It has an inlet-port 2 and an outlet-port 3 which may be at right angles to each other, as shown, or be in other suitable relation, depending on the directions in which it is desired to have the flow pass to and from the device. I have shown the inlet-port communicating with a nipple 4 in a radiator 5, the threaded flange 6 of the casing being secured to the nipple by a coupling 7. A return-pipe indicated at 8 connects with the outlet-port.

9 is a valve-seat and 10 is a valve adapted to seat thereon. The valve 10 is of greater cross-sectional area than the cross-sectional area of the inlet-port at the valve-seat. In the form shown the valve is a pivoted valve and I prefer to mount the same on an arm 15 pivoted to the casing on a pin 16 held by a plug 14 which has a bearing 13 for the pin. The valve is loosely mounted on the arm, as by having a shank 17 thereon received loosely through a hole 18 in the arm, a nut 19 received against a shoulder 20 on the shank holding the valve loosely on the arm, the valve being permitted to swing slightly on the arm to enable it to adapt itself to the valve-seat.

21 is an expansion-member of suitable material and is shown in a barrel 22 of the casing. The expansion-member is preferably adjustable in said barrel. I have shown the expansion-member secured to a head 23 having adjustment in the barrel toward and from the valve, as by having threaded connection 24 with the bore of said barrel, the expansion-member being secured to the head by being received in a bore 25 therein, a gland 26 being received in the threaded portion of the bore 25 and crowding a collar 27 at the end of the expansion-member against the inner end of the bore of the head 23. The end of the barrel is closed by a plug 28. The expansion-member is arranged to exert pressure upon the valve-parts for closing the valve, and for accomplishing this I have shown the arm 15 provided with a bracket 30 which extends within range of the expansion-member for being contacted thereby when the expansion-member is expanded, and thereby closing the valve, the arm and its bracket forming a bell-crank lever.

In operation, the steam under pressure passes through the valve-casing in the direction of the arrows a . When the main valve 32 of the radiator is opened to admit steam, usually under low pressure, the steam will crowd the air and water of condensation from the radiator through my improved device into the return pipe of the system, this air and water being crowded out in advance of the steam which gradually fills the radiator. When the steam reaches the casing, it will also be admitted into the barrel 22 thereof and come into contact with the expansion-member 21 for expanding the same. When the radiator has been heated,

thereby also heating the expansion-member, the expansion-member will expand against the bracket on the arm of the valve 10 and seat the valve, thereby preventing the further passage of steam into the return-pipe, the steam however filling the radiator and causing radiation of heat therefrom. The steam in the radiator, especially at its discharge-end, will gradually cool, and the expansion-member will also gradually cool, thereby permitting the valve 10 to again open for relieving the radiator from accumulated water of condensation and for again permitting the radiator to be filled with steam under the full pressure admitted through the supply-valve, the opening of the valve 10 automatically taking place for maintaining the radiator in proper heated condition, depending on the adjustment that has been given the expansion-member. If it is desired to shut off the radiator, and prevent the radiation of heat therefrom, the supply-valve of the radiator is closed, thereby shutting off the steam pressure to the radiator from the supply-pipe thereof, and causing a reduction of pressure in the radiator. This reduction of pressure in the radiator will tend to draw steam, water or air from the return-pipe, should any such be present therein. The condition existing would be the presence of greater pressure in the return-pipe than in the radiator. Upon presence of greater pressure in the return-pipe than in the radiator, the valve 10, which is normally in closed relation, would be pressed with force against its seat, and the pressure present in the return-pipe would be exerted against the face of said valve presented toward said return-pipe, and said face of said valve, being of greater cross-sectional area than the cross-sectional area of the inlet-port, the valve would be firmly pressed to its seat for effectually shutting off communication between the return-pipe and the radiator, and thereby preventing the entrance of steam or water or air into the radiator from the return-pipe. The center of gravity of the valve and parts swinging therewith is preferably within the outlet-passage in order to, as stated, normally maintain the valve in closed relation. The supply-valve of the radiator may also be only partially opened to any desired extent and the desired degree of heat maintained in the radiator by my improved device, my improved device automatically regulating the passage of steam from the supply-pipe through the radiator, for maintaining the same at desired temperature without waste of steam, and automatically preventing the entrance into the radiator of steam, water or air from the return-pipe, should the pressure in the latter be greater than the pressure of steam in the radiator.

While I have shown a shank style of ex-

pansion-member, it is obvious that other styles of expansion-members which are arranged to suitably act on the valve of my improved device may be employed for effecting the purposes desired.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a thermostatic valve, the combination of a casing having a valve-seat therein whose longitudinal projection extends laterally, said valve-seat provided with an opening which communicates with a source of pressure-supply, said casing having an outlet, a valve for said valve-seat, said valve having a pivot thereabove in said casing for normally gravitating said valve against said valve-seat in closed relation, and an expansion-member acting on said valve for pressing said valve against said valve-seat, the line of operative expansion of said expansion-member being transverse to the longitudinal projection of said valve-seat, substantially as described.

2. In a thermostatic valve, the combination of a casing, a valve-support therein, said valve-support having a pivot at its upper part in said casing, a valve on said support, said casing being provided with a valve-seat for said valve, the longitudinal projections of said valve and valve-seat being substantially horizontal, and the face of said valve being substantially vertical, the said pivot of said valve-support being outside said longitudinal projections, and arranged for normally gravitating said valve against said valve-seat in closed relation, and an expansion-member acting on said valve-support, substantially as described.

3. In a thermostatic valve, the combination of a casing, a valve-support therein, a valve on said support, said casing being provided with a valve-seat comprising an inlet-port, the longitudinal projections of said valve and valve-seat being substantially horizontal, and constructed and arranged for normally gravitating said valve against said valve-seat in closed relation, and an expansion-member acting on said valve-support, said valve-casing being provided with an outlet-port, and the side of said valve removed from said valve-seat being of greater cross-sectional area than said inlet-port of said valve-seat, and the said side of said valve removed from said valve-seat being exposed to communication from said outlet-port, substantially as described.

4. In a thermostatic valve, the combination of a casing having a valve-seat therein and an inlet-passage for said valve-seat, said casing being provided with an outlet-passage, a valve-support pivoted in said casing in said outlet-passage, a valve loosely mounted thereon, the center of gravity of

said valve-support and valve being within said outlet-passage, an expansion member arranged to act against said valve-support, the said valve having a face exposed to
 5 said outlet-port of greater cross-sectional area than the cross-sectional area of said inlet-passage, substantially as described.

5. In a thermostatic valve mechanism, the combination of a casing provided with an inlet-passage, an outlet-passage and a valve-seat surrounding said inlet-passage, a valve-support pivoted in said casing, a valve on said support for said valve-seat, said valve-support having a bracket thereon for forming a bell-crank lever, the center of gravity of said valve-support and valve being within said outlet-passage, and an expansion-member arranged to act on said bracket for closing said valve, substantially as described.
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6. In a thermostatic valve, the combination of a casing having an inlet-port, an outlet-port, and a valve-seat surrounding said inlet-port, a valve-support pivoted in said casing, a valve for said valve-seat provided with a shank having a shoulder and a threaded end, said support having an opening in which said shank is loosely received, a nut received about said threaded
 25 end of said shank against said shoulder for securing said valve loosely to said support, said support having a bracket thereon for forming a bell-crank lever thereof, said casing being provided with a barrel, and an ex-
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pansion-member adjustably mounted in said barrel and arranged for acting on said bracket for closing said valve, substantially as described.

7. In a thermostatic valve, the combination of a casing having an inlet-port, an outlet-port and a valve-seat surrounding said inlet-port, a valve-support pivoted in said casing, a valve for said valve-seat provided with a shank having a shoulder and a threaded end, said support having an opening through which said shank is loosely received, a nut received about the threaded end of said shank against said shoulder for securing said valve loosely to said support, said support having a bracket thereon for forming a bell-crank lever thereof, said casing being provided with a barrel, and an expansion-member adjustably mounted in said barrel and arranged for acting on said bracket for closing said valve, and said valve having a face in said casing exposed to communication with said outlet-port of greater cross-sectional area than the cross-sectional area of said inlet-port, substantially as described.
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In testimony whereof, I have signed my name hereto in the presence of two subscribing witnesses.

ROBERT S. MAYER.

Witnesses:

EDWARD SOUTHWORTH,
 LILLIAN BURNETT.