Dec. 19, 1922. 1,439,069.

J. P. COUSINS.

THERMOSTATIC VALVE FOR HEATING SYSTEMS.

FILED MAR. 10, 1921. 2 SHEETS—SHEET 1.

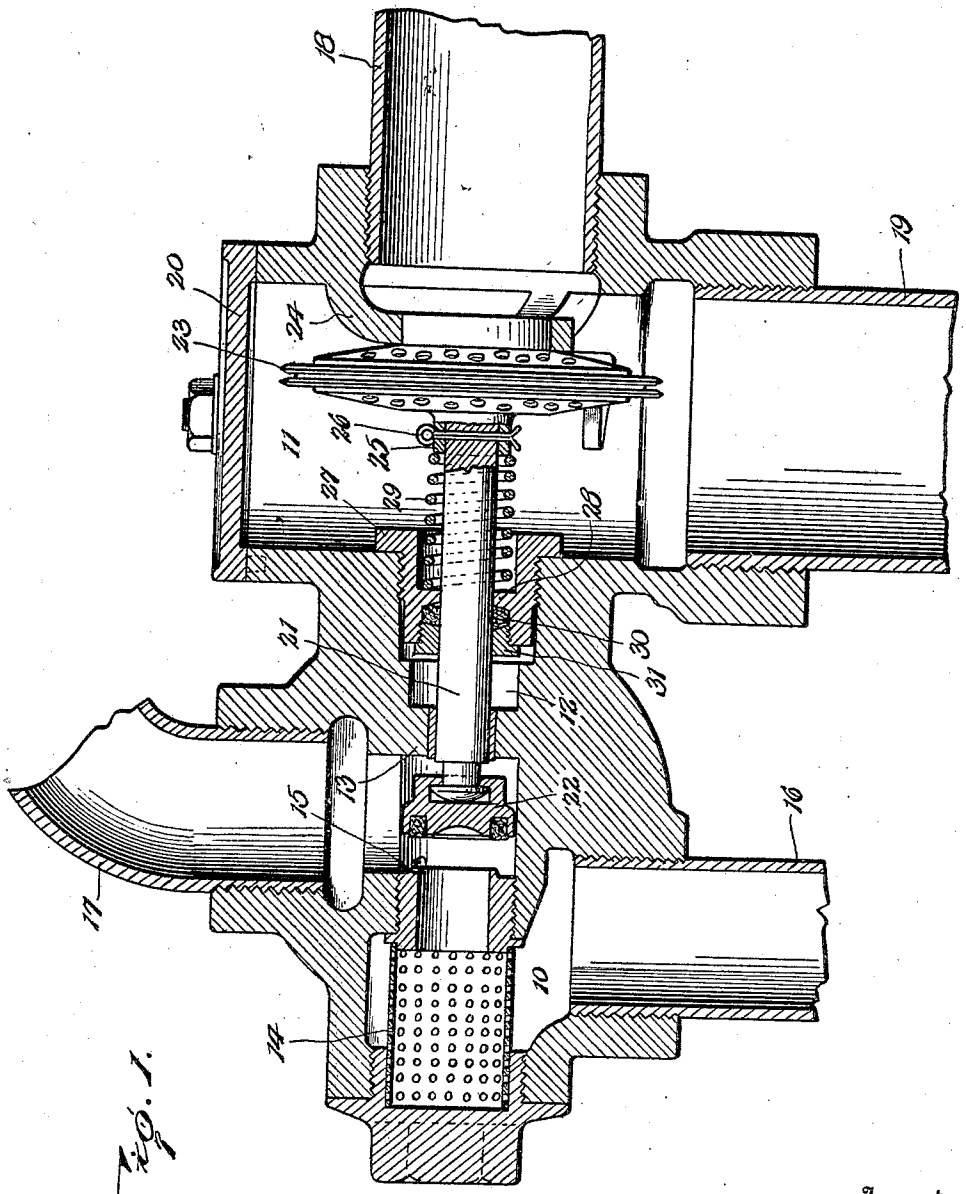


Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 2.

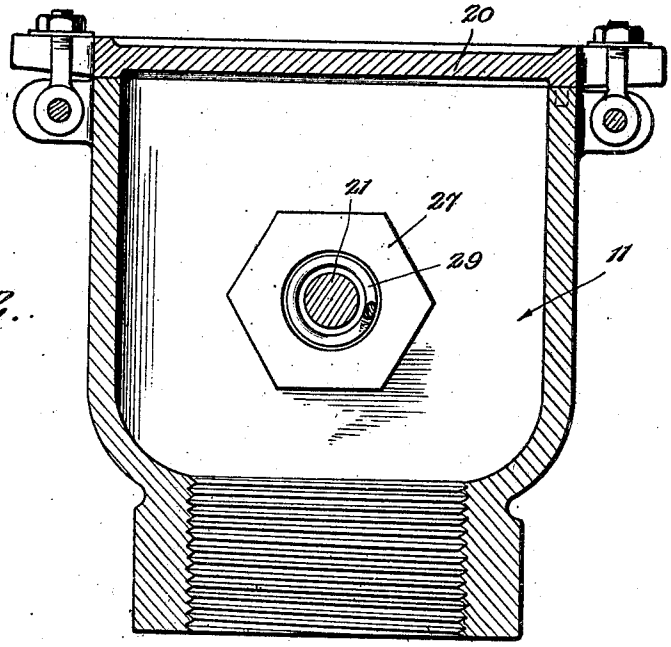
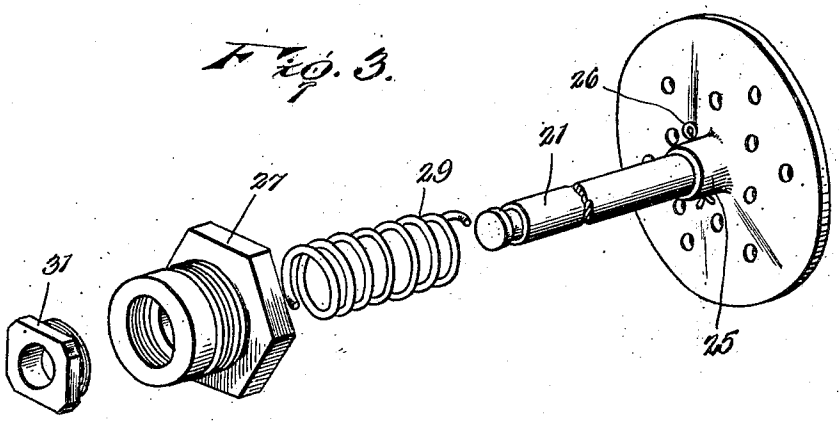


Fig. 3.



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Patented Dec. 19, 1922. 1,439,069

UNITED STATES PATENT OFFICE.

JOHN P. COUSINS, OF PORTSMOUTH, VIRGINIA, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO GOLD CAR HEATING & LIGHTING COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

THERMOSTATIC VALVE FOR HEATING SYSTEMS.

Application filed March 10, 1921. Serial No. 451,100.

To all whom it may concern:

Be it known that I, JOHN P. COUSINS, citizen of the United States, residing at Portsmouth, in the county of Norfolk and State of Virginia, have invented certain new and useful Improvements in Thermostatic Valves for Heating Systems, of which the following is a specification.

This invention relates to an improved thermostatic valve for heating systems, adapted for use in connection with car heating systems wherein the flow of steam through the valve to a radiator is controlled by a thermostat thermally affected by exhaust steam discharging through the valve, although not limited in its application to the particular service mentioned.

A prevalent type of valve of the character indicated has heretofore been constructed with an inlet chamber, an exhaust chamber, and an intermediate chamber in which latter chamber is located a spring normally holding the valve open, said spring being associated with the valve stem which extends from the intermediate chamber through a dividing wall into the inlet chamber. In such a construction, it has been found in practice that steam and water of condensation work through around the valve stem from the inlet chamber to the intermediate chamber to not only cause corrosion of the spring but to also cause the spring to lose its temper with a resultant faulty operation of the valve. Furthermore, in thus mounting the spring within the intermediate chamber, the spring is very inaccessible. The present invention has, therefore, among other objects, to overcome these varous difficulties and to provide a valve which, while being free from the objectionable features noted, will also be simplified in construction and facilitate the renewal of the spring without disturbing the packing surrounding the valve stem.

In the drawings:

Figure 1 is a sectional view taken medially through a valve embodying the present invention,

Figure 2 is a vertical sectional view taken through the exhaust chamber of the valve, and

Figure 3 is a perspective view showing the valve stem and associated parts in detail.

Referring now more particularly to the drawings, I have illustrated a thermostatic valve of a type quite prevalently used in connection with car heating systems. This valve comprises a casing which is formed with a steam inlet chamber 10, an exhaust chamber 11, and an intermediate chamber 12 separated from the chamber 10 by a dividing wall 13. Within the chamber 10 is mounted the usual strainer 14 associated with an appropriate bushing providing a valve seat 15. Leading into said chamber is an inlet pipe 16 while a contiuuation 17 of said pipe leads from the chamber to a suitable radiator. Connecting the radiator mentioned with the exhaust chamber 11 is a return pipe 18 for spent steam and leading from the exhaust chamber to the atmosphere is the usual outlet or horn 19, the exhaust chamber being closed at its upper end by a removable cover plate 20. Slidable through the partition wall 13 axially of the chamber 12 is a valve stem 21 upon the inner end of which is mounted a valve 22 adapted to cooperate with the seat 15. Mounted upon the outer end of said stem is a thermostat 23 arranged to cooperate with an abutment 24 for opening and closing the valve 22, the thermostat being thermally affected by the spent steam flowing through the exhaust chamber.

Coming now more particularly to the subject of the present invention, one of the side plates of the thermostat 23 is, as particularly shown in Figures 1 and 3, provided with a socket 25 which removably receives the outer end of the stem 21 and extending through the wall of the socket and through said stem is a cotter 26 locking the plate upon the stem, this construction providing an arrangement whereby the stem may be readily detached. The outer end portion of the chamber 12 is enlarged and threaded therein is a tubular bushing or gland plug 27 provided at its outer end with a head to coact with the wall of the chamber 11. This plug is formed internally at a point between its ends with a partition wall 28 slidably receiving the stem 21 therethrough for guiding and supporting the stem and extending

into the plug to bear at one end against said wall is the usual spring 29 coacting at its opposite end with the socket 25 for normally holding the valve 22 open. This socket, therefore, serves the function of a shoulder for sustaining the thrust of the spring and eliminates the necessity for forming the stem 21 itself with a shoulder. In thus making provision whereby a smooth stem may be employed, the cost of production is, as compared with an arrangement wherein the stem is so formed with a shoulder, materially reduced. Arranged within the inner end portion of the plug at the side of the partition wall 28 opposite the spring 29 is a suitable packing 30 and threaded into the plug at its inner end to surround the stem 21 is a gland nut 31 compressing the packing to provide a tight joint between the stem and the plug. Thus, live steam or water of condensation working through the dividing wall 13 around the stem 21 from the inlet chamber 10 into the intermediate chamber 12, will be prevented from flowing along the stem to come in contact with the spring 29, the spring not only being mounted at the side of the dividing wall 13 opposite the inlet chamber but also being protected by the packing gland of the plug 27. Corrosion of the spring or overheating thereof to cause the spring to lose its temper, will accordingly be effectually prevented. Furthermore, since the spring is carried by the stem within the exhaust chamber 11, which chamber is open to the atmosphere through the pipe 19, the spring will be subjected to the cooling influence of the atmosphere to thus further guard against overheating of the spring.

Attention is now directed to the fact that by employing the tubular plug 27, the spring 29 is accommodated without the necessity for widening the exhaust chamber 11, it being appreciated, of course, that said spring must be of a given length to permit proper travel of the valve 22. Furthermore, by employing a tubular plug of the character shown, provision is made for the packing gland without the necessity for forming the casing to accommodate the gland. Access to the spring may be had by simply removing the plate 20 when, by displacing the pin 26, the thermostat 23 may be detached from the valve stem. The spring may then, of course, be drawn forwardly from around the valve stem and removed while, should it be found desirable to renew the packing 30, the plug 27 may then be displaced, the nut 31, of course, remaining stationary upon the plug. It will thus be seen that, when desired, the spring 29 may be readily renewed and the valve easily maintained in proper working order.

Having thus described the invention, what is claimed as new is:

1. A thermostatic valve comprising, in combination, a valve casing having a thermostat chamber, a valve stem extending into said chamber, a thermo-motive element removably mounted in said chamber and detachably connected with said valve stem, a recess in said casing surrounding said valve stem and opening into said chamber, a bushing secured in the recessed portion of said casing, said bushing having an annular portion of larger internal diameter than said valve stem terminating well within said recess in a restricted portion forming a guide for said valve stem, means comprising a spring restraining abutment carried by said valve stem at the end connected with said thermo-motive element, and a spring surrounding the end of said valve stem exposed in said chamber, said spring being confined between said abutment and the restricted portion of said bushing.

2. A thermostatic valve, as defined by claim 1, in which the restricted portion of said bushing comprises a gland, a packing ring in said gland, and a gland nut, whereby said ring may be compressed into sealing relation with said valve stem.

3. A thermostatic valve, as defined by claim 1, in which the restricted portion of said bushing comprises a packing ring gland opening from the inserted end of said bushing, a ring of packing in said gland, and a gland nut closing the open end of said gland.

4. A thermostatic valve as defined by claim 1, in which said bushing is in threaded engagement with the recessed portion of said casing and is provided at its exposed end with a head of increased diameter to facilitate its removal, the underside of said head also forming a limiting stop.

5. A thermostatic valve as defined by claim 1 in which the restricted portion of said bushing comprises a gland, a packing ring in said gland, and a gland nut, the complete bushing, including said gland, packing ring, and nut, being removable from said casing as a self contained unit.

6. A thermostatic valve, as defined by claim 1, in which said bushing comprises a packing ring gland opening from the inserted end of said bushing, a ring of packing in said gland, and a gland nut closing the open end of said gland, said bushing having threaded engagement with the recessed portion of said casing and having, at its exposed end, a head of increased diameter to facilitate its removal, the underside of said head also forming a limiting stop.

In testimony whereof I affix my signature.

JOHN P. COUSINS. [L. S.]