

J. H. BRADY.

THERMOSTAT.

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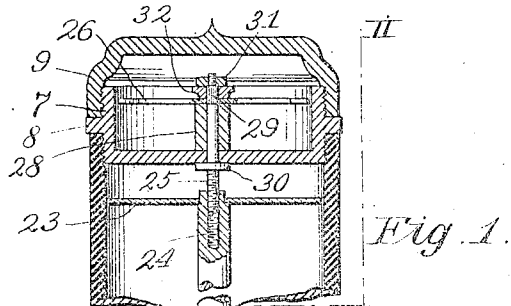


Fig. 1.

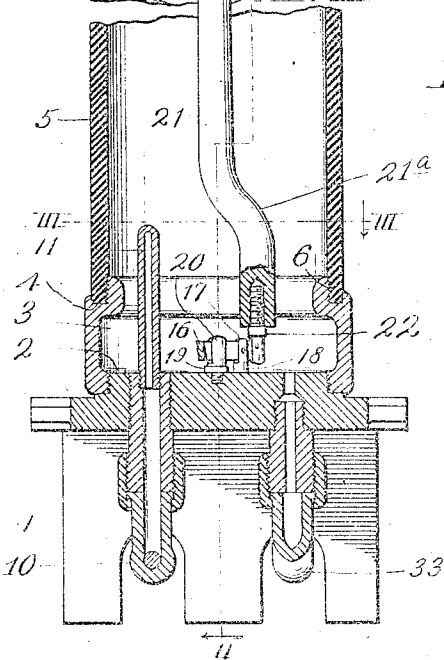


Fig. 2.

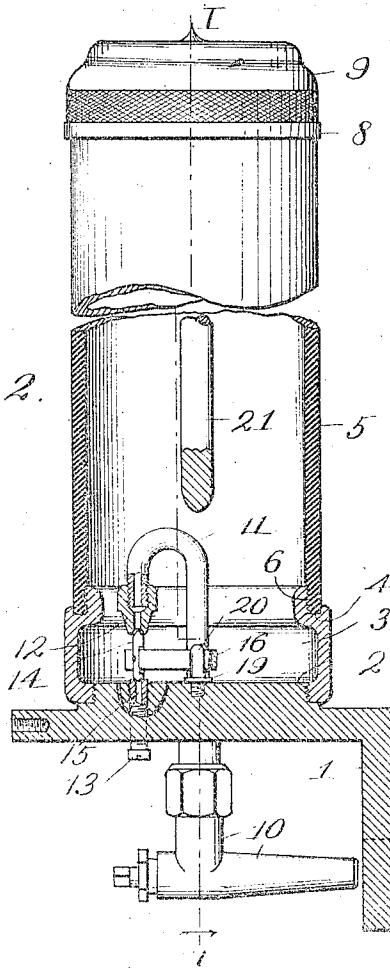


Fig. 3.

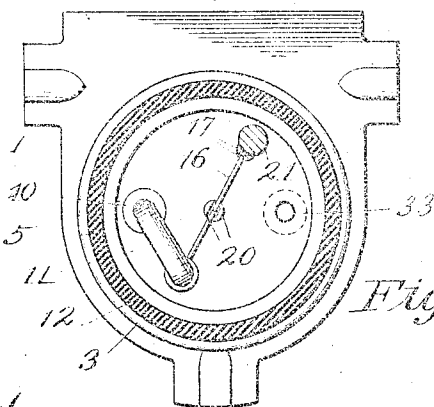
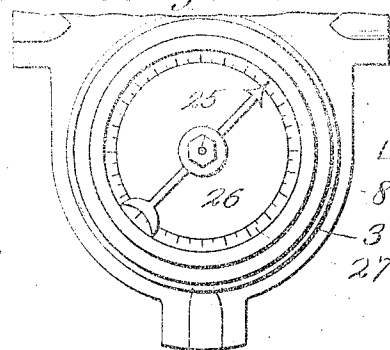


Fig. 4.



Witnesses:

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UNITED STATES PATENT OFFICE.

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To all whom it may concern:

Be it known that I, JOSEPH H. BRADY, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Thermostats, of which the following is a specification.

My invention relates to improvements in thermostats, and pertains to that class employed to automatically regulate the temperature of apartments by controlling the heating or the ventilating apparatus thereof.

My invention embraces a valve mechanism for controlling the flow of a suitable motive fluid employed in communicating the action of the thermostat to the regulating valve of the apparatus; and one object is to arrange the valve mechanism on a base so that it may be removed from the thermostat intact when it is desired to adjust or repair said valve mechanism.

A further object is to provide simple means for imparting a long stroke to the valve of the thermostat, and with this end in view I employ two media upon which a rising temperature has the opposite effects of expanding one and contracting the other. These media are arranged to move in the same direction when affected by variations in temperature, and one of them is connected to the free end of the other and the valve mechanism so that the combined movements of the media will be transmitted to said valve mechanism.

In order that the invention may be fully understood reference will now be made to the accompanying drawing, in which:—

Figure 1 represents an irregular vertical section of the thermostat on line I—I of Fig. 2. Fig. 2 is a side elevation of the same, partly in section on line II—II of Fig. 1. Fig. 3 is a transverse section on line III—III of Fig. 1. Fig. 4 is a plan view of the thermostat with its cover removed to show an indicator whereby the thermostat is set to act at a certain temperature.

In carrying out the invention, I employ a bracket 1, provided at its horizontal portion with a circular shoulder 2, which is threaded to receive the threaded lower end of a chamber 3, wherein the valve mechanism of the thermostat is inclosed to protect it from injury or from being tampered with. The upper edge of the chamber wall has an annular groove 4 forming a seat for the lower end of a tubular medium 5, which is

drawn firmly to its seat by screw-threads 6. Medium 5 consists of ebonite or other material, which will expand when subjected to a rising temperature, and being firmly secured at its lower end it is obvious that any movement caused by expansion will be upward. The upper free end of medium 5 is closed by an annular cap 7 having a peripheral flange 8, which is adjusted tightly into contact with the upper end of the medium to form an air-tight joint. The upper end of cap 7 is normally closed by a removable cover 9 to protect the indicator hereinafter described.

10 designates an inlet pipe leading into chamber 3 and adapted to be connected at its outer end to a pipe leading from the source of motive fluid not shown. Pipe 10 enters chamber 3 through bracket 1 and terminates in a goose-neck 11, provided at its discharge end with a nipple 12 having a valve-seat in its lower terminal.

13 designates a tubular screw extending into chamber 3 through the horizontal portion of the bracket and provided at its upper terminal with a valve-seat arranged in vertical alinement with the valve-seat in nipple 12.

14 designates a valve having attenuated terminals adapted to alternately engage the valve-seats for the purpose of shutting off the flow of fluid into chamber 3 and medium 5, or permitting its escape from the same, after being used, through the exhaust-port extending through screw 13, which latter may be adjusted toward or away from the valve to time the seating of the same. Nipple 12 is likewise adjustable on the goose-neck for the same purpose.

Valve 14 is pivoted to one end of a lever 16, fulcrumed between the jaws 17 of a stem 18 and arranged in about the proportion of six to one, so that its valve-carrying end will have considerable more throw than its opposite end.

19 designates another stem having a pair of jaws 20, between which the lever extends so that the same cannot move laterally and throw valve 14 out of alinement with its seats. The rear end of lever 16 is connected to a medium 21 by a stem 22, which is screwed into the lower free end of said medium.

Medium 21 consists, preferably, of an alloy having the peculiar characteristic of contracting when subjected to heat, and consist-

ing preferably of the following ingredients; nine parts lead, two parts antimony, and one part bismuth. Said medium extends upwardly into medium 5 where it is provided with a guide-disk 23 which loosely engages the inner vertical surface of medium 5.

The upper end of medium 21 has a threaded bore 24 for the reception of the lower end of a screw 25 extending upward through cap 7 and provided with a pointer 26, which in conjunction with a circular scale 27, stamped on the cap, forms an indicator for setting the thermostat to act at any desired degree of temperature. Pointer 26 rests upon a sleeve 28 and fits upon the rectangular portion 29 of screw 25, so that when it is turned to the right or left it will turn the screw therewith and cause it to raise or lower medium 21 for the purpose of adjusting valve 14 in proper relation to nipple 12 and tubular screw 13. Screw 25 is prevented from moving up or down with medium 21 by an integral shoulder 30, engaging the underside of cap 7, and a nut 31 on the upper end of screw 25, bearing upon a washer 32 interposed between the cap and the pointer.

33 designates an outlet pipe leading from chamber 3 to the valve of the heating, or ventilating apparatus, (not shown).

Assuming that the thermostat has been set to act at seventy degrees, medium 5 will expand and lift medium 21 when the temperature rises above this point. Medium 21 will in turn contract and as the movement of the media is upward valve 14 will be unseated from nipple 12 and seated in screw 13, so that the motive fluid will be free to enter chamber 3 and medium 5 and flow thence through pipe 33 to the valve of the apparatus which is thereby closed and shuts off the heating agent. When the temperature falls below seventy degrees medium 5 contracts while medium 21 expands, so that the combined movements of both will seat valve 14 in nipple 12 and uncover port 15. The motive fluid in chamber 3 and medium 5 will then exhaust through port 15 and permit the valve of the apparatus to open. Further expansion or contraction of the media after valve 14 has become seated is permitted by medium 21 which is curved at 21^a so that it may yield more or less.

Pipes 10, 33, screw 13, and the valve mechanism is carried by bracket 1 so they may be removed together with said bracket when it is desired to repair or adjust any of the parts, and in order to effect this removal it is only necessary to disconnect screw 25 from medium 21, or unscrew nut 31 from the upper end of screw 25 so that medium 21 may be removed with brackets 1 and the parts carried thereby. When the parts are replaced guide 23 centers the upper end of medium 21 within medium 5 so that it may

be engaged by the screw 25, or if said screw be removed with the medium the guide will hold the screw in line with the central opening in cap 7 so that the screw will readily enter said opening.

Having thus described my invention, what I claim is:--

1. A thermostat consisting of a hollow medium which expands under a rising temperature, a chamber communicating with the lower end of said medium, an inlet pipe for conducting motive fluid to said chamber, terminating in a goose-neck having a valve-seat in its downturned end, a member entering the chamber having an exhaust-port and a valve-seat in axial line with the first-mentioned valve-seat, a valve for alternately engaging the valve-seats, a second medium which contracts under a rising temperature and is connected at its ends to the free end of the first medium and the valve, so that the added movements of the media will be transmitted to said valve, and an outlet pipe for conducting the motive fluid from the chamber to the point of use.

2. A thermostat consisting of a hollow medium which expands under a rising temperature, a chamber communicating with the lower end of said medium, an inlet pipe for conducting motive fluid to said chamber, terminating in a goose-neck, a member adjustably engaging one end of said goose-neck and terminating in a valve-seat, a screw entering the chamber having an exhaust-port and a valve-seat in axial line with the first-mentioned valve-seat, a two-faced valve for alternately engaging the valve-seats, a lever to one end of which said valve is pivoted, a second medium which contracts under a rising temperature and is connected at its ends to the free end of the first medium and the lever so that the added movements of the media will be transmitted to said valve, and an outlet pipe for conducting the motive fluid from the chamber to the point of use.

3. A thermostat comprising in combination, a medium which expands under a rising temperature, a chamber forming a continuation of the interior of said medium, inlet and outlet pipes for conducting motive fluid to and from the chamber, and having an exhaust port leading from the chamber, said inlet pipe entering said chamber adjacent said exhaust port and being provided with a mouth suspended concentrically opposite said exhaust port, a valve having opposite faces adapted to alternately close the inlet pipe and the exhaust port, means for holding the inlet and outlet pipes and the valve mechanism from which the expansible medium may be removed and means connecting the valve to the free end of the medium.

4. A thermostat consisting of a hollow medium which expands under a rising temperature and is provided at its upper end with

an annular scale, a removable base having a cylindrical extension supporting said hollow medium and forming a closed chamber therewith, valve mechanism carried within said extension, and means connecting said valve mechanism with said expansible medium, said valve mechanism comprising a goose necked inlet pipe provided at its downturned end with a valve seat, an adjustable exhaust port pipe also provided with a valve seat in axial alinement with said inlet valve seat, an outlet pipe and a two way valve plug operable by said connecting means to alternately open and close said inlet and exhaust port pipes.

5. A thermostat consisting of a hollow medium which expands under a rising temperature, bodily removable valve mechanism supported at one end of said medium within a chambered base, and means connecting said medium with said valve mechanism whereby to utilize the expansion and contraction of said medium to operate said valve mechanism, said valve mechanism comprising an inlet pipe having a downturned adjustable valve seat, an exhaust port pipe also provided with a valve seat disposed oppositely to said inlet valve seat, an outlet pipe and a valve operating between said exhaust port and inlet valve seats to alternately open and close said outlet and inlet, with the expansion and contraction of said medium.

6. A thermostat comprising an expansible medium, a chambered base at its lower end, the chamber thereof being open to said medium, valve mechanism inclosed by said chambered base, said valve mechanism comprising outlet, inlet and exhaust pipes, said inlet and exhaust pipes being concentrically and oppositely disposed, a valve operative between said inlet and exhaust pipes and a pivoted lever adapted to move said valve, a second medium contractible as said first medium is expansible supported by said first medium at its upper end, and connecting it with said valve mechanism whereby to utilize

the resultant of their added movements when affected by heat to operate said valve.

7. A thermostat comprising a medium expansible under caloric influence, a second medium contractible when said first medium is expansible and valve mechanism supported in operative relation thereto, said valve mechanism comprising outlet, inlet and exhaust pipes, said inlet and exhaust pipes being concentrically and oppositely disposed, a valve operative between said inlet and exhaust pipes, and a pivoted lever adapted to move said valve, whereby the resultant of their added movements when affected by caloric influence may be utilized to operate said valve mechanism.

8. A thermostat comprising in combination with a hollow medium expansible under action of heat, a base portion supporting said medium and comprising a chamber, valve mechanism mounted in said chamber comprising an inlet, outlet and an exhaust port pipes, an oscillating valve operating between said inlet and exhaust port pipes, and a second medium contractible under the action of heat, said second medium connecting said first medium with said oscillating valve whereby to utilize the resultant of the added movements of said mediums under the action of heat to operate said valve, said second medium comprising a rod connected at its upper end to the upper end of said first medium and connected at its lower end to said oscillating valve, and having means for adjusting said rod at its upper end and having intermediate its length an offset portion whereby to compensate for the expansion of said medium after said valve is seated.

In testimony whereof I affix my signature, in the presence of two witnesses.

JOSEPH H. BRADY.

Witnesses:

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M. Cox.