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CONTROL FOR THERMOSTATIC VALVES

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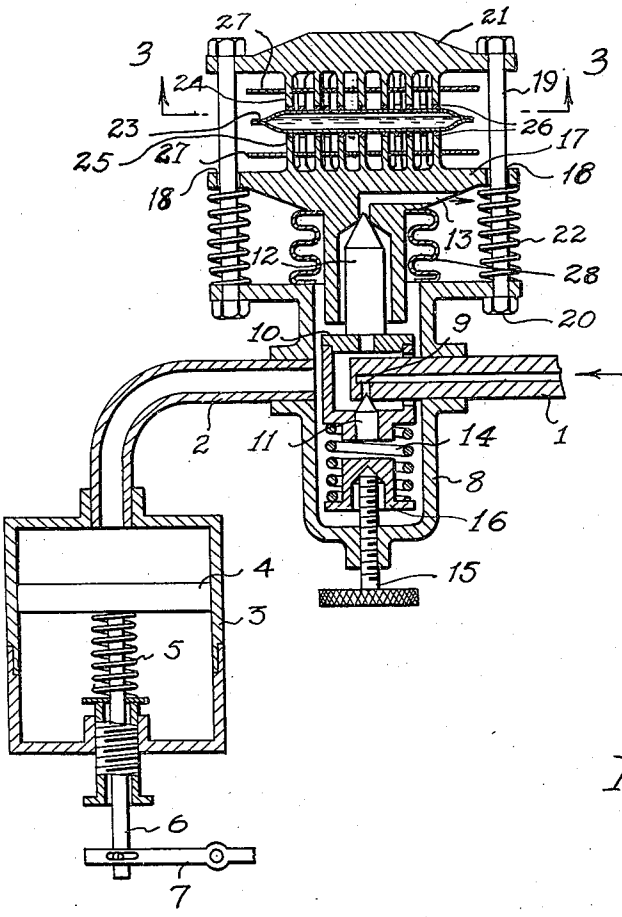


Fig. 1.

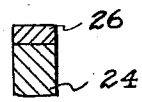


Fig. 4.

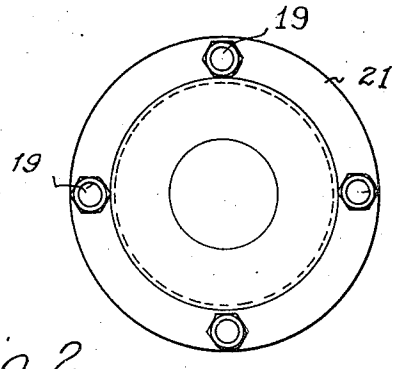


Fig. 2.

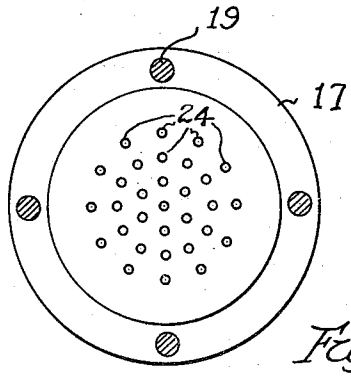


Fig. 3.

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CONTROL FOR THERMOSTATIC VALVES

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2 Claims. (Cl. 297—3)

This invention relates to thermostatically operated valves and more particularly to the thermostatic element therefor and its environment, and has for its object to provide a device of this kind of improved sensitiveness.

In large valves, such, for example, as are used for operating ventilation dampers for rail vehicles, the chamber containing the temperature responsive fluid as now constructed is usually of heavy construction which, because of its mass, causes an unduly long lag in the responsiveness of the fluid. It is highly desirable to reduce the lag to an absolute minimum in order that the thermostatic fluid will respond immediately to the temperature of the air or other surrounding medium to which it is exposed and which it is expected to control. It is, therefore, an object of this invention to provide a chamber which may be described as a separate capsule of thermostatic fluid together with assembly means for retaining the capsule in operative position of such construction as will provide a minimum heat path from the valve cage to the capsule.

More particularly it is an object to provide a thin-walled expansible capsule containing thermostatic fluid in combination with retaining means therefor against which said capsule reacts, said retaining means presenting a minimum surface to the capsule and being separated from direct contact therewith by pads having poor heat transmitting properties.

Another object is to provide means for supporting a thermostatic capsule in an air stream between two surfaces of substantial mass which comprises a multiplicity of fingers of thin cross-section in combination with air deflecting and heat blocking surfaces which restrict the capsule against contact by air which has contacted said surfaces.

Other objects and advantages will become more fully apparent as reference is had to the accompanying drawing wherein my invention is illustrated, and in which:

Fig. 1 is a vertical section through a thermostatically operated valve construction embodying my invention,

Fig. 2 is a top plan view thereof,

Fig. 3 is a horizontal section taken along the line 3—3 of Fig. 1 showing a capsule contacting member in plan view, and

Fig. 4 is an enlargened sectional detail of a plate projection with its insulating cap.

More particularly 1 indicates a fluid pressure line connected through a thermostat control valve device to a line 2 leading into a cylinder 3, which houses a piston 4. The piston is adapted to be moved in one direction by the pressure in the lines 1 and 2 and in the other direction by a spring 5. A piston rod 6 fixed to the piston is attached at its outer end to a lever 7 for operating a damper or any other suitable device or mechanism (not shown).

The control valve is composed of a housing 8 into the sidewalls of which the lines 1 and 2 are connected. The line 1 projects into this housing, is sealed at its end and has its outlet at 9 in the side thereof. A valve carrier 10 resides within the housing 8 and is equipped with one valve 11 for opening and closing the port 9 and another valve 12 for opening and closing an outlet passage 13 by which the interior of the housing 8 may be vented. A spring 14 urges the valves 11 and 12 toward their respective seats, the pressure exerted by the spring being adjustable by means of a manually operable screw 15 which extends through the housing 8 and which carries the spring base 16.

The passage 13 is formed in a movable member 17 having guide holes 18 for the insertion therethrough of guide rods 19 fixedly secured at one end 20 to the housing 8 and at their other end to a relatively stationary member 21. Springs 22 encircling the rods 19 urge the movable member 17 with its passage 13 away from the housing 8.

In order to flexibly seal the space between the member 17 and the housing 8 a bellows 28 is interposed whereby the member 17 may move as required by the expansion and contraction of a thin-walled metallic capsule 23. This capsule is filled with a suitable fluid, such as methyl chloride or butylene which boil under atmospheric pressures at 5° F. and 24° F., respectively, and which have, at ordinary atmospheric temperatures, vapor pressures which are substantially higher than atmospheric pressure and which vary considerably with changes in temperature. This capsule is contained between a multiplicity of elongated projections or fingers 24 and 25 arising from the opposed surfaces of the members 21 and 17, respectively, being separated from each thereof by small pads 26 of fiber, rubber or any other material having poor heat conducting properties. In Fig. 3 the large number and preferred orderly arrangement of the projections 24 is illustrated and it will be understood that there is a similar number of projections 25, similarly placed. The capsule 23 is held firmly against tne pads 26 by pressure of the springs 22 which constantly urge the member 17 toward the mem-

ber 21 so that any movement of the capsule, either of contraction or expansion, is immediately transmitted to the member 17 to cause movement thereof.

The fluid, usually air, to which the thermostatic element 26 is expected to respond flows in a direction from left to right or vice versa as viewed in Fig. 1. Two baffles, 27, preferably of thin material, pierced for the purpose are placed one over the projections 24 and the other over the projections 25 to reside in spaced relation between the capsule and the members 21 and 17. The same which contacts the surfaces of the members 21 and 27 cannot contact the capsule as the air directly contacting the capsule is restricted to that between the baffles 27.

What I claim is:

1. The combination in a thermostatically controlled device of two relatively movable members of substantial heat retaining qualities, an element responsive to changes in temperature of a flow of fluid therepast for moving said members relatively, a plurality of projections of small cross-section arising from said members as spacer means between said element and said members, said projections being regularly spaced and in the direct path of said fluid, and baffle means carried by the projections from both of said members intermediate their length for preventing contact with said element of fluid which has contacted either of said members.

2. The combination in a thermostatically controlled device of two relatively movable members of substantial heat retaining qualities, an element responsive to changes in temperature of a flow of fluid therepast for moving said members relatively, a plurality of projections of small cross-section arising from said members as spacer means between said element and said members, said projections being regularly spaced and in the direct path of said fluid, and baffle means carried by the projections from both of said members intermediate their length for preventing contact with said element of fluid which has contacted either of said members, each of said projections having a cap between its end and said element composed of material of relatively poor heat transmitting quality.

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