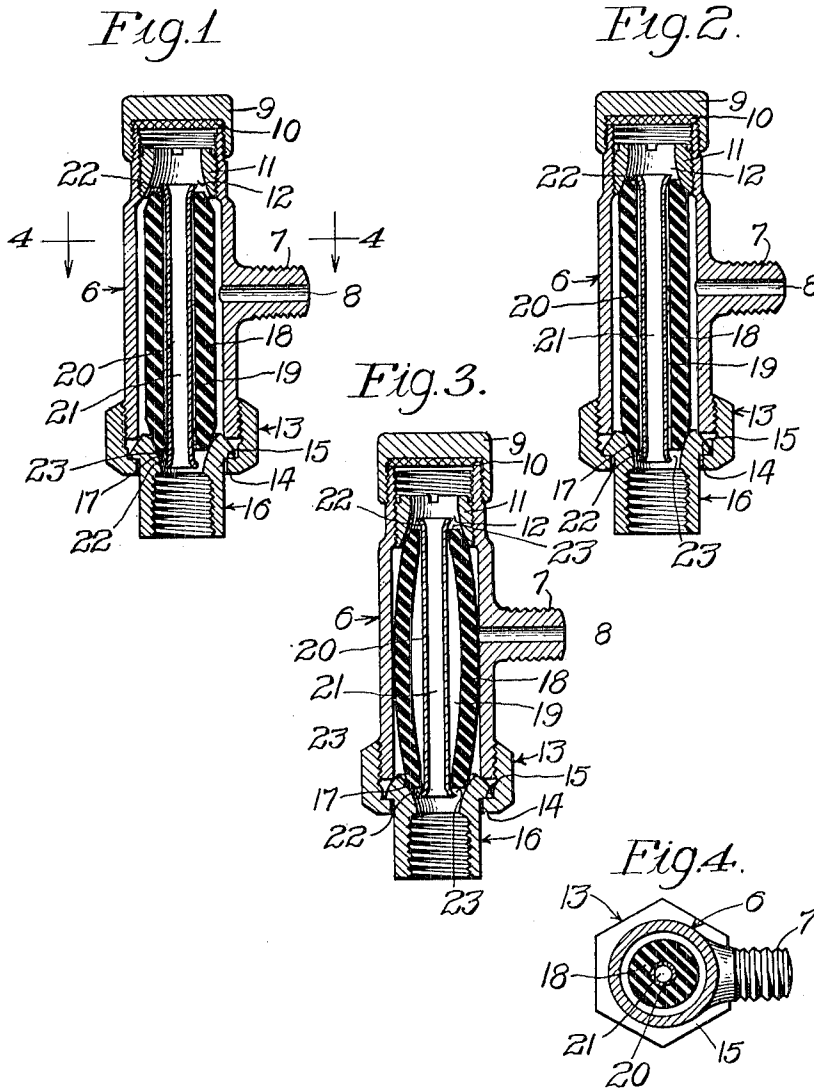


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THERMOSTATIC MEMBER FOR AIR VALVES FOR RADIATORS.
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To all whom it may concern:

Be it known that I, FRED W. LEUTHESSE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Thermostatic Members for Air-Valves for Radiators, of which the following is a specification.

The present invention relates to a construction of a thermostat member or vulcanite which is placed within the interior of an air valve and is expanded and contracted through the influence of steam or other heating medium entering said casing, and by such expansion and contraction serves to control the passage of air and steam through said valve casing.

The objects of the present invention are to provide the thermostatic member with a reinforcement in the nature of a metallic tube, which will be at all times free and loose with respect to said member whereby at all times relative movement between said member and tube is permitted; to so construct the member and reinforcement as to effect no change in the general construction and arrangement, or principle of operation of the expansible member; to utilize said reinforcing member to insure against the expansible member being rendered useless by reason of an abnormal expansion, or abnormal end pressure being placed upon the same.

The invention further consists in the features of construction and combination of parts hereinafter described and claimed.

In the drawings: Figure 1 is a vertical section of an air valve showing the vulcanite or expansible member of the present invention in normal condition for permitting discharge of air or steam through the valve casing from the interior of the radiator. Fig. 2 a view similar to Fig. 1, showing the expansible member lengthened or expanded to stop the discharge of air or steam through the valve casing; Fig. 3 a vertical section of an air valve with the expansible member or vulcanite of the present invention and illustrating the effect of the central guide or support of the present invention in permitting a free compression of the expansible member; and Fig. 4 a cross section on line 4-4 of Fig. 1 looking in the direction of the arrows.

It is a common and general practice in the construction of air valves for radiators to

use the expansible member for controlling the discharge of air from the radiator through the valve casing, and preventing the escape of steam from the radiator through the valve casing. These expansible members are formed of a composition or material which will expand under heat and contract under cold, and one type now used is a rubber composition vulcanized and termed a vulcanite. These vulcanites are of two well recognized forms, one having a solid body, and the other having an axial or central longitudinal bore or passage therethrough. These expansible members or vulcanites, no matter how made, are located within the shell of the air valve, either fixedly or loosely, and their upper ends are formed or arranged to co-act with an adjustable seat, usually a threaded plug, which may be formed with or without a vent passage therein, while their lower ends are mounted or held in various ways, some by a socket in the base of the shell, others by a short stud or tube fitting into the end of the expansible member lightly, and others by a central rod passing into or through the expansible member, longitudinally and snugly engaging with said member. Experience has proven that these vulcanites whether they are solid or of a bored formation, and mounted or held in any of the present well known methods, owing to the constant expansion and contraction in use, become broken, bent, bulged or destroyed, impairing the efficiency of the valve and destroying the capability of the expansible member for controlling the vent of the air and preventing the escape of steam. It has been sought to overcome this serious and objectionable defect found to exist in these expansible members in various ways, such as by inclosing the member in a sheave or sleeve of thin metal fixedly attached to the member, or a sleeve or tube entered into and fixedly attached to the member, or a tube or rod extending from end to end of the member and longitudinally and closely fitting into an axial bore in the member, but while these added supports or projections have been of more or less benefit they have not overcome the danger of the expansible member becoming useless by breaking, bulging, or bending, because of distortion or disruption arising from improper adjustment or an abnormal increase of heat.

The purpose of the present invention is to

construct an expansible member or vulcanite which will overcome the defects and deficiencies of such members as have hitherto existed in prior constructions, and which will practically eliminate any ill effects from over expansion or improper adjustment whereby a bending, bulging or curving of the member by an excess of pressure thereon will be eliminated and whereby the expansible member or vulcanite will return to its normal straight condition after being bent, bulged or curved outward, and which will eliminate to all practical purposes the danger of a distortion of the expansible member in use, by maintaining such member in a condition to insure its return to normal shape in contracting after its expansion.

The invention consists in mounting the expansible member or vulcanite on a center guide or support extending from end to end of the expansible member and out of contact therewith and of a greater length than the member or vulcanite, with the ends of the guides or support outflared, or otherwise enlarged so as to have a clearance between the end of the expansible member and the metal guide or support, whereby the expansible member can lengthen for seating purposes, without engaging with the ends of the guide or support, thus leaving the guide or support normal where it will serve its purpose of maintaining the expansible member or vulcanite in proper operative condition, and owing to its freedom from the expansible member, this guide or support is not affected by an over expansion of the expansible member with the result that should such over expansion bend, bulge, or curve, the expansible member, the metal guide or stem will serve to force the expansible member as it cools and contracts, back to its straight, normal, operative condition, which would not be the case if the expansible member and the metal guide or support were not free of one another with a clearance for the endwise expansion of the expansible member independent of the metal guide or support.

The air valve with which the present invention is illustrated is as to all of its parts of a well known form of construction, said construction as illustrated consists of an outer shell or casing 6 having a lateral nipple 7 provided with an exterior thread and a lateral passage 8, said thread being provided for attaching the valve to the radiator. The upper end of the shell or casing has an exterior and an interior threaded surface; the exterior surface receiving a cap or closure 9 provided with a packing 10, and the interior thread receiving an adjustable ring plug 11 with an interior face 12 for the upper seating end of an expansible member of vulcanite. The lower end of the shell

or casing has an exterior thread which receives a coupling or ring nut 13 having an inner flange 14 that engages a shoulder 15 on a tail piece 16 to which is connected the return air pipe of the system, not shown, and as illustrated, the upper end of the tail piece 16 has an interior bearing or seating face 17 for the lower end of the expansible member or vulcanite. The valve shown is of the type designed for use with what is known as the air line steam heating system and the parts above described can be of any usual and well known form of construction adapted for use with systems of this type.

The gist of the present invention lies in the construction of the expansible member. This expansible member is indicated by the numeral 18, and as shown is provided with a central longitudinal bore 19, through which passes a central guide or support 20, which as shown is in the form of a metallic tube having a longitudinal or axial passage 21, for discharge of the air when the expansible member or vulcanite is not engaged with the upper bearing or seating face 12 of the adjustable member or plug 11. The center guide or support 20 is of less diameter than the bore 19 of the expansible member or vulcanite 18, so as to leave a definite, perfect and free clearance between the exterior of the guide or support and the interior of the expansible member, giving the member perfect freedom in expanding and contracting without affecting the guide or support. This guide or support 20 is of greater length than the normal length of the expansible member 18, and as shown said support and expansible member are prevented from becoming displaced by outflaring or upsetting the ends of the guide or support so as to furnish an upper and lower flange 22 which prevents such separation. The excess of the guide is such as to leave a space 23 between the ends of the expansible member and the retaining ends 22 of the guide or support even when the expansible member is distended, to permit the necessary lengthening or expanding of the expansible member for seating purpose, without deflecting or bending the guide or support from its normal straight condition.

In the ordinary type of expansible member, in case of an excess of end pressure thereon, either from an over adjustment of the upper seat for the member, or by an over expansion of the expansible member itself, a bending or curving of the member is produced, which prevents a return of the member to straight normal condition thus interfering with and impairing the perfect operation of the valve, and it has been found in practice, that this bending or curving of the expansible member occurs, even where a metal shield is attached around the member or a metal center is provided to which

the expansible member is secured, as the bending or curving effect is transmitted to the attached metal shield or center, bending or curving such part, which owing to its rigidity will resist any tendency which the expansible member or vulcanite might have, to return to its normal straight condition and if no guide is afforded the expansible member will not return in true form, so that it will fail to properly locate itself as respects its seating surfaces, and will thus fail to perform its functions of controlling passage of air and steam through the casing of the valve.

The benefits and advantages of the special construction of the expansible member or vulcanite forming the gist of the present invention, and the manner in which the danger and liability of bending or curving the expansible member is overcome, will be understood by referring to Fig. 3. In this figure it will be seen that the center guide or support has no fixed attachment or close connection with the expansible member or vulcanite. Any excess of end pressure on the member will cause the member to bulge by direct action, as shown in Fig. 3, and this bulging is not imparted to the guide or support owing to the clearance between the member or vulcanite and the ends and sides of the guide or support, but is received wholly by the expansible member resulting in an endwise compression thereof, and inasmuch as the member or vulcanite cannot curve or bend laterally to one side it spreads or bulges laterally in all directions. This spreading or bulging does not distort or disturb the central guide or support 20, so that on the removal of the end pressure, the member or vulcanite is free to return naturally to its normal condition as shown in Fig. 1, because of its freedom from the central guide, and at the same time it must follow the straight line of the guide in assuming its normal shape and condition. To summarize, the benefits and advantages of the expansible member or vulcanite of the present invention are: perfect freedom between the member and the guide or support, or ability of the member to lengthen or expand for seating purposes without affecting the guide; transmission of end pressure directly and wholly on the member or vulcanite, causing the member or vulcanite to spread or bulge laterally, instead of bending sideways or curving; furnishing a guide by means of which the member or vulcanite when spread or bulged must return to its normal condition, when the end pressure is removed, leaving the guide or support and the expansible member free from each other, each serving its purpose without being affected by the presence of the other and insuring a positive and efficient operation of the expansible member or vulcanite, and

overcoming the danger and liability of injurious bending or curving. These advantages and benefits are due to the free movement permitted the expansible member by reason of the clearance between the expansible member and the guide or support, and leaving the guide or support in its normal straight form and condition under all circumstances.

It is to be noted that the principle of construction of the expansible member or vulcanite is not confined to the use of valves as herein described, but is adapted for use with any form or style of valve which might be deemed practicable.

I claim:

1. In an air valve for radiators, an outer casing, an expansible valve member within the casing, an upper seat in the casing for the expansible valve member, a lower seat in the casing for the expansible valve member, said valve member being located between the upper and lower seats, said valve member consisting of an outer section of expansible material, and an inner section of rigid material, non-separable from one another and loosely held with respect to one another, and having a sidewise clearance and an endwise clearance therebetween, said outer section and inner section being unattached as respects said seats, substantially as described.

2. In an air valve for radiators, an outer casing, an expansible valve member within the outer casing, an adjustable lower seat in the casing for the expansible valve member, said member being located between the upper seat and the lower seat, said member consisting of an outer section of expansible material, and an inner tubular section of rigid material, loosely held with respect to one another, and non-separable from one another, and provided with a sidewise clearance and an endwise clearance between the two sections, said outer section and inner section being unattached as respects said seats, substantially as described.

3. As a new article of manufacture, a valve member for air valves for radiators consisting of an outer section of expansible material and an inner rigid section in the form of a metal tube serving as a guide and support for the outer expansible section, the two sections being loosely engaged and having a sidewise clearance and an endwise clearance therebetween, and means adjacent the ends of the inner section for preventing endwise separation between the sections, the ends of the inner section extending beyond the end of the outer section, and said outer section having a free movement between the means preventing endwise separation of the sections, substantially as described.

4. As a new article of manufacture, a valve member for air valves for radiators

consisting of an outer section of expansible material and an inner rigid section of metal tubing serving as a guide support for the outer section, said tubing having its ends upset for loosely retaining the two sections in place with a sidewise clearance and an endwise clearance between the two sections, the ends of the inner section extending beyond the ends of the outer section, and said outer section having free movement between the upset ends of the inner section, substantially as described.

5. As a new article of manufacture, an expansible valve member for air valves for radiators consisting of an outer section of expansible material and an inner section of

rigid material of greater length than the outer section and extending at each end beyond the ends of the outer section, the two sections being loosely held one with respect to the other with a sidewise clearance and an endwise clearance between the two, and means adjacent the ends of the inner section for preventing endwise separation between the two sections, and said outer section having free movement between the means preventing endwise separation, substantially as described.

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