Dec. 9, 1930. J. V. GIESLER 1,784,058

THERMOSTAT SUPPORT

Filed Oct. 30, 1926

Fig. 1.

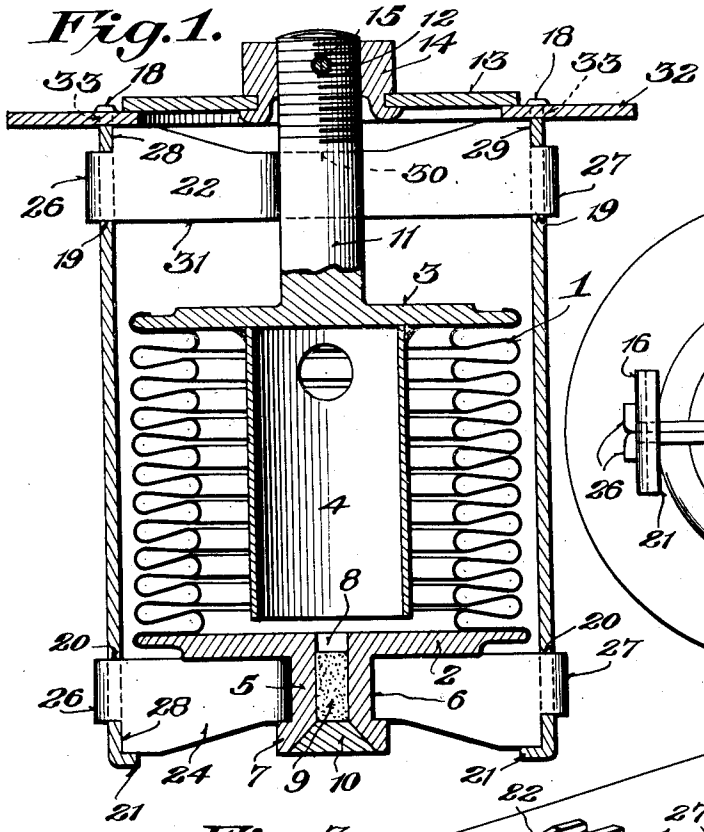


Fig. 2.

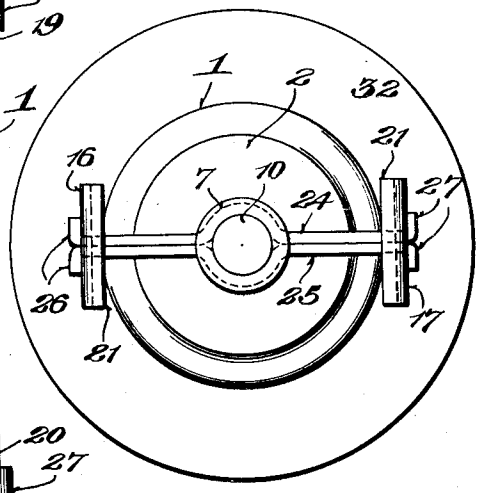
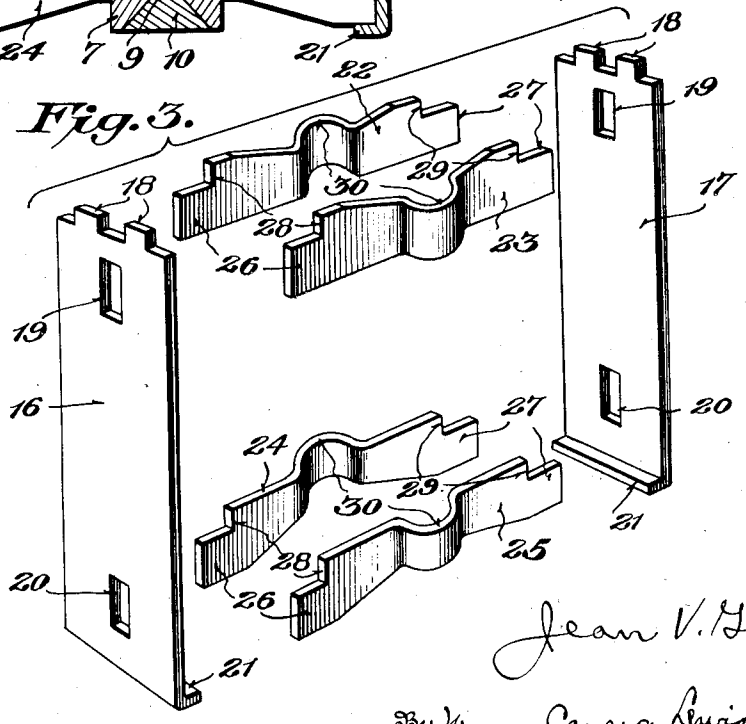


Fig. 3.



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UNITED STATES PATENT OFFICE

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THERMOSTAT SUPPORT

Application filed October 30, 1926. Serial No. 145,347.

This invention relates to thermostat supports, particularly supports for thermostats of the character used in thermostatically operated valve mechanism for controlling the quantity or path of circulation or flow of cooling medium in the cooling systems of internal combustion engines.

It is an object of this invention to provide a thermostat support of simplified construction so that the same may be inexpensively manufactured and assembled.

Another object of this invention is to provide a thermostat support which is composed of a few simple parts which may be readily blanked out of and bent up from sheet metal and which is comparatively light and yet strong and rigid.

Another object of this invention is to provide a thermostat support which employs a number of duplicate pieces so as to reduce the number of blanking and shaping dies required.

Another object of this invention is to provide a device of the character described which rigidly retains the stationary end of the thermostat in fixed position; which acts as a guide for the movable end of the thermostat, and may also act as a stop therefor; and which may be readily and securely attached in operative relation to the element or elements with which the support and thermostat are to be assembled.

Other objects of the invention will appear as the description of the invention proceeds.

The invention is capable of receiving a variety of mechanical expressions, one of which is shown on the accompanying drawing, but it is to be expressly understood that the drawing is for purposes of illustration only and is not to be construed as a definition of the limits of the invention, reference being had to the appended claims for that purpose.

Referring in detail to the drawing wherein the same reference characters are employed to designate corresponding parts in the several figures.

Fig. 1 is an enlarged axial section through a thermostatically operated valve mechanism embodying the present invention.

Fig. 2 is a bottom plan view thereof, and Fig. 3 is a perspective of the component elements of the support spaced apart but in their proper relative positions.

Referring to Fig. 1, a thermostat 1 having a deeply corrugated, highly flexible expansible and collapsible tubular metal wall, preferably of resilient metal, is illustrated as typical of any suitable thermostat to be supported. As here shown, said corrugated tubular wall is attached in any suitable way, as by brazing, to a stationary end wall 2 and a movable end wall 3. A tubular stop 4 is shown as mounted on said movable end wall 3, and may be formed integral with said wall or may be formed separately and suitably attached thereto, as by solder. The stationary end wall 2 is shown as provided with a boss 5 reduced in diameter as shown at 6 for a portion of its length and thereby provided with a head 7. The filling opening 8 for the thermostat may be provided through said boss 5 and said opening is shown as sealed with a stopper 9 and solder 10. It is to be understood that a suitable thermosensitive fluid is sealed within the closed vessel constituted by the end walls 2 and 3 and the connecting corrugated wall to the end that said vessel may be expanded and contracted under the influence of predetermined temperature changes. It is also to be expressly understood that the thermostat may be possessed of any suitable characteristics; for example, it may be charged with a thermosensitive fluid at a pressure below atmospheric, at normal temperature, so that at temperatures below that at which the thermostat is designed to operate, there will be an unbalanced excess pressure acting on the exterior of the thermostat tending to collapse the same. As the details of the thermostat constitute no part of the present invention and as a thermostat of any suitable construction and possessed of any suitable characteristics may be employed, further description of the thermostat itself is believed to be unnecessary.

The thermostat is operatively connected to means to be controlled of any suitable character. In the form shown the movable end wall 3 is provided with a stem 11, in-

tegral therewith or suitably attached thereto, said stem being threaded at its outer end, as shown at 12, to receive a valve member. Said valve member may be of any suitable construction, being shown as composed of an annular disk 13 which carries a centrally arranged, interiorly threaded hub 14 suitably secured to the disk 13. The valve member thereby provided is illustrated as locked to the valve stem 11 by a cotter pin 15. Although the thermostat is here shown as operatively connected to a valve member, and the invention is of particular utility when embodied in a thermostatically operated valve machanism of the type employed in controlling the circulation of the cooling medium in the cooling systems of internal combustion engines, it is to be expressly understood that the invention is not restricted to a structure of this character.

In conformity with the present invention a thermostat support is provided which is composed of a few simple parts which may be readily blanked out of sheet metal and bent into the desired form, said parts being preferably formed from duplicate blanks so as to reduce the number of blanking dies required, and said blanks being of such a character as to minimize the amount of scrap from the blanking operations, so that the component parts of the support may be economically formed from sheet stock and shaped and assembled with a minimum of labor.

While within the broader aspects of this invention the component parts of the support may take a variety of forms, the preferred construction is illustrated in Fig. 3 wherein the support is shown as composed of six members which may be formed by the use of two blanking dies. Two of said members 16 and 17 are duplicates and constitute the longitudinally extending lateral members of the support. Said members take the form of rectangular blanks which may be provided at one end with one or more tabs 18 to constitute an attaching means to be described. Each blank is also provided with a pair of suitably spaced and shaped apertures 19 and 20 for the attachment of the transverse members to be described, and may also be provided, although not necessarily, with a right angularly directed flange 21 at the end opposite the tabs 18, so as to provide a narrow inwardly directed ledge for a purpose to be described.

The transverse members of the support are composed of four duplicate blanks 22, 23, 24 and 25, each of which may be of generally rectangular configuration, although shown as somewhat reduced in width at their medial portions, and each provided at its opposite ends with tabs 26 and 27 which provide shoulders 28 and 29 at the junction of said tabs with the body portion of said blank, although, if desired, said tabs may be as wide as said body portion. Said tabs 26 and 27 are entered into the apertures 19 and 20 in the lateral members 16 and 17 until said shoulders 28 and 29 contact the inner faces of said lateral members, in which position said tabs may be secured in any suitable way, as by bending said tabs over against the outer faces of the lateral members, or by solder, or both. Each of said members 22, 23, 24 and 25 is provided intermediate its length with a generally semi-circular bend 30, so that when a pair of said transverse members are assembled in opposed relationship with their inner faces in contact, a pair of opposed curved portions 30 will, in one case, form a tubular portion of such size as to embrace and guide the stem 11 and, in the other case, form a tubular portion of such size as to closely embrace the portion 6 of the boss 5. In the latter case the width of the transverse members at the bent portions 30 also conforms with the length of said reduced portion 6, so that said bent portions 30 also interlock with the boss 5 between the stationary end wall 2 and the head 7 and thereby prevent displacement of the end wall 2. In order that all four of said members 22, 23, 24 and 25 may be duplicates, the stem 11 and the reduced portion 6 of boss 5 are preferably made of substantially the same diameter, so that all of the curved portions 30 may be made of the same curvature, and the blanks otherwise are made of the same size and shape, although, if preferred, blanks which are not duplicates may be used.

When the lateral members 16 and 17 are provided with flanges 21, the apertures 20 are so disposed with respect to the flanges 21 that when the members 24 and 25 have their tabs 26 and 27 inserted into said apertures 20, said members 24 and 25 seat on said ledges 21 as shown in Fig. 1. The apertures 19 and 20 in each of the lateral members 16 and 17 are so disposed, by preference, that when the thermostat is assembled with the members of the support, the inner face 31 of the combined member 22, 23 will constitute a stop for engagement with the movable end wall 3 of the thermostat, or some suitable element carried thereby or by the stem 11, to limit the expansive movement of the thermostat. The contractive movement of the thermostat is limited by the valve disk 13, when in position, or by the tubular stop 4 when the valve disk is not in position, but in place of the latter a suitable stop may be provided on the stem 11 for coaction with the combined member 22, 23 to limit the contractive movement of the thermostat.

In assembling a support of the character described with a thermostat, two pairs of members 22, 23 and 24, 25 are positioned on opposite sides of the stem 11 and the boss 5, each pair of members contacting in a plane

which includes the axis of the member embraced. Said pairs may be secured together in this position, as by rivets or screws, if desired, but this is unnecessary in view of the fact that said members are to be secured together in their proper position when assembled with the lateral members 16 and 17. The lateral members 16 and 17 are then engaged with the two combined transverse members 22, 23 and 24, 25 with the tabs 26 and 27 inserted into the apertures 19 and 20 until the lateral members 16 and 17 contact the shoulders 28 and 29. In this position said tabs 26 and 27 are secured in the apertures 19 and 20 as by bending over said tabs, or soldering the tabs in said apertures, or by both bending and soldering. When so assembled the lateral members 16 and 17 constitute with the transverse members 22, 23 and 24, 25 a rigid frame of generally rectangular formation, the combined transverse member 24, 25 embracing the reduced portion 6 of the boss 5 between the stationary end wall 2 and the head 7 so as to interlock with the boss 5, and the combined transverse member 22, 23 embracing and forming a guide for the stem 11 and, if desired, being so related to the movable end wall 3 as to afford a stop for properly limiting the expansive movement of the thermostat.

The support so constructed may then be mounted on a suitable element by inserting the tabs 18 into suitable apertures provided in such element. In the form shown in Fig. 1, a valve seat 32 is provided with suitable apertures 33 to receive the tabs 18, in which position they may be secured by bending over said tabs or by solder or by both. As shown in Fig. 1 the apertures 19 may be so disposed with respect to the adjacent ends of the lateral members 16 and 17 that when the support is assembled with the element 32 said element engages the side of the combined transverse member 22, 23 adjacent its ends, analogously as the flanges 21 engage the side of the combined transverse member 24, 25 adjacent its end. Although this contact with the sides of the transverse combined members is not necessary, the illustrated arrangement increases the rigidity and strength of the structure.

The present invention also embraces a novel construction of valve member whereby the same is rendered resiliently deformable to accurately seat itself notwithstanding irregularities in the valve seat or the valve member or both, and thereby eliminates the necessity of grinding the valve seat in order to avoid leakage.

Heretofore thermostatically operated valve members have been made of relatively rigid construction and the accurate seating of the valve member has been dependent upon the machining of the coacting parts. In conformity with the present invention the valve member is made of resilient material so that it is readily deformable under the load imposed by the thermostat thereon when said valve member is drawn against the valve seat. In the form shown the valve member 13 includes a flat thin disk of any suitable metal, such as spring bronze or spring brass of the proper thickness, so that it will be deformable under the contractive effort of the thermostat when the latter engages the valve member with its seat.

While the valve member has been shown as constructed in conformity with the disclosure of the joint application of Jean V. Giesler, William W. Carson, Jr., and Thomas R. Clark, Serial No. 145,343, filed October 30, 1926, and entitled Thermostatically controlled valve mechanism, it is to be expressly understood that the invention is not restricted thereto as the valve member may be of any suitable construction. While this feature of the invention has been disclosed only in conjunction with thermostatically operated valves for use in connection with devices for controlling the circulation of a cooling medium through the cooling system of an internal combustion engine, it is to be expressly understood that the invention is of a broader application.

It will therefore be perceived that a simple thermostat support has been provided which is composed of a few simple elements which may be easily blanked out of and bent up from sheet metal. Moreover, the lateral members 16 and 17 are of the same size and shape and symmetrical about a longitudinal axis and the transverse members 22, 23, 24 and 25 are of the same size and shape and symmetrical about a medial transverse axis, so that all of said blanks may be formed by the use of only two dies, although it is to be expressly understood that non-duplicate lateral and transverse members may be employed, if desired. Thus, while it is preferred to employ transverse members which have equally bent or curved portions intermediate their length, such is not essential, as the requisite curvature for embracing the elements on the thermostat may be provided in only one of the sections of each transverse member, the other section bridging the curved portion and forming the tubular sections to embrace the valve stem or the boss 5, or the sections may have unequally curved portions. The character of blanks illustrated permits an economical use of sheet stock, because there is little waste, and the support may be easily and inexpensively assembled. Although light and simple in construction, the support is strong and rigid, and fixedly retains one end of the thermostat in position by interlocking with its stationary end wall while at the same time positively guiding, and if desired, limiting the movements of the movable end of the thermostat.

Therefore, a support of this character may be easily standardized and turned out in large quantities with a minimum cost.

While it is preferred to form the component parts of the support of sheet metal, it is to be understood that such is not essential. While only two lateral members have been shown, the present invention contemplates that three or more lateral members may be employed, and preferably equally spaced around a central axis, said lateral members being connected into a unit by transverse members suitably shaped intermediate their length to embrace the valve stem and boss 5 when the sections of the transverse members are assembled with the lateral members.

While the embodiment of the invention illustrated on the drawing has been described with considerable particularity, it is to expressly understood that the invention is not restricted thereto as the same is capable of receiving a variety of mechanical expressions, some of which will now readily suggest themselves to those skilled in the art, while changes may be made in the details of construction, arrangement and proportion of parts without departing from the spirit of this invention. Reference is therefore to be had to the appended claims for a definition of the limits of the present invention.

What is claimed is:

1. A thermostat support composed of longitudinally extending lateral members and a plurality of transverse members connecting said lateral members and each composed of sections secured together by their connection to said lateral members.

2. A thermostat support composed of longitudinally extending lateral members each provided with spaced apertures and transverse members provided at each end with tabs which are secured in the apertures of said lateral members.

3. A thermostat support composed of longitudinally extending lateral members and a plurality of transverse members secured thereto, one of said transverse members being shaped intermediate its length to interlock with a thermostat and fixedly retain the same in position.

4. A thermostat support composed of longitudinally extending lateral members and a plurality of transverse members secured thereto, one of said transverse members being formed intermediate its length to guide the movement of the thermostat.

5. A thermostat support composed of longitudinally extending lateral members and a plurality of transverse members secured thereto, one of said transverse members being formed to constitute a stop for the thermostat.

6. A thermostat support composed of longitudinally extending lateral members each provided with a flange at one end and transverse members connecting said lateral members, one of said transverse members being seated on the flanges of said lateral members.

7. A thermostat support composed of longitudinally extending lateral members provided with tabs at one end and a plurality of transverse members extending between and connected to said lateral members.

8. A thermostat support composed of longitudinally extending lateral members provided with tabs at one end for securing the support to a supporting element, and transverse members extending between and connected to said lateral members, the transverse member adjacent said tabs being adapted to seat on the supporting element to which said tabs are secured.

9. A thermostat support composed of a pair of longitudinally extending lateral members and four members arranged in pairs transversely between and fastened together by said lateral members.

10. A thermostat support composed of a pair of longitudinally extending lateral members and four members arranged in pairs transversely between said lateral members, each of said transverse members being provided with end tabs engaged in apertures in said lateral members.

11. A thermostat support composed of a pair of longitudinally extending lateral members and four members arranged in pairs transversely between said lateral members, each of said transverse members being curved intermediate its length whereby each pair of transverse members forms a tubular portion.

12. A thermostat support composed of a pair of longitudinally extending lateral members provided with apertures and four members arranged in pairs transversely between said lateral members, each of said transverse members being provided with end tabs and shoulders adjacent thereto whereby said lateral members are rigidly locked in spaced relation against said shoulders by the engagement of said end tabs in said apertures.

13. A thermostat support composed of duplicate longitudinally extending lateral members and duplicate transverse members connecting said lateral members and each composed of duplicate sections forming tubular portions adapted to embrace elements on the thermostat.

14. In combination with a thermostat having movable and stationary end walls, a support for said thermostat formed of sheet metal and composed of longitudinally extending lateral members provided with apertures and opposed sectional transverse members fastened in the apertures of said lateral members at opposite ends of the thermostat, one of said transverse members constituting a fixed abutment for the thermostat, and the other of said transverse members being so dis-

posed with respect to said first named transverse member as to predeterminately limit the expansive movement of the thermostat.

15. In combination with a thermostat having movable and stationary end walls, a support for said thermostat formed of sheet metal and composed of longitudinally extending lateral members and opposed transverse members attached to said lateral members at opposite ends of the thermostat, each of said transverse members being provided with tabs engaged in apertures in said lateral members.

16. In combination with a thermostat having movable and stationary end walls, a support for said thermostat formed of sheet metal and composed of longitudinally extending lateral members and opposed transverse members attached to said lateral members at opposite ends of the thermostat, each of said transverse members being provided with tabs and spaced shoulders whereby said tabs engage in apertures in said lateral members and space said lateral members by their engagement with said shoulders.

17. In combination with a thermostat having movable and stationary end walls, a support for said thermostat formed of sheet metal and composed of longitudinally extending lateral members and opposed transverse members attached to said lateral members at opposite ends of the thermostat, each of said transverse members being formed of sheet-metal sections bent to shape and assembled to embrace elements on said stationary and movable end walls.

18. In combination with a thermostat having movable and stationary end walls, a support for said thermostat formed of sheet metal and composed of longitudinally extending lateral members and opposed transverse members fastened to said lateral members at opposite ends of the thermostat, each of said lateral members being provided with tabs, and a valve seat ring provided with apertures in which said tabs are secured.

19. In combination with a thermostat having movable and stationary end walls, a support for said thermostat formed of sheet metal and composed of longitudinally extending lateral members provided with apertures and sectional transverse members fastened in the apertures of said lateral members at the opposite ends of the thermostat, one of said transverse members being formed to constitute a guide for the movements of the thermostat.

In testimony whereof I have signed this specification.

JEAN V. GIESLER.