Aug. 29, 1933. C. E. McGREGOR 1,924,647

THERMOSTAT

Filed Feb. 14, 1931

FIG. I.

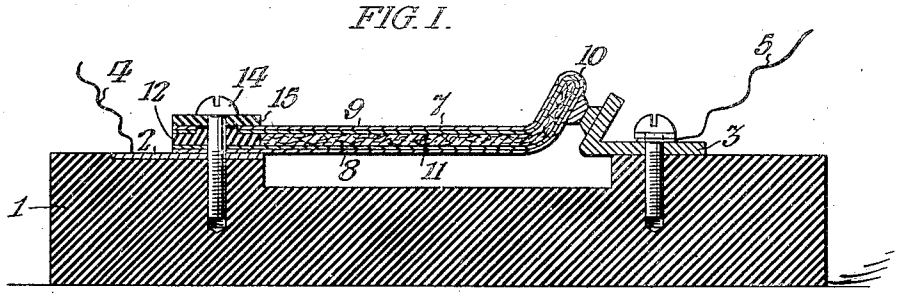
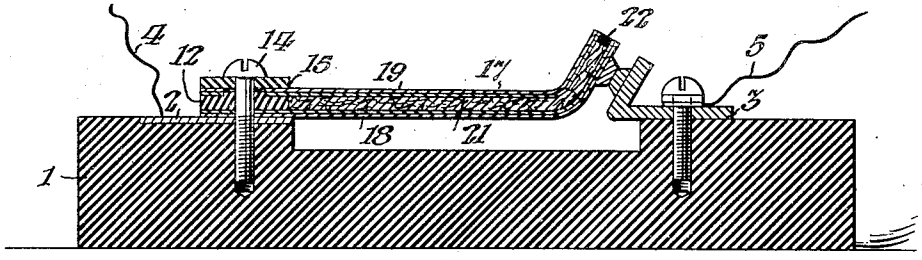


FIG. II.



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THERMOSTAT

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6 Claims. (Cl. 200—113)

My invention relates to thermostats wherein the thermally movable element is a bimetallic strip. Ordinarily, thermostats of that class are affected by ambient temperatures and, if said movable element is either directly or indirectly connected with an electric switch, changes in the ambient temperatures effect such movement of the strip as to vary the electrical connection causing changes in resistance and sparking if the connection is broken. For instance, it is desirable to control an electric motor actuating a pump in liquid dispensing apparatus embodied in curb stands for dispensation of gasolene, by means of a thermostatic switch which will break the circuit of the pump if it is subjected to any abnormal current which might be destructive to the apparatus or ignite any fumes of gasolene in the curb stand casing in which the switch is located. The confined atmosphere in such a casing becomes abnormally hot whenever the casing is subjected to direct sunlight and in such an embodiment an ordinary bimetallic single strip thermostat is a constant source of trouble because of its movement in correspondence with the changes in the ambient atmosphere.

Therefore, it is the purpose and effect of my invention to so construct and arrange a bimetallic thermostatic element that it is not affected by ambient temperatures and therefore may be used as a switch member to directly transmit an electric current regardless of the ambient temperatures to which it is subjected and subject only to movement in accordance with the heat imparted to it by the electric current.

As hereinafter described, my improved thermostatic element includes two similar bimetallic members disposed in opposition to each other and preferably with heat refractory material between them serving to insulate them from each other so that the stresses upon the assemblage incident to the ambient temperatures are counterbalanced so that the thermostatic element remains stationary as a whole despite extreme fluctuations in the ambient temperatures.

My invention includes the various novel features of construction and arrangement hereinafter more definitely specified.

In said drawing; Fig. I is a longitudinal sectional view of an electric switch including a convenient embodiment of my invention, wherein the two thermostatic strip members which are opposed to each other are connected in unitary relation by a bight at one end of the movable switch member.

Fig. II is a sectional view of an electric switch, similar to Fig. I, but wherein the opposed thermostatic strip members are separate from each other.

Referring to the form of my invention shown in Fig. I, the insulating base 1 supports the terminals 2 and 3 of an electric circuit comprising the conductors 4 and 5. Said terminals 2 and 3 are normally bridged and the circuit closed by the movable switch member 7 which is rigidly connected at one end with the terminal 2 and movable to and from contact with the terminal 3 at its opposite end.

As shown in Fig. I, said movable switch member 7 includes opposed bimetallic strip members 8 and 9 which are connected in unitary relation at one end of said member 7 by the bight 10, and said members 8 and 9 are separated by the heat refractory material 11 which may be a composition including asbestos, or any other material adapted to prevent or retard the transmission of heat between said members 8 and 9. The ends of said members 8 and 9 adjacent to the terminal 2 are electrically insulated from each other, conveniently by the washer 12 which surrounds the screw 14, extending in threaded engagement with said base 1 and by which said thermostatic member 8 is clamped in electrical connection with said terminal 2; said screw being electrically insulated from the thermostatic member 9 by the insulating washer 15.

As indicated in Fig. I, said thermostatic members 8 and 9 each include two laminæ, the outer one of which has a greater coefficient of expansion than the inner one. Consequently, increment in temperature of the ambient atmosphere tends to bend the thermostatic member 8 upward and the thermostatic member 9 downward, and those stresses neutralize each other, leaving the switch member 7 continually immovable by such changes of temperature. However, if and when the circuit 4, 5, is electrically energized, the member 8 forms part of the circuit but the member 9 does not, and, consequently, the member 8 is heated by the electric current to a greater degree than the member 9 and bends upward carrying the member 9 with it to break the connection between the switch member 7 and the terminal 3 and thus open the circuit whenever the temperature for which the device is calibrated is attained. Such calibration may be effected by primarily bending the switch member 7 so that in the position shown, it contacts with the terminal 3 with more or less pressure. Of course, the greater such initial pressure of contact, the greater increment of temperature is required to counterbalance it and effect the opening movement of the switch.

The form of my invention shown in Fig. I is advantageous in that the bight 10 holds the several parts of the switch member 7 together. However, that form of thermostatic element is more costly to manufacture than a form in which the opposed thermostatic members are formed of different pieces of bimetallic metal, as in Fig. II wherein the switch member 17 is similar to the switch member 7 except that the opposed thermostatic members 18 and 19 are formed of separate pieces of bimetallic metal of which the outer lamination of each has a greater coefficient of expansion than the inner lamination. However, it is to be understood that the form of my invention shown in Fig. II is operative in substantially the same manner as the form of my invention shown in Fig. I.

Although I prefer to interpose heat insulating material between the opposed thermostatic members, as indicated at 11 in Fig. I and at 21 in Fig. II; such material may be entirely omitted from both forms of my invention and, in the form of my invention shown in Fig. II, the thermostatic members 18 and 19 may be mechanically connected by the member 22 to transmit mechanical stresses between them induced by changes in the ambient atmosphere.

Therefore, I do not desire to limit myself to the precise details of construction and arrangement herein set forth, as it is obvious that various modifications may be made therein without departing from the essential features of my invention, as defined in the appended claims.

I claim:

1. In a thermostat, the combination with opposed bimetallic members, each including two laminæ of metals having different coefficients of expansion under changes of temperature; of means supporting said members at one end thereof in spaced relation, with their laminæ having the same coefficient of expansion toward each other; and means mechanically connecting the opposite ends of said members; whereby bending stresses induced in said members by ambient temperatures counteract each other and tend to hold said thermostat stationary, and said thermostat is movable solely by internal changes of temperature.

2. A structure as in claim 1; wherein said members are connected in unitary relation by a bight at the end thereof remote from said supporting means.

3. A structure as in claim 1; wherein said members are in close parallel spaced relation, and a heat insulating material is interposed between them.

4. A structure as in claim 1; wherein said members are connected in unitary relation by a bight at the end thereof remote from said supporting means; and heat insulating material is interposed between said members and is held in said bight.

5. A structure as in claim 1; wherein the support includes means for electrically insulating the supported ends of said members from each other.

6. A thermostat structure as in claim 1; wherein the support includes means for electrically insulating the supported ends of said members from each other; and an electric terminal in electrical connection with one of said members at the supported end thereof; and another electric terminal normally in separable electrical connection with the opposite end of the member connected with said first terminal; whereby said structure is responsive to changes of temperature induced in said electrically connected member by electric energy to bend both of said thermostatic members out of contact with the second terminal at a temperature predetermined by the construction and arrangement of said members; said structure being returned to its contact relation to close the circuit when said temperature induced by the electric current falls below a predetermined degree; whereby said structure is solely movable by changes in temperature thereof independent of changes in temperature of the ambient atmosphere.

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