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THERMOSTATIC SIGNAL OPERATING DEVICE

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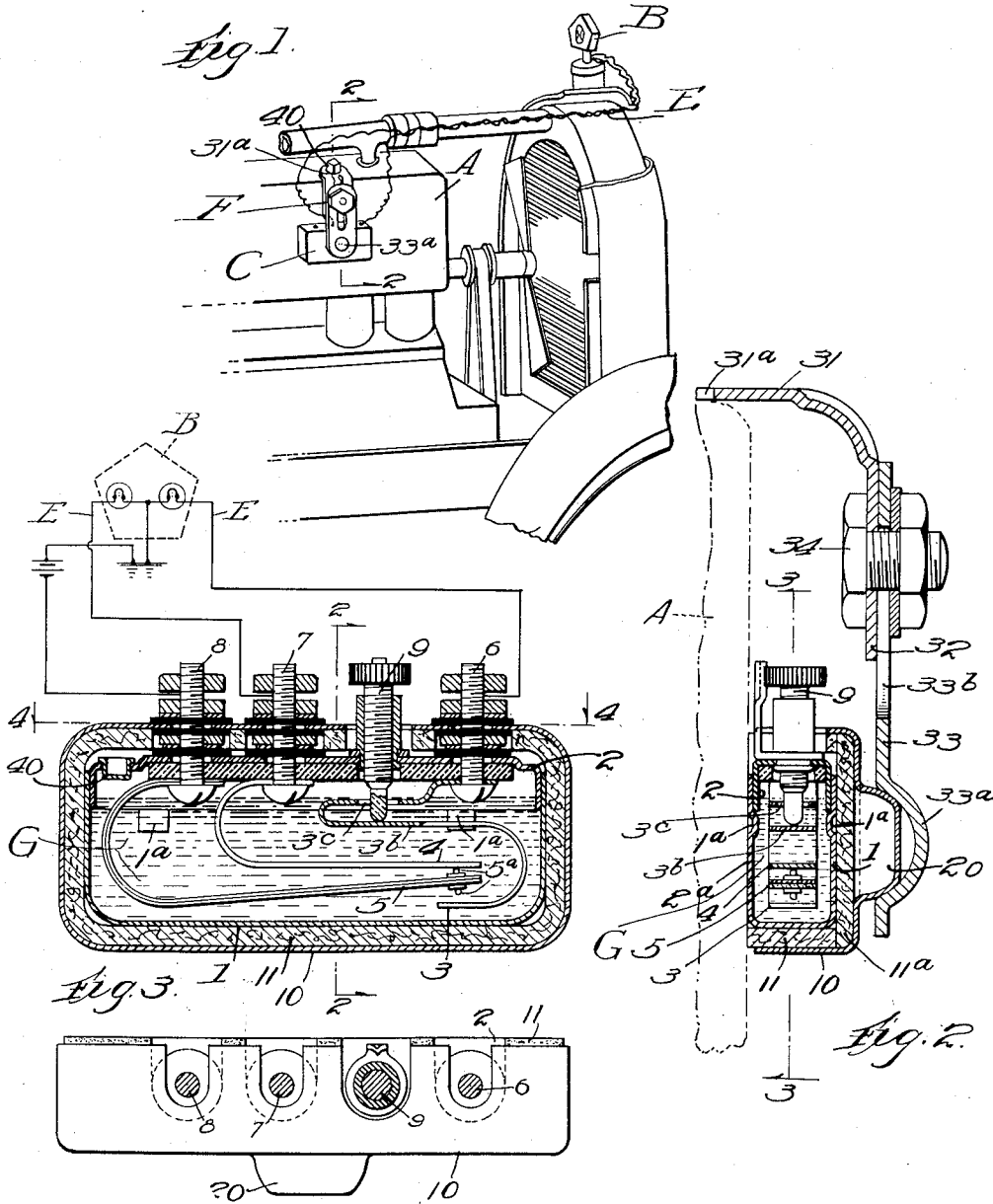


Fig. 4.

Witness:
[Signature]

Inventor:
 Frederik G. Whittington
 by *[Signature]*
 his Attys.

UNITED STATES PATENT OFFICE.

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THERMOSTATIC SIGNAL-OPERATING DEVICE.

Application filed February 11, 1921. Serial No. 444,134.

To all whom it may concern:

Be it known that I, FREDERIK G. WHITTINGTON, a citizen of the United States, residing at the city of Chicago, in the county of Cook and the State of Illinois, have invented certain new and useful Improvements in Thermostatic Signal-Operating Devices, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The purpose of this invention is to provide an improved construction and mount of a thermostatic device for operating a signal, particularly designed for indicating or signaling the temperature of an automobile engine. It consists in the elements and features of construction shown and described, as indicated in the claims.

In the drawings:

Figure 1 is a perspective view of a portion of an engine equipped with this device for showing its relation in general to the engine structure and signal.

Figure 2 is a section at the line, 2—2, on Figure 1.

Figure 3 is a section at the line, 3—3, on Figure 2.

Figure 4 is a section at the line, 4—4, on Figure 3.

In the structure shown in the drawings, a portion of the engine body is shown at A. A signaling device is shown at B, mounted upon the top of the radiator. C is the casing enclosing the thermostatic circuit-controlling devices. The circuit wires are shown at E. F is a hanger by which the casing, C, is mounted and clamped in position against the hot wall of the engine.

The particular construction of casing and circuit-controlling devices therein will be first described. The casing is substantially a parallelogrammatic box, double walled with interspace between the walls occupied preferably by insulating material. The inner casing member, that is, the one which forms the inner of the interspaced walls, comprises the two parts, 1 and 2, substantially in the form of an open-sided box with an inter-telescoped cover, 1, being the box member and 2 the cover member, the member, 1, having bosses, 1^a, 1^a, struck inward in proper position for stopping the cover member, 2. The binding posts and

the adjusting screw for the circuit terminals and thermostatic element are all mounted on the cover member, 2, 3 and 4, being the terminals from which the circuit wires run to two signals to be operated, 5 being a thermostatic or temperature-responsive element having its contact point, 5^a, at the free end for vibrating between and making contact alternately with the terminals, 3 and 4. 6, 7 and 8 are binding posts, respectively, for the terminals and the temperature-responsive member. 9 is an adjusting screw hereinafter more particularly described for adjusting the terminal, 3. The outer casing member, 10, is substantially of box form with an open side adapted to be telescoped over the inner box member, along a dimension at right angles to the dimension along which the cover 2, of the inner box member is telescoped into the other part 1, of said inner member; and to facilitate thus applying the outer member to enclose the inner member, the side of said outer member 10, which corresponds to the side which constitutes the cover of the inner member from which the binding post projects is notched to accommodate the binding posts in applying said outer member over the inner. The interspace between the two members, 1 and 10, is preferably filled with heat-insulating material; and preferably this material is in fabric form, such as asbestos sheet or felt, adapted to maintain its form and dimensions, as distinguished from a powder or granular material which might equally serve the mere purpose of insulation. The reason for preferring insulating material of the character stated rather than granular, is that the insulating material is to be relied upon for definitely spacing the members, 1 and 10, apart on all sides, and in reality, constituting the means for holding the inner member positioned when the outer member is definitely mounted, without any direct attachment to the inner member, whose position is therefore determined by the distribution of the material which fills the interspace between the two members, 1 and 10. Conveniently, the insulating sheet is applied in two pieces, one constituting a strip, 11, encompassing the periphery of the box member, 1, on four sides, the other a sheet, 11^a, dimensioned to fit into and cover the

bottom of the outer member, 10, its dimensions being those of the open side of said member through which it is introduced and applied against the opposite side before the inner member, 1, with the peripherally accompanying strip, 11, is telescoped into said outer member through the said open side. It will be understood, therefore, that the inner member, 1, has one side wall exposed without insulation at the open side of the outer member, so that when the entire casing with the contained terminal members and temperature-responsive member is mounted against the side of the engine, said side wall, 2^a, of the inner member, 1, will come into direct contact with the hot wall of the engine. It will be observed that the outer casing member, 10, is applied to enclose the inner member, 1, by telescoping movement with respect to said inner member in the direction in which the entire casing is to be pressed against the engine on which it is to be mounted, so that this pressure for mounting and holding the device in position on the engine operates also for holding the outer casing member securely in relation to the inner member as enclosing the latter.

It is desirable that this device should be susceptible of being mounted upon the engine which it is to serve without the necessity of doing any work upon the engine itself by way of making bolt holes or the like for securing the device. It is also desirable that the mounting device should not be in such relation to either of the parts of the casing as to operate as a heat conductor either to or from the inner casing member, 1. To provide for the mounting consistently with both of these desirabilities, the outer casing member, 10, has upon the wall opposite its open side an exteriorly-protruding inwardly-hollow boss, 20, and there is provided a clamping or mounting device, F, which is in the form of an L-shaped or angle bracket or hanger having one limb, 31, provided with a bolt hole, 31^a, by which it may be engaged under the head or nut of any bolt of the engine structure which is conveniently situated for that purpose, as the bolt, 40, seen in Figure 1, protruding from the upper side of the engine; and the other limb of said angle bracket has an exteriorly-protruding hollow boss, 33^a, adapted to seat upon the hollow boss, 20, of the outer casing member, 10, as seen in Figure 2. The limb, 32, of said angle bracket is preferably made extensible by being made in two parts, the terminal part 33, which has the boss, 33^a, being applied to the other part secured by a clamping bolt, 34, taking through an extended slot, 33^b, in said part, 33, so as to permit a range of vertical adjustment of the casing on the side of the engine against which it is to be pressed. The device is

thus accommodated to engines of varying dimensions, and having convenient fastening bolts in different positions relatively to the area at which it is convenient or desirable to apply the device for deriving the heat of the engine.

On account of the varying structure of different engines and the varying thickness of their different walls, and other variations effecting the relative temperature of the interior and exterior of the engine, it is necessary to calibrate the device for the particular engine to which it is applied, and this is accomplished by providing for adjustment of one or the other or both of the circuit terminals with respect to the temperature-responsive elements which vibrates between them. In the device as shown, it is intended that the terminal, 4, shall be connected with a signal, as for example a green light, which shall be at all times illuminated while the engine is cold and at any higher not unsafe temperature; and it is intended that the terminal, 3, shall be connected to a signal, as a red light, to be illuminated when the engine approaches an unsafe temperature; and it is designed that when the temperature becomes absolutely unsafe, the green light shall be extinguished and the red light only shall be displayed. To this end the terminal, 4, is made of light spring whose flexure will impose upon the temperature-responsive element, 5, only a negligible amount of work, and that the normal position of the parts will be as shown in Figure 3, with the contact terminal, 5^a, of the temperature-responsive element, 5, in contact with the end of the circuit terminal, 4, the said terminal, 4, being under these circumstances,—that is, when the engine is cold,—flexed somewhat from its normal position, so that it will tend to react toward the terminal, 5^a, and follow up that terminal as the latter moves toward the terminal, 3, on rise of temperature, and will continue thus to follow up until the contact, 5^a, makes contact with the terminal, 3. Assuming that the highest temperature of the circulatory cooling system of the engine consistent with safety is say, 200 degrees Fahrenheit, this contact of the terminal, 5^a, with the terminal, 3, will occur when the temperature of the cooling water is say, about 180 degrees Fahrenheit, and by the time the temperature has arisen to the danger point of 200 degrees Fahrenheit, the contact button, 5^a, should be out of contact with the terminal, 4, that is, should have moved beyond the limit of reaction of the terminal, 4, to its normal position, so that, thereafter, while the temperature remains at the high point or rises, the red light only will be displayed. In order to obtain this result, the device is calibrated after it is mounted upon the engine which is to be served, by bringing the engine to the

temperature at which the water in the circulatory system is heated to 200 degrees Fahrenheit, and operating the adjusting screw, 9, to cause the red light only to be displayed, indicating that the contact button, 5^a, has made contact with the terminal, 3, and withdrawn from contact with terminal, 4. In original construction the position and tension of the two terminals with respect to each other and the temperature-responsive element will be such that initially the terminal, 4, will be flexed from its normal position to such an extent that its reaction to normal position will cause it to follow the contact button, 5^a, of the temperature-responsive element to a temperature approximating the dangerous temperature within the number of degrees estimated to be the maximum difference between change of temperature of the cooling water and the resulting or contemporaneous change of temperature experienced by the temperature-responsive element, so that in any event when the terminal, 3, has been adjusted as above described, the contact button, 5^a, will not be withdrawn from contact with the terminal, 4, until after said opposite end of said contact button, 5^a, has made contact with the terminal, 3, so that one light or the other will always be displayed, some variation being permissible as to the overlap or change of temperature through which both lights will be displayed. It will be understood that the reason for providing that one light or the other shall always be displayed is that the signal operated may serve not only as a temperature signal, but also as an ordinary vehicle-position-indicating light.

It is found that a very considerable range of adjustment is necessary to be provided for with respect to the terminal, 3, to calibrate the device for different engines and it is for this reason that it is mounted in the form shown, being reflexed upon itself for a portion between its binding-post securement and the contact end, as seen at 3^b, and the initial limb of this reflexion viz. the portion extending directly from the binding post to the bend,—is apertured as seen at 3^c, so that the adjusting screw, 9, may extend through said aperture to impinge upon the other limb, thereby gaining the advantage of the resiliency of the bar throughout the entire extent from the binding post securement around the bend to the point of contact of the adjusting screw, 9, including the especial resiliency of the bend; and by this construction it will be seen that the adjustment of the contact end of this terminal 3, is effected by movement almost directly transverse to its length, as distinguished from movement about a pivot, which would be the character of the movement if, having the same length from the

binding post to the contact end, it were made without any bend throughout that length.

It has been found that when the casing which encloses the circuit terminals and temperature responsive element is occupied by air the response to temperature changes is not reliably uniform throughout the length of said element, and the deflection upon a given change of temperature of the engine is not the same in all cases. To overcome this difficulty the casing, C, is preferably filled with a rather heavy oil, indicated at G, which tends to become uniformly heated throughout and so tends to cause the temperature responsive element to have equal temperature throughout its length, and to acquire change of temperature with equal promptness under all circumstances. 40 is a removable cap for closing the filling aperture through which the oil may be supplied to the chamber, C.

I claim:—

1. A device for the purpose indicated comprising a casing having double walls interspaced on all sides but one; electric circuit terminals and a temperature responsive element and binding posts for connecting them respectively with an electric circuit mounted on the inner of said interspaced casing walls and projecting across the interspace and through the outer wall; the outer-wall-casing member being in box form, having an open side; heat-insulating material interposed in the interspace between said casing members for holding them spaced apart, and means supporting the device engaging the outer casing member only.

2. In the construction defined in claim 1, foregoing, the heat-insulating material being a fabric adapted to maintain its form and dimensions, whereby the spacing between the walls at the several sides is maintained in accordance with the thickness of said fabric at said sides respectively.

3. In the construction defined in claim 1, foregoing, the inner casing member comprising two parts which are telescoped together for closing the casing, the binding posts being all mounted upon the same wall of one of said parts, and the outer casing member of box form being adapted to be telescoped onto the inner member, for enclosing the latter, in the direction of a dimension at right angles to the dimension upon which the two parts of the inner casing member are telescoped together, whereby said outer casing member locks the two parts of the inner casing member in their telescoped relation.

4. A device for the purpose indicated comprising a casing adapted to be mounted against the wall of an engine; electric-circuit terminals and a thermostatic member and binding posts by which they are mount-

ed in the casing, the thermostatic member having a free end positioned for vibrating between the circuit terminals under temperature changes, one of said terminals being
5 reflexed upon itself between its binding post securement and its circuit-closing contact end, and an adjusting screw set through the casing wall and extending past one limb of said reflexure for impinging on the other
10 limb to flex said terminal at the bend for adjusting the contact end relatively to the thermostatic member.

5. A thermostatic electric circuit closing device comprising a casing, adapted to be
15 held pressed against a hot part of an engine, said casing having a double wall at all sides except that which is pressed against the engine, means for insulating the enclosed part from exterior temperature except that of
20 the engine, the outer wall having means for engaging a pressure arm, and such pressure arm adapted for such engagement and having a bolt hole for securing it under the head or nut of any convenient bolt of the en-
25 gine structure.

6. In the construction defined in claim 5, foregoing, the pressure-arm-engaging means of the casing being an interiorly hollow and exteriorly-protruding boss, whereby the

thermal insulation from the pressure arm is 30 increased.

7. A device for the purpose indicated, consisting of a casing adapted to be mounted against the heated surface of the body of an engine to be served with direct metallic
35 connections from said heated surface to the wall of the casing at one side thereof; circuit terminals and a temperature-responsive circuit-closing member, mounted and enclosed in the casing, the cavity of the case within
40 which said parts are enclosed being filled with oil.

8. A device for the purpose indicated, consisting of a double walled casing with interspace between the walls, adapted to be
45 mounted against the heated surface of the body of an engine to be served with direct metallic connection from said heated surface to the inner wall at one side, circuit terminals and a temperature responsive circuit
50 closing member mounted and enclosed within the case, the interspace between said enclosed parts and the wall of the case being filled with oil.

In testimony whereof, I have hereunto set
55 my hand at, Chicago, Illinois, this 9th day of February, 1921.

FREDERIK G. WHITTINGTON.