E. B. LANE.

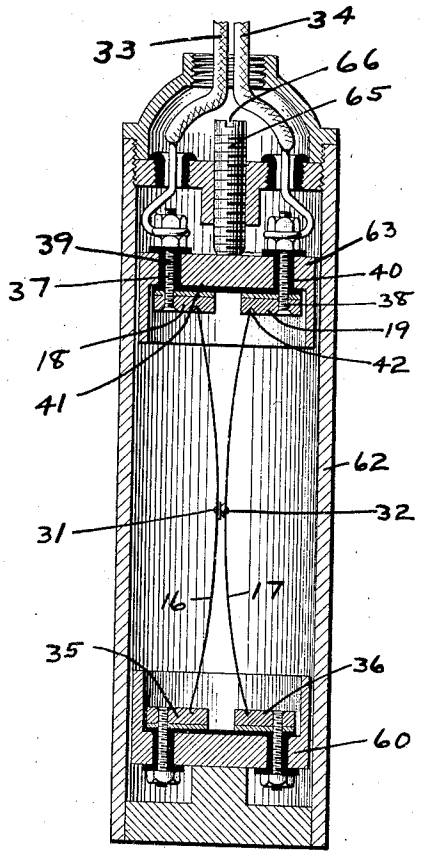
THERMOSTAT.

APPLICATION FILED JAN. 28, 1918.

1,392,340.

Patented Oct. 4, 1921.

Fig. 1.



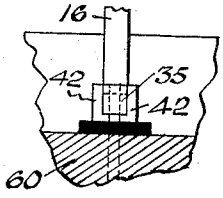


Fig. 2.

Edwin B. Lane, Inventor,

By his Attorneys,

Emery, Booth, Janney & Varney

UNITED STATES PATENT OFFICE.

EDWIN B. LANE, OF WEST HOBOKEN, NEW JERSEY.

THERMOSTAT.

1,392,340. Specification of Letters Patent. Patented Oct. 4, 1921.

Original application filed November 4, 1916, Serial No. 129,605. Divided and this application filed January 28, 1918. Serial No. 214,078.

To all whom it may concern:

Be it known that I, EDWIN B. LANE, a citizen of the United States, and a resident of West Hoboken, in the county of Hudson and State of New Jersey, have invented an Improvement in Thermostats, of which the following is a specification.

This invention relates to thermostats, and with regard to certain more specific features, to a temperature-controlled contact device adapted to open and close an electric circuit. This application is a division of my application Serial No. 129,605, filed November 4, 1916, patented January 29, 1918, No. 1,254,814.

Among the objects of the invention may be noted the provision of a simple and inexpensive thermostat that is proof against vibration and operating at a comparatively high pressure at the contact points, and yet sensitive to minute changes of temperature. Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly comprises the features of construction and operation, combinations of elements, and arrangements of parts which are exemplified in the structure hereinafter described and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings, in which is shown one of various possible embodiments of this invention,

Figure 1 is a sectional elevation of a thermostat adapted for measuring or controlling temperatures not detrimental to the contact-making devices; and Fig. 2 is a detail showing the side plates and associated parts.

Referring now to the drawing, there is illustrated a thermostat comprising an expanding casing 62, which may be immersed in a tank, oven or furnace or other region whose temperature is to be controlled. As the temperature of the tank increases, the casing expands, allowing the substantially non-expanding bowed springs 16, 17, to move away from one another. These springs are seated at their upper ends in the insulated blocks 18, 19, and at their lower ends in the insulated blocks 35, 36. The upper blocks are secured to an upper cup 63, the relative position of which to the casing may be adjusted by the threaded rod 65, slotted at 66 to receive an operating tool. This type of thermostat is particularly applicable to temperatures and other conditions not detrimental to the springs 16, 17. The lower cup 60 is mounted directly upon the closed lower end of the casing 62.

The contacts 31, 32, riveted respectively to the leaf springs 16, 17, about midway of their length, are normally in circuit-closing position, as indicated in the drawing, so that normally the external circuit represented by the leads 33, 34, is closed at these contacts. With an increase of temperature above normal, however, the expansion of the casing causes the cups 63, 60, to move apart under the pressure exerted thereon by the springs 16, 17, (which tend to separate) and contact is broken at the points 31, 32. This break in the external circuit is utilized for shutting off or reducing the supply of heat to the tank, but since the means for effecting this forms no part of the present invention, the drawings have been confined to the thermostat itself. Conversely, when the temperature in the tank drops below normal, the expanding casing 62 contracts and forces inwardly the upper and lower cups, causing the springs 16, 17, to close the external circuit at the contacts 31, 32.

By providing a pair of springs movable toward and away from each other in this manner, a considerable movement of the contacts 31, 32 toward and away from each other is attained for a comparatively small linear expansion or contraction of the casing 62, so that the circuit can be effectively broken and effectively closed with but a slight expansion or contraction, as the case may be, of the casing 62. Furthermore, with this construction, a considerable pressure may be maintained in the springs 16, 17, giving adequate pressure at the contact points, and thereby avoiding interruption of the circuit by dirt or other extraneous matter whose electrical resistance might impair the operation of the device if only a light contact-pressure were available.

The leads 33, 34, are electrically connected to the springs 16, 17, respectively, as illustrated in the drawing. Each spring is seated at its upper end in a block 18, 19, to which is riveted a threaded shaft 37, 38, passing through an insulating bushing 39, 40, in the upper cup 63 and projecting above the upper face of the cup to serve as a binding post for the lead. A layer of insulation 41 prevents electrical contact between either block 18, 19 and the cup 63, while the threaded rods 37, 38, hold the blocks 18, 19 in their normal position with respect to the cup. Side plates 42 (Fig. 2) secured to or integral with each of the four blocks 18, 19, 35 and 36, prevent lateral displacement of the springs with respect to the blocks. The lower blocks 35, 36 are similarly mounted in the lower cup 60, except that the threaded rods associated with the lower blocks are not extended as far beyond the surface of the cup, since they are not connected to leads.

The temperature at which contact is made and broken by the thermostat may be adjusted by raising or lowering the upper cup 63. If the upper cup is moved downwardly, the standard of temperature will be increased, because a greater expansion of the expanding casing 62 will be needed to allow the cups to move far enough away from each other to break the circuit at the contacts 31, 32, and shut off the heat. And conversely if the set screw 66 is turned in reversed direction, the springs 16, 17 force the upper cup 63 to move upwardly, and the expansion necessary in the casing 62 to break the circuit at the contacts 31, 32, is decreased.

This vertical adjustment of the upper cup 63 may be effected by the threaded rod 65 slotted at 66 to receive an operating tool.

If desired, the cup at its upper end may be sealed in the manner in common use in water-tight electrical outlets.

From the above, it will be seen that in the illustrated embodiment of the invention, there is provided a thermostat of simple, compact and inexpensive construction, responsive to slight temperature changes, and reliable under severe operating conditions.

As various possible embodiments might be made of the above invention and as various changes might be made in the embodiment above set forth, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

I claim:

1. A thermostat combining substantially non-expanding contact members each fixed at each end and movable toward and away from each other, and an expanding casing inclosing said members and varying in length with changes in temperature and effecting said movement of said members by such variations in length, and means for adjusting the standard of temperature at which contact is made and broken.

2. A thermostat combining springs movable toward and away from each other, a casing mounting said springs and effecting said movement of said springs with variations of temperature, and a single means for adjusting the standard of temperature at which contact is made and broken.

3. A thermostat combining a casing varying in length with variations in temperature, a pair of leaf springs mounted therein and bowed toward each other and movable toward and away from each other by such variations in length of the casing, and means for adjusting the standard of temperature at which contact is made and broken by the springs.

4. A thermostat combining a pair of springs, means at either end of the springs for retaining them in position, and an expanding casing surrounding the springs and adapted to move said means toward and away from each other with changes in temperature.

5. A thermostat combining an expanding casing, a pair of comparatively non-expanding leaf springs each retained at each end therein and movable toward and away from each other with changes in temperature of the casing, and means for adjusting the standard of temperature at which contact is made and broken by the springs.

6. A thermostat combining a casing, a pair of leaf-springs therein bowed toward each other, means at either end of the springs for insulating them from each other and from the casing and for limiting the movement of the springs away from each other, the casing being responsive to temperature changes for permitting relative movement of said retaining means to effect making and breaking of the circuit at predetermined temperature.

7. A thermostat combining an expanding container, a pair of leaf-springs bowed toward each other, and adapted when in contact with one another to complete an electric circuit, means at either end of the springs for insulating them from each other and from the casing of the apparatus, the casing being responsive to temperature changes for permitting movement of one of said first means to effect making and breaking of the circuit at predetermined temperatures, and means for adjusting the other retaining means toward and away from the first retaining means to vary the standard of temperature maintained.

8. A thermostat combining a pair of leaf-springs bowed toward each other, contacts riveted to the springs and normally abutting one another to complete an electric circuit, means at either end of the springs

for insulating them from each other and from the casing of the apparatus and for limiting the movement of the springs away from each other, the casing being responsive to temperature changes for permitting movement of one of said retaining means to effect making and breaking of the circuit at predetermined temperatures, and means for adjusting the other retaining means toward and away from the first retaining means to vary the standard of temperature maintained.

In testimony whereof I have signed my name to this specification this 26th day of January, 1918.

EDWIN B. LANE.