H. E. REEVE.

THERMOSTAT.

APPLICATION FILED JULY 26, 1912.

1,212,260. Patented Jan. 16, 1917.

Fig. 7.

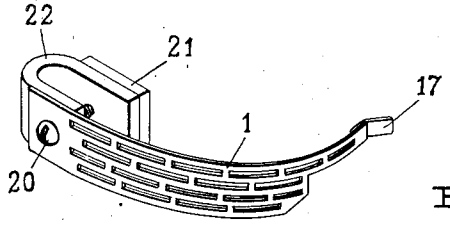


Fig. 1.

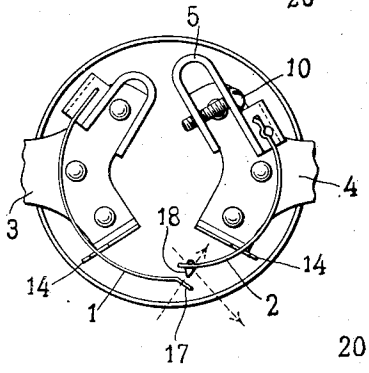


Fig. 3.

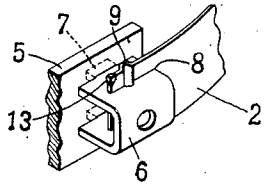


Fig. 6.

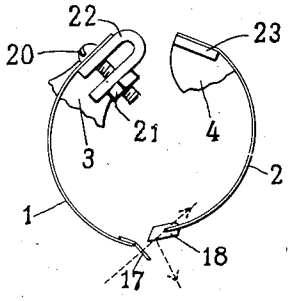


Fig. 2.

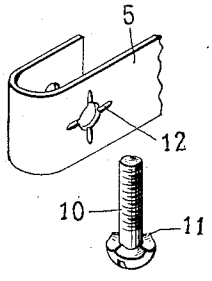


Fig. 5.

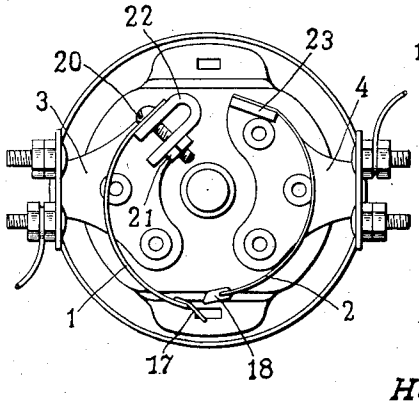
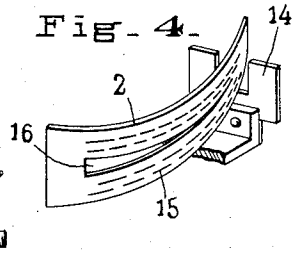


Fig. 4.



WITNESSES

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THERMOSTAT.

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To all whom it may concern:

Be it known that I, HENRY E. REEVE, a citizen of the United States, and resident of New York, in the county of Kings and State of New York, have invented certain new and useful Improvements in Thermostats, of which the following is a specification.

My invention relates particularly to thermostatic devices for electric alarm circuits. It has been customary in some devices of this character to employ thermostatic elements in the form of a bi-metallic arm or "coil" as it is sometimes called, one end of the coil being fixed and the other end free to move. Adjacent the movable end usually is stationed an adjustable contact. Upon increase in temperature the circuit is closed by the movable end of the coil engaging the stationary contact. These coils being of considerable length are subject to vibrations and are some times distorted accidentally or intentionally so as to alter the temperature at which the circuit is closed.

The main object is to provide a simple and efficient device which is reliable under all conditions. Among the specific objects of my invention are the following; to provide a construction in which the electric contact is made by a long powerful scraping action for normal closing of the circuit so as to insure a perfect contact; to facilitate the adjustment; to enable the parts to withstand mechanical shock; to afford the maximum rapidity of response to a rise of temperature.

The invention is in its preferred form will be found to contemplate the use of two thermostatic arms constructed and mounted so that their tips engage by a sliding or scraping contact upon change in temperature. Each thermostatic arm is supported by a yoke having a minimum capacity for thermal conductivity so as to minimize loss of heat or sudden rise of temperature. Each arm is preferably supported by a U-shaped member and one or both of these may be adjusted. The adjustment is so effected that there is no danger of its being altered accidentally. The end of each arm may be protected by a guard to prevent injury by a mechanical shock. Each arm may be provided with a plurality of small openings extending throughout its entire length so as to afford a maximum exposed area. Each arm may be also slitted longitudinally along its center line so as to prevent buckling due to transverse expansion and contraction. Each arm may also be slightly tapered in thickness from its base to its tip, the thickness at the base being say twenty-thousandths and at the tip fifteen-thousandths of an inch. It will be obvious that the device may be made to embody all of these features of construction or that certain advantages may be had in using one or more features as herein set forth.

Figure 1 shows the construction and arrangements of the parts of a thermostat embodying the preferred form of my invention. Fig. 2, is a detail perspective view showing the means for effecting the adjustment of one of the arms. Fig. 3, is a perspective view showing the anchorage device for one of the arms. Fig. 4, is a perspective view of one of the arms and showing the guard device for its tip. Fig. 5, is a view similar to Fig. 1 showing certain modifications of construction. Fig. 6, shows a pair of thermostatic arms with dotted lines indicating the direction of movement of the contact tips. Fig. 7, is a perspective view of a contact arm.

The arms 1 and 2 are electrically connected to the circuit terminal plates 3 and 4. The shape, size and method of supporting and insulating the circuit terminal plates is immaterial to this invention. The arms 1 and 2 are formed of composite sheets consisting for instance of layers of steel and brass and in the arrangement shown the left hand arm 1 has its outer face of brass and its inner face of steel while the right hand arm has its inner face of brass and its outer face of steel.

For convenience in manufacture, assembling and adjustment each terminal plate may have integral with it a U-shaped support such as 5 bent up out of the plane of the main body of the terminal plate, one side of the U-shaped member being integrally united with the terminal plate and the other side of the U-shaped member serving as a support for the thermostatic arm. A yoke 6 having lugs such as 7 riveted or otherwise suitably secured to the support 5 serves as an anchorage device for the thermostatic arm, the upper and lower portions of the yoke being slotted as at 8 to receive the

end of the thermostatic arm. The end of the arm may have a projection such as 9 and the slot may be provided with a similar shaped off-set portion to receive the said projection whereby to prevent longitudinal disengagement of the thermostatic arm from its support.

In the anchorage device the corners of the thermostatic arm may be bent over as at 13 as indicated to prevent the arm from being movable edgewise from the slot 8. While this method of anchorage insures a good electrical circuit, it reduces to a minimum the metallic mass and thus reduces the loss of heat. This form of connection also makes a clean cut anchorage confined to one cross section instead of being distributed over a considerable portion of the length of the arm as when riveted and soldered as has been customary. This also avoids the use of solder and the treacherous solder fillets sometimes present.

The thermostatic arm may be readily adjusted by means of a screw such as 10 passing through the movable side of the U-shaped support 5 and screwing into the fixed portion. The screw may be prevented from working loose by providing teeth or projections such as 11 underneath the head of the screw and notches such as 12 in the support. The yielding nature of the U-shaped support will enable the screw to be turned by force even when the projections 11 are seated in the notches 12 but will prevent accidental turning or working loose of the screw.

The freely movable end of the thermostatic arm is guarded by a slotted plate such as 14 which is shown in Figs. 1 and 4 as suitably secured to the terminal plate. This guard prevents the bending of the arm by mechanical shock and thus avoids the danger of the device being thrown out of adjustment.

Each arm is preferably provided with a plurality of small slots or perforations such as 15 throughout its entire working length so as to afford a maximum exposure and uniformity of action. Each arm is also preferably slotted as at 16 along its center line at its wider or base portion so as to minimize cross sectional warping and the consequent reduction of effective contact movement.

The parts are so arranged, constructed and adjusted that the tips 17 and 18 of the thermostatic arms upon change in temperature travel in the direction of the dotted lines as shown in Fig. 6 so that one tip scrapes across the other. This insures electrical contact even though one or both of the contacts becomes coated with dirt or other non-conductive material.

As before intimated the shape of the circuit terminals 3 and 4 and other features of construction not herein claimed are immaterial. In Figs. 5, 6 and 7 another modification of the support of the thermostatic arms is shown. In this case a bolt 20 and a nut 21 may be considered as the equivalent of the screw 10 for adjusting the support 22. The arm 2 is supported directly by a flange 23 of the plate 4.

It will be obvious to those acquainted with this art that changes may be made in details of construction without departing from the spirit and scope of my invention and that the arms can be arranged so as to make contact either upon a decrease or increase of temperature. The terms of the claims are therefore used in a descriptive sense rather than as terms of limitations except so far as required by the state of the prior art.

What I claim is:—

1. In a thermostat, two curved thermostatic arms arranged one to expand inwardly and the other arranged to expand outwardly under influence of heat, means supporting each of said arms at one end and with the free ends of the arms closely adjacent and arranged to move toward each other on intersecting paths in the expansive action of said arms, the said free ends of the arms having contact tips and the contact tip carried by the free end of one of the said arms being inclined with respect to the path of travel of the contact tip of the other arm, whereby to produce in the expansive movement of the thermostatic arms a sliding, wiping contact of one contact tip in engagement with the other.

2. In a thermostat, two expansible thermostatic arms, means supporting said arms with their free ends closely adjacent each other and movable toward each other on intersecting angles and guard devices for the free ends of said arms whereby to prevent accidental displacement of the free ends of said arms with respect to each other.

3. In a thermostat, a contact and a thermostatic arm supported at one end and free to expand longitudinally at its opposite end into engagement with the said contact, the said thermostatic arm being centrally slotted longitudinally throughout the working length thereof to divide the working length into two transversely separated parts and thereby prevent transversely continuous warping which otherwise would interfere with the free longitudinal expansion of the thermostatic arm.

4. In a thermostat, a pair of curved thermostatic arms arranged one to expand outwardly under influence of heat and the other arranged to expand inwardly under influence of heat and means supporting said curved arms with their free ends closely approaching each other with the free end of the outwardly expanding arm disposed in-

side the plane of the free end of the inwardly expanding arm whereby under influence of heat the free ends of the arms will travel in intersecting paths to produce a wiping contact.

5. In a thermostat, a supporting member having a slot with an offset portion and a thermostatic arm engaged in the said slot and provided with a projection interlocking with the offset in the slot to prevent longitudinal disengagement of the arm from said slot.

6. In a thermostat, a support for a thermostatic arm, comprising an anchoring yoke having parallel side portions spaced apart and provided with oppositely alined slots to receive the base end of a thermostatic arm, and a thermostatic arm having its end engaged in the alined slots in the parallel side portions of the yoke.

7. In a thermostat, a supporting member having a main portion and spaced outstanding anchoring portions extending laterally therefrom, a thermostatic member carried by the outstanding anchoring portions of the said supporting member and spaced apart from the main portion thereof, one of the said members being slotted and the other member fitting therein and means securing the one member in its slotted engagement in the other member.

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Witnesses:
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