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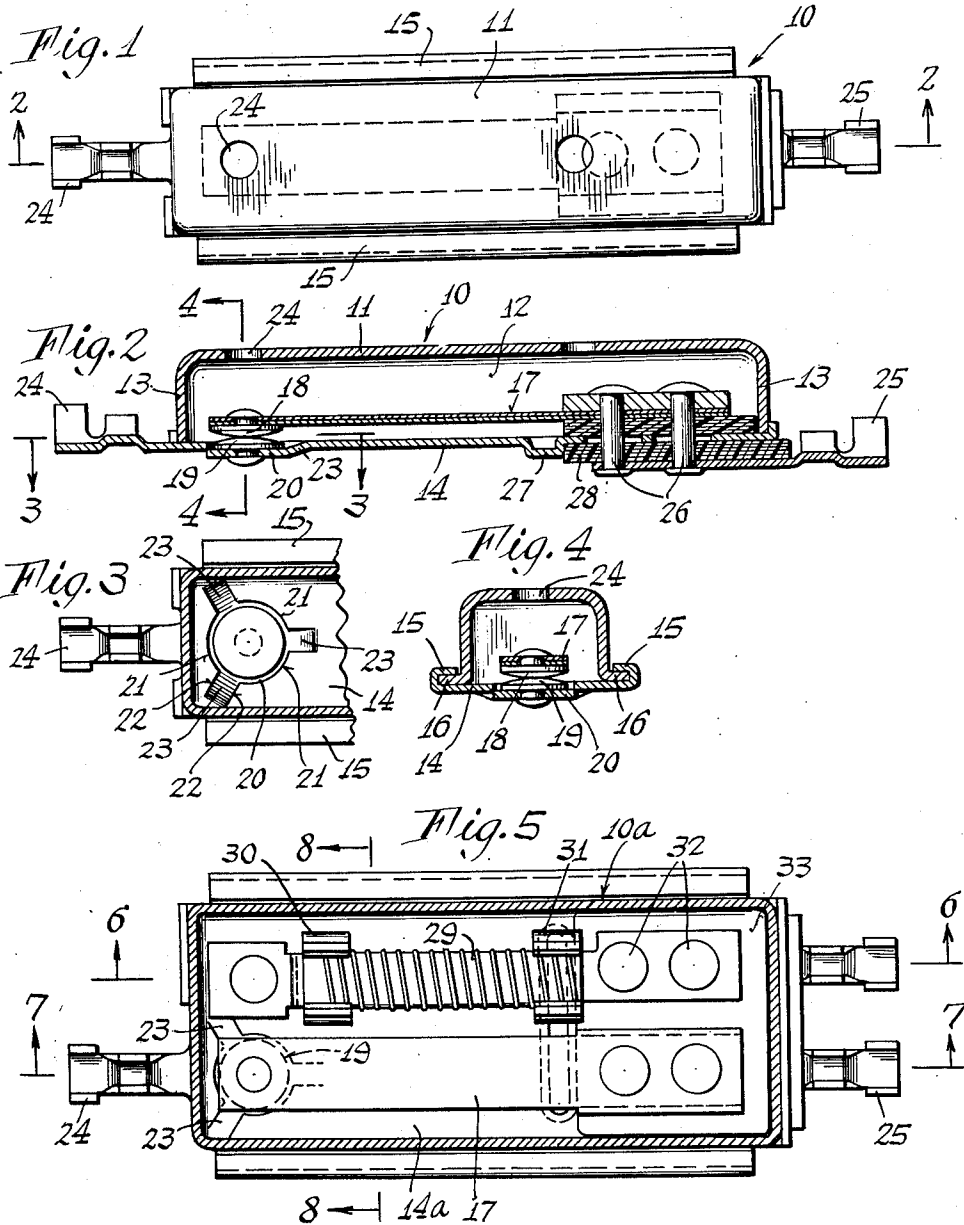
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2,675,445

THERMOSTAT FOR HEATING PADS, BLANKETS, AND THE LIKE

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2 Sheets-Sheet 1



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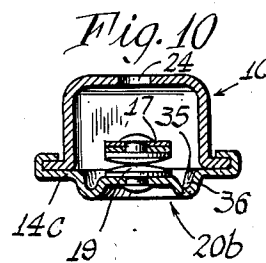
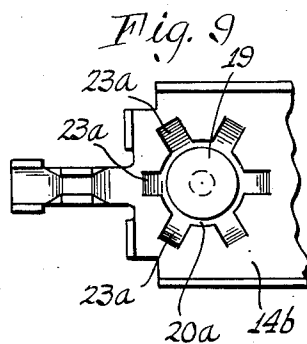
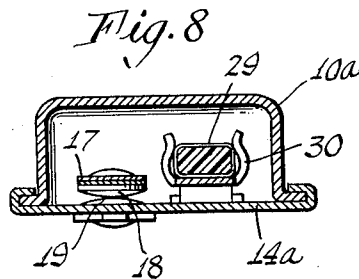
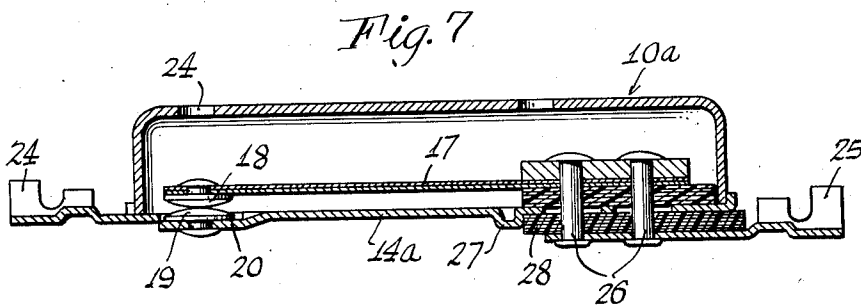
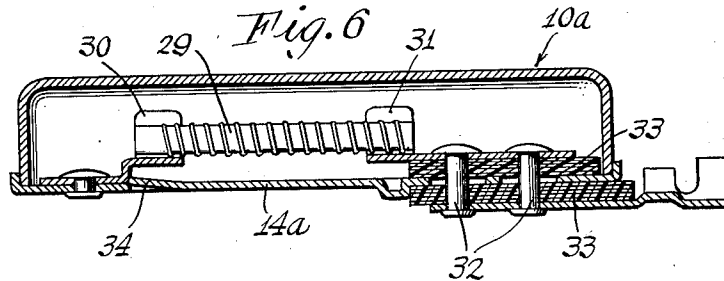
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THERMOSTAT FOR HEATING PADS, BLANKETS, AND THE LIKE

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THERMOSTAT FOR HEATING PADS,
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5 Claims. (Cl. 200-139)

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This invention relates to small thermostatically controlled electric switches for use with heating pads, electric blankets, and like devices, such switches being mostly of the slow-break type characterized by small actuating forces.

An object of the invention is to provide an improved thermostatic switch of this type, which is extremely simple in its construction, and is economical to manufacture.

Another object of the invention is to provide an improved thermostatic switch as above characterized, which may be easily and quickly permanently adjusted to the desired temperature range.

A still further object of the invention is to provide an improved thermostatic switch in accordance with the foregoing, which is compact and small in size so that it does not require a great deal of spacing in the heating pad or blanket.

Still another object of the invention is to provide an improved thermostatic switch as above set forth, which is reliable in operation, having an extended, useful life.

Heretofore, in thermostatic switches of the above type it was the practice, in order to secure uniform and satisfactory operation, to make the contacts of certain metals or alloys which were quite expensive. For example, one contact point would be made of a silver-cadmium alloy, and the other might be of platinum. Or, instead of platinum the other contact might be made of a palladium-ruthenium alloy. These materials were employed because of their satisfactory contact qualities, and to prevent the contacts from melting and fusing together, which often occurred if they were made of silver alone.

By the present invention a novel organization is provided whereby inexpensive silver contacts may be employed in the switch, fusing of the contacts being prevented by the provision of simple means for quickly conducting heat away from at least one of said contacts. This means, as illustrated herein, comprises a copper supporting member for the said one contact, and said member may advantageously constitute a part, such as a wall, of the enclosing casing. Preferably the stationary contact of the switch is mounted directly on the copper member to be in intimate, heat-exchanging relation therewith.

Also, by the present invention, I utilize the soft and ductile characteristics of the copper mounting member to effect a simple and quick permanent adjustment of the stationary contact whereby the thermostat may be readily calibrated. The portion of the copper member immediately surrounding the stationary contact is weakened, as

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by slitting it or embossing it, thereby to enable said portion to be readily laterally displaced by a suitable tool. Thus the position of the stationary contact may be easily changed within limits, to effect an adjustment of the switch.

A further economy is effected in the construction of the switch, by making the copper supporting member for the stationary contact in the form of a flat plate of relatively small size and weight, and making the remainder of the switch casing of inexpensive metal such as sheet steel and in the form of a shell. With such construction, a minimum amount of copper is required, resulting in a low material cost.

While the embodiments of the invention illustrated herein comprise slow make and break switch actions, the invention has utility in connection with snap-action thermostatic switches intended for the same general use, wherein actuating forces are small.

Other features and advantages will hereinafter appear.

In the accompanying drawings:

Figure 1 is a top or plan view of a thermostatic switch made in accordance with the invention.

Fig. 2 is a longitudinal section of the switch taken on line 2-2 of Fig. 1.

Fig. 3 is a fragmentary sectional view taken on line 3-3 of Fig. 2.

Fig. 4 is a transverse vertical sectional view taken on line 4-4 of Fig. 2.

Fig. 5 is a view partly in horizontal section and partly in plan, of a thermostatic switch and heater therefor, made in accordance with the invention.

Fig. 6 is a longitudinal sectional view taken on line 6-6 of Fig. 5.

Fig. 7 is a longitudinal sectional view taken on line 7-7 of Fig. 5.

Fig. 8 is a transverse section taken on line 8-8 of Fig. 5.

Fig. 9 is a view like Fig. 3, but illustrating a modified form of the invention.

Fig. 10 is a view like Fig. 4, but illustrating still another form of the invention.

Referring to Figs. 1 through 4, the improved thermostatic switch comprises a casing 10 which is in the form of an inverted shell of substantially oblong shape, having a top 11, side walls 12 and end walls 13. The shell 10 may be advantageously formed of inexpensive sheet metal such as steel.

In accordance with the invention I provide a closure for the opening or mouth of the shell 10, said closure functioning as a support for a stationary contact point of the switch and being so

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constituted as to quickly conduct heat away from said contact point and dissipate it, thereby to prevent fusing together of the contacts. The heat-dissipating closure has a weakened portion concentric about and carrying the contact, arranged to be readily displaceable laterally so as to enable the contact to be readily translationally shifted toward or away from its cooperable contact without tilting or angularly moving the contact point or impairing the alignment of the contact, thereby to provide for accurate adjustment of the thermostat.

Referring to Figs. 2 and 4, the closure for the shell 10 comprises a generally flat plate 14 formed of soft and ductile copper. The plate 14 may be secured to the shell in any suitable manner, as by folding over its longitudinal edge portions 15 against longitudinal flanges 16 of the casing 10.

On the plate 14 there is insulatedly mounted a bimetallic arm 17 carrying a movable contact point 18 cooperable with a stationary contact point 19, the latter being mounted on a portion 20 of the plate 14 so as to be in intimate heat-exchanging relation with the plate.

I have found that the contacts 18 and 19 may be made of silver instead of the expensive metals or alloys heretofore mentioned, such as platinum, silver cadmium, palladium-ruthinium, etc., if at least one of the contacts is mounted on a copper plate so as to have its heat quickly removed by the plate. The heat conduction is so great as to effectively prevent melting and fusing together of the contacts, and accordingly the operation of the thermostat is at all times reliable, while a substantial economy is effected by the use of the relatively inexpensive silver. Moreover, desirable electrical characteristics are imparted to the switch by virtue of the low contact resistance of the silver contacts.

To effect adjustment of the contacts, I provide means by which the copper plate 14 is weakened in the portion which supports the contact 19, thereby to enable said weakened portion to be easily and quickly laterally displaced by a suitable tool. As shown in Figs. 2, 3 and 4, I provide three curved slits 21, connecting with six radially extending slits 22 whereby the contact-carrying portion 20 of the plate 14 is supported by three relatively narrow, radially extending sections 23. By the use of a suitable tool such as a punch, the portion 20 of the copper plate 14 may be readily displaced inward or upward as viewed in Fig. 2 to reduce the spacing between the contacts 18 and 19 when the latter are separated under the action of heat. I provide an opening 24 in the top wall 11 of the casing 10 to enable a punch to be inserted into the casing for engagement with the back of the contact 18 whereby downward displacement of the plate portion 20 carrying the contact 19 may be effected in the event that the upward displacement has been carried too far.

I have thus provided by the above construction a very simple and economical-to-manufacture thermostatic switch which is compact and small in size, uniform and reliable in operation and especially well suited for use in electric blankets, heating pads and the like. The contacts 18 and 19, being of silver, provide excellent conductivity at low cost; fusing of the contacts is prevented by the heat conducting and dissipating copper plate 14, and adjustment of the contacts is effected by displacing a portion of

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the plate 14 without requiring any additional parts such as screws, cams, etc.

Connections to the switch may be made by means of connecting lugs 24 and 25, the lug 24 being integral with the plate 14 and the lug 25 being secured in place by rivets 26, and being insulated from the plate 14 as is well understood.

Referring to Fig. 2, the plate 14 may have an embossed shoulder 27 to position the insulating strip 28 effecting the insulation between the lug 25 and the plate 14.

Another embodiment of the invention is illustrated in Figs. 5 through 8. This embodiment is generally similar to that described above, except that the casing 10a is made larger or wider to accommodate a heater 29 carried by spring clips 30 and 31. The clip 30 is mounted on the copper closure plate 14a which is wider than the plate 14 described above, and the clip 31 is insulatedly secured to the plate 14a by rivets 32 and insulating strips 33. Positioning of the clip 30 is effected by a finger 34 lanced from the plate 14a. Other parts in Figs. 5 through 8 which are similar to those already described have been given the same characters.

Referring to Fig. 9, the stationary contact 19 of the thermostatic switch may be carried on a portion 20a of a copper plate 14b which is slitted to provide six radially extended sections 23a around the contact instead of the three sections 23 shown in Fig. 3. By this organization a greater heat conductivity may be had from the contact to the plate, than if three sections are provided.

In Fig. 10 an organization is shown which provides a still greater degree of heat conductivity between the stationary contact and the copper plate. In this figure the copper plate 14c has an embossed portion 20b providing an annular rib 35 and an annular groove 36 surrounding the contact. In this construction the plate 14c is not slitted at all, and therefore heat from the contact 19 has a relatively large path in flowing to the copper plate. The provision of the embossed rib and groove 35, 36 enables the portion 20b of the plate which carries the contact 19 to be readily laterally displaced without adversely affecting the contact mounting. If the plate were not embossed or slitted, displacement of the contact carrying portion thereof would tend to loosen the contact where it is headed over, resulting in an unsatisfactory switch structure.

Variations and modifications may be made within the scope of the claims and portions of the improvements may be used without others.

I claim:

1. Electrical thermostatic switch means for incorporation in electric blankets, heating pads and like devices to control the heating of said devices, comprising a casing; a pair of contact points in the casing, one of said contact points being of silver; a copper supporting member carried by the casing, said silver contact point being mounted on a portion of said member in intimate heat-exchanging relation therewith whereby heat is carried quickly away from the silver contact point to minimize the possibility of the contacts fusing together and said copper member comprising a sheet metal plate having confined edges on opposite sides of the portion mounting the silver contact point, said mounting portion being rigid and non-resilient and having a plurality of unconnected cuts disposed concentrically about

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and equispaced from the silver contact point to enable the contact point to be laterally displaced with respect to the confined edges to adjust the setting of said contact point without tilting it angularly; and heat-responsive means for actuating one of said contact points to control the heating of the said device.

2. Electrical thermostatic switch means for incorporation in electric blankets, heating pads and like devices to control the heating of said devices, comprising an enclosing casing having a sheet-metal wall; and a pair of cooperable contacts in the casing, one of said contacts being normally stationary and being carried by said sheet-metal wall, and said wall having a plurality of unconnected slits in it, located disposed concentrically around and equispaced from the contact to weaken the wall and enable the wall portion carrying said contact to be readily laterally displaced for translational adjusting movement of said stationary contact without tilting or angular movement of the contact.

3. The invention as defined in claim 1, in which the cuts in the sheet-metal copper plate are of equal length and are curved and lie in a circle disposed around the silver contact point equispaced therefrom to uniformly weaken the plate and facilitate lateral displacement of said portion without materially disturbing the alignment of the contact point.

4. Electrical thermostatic switch means for incorporation in electric blankets, heating pads and like devices to control the heating of said devices, comprising an enclosing casing having a sheet-metal wall; and a pair of cooperable contact points in the casing, one of said contact

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points being normally stationary and being carried by said sheet-metal wall, and said wall having an embossed annular bead in it, extending around and equispaced from the contact point to enable the wall portion carrying said contact point to be readily laterally displaced for adjustment of said stationary contact point without impairing the alignment of the contact point.

5. Electrical thermostatic switch means for incorporation in electric blankets, heating pads and like devices to control the heating of said devices, comprising an enclosing casing having a substantially flat metal plate; and a pair of cooperable contact points within the casing, one of said contact points being carried by the metal plate, said plate being rigid and non-resilient and having weakened portions disposed around, equispaced from and concentric with the contact point, said weakened portions extending radially outward from the contact point and enabling limited, permanent lateral displacement of said point to be effected for purposes of adjustment of the contacts without materially tilting or disturbing the mounting alignment of the contact point on the plate.

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