July 12, 1932. O. A. ROSS 1,867,379

TEMPERATURE CONTROLLED ELECTRIC SWITCH

Filed Nov. 15, 1927

Fig. 1.

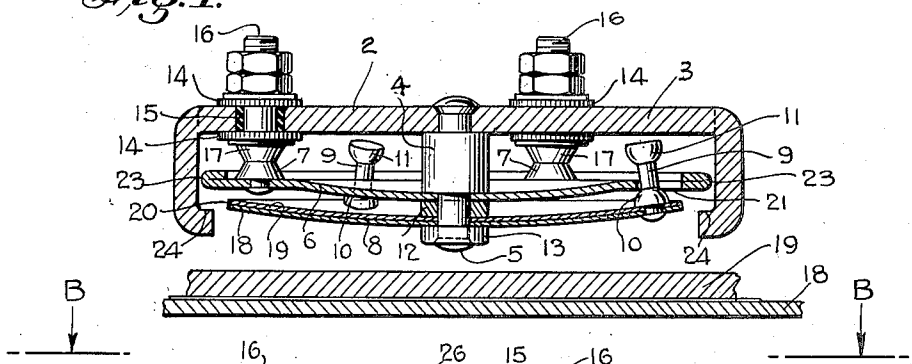


Fig. 2.

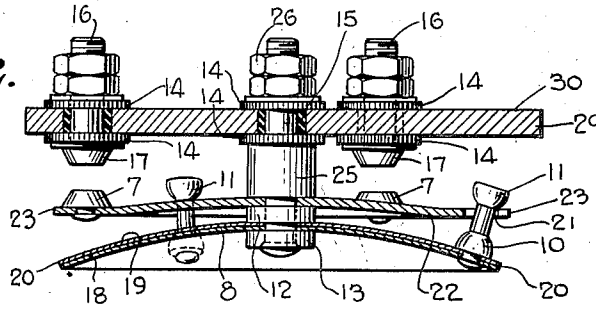


Fig. 3.

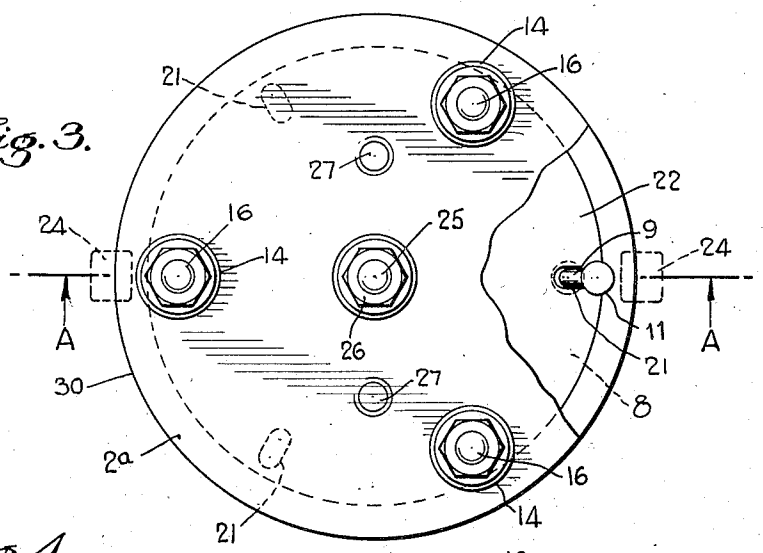
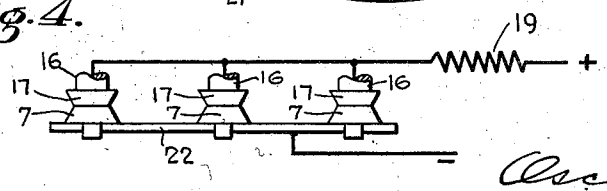


Fig. 4.



INVENTOR

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UNITED STATES PATENT OFFICE

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TEMPERATURE CONTROLLED ELECTRIC SWITCH

Application filed November 15, 1927. Serial No. 233,483.

This invention relates to automatic temperature controlled electric switches and more particularly to automatic temperature controlled electric switches employed in electric flat irons, or similar heat generating appliances.

One object of this invention is to produce an automatic temperature controlled electric switch wherein the normal contact pressure is maintained at maximum until the actual opening of the circuit occurs.

Another object is to produce a switch wherein the automatic switch actuating member is acted upon by heat and is independently moved for predetermined distance before actuating the contacting mechanism, the actual movement of the contacting mechanism not occurring until after the actuating member has attained a high rate of speed and thereby causes a quick break of the contacting mechanism without varying the contact pressure prior to the actual breaking of the circuit.

Another object is to produce a switch wherein temperature regulation is maintained substantially close whereby as for example, an electric iron will not abnormally cool before the switch is again closed to supply current to the heating element forming part of said iron.

Another object is to produce a switch comprising a self contained unit which may be suitably attached to an electric iron or other heat generating appliance.

Another object is to produce a switch wherein the "break" is rapid and the "make" is slow, in this manner preventing fusing of contact on the "break" and abrasion of said contacts on the "make".

Other objects and advantages will appear as the description of the invention progresses and the features of the invention will be pointed out in the appended claims.

This invention consists in the novel construction and arrangement of parts hereinafter described, delineated in the accompanying drawing, and particularly pointed out in that portion of the instrument wherein patentable novelty is claimed for certain and peculiar features of the device, it being understood that, within the scope of what hereinafter is claimed, divers changes in the form, proportions, size and minor details of the structure may be made without departing from the spirit of the invention, or sacrificing any of its details.

In describing the invention in detail, reference is had to the accompanying drawing, where I have illustrated embodiments of the invention, and wherein like characters of reference designate corresponding parts throughout the several views.

Figures 1 and 4 are sectional views of one form of switch and are taken in part on line A—A of Fig. 3, and Fig. 2 is also a sectional view taken on line A—A of Fig. 3, and Fig. 3 is a top view taken on line B—B of Fig. 2.

Referring to 1, switch 2, comprises base 3, riveted, or welded to which is stud 4 having extension 5 supporting contact disk 6 having contacts 7—7 and thermo metal disk 8, riveted to which are actuating studs 9—9 having circuit closing balls 10—10 and circuit opening balls 11—11. Disks 6 and 8 are held in spaced relation by collar 12 and are rigidly secured to stud 3 by collar 13 riveted or welded to extension 5.

Insulatively mounted on base 2 by insulating washers 14—14 and bushings 15—15 are contact posts 16—16 having contact 17—17 forming one terminus of the circuit to be broken.

Thermo disk 8 comprises two dissimilar metals 18 and 19 as for example, steel and brass welded together in sheet form after which a flat disk as 8 is stamped therefrom and whereafter said disk is spun or stamped into cup form as shown in Fig. 1, the steel face 18 facing downwardly.

The contact disk 6 is stamped from sheet metal, preferably steel, and its movement is not affected by variation of temperature. Said disk is formed cup shaped and of deeper magnitude than shown, the position shown being determined by the impingement of contacts 7—7 against contacts 17—17, the restraint of said disk determining the contact pressure between said contacts.

As shown in Fig. 1, the electric iron 18 and its heating element 19 is assumed to have

cooled sufficiently to require re-heating of said iron. When said iron is fully heated and whereby switch 2 has opened its contacts, the thermo disk 8 will be substantially in the position shown as shown in Fig. 2. As the iron 18 and its heating element 19 cool, the outer edge 20 of thermo disk 8 moves substantially slowly upwardly until circuit-closing balls 10—10 impinge on the lower side of orifices 21—21 in contact disk 6, whereafter the outer edge of contact disk, as 6, or 22, is also moved slowly upward until contacts 7—7 and 17—17 are substantially close together. As the circuit closing balls 10—10 impinge on orifice 21 the critical buckling stage of thermo disk 8 has been reached and without aid of heat, it tends to move upwardly rapidly thereby exerting additional pressure to move contact disk, as 6 or 22 upward more rapidly. However, as said contact disk has not reached its critical buckling stage it resists the additional upward action of said thermo disk. As contacts 7—7 closely approximate contacts 17—17 the critical buckling stage of contact disk, as 6, or 22 is reached and said disk snaps upwardly rapidly until contacts 7—7 impinge on contacts 17—17. The outer edge 23 of contact disk, as 6 or 22, is now tending to move upwardly without the assistance of thermo disk 8 and thereby causes contacts 7—7 to impinge upon, and establish firm contact with contacts 17—17.

As the iron 18 and its heating element 19 cool, the outer edge 20 of thermo disk 8 moves downwardly slowly until the circuit opening balls 11—11 approximate the upper side of orifice 21. As this occurs the buckling stage of said disk is reached and it snaps downwardly rapidly independently of temperature control, and as said balls impinge on said orifice the contact disk as 6, or 22, is also rapidly moved downwardly in this manner causing a quick break, or separation between contacts 7—7 and 17—17. As contact disk, as 6 or 20 is moved rapidly downwardly by thermo disk 8 it passes through its critical buckling stage and thereafter moves downwardly independently of the restraining action of circuit opening balls 11—11.

By slowly approximating contacts 7—7 to contacts 17—17 and thereafter causing a quick closing of said contact, abrasion from phening, or hammering is reduced to a minimum thus insuring long life of said contact. Furthermore by causing a quick break of said contacts without reducing the contact pressure prior thereto, substantially prevents arcing and fusing of said contacts in this manner further prolonging the life of said contacts.

For certain switches, as 1, the base 2 is formed to include stops, as 24—24 to limit the downward movement of edge 23 of contact disk 6.

Referring to the modificated switch 30 shown in Figs. 2 and 3, disk supporting stud 25 has been modified and insulatively supported by insulating washers 14—14 and bushing 15. Also stop lugs 24—24 and the reinforcing flange of contact disk 6 have been omitted.

The base 2 of switch 1, is insulatively mounted within the electric iron housing 18, whereas the base 2*a* of switch 30 may be secured thereto without said insulation, suitable holes 27—27 being provided for that purpose.

What I claim is:

1. A thermo-electric switch comprising in combination; a base member, contacts insulatively supported thereby, a biased disk member supported by the base member having a movable circumferential portion, contacts supported by the movable circumferential portion arranged to engage the base member contacts, a thermostatic member supported by the base member having a heat affected movable portion arranged to actuate the movable circumferential portion of the biased member, and lost motion means actuated by the heat affected movable portion of the thermostatic member for operating the movable circumferential portion of the biased member only during the final movement periods thereof whereby a substantially initial rapid movement of the movable circumferential portion of the biased member is effected as the contacts are separated.

2. A thermo-electric switch comprising in combination; a base member, contacts insulatively supported thereby, a concave disk member having a central portion rigidly secured to the base member, a movable biased circumferential portion surrounding the rigidly secured central portion, contacts supported thereby arranged to engage the base member contacts, a bi-metallic concave disk member having a central portion rigidly secured to the base member, a movable biased circumferential portion surrounding the rigidly secured central portion arranged to be actuated by variation of temperature, and means supported by the movable biased circumferential portion of the thermostatic member for operating the movable biased circumferential portion of the contact supporting disk member from one biased position to the other biased position whereby the contacts may be separated or engaged.

3. A thermally actuable switch including a base member, contact members insulatedly supported thereby, an inherently snap-acting disk member supported on said base, contact members on said disk member arranged to engage the contacts on the base, an inherently snap-acting bimetal disk member having two limiting positions of stable equilibrium supported by said base, and means carried by the bimetal disk member to ensure

a predetermined initial movement of a portion thereof independently of the first named disk member and to then operatively engage the same to actuate it.

4. A thermally controlled switch comprising a base, contact members thereon, a single-metal disk, a bimetal disk, both of said disks being dished to effect operation thereof inherently from one limiting position to another with a snap action, contact members on the single metal disk cooperating with the contact members on the base, a single means for supporting both of said disks in coaxial positions on said base, and lost-motion means carried by the bimetal disk for actuating the single-metal disk when the bimetal disk is subjected to variations of temperature.

5. A thermally controlled switch including a base, contact members thereon, an inherently snap-acting single-metal disk, an inherently snap-acting bimetal disk, each of said disks having two opposed limiting positions, contact members on the single-metal disk cooperating with the contact members on the base, means for supporting said disks in spaced relation on said base, and lost-motion means carried by the bimetal disk for actuating the single-metal disk when the bimetal disk is subjected to variations of temperature.

Signed at New York city, in the county of New York, and State of New York, this 28th day of October, A. D. 1927.

OSCAR A. ROSS.