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ELECTRIC THERMAL SWITCH

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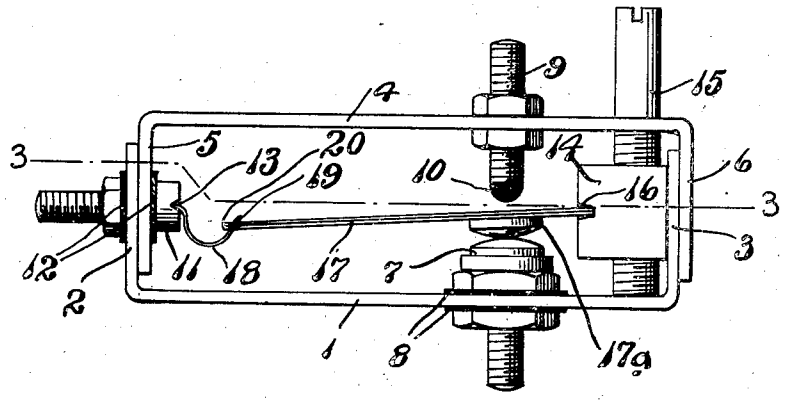


Fig. 1.

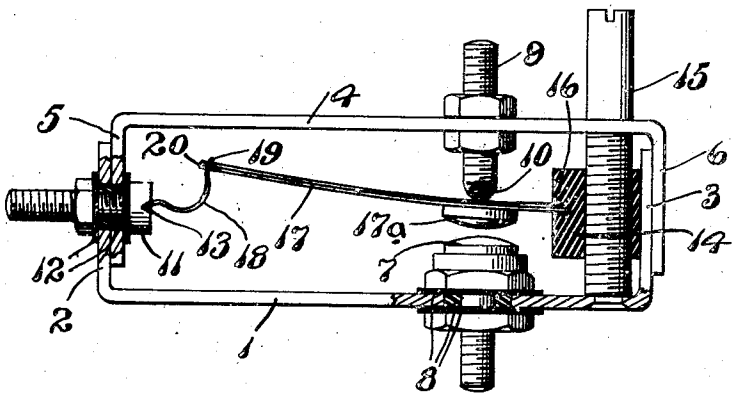


Fig. 2.

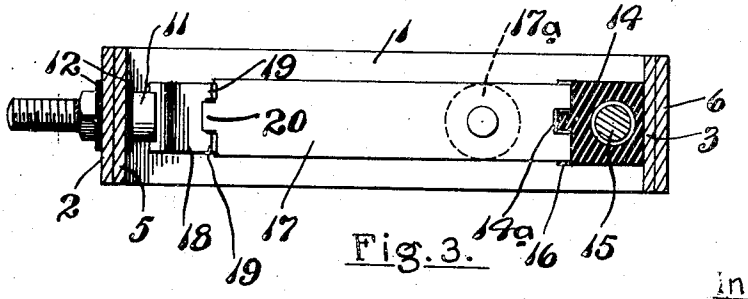


Fig. 3.

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ELECTRIC THERMAL SWITCH

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2 Claims. (Cl. 200—139)

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This invention relates to a thermostatically controlled switch for electric circuits and in which the current may be automatically turned on and off upon the attainment of predetermined temperatures to which the switch structure is subjected; as for example, as one place of utility, in electric flat irons. However the switch is not limited in use solely to electric flat irons but is adapted for use in a great many relations where a temperature controlled switch and one which may be adjusted to snap on or off at different predetermined temperatures is desired.

The present invention is directed to a switch of the character stated which is simple and economical in construction, is sturdy and durable and which may be manufactured in large quantity, the parts thereof being readily formed and easily assembled.

An understanding of the invention may be had from the following description taken in connection with the accompanying drawing, in which,

Fig. 1 is a side elevation of the switch showing it in closed position.

Fig. 2 is a similar view with parts in section to better disclose the hidden structure and with the switch in its open position, and

Fig. 3 is a horizontal section substantially on the plane of line 3—3 of Fig. 1 looking in a downward direction.

Like reference characters refer to like parts in the different figures of the drawing.

In the construction of the switch an open supporting frame is made of two identical parts formed from flat stock. One of said parts includes a lower side 1 with upwardly extending ends 2 and 3 turned at right angles therefrom. The other or upper part of the frame includes a horizontal upper section 4 with downturned ends 5 and 6. The two parts of the frame are identical in construction and are placed together with the ends 2 and 5 overlapping and likewise the ends 3 and 6. The ends 3 and 6 may be permanently secured in any suitable manner as by welding and the ends 2 and 5 secured together by attachment of one of the binding posts of the switch structure as later described.

A binding post having a contact head 7 and a threaded stem is mounted upon the lower member 1 of the frame, the stem extending therethrough and being connected by nuts as shown, with suitable insulation disks and collar 8 to electrically insulate from the supporting frame. Directly over the contact head 7 a threaded stem 9 is mounted upon and passes through the upper member 4 of the frame being secured by nuts

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as shown. The lower end of the stem which is spaced a distance from the upper side of the contact head 7 has a head 10 of insulating material permanently secured thereto.

At one end of the frame a second binding post having a head 11 and a threaded stem is mounted, the stem passing through the overlapping ends 2 and 5 as shown in Fig. 2 and such binding post is insulated from the frame by insulating disks and collar 12 as shown in Fig. 2. The head at the inner side has a transverse horizontal V-shaped groove 13 cut or otherwise formed therein.

Adjacent the opposite end of the frame a vertical adjusting screw 15 passes freely through the upper side 4 and is secured to the underside 1 so that it may turn readily about its vertical axis. It passes through a block 14 rectangular in cross section of insulating material, the outer flat side of which rides against the inner side of the end member 3 of the supporting frame. At its inner side the block 14 has horizontal grooves 16 cut therein from its opposed sides inwardly for a distance leaving a tongue 14a which separates the inner ends of the grooves 16 as shown in Fig. 3.

A temperature affected thermostatic bar 17 has one end notched to be received in the grooves 16 (Fig. 3), and extends toward the binding post head 11 but terminates short thereof. This thermostatic bar is made of two connected layers or strata of different metals which have different co-efficients of expansion, providing a bimetallic member which is affected as to its shape by changes of temperature because of the differing elongations of the two metallic parts upon increases and decreases of temperature. A spring 18 of flat metal and of concave form with outwardly curved end portions has one end seated in the groove 13 in the head 11. The opposite end has its middle portion cut away leaving two spaced apart ears 19, and the other end of the bimetallic element 17 is provided with a centrally disposed projecting tongue 20 which lies in the notch between said ears 19. At the under side of the bimetallic element 17 a contact head 17a is permanently secured directly over the contact head 7 and adapted in one position to have contact engagement therewith (Fig. 1) and in another be separated (Fig. 2).

The binding posts having the heads 7 and 11 are designed for the attachment of the wires of an electric circuit. When the switch is in the position shown in Fig. 1, contacts 7 and 17a being in engagement the circuit is completed through the binding posts, the bimetallic element 17 and

the spring member 18. Upon an increase in temperature and a greater expansion of the lower member of the bimetallic element 17 such element as a whole changes its form from, for example, the straight form shown in Fig. 1 to a bowed form shown in Fig. 2, with an elevation of the end of the element 17 connecting with the spring 18, and a flexing of said spring 18 until the line of force of the spring passes above the plane of the notch 13, whereupon there is an instantaneous upward movement of the bimetallic element to the position shown in Fig. 2 and a like instantaneous separation of the contact 7 and 17*a*. This breaks the circuit and the flow of current is interrupted. Upon reduction of temperature of the contraction of the lower member of the bimetallic element 17, greater than that of the upper member, serves to straighten such element 17 with a lowering of the end connected with the spring 18 and a passage of the line of force exerted by the bimetallic element below the horizontal plane of the notch 13, with an instantaneous contact engagement of the contacts 7 and 17*a* and, therefore, an elimination of sparking between said contacts.

The insulating block 14 which carries one end of the bimetallic element 17 is adjustable vertically to different positions by turning the adjusting screw 15. This varies the times at which the making and breaking of the circuit occurs. For example in a flat iron, by adjustment to one position the temperature of the heating coil which is supplied by the electric circuit in which the switch of the present invention is installed may be a predetermined lower temperature, the attainment of which will cause the switch to move from closed to open position, than another or other adjustments for higher temperatures at which the closed switch will be automatically opened.

The construction described is simple and practical and economical to make as the major portion of the parts may be produced by simple punch press or automatic screw operations. The assembly is easy requiring little or no skill on the part of the workmen. The construction is very practical and useful and has been so proven in test and trial.

The invention is defined in the appended claims and is to be considered comprehensive of all forms of structure coming within their scope.

I claim:

1. A construction of the class described comprising, a support having spaced sides and ends, a binding post mounted on one of the ends of the support, a second binding post mounted on one of the sides of the support, said binding posts being adapted to have circuit wires connected therewith, an adjusting screw extending through the opposite side of the support and mounted for turning movement, a block of insulating material through which said adjusting screw passes, said first mentioned binding post and said block having grooves at their inner sides, a bimetallic element having one end received in the groove of said block and extending over said second binding post, a contact on said bimetallic element over the second binding post, a U-shaped spring of flat metal having an edge received in the groove of the first mentioned binding post, hinge connections between the other end of said spring and the adjacent end of said bimetallic element and a stop mounted on the side of said support opposite the second binding post between which and said second binding post the bimetallic element is movable, said stop having an inner end of insulating material, and said binding posts being insulated from said support.

2. A support comprising two U-shaped members of flat metal having parallel upper and lower sides and having legs overlapping each other to provide ends for the support, a binding post connected at one end of said support and insulated therefrom, an adjusting screw passing through one side of the support and having a rotatable connection to the opposite side, a block of insulating material through which the adjusting screw passes, the head of the binding post at its inner side and the inner side of said block having horizontal grooves therein, a bimetallic element having one end received in the groove of said block, a spring having one end received in the groove of the binding post head and provided with a notch in its opposite end to provide spaced ears one at each side of the notch, said bimetallic element at its adjacent end having portions cut away at each side to form a tongue received between said ears, a second binding post secured to the lower side of the support and insulated therefrom adjacent the end of the support at which the block is mounted, a contact carried by the bimetallic element over the head of the second binding post, a screw adjustably mounted on and extending through the upper side of the support in vertical alinement with the second binding post, and a member of insulating material connected to the inner end of the screw.

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