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THERMOSTATIC SWITCHING DEVICE FOR ELECTRIC IRONS.

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To all whom it may concern:

Be it known that I, FRANK JERMIN, a citizen of the United States, and a resident of Alpena, in the county of Alpena and State of Michigan, have invented a new and Improved Thermostatic Switching Device for Electric Irons, of which the following is a full, clear, and exact description.

This invention relates to a thermostatic switching device for electric irons, and has particular reference to means whereby the current supplied to and the temperature of the iron may be controlled.

A main object of the invention resides in the provision of a thermostatically operated switch constructed to open and break the electric circuit at a predetermined temperature, and means combined therewith to prevent the switch from being closed again until the iron has cooled by a definite amount.

Another object resides in the construction of the above mentioned switch in such manner that it may be at any time released manually when desired.

A further object resides in the construction of a circuit-controlling unit, including a thermostat which is applicable in a very economical manner to any suitable type of iron with a minimum necessity for altering the structure of the iron.

A still further object resides in the disposition of the parts in such manner that they are substantially enclosed within the iron and can be affected only to a minimum degree by outside interference.

Another object resides in the construction of a thermostat which is extremely sensitive to operate quickly and efficiently at the critical temperature to open the circuit.

A further object resides in the particular construction and arrangement of parts which are hereinafter described and claimed and shown in the accompanying drawings.

The invention is illustrated in the drawings, of which—

Figure 1 is a vertical section through the body portion of the iron showing the current-controlling switch located in the heel of the iron.

Fig. 2 is a plan view of the rear portion of the iron with the cover removed showing the parts in their closed position.

Fig. 3 is a partial vertical sectional view

through the iron, and enlarged, showing the manually operated switch and the thermostatic means for opening it.

Fig. 4 is a plan view of Fig. 3 and also includes a diagram of the essential circuit connection.

The form of the invention shown in the drawings is a preferred form, although it is understood that modifications in the construction and arrangement of the parts and in the character of the material used may be adopted without departing from the spirit of the invention.

One form in which my invention may be embodied is illustrated in the drawings and comprises an iron having an ironing surface 1 and a body portion 2 within which an electrical heating medium is disposed in any desired and well known manner. This iron is provided with a cover 3 and a handle 4. The cover, handle, body portion and ironing surface are fastened together in any well known manner by means of screws 5 and 6. The rear portion of the body 2 is provided with a recess 7, and in this recess there is adapted to be disposed current-controlling devices whereby the heating current supplied to the heating element is controlled to any desired degree.

This controlling apparatus comprises a switch bar 8 having a button 9 on its end, whereby it may be manually operated, and a spring 10 tending normally to disengage the switch bar from the spring contact fingers 11 and 12. The switch bar is not only adapted to be operated manually but is also adapted to be operated by a thermostat or temperature responsive element 13. The switch bar 8, the temperature responsive element 13, and their co-operating parts, are connected to and mounted on a switch base 14, preferably, although not necessarily, in the form of a sheet-metal stamp 14 having a cup-shaped depression 15 to receive the thermostatic element 13, which is shown, and preferably is, in the form of a flat disk-like container within which is disposed, preferably, an expansive fluid which has a definite temperature beyond which it expands. The lateral faces of the disk, such as 16 and 17, are of such thickness that the expansion of the fluid within the disk or container 13 will cause a deflection thereof.

This disk-like container 13 is clamped in

the recess by reason of the engagement therewith of fingers 18, preferably struck from the metal of the stamping or switch base 14. The switch bar 8 is provided with a base portion 19 adapted in the normal position of the bar to rest on the top surface 17 of the thermostatic element 13. The bar is provided with a contact stud 20 extending through the bar and electrically separated therefrom by insulation 21 in the form of an insulated sleeve. This stud 20 is adapted to bridge the gap between the spring contact fingers 11 and 12. The bar is provided with a notch 22 adapted to engage with a lip 23 formed in the bottom of a slot 24 at the rear of the stamping or switch base 14. This stamping at its rear end is also provided with a struck-up finger 24^a which is adapted to project across the top edge of the bar to limit the amount to which it can be lifted to an amount just sufficient to permit of the release of the notch 22 from the lip 23. The bar is adapted to ride in this slot so formed. A pin 25 engages with the rear wall of the switch base to prevent the switch bar from moving backward more than a determined amount. The forward end of the bar is tapered as at 26 and protrudes through a slot 27 formed in the front wall of the switch base. The position of the front end of the bar when the switch closes is indicated in full lines in Fig. 3. The position of the bar when the switch is open is indicated in dot-and-dash line in this same figure. These two positions will indicate that the forward portion or edge of the bar 8 always engages to some extent in the slot 27. When the switch is in its closed position, a fulcrum pin is formed at the point 28, for instance, so that when the thermostatic element 13 expands against the base 19 of the bar, the rear end in which the notch 22 is located is lifted from engagement with the lip 23, so that the spring 10 will force the bar back to the limit of the movement allowed by the pin 25 so that the stud 20 will disengage from the spring fingers 11 and 12. The slot 24 is of ample height to allow the bar 8 to be disengaged from the lip 23 and to slide far enough back to open the switch. However, the switch can be released manually by moving the button or knob 9 with the finger, thus manually disengaging the lip 23 from the notch 22.

When the thermostatic element 13, however, is in its expanded condition and the switch has been released, it will be observed that it will be impossible to move the switch back into closed position because the parts are so coordinated that the switch bar can only be disposed in its closed position when the thermostatic element is not in its expanded condition. This element expands only when a predetermined temperature is

obtained, and as long as this temperature remains the disk 13 will remain expanded and will not allow the switch to be moved back so that the notch 22 will engage with the lip 23. This provision keeps the switch in the off position until the iron is sufficiently cooled below the predetermined temperature, and will keep the switch open even then until it is operated by hand to move it to the closed position.

In Fig. 4 I show the ordinary terminal posts 29 and 30, a terminal wire 31 connected to the post 29, and a wire 32 connected to the post 30. The wire 31 is connected to one end of a heater element 33, the other end of which is connected to a binding post 34. This binding post is insulatingly supported in any desired manner on the iron. The other spring finger 12 is connected to a similar binding post 35 to which the wire 32 is connected. It is, of course, easily understood that the circuit between the terminal posts and the heating element is broken at the spring contact fingers 11 and 12. The binding posts 34 and 35 are thoroughly insulated from the switch base 14 in any suitable manner. They are preferably, although not necessarily, supported in this manner from the switch base. It will be seen, therefore, that this switch base or stamping 14 supports the thermostatic element, the switch bar, its operating spring, the binding posts and the spring fingers. The supporting of these different elements on the one base makes the insertion of this control device a matter of the insertion of the single unit which can be separately assembled and put in an iron provided the iron has a recess such as 7 sufficient to receive the unit. After that it is merely a matter of making the proper wire connections between the heater element, the unit and the terminal posts. This unit, including the base plate 14, can be fastened to the body portion of the iron by any suitable means, such as a screw 36. The terminal posts 29 and 30 and the button 9 are protected by sleeve portions such as 37 and 38 in a manner well known in electric irons so that they cannot be very readily injured by contact.

What I claim is:

1. A thermostatic switching device for electric irons which comprises a current controlling switch, an expansible thermostatic element disposed in association with the switch whereby its expansion will open the switch at a predetermined temperature, said thermostatic element being so disposed that when expanded the switch cannot be returned to its closed position.

2. A thermostatic switching device for electric irons which comprises a manually operable switch, expansible thermostatic means for opening said switch at a predetermined temperature, the expansion of the

thermostatic means engaging with the switch to move it to an open position and barring the return of the switch to its closed position until the thermostatic element has assumed its normal position.

3. A thermostatic switching device for electric irons which comprises spring contact fingers, a slidable switch bar adapted to co-operate therewith to close the heating circuit, a flat disklike container containing expansive fluid, a portion of the switch bar resting normally on the disklike container when the bar is in its closed position, means engaging the switch bar tending to move it to its open position, and means for holding the switch bar in its closed position, the expansion of the fluid within the container causing the release of the means for holding the switch bar whereby it is moved to open position.

4. A current control device for electric irons, which comprises a slidable switch bar, a contact stud thereon, spring circuit fingers with which the stud is adapted to engage to close the circuit when the bar is in its closed position, a switch base on which said bar is mounted having a slot therein, an expansible temperature-responsive element disposed on the switch base beneath the bar to engage with the bar in its closed position, and a spring engaging the bar and tending normally to move it to its open position, said bar having a notch to engage with a portion of the switch base in said slot to hold the switch bar in its closed position, said switch base having a second slot engaging with the forward end of the switch bar, this engagement causing the front end of the bar to act as a fulcrum when the temperature-responsive element expands and releases the switch.

5. A current control device for electric irons, which comprises a slidable switch bar, a contact stud thereon, spring circuit fingers with which the stud is adapted to engage to close the circuit when the bar is in its closed position, a switch base on which said bar is mounted having a slot therein, an expansible temperature-responsive element disposed on the switch base beneath the bar to engage with the bar in its closed position, and a spring engaging the bar and tending normally to move it to its open position, said bar having a notch to engage with a portion

of the switch base in said slot to hold the switch bar in its closed position, said switch base having a second slot engaging with the forward end of the switch bar, this engagement causing the front end of the bar to act as a fulcrum when the temperature-responsive element expands and releases the switch, said switch bar having on its rear end a knob which can be manually engaged to release the bar at will.

6. A thermostatic switching device for electric irons which comprises a movable switch bar disposed in the heel of the iron, a knob on the rear end of the bar and projecting from the iron to permit of the manual operation of the switch, and temperature-responsive means within the iron and engaging with the bar to automatically open the switch when the temperature of the iron reaches a predetermined degree.

7. A thermostatic switching device for electric irons which comprises a switch element having a normally closed position, and temperature-responsive means engaging with the switch bar in its closed position, the actuation of the temperature-responsive means when the temperature exceeds a certain degree moving the switch from its closed to an open position, said temperature responsive means in its expanded position obstructing the normal path of movement of the switch to its closed position whereby the switch cannot be closed until the temperature has dropped a predetermined amount.

8. A thermostatic switching device for electric irons which comprises a switch element having a normally closed position, temperature-responsive means engaging with the switch bar in its closed position, the actuation of the temperature-responsive means when the temperature exceeds a certain degree moving the switch from its closed to an open position, said temperature-responsive means in its expanded position obstructing the normal path of movement of the switch to its closed position whereby the switch cannot be closed until the temperature has dropped a predetermined amount, and means on said switch element to permit its operation by hand, said last-mentioned means extending sufficiently from the iron to permit of manual engagement.

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