Oct. 22, 1957 F. E. FINLAYSON 2,810,813

THERMOSTATICALLY CONTROLLED FLATIRON

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Fig. 1.

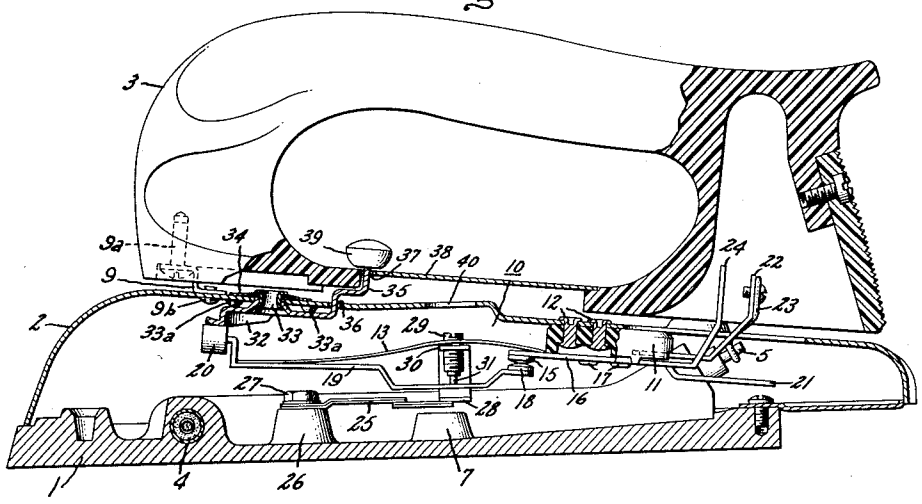


Fig. 2.

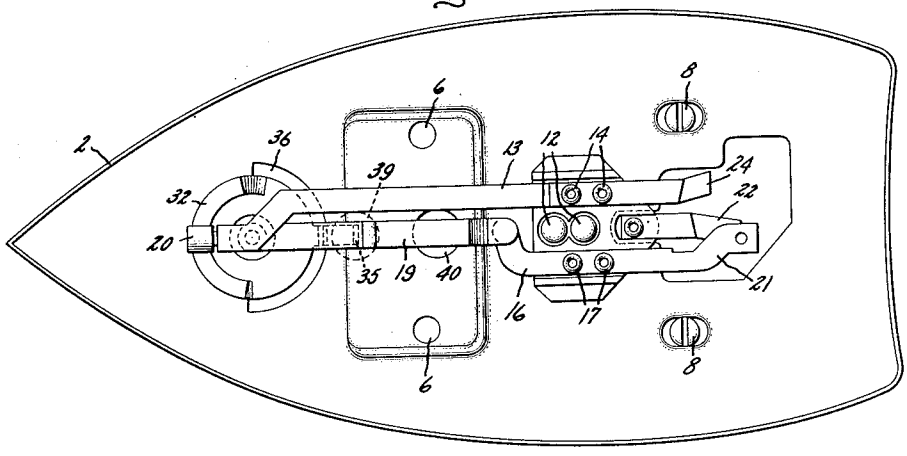
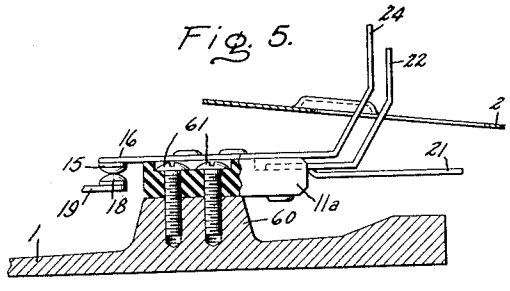


Fig. 5.



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Fig. 3.

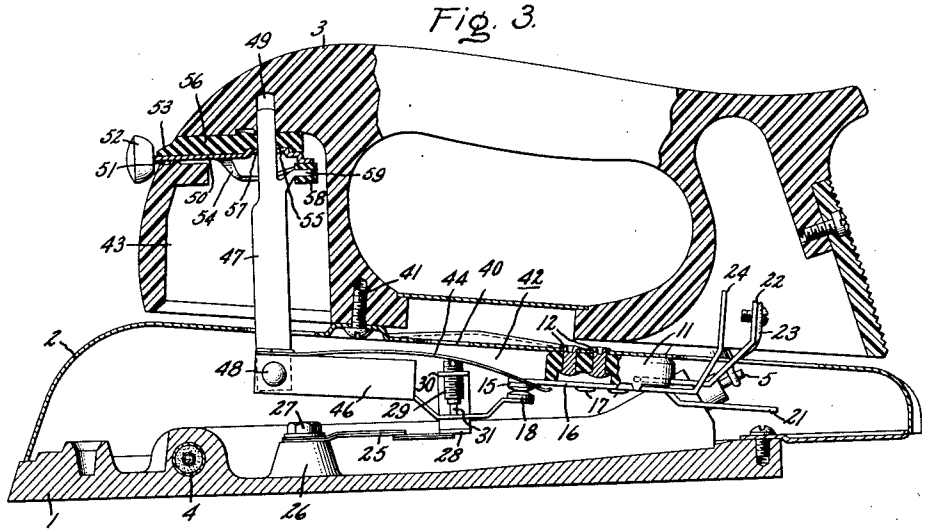
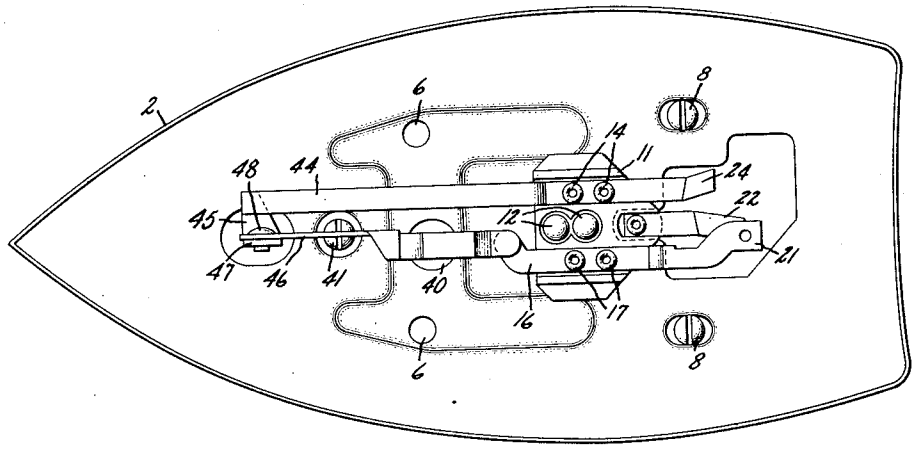


Fig. 4.



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THERMOSTATICALLY CONTROLLED FLATIRON

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Application October 27, 1954, Serial No. 464,978

2 Claims. (Cl. 219—25)

My invention relates to electric flatirons, more particularly to such flatirons including a thermostatic mechanism for controlling the temperature thereof.

Since different materials require different temperatures for optimum ironing thereof, electric flatirons are conventionally provided with adjustable thermostatically controlled mechanisms for maintaining the temperature of the iron at any desired temperature over a substantial range. This is usually a somewhat complex mechanism requiring a number of parts and a substantial frame for carrying the various parts. In accordance with my invention, the construction has been simplified by mounting the parts in such a manner as to eliminate the need for the frame and by combining functions so as to reduce the number of parts required. More specifically I have provided an improved arrangement in which the parts may be mounted on the cover or shell of the iron so that the cover itself acts as a frame. Alternatively some of the parts may be mounted on the handle so that a combined assembly of a handle and the cover acts as the frame for the thermostatic mechanism. Moreover, I have provided an improved arrangement which facilitates manipulation of the control by the thumb or finger of the user.

It is an object of my invention to provide an improved thermostatically-controlled electric flatiron which is simple in construction and employs a minimum of parts.

It is another object of my invention to provide an improved thermostatically-controlled electric flatiron in which a major component of the iron itself, for example, the cover, also provides a frame for the thermostatic mechanism. It is a further object of my invention to provide an improved arrangement utilizing a hollow front handle support for facilitating convenient adjustment of the thermostatic mechanism.

Further objects and advantages of my invention will become apparent as the following description proceeds. The features of novelty which characterize my invention are pointed out with particularity in the claims annexed to and forming part of this specification.

In carrying out the object of my invention in one form thereof, a switch mechanism is mounted on one portion of the cover and the adjusting means, comprising a combined cam and cam-actuating member, is mounted on another portion of the cover in such a manner as to cooperate effectively with the switch mechanism. A temperature-responsive element is mounted on the soleplate and arranged to engage the mechanism for opening and closing the contacts. Alternatively, the switch mechanism may be mounted on the cover and the adjusting means mounted in appropriate relationship on the handle. In either case an easily accessible calibrating member is provided for making a satisfactory factory adjustment of the temperature setting. The adjusting means is arranged for convenient finger manipulation by the user.

For a better understanding of my invention reference may be had to the accompanying drawing in which:

Fig. 1 is an elevation view, partly in section, of an

electric flatiron incorporating an embodiment of my invention.

Fig. 2 is a bottom plan view of the flatiron shown in Fig. 1, the soleplate being removed.

Fig. 3 is an elevation view, partly in section, of a modified form of my invention.

Fig. 4 is a bottom view, with the soleplate removed, of the iron shown in Fig. 3.

Fig. 5 is a partial sectional elevation illustrating a modified form in which this invention may be carried out.

Referring to Figs. 1 and 2, there is shown an electric flatiron which includes a soleplate **1**, a cover or shell **2**, and a handle **3**. The handle is formed of a conventional, electrically-insulating material. Heat is supplied to the soleplate by a heating element **4**, preferably of the sheathed type, embedded in the soleplate **1**. Conventionally, the heating element **4** is generally U-shaped and includes two terminals at the rear end, one of which is shown at **5**.

In the form illustrated the cover **2** is secured to the soleplate by two screws (not shown) which are received in openings **6** in the cover. Each of the screws is received in a corresponding threaded boss **7** extending upwardly from the soleplate **1** and formed integral therewith. The rear portion of the handle is held in assembled relation with the cover by screws **8** which pass through openings in the cover and are received in threaded recesses (not shown) in the bottom of the handle **3**. The forward portion of the cover and the corresponding portion of the handle are held in assembled relation by means of a bracket **9**. One end of the bracket **9** is mounted on the handle by the means of a screw **9*a*** received in a threaded recess in the handle. The other end of the bracket **9** is secured by a screw or other suitable fastening device **9*b*** to the cover **2**.

In order to control the temperature of the iron so as to maintain it within any desired range, a thermostatic switch mechanism, indicated generally at **10**, is employed. The switch structure is supported from the cover **2** by an insulating member or block **11** mounted on the underside of the cover **2**. Block **11** may be formed of any suitable electrically-insulating material. The block **11** may be secured to the cover **2** in any suitable manner, for example, by means of rivets **12** passing through openings in the block and in the cover **2**. A leaf spring **13**, which is in the form of a long flexible resilient member, is mounted at its rear end on the insulating block **11** by means of suitable fastening devices, such as the rivets **14**. A fixed contact **15** is mounted on an arm **16** which is secured in any suitable manner, as by rivets **17**, to the insulating block **11**. A movable contact **18** is provided for cooperation with the fixed contact **15** to make and break circuit to the heating element **4**. This movable contact **18** is mounted on an arm **19** which extends rearwardly from the free or forward end of the leaf spring **13**.

In the specific form illustrated the free or forward end of the leaf spring **13** is secured to the switch arm **19** in any suitable manner, as by riveting or welding. An insulator **20** is then secured to the extreme forward end of the switch arm **19**. It will be apparent, however, that the leaf spring **13**, the switch arm **19** and the insulator **20** may be connected together in a number of different ways. For example, the forward ends of both the leaf spring **13** and the switch arm **19** may be received by a press fit in a recess in the insulator **20**, the insulator then being mounted on the ends of both of these members **13** and **19**. Also, if desired, the members **13** and **19** can be formed from a single strip of material folded back upon itself at the forward end. However, it is usually more desirable to have the switch arm **19** of a more rigid material than the relatively resilient leaf spring **13** and accordingly it is preferable that the two members **13** and

19 be formed of separate strips connected in a suitable manner near the forward ends thereof.

Since it does not form part of my invention, the details of the iron cord and its connection to the iron have not been shown. It will be apparent from the illustration, however, that the arm 16 from the fixed contact 15 includes a rearward extension 21 to which one end of the electric supply cord is connected. The other end of the supply cord, that is the other side of the power supply, is connected to a strip 22 which in turn is connected by a strap 23 to one end or terminal of the heating element 4. The other end of the heating element is connected by a corresponding strap to a rearward extension 24 of the leaf spring 13. Thus, the switch mechanism 10 is connected in series with the heating element so as to control the supply of electrical power to the heating element.

In order to control the actuation of the movable switch contact 15 for opening and closing the thermostatic switch mechanism 10, a temperature-responsive element 25 is provided. In the form illustrated, the temperature-responsive element 25 is in the form of a two-part bimetallic strip. The two parts consist of reversely positioned bimetals in accordance with the invention of Russell A. Windborne, described and claimed in Patent 2,128,869, and assigned to the assignee of the present invention. The bimetallic strip 25 is mounted in heat exchange relationship with the soleplate 1. Specifically, in the form illustrated, one end of the bimetallic strip 25 is mounted in direct contact with a boss 26 formed integral with the soleplate 1. The bimetallic strip 25 is held in intimate contact with the boss 26 by a screw 27 received in a threaded recess in the boss 26.

An actuating arm or member 28 is connected to the free end of the bimetallic strip 25 and extends upwardly therefrom to effect actuation of the switch arm 19 and hence of the movable contact 18. Actual engagement of the switch arm 19 is effected by means of a calibrating screw 29. The calibrating screw is threadedly received in an opening in a flange 30 at the top of the actuating member 28. The screw includes a projection or tip 31 of electrically insulating material which engages the switch arm 19. The bimetallic strip 25 is arranged so as to bend downwardly as the temperature increases. It can be seen, therefore, that as the temperature of the soleplate increases to a predetermined maximum, downward movement of the bimetallic strip 25 and hence of the calibrating screw 29 ultimately causes the switch arm 19 to be moved downward to an extent sufficient to break the circuit of the heating element at the contacts 15, 18.

In order to adjust the temperature setting of the thermostatic switch mechanism, a cam 32 is provided for engagement with the insulator or cam follower 20. In accordance with my invention, this cam 32 is also mounted on the cover 2. Specifically the cam 32 is rotatably received within an opening in the cover 2. A suitable fastening device, for example, a rivet 33 is employed together with a spring washer 34 for holding the cam 32 in the desired rotative relationship with the cover 2. To facilitate rotational movement of the cam, a plurality of projections 33*a* may be formed extending downwardly from the cover 2. In order to provide for adjusting the position of the cam 32, a control lever or cam-actuating member 35 is provided. In the form illustrated this lever is formed integrally with the cam 32 and thus the functions of the control lever and the cam are combined in one part. The control lever 35 is arranged to extend upwardly through an arcuate slot 36 in the cover 2 and through a gap 37 between a saddle plate 38 and the handle 3. A control knob 39 is provided on the extremity of the control lever 35 for facilitating actuation thereof.

It will be apparent that there may be some variations in the relationship of the various parts of the assembled structure as a result of variations during the manufacturing operation. In order to provide an accurate setting

of the temperature of the iron despite such variations, the calibrating screw 29 is provided. Access to the calibrating screw after assembly of the iron has been completed is provided by an opening 40 in the cover 2 in alignment with the calibrating screw 29. Thus, before the saddle plate 38 is assembled, the calibrating screw may be readily adjusted by a tool inserted in the opening 40 so that the temperature of the iron coincides with the temperature indicated on a dial adjacent to the control lever 35. After the iron has been properly calibrated by adjusting the screw 29, the saddle plate 40 is assembled on the iron.

The cam 32 is shaped, as illustrated, to provide a surface of varying height in engagement with the insulator 20. The insulator 20 is maintained continuously in engagement with the surface of the cam 32 because of the natural resilience of the leaf spring 13. In order to adjust the temperature setting of the iron, the control knob 39 and the control lever 35 are moved in a horizontal plane to rotate the cam 32. In the position illustrated in Fig. 1, the temperature is set at a relatively high value. If it is desired to lower the temperature, the control lever 35 is moved to rotate the cam so that the insulator 20 is allowed to move upwardly, carrying with it the end of the switch arm 19. In this new position of the switch arm 19, it will require a smaller downward movement of the free end of the bimetallic strip 25, and of the calibrating screw 29, to effect engagement with and movement of the switch arm 19 for breaking the circuit at the contacts 15, 18.

It can be seen that by the structure utilized in my invention, the cover 2 acts as the frame for the thermostatic controlling mechanism, and the switch structure and the adjustable control therefor are all conveniently mounted upon this existing part of the iron. In addition, the temperature-responsive element which is mounted on and is directly responsive to the temperature of the soleplate is easily related to and coordinated with the thermostatic switch mechanism for actuating the switch.

A modified form of my invention is shown in Figs. 3 and 4. Corresponding parts have been indicated by the same numerals in Figs. 1 and 2 and Figs. 3 and 4. The structure shown in Figs. 3 and 4 includes a soleplate 1, cover or shell 2 and a handle 3. The cover 2 is assembled on the soleplate 1 in the same manner as in the form previously described. The rear end of the cover 2 is connected to the handle by screws 8, as in the form previously described. The forward portion of the handle and the cover are connected together by a screw 41, which extends through an opening in the cover and is received in a threaded opening in the handle 3. The iron includes a thermostatic switch mechanism indicated generally at 42. The modified form of my invention differs from that previously described primarily in that the cam is positioned at the upper end of a passage 43 in a hollow front supporting portion of the handle 3 in lieu of being mounted directly on the cover 2, and a connecting member extends vertically through the passage 43 to cooperate with the cam and the switch mechanism.

Thus the structure includes a leaf spring 44 corresponding to the leaf spring 13 in the form illustrated in Fig. 1. The leaf spring 44 is similarly mounted on the insulating block 11. On the forward or free end of the leaf spring 44 there is mounted an L-shaped member 45. The leaf spring may be connected to the member 45 in a suitable manner, as by welding or brazing. The switch arm 46 is shaped as illustrated and includes a movable contact 18 mounted on the rear end thereof and adapted to cooperate with the fixed contact 15. The switch structure including the leaf spring 44 and the switch arm 46 has connected thereto at the forward end thereof, an upwardly extending, generally vertical elongated member 47 which is positioned in the passage 43 of the aforementioned hollow front supporting portion of the iron handle. A pin or other fastening device 48 is provided for connecting the member 47 pivotally to the forward end of the switch

arm **46** and to the L-shaped member **45** on the leaf spring **44**. The upper end of the member **47** is slidably mounted in a recess **49** formed in the iron handle **3** adjacent to the uuper end of the passage **43**.

In order to effect adjustment of the temperature setting of the iron, a control lever **50** is provided at the upper end of the passage **43**. The control lever extends through a transverse passage or slot **51** in the front of the handle, and includes a knob **52** on the forward end for actuation thereof. A suitable indicating dial **53** is provided adjacent to the control knob **52** for indicating the temperature setting of the iron. The rear end of the control lever is formed to include a cam **54** at the underside thereof. The combined control lever and cam is formed to provide a circular raised portion **55** which cooperates with a circular recess in the dial plate **56**. The raised portion has an opening **57** therein of sufficient diameter to clear the member **47**.

In order to transmit motion from the cam surface to the thermostatic switch mechanism, an insulator or cam follower **58**, corresponding to the insulator **20** of the form shown in Fig. 1, is mounted on a laterally extending projection **59** formed integrally with the member **47**. This insulator **58** is urged into constant engagement with the surface of the cam **54** by the resilience of the leaf spring **44** which urges the member **47** and its associated insulator **58** upwardly.

The adjustment of the temperature setting by the means of a control lever **50** is accomplished in the same general manner as in the form previously described. Thus, as the control lever is rotated in a horizontal plane, the cam **54** affects the position of the insulator **58** and hence the member **47**. For example, as the control lever is rotated from the position shown, the cam surface forces the insulator **58** and the member **47** downwardly. This moves the switch arm **46** downwardly, thereby making a greater movement of the bimetallic strip **25** necessary in order to engage the switch arm **46** and actuate the movable contact **18** for interrupting the heating circuit. Accordingly, a higher temperature of the iron will be maintained.

In this modified form of my invention, it can be seen that the structure is simple and the number of parts required are again minimized, since the frame for the thermostatic mechanism is furnished by the combination of the cover and the handle mounted thereon. Also the functions of the control lever and the cam are directly combined in one member, the structure being arranged so that an insulator on the switch mechanism is held by the leaf spring **44** constantly in engagement with the cam surface of the combined cam and cam actuating member.

Another modified form of a portion of an iron embodying my invention is shown in Fig. 5. This form differs from those previously described only in that the insulating member which supports parts of the thermostatic mechanism is mounted on the soleplate **1**. The same numerals have been employed to designate the same parts in Fig. 5 as in the forms previously described. The same numerals with a subscript "*a*" added have been employed to designate a modified part corresponding to the parts used in the forms previously described.

Referring to Fig. 5 an insulating member **11***a*, used for mounting parts of the thermostatic switch mechanism, is mounted on a boss **60** extending upwardly from the soleplate **1** by means of screws **61** or other suitable fastening devices. Except for the fact that the insulating member **11***a* is mounted on the soleplate rather than on the cover, the remainder of the mechanism employed is the same as that shown in the form illustrated in Figs. 1 and 2 or the form illustrated in Figs. 3 and 4.

While I have shown and described specific embodiments of my invention, I do not desire my invention to be limited to particular constructions shown and described, and I intend by the appended claims to cover all modifications within the spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In an electric flatiron including a soleplate, a cover, and a handle, a thermostatic mechanism for controlling the temperature of said flatiron, said mechanism including an insulating member mounted on said cover, a leaf spring having one end mounted on said insulating member, a movable contact carried by said leaf spring, a stationary contact mounted on said insulating member and adapted to be engaged by said movable contact, a temperature-responsive element mounted on said soleplate for effecting movement of said movable contact into and out of engagement with said fixed contact, said handle being formed to provide a hollow supporting portion at the forward end thereof, a combined cam and cam-actuating member positioned at the upper end of said hollow portion, an elongated member positioned in said hollow portion and adapted to be moved vertically by said cam for adjusting the temperature setting of said thermostatic mechanism, said handle including a recess at the upper end of said hollow portion, the upper end of said elongated member being slidably received in said recess, and an insulator mounted on said elongated member near the upper end thereof for engaging said cam, the lower end of said member being mounted on the free end of said leaf spring whereby said leaf spring maintains said insulator in engagement with said cam.

2. In an electric flatiron including a soleplate, a cover, and a handle, a thermostatic mechanism for controlling the temperature of said flatiron, said mechanism including an insulating member mounted on said cover, a leaf spring having one end mounted on said insulating member, a switch arm mounted on the free end of said leaf spring, a movable contact carried by said arm, a fixed contact mounted on said insulating member and adapted to be engaged by said movable contact, a temperature-responsive element mounted on said soleplate for effecting movement of said movable contact into and out of engagement with said fixed contact, said handle being formed to provide a hollow supporting portion at the forward end thereof, a combined cam and cam-actuating member positioned at the upper end of said hollow portion, an elongated member positioned in said hollow portion, said handle including a recess at the upper end of said hollow portion, the upper end of said elongated member being slidably received in said recess, and an insulator mounted on said elongated member near the upper end thereof for engaging said cam, the lower end of said member being mounted on the free end of said leaf spring whereby said leaf spring maintains said insulator in engagement with said cam.

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