Oct. 31, 1950 A. G. SWENSON 2,528,254

THERMAL CUTOUT FOR FLATIRONS OR THE LIKE

Filed June 26, 1948

Fig. 1.

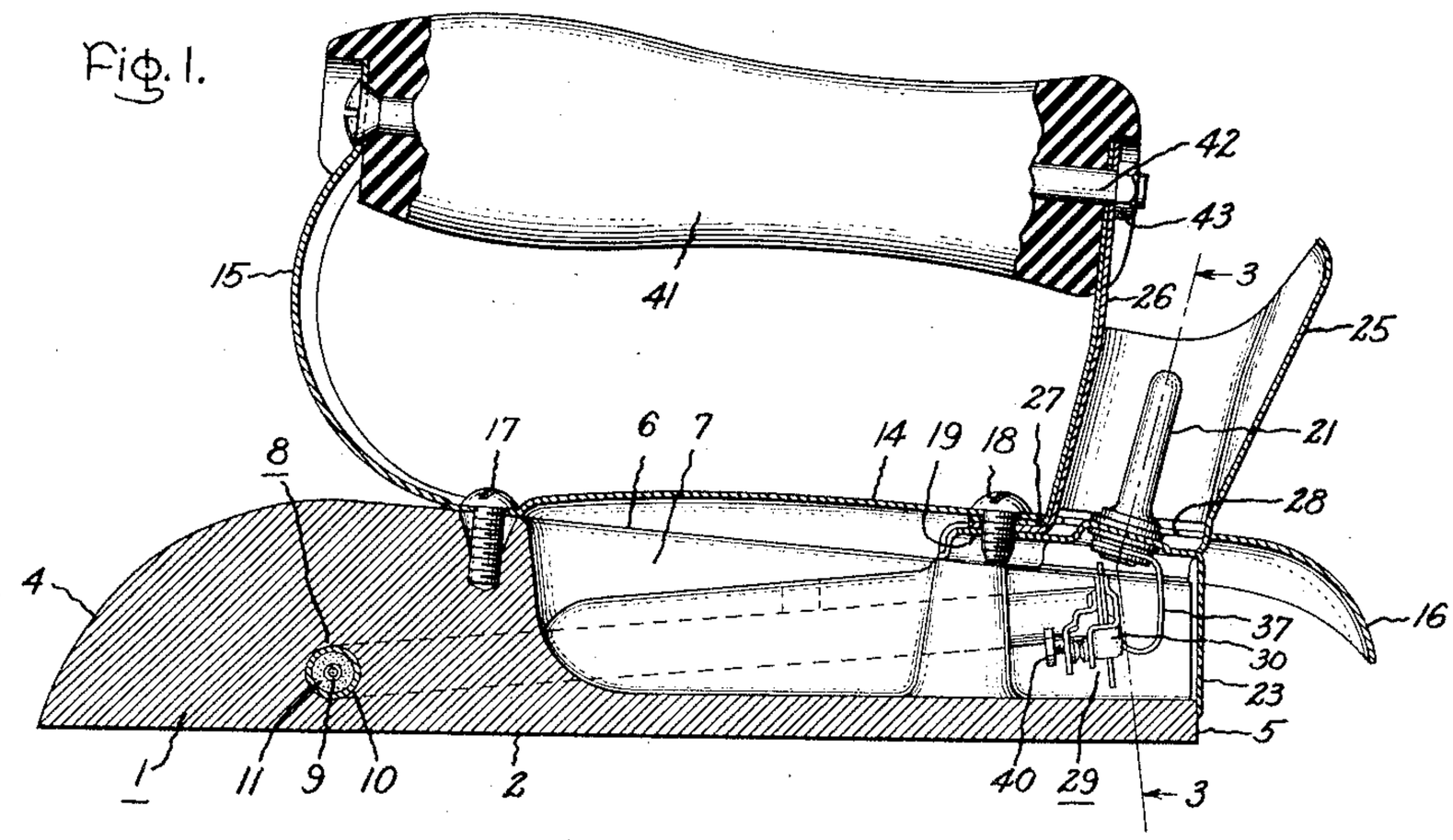


Fig. 2.

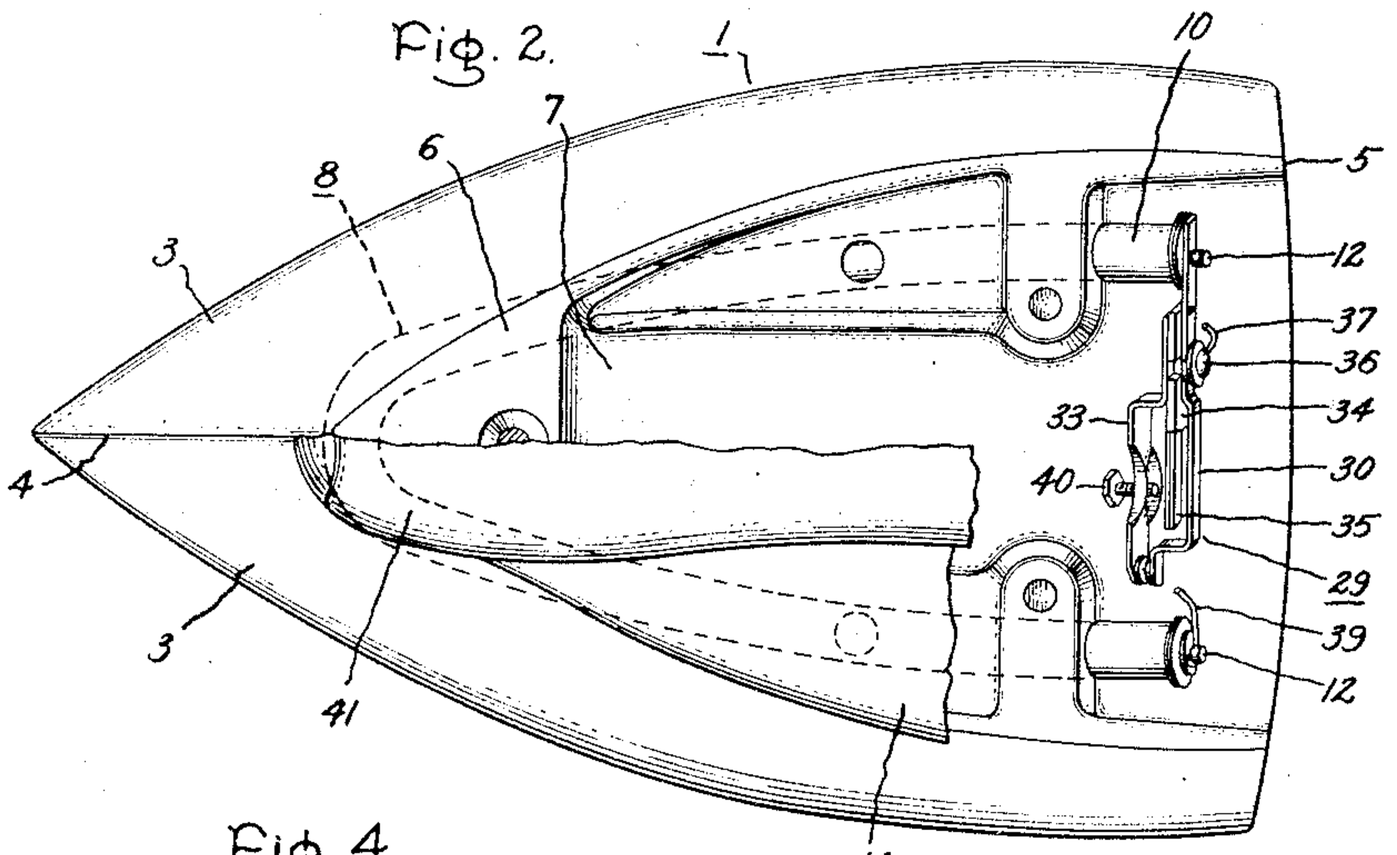
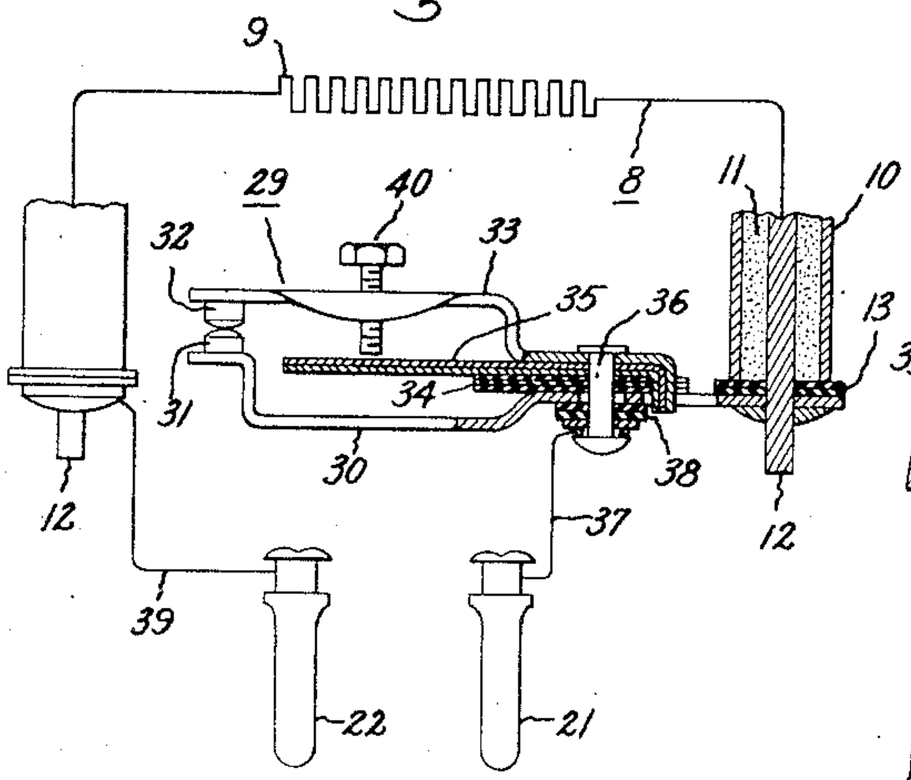
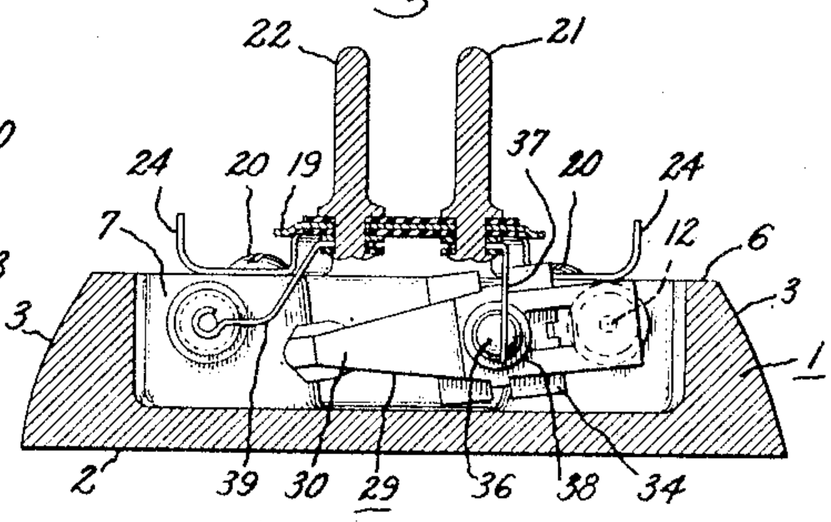


Fig. 4.

Fig. 3.





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2,528,254

THERMAL CUTOUT FOR FLATIRONS OR THE LIKE

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Application June 26, 1948, Serial No. 35,335

2 Claims. (Cl. 219—25)

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My invention relates to improvements in thermostats or cutouts for heating devices such as electric flatirons. Among the objects of my invention are to make an inexpensive cutout which is easy to manufacture, reliable in operation, and capable of withstanding rough usage.

Many cutouts for flatirons prior to my invention have suffered from the disadvantage that they are subject to "overshoot," i. e., the temperature of the iron will continue to rise to an undesirable degree after the protective cutout has opened the circuit to the heating element of the iron. One of the specific advantages of my invention is the alleviation of this condition while accomplishing the primary objects mentioned above.

The objects and advantages desired are obtained not only by the particular design of the thermostat or cutout itself, but also by the manner and place of mounting the cutout with relation to other parts of the iron or other heating device. Details of that which I believe to be novel and my invention will be clear from the following description and claims taken with the accompanying drawing in which is illustrated, as an example, a flatiron with improved cutout mounted so as to obtain the desirable objects and advantages noted.

In the drawing, Fig. 1 is a sectional side view of an iron; Fig. 2 is a plan view of the iron of Fig. 1 with some of the top parts of the iron partly broken away to show the cutout and its mounting; Fig. 3 is a section substantially on the line and in the direction indicated at 3—3 in Fig. 1, showing the cutout and its mounting in elevation; and Fig. 4 is an enlarged cross section of the cutout, with a wiring diagram.

The construction of the particular iron shown and described here is not my invention, but is shown, described and claimed in the copending application of Frank E. Finlayson for "Inexpensive Electric Flatiron," Serial No. 35,400, filed June 26, 1948, and assigned to the same assignee as the present application. For purposes of the present disclosure, and to illustrate an example of preferred construction in which my cutout may be used and mounted, the iron proper will be described first, and the thermal cutout of my invention will then be described in relation to parts of the exemplary iron.

The principal part of the iron is the sole block 1, made of cast aluminum or other metal. The block is provided with a bottom ironing face 2, and two converging side faces 3, which meet at the toe 4 of the block. Joining the rear ends

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of the side faces is a back face 5. A flat top face 6 completes the outer surfaces of the sole block.

In the top face 6, a cavity 7 is provided, in which the heater terminals, the power connections and the cutout will be secured and positioned as later described. This cavity also extends and opens into the back face of the block.

For supplying heat to the iron, a heating element 8 is provided. This element is embedded in the block around the cavity and is preferably of the substantially rigid, self-insulated type in order to best utilize my invention. Such a heating element may be of the character patented by C. C. Abbott, No. 1,367,341 on February 1, 1921. It has a helical resistance conductor 9 housed within a metallic sheath 10 with a highly compacted heat conducting and electrical insulating material 11, such as powdered magnesium oxide, to support the conductor in spaced relation within the sheath. The terminal sections of this heater are provided with the usual rigid and self-supporting wire leads 12 which are connected to the internal resistance conductor in the usual fashion and are insulated from the ends of the metallic sheath by the compacted insulating material 11. Washers 13, preferably of mica or similar insulating material, may assist in the insulation of the wire lead terminals from the sheath.

Because the heater is embedded in the block and is substantially rigid, and the terminals 12 extend into the cavity of the block opposite the opening in the back face of the block, these terminals may be described as self-supporting. No outside support for the free ends of the heater is required.

Closing the top of the cavity in the sole block, and housing the terminals and the cutout, is a cover plate 14. This cover carries a front handle post 15, and is provided with a rolled back edge 16 which may form part of a heel stand for the iron when the iron is at rest. This cover plate may be held in place by suitable means such as a screw 17, threaded into the block directly, and by a screw 18 which is threaded into a support 19. This support is shown as secured by screws 20 to the block, and bridges the cavity in the iron.

Conventional plug terminals 21 and 22 are provided, and these are conveniently carried by but insulated from the support 19 in a manner readily understood. These plug terminals are adapted to be connected to a source of electrical

power through the usual appliance cord and plug, not shown.

A back cover 23 for the back face opening is provided, and this may be made as a part of the support member. Ears 24 on the support can serve to position the cover plate on the sole block and to hold it in slightly spaced relation therefrom.

A plug guard 25, carrying a rear handle post 26, is shown as secured to the support 19 by a ledge 27 which extends under the edge of a hole 28 in the cover plate, being held in place by the screw 18.

Completing the iron is a hand grip 41, fastened between the handle posts, as by a long bolt 42 and nut 43.

To provide control for the heating unit, reducing hazards in use and possible damage to the heating unit or sole block from overheating, the cutout and its mounting of my invention were specifically designed. This thermally responsive cutout or thermostat is generally indicated at 29. This cutout has a current-carrying frame 30, one end of which is attached directly to one of the heater terminals, as by brazing. A contact 31 is attached to the other end of the frame member. Cooperating with this first contact is another contact 32 carried by a spring arm 33 which in turn is carried by, but insulated from, the frame member by insulation piece 34. This piece, which may be of mica, also insulates the small bi-metallic piece 35 from the frame, and is held in place together with the spring arm by rivet 36. Naturally, the spring arm resiliently urges the contacts 31 and 32 toward each other. The terminal rivet 36 mechanically holds the parts together, and connects the fixed end of the spring arm electrically to a wire 37 leading to the plug connection terminal 21, the rivet passing through but being insulated from the current-carrying frame 30, as by the mica washer 38.

The other plug connection terminal 22 is electrically connected directly to the other heater terminal by wire 39. A circuit through the device will be completed from the plug terminal 21 through the wire 37, the rivet 36, the spring arm 33, the contacts 32 and 31, the frame 30, the heater terminal 12, the resistance wire 9 of the heater, the other heater terminal 12, the wire 39, and the plug terminal 22.

In operation, the bimetallic strip 35, when heated, will flex in a direction toward the spring arm. Any satisfactory adjusting means, such as setscrew 40, mounted in the spring arm, may be used to adjust the setting of the thermostat. The bimetal will bear against the end of the screw and flex the spring arm to open the contacts when a desired heat has been reached.

The above-described thermally-responsive cutout arrangement has been found materially to reduce "overshoot" commonly encountered in the control of heating devices of this character. A major part of this result, I believe, is due to the mounting of the current-carrying frame directly on the heating unit terminal. This mounting permits direct heat conduction from the heater to the thermostat, thereby reducing the usual time lag between the reaching of a particular heat by the heater and the response by the cutout.

Contributing to the accurate response of the thermostat to heating changes within the exemplary iron are other factors, such as the absence of physical support of the cutout by other and possibly cooler parts of the iron, the position of the bimetal between the legs formed by the current-carrying frame and the spring arm, the mounting of the cutout in the cavity between the heated side walls and bottom face of the iron, and the substantially complete enclosure of the space in which the cutout is mounted.

Obviously, forms of irons other than the one shown, and heating devices other than flatirons, may be provided with the thermal cutout of my invention to advantage. The device described here, however, has all of the structures necessary for the complete utilization of my invention in its presently preferred form.

As will be evident from the foregoing description, certain aspects of my invention are not limited to the particular details of construction of the example illustrated, and I contemplate that various and other modifications and applications of the invention will occur to those skilled in the art. It is, therefore, my intention that the appended claims shall cover such modifications and applications as do not depart from the true 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 heating device of the type including a block with a heater thereon having self-supporting terminals extending into an enclosed cavity in the said device, that improvement in cutouts which comprises a current-carrying frame electrically and mechanically connected to and supported entirely by a terminal of the heater and entirely within the cavity, a spring arm carried by but insulated from said frame, a thermally movable member supported and extending between the frame and the arm adapted to engage and move the arm when the member is heated, cooperating normally engaged contacts on the frame and on the arm actuated by movement of the arm upon movement of the member, and a circuit connection from said arm to a power source.

2. An electric flatiron comprising a sole block, said block having a cavity therein, a heater embedded in the block around the cavity, a cover for the cavity, rigid self-supporting terminals extending from the heater into the cavity under the cover, a thermally-responsive cutout electrically connected to and mechanically entirely supported by one of the terminals and located entirely within the cavity, and electrical connections from the cutout and from the other terminal extending outside of the cavity through the cover.

ALFRED G. SWENSON.

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