Sept. 30, 1924. 1,509,989

F. THORNTON, JR

AUTOMATIC CUT-OUT FOR ELECTRIC FLATIRONS

Filed Nov. 29. 1921

Fig.1.

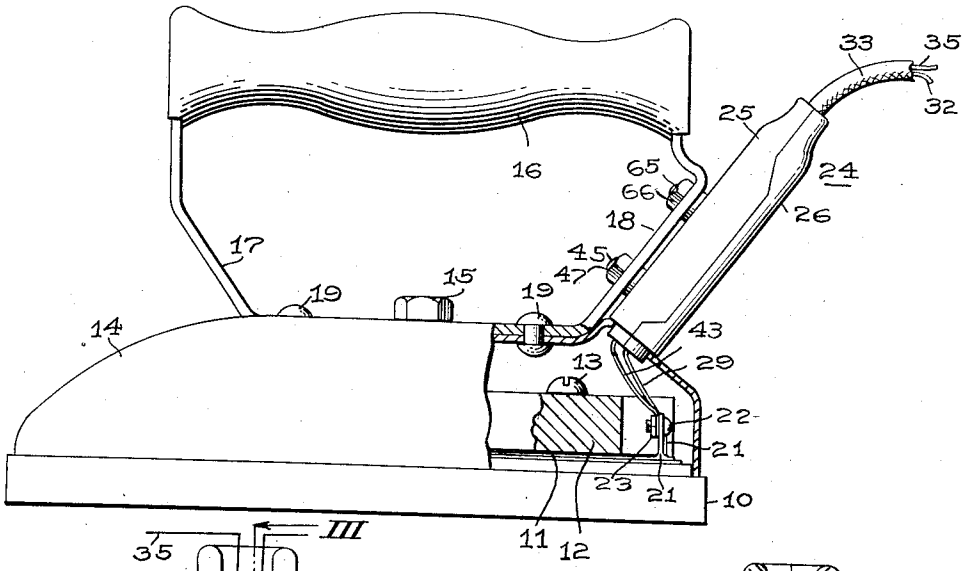


Fig.2.

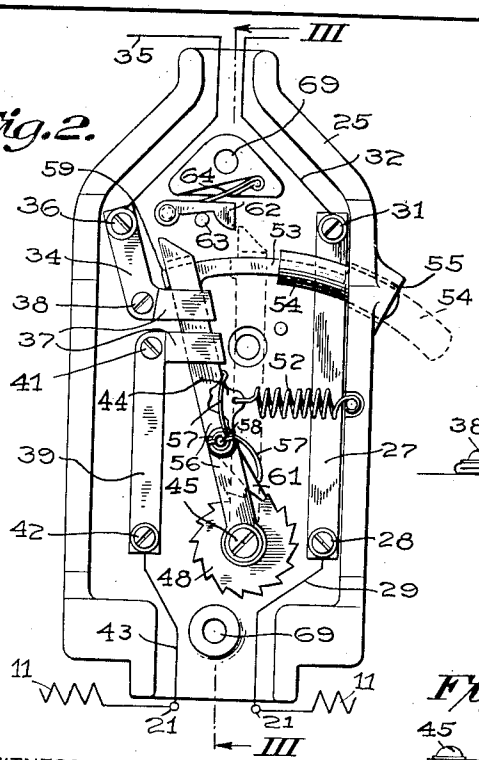


Fig.3.

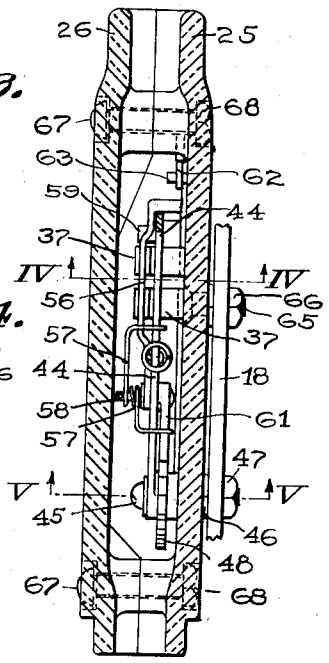


Fig.4.

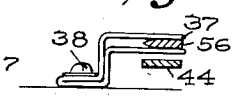
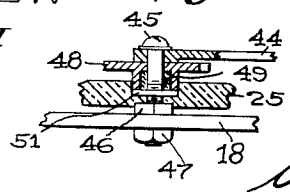


Fig.5.



WITNESSES:

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UNITED STATES PATENT OFFICE.

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AUTOMATIC CUT-OUT FOR ELECTRIC FLATIRONS.

Application filed November 29, 1921. Serial No. 518,545.

To all whom it may concern:

Be it known that I, FRANK THORNTON, Jr., a citizen of the United States, and a resident of Mansfield, in the county of Richland and State of Ohio, have invented a new and useful Improvement in Automatic Cut-Outs for Electric Flatirons, of which the following is a specification.

My invention relates to electrically heated apparatus and particularly to means for limiting the temperature of electrically heated flat irons, and it has for its object to provide a combined terminal block, temperature indicating, temperature limiting and circuit-interrupting device for such application.

It is highly desirable to limit the temperature which may be reached by the body of an electrically heated flat iron and to permanently interrupt the circuit in case the temperature of the working surface reaches a predetermined value. It has not been found practicable heretofore to use a bimetallic strip to effect the interruption of the circuit, as the maximum permissible temperature of the iron is so high as to injuriously affect the metal employed in the strip, and the setting thereof is changed. Expansion members have also been suggested to effect the interruption of the circuit, but, so far as I am aware, none of these devices have proved effective in actual commercial work.

In practising my invention, I provide an insulating casing secured to the handle strap at the rear of the iron containing a knife-blade switch which is spring-biased to its open position. The switch blade is pivotally mounted on one of the bolts securing the casing to the handle strap, a ratchet being also mounted on said bolt and being normally secured thereto by a solder joint. A pawl on the knife blade co-operates with the ratchet to hold the switch in its closed position when it has been manually moved thereto. A second blade is pivotally mounted on the first one, a spring being provided to yieldingly maintain it in proper operative position relatively to the first blade, said spring serving also to yieldingly maintain the pawl in its operative engagement with said ratchet.

A spring-biased stop member is so located in the casing as to momentarily arrest the movement of the second knife blade while the switch is being manually closed, so as to result in a "quick make" action, the stop permitting, however, a quick breaking action when the solder holding the ratchet softens and the spring connected to the knife blade disengages it from the stationary jaws.

In the single sheet of drawings,

Figure 1 is a view, in side elevation, of an electric flat iron comprising the device embodying my invention, portions being broken away.

Fig. 2 is a view, in front elevation, of the combined terminal block and circuit-interrupting device, the outer cover portion of the casing being removed;

Fig. 3 is a longitudinal section thereof taken on the line III—III of Fig. 2;

Fig. 4 is a partial cross sectional view on the line IV—IV of Fig. 3, and

Fig. 5 is a lateral cross sectional view taken on the line V—V of Fig. 3.

An electrically heated iron comprises a bottom plate 10, a heating element 11 and a top plate 12, the three members being secured together by means of a plurality of screws 13, only one of which is illustrated in Fig. 1 of the drawing. A cover member 14 is secured, in its proper operative position, on the bottom plate by means of a suitable bolt 15. A handle 16 is mounted on the cover member by means of suitable handle straps 17 and 18, the lower ends of the handle straps being secured against the cover member by means of rivets 19. The bottom plate, the heating element and the top plate constitute what may be termed the body portion of the iron.

The heating element 11 may be of any desired type or construction usually employed in the art and is not, therefore, described in detail. It may be provided with a plurality of terminal members 21 to which the ends of the resistor may be suitably secured, as by means of screws 22 and nuts 23.

A terminal casing 24 comprises an inner part 25 and an outer part 26, each being made of any suitable insulating material and so formed as to interfit and constitute a substantially closed casing having a chamber therein.

A metallic strap member 27 extends longitudinally of the casing at one side thereof provided, at its lower end, with a clamping screw 28, which not only secures the end of the strap 27 against the inner surface of the

insulating member 25 but also clamps thereon a conductor 29 extending from one of the terminal members 21. A similar clamping screw 31 is provided at the upper end of the member 27 and serves to suitably clamp a conductor 32 of a twin conductor cable 33 against the strap 27 as well as to secure the upper end of the strap against the casing part 25. At the opposite side of the casing is provided a relatively short metallic strap 34 to the upper end of which is secured the other conductor 35 of the supply cable 33 by means of a clamping screw 36. At the lower end of the member 34 is secured a two-part metallic switch jaw 37, being secured against the strap 34 and mounted in its proper operative position in the casing, by means of a screw 38, this construction being illustrated in Fig. 4 of the drawing. A metallic strap member 39 is located below the strap 34, extending substantially longitudinally of the member 25, a suitable clamping screw 41 being provided at the upper end to secure thereagainst a substantially similar two-part switch jaw 37. A clamping screw 42, located at the lower end of the member 39, serves to secure thereto a conductor 43, the lower end of which is connected to the other one of the terminals 21 of the heating element 11.

A lever arm 44 of a two-part knife-blade switch is pivotally mounted on a bolt 45 located in the lower end of the casing which is secured against the handle strap by means of nuts 46 and 47. A ratchet wheel 48 is normally secured to the body of the bolt 45 by means of a solder joint 49, a washer 51 protecting the insulating material of the casing 25 from the solder which, as will be hereinafter set forth more in detail, softens when the temperature of the body portion of the iron reaches a predetermined temperature.

The arm 44 has secured thereto, intermediate its ends, a spring member 52, the outer end of which may be mounted in a side wall of the casing. An integral lateral extension 53, substantially of arcuate form, is provided adjacent the upper end of the lever arm 44, an insulating member 54 being suitably secured thereto at the outer end thereof to extend outwardly through an opening 55 in the side wall of the casing member 25 to permit of manually moving the switch to its closed position.

A switch 56 is pivotally mounted on the lever arm 44 intermediate its ends, the intermediate portion of the switch blade 56 being so bent as to be a substantial distance away from, and parallel to, the lever arm 44, the construction being more particularly illustrated in Figs. 3 and 4 of the drawing. A spring member 57 mounted upon a pivot pin 58, upon which one end of the switch blade 56 is also mounted, serves to resiliently press the switch blade against a stop member 59 integral with the lever arm 44 adjacent its upper end.

The other end of the spring member 57 serves to yieldingly press a pawl 61 into operative engagement with the teeth of the ratchet member 48, the construction being such that, while the lever 44 and the switch blade 56 mounted thereon are moved by means of the member 54, the pawl moves over the ratchet 48 and prevents the return of the knife switch under the influence of the spring 52 until a predetermined temperature of the body portion of the iron is reached, as will hereinafter be set forth in detail.

In order to obtain a "quick make" action I provide a stop member 62 pivotally located in the path of travel of the knife blade 56, a pin 63 being located in the casing member 25 to limit the position of the stop 62 which is pressed against the pin 63 by means of a spring 64. When the knife switch is moved by the operator in a counterclockwise direction in the mechanism illustrated, particularly in Fig. 2 of the drawing, the switch blade 56 is momentarily arrested in its movement by the stop member 62 until the lever arm 44 has been moved to substantially the position illustrated by the full lines in Fig. 2, when the upper end of the blade 56 is released and moves quickly into its position illustrated in the full lines of Fig. 2 under the influence of the coil spring 57.

So long as the operator is using the iron in ordinary ironing operations the temperature of the body portion of the iron will not reach an excessively high value but if the operator should leave the iron for an extended length of time the temperature of not only the bottom plate 10 but also of the top plate 12 and of the cover member 14 would reach a dangerously high value. This heat is conducted by the terminal strap 18 to the bolt 45 and to the solder joint 49 and, after a predetermined length of time, the solder joint softens and permits the spring 52 to move the lever arm 44 and the switch blade 56 quickly to the open position, substantially as illustrated by the broken lines of Fig. 2. The stop member 62 does not interfere with the return movement of the knife blade 56. It is impossible for the operator to immediately reclose the circuit and have the mechanism maintain it in its closed position as the temperature of the entire iron and, of course, particularly of the solder joint must fall before the ratchet 48 is again secured to the lever arm 44. When this occurs, the operator may again move the switch to its closed position by means of the member 54, in the manner hereinbefore described and the switch then remains in its closed position until the recurrence of the dangerously high temperature.

The member 54 serves also to indicate whether the switch is in its open or its closed position and hence whether or not current is traversing the heating element if the supply circuit conductor is connected to a suitable source of energy.

A second bolt 65 and nut 66 may be employed to secure the upper end of the casing against the handle strap 18, and a plurality of bolts 67 and nuts 68 may be employed to secure the outer casing 26 against the inner casing 25, suitable openings 69 being provided in the casing 25.

The device embodying my invention thus provides a normally non-removable terminal casing and temperature-indicating, temperature-limiting, circuit-interrupting and current-indicating means for an electrically heated flat iron, which device is operative to automatically interrupt the circuit upon the occurrence of a predetermined temperature in the body of the iron.

While I have illustrated a particular embodiment of the device effective to operate as hereinbefore described, I do not wish to be limited thereto, as many modifications may be made without departing from the spirit and scope of my invention and I desire, therefore, that only such limitations shall be placed thereon as are imposed by the prior art or are specifically set forth in the appended claims.

I claim as my invention:—

1. A combined terminal and temperature-limiting device for an electrically heated flat iron comprising a handle member, and a cover member to which said handle member is secured, said device comprising an insulating casing, a bolt for securing said casing to said handle member, a switch in said casing biased to its open position, means for manually closing said switch, locking means for holding said switch in its closed position, means for securing said locking means to said bolt, said locking and securing means permitting said switch to open at a predetermined temperature of said iron.

2. A combined terminal and temperature-limiting device for an electrically heated flat iron comprising a handle member, and a cover member to which said handle member is secured, said device comprising an insulating casing, a bolt for securing said casing to said handle member, a switch member having a turning movement on said bolt, means for biasing said switch member to its open position, means operatively associated with said bolt to hold said switch member in its closed position, and means for securing said switch-holding means to said bolt, said switch and switch-holding means having a turning movement on said bolt at a predetermined temperature of said iron.

3. A combined terminal, temperature-limiting and circuit-interrupting device for an electrically heated flat iron comprising an insulating casing, a bolt for holding said casing against said flat iron, a lever pivotally mounted on said bolt, a switch blade pivotally mounted on said lever, means for resiliently maintaining said switch blade normally in a predetermined position relatively to said lever, manually operable means for causing said lever to have a turning movement on said bolt, means temporarily arresting the movement of the outer end of said switch blade during the movement of said lever, and means operatively associated with said bolt for locking said lever and switch blade in a predetermined position.

4. A terminal and temperature-limiting device for an electrically heated flat iron comprising a cover member, and a handle member secured thereto, said device comprising an insulating casing, a bolt for securing said casing against said handle member, a manually closable switch member in said casing, resilient means tending to open said switch, and means for locking said switch member in its closed position, said locking means being operatively associated with said bolt and having a turning movement thereon to permit the resilient means to open said switch at a predetermined temperature of said flat iron.

In testimony whereof, I have hereunto subscribed my name this nineteenth day of November 1921.

FRANK THORNTON, JR.