H. W. DENHARD.

AUTOMATIC CUT-OFF FOR ELECTRICALLY HEATED DEVICES.

APPLICATION FILED JAN. 30, 1911. RENEWED DEC. 4, 1912.

1,143,573. Patented June 15, 1915.

Fig. 1.

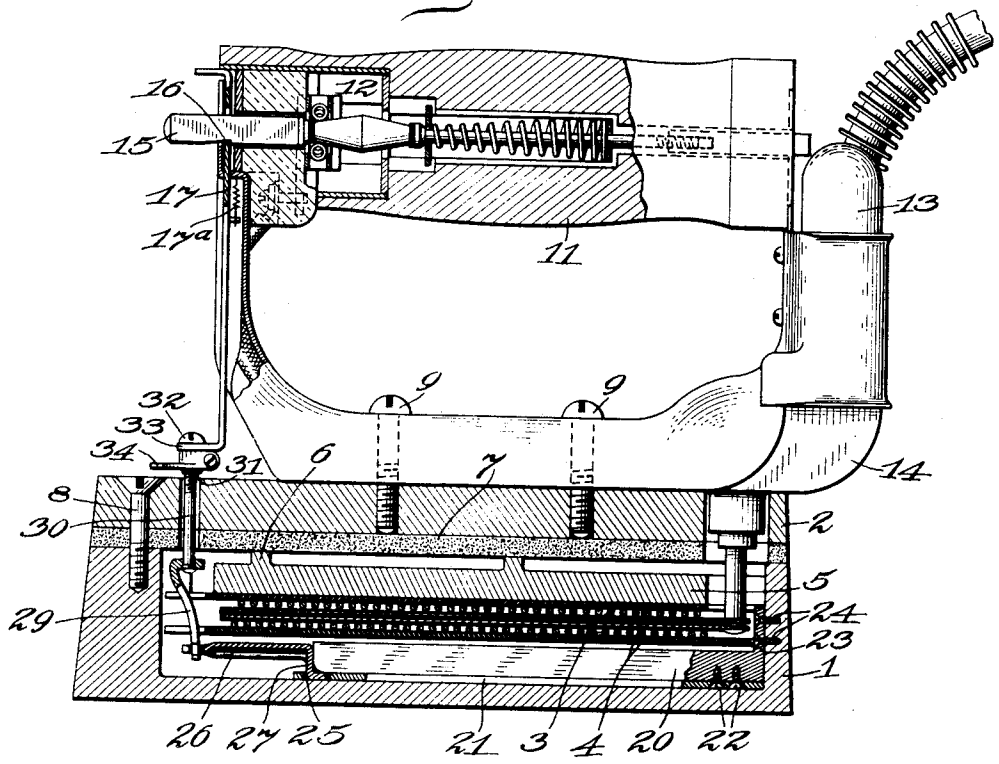
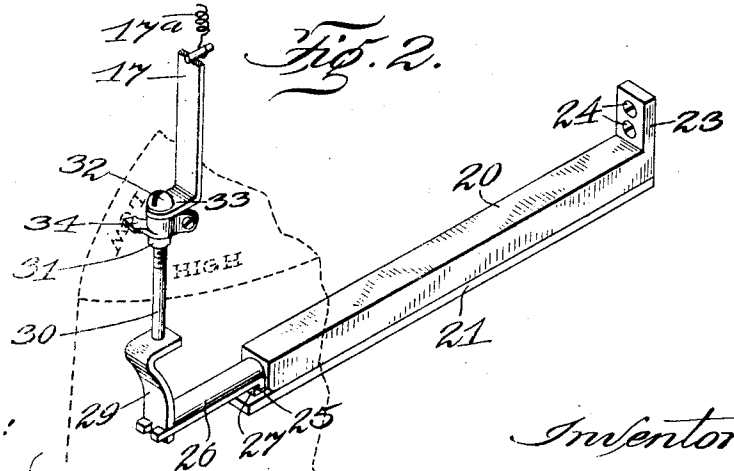


Fig. 2.



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AUTOMATIC CUT-OFF FOR ELECTRICALLY-HEATED DEVICES.

1,143,573. Specification of Letters Patent. Patented June 15, 1915.

Application filed January 30, 1911, Serial No. 605,343. Renewed December 4, 1912. Serial No. 734,984.

To all whom it may concern:

Be it known that I, HARRY W. DENHARD, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented new and useful Improvements in Automatic Cut-Offs for Electrically-Heated Devices, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention relates to improvements in automatic cutoffs for electrically heated devices.

The invention herein disclosed is another species of the generic invention set forth and claimed in my co-pending application, Serial No. 579,845, filed August 3, 1910.

In order that my present invention may be fully and clearly understood, I shall describe the embodiment thereof illustrated in the accompanying drawing. It should be understood, however, that the present invention is not limited to the specific device illustrated.

In the accompanying drawing, Figure 1 is a longitudinal sectional view through the body of the iron with parts of the handle shown in section and the remainder in elevation. Fig. 2 is a perspective view of the switch releasing device.

The iron illustrated is of the same general construction as that shown in my co-pending application aforesaid, and I shall therefore only briefly describe like parts herein. The body portion of the iron is formed in two sections 1 and 2. The lower section 1 is formed hollow to receive the heating unit 3 which is interposed between layers 4 of suitable insulating material. The unit is held in place against the bottom of the section 1 of the iron by a plate 5 having lugs 6 bearing against an insulating mat 7 interposed between the sections 1 and 2. The section 2 is secured to the section 1 by suitable means, such as screws 8 only one of which is apparent.

Secured to the top of portion 2 as by means of screws 9 is a handle frame carrying a handle 11 within which is arranged a switch mechanism 12 for controlling the continuity of the circuit of the heating element 3. At the rear end of the handle frame are two complementary terminal members 13 and 14 through which current is supplied to the iron. It may be assumed that the connections between the switch 12, the heating element 3 and the terminal members are the same as illustrated and described in my co-pending application aforesaid whereby the switch 12 controls the connections between the terminal members and element 3. The switch mechanism is provided with an operating member 15 having on its under side a notched portion 16 adapted to be engaged by a vertically movable member 17 slidably mounted on the forward end of the handle frame. The switch 12 is biased to open position and is held in closed position by engagement of the member 17 with the operating member 15 in the manner aforesaid. The member 17 is biased to holding position by a spring 17^a.

I shall now describe in detail the characteristic parts of the iron herein illustrated.

Within a recess arranged in the bottom face of the interior of the portion 1, which recess preferably extends longitudinally of the iron, is a controlling device for the switch mechanism 12. This controlling device preferably comprises a brass bar 20 and an iron strip, or plate 21, secured to the under side thereof by any suitable means such as screws 22. It is not essential that the iron plate be secured to the under side of the brass bar 20, or that these particular metals be employed, but this is the preferred construction. The brass bar is in turn provided with an upwardly extending lug 23, which is secured by any suitable means such as screws 24, to the rear wall of portion 1 of the iron. It is preferred that the bar 20 be rigidly secured to the iron. The iron plate or strip 21 is preferably extended slightly beyond the forward end of the bar 20 and provided with a recess 25 preferably rectangular and partially covered by the end of the bar 20. The controlling device is provided with a third member 26 which may assume various different

forms. As illustrated, the member 26 has an elongated portion substantially in line with the bar 20 and an angularly disposed L shaped lug 27, the vertical portion of which abuts against the end of the bar 20 while the horizontal portion thereof is inserted in the aperture 25 of the iron strip 21. The parts of the device are so designed as to inherently bias the member 26 to the position illustrated. However, the connection of the member 26 to the device is such as to provide a fulcrum for the former. To the forward end of the member 26 is attached a substantially vertically disposed member 29 which for a purpose hereinafter set forth is preferably connected to the member 26 in the manner illustrated. This connection is formed by notching the lower extremity of the member 29 on opposite sides and bifurcating and recessing the forward extremity of the member 26 so that when the extremities of the members 29 and 26 are interfitted they will be firmly secured together, but will be permitted a slight relative play. Riveted, or otherwise rigidly secured to the member 29 is a pin 30 projecting through the section 2 of the iron. The upper extremity of the pin 30 is screw-threaded. An internally screw-threaded cap 31 having a head 32 is screwed onto the threaded portion of the pin 30. The member 17 is provided with a forwardly extending lug 33 through which the pin 30 projects. Thus when the cap 31 is secured onto the pin 30 the head thereof will bear against the upper face of the lug 33. Tightly clamped to the cap 31 below the lug 33 is a pointer 34. With this arrangement the member 17 and pin 30 are securely fastened together to move in unison in both directions, while the cap 31 is free to be rotated in either direction relatively to the pin 30 by means of the pointer 34 which, as above set forth, is tightly clamped thereto. Such rotation of the cap 31 will through its screw-threaded connection with the pin 30 cause a relative adjustment between the member 17 and the member 26 of the switch controlling device. The purpose of this adjustment will be hereinafter explained.

I shall now describe the purpose and functions of the various parts described.

Let it be assumed that the switch is in the position illustrated with the member 17 in engagement with the notched portion of the operating member 15 of the switch. The switch in this position completes the circuit of the heating unit of the iron and is retained in this position so long as the member 17 remains in engagement with the notched portion of the operating member 15. When these parts are disengaged the switch being biased to open position automatically breaks the circuit of the heating unit 3. With proper adjustment between the member 17 and the member 26 of the switch controlling device the member 17 will be held in engagement with the notched portion of the member 15 so long as the member 26 remains in normal position, as illustrated, and until said member is moved to a predetermined degree. Here it should be noted that the member 26 due to its inherent tendency to remain in the position illustrated coöperates with the spring 17^a of the retaining member to minimize the liability of said retaining member being accidentally disengaged from the switch operating member. Movement of the member 26 to a degree to disengage the member 17 from the switch operating member 15 will only occur under predetermined temperature conditions of the iron. It is well understood by those skilled in the art that iron and brass have different coefficients of expansion, the expansion of brass being greater than that of iron. Bearing this in mind it will be seen that upon an increase in the temperature of the electrically heated device the brass bar 20 will expand longitudinally to a greater degree than the iron strip 21, thereby pressing forwardly against the member 26. Pressure thus exerted against the member 26 will cause the same to be tilted downwardly thereby exerting a pull upon the pin 30, which in turn tends to withdraw the member 17 from engagement with the operating member of the switch. When the member 26 has been tilted to a predetermined degree disengagement of the members 15 and 17 is accomplished whereupon the switch opens and disconnects the heating unit 3 from circuit. It will thus be seen that by proper design and adjustment of the parts the release of the control switch may be effected upon any predetermined temperature rise of the heated device. It will further be observed that by giving member 17 and the notched portion of the operating member 15 an appreciable overlapping engagement, that by moving the pointer 34 the release of the switch may be insured at intermediate temperatures between prescribed limits. That is to say, assuming that the switch will be automatically released at a predetermined temperature with the pointer 34 directed to the point of the iron, if the pointer then be moved in a clockwise direction it will cause relative adjustment between the members 17 and 26 to cause the switch 12 to be released at a lower, or higher temperature in accordance with the character of the screw-threads and to a degree dependent upon the pitch of the screw and the degree of movement of the pointer. Movement of the pointer in an anti-clockwise direction would have an opposite effect.

The particular construction of the switch release device herein illustrated and de-

scribed gives a very positive and powerful action in nowise dependent upon the resiliency of the heat responsive parts. Thus the effectiveness of the device is in nowise impaired or endangered by continued use. As previously set forth, other metals may be employed for the switch releasing device and the parts of the device might be arranged in other ways. Furthermore, where iron is employed, as in the present case, the member 26 might be seated directly in the base of the section 1 and the strip 21 dispensed with. Also the switch release device might be located in other parts of the heated device, but inasmuch as it is the working face of the heated device that it is desired to regulate I prefer to locate the releasing device in as close proximity to the working face as is practicable.

It will be seen that as the member 26 is rocked, as above set forth, if a rigid connection between the same and the member 21 was provided a lateral strain would be exerted upon the part 29 and the other parts connected therewith. The connection between the members 29 and 26 illustrated is designed to eliminate this tendency and does so by allowing a slight lateral, or pivotal movement of the member 29 independently of the member 26.

Having thus described my invention what I claim as new and desure to secure by Letters Patent is:

1. In combination, an electrically heated device, a quick make and break control switch therefor biased to disconnect the same from circuit, a member for retaining said switch in circuit closing position and a temperature responsive device comprising rigid parts for moving said retaining member to release said switch.

2. In combination, an electrically heated device, a circuit controlling device therefor biased to disconnect the same from circuit, a member for retaining said device in circuit closing position, and a temperature responsive device entirely comprising rigid parts, said temperature responsive device inherently tending to hold said member in retaining position and being adapted under predetermined temperature conditions to move said member out of retaining position.

3. In combination, an electrically heated device having a circuit controlling switch tending to stand in a predetermined position, a longitudinally movable member for retaining said switch in another position, and a temperature responsive device operatively connected to said retaining member, said temperature responsive device comprising rigid parts adapted under predetermined temperature conditions to impart a longitudinal movement to said member.

4. In combination, an electrically heated device having a circuit controlling switch tending to stand in a predetermined position, a longitudinally movable member for retaining said switch in another position, and a temperature responsive device operatively connected to said retaining member, said temperature responsive device comprising a plurality of rigid parts adapted under predetermined temperature conditions to hold said retaining member against movement and under other temperature conditions to positively move said retaining member.

5. In combination, an electrically heated device, a circuit controlling device therefor tending to move from one position and having a sliding retaining member, a temperature responsive device operatively connected to said retaining member and angularly disposed thereto, said temperature responsive device having a plurality of rigid parts adapted under predetermined temperature conditions to coöperate to move the retaining member.

6. In combination, an electrically heated device, a circuit controlling device therefor tending to move from one position and having a sliding retaining member, a temperature responsive device operatively connected to said retaining member and angularly disposed thereto, said temperature responsive device having a plurality of rigid parts adapted under predetermined temperature conditions to coöperate to move the retaining member, said temperature responsive device having an inherent tendency to hold said retaining member in retaining position.

7. In combination, an electrically heated device, a control switch therefor biased toward a predetermined position, a longitudinal movable member for retaining said switch in another position, and a temperature responsive device comprising a plurality of rigid parts, one of said parts being movable relatively to and by the expansion of another, said relatively movable part being operatively connected to said retaining member to move the same under temperature conditions.

8. In combination, an electrically heated device, a control switch therefor biased toward a predetermined position, a longitudinally movable member for retaining said switch in another position, and a temperature responsive device comprising a plurality of rigid parts, one of said parts being movable relatively to and by the expansion of another, said relatively movable part being operatively connected to said retaining member to move the same under different temperature conditions, said temperature responsive device having an inherent tendency to hold said retaining member in retaining position.

9. In combination, an electrically heated device, a control switch therefor biased to-

ward one position, a longitudinal movable retaining member for holding said switch in another position, and a temperature responsive device operatively connected with said retaining member to move the same out of holding position under temperature conditions, said temperature responsive device including a rigid rocking member and a rigid and stationarily mounted bar adapted under predetermined temperature conditions to expand to actuate said rocking member.

10. In combination, an electrically heated device, a control switch therefor biased toward one position, a longitudinal movable retaining member for holding said switch in another position, and a temperature responsive device operatively connected with said retaining member to move the same out of holding position under temperature conditions, said temperature responsive device including a rigid rocking member and a rigid and stationarily mounted bar adapted under predetermined temperature conditions to expand to actuate said rocking member, said temperature responsive device inherently tending to move said rocking member to a predetermined position under other temperature conditions.

11. In an electrically heated device, in combination, a device tending to break circuit, a movable member for retaining said device in circuit closing position, a temperature responsive device, and a screw-threaded coupling for operatively connecting said temperature responsive device to said retaining member to operate the same, one member of said coupling being revoluble at will to adjust said device and retaining member relatively.

12. In combination, an electrically heated iron, a control switch therefor having an actuating member in proximity to the handle of said iron, said switch being biased in one direction, a retaining member for holding said switch in a predetermined position, and a temperature responsive device comprising rigid parts arranged in proximity to the working face of the iron for actuating said retaining member under predetermined conditions to release said switch.

13. In combination, an electrically heated iron, a control switch therefor arranged in the handle thereof, said switch being biased in a direction to disconnect said iron from circuit, a latching member for holding said switch in circuit closing position, and a temperature responsive device comprising rigid parts for actuating said latching member to close said switch under predetermined conditions, said temperature responsive device being in close proximity to the working face of said iron.

14. In combination, an electric iron, a control switch therefor arranged within the handle thereof, said switch being biased to open circuit position and having an operating member movable axially of the handle, a longitudinally movable latching member for said switch operating member disposed perpendicularly thereto, and a temperature responsive device within said iron and operatively connected to said latching member to actuate the same under predetermined conditions, said temperature responsive device comprising rigid parts.

15. In combination, an electric iron, a control switch therefor biased to disconnect the same from circuit, a longitudinally movable retaining member for holding said switch in circuit closing position, and a temperature responsive device for actuating said longitudinally movable member under predetermined conditions, said device comprising a rocking member connected to said retaining member and a longitudinally expansible member for actuating said rocking member.

16. In combination, an electric iron, a control switch therefor biased to disconnect the same from circuit, a longitudinally movable retaining member for holding said switch in circuit closing position, and a temperature responsive device for actuating said longitudinally movable member under predetermined conditions, said device comprising a rocking member connected to said retaining member and a longitudinally expansible member for actuating said rocking member, said expansible member and said rocking member normally tending to hold said retaining member in effective position.

17. In combination, an electric iron, a control switch therefor biased to disconnect the same from circuit, a longitudinally movable retaining member for holding said switch in circuit closing position, and a temperature responsive device for actuating said retaining member under predetermined conditions, said device comprising two strips or bars of different metals, one superimposed upon the other and a member connected to one of said strips and abutting the end of the other to be rocked thereby upon the expansion thereof, said rocking member being connected to said retaining member.

18. In combination, an electric iron, a control switch therefor biased to disconnect the same from circuit, a longitudinally movable retaining member for holding said switch in circuit closing position, and a temperature responsive device for actuating said retaining member under predetermined conditions, said temperature responsive device comprising two strips or bars of different metals one superimposed upon the other, and a member having a right angle portion, one side thereof abutting against the end of the upper strip or bar, and the other side thereof being set into a recess in the lower strip or bar and underlying the lower edge

of the upper strip or bar, whereby said member is normally held in a predetermined position and tilted by relative movement of said bars under temperature variations, said member being connected to said switch retaining member to actuate the same under predetermined conditions.

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses.

HARRY W. DENHARD.

Witnesses:
ALFRED HALVERSON,
M. R. FERRIS.