Aug. 5, 1930. S. HARPER 1,772,002

ELECTRICAL HAIR TREATING IMPLEMENT

Original Filed Oct. 25, 1924 2 Sheets-Sheet 1

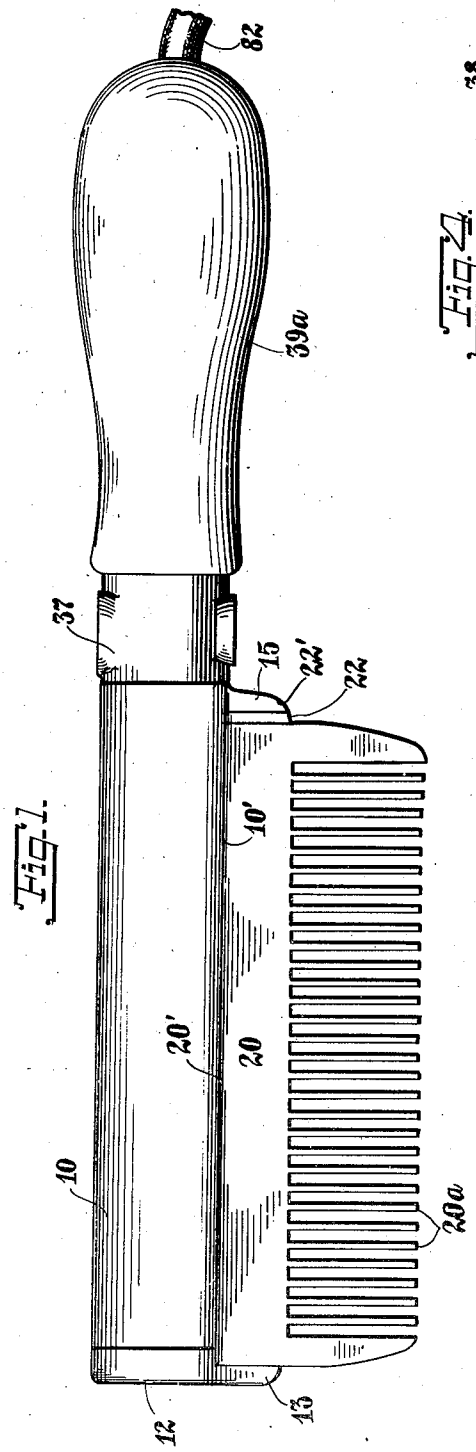

Fig. 1.

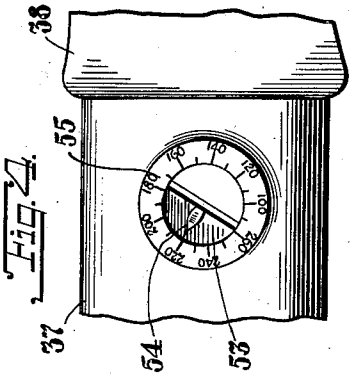

Fig. 4.

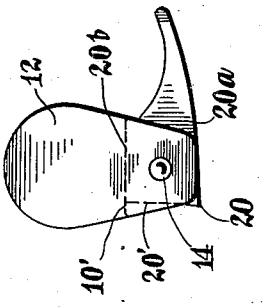

Fig. 3.

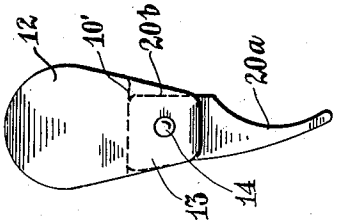

Fig. 2.

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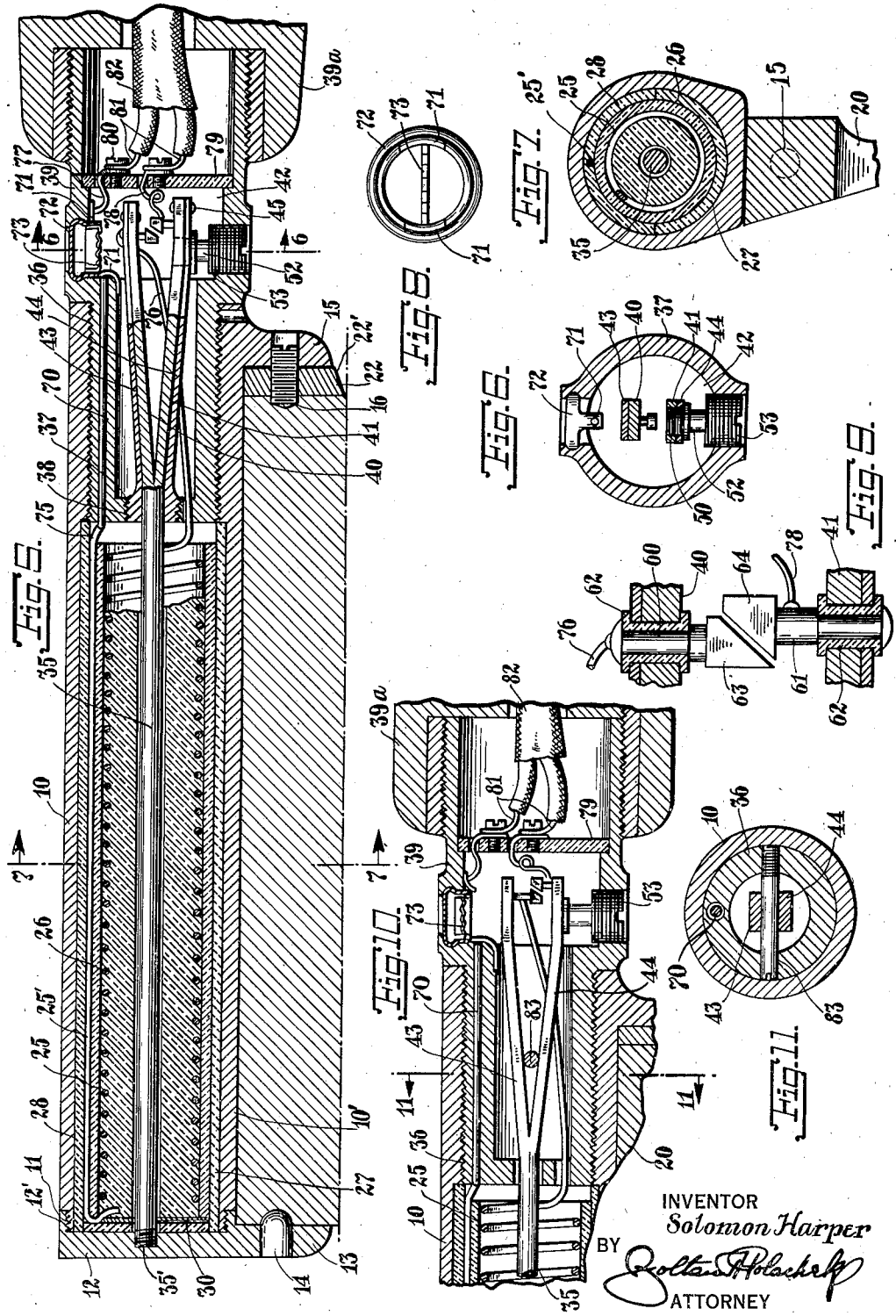

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UNITED STATES PATENT OFFICE

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ELECTRICAL HAIR-TREATING IMPLEMENT

Original application filed October 25, 1924, Serial No. 745,830. Divided and this application filed December 23, 1927. Serial No. 242,044.

This invention relates to devices for use in treating hair, and more particularly to an automatically controlled, electrically heated comb for dressing, drying, and straightening the hair. This application is a division of my copending application Serial Number 745,830, filed October 25, 1924, for electrical hair treating implements (now Patent 1,663,078, granted March 20, 1928).

The invention is designed to provide an improved device characterized by mechanical simplicity, efficiency and ease of operation, and in which the danger of burning or overheating of the hair or skin of the user is eliminated.

A further object of the invention is to provide a device wherein the electric current to the heater is automatically cut off to prevent overheating of the device, this object being attained by the provision of an adjustable auxiliary cut-off device which limits the maximum temperature of the heater.

A further object is to provide for adjustable mounting of the comb on the main backing element, whereby the angle of inclination of the comb teeth with respect to the backing element may be varied.

Further objects and advantages will be apparent as the description proceeds.

The invention is illustrated in the accompanying drawings, which are to be construed as illustrating, rather than limiting, the invention.

Fig. 1 of the drawings is a side view of a device embodying the invention.

Fig. 2 is an end elevation of the same, showing the teeth of a comb in their extended position.

Fig. 3 is a view similar to Fig 2, but showing the teeth extending in a different direction with respect to the backing element.

Fig. 4 is a detailed view of the device for adjusting the temperature at which the thermostatic current control operates.

Fig. 5 is an enlarged partial longitudinal sectional view of the device.

Fig. 6 is a transverse sectional view taken on the line 6—6 of Fig. 5.

Fig. 7 is a transverse sectional view taken on the line 7—7 of Fig. 5.

Fig. 8 is a detailed face view of the safety fuse element.

Fig. 9 is a fragmentary sectional view showing the mounting of the switch members.

Fig. 10 is a similar view to Fig. 5, but showing a slightly modified construction.

Fig. 11 is a transverse sectional view taken on the line 11—11 of Fig. 10.

Referring now to the drawings, my improved device comprises a main metal member 10 that has the combined functions of a backing for the comb, and a casing for the electric heating unit; and which might, generally speaking, be termed the comb shell. This casing member is in the form of an elongated cylinder, which however presents a transversely flat and longitudinally rectilinear surface 10′ that forms an abutment against which the adjustable comb bears. This casing 10 is formed at one end with a diminished, exteriorily screw threaded tip 11 over which is engaged the flange 12′ of a cap 12 that closes the said end of the cylinder. This cap 12 is formed on one side with a laterally projecting lug or ear 13 in which is fixed a pintle or stud 14 that serves to support the comb at one end of the latter. At its other end the casing is formed with an integral projecting lug or ear 15 that acts complementarily to the lug 13 in supporting the comb, this lug 15 being formed with a screw threaded aperture through which is passed a screw 16 engaging in a socket in the end of the comb, the pintle 14 above mentioned projecting into a like socket in the first named end of the comb.

The comb is shown generally at 20 and its rear edge is shaped to present a flat surface 20′ complementary to the surface 10′ and bearing against the latter, in flat contact therewith, when the comb is in one of its selected positions. The comb 20 is slightly shorter in length than the surface between the lugs 13 and 15 so as to leave a space between the end of the comb and the lug 15 whose purpose is to permit of ready adjustment or removal of the comb. This space between the comb end and the lug 15 is slightly

greater than the distance the pintle 14 projects into the end of the comb, so that by moving the comb longitudinally toward the lug 15 after the screw 16 has been drawn backward, the comb may be disengaged from the said pintle. A washer 22, having its edge beveled obliquely as at 22' to preserve a smooth outline in the exterior parts of the device, is preferably inserted between the end of the comb and the lug 15. In the operation of the comb in adjusting it to various positions, the space between the comb and the lug 15, is (as previously stated) slightly greater than the distance the pintle 14 projects into the end of the comb. Moving the comb away from the pintle 14 therefore after the screw 16 has been drawn backwards permits the comb to move out of contact with the pintle 14, and allows it to be dropped down so as to permit the comb in turning to clear the surface 10'. After turning to the desired position, the comb may again be placed in engagement with the pintle 14 and screw 16.

It is obvious that this operation will permit adjustment of the comb and comb teeth 20^a to various angular positions. The washer 22 may or may not be removed during adjustment of the comb, according to the closeness of the fit between it and the abutting surfaces of the parts 15 and 20.

The teeth of the comb are indicated specifically by the reference character 20^a and are longitudinally curved as shown, the curvature on the concaved advancing side of the comb being greater than on the following side, as clearly shown. In addition to the flat surface 20' that abuts against the surface 10' when the comb is in the position shown in Fig. 2 of the drawing, the longitudinal rib of the comb presents a second surface 20^b that is substantially perpendicular with respect to the surface 20' and spaced equi-distant with the latter from the median line of the members 14 and 16, so that the comb may be positioned at different angular relations with respect to the casing 10, with either of the side surfaces abutting against the surface 10' on the casing.

Within the casing I position the electrical heating unit which comprises a helically wound coil 25 of slightly less length than the casing; and a thermostatic switch for controlling the current to the coil, this coil being of high electrical resistance. Closely surrounding this coil 25 is a cylindrical shell 26 of electrically insulating material, while this shell is in turn surrounded closely by another shell that is in the form of two semi-cylindrical halves, the plane of division between these two halves being in parallelism with the surface 10'. The shell section 27 that is adjacent the said surface 10' is of a heat insulating material such as asbestos, and forms a shield preventing overheating of the comb, while the other shell section 28 is of ordinary electrical insulation such as fibre, or other like material. The purpose of the arrangement just described is to insulate the comb in some degree from the heater, the bulk of whose heat is designed to be projected upon the portion of the casing remote from the comb. At one end the coil 25 is in close adjacence to the cap 12 closing the end of the casing 10, while an insulating disc 30 is positioned between the coil and the said cap. The current carrying wire 25' from this end of the coil passes longitudinally through the casing 10, between the shells 26 and 28 one of which is suitably longitudinally curved to accommodate this wire, the wiring passing along the casing on the side remote from the comb and being of the same high resistance material and dimension as the coil itself, so as to assist in heating the back of the casing where the greatest heat is to be developed. The manner in which this wire 25, and the other end of the coil likewise, connect to the main lead wires will be fully set forth later.

Extending longitudinally through the casing, in the axial line thereof, is a metal rod 35 which forms one of the elements of the thermostatic current control device. This rod is preferably screwed at one end into the cap 12 as at 35', while its other end is supported for unimpeded longitudinal movement as will be presently set forth. A suitable filler material such as asbestos cement, or asbestos tubing, or other insulating element or compound is placed between the turns of the coil 25 and the rod 35. This filler material performs the functions of effecting a uniform temperature from the heating coil, increasing the weight of the comb, and embedding the coil against shocks that might otherwise break it. Screwed into the opposite end of the casing 10 to that closed by the cap 12 is a nipple 36 which may be of approximately one-quarter the length of the casing slightly overlapping the handle end of the comb and whose inner end is adjacent the heating coil 25 in the said casing. The threads of this nipple are gradually flattened toward the end of the nipple as shown to accommodate expansion under heat, changing the contour of the nipple from the usual cylindrical one to a frusto-conical one. This nipple is provided on its inner end with a radially inturned flange 37 that encloses a central aperture into which is screwed an apertured plug 38, the rod 35 before mentioned passing freely through the aperture in the said plug. The nipple 36 is formed on the end of a cylindrical member 39 that forms, in effect, an extension of the casing 10 and is of equal exterior diameter with the latter. This member 39 has the end thereof opposite the nipple 36 exteriorly screw threaded as at 39' for securing it to a handle 39^a of hard wood or the like, the handle hav-

ing a socket in its end into which said member is screwed.

At the point where the rod 35 emerges from the plug 38 into the chamber in the nipple 36 it is bifurcated as shown to form two prongs or legs 40 and 41 that diverge from one another at a comparatively small oblique angle. At their ends these prongs extend beyond the confines of the nipple into a widened chamber 42 in the member 39, the end portions of the prongs preferably extending parallel, or substantially parallel, to one another, as clearly shown in Fig. 5 of the drawings. These prongs or legs 40 and 41 are designed to act in cooperation with other elements of a material having a less coefficient of expansion under heat, whereby lateral movement of the prongs with relation one to the other may be effected under variation of heat applied thereto or reaching said prongs from the heating coil by transmission along the rod 35, said prongs opening away from one another in proportion to the heat developed in the rod 35, the casing 10, and the parts adjacent to and surrounding the prongs. These other elements with which the prongs cooperate are in the form of straps 43 and 44 that are projected integrally from the plug 38 along the remote faces of the prongs, the straps having their ends flush with the ends of the prongs, the said prongs and straps being riveted together adjacent the said ends by means of the rivets 45.

One of the prongs is arranged for setting in certain predetermined or selected positions whereby the thermostatic control device may be adjusted to cut off the current to the heating coil at certain predetermined temperatures, that may be selectively varied at the will of the user of the device. For the accomplishing of this function a stud 50 of suitable heat-refractory material is screwed into the end of the prong 41, transversely of the latter, and is formed with a flat head 51 against which bears an abutment tip 52 on a screw 53 that is threaded into a suitable tapered aperture in the wall of the chamber 42 in the member 39. The outer end face of this screw is formed to present a pointed indicator which may be constituted by an indentation 54 sunk in the said face, the periphery of the member being formed to present an annular flat face 55 surrounding this screw on which are a series of marks bearing different numerical indications representing different temperatures at which the thermostatic control may be set to operate when the screw is adjusted to bring the indicator into registry with selected ones of the said numeral indications. The screw 53 is preferably formed with threads of comparatively large pitch so that by a single turn of the same the desired variation of the temperature-action of the thermostatic control may be varied. The different parts relating to the thermostatic control are preferably constructed and relatively proportioned so that the said control may be set to operate when the surface of the casing element 10 stands at temperatures ranging anywhere from one hundred to two hundred and sixty degrees Fahrenheit, according to the desire of the user.

The switch contacts of the thermostatic control device comprises the pins 60 and 61 fixed to the contiguous faces of the prongs 40 and 41 adjacent the end of the same, these pins being aligned with one another and projecting into the space between the prongs. The pins are suitably insulated from the prongs by means of the insulating bushings 62 in which said pins are set. These pins have fixed on their adjacent ends the enlarged block-like carbon heads 63 and 64 respectively, that normally overlap one another and have their contiguous faces beveled as shown to present obliquely inclined contact faces. The pins 60 and 61 are preferably so constructed as to permit of ready replacing of the heads 63 and 64 and to insure that the head 64 alone will break if such tendency develops. It will be understood of course that the interior diameter of the nipple 36 is sufficient to allow the prongs 40 and 41 to move away from one another the distance necessary to disengage the beveled contact faces of the heads 63 and 64 from each other.

The thermostatic control device that has just been described acts under normal conditions to prevent overheating of the implement. In addition to the thermostatic control device, I preferably provide also a supplementary or auxiliary safety cut-out element that will function automatically to cut off the electric current from the heating coil 25, so as to provide an absolute safeguard against the heat rising to a point where danger to the hair or scalp of the user might be anticipated. This supplementary or auxiliary cut-out element comprises a thrust rod 70 of a metal having a high heat conductivity, this rod extending freely through a longitudinal boring in the annular wall of the nipple 36 and having one end adjacent to the end of the heating coil and its other end in free engagement with one of the legs 71 projected from a short plug 72 screwed into the wall of the member 39 in diametric juxtaposition to the screw 53. Extending between the said legs 71 projected from the plug 72 is a wire 73 that forms a thermal fuse, and that also constitutes part of the circuit to the heating coil, which wire fuses or melts when the temperature exceeds the permitted maximum. It will be understood that the parts 53 and 72 are sunk within the periphery of the member 39 to obviate possibility of the hair of the user becoming entangled therein. In arranging the electrical connections to the heating coil the end of the high resistance wire 25' con-

nects adjacent what might be termed the near end of the coil 25, with a low resistance wire 75 that may be carried longitudinally through the same aperture or boring as the rod 70, or through a different boring, the other end of this wire 75 being electrically connected to one of the legs 71 of the plug 72. The said near end of the coil 25 has connected thereto another suitably insulated low resistance wire 76 that connects as indicated with the pin 60. From the other leg of the plug 72, and from the pin 61, respectively, other wires 77 and 78 lead through apertures in a disc 79 of insulating material forming a transverse partition near the end of the member 37 and are connected to binding screws 80 threaded into said disc. These screws 80 have also connected thereto the two leads 81 from a duplex cord 82 of usual construction comprising two insulated wires in a flexible sheathing which may have a suitable plug on its other end to engage with an electric lamp socket, or any other socket it may be desired to connect the device to.

The form of the device shown in Figs. 10 and 11 differs only from that above described in substituting for the straps 43, 44, to perform the same function, a pin 83 that is fixed at its end in the wall of the nipple 37 and projects between the legs of the rod 35 to act to cam or wedge the latter away from one another when the rod expands under heat.

What is claimed is:

1. In an implement of the class described, an electrically operated heating unit, a comb, means providing an electric circuit leading through the said heating unit, a switch in said circuit, an automatically operating thermostatic control device for said switch, and means accessible from the exterior of said implement for adjusting said thermostatic control device to cause the same to operate at different temperatures.

2. In an implement of the class described, an electrically operated heating unit, a comb, means providing an electric circuit leading through the said heating unit, a switch in said circuit, an automatically operating thermostatic control device for said switch, means for adjusting said thermostatic control device to cause the same to operate at different temperatures, and a dial cooperating with said device to indicate the temperature at which the same is set to operate.

3. An implement of the class described, comprising a casing, an electric heating unit therein, a comb mounted on said casing, means for adjustably positioning said comb on said casing to vary the angle at which the teeth of the comb project from the casing, and mechanism for retaining said comb in a plurality of adjusted positions.

4. An implement of the class described comprising a casing, an electric heating unit therein, a comb mounted on said casing, and means for adjustably positioning said comb on said casing to vary the angle at which the teeth of the comb project from the casing, said casing and comb presenting flat rectilinear abutment surfaces engaged with one another to maintain the comb in adjusted positions on the said casing.

5. An implement of the class described comprising an elongated cylindrical casing, a comb mounted on one side of said casing, a helical heating coil in said casing, and a sheath interposed in the casing between the said coil and the side wall of the casing, the portion of said sheath on the side of said coil toward said comb being of heat insulating material and the portion thereof on the side opposite to said comb being of non-heat insulating material.

6. An implement of the class described comprising an elongated cylindrical casing, a comb mounted on one side of said casing, a helical heating coil in said casing, a heat insulating shield interposed in the casing between the said coil and the side wall of the casing adjacent the said comb, and a tubular electrical insulator surrounding the said coil between the latter and the said shield.

7. An implement of the class described comprising an elongated cylindrical casing, a comb mounted on one side of said casing, a helical heating coil in said casing, and a thermostatic device for controlling said heating coil, said thermostatic device being operated by means including a rod extending axially through the said heating coil.

8. An implement of the class described comprising an elongated cylindrical casing, a comb mounted on one side of said casing, a helical heating coil in said casing, a thermostatic device for controlling said heating coil, including a rod extending axially through the said heating coil, and an insulating filler in the space between the said rod and the turns of the coil.

9. An implement of the class described comprising an elongated cylindrical casing, a comb mounted on one side of said casing, a helical heating coil in said casing, a thermostatic device for controlling said heating coil, including a rod extending axially through the said heating coil, and means for adjusting the said thermostatic device to operate at different selected temperatures.

10. In an implement of the class described, a heating coil, a thermostatic device comprising a rod extending adjacent said heating coil, said rod having one end projected beyond the said coil and bifurcated, switch elements carried by the respective legs of the said bifurcated end of the rod, and means whereby expansive movement of the said rod under increase of temperature causes the said legs to move away from one another to open the said switch elements.

11. In an implement of the class described,

a heating coil, a thermostatic device comprising a rod extending adjacent said heating coil, said rod having one end projected beyond the said coil and bifurcated, switch elements carried by respective legs of the said bifurcated end of the rod, and means whereby expansive movement of the said rod under increase of temperature causes the legs to move away from one another to open the said switch elements, said means consisting of straps extended along said legs and fastened at one end to the adjacent ends of the legs, said straps being of material having a different coefficient of expansion under heat than the said rod.

12. In an implement of the class described, a heating coil, a thermostatic device comprising a rod extending adjacent said heating coil, said rod having one end projected beyond the said coil and bifurcated, switch elements carried by the respective legs of the said bifurcated end of the rod, and means whereby expansive movement of the said rod under increase of temperature causes the said legs to move away from one another to open the said switch elements, said switch elements being in the form of pins projected toward one another and having obliquely inclined overlapping heads.

13. In an implement of the class described, a heating coil, a thermostatic device comprising a rod extending adjacent said heating coil, said rod having one end projected beyond the said coil and bifurcated, switch elements carried by the respective legs of the said bifurcated end of the rod, means whereby expansive movement of the said rod under increase of temperature causes the said legs to move away from one another to open the said switch elements, and an adjustable abutment bearing on one of said legs to set the same in different positions to cause the said switch elements to move out of contact at varying temperatures developed in the device.

14. In an implement of the class described, a heating coil, a thermostatic device comprising a rod extending adjacent said heating coil, said rod having one end projected beyond the said coil and bifurcated, switch elements carried by the respective legs of the said bifurcated end of the rod, means whereby expansive movement of the said rod under increase of temperature causes the said legs to move away from one another to open the said switch elements, and an adjustable abutment bearing on one of said legs to set the same in different positions to cause the said switch elements to move out of contact at varying temperatures developed in the device, said adjustable abutment being in the form of a screw of a relatively large pitch threaded into the casing.

15. In an implement of the class described, a heating coil, a thermostatic device comprising a rod extending adjacent said heating coil, said rod having one end projected beyond the said coil and bifurcated, switch elements carried by the respective legs of the said bifurcated end of the rod, means whereby expansive movement of the said rod under increase of temperature causes the said legs to move away from one another to open the said switch elements, an adjustable abutment bearing on one of said legs to set the same in different positions to cause the said switch elements to move out of contact at varying temperatures developed in the device, said adjustable abutment being in the form of a screw of a relatively large pitch threaded into the said casing, and dial and pointer indicating means for said screw.

16. In an implement of the type described, a casing, a helically operated heating unit in said casing, a comb, means providing an electric circuit through the said heating unit, and separate thermo-controlled devices for cutting off the current to the said heating unit, one of the said devices being in the form of a thermal fuse.

17. In an implement of the class described, a heating coil, a thermostatic device comprising a rod extending adjacent said heating coil, said rod having one end projected beyond the said coil and bifurcated, switch elements carried by the respective legs of the said bifurcated end of the rod, and means whereby expansive movement of the said rod under increase of temperature causes the said legs to move away from one another to open the said switch elements, said means comprising a wedge element positioned between the said legs of the rod.

In testimony whereof I have affixed my signature.

SOLOMON HARPER.