

May 30, 1950

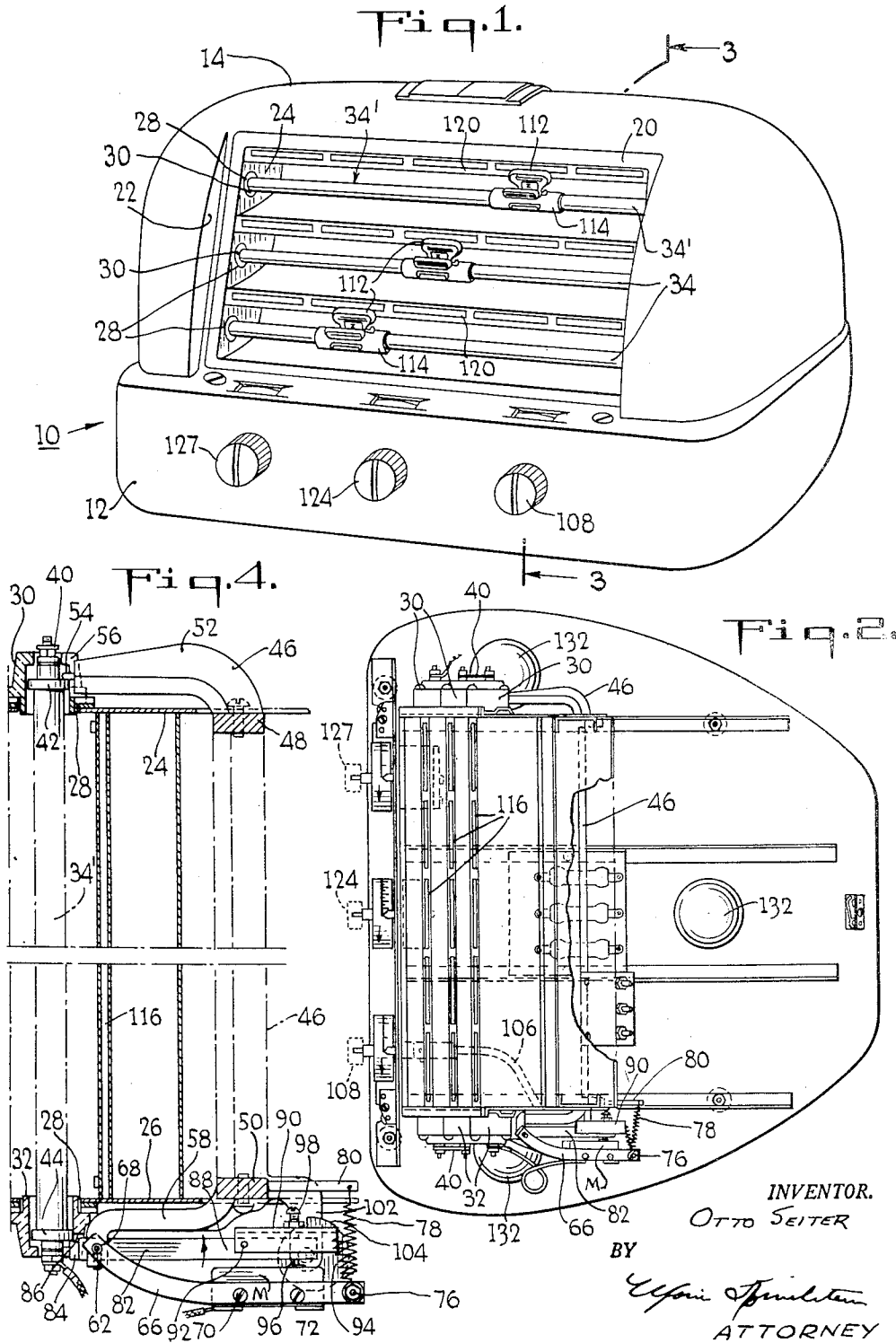
O. SEITER

2,509,747

ELECTRIC PREHEATER FOR PERMANENT WAVING

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2 Sheets-Sheet 1



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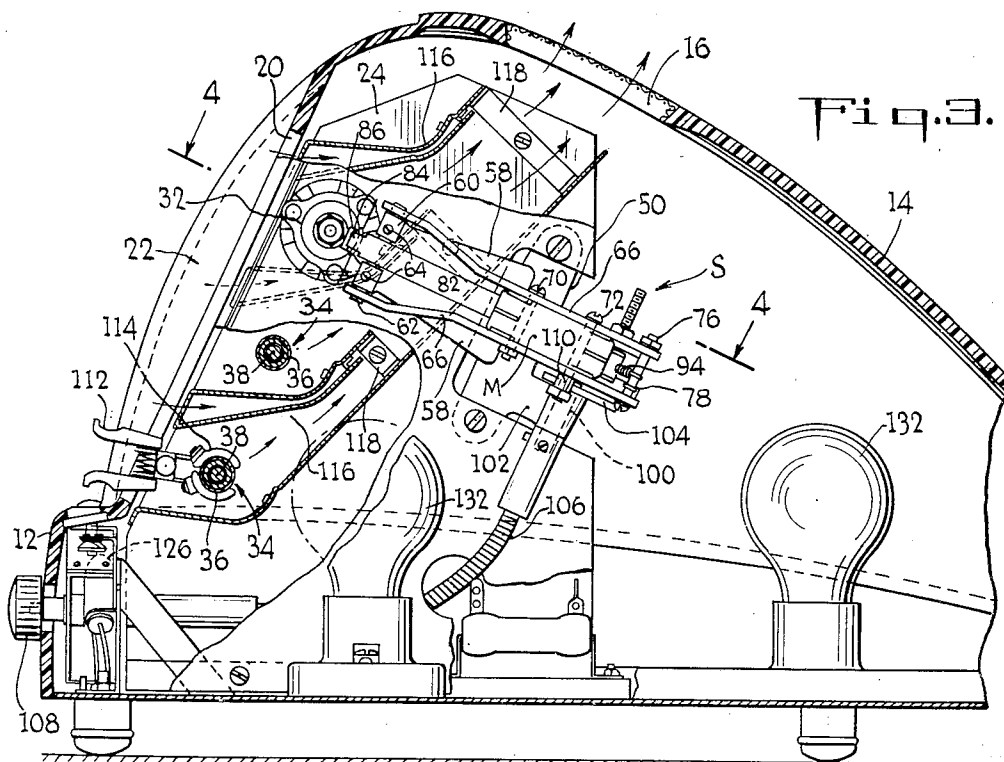
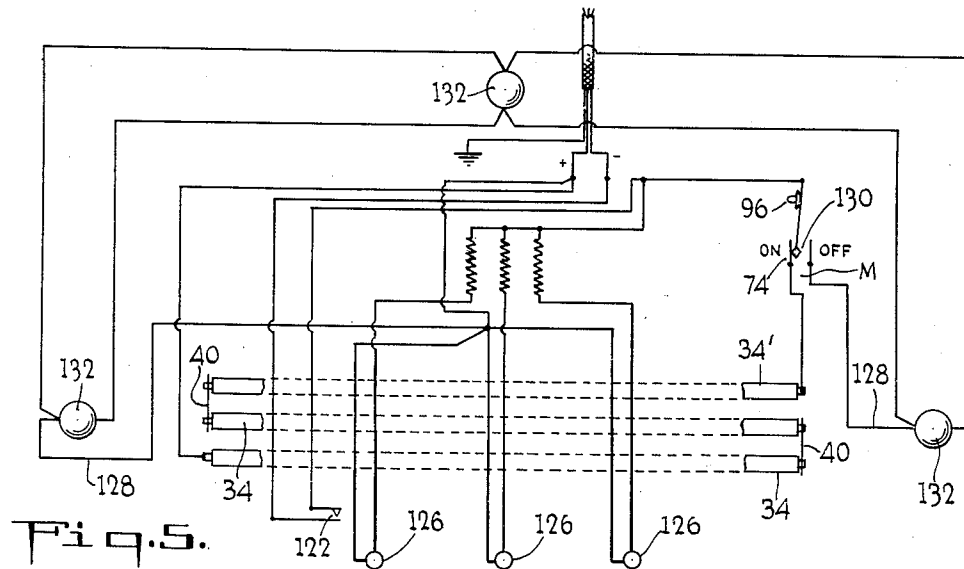
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2 Sheets-Sheet 2



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ELECTRIC PREHEATER FOR PERMANENT
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9 Claims. (Cl. 219—24)

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The present invention relates to apparatus for heating heat-storage curlers used for permanently waving hair of the human head and is of the same general type as that shown and described in the copending application of Harold M. Cook, Serial No. 727,188, filed February 7, 1947, owned by the assignee of the present application. The instant invention is directed toward an improvement of the apparatus of said copending application in a number of material respects.

In apparatus of the general type to which the present invention relates there are provided a number of rods which are electrically heated, usually by means of internally contained resistors, on which rods are clamped the heat-storage curlers which are transferred, after they have been heated to the desired temperature on the rods, directly to the hair curls on the head, to set them permanently.

It is highly important in the above method of hair curling and waving that the heating rods and the heat-storage curlers be sufficiently hot to be operatively effective and yet do not become overheated to damage the hair. It is also material that heating uniformity prevail throughout all of the rods to effect uniform heating of the curlers and uniformity in curling results. It is likewise important that the degree of heating may be regulated to accommodate the apparatus to hair of different texture and heat responsiveness. Another material consideration in such apparatus is to prevent the heating of other than the heat storing portions of the curlers, so as not to make their handling unsafe and inconvenient for the operator.

It is an object of the present invention, therefore, to provide apparatus of the character described in which the temperature of the heating rods may be more accurately controlled to approximate more exactly the desired heating temperature.

It is likewise an object of the present invention to provide apparatus of the character described having temperature control means which will automatically break the circuit through the electrically heated heater rods when a predetermined temperature is attained and which will also automatically close the circuit again when such temperature drops.

It is another object of the present invention to provide apparatus of the character described in which the several heating rods may be maintained at a more uniformly even temperature.

It is also an object of the present invention to

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provide apparatus of the character described in which the critical temperature of the heating rods may be regulated and in which such regulation may be accomplished with ease and convenience.

It is a further object of the present invention to provide apparatus of the character described in which heat control and heat regulation are more direct and therefore more reliable and efficient, and of more simple and durable construction and less likely to get out of order.

It is a still further object of the present invention to provide apparatus of the character described having improved ventilation, whereby the mutual heating of rods by their radiation is materially reduced to promote uniformity of temperature and to avoid the heating of the curler handles.

It is yet a further object of the present invention to provide apparatus of the character described which will automatically apprise the operator when it is in operation and also when the heating rods have attained their maximum temperature and the heat storage curlers mounted thereon are ready for use.

The foregoing and other advantages and superiorities of the heating apparatus for heat storage curlers of the present invention will become more readily apparent to those skilled in the art from the embodiment thereof shown in the accompanying drawing and from the description following. It is to be understood, however, that such embodiment is shown by way of illustration only, to make the principles and practice of the invention more readily comprehensible, and without any intent of limiting the invention to the specific details therein shown.

In the drawings:

Fig. 1 is a perspective view of one embodiment of the apparatus of the present invention;

Fig. 2 is a top plan view thereof, with the hood removed, partly broken away to show structural detail;

Fig. 3 is a section taken on line 3—3 of Fig. 1;

Fig. 4 is an enlarged plan view of the thermostat and heat regulating assembly of the apparatus; and

Fig. 5 is a diagram of the electric circuit used in the apparatus.

Referring more specifically to the accompanying drawings, the apparatus of the present invention comprises a cabinet 10 including a base 12, and a hood 14 supported thereon. The hood 14 is formed with a top ventilating opening 16, and also with a large, substantially rectangular

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front opening 20 which may have inwardly offset flanges 22 setting the opening back from the face of the hood.

Secured on the base 12, in any suitable desired manner, as by their offset bottom edges, are a pair of upright mounting panels 24, 26, each preferably in alignment with one of the side flanges 22 of the opening 20. Each of the panels 24, 26 is provided with a row of a plurality of vertically aligned openings 28 adjacent its forward edge, the corresponding openings 28 in each of the panels 24, 26 also being in alignment. A heat insulating bearing 30 is secured on the outer face of the panel 24 opposite each of its openings 28, and a similar bearing 32 is secured on the outer face of the panel 26 opposite each of its openings 28; each set of bearings 30-32 supporting between them, by its ends, a heating rod 34.

The heating rods 34 may be of any suitable construction including an outer tubular casing 36, housing an electrical resistance 38, such as described in the co-pending application aforesaid. The heating rods preferably are connected in series as by means of bus bars 40 suitably held in place on the ends of the rods 34 which project from the bearings 30, 32.

Thermostatic means is provided for controlling or limiting the upper temperature range of the heating rods 34. Heretofore, different types of thermostatic temperature control means have been used with apparatus of this type. One form of thermostat used, was the remote electrical thermostat, including an independently heated resistance approximately of the characteristics of the heating rods. Such thermostatic means was complicated, expensive and inexact. Another type of thermostatic means heretofore used was the type described in the aforesaid copending application which operated by conduction and therefore was more exact but, nevertheless, still not perfect.

The present invention provides the most direct, and therefore the simplest, most accurate and most reliable heat control for the heating rods 34 of the apparatus by making the thermostatic mechanism responsive directly to the heat of the rods themselves.

Optionally, the thermostatic means is associated with only one of the heating rods 34, preferably the uppermost of them, designated 34'. For that purpose, each end of the rod 34' fixedly carries a disc or collar 42, 44 whereon the rod 34' is supported and which are disposed in the bearings 30, 32 within which said collars are slidable as the rod 34' expands or contracts with temperature variations thereof.

A yoke 46 is fixedly supported in the apparatus, preferably to the rear of the bearings 30, 32, on the panels 24, 26 with the aid of its integrally formed bracket arms 48, 50. The yoke 46 has a forwardly extending arm 52 whose tip is reduced to constitute a lug 54 which extends into the bearing 30 through a slot 56, being disposed to engage the outer face of the collar 42 thereby to limit outward movement of this end of the rod when the rod expands upon heating.

The other end of the yoke is provided with a pair of spaced substantially parallel arms 58, extending forwardly therefrom to a point adjacent the bearing 32. Each of the arms 58 has an apertured ear 60 on its extremity in which a shaft 62 is fixed, as by set screws 64, said shaft having its ends projecting from the ears. The shaft supports a switch assembly S comprised of

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a pair of spaced arms 66 pivoted by apertures 68 formed in their forward ends on the shaft 62, one on each end thereof externally of the ears 60, said forward ends of the arms 66 being curved outwardly (see Fig. 4) to space their rearward portions away from the yoke 46. The rear portions of the arms 66 support between them a single pole double throw microswitch M, as by means of bolts 70, 72 passing through the casing or housing of the microswitch. The normally open set of contacts 74 of the microswitch are series connected in the heating circuit. An additional bolt 76 may connect the arms 66 at their rearward extremities above the microswitch. The bolt 76 serves as an anchor for one end of a tension spring 78 the other end of which is secured to a post 80 rigidly fixed to and extending rearwardly from the yoke 46 thereby to keep the switch assembly in place and urge it in direction of the yoke 46.

Means is provided for opening and closing the microswitch, said means being responsive directly to the temperature of the heating rod 34' and being actuated directly by said rod. Such means comprises a lever 82 pivoted on the shaft 62 intermediate the ears 60. The shorter forward arm 84 of said lever extends into a slot 86 formed in the bearing, said arm being positioned to be engaged by the outer face of the collar 44 as it is moved outwardly under heat expansion of the rod 34'. The longer rear arm 88 of said lever is disposed substantially parallel to and between the arms 66 and intermediate the microswitch M and post 80.

A U-shaped or channel piece 90 is carried by the lever arm 88, extending beyond its end (see Fig. 4). The channel piece is pivoted at 92 on its forward ends of its side walls to the lever arm 88, and its rear end is connected by a tension spring 94 to the bolt 76 to urge the rear lever arm 88 against the operating finger 96 of the microswitch M to depress the latter and keep it normally in circuit closing position for heating the rods 34. A screw 98 is threaded in the web of the member 90 for adjusting the tension of the spring 94 as desired.

It will be readily apparent (see Fig. 5) that, when the current is passed through the apparatus, the closed set of contacts 74 of the microswitch M will permit the current to flow in series through all of the rods 34, including the rod 34', which, upon becoming heated, will expand. By reason of the limitation of the movement of the rod 34' in one direction by the lug 54, it will expand in the direction of the forward lever arm 84, until the collar 44 presses against it to tilt the rear lever arm 88 in a direction away from the switch finger 96 against the action of spring 94, while the switch is held in fixed position by suitable means hereinafter described against the action of spring 78. Because of the substantial difference in the length of lever arm 84 as compared to the distance between the shaft 62 and the switch finger 96, upon a comparatively slight shifting of the end of lever arm 84 the lever arm 88 will tilt a sufficient distance to release the button 96, thereby allowing the closed set of contacts 74 of the microswitch to open and break the heating circuit.

It also will be evident that by moving the microswitch M, through the tilting of the arms 66 toward or away from the yoke 46, the end of the inner lever arm 84 will be moved away from or toward the collar 44, and the rod 34' will have to be heated to a higher or lower tem-

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perature, respectively, before its collar 44 engages the lever arm 84 and moves it sufficiently to open the microswitch contacts 74. For this purpose, there is provided means for adjustably fixing the microswitch in position relative to the yoke 46. Said means comprises a shaft 100 journaled in a bearing 102 integral with the yoke bracket 50. The shaft has at one end an eccentric or cam 104 and at its other end thereof a driving means which may comprise a flexible cable 106 connected to a knob 108 set on the front of the base 12 for convenient operation of the cam 104.

The cam is arranged to have its edge bear against a roller 110 supported on the extension of one of the switch frame bolts, such as the bolt 72, and thus serves both to move the switch M closer and further away from the yoke 46, as desired, so as to regulate the operative temperature of the thermostatic control, and to retain said switch in fixed adjusted position.

The apparatus of the present invention also is provided with improved ventilating means which more completely insulates the heating rods 34 from their mutual radiant heating of one another and which generally cool the apparatus more effectively and more completely and avoid the heating of the handles 112 of the heat storage curlers 114 when they are clamped on the rods 34 for heating. For that purpose, there are supported in the opening 20, intermediate adjacent rods 34, hollow, open ended baffles or flues 116 which extend across the entire width of the opening 20 and curve rearwardly and upwardly toward the hood 14. These flues 116, beside providing a double wall partition between rods 34 also bring about the circulation of an insulating and cooling air current through themselves as well as about themselves to add additionally to their effectiveness.

The flues 116 may be supported in the apparatus in any desired manner, as from the mounting panels 24 and 26, by means of brackets 118 connected to the panels and to the flues. The flues may also be provided across their forward openings with ornamental and reinforcing grilles, 120.

In the preferred embodiment of the apparatus, means is provided to apprise the operator whether the apparatus is operating and also when the heat storage curlers 114 disposed on the heating rods are ready for use. For these purposes, the hood 14 may be formed wholly or partly of a pellucid material, preferably translucent, such as a synthetic plastic, which may be colored.

For the first of the foregoing purposes, the heating circuit for the rods, which is controlled through a switch 122 (Fig. 5) operated by a knob 124 in the base 12, has a branch circuit including a number of relatively small electric lights 126, which go on when the heating circuit is closed, and throw a light through the dials D associated with the knobs 108, 124, 127, thus showing the apparatus to be in work. The knob 127 controls a lapsed time clockwork mechanism which is conventional in an apparatus of the type herein described.

For the second of the foregoing purposes, there is provided in the apparatus another circuit 128 which automatically is closed when the heating circuit is opened. Such other circuit preferably is controlled by the thermostat mechanism of the apparatus. This may be accomplished through the microswitch M of the ap-

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paratus which, as already noted, is of the single pole double throw type. Said switch has a pair of normally closed contacts 130 which are opened, when the apparatus is out of use, by pressure on the finger 96. When such pressure is released upon reaching a sufficiently elevated temperature, said contacts reclose and thereby energize the circuit 128. A plurality of relatively large and powerful electric lights 132 are mounted within the base 12, and are series connected in the circuit 128. It is quite apparent that lamps 132 will be lit, to brightly illuminate the hood 14 when the circuit 128 is closed as the heating circuit, through the rods 34, is broken as the predetermined temperature is attained, indicating thereby that any heat storage curlers disposed on said rods also have their effective temperature.

This completes the description of one embodiment of the heat storage curler heating apparatus of the present invention. It will be quite clear that the thermostatic control mechanism of the apparatus is direct acting, accurate and of simple construction, and easily and conveniently regulated and adjusted by simple and conveniently accessible means, and that it is efficiently and thoroughly ventilated against heating by mutual radiation of the rods themselves and of the handles of the heat storage curlers clamped upon them.

It will also be apparent that many modifications and variations of the apparatus of the present invention may be made by anyone skilled in the art in accordance with the principles of the invention hereinabove set forth and without the use of any inventive ingenuity. The protection of the patent laws is desired, therefore, for all such modifications and variations that may be made within the spirit of the present invention and the scope of the claims hereto appended.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. In an apparatus for heating heat storage curlers, a base, a pellucid hood over said base, a plurality of heating rods mounted on said base under said hood, said hood having an opening giving access to said rods, each of said rods including an outer casing and an electrical resistance within said casing, said rods being horizontally disposed in vertically spaced parallel relation, hollow open ended baffles interposed intermediate said heating rods, said baffles extending rearwardly and upwardly relatively to said rods, means interconnecting said heating rods in series in an electric circuit, a pair of insulating bearings mounted over said base and supporting the ends of one of said heating rods, each end of said heating rod having a collar slidable axially of the rod within its supporting bearing, a yoke spanning the space between said bearings and fixedly supported in position on said base in certain spaced relation to said heating rod, one end of said yoke extending into one of said bearings to engage the associated collar and limit the expanding movement of the heating rod, the other end of said yoke comprising a pair of spaced arms extending toward and terminating adjacent the second of said bearings, a shaft fixedly supported in said arms adjacent said second bearing, a frame having an end pivotally supported on said shaft, spring means rotatively biasing said frame about said shaft, a snap-acting momentary switch connected in circuit with said heating rod and carried

on said frame, a switch operating lever pivoted on said shaft, a shorter arm of said lever entering an opening in the adjacent rod supporting bearing in position to be engaged by the associated collar under expanding movement of the heating rod upon heating, a longer arm of said lever having a portion in operative relationship with said switch, spring means normally maintaining said lever portion in circuit closing engagement with said switch, cam means engaging said frame for adjusting its angular position relative to said shaft, manually manipulative means for controlling said cam means, a second electric circuit, said circuit having switch means arranged to be closed when the said first circuit is broken and to be opened when said first circuit is closed, and a plurality of electric lamps mounted within said hood and connected in said second circuit.

2. In an apparatus of the character described, a plurality of heating rods, each including a casing and an electrical resistance within said casing, said rods being horizontally disposed in vertically spaced parallel relation, said heating rods being connected in series in an electric circuit, at least one of said rods being freely supported at its ends in a pair of spaced insulated bearings, each end of said rod having a collar thereon whereon it is slidable within its supporting bearing, a yoke spanning the space between said bearings and supported in fixed position to said rod, one of the ends of said yoke extending into one of said bearings to engage the associated collar and limit the expanding movement of said heating rod, the other end of said yoke comprising a pair of arms extending toward the adjacent rod supporting bearing, a shaft fixedly held in said arm adjacent said second bearing, a frame pivoted on said shaft, a snap-acting momentary switch connected in circuit with said heating rods and supported on said frame, spring means rotatively biasing said frame about said shaft, a switch operating lever pivotally supported on said shaft, a shorter arm of said lever entering an opening in the adjacent rod supporting bearing in position to be engaged by the associated collar under expanding movement of said heating rod upon heating, a longer arm of said lever having a portion in operative relationship with said switch, spring means normally maintaining said lever portion in circuit closing engagement with said switch, cam means for adjusting the angular position of said frame relative said heating bar, and manually manipulative means for controlling said cam means.

3. In an apparatus of the character described, a plurality of heating rods, each including a casing and an electrical resistance therein, said rods being horizontally disposed in vertically spaced parallel relation, hollow open ended baffles interposed intermediate said heating rods, said baffles extending rearwardly and upwardly relative thereto, means connecting said heating rods in series in an electric circuit, at least one of said heating rods being freely supported by its ends in a pair of insulating bearings, each end of said rod carrying a collar whereon it is freely slidable within its supporting bearing, a yoke spanning the space between said bearing and being supported in fixed position to said heating rod, one end of said yoke extending into one of said bearings to engage the associated collar and limit the expanding movement of the heating rod, the other end of said yoke comprising a pair of arms extending toward and

terminating adjacent the second of said rod supporting bearings, a shaft fixedly supported in said arm adjacent said second bearing, a frame pivotally supported on said shaft, spring means rotatively biasing said frame about said shaft, a snap-acting momentary switch connected in circuit with said heating rods and a switch operating lever pivoted on said shaft, a shorter arm of said lever entering an opening in the adjacent rod supporting bearing in position to be engaged by the associated collar under expanding movement of said heating rod upon heating, a longer arm of said lever having a portion in operative relationship with said switch, spring means normally maintaining said lever portion in circuit closing engagement with said switch, cam means engaging said frame for adjusting the angular position of said frame relative said shaft, and manually manipulative means for controlling said cam means.

4. In an apparatus of the character described, an elongated thermally expansible member, an electric heating circuit for said member, a momentary snap-acting switch in said circuit, means to fix the position of one end of said member, a lever engaging said member adjacent its other end, means to mount said lever for rotation about an axis perpendicular to the longitudinal axis of said member, an arm, means to mount said arm for rotation about an axis perpendicular to the longitudinal axis of said member, said two axes of rotation being coincident, said switch being carried by said arm, said lever having a portion in operative relationship with said switch, means to bias said portion toward said switch, cam means to engage and vary the angular position of said arm, a spring to urge said lever against said cam means and manually manipulative means for controlling said cam means.

5. A combination as set forth in claim 4 wherein spring means is provided to urge the lever to switch operative position, said lever being moved away from said position by expansion of the member.

6. In an apparatus of the character described, an elongated thermally expansible member, an electric heating circuit for said member, means to fix the position of one end of said member, a switch supporting element pivotally mounted adjacent the other end of said member, a switch in the heating circuit for said member, said switch being supported on said element, spring means for holding said element in position, cam means engaging said element for adjusting its position against the force of said spring means, a switch actuating lever pivotally mounted alongside said element, spring means urging a portion of said lever into switch closing position, another portion of said lever engaging said member adjacent the end thereof remote from the fixed end, whereby said lever will be moved into switch disengaging position upon expansion of said member at a predetermined temperature, and means for manipulating said cam to select said predetermined temperature.

7. A combination as set forth in claim 6, wherein the cam manipulating means includes a shaft connected axially to said cam, a bearing for said shaft, a flexible cable connected to said shaft, and a knob for engaging and turning said cable.

8. In an apparatus of the character described, an elongated thermally expansible member, an electric heating circuit for said member, means to fix the position of one end of said member, a shaft fixedly supported adjacent the other end

of said member, a switch supporting element pivoted at one end on said shaft, a switch connected in said electric heating circuit, said switch being mounted on said element adjacent its free end, means including a tension spring for urging said element in one direction, means including a cam engaging the said element to urge it in an opposite direction, means for actuating said cam, thereby to adjust the position of said element, a lever pivoted on said shaft, said lever having a long arm extending alongside of said switch, tension means holding said long arm against said switch to activate it, said lever having a short arm positioned for engagement by the end of the member remote from the fixed end so that said member as it expands under heat will engage said lever at a predetermined temperature and move it to tilt the long arm out of engagement with the switch.

9. A combination as set forth in claim 8, including a shaft axially connected to said cam, a bearing for said shaft, a flexible cable connected to said shaft, and means at the end of said cable for grasping and turning the same.

OTTO SEITER. 25

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