HEATED HAIR CURLER
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Abstract

This invention relates to hair curlers and more particularly it relates to hair curlers with self-contained heating units, which can be heated electrically to its operative temperature quickly, easily and safely, so that the heat is directed to hair exteriorly wound about the curler.

Hair curling as practiced today in the home and beauty shops involves division of the hair of the user into various tresses or switches. Each of the tresses is ordinarily wound uniformly about a hair curler and by dampering the curled tress with water or with chemicals, or applying heat or the like to the tress, the tress is caused to take the form imparted to the hair by the curler. Curlers came in various diameters from about a half an inch to three or four inches in diameter to form the various size curls required by the dictates of fashion or the user.

It is well-known in the art that the curling operation can be hastened and performed more effectively if the hair is heated during the curling process. Heat applied exteriorly to the curled hair required expensive and elaborate apparatus. Various attempts were made to provide heat interiorly of the curl itself, such as disclosed in the Paternak Pat. 3,228,403. While the results obtained from applying heat interiorly were generally satisfactory, the curling units were difficult to use, cumbersome and relatively heavy, so that they proved uncomfortable to the user, since it normally required a plurality of these curlers in the hair at one time. Further, these prior art curlers had to be heated in boiling water for a relatively long period of time to reach their operating temperature, about 212° F., and hence did not allow for flexibility of use. Additionally, the user was not always certain that the curler was at the optimum temperature causing further delays. The temperature of the curler was inherently limited by the temperature of boiling water.

Accordingly, it is an object of the present invention to provide a simple and effective heating device which provides a signal to the user when it reaches its optimum temperature.
received within downwardly extending flange 41 from a transversely extending disk 43. Disk 43 has an outer diameter slightly smaller than the inner diameter or wall 26, so as to be slidable within wall 26 and abut against inwardly directed flange or step 32. At the lower end of rod 36 abutting lower end cap 38, disk 43 which on turn is mounted on end piece 42. End piece 42 has a transverse disk section 42a and an outwardly longitudinally extending sleeve 42b with outwardly radially extending flange 42c. End piece 42 is fractionally received within wall 26 and flange 42c mates with a circumferential recess to gene vertically extend ing radial flange 44 on the end of wall 26. Extending through disk portion 42a is a pin or conducting finger 47, which is matingly received within aperture 18 of receptacle 16. Sleeve 42b of end piece 42 has an inner diameter and length sufficient to slidably receive regulating rod 36 of the motorized wall 26, and in as resistance wire 46 forming a series of coils. Wire 46 is electrically connected to each of end caps 38. Lower end cap 38 is electrically connected to pin or finger 47. The circuit is completed by a conductor 48 which is a generally L-shaped bar, electrically connected to upper end cap 38 and has a lower end 49, extending through end piece 42 to suitably mate with aperture 18 in receptacle 16.

Electrically connected in parallel to resistance wire 46 is a circuit including a conductor 50 electrically connected to the lower end cap 38, a resistor 52, a bulb 54 and a conductor 57 electrically connected to the upper end cap 38. Resistor 52 is of sufficient resistance to prevent the burn out of bulb 54 when the curler is operated in the manner discussed below. Advantageously bulb 54 is positioned in the space between disk 43 and curled end 28. To aid in making heating unit 26 unitary, holding rods 56 interconnect upper disk 43 and end piece 42.

To use curler 12, plug 24 is connected to a source of electrical energy, not shown. Curler 12 is mounted on receptacle 16, so that male connectors 47 and 49 are matingly received by apertures 18. As receptacle 16 is received within the volume defined by end piece 42, finger 17 is depressed, thereby actuating timer 19 which allows electric current to flow to female conductors 20, which are electrically connected to elements 47 and 49. Resistance wire 46 becomes heated within a short period of time, which in turn heats ceramic rod 36 and upper and lower ceramic sections 40 and 45. Similarly, bulb 54 is illuminated. After a predetermined time, which has been found to operate between 75 and 90 seconds, curler 12 is heated to about 350° F. and timer 19 breaks the electric circuit to curler 12 causing bulb 54 to go out. Since curler end 28 is translucent, the user can immediately tell when curler 12 is ready for use. The heated curler is not uncomfortable to handle because of the insulating ceramic wall 26, and flanges 44 and 45. The user removes the heated curler from base 14 and rolls a tress of hair thereabout in a conventional manner. The rolled tress can be retained on the curler by clips, pins, or the like. After the tress has remained on the roller for a few minutes, generally about 3-12 minutes, depending on the nature of the hair, the roller is removed and the tress of hair is curled. For larger size curls the curler is left in position for less time and for tighter curls the curler is left in the hair for a longer period of time. For average size curls the curlers are left in the hair for about 5-8 minutes. In view of the mass of the coils and the insulating properties of the plastic used, the curler remains sufficiently heated for the curling operation. The curler can be reheated and used again, or another curler which has been heated can be used.

A further embodiment is shown in FIGS. 4-6, wherein a curler 60 is positioned on a base 62. Base 62 is generally similar to base 14 and has a receptacle 64 extending upwardly from the upper surface of base 62. Receptacle 64 has a single opening 66, which receives the electrical prong or finger 67 of curler 60. A pair of electrical conductors 68 supply electricity to receptacle opening 66, as shown in FIG. 5.

Curler 60 has an open grid plastic outer shell 70 with an integrally piece 72 as a ceramic radial extending rim 74. End piece 72 is translucent. As shown, plastic shell 70 has extending from its end opposite to end 72, a sleeve 71 which defines an inner volume so as to frictionally receive receptacle 64, as shown in FIG. 5. Longitudinally extending within shell 70 is a ceramic rod 76 having metal caps 78 at opposite ends. Upper cap 78 is received within a ceramic sleeve 80, which contains a thermostat 82. As shown, thermostat 82 has a bi-metallic finger 83, which electrically contacts end cap 78 when in its unheated position. Lower end cap 78 is mounted on a ceramic member 84, which has a depending sleeve 85 concentric to shell 70. Extending through sleeve 85 is a conducting prong 87 which is electrically coupled to lower end cap 78. Helically wound about rod 76 is resistance wire 86 forming a series of coils, which is electrically coupled to each of end caps 78. Electrically connected in parallel between end caps 78 is a circuit consisting of conductor 88 which is connected to resistor 90, which in turn is connected to one element of bulb 92, which in turn is electrically connected to upper end cap 78 via conductor 94.

Concentrically disposed about rod 76 is a metal cylindrical wall 96, which is advantageously made of brass, copper or aluminum, or other conductive material. Wall 96 is spaced inwardly from plastic shell 70. The upper part of wall 96 is received within end 72, and the lower end of wall 96 is directed inwardly abutting the outer surface of ceramic member 84 and surrounds the outer surface of ceramic sleeve 85. Electrically connecting one end of thermostat 82 with wall 96 is a conductor 98. One of the conductors 68 in base 62 is electrically connected to wall 96, when curler 60 is mounted on receptacle 66 in FIG. 5 completing the heating circuit.

To use curler 60, the plug on base 62 (not shown) is connected to a conventional source of electrical energy, which is supplied to conductor 68. Curler 60 is mounted on receptacle 64 in a manner similar to that discussed above with respect to curler 12, thereby making electrical contact with conductors 68. Wire 86 is heated and bulb 92 is illuminated. The heat from wire 86 is radiated and heats ceramic rod 76 as well as upper end cap 78, whereby heat flows into thermostat 82 via wire 86. Thermostat 83 is heated in this manner sufficient to cause it to move away from contact with end cap 78, thereby breaking the electrical circuit in curler 60. Bulb 92 ceases to be illuminated and the viewer seeing the light goes out through cap 72, which is translucent, removes the curler from base 62 by grasping the rim 74 on end piece or cap 72, the metal wall 96 is heated by reason of radiation, convection and conduction of the heat from coil 86 and ceramic rod 76 and ceramic sleeves 79 and 84. The hair is rolled on the curler in a manner similar to that described above and the roller removed within a short time to form the desired curl.

A further embodiment of the present invention is shown in FIGS. 7 and 8. Here a curler 100 is mounted on a base member 102. Base member 102 is preferably made of an insulating material, such as a plastic. Base member 102 has a generally cylindrical opening having side walls 104 and a bottom wall 106. Receptacle 108 is insulatingly mounted in bottom wall 106 through an insulating bushing 110. Contact carrying member 108 can be secured in position in bottom wall 106 in any convenient manner, such as by bolting, friction or the like, and advantageously insulated bushing 110 should be heat resistant. At the forward end of contact carrying member 108 is a contact member 112 having one or more integral bow shaped fingers 113 extending therefrom with hooks or the like at their ends.
Slidably mounted within side wall 104 is a slide or cup 116 which has a free sliding fit within wall 104. Disposed generally centrally of slide 116 is a catcher or stud 118 which is insulated from slide 116 by a suitable insulating washer or sleeve 119. Preferably stud 118 is held in position within slide 116 by a stud 118 made integral with the base 120. Slide 116 has downwardly extending sleeve portion which serves to hold a spring 122 in position with the other end of spring 122 resting on insulating bushing 110. Advantageously bushing 110 has an upstanding rib 123 for maintaining spring 122 in position. Extending through bottom end and making electrical contact with spring 122 is a conducting rod 124. The rearward end of contact carrying member 108 is electrically connected to a conductor 126 and similarly, the rearward end of conducting rod 124 is electrically connected to conductor 128.

Curler 100 comprises a generally tubular cross section with a generally thin outer cylindrical wall 130 made of rigid plastic material having an integral cover 132 attached to the upper end. Concentrically disposed within wall 130 is a ceramic rod 134 having upper and lower end caps 136 and 138. Frictionally mounted within wall 130 is an end piece 139 having a transverse portion 138a and downwardly extending sleeve 138b. Inner wall 139 has upper end 132 and upper end cap 136 is a ceramic sleeve 140 abutting each respectively. Similarly, disposed between end piece 138 and lower end cap 136 is a ceramic sleeve 142 abutting each respectively. Extending through ceramic disk 142 and transverse section 136 of end piece 138 is a rod 144 which is made of electrical conductive material. The outer diameter of rod 144 is such as to be matingly received within the header over shank 120, and make electrical contact therewith. Coiled about rod 134 is a resistance wire 135 which is electrically connected to end caps 136. Similarly, the outer diameter of curler 100 is cooperatively received within the opening in base 102 and formed by side wall 104. Electrically connected to upper end cap 136 is a conductor 146 which as shown is an L-shaped rod, and passes through wall 138b of end piece 138. Extending through slide 116 is an electrical contact 148 which is electrically coupled to spring 122 and which is positioned to contact extending portion of conductor 146, such as shown in FIGS. 7 and 8.

Preferably the catch and thermostatically controlled switch is made unitary to provide a single assembly with reduced cost. Contact member 112 is made of a bimetallic material in order to be responsive to thermal conditions, and its fingers 113 are of narrow length and slightly bowwed, so as to readily spread or open to the dotted line position shown in FIG. 8 under the influence of heat. Preferably the ends of fingers 113 of contact member 112 are provided with hooks which positively engage stud 118. The end of stud 118 facing contact member 112 has a tapered surface 150 which terminates in a shoulder 152. When stud 118 is pushed toward bottom wall 106, tapered surface 150 forces fingers 113 of contact member 112 apart, which are then snapped in back of a shoulder 152 and lock stud 118 in closed position. Fingers 113 lock and hold stud 118 in closed position while simultaneously completing an electrical connection from conductor 126 through contact carrying member 108, contact member 112, stud 118 and stud shank 120 through wire or heating element 135, conductor 146, contact member 148, spring 122, conductor rod 124 and to conductor 128, so that wire 135 is heated. As the heating element 135 is heated, the base 134 and ceramic rod 134 and bottom end cap 136 to conductor rod 144. Stud 118 is thus heated and simultaneously heats fingers 113 of contact member 112, causing fingers 113 to expand in the direction shown in dotted lines in FIG. 8, until the ends 114 of fingers 113 move clear of the shoulder 152 of stud 118, whereupon the spring 122 is free to move slide 116 upwardly in the base opening separating stud 118 from contact member 112, thereby breaking the circuit to coil 135. Fingers 113 are so constructed that they release stud 118 when curler 100 has reached the desired operating temperature.

Thus, when it is desired to heat curler 100, the curler is placed in the opening in base 102, such as shown in FIG. 7, and it and slide 116 are pushed downwardly into the opening against the pressure of the yielding spring 122, whereby beveled end 150 of the contact stud 118 engages fingers 113 of contact member 112 to lock the sliding unit in switch closing position. As coil 135 is heated, some of the heat travels through conductor rod 144 to stud 118 and gradually moves up towards the bimetallic member 113 to open position, causing the ends 114 of fingers 113 to ride over shoulder portion 152 of stud 118 until a release between the shoulder 152 and fingers 113 is effected and the curler 100 is urged back into the operative position shown in FIG. 7 under the influence of slide 116 and spring 122. Thereafter the user winds a tress of hair about the heated curler 100 and uses it in a similar manner described above. The sound of the curler being released alerts the user the curler has reached its operative position.

Advantageously, it has been found that using about 67 turns of .003 inch diameter resistance type wire provides adequate heat about 350°F., within a relatively short period of time, namely, 75-90 seconds. Faster heating is desired, a larger size wire can be used so that the heat will be greater.

A further embodiment of a heated curler shown in FIGS. 7 and 8 is if the heating coil is positioned in stud shank 120, so that conductive rod or prong 144 is heated, thereby conducting heat to ceramic rod 134, which retains the heat. Also, curler end 126 could be generally flat and the heating coil placed on the upper surface of slide 116, so that the curler end rests on the heating coil and heats the ceramic material within the curler.

While one form of detent construction has been shown for maintaining the electrical circuit closed during the heating of the curler, other releasable holding mechanisms may be employed.

Also, it should be noted that advantageously the male prongs projecting from the bottom end of the curler do not extend beyond the plastic wall, so that the user would not be inadvertently burned while rolling the hair. If desired, the curler could be made with the female connections, i.e., apertures in the lower end, and the base member could contain the male electrical connectors or prongs extending upwardly to mate with the female receptacle of the curler. The plastic curler body prevents the curler from becoming uncomfortable to handle. The thermostatic or time control prevents overheating of the curler body.

To aid in rolling and holding the tress of hair about the outer surface of the roller as shown in the drawings, rows of outward radial projections 156 are shown. The body of the curlers are formed of a rigid plastic, which has a higher softening point than the temperatures reached by the plastic when the curler is heated. Some of the plastics which could be used are polystyrene, nylon, acrylics, polypropylenes, butyrates, polyethylene and vinyl. The present curler construction contains adequate heat retaining material, such as the ceramic and plastic, so that when heated the curler retains the heat over a period of time.

Also, the present invention provides a minimum loss of heat from the source of heat to the hair. Advantageously, the hair is clamped after rolled.

While the foregoing have shown and described the present invention, it is to be understood that various other modifications and rearrangements of the herein described invention may be made by those skilled in the art without departing from the spirit and scope of the invention as defined in the appended claims, wherein the present invention is set forth.
If desired, with minor changes, the curlers disclosed can be adapted for use with direct current, such as with automobiles.

The present invention will produce curls within a few minutes without the use of acids, lotions or the like. The curler is controlled so as to be heated quickly to an optimum temperature, which allows the roller to be readily handled by the user, but which will provide adequate heat to the rolled hair to quickly form the hair into a curl. A base can be used to allow several curlers to be heated simultaneously, so as to quickly provide curls for the entire hair.

All preferred embodiments have been described above, but it will be understood that many variations thereof will be readily apparent to those skilled in the art without departing from the spirit thereof. Therefore, it is intended that the foregoing description shall be deemed illustrative only and not construed in the limiting sense, the present invention being defined solely by the appended claims.

What I claim is:

1. A hair curling apparatus comprising a hair curler, including an elongated tubular member about which hair is rolled, a heat absorber mounted within said tubular member, an electrical connector affixed at one end of said tubular member, a heating element contained within said tubular member in heating relation with said heat absorber and electrically coupled to said electrical connector; in combination with a base, said base including a member axially movable to operative and inoperative positions and adapted to be engaged by said one end of said tubular member; an electrical source coupled to said base; means carried by said movable member and cooperating to electrically couple said electrical source to the electrical connector on said tubular member when said movable member is moved to the operative position by said curler; means normally urging said movable member into inoperative position; and means in heat exchange relationship with said heating element for releasably holding said movable member in circuit closing position until the heating element in said tubular member has obtained a predetermined temperature; when said predetermined temperature is reached, said last-mentioned means releases said movable member and permits said movable member and said curler to be moved to inoperative position.

2. A hair curling apparatus as in claim 1, wherein said movable member is a slide cooperatively movable with the tubular member into electrically operative and inoperative positions; said holding means includes a bimetallic arm for cooperatively holding the slide in electrically operative position and cooperatively connects the heating element to the source of electricity until said element is heated to a predetermined temperature, whereupon said bimetallic arm deforms in response to heating for releasing said slide and allowing it to return to its inoperative position and to disconnect said source of electricity from said heating element.

3. A hair curling apparatus according to claim 2, wherein said base member has an elongated upright cylindrical cavity, which opens through the upper surface; said curler being remotely received within said cavity; said slide being movable within said recess and said holding means being a detent, comprising a cooperating shouldersed stud on said slide and said bimetallic arm on said base member; said arm being in heat-exchange relation to said heating element, and responsive to the temperature of said heating element, so that when said predetermined temperature is reached, said arm deforms in response to heating and releases said stud thereby permitting said slide to be displaced from said operative position to said inoperative position.

4. A hair curling apparatus as in claim 3, wherein said shouldersed stud is insulatingly mounted to said slide and movable therewith, said stud being electrically conductive and electrically coupled to the electrical connector affixed to said tubular member; and said bimetallic arm being hooked-shaped and electrically connected to said source of electricity.

5. A hair curling apparatus as in claim 1, wherein said tubular member is constructed from plastic material, and said heating element comprises resistance wire extending generally longitudinally within said tubular member.

6. A hair curling apparatus according to claim 5, wherein said electrical connector on said tubular member is a prong extending longitudinally outwardly from said tubular member end, said tubular member having a sleeve extending longitudinally beyond said prong.

7. A hair curling apparatus in accordance with claim 1, wherein said means for normally urging the movable member into inoperative position is a spring, said spring being electrically conductive and being electrically coupled to said heating element.

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