July 7, 1970 N. L. SOLOMON 3,519,792

HEATED HAIR CURLER

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FIG. 1

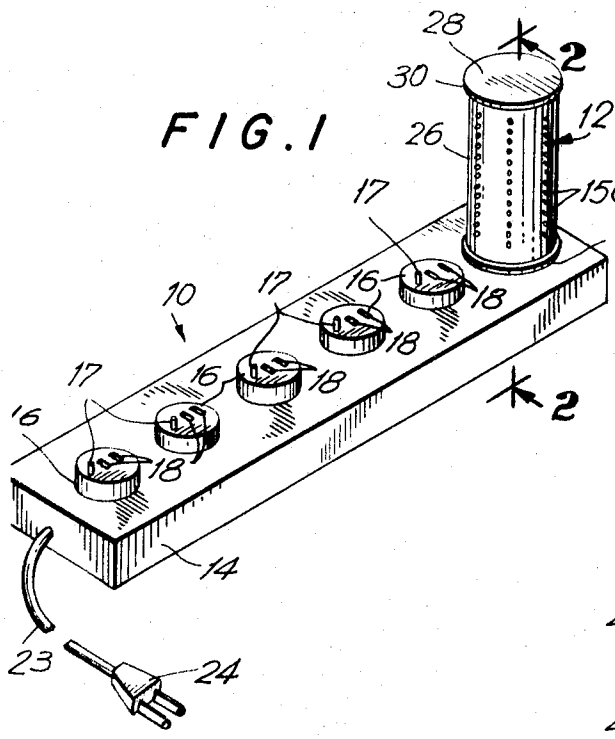
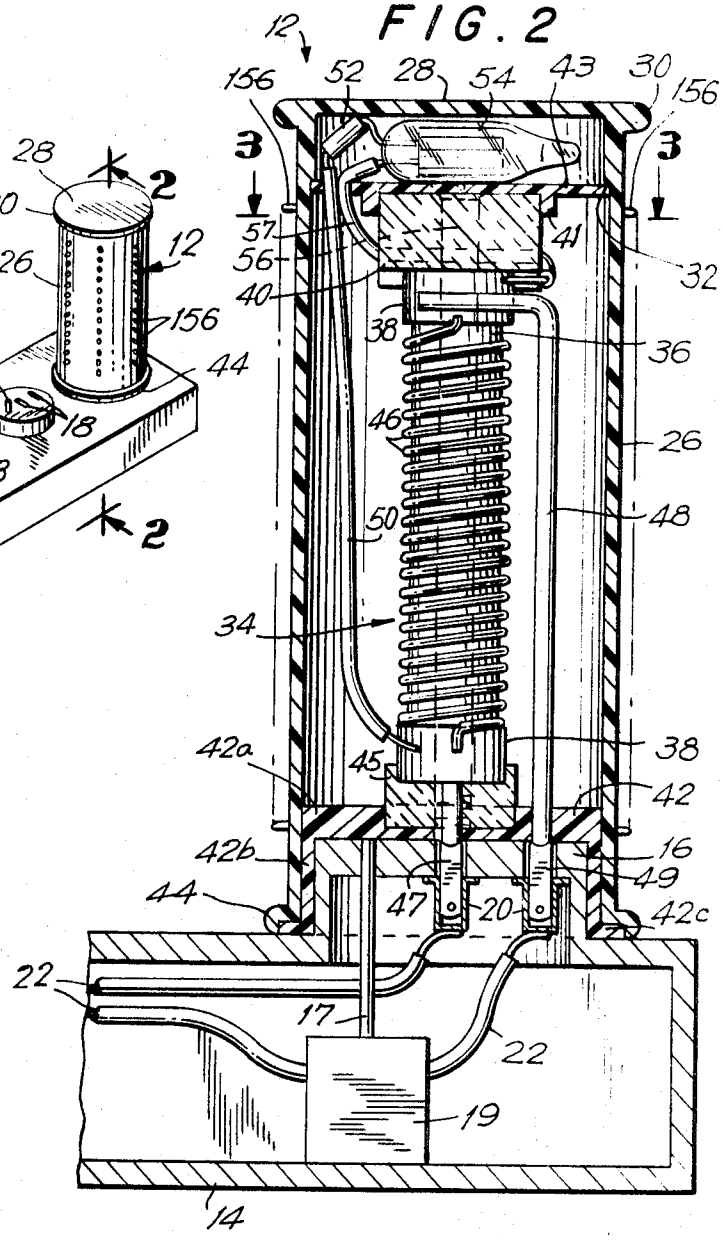


FIG. 2



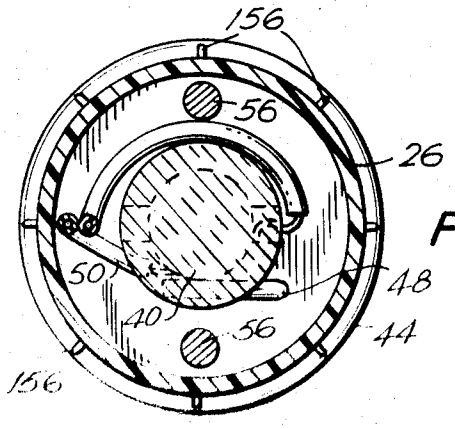


FIG. 3

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FIG. 4

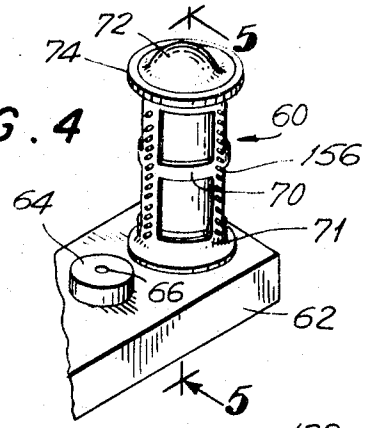


FIG. 5

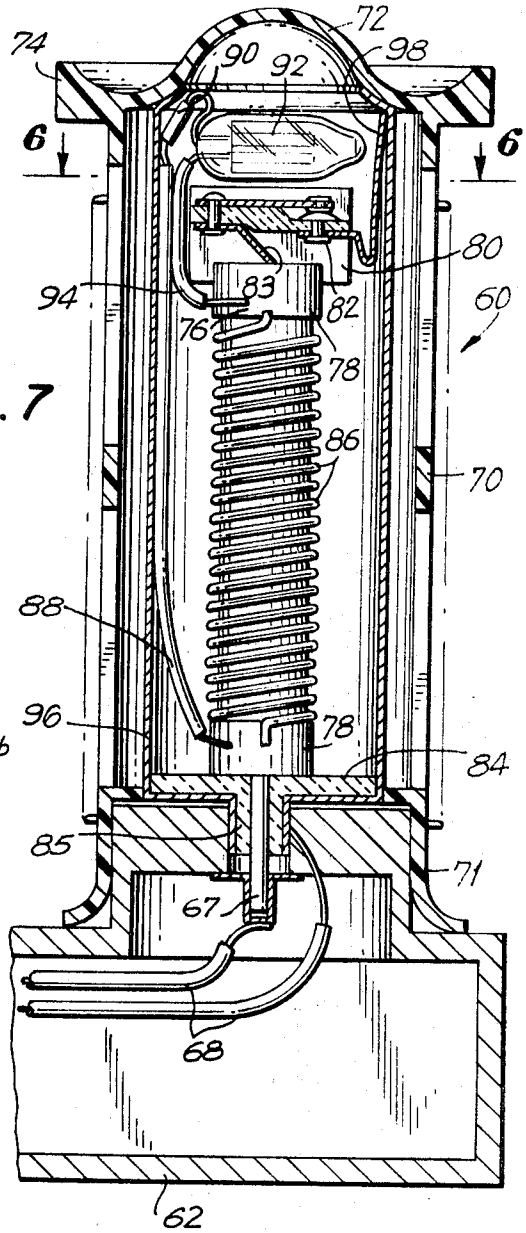


FIG. 7

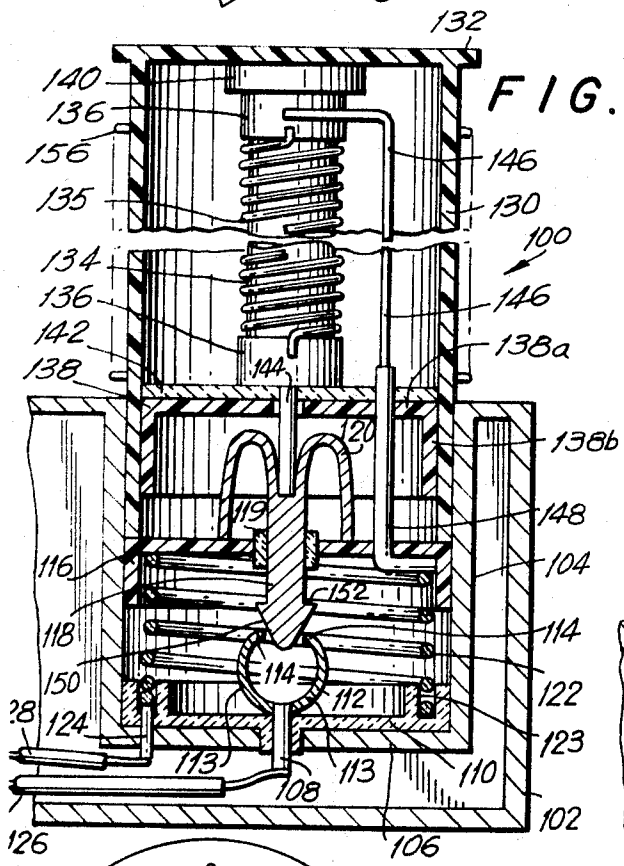


FIG. 6

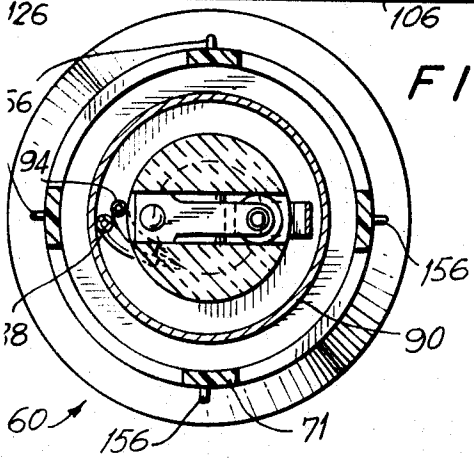
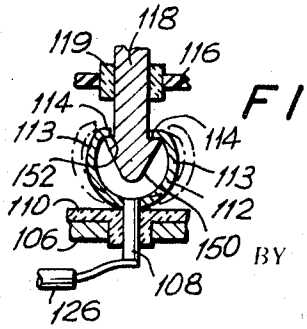


FIG. 8



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United States Patent Office 3,519,792 Patented July 7, 1970

3,519,792

HEATED HAIR CURLER

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Filed July 26, 1967, Ser. No. 656,163
Int. Cl. A45d 2/36, 4/16; H05b 1/00
U.S. Cl. 219—222 7 Claims

ABSTRACT OF THE DISCLOSURE

An electrically heated hair curler having a self-contained heating element with temperature limiting means for preventing overheating of the curler and indicia for indicating to the user when the curler has reached its operative temperature. The curler contains adequate heat retaining material to maintain an elevated temperature during the curling process.

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 swatches. Each of the tresses is ordinarily wound uniformly about a hair curler and by dampening 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 Pasternak 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 heated hair curler which reaches an optimum elevated temperature quickly, and maintains an elevated temperature over a protracted period of time.

A further object of the present invention is to provide a curler having self-contained heating element which quickly reaches its optimum temperature above 212° F., and then automatically shuts off, preventing overheating.

A still further object of the present invention is to provide a hair curler having a self-contained heating unit of a predetermined diameter, which can produce a variety of different size curls proportionate to the length of time the tress remains about the heated curler.

Another object of the present invention is to provide a simple to use lightweight, heated hair curler, which provides a signal to the user when it reaches its optimum temperature.

Still another object of the present invention is to provide a self-contained electric hair curling device which accomplishes all of the above and yet it is simple to use, durable, easy to fabricate, light in weight, fast-acting and is reliable and safe in use.

Further objects and features of the invention will be apparent when the following description is considered in connection with the annexed drawings, in which:

FIG. 1 is a perspective elevated view of one form of a hair curler ready to be heated in accordance with the present invention;

FIG. 2 is an enlarged cross-sectional view taken along line 2—2 of FIG. 1;

FIG. 3 is a cross-sectional view taken along line 3—3 of FIG. 2;

FIG. 4 is a fragmentary perspective elevated view of a further embodiment of the present invention;

FIG. 5 is an enlarged cross-sectional view taken along line 5—5 of FIG. 4;

FIG. 6 is a cross-sectional view taken along line 6—6 of FIG. 5;

FIG. 7 is an elevational sectional view of a further embodiment of the curler and heating unit in inoperative position; and

FIG. 8 is a view similar to FIG. 7, but with the heating unit in operative position.

Similar reference characters refer to similar elements throughout the several views of the drawings.

Referring now to the embodiment of the present invention, shown in FIGS. 1–3, an assembly **10** is shown in FIG. 1 for heating and storing a plurality of hair curlers, such as hair curler **12**. As shown, heating assembly **10** has a generally rectangular base portion **14** having a plurality of female electrical receptacles **16**, shown in the form of cylinders, extending upwardly from its upper surface. Each of receptacles **16** has a pair of apertures **18** in which are positioned electrical elements **20**, which are electrically connected to suitable electric conductors **22**, respectively, for furnishing electricity thereto.

Extending upwardly from each of receptacles **16** is a depressable finger or rod **17**. Finger **17** is springloaded so as to be urged upwardly and is operatively connected to a timer **19**, well-known in the art, in base **14**. As shown in FIG. 2, one of conductors **22** is interrupted by timer **19** and is electrically connected thereto. When finger **17** is depressed, it actuates timer **19** for a predetermined time. When timer **19** is actuated, electrical current through conductors **22** is received by female receptacle **16** and when timer **19** cuts off after the predetermined period of time, electric current to receptacle **16** is cut off. Extending from base **14** is an electrical conductor **23** terminating in a male plug **24** for insertion in an electric socket, not shown, for supplying through conductor **23** an electric current to conductors **22** and elements **20** in apertures **18** in each of the various receptacles **16**.

As seen best in FIGS. 2 and 3, curler **12** is generally tubular in cross section with a relatively thin outer cylinder wall **26** made of a rigid plastic material. One end of curler **12** is closed indicated at **28** and is integrally attached to wall **26**. End **28** has an exteriorly directed radial flange **30** extending beyond wall **26**. Wall **26** adjacent end **28** has a smaller inner diameter than the remainder of its inner surface, forming a step or flange **32** spaced from end **28**. Generally concentrically disposed within wall **26** is a heating unit **34**, which as shown, has a longitudinally disposed support rod **36**, which is advantageously made of a ceramic or other heat-resisting material. Mounted at opposite ends of rod **36** are end caps **38** preferably made of steel. Upper end cap **38** is received in a ceramic sleeve **40**, which in turn is

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 slidably received within wall **26** and abut against inwardly directed flange or step **32**. At the lower end of rod **36** abutting lower end cap **38** is a ceramic disk **45** which in turn is mounted on end piece **42**. End piece **42** has a transverse disk section **42***a* and an outward longitudinally extending sleeve **42***b* with outward radially extending flange **42***c*. End piece **42** is frictionally received within wall **26** and flange **42***c* mates with a circumferential recess or groove in an outwardly extending radial flange **44** on the end of wall **26**. Extending through disk portion **42***a* is a pin or conducting finger **47**, which is matingly received within aperture **18** of receptacle **16**. Sleeve **42***b* of end piece **42** has an inner diameter and length sufficient to slidably receive receptacle **16**. Helically mounted about rod **36** is a 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 advantageously to be 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 properties of the plastic wall **26**, and flanges **30** and **44**. 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 heated ceramic materials 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 connected end piece **72** having a radial outwardly 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 **67** 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 under 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 finger **83**. Finger **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 go 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** and contact carrying member **108** is insulatedly 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

114. 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 catch or stud 118 which is insulated from slide 116 by a suitable insulating washer or sleeve 119. Preferably stud 118 is held in position on slide 116 by heading over the end of its shank 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 wall 106 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. Frictionally mounted within wall 130 is an end piece 138 having a transverse portion 138*a* and downwardly extending sleeve 138*b*. Interposed between 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 138*a* 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 headed over shank 120, and make electrical contact therewith. Coiled about rod 134 is 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 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 138*a* 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 width and slightly bowed, 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 heat is transferred through 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 deeper 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 the fingers 113 of the bimetallic member 112 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 inoperative 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 disclosed 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. If 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 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 that could be used are polystyrene, nylon, acrylics, polypropylenes, butyrates, polyethylenes 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 base members show receptacles for a plurality of curlers, a single receptacle can be provided, which is preferable for portability. While the receptacles on the base members were shown cylindrical, other shapes could be used. Also, the rods about which the resistance wire was wound was indicated as being ceramic, however, other heat resistance materials could be used. Further, while light was shown as the signal means, sound, such as a buzzer or bell could be used.

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 operatively holding the slide in electrically operative position and operatively 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 removably received within said cavity; said slide being movable within said recess and said holding means being a detent, comprising a cooperating shouldered 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 shouldered stud is insulatively 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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ANTHONY BARTIS, Primary Examiner

U.S. Cl. X.R.

132—33; 219—241, 242, 521