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3,283,122

APPARATUS FOR USE IN CURLING HAIR

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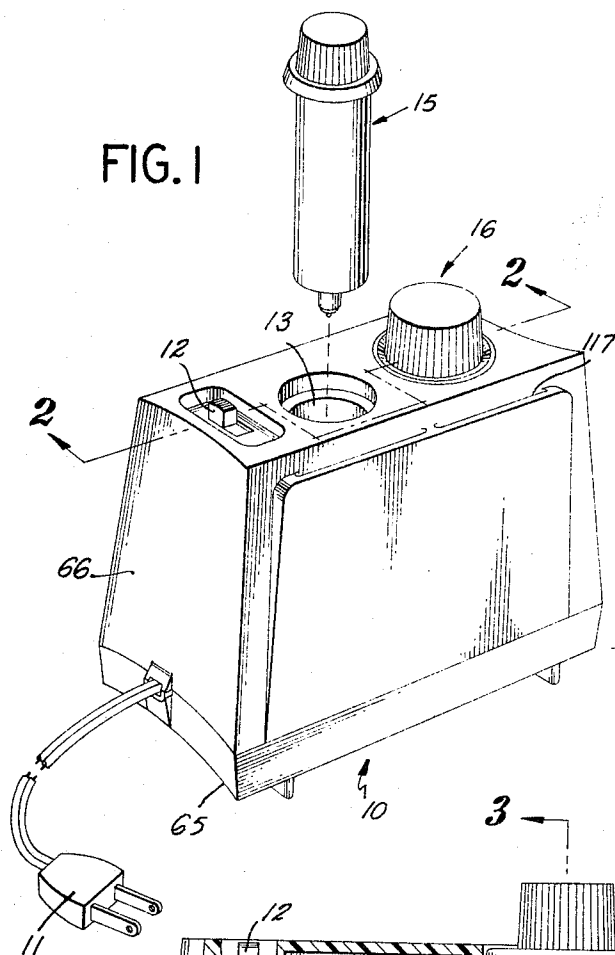


FIG. 1

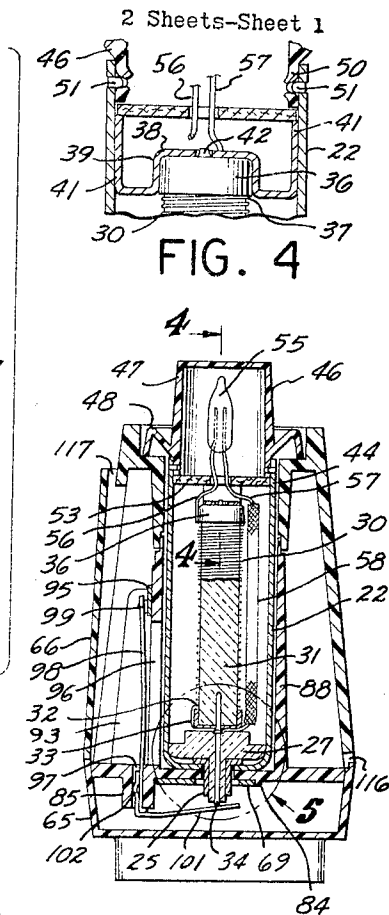


FIG. 4

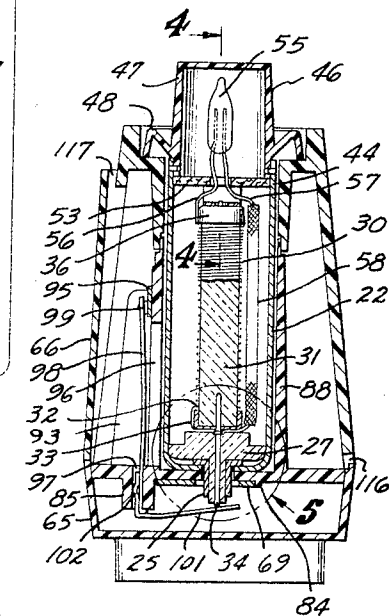


FIG. 3

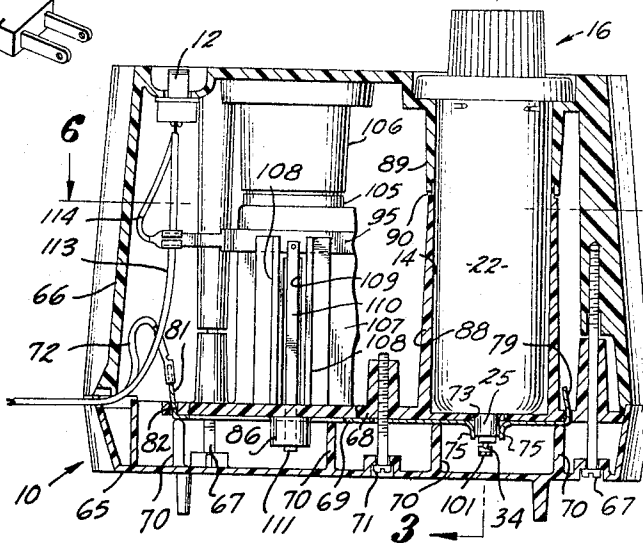


FIG. 2

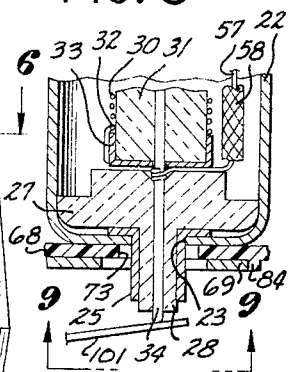


FIG. 5

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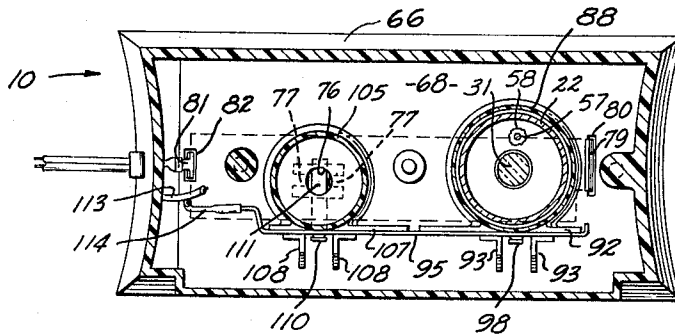


FIG. 6

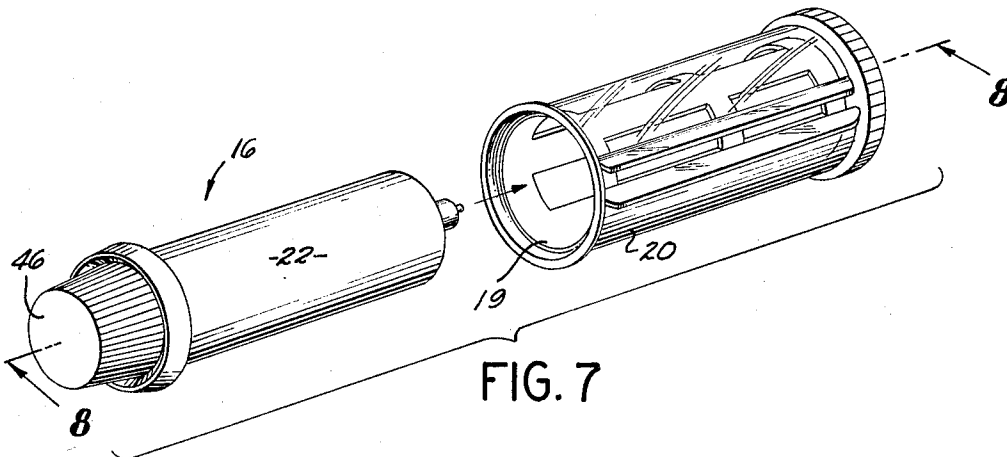


FIG. 7

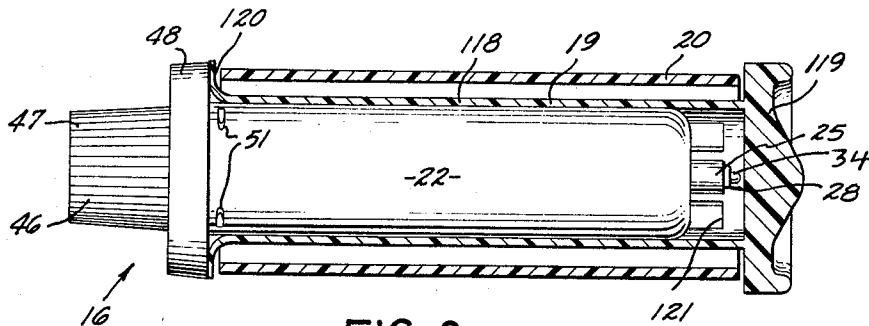


FIG. 8

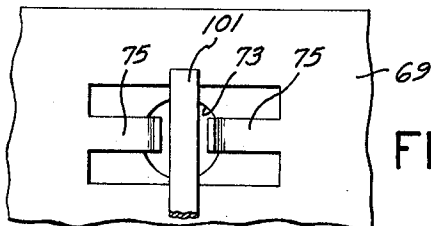


FIG. 9

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APPARATUS FOR USE IN CURLING HAIR

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3 Claims. (Cl. 219—222)

This invention relates to apparatus for use in curling hair and more particularly to such apparatus which use heat to curl the hair.

It has long been known that human hair is somewhat plastic in that it may be shaped, and then by subjecting it to heat, the hair will take on the new shape. However, prior devices for curling hair by heat have been, for the most part, cumbersome and thwart attempts to attain curls of consistent quality. With embodiments of the present invention the disadvantages and difficulties of prior hair curling devices are overcome.

With the foregoing in mind, it is a major object of this invention to provide improved means for curling hair.

It is another object of this invention to provide easily used apparatus for curling hair more quickly than prior devices.

It is a further object of this invention to provide hair curling apparatus which is economical to manufacture and maintain in proper working condition.

Still another object of this invention is to provide an improved means for subjecting hair to heat for the purpose of shaping the hair.

It is a still further object of this invention to provide an improved roller for use in curling hair with the use of heat.

It is still another object of this invention to provide an improved combination of a hair curl roller and hair heating means, which combination functions to direct the heat more efficiently to the hair wound around the roller.

Other and further objects of this invention will become apparent from the detailed description of the preferred embodiment of the present invention in conjunction with the attached drawings wherein:

FIGURE 1 is a perspective view of apparatus embodying a portion of the present invention;

FIGURE 2 is a cross-sectional view of the apparatus taken along line 2—2 in FIGURE 1;

FIGURE 3 is a cross-sectional view of the apparatus taken along line 3—3 in FIGURE 2;

FIGURE 4 is an enlarged fragmentary view of the upper portion of one preferred embodiment of the heat transfer unit taken along line 4—4 in FIGURE 3;

FIGURE 5 is an enlarged fragmentary view of the lower portion of one preferred embodiment of the heat transfer unit in the area circled by line 5 in FIGURE 4;

FIGURE 6 is a cross-sectional plan view of the apparatus in FIGURE 1 taken along lines 6—6 in FIGURE 2;

FIGURE 7 is an exploded perspective view of a preferred embodiment of the heat transfer unit and hair curl roller;

FIGURE 8 is a partial cross-sectional view of the heat transfer unit and roller taken along line 8—8 in FIGURE 7 but with the unit inserted in the roller; and

FIGURE 9 is an enlarged fragmentary view of the apparatus as seen from line 9—9 in FIGURE 5.

In the preferred embodiment, this invention incorporates the use of heat transfer, or heat sink, units which are operatively connected to a console and become heated by electrical power supplied to the console. The heat transfer unit stores heat within itself which is then transferred to hair wrapped around a hair curl roller when the heat transfer unit is inserted into the center of the roller.

The number of rollers and different sizes thereof, along with the number of heat transfer units and different

sizes thereof would depend upon the particular circumstances. However, I have found that a set of approximately 25 rollers of two different sizes in combination with a console including four different heat transfer units of two different sizes are very satisfactory for use in a woman's dressing room. Similarly, the ensemble could include only one heat transfer unit and roller adapted to be carried in the purse of the user and then used for touch-up purposes.

Referring now to the drawings there is shown a preferred embodiment of the invention, which embodiment includes a console and two heat sink, or heat transfer, units of two different sizes. More particularly, the console includes a housing 10 to which is supplied electrical power from a conventional wall plug 11. The power supply to the console is controlled by a standard on-off switch 12. Formed within the housing 10 are two cavities 13 and 14 (see FIGURES 1 and 2) which open through the top of the housing 10 to receive heat transfer, or heat sink, units indicated generally by the arrows 15 and 16. As mentioned above, and as will be described in greater detail below, the heat transfer units 15 and 16 cooperate with the electrical components within the console in such manner that, when the heat transfer units 15 and 16 are inserted into the cavities 13 or 14 the heat transfer units are heated up to a predetermined temperature. As will be further described below, the heat transfer units 15 and 16 each have masses of material, preferably ceramic, located within them, which material has the specific function—among other things—of absorbing heat while the heat transfer unit is in the console and storing that heat.

Prior to the time the heat transfer unit 15 or 16 has become heated, the user will wrap her hair around numerous hair curl rollers having a cylindrical cavity therein such as hair curl roller 19 (see FIGURE 7) and clamps the hair around the roller 19 by a clamp 20. Then the user grasps the heat transfer unit, removes it from the console and inserts into the center of the particular roller 19. With the heat transfer unit in the position shown in FIGURE 8, the heat which is stored in the unit will radiate radially outward into the hair wrapped around the roller 19. As will be described in greater detail below, the preferred embodiment of the heat transfer unit 16 cooperates with the preferred embodiment of the hair curl roller 19 so that the heat stored in the heat transfer unit 16 to radiate radially outward from the unit and minimize the heat losses out of the end of the ends of the combination. The heat transfer unit 15 is used with a hair curl roller just like the roller 19 except that the roller would be of smaller diameter corresponding to the diameter corresponding to the diameter of the heat transfer unit.

Referring now to FIGURES 2 to 6, the preferred construction of the heat transfer unit 16 will be described in detail. In order to facilitate the description and understanding of the preferred embodiment of the heat transfer unit 16, it will be described in the generally vertical position shown in FIGURE 3. However, naturally, such terms as "upper" and "lower" and "top" in the specification and claims are merely used as a frame of reference and are not to be taken as a limitation of the orientation with respect to the earth of the different portions of embodiment of the invention.

Forming the outside shell of the unit 16 is a cylindrical body 22 made of electrical and heat conducting material such as aluminum. The body 22 is substantially closed at its lower end and is provided with a reduced hole 23 therethrough to receive a depending tubular nipple 25. (See FIGURE 5 in particular.) Naturally, the nipple 25 could be integral with the body 22.

As will be described in greater detail below, in the preferred embodiment, the heater element is located within

the heat transfer unit 16 and the nipple 25 is one of the contacts by which electrical power is supplied to the heater element.

Located within the body 22 at the lower end thereof, is a ceramic insulator 27 having a tubular portion 28 depending through the center of the nipple 25. The ceramic insulator 27 has the additional function of absorbing heat and storing it for purposes which will be described in greater detail below.

Also located in the body 22 is a heater element 30 helically wrapped around a ceramic core 31. Lower end 32 of the heater element 30 is electrically connected to a lower cap 33 which in turn is electrically connected to, and assists in supporting, a central contact 34 which depends down through and beyond the insulator 27. Note that the insulator 27 and the contact 34 function to center the lower end of the core 31 with respect to the body 22.

At the upper end of the core 31, is a cap 36 to which upper end 37 of the heater element 30 is electrically connected. (See FIGURE 4 in particular.) The upper end of the heater element 30 is centered with respect to the body 22, and electrically connected to the body, by a bracket 38, preferably constructed of some material such as copper. The bracket 38 has a U-shaped central portion 39 which is of such dimension that it is received over the cap 36 and grips it while spring legs 41 frictionally engage the interior surface of the cylindrical wall of the body 22. In order to prevent the bracket 38 from sliding sideways off of the cap 36 a protuberance 42 is provided on the cap and cooperates with a small opening in the said bracket.

At its upper end 44, the body 22 is open for reception of the internal components. The end 44 is closed by a cap 46 having a handle portion 47 and heat deflector rim 48. As will become apparent below, the cap 46 is constructed of some light conducting material, e.g., a translucent plastic, which is softer than the material of which the body 22 is constructed.

The manner in which the cap 46 is fixed to the body 22 should be noted. As can best be seen in FIGURE 4, the cap 46 has a depending annular portion 50 at its lower side. With the portion 50 inserted into the end 44 of the body 22, the cap may be joined to the body by crimping a portion of the body 22 into the annulus 50, as at portions 51.

In order to minimize the movement of heat from the heater element 30 into the cap 46, an asbestos washer 53 is located between the upper end of the spring legs 41 and the annulus portion 50.

It should be noted that the dead air space between the core 31 and the walls of the body 22 reduces the rate at which the heat stored in the core 31 is radiated to the wall of the body 22 and thence into the hair wound around the curler. Therefore, while the unit 16 is in the cavity 14, the core 31 may be raised to a much higher temperature than the wall of the body 22, thereby storing more heat. And, after the unit 16 is removed from the cavity, the temperature of the body 22 continues to rise and remains at a high temperature for a relatively long period of time. This is a distinct advantage over my previous heat transfer units which were heated from the outside.

In the construction of the heat transfer unit 15 the same heater element 30, core 31, neon lamp 55 and contact 34 are used. Naturally, since the unit 15 is of smaller diameter than the unit 16, the body, the ceramic washer and the plastic cap are of smaller diameter.

As will be described in greater detail below, when the heat transfer unit is inserted into the cavity in the console, the combination automatically cuts off the electrical power to the heater element when the transfer unit reaches a predetermined temperature. Accordingly, means are provided in the combination indicating when the heat transfer unit has reached the predetermined temperature. In the preferred embodiment, the means for such indi-

cating or signalling takes the form of a neon lamp 55 located within the handle portion 47 of the cap 46. Lead 56 on the lamp 55 is electrically connected to upper cap 36 on the core 31 while the lamp's other lead 57 is electrically connected to the central contact 34 whereby the lamp 55 is in parallel with the heater element 30. Because of the temperatures that are generated in the interior of the body 22, the leads 56 and 57 are not insulated except that lead 57 has a woven fiber-glass sleeve 58 therearound to prevent accidental shorting.

As can be seen, the heater element 30 will be energized when electrical voltage is connected across the nipple 25 and the central contact 34. At this point, I will describe the preferred manner in which that electrical power is supplied to these contacts and then interrupted when the heat transfer unit 16 reaches the predetermined temperature.

The housing 10 comprises a base 65 and a top 66 which are held together by a pair of screws 67. Located within the housing 10 is a horizontal plate 68 which holds lower bus bar 69 against a series of pedestals 70 in cooperation with a screw 71.

One wire 72 from the plug 11 is connected to the lower bus bar 69 for the purpose of supplying electrical power to the nipple 25 of the heat transfer unit 16, or such other unit as may be inserted into a cavity in the housing 10. To this end, a hole 73 in the plate 68 is located at the center of the cavity 14 to receive the nipple 25 therethrough. The bus bar 69 is cut away to form a pair of fingers 75 (see FIGURES 2 and 9 in particular) which are then bent downwardly and adapted to accommodate and resiliently engage the nipple 25 of the transfer unit 16. As can be seen in FIGURE 6, a hole 76 through the plate 68 is provided in the center of the cavity 13. And spring fingers 77 are the same as spring fingers 75.

Before leaving the lower bus bar 69, the preferred manner in which it is mounted in the console will be described as this unique construction reduces costs of manufacture. One end 79 of the bus bar 69 is bent approximately 110° and received through a slot 80 in the plate while the bus bar's other end 81 is bent up and received through a second slot 82 in the plate. The bus bar 69 is held from forward and rearward movement by a depending rib 84 (see FIGURE 3) and depending bosses 85 and 86 (see FIGURE 2). In manufacture, the bus bar 69 is stamped and bent to the described configuration. Then, by inserting the ends 79 and 81 through the slots 80 and 82 respectively, the bus bar 69 may be quickly positioned and held in proper register relative to the holes 73 and 74 at the bottom of the respective cavities 13 and 14.

The cavity 14 is defined by an upstanding cylindrical wall 88 on the plate 68, which cylindrical wall partially telescopes into a depending cylindrical wall 89 at 90. As can best be seen in FIGURES 3 and 6, an upstanding plate 92 is formed integral with the cylindrical wall 88 and has a pair of support flanges 93 extending at a right angle thereto. The flanges 93 are recessed at their upper end to receive and frictionally grip therein an upper bus bar 95.

A vertical slot 96 is formed through the cylindrical wall 88 at the area between the flanges 93. Thereby, when the body 22 is in the cavity 14, the heat from the body will radiate through the slot 96.

The depending boss 85 has a slot therethrough which receives the lower end of a bi-metallic strip 98 having a contact button 99 at its upper end. The bi-metallic strip 98 is held in its position juxtapositioned to the slot 96 by a spring contact 101 which is crimped at 102 and forced up into the slot 97. The spring contact 101 resiliently engages the contact point 34 when the heat transfer unit 16 is inserted in the cavity 14.

By this arrangement the bi-metallic strip 98 may be installed by merely pushing it down through slot 97 and hooking it at the lower end of the boss 85, and then, forcing the contact 101 up into the slot 97. At this point,

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the crimp 102 will frictionally hold the contact 101 and the bi-metallic strip 98 in position.

The bi-metallic strip 98 is a piece of metal composite which has the characteristic that as it is heated it will bend in a direction to move the contact button 99 away from the upper bus bar 95. With this arrangement, heat from the body 22 radiating through the slot 96 will heat the bi-metallic strip 98 and when the body 22 reaches a predetermined temperature the button 99 will break the circuit to be described.

The means for controlling the temperature in the left cavity 13 is substantially the same as the apparatus just described. More particularly, the left cavity 13 is defined by an upstanding cylindrical wall 105 which partially telescopes into depending cylindrical wall 106. An upstanding plate 107 is formed integral with the cylindrical wall 105 in the same manner that upstanding plate 92 is formed integral with cylindrical wall 88. And a pair of support flanges 108 are provided on either side of a vertical slot 109 which extends through the cylindrical wall 105. Juxtapositioned to the slot 109 is a bi-metallic strip 110 which is anchored in the depending boss 86 by spring contact 111 in the same manner that bi-metallic strip 98 is secured by spring contact 101. Bi-metallic strip 110 and spring contact 111 are the same as bi-metallic strip 98 and spring contact 101 and therefore, side views thereof are felt to be unnecessary.

As in the case of support flanges 98, the support flanges 108 are relieved at their upper end to receive therein the upper bus bar 95 which is pressed into the recesses and held by friction. The end of the bus bar 95 is electrically connected to the plug 11 by means of a wire 113, switch 12, and wire 114.

In operation, the console is plugged into a conventional wall socket and the switch 12 is turned on. At this point, when the heat transfer unit 16 is inserted in the cavity 14 electrical current can flow from the lower bus bar 69 through the nipple 25, the body 22, and bracket 38 to the upper end of the heater element 30. From that point, the current flows through the heater element 30 to the lower cap 33 and central contact 34 and thence to the spring contact 101. From the spring contact 101 the current flows through the bi-metallic strip 98 to the upper bus bar 95 and thence to the switch 12 where it returns through wire 113 to the wall socket. This current heats the heater element 30 and the voltage developed across the heater element causes the neon lamp 55 to glow indicating the fact that the unit 16 is being heated.

As the unit continues to heat, heat is stored in the ceramic core 31 and the ceramic insulator 27. And, the core 31 actually heats to a much higher temperature than the body 22. The insulator 27 also heats to a higher temperature than the body 22, however, the difference is less than in the case of the core 31 because the insulator 27 is in direct contact with the body. As the temperature of the body 22 is increased by the heating, the body will radiate heat through the slot 96 to the bi-metallic strip 98 heating the strip. When the heat increases the temperature of the strip 98 sufficiently, the contact button 99 will be moved away from the upper bus bar 95 whereupon the heater element 30 will be electrified no longer, and the lamp 55 will go out.

The heat transfer unit 15 is heated in the same manner.

A certain amount of heat is always radiated from the cavities 13 or 14. Therefore, means are provided to ventilate the interior of the housing 10. To this end, a series of inlet vents 116 (see FIGURE 3) are provided along the lower edge of the front of the top 66 and a series of outlet vents 117 are located near the upper edge of the rear of the top 66. With this arrangement, air is drawn by convection in through the inlets 116 and carry away heat through outlet vents 117.

During the time that the heat transfer units 15 and 16 are being heated the user will roll her hair around hair

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curl rollers such as 19 and clamp the hair around the roller with the clamp 20. Then the user inserts the heat transfer unit into the cavity in the roller. It should be noted that the roller 19 has a cylindrical central portion 118 with a relatively thick closure 119 closing the roller at one end of the central portion. At the other end of the central portion 118 there is provided a flare 120 to facilitate insertion of the heat transfer unit. Also provided are a plurality of openings 121 in the wall of the central portion 118 to facilitate radiation of heat from the body 22 outwardly into the hair wrapped around the central portion 118.

It should also be noted that the combination of the preferred heat transfer unit and roller 19 maximizes the use of the heat stored within the body 22. To this end, the asbestos washer 53 minimizes heat losses longitudinally through the cap 46 and the thick closure 119 minimizes heat losses longitudinally out the other end of the combination. On the other hand, the central portion 118 is constructed to minimize the resistance to flow of heat from the body 22 outward. Therefore, the practically all of the stored heat is directed radially outwardly into the hair.

While only a few embodiments of the present invention have been shown and described in detail, it will be apparent to those skilled in the art that such is by way of illustration only and numerous changes can be made thereto without departing from the spirit of the present invention. Accordingly, the present invention should be limited solely by the scope of the appended claims.

I claim:

1. Hair curling apparatus comprising:

a housing;

an elongate upright cylindrical cavity formed in said housing and opening through the top of said housing;

a heat transfer unit, said unit including

an elongate metallic heat conducting tube removably received in said cavity,

a heat absorber mounted within said tube,

an electrically energizable heating circuit including a heating element inside said tube and in heating relationship with said heat absorber, and

a translucent hollow handle portion connected with said tube and projecting above the cavity with an indicator lamp therein, said lamp connected with said heating circuit;

detachable electric connector means comprising cooperating connector means carried respectively by the heat transfer unit and housing and operable to supply power to said circuit and lamp while said heat transfer unit is in said cavity; and

thermally actuated switch means responsive to the heat generated in said heat transfer unit connected in said heating circuit for deenergizing said circuit lamp when a predetermined temperature for the heat transfer unit has been reached.

2. Hair curling apparatus as in claim 1, wherein said heat transfer unit has at its lowermost end an electrically conductive nipple and coaxial electrically conductive pin extending through said nipple, said nipple and pin connected in said heating circuit and forming part of the connector means carried by the heat transfer unit;

means electrically insulating said nipple from said pin; and

said connector means carried by said housing including contact elements respectively detachably contacting said nipple and pin.

3. Hair curling apparatus comprising

a housing;

an elongate upright cavity formed in said housing and opening through the top of said housing;

a heat transfer unit, said unit including

an elongate metallic heat conducting tube removably received in said cavity and substantially closed at both ends,

a heat absorbing element within said tube,
 an electrically energizable heating circuit, including a heating element inside said tube and in heating relationship with said heat absorbing element, and
 a non-heat conducting handle portion connected with said tube and projecting above the cavity;
 cooperating detachable electric connector means carried respectively by said tube and in said housing and detachably connecting said heating circuit for receipt of electric power to said circuit from within said housing while said unit is in said cavity, said connector means carried by said tube including an electrically conductive nipple at the lower end of the tube and a coaxial electrically conductive pin extending through said nipple, said nipple and pin connected in said heating circuit and electrically insulated from one another, said connector means carried by said housing including contact elements respectively detachably contacting said nipple and pin, and
 thermally actuated switch means responsive to the heat generated in said heat transfer unit connected in said circuit for deenergizing said circuit when a predetermined temperature for the heat transfer unit has been reached.

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