United States Patent

[11] 3,556,114

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[45] Patented **Jan. 19, 1971**

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[54] **HAIR CURLER**
11 Claims, 5 Drawing Figs.

[52] **U.S. Cl.** **132/40**
[51] **Int. Cl.** **A45d 2/00**
[50] **Field of Search** 132/40, 39, 41, 40, 42, 36.2; 28/78

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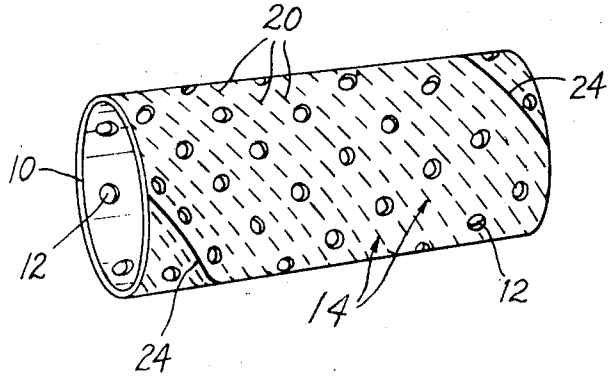
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ABSTRACT: Hair curlers are described which are formed of a plastic-base ribbon having parallel rows of monofilament upstanding hooks extending from embedded portions in the base. The ribbon is arranged as a helix to form a cylinder, with its abutting helical edges fused together, being self-supporting and self-sufficient as a complete unit needing no pins or clips to retain the hair wound on the curler. The overhang portions of the hooks extend at a slant angle to the hair as it is wound on the curler, promoting easy deflection of each hook by the hair, followed by reengagement of the hair by the hooks. The helical distribution of the hooks on the curler avoids empty zones or bands about the curler that could otherwise receive wound hair without retention.



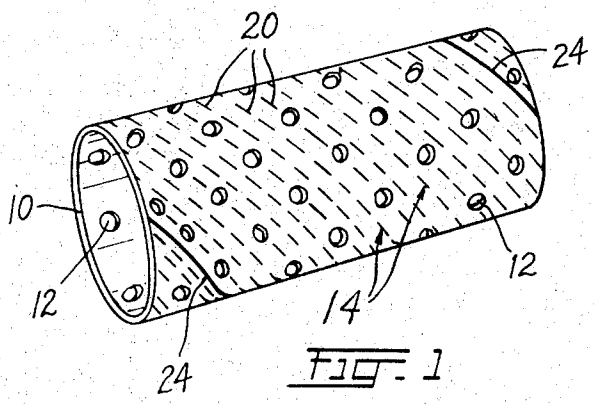


FIG. 1

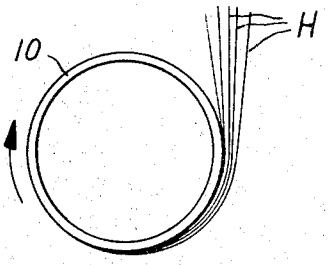


FIG. 2

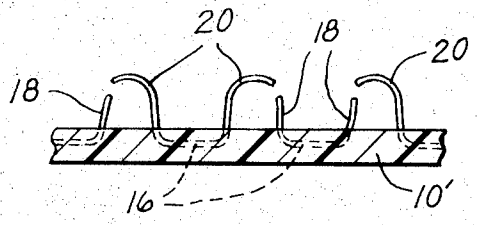


FIG. 3

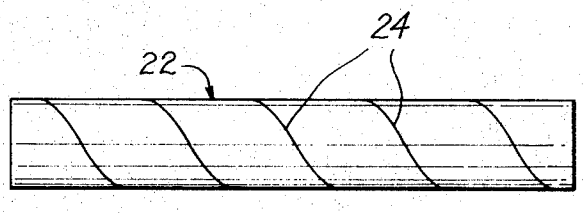


FIG. 4

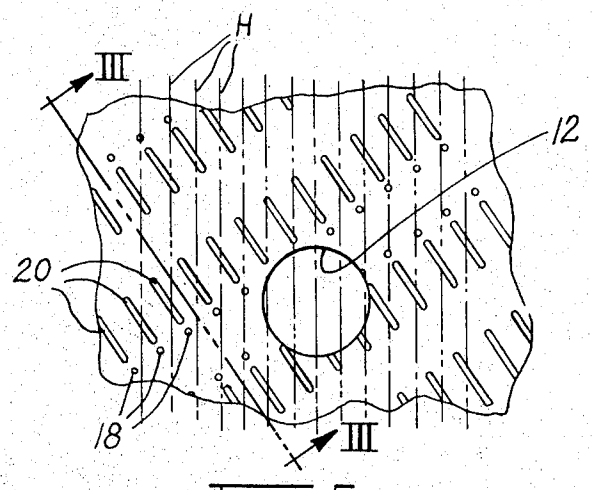


FIG. 5

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HAIR CURLER

This application is a continuation-in-part of my application Ser. No. 558,080, now abandoned, filed Jun. 16, 1966, which is, in turn, a continuation-in-part of my application Ser. No. 346,831, now abandoned, filed Feb. 24, 1964 claiming a convention priority date of Jul. 29, 1963.

The present invention relates to hair curlers, or hair rollers as they are called at times.

The general object of the invention is to provide a new and improved means for curling hair. More specifically, an object of this invention is to provide improvements in hair curlers so as to make them effective for holding hair when wound thereon and for causing the hair to hold the rollers in place. Such a curler is inherently simple, and it avoids the need for manipulating additional holding devices such as pins, clips and bars. A further object of the invention resides in providing a self-sufficient hair curler that is well suited to resist the heat and chemicals used in treating hair, and which is easily cleansed, and which retains its form and effectiveness.

The novel curlers described in detail below and shown in the accompanying drawings are well suited to achieving the foregoing objects and others, and they have a number of unique features that will be appreciated more fully from the detailed description. As one important feature, the curler has a cylindrical wall that bears numerous projecting hair-retaining elements, and these are distributed in helical rows. As a result, there is a high probability of each strand of hair being engaged by one of the retaining elements as the hair is being wound around. the curler. Conversely, because of the efficiency of the helically distributed retaining elements, the rows of retaining elements can be mutually spaced in a relatively open pattern. This contrasts with an alternative arrangement wherein the hair-retaining elements are arranged in circles around the curler. Such other arrangement leaves channels between the circles of hair-retaining elements. Strands of hair can be received in those channels without interengagement with the hair retainers.

A further feature of the novel hair curlers relates to the form and orientation of the hair-retaining elements on the curler. These elements comprise numerous tiny hooks that include an upstanding leg and a lateral or overhang portion on each leg. The overhang portions extend at an acute angle to the strands of hair that are being wound transversely to the cylindrical body of the curler and thus at an acute angle to a plane passing perpendicular to the axis of the cylindrical wall. This form of hook has been found particularly efficient. This may be explained by considering that each strand of hair that presses down on each overhang portion of the hook tends to deflect the hook due to the acute angle, and thereafter the hook snaps back into its natural position and over the strand of hair. The hair is effectively held to the curler and the curler is held in position on the user's head without other fasteners or further manipulations.

The foregoing features and other desired features are incorporated in a novel hair curler, as will be seen, which is of simple and easily cleaned form, which is hollow and perforate to promote drying of the hair, and which can be made of materials well suited to resist the heat and chemicals used in curling hair. The foregoing objects and features, and others, will be more fully appreciated from the following detailed description of the presently preferred embodiment of the invention in its various aspects.

The presently preferred hair curler shown in the accompanying drawing is an illustrative embodiment of the invention in its various aspects. Its features are subject to modification and substitution; and certain features may be omitted without impairing the novel features retained. The illustrative embodiment is shown in the accompanying drawings, wherein:

FIG. 1 is an isometric view of a novel hair curler illustrating various features of the present invention;

FIG. 2 is an end view of the hair curler of FIG. 1, additionally including hair H;

FIG. 3 is a greatly enlarged cross section of a preferred from of material used in making the hair curler shown in FIG. 1, as viewed from the section lines III–III in FIG. 5;

FIG. 4 is a view of a tube formed of a ribbon of material as in FIG. 3 wherein the ribbon is wound helically and edge-united, so as to be suitable for making multiple hair curlers of the form shown in FIG. 1; and

FIG. 5 is a greatly enlarged view of a portion of FIG. 1, including broken vertical lines representing the hair of a user.

In FIGS. 1 and 2, there is shown a hair curler which exemplifies certain important features of the invention. The illustrated hair curler includes a cylindrical wall **10** having holes **12** distributed over the area, and parallel helical rows **14** of resilient hooks **20**.

The material used in forming the illustrated hair curler is shown in FIG. 3, greatly enlarged. As will be seen, this material has many distinctive attributes. It includes a plastic nontextile sheet **10'** as a base, which constitutes the wall **10** of the curler in FIG. 1, and a thermoplastic filament that is shaped into a series of undulations with alternate loops **16** embedded and firmly secured in the base sheet. The projecting loops of the filament are cured by heat so as to retain their shape, and they are severed so as to form bristles **18** and hooks **20**. There is a gap between the end of each bristle and the end of each hook. The gap results from the action of a heated cutter that melts the filamentary material as it cuts.

The extent that the hook **20** may extend reversely toward a bristle **18** influences greatly the retention of hair by the curler. By cutting the projecting filament loops nearest the corner "-corner" where an upright part joins a transvers part of each loop, the reverse part of the hook is minimized. It is then easiest to remove a curler from the hair. The resulting hook **20** thus consists essentially of an upright or leg portion which carries a transverse or laterally extending overhang portion. In the form shown, each hook **20** is associated with a bristle **18**. The gap between the hook and the bristle may become enlarged as a result of slight twisting of the upright portion or leg of the hook that can occur after the loop is cut, so as to swing the transverse part of the hook through a small angle and out of line with bristle **18**.

The material shown in FIG. **3** is formed initially as a ribbon, with many parallel undulating filaments extending along its length and divided into hooks and companion bristles. A large proportion of the overhang portions extend essentially along their respective rows of hair retaining elements and, accordingly, the overhang portions extend slantwise relative to the user's hair when wound about the cylindrical wall of the curler. The overhang portions extend at an acute angle to a plane passing perpendicular to the axis of the cylinder. It is advantageously perforated to form vent holes **12**, and then it is formed into a tube by winding the ribbon helically and uniting the edges. The edge joint **24** is readily made by heat-softening the edges of the ribbon during or just prior to winding so that, upon winding, the heat-softened edges are pressed together and become fused into the butt joint **24**.

The helically wound ribbon is manufactured as a continuous length of tubing that may be cut into individual hair curlers of various lengths, for example 2 inches to 3 inches long and five-eighths inch to 2 inches in diameter, using a ribbon approximately 2 inches wide. The continuous tubing may be cut directly into individual curlers, or long tubes **22** may be cut and sold, for example, 18 inches in length.

The user then can easily cut tube **22** into individual hair curlers of any lengths that may be desired at the time of use, by means of an ordinary pair of scissors. Curlers of different lengths may be used to advantage at different parts of the head. The use of a ribbon that is wound helically as described has the further advantage of facilitating the manufacture of tubing of various diameters, merely by changing the helical pitch.

The helical disposition of the rows of hooks **20** has been found to provide a number of distinctive properties, and is of particular significance. First, as the roller is being used and the hair H (FIGS. **2** and **5**) is pressed against the overhang portions of the hooks, the pressure tends to swing the hooks **20** out of line with the companion bristles **18**. This occurs because the hair extends at an acute angle relative to said

overhang part of the hooks. The deflected hooks then snap back to overlie the hair. Second, due to the diagonal or slant relationship of the hooks to the hair as a result of the location of the hooks in spiral rows, any particular strand of hair will certainly cross one of the many hooks by the time the curler has been turned through even a small angle during the winding of curls. This is in contrast to the situation that would exist if the rows of hooks were to extend in circles around the curler, for in that case many strands of hair would readily find places in the circular spaces between adjacent circular rows of hooks. Such strands of hair would not be held in place by any hooks. Thus, the helical disposition of the rows of hooks greatly increases the probability of any particular hook becoming actively interengaged with a wound strand of hair so as to be held in place. This increased efficiency of the hooks has the further advantage of making it practical to rely upon relatively fewer, less crowded, rows of hair-retaining elements than would otherwise be needed for an effective curler of the self-securing type.

The thickness and resilience of the monofilament used in making the hooks can be chosen as desired for best action in securing the hair by the hooks and in holding the curler in place without need for bars, hairpins and the like, and yet the hooks can be sufficiently yielding to allow easy unrolling of the curler after the curl has been set and dried.

The monofilaments are of nylon in a preferred form of the curler, and the base is a self-supporting layer or sheet of nylon or of other suitable heat-resistant material that is relatively inert to the chemicals used in treating hair; and this base material is preferably thin and flexible enough to yield when pressed against the head of the user, yet firm enough to retain its shape during winding of a curl. The undulations of the filaments are embedded in the layer while the latter is hot enough to flow about each loop **16** and retain it securely in place so that bristles **18** and loops **20** will be erect for best effect in the use of the curlers. The finished curler consisting solely of the cylindrical wall and the hair-retainers projecting therefrom is thus highly effective and self-sufficient, without need for clips or pins or bars for holding the wound hair in place on the curler. Moreover, the materials used are well suited to resist the chemicals used on the hair and the heat used in setting and drying the curls. Wall **10** is sufficiently firm to hold its shape while it is being manipulated to wind a curl, and yet it is readily capable of yielding in case it is pressed against the head of the wearer.

The fact that base **10'** is a layer of plastic sheet material is of advantage in maintaining the hooks **20** and bristles **18** securely in place as manufactured. The holes **12**, which are much larger in diameter than the thickness of the base, provide effective passages through wall **10** to the internal hollow space of the curler for promoting drying of the hair.

It is within the present contemplation to utilize the described helically disposed rows of hair-retaining elements even where the base **10'** is of woven threads or other material, for the distinctive advantages discussed above. Other variations may be made by those skilled in the art for utilizing certain of the novel features in the preferred embodiment described above, and consequently the invention should be construed broadly in accordance with its full spirit and scope.

I claim:

1. A hair curler having a cylindrical wall and having numerous means projecting from the cylindrical wall for retaining hair against the wall when wound thereon so that the hair and the curler can hold each other in position without resort to additional components cooperating with the cylindrical wall, said hair retaining means comprising numerous resilient hair retaining filamentary elements secured to and projecting integrally from said wall and distributed over at least a large part of the external area of the cylindrical wall, each of said filamentary elements including an upstanding portion and an overhang portion extending laterally from said upstanding portion to provide a space between the cylindrical wall and the overhang portion for hair retention, said filamentary hair retaining elements being disposed in parallel helical rows, said filamentary hair retaining elements being spaced from each other for cooperation individually with hair being wound on the hair curler, said filamentary elements being so distributed on said cylindrical wall within each helical row and between successive helical rows that said filamentary elements intersect substantially all circular paths around the hair curler in the area thereof occupied by the hair retaining means, whereby there is at least a high probability of the strands of hair wound about the cylindrical wall transversely thereto becoming engaged by one or more of said hair retaining filamentary elements.

2. A hair curler in accordance with claim **1**, wherein each of said laterally extending overhang portions includes (no more than a minimal reverse part) extending toward the cylindrical wall at the end of the overhang portion remote from the juncture of the latter with a related said first portion, for promoting easy removal of the curler from the hair.

3. A hair curler in accordance with claim **1**, wherein said cylindrical wall consists essentially of a self-supporting nontextile plastic sheet whereby a curler having the features in claim **24** also has a cylindrical wall that is inherently free of the numerous interstices characterizing textile materials and accordingly is easily cleaned.

4. A hair curler in accordance with claim **1**, wherein said overhang portions are disposed essentially along their respective helical rows and thus are disposed at an acute angle to strands of hair when wound transversely about the cylindrical wall, thereby making it easier for each overhang to be deflected by hair being thus wound and the deflected overhangs thereafter tending to snap over the deflection-inducing strands of hair when the latter are wound against the cylindrical wall.

5. A hair curler in accordance with claim **1**, wherein said overhang portions predominantly extend at acute angles to hair being wound about said cylindrical wall so that such strands of hair initially tend to induce lateral deflection of said overhang portions engaged thereby during the winding and so that the overhang portions thus deflected thereafter tend to snap over such strands of hair when the latter are wound against the cylindrical wall.

6. A hair curler having a cylindrical wall and numerous means for retaining hair against the cylindrical wall when wound thereon, said means being distributed as successive helical rows extending over at least a large part of the outer area of said cylindrical wall, a predominant proportion of said hair retaining means individually having a resilient, flexible filamentary element projecting from the outer surface of said cylindrical wall and including a first portion extending away from said cylindrical wall and an overhang portion extending laterally from said first portion so as to provide a space between said overhang portion and said cylindrical wall for receiving and retaining strands of hair wound about the curler, said overhang portions generally extending at acute angles to respective planes perpendicular to the axis of the cylindrical wall and accordingly extending slantwise to hair being wound on the curler transversely to said cylindrical wall, whereby pressure of the hair against the overhang portions when being thus wound tends to deflect the overhand portions laterally which then tend to snap back to their original positions and thus to extend over wound strands of hair in hair retaining relationship individually and without mutual interference, said filamentary elements being so distributed on said cylindrical wall within each helical row and between successive helical rows that said filamentary elements intersect substantially all circular paths around the hair curler in the area thereof occupied by the hair retaining means.

7. A hair curler in accordance with claim **6**, wherein said numerous hair retaining means are mutually spaced apart and include respective bristles projecting integrally from said cylindrical valve, said bristles being companion to and laterally spaced from said first portions, respectively, and the ends of said bristles being adjacent to the free ends of said

overhang portions remote from said first portions, respectively, said bristles partially closing off laterally the spaces under said overhang portions and inherently rendering hair retention more secure.

8. A hair curler having a cylindrical wall comprising a unitary layer of plastic sheet material, and numerous means for retaining hair against the cylindrical wall when wound thereon, said means being distributed over at least a large part of the outer area of said cylindrical wall, a predominant proportion of said hair retaining means individually having a resilient, flexible filamentary element projecting integrally from said unitary layer and including a first portion extending away from said layer and an overhang portion extending laterally from said first portion so as to provide a space between said overhang portion and said layer for receiving and retaining strands of hair wound about the curler, said overhang portion extending slantwise to a plane passing perpendicular to the axis of the cylindrical wall, the slantwise extending overhang portion tending to be engaged and deflected by hair being wound transversely about the cylindrical wall and tending thereafter to snap over and to retain the wound hair, said flexible filamentary elements being spaced apart from each other so as to promote individual effectiveness thereof in being deflected by and snapping over the hair being wound on the curler, thereby to constitute a hair curler that is easily cleaned, and which is self-sufficient and may be used effectively without resort to additional holding devices such as clips, said means for retaining hair being disposed in helical rows about the cylindrical wall, said filamentary elements being so distributed on said cylindrical wall within each helical row and between successive helical rows that said filamentary elements intersect substantially all circular paths around the hair curler in the area thereof occupied by the hair retaining means, thereby developing a high probability that each strand of hair being wound transversely about the cylindrical wall will encounter a hair retaining means.

9. A hair curler in accordance with claim 8, wherein said means for retaining hair have the overhang portions thereof disposed essentially along helical rows, thereby developing a high probability that each strand of hair being wound transversely about the area of the cylindrical wall bearing said hair retaining means will encounter and initially deflect at least one of said overhang portions, thereafter to be retained by such overhang portion.

10. A hair curler having a cylindrical wall comprising a unitary layer of plastic sheet material, and numerous means for retaining hair against the cylindrical wall when wound thereon, said means being distributed over at least a large part of the outer area of said cylindrical wall, a predominant proportion of said hair retaining means individually having a resilient, flexible filamentary element projecting integrally from said unitary layer and including a first portion extending away from said layer and an overhang portion extending laterally from said first portion so as to provide a space between said overhang portion and said layer for receiving and retaining strands of hair wound about the curler, said overhang portion extending slantwise to a plane passing perpendicular to the axis of the cylindrical wall, the slantwise extending overhang portion tending to be engaged and deflected by hair being wound transversely about the cylindrical wall and tending thereafter to snap over and to retain the wound hair; said flexible fragmentary elements being spaced apart from each other so as to promote individual effectiveness thereof in being deflected by and snapping over the hair being wound on the curler, thereby to constitute a hair curler that is easily cleaned, and which is self-sufficient and may be used effectively without resort to additional holding devices such as clips, said layer and said hair retaining means being in the form of a thermoplastic strip having said hair retaining means distributed thereon in parallel rows parallel to the longitudinal edges of the strip and said strip being arranged as a helix having the longitudinal edges thereof fused to each other to form said cylindrical wall, said cylindrical wall thereby being economically made in various diameters and having the hair retaining means disposed in parallel helical rows for enhancing further the probability of strands of hair engaging the hair retaining means when being wound on the curler.

11. A hair curler in accordance with claim 10, wherein said overhang portions extend generally along respective ones of said rows, and said filamentary elements being so distributed on said cylindrical wall within each helical row and between successive helical rows that said filamentary elements intersect substantially all circular paths around the hair curler in the area thereof occupied by the hair retaining means.