March 21, 1933. G. E. BJORKMAN ET AL 1,901,892

HAIR CURLER

Filed Dec. 7, 1929

Fig. 1.

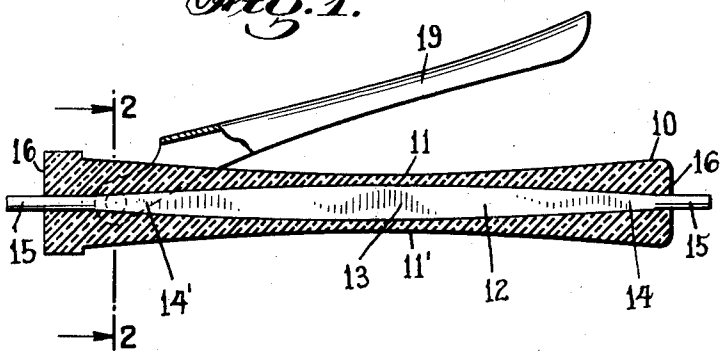


Fig. 2.

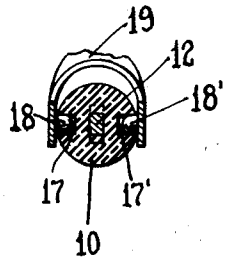


Fig. 3.

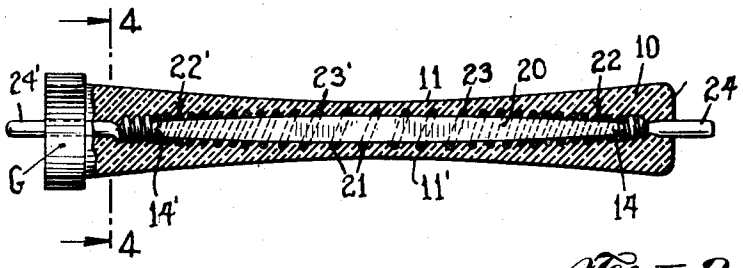


Fig. 4.

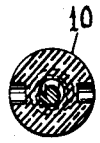


Fig. 8.

Fig. 5.

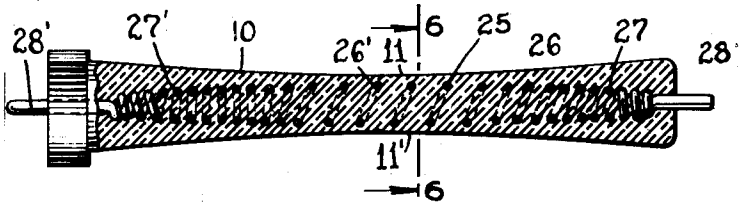


Fig. 6.

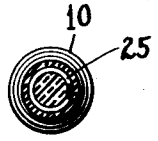
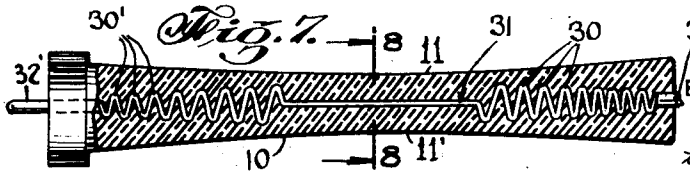


Fig. 7.



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UNITED STATES PATENT OFFICE

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HAIR CURLER

Application filed December 7, 1929. Serial No. 412,325.

This invention relates to improvements in curlers for use in permanent hair waving.

Up to the present time, curlers of the interiorly heated type have been formed of metal, and have either had openings into which heating units were inserted, or have had electrical heating elements permanently mounted within the curler.

One of the difficulties with curlers of the above types was the fact that the heat developed had a deleterious effect upon the hair, which was in direct contact with the metal exterior surface.

Another difficulty lay in the fact that with interiorly heated curlers of these types, the heat developed in the central portion of the curler was greater than the heat developed at the end portions, with the result that the hair wound around the curler or along the curler was subjected to various degrees of heating, and the hair either burned in parts and the texture thereof destroyed by overheating, or was heated insufficiently to produce the required permanent wave. If not overheated, it was subjected to various ranges of heat along the curler, so as to produce an uneven and irregular wave.

Specifically, this invention contemplates the application of a molded curler, formed essentially of a phenolic condensation product having particularly uniform heat conducting properties in conjunction with its inherent insulation characteristics, and having imbedded therein a resistance or heat developing element of such formation as to provide an even distribution of heat, conducted through the walls of the curler, whereby the entire length of hair wound about the curler has imparted thereto the same heating effect.

Specifically, it is an object of this invention to provide a curler comprising a non-metallic cylinder, or a cylinder bowed concavely towards the center, in which curler there is embedded a strip or section of resistance wire so positioned, and so proportioned as to produce an even distribution of heat all along the length of the curler.

These and other advantages, capabilities and features of the invention will appear from the subjoined detail description of one specific embodiment therefor illustrated in the accompany drawing.

Figure 1 is a side elevation partly in section of one form of this invention.

Figure 2 is a front elevation in section taken along lines 2—2 of Figure 1.

Figure 3 is a side elevation partly in section of one form of this invention.

Figure 4 is a front elevation in section taken along lines 4—4 of Figure 3.

Figure 5 is a side elevation partly in section of one form of this invention.

Figure 6 is a front elevation in section taken along lines 6—6 of Figure 5.

Figure 7 is a side elevation partly in section of one form of this invention.

Figure 8 is a front elevation in section taken along lines 8—8 of Figure 7.

Referring to the reference characters in the drawing, numeral 10 represents the shell or casing forming the exterior of the curler, the said shell being in this case concavely bowed towards the center as at 11 and 11′. Within the shell 10 there is positioned the resistance unit shown in Figures 1 and 2 as a flat plate or strip 12, which is of considerable width as at center portion 13, and which narrows down towards the ends 14 and 14′, the ends having either formed integral therewith or attached thereto contact rods 15, which project through the end wall 16 of the shell. Grooves or apertures 17 and 17′ are molded at one end of the shell, in which grooves there is adapted to be positioned trunnions 18 and 18′ formed as either integral with or attached to the clamp member 19, which is adapted to be thus pivotally mounted at one end of a shell, and rest upon and hold in position strands of hair wound along the curler. At one end of the curler, preferably the end adjacent to which the clip is fastened, gripping portions G are formed, so that the curler may be grasped and turned by the operator for winding and unwinding a strand of hair.

To produce this device, a mold is provided of substantially the contour of the shell 10, in which there is positioned the completely

assembled resistance element 12 having the contact ends thereon, a phenolic condensation product in powdered form is placed in the mold, and the mold subjected to heat and pressure, whereupon the powdered phenolic condensation product assumes a solidified form shown in Figure 1, and has firmly imbedded therein the resistance element 12.

Referring to Figure 3, a shell 10 of the same configuration is provided, the variation between the disclosure in Figures 1 and 3 being the application of a non-conductor 20 formed of mica, of substantially the same shape as the resistance element 12, about which there is wound a resistance wire 21. The resistance wire, however, is wound more densely at the end portions 22 and 22′, and more sparsely at the center portions 23 and 23′, the ends of the wire being continued so as to form the projecting contacts 24 and 24′, although these contacts may be separable elements attached to the ends of the wire.

In view of the formation of the resistance element so that the center portion is sparsely wound, and the end portions densely wound, the heat developed at the end portions will be greater in proportion to the heat developed in the center portion where the shell wall is much thinner.

The molding process to form this modification shown in Figures 3 and 4 is the same as that applied in forming structure shown in Figure 1, with the exception that in the mold there is placed the insulating member 20 having a resistance wire wound thereon.

Referring to Figure 5, a third modification of this device is indicated where the resistance wire 25 in form of a coil having a center portion sparsely wound, as at 26 and 26′, and end portions densely wound as at 27 and 27′, terminating in two conductors 28 and 28′ is directly imbedded in a manner similar to the plate 12 shown in Figure 1 into the powdered phenolic condensation product, and then molded to shape.

In the structure shown in Figures 7 and 8, the same molding steps, and the same shell are applied, but instead of a coiled spring as shown in Figures 3 and 5, a flat spring having ridges 30 and 30′, and a single unridged or uncoiled portion 31 is molded within the shell, the ends of the wire as before either having contacts 32 and 32′ formed integral therewith, or attached thereto before the molding process.

Although the disclosures in the drawing and specification indicate a cylindrical shell which has its outer surface bowed in concavely from end to center, it is within the province of this invention to provide for a cylindrical shell formed of a phenolic condensation product, and having a resistance element of the nature above specified imbedded therein. With the use of such a resistance element, the tendency of the opposing ends of the unit to be cooler than the center is completely obviated, since the developed heat, through the use of this resistance, is greater at the ends than at the center, and the normal losses through cooling at the ends are compensated by the greater heating effect produced through the use of the resistance medium specified.

It is obvious that various changes and modifications may be made to the details of construction without departing from the general spirit of the invention as set forth in the appended claims.

We claim:

1. A curler comprising a shell formed of a phenolic condensation product, and having imbedded therein a ribboned resistance element, the ends of said resistance element being undulations therefor to introduce a higher resistivity at the ends thereof to an electrical current than the center thereof, whereby to produce a heat effect varying in intensity along the length of said resistance element, the shell being so formed with respect to the resistance therein contained as to cause the distribution of an even heating effect to hair wound thereon.

2. A hair curler comprising a shell formed of a phenolic condensation product in the shape of a cylinder having its sides curved concavely inwardly towards the center thereof, to provide for a greater thickness of the shell at the ends than at the center, and having imbedded therein a resistance element in the form of a ribboned strip of wire having a flat center and undulations formed at the opposite ends thereof, whereby to produce a greater heat effect within the shell at the ends thereof, than at the center thereof, upon the passage therethrough of current, but to provide for an even distribution of heat along the exterior of the shell.

3. A hair curler comprised of a shell formed of a phenolic condensation product having greater thickness at the ends than at the center, and having imbedded therein a resistance element in the form of a strip of wire extending in one plane from end to end of the shell and having its end portions bent in the form of undulations, whereby to cause the production of a greater heat effect within the shell at the ends thereof than at the center, upon the passage therethrough of current, but to provide for an even distribution of heat through the length of the shell.

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