

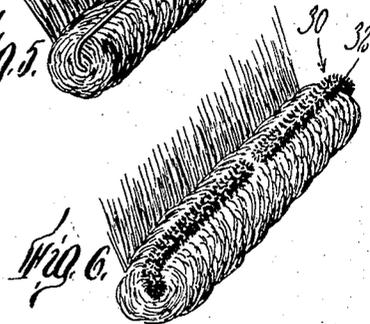
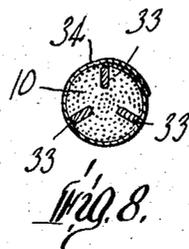
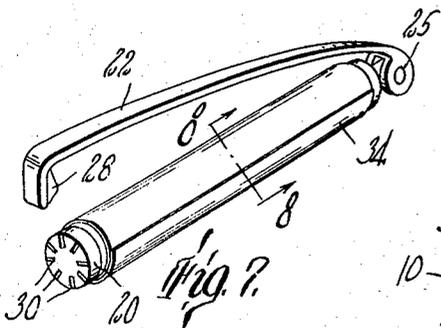
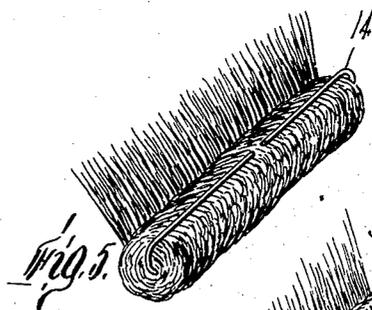
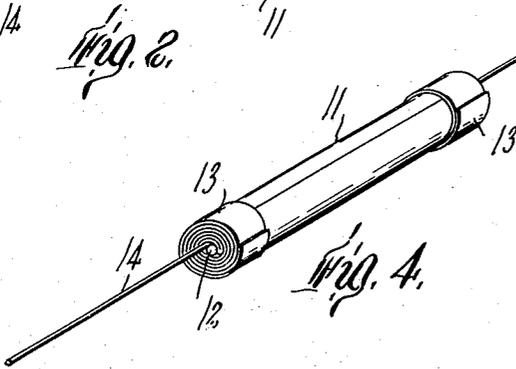
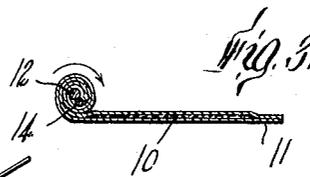
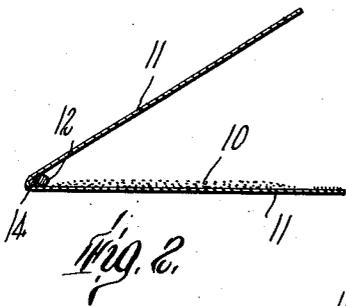
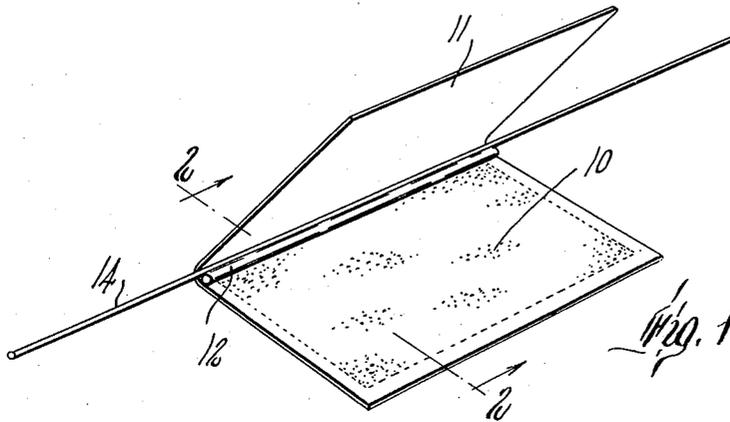
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HAIR CURLER

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HAIR CURLER

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This invention relates to an improved hair curling device for use in permanently waving or curling hair, particularly human hair, and pertains more specifically to a device adapted for use in cold permanent waving processes; i.e., processes which are carried out without the external application of heat.

The cold permanent waving of hair is generally carried out by applying to the hair, while in wound curled configuration, an aqueous solution containing a chemical agent capable of splitting, through reduction, the disulfide bonds in the hair keratin and concomitantly softening the hair. Following the softening step the disulfide bonds are restored and the hair is set or hardened in its curled configuration by application to the hair of a neutralizer for the waving lotion. Conventionally such neutralizers are aqueous solution of an oxidizing agent such as hydrogen peroxide, sodium perborate, sodium bromate, or the like.

While the conventional procedure described above provides a generally acceptable wave, the neutralization step is frequently troublesome, particularly in the case of home permanent waving where the process is carried out by an untrained person without any particular skill in the waving of hair who may not mix or apply the neutralizer solution properly. Furthermore, a relatively large volume of the neutralizer solution and laborious repeated applications thereof to the hair are normally required in order to be sure of obtaining adequate penetration of the solution into the wound hair which has previously been wet by the waving lotion and to ensure complete hardening or setting of the wound hair throughout its extent, particularly in the interior of each curl. The large volume of neutralizer solution employed has tended to cause discomfort and annoyance in that it is likely to drip onto the scalp, eyes, or other parts of the body or onto the clothing of the person whose hair is being waved. In order to avoid these difficulties in the neutralization step, it has been proposed to eliminate completely the use of such a solution of chemical neutralizer and to rely instead in whole or in part on the oxygen present in the atmosphere to oxidize and set the hair in its curled configuration. However, aerial oxidation is much slower than neutralizer-promoted oxidation.

One object of the present invention is to provide a device adapted for use in the permanent waving of hair which eliminates the necessity for applying to the hair a separate solution of neutralizer and yet which permits completion of the total waving operation, including neutralization, in substantially less time than is required when aerial oxidation alone is employed.

Another object is to provide a device adapted for use in the permanent waving of hair which exerts a desirable control on the effect of the waving lotion containing the chemical reducing agent on different convolutions of the wound tress.

Still another object is to provide a device such as a hair curler which automatically neutralizes the hair subsequent

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to application of a conventional aqueous waving lotion to the hair.

Still a further object is to provide a device of the type described which provides for automatic neutralization of the hair while a conventional aqueous waving lotion is maintained on the hair in wound curled condition, the neutralization being effected first at the end of the hair tress remote from the scalp.

Other and further objects will be apparent from the drawing and the description which follows:

In the drawing:

Fig. 1 is an isometric view showing an intermediate stage in the manufacture of one embodiment of the invention;

Fig. 2 is a view in section along the line 2-2 of Fig. 1;

Fig. 3 is a view in section showing a further stage in the manufacture;

Fig. 4 is an isometric view showing the completed embodiment;

Fig. 5 is a view showing the embodiment of Fig. 4 as applied to the hair;

Fig. 6 is a view showing a second embodiment as applied to the hair;

Fig. 7 is an isometric view showing still another embodiment of the invention; and

Fig. 8 is a view in section along the line 8-8 of Fig. 7.

In each embodiment of the present invention there is provided in dry solid form a supply of chemical neutralizer such as any conventional oxidizing or hardening agent for reduced hair which may be provided in such form; for example, sodium or potassium bromate, sodium iodate, sodium perborate, urea peroxide, and the like, and mixtures thereof, of which sodium and potassium bromate, particularly the latter, are preferred for best results. It is also possible to employ somewhat stronger oxidizing agents, such as sodium carbonate peroxide, sodium pyrophosphate peroxide, and the like, provided they are mixed with a solid diluent inert to the hair to lessen the bleaching tendency. It is preferred to employ a material which is readily soluble in aqueous media, which is not subject to decomposition during storage, and which has no undesired side effects on the hair or other materials with which it comes in contact. Conventional adjuvants may be mixed with the dry solid chemical neutralizer, such as buffering agents or salts such as citrates, phosphates, or bromates; sequestering agents for facilitating solution of the neutralizer in hard water such as polyphosphates or salts of ethylene diamine tetraacetic acid; highly hydrated solubilizing aids such as sodium carbonate decahydrate; surface-active substances which promote wetting of the hair and diffusion therethrough of aqueous media; perfumes; and oxidation catalysts such as salts of manganese, copper or iron which promote oxidation of the reduced hair by the chemical neutralizer.

The dry solid chemical neutralizer composition may be provided in the form of a solid stick or rod, but is preferably particulate in nature to provide a maximum surface area. When the composition is employed in particulate or distributed form, it is preferably held in place by a water-pervious or bibulous member such as porous paper, fibrous or spongy material, or the like.

As shown in Figs. 1 to 4, the dry, solid, particulate neutralizer composition 10 may be enclosed within a sheath of thin porous paper 11 which is folded and sealed along its margins in the form of a flat envelope or container filled with the mass of dry neutralizer composition. This envelope or container is wound spirally around a relatively rigid reinforcing bar or wire 12 which may suitably be made of an inert metal, such as copper, or a molded plastic composition, the envelope being secured in spirally wound condition with masking tape

13. Along with reinforcing bar 12 there is enclosed within the spirally wound container a relatively flexible wire member 14 of considerably greater length than the width of the envelope which serves, as shown in Fig. 5, for retaining the hair in wound curled configuration about the body of the container, the latter serving as a winding member.

In another embodiment of the invention, as shown in Fig. 6, the device may take the form of a conventional pipe cleaner 30 in which the fibrous tufts 32 have been impregnated with a solution of the chemical neutralizer and dried. A tress of hair may then be wound around the central portion of the tufted member (which serves as the winding member) to form a curl, the outwardly extending ends of the tufted member being bent toward each other when the curl is completed to retain the hair in wound curled configuration. In this embodiment the supply of dry solid neutralizer is available both in the interior of the curl and at the outside of the curl. Preferably a layer of thin, water-pervious material, such as a conventional end paper, is interposed between the hair and the impregnated tufts 32 both inside and outside the curl to avoid too rapid neutralizing action.

In still another embodiment of the invention, as shown in Figs. 7 and 8, a curler is provided with a winding member 20 and a clasp member 22 which is rotatably mounted at one end of the winding member by means of ball-and-socket joint 25; the other end of clasp member 22 carries a tang 28 which is releasably engageable in slots 30 in the other end of winding member 20 to lock the latter against rotation and retain the hair wound upon it. Winding member 20 has a hollow interior extending along its length and is provided with apertures between axially extending ribs 33, 33, permitting ready access of liquid to the hollow interior. The winding member is water pervious for the purpose of the present invention. The chemical neutralizer 10 in dry, solid, particulate form is disposed within the hollow interior, being maintained in place therein by a generally cylindrical wrapping or covering 34 of thin, water-pervious paper which also is a part of the winding member.

If desired, the water-pervious paper wrappers 11 and 34 of Figs. 4 and 7 may first be impregnated with a solution of the desired chemical neutralizer composition, then dried and wrapped as shown to provide a supply of neutralizer in dry solid form without the necessity of placing any particulate neutralizer material within it. Indeed, such an impregnated paper may be employed as an end paper used to cover the ends of the hair tress which is then wrapped upon a conventional curling rod with the end paper enclosing the initial one to two turns of the hair tress. In either case it is preferred for best results to have a layer of unimpregnated paper interposed between the hair and the dry solid neutralizer to avoid too rapid neutralizing action.

It will be apparent from the foregoing that a variety of conventional hair curlers may be adapted to the present invention, particularly those that have some free space within the interior of the winding member to which the waving lotion or other aqueous liquid applied to the hair during the waving process has access through openings such as slots or perforations in the wall of the winding member, simply by inserting a supply of dry solid chemical neutralizer into the free space. The neutralizer, as indicated above, may be in the form of a solid stick or rod or may be in particulate form, preferably enclosed in a sheath of water-pervious material such as paper, or may be in the form of a bibulous carrier which has previously been impregnated with a solution of the neutralizer and dried so that the neutralizer is distributed therethrough. When no water-pervious sheath is provided, it is preferred that the end of the hair tress be enclosed in the usual manner in a conventional water-pervious end paper prior to winding in curled form.

It has been found that 0.3 gram of the neutralizer for

each tress of hair provides satisfactory results, although in many cases even less may be used. Although it is possible to use larger quantities, no advantage is gained thereby.

The devices of the present invention may be employed in conjunction with any of the hair softening waving lotions used or known in the cold permanent waving art. Particularly useful are those aqueous waving lotions in which the reducing agent employed, i.e., the chemical agent capable of splitting the disulfide bonds in the hair keratin, is a mercaptan, particularly thioglycolic acid. Such waving lotions, as is well known to the art, normally contain an excess of an alkaline material such as ammonium or alkali metal hydroxides, carbonates or bicarbonates, organic amines, or mixtures of such alkaline materials. It is to be understood that this invention is concerned primarily with the device for providing the neutralization step in the waving process, the particular reducing agent or waving agent used in the hair softening step being merely a part of the environment in which the present device is employed.

In using the device of the present invention, the hair which is to be waved is separated into tresses in conventional manner and each tress is wound to form a curl with the supply of chemical neutralizer disposed in the interior of the curl. If desired, the hair tress may be moistened or saturated with the aqueous waving lotion containing the chemical waving agent for splitting the disulfide bonds prior to winding around the supply of neutralizer, or this saturation step may be postponed until after the hair has been wound, although the former procedure is preferred. It is usually desirable, when the hair has first been saturated with waving lotion then wound around the supply of neutralizer, to resaturate the hair with additional aqueous waving lotion.

The waving lotion is allowed to remain on the wound curled hair for the desired period of time, which may vary from ten minutes to thirty minutes or more, during which period the chemical waving agent acts to soften the hair shafts by reducing or splitting the disulfide bonds and the neutralizer is slowly leached from the supply within the wound curl as it is contacted by the aqueous lotion, the neutralizer dissolving in the lotion and gradually diffusing outwardly through the mass of the wound hair, serving to restore some of the disulfide bonds and to oxidize excess waving agent. At the end of the desired period of time, the hair may be rinsed with water if desired, this water rinse serving to remove any excess chemical waving agent which has not yet been neutralized and serving also to leach additional neutralizer from the supply and diffuse it through the mass of the wound curl.

Following the rinsing step the hair may be allowed to remain in wound curled form for an additional period of time of from ten minutes to thirty minutes or more in order to ensure complete neutralization of residual waving agent and complete restoration of the disulfide bonds in the hair keratin with the concomitant hardening or setting of the hair in its curled configuration. The hair may then be unwound, given a further water rinse if desired, and towel blotted to dry. The hair thus treated exhibits a commercially satisfactory permanent wave which is retained through subsequent shampooing. The ends of the hair tresses exhibit a particularly satisfactory tight curl which is highly permanent in nature and at the same time are completely free of "frizzing."

As may be seen from the foregoing, neutralization occurs first at the convolutions of the hair tress which are disposed closest to or in contact with the supply of dry solid neutralizer. In the embodiments of Figs. 1 to 5, 7 and 8 these are only the innermost convolutions of the wind which are at the tip of the tress and the outer portions of the curl, which represent that portion of the hair closest to the head, will be subjected to neutralization only after a substantial time delay period because of the inherent slowness of diffusion of the dissolved neutralizer.

This is advantageous since in the case of a head of hair which has previously been waved, the new hair closest to the scalp which has never been subjected to a permanent waving process requires more action by the waving lotion to achieve the desired results.

Under some conditions, however, as in the case of long or bulky hair tresses which form wound curls of large mass, it may be desirable to provide an additional supply of neutralizer at the outside of the curl as in the embodiment of Fig. 6.

Although specific embodiments of the invention have been described herein, it is not intended to limit the invention solely thereto, but to include all of the obvious variations and modifications within the spirit and scope of the appended claims.

I claim:

1. A hair curler for use in the permanent waving of hair comprising a winding member on which the hair is adapted to be wound and means for retaining the hair in wound form on said member, said winding member and retaining means being secured together, said winding member including a supply of water-soluble, dry, solid neutralizer in position to be exposed to aqueous liquids applied to the wound hair during the waving process and to be leached therefrom by said liquids for diffusion throughout the mass of the wound hair.
2. A hair curler as defined in claim 1 in which said winding member comprises a bibulous element in which said neutralizer is distributed.
3. A hair curler as defined in claim 1 in which said neutralizer is in particulate form and is enclosed within a water-pervious paper sheath.
4. A hair curler as defined in claim 1 in which said neutralizer comprises sodium bromate.
5. A hair curler as defined in claim 1 in which said neutralizer comprises potassium bromate.
6. A hair curler for use in the permanent waving of hair comprising an elongated winding member on which the hair is adapted to be wound, a clasp member having one end rotatably mounted on one end of said winding member and the other end releasably engageable with the other end of said winding member to lock the latter against rotation, thereby retaining hair wound on said winding member, said winding member including a supply of water-soluble, dry, solid chemical neutralizer for permanent waving lotion in position to be leached therefrom and diffused outwardly throughout the mass of wound hair by aqueous liquids applied to the hair during the waving process.
7. A hair curler as defined in claim 6 in which said winding member comprises a plurality of spaced axially extending ribs and said neutralizer is disposed between said ribs.
8. A hair curler as defined in claim 7 in which said neutralizer is in particulate form and is enclosed within a water-pervious paper sheath.

9. A device for use in the permanent waving of hair comprising a supply of water-soluble chemical neutralizer for permanent waving lotion, said supply being in dry solid form, and water-pervious means for maintaining said supply within the interior of a curled tress of hair in position to be leached therefrom for diffusion throughout the mass of the curled tress by aqueous liquids applied to the hair during the waving process.

10. A device as defined in claim 9 in which said water-pervious means comprises paper.

11. A device as defined in claim 9 in which said neutralizer comprises sodium bromate.

12. A device as defined in claim 9 in which said neutralizer comprises potassium bromate.

13. A device as defined in claim 9 in which said water-pervious means comprises a bibulous member throughout which the neutralizer is distributed.

14. In the method of permanently waving hair which comprises applying to the hair an aqueous solution of a chemical agent capable of splitting the disulfide linkages in hair keratin, permitting the solution to act on the hair with the latter in wound curled condition to split said linkages and soften the hair, and neutralizing the hair while in wound curled condition to restore disulfide linkages in the hair keratin, the step which comprises providing within said curl in dry solid form a supply of water-soluble chemical neutralizer for said agent in position to be leached therefrom and diffused throughout the mass of the curl by the application of aqueous media to the curl during the waving process.

15. A device as defined in claim 9 in which a layer of water-pervious paper is interposed between said supply and the hair tress.

16. A device as defined in claim 9 in which said supply is enclosed within a sealed container of water-pervious paper.

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