Sept. 29, 1959 L. G. BEAUREGARD 2,906,275

HAIR WAVING DEVICE

Filed Jan. 18, 1957

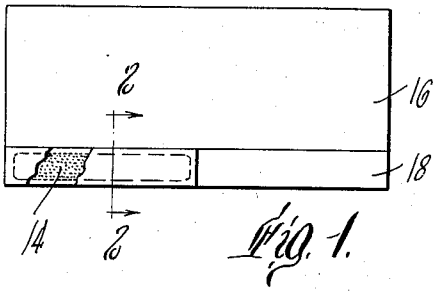


Fig. 1.

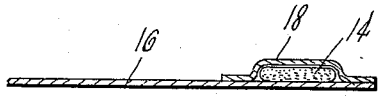


Fig. 2.

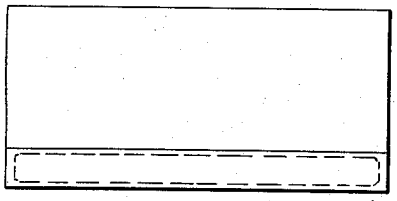


Fig. 3.

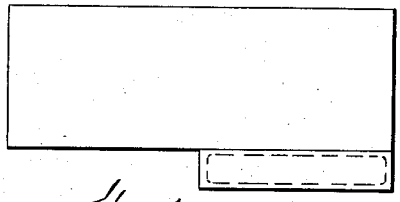


Fig. 4.

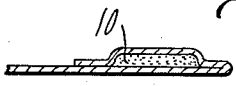


Fig. 5.

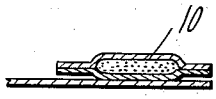


Fig. 6.

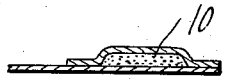


Fig. 7.

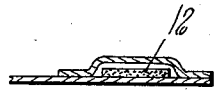


Fig. 8.

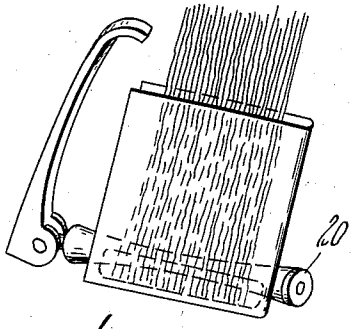


Fig. 9.

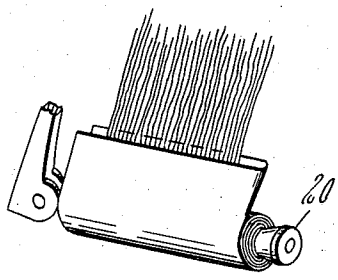


Fig. 10.

United States Patent Office 2,906,275 Patented Sept. 29, 1959

2,906,275

HAIR WAVING DEVICE

Lawrence G. Beauregard, Washington, D.C., assignor to The Gillette Company, Boston, Mass., a corporation of Delaware

Application January 18, 1957, Serial No. 634,897

13 Claims. (Cl. 132—41)

This invention relates to cold permanent waving of hair and pertains more specifically to an improved end paper adapted for use in cold permanent hair 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 solutions 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 special skill in the waving of hair who may fail to 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, taking hours for completion rather than the minutes needed for neutralizer-promoted oxidation.

It is also conventional, when rolling a hair tress up upon a hair curler during the process of permanently waving the hair, to employ a rectangular sheet of thin, water-pervious fibrous material such as paper which is folded about the hair tress at its end remote from the scalp and serves to hold the loose ends of the hair fibers together as the rolling of the tress on the curler is begun. This sheet is known in the art as an end paper.

One object of the present invention is to eliminate the necessity for a separate neutralizing step as such in the cold permanent waving of hair.

Another object is to provide a supply of neutralizer for the hair waving lotion in a dry, water-soluble, solid

form secured to the end paper so that this supply of neutralizer will be disposed in the interior of each curl when the hair is wound upon curlers in a conventional manner.

Another object is to provide a supply of dry, solid, water-soluble neutralizer in combination with an end paper so arranged that the neutralizer may be leached from its position within the curl by the action of the liquid waving lotion and rinse water, if any, applied to the hair.

Still a further object is to provide an improved end paper construction embodying a dry, solid, water-soluble neutralizer and including means for limiting the rapidity with which the neutralizer is leached from the end paper by the liquid waving lotion so that a maximum degree of curl will be produced before neutralization occurs.

Other and further objects will be apparent from the drawings and from the description which follows.

In the drawings:

Fig. 1 is a plan view, partly broken away and in section, showing one embodiment of the invention;

Fig. 2 is a view in cross section along line 2—2 of Fig. 1;

Fig. 3 is a plan view showing a second embodiment of the invention;

Fig. 4 is a plan view showing still another embodiment of the invention;

Figs. 5 to 8 inclusive are views in cross section, partly broken away, showing additional embodiments;

Fig. 9 is an isometric view showing application of the present invention to a hair tress; and

Fig. 10 is a view similar to Fig. 9 showing a further stage in the winding of a tress of hair upon a curler.

It has been found that the foregoing objects are achieved by providing a supply of neutralizer, preferably sodium or potassium bromate, in dry, solid form secured to a conventional end paper comprising a sheet of flexible, water-pervious material. It has been found preferable to limit the supply of neutralizer to a localized zone of the end paper. This localized zone preferably is adjacent one longitudinal margin of an elongated rectangular end paper as shown in Figs. 1, 3 and 4 and preferably extends from one end of the end paper to approximately the middle as shown in Figs. 1 and 4. The width of the localized zone preferably is no more than one-fourth the overall width of the end paper.

It is also preferred to employ one or more layers of water-pervious sheet material to limit the rapidity with which the supply of neutralizer is leached out by the liquid waving lotion; that is, the supply of neutralizer is preferably confined within and enclosed by a pouch or sachet having a wall of water-pervious material; this wall may conveniently be and preferably is formed of the same material as the end paper itself.

A variety of means may be employed to confine and enclose the supply of dry, solid neutralizer to the desired localized zone. For example, a marginal portion of the end paper may be folded back upon itself as in Fig. 5 and secured with any conventional adhesive to form a package or envelope within which the neutralizer is contained. The package or container may extend outwardly from the longitudinal margin of the end paper as shown in Fig. 4 or may extend inwardly therefrom as shown in Figs. 1 and 3. A pouch or envelope may be separately formed from two strips of porous sheet material, then adhered to a margin of the end paper as shown in Fig. 6.

If desired, a separate strip of porous sheet material the same as that of the end paper itself or similar thereto may be adhered along its margins to the end paper with the dry, water-soluble neutralizer confined between the two layers of paper as shown in Fig. 7.

While the supply of neutralizer may be composed of individual small particles **10** of the neutralizer material as shown in Figs. 5 to 7, it is also possible to provide a suitable supply of neutralizer as shown in Fig. 8 simply by saturating a mass **12** of bibulous material such as absorbent paper, cotton sliver or the like with a concentration solution of the neutralizer in water or other suitable volatile solvent then drying it so that no individual particles of neutralizer material are readily apparent to the naked eye, the bibulous material (preferably fibrous material) acting as a carrier or binder and being enclosed by the end paper and by a supplemental strip of similar paper.

It is also possible to disperse the neutralizer in a soft mass or solution of a water-soluble, cohesive binder, preferably a polymeric binder composition which may include a suitable plasticizer, and extrude such a dispersion in the form of a strip of suitable size onto each individual end paper so that when the solvent (if present) is evaporated the neutralizer is in the form of a localized mass or cake of material **14** which is both cohesive and adhesive to the face of the end paper itself. Such a composition comprising neutralizer in dry particulate form held together by means of a water-soluble cohesive polymeric binder provides a convenient form for making neutralizer available for use in hair waving processes since it may readily be extruded or otherwise shaped as desired into a mass to fit within a curled or wound hair tress.

If desired, it may be secured to a hair curler by means of which it may be held within the hair curl as described in my co-pending application Serial No. 571,694 filed March 15, 1956.

The binders which are found satisfactory include readily water-soluble, solid, cohesive polymeric materials such as polyvinyl alcohol, polyvinyl pyrrolidone, etc. The binder, in addition to securing the neutralizer to the sheet of water-pervious material forming the end paper, may also serve to limit the rapidity with which the neutralizer is dissolved by the waving lotion, although it is usually desirable to employ a sheet of water-pervious material for that purpose in addition to the binder. A film of the cohesive polymeric binder material (preferably containing plasticizer) may be laid down over the face of the extruded neutralizer-binder composition, if desired, to serve as the water-pervious sheet material. The following composition, in which the parts are by weight, is an example of a suitable extrudable composition:

	Parts
Sodium bromate	100
Polyvinyl pyrrolidone	20
Glycerine	10
Ethyl alcohol	32

In making the embodiment of the invention shown in Figs. 1 and 2, for example, the extruded strip of neutralizer and binder may be simply laid down along one margin of each end paper **16** for about one-half its length then covered with a strip of similar paper **18** sufficiently wide to enclose and confine all of the neutralizer composition to a relatively narrow zone extending along the longitudinal margin of the end paper, the two layers of paper being adhered together along the margins of strip **18** and being coextensive in length. In some cases the binder itself may serve as the adhesive for bonding the two layers of paper together, but any other convenient adhesive such as polyvinyl alcohol, rubber cement or the like may be employed if desired.

While a variety of conventional neutralizer chemicals (oxidizing agents) may be employed in the present invention, best results are obtained by employing sodium or potassium bromate or mixtures thereof, or other conventional neutralizers which dissolve to a sufficient extent as well as sufficiently rapidly in water or in aqueous waving lotions. The amount of neutralizer may vary from as little as 50 milligrams or even less to as much as 250 milligrams for each end paper. While larger amounts may be employed, there is no advantage in employing more since the excess is not used and tends to make the end paper undesirably bulky.

The material employed for the sheet which acts as the main body of the end paper is preferably a flexible, unwoven, water-pervious, fibrous material such as paper or unwoven bonded webs made of cotton, cellulose, cellulose acetate, Dynel or other fibrous materials. The use of such materials containing thermoplastic fibers or containing thermoplastic bonding agent may be advantageous in permitting heat sealing to be used in securing the pouch or envelope containing the neutralizer to the main body of the end paper. Woven or knitted textile fibrous materials may also be employed. The unwoven fibrous sheet or paper may vary considerably in thickness, but best results have been obtained by employing a material having a thickness of the order of 1 to 3 mils. The degree of porosity or perviousness of the fibrous sheet material to water may vary over a rather wide range, and thermoplastic or thermoset resins or other sizing materials, e.g., polyvinyl alcohol, may be employed to bond the fibers together and to vary the porosity. Fire-retarding agents may also be incorporated in the sheet material to guard against the possibility of reaction between the neutralizer and the cellulose of the paper. The rapidity with which leaching or dissolution of the supply of neutralizer occurs depends upon a number of variable factors including porosity of the wall of the pouch within which the supply is enclosed, the identity of the neutralizer and the form in which the neutralizer is present, the nature and quantity of binder employed, the fluidity or viscosity of the waving lotion, and the nature of the waving procedure (e.g., the length of time elapsing before the hair is rinsed). Variations in any one or more of these may be compensated for at least in part by variations in the others. For example, if in any specific embodiment and use the rapidity of leaching of the neutralizer is too rapid, modification of the device may be made to counteract the rapidity of neutralization by employing potassium bromate, which dissolves more slowly, in place of sodium bromate and/or by employing a less pervious wall for the pouch enclosing the neutralizer (as by using a double layer of sheet material for the wall) or by increasing the viscosity of the waving lotion.

The degree of porosity of any sheet material may be determined approximately by forming a small "boat" from one square inch of the sheet material, placing a known amount of the dry, solid, particulate neutralizer on its upper surface, floating it on a known quantity of aqueous waving lotion, and determining the extent of reaction which has occurred between the neutralizer and the waving agent. In one form of such a test, 10 milliequivalents of neutralizer are employed and the "boat" is floated for twenty minutes upon 25 ml. of aqueous waving lotion which contains 17.5 milliequivalents of ammonium thioglycolate. In general, it has been found that sheet material which, when tested as described above, permits from 3 to 8 milliequivalents of the ammonium thioglycolate to be neutralized is satisfactory for use in the present invention. The precise porosity for optimum results will vary depending upon the other factors mentioned in the preceding paragraph.

The device of the present invention may be used in a wide variety of waving processes. Typically it is folded about a tress of hair as shown in Fig. 9 with the package or supply of neutralizer on the side facing curler **20**. The hair tress enfolded by the sheet material is then rolled up upon the curler as shown in Fig. 10. The hair tress is preferably saturated with the desired waving lotion such as an aqueous alkaline solution of a water-soluble mercaptan, e.g., ammonium thioglycolate, before it is enfolded by the end paper; and when rolling of the tress upon the curler has been completed, additional waving

lotion may be applied to the wound tress. The hair is then permitted to remain in the wound curled condition for a period of time ranging from about 10 minutes to an hour or more, whereupon the hair may be rinsed with water if desired. When the waving lotion comes in contact with the supply of neutralizer the latter begins slowly to be dissolved and leached from its position and diffuses slowly into the lotion to neutralize (oxidize) the excess mercaptan or other reducing agent as well as the hair which has previously been reduced by the waving agent. In the latter case the neutralizer acts to restore the disulfide linkages which have been split by the reducing agent and harden or set the hair in its wound curled configuration. A water rinse may be interposed at some stage between the application of the lotion and the removal of the hair from the curler. While such a step may be omitted, it is found that a water rinse facilitates and enhances removal of excess reducing agent and diffusion of the neutralizer from the supply throughout the mass of hair fibers. Indeed, an aqueous solution of neutralizer may be applied externally to the wound hair tress if desired while neutralizer is being leached from the supply on the end paper within the wound curled tress. When a water rinse is employed, best results are obtained by permitting the hair to remain in wound curled condition for a substantial period of time following the rinse, say from 30 to 120 minutes or more, the strength of the wave increasing as the time is increased within these limits.

Although it is preferred that the package or container of neutralizer be at the end of the hair tress and at the side adjacent the curler as shown in Fig. 9, similar results are obtained when the package is at the face of the end paper remote from the curler and adjacent the hair tress and even when it is at the upper margin of the end paper as viewed in Fig. 9. It will be understood that there may be included with the supply of dry solid neutralizer any of the conventional buffers, oleaginous materials, inorganic salts (which tend to reduce swelling of the hair fibers), etc.

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. In combination an end paper for use on a hair tress during the cold permanent waving of hair by the application of an aqueous waving lotion to the hair comprising a sheet of flexible, water-pervious fibrous material, a supply of neutralizer in dry, water-soluble form, and means for securing and confining said supply to a localized zone which is relatively narrow with respect to said sheet.

2. The combination as defined in claim 1 in which said securing and confining means includes a pouch having a wall of water-pervious fibrous sheet material enclosing said supply.

3. The combination as defined in claim 1 in which said securing and confining means includes a water-soluble cohesive binder.

4. In combination an end paper for use on a hair tress during the cold permanent waving of hair by the application of an aqueous waving lotion to the hair comprising an elongated rectangular sheet of flexible, unwoven, water-pervious, fibrous material, a supply of neutralizer in dry, water-soluble form, and means for securing and confining said supply to a localized relatively narrow zone adjacent one longitudinal margin of said sheet.

5. The combination as defined in claim 4 in which said securing and confining means includes a flap of said sheet folded back upon itself to enclose said supply.

6. The combination as defined in claim 4 in which said localized zone extends from one end to approximately the middle of said sheet along said longitudinal margin.

7. The combination as defined in claim 4 in which said sheet of fibrous material comprises paper from one to three mils in thickness.

8. In combination an end paper for use on a hair tress during the cold permanent waving of hair by the application of an aqueous waving lotion to the hair comprising an elongated rectangular sheet of flexible, water-pervious paper from one to three mils in thickness, a supply of neutralizer in dry, water-soluble from, said supply being disposed in a localized relatively narrow zone at one face of said sheet adjacent a longitudinal margin thereof, and a second sheet of said paper smaller than the first secured over and enclosing said supply.

9. The combination as defined in claim 8 comprising in addition a mass of water-soluble, cohesive, polymeric binder in which said supply of neutralizer is intermingled, said mass being disposed between said sheets.

10. The combination as defined in claim 8 in which said neutralizer comprises sodium bromate.

11. The combination as defined in claim 9 in which said binder comprises polyvinyl pyrrolidone.

12. The combination as defined in claim 11 in which said neutralizer comprises sodium bromate.

13. The combination as defined in claim 1 in which said neutralizer is in particulate form and said securing and confining means comprises a water soluble cohesive polymeric binder in which said particles are dispersed.

References Cited in the file of this patent

UNITED STATES PATENTS

2,446,227	Grant	Aug. 3, 1948
2,540,494	Schwarz	Feb. 6, 1951

FOREIGN PATENTS

657,226	Great Britain	Sept. 12, 1951