

May 24, 1938.

H. N. DURHAM ET AL
PERMANENT WAVING DEVICE

2,118,177

Filed April 3, 1935

Fig. 1.

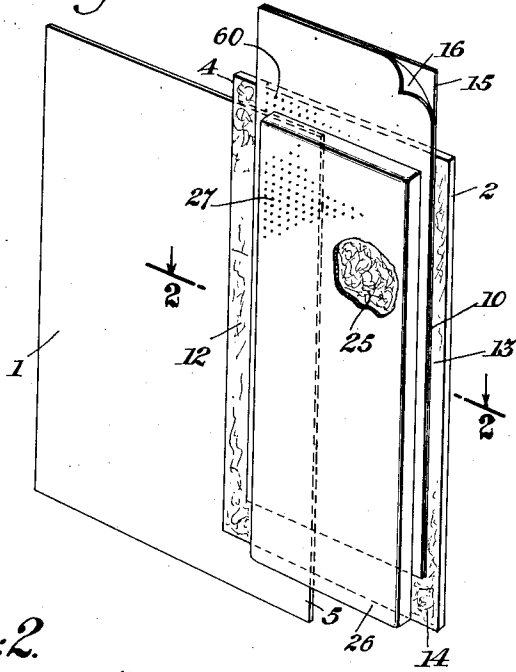


Fig. 2.

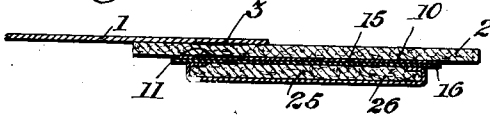


Fig. 4.

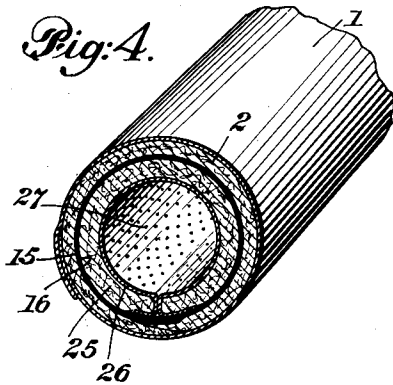
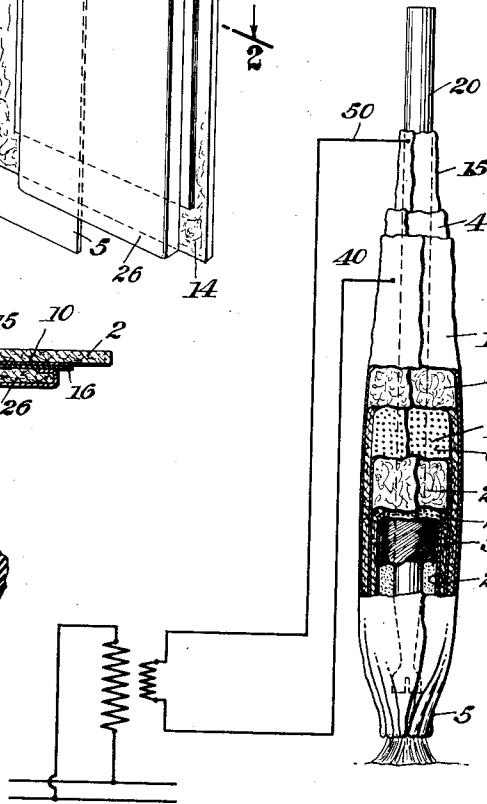


Fig. 3.



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2,118,177

PERMANENT WAVING DEVICE

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Application April 3, 1935, Serial No. 14,406
In Great Britain December 17, 1934

5 Claims. (Cl. 219—24)

The invention relates to permanent waving and more particularly to a novel and useful method and means for effecting the heating of hair and hair-softening chemicals by resistance to electrolytic conduction.

Objects and advantages of the invention will be set forth in part hereinafter and in part will be obvious herefrom, or may be learned by practice with the invention, the same being realized and attained by means of the instrumentalities and combinations pointed out in the appended claims.

The invention consists in the novel parts, constructions, arrangements, combinations and improvements herein shown and described.

The accompanying drawing, referred to herein and constituting a part hereof, illustrates one embodiment of the invention, and together with the description, serves to explain the principles of the invention.

Of the drawing:

Fig. 1 is a perspective view of a multi-ply electrolytic heating device and lotion applicator embodying the invention;

Fig. 2 is a transverse section taken on line 2—2 of Fig. 1;

Fig. 3 is an elevation of a curl and curling rod having applied thereto the device shown in Fig. 1, parts being broken away to show the relation of the several plies; and

Fig. 4 is a fragmentary perspective of a modification showing the device in tubular form.

The invention relates to a novel and useful device or means for applying the permanent-waving lotion or other hair softening chemicals to hair to be permanently waved and in combination therewith means for heating the hair and chemicals by resistance to the electrolytic conduction. The invention also relates to a novel and useful method for employing such means.

The present invention is, in certain respects, an improvement on inventions disclosed and claimed in our prior copending application Ser. No. 641,576, filed November 7, 1932 and in our prior Patent No. 1,926,987 dated September 12, 1933.

It is an object of the invention to provide an improved applicator for the hair-softening chemicals wherein the heat and vapor for the permanent waving operation are produced by resistance to the passage of electric current through an electrolytically-conducting liquid. By our present invention we retain many of the benefits of the flexible, deformable lotion applicator and electrolytic heater disclosed and claimed in our applica-

tion and our patent referred to above, while at the same time we avoid passing the electric current through at least all, or a part of, the hair-waving chemical itself. In commercial practice it requires considerable chemical skill and care to produce a hair-waving lotion or the like which is perfectly adapted both to conduct the heating current and to give the most desirable chemical waving effect. While it is entirely possible to produce solutions adapted to function very satisfactorily both as conductors for the heating current and as permanent waving lotions, and we have successfully done so in commercial practice, nevertheless, many suitable hair waving lotions or chemicals now on the market are not susceptible of such combined use without radical change. This is especially true of hair-waving chemicals used in sachets of the dry, impregnated type where the waving solution is formed by dipping the chemically impregnated pad into water or other fluid just prior to the wrapping and heating operations. For example, it has been found that when certain commercial solutions or impregnated sachets are also utilized as the electrolytic conductor for heating, the passage of the electric current therethrough apparently destroys or changes certain of the hair-waving chemicals so that the waving action on the hair is impaired or retarded.

The present invention avoids the sometimes very difficult chemical problem of modifying commercially successful waving lotions or sachets to adapt them to electrolytic conduction in accordance with the process disclosed and claimed in our copending application.

By our invention we either entirely or partially segregate the hair waving chemical from the electrolytic heating current so that all or at least a portion of said chemical is heated by contact with an electrolytically conducting heating device which may or may not itself utilize hair-waving chemicals as the electrolyte. More specifically, we combine with a flexible, deformable, electrolytically conducting heater of the type disclosed in our former application and patent, an absorbent layer closely contacting with the inner face of the inner electrode member, said absorbent layer being adapted to contain the hair-waving chemicals and to closely contact with the curl to be waved. The heater itself will comprise an absorbent layer between the electrodes and said layer may be moistened with the same chemical solution as the inner absorbent, or may contain a different solution which is primarily or entirely adapted to perform the heating function.

In the latter case, both the heating absorbent and the inner waving absorbent may be previously impregnated with chemicals in a dry state so that the multi-ply device may be dipped as a unit into water or other liquid, the chemicals in the outer heating absorbent being adapted to form an efficient electrolytic heating medium and those in the inner absorbent layer being primarily adapted to give a good waving action. By this method of moistening the composite heating device and sachet we avoid any change in the usual practice of permanent waving operators, who are now accustomed to wet and press out the impregnated sachet without carefully measuring the amount of liquid to be absorbed.

As another alternative we provide a method of moistening and/or supplying electrolyte to the heating absorbent from the moistened hair-waving sachet. That is, by permitting communication between a moistened waving sachet and an unimpregnated heating absorbent (as by perforations through the inner electrode which separates said two absorbents) some of the chemicals and moisture in the waving sachet will be absorbed into the heating pad and can be used as the heating electrolyte. This system has the advantage that the originally dry absorbent picks up excess moisture which may have been taken up in moistening the sachet, thus preventing excess dripping of liquid during the heating process. Also it becomes unnecessary to impregnate the heating absorbent with a separate chemical solute for heating purposes, thus simplifying manufacture of the device. However, in accordance with the invention, no current will pass through the chemicals in the hair-waving pad itself so that the disadvantages of such action are avoided. At the same time the heating action is created in an electrolyte known to be beneficial to the hair, i. e., of the same composition as that in the waving pad or sachet itself.

It will be understood that the foregoing general description and the following detailed description as well are exemplary and illustrative of the invention but are not restrictive thereof.

Referring now in detail to present preferred embodiments of the invention, illustrated by way of example in the accompanying drawing, a flat or wrappable, composite waving sachet and electrolytic heating device is shown in Fig. 1. The exterior ply, adapted to be wrapped firmly around the sachet and curl and thus constitute a steam and liquid seal, comprises a sheet of metal foil 1. If desired, the exterior face of the sheet 1 may be covered with parchmentized paper, cellophane or other protective, insulating coating, but in the present preferred practice, such additional covering is non-essential. When such covering is provided, proper contacting access to the conducting surface of the foil 1 may be provided by a suitable opening in the paper or by leaving one margin of the outer surface of the foil 1 exposed. The inner surface at least of the foil 1 is uncovered so as to act efficiently as an electrode, and the foil itself is preferably of zinc or a lead alloy or other readily deformable and inexpensive metal or conductive material.

The invention provides an absorbent sheet or ply 2 for holding the heating electrolyte, conveniently composed of flannel, blotting paper or the like. Said ply 2 is adapted to be placed in contact with the inner surface of the foil electrode 1 and in the flat sachet construction shown in Figs. 1 and 2 is preferably attached to said foil surface along a line spaced from one longitudinal

edge of the foil, as shown. The attachment of the absorbent 2 to the foil 1 may be by sewing, stapling or other suitable means, but in our present preferred embodiment a strip of adhesive 3 is preferably employed. The width of the absorbent 2 is such that it can be wrapped completely around a wound curl of more than average thickness and also around a sachet or similar body encircling the curl. The foil sheet 1 is preferably of greater width than the absorbent sheet 2 so as to permit the foil sheet to completely encircle the assembled curl, sachet and absorbent and also have a substantial overlapping margin to permit tight closure of the assembled device and thus provide an effective steam chamber about the curl. As indicated in Fig. 1, the upper end of the sheet 2 extends beyond the upper end of the foil sheet 1 to provide a substantial insulating margin 4. The lower end of the foil 1 extends beyond the lower end of the absorbent sheet 2 to provide a bottom margin or skirt 5 of impervious flexible foil which may serve as a means for sealing the bottom of the composite sachet and heater at the end adjacent the scalp. The relative sizes and disposition of the outer foil 1 and the absorbent sheet 2 hereinbefore described are substantially the same as disclosed and claimed in our Patent No. 1,926,987.

The inner electrode comprises a sheet of foil 10 preferably narrower than the absorbent sheet 2 and mounted medianly thereof with respect to the longitudinal or side edges. The foil sheet 10 is preferably secured to the absorbent sheet 2 by at least one line of adhesive 11 which, for convenience in manufacture and handling, may be opposite the adhesive strip 3. The foil sheet 10 is sufficiently narrower than the absorbent sheet 2 so that, when positioned as shown, insulating margins of absorbent 12 and 13 will be provided at either side of the foil, thereby to minimize the danger of short circuiting the two foils during the wrapping of the device about the curl. The foil sheet 10 is displaced longitudinally of the absorbent 2 to provide an insulating margin 14 at the bottom. Said margin 14 also constitutes an area which, in the heating operation, will be substantially out of the heating current path and will thus act to cool off any hot liquid tending to be extruded toward the bottom of the sachet and the customer's scalp.

The upper end of the electrode 10 projects a substantial distance beyond the upper edge of the absorbent sheet 2 to provide an exposed margin 15 for contacting. Preferably, but not necessarily a ply 16 of parchmentized paper, water-proof cellophane or the like may be attached to the inner face of the foil 10, said ply thus serving as an insulator between the electrode 10 and the metal curling rod 20 or other metal parts with which said electrode may accidentally or necessarily come in contact during use. The hereinbefore described construction and arrangement of the inner electrode is substantially that disclosed in our prior Patent No. 1,926,987.

In accordance with the invention, an absorbent member 25 of flannel or other suitable material is mounted adjacent to and preferably in contact with the inner face 16 of the inner electrode 10, thereby being positioned to be heated directly by the heating action of the electrolyte in the absorbent 2. In the preferred form, the absorbent member 25 constitutes a separate pad fastened to the face 16 of the inner electrode by adhesive or other suitable means. The pad 25 may be partially covered with a paper or other pro-

protective envelope 26 which, as shown, covers the interior face of the pad and all the edges, but leaving bare the outer face which lies against the inner face of the electrode 10. This protective coating 26 is particularly desirable when the pad 25 is impregnated with chemicals adapted to be dipped into water or other solvent, as it serves to preserve the integrity of the pad and the freshness of the chemicals. The inner face of the envelope 26 is preferably foraminous as by small perforations 27 which permit vapor and liquid to reach the hair but prevent actual contact of the hair with the solid contents of the pad. If desired, however, the pad 25 may consist of a single sheet of absorbent material like the member 2, that is, having no chemical impregnated therein and/or without any paper or other protective envelope. In such case the absorbent members 2 and 25 may consist of an integral strip of material enveloping the lower portion of the electrode 10 thereby serving to completely insulate said electrode and also facilitating convenience of manufacture.

In accordance with one form of the invention, both the absorbent ply 2 and the absorbent ply 25 may be free from chemical impregnation, both plies being adapted to be wet with the same permanent waving solution. In such case the entire multi-ply device shown in Fig. 1 may be dipped into the solution bath or the same lotion may be otherwise applied to both absorbent plies. When so moistened, the entire multi-ply device may then be wrapped about a curl 30 as shown in Fig. 3, the pad 25 thus lying against the curl, while the moistened absorbent 2 lies between and in contact with the two electrodes 1 and 10. The multi-ply device, when so moistened, is sufficiently pliable and deformable to permit shaping about the curl as shown in Fig. 3, thereby providing intimate contact of the hair-waving chemicals with the hair. The overlapping and compressing of the impervious foil 1 also provides a substantially vapor tight chamber about the sachet and curl thus insuring proper steaming and heating, while at the same time electrolytic conductivity between the heating elements is enhanced. Upon applying low-voltage contact terminals (diagrammatically indicated as 40 and 50) to the electrodes 1 and 10, the heating circuit will be completed through the liquid in absorbent member 2. The heat so created will be sufficient to effect boiling of the lotion in the adjacent absorbent member 25 and thereby to impart a permanent wave to the curl.

In the form of the device described in the preceding paragraph the inner foil electrode 10 may or may not be perforated as desired. If unperforated, the heating elements act chiefly to raise the temperature of the lotion in the contiguous absorbent 25 by conduction and radiation, but transfer of any of the electrolytically conducting liquid from pad 2 to pad 25 or the hair is prevented. Alternatively, the inner electrode 10 may be foraminous, as with perforations 60, except for the contact margin 15. When present, these perforations 60 permit passage of heated vapors and liquid from the heating elements into the pad 25.

In another form of the invention, the absorbent ply 2 may be impregnated in the dry state with an electrolytically conducting chemical which is not necessarily a hair-waving chemical, such as sodium chloride, for example, or ammonium sulphate which is an excellent conductor in solution and harmless to hair. The inner ply

or pad 25 will be impregnated with any known or suitable chemical or chemicals for imparting the permanent wave. In use this form of the device may be moistened simply by dipping it all into plain water, the solution so formed in the absorbent ply 2 serving as the heating element, while the solution formed in the absorbent 25 becomes a waving lotion in the usual manner. In this form the inner electrode 10 is preferably impervious to prevent the non-waving solution from reaching the hair.

In a third form of the invention, the absorbent ply 2 is maintained free from chemicals in the dry state and only the pad or sachet 25 is impregnated, preferably with the usual or known waving-chemical materials, many of which are good conductors in solution. With this form the inner electrode 10 is preferably perforated. When the multi-ply device is moistened by dipping it into plain water or the liquid ordinarily used for moistening the standard sachet 25, some of the chemical material in the pad 25 will pass through the perforations 60 and form a conductive solution within the absorbent 2. This form of the device has the advantage that in manufacturing only one ply (25) need be impregnated and only one chemical impregnating bath provided. Also, while a portion of the waving chemicals are used for conductivity in ply 2, no electric current passes through the chemicals in pad 25, which is in contact with the hair.

Furthermore, with said third form the absorbency and/or the size of the absorbent sheet 2 can be regulated so as to give practically any desired rate and duration of heating, it being clear that one type of absorbent material in pad 2 will draw electrolyte from the impregnated pad 25 more rapidly than another. With this form of the device the heating action will generally be less rapid to start with as the conductivity of the solution in the absorbent 2 will initially be quite weak and said conductivity will increase both with the strengthening of the solution therein and the increasing temperature thereof. With some types of hair it is preferable that the heating temperature rise more slowly than for normal hair, as a sudden rise of temperature will sometimes injure the structure of weakened or fragile hair.

As an alternative method of using said third form of the invention described above, it is contemplated to moisten only the absorbent pad 25, leaving the absorbent pad 2 dry until the device is applied to the hair. This partial moistening operation may be effected by bending the pad 25 away from the remainder of the multi-ply device and dipping only said pad 25 into the water or other solvent. Alternatively, the water or solvent may be applied only to the inner perforated face of the pad 25 as by suitable liquid dispensing means. By introducing the solvent into the absorbent 25 only, the dry absorbent pad 2 will act to pick up any excess amount of moisture in the sachet device as a whole and thus provide a factor of safety against excessive moisture and dripping of liquid on the head. In wrapping the sachet about the hair, moisture from the pad 25 quickly penetrates through the perforations 60 into the absorbent 2 sufficiently to initiate heating action as soon as the current is applied to the electrodes.

In order to assure efficient heating and boiling of the permanent waving solution adjacent the hair, we may provide an electrolyte in the heating absorbent 2 which has a higher boiling point

than the permanent waving solution. Thus an efficient heating action is assured, as any loss in temperature in the transference of heat from the pad 2 to the pad 25, by radiation or otherwise, is more than compensated for by the higher temperature of the heating medium. Consequently rapid heating and complete vaporization of the permanent waving fluid in the pad 25 and on the hair is assured. So far as this feature of the invention is concerned, the pad 25 may be dispensed with if desired and the low-boiling lotion applied directly to the hair, either before or after winding the curl. In such case the higher temperature of the electrolyte in the pad 2 will rapidly and thoroughly heat the low-boiling lotion in the hair. Alternatively, of course, the pad 25 may be used to hold the low-boiling lotion. An example of a high-boiling electrolyte would be a solution comprising water and sodium sulphate and/or ammonium sulphate. An example of a lower-boiling hair-waving solution for use in conjunction therewith would be one comprising water, ammonium hydroxide and ammonium carbonate.

Referring now to the device shown in Fig. 4, the invention may be readily embodied in a preformed cylinder or tube. The interior diameter of such a tube will be sufficient to permit easy passage of the tube over a wound tress of the maximum diameter. In forming the tube, a sachet constructed substantially as shown in Fig. 1 may be preformed into the shape shown in Fig. 4 simply by rolling the sachet about a suitable mandrel and fastening the overlapping edge of the outer electrode 1 as indicated. Lotion or other solvent may be introduced into the tube as desired, the simplest method being to stand tube on its lower end in the liquid at a predetermined level. The introduction of the liquid into the absorbents 2 and 25 will render the tube semi-plastic so that it may be shaped about the curl after being slipped over it.

The invention in its broader aspects is not limited to the specific mechanisms shown and described but departures may be made therefrom within the scope of the accompanying claims without departing from the principles of the invention and without sacrificing its chief advantages.

What we claim is:

1. A multi-ply electrolytic heating device and lotion applicator for permanent waving having an outer ply comprising a metallic electrode, an absorbent layer impregnated with an electrolytically conductive solute and having one face in contact with the outer electrode, an inner electrode contacting with the opposite face of said absorbent layer and a second absorbent layer im-

pregnated with a hair-waving solute contacting with the inner face of said inner electrode, and means permanently fastening said plies together whereby said multi-ply device can be moistened in a single liquid and applied to a curl as a unit.

2. A multi-ply electrolytic heating device and lotion applicator for permanent waving having an outer ply comprising a flexible, deformable metallic electrode, an absorbent layer having one face in contact with the outer electrode, an inner, flexible, deformable metallic electrode contacting with the opposite face of said absorbent layer and a second absorbent layer contacting with the inner face of said inner electrode, and fastening means holding the plies together whereby said multi-ply device can be moistened and applied to a curl as a unit.

3. A multi-ply electrolytic heating device and lotion applicator for permanent waving having an outer ply comprising a metallic electrode, an absorbent layer having one face in contact with the outer electrode, an inner electrode contacting with the opposite face of said absorbent layer and a second absorbent layer contacting with the inner face of said inner electrode and means for fastening said four plies permanently together, whereby said multi-ply device can be moistened and applied to a curl as a unit.

4. A multi-ply electrolytic heating device and lotion applicator for permanent waving having an outer ply comprising a flexible, deformable metallic electrode, an absorbent layer having one face in contact with the outer electrode, an inner, flexible, deformable metallic electrode contacting with the opposite face of said absorbent layer and a second absorbent layer contacting with the inner face of said inner electrode and means for fastening said four plies permanently together, whereby said multi-ply device can be moistened and applied to a curl as a unit.

5. A multi-ply electrolytic heating device and lotion applicator for permanent waving having an outer ply comprising a metallic electrode, an absorbent layer having one face in contact with the outer electrode, an inner foraminous electrode contacting with the opposite face of said absorbent layer and a second absorbent layer contacting with the inner face of said inner electrode, and means for fastening said electrodes and absorbent layers together to form a permanent unit in the relation set forth, said second layer being impregnated with hair-waving chemical whereby the unit may be moistened in a single liquid to supply electrolyte in the first absorbent layer and activate the hair-waving chemical in the second absorbent layer.

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