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HAIR-WAVING DEVICE AND METHOD OF PREPARING THE SAME

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FIG. 1.

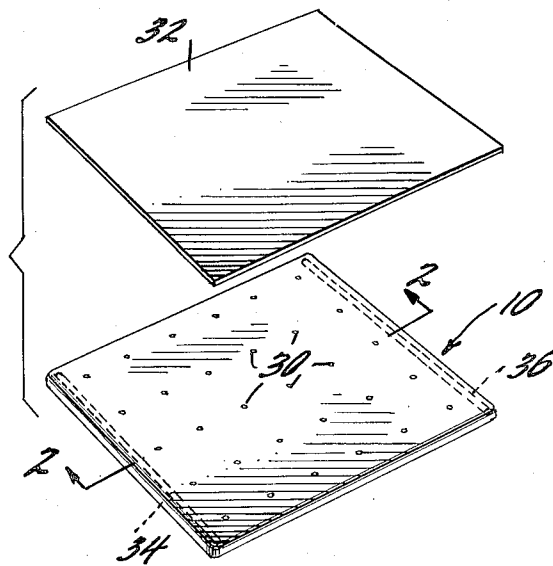
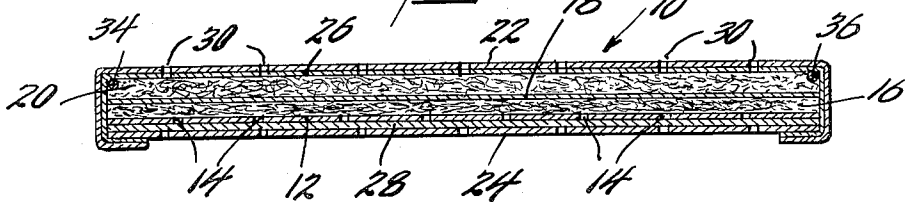


FIG. 2.



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1

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HAIR-WAVING DEVICE AND METHOD OF PREPARING THE SAME

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8 Claims. (Cl. 132-9)

My invention relates to the permanent waving of human hair.

Heretofore, it has been proposed to produce a permanent wave in hair by utilizing the heat-liberating electrochemical reaction which will take place when a sheet of metal foil is exposed to a chemical reagent containing a metallic cation which is lower in the electrochemical series than the metal in the sheet of metal foil, such a reagent generally being referred to as an activator.

Prior to my invention, it has been the practice to utilize this principle by providing a person who wishes to produce a permanent curl in hair with a sheet of metal foil and a prepared sheet of absorbent cotton impregnated with such an activator. It has also been found desirable to provide a chemical reagent comprising a plurality of chemical compounds which will delay and otherwise regulate the initial reaction of the activator with the metallic foil, such a reagent generally being referred to as a retarder. It has been customary to prepare the retarder as a solution prior to actual use in order to properly proportion the amount of each chemical compound to be utilized so that a properly regulated reaction will occur.

In practice, a wad of absorbent cotton or a similar material which contains an activator, is dipped into a solution containing a retarding compound or compounds. After the absorbent cotton has absorbed a sufficient amount of the solution and dissolved the activator, it is placed against a sheet of metal foil in order to produce a heat-generating reaction. This structure is then brought into close proximity to a wound strand of hair so that the heat produced as a result of the chemical reaction will cause a permanent distortion of the individual hair fibers in order to produce a permanent curl in the hair thus treated. Prior to applying the thus prepared heat generator to a strand of hair wound on a bobbin, it has been customary to place a sheet of paper between the assembled generator and the hair in order to prevent contamination of the hair by the chemicals used to produce the desired chemical reaction.

However, this method has not been entirely satisfactory because the compounds utilized in producing a heat-generating reaction have generally been capable of producing stains on the hands or the hair of a person using such chemicals. Also, these compounds tend to give forth obnoxious odors, and in addition, there is always the possibility of spilling the prepared solution, thus staining or otherwise contaminating articles contacted by the spilled solution.

Another difficulty encountered by presently practiced methods is the difficulty in controlling the rate of reaction of the reactors and the chemical foil. Thus, reaction will generally commence sometime within thirty seconds after the impregnated sheet of cotton is placed next to the aluminum foil, and this will not give an individual a sufficient opportunity to properly adjust the pad about the curl of hair which is to be permanently waved. Also, there is a tendency for steaming, sizzling

2

and popping to occur during the reaction, all of which is very annoying to the user.

Another difficulty encountered has been that since the absorbent cotton impregnated with an activator is dipped into a solution containing the retarder, it is impossible to regulate the amount of retarder utilized, and it sometimes happens that an insufficient amount of retarder is absorbed by the cotton, thereby producing an excess amount of heat. Conversely, if an excessive amount of retarder is absorbed by the cotton, it frequently happens that the curl produced is not of sufficient permanence. This is apt to occur because the quantity of retarder absorbed by the cotton cannot be regulated in advance, and a person utilizing such a solution must ascertain the correct amount of solution to be absorbed by trial and error.

Still another difficulty has been encountered in properly securing the metal foil and the impregnated absorbent cotton about the bobbins upon which a strand of hair has been wound; there being a strong tendency for the sheet of metal foil, the impregnated absorbent cotton, or both, to slip or actually fall from the bobbin about which they have been placed.

Accordingly, the primary object of my invention is to provide a person desiring to curl hair with a prepared heat-generating pad which will generate a predetermined amount of heat.

Another object is to produce a heat-generating pad which will liberate a sustained quantity of heat over a desired period of time and which will not begin to generate heat until sufficient time has elapsed to permit the user to place a heat-generating pad in the desired position about a roll of hair which has been wound about a bobbin.

Another object is to produce a pad which will not stain the hands or hair of the user.

Another object is to produce a heat-generating pad which will neither steam, sizzle nor pop.

Another object is to produce a heat-generating pad which will progressively bake a permanent curl into hair fibers.

Another object of my invention is to provide a method for preparing, in advance, dry reagents to be utilized in a heat-generating pad so that it will not be necessary to provide prepared chemical solutions for a person using such a pad.

Another object of my invention is to provide a heat-generating pad which will not readily tend to slip or fall from a bobbin about which it has been placed when wet.

Other objects and advantages of my invention will be apparent from a reading of the following specification, wherein, for the purposes of illustration, I have set forth a preferred embodiment of my invention.

An illustrated embodiment of my new and improved heat-generating pad is shown on the accompanying sheet of drawings, wherein

Figure 1 is a perspective view of an assembled heat-generating pad showing separated therefrom a sheet of paper, or the like, which is placed between the hair and the pad; and

Figure 2 is a section taken along the lines 2-2 of Figure 1.

Turning now to the drawings, the numeral 10 designates generally an assembled heat-generating pad, the construction of which will be more apparent from a consideration of Figure 2. The interior assembly comprises a sheet of metal foil 12, preferably aluminum, and preferably provided with a plurality of perforations 14. A layer of wettable material 18, for example, absorbent cotton, is impregnated with a dried chemical capable of electrochemical reaction with the sheet of metal foil 12. Intermediate the sheet of foil 12 and the sheet 18 is another

3

sheet of absorbent material 16 impregnated with a chemical capable of retarding reaction between the sheet of metal foil 12 and the chemicals of sheet 18. The preferred method of impregnating sheets 16 and 18 will be hereinafter described.

If desired, the interior structure may also contain a sheet of wettable material 20, such as absorbent cotton, which is placed over impregnated sheet 18.

In order to impart rigidity to the assembled heat-generating pad 10 without destroying its flexibility, flexible wires 34 and 36 are placed at opposite sides of one of the sheets of absorbent material, as, for example, at opposite sides of sheet 20. As a result, when the heat-generating pad 10 is assembled in a manner which will be described, and wound about a bobbin, the wires 34 and 36 will tend to keep the assembled heat-generating pad 10 in place.

The thus assembled interior structure is placed within a casing or wrapper which is formed, for example, by facing sheets of aluminum foil 22 and 24 with sheets of paper or similar chemically non-reactive materials 26 and 28 and wrapping the paper-faced aluminum foil about the structure as shown to form a casing. The casing is perforated as at 30, in order to permit the introduction of water or other liquid into the interior of the casing, for a purpose to be described. The perforations 30 may be formed in the casing at the time of manufacture and assembly of the pad or alternatively by the user just prior to use thereof. In the latter case, the casing is preferably indented slightly at a plurality of points at the time of manufacture to facilitate later perforating by the user.

As an example of the method of treating the sheet 18, two ounces of stannous chloride are deposited on a sheet of absorbent cotton in dry, granular form. The stannous chloride is then slightly dampened to insure adhesion of the chemical to the sheet, and the thus impregnated sheet is then dried prior to being incorporated into the heat-generating pad 10. The stannous chloride comprises an activator and generates heat when it reacts with the sheet of aluminum foil 12 when placed in solution and brought into contact with the aluminum. One and one-half ounces of a chemical delayer comprising by weight $7\frac{1}{2}$ parts sodium nitrate and $2\frac{1}{2}$ parts calcium chloride are mixed in dry, granular form and deposited on the sheet 16. This sheet is then dampened slightly in order to insure adhesion of the chemicals to the sheet and this thus impregnated sheet is likewise dried before being incorporated into the heat-generating pad 10. It is to be noted that sheet 16 is placed between the sheet of aluminum foil 12 and the sheet of absorbent cotton 18 impregnated with an activator in order to prevent a premature reaction.

It will be apparent that when water is introduced into the interior of the pad through the perforations 30, it will dissolve the activator and the retarder, and these chemicals will go into solution. This solution will migrate through the absorbent sheets and come into contact with the sheet of aluminum foil 12. It is preferable that both faces of the sheet of aluminum foil 12 be contacted, and for this purpose, perforations 14 are provided through which some of the solution may migrate to the rear face of the sheet. As a result, a heat-generating reaction occurs.

It will be apparent to one skilled in the art that the sheet of foil 12 may be composed of metallic substances other than aluminum, provided that the metal forming the foil is higher in the electrochemical series than the metal forming the cation of the activator.

It will also be obvious that the retarding and activating chemicals may be used in their natural crystalline form or in finely powdered form; that other halogens may be substituted for the chlorine mentioned previously, and that other alkaline earth metals may be utilized in place of the calcium mentioned.

Similarly, it will be apparent that the interior structure

4

of the pad may be modified, as for example, by separately enclosing the retarding and activating chemicals in individual closed envelopes of absorbent material, perforated or not as desired, provided only that the dried activator be kept separate from the sheet of metal foil.

Operation

When it is desired to use a heat-generating pad in order to produce a curl in hair, the hair is first prepared in the usual manner, including treating the hair with a conventional permanent waving solution and winding of strands of hair on bobbins. Water is then worked into the heat-generating pad through the perforations 30 and the thus activated heat generator is wound about a rolled strand of hair on a bobbin. If desired, a sheet of paper, designated by the numeral 32 in the drawings, may be placed between the heat-generating pad and the curl.

A heat-generating pad, prepared in accordance with the given example, may be activated by working three teaspoons full of water into the interior of the pad through the perforations 30. When water is thus added, it will dissolve the chemical activator and the chemical retarder and form a solution. As mentioned, the solution will contact the sheet of aluminum foil 12. However, the sodium nitrate present in the retarder will prevent immediate reaction between the aluminum foil and the stannous chloride. The calcium chloride present, however, will prevent the sodium nitrate from completely blocking the reaction, and after approximately two minutes have elapsed, an adequate period for properly adjusting the pad about a curl of hair, the electrochemical reaction between the aluminum and the stannous chloride will commence. It will be approximately two minutes after commencement of the electrochemical reaction before the boiling point of the reacting solution will be reached. As a result, the hair fibers will be subjected to an increasingly effective baking action which will slowly but surely modify the structure of the hair fiber in order to produce a permanent curl. That is, the curl will slowly and progressively be baked into the hair, and since the heat applied gradually increases from an initially small degree, there will be little tendency for the hair to become kinked or frayed or otherwise damaged.

When water is introduced into the interior of the casing through perforations 30 and is absorbed by the absorbent cotton in the interior of the heat-generating pad, the absorbent cotton will lose the natural rigidity which it normally possesses in the dry state. Also, as the electrochemical reaction progresses, the sheet of aluminum foil 12 will be progressively destroyed, so that it will have substantially disappeared when the heat-generating reaction is completed. As a result, the natural rigidity which the heat-generating pad possessed prior to use will be progressively destroyed. Normally, this loss of rigidity would tend to cause the heat-generating pad to slip or fall from place. However, flexible wires 34 and 36 will counteract this tendency by imparting rigidity to the pad which is not affected by the addition of water or the heat-generating reaction.

From the foregoing description, it is apparent that the heat-generating pad thus described is suitable for use in the home by persons not having specific technical training in the permanent waving of hair, and that such a pad may be used with perfect safety. The only step which a user is required to take in preparing the heat-generating pad is the addition of water, and this chemical being everywhere abundant and harmless, it is apparent that the user will not be exposed to the action of chemicals which may be of a poisonous nature, or which may have an obnoxious odor, or which may be capable of staining. Also, by preparing the activator and retarder in advance in a dry form in accordance with my method, the chemical compounds utilized in the heat-generating pad may be properly and accurately proportioned so that a predetermined desired degree of heat will always be generated when reaction occurs.

It is thus seen that I have invented a new heat-generating pad possessing new and novel characteristics as described above, and that changes in the precise method of assembly and the specific chemicals mentioned may be made without departing from the spirit of my invention.

I claim:

1. A heat generator for use in producing a permanent curl in hair which comprises a sheet of metal foil, a normally dry wettable sheet treated with a dried chemical and positioned adjacent said sheet of metal foil, said chemical when wet being capable of electrochemical reaction with said sheet of metal foil, normally dry wettable means insulating the sheet treated with the dried chemical from said metal foil, said normally dry wettable means including a retarder for delaying the electrochemical reaction between said sheet of metal foil and said chemical when the latter is wet, and a wrapper surrounding said foil, said sheet treated with dried chemical, and said insulating means, to form a unitary pad into which liquid may be introduced to dissolve said chemical, wet said wettable insulating means with a solution of the chemical, and cause such solution, flowing through said insulating means to contact said metallic sheet in order to produce a heat-generating reaction.

2. A heat generator for use in producing a permanent curl in hair which comprises a sheet of aluminum foil, a normally dry wettable sheet treated with dried stannous chloride, normally dry wettable means containing a retarder for delaying the reaction between the stannous chloride and the aluminum foil insulating said stannous chloride from said aluminum foil, and a perforated wrapper surrounding said foil, said treated sheet and said insulating means, whereby liquids may be introduced inside said wrapper to dissolve said stannous chloride for absorption by and flow through said wettable insulating means into contact with said foil to produce a heat-generating reaction.

3. A heat generator for use in producing a permanent curl in hair which comprises a sheet of aluminum foil, a normally dry wettable sheet treated with a dried activator comprising stannous chloride, a normally dry wettable sheet intermediate said sheet of aluminum foil and said sheet treated with said activator, said intermediate sheet being impregnated with a dried retarder comprising an alkali metal nitrate and an alkaline earth metal halide, and a perforated wrapper surrounding said foil and said treated sheets.

4. A heat generator for use in producing a permanent curl in hair which comprises a sheet of aluminum foil, a dried activator comprising substantially 12 parts by weight of a stannous halide, a dried retarder intermediate said aluminum foil and said dried activator comprising by weight substantially $7\frac{1}{2}$ parts alkali metal nitrate and $2\frac{1}{2}$ parts alkaline earth metal halide, normally dry wettable means separating said activator and said sheet of aluminum foil, and a perforated wrapper surrounding said foil, said activator, said retarder, and said wettable means.

5. A heat generator for use in producing a permanent curl in hair which comprises a sheet of aluminum foil, a dried activator comprising substantially 12 parts by

weight of stannous chloride, a dried retarder comprising by weight substantially $7\frac{1}{2}$ parts sodium nitrate, and $2\frac{1}{2}$ parts calcium chloride, normally dry wettable means separating said actuator and said sheet of aluminum foil and incorporating said retarder, and a perforated wrapper surrounding said foil, said activator, said retarder, and said wettable means.

6. A heat generator for use in producing a permanent curl in hair which comprises a sheet of metal foil, a normally dry wettable sheet impregnated with a dried chemical, said chemical when wet being capable of electrochemical reaction with said sheet of metal foil, normally dry wettable means insulating said impregnated sheet from said metal foil, said normally dry wettable means including a retarder for delaying the electrochemical reaction between said sheet of metal foil and said chemical when the latter is wet, a perforated wrapper surrounding said foil, said impregnated sheet and said insulating sheet, and spaced flexible wires intermediate said wrapper and said impregnated sheet, whereby liquid may be introduced inside said wrapper to dissolve said chemical, wet said wettable insulating means with a solution of the chemical, and cause such solution, flowing through said insulating means to contact said metallic sheet in order to produce a heat-generating reaction, and whereby rigidity will still be retained by said heat generator after the introduction of water destroys the natural rigidity of said normally dry impregnated sheet and said normally dry insulating sheet.

7. A heat generator for use in producing a permanent curl in hair which comprises a sheet of aluminum foil, a normally dry wettable sheet treated with a dried activator comprising stannous chloride, a normally dry wettable sheet intermediate said sheet of aluminum foil and said sheet treated with said activator, said intermediate sheet being impregnated with a dried retarder comprising an alkali metal nitrate and an alkaline earth metal halide, a perforated wrapper surrounding said foil and said treated sheets, and spaced parallel flexible wires intermediate said perforated sheets and said perforated wrapper.

8. A dry reagent capable of retarded electrochemical heat-generating reaction of sustained intensity with a sheet of aluminum foil when dissolved in water and brought into contact with said aluminum foil, which comprises by weight an activator comprising substantially 12 parts by weight of stannous chloride, and a retarder comprising by weight substantially $7\frac{1}{2}$ parts sodium nitrate and $2\frac{1}{2}$ parts calcium chloride.

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