March 28, 1939. F. K. BEZZENBERGER 2,152,342

PERMANENT WAVING MECHANISM

Filed July 2, 1936 2 Sheets-Sheet 1

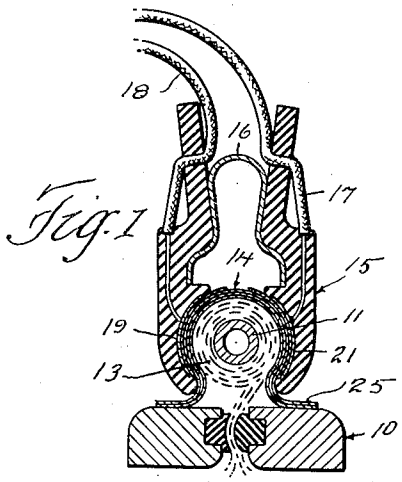


Fig. 1

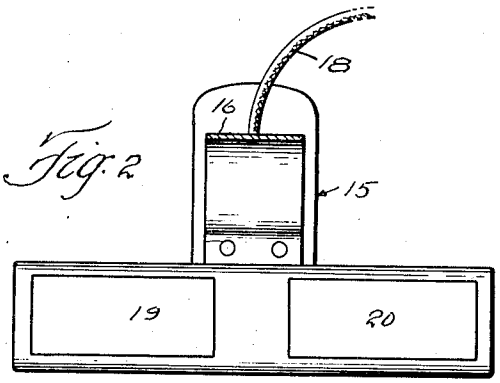


Fig. 2

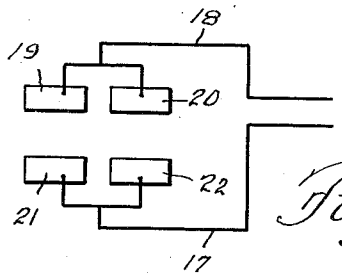


Fig. 3

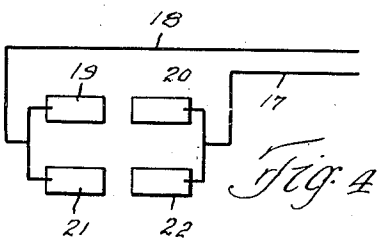


Fig. 4

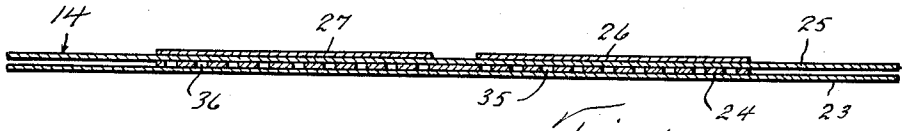


Fig. 6

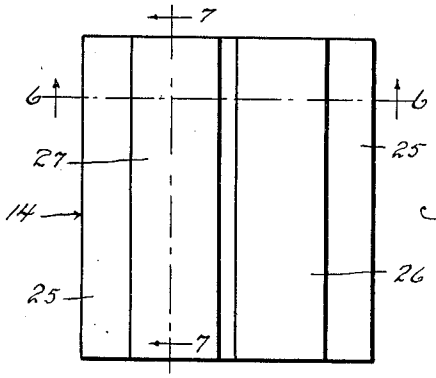


Fig. 5

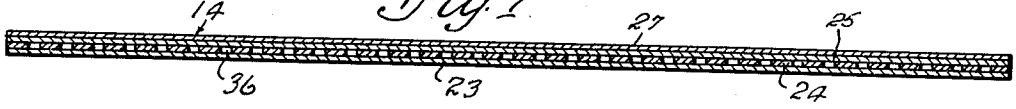
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PERMANENT WAVING MECHANISM

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Fig. 7



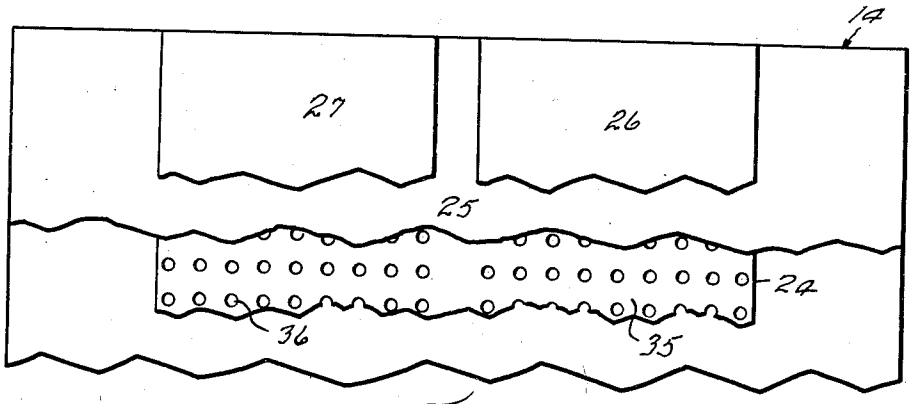


Fig. 8

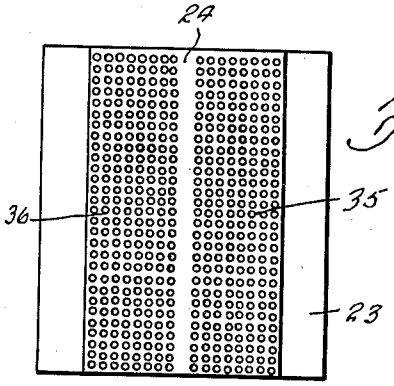


Fig. 9

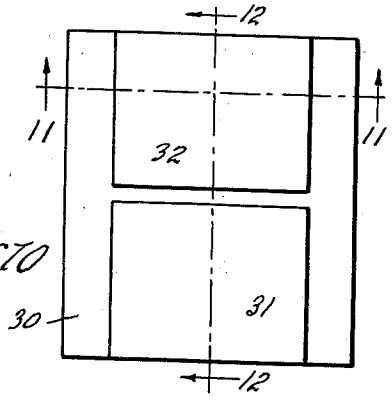
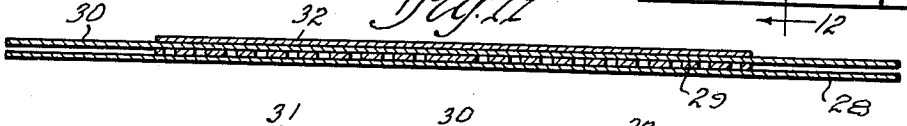


Fig. 10

Fig. 11



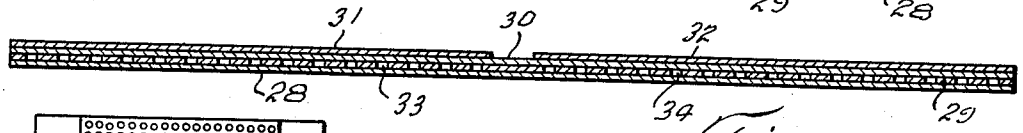


Fig. 12

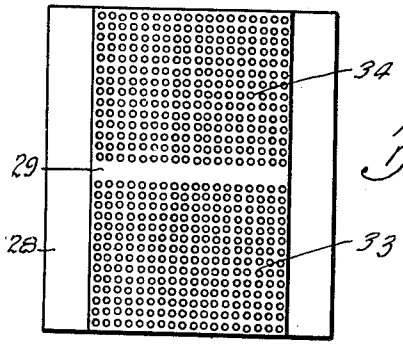


Fig. 13

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UNITED STATES PATENT OFFICE

2,152,342

PERMANENT WAVING MECHANISM

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Application July 2, 1936, Serial No. 88,620

13 Claims. (Cl. 219—24)

This invention relates to permanent waving mechanism and particularly to electrolytic heating mechanism for use in the permanent waving art.

An object of the invention is to provide electrolytic heating mechanism capable of developing adequate heat at low voltage, using either direct or alternating current and to secure such result by a simple construction which is inexpensive and lends itself readily to quantity production.

A further object is to provide a pad for electrolytic heating wherein provision is made for absorption of the electrolyte from a moist curl or a moist covering on the curl.

A further object is to provide in a simple construction, what in effect, are two electrolytic heaters in series, the electrolyte for both being contained in a single liquid sustaining sheet or a single layer made up of a plurality of such liquid sustaining sheets; also to provide for applying current to sheets of a single layer only.

A still further object is to provide a construction in which the sheets to which current is applied run in either longitudinal or lateral direction with respect to the other sheets making up the pad, the term longitudinal and words of like import referring to that dimension which extends longitudinally of the curl to which the pad is to be applied; also to provide a clip capable of supplying current to either a pad in which the sheets to which current is applied run longitudinally or one in which they run laterally.

With the foregoing and other and more limited objects in view, which will be in part apparent and in part pointed out hereinafter, the invention consists of all the novel features of construction and operation and arrangements of parts hereinafter described and illustrated in the accompanying drawings wherein Fig. 1 is a transverse section showing one embodiment of my invention; Fig. 2 is a vertical longitudinal section showing the inner aspect of the clip which I prefer to employ; Figs. 3 and 4 are schematic wiring diagrams showing the modes of connecting the contacts depending upon whether the pads of Figs. 5 and 6 or that of Figs. 10 and 11 is employed; Fig. 5 is a plan view of a pad according to my invention; Figs. 6 and 7 are sections on the lines 6—6 and 7—7 respectively of Fig. 5; Fig. 8 is a fragmentary enlarged plan view with parts broken to show the relationship of the different layers; Fig. 9 is a plan view with the two top layers removed; Fig. 10 is a plan view of a modified form of pad in which the electrodes to which current is applied extend transversely of the pad; Figs. 11 and 12 are sections on the lines 11—11 and 12—12 respectively of Fig. 10, and Fig. 13 is a plan view of the form of Figs. 10 and 11 with the two top layers removed.

In the drawings, the numeral 10 indicates a protector clamp which may be of usual construction and adapted to grip a strand of hair adjacent to the scalp and to support a curler rod 11 in the manner usual in Croquignole waving equipment. Surrounding the curler rod 11, I have indicated a wound curl or strand 13 which in turn is surrounded by the electrolytic heating pad indicated generally by the numeral 14. Embracing the pad 14 is a clip 15 comprising a pair of jaws normally urged toward each other by a spring hinge 16 and which contain conductors 17 and 18 extending to contact elements 19, 20, 21 and 22 carried on the inner surfaces of such jaws. It will be obvious from Figs. 2, 3 and 4 that the contacts 19 to 22 inclusive are positioned at the ends of the shells of the clip 15 and spaced from the center. After they are connected as in Fig. 3, then the contacts 19 and 20 will in effect constitute a single contact while those 20 and 22 will constitute the other contact. When the contacts are connected as in Fig. 4, then the contacts 19 and 21 will in effect constitute a single contact, although carried in different halves of the clip 15, while the contacts 20 and 22 will form the other contact. It is also within the contemplation of my invention to omit for example contacts 19 and 22 whereby no change in connection would be necessary in order to use the clip on either type of pad hereinafter described. Such omission can well be made where the contacts do not also act as electrodes. Where, however, they do act as electrodes, such omission will not be desirable; in that case contacts 20 and 22, Fig. 3 for example, may be omitted so that one end only of the curl will be heated.

The pad 14 may consist of a lower layer 23 of liquid sustaining material, such for example as cotton flannel, a perforated metal foil layer 24 overlying the layer 23, a second layer 25 of liquid sustaining material and an upper layer comprising spaced sheets of metal foil 26 and 27. Electrode sheets 26 and 27 overlie separate parts of metallic sheet 24 and such parts are preferably perforated whereby to allow electrolyte from a moist curl or a moist covering thereon to be absorbed into the liquid sustaining sheet 25. I pereferably do not perforate the sheet 24 except at those parts which underlie the electrode sheets 26 and 27 since if the entire sheet is per-

forated, there is danger of too rapid evaporation of the electrolyte from the sheet **25**.

Preferably the various sheets are secured together either by adhesive or by stitching and all extend in the same direction and are of the same length whereby the pad may be constructed by drawing off and assembling the material from rolls and cutting off lengths by automatic mechanism. It is within the contemplation of my invention to leave the sheet **23** detached from the other three sheets making up the pad and to moisten the same, either in hair waving solution, the same being an electrolyte or in a separate electrolyte and placing the same over a curl before the remainder of the pad is placed thereon. In this way, is becomes unnecessary to depend upon the electrolyte being absorbed from the moist curl. I may also leave the sheet **24** imperforate and perforate the sheets **26** and **27** so that the pad may be placed upside down on an electrolyte soaked surface for a time before being used so that the sheet **25** will contain a suitable quantity of electrolyte. Also the elements **24**, **26** and **27** may be left imperforate and the pad soaked for a sufficient time to allow a suitable quantity of electrolyte to be absorbed by the sheet **25** from its projecting portion.

The pad of Figs. 10 to 13 inclusive differs from that of Figs. 5 to 9 inclusive only in that the electrode sheets corresponding to those **26** and **27** extend transversely instead of longitudinally and in that the inner metallic sheet has its perforations arranged to correspond with the transverse electrode sheets. This pad may consist of layers **28**, **29** and **30** corresponding to those **23**, **24** and **25** and transversely extending electrode sheets **31** and **32**. As will be clear from Fig. 13, the groups of perforations in the sheet **29** are located at the ends thereof as indicated at **33** and **34** instead of being arranged at the sides thereof as seen in Fig. 9 at **35** and **36**.

It will be obvious that when current is supplied through the contacts **19** to **22** inclusive or a pair of them (reference being had to Fig. 6), current will flow from electrode sheet **27** through an electrolyte contained in the sheet **25** and to the sheet **24**. In the region beneath the electrode **26** thence to the region of the sheet **24** beneath the electrode **27**, through a portion of the sheet **25** and to the electrode sheet **27**. This gives in effect a pair of electrolytic heaters connected in series and brings the points of contact to be supplied with current to one surface of the pad. Obviously it will be possible, when the contact elements **19** to **22** inclusive are of sufficient area to act as electrodes, to omit the electrode sheets **26** and **27** or those **31** and **32**, making use of the contact elements as electrodes. Using pads as described, I have found that I am able to secure adequate heat by the use of potentials as low as 3 volts.

While I have shown and described the present preferred embodiments of my invention, I am aware that it may be realized in other constructions and I therefore do not wish to be limited except in accordance with the appended claims.

Having thus described my invention, what I claim is:

1. Electrolytic heating mechanism for permanent waving, comprising in combination, a flexible, metallic sheet adapted to embrace a wound curl, a flexible sheet of liquid sustaining, electrically non-conductive material overlying said metallic sheet, a pair of flexible sheet metal electrodes overlying separate portions of said metallic sheet and spaced therefrom by said non-conductive material, and means for holding the above recited elements in embracing relation to a curl and connecting said electrodes one to each side of a source of current.

2. A pad for use in electrolytically heating a wound curl of hair, comprising, a flexible metallic sheet, flexible, metallic electrode sheets overlying separate portions of said first sheet and flexible, liquid sustaining, electrically non-conductive material separating said electrodes from said first sheet, said first sheet being provided with perforations whereby liquid from a moist curl or a moist covering thereon may pass to said liquid sustaining material.

3. A pad for use in electrolytically heating a wound curl of hair, comprising, a flexible metallic sheet, flexible, metallic electrode sheets overlying separate portions of said first sheet and flexible, liquid sustaining, electrically non-conductive material separating said electrodes from said first sheet, said first sheet being provided with perforations whereby liquid from a moist curl or a moist covering thereon may pass to said liquid sustaining material, said perforations being limited to the areas covered by said electrodes whereby to avoid too rapid loss of moisture by evaporation.

4. A pad for use in electrolytically heating a wound curl of hair, comprising, a flexible metallic sheet, a flexible, liquid sustaining, electrically non-conductive sheet overlying said metallic sheet, and flexible, metallic electrode sheets overlying separate portions of said first sheet, all said sheets extending in the same direction, being of the same length and being secured together.

5. A pad for use in electrolytically heating a wound curl of hair, comprising, a flexible, liquid sustaining, electrically non-conductive sheet, a flexible, metallic sheet overlying said first sheet, a second, flexible, liquid sustaining, electrically non-conductive sheet overlying said metallic sheet, and flexible, metallic electrode sheets overlying separate portions of said second liquid sustaining sheet.

6. A pad for use in electrolytically heating a wound curl of hair, comprising, a flexible, liquid sustaining, electrically non-conductive sheet, a perforated, flexible, metallic sheet overlying said first sheet, a second, flexible, liquid sustaining, electrically non-conductive sheet overlying said metallic sheet, and flexible, metallic electrode sheets overlying separate portions of said second liquid sustaining sheet.

7. A clip for supplying current to an electrolytic heating pad, comprising elongated means adapted to engage opposed portions of a wound curl or its covering, said means carrying contacts adapted to engage electrodes on such heating pad, there being one contact positioned at one side of the center of said elongated means and another contact positioned at the other side of the center thereof, said contacts being adapted to engage opposed portions of said curl or its covering and a conductor extending from each of said contacts and adapted to be connected to a source of current.

8. A sectional clip for supplying current to an electrolytic heating pad, comprising, a pair of elongated shells adapted to engage opposed portions of a wound curl or its covering, each of said shells carrying a contact on its inner surface, one of said contacts being located at one side of the center of one of said shells and another

thereof located at the other side of the center of the other shell and a conductor extending from each of said contacts and adapted to be connected to a source of current.

9. An electrolytic heating means for permanent hair waving comprising a pair of electrolytic heating cells connected in series each consisting of a pair of sheet metal electrodes separated by a sheet of electrically non-conductive, liquid sustaining material, a single sheet of metal constituting one electrode of each cell and a single sheet of said liquid sustaining material constituting the separators for both cells.

10. Electrolytic heating mechanism for permanent waving comprising, in combination, a rectangular sheet metal element adapted to embrace a wound curl, electrode elements overlying said first element, a sheet of liquid sustaining, electrically non-conductive material interposed between said first element and said electrode elements and adapted to absorb a quantity of electrolyte, said electrode elements being spaced apart and both thereof with the space therebetween defining an area substantially coextensive with that of said first element.

11. Electrolytic heating mechanism for permanent waving comprising, in combination, a rectangular sheet metal element adapted to embrace a wound curl, electrode elements overlying said first element, a sheet of liquid sustaining, electrically non-conductive material interposed between said first element and said electrode elements and adapted to absorb a quantity of electrolyte, said electrode elements being spaced apart and both thereof with the space therebetween defining an area substantially coextensive with that of said first element, and all said elements being flexible.

12. Electrolytic heating mechanism for permanent waving comprising, in combination, an elongated rectangular sheet metal element adapted to embrace a wound curl, electrode elements overlying said first element, a sheet of liquid sustaining, electrically non-conductive material interposed between said first element and said electrode elements and adapted to absorb a quantity of electrolyte, said electrode elements being spaced apart and both thereof with the space therebetween defining an area substantially coextensive with that of said first element, and all said elements being flexible, said electrode elements extending longitudinally of said first element and forming therewith, when said non-conductive material has an electrolyte absorbed therein, a pair of electrolytic cells connected in series by that portion of the said first element which is opposite the space between said electrode elements.

13. Electrolytic heating mechanism for permanent waving comprising, in combination, an elongated rectangular sheet metal element adapted to embrace a wound curl, electrode elements overlying said first element, a sheet of liquid sustaining, electrically non-conductive material interposed between said first element and said electrode elements and adapted to absorb a quantity of electrolyte, said electrode elements being spaced apart and both thereof with the space therebetween defining an area substantially coextensive with that of said first element, and all said elements being flexible, said electrode elements extending longitudinally of said first element and all said elements as well as said liquid sustaining sheet being of equal length.

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