Jan. 14, 1958 L. A. SPILO ET AL 2,819,722

METHOD AND APPARATUS FOR HAIR TREATMENT

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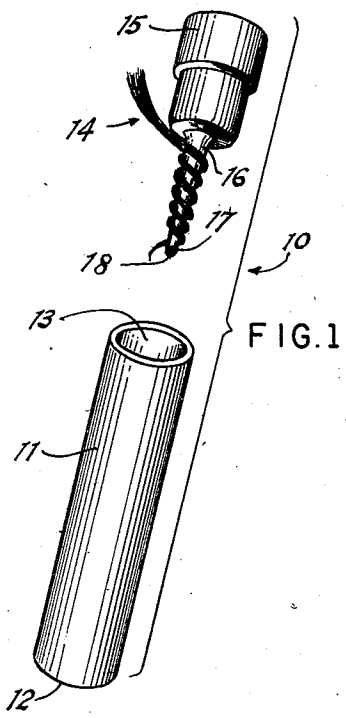


FIG. 1

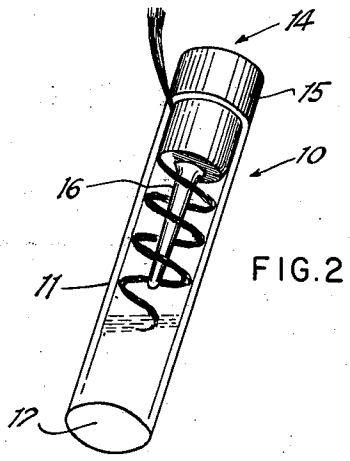


FIG. 2



FIG. 3

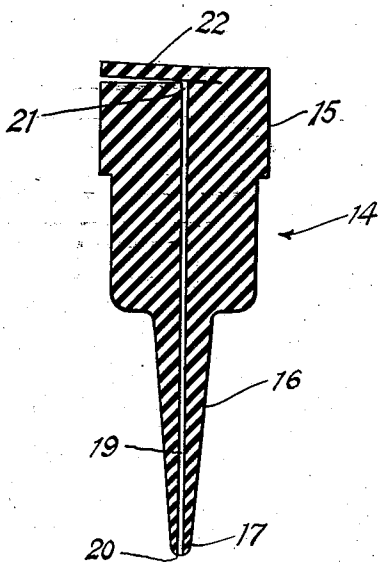


FIG. 4

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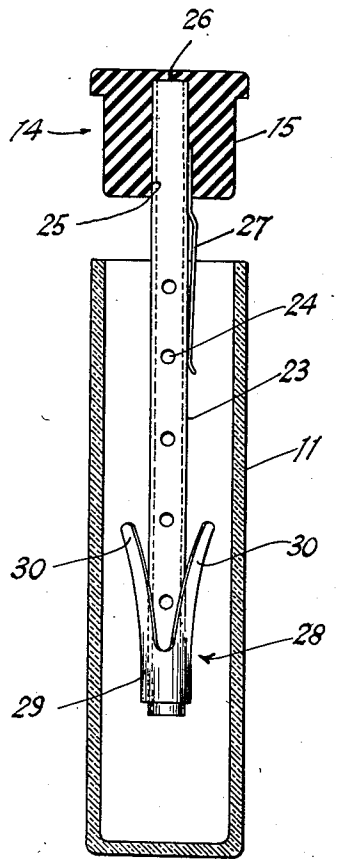


FIG. 5

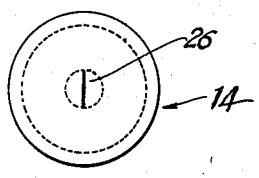


FIG. 6

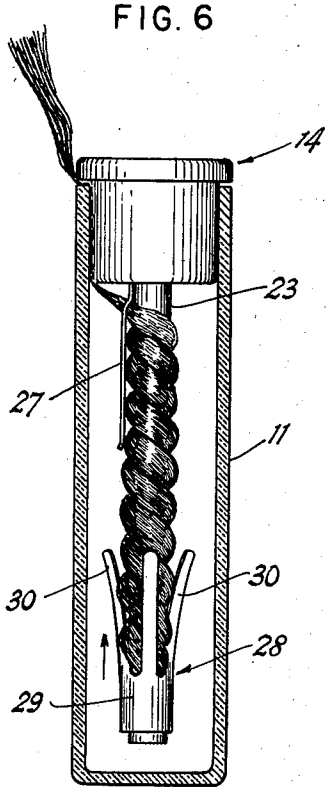


FIG. 7

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METHOD AND APPARATUS FOR HAIR TREATMENT

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14 Claims. (Cl. 132—41)

This invention relates to improvements in methods of and apparatus for treating strands of hair in situ.

Broadly, it is an object of this invention to provide a method of and apparatus for applying a treatment, for example, bleaching, tinting, or imparting a curl to discrete strands of hair.

Up to the present time in the beauty field, where it has been desired to bleach or tint or impart a curl, in situ, upon discrete strands of hair, such procedures have generally been carried out by a wetting step wherein the treatment medium is applied by brush or a swab. In bleaching, the strand of hair usually is wetted by a dabbing or brushing action with a treatment solution and if desired, aluminum foil wrapped around the wetted strand, the foil being periodically unwrapped and the strand periodically wetted until the desired bleaching effect is attained; in tinting, the strand of hair is wetted by a dabbing or brushing action and the tint allowed to develop; in curling, the strand of hair is sometimes initially wetted by a dabbing or brushing action, thereafter the strand is wound upon a rod and again wetted, and in some instances, the wetted wound strand is enveloped by a wrapper. In all of these procedures, by virtue of the fact that the treatment medium is applied to the strands of hair with a swab or brush, there is a tendency for the treatment medium to spread or flow onto the scalp or onto adjacent strands of hair which are not desired or intended to be treated, with the result that the treatment effect is not developed upon or limited to the specifically desired discrete strands.

It is the purpose of this invention to provide a method of and apparatus for treatment of discrete strands of hair in situ, wherein the selected strands are entered into a treatment member in which treatment solution is maintained, or which may be charged with treatment solution after entry of the selected strands, such member being supportingly mountable onto a portion of the strand beyond that entered thereinto and leading to the scalp, and being maintained against relative movement in such mounted position, whereby only that portion of the selected strand entered into the treatment member may be subjected to the desired treatment in situ.

It is a further object of this invention to provide a method of and apparatus for treatment in situ of discrete hair strands wherein a treatment member is mountable on the selected strand of hair, and into which the ends of the selected strand to be treated are entered, the treatment member being mounted and maintained against relative movement upon a portion of the selected strand between the scalp and the entered portion thereof, and whereby treatment fluid may be entered into the treatment member after the same has been mounted as aforesaid, the medium for permitting entry of the treatment fluid serving as a breather to permit discharge of any excess gases developed in the treatment member as the treatment solution acts on the entered hair ends.

It is a further object of this invention to provide a method of and apparatus for treatment of discrete strands of hair in situ where the strand being treated is disposed in a treatment casing formed of transparent material, so that the strand of hair being treated and the action of the treatment medium thereon is at all times visible to the person using the same, thereby facilitating recognition of the attainment of the desired end result, whether

it be a bleaching, a tinting or a curling of the strand of hair.

These, and other objects, advantages and novel features of the invention will be apparent from the following description and the accompanying drawing. In the drawing:

Fig. 1 is an exploded perspective view showing the treatment member.

Fig. 2 is a perspective view of the treatment member as operatively assembled.

Fig. 3 is a perspective view showing the treatment member as applied to the human head.

Fig. 4 is a front elevation in section showing another embodiment of the closure element of the treatment member.

Fig. 5 is an exploded perspective view showing a further embodiment of the treatment member.

Fig. 6 is a plan view of the closure member of such further embodiment.

Fig. 7 is a perspective view of the treatment member of such further embodiment as operatively assembled.

Referring to the reference characters in the drawing wherein, for example, the invention is illustrated with respect to a hair bleaching or tinting procedure, the treatment member **10** shown in expanded form, comprises, respectively, a tubular base **11**, preferably formed of transparent plastic material, and preferably closed at one end as at **12**, and open at the other end as at **13**; and a closure element **14** of stepped conformation, the uppermost step **15** of which is formed of resilient material and which is of such diameter as to enter and be maintained in forced fit at the open end **13** of the tube **11**, and the lowermost step of which is preferably in the form of a conical extension **16** which may be of resilient material integral with the uppermost step, or which may be of a different material, rigid or not, and connectible to said uppermost step **15**. The apex of the tip **17** of the lowermost conical extension **16** may be slitted, as at **18** for a purpose of gripping and locking the free end of a strand or strands of hair being mounted on the extension **16** of the closure element **14**.

In the embodiment shown in Fig. 4 the closure element **14** may be provided with a longitudinally extending conduit **19** of diameter sufficient to permit free flow of treatment medium in one direction, and free movement of any gases developed during the treatment in the other direction, one end of which conduit extends to and provides an opening **20** at the apex **17** of the conical extension **16** of the closure, and the other end **21** of which is normally sealed by a flap **22** formed in the uppermost zone of the step **15** by transversely slitting the same for a portion of its cross sectional area.

Referring to the embodiment of Figs. **5**, **6** and **7**, the base **11** is identical with that applied in the other embodiments, while the mandrel preferably is in the form of a hollow cylindrical tube **23** which may have perforations **24**, preferably along its length, the open end of the tube **23** being entered into a central bore **25** formed as an internal bore of the stepped stopper **15**. The uppermost end of the hollow mandrel **23** extends within the bore **25** substantially to the upper surface of the stopper **15** which is constituted preferably of rubber, at the center of the upper surface of which and above the open upper end of the mandrel tube there is formed a slit **26** the extent of which is at least equal to the diameter of such mandrel tube. A flexible clip **27** is positioned on the periphery of the mandrel at a point adjacent the lowermost step of the stopper **15**, such clip serving to clamp the first coil of the strand of hair, thereby to permit a firm winding of the remaining length towards the free end of the strand about the mandrel. At the lowermost or free end of the mandrel **23** there is disposed a winder **28** which preferably

may be in the form as to have a tubular base **29** and a plurality of gradually outwardly extending fingers **30**; the tubular base **29** having a sliding frictional fit with the periphery of the mandrel so that when the strand of hair as clamped is wound about the mandrel in coil formation the free end thereof may be gripped by the fingers **30** of the winder **28**, which is moved rotatingly upward, and the coiled formation of the wound strand maintained on the mandrel in the requisite tight coil formation thereby.

Once the strand of hair has been wound, as in the manner indicated in Figs. 5 and 7, the same is inserted into the base **11** in which treatment fluid for cold waving is present, or in which treatment fluid may be entered through the slit **26** and tube **23** respectively, of the closure and the mandrel; the treatment member being anchored to the strand of hair at a desired position relative to the scalp in the manner as provided in the embodiments provided in Figs. 1 to 3 and Fig. 4, viz., by the force fit locking of the uppermost step of the closure member to the inner periphery of the open end of the base with a portion of the length of the hair strand frictionally maintained therebetween.

In operation, for example, to bleach or tint a strand of hair it is preferred to utilize the embodiments of Figs. 1 to 3 and Fig. 4. The selected strand of hair extending from the scalp of a person being treated may be grasped intermediate its length, particularly at that portion of its length below which it is desired to impart treatment to the hair strand; and that portion of the strand there below is wound about the conical extension **16**, which latter serves as a mandrel for the wound free ends of hair, the outermost portions of which are disposed adjacent the apex of the conical extension.

Treatment solution in the desired amount is disposed in the base **11**, and the closure element with the hair wound about its conical extension **16**, as above described, is entered into the base **11**, that portion of the hair strand above that wound about the mandrel and which extends longitudinally along the peripheral surface of the uppermost step **15** of the closure, as the closure element is entered into the base, being disposed between the open end **13** of the base **11** and the peripheral surface of the step **15** so that as pressure is applied to bring the closure element **14** into forced fit in relation with the open end **13** of the base, a frictional sealing relationship is developed between the closure, the intermediate longitudinally extending portion of hair, and the open end of the tube. By such forced fit or frictional sealing action the closure element and base are interlocked with a strand of hair; and the portion of the free end of this strand of hair heretofore wound about the mandrel becomes displaced and loosely arranged in coil form about the mandrel as shown in Fig. 2 of the drawing, by virtue of the removal of any holding action, manual or otherwise, and due to its inherent resiliency.

In the illustration of the embodiment in Figs. 1 to 3, the amount of treatment liquid shown is such as will not fill the available volumnar space afforded by the base and in effectuating the bleaching or dyeing, or any other analogous treatment, the tube as suspended from the scalp on the particular strand, may be flipped or otherwise displaced to allow the treatment liquid to envelop the coiled strand within the base. Alternately, the end **12** of the base of the tube may be open (and sealable by a stopper) and the treatment liquid may be deposited into the base to which the closure **12** carrying the coiled hair strand has been interconnected as aforementioned, and in this case the treatment liquid for example may be applied by dropper, syringe, or spray nozzle as the tube is tilted and held with its closure lowermost, after which a separable stopper may be force fitted into the open end **12** of this particular embodiment, and the treatment member allowed to return to its upright position as shown in Fig. 3.

Referring to the operation in connection with the embodiment in Fig. 4, the winding step for the hair strand end to be treated is the same as heretofore, likewise the interlocking between the strand of hair and the closure and base. However, the treatment liquid in this embodiment may be delivered to the unit by injecting a requisite amount thereof through the opening in the uppermost step of the closure element into the conduit **19**, for discharge through the opening **20** at the apex **17** of the conical extension **16**. Once the treatment fluid has been discharged into the conduit and the source of treatment fluid withdrawn, the flap **22**, by virtue of its resilient hinge mounting on the uppermost zone of step **15** returns to its position whereby the opening **21** is sealed, thereby rendering the member leak-proof even when the same is tilted for the purpose of wetting the strand of hair therein contained.

The aforesaid arrangement involved in the embodiment of Fig. 4, serves in addition, to providing a ready means of charging with treating fluid to provide a mechanism whereby any excess gas pressures developed as the treatment fluid functions in relation to the strands of hair being treated may be discharged through the conduit **19** and its discharge opening **21**, the normal pressure maintained by the flap **22** against such opening being such as to permit the development of a valve operation, the opening and closing of which being controlled by the presence or absence of gas pressure in excess of that required to displace the resilient flap **22** from sealing juxtaposition against the opening **20**.

In operation of the invention, to impart a permanent ("cold") wave to the wound strand of hair as per the embodiment in Figs. 5 to 7, the hair is wound on the mandrel and the assembly operatively inter-connected as shown in Fig. 7 so that the treatment member is firmly supported adjacent the scalp, and on the strand being treated as shown in Fig. 3. The treatment fluid may be entered into the tube **11** prior to the entry of the mandrel closure member, or alternately, the treatment fluid may be charged into the treatment member by directing the same by means of a nozzle or dropper between the juxtaposed walls of the slit **26**, the walls being displaced against their normal tendency to remain in juxtaposed position by virtue of their inherent resiliency, and once the nozzle or dropper is removed, the displaced walls will return to their juxtaposed sealing position. In the event any gas is developed within the treatment chamber by virtue of the reaction of the treatment medium on their hair wound in the mandrel, the thickness of the stopper wall is such that upon attainment of predetermined excess pressure within the treating chamber gas will pass up through the tubular mandrel to exert a force against that portion of the stopper adjacent the slit **26** thereof, causing a distending of the stopper at such zone and a spreading of the walls of the slit, thereby opening the slit for discharge to the atmosphere of the gas at pressure in excess of that of atmosphere; in attainment of a balance of pressure the walls of the slit, by virtue of the inherent resiliency of the material of the stopper, may be drawn together to juxtaposition and sealing relationship.

Although the conical extension defining the mandrel has been shown in the figures of the embodiments of Figs. 1 to 3 and Fig. 4 as providing a continuous surface, it is within the province of this invention to provide, particularly in the embodiment of Fig. 4, a series of spaced apertures leading to the conduit so that treating fluid as charged into conduit may be dispersed through such thus formed branch conduits into contact with those portions of the hair strands not directly immersed in the treating fluid.

Although the closure member and the tubular base in the embodiments of the invention as illustrated in the drawing are interlocked with the strand of hair therebetween by a force fitting operation which is made effective for locking purposes by virtue of the resiliency of the

material of the closure member, it is within the province of this invention to make either the closure or the base of resilient material, alternately, it is within the province of this invention to provide for relatively non-resilient closure element and base wherein the two are interlocked by cooperating threads or the like and wherein the strand of hair is locked therebetween by compression as the closure element and base are threaded together.

Where reference has been made to the closure element being of resilient material, in whole or in part, it is understood that, preferably, such resilient material be of such nature as will not be chemically affected by the treating solution; in some instances rubber, and in other instances resilient plastic material will adequately serve, dependent upon the proposed treatment to be applied, viz., whether bleaching, tinting or permanent waving the selected strand of hair in situ.

Although the casing, as illustrated in the embodiments of the invention as shown and described, is formed of a transparent plastic material of relatively rigid conformation; it is within the province of this invention to provide a casing of flexible and expansible plastic material as, for example, rubber or a flexible synthetic. In such an embodiment, the requirement of a breather valve for the discharge into the atmosphere of excess gas developed as part of the treatment reaction is obviated since, in the event of gas development, the pressures developed will cause an expansion of the casing without reducing the speed of reaction of the treatment medium on the hair strand entered into the casing. The flexible casing may be provided with a relatively rigid neck to permit association with the closure member of the strand in the manner outlined in the embodiments heretofore described, or a separate latching member may be formed at the neck of such flexible casing for interlocking with the closure member and the selected strand of hair, so that the casing and closure member are supportingly mounted on the strand of hair.

While specific embodiments of the invention have been shown and described in detail to illustrate the application of the invention principles, it should be understood that the invention may be otherwise embodied without departing from such principles.

What is claimed is:

1. A device for treating in situ a discrete strand of hair, said device comprising, in combination, a relatively elongated tubular casing having an open end and a substantially imperforate end, and in which a treatment fluid is disposable; a relatively elongated mandrel having an inner end formed for connection to the end of the strand of hair for disposition of the intermediate portion of the strand along the mandrel, and an outer end of resilient material formed as a stopper having a tight frictional fit within the open end of the casing to sealingly close the same; the part of the strand of hair beyond the mandrel extending out of the casing and being tightly gripped between peripheral surfaces of the casing and stopper when the latter is force fitted into the open end of the casing.

2. A device as claimed in claim 1 wherein the mandrel is shaped for winding of the hair strand thereon.

3. A device in accordance with claim 1, wherein means are provided for admitting and conducting said treating fluid into the casing after the same is mounted on the strand.

4. A device in accordance with claim 1, wherein means are provided in the stopper for admitting said treatment fluid, said stopper having passage means for conducting said treatment fluid into the casing after the same is mounted on the strand.

5. A device in accordance with claim 1, wherein means comprising a conduit in said mandrel and a valve element in said stopper normally closed and capable of being opened under pressure are provided for admitting said treatment fluid into the mandrel conduit and casing and allowing escape of gases from the casing when the pressure within the device exceeds atmospheric pressure.

6. A device in accordance with claim 1, wherein the mandrel is of sloping configuration.

7. A device in accordance with claim 1, wherein the casing is formed of material capable of expansion, upon development within the casing during the treatment reaction of gas pressures in excess of atmospheric pressure.

8. A device in accordance with claim 1, wherein a conduit is provided within the mandrel conduit, a valve element is provided in the stopper for admitting said treatment media into the conduit and the casing, and wherein the casing is formed of material capable of expansion, upon development within the casing during the treatment reaction of gas pressures in excess of atmospheric pressure.

9. A device in accordance with claim 2, wherein means comprising a conduit in said mandrel and a valve element in said stopper normally closed and capable of being opened under pressure are provided for admitting said treatment fluid into the mandrel conduit and casing and allowing escape of gases from the casing when the pressure within the device exceeds atmospheric pressure.

10. A device in accordance with claim 2, wherein the mandrel is of sloping configuration and has formed at the free end thereof a slit for engaging and locking the free end of said strand of hair to maintain the same in wound formation on said mandrel during treatment.

11. A device in accordance with claim 2 wherein the mandrel has provided thereon locking means for maintaining the portion of the strand of hair wound thereon in tight coiled formation.

12. A device in accordance with claim 2, wherein the mandrel has provided thereon locking means for the wound portion of the strand comprising a fixed clip and a movable clip, the fixed clip serving to engage the strand of hair at a zone along the length of such strand contiguous to the wound portion thereof, and a movable clip serving to engage the free end of said wound strand, and upon rotation and movement towards the fixed clip to tighten the windings of said strand about the mandrel.

13. A device in accordance with claim 2 wherein the mandrel has provided thereon locking means for the wound portion of the strand comprising a fixed clip and a movable clip, the fixed clip serving to engage the strand of hair at a zone along the length of such strand contiguous to the wound portion thereof, and a movable clip serving to engage the free end of said wound strand, and upon rotation and movement towards the fixed clip to tighten the windings of said strand about the mandrel, and wherein means comprising a conduit in said mandrel and a valve element in said stopper normally closed and capable of being opened under pressure are provided for admitting said treatment fluid into the mandrel conduit and casing, and allowing escape of gases from the casing when the pressure within the device exceeds atmospheric pressure.

14. A device in accordance with claim 2, wherein the casing is formed of material capable of expansion, upon development within the casing during the treatment reaction of gas pressures in excess of atmospheric pressure.

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