United States Patent [19]

Heck

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[54] **METHOD AND APPARATUS FOR MAKING HAIRPIECES**

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[52] **U.S. Cl.** **132/5**
[51] **Int. Cl.** **A41g 3/00**
[58] **Field of Search** ..... 132/5, 9, 53, 54, 56; 223/66; 43/57.5 R; 28/74

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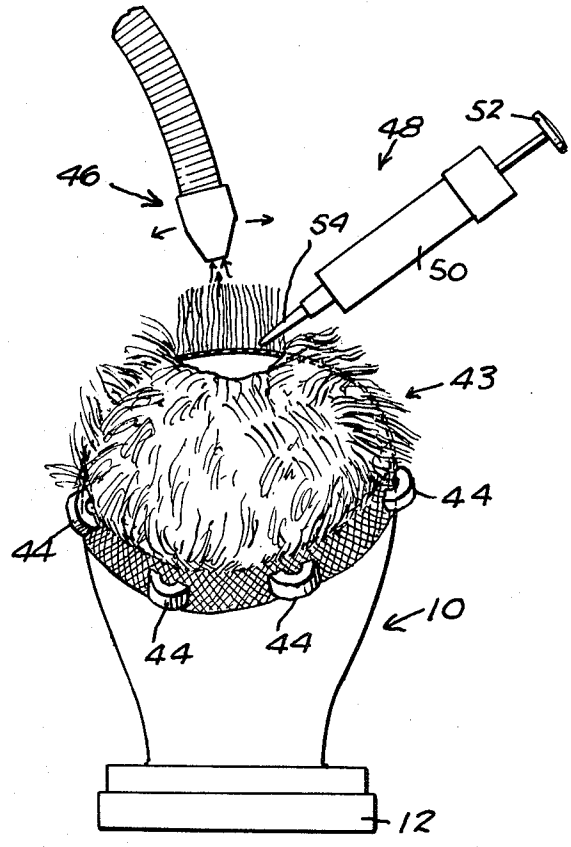
Primary Examiner—G. E. McNeill
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[57] **ABSTRACT**

Foundation fabric with attached hair strands is fitted over a heated human head shaped form. The strands are drawn by a vacuum to an erect position in which they extend away from the fabric at an abrupt angle. Liquid resin is applied to the bases of the erect strands by a syringe and is partially cured by the heat to tacky condition. The form is then heated to a higher temperature to completely cure the resin with the strands emerging therefrom at an abrupt angle.

The form is hollow and has internal electrical resistance heating elements. When the form is made of a ferromagnetic metal, magnets are provided for securing the fabric to the form while applying the liquid resin.

23 Claims, 10 Drawing Figures



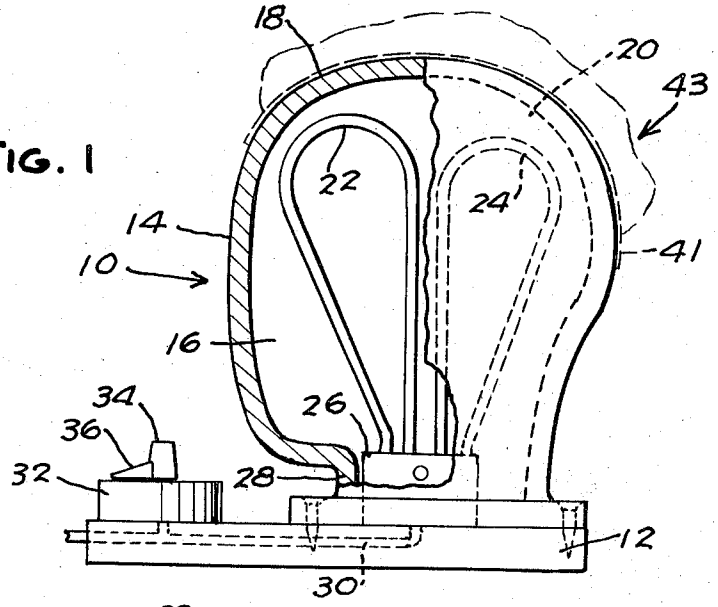


FIG. 1

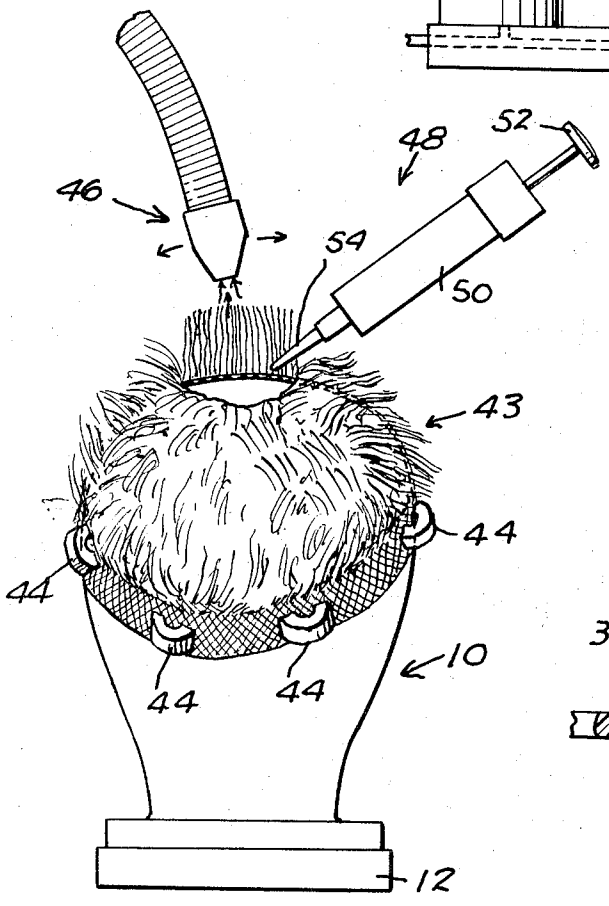


FIG. 2

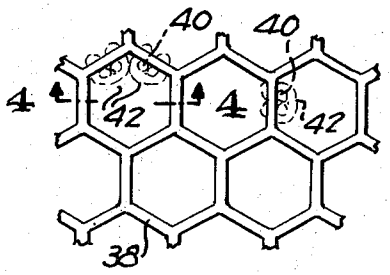


FIG. 3

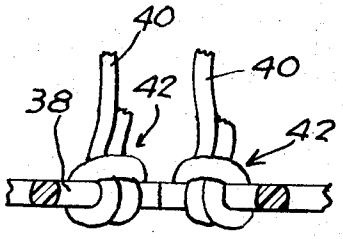


FIG. 4

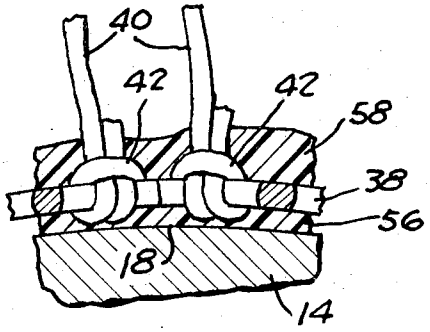


FIG. 5

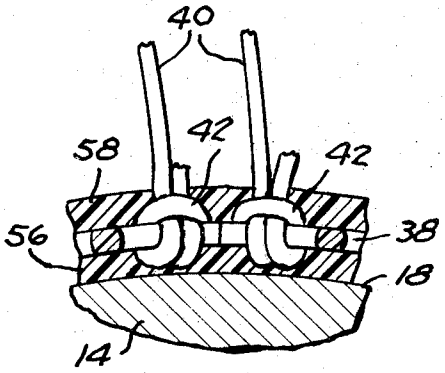


FIG. 6

FIG. 7



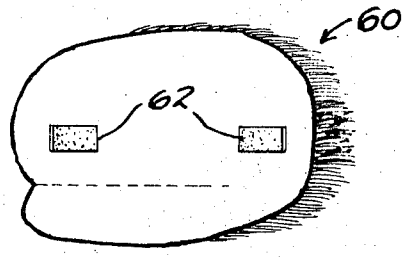


FIG. 8

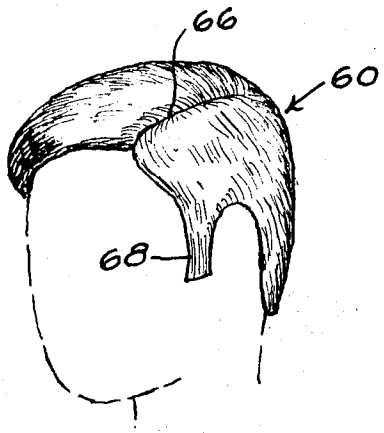


FIG. 10

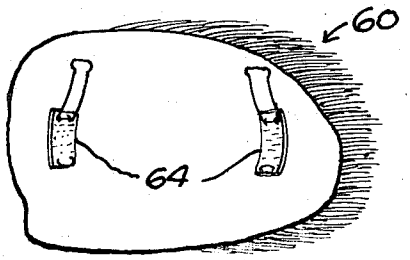


FIG. 9

METHOD AND APPARATUS FOR MAKING HAIRPIECES

This invention relates to the art of making hairpieces and comprises an improvement over the method disclosed in my U.S. Pat. No. 3,189,035.

As is brought out in that patent, a conventional way of making hairpieces is to thread strands of hair through a foundation fabric and to attach the strands to the fabric as by knotting. Thus applying the hair strands to the fabric is commonly referred to in the art as "ventilating". A form having the general shape of a human head is then coated with a liquid resin. The foundation fabric with the hair strands ventilated into it is then firmly fitted over the coated form so that the resin extrudes through the fabric. The knotting and contiguous fabric become embedded in the resin. The resin is then cured to complete the hairpiece.

The foregoing conventional procedure is objectionable in that the portions of the strands of hair adjacent their knots tend to lay flat or nearly so against the foundation fabric when the fabric is tightened against the form. The result in the finished product is that the base portions of the hair strands are matted against the artifical scalp formed by the cured resin and embedded foundation fabric. This presents an unnatural appearance.

The object of the present invention is to provide a relatively simple, inexpensive method and related apparatus for making hairpieces improved so that each individual hair strand emerges from the artificial scalp at an abrupt angle thereby simulating the appearance of hair growing at an abrupt angle out of a natural scalp.

In the drawings:

FIG. **1** is a side view partly in elevation and partly in section illustrating a simulated human head form with a foundation fabric and ventilated hair strands applied thereto.

FIG. **2** is an end elevational view of the form and related equipment and illustrating a step in making a hairpiece.

FIG. **3** is a greatly enlarged fragmentary partly diagrammatic plan view of a foundation fabric with hair strands ventilated therethrough.

FIG. **4** is a further enlarged sectional view on line 4—4 of FIG. **3.**

FIG. **5** is a view similar to FIG. **4** but illustrating a subsequent step in the method.

FIG. **6** is a view similar to FIG. **5** but illustrating a subsequent step in the method.

FIG. **7** is a fragmentary perspective view of a hairpiece made according to the present invention.

FIG. **8** is a plan view of the interior of a hairpiece.

FIG. **9** is a view similar to FIG. **8** but illustrating a different form of head attachment.

FIG. **10** is a perspective view of a hairpiece having sideburns.

Shown in FIGS. **1** and **2** is a form **10** having the general shape of a human head and being mounted on a base **12.** Form **10** comprises a shell or wall **14** which defines a hollow interior **16.** Wall **14** is made of a heat conductive material such as aluminum or a ferromagnetic metal, e.g. iron or steel. Wall **14** has an exterior surface portion **18** which encompasses the area which is utilized in shaping and curing a hairpiece. Surface **18** is relatively smooth to avoid forming a mechanical bond with the resin material contacting it in liquid form and thereafter cured to form-retaining condition. Wall **14** has an interior surface portion **20,** the area of which generally underlies that of exterior wall portion **18.**

Means are provided for heating interior surface **20** and in the illustrated form of the invention this means comprises a plurality of loop-type electrical resistance heating elements **22** and **24.** These elements are mounted on a support **26** within a bottom portion **28** of wall **14,** the support being mounted on base **12.** Electric current is furnished to the heating elements by circuitry represented at **30** which includes a rheostat or equivalent control **32** adjustable by a handknob **34.** Knob **34** has a finger **36** which points to temperature calibrations on a conventional dial (not shown) in different rotative positions of the knob.

As is conventional, a foundation fabric **38** is provided which preferably has an area somewhat greater than the area of the ultimate hairpiece. The fabric may be made of any one of a number of materials such as nylon, cotton, or silk. Strands of hair **40** are attached to the foundation fabric over the entire area of the ultimate hairpiece, leaving a peripheral band **41** of the foundation fabric to which hair strands are not attached.

As is common in the art, the hair may be attached to or ventilated into the foundation fabric by looping an end of each strand upon itself, inserting the looped end through the fabric, around the fibers of the fabric and back through the fabric, and then drawing the loose ends of the strand through the loop to provide the knot attachment illustrated at **42.** When hair strands have been ventilated into the foundation fabric throughout the area of the intended hairpiece, the resulting assembly **43** is ready to be applied to head form **10.**

In the completed hairpiece the simulated scalp is comprised of foundation fabric **38** coated on both sides with a resin which in cured condition is flexible and has the hue of a natural scalp. In the form of the invention illustrated, the resin is of the type which is cured from liquid condition to form retaining condition by heat. A suitable resin material is a polyvinyl chloride compound of the type used to make various flesh-resembling prostheses. Such materials are well known in the art and are commercially available. Satisfactory results have been obtained in practice of this invention by employing a polyvinyl chloride compound which cures partially to tacky condition at a temperature range of about 140° to about 150° and cures completely at a temperature range of about 350° to about 375°.

The foundation fabric is fitted firmly over head form **10** with the hair strands disposed outwardly. When the head form is made of a magnetically attractive material, the foundation fabric is secured in place by applying a number of magnets **44** to selected portions of the outward side of the foundation fabric such as peripheral band **41.**

Before or after the fabric is fitted to the head form the head form is heated to a temperature in the range of about 140° to about 150°. In the illustrated structure this is done by turning control knob **34** so that its pointer **36** points to the appropriate temperature in said range indicated on the dial referred to above. Electrical current is furnished to heating elements **22,24** and heat radiated therefrom heats inner surface **20** of wall **14.** The conductive material of the wall transmits this heat to outer surface **18.**

Some or all of the hair strands are now elevated away from the foundation fabric so that the portions of the strands adjacent the fabric extend away from the fabric at an abrupt angle, this angle being illustrated in FIGS. 2 and 4–6 as about 90°. A preferred method of elevating the hair strands is to subject them to a stream of air flowing away from the head form and a preferred method of providing the air stream is by positioning a vacuum head near the head form as represented at **46** in FIG. **2.**

Liquid resin is now applied to that area of foundation fabric **38** whose hair strands have been drawn upwardly by the air stream. The resin is preferably applied by means of syringe **48** having a body **50** which contains a quantity of the resin, a plunger **52,** and a hollow needle **54** through the orifice of which (not shown) the resin is ejected when plunger **52** is depressed.

The resin is applied beneath fabric **38** as at **56** by inserting the orificed end of needle **54** between the fabric and surface **18** and depressing plunger **52.** The resin is also applied through the needle to the outer side of the fabric, that is the side of the fabric opposite to that which is engaged against surface **18** as at **58.** By this procedure both the inner and outer sides of the fabric, the inner and outer sides of knots **42,** and portions of the hair strands **40** adjacent to the knots are coated with resin.

The resin very quickly becomes heated by surface **18** to a temperature in the range of about 140° to about 150° and becomes tacky as represented in light hatching in FIG. **5.** The resin in tacky condition has sufficient body to retain the portions of hair **40** adjacent knots **42** in their abrupt-angled position relative to fabric **38.**

When an area of the foundation fabric has been thus coated, vacuum head **46** is moved to draw up the hair strands from another area of the foundation fabric and resin is applied to this area in the manner described above. The procedure is repeated until the entire area within peripheral band **41** has been coated.

Since the resin in tacky condition will yield to manipulation the hair may be parted or otherwise styled after the resin has been applied.

The temperature of head form **10** is now increased to a temperature in the range of about 350° to about 375°, and this is done by turning knob **34** to position its pointer **36** at the appropriate temperature reading on the dial referred to above. The increased current in heating elements **22,24** elevates their temperature and this temperature elevation is transmitted to surface **20,** through wall **14,** to surface **18** and then to the resin. The resin cures completely in about 12 to 15 minutes time. Thereafter the resulting assembly is removed from the head form and the peripheral band **41** of uncoated foundation fabric is trimmed away.

Removal of the assembly is accomplished merely by lifting it off of form **10** since the resin forms neither a chemical nor a mechanical bond with surface **18.** Hairpiece **60** is now essentially complete except for the addition of such details as tapes **62** (FIG. **8**) or clips **64** (FIG. **9**) for attachment to a scalp or existing hair. While only two tapes **62** and clips **64** are illustrated, it will be understood that as many tapes or clips can be utilized at whatever locations are desired or necessary.

In the complete hairpiece each individual strand **40** of hair is maintained by the cured resin in such a position that it extends out from the resin at an abrupt angle and therefore simulates the appearance of natural hair growing out of a scalp at an abrupt angle. This characteristic is illustrated in FIG. **7.** It will be noted that the hair strands need not extend away from the simulated scalp at a 90° angle and in fact, at some locations such as adjacent a part **66** it is preferable that in the completed hairpiece the angle be somewhat less than 90°.

By means of this invention hairpieces of many different types and configurations can be made both for women and men and with and without such features as parts **66** and sideburns **68** (FIG. **10**).

When magnets **44** are employed, they may be engaged against any convenient portion of the foundation fabric whether or not hair strands **40** have been ventilated therethrough. However, once a portion of the fabric has been coated with the resin, a magnet should not be applied thereto since it will flatten the hair strands under it against the fabric and cause the matting which the present invention is intended to avoid.

As a procedure alternative to that described above, head form **10** is first heated to a temperature in the range of about 140° to about 150° and then a coating of the resin material is applied, by painting, spraying, or the equivalent, to the area of surface **18** which will define the extent of the ultimate hairpiece. The resin is immediately heated and becomes tacky so that it does not flow away from its intended area. Foundation fabric **38** with hair strands **40** ventilated into it is fitted against the coated surface with peripheral band **41** of the fabric overlying uncoated surface portions of the head form. Hair is drawn upwardly and additional resin is applied to the outer surface of the fabric and to knots **42** by use of syringe **48** as described above.

If upon inspection, it appears that insufficient resin has been provided between fabric **38** and surface **18** by the coating step, additional resin can be injected therebetween by use of the syringe. After the requisite resin has been added with the syringe the temperature of the head form is increased to a range of about 350° to about 375° in the manner described above to completely cure the resin.

The alternative procedure just described has the advantage of being quicker than the first described procedure since much of the resin material can be layed down simply by painting, spraying, or the equivalent. Also the alternative procedure is advantageous where a nonmagnetic head form is used since the tacky resin assists in holding fabric **38** in place during the step of syringe application of resin.

The two stage curing of the resin is advantageous in that it allows the operator to work close to head form **10** during syringe application of the resin while the head form is in relatively cool condition. Nevertheless, the resin anchors the hair strands in their erect position during this step. The head form is only heated to temperatures which would be unduly uncomfortable for the operator after all of the close work around the head form has been accomplished.

It is within the invention to use a resin such as polyester and polyurethane resins which air cure at room temperature. Such resins cure partially to tacky condition in about four minutes and cure completely in about seventeen minutes. Either the procedure first described above or the alternative procedure can be employed utilizing the air-curing resin. In either procedure, however, the step of heating the head form is omitted.

I claim:

1. The method of making a hairpiece which comprises,
attaching strands of hair to a foundation fabric by threading the strands therethrough,
fitting said fabric with said strands attached thereto against a form,
while maintaining said fabric against said form, positioning at least certain of said strands so that at least the portions thereof adjacent their attachments extend away from said fabric at an abrupt angle,
applying to the attachments of said strands so positioned and to the fabric contiguous thereto a liquid resin,
curing said resin and thereby securing said strand portions in said position relative to said fabric,
and removing said fabric, strands and cured resin from said form.

2. The method defined in claim 1 wherein said certain strands are so positioned by applying thereto a stream of air flowing away from said fabric.

3. The method defined in claim 2 wherein said stream of air is applied by positioning a vacuum head near to said fabric.

4. The method defined in claim 3 wherein said vacuum head is positioned near the side of said fabric opposite the side which is fitted to said form.

5. The method defined in claim 1 wherein said resin is so applied by ejecting it from the orifice of a hollow needle positioned closely adjacent said fabric.

6. The method defined in claim 5 wherein said resin is so applied both between said fabric and form and to the side of said fabric opposite to the side which is fitted against said form.

7. The method defined in claim 1 and including in addition the step of coating said form with liquid resin prior to fitting said fabric against said form.

8. The method defined in claim 7 wherein in said applying step additional liquid resin is applied both between said fabric and form and to the side of said fabric opposite to the side which is fitted against said form.

9. The method defined in claim 5 wherein said liquid resin is so ejected by a syringe of which said needle is a part.

10. The method defined in claim 1 wherein said resin is partially cured to tacky condition during said applying step by heating said resin to a relatively low temperature, and thereafter said resin is completely cured by heating the same to a higher temperature.

11. The method defined in claim 10 wherein said resin comprises a polyvinyl chloride material, said relatively low temperature being in the range of about 140° to about 150°, said higher temperature being in the range of about 350° to about 375°.

12. The method defined in claim 1 and including in addition the step of heating said form and utilizing the heat from said form to cure said resin.

13. The method defined in claim 12 wherein said form is heated by utilizing electrical resistance.

14. The method defined in claim 13 wherein said form has the general shape of a human head and has a hollow interior, said electrical resistance being utilized by providing electrical resistance heating means within said interior.

15. The method defined in claim 1 wherein said form is magnetically attractive, said fabric being so maintained against said form by utilizing the magnetic attraction of said form.

16. The method defined in claim 15 wherein a plurality of elements are provided which are mutually magnetically attractive with said form, said maintaining step being accomplished by applying said elements to portions of that side of the fabric opposite to the side which is fitted against said form.

17. The method defined in claim 16 wherein said form is made of a ferromagnetic material and said elements comprise magnets.

18. The method of making a hairpiece which comprises providing a form contoured to simulate the shape of a human head,
providing a quantity of liquid resin partially curable to tacky condition at a relatively low temperature and completely curable at a higher temperature,
providing a foundation fabric with strands of hair attached thereto,
heating said form to said lower temperature,
fitting said fabric against said form,
applying to at least certain of said strands a stream of air flowing away from said fabric and thereby positioning said certain strands so that they extend away from said fabric at an abrupt angle,
while maintaining said form at said lower temperature and maintaining said certain strands so positioned, applying to the attachments of said strands to said fabric and to the fabric contiguous thereto said liquid resin,
utilizing the heat from said form to partially cure said additional resin,
thereafter heating said form to said higher temperature and utilizing the higher heat to completely cure all of said applied resin,
and then removing the resulting assembly from said form.

19. Apparatus for use in making hairpieces which comprises,
a form made of a heat conducting metal and having generally the shape of a human head,
said form having outer surface portions adapted to be coated in nonbonding relation with a heat curable liquid resin,
said form having a hollow interior, electrical resistance heating means within said interior operable to heat interior surface portions of said form,
said interior and exterior surface portions being so relatively disposed that when said interior surface portions are heated said exterior portions are heated by conduction for curing a resin contiguous thereto,
and electrical control means co-operable with said heating means and heat conductive metal to heat said outer surface portions to selected temperatures at least up to the complete curing temperature of a resin contiguous thereto.

20. The apparatus defined in claim 19 wherein said heating means comprises at least one looped heating element having portions disposed in heat transmitting relation to said interior surface portions of said form.

21. The apparatus defined in claim 19 wherein said metal comprises aluminum.

22. The apparatus defined in claim 19 wherein said metal comprises a ferromagnetic metal.

23. The apparatus defined in claim 22 and including in addition a plurality of magnets adapted to be engaged against a hair-strand-bearing fabric fitted to the exterior of said form for retaining said fabric in place thereon.

* * * * *