

[54] **HAIR PIECE AND METHOD AND APPARATUS FOR MAKING SAME**

[76] Inventor: **Peter Anthony Incando**, 8907 E. Valley Blvd., Rosemead, Calif. 91770

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[52] **U.S. Cl.** ..... **132/53**

[51] **Int. Cl.** ..... **A41g 3/00**

[58] **Field of Search** ..... 132/53, 54, 5, 9, 7

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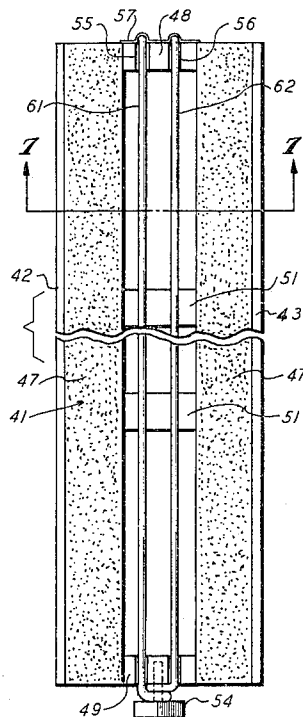
*Primary Examiner*—G.E. McNeill

*Attorney, Agent, or Firm*—Wm. Jacquet Gribble

[57] **ABSTRACT**

A hair piece is made of a base of alternating nylon and thin transparent or translucent plastic layers underlying an anchor net with hair strands fixed to the net. Hair wefts are made upon a bifurcated frame divided centrally by string hair retainers which also act to contain a plastic anchor strip applied as a liquid. The bottom of the base is contoured and bias-edged to have a slightly greater curvature than the scalp for which it is designed in order to provide scalp ventilation. The method of fabrication includes steps of making a head contour mold from which plaster casts are made as mandrels for the anchor net and for the base, weaving hair strands into the anchor net in one portion that are adhered to the nylon and plastic base in a final coating of the plastic. Remaining portions of the anchor net are covered by rows of long continuous weft strips made upon the frame, which has two beveled rails spaced apart about a central double string retainer.

**2 Claims, 10 Drawing Figures**



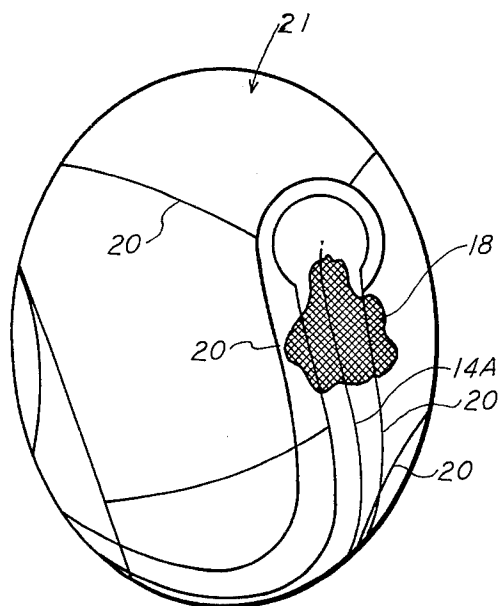


FIG. 2

FIG. 3

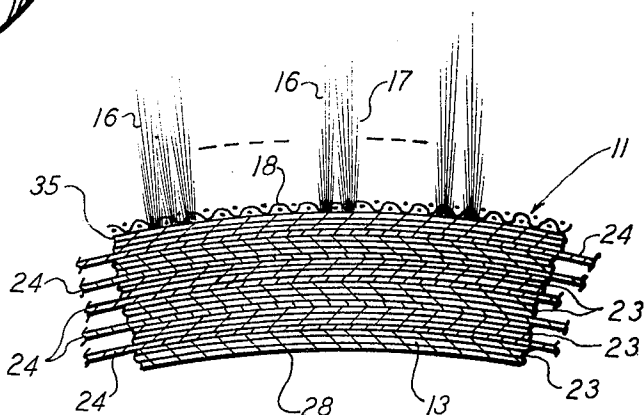


FIG. 5

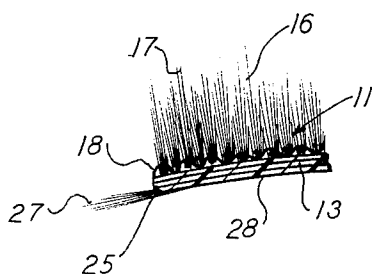


FIG. 1

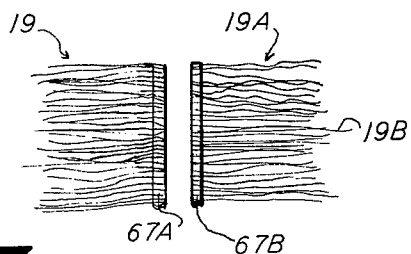
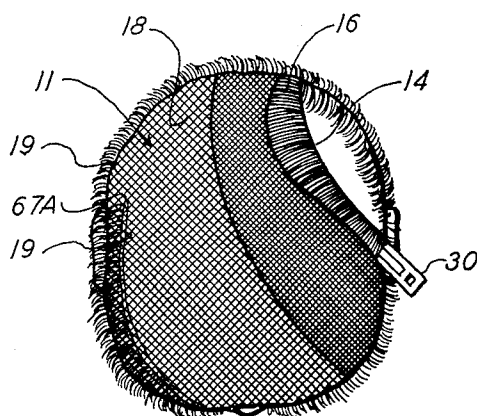


FIG. 4

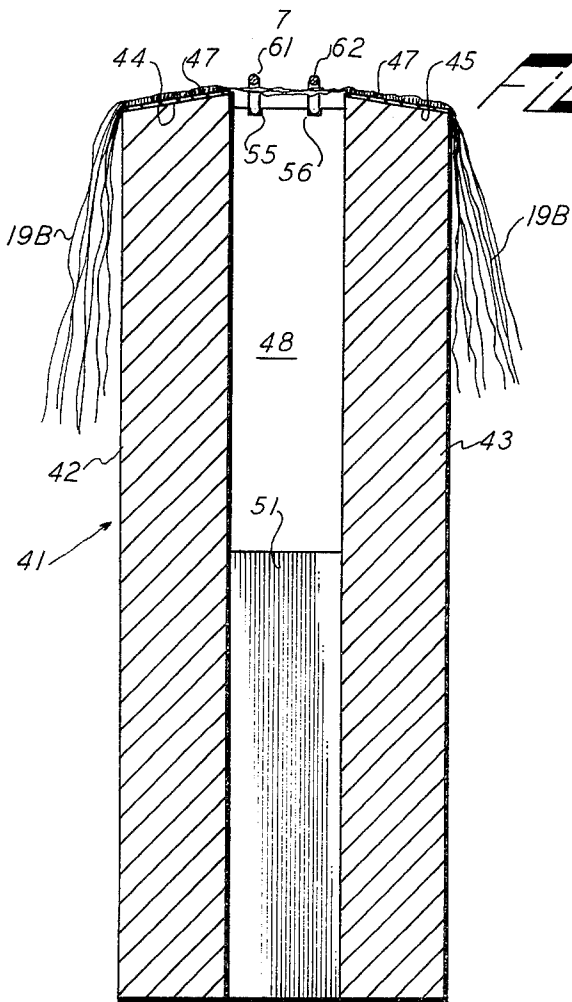


FIG. 1

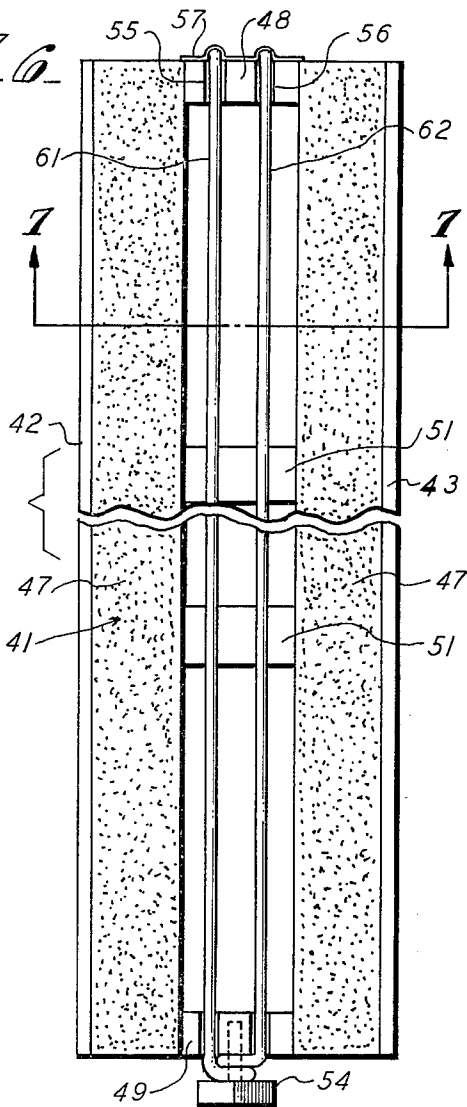


FIG. 2

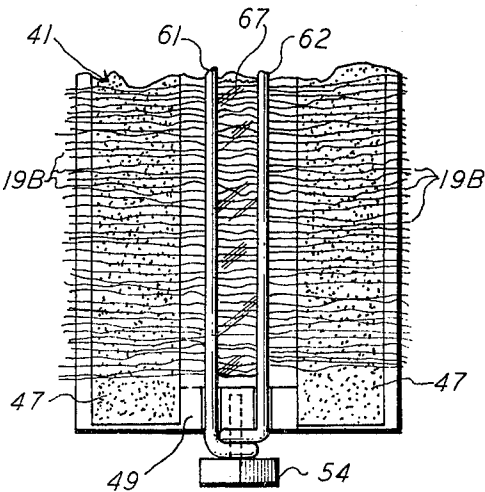
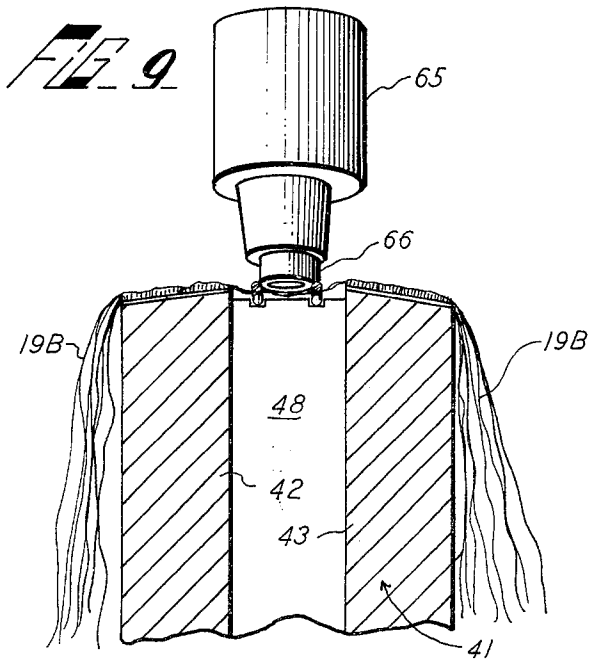
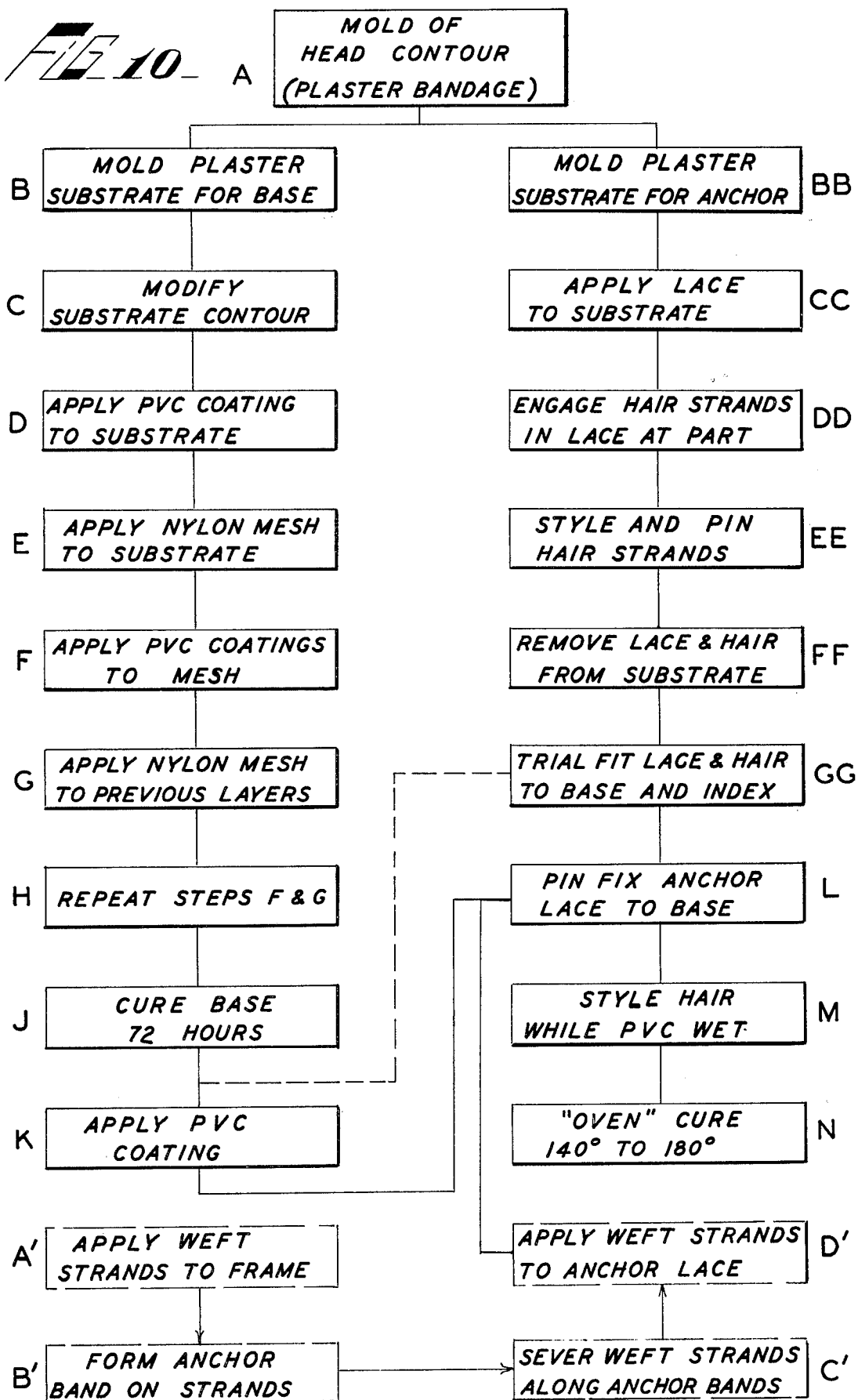


FIG. 8

**FIG 10**

## HAIR PIECE AND METHOD AND APPARATUS FOR MAKING SAME

### BACKGROUND OF THE INVENTION

The invention relates to hair pieces and the method of fabricating hair pieces, and more particularly to hair pieces which may be securely fixed to the scalp of a wearer and which comprise hair strands fixed to the hair piece base by two or more different methods.

Great progress has been made in the field of hair pieces which blend naturally with remaining hair and which stay in place under normal activities. However, accidental loss of such hair pieces is common and the contour dictated by the means of affixing the hair piece and the materials used in the hair pieces have made them obvious on a wearer.

I have invented a hair piece and a method and apparatus for fabricating the same which results in a hair piece which cannot be distinguished from the natural hair of the wearer and which remains fixed in place despite strenuous activity on the part of the wearer, and which is comfortably cool to wear because a major portion of the hair base is slightly separated from the scalp of the wearer during use.

### SUMMARY OF THE INVENTION

The invention contemplates a hair piece comprising a hair base having a downward concavity of slightly greater curvature than the scalp of the wearer. The base has a multiplicity of nylon and plastic layers in which the plastic layers are transparent or translucent and the nylon layers are flesh-colored. Hair anchor lace of a material chemically compatible with the plastic layers of the base has hair strands anchored to it. Preferably the hair strands are individual strands blended together of human hair and synthetic fibers, in the ratio of 20 percent human hair and 80 percent synthetic fibers, approximately. Some hair strands are stitched to the anchor net, particularly along the part line of the hair piece, while others are applied to the anchor net as continuous weft strips spiralling from the lower edge of the hair piece around and upward to the part line.

The process of the invention contemplates the steps of forming a casting from the head of the hair piece user, molding a hair anchor form and a base form from the head casting and fixing a hair anchor lace to the anchor form. Hair and synthetic fiber strands are then secured to the anchor lace while alternating layers of nylon and plastic are applied over the base form. The base is cured during application of the successive layers. Preferably a final coat of plastic is applied to the upper layer of the base form and the base form is placed upon a head form after placing a layer of absorbent material between the head form and the base form, followed by the steps of applying the anchor lace with some hair strands to the base such that the anchor lace is gripped by the liquid layer of plastic on the top of the base form, and securing the anchor lace in place on the base form with pins extending into the absorbent layer beneath the base form. Hair wefts in strips are made upon a frame, each weft comprising hair strands and a plastic film anchor band. The plastic film anchor band is central of the length of the weft strands and after the plastic film dries the anchor band and the strands associated therewith are parted longitudinally of the band to make two symmetrical wefts, which are

divided and adhered at the anchor band to the anchor lace.

The frame of the invention for making the unique hair wefts comprises parallel spaced rails having upwardly beveled surfaces with adhesive on the surfaces and spaced retainer strings removably extending between the rails to form a film trough with applied hair strands as the trough base.

The resultant hair piece is one which can be made from presently obtainable materials and which can be processed with conventional molding techniques and equipment. While skill is required to implement the process, the steps thereof are comprehended simply and technicians may be easily trained in the process. Several hair pieces can be in process at the same time within a limited space with the intervals between the steps providing time for the technicians to move from hair piece to hair piece during fabrication. These and other advantages of the invention are apparent from the following detailed description and drawing.

### BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a schematic plan view of an in-process hair piece with the plastic and nylon base trimmed with edge hair strands;

FIG. 2 is a plan view of a hair piece base with the hair pattern areas indicated;

FIG. 3 is a fragmentary sectional elevation taken through the hair piece in which layer thicknesses are exaggerated;

FIG. 4 is a schematic view of exemplary hair piece wefts;

FIG. 5 is a fragmentary section of an edge of the base;

FIG. 6 is a fragmentary plan view of the weft-making apparatus;

FIG. 7 is a sectional elevation taken along line 7—7 of FIG. 6;

FIG. 8 is a fragmentary plan view of the apparatus of FIG. 6 with hair strands in place;

FIG. 9 is a fragmentary sectional elevation taken along a line similar to line 7—7 of FIG. 6; and

FIG. 10 is a block diagram of the steps of the inventive process.

### DESCRIPTION OF THE PREFERRED EMBODIMENTS

The hair piece of the invention covers the head area where hair is thin or gone, blending with remaining strands so as to be undetectable. Such concealment is possible because of the unique invention and process and apparatus disclosed herein.

As can be seen from FIGS. 1 and 2, a hair piece 11 having a base 13 in accordance with the invention is generally oblong, with the front to back dimension being longer. However, the hair piece may be applied to thin or bald areas of other configuration, so that the invention has application to hair pieces of any configuration. The long dimension in most instances, however, varies between 5 to 8 inches and the short dimension from 3 to 6 inches.

Many hair pieces are secured to the head to cover baldness along a part line, such as the lines 14, 14A of FIGS. 1 and 2, respectively. The hair strands 16 and 17, which are fixed in an anchor net or lace 18, are therefore secured to the anchor net or lace so as to fall in a particular direction with respect to the part line 14. Each strand 16, 17 is individually secured within the

hair anchor net, is conventional fashion, at the intersection of two crossing net strands. The attitude of the warp and woof of the net with respect to the part line has been discovered to affect the disposition of the hair strands. The invention, therefore, includes an anchor net 18 placed with respect to the front to rear axis of the head or the part line such that the warp and woof strands of the net cross the axis at an angle. The angle varies with the desired fall of the hair strands. The hair wefts 19, 19A of FIG. 4 are applied to the net in an edge-to-center spiral as indicated in FIG. 1.

In FIG. 2 the anchor net 18 is shown only fragmentarily so that the desired hair strand pattern of lines 20 laid out on the hair anchor net form or mandrel 21 can be seen. The pattern areas are determined in accordance with best wigmakers practice, the pattern varying with the hair style and strand pattern of the wearer such that the illustrated mandrel marking is no more than exemplary.

The hair piece 11 of the invention has four basic components: the base 13 which is made up of a multiplicity of plastic layers 23 and a multiplicity of nylon layers 24. Preferably the nylon is in the form of a mesh cloth similar to the weave of nylon stockings and each plastic layer is of a substance like poly vinyl chloride or PVC. The second component is the anchor net 18 to which the third component, the hair strands 16 and 17, are attached. The fourth component is the hair wefts 19, 19A.

A secondary element of the hair piece is shown in FIG. 5 and comprises a beveled edge 25 adjacent which short strands 27 are attached. Both the bevel and the short strands extend around the periphery of the hair base and enhance the blending of the hair piece with the natural strands of the user.

A smooth underside 28 of the base has a contour determined from the head contour of the user. Each of the mandrels, respectively, is formed from a cloth and plaster cast (not shown) made of the user's scalp area. Each of the mandrels is then modified as to its contour such that the resulting hair piece base has a contour of greater curvature than the user's head so that the hair piece in place is spaced slightly from the scalp in its central area. The base may be secured to the head of the wearer by double-faced surgical tape, not shown, such as is in conventional usage in medical and cosmetic circles.

It has been discovered that a blend of human hair strands and synthetic strands in a certain proportion affords a hair piece of extremely natural appearance and which can be permanently set in a particular hair style. One plastic strand which lends itself to such blending is a vinyon stereoregular or "vinylic hair" of a type which is sold under the trademark "Venicel" by the firm Chatillon of Milan, Italy. In order to achieve permanent setting of the strands, it is important that a majority of the strands of the hair piece be of the synthetic material. In a preferred embodiment of the invention the strand blend is 80 percent synthetic strands and 20 percent human hair strands.

The area density of the strands may vary with respect to the location to the part. In the part area the strands are as dense as 300 per square inch, while in the area more remote from the part, the density may be 175 strands per square inch. These figures are average figures and vary somewhat with the diameter of the strands used to match the natural hair of the user.

Turning now to FIG. 3, the various plastic layers 23 and nylon mesh layers 24 have been exaggerated in thickness. The undersurface 28 is first laid upon a thin polyurethane separation layer which rests upon the mandrel 21 to prevent bonding to the mandrel. Each of the layers 23 comprises a dried poly vinyl chloride coating, each of which is applied one by one after the previous coating is dried. After three to five such PVC layers a nylon mesh layer 24 is applied to the last of the PVC coatings while the coating is still undried. The PVC may be transparent and therefore the nylon mesh 24 can be chosen for color to impart a color density to the hair piece closely matching the scalp coloration of the eventual user. In a preferred hair piece of the invention, the hair base has 30 to 40 poly vinyl chloride layers and five layers of nylon mesh and the anchor net of nylon lace is applied atop these.

In order to heighten the deceptive qualities of the hair piece, a powdered coloring agent is applied to the part line after the anchor net with its hair strands is applied to the base piece 13. The coloring powder may be a finely ground fiberglass of the proper color density.

The hair piece of the invention may be applied to the head of the user in the proper orientation and secured thereto by the double-faced tape with the tabs of tape on the under surface of the hair piece at front and rear. Because of the air space between the scalp and the undersurface 28 of the hair piece, the inventive hair piece is comfortable to wear and because of the affinity between the double-faced tape and the material of the hair piece base, the hair piece stays securely in place.

#### The Process

As can be seen from FIG. 10, the method of the invention involves three parallel lines of action which are united toward the end of the process. The steps marked "B, C, D," etc. refer to the steps of the process for the fabrication of the hair piece base 13. The steps of the process marked "BB, CC, DD" etc. delineate the process steps for forming the anchor net with its hair strands prior to union with the base 13. The steps A', B', C' and D' refer to process for making hair wefts. All of the steps of the process are simple in concept but do require manual dexterity and care for proper execution. However, none of the steps requires techniques beyond the capability of present technology.

As can be seen from FIG. 10, a mold of the head contour is first made with a plaster bandage technique. Two molds 21 are then made (B, BB) from the mold of the head contour. These molds of plaster become the substrate for the base and for the anchor net and are shown in FIG. 2 at 21.

The mold 21 is then modified (C) to agree in contour with the desired undersurface 28 of the eventual hair piece base. After this contour is achieved a PVC coating is applied to the substrate which is preferably covered at this time by a polyurethane membrane to which the PVC coating does not adhere. Several PVC coatings are applied at time intervals determined by the drying time of the substrate-supported first coatings. A nylon mesh layer is then applied while the last of the previous PVC coatings is still wet. Subsequently additional PVC coatings are applied to the mesh. This process is repeated with requisite drying intervals until the desired base thickness and color density is achieved. The base is then cured for seventy-two hours, more or less, depending upon the curing temperature selected.

Normally, an ambient temperature of about 70° F is satisfactory.

While the fabrication of the base 13 is progressing, the same operator or a second operator may be processing the anchor lace with its hair strands. The plaster substrate is marked in accordance with the hair pattern desired in the hair piece and the anchor net 18 is pinned in place about it with the orientation of the net warp and woof with respect to the front to rear line, as previously stated. This angle may be on the order of 30°. The anchor net is pinned in place upon the substrate or mandrel usually by inserting pins into a cloth head (not shown) upon which the substrate is supported. As a practical matter, the substrate is usually anchored to a paper head form (not shown) with pins to form a stand upon which work is performed. Hair strands are then engaged in the lace of the anchor net around the part line in accordance with the desired density per square inch and pattern as dictated by the lay-out on the substrate. The hair is then styled and pinned in place with conventional hair styling equipment, such as the "Klippee" 30. The lace and hair are then removed from the substrate and trial fitted to the base 13 upon its substrate 21 with index marks being made upon the base substrate and the paper head (not shown) upon which the base substrate is pinned. As indicated by the dotted line of the diagram, the lace and hair are not fixed to the base at this point but are removed therefrom and the base receives a final PVC coating 35 (K). The lace and hair are then quickly transferred to the base with its wet final coating. The coating normally dries in about 80 seconds and considerable skill is required to transfer quickly the anchor net and hair in accordance with the index markings previously fixed to the base substrate and mounting head. The base and the anchor net and strands are then cured (N) at a temperature of between 140° and 180° for a period of 24 hours.

After this curing it may be desirable to reheat the hair piece to soften the base 13 so that the edge of the base may be contoured or beveled, as shown in FIG. 5, in order to perfect the fit between the scalp and the edge of the base piece and insure the arched relationship between head and base. The short strands 27 may be applied around the periphery of the base at this point, since the softening of the PVC base is sufficient to adhere the strands to the periphery.

#### Hair Weft Process

The weft process of fabrication shown as part of FIG. 10 is best implemented through the apparatus shown in FIGS. 6-9. In FIG. 6 a frame indicated generally at 41 has spaced parallel side members each having inwardly and upwardly slanting top surfaces 44, 45, respectively defining beveled rails 42, 43. On each of these surfaces is a low adhesion gripping strip 47. The space between the side members is maintained by relatively high spacer blocks 48, 49 and a plurality of relatively low spacer blocks 51, the number of which depends upon the length of the frame 41. It has been found that a 48 inch long frame using four spacer blocks is well suited to the fabrication of hair wefts.

A retaining pin 54 is located in one of the end spacer blocks 49 at a point below the bottoms of spaced thread notches 55, 56 which are in each end spacer block. A small nylon thread is lodged first in a notch 55 and its first loose end held in place by a piece of adhesive

tape 57. The thread or strand is then extended between the side members through the opposite end piece notch 55, looped about the retaining pin 54 and then threaded through the notches 56 of the two opposite spacer blocks and the second loose end is secured with the remaining portion of the tape 57 such that the thread defines two taut courses 61, 62 parallel central of the side members of the frame.

As can be seen from FIGS. 7-9, the thread is applied after a multiplicity of strands 19, 19A have been placed transversely of the side members, held in place by the adhesive strips 47. The length of the strands depends upon the need in the particular hair piece and the make-up of the strands is preferably blended in the proportions previously described with the majority of the strands being synthetic. The strands 19, 19A are continuous when applied to the frame and are held in place on the frame not only by the adhesive qualities of the strips 47 but also by the downward pressure of the tensioned thread courses 61, 62. As can be seen in FIG. 8, the thread courses define a trough in which the threads are the sides and the hair strands are the bottom.

The process includes the steps of applying the strands to the frame, tensioning the thread courses along the frame and upon the hair strands and then applying an adhesive film to the strands between the thread courses. In FIG. 9 the application of the adhesive film is illustrated with a fragmentarily shown liquid adhesive container 65 having an exit spout 66 being traversed between the thread courses so as to deposit a film of adhesive which quickly dries and hardens to form a band 67 adhering to the hair strands. Once the adhesive film has sufficiently dried, the band and the strands adhering to it are severed centrally of the thread courses to form the two wefts 19, 19A of FIG. 4. The wefts are then in condition to be applied as illustrated in FIG. 1 to hair net 18. The bands 67A, 67B formed by severing are chemically compatible with the materials of the base and are adhered by solvent welding, preferably in a spiral pattern inwardly from the edge of the hair piece such that the wefts hold several layers of hair strands at any point on the hair piece. With such overlapping strands, the hair strands of the wefts may be combed and styled and blended with the hair strands 16 and 17 previously anchored in the net and styled to reveal the part line.

An alternative embodiment of the process includes the coloration of the part line with powdered coloring agent, which may be fiberglass granules. This step may be done while the hair is being styled after the anchor net and the base have been united and while the final coating 35 is still wet.

Several plastics bond well to the preferred nylon mesh of the laminated base. It has been found that poly vinyl chloride (PVC) is best suited to the fabrication of the base. Therefore, special blends of PVC with ketones and oxygenated solvents with the resins have been developed. In some instances a flattening agent has been added to reduce reflectivity of the laminar base.

A plasticizer is a desirable additive to the basis PVC formulation, giving more flexure characteristics to the laminar base. DiOxtyl Plasticizer (D.O.P.) is well suited to this purpose, with No. 700 being the least flexible grade used. In each formulation the resultant PVC adapts to common solvents so that the nylon netting is easily secured on the base and the hair weft anchor bands, of a similar material, may easily be adhered to

the net which is permeated by the plastic final layer of the base.

The hair piece of the invention is a unique piece representing considerable advance in the art and the process is adapted to a fabrication of hair pieces of many colors, styles and sizes. Many modifications in both the process and the hair piece of the invention within the scope of the invention may occur to those skilled in the art. It is therefore desired that the invention be measured by the appended claims rather than by the illustrative embodiments disclosed herein.

I claim:

1. A hair piece for attachment to the scalp of a user and comprising a base having a plurality of polyvinylchloride plastic layers, a concave undersurface on the base, and nylon mesh cloth layers; a nylon anchor net and a multiplicity of strands of hair fixed to the anchor net, said anchor net and base being joined by the final plastic layer of the base; some of said hair strands being looped through the anchor net; and some of said

strands of hair being hair wefts each comprising a plurality of hair strands, a plasticized anchor band chemically co-soluble with the plastic layers of the base and securing each hair strand of each weft in like orientation with respect to the extent of the anchor band, said hair wefts being solvently united with said plastic layers by reason of their compatible chemical solubility.

2. A process for fabricating hair wefts for application to hair pieces and comprising the steps of spacing two parallel slanting tops along a course, placing a plurality of hair strands across the tops so as to extend between the tops and outwardly beyond both rails; tensioning spaced, parallel threads across the strands between the tops so as to define a trough having strands for a bottom and threads for sides, pouring solvent plastic on the strands between the threads in the trough, to form an anchor band, hardening the solvent so as to bond to the strands, dividing the anchor band and the strands along the run of the anchor band.

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