April 28, 1953 M. SEIDERMAN 2,636,460

METHOD OF APPLICATION OF HAIR-SIMULATING FIBER

Filed Aug. 31, 1951

2 SHEETS--SHEET 1

Fig. 1

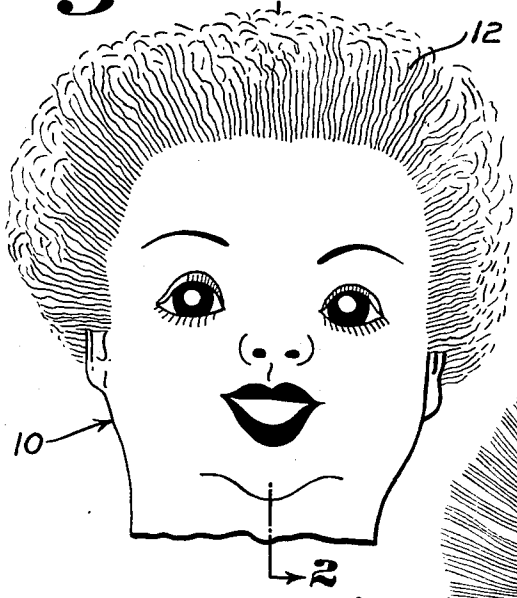


Fig. 2

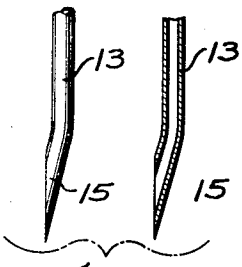


Fig. 3

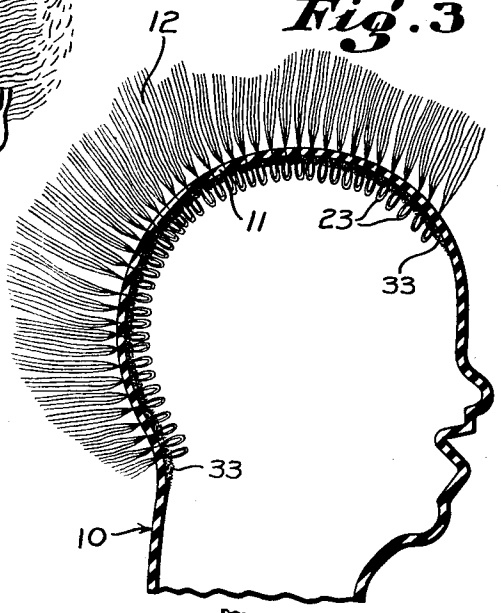


Fig. 4

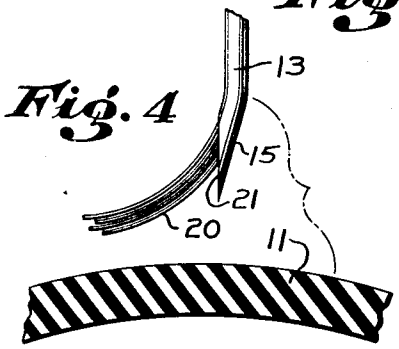
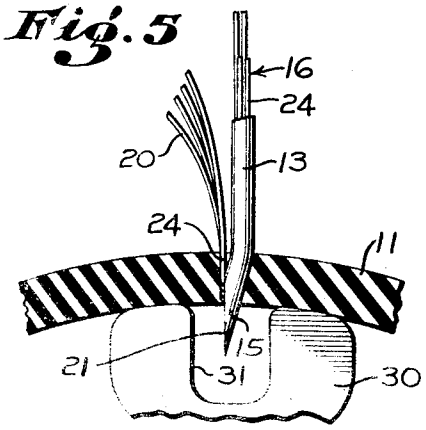


Fig. 5



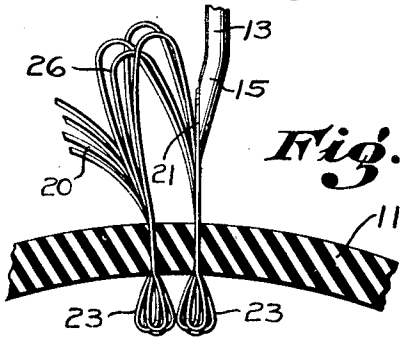


Fig. 6

INVENTOR.
Maurice Seiderman
BY Lyon & Lyon
ATTORNEYS

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METHOD OF APPLICATION OF HAIR-SIMULATING FIBER

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2 SHEETS—SHEET 2

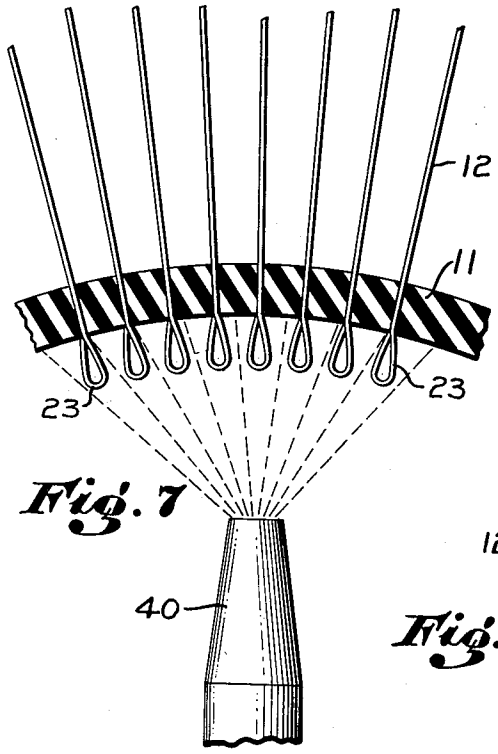

Fig. 7

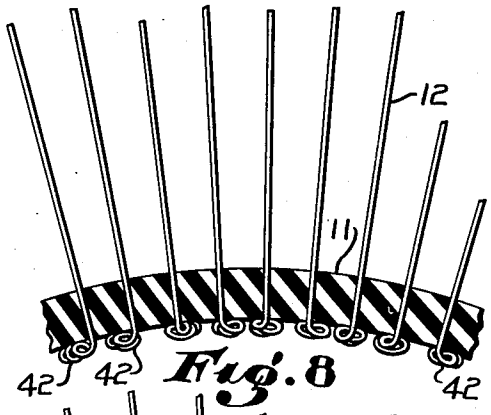

Fig. 8

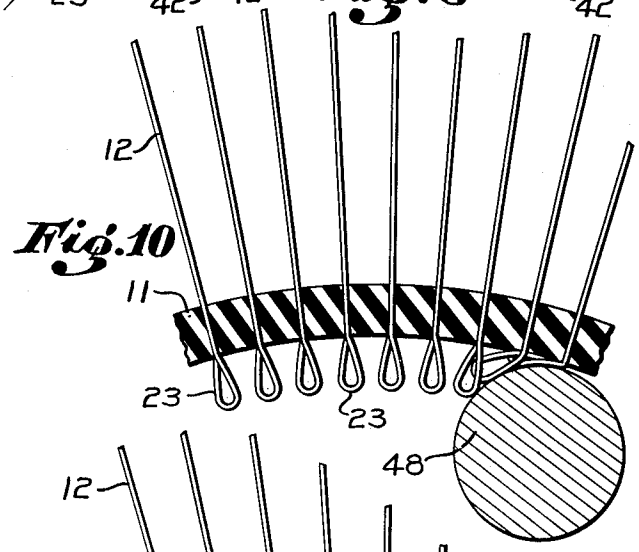

Fig. 10

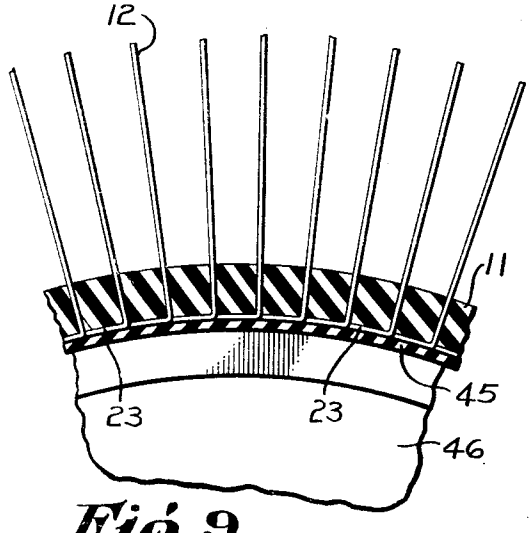

Fig. 9

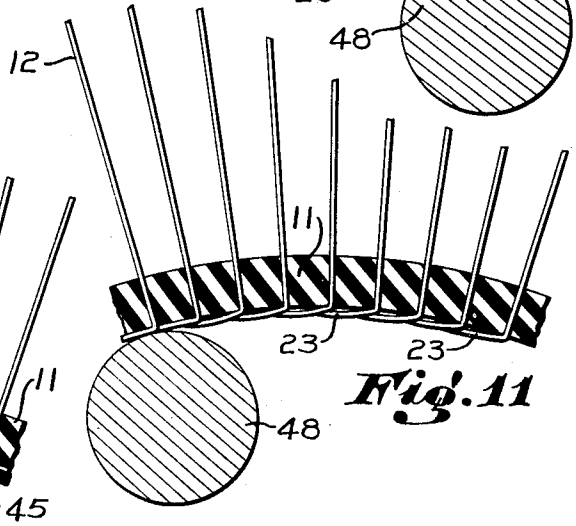

Fig. 11

INVENTOR.
Maurice Seiderman
BY
Lyon & Lyon
ATTORNEYS

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2,636,460

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METHOD OF APPLICATION OF HAIR-SIMULATING FIBER

Maurice Seiderman, Burbank, Calif.

Application August 31, 1951, Serial No. 244,647

11 Claims. (Cl. 112—1)

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This invention relates to hair coverings, and has particular reference to a process for making a product simulating human or animal hair.

The principal object of this invention is to provide a novel process for the manufacture of products simulating human or animal hair.

A further object of this invention is to provide a novel process for applying continuous lengths of hair-simulating fibre to a base.

Another object of this invention is to provide a process of the character described which is simple and adapted to be carried out by even unskilled persons.

More particularly, it is an object of this invention to provide a process for the application of continuous strands of fibrous material to a resilient or rubber-like base, which process includes the step of reciprocating a hollow needle into and out of said base, the needle having threaded therethrough the strands of fibrous materials whereby a plurality of loops of fibrous material are applied to the base, which loops may then be cut, and the resulting strands curled or waved to simulate natural hair.

Other objects and advantages of this invention it is believed may be readily apparent from the following detailed description of a preferred embodiment thereof, when read in connection with the drawings.

In the drawings:

Figure 1 is a front elevation of a doll's head having applied thereto hair-simulating material in accordance with a preferred embodiment of this invention.

Figure 2 is a sectional elevation taken substantially on the line 2—2 of Figure 1.

Figure 3 is a view illustrating, in side elevation and in vertical section, a preferred type of needle to be used in carrying out the process.

Figure 4 is a fragmentary side elevation, partly in section, illustrating the needle in position to penetrate through the rubber-like base.

Figure 5 is a view similar to Figure 4, but illustrating the position of the needle as it penetrates the base.

Figure 6 is a fragmentary side elevation, partly in section, illustrating the position of the continuous strands of fibre after they have been applied to the base, and before they have been cut to provide the finished product.

Figure 7 is a diagrammatic view illustrating a modified process embodying the invention.

Figure 8 is a fragmentary side elevation, partly in section, illustrating the fibrous strands anchored in place by means of the method shown in Figure 7.

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Figure 9 is a diagrammatic view illustrating another modification.

Figure 10 is a diagrammatic view illustrating yet another modification of the invention.

Figure 11 is a fragmentary side elevation, partly in section, illustrating the fibrous strands anchored in place by means of the method illustrated in Figure 10.

Referring now to the drawings, the preferred embodiment of this invention is illustrated in connection with the production of a doll's head generally indicated 10. The doll's head is preferably formed of a resilient, rubber-like material, and preferably is molded, in a manner familiar to those skilled in the art, of a plasticized resin composition. It is preferred to use a relatively soft, plasticized vinyl chloride polymer, although any material having resilient or rubber-like properties may be used.

Secured to the base or scalp portion 11 of the head 10 is a plurality of hair-simulating strands of fibres 12. These fibres are applied to the head in accordance with the process illustrated in Figures 4 through 6. In carrying out this process a hollow needle 13 is provided, and it has been found that needles such as hypodermic needles are excellently suited to be used in carrying out this process. It is preferred to use a hypodermic needle having a so-called Huber point, which as shown, comprises a hollow needle having a curved and sharpened end 15. It has been found that there is less tendency for a needle of this type to cut out portions of the base material, but other types of hypodermic needles have been successfully used and, in fact, any relatively narrow hollow needle having a sharp point and an opening adjacent the point may be used.

The needle 13 is threaded with a number of strands of continuous fibre 16. A preferred type of material is a 120 denier extruded fibre sold under the trade name "Saran," a vinylidine chloride plastic material. Here again other materials may be used, such as, for example, Vinyon, nylon, or any other suitable continuous fibre material. Synthetic fibres of this type are preferred, since they closely resemble human hair when applied by the process herein described. As shown, it is preferred to thread four strands of the continuous fibre through the hollow needle 13, the free ends 20 of the strands extending through the lower opening 21 of the needle and the other ends of the strands extending to a supply spool or spools (not shown).

The needle 13 thus "loaded" is then caused to be moved in a path to reciprocate into and out of the scalp portion 11, from the position shown in Figure 4 through the respective positions illustrated in Figures 5 and 6. The needle during its downward stroke is caused to completely penetrate the base scalp portion so that the strands are caused to form the lower loops 23 shown in Figure 6. As the needle is withdrawn, the loops remain in place, due to the fact that the free legs 24 thereof are gripped by the rubber-like material of the scalp portion, and there being little frictional resistance between the supply legs 25 of the loops and the needle since the supply legs are completely encased within the needle. There is therefore no tendency for the loop to be pulled out as the needle is withdrawn or retracted. The needle is caused alternately to penetrate and be withdrawn over the entire area of the scalp portion, the points of penetration being spaced sufficiently close together to afford complete coverage. Upper loops 26 are thereby formed and these loops are cut at their outer ends, and the resulting single strands are curled or waved to produce the finished hair covering illustrated in Figures 1 and 2.

The inherent resiliency of the base material tends to maintain the strands of hair in place, but in order to avoid pulling out of the hair on rough handling the fibres are firmly anchored in place. A preferred method for anchoring the fibres involves the use of an adhesive material. Any adhesive material may be used which is not compatible with the material of the base or scalp portion, i. e., one which does not have a solvent action for the base material, or vice versa. I prefer to use ordinary carpenter's glue, but other adhesives such as calcined magnesium oxy-chloride in a solution of magnesium chloride (18–22 Bé.), plaster of Paris, etc. may be used. The liquid adhesive is merely poured into the inverted head and allowed to set as a film indicated at 33, whereby the strands are firmly anchored in place.

While the reciprocation of the needle may be accomplished by hand, it is preferred to mount a gang of at least four needles upon a machine (not shown) which is arranged to vertically reciprocate the gang of needles. Such machine is neither shown nor described in detail since any mechanical device may be used and since it does not per se form a part of this invention. To further facilitate the operation the head 10 is placed upon a mandrel 30 which is mounted directly below the needle 13 or below the gang of needles, as the case may be, the mandrel being provided with a central recess 31 in which the needle or needles are received at the lower portion of the downward stroke. When the needles are mounted for mechanical reciprocation as described above the operator simply moves the head about on the mandrel to obtain complete coverage of the scalp portion.

In Figure 7 is illustrated a modified method for securing the hair to the scalp portion 11. Here a jet of gas is forced through a nozzle 40, the gas being at a temperature sufficiently high to cause the loops 23 to become fused. It has been found that with fibres of thermoplastic material such as Saran, hot air at a temperature of about 600° F. is satisfactory in fusing the loops without affecting the scalp portion 11. It has been found that the jet of hot air need only be directed at any one group of loops for only a few seconds to fuse the loops into the form of nodules indicated at 42 in Figure 8. These lumps or nodules 42 are of sufficient size so that they prevent withdrawal of the air strands from the scalp portion. During the process of fusing, the loops tend to curl and shrink so that the nodules 42 thus formed are brought into contact with the underside of the scalp portion 11 as shown in Figure 8.

Another modified method for anchoring the hair strands in place on the scalp portion is shown in Figure 9. Here a relatively thin film 45 of thermoplastic material of the same type as that used for the hair strands is placed inside of the scalp portion 11 and against the loops 23. A heated mandrel or die 46 is then inserted into the scalp portion and contacts the film 45 under pressure to fuse the same integrally with the loops 23.

In Figure 10 is illustrated a further modification of the invention. In carrying out this form of the invention, the hair strands are spaced relative to the length of the loops 23 so that when the loops are deformed to the position shown in Figure 11, adjacent loops are in contact with each other. In order to anchor the strands in place a heated die 43 is drawn across the underside of the scalp portion 11 with sufficient pressure to force the loops 23 against the scalp portion and to fuse adjacent loops together as shown in Figure 11.

While the process which embodies this invention has been described with reference to the application of hair-simulating fibres to a doll's head, it will be readily apparent that the process is not inherently so limited, and may be used in applying hair to toy animals and the like, and in the manufacture of other products adapted to simulate hair, such as wigs and the like. Furthermore, while the base 11 is described as being of a rubber-like material, it is apparent that a fabric base impregnated with a rubber-like material may be used.

Having fully described my invention, it is to be understood that I do not wish to be limited to the details herein set forth, but my invention is of the full scope of the appended claims.

I claim:

1. In a process of the character described, the steps which comprise vertically reciprocating the pointed end of a hollow needle into, through and out of a rubber-like base, said needle having an opening in the pointed end thereof, said needle having a strand of continuous fibre threaded therethrough, the free end of said strand extending outwardly through the opening, said rubber-like base being sufficiently resilient to grip the strand and maintain it in place whereby said strand is repeatedly embedded in said base and formed into a plurality of loops on both sides of said base as said needle is reciprocated; cutting the outer ends of the loops on one side of the base; and fusing said uncut loops on the other side of said base to form nodules of greater diameter than said strands.

2. In a process of the character described, the steps which comprise vertically reciprocating the pointed end of a hollow needle into, through and out of a rubber-like base, said needle having an opening in the pointed end thereof, said needle having a strand of continuous fibre threaded therethrough, the free end of said strand extending outwardly through the opening, said rubber-like base being sufficiently resilient to grip the strand and maintain it in place whereby said strand is repeatedly embedded in said base and formed into a plurality of loops on both sides

of said base; cutting the outer ends of the loops on one side of the base as said needle is reciprocated; and directing a jet of hot gas at said uncut loops on the other side of said base whereby said loops are fused to form nodules of greater diameter than said strands.

3. In a process of the character described, the steps which comprise vertically reciprocating the pointed end of a hollow needle into, through and out of a rubber-like base, said needle having an opening in the pointed end thereof, said needle having a strand of continuous fibre threaded therethrough, the free end of said strand extending outwardly through the opening, said rubber-like base being sufficiently resilient to grip the strand and maintain it in place whereby said strand is repeatedly embedded in said base and formed into a plurality of loops on both sides of said base as said needle is reciprocated; cutting the outer ends of the loops on one side of the base; applying a relatively thin film of thermoplastic material to said uncut loops on the other side of said base; and fusing said film to said loops by means of heat and pressure.

4. In a process of the character described, the steps which comprise vertically reciprocating the pointed end of a hollow needle into, through and out of a rubber-like base, said needle having an opening in the pointed end thereof, said needle having a strand of continuous fibre threaded therethrough, the free end of said strand extending outwardly through the opening, said rubber-like base being sufficiently resilient to grip the strand and maintain it in place whereby said strand is repeatedly embedded in said base and formed into a plurality of loops on both sides of said base as said needle is reciprocated; cutting the outer ends of the loops on one side of the base; and applying heat and pressure to said uncut loops on the other side of said base whereby adjacent loops are fused together.

5. In a process for applying hair to a hollow doll head, the steps which comprise reciprocating the pointed end of a hollow needle into, through and out of the scalp portion of said doll, said scalp portion comprising a rubber-like base, said needle having an opening in the pointed end thereof and a strand of continuous fibre threaded therethrough with the free end of the strand extending outwardly through the opening, said rubber-like base being sufficiently resilient to grip the strand and maintain it in place, whereby said strand is repeatedly embedded in said base and formed into a plurality of loops on both the interior and exterior sides of said scalp portion as said needle is reciprocated; cutting the loops extending from the exterior side of said scalp portion to form individual strands, and changing the configuration of said individual strands on the exterior side of said scalp portion.

6. In a process for applying hair to a hollow doll head, the steps which comprise vertically reciprocating the pointed end of a hollow needle into, through and out of the scalp portion of said doll, said scalp portion comprising a rubber-like base, said needle having an opening in the pointed end thereof and a strand of continuous fibre threaded therethrough with the free end of the strand extending outwardly through the opening, said rubber-like base being sufficiently resilient to grip the strand and maintain it in place, whereby said strand is repeatedly embedded in said base and formed into a plurality of loops on both the interior and exterior sides of said scalp portion as said needle is reciprocated; cutting the loops extending from the exterior side of said scalp portion to form individual strands; anchoring the loops on the interior side of said scalp portion, and changing the configuration of said individual strands on the exterior side of said scalp portion.

7. In a process for applying hair to a hollow doll head, the steps which comprise vertically reciprocating the pointed end of a hollow needle into, through and out of the scalp portion of said doll, said scalp portion comprising a rubber-like base, said needle having an opening in the pointed end thereof and a strand of continuous thermoplastic fibre threaded therethrough with the free end of the strand extending outwardly through the opening, said rubber-like base being sufficiently resilient to grip the strand and maintain it in place, whereby said strand is repeatedly embedded in said base and formed into a plurality of loops on both the interior and exterior sides of said scalp portion as said needle is reciprocated; cutting the loops extending from the exterior side of said scalp portion to form individual strands; fusing said uncut loops on the interior side of said scalp portion to form nodules of greater diameter than said strands; and changing the configuration of said individual strands on the exterior side of said scalp portion.

8. In a process of the character described, the steps which comprise threading a strand of continuous fibre through a hollow needle having an opening in the pointed end thereof, forming a supply leg of said strand encased in said needle and a free leg of said strand exteriorly of said needle and extending from said opening, inserting said needle through a rubber-like base from one side thereof to form a loop on the other side of said base, withdrawing said needle completely therefrom a substantial distance, said rubber-like base being sufficiently resilient to grip said free leg and prevent withdrawal thereof as the needle is withdrawn and to prevent withdrawal of the portion of the strand previously comprising the supply leg and left in the base as a result of the withdrawal of said needle, whereby said loop as a whole remains in place, forming a loop on said one side of said base by again inserting said needle through said base, repeating the steps of insertion and withdrawal to form a plurality of loops on both sides of said base, cutting the loops extending from one side of the base to form individual strands and waving said individual strands to change the configuration thereof.

9. In a process of the character described, the steps which comprise threading a strand of continuous fibre through a hollow needle having an opening in the pointed end thereof, forming a supply leg of said strand encased in said needle and a free leg of said strand exteriorly of said needle and extending from said opening, inserting said needle through a rubber-like base from one side thereof to form a loop on the other side of said base, withdrawing said needle completely therefrom a substantial distance, said rubber-like base being sufficiently resilient to grip said free leg and prevent withdrawal thereof as the needle is withdrawn and to prevent withdrawal of the portion of the strand previously comprising the supply leg and left in the base as a result of the withdrawal of said needle, whereby said loop as a whole remains in place, forming a loop on said one side of said base by again inserting said needle through said base, repeating the steps of insertion and withdrawal to form a plurality of loops on both sides of said base, cutting the loops

on one side of said base, to form individual strands, anchoring to said base the loops on the other side of said base, and waving said individual strands to change the configuration thereof.

10. In a process for applying hair to a hollow doll head, the steps which comprise reciprocating the pointed end of a hollow needle into, through and out of the scalp portion of said doll, said scalp portion comprising a rubber-like base, said needle having an opening in the pointed end thereof and a strand of continuous fibre threaded therethrough with the free end of the strand extending outwardly through the opening, said rubber-like base being sufficiently resilient to grip the strand and maintain it in place, whereby said strand is repeatedly embedded in said base and formed into a plurality of loops on both the interior and exterior sides of said scalp portion, as said needle is reciprocated, and cutting the loops extending from the exterior side of said scalp portion to form individual strands.

11. In a process for applying hair to a hollow doll head, the steps which comprise vertically reciprocating the pointed end of a hollow needle into, through and out of the scalp portion of said doll, said scalp portion comprising a rubber-like base, said needle having an opening in the pointed end thereof and a strand of continuous fibre threaded therethrough with the free end of the strand extending outwardly through the opening, said rubber-like base being sufficiently resilient to grip the strand and maintain it in place, whereby said strand is repeatedly embedded in said base and formed into a plurality of loops on both the interior and exterior sides of said scalp portion as said needle is reciprocated; cutting the loops extending from the exterior side of said scalp portion to form individual strands, and anchoring the loops on the interior side of said scalp portion.

MAURICE SEIDERMAN.

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