# DESCRIPTION

# WIG

## TECHNICAL FIELD

The present invention relates to a wig to be worn to a head in full or in part, and more specifically, to a wig comprising a wig base and curled hair materials fixed to the wig base.

## BACKGROUND ART

Conventionally, hair materials used for wigs have generally been straight hairs. In recent years, however, there are a variety of hair styles. Particularly, in case the user is a lady, an elegant and unique fashionableness in hair styles as well as increase of hair in volume is quite often required, and it is difficult to meet such requirements of various hair styles with straight hairs, which only provide a rather low flexibility,.

To solve this problem, there is known, for example, a technique as disclosed in Japan Patent Application Laid-open 64-40606 A. According to the technique disclosed in this specification, a hair material is folded into two, the folded portion is fastened to the front portion of a wig base, the hair material is curled or turned over toward in the outward direction, and then the curled hair material is set to wave from the front side toward the rear side of the wig base.

However, according to the above-described configuration, in which curl is imparted to all the hair materials fastened to the wig base through post-processing, the folded portion 1a of each hair material 1 is already fixed to a wig base 2 as shown in Fig. 21, so it is impossible to secure a sufficient length for the remaining hair piece 1b to impart curl thereto. As a result, the hair piece 1b can not be sufficiently wound around a curl imparting means 3 such as a rod or a curler, and it is likely to result in loose curl, making it rather difficult to impart a predetermined curl diameter.

In case curl is imparted through heat treatment, there is a fear of the heat resistance of the wig base 2 being rather insufficient. If the heat treatment can not be conducted at a predetermined high temperature, it is not possible to maintain curl for a long period of time.

Further, since imparting curl through post-processing is the same way as perming the natural hair, it takes time and effort, resulting in a rather low efficiency.

In view of this, it might be conceivable to fasten a hair material with the hair pieces previously curled to a wig base. However, as shown in Fig. 22, in case the folded portion 1a is fastened to the base 2 in a general manner, the curls of the hair pieces 1b are oriented to various directions. Thus, even if the hair material 1 is combed, it is impossible to align the curl of the hair pieces in a predetermined direction. It results not only in leading to a rather poor outward appearance but also in not obtaining a desired hair fashion.

The present invention has been made in view of the above problem. It is an object of the present invention to provide a wig allowing orientation of the curl of a hair material in a predetermined direction after being fastened to a wig base even in the case of hair material curled in advance. Another object of the present invention is to provide a wig capable of maintaining the curl imparted to the hair pieces for a long period of time.

## DISCLOSURE OF THE INVENTION

To achieve the object described above, a wig according to the present invention comprises a wig base to be worn to a head; and a large number of hair materials fastened to the wig base, each being a pair of hair pieces folded into two, wherein curls are imparted in advance to the pair of hair pieces before being fastened to the wig base, wherein a folded portion of the pair of hair pieces is fixed to the wig base while tips of the pair of hair pieces are being oriented to a predetermined direction with respect to the wig base, thereby the curls of the pair of hair pieces are oriented to a predetermined direction after being fixed to the wig base.

The fixation of the hair material to the wig base can be effected by fastening, transplanting, etc. When the wig base is of a net-like configuration, the hair material is fixed to the wig base by fastening the folded portion between the two hair pieces to a filament of the net. When the wig base is of a sheet-like configuration, the hair material is fixed to the wig base by fastening or transplanting the folded portion between the two hair pieces to the filament.

According to the present invention, the curls of the pair of hair pieces may be imparted by

a method comprising the steps of applying a first cold permanent liquid to the weft containing a predetermined number of the hair materials in each of a predetermined number of pitches and impregnating a sheet of non-woven fabric with water; placing the weft on the sheet and combing the weft to thereby uniformly distribute the hair materials on the sheet; winding the weft and the sheet integrally around a pipe; keeping them in this state sealed in a bag for a predetermined period of time; applying a second cold permanent liquid to the hair materials extracted from the bag after the predetermined period of time has elapsed; winding the weft and the sheet integrally around the pipe; keeping them in this state for further predetermined period of time; and washing in water the weft wound off after the further predetermined period of time has elapsed.

According to the present invention, the curls of the pair of hair pieces may be imparted by a method comprising the steps of applying a conditioner for chemical fibers to the weft containing a predetermined number of the hair materials in each of a predetermined number of pitches; placing the weft on a sheet of one of non-woven fabric and paper and combing the weft to thereby uniformly distribute the hair materials on the sheet; winding the weft and the sheet integrally around a pipe; and heating them in this state for a predetermined period of time.

According to the present invention, the curls of the pair of hair pieces may be imparted by a method comprising the steps of impregnating the weft containing a predetermined number of the hair materials in each of a predetermined number of pitches and a sheet of non-woven fabric with an aqueous solution of silicon emulsion; placing the weft on the sheet and combing the weft to thereby uniformly distribute the hair materials on the sheet; winding the weft and the sheet integrally around a pipe and covering them with an aluminum foil; and heating them in this state for a predetermined period of time.

According to the present invention, the curls of the pair of hair pieces may be imparted by a method comprising the steps of: immersing the weft containing a predetermined number of the hair materials in each of a predetermined number of pitches and a sheet of non-woven fabric in an aqueous solution of silicon emulsion; placing the weft on the sheet material and combing the weft to thereby uniformly distribute the hair materials on the sheet material; winding the weft and the sheet integrally around a pipe and drying them; and heating them in this state for a predetermined period of time.

According to the present invention, the third and fourth steps of the just prior embodiment may be replaced with the steps of: winding the weft and the sheet integrally around a pipe and covering them with an aluminum foil; and heating them in this state for a predetermined period of time.

As the hair materials of the present invention, apart from human hairs, it is also possible to use, hairs of synthetic resin such as acrylic resin, modacrylic resin or polyamide resin. As the wig base to which this hair material is to be fastened, there is used a filament or a sheet-shaped base obtained by knitting synthetic fibers (chemical fibers), vegetable fibers, animal fibers, etc. into a net-like form. From the viewpoint of stability in performance, durability, cost, etc., it is desirable to use synthetic fibers, such as nylon or polyester. As the sheet-like member to be used as a guide in winding around a pipe member, non-woven fabric, paper, etc. are suitable. A non-woven fabric of rayon, polyester or the like, which increases in surface frictional force when moistened to thereby prevent slippage, is more preferable.

As the weft to be used in the present invention, a plurality of hair materials cut in a predetermined length are preferably arranged at intervals, and sewn together at appropriate positions in the length direction of the hair materials to form a sewn bundle. When the lateral width of the weft is too large, it is rather difficult to apply uniform tension to the winding pipe member in the operation of winding it around the winding pipe member. It is thus desirable for the lateral width of the weft to be 20 cm or less.

Since chemical fiber hairs after imparting curl thereto is hardened, a conditioner is applied to the weft to improve the texture thereof. As the conditioner, it is desirable to use a conditioner for chemical fibers containing 20 to 30 % of a surface-active agent composed of nonions, cations or a mixture thereof. When the content of the surface-active agent exceeds 30 %, the surface of the hair material 10 becomes sticky or the tone thereof is changed during the heat treatment after the imparting of curl. When the content of the surface-active agent is less than 20 %, an improvement in texture after the imparting of curl is hardly to be observed.

According to the present invention in Claims 1 through 6, the direction of the curl of the hair pieces is determined depending upon the direction in which the hair materials are fastened to the wig base, and a predetermined hair design results. For example, when the

hair materials are fixed to the wig base in a state in which they are aligned in the same direction, the curl of the hair pieces of these hair materials is aligned in the same direction. When a large number of hair materials are fastened to the wig base in fixed amounts in different directions, the curls of the hair pieces of these hair materials are oriented in different directions. Thus, through appropriate selection of hair material fixing directions with respect to the wig base, it is possible to obtain wigs for a variety of hair designs. Further, it is possible to maintain the curl imparted to the hair pieces of the hair materials in a satisfactory state for a long period of time. In the construction of the present invention, the hair materials are fixed to the wig base with their directions determined, so the direction of the curl of the hair pieces is determined. Thus, after fixing the hair materials to the wig base, it is possible to easily obtain a wig in which the hair piece curl is oriented in a predetermined direction. Further, through this hair material attachment, it is possible to apply the wig not only to a basic hair design, but also to a complicated hair design with intermingled curl directions, making it possible to attain a hair design of high degree of freedom. Thus, as compared with the conventional wig, in which the curl direction is not fixed even if the hair materials are combed and which is rather poor in terms of design, it is possible to obtain a product that is more perfect as such.

Further, by forming a pair of hair pieces aligned in the same curl direction, when the hair material is fastened to the wig base, it is possible to orient the hair piece curl in a predetermined direction more easily, with the hair piece not being easily allowed to wave in any other direction. Further, as compared with the conventional technique, in which curling processing is effected after fastening the hair materials to the wig base, a predetermined curl size can be imparted more easily and the curling operation can be performed in a shorter time. It is further possible to maintain the curl configuration imparted to the hair materials in a satisfactory manner for a long period of time.

## BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a plan view illustrating the operation of fastening a hair material to a wig base according to a first embodiment of the present invention. Fig. 2 is a perspective view of a wig according to the first embodiment of the present invention. Fig. 3 is a perspective view of a weft according to the first embodiment of the present invention. Fig. 4 is a perspective view of a single hair material according to the first embodiment of the present invention. Fig. 5 is a front view of a hair material as fastened to a wig base according to

the first embodiment of the present invention. Fig. 6 is a plan view illustrating the operation of fastening a hair material to a wig base according to a second embodiment of the present invention. Fig. 7 is a perspective view illustrating the operation of blending hair materials common to third to seventh embodiments of the present invention. Fig. 8 is a plan view of sewn weft common to the third to seventh embodiments of the present invention. Fig. 9 is a plan view of a weft common to the third to seventh embodiments of the present invention as placed on a sheet material. Fig. 10 is a plan view of a weft common to the third to seventh embodiments of the present invention placed on a sheet material as combed. Fig. 11 is a sectional view of a weft common to the third to seventh embodiments of the present invention placed on a sheet material. Fig. 12 is a plan view illustrating how weft common to the third to seventh embodiments of the present invention and a sheet material are wound around a pipe member. Fig. 13 is a sectional view showing a weft common to the third to seventh embodiments of the present invention and a sheet material as wound around a pipe member. Fig. 14 is a perspective view showing a weft common to the third to seventh embodiments of the present invention and a sheet material as wound around a pipe member. Fig. 15 is a front view of a hair material common to the third to seventh embodiments of the present invention as fastened to a filament of a wig base. Fig. 16 is a plan view of hair materials drawn out of weft common to the third to seventh embodiments of the present invention. Fig. 17 is a longitudinal sectional view of a hair material composed of straight-chain aliphatic polyamide according to a fifth embodiment of the present invention. Fig. 18 is a perspective view of a pipe member according to a fifth embodiment of the present invention as covered with an aluminum foil. Fig. 19 is a schematic sectional view of an artificial hair material of a core-sheath structure according to a sixth embodiment of the present invention. Fig. 20 is a schematic view showing asperities of an artificial hair material according to the sixth embodiment of the present invention. Fig. 21 is a schematic view showing how a conventional hair material is curled. Fig. 22 is a schematic view showing how conventional hair materials are fastened to a wig base.

## BEST MODE FOR CARRYING OUT THE INVENTION

In the following, embodiments of the present invention will be described with reference to Figs. 1 through 20. Of the drawings, Figs. 1 through 5 show the first embodiment of the present invention. Figs. 1(a) through 1(e) are plan views illustrating the operation of fastening a hair material to a filament of a wig base in the form of a net, Fig. 2 is a

perspective view of a wig, Fig. 3 is a perspective view of a weft, Figs. 4(a) through 4(d) are perspective views of a single hair material, and Fig. 5 is a front view of hair materials as fastened to a filament of a wig base.

In the first embodiment of the present invention shown in Figs. 1 through 5, a large number of hair materials 10 are fastened to a wig base 12 as hair 11 to form a wig 13 as shown in Fig. 2. As the hair materials 10, human hairs or synthetic resin hairs are used. In the state of a weft 14 prior to the fastening to the wig base 12, curl is imparted to hair pieces 10a, 10b beforehand. When large number of hair materials 10 are fastened to the wig base 12, there is formed a hair design in which the hair 11 equally parted in the middle is curled symmetrically.

As shown in Figs. 1 through 5, the wig base 12 is composed of an artificial skin or a net of synthetic resin shaped into a head configuration. In this embodiment, the hair materials 10 are fastened to filaments 15 forming a net constituting the wig base 12. The weft 14 is obtained by sewing together a plurality of hair materials 10 cut in a predetermined length at a predetermined longitudinal position with a sewing thread 16. The weft is wound around a cylindrical member such as a pipe member (not shown) and is subjected to heat treatment, so curl is imparted to the hair pieces 10a, 10b of the hair materials 10 as shown in Fig. 2.

A hair material 10 is drawn out of the weft 14 whose hair pieces 10a, 10b are thus curled beforehand. The hair material 10 thus drawn out is folded into two to form a pair of hair pieces 10a, 10b curled in the same direction and a folded portion 10c folded between the hair pieces 10a, 10b. The hair pieces 10 thus folded into two are classified into, as shown in Fig. 2, right-hand side curl hair pieces for use on the right-hand side with respect to the middle parting portion of the wig 13 and left-hand side curl hair pieces for use on the left-hand side with respect to the middle parting portion so as to be fastened to the wig base 12.

As shown in Figs. 4(a) and 4(b), the right-hand curl hair piece 10 is retained with the tips of the hair pieces 10a, 10b on the right-hand side and the curved folded portion 10c on the left-hand side. When hair piece portions in the vicinity of the folded portion 10c are held between a left thumb and a left index finger, the two hair pieces 10a, 10b are curled so as to be wound around the left index finger.

As shown in Figs. 4(c) and 4(d), the left-hand curl hair piece 10 is retained with the tips of the hair pieces 10a, 10b on the left-hand side and the curved folded portion 10c on the right-hand side. When hair piece portions in the vicinity of the folded portion 10c are held between a left thumb and a left index finger, the two hair pieces 10a, 10b are curled so as to be wound around the left thumb. While in Figs. 4(b) and 4(d) the hair pieces 10a, 10b are shown as held between fingers for the sake of convenience to facilitate the understanding of the hair piece curling direction, in reality, the hair materials 10 are fastened to the wig base 12 while being grasped by a mechanical grasping means.

In the process shown in Figs. 1(a) through 1(e), the right-hand curl hair material 10 held as shown in Figs. 4(a) and 4(b) is fastened to a filament 15 forming a net as the wig base 12 through mechanical operation of a crochet 18.

In fastening the right-hand curl hair material 10 to the filament 15, while grasping the hair material 10 by a mechanical grasping means (not shown) such that the two hair pieces 10a, 10b are directed to the right with respect to the wig base 12, the folded portion 10c of the hair material 10 is situated on the lower side (a side to be worn to a head) of the filament 15, and the hair pieces are caused to cross each other so that one hair piece 10a comes over the other hair piece 10b as shown in Fig. 1(a), thereby forming a first loop portion 17 on the inner side of the folded portion 10c.

Next, as shown in Fig. 1(b), the folded portion 10c is brought in the direction of the filament 15, and one hair piece 10a is passed through the first loop portion 17 while being folded as shown in Fig. 1(c), so a curved portion 10d is formed in the middle portion of one hair piece 10a drawn out of the first loop portion 17, and a second loop portion 19 is formed on the inner side of the curved portion 10d.

Subsequently, as shown in Fig. 1(d), the other hair piece 10b is passed through the second loop portion 19 so as to be wound around one hair piece 10a from the outside, and as shown in Fig. 1(e), the hair pieces 10a, 10b are pulled in opposite directions each other, and the filament 15 is bound by a knot 20, so the hair material 10 is fastened to the filament 15.

The hair material 10 of this embodiment having right-hand curl in the hair pieces 10a, 10b

is fastened to the filament 15 in this way. As a result, as shown in Fig. 5(a), the hair pieces 10a, 10b are oriented with their curls aligned to the right with respect to the filament 15 of the wig base.

The left-hand curl hair material 10 shown in Figs. 4(c) and 4(d) are also fastened to the filament 15 by the same process as that for the right-hand curl hair material 10 described above, and as shown in Fig. 5(b), the hair pieces 10a, 10b are oriented with their curls aligned to the left.

As described above, in this embodiment, the folded portion 10c is fastened to the filament 15 through mechanical operation of the crochet 18 while grasping the tips of the previously curled hair pieces 10a, 10b by a separate grasping means such that they are oriented in a predetermined direction, i.e., either to the right or to the left, with respect to the wig base 12, so it is possible to easily obtain a wig 11 of a design in which the right-hand curl and left-hand curl imparted to the hair pieces 10a, 10b are orderly parted on the right-hand and left-hand sides of the wig base 12.

Thus, it is possible to avoid a situation as experienced in the prior art in which the curl directions of the hair pieces 10a, 10b fastened to the wig base 12 are not fixed, and there is no need to perform a post-processing, such as alignment of the curls of the hair pieces 10a, 10b by combing the hair material 10 after the attachment thereof, so it is possible to obtain a product superior not only in operability and productivity but also in completeness as such.

Next, the second embodiment of the present invention will be described with reference to Fig. 6. Figs. 6(a) through 6(c) are plan views for illustrating the operation of fastening a previously curled hair material to a wig base. The hair material 10, the wig base 12, the filament 15, and the crochet 18 are the same as those of the first embodiment.

As in the first embodiment shown in Figs. 1(a) through 1(e), in the second embodiment shown in Figs. 6(a) through 6(c), in fastening the previously curled hair material 10 to the filament 15 of the wig base 12, the hair material is grasped by a mechanical grasping means (not shown) such that the curls of the two hair pieces 10a, 10b are oriented in a predetermined direction with respect to the wig base 12. As shown in Fig. 6(a), the folded portion 10c of the hair material 10 is situated on the lower side (head side) of the

filament 15, and the hair pieces are caused to cross each other such that one hair piece 10a comes over the other hair piece 10b, forming a first loop portion 21 on the inner side of the folded portion 10c.

In Fig. 6(b), the folded portion 10c is wound from the lower side to the upper side of the filament 15, and the other hair piece 10b is passed through the loop portion 21. Further, the entire other hair piece 10b is drawn out of the loop portion 21, and the hair pieces 10a, 10b are pulled each other in opposite directions, and the filament 15 is bound by a knot 22, so the hair material 10 is fastened to the filament 15.

While in the first and second embodiments described above, a net-shaped wig base using filament is adopted, it is also possible, in the present invention, to use a sheet-like member composed of an artificial skin or the like formed of synthetic resin as the wig base. In this case, to fasten the hair materials to the sheet-like wig base, a large number of through-holes are provided in the sheet-like member, and two through-holes, i.e., a first through-hole and a second through-hole are used per hair material, the hair material being fastened regarding these through-holes as both sides of the filament of the first and second embodiments. Further, when the wig base composed of a sheet-like member, the fixation of the hair material can also be effected by transplanting, in which case the sheet-like member is pierced by the folded portion of the hair material, and a detachment preventing means is provided at the tip of the folded portion protruding from the lower side of the sheet-like member.

Next, procedures by which curl is imparted to the hair pieces 10a, 10b of the hair material 10 used in the above embodiments will be described with reference to the third through sixth embodiments shown in Figs. 7 through 16. In describing the third through sixth embodiments, Figs. 1 through 6 in the above will also be referred if necessary.

Of the drawings, Figs. 7 through 16 show the third embodiment. Fig. 7 is a perspective view illustrating the operation of blending hair materials, Fig. 8 is a plan view of a sewn weft, Fig. 9 is a plan view of a weft as placed on a sheet material, Fig. 10 is a plan view of a weft placed on a sheet material as combed, Fig. 11 is a sectional view of a weft on a sheet material, Fig. 12 is a plan view illustrating how hair a tuft and a sheet material are wound around a pipe member, Fig. 13 is a sectional view showing a weft and a sheet material as wound around a pipe member, Fig. 14 is a perspective view showing, like Fig.

13, hair a tuft and a sheet material as wound around a pipe member, Fig. 15 is a front view of a hair material as fastened to a filament, and Fig. 16 is a plan view of hair materials drawn out of hair a tuft.

The third embodiment shown in Figs. 7 through 16 is suitable for imparting curl to human hairs as the hair materials 10 (including human hairs from which the cuticles have been removed and which have undergone bleaching and dyeing processes so as to be suitable for use in a wig). First, as shown in Figs. 7(a) and 7(b), a hair bundle 30 formed by a plurality of hair materials 10 composed of human hairs of a plurality of desired colors is applied to a hair comber 31, and the hair bundle 30 is repeatedly combed by a teeth 31a of the hair comber 31 to thereby effect blending on the hair materials 10 of a plurality of colors to a sufficient degree. Even when the hair materials 10 are monochrome human hairs, the hair bundle 30 is disentangled into unit hairs by putting it through the hair comber 31. Next, the blended hair bundle 30 is cut in a predetermined length. This predetermined length is a reference length in fastening the hair materials 10 to the wig base 12.

Fig. 8(a) is a plan view of a weft 14 prepared by sewing together an appropriate amount by weight of the hair materials 10 cut in a predetermined length at a predetermined longitudinal position, and Fig. 8(b) is an enlarge view of the weft 14. The weft 14 thus formed has a plurality of sewn bundles 32. When a lateral width 6L of the weft 14 shown in Fig. 8(a) is too large, it is rather difficult to apply a uniform tension to an aluminum pipe member 33 in the operation described below of winding the weft 14 around the pipe member 33, so it is desirable for the width to be 20cm or less. Sewing marks 34 of sewing thread 16 are left in the hair materials 10 in the process described below (see Fig. 16), so the position where the sewing marks 34 of the sewing thread 16 are left constitutes the folding position in fastening the hair materials 10 to the wig base 12.

It is desirable for the weft 14 thus formed to contain 8 to 10 sewn bundles 32 per centimeter, and it is desirable for each sewn bundle 32 to contain 12 to 27 hair materials 10. If the number of sewn bundles 32 per centimeter were less than eight, the pitch of the sewn bundles 32 would be too large, making it impossible to uniformly distribute the hair materials 10 shown in Fig. 10. Further, it would be difficult to wind the hair materials 10 around the pipe member 33 at a fixed angle. Further, when combing the weft 14 prior to the winding so as to make it straight, the hair materials 10 would be likely to be detached

to the sewn bundles 32. On the other hand, if the number of sewn bundles 32 per centimeter were more than ten per centimeter, there would be no interval between the sewn bundles 32, and the sewn portion would be rather thick to constitute a step when wound around the pipe member 33 to wrinkle the hair materials 10. Thus, so-called loose curl, which is weaker than a predetermined curl, is likely to result. Further, if the number of sewn bundles 32 per unit length is large, when sewing is performed in the production of the weft 14, the hair materials 10 and the sewing thread 16 are likely to be entangled with each other, and the sewing thread 16 is pulled, with the result that a neat weft 14 cannot be obtained. Thus, the hair materials 10 are wrinkled or rumpled after the imparting of curl thereto.

When the number of hair materials 10 in each sewn bundle 32 is less twelve or less, there is no problem in terms of the imparting of curl. However, the length of the weft 14 becomes rather large, and a large number of wefts 14 have to be produced in order to prepare the requisite amount of hair materials 10, with the result that the number of pipe members 33 around which the wefts 14 are to be wound increases, resulting in an increase in burden in terms of operation and cost. When the number of hair materials 10 per sewn bundle 32 is twenty-seven or more, the thickness of each sewn bundle 32 increases, and loose curl, which is weaker than a predetermined curl, is likely to result.

Figs. 9 and 11(a) show a state in which a first cold permanent liquid has been sufficiently applied to the weft 14 formed as described above and in which the weft 14 has been placed at a predetermined position on a sheet material 35 moistened and spread on a working table. The weft 14 is combed so as to make it straight, so the hair materials 10 are aligned in a row with no gap therebetween as shown in Figs. 10 and 11(b), thereby reducing the thickness of the weft 14.

The sheet material 35 serves as a guide when winding the weft 14 around the pipe member 33. At the time of use, it is moistened and spread over and held in intimate contact with the working table so as to involve no wrinkles. As the sheet material 35, non-woven fabric is preferable since it increases in surface frictional force when moistened to prevent slippage. When it involves slippage when moistened, it may cause spinning or generate a gap between the weft and the aluminum pipe member 33 around which it is wound, resulting in loose curl.

For this reason, as the material of the non-woven fabric for the sheet material 35, rayon or polyester is preferable. More preferably, a weight per unit area [metuske] of 18 to 30 $g/m^2$ is adopted. When the weight per unit area [metuske] is 18 $g/m^2$ or less, the density of the sheet material is rather small, and the cold permanent liquid applied to the weft 14 is easily vaporized, making it impossible to impart curl to a sufficient degree. Further, at the time of operation of winding it around the pipe member 33, the sheet material 35 is likely to suffer damage when tension is applied thereto. On the other hand, when the weight per unit area [metuske] is 30 $g/m^2$ or more, the thickness of the sheet material 35 is rather large, so that when it is wound around the pipe member 33, a rather large diameter results as the winding diameter increases, and the tuft 14 is likely to assume loose curl, which is weaker than curl of a predetermined configuration.

In the subsequent process shown in Fig. 12, an aluminum pipe member 33 with a circular sectional configuration is placed at one end of the sheet material 35, and the weft 14 and the sheet material 35 are wound integrally around the pipe 33 while applying tension thereto, as shown in Figs. 13 and 14, fixing the outer center and both side ends of the tuft 14 by a fixing means 36, such as an adhesive tape or a rubber band. Next, the pipe 33 around which the weft 14 and the sheet material 35 have been wound is sealed in a plastic bag (not shown) and left to stand for approximately 15 minutes at room temperature. After that, a second cold permanent liquid are directly applied to the sheet material 35 in the outer periphery of the pipe member 33 extracted from the plastic bag, or to the disentangled weft 14 from the pipe member 33. Next, the weft 14 and the sheet material 35 are wound around the pipe member 33 again and fixed by the fixing means 36 before being left to stand for 15 minutes at room temperature.

After that, the fixing means 36 is released, and washing in flowing water is effected while gradually releasing the weft 14 and the sheet 35 wound around the pipe member 33, and the sheet material 35 is spread over the working table so as to involve no wrinkles. Next, the washed weft 14 is arranged at a predetermined position on the sheet material 35, and hair rinse or conditioner is applied to the weft 14. The application of the rinse or conditioner is effected for the purpose of achieving an improvement in terms of texture since the texture of the hair materials 13 that have undergone treatment with the cold permanent liquid is rather hard.

Next, the weft 14 is combed by the same process as that of Fig. 10, and the hair materials

10 are uniformly distributed so as to involve no gaps therebetween and to be aligned in a row, thereby reducing the thickness of the weft 14. Next, by the same process as that shown in Figs. 12 through 14, the weft 14 and the sheet material 35 are integrally wound around the pipe material 33. Further, the weft 14 and the sheet material 35 are fixed in position by a fixing means 36, such as an adhesive tape or a rubber band, and the pipe member 33 is wrapped up in a towel or the like to remove surplus water from the sheet material 35. After that, they are left to stand at room temperature until the sheet material 35 wound around the pipe member 33 is completely dried, or dried in a dryer at a temperature of approximately 90°C. Finally, the sheet material 35 and the weft 14 are extracted.

Fig. 15 shows a single hair material 10 thus curled. Each hair material 10 has a sewing mark 34 at the position where sewing has been effected with the sewing thread 16. When, by the sewing process of Fig. 8, the middle points in the length direction of the hair materials 10 are sewn together, the length of the hair pieces 10a, 10b of each hair material 10 fastened to a filament 15 of the wig base 12 is half the total length of the hair material 10 as shown in Fig. 15(a). The position at which the sewing is effected with the sewing thread 16 is not restricted to the position where the total length of the hair material 10 is equally divided. When the sewing is effected with the sewing thread 16 at a position somewhat deviated therefrom, the hair pieces 10a, 10b differ in length as shown in Fig. 15(b), and when it is fastened to the filament 15 of the wig base 12, it is possible to obtain an outward appearance different from that obtained by effecting sewing at the position equally dividing the hair material as shown in Fig. 15(a).

Next, the fourth embodiment of the present invention will be described with reference to Figs. 7 through 16, which are common to the third embodiment. A detailed description of the components that are the same as those of the third embodiment will be omitted. In this embodiment, the hair material 10 is formed of an acrylic resin or a modacrylic resin (copolymer of acrylic resin and vinyl chloride) or the like. It is suitable for imparting curl to chemical fiber hairs of low heat resistance and exhibiting a softening temperature of 100°C or less.

In the fourth embodiment shown in Figs. 7 through 16, the processes of Figs. 7 and 8 are the same as those of the third embodiment. In the subsequent process shown in Figs. 9 and 11(a), a conditioner for chemical fibers is applied to the weft 14, and the weft 14 is

placed at a predetermined position on the sheet material 35 spread on the working table. The sheet material 35 serves as a guide in winding the weft 14 around the pipe member 33, and when in use, it is spread over and held in intimate contact with the working table so as to involve no wrinkles. The weft 14 is combed so as to make it straight, so the hair materials 10 are aligned in a row with no gap therebetween as shown in Figs. 10 and 11(b), thereby reducing the thickness of the weft 14.

As the sheet material 35 of this embodiment, non-woven fabric or paper is suitable. There are no particular limitations regarding its nature except that the weight per unit area [metuske] thereof is 40 to 50 $g/m^2$. When the weight per unit area [metuske] is not more than 40 $g/m^2$, the density of the sheet material 35 is rather low, and heat is allowed to be conducted quickly at the time of heat treatment to impart curl. Thus, the uppermost layer of the weft 14 wound around the aluminum pipe member 33 is excessively heated, and shrinkage occurs in the portion, resulting in a rather poor outward appearance, which leads to a product of no commercial value. On the other hand, when the weight per unit area [metuske] is 50 $g/m^2$ or more, the thickness of the non-woven fabric or paper increases, so that when wound around the pipe member 33, it increases in diameter as the winding diameter increases. Thus, the weft 14 is likely to result in loose curl, which is weaker than curl of a predetermined configuration. Further, the density of the non-woven fabric or paper is rather high, so that the heat is cut off at the time of heat treatment to impart curl, and the requisite heat for curling is not applied, which is likely to lead to so-called loose curl, which is weaker than curl of a predetermined configuration.

The conditioner for chemical fibers applied to the weft 14 is used for the purpose of achieving an improvement in terms of texture since chemical fiber hairs become harder after the imparting of curl. As the conditioner, it is desirable to adopt one containing 20 to 30 % of a surface-active agent composed of nonions or cations or a mixture thereof. When the content of the surface-active agent exceeds 30 %, the surface of the hair materials 10 become sticky of a change in tone is involved in the heat treatment after the imparting of curl. When the content of the surface-active agent is 20 % or less, the effect of improving the texture after the imparting of curl is hardly to be observed.

In the process shown in Fig. 12, the aluminum pipe member 33 of a circular sectional configuration is placed at one end of the sheet material 35, and they are wound integrally around the pipe member 33 while applying tension to the weft 14 and the sheet material 35,

fixing the outside center and both side ends of the tuft 14 in position by the fixing means 36, such as an adhesive tape or a rubber band, as shown in Figs. 13 and 14. Next, the pipe member 33 around which the weft 14 and the sheet material 35 have been wound is put in a dryer set at a temperature of approximately 90°C, and heat treatment is conducted for approximately one hour. After that, the pipe member 33 is extracted and allowed to cool itself. Finally, the weft 14 is removed from the sheet material 35.

Next, the fifth embodiment of the present invention will be described with reference Figs. 7 through 16 common to the third and fourth embodiments plus Figs. 17 and 18. A detailed description of the components that are the same as those of the third and fourth embodiments will be omitted. This embodiment is superior in imparting curl to the hair pieces 10a, 10b of a hair material 10 that is formed of polyamide, in particular, a straight-chain aliphatic polyamide. Further, it is more desirable that the coloring of the hair material be effected by mixing in the raw material, that the surface of the hair material be composed of spherulites, blasts or a combination thereof to form asperities 10e on the surface of the artificial hair material 10 to thereby suppress the gloss thereof, and that the shrinkage rate of the hair material be 2 to 5 %.

In the fifth embodiment, the processes of Figs. 7 and 8 are the same as those of the third and fourth embodiments. When they are wound around the pipe member 33, the weft 14 and the sheet material 35 are immersed in an aqueous solution of silicon emulsion. As the sheet material 35, a non-woven fabric of a weight per unit area [metuske] of 18 to 30 $g/m^2$ is suitably used. When the weight per unit area [metuske] is 18 $g/m^2$ or less, the impregnation amount of the silicon emulsion aqueous solution is small, and it is rather difficult to fix the skin on the surface of the hair material uniformly and at a predetermined film pressure. The sheet material is likely to suffer damage when tension is applied thereto while winding it around the pipe member 33. On the other hand, when the weight per unit area [metuske] is 30 $g/m^2$ or more, the thickness of the sheet material 35 increases, so that when it is wound around the pipe member 33, its diameter increases as the winding diameter increases, with the result that the weft 14 is likely to assume loose curl, which is weaker than curl of a predetermined configuration.

As the non-woven fabric for the sheet material 35, it is desirable to adopt one that increases in surface friction force when moistened to thereby prevent slippage. If the surface of the sheet material 35 is slippery when moistened, spinning occurs when it is

wound around the aluminum pipe member 33, and a gap is generated between the pipe member 33 and the weft 14 wound around it, which leads to loose curl. For these reasons, the material of the non-woven fabric is preferably rayon or polyester, as described above, with the weight per unit area [metuske] thereof being preferably 18 to 30 g/m$^2$.

The silicon emulsion is used for the purpose of imparting curl to the hair material 10 and imparting smoothness and a deep color effect to the hair material surface. From the viewpoint of deep color effect, texture, and durability, an anionic discoloring epoxy silicon is preferable, and an aqueous solution concentration of 1 to 2 % is preferable since it involves no discoloration or sticky texture after the imparting of curl.

In the process of Figs. 9 and 11(a) subsequent to Figs. 7 and 8, the weft 14 and the sheet material 35 are immersed in an aqueous solution of silicon emulsion and are then lightly squeezed. Fig. 9 shows how the sheet material 35 is spread over the working table so as to involve no wrinkles, with the weft 14 being placed at a predetermined position on the sheet material 35. Next, the weft 14 is combed so as to make it straight. As a result, as shown in Figs. 10 and 11(b), the hair materials 10 are aligned in a row so as to involve no gap therebetween, thereby reducing the thickness of the weft 14.

In the next process shown in Fig. 12, the aluminum pipe member 33 with a circular sectional configuration is placed at one end of the sheet material 35, and the weft 14 and the sheet material 35 are integrally wound around the pipe member 33 while applying tension thereto, fixing the outside center and both side ends of the weft 14 in position by the fixing means 36, such as an adhesive tape or a rubber band, as shown in Figs. 13 and 14. Next, the pipe member 33 around which the weft 14 and the sheet material 35 are wound is covered with a towel or the like to wipe away surplus silicon emulsion aqueous solution.

In the next process shown in Fig. 18, the outer side of the weft 14, the sheet material 35, and the pipe member 33 as a whole is covered with an aluminum foil 37, and is put in a dryer set at a temperature of 160 to 170°C to conduct heat treatment for 40 to 60 minutes. After the heat treatment, the whole is extracted from the dryer, and allowed to cool itself. Finally, the weft 14 is extracted.

The covering with the aluminum foil 37 in this embodiment is effected for the purpose of

obtaining a curl of high retaining property at lower temperature by continuously applying moist air and dry air in a single heat treatment. That is, for 20 to 30 minutes after the whole is put in the dryer, the evaporation of the water of the silicon emulsion aqueous solution with which the weft 14 and the sheet material 35 are impregnated is suppressed by the influence of the materials of the aluminum pipe member 33 and the aluminum foil 37, so that the weft 14 is subjected to heat treatment at high temperature and high humidity. When, thereafter, the water has been evaporated, the heat treatment is conducted in a dry state.

In this way, in the fifth embodiment, it is possible to apply moist air and dry air continuously with ease, without using any special device, through a combination of the material and weight per unit area [metuske] of the non-woven fabric wound together with the weft 14, the aluminum pipe member 33, and the aluminum foil 37, and through adjustment of the temperature and time of the heat treatment, thereby making it possible to obtain a curl of still higher retaining property.

Next, the sixth embodiment of the present invention will be described with reference Figs. 7 through 16 common to the third through fifth embodiments plus Figs. 19 and 20. A detailed description of the components that are the same as those of the third through fifth embodiments will be omitted. This embodiment is suitable for an artificial hair described below. That is, an artificial hair of a core/sheath structure is preferable, with the core portion being formed of a semi-aromatic polyamide with a phenylene unit in the main chain, and the sheath portion being formed of a straight-chain aliphatic polyamide of methylene chain bonding. The sheath/core weight ratio ranges from 30/70 to 10/90, and the hair thickness ranges from 40 to 80 μm.

As the semi-aromatic polyamide forming the core portion, it is more desirable to adopt, for example, nylon MXD6, which is obtained through polymerization of methaxylenediamine and adipic acid. As the straight-chain aliphatic polyamide forming the sheath portion, it is more desirable to adopt, for example, nylon 6. Fig. 19 is a schematic sectional view of the artificial hair material of the sheath/core structure. Further, as shown in Fig. 20(a), the surface of the artificial hair material 10 is preferably roughened by blast shot or the like to form asperities 10f to thereby suppress gloss. As shown in Fig. 20(b), which is an enlarged view, the asperities 10f are preferably formed to such a degree that the maximum difference in height between the protrusions and recesses, indicated at 38, is approximately

1.3 μm.

In the sixth embodiment, the processes of Figs. 7 and 8 are the same as those of the fifth embodiment. As in the fifth embodiment, when winding the weft 14 and the sheet material 35 around the pipe member 33, they are immersed in an aqueous solution of silicon emulsion. Apart from imparting curl, this aqueous solution of silicon emulsion is used for the purpose of fixing a film with smoothness to the surface of the hair materials 10. As the sheet material 35, a non-woven fabric of rayon or polyester of a weight per unit area [metuske] of 18 to 30 g/m$^2$ is preferable.

When the weight per unit area [metuske] is 18 g/m$^2$ or less, the impregnation amount of the silicon emulsion aqueous solution is small, and it is rather difficult to fix the skin on the surface of the hair material uniformly and at a predetermined film pressure. The sheet material is likely to suffer damage when tension is applied thereto while winding it around the pipe member 33. On the other hand, when the weight per unit area [metuske] is 30 g/m$^2$ or more, the thickness of the sheet material 35 increases, so that when it is wound around the pipe member 33, its diameter increases as the winding diameter increases, with the result that the weft 14 is likely to assume loose curl, which is weaker than curl of a predetermined configuration.

As the non-woven fabric for the sheet material 35, it is desirable to adopt one that increases in surface friction force when moistened to thereby prevent slippage. If the surface of the sheet material 35 is slippery when moistened, spinning occurs when it is wound around the aluminum pipe member 33, and a gap is generated between the pipe member 33 and the weft 14 wound around it, which leads to loose curl. For these reasons, the material of the non-woven fabric is preferably rayon or polyester, in addition, with the weight per unit area [metuske] thereof being preferably 18 to 30 g/m$^2$.

In the process of Figs. 9 and 11(a) subsequent to Figs. 7 and 8, the weft 14 and the sheet material 35 are immersed in an aqueous solution of silicon emulsion and are then lightly squeezed. Fig. 9 shows how the sheet material 35 is spread over the working table so as to involve no wrinkles, with the weft 14 being placed at a predetermined position on the sheet material 35. Next, the weft 14 is combed so as to make it straight. As a result, as shown in Figs. 10 and 11(b), the hair materials 10 are aligned in a row so as to involve no gap therebetween, thereby reducing the thickness of the weft 14.

In the next process shown in Fig. 12, the aluminum pipe member 33 with a circular sectional configuration is placed at one end of the sheet material 35, and the weft 14 and the sheet material 35 are integrally wound around the pipe member 33 while applying tension thereto, fixing the outside center and both side ends of the weft 14 in position by the fixing means 36, such as an adhesive tape or a rubber band, as shown in Figs. 13 and 14. Next, the pipe member 33 around which the weft 14 and the sheet material 35 are wound is covered with a towel or the like to wipe away surplus silicon emulsion aqueous solution.

Next, the pipe member 33 around which the weft 14 and the sheet material 35 are wound is put in a dryer set at a temperature of 100°C or less, and dried to evaporate the water therein, solely leaving silicon on the weft 14 and the sheet material 35. After that, the pipe member 33 around which the weft 14 and the sheet material 35 are wound is put in a dryer set at a temperature of 180°C, and heat treatment is conducted for two hours, thereby imparting curl to the hair materials 10 and fixing a coating film to the surface of the hair materials 10. After the heat treatment, the whole is extracted from the dryer, and allowed to cool itself. Finally, the weft 14 is extracted.

As a modification of the sixth embodiment described above, it is also possible to carry out the seventh embodiment described below. In the seventh embodiment, in the process of the sixth embodiment shown in Fig. 14, the weft 14 and the sheet material 35 are wound around the pipe member 33, and in the process shown in Fig. 15, the entire pipe member 33 is covered with the aluminum foil 37. This is put in a dryer set at a temperature of 180°C, and heat treatment is conducted for two hours, thereby imparting curl to the hair materials 10, and at the same time, fixing a coating film to the surface of the hair materials 10. After the heat treatment, the whole is extracted from the dryer, and allowed to cool itself. Finally, the weft 14 is extracted.

## INDUSTRIAL APPLICABILITY

The wig of the present invention is useful as a hair volume increasing means for covering a hair receding head portion, or especially as a fashion item for ladies, or as a medical covering means for a head that has undergone operation. Further, it is useful as a stage makeup means for performing arts or the like.

# CLAIMS

1. A wig comprising:

a wig base to be worn to a head; and

a large number of hair materials fastened to the wig base, each being a pair of hair pieces folded into two,

wherein curls are imparted in advance to the pair of hair pieces before being fastened to the wig base,

wherein a folded portion of the pair of hair pieces is fixed to the wig base while tips of the pair of hair pieces are being oriented to a predetermined direction with respect to the wig base, thereby the curls of the pair of hair pieces are oriented to a predetermined direction after being fixed to the wig base.

2. The wig according to Claim 1, wherein the curls of the pair of hair pieces are imparted by a method comprising the steps of:

applying a first cold permanent liquid to the weft containing a predetermined number of the hair materials in each of a predetermined number of pitches and impregnating a sheet of non-woven fabric with water;

placing the weft on the sheet and combing the weft to thereby uniformly distribute the hair materials on the sheet;

winding the weft and the sheet integrally around a pipe;

keeping them in this state sealed in a bag for a predetermined period of time;

applying a second cold permanent liquid to the hair materials extracted from the bag after the predetermined period of time has elapsed;

winding the weft and the sheet integrally around the pipe;

keeping them in this state for further predetermined period of time; and

washing in water the weft wound off after the further predetermined period of time has elapsed.

3. The wig according to Claim 1, wherein the curls of the pair of hair pieces are imparted by a method comprising the steps of:

applying a conditioner for chemical fibers to the weft containing a predetermined number of the hair materials in each of a predetermined number of pitches;

placing the weft on a sheet of one of non-woven fabric and paper and combing the weft to thereby uniformly distribute the hair materials on the sheet;

winding the weft and the sheet integrally around a pipe; and

heating them in this state for a predetermined period of time.

4. The wig according to Claim 1, wherein the curls of the pair of hair pieces are imparted by a method comprising the steps of:

impregnating the weft containing a predetermined number of the hair materials in each of a predetermined number of pitches and a sheet of non-woven fabric with an aqueous solution of silicon emulsion;

placing the weft on the sheet and combing the weft to thereby uniformly distribute the hair materials on the sheet;

winding the weft and the sheet integrally around a pipe and covering them with an aluminum foil; and

heating them in this state for a predetermined period of time.

5. The wig according to any one of Claims 1 to 5, wherein the curls of the pair of hair pieces are imparted by a method comprising the steps of:

immersing the weft containing a predetermined number of the hair materials in each of a predetermined number of pitches and a sheet of non-woven fabric in an aqueous solution of silicon emulsion;

placing the weft on the sheet material and combing the weft to thereby uniformly distribute the hair materials on the sheet material;

winding the weft and the sheet integrally around a pipe and drying them; and

heating them in this state for a predetermined period of time.

6. The wig according to Claim 5, wherein the third and fourth steps are replaced with the steps of:

winding the weft and the sheet integrally around a pipe and covering them with an aluminum foil; and

heating them in this state for a predetermined period of time.