SPECIFICATION

HAIR-INCREASING DEVICE AND METHOD OF PRODUCING THE SAME

Technical Field

[0001] The present invention relates to a hair-increasing device which can be utilized for a wig covering the thinning areas of a head, for example, a hair-increasing device which can attach hair to a wig base in good appearance mainly composed of a net member made of filaments arranged in a lattice-like pattern, or to a hair-secured frame formed by assembling longitudinal ribs having rigidity and elasticity, and a method of producing the same.

Background Art

[0002] A wig comprises in general a sheet-like or film-like wig base formed with artificial skin made of thin synthetic resin and hair planted on said wig base. In cases where hair is thus planted on a wig base formed film-like with artificial skin or others, hair flow or hair amount can be freely designed depending upon the user's preferred hair style, using known hair planting arts such as single, half-knot, and split-knot plantings.

For example, if desired to finish in back style, hair is planted from the forehead to the top portion so to extend backward, and to make the hair appear to flow backwards at an angle on side head portions.

Also, in case to form a hair-dividing portion or a hair whorl in a wig base of artificial skin, hair flow or hair density can be freely designed so to extend in the pre-determined direction.

Thus, for a wig base formed sheet-like, film-like, or plane-like with densely woven textile, hair style can be freely expressed depending upon the user's preference by properly mixing known hair-planting arts.

[0003] Here, when the hair is in an early stage of thinning, or it is desired to increase hair amount only at a portion of a head, it is annoying to use a wig base formed film-like with artificial skin which has high airtightness,

and hence a hair-increasing device mainly comprising light nets excellent in air permeability is used, instead of an artificial skin base as a more convenient hair piece.

As such a hair-increasing device, a net base composed with filaments arranged lattice-like in matrix, or a hair-secured frame formed in the shape of a rib cage by assembling longitudinal linear ribs having rigidity and elasticity is often used.

For example, as is schematically shown in a diagonal view of Fig.13, the hair-increasing device 30 comprising a rib cage-shaped hair-secured frame 32 and hair 33 knotted to said hair-secured frame 32 is currently in wide use, as, in addition to its lightness and excellent air permeability, the appropriate desired hair-increasing treatment is possible, and arbitrary variation of hair style can be expressed, fully utilizing the user's own hair.

The rib cage-shaped hair-increasing device 30 comprises a hair-secured frame 32 having a connecting rib 32a at the center and a plurality of ribs 32b extending at both sides from said connecting rib 32a, and is formed by curving along the user's head shape (See Patent reference 1.).

Hair 33 is knotted densely to respective ribs 32a and 32b of said hair-secured frame 32, though only its portion is shown in Fig. 13, and most of hair 33 is omitted.

[0004] Hair 33 is knotted to respective ribs 32a and 32b of said hair-secured frame 32 by the above-mentioned known knotting.

Fig.14 is an enlarged diagonal view schematically illustrating hair flow of the hair 33 knotted by, for example, half-knot planting.

A strand of hair or a few strands of hair 33 are bound and bent at a center, and said bent portion is secured with knots 33c formed in 32a and the ribs 32b.

Here, the term "planting" or "hair planting" is used to convey the concept which would widely include the cases to knot hair to wire materials or to attach hair on a film-like wig base by sewing or bonding.

[0005] However, in cases where hair is attached on said net base or to a hair-secured frame, since filaments or ribs (hereinafter, these are termed

as wire materials as a whole) are all made of thin and long wire materials, hair is wound and knotted to said wire materials by using known hair planting arts such as single, half-knot, and split-knot plantings.

Therefore, unlike hair planting to artificial skin, the flow of the hair attached to filaments or ribs has to be restricted in a certain direction.

That is, in either case of a net member or a hair-secured frame, since it is formed by assembling wire materials in matrix or diagonal direction, in case, for example, to knot hair to the wire materials arranged in the forward and backward direction of a head, hair flow is necessarily in the direction in which one side and the other of the knotted hair are both orthogonally crossing to the wire materials, that is, divided left and right, and hence the backward hair flow is difficult in case, for example, back style is desired.

[0006] Explanation is made here, referring to Figs. 15 – 17, of the case to apply the known single, half-knot and split-knot planting to said wire material 32b arranged in back and forth direction of the hair-secured frame as shown in Fig. 14 to knot hair 33.

In Fig.15, the upper end of the wire material 32b is assumed to be arranged in the forehead direction, and the lower end in the backhead direction.

The single planting is the method to form a loop 34 by twisting the bent hair 33 (See Fig.15(A).), winding said loop 34 from the lower to the upper side of the wire material 32b with a hair-tying needle, and to knot after pulling out both one side 33a and the other side 33b of hair from the loop 34 (See Fig.15 (B) and (C).).

Therefore, both one side 33a and the other side 33b of the hair knotted by single planting are horizontally supported in the right angle direction to the wire material 32b arranged in the back and forth direction of the head, forming the right side hair flow in the figure.

[0007] The half-knot planting is, as shown in Fig.16, the method to form a loop 34 by twisting the bent hair 33 (See Fig.16(A).), winding said loop 34 like the above-mentioned case from the lower to the upper side of the wire material 32b with a hair-tying needle (See Fig.16(B).), and next to knot

only the other side 33b of hair to the wire material after pulling out from the loop 34 (See Fig.16(C).). By this method, the leftward and rightward direction hair flow is formed in which one side 33a of hair orthogonally crosses to the left side of the wire material 32b, and the other side 33b to the right side in the figure, and both one side and the other side of hair do not stand up in the planted state, but are knotted as the lying state.

[0008] The split-knot planting shown in Fig.17 is the method to form a loop 34, as shown in (A), by twisting clock-wise the bent hair 33 (See Fig.17(B).), to form a second loop 35 like the above-mentioned case with the other side 33b by passing the other side 33b of hair through the loop 34 (See Fig.17(C).), and next to knot one side 33a to the wire material after pulling out from the second loop 35 (See Fig.16(D).). By this method, one side 33a of hair stands diagonally upward with regard to the wire material 32b in the figure, but the other side 33b lies to the left of the wire material to form a crossing hair flow. Here, since a loop 34 is formed by clock-wise twisting in the illustrated example, the hair flow like one side 33a and the other side 33b of hair of Fig.17(D) is formed, but if a loop 34 is formed by anticlock-wise twisting and knotted sequentially, the other side 33b of hair stands diagonally upward with regard to the wire material 32b, but one side 33a lies likewise in the orthogonal direction to the wire material to form crossing hair flow.

[Patent Reference 1] JP Laid-open publication 2002-115115 A

Summary of the Invention

Problems to be Solved

[0009] As explained above, by any of the known hair planting methods, hair 33 has to be knotted orthogonally in the left and right direction with regard to the wire material 32b.

Therefore, first of all, since hair extends left and right with regard to the wire material 32b arranged in the back and forth direction of the head, it is difficult to design hair flow in the directions of forehead or backhead, and it tends to cause hair divided left and right, thereby the degree of freedom of hair style is restricted.

That is, since the base end side closer to the hair knot is knotted

in the sideward direction, that is, in the directions of left and right side head portions, even if natural backward hair flow is to be made from the forehead to the backhead portion, hair tends to have a sideward flow after a while due to its elasticity even if combed to make the tip side of hair flowing backward, resulting in separation from the user's own hair.

Thus, conventional knotting methods can only restrict the freedom or the versatility of hair style.

Secondly, since the wire material 32b is arranged orthogonally to the hair flow direction of hair 33, it is difficult to cover the wire material 32b completely with hair, and it might be possible for the wire material to be visible as a longitudinal line from the user's front or the upper side, and hence there is a problem that a hair-increasing device tends to be visible when worn.

Thirdly, both known hair knotting methods, especially the single or half-knot planting, cause the knotted hair to lie sideward as explained above, and hair does not stand upright even if knotted densely, resulting in a feeling of not having thick hair (rich voluminous appearance). Also, split-knot planting causes one side of hair to stand upright, but the other side to lie likewise in the orthogonal direction to the wire material.

Fourthly, both known methods tend to cause the knots to loosen. Therefore, a hair fixing process to firmly fix the hair 33 to the wire materials 32a and 32b is indispensable after knotting.

In order to firmly fix hair, adhesive solution diluted with organic solvent is applied and cured from the back side of wire materials 32a and 32b after the hair 33 is knotted, so-called resin coating has to be applied (not shown in the figure), and the knotted portion of the hair 33 has to be sandwiched between the ribs 32a and 32b and resin coating to be fixed and held.

[0010] As explained above, in case where hair is knotted and attached to a wire material of a net base or a rib-type hair-secured frame, the conventional planting method knots hair 33 to a wire material so to extend perpendicular, and hence hair does not stand upright and has a sensation of not having thick hair due to lying down of hair.

Also, since hair is knotted to the wire material sideward, the wire

material is not completely hidden. Therefore, the sire material tends to be visible through hair gaps, and there is a problem that the use of a wig may be apparent.

Furthermore, even if hair 33 knotted to the wire material is combed by brushing, it is difficult to align the hair flow in the longitudinal direction of the wire materials 32a and 32b, that is, to give the hair flow toward a back head or a forehead portions, and hence there is a problem of poor freedom of hair style.

[0011] One of the objects of the present invention is, in reference to the above-mentioned problems, to provide a hair-increasing device capable of making a wire material hardly visible because it is hidden with hair, the hair knot hardly loosened, causing good upright standing of the knotted hair, and giving free hair flow from the forehead toward the back of the head.

Another object of the present invention is to provide a new method of hair securing to the hair-increasing device, and a method of producing a hair-increasing device with said hair planting method applied thereto.

Here, a hair-increasing device of the present invention includes a wig base made mainly of net members produced by assembling filaments in mesh shape, and a hair-secured frame with hair knotted thereto produced, for example, rib cage-shaped with synthetic fiber having rigidity and elasticity similar to that of strings of a tennis racket, but, not limited only to them, but also includes known wigs made of a film-like wig base of artificial skin or others, and also a method of hair securing in accordance with the present invention is applicable to any wig.

Means to Solve Problems

[0012] In order to achieve one of said objects, a hair-increasing device in accordance with an embodiment of the present invention is characterized to have a wire material and hair tied to said wire material, bent hair being knotted to said wire material, its one side extending from the knot standing upright with regard to said wire material, and the other side extending from the knot on and along said wire material.

That is, the hair-increasing device of the present invention is such

that the bent portion of bent hair is knotted by twice winding one side of hair around the wire material, and by once winding and pulling out thereafter the other side, thereby one side of hair stands upright from the wire material, and the other side of hair is secured on the wire material to make hair flow extending along the longitudinal direction of said wire material.

More concretely, the hair-increasing device of the present invention has a first loop formed by twisting the bent portion of bent hair, a second loop formed on one side by winding said first loop to the wire material, and passing said one side of the bent hair into the first loop, a third loop formed on said one side by passing said one side into the second loop, and a knot formed with one side and the other side of hair by tightly binding the first, the second, and the third loops, characterized in that one side of hair stands and extends upward from the knot with regard to the wire material, and the other side of hair extends from the knot on and along the wire material after pulled out of the third loop.

That is, one side of hair is pulled out of the third loop, and is supported with said third loop to stand upright and extend upward with regard to the wire material, whereas the other side of hair is clipped between the wire material and the lower side of the second loop pushed down by the third loop, and lies on said wire material to extend along.

[0013] According to each of said aspects, as to the bent portion of bent hair, since one side is wound twice, while the other side is once wound and pulled out thereafter, and hence one half and the other half of hair are knotted to the wire material, the knot will not loosen, and is firmly knotted.

Also, since one half of the hair knotted to the wire material stands upright and extends vertically from the wire material to give hair flow in a direction of vertically standing upright, a sensation of having thick hair (rich voluminous appearance) increases, and hair-increasing appearance is realized by relatively small hair planting amount.

Further, since the other side of hair lies along the wire material and extends in its longitudinal direction, the surface side (upper side) of the wire material is covered and hidden with the other side of hair

knotted in plurality in parallel. Therefore, since the wire material is hidden with hair, and becomes invisible, the use of a hair-increasing device has no possibility of exposure.

[0014] In order to achieve said another object, the present invention provides a method of knotting hair to the wire material constituting a hair-increasing device, characterized in that it includes a first step to bring a hair-tying needle at the lower side of the wire material, hook and scoop with the hair-tying needle the bent portion of the bent hair, and thereby to form a first loop by twisting, a second step to form a second loop by winding said first loop to the wire material and scooping one side of hair with the hair-tying needle inserted through the first loop at one side of said hair scooped through the first loop, a third step to form a third loop by scooping again one side of hair with the hair-tying needle inserted through the second loop at said one side of hair scooped through the second loop, next a fourth step to scoop the other side of hair with the hair-tying needle inserted through the third loop and to completely pull out the other side of said scooped hair from the third loop, and finally a fifth step to have one side of hair stand upright on the wire material by tightly binding the first, the second and the third loops, and have the other side lie and extend on and along said wire material.

[0015] In order to further achieve said another object, the present invention provides a method of producing a hair-increasing device having a wire material and hair tied to the wire material, characterized in that a process of knotting hair to the wire material is constituted with a first step to bring a hair-tying needle at the lower side of the wire material, hook and scoop with the hair-tying needle the bent portion of the bent hair, and thereby to form a first loop by twisting, a second step to form a second loop by winding said first loop to the wire material and scooping one side of hair with the hair-tying needle inserted through the first loop at one side of said hair scooped through the first loop, a third step to form a third loop by scooping again one side of hair with the hair-tying needle inserted through the second loop at said one side of hair scooped through the second loop, next a fourth step to scoop the other side of hair with the hair-tying needle inserted through the third loop and to completely pull

out the other side of said scooped hair from the third loop, and finally a fifth step to have one side of hair stand upright on the wire material by tightly binding the first, the second and the third loops, and have the other side lie and extend on and along said wire material, and, by repeating said first to fifth steps sequentially, hair is tied to said wire material while said wire material is covered with the other side of hair.

Said first loop can be formed by twisting half a turn of the bent portion of the bent hair, and crossing the other side over one side of hair.

At the second step, the second loop may be formed by passing one side of the scooped hair into the first loop, and said second loop may be twisted half a turn.

At the third step, the third loop may be formed by passing one side of hair into the second loop, and said second loop may be twisted half a turn.

At the fifth step, when one side of hair is pulled, said first, second and third loops are tightened, and at the same time the third loop passes the second loop, protrudes through said second loop, and opens in a vertical direction with regard to the wire material at the top position, and one side of hair is supported by the third loop to stand upright with regard to said wire material by passing through the opening of the third loop from the lower side to protrude upward, and further the other side of hair is clipped between the second loop and the wire material, as the third loop presses the second loop downward, to extend on and along said wire material longitudinally.

[0016] The wire material used for the present invention may be filaments to constitute the net member of a wig base, or may be composed of a rib cage-shaped rib formed by assembling a plurality of rigid synthetic fiber filaments having elasticity. A frame of the predetermined shape made by assembling a plurality of ribs may be used as a hair-secured frame for hair-increasing.

In said aspect, hair may be knotted to each rib constituting a hair-secured frame after forming a frame of the predetermined shape made by assembling a plurality of ribs, or, after knotting hair to a rib in advance, a hair-secured frame may be constituted by assembling a

plurality of knotted ribs in matrix shape.

Here, the method of hair tying of the present invention is of course applicable to a film-like wig base made of artificial skin or textile, and these cases are also included within the range of the present invention.

Effect of the Invention

[0017] According to the present invention, since hair knotted to the wire material is such that one side of hair stands upright and extends vertically from the wire material, it provides a good upright angle and a sensation of having a good standing and rich voluminous appearance of hair, and since the other side extends in the longitudinal direction of the wire material, hair flow can be formed along the longitudinal direction of the wire material. Therefore, the hair-increasing device can be easily produced in which a wire material is hardly visible because it is covered and hidden by the other side of hair, knots do not easily loosen, excels in appearance and rich voluminous appearance, and various hair styles can be freely designed.

[0018] Also according to the method of hair knotting of the present invention, it is possible to knot hair, not only to said sire material but also to a film-like wig base, so as to make hair styles freely, and to knot for not easily loosened knots and good upright standing.

Brief Description of the Drawings

[0019]

Fig.1 is a diagonal view schematically illustrating an embodiment of a hair-increasing device in accordance with the present invention.

Fig.2 is an enlarged diagonal view schematically illustrating the flow of the hair tied to the rib of Fig.1.

Fig.3 is a partially enlarged diagonal view of a middle way of forming a first loop at a first step of hair knotting.

Fig.4 is a partially enlarged diagonal view illustrating the state of the first loop twisted half a turn at a first step of hair knotting.

Fig.5 is a partially enlarged view of a middle way of forming a second loop at a second step of hair knotting, and (A) is a front view, and

(B) is a right side view.

Fig.6 is a partially enlarged front view illustrating the state of forming a second loop at a second step.

Fig.7 is a right side view of said second loop.

Fig.8 is a partially enlarged view of a middle way of forming a third loop at a third step, and (A) is a front view, (B) is a right side view forming the third loop by passing one side of hair through the second loop, and (C) is a left side view.

Fig.9 is a partially enlarged view of the state to insert the other side of hair into the third loop at a fourth step of hair knotting, and (A) is a front view, (B) is a right side view of the state to pull the other side of hair into the third loop, and (C) is a front view of the state to pull the other side of hair into the third loop.

Fig.10 is a partially enlarged view of the state to pull out the other side of hair through the third loop, and (A) is a front view, and (B) is a right side view.

Fig.11 is a partially enlarged view of the state to separate the other side by pulling one side of hair at a final step of hair knotting, and (A) is a left side view, and (B) is a left side view during tightening.

Fig.12 shows the extending directions of one and the other halves of hair after tightening in the completed state of hair knotting, and (A) is a front view, (B) is a right side view, and (C) is a left side view.

Fig.13 is a diagonal view schematically illustrating the constitution of an embodiment of a conventional hair-increasing device.

Fig.14 is an enlarged diagonal view schematically illustrating hair flow of the hair tied to the wire material of Fig.13.

Fig.15 is an illustrative view sequentially showing the planting method by conventional single planting.

Fig.16 is an illustrative view sequentially showing the planting method by conventional half-knot planting.

Fig.17 is an illustrative view sequentially showing the planting method by conventional split-knot planting.

Explanation of Marks and Symbols

[0020]

10: Hair-increasing Device
11: Hair-secured Frame
11a: Connecting Rib
11b: Rib (Wire Material)
12: Hair
12a: One side of Hair
12b: The Other side of Hair
20: Hair Planting Needle
21: First Loop
22: Second Loop
23: Third Loop

Best Modes for Carrying out the Invention

[0021] The present invention will be more fully understood from the detailed description given hereinbelow and the accompanying drawings which are given by way of illustration only, and thus are not limitative of the present invention.

A hair-increasing device of the present invention comprises wire materials arranged in lattice shape and the hair tied to these wire materials, in which the hair paired by bending at about the middle portion is knotted to the wire material by binding one strand or a few strands of hair, one side of this pair of hair stands and extends upward with regard to the wire material from the knot, and the other side lies and extends from the knot on and along said wire material. Therefore, rich voluminous appearance is excellent, as one side stands upright with regard to the wire material by knotting a number of hairs densely to the wire material according to the present invention. Also, since the other side of hair extends along the longitudinal direction of the wire material, the wire material can be covered and hidden with the other side of hair.

[0022] Fig. 1 illustrates an embodiment of a hair-increasing device in accordance with the present invention. In the embodiment below, a hair-increasing device is explained as an example which uses ribs 11a and

11b formed with the rigid and elastic synthetic fiber of relatively large diameter as a wire material, and comprises a rib cage-shaped hair-secured frame 11 made by combination of a plurality of said ribs and hair 12 knotted to said hair-secured frame 11.

Said hair-secured frame 11 is constituted similarly to a hair-secured frame 2 of the conventional rib type hair-increasing device 1 shown in Fig.13, and is provided with a connecting rib 11a at the center, and a plurality of ribs 11b connected to said connecting rib 11a and extending to both sides.

Both connecting rib 11a and a plurality of other ribs 11b are made of same materials of about same diameter, and, for example, the connecting rib 11a illustrates a rib cage structure of a horizontal direction (that is, the direction of the user's left and right side head portion), and a plurality of the other ribs 11b illustrates a rib cage structure of a longitudinal direction (the direction from the user's forehead to back head portions).

Said hair-secured frame 11 is formed so that its whole including ribs 11a and 11b curves along the user's head shape. At both ends of ribs 11a and 11b are preferably formed swollen portions 11c.

By forming said swollen portions 11c in approximately a swollen spherical shape, the hair attached to each rib can be prevented from falling off, and contact with scalp is made soft so that injuring scalp can be prevented.

[0023] As the material for the ribs 11a and 11b, such synthetic resin material as nylon (polyamide synthetic fiber) and polyester that would neither injure the user's scalp nor be thermally distorted by a drier or others is preferred, and, in addition, the materials having elasticity and rigidity such as metal, hard paper, hard rubber, wood, bamboo, glass fiber and carbon fiber can be used.

[0024] Said hair 12 is made of human hair or artificial hair, and is knotted to ribs 11a and 11b at the loop side formed at the bent portion by binding and bending at about the middle portion one strand or a plurality of strands of hair 12.

[0025] Fig. 2 is an enlarged diagonal view schematically illustrating the

flow of the hair 12 tied to the rib 11b of Fig. 1.

As is illustrated, each hair 12 is knotted by binding one strand or a plurality of strands of hair, and bending at about a middle portion to make a pair of one side 12a and the other side 12b, so that said one side 12a stands upright in approximately a perpendicular direction from the rib 11b.

As the base portion of one side 12a of hair is knotted in the perpendicular direction, a sensation of having thick hair (rich voluminous appearance) can be realized with little hair tying amount, compared with the hair lying along a scalp.

The other side 12b of a hair portion is knotted along the longitudinal direction of the rib 11b and lies and extends on the upper surface of the rib 11b.

Therefore, the rib 11b is covered and hidden with the other side 12b of hair 12.

Thereby, since hair flow is formed along the longitudinal direction of the rib 11b, natural hair flow can be formed, and the degree of freedom of hair styles is improved, and thereby exposure of a hair-increasing device can be prevented. Here, hair knotting to a connecting rib 11a can be conducted similarly, but it may be by a known knotting method for a connecting rib 11a to be worn in the traversal direction, that is, in the direction of a user's left and right side head direction.

[0026] As for each hair 12 knotted to a hair-secured frame 11 of the hair-increasing device 10, as described below, since one side of hair 12a is wound twice, and the other side is once wound and pulled out thereafter for knotting, the knot 12c shown in Fig. 12 would not loosen, and further since the other side is wound once, the knot 12c would not become too large.

Since knotted on the upper side of the rib (the opposite side of scalp), the knot 12c would not contact scalp to cause bad feeling on skin upon wearing of the hair-increasing device 10. Since also one side of hair 12a is supported by said knot 12c so as to stand upright vertically from both sides, rich voluminous appearance can be increased with little hair planting amount, whereas the other side of hair 12b is supported by said

knot 12c horizontally so as to extend in the longitudinal direction of the rib 11b, the rib is hidden by the other side of hair 12b, as well as hair flow can be formed in the forward and backward direction from a user's forehead portion to back head portion.

[0027] The hair-increasing device 10 of the present invention uses a wig base made of a net member of wide meshes, or a rib cage-shaped hair-secured frame like the above-mentioned example, and is suitable to a so-called living hair-utilizing type wig used by mixing with the user's own hair.

For wearing the hair-increasing device 10 of the present invention on a head, it is possible by attaching a specific stopper on the back side of the hair-increasing device 10, and clipping living hair on a head with said stopper, or by knitting living hair into the hair of a wig, or knotting living hair to a string member provided on the periphery of a base.

[0028] Explanation is next made of an example of the case to attach hair to a rib using said hair-secured frame by a producing method of the hair-increasing device 10 of the present invention.

First, a hair-secured frame of the predetermined shape is produced. More concretely, twisted fiber of nylon of 0.1 – 3.0 mm diameter or the like, for example, is made ready as ribs 11a and 11b constituting a hair-secured frame 11, and it is formed by assembling appropriate number of strands, and mutually jointing these cross sections by such various methods as adhesion, knotting, sewing and melting so that the predetermined shape is prepared suitable to the wearer's head shape. In this case, as shown in Fig.1, longitudinal ribs 11b are bonded one by one at proper intervals to connecting ribs 11a as crossing ribs.

Next, the hair-secured frame 11 prepared by connection is placed on a pattern prepared in advance of the wearer's head shape, for example, a plaster type, and a pattern is prepared for the wearer's head shape by heating for the pre-determined time at the pre-determined temperature.

Here, if the surface of each rib 11a and 11b is made coarse with sand paper or else, the gloss of the rib surface is suppressed, and the fall off or misalignment of the hair 12 attached by the later process is better prevented. A swollen portion 11c is also formed at both tips of each rib

11a and 11b to prevent fall off of the knotted hair 12 and to protect a scalp. On the thus formed hair-secured frame 11, hairs are attached one by one according to the hair planting method of the present invention.

[0029] Hereinafter, explanation is made of embodiments of the knotting method of hair 12 in accordance with the present invention.

Figs.3 – 11 illustrate each step to knot hair 12 to a rib 11b arranged in the back and front direction of a head, and Fig.12 shows the state of knotted hair completed by tightening.

As a first step as shown in Fig.3, a strand or a bundle of 2 – 4 strands of hair 12 (a strand is shown in the figure) brought to the lower side of a rib 11b from the left side in the figure of the rib 11b is hooked with a hook-shaped hair-tying needle brought to its lower side (the side contacting scalp) from the right side of the rib 11b.

In this case, a loop is formed first by bending hair 12, for example, at about the middle portion, a hair-tying needle 20 is hooked to this loop, and, as shown in Fig.4, the loop is twisted by half rotating the hair-tying needle 20 anticlockwise on the figure.

In Fig.4, twisting is conducted so that the other side 12b of hair comes above one side 12a of hair which is made a pair by bending. Thus, a first loop 21 is formed. Said first loop 21 is taken up from the lower side of the rib 11b, and wound upward above the rib 11b.

[0030] In the actual hair planting work at said first step, the hair-tying needle 20 is hooked to the first loop 21, and thereafter is twisted by one rotation anticlockwise on the figure so that the hook of the hair-tying needle 20 turns upward (illustration omitted). In this state, the first loop 21 is wound around the rib 11b by moving the hair-tying needle 20 from the lower to the upper side of the rib 11b. In this case, if the positions are interchanged of one side 12a and the other side 12b of hair, the first loop 21 is in the twisted state by half rotation (See Fig.4.).

[0031] After bending the first loop 21 wound around the rib 11b to the other side (the left side in the figure), as a second step as shown in Fig.5, the hair-tying needle 20 is inserted through the first loop 21, hooking and scooping one side 12a of hair 12, and is pulled into the first loop 21. Fig.5 (A) is a front view of a middle way of pulling one side 12a of hair 12 into

the first loop 21 using the hair-tying needle 20, and (B) is a right side view.

As shown in Fig.6, a second loop 22 is formed with one side 12a of the scooped hair. In this case, the second loop 22 may be inverted by half rotating the hair-tying needle 20. Of course, the process may proceed to the next step without inversion.

[0032] As a third step as shown in Fig.7, said second loop 22 is bent to the other side (the left side in the figure) using the hair-tying needle 20 which is inserted into said second loop 22 as shown in Fig.8, one half 12a of said hair 12 is again hooked and scooped, and is pulled into the second loop 22. A third loop 23 is formed above the second loop 22 with one half 12a of the scooped hair 12. Here, Fig.8 (A) is a front view of the state to scoop one half 12a of hair with the hair-tying needle 20, (B) is a right side view of the state to pull one half 12a of the scooped hair into the second loop 22, but illustrates the state before tightening to clearly show the knotting step. (C) is a left side view.

[0033] As a fourth step that follows as shown in the front view of Fig.9 (A), the hair-tying needle 20 is inserted into the third loop 23, and hooks and scoops in this case the other side 12b of hair, and, as shown in Figs.9 (B) and (C), the hair-tying needle 20 is pulled out completely the other side 12b of the scooped hair from said third loop 23, as shown in Fig.10. The state of the other side 12b of hair pulled out from the third loop 23 is illustrated in Fig.10 (B). In this state, one side 12a of hair extends to the left side in the figure, and the other side 12b extends to the right side in the figure. The hair knotting step to the rib is thus completed.

[0034] The final step is a process to tightly binding the knotted hair. In this case, if both halves 12a and 12b of said hair 12 are held with fingers, for example, one side 12a is grabbed with left fingers, the other side 12b grabbed with right fingers, and then one side 12a is pulled in the direction of an arrow mark of Fig.11, a loose knot is gradually tightened, and one side 12a and the other side 12b of hair slide in the opposite direction (lower and upper directions in the figure) along the rib 11b, as shown in Fig.11, so that each of the first, second and third loops 21, 22 and 23 is tightened.

[0035] When one side 12a of hair is further tightened in the arrow mark direction of Fig.11 (B), the third loop 23 passes through the opening of the second loop 22, as shown in Fig.12, is brought above said second loop 22, and ultimately forms a loop at the uppermost portion in the approximately horizontal direction. Therefore, one side 12a of hair passes through the opening from the lower side of said third loop 23 to protrude upward, supported by the third loop 23, and stands upright above the rib 11b and extends upward.

The second loop 22 is pressed on to the rib 11b with said third loop 23 below the third loop 23. Therefore, the other side 12b of hair is in the state of being clipped and pressed between the second loop 22 and the rib 11b, and lies and extends horizontally on said rib 11b toward the tip of the rib 11b (upper direction in Fig.12 (A) and (B).).

[0036] Thus, at the final fifth step, when one side 12a of hair is pulled and tightened, one side 12a of hair 12 is supported mainly with the third loop 23, as shown in Fig.12, and can extend vertically upward above the rib 11b. That is, since the third loop 23 is formed approximately horizontally so as to open in the upward and downward direction at the uppermost position of the knot, one side 12a of hair is tightened and supported therearound with ring-shaped hair, as the third loop 23 opening upward above the rib 11b is closed. Thus, one side 12a of hair is supported vertically with the third loop 23, and extends in the vertical direction to the rib 11b. However, the tip portion of hair 12a curves downward by flexibility.

On the other hand, the other side 12b of hair is clipped and pressed between the lower side of the second loop 22 pressed with the third loop 23 and the rib 11b, and extends in the longitudinal direction of said rib 11b on said rib 11b. Therefore, if a number of strands of hair 12 are densely knotted to the rib 11b, the rib 11b is completely covered and hidden with the other halves 12b of hair, so that the rib 11b is hardly exposed, and hair flow can be formed in the forward and backward direction of a head with the other halves 12b of hair along the longitudinal direction of the rib 11b.

[0037] By repeating the above-described method of tying, strands of hair

12 of the predetermined number are tied to each rib 11b, and thereby a hair-increasing device 10 can be produced.

Here, for a connecting rib 11a shown in Fig.1, that is, a rib in the traversal direction, since hair flow in the forward and backward direction can be formed, if hair planting is conducted using a known knotting method, for example, split-knot planting, it is in the same direction as the above-mentioned hair flow, and hence fits well. Alternatively, if variation is properly made depending upon hair planting positions by the knotting method of the present invention and by known knotting methods, various tasteful hair flow and hairstyle can be formed.

[0038] The hair increasing device 10 in accordance with embodiments of the present invention is constituted as described above, and is used by wearing at the predetermined position of a user's head. Since said hair-increasing device 10 is such that one side 12a of each hair 12 is tied to stand upright in the approximately vertical direction from a rib 11b, it has rich voluminous appearance.

Since the other side 12b of hair makes hair flow extending along the longitudinal direction on the rib 11b, the rib 11b is covered with hair 12, and hence it is almost invisible from outside. Also, since hair flow is easily formed along the longitudinal direction on each rib 11b, a hair style rich in variation can be realized.

[0039] As for each hair 12 knotted to a hair-secured frame 11 of a hair-increasing device 10, since one side is knotted by twice winding, and the other side is knotted by once winding and pulling out thereafter, knots would not loosen, and moreover since the other side is wound only once, knots would not become so large, and would not cause bad feeling on skin by contact of knots on the scalp upon wearing of the hair-increasing device 10.

[0040] As has been described, according to the present invention, a hair-increasing device and a method of planting thereon are provided which offer a hair-secured frame and its rib hardly visible, knots hardly loosened, and good upright standing.

[Example]

[0041] First of all, ribs 11a and 11b of a proper number were prepared by cutting twined nylon filament of 1.2 mm diameter to the predetermined size as a wire material, assembled to the predetermined shape suited to a user's head shape, and each of their cross sections was mutually connected by supersonic bonding, thereby a hair-secured frame 11 was produced.

Next, the connected hair-secured frame 11 was placed on a plaster pattern of the wig wearer's head shape prepared in advance, shaping of the hair-securing frame was conducted of the wig wearer's head shape by heating at 170℃ for 3 hours, the surface of each of ribs 11a and 11b was made coarse.

Thereafter both tip portions of each of ribs 11a and 11b were soaked in nylon solution dissolved in organic solvent, and solidified by cooling, or were coated with or soaked in a thermosetting resin solution and dried, thereby each swollen portion 11c was formed.

By the fastening method explained by the above-mentioned producing method (See Figs.3 – 12.), hairs of the predetermined number were tied to each rib 11b. Finally, by bonding and fixing the tied hair to each rib with an adhesive for hair, the hair-increasing device 10 was obtained.

[0042]

(Comparative Example)

A hair-increasing device of Comparative Example was produced, using the same hair-secured frame 11 and rib 11b as Example, and by the conventional method of knotting hairs of the same number.

[0043] Outlook inspection was conducted next for Example and Comparative Example.

In case of the hair-increasing device 10 of Example, it turned out that hair flow of the tied hair 12 was formed in the longitudinal direction of the rib 11b, and the rib 11b is not exposed, and hence has good appearance compared with Comparative Example. On the other hand, in case of Comparative Example, since hair flow was formed on left and right sides of the rib 11b, hair dividing was caused as time elapsed in spite of brushing and combing, and the rib tended to be exposed, hence

appearance turned out to be poorer than Example. As hair lied down, rich voluminous appearance was also poor.

[0044] Next, the hair-increasing device 10 of Example was worn by a tester, and outlook observation was conducted after blended with the wearer's own hair. Then, the presence of the rib 11b was not observed.

Also, hair flow of the wearer's own hair and that of the hair 12 knotted on the hair-increasing device 10 fitted one another well, wearing of the hair-increasing device 10 was undetectable even upon long time wearing, and appearance was excellent.

[0045] Heretofore, suitable embodiments of the present invention were explained, but the present invention is not limited only to these embodiments, but proper modification is possible within the range of the present invention. For example, the color or size of knotted hair 12 may be chosen freely, and particularly in case for decoration, hair 12 of various color may be knotted to the ribs 11a and 11b. Also as a wire material, it is not limited only to the ribs 11a and 11b shown in the above-mentioned Example, but obviously filaments constituting a wig base made of ordinary net member, and other various linear, rod-shaped, or belt-shaped materials may also be applicable. The method of hair planting of the present invention is also obviously applicable to a film-like wig base formed with artificial skin or textile sheet or film. Further, concrete numerical values and others explained in said embodiments may be properly changeable as is required. It is of course possible to add a process, after hair is attached by the present invention, of bonding and fixing to the wire material with an adhesive for hair.

Here, as an embodiment, an example was shown in which a loop 21 was formed at a first step by twisting a bent portion of hair anticlockwise, and laying the other side 12b of hair on one side 12a, followed by knotting in turn, but a loop may be formed by twisting a bent portion of hair clockwise, and laying one side 12a of hair on the other side 12b, and the process may proceed on to next step (illustration omitted). In this case, one side 12a and the other side 12b of hair are knotted in turn in the reverse order to the above-mentioned explanation, and finally, the other side of hair stands and extends upward from the knot with respect

to a wire material, as well as one side lies and extends from the knot on and along the wire material. In the present invention, one side and the other side of hair are a relative concept, and it is obvious that which side is defined as one half or the other half is not an important factor of the present invention.

CLAIMS

What is claimed is:

1. A hair-increasing device, provided with a wire material and hair tied to said wire material, comprising:

bent hair being knotted to said wire material; and

one side of said bent hair standing and extending upward from the knot with respect to said wire material, whereas

the other side extending from the knot on and along said wire material.

2. A hair-increasing device, provided with a wire material and hair tied to said wire material, comprising:

the bent portion of the bent hair being knotted; so that

one side of hair standing and extending upward with respect to said wire material, whereas

the other side of hair extending on and along the longitudinal direction of said wire material to form hair flow extending in the longitudinal direction,

by knotting after twice twisting one side of hair around said wire material, whereas once twisting the other side of hair and pulling it out thereafter.

3. A hair-increasing device, provided with a wire material and hair tied to said wire material, comprising:

a first loop formed by twisting the bent portion of bent hair,

a second loop formed with one side by winding said first loop around the wire material and passing said one side of the bent hair through said first loop,

a third loop formed with said one side by passing said one side through said second loop, and

a knot, which is made with one side and the other side of hair, formed by tightly knotting said first, second and third loops,

one side of hair stands and extends upward from said knot with respect to the wire material, whereas

the other side of hair, which is pulled out through said third loop, extends on and along said wire material.

4. The hair-increasing device according to claim 3, wherein when said first, second and third loops are tightly bound,

said third loop opens in the vertical direction at the uppermost position with respect to the wire material,

one side of hair protruding upward from said third loop is supported with said third loop, and stands upright with respect to said wire material, whereas

said other side of hair is clipped and pressed between said second loop and said wire material beneath the pushed down second loop, and extends on and along said wire material.

5. The hair-increasing device according to any one of claims 1 – 3, wherein said wire material is a filament constituting a net member of a wig base.

6. The hair-increasing device according to any one of claims 1 – 3, wherein said wire material is made of rib cage-shaped ribs formed by assembling a plurality of rigid synthetic fiber filaments having elasticity.

7. The hair-increasing device according to claim 6, wherein:

a hair-secured frame is made by assembling a plurality of said ribs, and said hair-secured frame is worn on a user's head, and is mixed with the user's own hair.

8. A method of knotting hair to a wire material constituting a hair-increasing device comprising:

a first step to bring a hair-tying needle beneath the wire material, to hook and scoop the bent portion of bent hair with said hair-tying needle, and to form thereafter a first loop by twisting;

a second step to wind said first loop around the wire material, to scoop one side of hair by inserting the hair-tying needle through said first loop, and to form a second loop with said one side of hair scooped through said first loop;

a third step to scoop again said one side of hair by inserting the hair-tying needle through said second loop, and to form a third loop with said one side of hair scooped through said second loop;

a fourth step next to scoop said other side of hair by inserting the hair-tying needle through said third loop, and to pull out completely said scooped other side of hair from the third loop; and

a final fifth step to have one side of hair stand upright with respect to the wire material by tightening said first, second and third loops, whereas to have the other side extend on and along said wire material.

9. A method of producing a hair-increasing device provided with a wire material and hair tied to said wire material, a hair knotting process to said wire material comprising:

a first step to bring a hair-tying needle beneath the wire material, to hook and scoop the bent portion of bent hair with said hair-tying needle, and to form thereafter a first loop by twisting;

a second step to wind said first loop around the wire material, to scoop one side of hair by inserting the hair-tying needle through said first loop, and to form a second loop with said one side of hair scooped through said first loop;

a third step to scoop again said one side of hair by inserting the hair-tying needle through said second loop, and to form a third loop with said one side of hair scooped through said second loop;

a fourth step next to scoop said other side of hair by inserting the hair-tying needle through said third loop, and to pull out completely said scooped other side of hair from the third loop; and

a final fifth step to have one side of hair stand upright with respect to the wire material by tightening said first, second and third loops, whereas to have the other side extend on and along said wire

material, and

tying hair to said wire material covering the same with the other side of hair by repeating in turn said first to fifth steps.

10. The method of producing a hair-increasing device according to claim 9, wherein said first loop is formed by twisting half a turn of the bent portion of bent hair, and crossing the other side on one side of hair.

11. The method of producing a hair-increasing device according to claim 9, wherein at said second step, said scooped one side of hair is passed into the first loop to form a second loop, and said second loop is twisted half a turn.

12. The method of producing a hair-increasing device according to claim 9, wherein at said third step, said one side of hair is passed into the second loop to form a third loop, and said second loop is twisted half a turn.

13. The method of producing a hair-increasing device according to claim 9, wherein at said fifth step, by pulling said one side of hair to tighten said first, second and third loops,

the third loop passes through, and protrudes from the second loop, and opens in the vertical direction at the uppermost position with respect to the wire material, and

one side of hair passes through the third loop from the lower side of said third loop and protrudes upward, thereby stands upright supported with said third loop with respect to said wire material, and further

as said third loop presses said second loop downward, the other side of hair is clipped and pressed between said second loop and said wire material, and extends on and along said wire material.

14. The method of producing a hair-increasing device according to claim 8 or 9, wherein said wire material is a filament constituting a net

member of a wig base.

15. The method of producing a hair-increasing device according to claim 8 or 9, wherein said wire material is made of ribs formed by assembling a plurality of rigid synthetic fiber filaments having elasticity.

16. The method of producing a hair-increasing device according to claim 15, wherein a plurality of said ribs are assembled to form a frame of the predetermined shape, and thereafter said hair is knotted to each rib constituting said frame.