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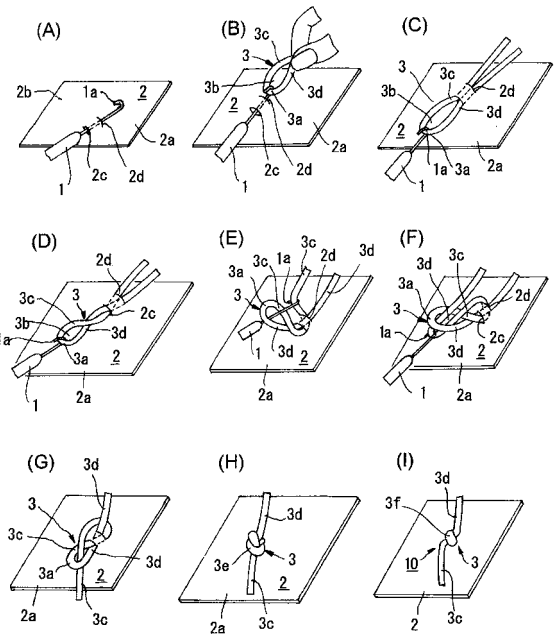
(54) WIG, AND ITS MANUFACTURING METHOD

(57) By undergoing a first step for passing a hook portion 1a of a hair-implanting needle 1 from the surface 2a to the back 2b of a wig base 2 and passing the hook portion back onto the surface at another position, a second step for catching a loop 3b formed at the turning position of hair 3 folded, a third step for pulling the loop 3b out of the wig base 2 in a state wherein the hair is caught by the hair-implanting needle 1, a fourth step for catching one side 3a of the hair with the hook portion 1a, a fifth step for pulling the hair-implanting needle out of the loop 3b in this state, a sixth step for forming a knot by pulling one side 3a of the hair while holding the other side 3b, and a seventh step for moving the knot 3e to the back 2b of the wig base by pulling the other side 3b of the hair while holding the one side 3a of the hair, a wig wherein the knot 3e of the hair 3 is on the back 2b of the wig base is produced.

FIG.1



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Description

Technical Field

[0001] The present invention relates to a wig worn on a head and a method for manufacturing the wig, more specifically the wig wherein the part that ties hair to a wig base is not placed on the surface of the wig base and has sufficient adhesion, and the manufacturing method of the wig.

Background Art

[0002] Conventionally, a wig is manufactured by implanting human or artificial hair to a wig base in a shape of a head made of artificial synthetic resin skin or a net material, and by applying a hair adhesive, as required, to the back of the wig base on which the hair has been planted. As disclosed in patent literature 1, planting methods such as single planting, half-knot planting, and split-knot planting are known.

[0003] All of the planting methods disclosed in patent literature 1 make pairs of holes on a wig base using a hook, etc., make hair pass through these holes, and tie them on the surface of the wig base, meaning that the knots are placed on the surface of the wig base.

[0004] Under any of the methods disclosed in patent literature 1, knots of hair are on the surface of the wig base. Consequently, the knots look like blots, and because of that unnaturalness, the wig is easily recognizable as a wig. In addition, when hair is brushed, the teeth of a brush may catch these knots, hampering smooth brushing. If brushing is given repeatedly, the knots may become loose, thus resulting in coming off of wig hair. Furthermore, depending on the knotting method, erection of hair may become insufficient and consequently desirable volume may not be obtained.

[0005] To solve these problems, patent literature 2 discloses a method for planting hair on a second base, which forms a bottom layer of a wig base comprised of a top first base and a bottom second base, inserting a hook from the surface of the top first base, catching the hair planted on the second base, and drawing the hair out of the surface of the first base.

[0006]

Patent literature 1: JP2007-92202A
Patent literature 2: JP2006-183215A

Disclosure of Invention

Technical Problem

[0007] However, although this method solves the problem described above resulting from the structure that hair knots are on the surface, along with the problem of insufficient hair erection, the method requires providing two wig bases. In addition, the process of drawing out the hair planted on the second base onto the surface of the first base is a cumbersome task decreasing work efficiency. In addition, application of a hair adhesive was still needed.

[0008] To solve the problems described above, the present invention provides a wig comprising a wig base and hair planted on the wig base, **characterized in that** hair knots are not on the surface of a wig base and that sufficient adhesion is obtained, along with the manufacturing method of the wig.

Solution to Problem

[0009] To achieve the above objective, the present invention provides a wig comprising a wig base and hair tied to the wig base, **characterized in that** the knots of hair are on the back of the wig base.

[0010] According to the present invention, the bridging portion of hair linked to a knot is on the surface of the wig base.

[0011] It is preferable that the wig base be an artificial skin base at least a part of which is made of a synthetic resin, and the knot of hair be placed on the back of the artificial skin base by being made to pass through a pinhole made on the artificial skin base.

[0012] The pinhole made on the artificial skin base contracts while catching hair. Consequently, the hair can be retained upright.

[0013] It is preferable that the wig base be a net base made of a net member, at least partially, that the hair be tied by being wrapped around a filament constituting the net base, and that the knot be placed on the back of the net base.

[0014] It is desirable that the mesh size of the net base be smaller than the size of the knot.

[0015] The method of manufacturing a wig according to the present invention comprises a process of tying hair to a wig base and a process of transferring the hair-tying knot to the back of the wig base, while settling the bridging portion linked to the knot onto the surface of the wig base, by pulling one side of the hair.

[0016] Specifically, the method for manufacturing the wig according to the present invention comprises a first step for attaching hair to a wig base by passing a hook portion of a hair-implanting needle from the surface to the back of the wig base and passing the hook portion back onto the surface at another position, a second step for folding the hair and catching the loop formed at the turning position by the hook portion, a third step for pulling the hair-implanting needle, with the loop of the hair kept caught by the hook portion, back onto the surface of the wig base through the pinholes through which the hair-implanting needle was inserted previously, a fourth step for catching one side of the hair with the hook portion, a fifth step for pulling the hair-implanting needle out of the loop with that side of the hair caught by the hook portion, a sixth step for forming a knot by pulling one side of the hair while holding the other side, and a seventh step for

moving the knot to the back of the wig base by pulling the other side of the hair while holding the one side of the hair.

[0017] Under the method of the present invention, it is desirable to insert a step of rotating the hair-implanting needle, after the loop is caught by the hook portion, on the axis of the longitudinal direction of the hair-implanting needle.

[0018] Under the method of the present invention, it is desirable to settle the bridging portion linked to the knot of the hair on the surface of the wig base.

[0019] Under the method of the present invention, it is desirable to form at least a part of the wig base with an artificial skin base made of a synthetic resin, and to pass the knot of the hair through a pinhole made on the artificial skin base, thus making it settle on the back of the artificial skin base.

[0020] Under the method of the present invention, it is desirable to retain the hair upright by allowing the pinhole made on the artificial skin base to close while retaining the hair.

[0021] Under the method of the present invention, it is desirable to form at least a part of the wig base with a net base made of a net member, to fasten the hair to filaments constituting the net base by wrapping the hair around the filament, and to transfer the knot to the back of the net base.

[0022] Under the method of the present invention, it is desirable that the mesh size of the net base be smaller than the size of the knot.

Advantageous Effects of Invention

[0023] According to the wig of the present invention, since the relatively large knots are placed on the back of the wig base, the knots are invisible through the gap between the hairs planted from the surface of the wig base, making the wig hardly recognizable as a wig. In addition, smooth brushing is allowed even when the wig is worn because the teeth of a brush do not catch the knots, thus minimizing the load on the hair implanted. Damage on the hair or loosening of the knots and resulting coming off of hair can thus be prevented. Furthermore, since the knots are placed on the back of the wig base, the teeth of a brush do not contact the knots directly when brushing or washing is performed. Loosening of the knots can thus be prevented. In addition, since adhesion of the hair to the wig base is so strong that no adhesive is required to fasten the hair after implantation. Since only one wig base is needed, the entire wig is made thin and lightweight, making the boundary between the head and the outer periphery of the wig less recognizable. Another advantage of the present invention is that since the part immediately adjacent to the knot of implanted hair is supported by the wig base, favorable erection of the hair is achieved, thus providing sufficient hair volume.

[0024] According to the manufacturing method of the present invention, a wig that does not have knots on the surface can be manufactured. Furthermore, since the knots exist on the back of the wig base, the hair can be adhered to the wig base securely, and the need for applying an adhesive for fastening after implantation can be eliminated, simplifying the manufacturing process.

[0025] By rotating the hair-implanting needle in the second step, the hair is twisted, which enhances the adhesion of the hair to the wig base.

Brief Description of Drawings

[0026] FIG. 1 provides perspective views illustrating the manufacturing method of the wig in the embodiment of the present invention. (A) illustrates the first step, (B) the second step, (C) and (D) the third step, (E) the fourth step, (F) and (G) the fifth step, (H) the sixth step, and (I) the seventh step sequentially.

FIG. 2 (A) shows an image of the cross section of the wig in the embodiment (observed at 90-fold magnification) viewed at an oblique angle from above. FIG. 2 (B) is a diagram for assigning codes showing the same part as FIG. 2 (A).

FIG. 3 (A) shows an image of the cross section of the wig in FIG. 2 (observed at 80-fold magnification) viewed at an oblique angle from underneath. FIG. 3 (B) is a diagram for assigning codes showing the same part as FIG. 3 (A).

FIG. 4 (A) shows another image of the cross section of the wig in FIG. 2 (observed at 80-fold magnification) viewed at an oblique angle from underneath. FIG. 4 (B) is a diagram for assigning codes showing the same part as FIG. 4 (A).

FIG 5 (A) shows an image of a plan view of the wig in comparative example 1 (observed at 50-fold magnification). FIG. 5 (B) is a diagram for assigning codes showing the same part as FIG. 5 (A).

FIG. 6 shows an image of a plan view of the wig in comparative example 2 (observed at 70-fold magnification). FIG. 6 (B) is a diagram for assigning codes showing the same part as FIG. 6 (A).

Reference Signs List

[0027]

1:	Hair-implanting needle
1a:	Hook portion
2:	Wig base
2a:	Surface of the wig base
2b:	Back of the wig base
2c:	First passing portion
2d:	Second passing portion
3:	Hair
3a:	Turning position of the hair
3b:	Loop
3c:	One side of the hair
3d:	The other side of the hair
3e, 31, 32:	Knot

3f: Intermediate part of the hair

Best Modes for Carrying Out the Invention

[0028] A preferred embodiment of the present invention will hereinafter be described in detail by referring to the attached drawings. As a wig base, an artificial skin base at least a part of which is made of a synthetic resin, or a net base at least a part of which is made of a net member, is used. As an artificial skin base, a polyurethane film or sheet formed in a convex shape, curving smoothly along the head of a user, is ideal. A polyurethane resin has excellent elasticity and flexibility. Therefore, when hair is attached to the polyurethane resin by inserting a hair-implanting needle into the resin, the hair that has passed through the resin is supported tightly by the contractive force of the resin. When a net base is used, it is desirable to use one having a mesh size smaller than the size of the knot of the hair to be implanted. For example, the mesh size kept within 2 to 2.5 times the diameter of the hair is smaller than that of the knot of the hair to be implanted. Either natural or artificial hair can be used.

[0029] FIG. 1 provides plan views illustrating the manufacturing method of the wig in this embodiment. An artificial skin made of a polyurethane resin is used.

[0030] In the first step shown in FIG. 1 (A), the hook portion 1a of the hair-implanting needle 1 is inserted from the surface 2a into the back 2b of the wig base 2, and then at a position a specified distance apart from the position of the insertion, the hook portion 1a is made to penetrate from the back 2b onto the surface 2a of the wig base to reappear on the surface 2a. Two holes, namely two pinholes, are thus made on the wig base 2, with the hair-implanting needle 1 inserted into these two pinholes. If a wig base made of a net member is used, the hair-implanting needle 1 is inserted into one mesh hole and back onto the surface through an adjacent mesh hole. In this case, the two pinholes or mesh holes through which the hair-implanting needle 1 is passed are defined as a first passing portion 2c and a second passing portion 2d, respectively. With an artificial skin wig base, it is desirable that the distance between the first and the second passing portions 2c and 2d be maintained at 0.5 mm to 2 mm at the maximum. If this distance is too long, creases may be formed on the wig base 2 when the hair is pulled for tightening after being tied, thus causing deformation of the wig base 2 or loosening of the tied portion.

[0031] In the second step shown in FIG. 1(B), one or approximately 2 to 5 hairs 3 are bundled and folded, and a loop 3b formed at the turning position 3a is caught by the hook portion 1a protruding on the surface of the wig base 2. In this case, both sides of the hair folded at the turning position 3a are defined as one side 3c and the other side 3d respectively. The length of one side 3c and the other side 3d may be identical, or one of them may be longer than the other. If the turning position 3a is determined to deviate from the midpoint of the hair, the length of the one side 3c differs from that of the other side 3d, providing the wig with natural finishing tone.

[0032] In step 3 shown in FIG. 1 (C), in a state in which the loop 3b of the hair 3 is caught by the hook portion 1a, the hair-implanting needle 1 is pulled through the wig base 2 onto the back 2b of the wig base 2 at the second passing portion 2d, and the hair-implanting needle 1 is then pulled through the first passing portion 2c. The hair-implanting needle 1 is thus pulled out of the wig base 2 completely. As a result, the loop 3b of the hair 3 caught by the hook portion 1a is pulled through the second passing portion 2d and then the first passing portion 2c, and exposed to the surface 2a of the wig base 2. As shown in FIG. 1 (C), the hair 3 that has passed through the second passing portion 2d and then the first passing portion 2c appear on the surface 2a of the wig base 2 as a loop 3b.

[0033] As shown in FIG. 1 (D), in a state in which the loop 3b is caught by the hook portion of the hair-implanting needle 1, the hair-implanting needle 1 is rotated counterclockwise by one turn on the axis of the longitudinal direction of the hair. By undergoing this process of twisting the loop 3b, the adhesion of the hair 3 to the wig base can be enhanced. This twisting process may be performed immediately after the loop 3b is caught by the hook portion 1a of the hair-implanting needle protruding from the surface 2a of the wig base 2 in the second step. The number of turns and the rotational direction can be set as required.

[0034] In the fourth step shown in FIG. 1 (E), one side 3c of the hair 3 is caught by the hook portion 1a of the hair-implanting needle 1 in a state in which the hair-implanting needle passes through the loop 3b.

[0035] In the fifth step shown in FIG. 1 (F), one side 3c of the hair 3 caught by the hook portion 1a is pulled through the loop 3b along with the hair-implanting needle 1. Then as shown in FIG. 1 (G), the one side 3c of the hair 3 is pulled out of the loop 3b completely along with the hair-implanting needle. The one side 3c of the hair 3 is then disengaged from the hook portion 1a of the hair-implanting needle 1.

[0036] In the sixth step shown in FIG. 1 (H), the one side 3c of the hair 3 is pulled while the other side 3d is held by the fingers of a hair-implanting engineer to form a knot 3e on the surface 2a of the wig base 2.

[0037] Finally, in the seventh step shown in FIG. 1 (I), in a state in which the wig base 2 is fastened on a workbench, the other side 3d of the hair 3 is pulled strongly while the one side 3c of the hair 3 is held by the fingers of the hair-implanting engineer. As a result, the knot 3e passes through the first passing portion 2c onto the back 2b of the wig base 2.When the loop 3b is twisted clockwise in the fourth step, the other side 3d of the hair 3 is caught by the hook portion of the hair-implanting needle 1 and pulled out of the loop 3b in the fourth step.

[0038] As shown above, by repeating from step 1 to step 7 for attaching the hair 3 to the wig base 2, the wig 10 in which the knots 3e are placed on the back 2b of the wig base 2 can be produced. In this case, the one

side 3c and the other side 3d of the hair 3 pass through the first passing portion 2c and the second passing portion 2d respectively, make a knot 3e on the back 2b of the wig base, and pass the first passing portion 2c and the second passing portion 2d respectively back onto the surface 2a of the wig base. In this state, the knot 3e of the wig 10 is positioned on the back 2b of the wig base 2, and the intermediate part of the hair 3 extending from this knot 3e, namely the bridging portion 3f linked to the knot 3e, is positioned on the surface 2a of the wig base. If the wig base is made of a net member, the hair is attached to the filament sandwiched by meshes adjacent to each other by winding the hair around the filament. The knot 3e is positioned on the back 2b of the wig base made of the net member, whereas the bridging portion 3f linked to this knot 3e is positioned on the surface 2a.

[0039] In the wig 10 thus formed, the bridging portion 3f is on the surface 2a of the wig base 2. The bridging portion 3f is in the form of a thin line having a thickness equivalent to the diameter of the hair 3, and the knot 3e of the hair 3 is on the back 2b of the wig base. Since the knot 3e is not on the surface 2a of the wig base 2, it is not exposed when the wig is worn. The knot 3e is invisible even through the gap between hairs, and consequently is hardly recognizable as a wig. In addition, smooth brushing is ensured because the teeth of a brush do not catch the knot 3e. No load is applied to the hair 3 implanted to the wig base, and cutting or coming off of the hair 3 can thus be prevented.

[0040] If artificial skin is used as a wig base, since the passing portions 2c and 2d formed in the first step contract due to the elasticity of the artificial skin, the knot 3e placed on the back of the artificial skin is not allowed to move to the surface 2a of the wig base. In the case in which a net member is adopted also, if the net size smaller than that of the knot 3e is selected, the knot 3e does not move to the surface 2a of the wig base because the knot 3e cannot pass through the mesh. In addition, since the one side 3c and the other side 3d of the implanted hair immediately adjacent to the knot 3e are supported by the contraction of the passing portions 2c and 2d of the wig base 2, and are thus made to erect upward, desirable volume of the wig can be obtained. After the hair is implanted to the wig base 2 and the knot 3e is moved to the back 2b of the wig base 2, the back 2b of the wig base 2 may be coated with an urethane resin, for example. This coating prevents the knot 3e from directly contacting the scalp of the user, eliminating the sense of discomfort and providing good sense of fitting. If the wig base 2 is made of a net base, this back coating prevents the bridging portion 3f from rotating around the filament.

Example 1

[0041] (Example 1)

As example 1, a wig was produced by the method in the form of implementation described above. Soft 0.20 mm-thick artificial skin made of a polyurethane resin was used as a wig base, and a number of 0.08 mm-thick artificial hairs made of a polyamide resin were implanted. FIG 2, FIG. 3, and FIG. 4 are cross-sectional views showing the implanted hair of the wig, viewed at an oblique angle from above, at an oblique angle from underneath, and from the bottom respectively. (A) of FIG. 2, FIG. 3, and FIG. 4 is a scanning electron microscopic image taken at 90-, 80-, and 80-fold magnification respectively. (B) is a figure for describing the members. It is apparent from these figures that the knot 3e of the wig of the example is on the back 2b of the wig base 2, and the bridging portion 3f linked to the knot 3e is on the surface 2a.

(Comparative example 1)

[0042] As comparative example 1, the same type of hair as the example of the present invention was implanted to the same type of artificial skin wig base as the embodiment by a conventional implanting method called a half-knot planting. Since the details of this half-knot planting method are given in the paragraph [0007] and FIG. 16 in the above patent literature 1, description is omitted here. FIG. 5 (A) is an image showing a plan view of the wig in comparative example 2 observed at 50-fold magnification. It is apparent that the knot 31 is exposed on the surface 2a of the wig base 2.

(Comparative example 2)

[0043] As comparative example 2, the same type of hair as the example of the present invention was implanted to the same type of artificial skin wig base as the example by a conventional implanting method called split-knot planting. Since the details of this split-knot planting method are given in the paragraph [0008] and FIG. 17 in the above patent literature 1, description is omitted here. FIG. 6 (A) is an image showing a plan view of the wig in comparative example 2 observed at 70-fold magnification. It is apparent that the knot 32 is exposed on the surface 2a of the wig base 2.

[0044] Table 1 lists the measurement results of the adhesion the hair to the wig base in the implementation and comparative examples 1 and 2. The adhesion of ten given hairs was measured, and the average of the measurements was found. As measurement samples, the above artificial skin with implanted hair and the same artificial skin with implanted hair with thermal-hardening urethane applied on the back in thickness of 0.2 mm after implantation were used for all of the embodiment and both comparative examples. The adhesion measurement conditions were as follows:

Measurement method: Single tensile measurement
Measuring instrument: Compact desktop tester, EZ Test, Shimadzu Corporation
Measurement condition: Sample (Distance between chucks); 50 mm, Tension speed; 100 mm/min.
The chuck is an instrument for catching hair.

[0045] The results obtained indicate that the example of the present invention made little difference regardless of whether a hair-fastening process was employed or not. The example also exhibited adhesion much higher than that of comparative examples 1 and 2 employing a hair-fastening process.

[0046] As shown above, if knots are placed on the back face of a wig base, higher adhesion of hair to the wig base is ensured, and the need for an adhesive for fastening hair after implantation is eliminated. Consequently, not only a process of applying an adhesive can be omitted but also the weight of the entire wig can be reduced and the boundary between a user's head and the periphery of the wig becomes less noticeable.

[0047] As described above, according to the wig and the manufacturing method of the wig of the present invention, the knots of hair are positioned on the back of the wig base, and various embodiments are available without departing from the scope of the invention. For example, materials of a wig base, the number of hairs to be implanted, etc. can be selected as required.

Claims

1. A wig, comprising: a wig base; and hair implanted to the wig base, **characterized in that** the knot of the hair is on the back of the wig base.

2. The wig according to claim 1, **characterized in that** a bridging portion linked to the knot of the hair is on the surface of the wig base.

3. The wig according to claim 1, **characterized in that** at least a part of the wig base is an artificial skin base made of a synthetic resin, and that the knot of the hair is transferred through a pinhole made on the artificial skin base onto the back face of the artificial skin base.

4. The wig according to claim 3, **characterized in that** the hair is retained upright because the pinholes made on the artificial skin base closes while retaining the hair.

5. The wig according to claim 1, **characterized in that** at least a part of the wig base is a net base made of a net member, that the hair is fastened to a filament constituting the net base by being wrapped around the filament, and that the knot is on the back face of the net base.

6. The wig according to claim 5, **characterized in that** the mesh size of the net base is smaller than the size of the knot.

7. A method for manufacturing a wig, comprising: tying hair to a wig base; and transferring the knot to the back of the wig base while settling a bridging portion linked to the knot on the surface of the wig base by pulling one end of the hair.

8. A method for manufacturing a wig by tying hair to a wig base, comprising: a first step for passing a hook portion of a hair-implanting needle from the surface to the back of the wig base and passing the hook portion back onto the surface at another position; a second step for folding the hair and catching the loop formed at the turning position of the hair by the hook portion; a third step for pulling the hair-implanting needle, with the loop of the hair kept caught by the hook portion, back onto the surface of the wig base; a fourth step for catching one side of the hair with the hook portion; a fifth step for pulling the hair-implanting needle out of the loop with the one side of the hair caught by the hook portion; a sixth step for forming a knot by holding one side of the hair while pulling the other side; and a seventh step for moving the knot to the back of the wig base by pulling the other side of the hair while holding the one side of the hair.

9. The method for manufacturing the wig according to claim 8, **characterized in that** the hair-implanting needle is rotated on the axis of the longitudinal direction of the hair-implanting needle in the second or third step, the loop being caught by the hair-implanting needle.

10. The method for manufacturing the wig according to claim 8, **characterized in that** the bridging part linked to the knot of the hair is positioned on the surface of the wig base and fastened.

11. The method of manufacturing the wig according to claim 7 or claim 8, **characterized in that** at least a part of the skin base is an artificial skin base made of a synthetic resin, and that the knot of the hair is passed through a pinhole made on the artificial skin base and settled on the back face of the artificial skin base.

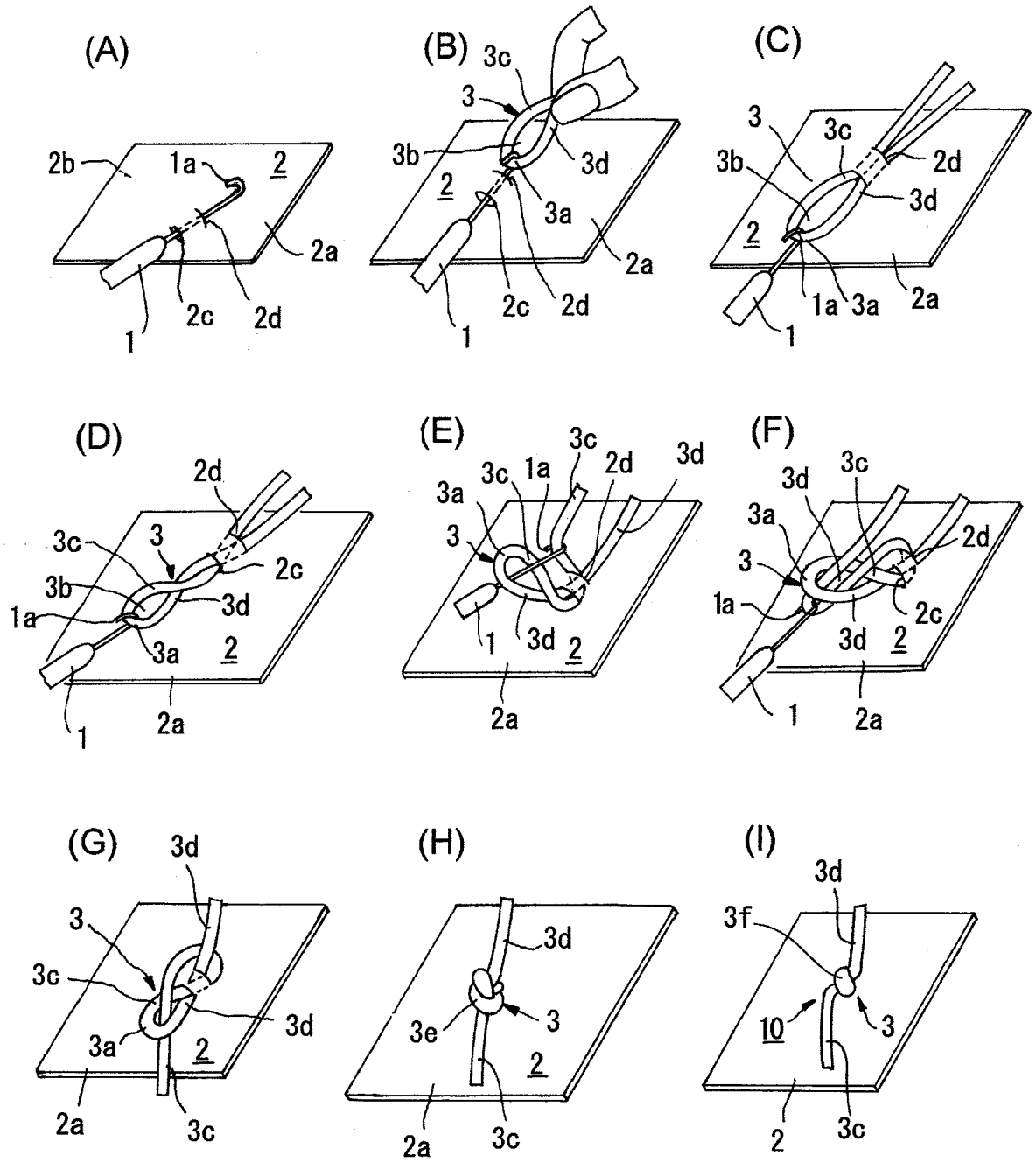
12. The method for manufacturing the wig according to claim 11, **characterized in that** the pinhole made on the artificial base closes, catching the hair, to retain the hair upright.

13. The method for manufacturing the wig according claim 7 or claim 8, **characterized in that** a part of the wig base is a net base made of a net member, that the hair is fastened to a filament constituting the net base by being wrapped around the filament, and that the knot is positioned on the back of the net base.

14. The method for manufacturing the wig according to claim 13, **characterized in that** the mesh size of the

net base is smaller than the size of the knot.

FIG.1


(A)
2b
1a
2
2a
1
2c
2d
(B)
3c
3
3b
2
3d
3a
2a
1
2c
2d
(C)
3
3c
3b
2d
3d
2
1a
3a
2a
1
(D)
2d
3c
3
2c
3b
3d
1a
3a
2
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2a
(E)
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1a
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3d
3a
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(F)
3d
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3a
2d
3
1a
2c
3d
2
1
2a
(G)
3d
3
3c
3d
3a
2
2a
3c
(H)
3d
3e
3
2
2a
3c
(I)
3d
3f
10
3
2
3c

FIG.2

(A)

(B)

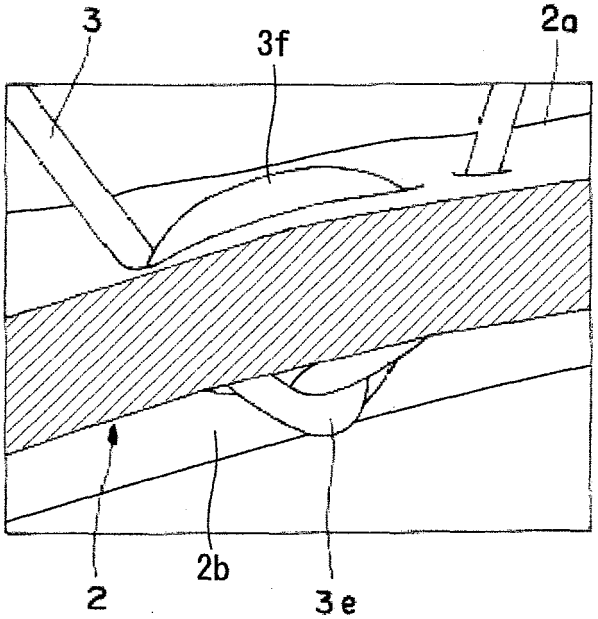
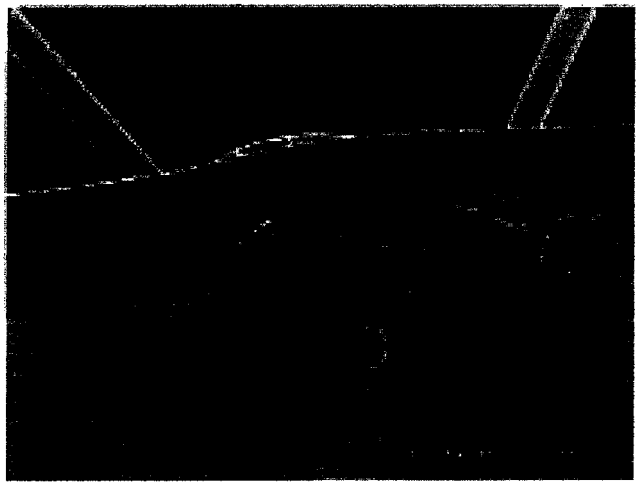


FIG.3

(A)



(B)

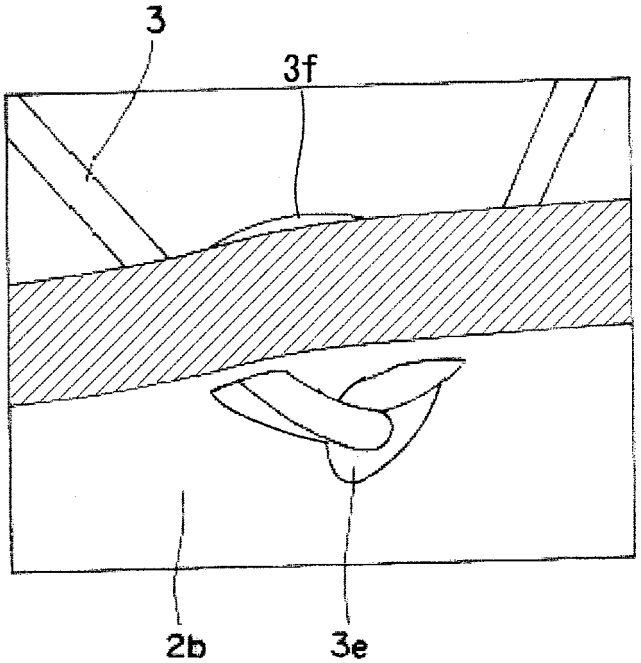


FIG.4

(A)

(B)

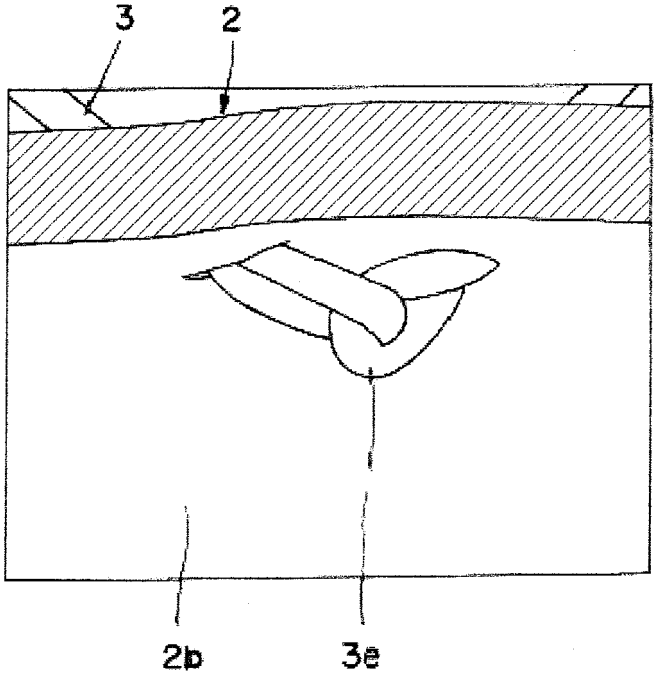
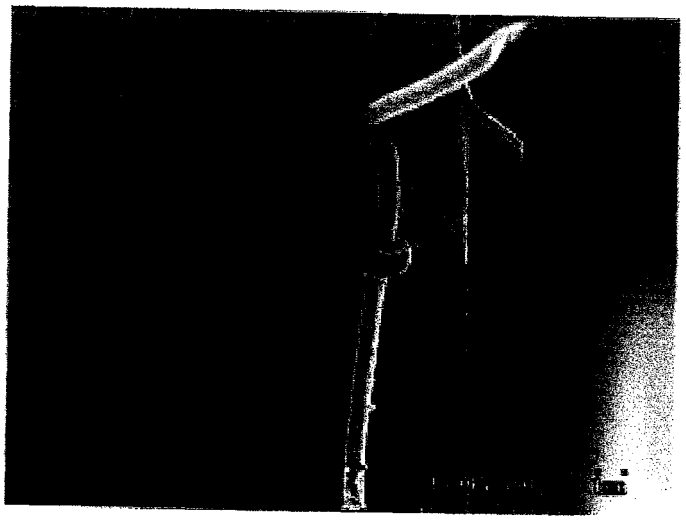


FIG.5

(A)



(B)

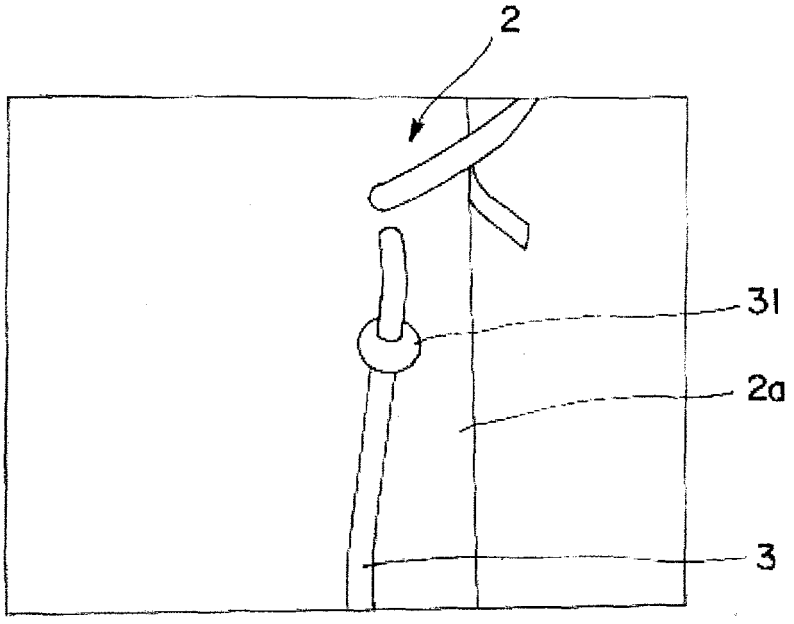
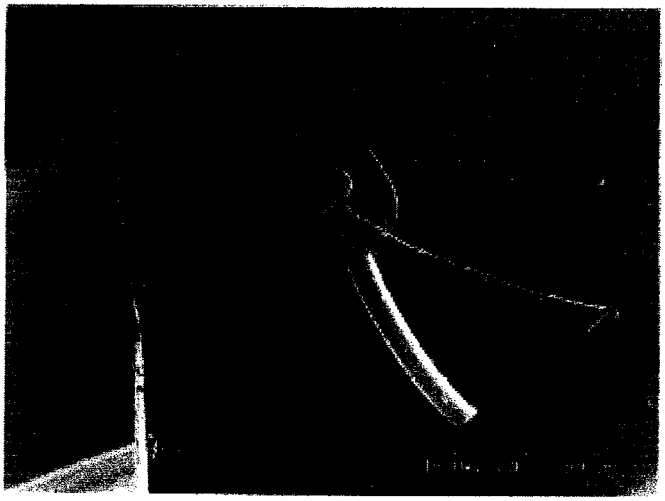
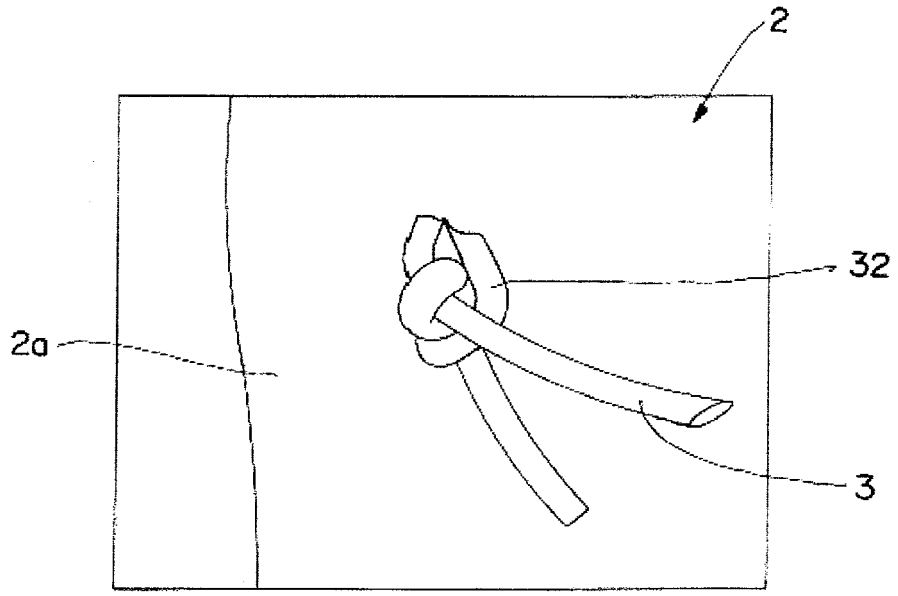


FIG.6

(A)



(B)



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2008/070682

A. CLASSIFICATION OF SUBJECT MATTER
A41G3/00(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A41G3/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2009
Kokai Jitsuyo Shinan Koho 1971-2009 Toroku Jitsuyo Shinan Koho 1994-2009

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2006-132072 A (UMIN Co., Ltd.), 25 May, 2006 (25.05.06), & US 2006/0090772 A1 & KR 10-2006-0040154 A	1-14
A	JP 2006-183215 A (Aderans Co., Ltd.), 13 July, 2006 (13.07.06), & US 2008/0092913 A1 & EP 1832187 A1 & WO 2006/070721 A1 & CA 2592526 A & KR 10-2007-0091686 A & NO 20073435 A & CN 101094600 A	1-14

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
09 February, 2009 (09.02.09)	24 February, 2009 (24.02.09)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (April 2007)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2007092202 A **[0006]**
- JP 2006183215 A **[0006]**