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(54) **HAIR EXTENSION PROVIDED WITH CROSS-SHAPED ENGAGING PORTION**

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(52) **U.S. Cl.**
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(57) **ABSTRACT**

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A hair extension includes cross-shaped engaging portions, pillar portions connected to the cross-shaped engaging portions, a bottom portion having opposite side surfaces. The pillar portions are connected to one surface of the opposite side surfaces of the bottom portion. The hair extension further includes a support portion fixed to the other surface of the opposite side surfaces of the bottom portion, a wig hair fixing portion connected to the support portion, and wig hairs fixed to the wig hair fixing portion.

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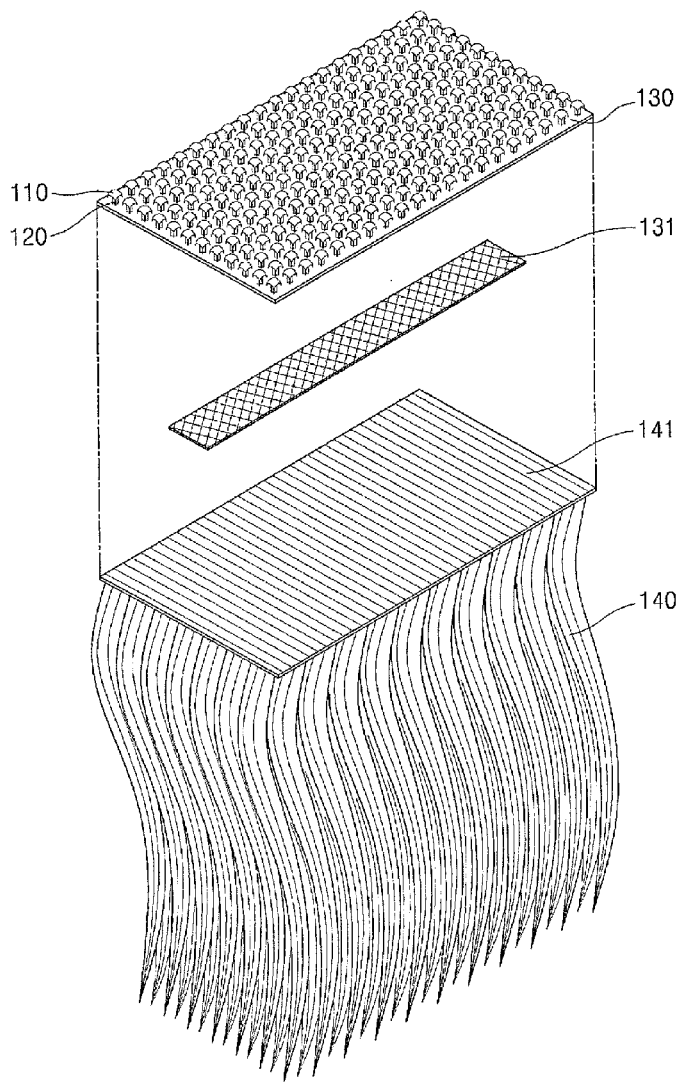


FIG. 1

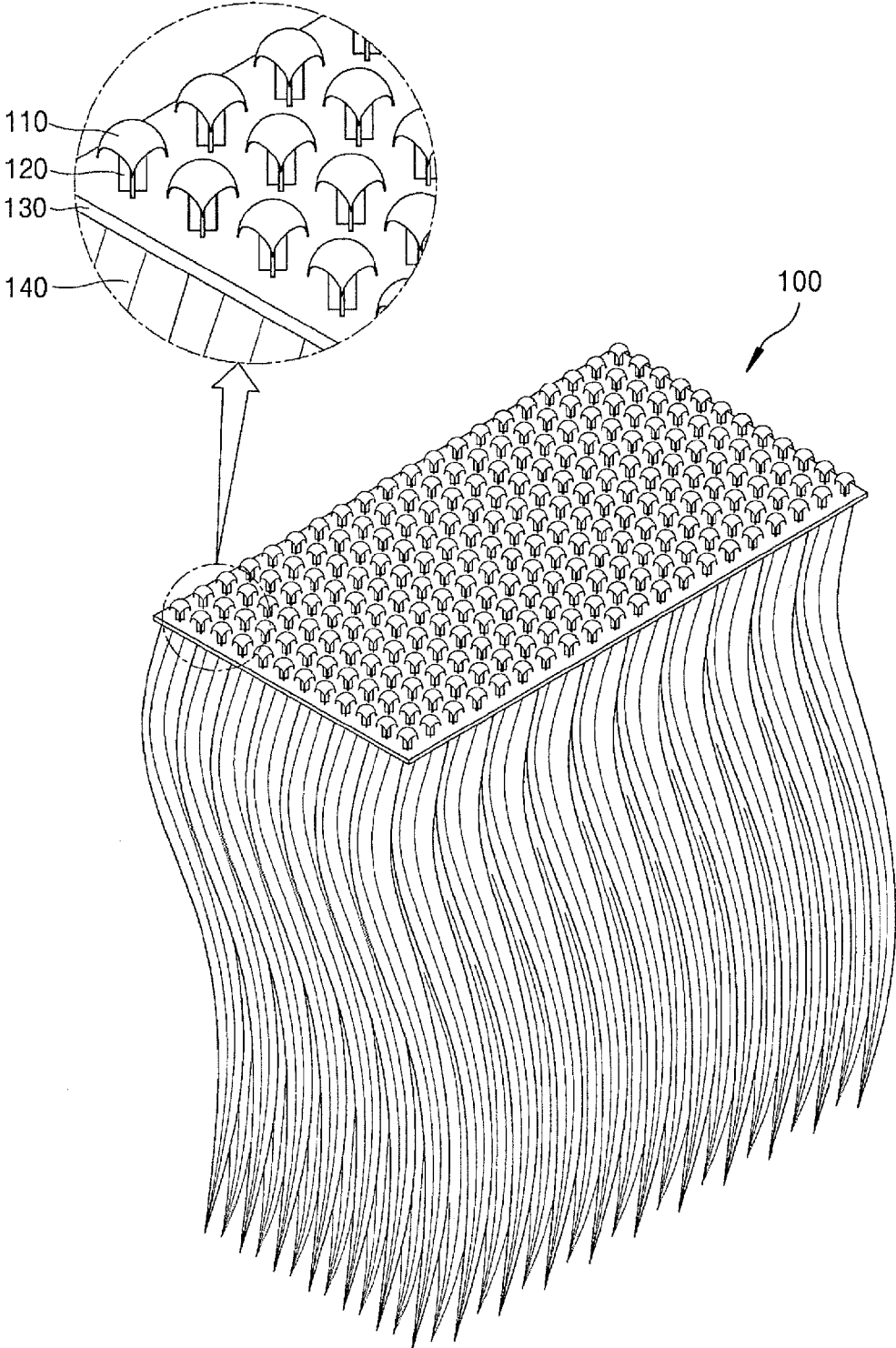


FIG. 2

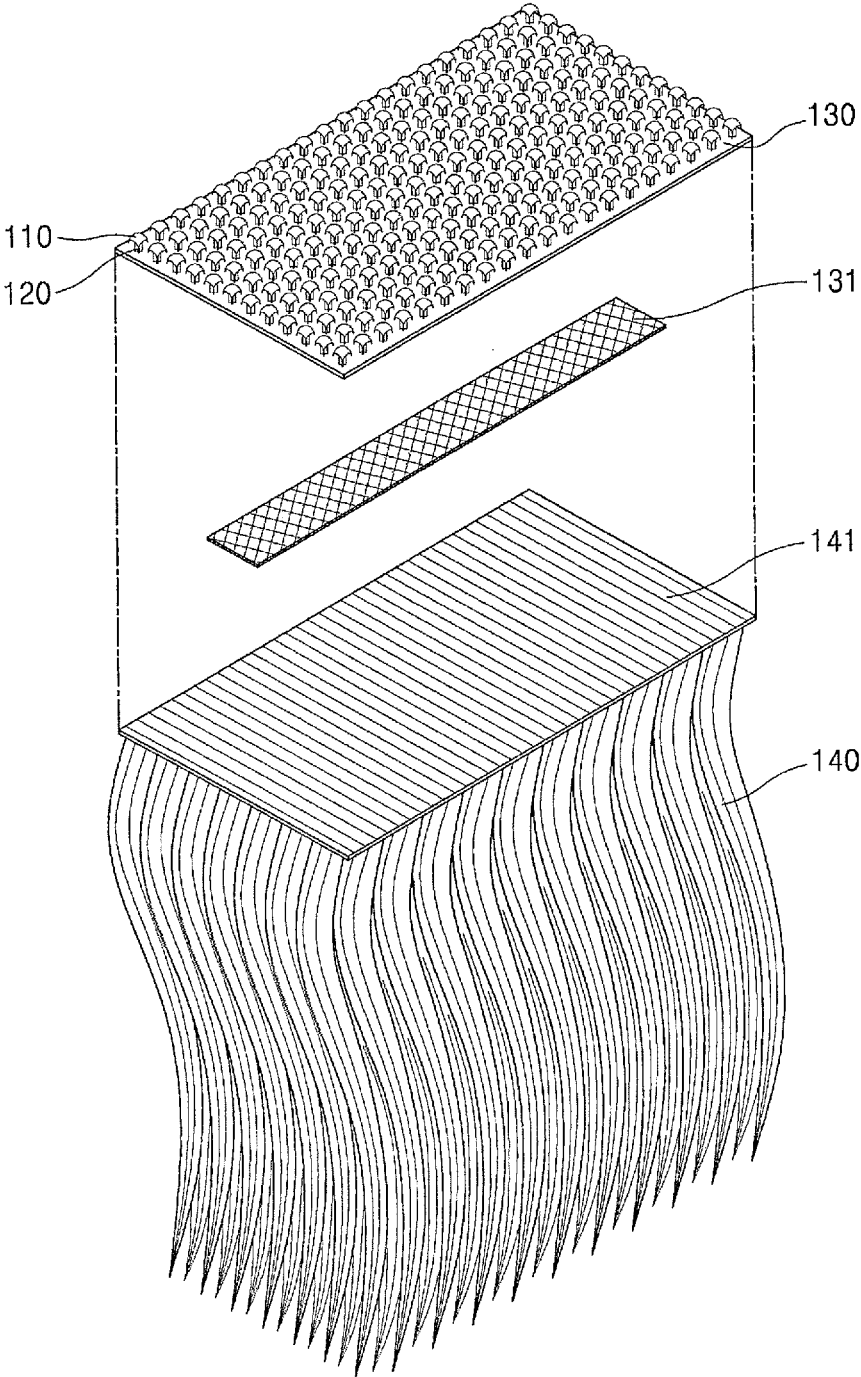


FIG. 3

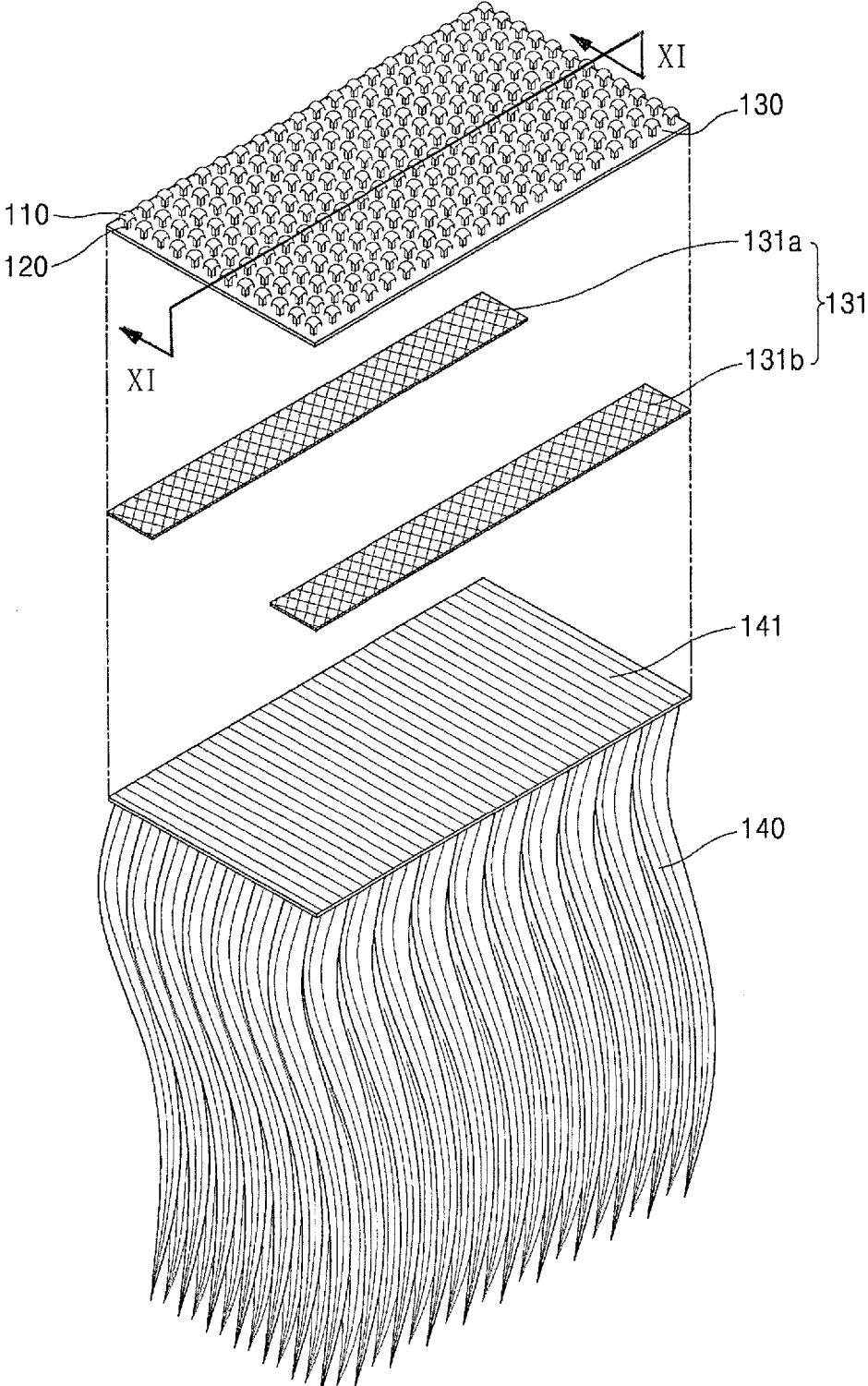


FIG. 4

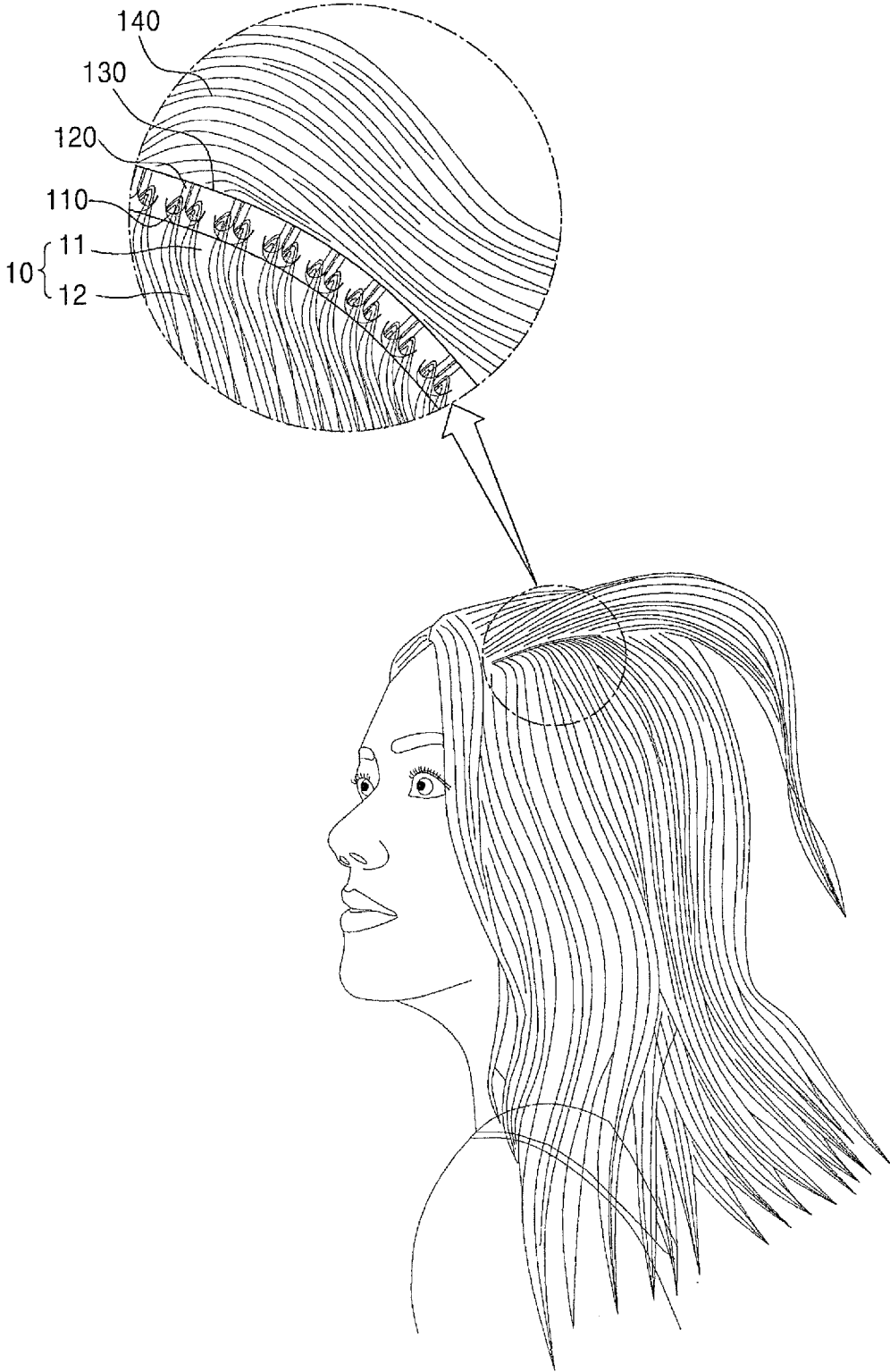


FIG. 5

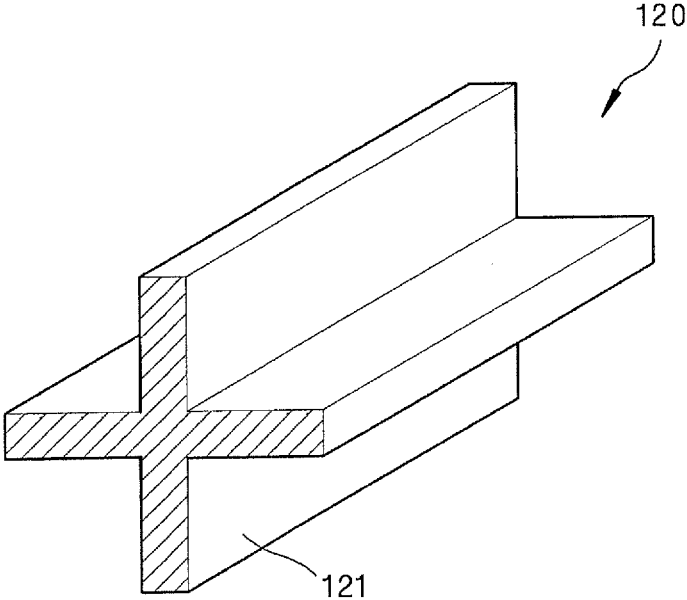


FIG. 6

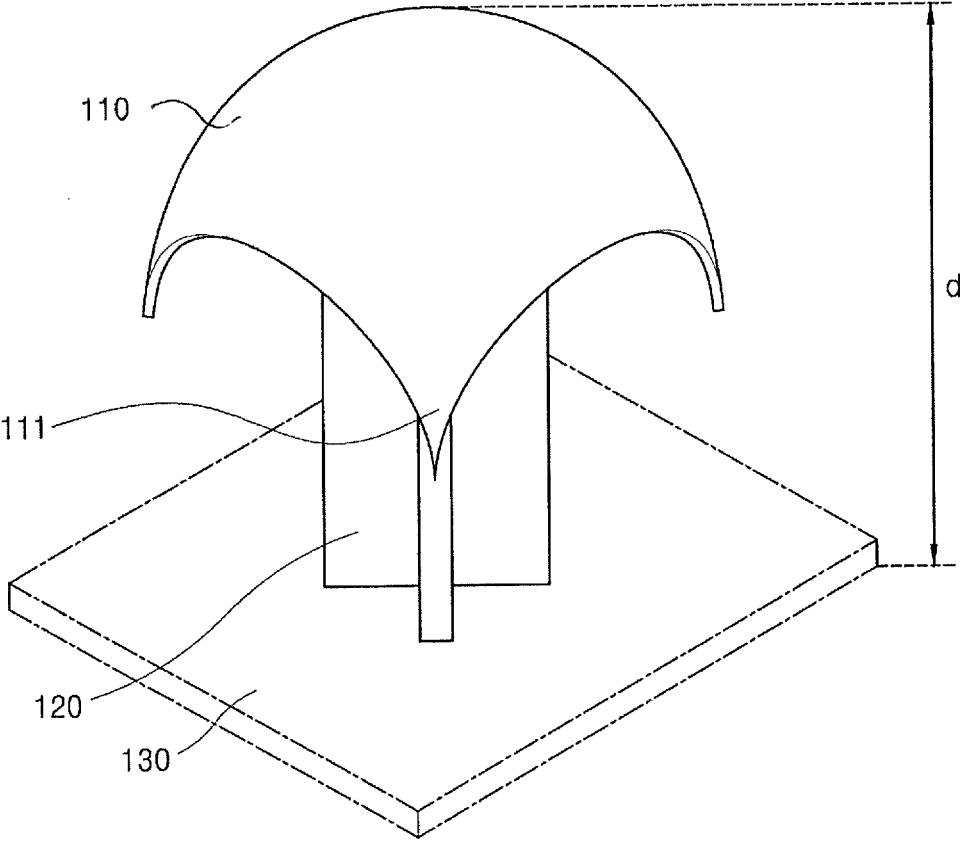


FIG. 7

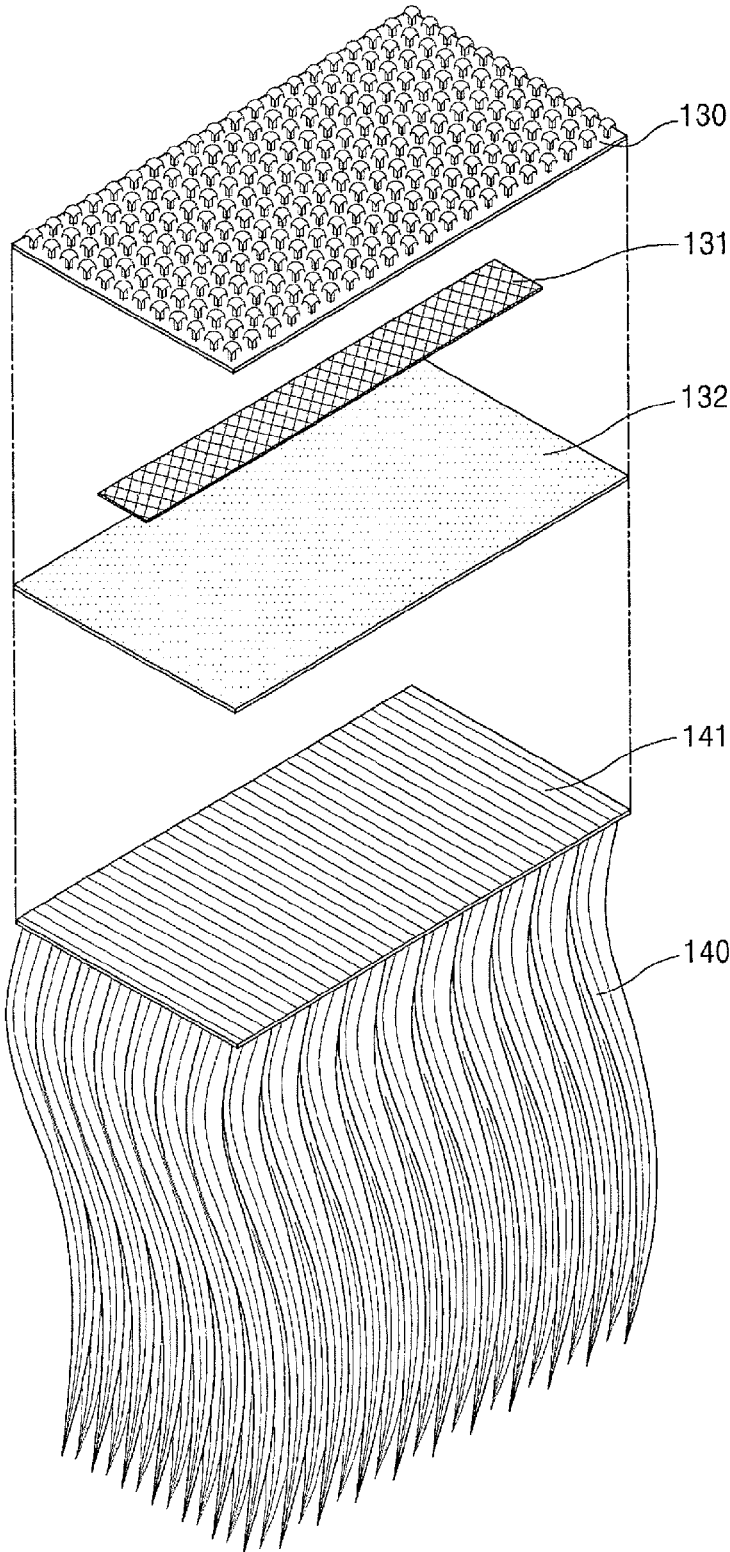


FIG. 8

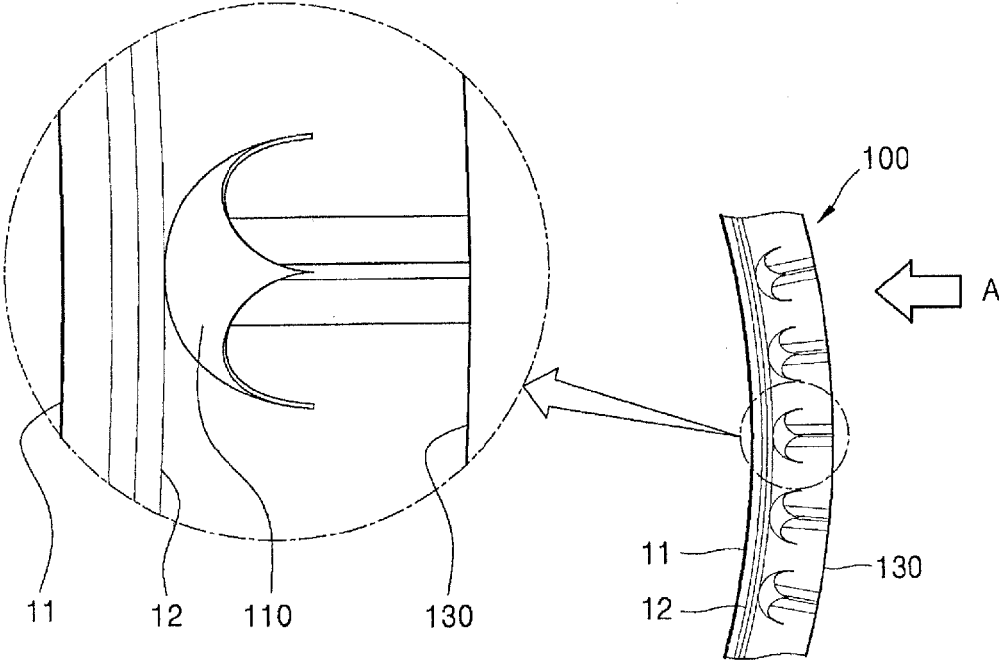


FIG. 9

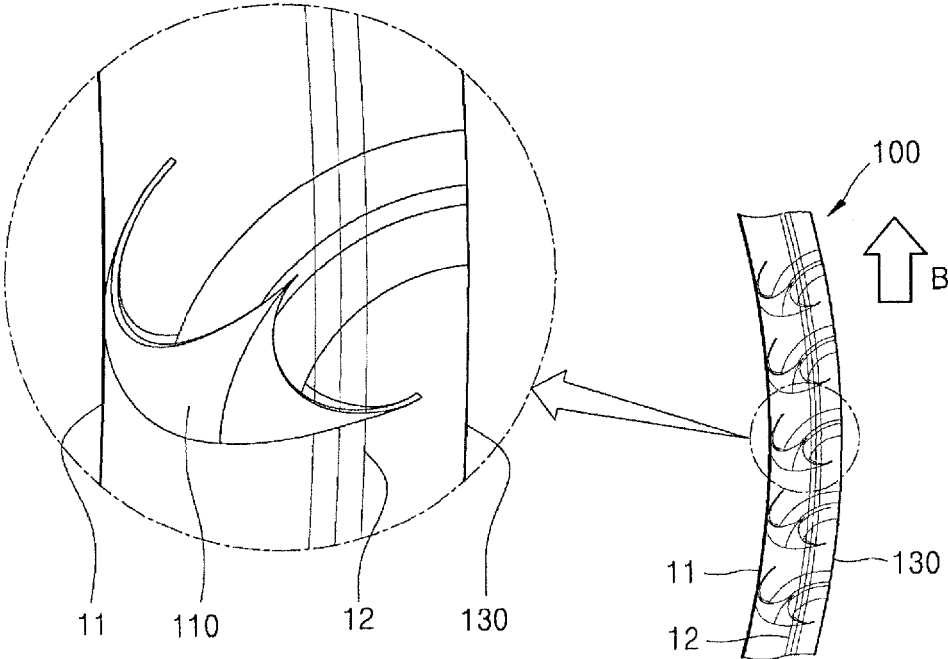


FIG. 10

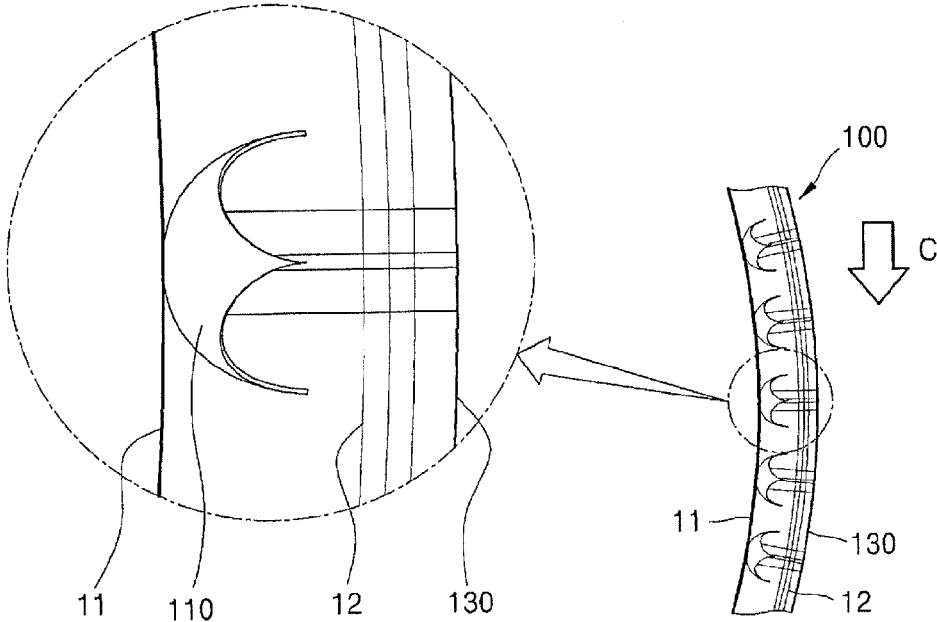


FIG. 11

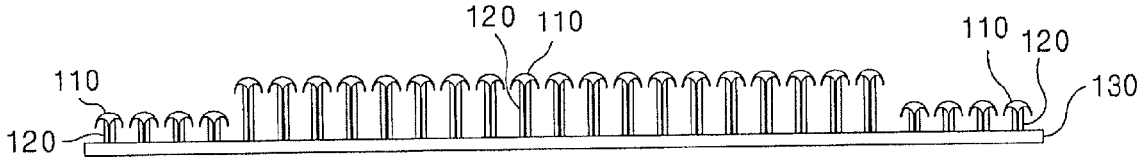


FIG. 12

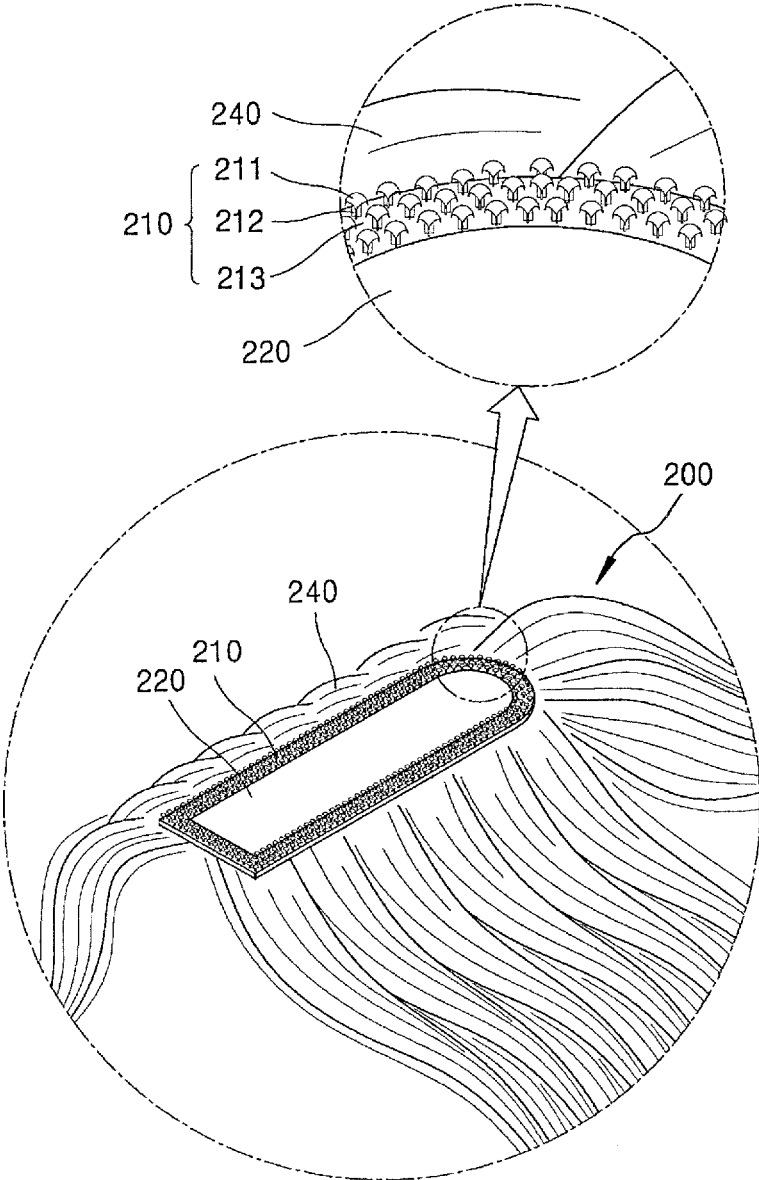


FIG. 13

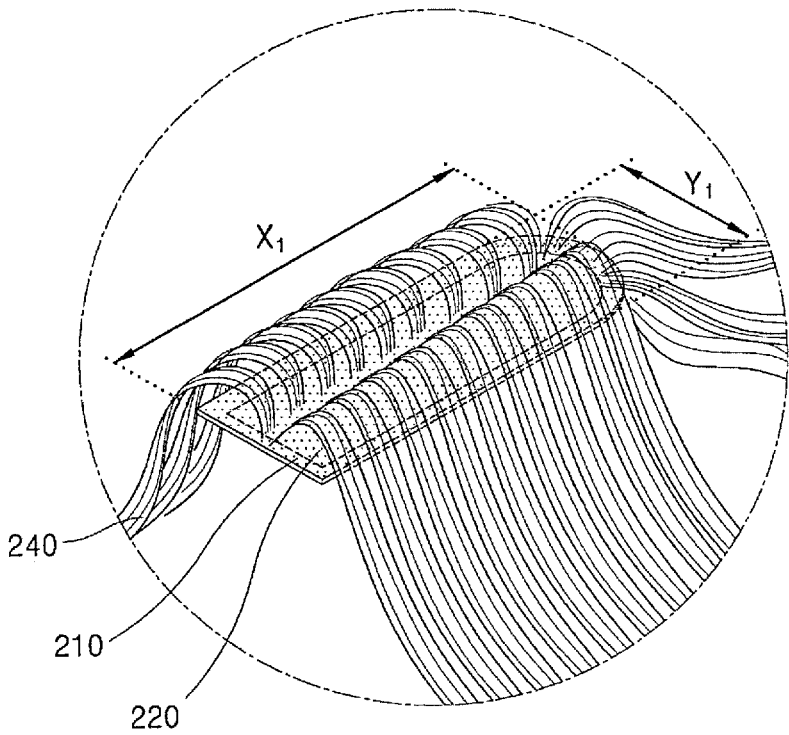


FIG. 14

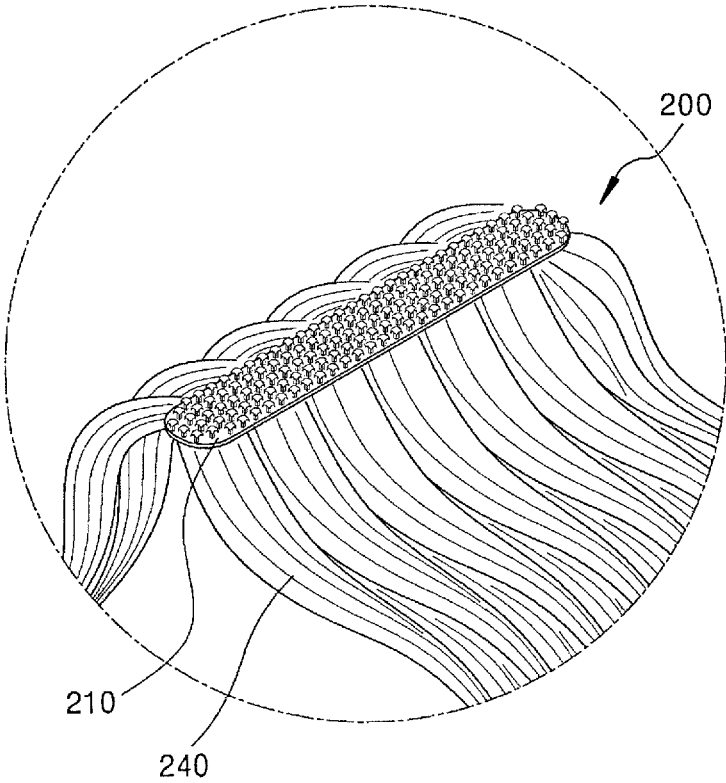


FIG. 15

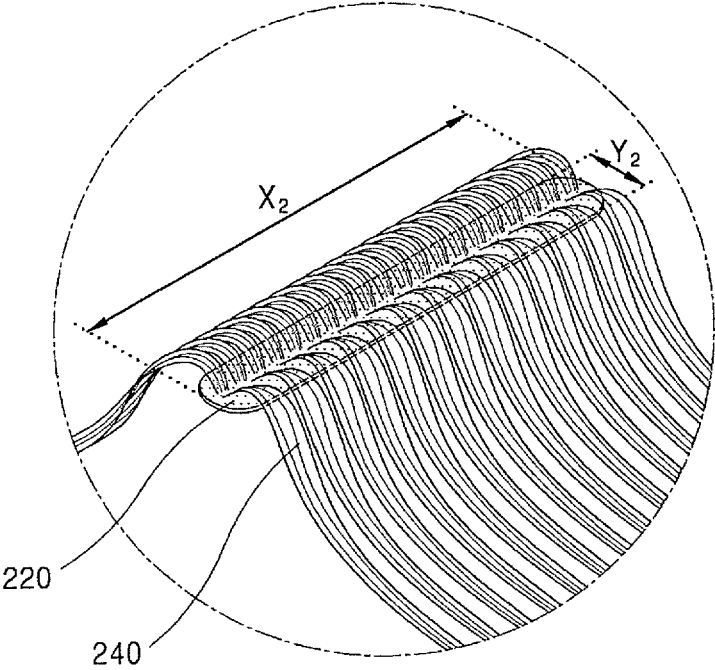


FIG. 16

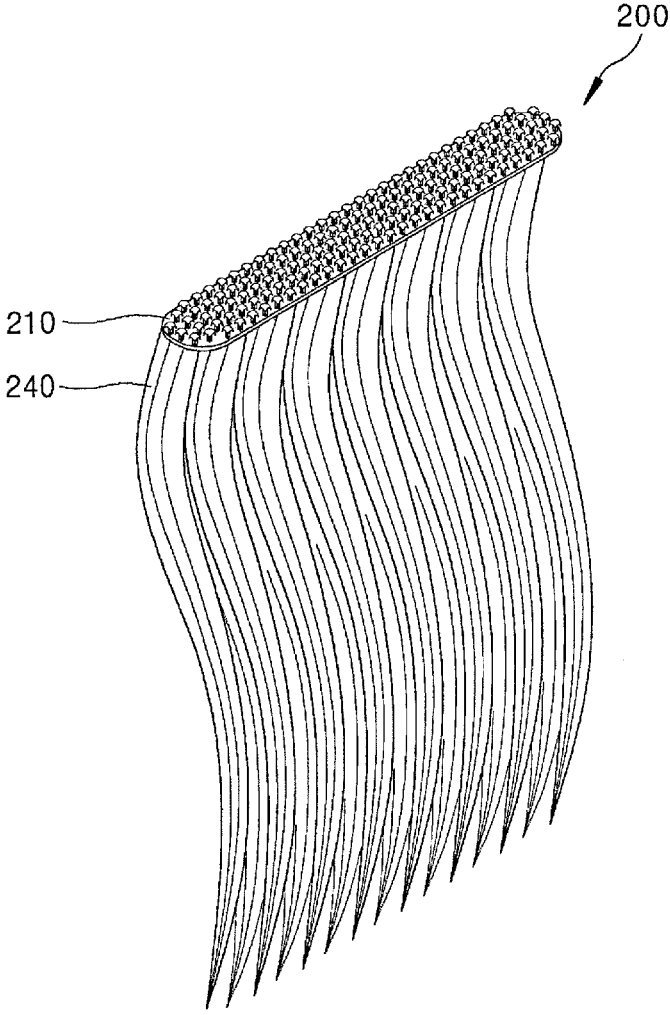


FIG. 17

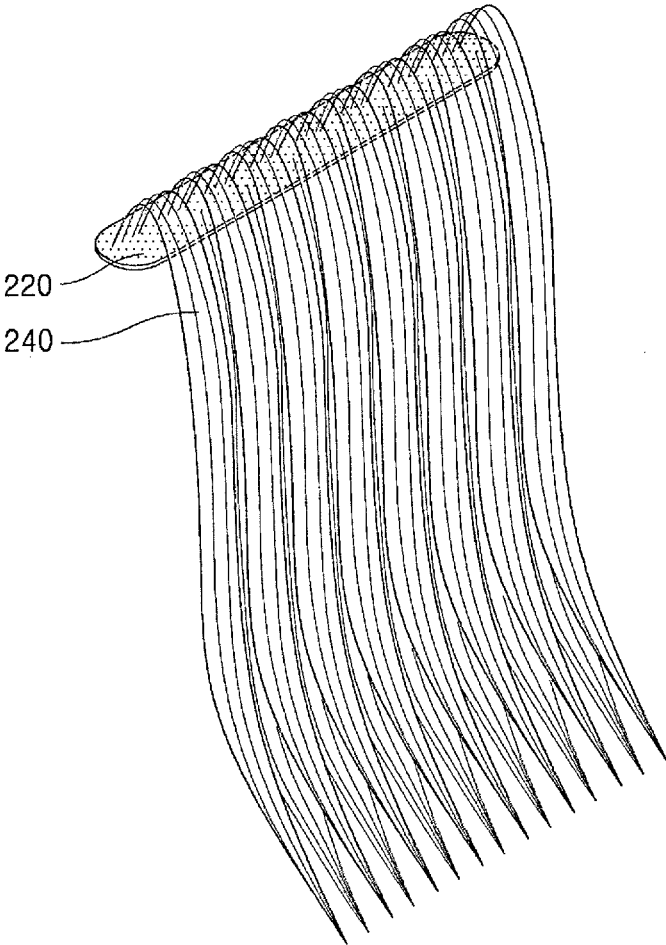


FIG. 18

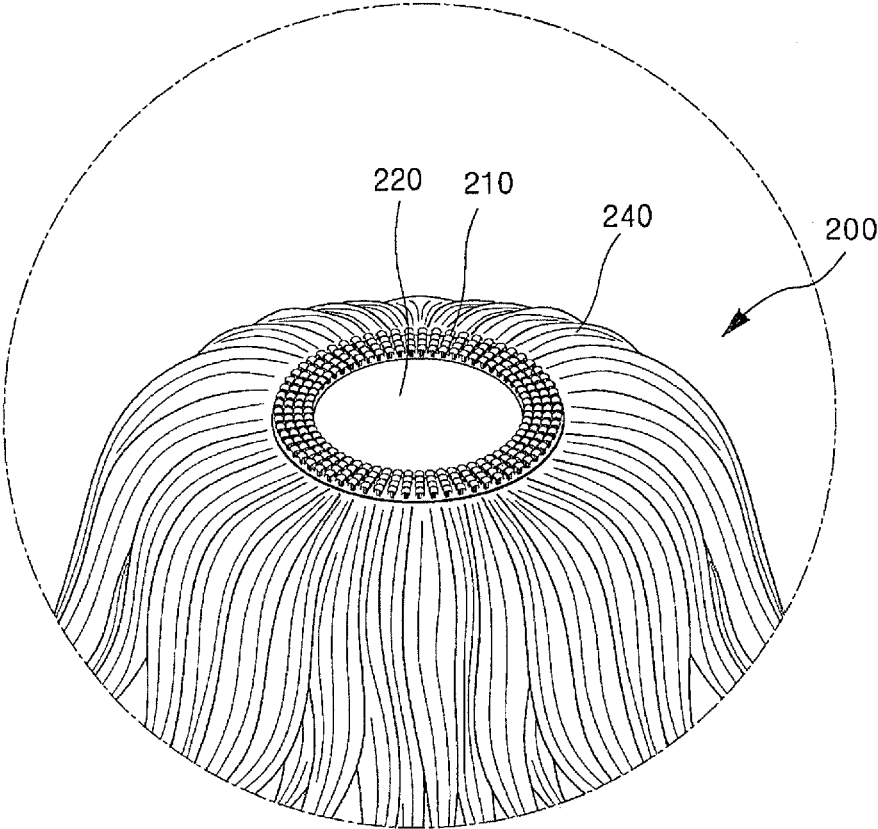


FIG. 19

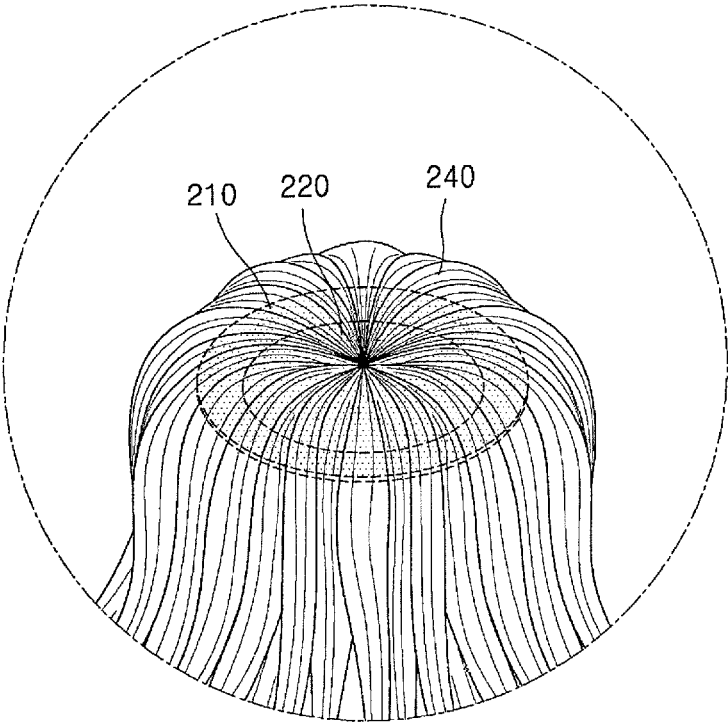
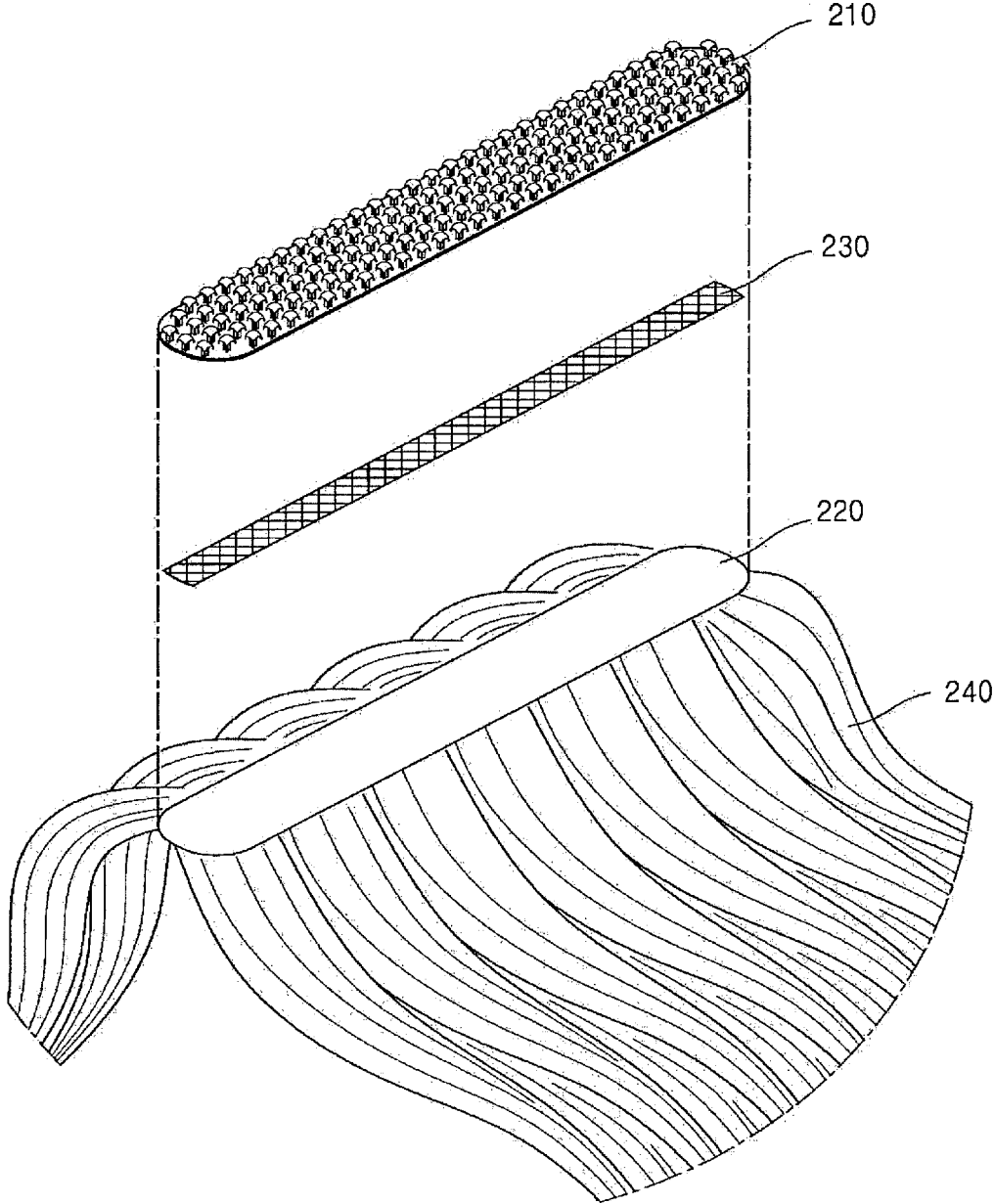


FIG. 20



HAIR EXTENSION PROVIDED WITH CROSS-SHAPED ENGAGING PORTION

TECHNICAL FIELD

[0001] The present invention relates to a hair extension and, more particularly, to a hair extension provided with cross-shaped engaging portions, which can be easily attached to a small number of hairs.

BACKGROUND

[0002] In general, a hair extension is used to lengthen short hairs or to make hairs look richer. The hair extension is formed by consolidating wig hairs to have a certain thickness and is connected to natural hairs of a wearer. The hair extension is widely used for cosmetic purposes.

[0003] A conventional hair extension is a wig having a predetermined thickness which is formed by providing multiple strands of hairs having a certain length and bonding the upper ends of the hairs together. For example, Korean Patent No. 10-0889004 discloses a hair extension which includes wig hairs with a certain length, the upper ends of the wig hairs bonded to each other to form a bonding portion, the wig hairs connected by a connecting cord to which a rubber strap separately prepared is tied.

[0004] According to the hair extension of Korean Patent No. 10-0889004, the portion where the natural hairs and the wig hairs are connected has a reduced thickness. It is therefore possible to improve the beauty. In the wearing process, the length of the hair extension is not reduced. This makes it possible to wear the hair extension with an initially intended length.

[0005] However, a precise technique is required to bind and connect the wig hairs and the natural hairs in the wearing process. Thus, the time for wearing the hair extension may greatly vary depending on the skill of experts who work at a place like a beauty salon or the like. In other words, a general consumer cannot personally wear such a hair extension. Time and effort are required for making a reservation in advance to wear the hair extension with the aid of an expert. Further, it is not easy to remove the hair extension and the cost for wearing the hair extension is high. Therefore, when wearing the hair extension, several things need to be considered.

[0006] An example of a conventional hair extension formed so as to enable an ordinary person to easily attach and detach the hair extension is disclosed in Korean Patent Application Publication No. 10-2011-0122903. This provides a hair extension mechanism that facilitates attachment and detachment of a hair extension to and from natural hairs using a hairclip type fastener.

[0007] However, in such a conventional technique, the portion for attachment and detachment is formed by a hairclip. Therefore, due to the volume of the hairclip, the boundary line between wig hairs and natural hairs is clearly recognized at the hair extension fixing position. In other words, as the hairclip becomes larger, the hairs may be seen in a protruding shape at the hair extension fixing position and may be easily recognized.

[0008] In addition, the hairclip has a certain weight. Thus, the hair extension may be heavy as a whole. As a result, the natural hairs may be partially and continuously pulled by the hair extension. This may stimulate the wearer's scalp and may increase the fatigue of the wearer.

[0009] It is difficult to find a hair extension which can provide a sufficient fixing force with a configuration other than a hairclip. At the present time, there is a demand for a hair extension capable of being easily attached and detached with a sufficient fixing force without having to use a fixing means such as a hairclip or the like, capable of being worn by an ordinary person with no aid of an expert, and capable of being conveniently worn for a long period of time.

PRIOR ART DOCUMENT

Patent Document

[0010] Korean Patent No. 10-0889004

[0011] Korean Patent Application Publication No. 10-2011-122903

SUMMARY

[0012] Embodiments of the present invention provide a hair extension provided with cross-shaped engaging portions, which is capable of being easily attached and detached with a simple configuration without having to use a fixing means such as a hairclip or the like and capable of being conveniently worn for a long period of time.

[0013] Furthermore, embodiments of the present invention provide a hair extension provided with cross-shaped engaging portions, which is capable of being easily engaged with and fixed to the hairs of a wearer, i.e., the natural hairs, regardless of the thickness of the natural hairs.

[0014] Furthermore, embodiments of the present invention provide a hair extension provided with cross-shaped engaging portions, which is capable of being worn with the thickness thereof kept inconspicuous and capable of producing natural decoration.

[0015] Furthermore, embodiments of the present invention provide a hair extension provided with cross-shaped engaging portions, which is capable of being locally fixed at several locations in a small unit.

[0016] In accordance with a first embodiment of the present invention, there is provided a hair extension, including: cross-shaped engaging portions; pillar portions connected to the cross-shaped engaging portions; a bottom portion having opposite surfaces, the pillar portions connected to one of the opposite surfaces of the bottom portion; a support portion fixed to the other of the opposite surfaces of the bottom portion; a wig hair fixing portion connected to the support portion; and wig hairs fixed to the wig hair fixing portion.

[0017] The cross-shaped engaging portions may be formed in a direction intersecting with the bottom portion and disposed at regular intervals on the bottom portion.

[0018] Each of the pillar portions may include four side protrusions defining a cross-shaped cross section, and each of the cross-shaped engaging portions may include hook portions transformed from the side protrusions by melting a part of each of the pillar portions.

[0019] The hair extension may further include a bottom fixing portion fixed to the other surface of the bottom portion and made of a material capable of allowing the wig hair fixing portion to be attached to and detached from the bottom fixing portion.

[0020] The wig hair fixing portion may be an injection-molded Velcro tape having hooks, and the bottom fixing

portion may be formed of a fabric capable of allowing the injection-molded Velcro tape to be attached to and detached from the fabric.

[0021] The support portion may have a length corresponding to a length of the bottom portion and a width smaller than a width of the bottom portion, and be formed, in a flat shape, of a plastic material having flexibility so that the support portion is bent and maintains a bent shape when a force is applied thereto.

[0022] The support portion may include a plurality of support portions disposed in a spaced-apart parallel relationship with each other.

[0023] The wig hairs may be bonded to one surface of the wig hair fixing portion by a bonding tape or a bonding agent or fixed to the bottom portion by sewing.

[0024] A height of the pillar portions positioned in a peripheral region of the bottom portion may be smaller than a height of the pillar portions positioned in a central region of the bottom portion.

[0025] A height of an attachment portion including the cross-shaped engaging portions, the pillar portions and the bottom portion may be set such that the height of the attachment portion positioned in the central region of the bottom portion is 1.8 mm to 1.9 mm and the height of the attachment portion positioned in the peripheral region of the bottom portion is 1.6 mm to 1.7 mm.

[0026] In accordance with a second embodiment of the present invention, there is provided a hair extension including: a net; an attachment portion connected to at least a part of one surface of the net; and wig hairs provided on the other surface of the net and configured to cover at least a part of a top of a head or a parting of a wearer, wherein the attachment portion is provided at a predetermined width along a periphery or an overall length of the net, the attachment portion including: cross-shaped engaging portions; pillar portions connected to the cross-shaped engaging portions; and a bottom portion having opposite surfaces, one surface being connected to the pillar portions and the other surface being connected to the net.

[0027] The cross-shaped engaging portions may be formed in a direction intersecting with the bottom portion and disposed at regular intervals on the bottom portion.

[0028] Each of the pillar portions may include four side protrusions defining a cross-shaped cross section, and each of the cross-shaped engaging portions may include hook portions transformed from the side protrusions by melting a part of each of the pillar portions.

[0029] The hair extension may further include a support portion fixed to the other surface of the bottom portion, wherein the support portion has a length corresponding to a length of the bottom portion and a width smaller than a width of the bottom portion, and is formed, in a flat shape, of a plastic material having flexibility so that the support portion is bent and maintains a bent shape when a force is applied thereto.

[0030] When the hair extension is attached around the parting, a width of at least one of the net and the attachment portion may be 5.5 cm to 6.5 cm.

[0031] When the hair extension is attached to the top of the head, at least one of the net and the attachment portion may be formed in a circular shape to have a diameter of 3.5 cm to 4.5 cm.

[0032] A height of the pillar portions positioned in a peripheral region of the bottom portion may be smaller than a height of the pillar portions positioned in a central region of the bottom portion.

[0033] A height of the attachment portion positioned in the central region of the bottom portion may be 1.8 mm to 1.9 mm and a height of the attachment portion positioned in the peripheral region of the bottom portion may be 1.6 mm to 1.7 mm.

[0034] According to the embodiments of the present invention, the hair extension can be easily attached and detached through a simple operation and can be conveniently worn for a long period of time due to the reduced weight thereof.

[0035] Since the bottom portion is made of a pliable material and the support portion is provided, the hair extension can be brought into close contact with the round head with no likelihood of floating away from the head.

[0036] Even if the thickness of the natural hairs of the wearer is small or the surfaces of the natural hairs are quite slippery, the cross-shaped engaging portions are fixed without sliding. Thus, a drier or a hair iron for producing various hair styles can be used in a state in which the hair extension is fixed to the natural hairs. It is also possible to prevent the hair extension from being separated from the natural hairs even when a strong motion is made.

[0037] The assembly including the engaging portions, the pillar portions and the bottom portion does not float away from the head regardless of whether the assembly is attached along the parting of the wearer or positioned in the roots of the natural hairs (hair root portions). This makes it possible to produce natural decoration.

[0038] In addition, it is possible to use a plurality of hair extensions. Thus, the hair extensions can be selectively fixed to desired portions. This makes it possible to enhance the utilization of the hair extension and the use convenience thereof.

BRIEF DESCRIPTION OF THE DRAWINGS

[0039] FIG. 1 is a perspective view for explaining the overall configuration of a hair extension provided with cross-shaped engaging portions according to a first embodiment of the present invention.

[0040] FIG. 2 is an exploded perspective view for explaining the hair extension provided with cross-shaped engaging portions according to the first embodiment of the present invention, which includes a support portion.

[0041] FIG. 3 is an exploded perspective view for explaining the hair extension provided with cross-shaped engaging portions according to a modification of the first embodiment of the present invention, which includes a plurality of support portions.

[0042] FIG. 4 is a perspective view showing a state in which the hair extension provided with cross-shaped engaging portions according to the first embodiment of the present invention is applied to a wearer.

[0043] FIG. 5 is a perspective view for explaining a pillar portion of each of the cross-shaped engaging portions in the hair extension provided with cross-shaped engaging portions according to the first embodiment of the present invention.

[0044] FIG. 6 is a perspective view for explaining the total thickness of the hair extension provided with cross-shaped engaging portions according to the first embodiment of the present invention.

[0045] FIG. 7 is a perspective view for explaining the configuration in which a bottom portion and wig hairs can be attached and detached in the hair extension provided with cross-shaped engaging portions according to a modification of the first embodiment of the present invention.

[0046] FIGS. 8 to 10 are perspective views for explaining a method of attaching the hair extension provided with cross-shaped engaging portions according to the embodiments of the present invention.

[0047] FIG. 11 is a sectional view taken along line XI-XI in FIG. 3.

[0048] FIGS. 12 and 13 are perspective views for explaining the overall configuration of a hair extension provided with cross-shaped engaging portions according to a second embodiment of the present invention.

[0049] FIGS. 14 and 15 are perspective views for explaining the overall configuration of a hair extension provided with cross-shaped engaging portions according to a third embodiment of the present invention.

[0050] FIGS. 16 and 17 are perspective views for explaining the overall configuration of a hair extension provided with cross-shaped engaging portions according to a fourth embodiment of the present invention.

[0051] FIGS. 18 and 19 are perspective views for explaining the overall configuration of a hair extension provided with cross-shaped engaging portions according to a fifth embodiment of the present invention.

[0052] FIG. 20 is an exploded perspective view for explaining the hair extension provided with cross-shaped engaging portions according to the embodiments of the present invention, which includes a support portion.

DETAILED DESCRIPTION

[0053] Hereinafter, configurations and operations of embodiments will be described in detail with reference to the accompanying drawings. The following description is one of various patentable aspects of the invention and may form a part of the detailed description of the invention.

[0054] However, in describing the invention, detailed descriptions of known configurations or functions are omitted to avoid obscure the invention.

[0055] The invention may be variously modified and may include various embodiments. Specific embodiments will be exemplarily illustrated in the drawings and described in the detailed description of the embodiments. However, it should be understood that they are not intended to limit the invention to specific embodiments but rather to cover all modifications, similarities, and alternatives which are included in the spirit and scope of the invention.

[0056] When it is said that a component is “coupled” or “linked” to another component, it should be understood that the former component may be directly connected or linked to the latter component or a third component may be interposed between the two components.

[0057] Specific terms used in the present application are used simply to describe specific embodiments without limiting the invention. An expression used in the singular encompasses the expression of the plural, unless it has a clearly different meaning in the context.

[0058] Hereinafter, hair extensions provided with cross-shaped engaging portions according to embodiments of the present invention will now be described with reference to the accompanying drawings.

[0059] Referring first to FIGS. 1 and 2, the hair extension 100 according to a first embodiment of the present invention includes cross-shaped engaging portions 110, pillar portions 120 connected to the cross-shaped engaging portions 110, a bottom portion 130 having one surface to which the pillar portions 120 are connected, a support portion 131 fixed to the other surface of the bottom portion 130, a wig hair fixing portion 141 connected to the support portion 131, and wig hairs 140 connected to the wig hair fixing portion 141.

[0060] In this regard, the cross-shaped engaging portions 110 may be formed by heating the end portions of the pillar portions 120 so that a part of the pillar portions 120 is melted down. The cross-shaped engaging portions 110 and the pillar portions 120 may be made of a plastic material such as polypropylene or the like. As the thickness of the pillar portions 120 becomes smaller, the size of the cross-shaped engaging portions 110 grows smaller. As a result, the cross-shaped engaging portions 110 can be moved inward and positioned between the natural hairs of a wearer.

[0061] As shown in FIG. 1, the cross-shaped engaging portions 110 may be positioned and fixed at regular intervals on the bottom portion 130. In this case, the cross-shaped engaging portions 110 may be formed in a direction intersecting with the bottom portion 130 (for example, at a right angle).

[0062] As the angle of the cross-shaped engaging portions 110 with respect to the bottom portion 130 comes close to a right angle, the cross-shaped engaging portions 110 can be easily moved inward between the natural hairs. Thus, the natural hairs are easily caught by hook portions 111 (see FIG. 6) formed in the cross-shaped engaging portions 110.

[0063] The bottom portion 130 may be made of a material such as nylon yarns or the like which can strongly hold the pillar portions 120. The bottom portion 130, which has flexibility, may be made of a material that can be easily bent in conformity with the shape of the head of a wearer who wears the hair extension 100 according to the first embodiment of the present invention or depending on the attachment position of the hair extension 100.

[0064] As shown in FIG. 2, the support portion 131 may be positioned on and fixed to the other surface of the bottom portion 130. The support portion 131 may be formed of a flat wire made of a plastic material having flexibility. The support portion 131 may be formed at a length corresponding to the length of the bottom portion 130 and at a width smaller than a width of the bottom portion 130.

[0065] The flat support portion 131 may be bonded and fixed to the bottom portion 130. The wig hair fixing portion 141 may be attached to the flat support portion 131. The wig hairs 140 may be fixed to the wig hair fixing portion 141. The wig hair fixing portion 141 may be connected to the support portion 131 and may be bonded to at least a part of the bottom portion 130.

[0066] The flat support portion 131 is configured to be bent and maintain a bent shape when a force is applied to the support portion 131. By providing the support portion 131, the hair extension 100 according to the present invention may be worn along the curvature of the head of a wearer and may be kept in an attached state for a long period of time without floating away from the head. Since the flat support

portion **131** is made of a plastic material rather than a metallic material, the support portion **131** is lightweight and is not broken even when repeatedly bent.

[0067] A hair extension **100** according to a modification of the first embodiment of the present invention will be described with reference to FIG. 3.

[0068] Although one support portion **131** is provided in the embodiment described above, there may be two or more support portions. As shown in FIG. 3, a plurality of support portions **131a** and **131b** may be formed at a length corresponding to the length of the bottom portion **130** of the hair extension **100** and may be disposed in a spaced-apart parallel relationship with each other.

[0069] In another embodiment of the present invention, the support portion **131** may be formed by a bendable plastic material in a flat mesh shape (not shown) and may be attached to the bottom portion **130**.

[0070] The wig hairs **140** may be fixed to the wig hair fixing portion **141**. The bottom portion **130**, the support portion **131** and the wig hair fixing portion **141** may be bonded by a bonding tape or a bonding agent so that the support portion **131** is positioned between the bottom portion **130** and the wig hair fixing portion **141**. In order to more strongly fix the wig hairs **140**, the bottom portion **130** and the wig hairs **140** may be sewn through the use of a material such as a thread or the like.

[0071] Sewing may not be required depending on the amount and thickness of the wig hairs **140** and the degree of bonding between the wig hairs **140**, the support portion **131** and the bottom portion **130**. Thus, the sewing may be selectively performed.

[0072] In one embodiment of the present invention, the wig hairs **140** may be uniformly arranged and positioned on one side of the periphery of the wig hair fixing portion **141** and may be fixed to the wig hair fixing portion **141** by a bonding tape or a bonding agent over the length extending to the other side of the wig hair fixing portion **141**. In this case, sewing may be performed on one side of the periphery of the wig hair fixing portion **141**.

[0073] Thus, a method of manufacturing the hair extension **100** provided with cross-shaped engaging portions **110** according to the first embodiment of the present invention may include a step of forming the cross-shaped engaging portions **110** while thermally treating and melting one end portions of the pillar portions **120** and a step of attaching the wig hairs **140** to the bottom portion **130** positioned at the other ends of the pillar portions **120**.

[0074] In another embodiment, the wig hairs **140** may be evenly distributed and fixed over a region from one side of the periphery of the wig hair fixing portion **141** to the other side thereof just like the distribution of the natural hairs on the scalp. In this case, the end portions of the wig hairs **140** are strongly fixed to the wig hair fixing portion **141**.

[0075] In a further embodiment, the wig hair fixing portion **141** to which the wig hairs **140** are fixed may be configured to be attached to and detached from the bottom portion **130** (see FIG. 7). Thus, when the cross-shaped engaging portions **110** are bent or deformed due to the repeated use of the hair extension **100** for a long period of time, a bottom portion **130** having new cross-shaped engaging portions **110** may be attached to the wig hair fixing portion **141**. This makes it possible to reuse the wig hairs **140**. In other words, a bottom portion **130** having cross-shaped engaging portions **110** may be purchased for replace-

ment purposes. This makes it possible to use the hair extension **100** for an extended period of time.

[0076] In the method of manufacturing the hair extension **100** described above, the step of attaching the wig hairs **140** to the bottom portion **130** may include a step of bonding the wig hair fixing portion **141** to the wig hairs **140** and a step of bonding a bottom fixing portion **132**, which is made of a material capable of being attached to and detached from the wig hair fixing portion **141**, to the bottom portion **130**.

[0077] The functions of the respective components of the hair extension **100** according to the first embodiment of the present invention will be described in more detail with reference to FIGS. 4 to 6.

[0078] As shown in FIG. 4, the wearer **10** includes a scalp **11** and natural hairs **12**. The cross-shaped engaging portions **110** of the hair extension **100** may be moved inward between the natural hairs **12** so that the hair extension **100** can make close contact with the scalp **11**.

[0079] As shown in FIG. 5, each of the pillar portions **120** includes four side protrusions **121** disposed perpendicularly to one another and has a cross-shaped cross section. As the end surfaces of the pillar portions **120** having such a cross-shaped cross section are melted down by a heat treatment, the side protrusions **121** form hook portions **111** as shown in FIG. 6. The hook portions **111** of the cross-shaped engaging portions **110** formed in this manner are engaged with the natural hairs **12**, whereby the hair extension **100** can be fixed to the wearer **10**.

[0080] Since four hook portions **111** are provided in a corresponding relationship with the four side protrusions **121** of each of the pillar portions **120**, the hair extension **100** can be kept in a strongly fixed state even when the hair extension **100** worn by the wearer **10** is twisted or pulled. For example, after the hair extension **100** is worn by the wearer **10**, even when the natural hairs and the wig hairs are tied up into one bundle to produce a ponytail or a raised hair bundle, the hair extension **100** can be naturally harmonized with the natural hairs in an engaged state.

[0081] Referring to FIG. 6, the length "d" denotes the total height of the attachment portions including the cross-shaped engaging portions **110**, the pillar portions **120** and the bottom portion **130**. As shown in FIG. 11, the height of the attachment portions positioned in the central region of the bottom portion **130** may be set to 1.8 mm to 1.9 mm and the height of the attachment portions positioned in the peripheral region of the bottom portion **130** may be set to 1.6 mm to 1.7 mm.

[0082] In order to make sure that the height of the attachment portions varies depending on the position thereof, the height of the pillar portions **120** positioned in the peripheral region of the bottom portion **130** may be set to be smaller than the height of the pillar portions **120** positioned in the central region of the bottom portion **130**.

[0083] If the height of the pillar portions **120** positioned in the peripheral region of the bottom portion **130** is set to be smaller than the height of the pillar portions **120** positioned in the central region of the bottom portion **130** as described above, the playing gap between the hook portions **111** and the bottom portion **130** becomes small in the state in which the natural hairs **12** engage with the cross-shaped engaging portions **110**. It is therefore possible to prevent the natural hairs **12** from being easily disengaged from the hook portions **111** and to prevent the peripheral edge of the hair extension **100** from floating away from the head.

[0084] If the height of the pillar portions 120 is larger than a proper value, the playing gap between the hook portions 111 and the bottom portion 130 is increased. Thus, there may be posed a problem that the natural hairs 12 are easily disengaged from the hook portions 111 and the hair extension 100 is easily separated from the natural hairs 12.

[0085] For reference, when the height of the attachment portions remains the same in all the regions (i.e., the peripheral region and the central region), if the height of the attachment portions is larger than a proper value (1.8 to 1.9 mm), the cross-shaped engaging portions 110 positioned in the peripheral region are first separated from the natural hairs 12 after a lapse of a predetermined time. If the height of the attachment portions is smaller than a proper value (1.8 to 1.9 mm), the cross-shaped engaging portions 110 are engaged with the natural hairs 12 with a large engaging force. However, there is posed a problem that it is not easy to remove the hair extension 100 from the natural hairs 12.

[0086] Accordingly, in the embodiments of the present invention, the height of the attachment portions positioned in the peripheral region of the bottom portion 130 is set to 1.6 mm to 1.7 mm which is smaller than the height of the attachment portions positioned in the central region, thereby increasing the engaging force of the cross-shaped engaging portions 110 so that the cross-shaped engaging portions 110 are not easily separated from the natural hairs 12. The height of the attachment portions positioned in the central region of the bottom portion 130 is set to 1.8 mm to 1.9 mm so that the engaging force of the cross-shaped engaging portions 110 positioned in the central region becomes slightly smaller than that of the cross-shaped engaging portions 110 positioned in the peripheral region. This makes it possible to easily remove the hair extension from the natural hairs while normally maintaining a certain level of engaging force.

[0087] A process of deriving such a result will be described in more detail with reference to experimental example 1 to be described later.

EXPERIMENTAL EXAMPLE 1

Time-Dependent Fixing Force

[0088] As shown in Table 1 below, the cross-shaped engaging portions 110 according to the present invention are capable of supporting the same weight for a longer time than a conventional attachment/detachment means such as a wig clip or the like.

TABLE 1

Attachment/detachment means	Weight when attached to natural hairs	Weight endurance time
Cross-shaped engaging portions 110 of the present invention	500 g	Kept in position after a lapse of five minutes
Conventional wig clip	500 g	Slid down within ten seconds

[0089] The experiment was conducted by fixing, with a bonding tape, a weight of 500 g to the wig hairs 140 attached to the bottom portion 130 having the cross-shaped engaging portions 110 according to the first embodiment of the present invention and measuring the time taken until the weight is slid down. The hair extension provided with a conventional wig clip as an attachment/detachment means is an ordinary

hair extension commercially available at the present time and is configured so that the hair extension can be fixed to the natural hairs with a clip. The thickness of the hair extension having the attachment/detachment means is larger than 3.0 mm in average.

[0090] Similar to the method of testing the fixing force of the cross-shaped engaging portions 110 according to the present invention, a weight of 500 g was fixed to the wig hairs 140 provided with a conventional wig clip using a bonding tape, and the time taken until the weight is slid down was measured. In the conventional sample and the sample of the present invention used at this time, the wig hairs have the same length and area. The fixing position of the weight of 500 g is the middle point of the wig hairs. In this state, the measurement was performed.

[0091] At this time, the measurement time is in the unit of second. Measurement was performed three times at the same position where the hair extension 100 is attached to the natural hairs of the wearer 10. In the measurement performed three times, the cross-shaped engaging portions 110 of the present invention was kept in position even after a lapse of five minutes, but the conventional wig clip was slid down within ten seconds. In other words, as compared with the conventional wig attachment/detachment means, the hair extension 100 provided with cross-shaped engaging portions 110 according to the first embodiment of the present invention has a substantially small thickness and shows a stronger fixing force.

[0092] In particular, it was confirmed that desired hair styles can be produced without any sliding-down phenomenon even at the time of combing, drying and ironing.

[0093] The hair extension 100 provided with cross-shaped engaging portions 110 according to the first embodiment of the present invention is superior not only in the fixing force but also in the wearing sensation as described below with reference to experimental example 2.

EXPERIMENTAL EXAMPLE 2

Wearing Sensation Measured in Daily Life Activities

[0094] The hair extension 100 according to the first embodiment of the present invention was actually worn in a daily life for 30 days. As a result, it was confirmed that no or little sense of irritation is felt by a wearer even when the wearer performs an act of leaning on a sofa or lying down on a bed.

[0095] Furthermore, a wearer who wears two hair extensions 100 including the bottom portion 130 having a length of 12 cm, two hair extensions 100 including the bottom portion 130 having a length of 8 cm and two hair extensions 100 including the bottom portion 130 having a length of 4 cm has got a sleep for eight hours. As a result, it was confirmed that only two of the six hair extensions 100 are separated from the wearer.

[0096] Referring to FIG. 7, the hair extension provided with cross-shaped engaging portions according to a modification of the first embodiment of the present invention may further include a bottom fixing portion 132 fixed to the other surface of the bottom portion 130 and made of a material capable of being attached to and detached from the wig hair fixing portion 141.

[0097] The wig hairs 140 are bonded and fixed to the wig hair fixing portion 141. The bottom portion 130 is bonded

and fixed to the bottom fixing portion **132**. In this regard, the bottom fixing portion **132** may be made of a material capable of being attached to and detached from the wig hair fixing portion **141**.

[0098] For example, the wig hair fixing portion **141** may be an injection-molded Velcro tape having a plurality of hooks. The bottom fixing portion **132** may be formed of a fabric that can be attached to and detached from the injection-molded Velcro tape.

[0099] In this regard, the injection-molded Velcro tape having a plurality of hooks may be a typical injection-molded hook-type Velcro tape made of a material such as nylon or the like. In the present invention, an injection-molded Velcro tape having a thickness of about 0.5 to 1.0 mm may be used as the wig hair fixing portion **141**. The fabric may be made of a material such as a felt sheet or the like which can be easily caught by the hooks of the injection-molded Velcro tape. Alternatively, the wig hairs **140** may be directly fixed to the bottom portion **130** by sewing without having to use the wig hair fixing portion **141** and the bottom fixing portion **132**.

[0100] A method of attaching and detaching the hair extension **100** provided with cross-shaped engaging portions **110** according to the embodiments of the present invention will be described in detail with reference to FIGS. **8** to **10**.

[0101] As shown in FIG. **8**, when attaching the hair extension **100** according to the embodiments of the present invention to the wearer **10**, an attachment position is first determined and then the bottom portion **130** is pressed in the direction indicated by an arrow A (first operation). As a result, the outer surfaces of the cross-shaped engaging portions **110** having a certain radius of curvature can separate the natural hairs **12** apart when the bottom portion **130** is pressed in the direction indicated by the arrow A.

[0102] Next, as shown in FIG. **9**, the bottom portion **130** is pressed in the direction indicated by an arrow B (upward in FIG. **9**) (second operation). At this time, the bottom portion **130** may also be pressed in left or right direction orthogonal to the direction indicated by the arrow B (in the backward or frontward direction with respect to the drawing sheet in FIG. **9**). When the bottom portion **130** is pressed in such directions, some of the cross-shaped engaging portions **110** may make contact with the scalp **11** of the wearer **10**. At this time, the pillar portions **120** are bent at a certain curvature, whereby some of the natural hairs are engaged with the hook portions **111**. Four hook portions **111** are provided in each of the pillar portions **120**. On the basis of illustration in FIG. **9**, the natural hairs are first caught between one upper hook portion **111** and two intermediate hook portions **111**.

[0103] Finally, as shown in FIG. **10**, the bottom portion **130** is pressed in the direction indicated by an arrow C (downward in FIG. **10**) (third operation). When the bottom portion **130** is pressed in such a direction, the cross-shaped engaging portions **110** are moved in the direction opposite to the direction indicated by the arrow B in a state in which the natural hairs **12** are caught by some of the hook portions **111**. Thus, the natural hairs **12** not caught in the previous operation can be easily caught by the hook portions **111**. In other words, on the basis of illustration in FIG. **10**, the natural hairs may be additionally caught between one lower hook portion **111** and two intermediate hook portions **111**.

[0104] As used herein, the language “the bottom portion **130** is pressed in the direction indicated by the arrow B or

the arrow C means that while pressing the bottom portion **130** in the direction indicated by the arrow A, the bottom portion **130** is waggled by a certain distance, e.g., 2 mm or more and 10 mm or less, in the direction indicated by the arrow B or C or in the left or right direction orthogonal to the direction indicated by the arrow B or C.

[0105] As a result, the natural hairs **12** are caught by four hook portions **111** of each of the cross-shaped engaging portions **110** and are positioned between the cross-shaped engaging portions **110**. Thus, the natural hairs **12** are not easily disengaged from between the cross-shaped engaging portions **110** by merely pulling the bottom portion **130**.

[0106] At this time, if the hair extension **100** is fixed such that the cross-shaped engaging portions **110** make close contact with the scalp **11**, the attachment portion including the cross-shaped engaging portions **110**, the pillar portions **120** and the bottom portion **130** is not largely spaced apart from the scalp **11**. Therefore, the hair extension **100** is naturally harmonized with the natural hairs **12**.

[0107] In this regard, the attachment portion including the cross-shaped engaging portions **110**, the pillar portions **120** and the bottom portion **130** is not largely spaced apart from the scalp **11**. Even if the cross-shaped engaging portions **110** are formed at a right angle with respect to the bottom portion **130**, the scalp **11** is not stimulated by the cross-shaped engaging portions **110**.

[0108] When one attempts to detach the hair extension **100** according to the first embodiment of the present invention from the wearer **10**, it is preferable that the hair extension **100** is detached by applying a force to the bottom portion **130** in the reverse directions of the arrows A, B and C in FIGS. **8** to **10**.

[0109] In the attachment process, the bottom portion **130** is pressed against the scalp **11** (first operation), moved upward (second operation) and moved downward (third operation). In the detachment process, the bottom portion **130** is moved upward in the reverse direction of the arrow C (fourth operation), moved downward in the reverse direction of the arrow B (fifth operation) and pulled away from the scalp **11** in the reverse direction of the arrow A (sixth operation), thereby detaching the hair extension **100**.

[0110] As used herein, the language “the bottom portion **130** is moved in the reverse directions of the arrow B or C means that while pulling the bottom portion **130** in the reverse direction of the arrow A, the bottom portion **130** is waggled by a certain distance, e.g., 2 mm or more and 10 mm or less.

[0111] As described above, the hair extension **100** provided with cross-shaped engaging portions **110** according to the present invention is easily attachable and detachable by a simple operation, conveniently wearable for a long period of time due to the reduced weight thereof, and convenient to use.

[0112] Hereinafter, second to fifth embodiments of the present invention will be described with reference to FIGS. **12** to **20**.

[0113] A hair extension **200** according to the embodiments of the present invention may include a net **220** having a predetermined area, an attachment portion **210** connected to at least a part of one surface of the net **220**, and wig hairs **240** provided on the other surface of the net **220** so as to form at least a part of the top of the head or the parting.

[0114] The attachment portion **210** may be disposed along the outer periphery or the overall length of the net **220** at a

predetermined width. The attachment portion 210 includes cross-shaped engaging portions 211, pillar portions 212 connected to the cross-shaped engaging portions 211, and a bottom portion 213 whose opposite surfaces (one surface and the other surface) are respectively connected to the pillar portions 212 and to the net 220. The bottom portion 213 may be bonded to one surface of the net 220.

[0115] The cross-shaped engaging portions 211, the pillar portions 212 and the bottom portion 213 differ only in reference numeral from those described above and have the same configuration, function and operation as those described above. Thus, the detailed description thereof will be omitted.

[0116] The net 220 may be formed of a net-like fabric, and the color thereof may similar to the color of the scalp. If the net 220 is formed of a net-like fabric, it is possible to easily weave the wig hairs 240 on the net 220 in various manners. The shape and size of the net 220 may vary depending on the position of the hair extension 200 on the head and the size of a hair loss region. Various modifications may be made for the shape and size of the net 220.

[0117] Since the wig hairs 240 are woven on the net 220 in this manner, even if the net 220 is positioned on the surface of the head so as to cover the natural hairs 12, the net 220 may look like the scalp 11. As a result, even if the hair extension is exposed to the outside, natural hairstyles can be produced without having to cover the hair extension with the natural hairs.

[0118] The wig hairs 240 may be woven on one surface of the net 220 in many different ways. The protruding direction of the wig hairs 240 with respect to the attachment portion 210 may be determined by the net 220. For example, when the net 220 is not provided, the wig hairs 240 need to be fixed to the attachment portion 210 by a fixing means such as a bonding agent or the like. In this case, the wig hairs 240 are fixed to the attachment portion 210, which makes it difficult to naturally produce the parting.

[0119] By providing the net 220, the wig hairs 240 may be used to produce various types of parting. In this case, due to the attachment portion 210 according to the present invention, the hair extension having a small size can be strongly attached to the natural hairs without having to use a clip or the like.

[0120] Examples thereof will be described in more detail with reference to the second to fourth embodiments of the present invention.

[0121] Another material such as silicon or the like may be further provided on the other surface of the net 220 on which the wig hairs 240 are woven, so that the attachment portion 210 can be easily bonded to the net 220.

[0122] The net 220 may be fixed to the other surface of the bottom portion 213 by a fixing means such as a bonding agent or the like. In this case, a bonding agent may be coated on the bottom portion 213 or the net 220, whereby the bottom portion 213 and the net 220 can be bonded to each other. In order to more strongly fix the net 220 to the bottom portion 213, the bottom portion 213 and the net 220 may be sewn using a thread or the like.

[0123] However, it is to be noted that the method of connecting the net 220 and the attachment portion 210 is not limited to a specific method. For example, in another embodiment, the net 220 and the attachment portion 210 may be detachably attached to each other.

[0124] Thus, when the cross-shaped engaging portions 211 are bent or deformed due to the repeated use of the hair extension for a long period of time, a bottom portion 213 having new cross-shaped engaging portions 211 may be attached to the net 220. This makes it possible to reuse the wig hairs 240. In other words, a bottom portion 213 having cross-shaped engaging portions 211 may be purchased for replacement purposes. This makes it possible to use the net 220 having the wig hairs 240 for an extended period of time.

[0125] A method of manufacturing the hair extension 200 provided with cross-shaped engaging portions 211 according to the embodiments of the present invention may include a step of cutting the net 220 to have a predetermined area, a step of implanting the wig hairs 240 on one surface of the net 220, a step of preparing the attachment portion 210 provided with the cross-shaped engaging portions 211, and a step of bonding the attachment portion 210 to the other surface of the net 220.

[0126] In another embodiment of the present invention, the hair extension 200 may further include a support portion 230 fixed to one surface of the bottom portion 213 before the attachment portion 210 is bonded to one surface of the net 220 (see FIG. 20).

[0127] The support portion 230 may be formed at a length corresponding to the length of the bottom portion 213 and at a width smaller than the width of the bottom portion 213. The support portion 230 is formed in a flat shape by a plastic material having flexibility. When a force is applied to the support portion 230, the support portion 230 may be bent and may maintain a bent shape.

[0128] The support portion 230 may be bonded and fixed to the bottom portion 213. The net 220 may be fixed to the bottom portion 213 to which the support portion 230 is bonded.

[0129] By inserting the flat support portion 230, the hair extension provided with cross-shaped engaging portions according to the present invention may be worn along the curvature of the head of a wearer and may be kept in an attached state for a long period of time without floating away from the head. Since the flat support portion 230 is made of a plastic material rather than a metallic material, the support portion 230 is not broken even when repeatedly bent.

[0130] According to the second embodiment among the embodiments of the present invention, as shown in FIGS. 12 and 13, it is possible to manufacture the hair extension 200 for making up for a region including the parting and the top of the head.

[0131] In this case, the wig hairs 240 may be implanted on the net 220 so that the wig hairs 240 can be naturally drooped in the radial direction with respect to the parting and the top of the head. In the second embodiment, the attachment portion 210 may be positioned in the periphery of the net 220 and may be fixed to the periphery of the net 220 by a bonding agent at a predetermined width.

[0132] In this regard, the longitudinal length X_1 of the net 220 may be about 7.0 cm and the transverse width Y_1 of the net 220 may be as small as about 3.5 cm to 4.5 cm. As a result of repeated tests, it was confirmed that the attachment force is slightly reduced if the longitudinal length X_1 is smaller than 7.0 cm and the transverse width Y_1 is smaller than 3.5 cm.

[0133] The magnitude of the attachment force was confirmed by attaching the hair extension 200 provided with cross-shaped engaging portions 211 according to the second

embodiment to the top of the head of a test model, fixing a weight to the hair extension **200** and measuring the time taken until the hair extension **200** is separated from the natural hairs. It was confirmed that the floating phenomenon is increased if the longitudinal length X_1 is larger than 7.0 cm and the transverse width Y_1 is larger than 4.5 cm.

[0134] Thus, the net **220** of the hair extension **200** provided with cross-shaped engaging portions **211** according to the second embodiment is preferably formed so that the longitudinal length X_1 is about 7.0 cm and the transverse width Y_1 is about 4.5 cm.

[0135] As described above, even if the width of the attachment portion **210** provided in the periphery of the net **220** is as small as about 1.0 cm, it is possible to strongly fix the hair extension to the natural hairs of a wearer.

[0136] As a result of repeated tests, it was confirmed that the attachment force is slightly reduced if the width of the attachment portion **210** is smaller than 1.0 cm. The measurement of the attachment force was conducted as in the aforementioned tests. Thus, it is preferred that the width of the attachment portion **210** is 1.0 cm or more.

[0137] The third embodiment of the present invention will be described in detail with reference to FIGS. **14** and **15**.

[0138] The hair extension **200** according to the third embodiment of the present invention may be used to intensively make up for the thin hairs in a region including the parting. Alternatively, the hair extension provided with the wig hairs having a color different from the color of the natural hairs may be used for cosmetic purposes. In this case, the wig hairs **240** may be implanted on the net **220** so that the wig hairs **240** can be naturally drooped on both sides of the parting. In the third embodiment, the attachment portion **210** may be positioned over the entirety of the net **220** and may be fixed to the net **220** by a bonding agent.

[0139] In this regard, the longitudinal length X_2 of the net **220** may be 5.0 cm to 7.0 cm and the transverse width Y_2 of the net **220** may be as small as about 1.0 cm. As a result of repeated tests, it was confirmed that the attachment force is slightly reduced if the longitudinal length X_2 is smaller than 5.0 cm. It was also confirmed that the floating phenomenon is increased if the longitudinal length X_2 is larger than 7.0 cm.

[0140] The magnitude of the attachment force was confirmed by the same method as the test method used in the second embodiment. As a result, it was confirmed that the net **220** of the hair extension provided with cross-shaped engaging portions according to the third embodiment of the present invention is preferably cut to have the longitudinal length X_2 of about 5.0 cm to 7.0 cm.

[0141] Similar to the second embodiment, it is preferred that the width of the attachment portion **210** is 1.0 cm or more. Even if the width of the attachment portion **210** provided over the entirety of the net **220** of the third embodiment is about 1.0 cm, it is possible to strongly fix the hair extension to the natural hairs of a wearer.

[0142] The fourth embodiment of the present invention will be described in detail with reference to FIGS. **16** and **17**.

[0143] The hair extension **200** according to the fourth embodiment of the present invention may be used to make up for the thin hairs in a region on one side of the parting as a boundary line. Alternatively, the hair extension provided with the wig hairs having a color different from the color of the natural hairs may be used for cosmetic purposes. A

plurality of hair extensions having different longitudinal lengths may be simultaneously attached around the parting.

[0144] In this case, the wig hairs **240** may be implanted on the net **220** so that the wig hairs **240** can be naturally drooped in one direction just like the natural hairs existing on one side of the parting. In the fourth embodiment, the attachment portion **210** may be positioned over the entirety of the net **220** as in the third embodiment and may be fixed to the net **220** by a bonding agent. The size of the net **220** may be similar to that of the second embodiment. The description thereof will be omitted.

[0145] The fifth embodiment of the present invention will be described in detail with reference to FIGS. **18** and **19**.

[0146] The hair extension **200** according to the fifth embodiment of the present invention may be used to make up for the thin hairs in a region of the top of the head. In this case, the wig hairs **240** may be implanted on the net **220** so that the wig hairs **240** can be naturally drooped in the radial direction just like the natural hairs existing at the top of the hair. In the fifth embodiment, at least one of the net **220** and the attachment portion **210** may be formed in a circular shape or an elliptical shape.

[0147] The net **220** may be formed in a circular shape to have a diameter of about 3.5 cm to 4.5 cm. In this case, the attachment portion **210** may be formed at the size equal to or smaller than the size of the net **220**. As a result of repeated tests, it was confirmed that the attachment force is slightly reduced if the diameter of the circular net **220** is smaller than 3.5 cm. It was also confirmed that if the diameter of the circular net **220** is larger than 4.5 cm, the floating phenomenon is increased and the wearing state is aesthetically unnatural.

[0148] The magnitude of the attachment force was confirmed by the same method as the test method used in the second embodiment to the fourth embodiment. As a result, the circular net **220** of the hair extension provided with cross-shaped engaging portions according to the fifth embodiment of the present invention may preferably be formed to have a diameter of about 3.5 cm to 4.5 cm.

[0149] Similar to the second to fourth embodiments, it is preferred that the width of the attachment portion **210** is 1.0 cm or more. Even if the width of the attachment portion **210** provided along the outer periphery of the net **220** of the fifth embodiment is as small as about 1.0 cm, it is possible to strongly fix the hair extension to the natural hairs of a wearer.

[0150] In the hair extension **200** provided with cross-shaped engaging portions according to the embodiment of the present invention, the net **220** and the attachment portion **210** may be different in size and shape from each other.

[0151] Furthermore, in the second to fifth embodiments of the present invention, as described above, the height of the attachment portion **210** positioned in the central region of the bottom portion **213** may be set to 1.8 mm to 1.9 mm and the height of the attachment portion **210** positioned in the peripheral region of the bottom portion **213** may be set to 1.6 mm to 1.7 mm.

[0152] In order to make sure that the height of the attachment portions varies depending on the position thereof, the height of the pillar portions **212** positioned in the peripheral region of the bottom portion **213** may be set to be smaller than the height of the pillar portions **212** positioned in the central region of the bottom portion **213**.

[0153] While the present invention has been described with reference to the preferred embodiments, it is to be understood that the scope of the present invention is not limited to the specific embodiments described above, and that variations and modifications will be apparent to those skilled in the art without departing from the scope and spirit of the present invention.

What is claimed is:

1. A hair extension comprising:
 - cross-shaped engaging portions;
 - pillar portions connected to the cross-shaped engaging portions;
 - a bottom portion having opposite surfaces, the pillar portions connected to one of the opposite surfaces of the bottom portion;
 - a support portion fixed to the other of the opposite surfaces of the bottom portion;
 - a wig hair fixing portion connected to the support portion; and
 - wig hairs fixed to the wig hair fixing portion.
2. The hair extension of claim 1, wherein the cross-shaped engaging portions are formed in a direction intersecting with the bottom portion and disposed at regular intervals on the bottom portion.
3. The hair extension of claim 1, wherein each of the pillar portions includes four side protrusions defining a cross-shaped cross section, and each of the cross-shaped engaging portions includes hook portions transformed from the side protrusions by melting a part of each of the pillar portions.
4. The hair extension of claim 1, further comprising:
 - a bottom fixing portion fixed to the other surface of the bottom portion and made of a material capable of allowing the wig hair fixing portion to be attached to and detached from the bottom fixing portion.
5. The hair extension of claim 4, wherein the wig hair fixing portion is an injection-molded Velcro tape having hooks, and the bottom fixing portion is formed of a fabric capable of allowing the injection-molded Velcro tape to be attached to and detached from the fabric.
6. The hair extension of claim 1, wherein the support portion has a length corresponding to a length of the bottom portion and a width smaller than a width of the bottom portion, and is formed, in a flat shape, of a plastic material having flexibility so that the support portion is bent and maintains a bent shape when a force is applied thereto.
7. The hair extension of claim 6, wherein the support portion includes a plurality of support portions disposed in a spaced-apart parallel relationship with each other.
8. The hair extension of claim 1, wherein the wig hairs are bonded to one surface of the wig hair fixing portion by a bonding tape or a bonding agent or fixed to the bottom portion by sewing.
9. The hair extension of claim 1, wherein a height of the pillar portions positioned in a peripheral region of the bottom portion is smaller than a height of the pillar portions positioned in a central region of the bottom portion.
10. The hair extension of claim 9, wherein a height of an attachment portion including the cross-shaped engaging portions, the pillar portions and the bottom portion is set

such that the height of the attachment portion positioned in the central region of the bottom portion is 1.8 mm to 1.9 mm and the height of the attachment portion positioned in the peripheral region of the bottom portion is 1.6 mm to 1.7 mm.

11. A hair extension comprising:
 - a net;
 - an attachment portion connected to at least a part of one surface of the net; and
 - wig hairs provided on the other surface of the net and configured to cover at least a part of a top of a head or a parting of a wearer,
 - wherein the attachment portion is provided at a predetermined width along a periphery or an overall length of the net, the attachment portion including:
 - cross-shaped engaging portions;
 - pillar portions connected to the cross-shaped engaging portions; and
 - a bottom portion having opposite surfaces, one surface being connected to the pillar portions and the other surface being connected to the net.
12. The hair extension of claim 11, wherein the cross-shaped engaging portions are formed in a direction intersecting with the bottom portion and disposed at regular intervals on the bottom portion.
13. The hair extension of claim 11, wherein each of the pillar portions includes four side protrusions defining a cross-shaped cross section, and each of the cross-shaped engaging portions includes hook portions transformed from the side protrusions by melting a part of each of the pillar portions.
14. The hair extension of claim 11, further comprising:
 - a support portion fixed to the other surface of the bottom portion,
 - wherein the support portion has a length corresponding to a length of the bottom portion and a width smaller than a width of the bottom portion, and is formed, in a flat shape, of a plastic material having flexibility so that the support portion is bent and maintains a bent shape when a force is applied thereto.
15. The hair extension of claim 11, wherein when the hair extension is attached around the parting, a width of at least one of the net and the attachment portion is 5.5 cm to 6.5 cm.
16. The hair extension of claim 11, wherein when the hair extension is attached to the top of the head, at least one of the net and the attachment portion is formed in a circular shape to have a diameter of 3.5 cm to 4.5 cm.
17. The hair extension of claim 11, wherein a height of the pillar portions positioned in a peripheral region of the bottom portion is smaller than a height of the pillar portions positioned in a central region of the bottom portion.
18. The hair extension of claim 17, wherein a height of the attachment portion positioned in the central region of the bottom portion is 1.8 mm to 1.9 mm and a height of the attachment portion positioned in the peripheral region of the bottom portion is 1.6 mm to 1.7 mm.

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