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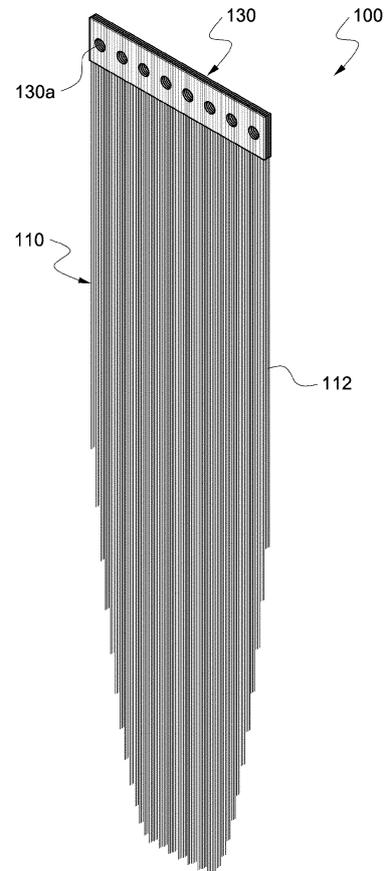
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**(54) Hair Extension and process for the same**

(57) A hair extension is disclosed, which can be used repeatedly and has extension hairs that is rarely lost and easy to be attached to and detached from. The hair extension includes a extension hair portion having a plurality of extension hairs and a binding portion for tying one ends of the extension hairs, and the binding portion includes a sheet binding portion for fixing the one ends integrally by melt-and-gluing two synthetic resin sheets with the one ends in-between.

【Figure 1】



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**Description**

[Field of Technology]

**[0001]** The invention relates to a hair extension and process for the same, especially to a hair extension and process for the same, which enables users to have hair-styles of excellent hair quality, affluent hair, or long hair by extending hairs of the user.

[Background of Invention]

**[0002]** Conventional hair extension is made by connecting one ends of flatly-arranged extension hairs into one by sewing, which was to attach to the user's hairs with hair clip or regular hair pin.

**[0003]** In such conventional hair extension, since the extension hairs were detached from part fixed by sewing or entangled, it was not able to be used repeatedly.

**[0004]** Also, since such conventional hair extension is unable to keep in place in an attached state to the user's hairs, it must be treated often.

**[0005]** Additionally, since such conventional hair extension was thick and had extension hairs divided and tied in sewing threads by a few strands by strands, there were many bumps on the surfaces. Therefore, such conventional hair extension had rough surfaces.

**[0006]** Since such conventional hair extension was hard to attach to the user's hairs and connected tightly to the user's hairs, the user had problems to move head freely.

[Disclosure]

[Problems to Solve]

**[0007]** The object of the invention is to provide a hair extension, in which extension hairs are not detached or entangled since they are fixed strongly.

**[0008]** Another object of the invention is to provide a hair extension, in which density or total number of extension hairs in a direction of thickness can be controlled easily in the process for manufacturing the hair extension.

**[0009]** Still another object of the invention is to provide a hair extension, which keeps initial state of being attached to user's hairs for a long time.

**[0010]** Still another object of the invention is to provide a hair extension, in which since it is possible to attach to the user's hairs with some movability it is easy to move after being attached and it keeps the attached state for a long time.

**[0011]** Still another object of the invention is to provide a hair extension, which can be used repeatedly many times.

**[0012]** Still another object of the invention is to provide a hair extension, which has smooth surfaces compared to conventional ones.

**[0013]** Still another object of the invention is to provide a hair extension, which is easy to attach to the user's hairs.

**[0014]** Still another object of the invention is to provide a process for manufacturing a hair extension according to the invention.

[Solutions to Problems]

**[0015]** A hair extension according to the invention comprises a extension hair portion including a plurality of strands of extension hairs and a binding portion for tying one ends of the extension hairs into one, wherein the binding portion comprises a sheet binding portion in which two sheets of synthetic resin overlapped with the one ends in-between are molten and glued so as to fix the one ends into one body.

**[0016]** The synthetic resin sheet is preferably a polyurethane sheet.

**[0017]** In cases, the extension hair portion comprises a first sub-extension hair portion and a second sub-extension hair portion disposed in layers together with the first sub-extension hair portion, and the sheet binding portion is formed by melting and gluing with neighboring ones a first polyurethane sheet disposed at an outer side of the first sub-extension hair portion opposite to the second sub-extension hair portion, a second polyurethane sheet disposed between the first and second sub-extension hair portions, and a third polyurethane sheet disposed at an outer side of the second sub-extension hair portion opposite to the first sub-extension hair portion.

**[0018]** In some cases, the extension hair portion comprises a first sub-extension hair portion, a second sub-extension hair portion disposed in layers together with the first sub-extension hair portion, a third sub-extension hair portion disposed in layers on the second sub-extension hair portion opposite to the first sub-extension hair portion, and the sheet binding portion is formed by melting and gluing with neighboring ones a first polyurethane sheet disposed at an outer side of the first sub-extension hair portion opposite to the second sub-extension hair portion, a second polyurethane sheet disposed between the first and second sub-extension hair portions, a third polyurethane sheet disposed between the second and third sub-extension hair portions, and a fourth polyurethane sheet disposed at an outer side of the third sub-extension hair portion opposite to the second sub-extension hair portion.

**[0019]** The synthetic resin is preferably a polyurethane sheet with thickness of 0.06~1.00mm.

**[0020]** In the extension hair portion, the extension hairs are preferably disposed in a plane.

**[0021]** In each of the first through third sub-extension hair portions, the extension hairs are disposed in a plane and there are 1 to 5 strands in the direction of thickness.

**[0022]** In the sheet binding portion are preferably formed holes with intervals.

**[0023]** A process for manufacturing a hair extension

according to the invention comprises: a first step for disposing two synthetic resin sheets in layers with one ends of a first sub-extension hair portion; and a first step for melt-and-gluing the one ends of the first sub-extension hair portion between the two synthetic resin sheets by melt-and-gluing the two synthetic resin sheets while pressing the two synthetic resin sheets toward each other.

**[0024]** The synthetic resin sheet is a polyurethane sheet, and the process for manufacturing may further comprise: a second step for disposing additional polyurethane sheet on a portion in which a second sub-extension hair portion is stacked in layers on the first sub-extension hair portion and one ends of the second sub-extension hair portion are overlapped on the molten and glued portion of the two polyurethane sheets; and a second step for melt-and-gluing the additional polyurethane sheet by heating while pressing to the molten and glued portion and fixing the second sub-extension hair portion between the additional polyurethane sheet and a portion where the two polyurethane sheets are molten and glued.

**[0025]** Also, the process for manufacturing may further comprise: a third step for disposing a newly added polyurethane sheet on a portion in which a third sub-extension hair portion is stacked in layers on the second sub-extension hair portion and one ends of the third sub-extension hair portion are overlapped on the molten and glued portion of the three polyurethane sheets; and a third step for melt-and-gluing the newly added polyurethane sheet by heating while pressing to the molten and glued portion and fixing the third sub-extension hair portion between the newly added polyurethane sheet and a portion where the three polyurethane sheets are molten and glued.

**[0026]** The thickness of the synthetic resin is preferably 0.06~1.00mm.

**[0027]** In each of the first through third sub-extension hair portions, the extension hairs are disposed in a plane and there are 1 to 5 strands in the direction of thickness.

**[0028]** The synthetic resin sheet is polyurethane sheet, and preferably the temperature of the polyurethane sheet in the first step for melt-and-gluing is 150~160 degrees in Celsius, and the pressure is 30~50 kg per centimeter squared.

**[0029]** The process may further comprise a step for forming a plurality of holes with intervals where the synthetic resin sheets are molten and glued.

#### [Brief Description of Drawings]

#### [0030]

Fig. 1 is a perspective view showing an example of hair extension according to the invention;  
 Fig. 2 is a partially exploded cross-sectional view for explaining three-layered extension hair portion;  
 Fig. 3 is a partially exploded cross-sectional view for explaining two-layered extension hair portion;  
 Fig. 4 is a partially exploded cross-sectional view for

explaining single-layered extension hair portion;  
 Fig. 5 is a flow chart for explaining a process for manufacturing hair extension according to the invention;

Fig. 6 is a plan view showing a state of extension hairs fixed to a fixing plate in a layer;

Fig. 7 is a plan view showing a state of disposing a first polyurethane sheet and a first sub-extension hair portion with extension hairs fixed on a fixing plate on a melt-and-gluing device;

Fig. 8 is a plan view showing a state of overlapping a second polyurethane sheet on an end of the first sub-extension hair portion;

Fig. 9 is a left side view for showing a state of heating the first and second polyurethane sheets while pressing with press-heater in the state of Fig. 8;

Fig. 10 is a plan view of a state showing overlapping a second sub-extension hair portion and a third polyurethane sheet thereon after melt-and-gluing the two sheets of Fig. 9;

Fig. 11 is a left side view for showing a state of heating the third polyurethane sheet while pressing downward with press-heater in the state of Fig. 10;

Fig. 12 is a plan view of a state showing overlapping a third sub-extension hair portion and a fourth polyurethane sheet thereon after melt-and-gluing the two sheets of Fig. 11;

Fig. 13 is a left side view for showing a state of heating the fourth polyurethane sheet while pressing downward with press-heater in the state of Fig. 12;

Fig. 14 is a plan view showing a hair extension before boring a hole made by Fig. 13;

Fig. 15 is a diagram showing another example of synthetic resin sheet which can be used in the invention;

Fig. 16 is a perspective view showing a state with user's hair taken out through a hole;

Fig. 17 is a perspective view showing a state with an engaging ring inserted in the hair taken out through two neighboring holes;

Fig. 18 is a perspective view showing a state of pressing the engaging ring; and

Fig. 19 is a perspective view showing a state of fixing the hair extension according to the invention to the user's hair.

#### [Detained Description of Invention]

**[0031]** Below, preferable embodiments of the invention are described in detail referring to the figures.

**[0032]** Fig. 1 is a perspective view showing an example of hair extension according to the invention, Fig. 2 is a partially exploded cross-sectional view for explaining three-layered extension hair portion, Fig. 3 is a partially exploded cross-sectional view for explaining two-layered extension hair portion, and Fig. 4 is a partially exploded cross-sectional view for explaining single-layered extension hair portion.

**[0033]** As shown in Figs. 1-4, the hair extension (100) according to the invention comprises a extension hair portion (110) having a plurality of extension hairs (112) disposed in a layer and a sheet binding portion (130) for connecting and fixing one end of the extension hairs (112) integrally. Thus the one end of the extension hair portion (110) is fixed to the sheet binding portion (130). In the invention, preferably human hairs are used for the extension hairs (112) forming the extension hair portion (110).

**[0034]** The sheet binding portion (130) is formed by melt-and-gluing the band-shaped polyurethane sheets together with the one ends of the extension hairs (112) with ends aligned, that is, the one end of the extension hair portion (110) in between, which fixes the one ends of the extension hairs (112) integrally. For polyurethane sheet may be used a polyurethane solution including 29~31:10~20:50~60 in weight of polyurethane, methyl ethyl ketone (MEK, CAS No. 78-93-3) and dimethylformamide (DMF, CAS No. 68-12-2), which is dried or baked to be 0.06~0.1mm thick in an oven and the like. The drying or baking temperature is preferably about 70~90 degrees, most preferably 80 degrees in Celsius. Of course, instead of such a polyurethane sheet, other synthetic resin sheet may be used.

**[0035]** In a case of melt-and-gluing using polyurethane sheets, polyurethane sheet that is thinner than 0.06mm is too little to be molten, such that it tends to make melt-and-gluing erroneous and the melt-and-gluing process of the two sheets may be infested with deformation.

**[0036]** And when the thickness of polyurethane sheet is larger than 0.1mm, it takes longer for heat to be delivered to inside and the temperature of outer surface where the pressing heater touches rises too high, reducing work efficiency.

**[0037]** The thickness of 0.08mm or 0.09mm of polyurethane sheet gives minimized erroneous melt-and-gluing, less deformation, and good workability.

**[0038]** That is, for the polyurethane sheet used for manufacturing the hair extension (100) according to the invention, 0.06~0.1mm thick ones are good to be used, and 0.08~0.09mm thick ones are more preferable.

**[0039]** A preferable dimension (width x length) of polyurethane sheet is 1.2cm x 9cm. However, for a larger hair extension, a 2cm x 15cm one may be used. In cases, ones smaller than 1.2cm x 9cm may be also used.

**[0040]** That is, the size of polyurethane sheet may be changed according to the size of the hair extension (100).

**[0041]** If pressing together and heating the two polyurethane sheets in order to form sheet binding portion (130), the molten portions smears into the extension hairs (112) and encloses one end, and then encounters another molten portions at the other side, to be glued.

**[0042]** If cooling down the molten portions, the portions get solidified and hard. Thus the one end of the extension hair portion (110) is fixed strongly between the two neighboring polyurethane sheets.

**[0043]** As shown, in the sheet binding portion (130) are formed a plurality of holes (130a) with intervals. The holes

(130a) are for attaching the hair extension (100) according to the invention to the user's hairs, the diameter of which may be about 1.5mm~2.0mm, which may be adjusted.

5 **[0044]** Referring to Figs. 2-4, the structure of the hair extension (100) according to the invention is described in more detail.

**[0045]** Referring to Fig. 2, the extension hair portion (110) of the hair extension (100) according to the invention preferably comprises a first sub-extension hair (110a), a second sub-extension hair (110b) disposed in layer on the first sub-extension hair (110a), and a third sub-extension hair (110c) disposed in layer on the second sub-extension hair (110b) opposite to the first sub-extension hair (110a). Therefore, the extension hair portion (110) has three layers, and each of the first sub-extension hair (110a) through the third sub-extension hair (110c) has preferably 1-5 strands of extension hairs (112) in a direction of thickness.

20 **[0046]** In Fig. 2, in an outer side of one end of the first sub-extension hair (110a) is disposed a first polyurethane sheet (131), and between one end of the first sub-extension hair (110a) and one end of the second sub-extension hair (110b) is disposed a second polyurethane sheet (132). The first polyurethane sheet (131) and the second polyurethane sheet (132) are melt-and-glued with each other, and each of them are also glued to one ends of the extension hairs (112) forming the first sub-extension hair (110a), fixing the one ends.

25 **[0047]** Also, between the second sub-extension hair (110b) and the third sub-extension hair (110c) is disposed a third polyurethane sheet (133). The third polyurethane sheet (133) and the second polyurethane sheet (132) are melt-and-glued with each other, and fix one end of the second sub-extension hair (110b) between the second polyurethane sheet (132) and the third polyurethane sheet (133) to the sheet binding portion (130).

30 **[0048]** In the outer side of the third sub-extension hair (110c) is disposed a fourth polyurethane sheet (134). The fourth polyurethane sheet (134) and the third polyurethane sheet (133) are melt-and-glued with each other, and fix one end of the third sub-extension hair (110c) between the third polyurethane sheet (133) and the fourth polyurethane sheet (134) to the sheet binding portion (130).

35 **[0049]** In the embodiment of Fig. 2, the first sub-extension hair (110a) through the third sub-extension hair (110c) are disposed in layers overlapping with each of the second polyurethane sheet (132) and the third polyurethane sheet (133) between neighboring ones.

40 **[0050]** Also, the first polyurethane sheet (131) through the fourth polyurethane sheet (134) are disposed in layers overlapping each of one ends of the first sub-extension hair (110a) through the third sub-extension hair (110c) between neighboring ones, and neighboring ones are melt-and-glued respectively.

45 **[0051]** In Fig. 3, the extension hair portion (110) is formed with the first sub-extension hair (110a) and the

second sub-extension hair (110b) as two layers, the density of which is lower than in Fig. 2.

**[0052]** The hair extension (100) shown in Fig. 3 are obtained by fixing one end of the first sub-extension hair (110a) and one end of the second sub-extension hair (110b) in layers using three polyurethane sheets, the first polyurethane sheet (131) through third polyurethane sheet (133), which is the same as what is obtained in Fig. 2 with the third sub-extension hair (110c) not attached to the sheet binding portion (130) through the fourth polyurethane sheet (134).

**[0053]** Describing in more detail referring to Fig. 3, the extension hair portion (110) comprises the first sub-extension hair (110a) and the second sub-extension hair (110b) disposed in layers with the first sub-extension hair (110a). And the sheet binding portion (130) is melt-and-glued with neighboring ones in which the first polyurethane sheet (131) disposed in the outer side of the first sub-extension hair (110a), the second polyurethane sheet (132) disposed between the first sub-extension hair (110a) and the second sub-extension hair (110b), and the third polyurethane sheet (133) disposed in the outer side of the second sub-extension hair (110b) overlapped in layers.

**[0054]** When density of each sub-extension hairs is same, as shown in Fig. 3, the density of extension hairs (112) is about 2/3 compared to one in Fig. 2.

**[0055]** Referring to Fig. 4, in cases, the hair extension (100) according to the invention may comprise only the first sub-extension hair (110a), and the first polyurethane sheet (131) and the second polyurethane sheet (132), which are melt-and-glued with each other on both sides of the first sub-extension hair (110a) and one end of the first sub-extension hair (110a) and form the sheet binding portion (130). In such a case, the extension hair portion (110) of the hair extension (100) according to the invention includes the first sub-extension hair (110a) only, and is formed in a single layer. The density of extension hairs (112) as shown in Fig. 4 is about 1/3 compared to the one in Fig. 2.

**[0056]** It is also possible that in the hair extension (100) according to the invention the extension hair portion (110) comprises more than four layers of sub-extension hairs.

**[0057]** That is, in the hair extension (100) according to the invention, it is easy to adjust the density of the extension hairs (112).

**[0058]** Fig. 5 is a flow chart for explaining a process for manufacturing hair extension according to the invention, and Figs. 6-13 are drawings showing major processes of manufacturing hair extension according to the invention.

**[0059]** In the manufacturing of the hair extension (100) according to the invention, a fixing plate (150) as shown in Fig. 6 is used. The fixing plate (150) comprises a band-shaped board (152) and a band-shaped Velcro tape 154 attached to the board (152).

**[0060]** Referring to Figs. 5 and 6, first, the extension hairs (112) are arranged and fixed in layer on the Velcro

tape (154) of the fixing plate (150), in which the top ends of the extension hairs (112) are aligned (S 1).

**[0061]** Each of extension hairs (112) is attached to the Velcro tape (154) by a thickness of 1-5 strands, preferably 2-4 strands. As the number of the extension hairs (112) disposed in a direction of thickness increases, the density of sub-extension hairs increases, but because the molten portion of polyurethane sheet is too thick to smear into the thick extension hairs (112), the glued area is reduced, both of the polyurethane sheets are hard to melt-and-glue to each other, and the fixing force of each extension hair (112) is lowered, so as to make defect rate increase.

**[0062]** In order to manufacture a hair extension (100) having three layers of the first sub-extension hair (110a) through the third sub-extension hair (110c) as shown in Fig. 2, three fixing plates (150), to which extension hairs are fixed, are needed, two of those in Fig. 3, or one of those in Fig. 4.

**[0063]** That is, those shown in Fig. 6 must be prepared by many according to the number of hair extension (100) to make, the number of layers, etc.

**[0064]** Next, as shown in Fig. 7 the first polyurethane sheet (131) is put on a supporting board (162) of a melt-and-gluing device (160) (S2), and on top of that the extension hairs (112) fixed in layer on the fixing plate (150), that is, one end of the first sub-extension hair (110a) is disposed and overlapped on the first polyurethane sheet (131) (S3).

**[0065]** And then, as shown in Fig. 8, the second polyurethane sheet (132) is overlapped with the first polyurethane sheet (131) by disposing the second polyurethane sheet (132) on one end of the first sub-extension hair (110a). Thus the one end of the first sub-extension hair (110a) is disposed between the first polyurethane sheet (131) and the second polyurethane sheet (132).

**[0066]** It is preferable for the first polyurethane sheet (131) and the second polyurethane sheet (132) to be overlapped completely on top of each other, but in order to show the top and bottom sheets in the figure, the edges of the two sheets were shown misaligned. This holds true for the third polyurethane sheet (133) and the fourth polyurethane sheet (134) below.

**[0067]** In this state, as shown in Fig. 9, the first polyurethane sheet (131) and the second polyurethane sheet (132) are melt-and-glued together by pressing the second polyurethane sheet (132) toward the first polyurethane sheet (131) and heating them with a pressing heater (164) of the melt-and-gluing device (160).

**[0068]** The molten portions of the first polyurethane sheet (131) and the second polyurethane sheet (132) molten by heating smear into the extension hairs (112) between the two sheets under pressure by pressing together, are melt-and-glued together, and also enclose the one ends of the extension hairs (112) and fix the extension hairs (112).

**[0069]** If stopping heating and pressing the two sheets through the pressing heater (164) by lifting up the press-

ing heater (164), the molten portion of the two sheets are cooled down and coagulated. Thus the two sheets keep the solidly melt-and-glued state, and fix the extension hairs (112).

**[0070]** By the above, the sheet binding portion (130) which fixes one end of the first sub-extension hair (110a) first to between the two sheets using melt-and-gluing is formed on the one end of the first sub-extension hair (110a) (S4). In this case, the extension hair portion (110) comprises the first sub-extension hair (110a) only. After the first melt-and-gluing step is done, the fixing plate (150) is detached from the first sub-extension hair (110a).

**[0071]** Here the heating temperature of the first and second polyurethane sheets (131, 132) is about 150-160 degrees in Celsius, the pressure about 30-50 kg/cm<sup>2</sup>, and the pressing time about 50-70 sec.

**[0072]** The thickness and dimension of polyurethane sheet have been discussed above already. Instead of polyurethane sheet other types of synthetic resin sheets can be used, which has preferably relatively low melting temperature of 140-200 degrees in Celsius, good gluing power, and little deformation in cooling down.

**[0073]** After the sheet binding portion (130) is formed by melt-and-gluing the two sheets, as shown in Figs. 10 and 11, the second sub-extension hair (110b) is overlapped in layer on the first sub-extension hair (110a), and the one end is overlapped in layer on the sheet binding portion (130).

**[0074]** And, on one end of the second sub-extension hair (110b) is disposed additional third polyurethane sheet (133), and the third polyurethane sheet (133) is heated and pressed toward the sheet binding portion (130) with the pressing heater (164), melt-and-gluing for a second time. Thus, one end of the second sub-extension hair (110b) is fixed between the additionally added third polyurethane sheet (133) and the sheet binding portion (130) formed by the two melt-and-glued polyurethane sheets (S5).

**[0075]** After the third polyurethane sheet (133) is melt-and-glued, the sheet binding portion (130) becomes a sheet binding portion (130) by three sheets. In such a case, the extension hair portion (110) comprises the first sub-extension hair (110a) and the second sub-extension hair (110b) overlapped with the first sub-extension hair (110a).

**[0076]** After the second melt-and-gluing step is done, the fixing plate (150) is detached from the second sub-extension hair (110b).

**[0077]** Then, as shown in Figs. 12 and 13, in a state of stacking the third sub-extension hair (110c) on the second sub-extension hair (110b) in layer, one end of the third sub-extension hair (110c) is overlapped on the sheet binding portion (130) which is where the three polyurethane sheets are melt-and-glued, and a the fourth polyurethane sheet (134) is further disposed on top of that. By this, the one end of the third sub-extension hair (110c) is disposed between the sheet binding portion (130) to which three polyurethane sheets are melt-and-

glued and the new fourth polyurethane sheet (134).

**[0078]** And, by moving the pressing heater (164) downward, the fourth polyurethane sheet (134) is pressed down toward the sheet binding portion (130) to which three sheets are melt-and-glued and heated for a third melt-and-gluing. Thus the one end of the third sub-extension hair (110c) is fixed solidly between the new fourth polyurethane sheet (134) and the portion where the three sheets are melt-and-glued (S6). By this, the third sub-extension hair (110c) is also fixed to the sheet binding portion (130).

**[0079]** Thus, the hair extension (100) according to the embodiment includes the sheet binding portion (130) by four sheets each fixing the one ends of the first sub-extension hair (110a) through the third sub-extension hair (110c) inserted between the neighboring melt-and-glued portions while the four sheets are overlapped.

**[0080]** After finishing the sheet binding portion (130), if the edges of the sheet binding portion (130) are not aligned top to bottom, the edges of all the polyurethane sheets get aligned by cutting the edges.

**[0081]** Fig. 14 is a plan view showing a hair extension manufactured by the above process before boring holes (130a) are formed as described in Fig. 1.

**[0082]** The first sub-extension hair (110a) through the third sub-extension hair (110c) are preferably formed with a same width.

**[0083]** If the third melt-and-gluing step is done, the fixing plate (150) is detached from the third sub-extension hair (110c).

**[0084]** Then, as shown in Fig. 1, in the sheet binding portion (130) are bored a plurality of holes (130a) with intervals (S7). The holes (130a) are for fixing the hair extension (100) to the user's hairs by inserting and passing the user's hairs through and fixing the user's hairs passing the two or more holes (130a) with an engaging ring, etc.

**[0085]** After boring the holes (130a), the remaining debris or other material sticking around or to the edge of sheets are removed for finishing.

**[0086]** By doing as in the above, the hair extension (100) according to the invention is manufactured, which includes the extension hair portion (110) in which the sub-extension hairs are disposed in three layers.

**[0087]** Fig. 15 is a diagram showing another example of synthetic resin sheet which can be used in the invention, and (a) is a plan view, and (b) is a side view in a folded state.

**[0088]** In cases, for the synthetic resin sheet (130b) such as polyurethane sheets for forming the sheet binding portion, instead of the two sheets used in the previous embodiment, can be used a sheet which is foldable as in Fig. 15(b) about the folding line (130c) formed along central portion as indicated in Fig. 15(a).

**[0089]** Referring to Figs. 16-19, a process for attaching hair extension according to the invention to the user's hairs is described.

**[0090]** Fig. 16 is a perspective view showing a state

with user's hair taken out through a hole, Fig. 17 is a perspective view showing a state with an engaging ring inserted in the hair taken out through two neighboring holes, Fig. 18 is a perspective view showing a state of pressing the engaging ring, and Fig. 19 is a perspective view showing a state of fixing the hair extension according to the invention to the user's hair.

**[0091]** Check the position where to attach the hair extension (100) in the user's head (10), and taking out the user's hairs (12) which are in positions corresponding to each holes (130a) through the holes (130a) using a hooking device (170) having a hook at an end as shown in Fig. 16.

**[0092]** Then, pass the hairs (12) taken-out through the holes (130a) through an engaging ring (180) as in Fig. 17, and move the engaging ring (180) to the vicinity of the sheet binding portion (130). There, do not push the engaging ring (180) to the sheet binding portion (130), but give some space such that the sheet binding portion (130) moves around and the hairs (12) are not pulled tightly. As such, the user does not feel uncomfortable with the hair extension (100) attached and can move freely.

**[0093]** After that, as shown in Fig. 18, squeeze the engaging ring (180) using a pliers (190) and fix the engaging ring (180) at the user's hairs (12). If eight holes (130a) are formed in the sheet binding portion (130), four engaging rings (180) are used.

**[0094]** Fig. 19 shows the hair extension (100) according to the invention attached to the user's hairs (12) through the above process.

**[0095]** In order to detach the hair extension (100) according to the invention after using them attached to the user's hairs (12) as in Fig. 19, open the squeezed portion of the engaging ring (180) using a tool and remove the engaging ring (180) from the user's hairs (12). Then, the hair extension (100) is detached from the user's hairs (12) by releasing the hairs (12) from the holes (130a).

**[0096]** And according to thermal analysis of human hairs, the rare elements and protein in hairs begin to burn at 200 degrees in Celsius, and if heating them up slowly (temperature increasing rate: about 5 degrees/min in Celsius) from room temperature to 500 degrees in Celsius at which most of hair protein gets carbonized, the total weight of hairs gets reduced by 75% of the initial weight.

**[0097]** Considering the above, for the synthetic resin sheets applied to the invention is suitable the polyurethane sheet as described above, but one person skilled in the art belonging to the invention may recognize to use other synthetic resin if they are melt-and-glued together below 200 degrees in Celsius, since they do not give a large thermal damage to extension hairs.

#### [Effects of Invention]

**[0098]** The hair extension according to the invention enables to fix extension hairs to a synthetic resin sheet such as thin and light polyurethane sheet in a high den-

sity.

**[0099]** The hair extension according to the invention has the extension hairs spread out widely in layer, but since it has a sheet binding portion that can form holes, it can be attached to and detached from the user's hairs rapidly and easily using the engaging rings.

**[0100]** The hair extension according to the invention enables the user to move freely because the degree of fixing to the user's hairs can be adjusted and it is fixed to the user's hairs indirectly.

**[0101]** The hair extension according to the invention has extension hairs that is rarely tangled or fallen off and therefore may be used many times, because the extension hairs are attached solidly by melt-and-gluing to resin sheets such as polyurethane sheet.

**[0102]** The hair extension according to the invention may be made with the density of extension hairs adjusted variously according to the usage.

**[0103]** The hair extension according to the invention does not produce rough surfaces since the extension hairs do not have to be tied as in sewing.

#### [Industrial Applications]

**[0104]** The hair extension according to the invention may be used for having hairstyles of excellent hair quality, affluent hair, or long hair by extending hairs of the user.

**[0105]** The process for manufacturing hair extension according to the invention may be used for producing hair extension of good quality to be used repeatedly.

#### Claims

1. A hair extension comprising a extension hair portion including a plurality of strands of extension hairs and a binding portion for tying one ends of the extension hairs into one, wherein the binding portion comprises a sheet binding portion in which two sheets of synthetic resin overlapped with the one ends in-between are molten and glued so as to fix the one ends into one body.
2. The hair extension of Claim 1, wherein the synthetic resin sheet is a polyurethane sheet.
3. The hair extension of Claim 1, wherein the extension hair portion comprises a first sub-extension hair portion and a second sub-extension hair portion disposed in layers together with the first sub-extension hair portion, and wherein the sheet binding portion is formed by melting and gluing with neighboring ones a first polyurethane sheet disposed at an outer side of the first sub-extension hair portion opposite to the second sub-extension hair portion, a second polyurethane sheet disposed between the first and second sub-extension hair portions, and a third polyurethane sheet disposed at an outer side of the sec-

ond sub-extension hair portion opposite to the first sub-extension hair portion.

- 4. The hair extension of Claim 1, wherein the extension hair portion comprises a first sub-extension hair portion, a second sub-extension hair portion disposed in layers together with the first sub-extension hair portion, a third sub-extension hair portion disposed in layers on the second sub-extension hair portion opposite to the first sub-extension hair portion, and the sheet binding portion is formed by melting and gluing with neighboring ones a first polyurethane sheet disposed at an outer side of the first sub-extension hair portion opposite to the second sub-extension hair portion, a second polyurethane sheet disposed between the first and second sub-extension hair portions, a third polyurethane sheet disposed between the second and third sub-extension hair portions, and a fourth polyurethane sheet disposed at an outer side of the third sub-extension hair portion opposite to the second sub-extension hair portion.
- 5. The hair extension of Claim 1, wherein the synthetic resin is a polyurethane sheet with thickness of 0.06~0.1mm.
- 6. The hair extension of Claim 1, wherein the extension hairs of the extension hair portion are disposed in a plane.
- 7. The hair extension of Claim 4, wherein in each of the first through third sub-extension hair portions, the extension hairs are disposed in a plane and there are 1 to 5 strands in the direction of thickness.
- 8. The hair extension of any one of Claims 1 through 4, wherein in the sheet binding portion are formed holes with intervals.
- 9. A process for manufacturing a hair extension, the process comprising:
  - a first step for disposing two synthetic resin sheets in layers with one end of a first sub-extension hair portion in-between; and
  - a first step for melt-and-gluing the one end of the first sub-extension hair portion between the two synthetic resin sheets by melt-and-gluing the two synthetic resin sheets while pressing the two synthetic resin sheets toward each other.
- 10. The process of Claim 9, wherein the synthetic resin sheet is a polyurethane sheet, and further comprising:
  - a second step for disposing additional polyurethane sheet on a portion in which a second

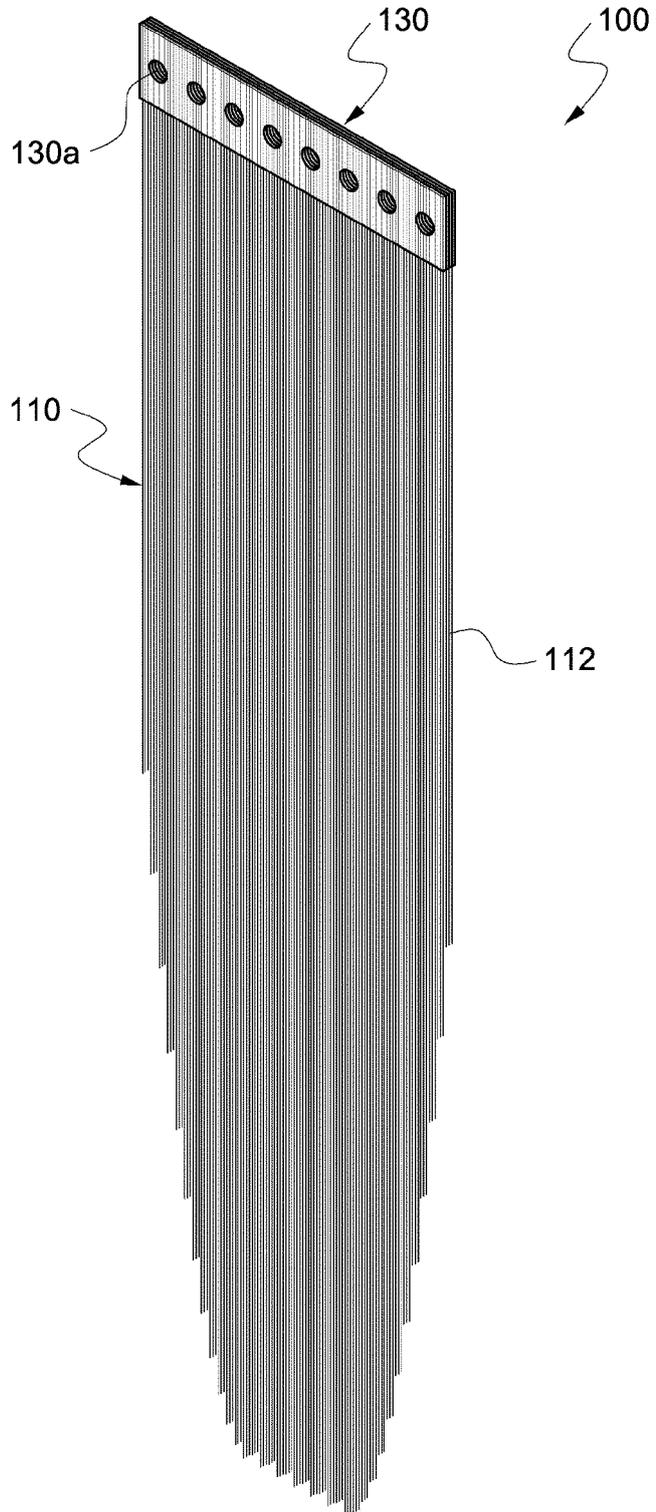
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sub-extension hair portion is stacked in layers on the first sub-extension hair portion and one end of the second sub-extension hair portion is overlapped on the molten and glued portion of the two polyurethane sheets; and a second step for melt-and-gluing the additional polyurethane sheet by heating while pressing to the molten and glued portion and fixing the second sub-extension hair portion between the additional polyurethane sheet and a portion where the two polyurethane sheets are molten and glued.

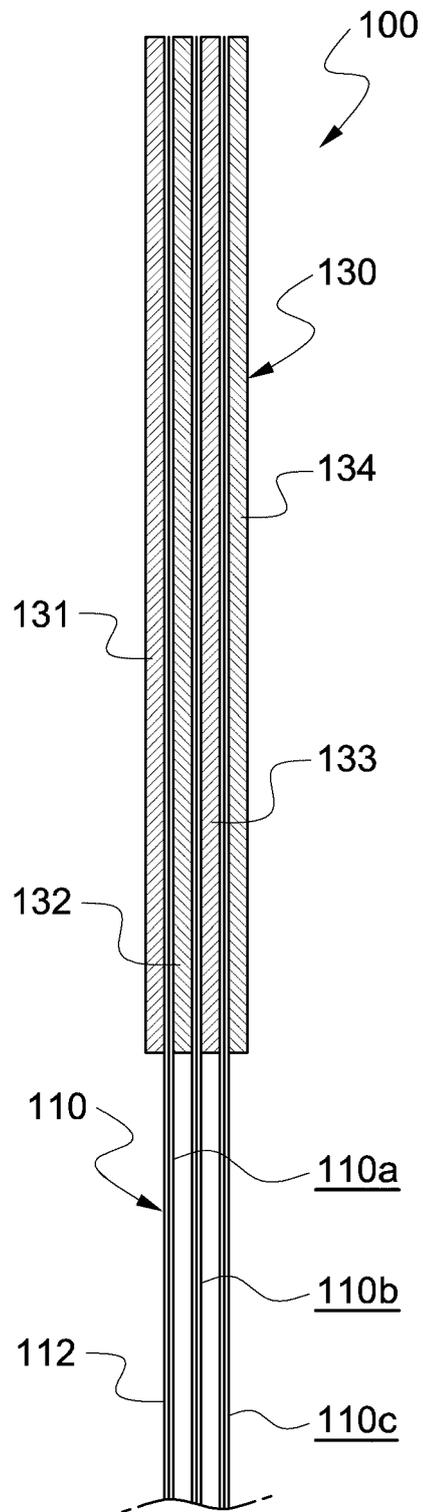
- 11. The process of Claim 10, further comprising:
  - a third step for disposing a newly added polyurethane sheet on a portion in which a third sub-extension hair portion is stacked in layers on the second sub-extension hair portion and one end of the third sub-extension hair portion is overlapped on the molten and glued portion of the three polyurethane sheets; and
  - a third step for melt-and-gluing the newly added polyurethane sheet by heating while pressing to the molten and glued portion and fixing the third sub-extension hair portion between the newly added polyurethane sheet and a portion where the three polyurethane sheets are molten and glued.
- 12. The process of Claim 9, wherein the thickness of the synthetic resin is 0.06~0.1mm.
- 13. The process of Claim 11, wherein in each of the first through third sub-extension hair portions, the extension hairs are disposed in a plane and there are 1 to 5 strands in the direction of thickness.
- 14. The process of Claim 9, wherein the synthetic resin sheet is polyurethane sheet, and the temperature of the polyurethane sheet in the first step for melt-and-gluing is 150-160 degrees in Celsius, and the pressure is 30-50 kg per centimeter squared.
- 15. The process of any one of Claims 9 through 11, further comprising a step for forming a plurality of holes with intervals where the synthetic resin sheets stacked in layers are molten and glued.

【DRAWINGS】

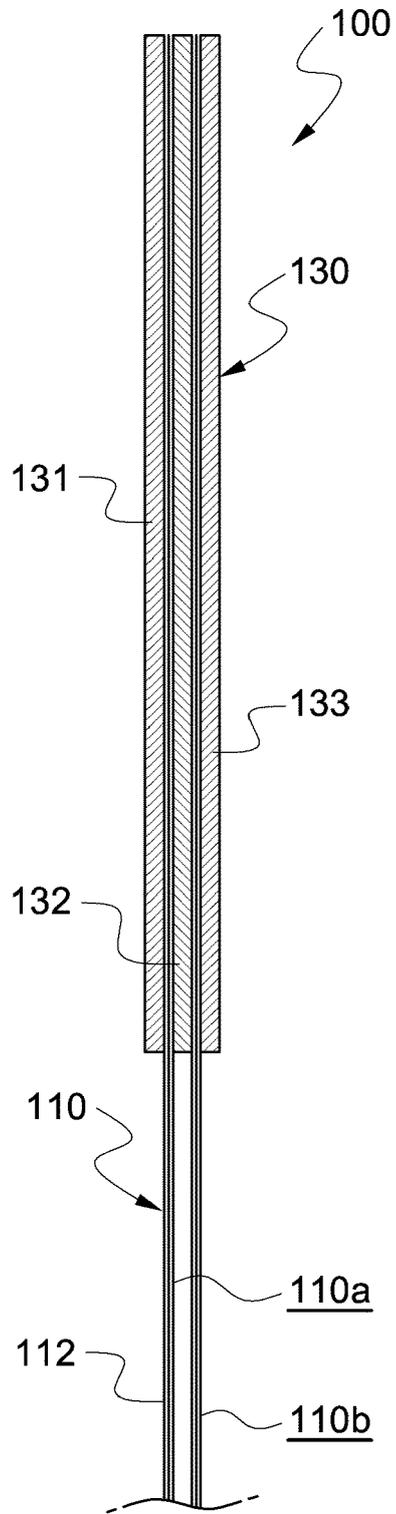
【Figure 1】



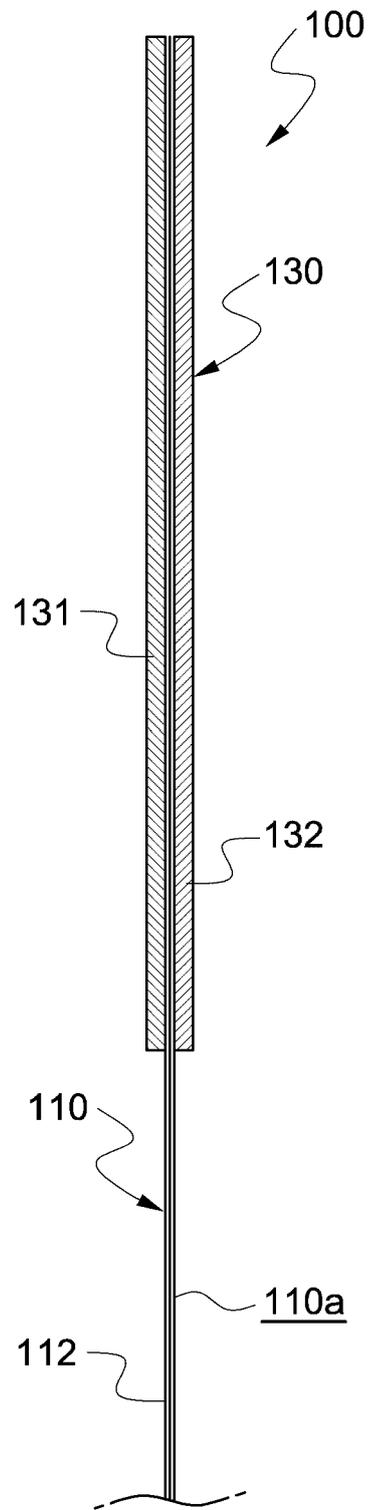
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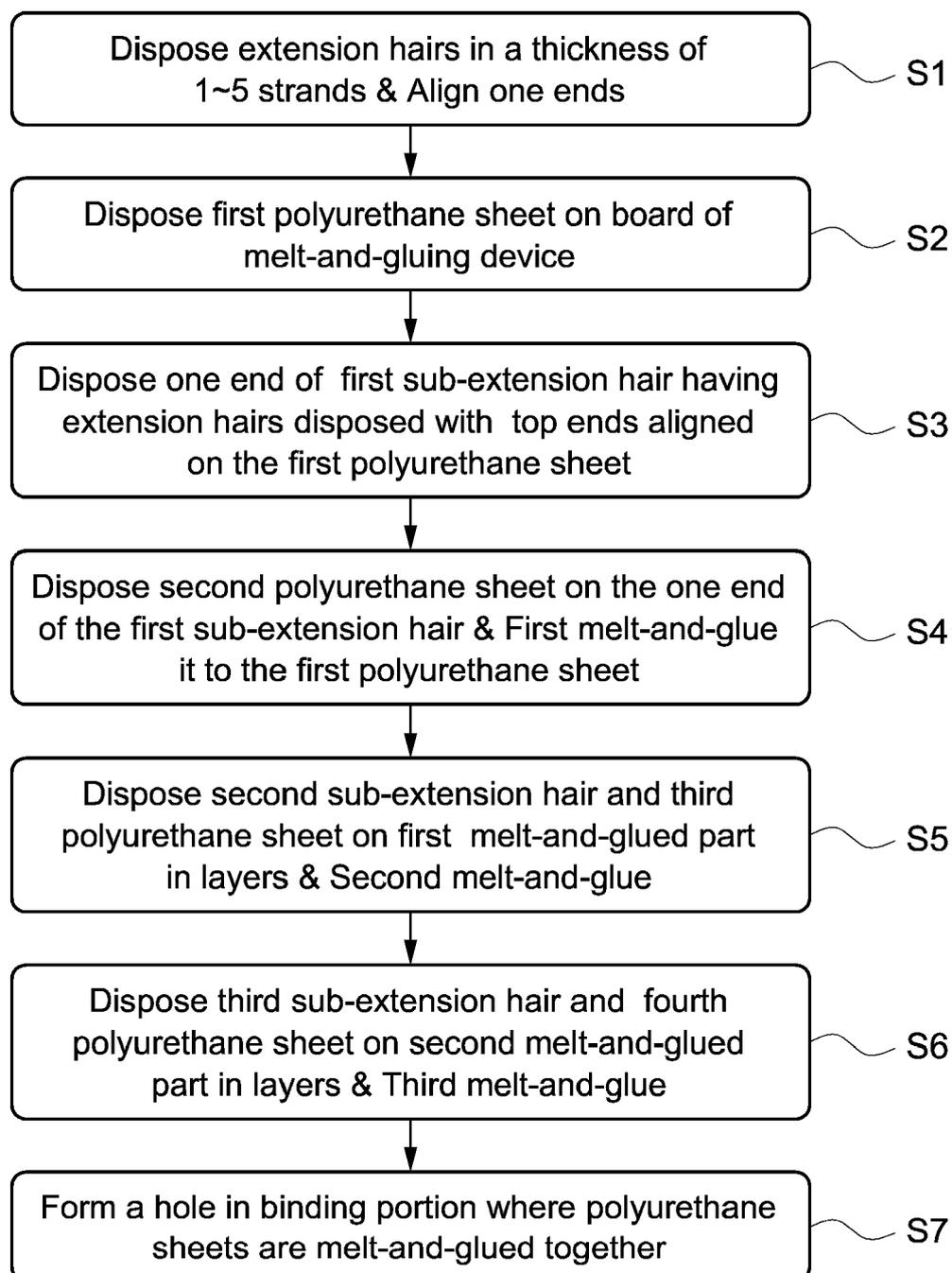
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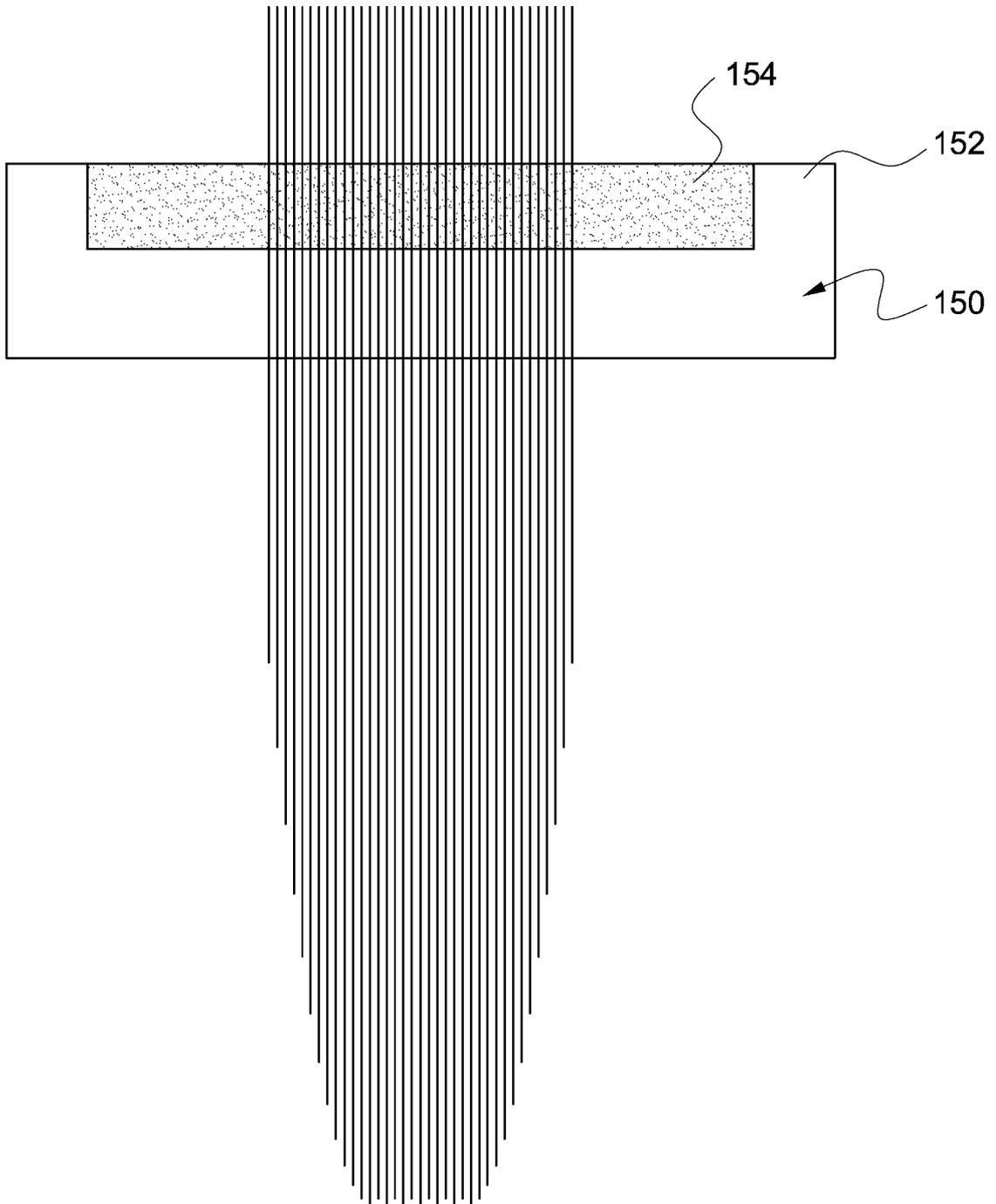
【Figure 4】



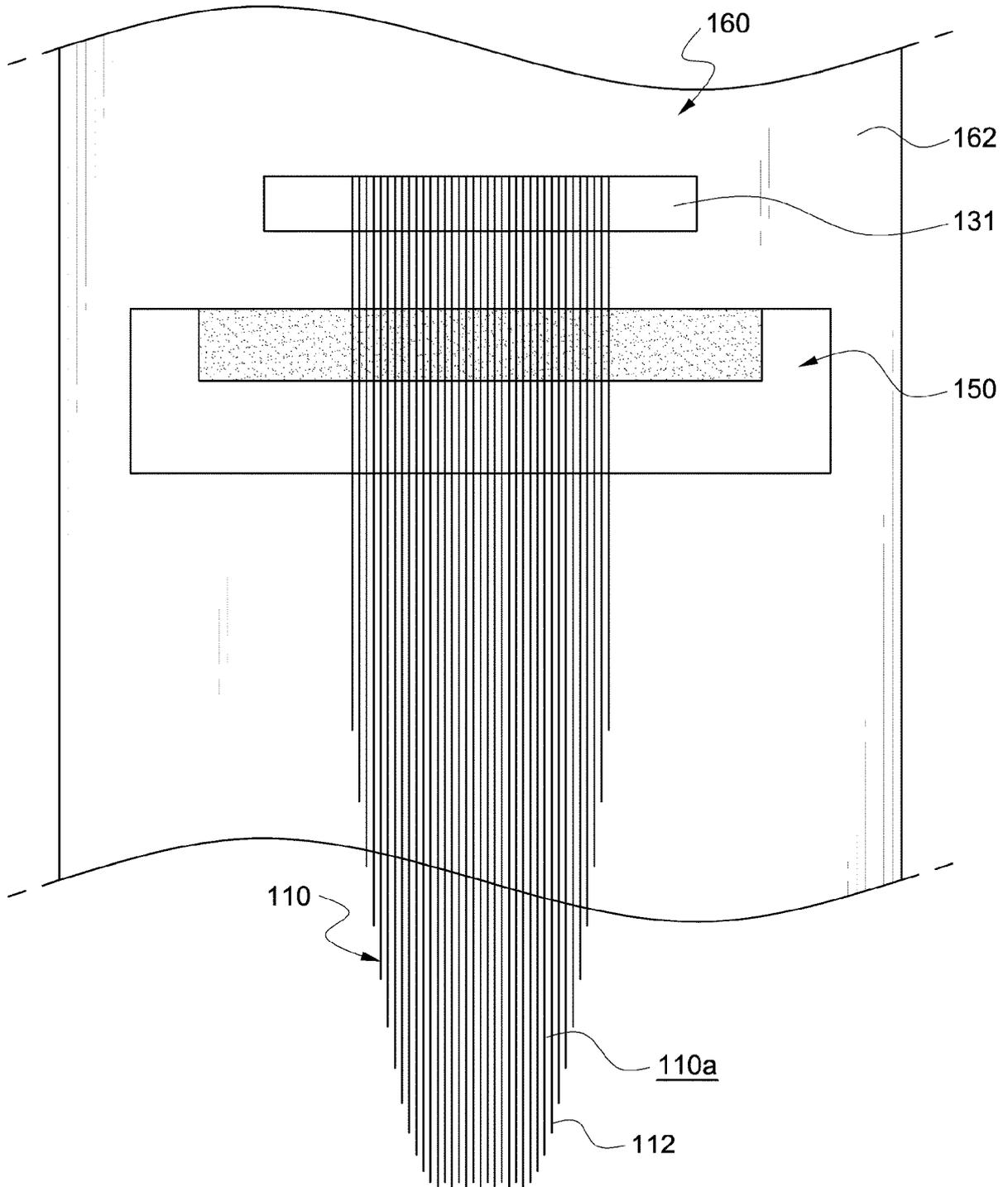
【Figure 5】



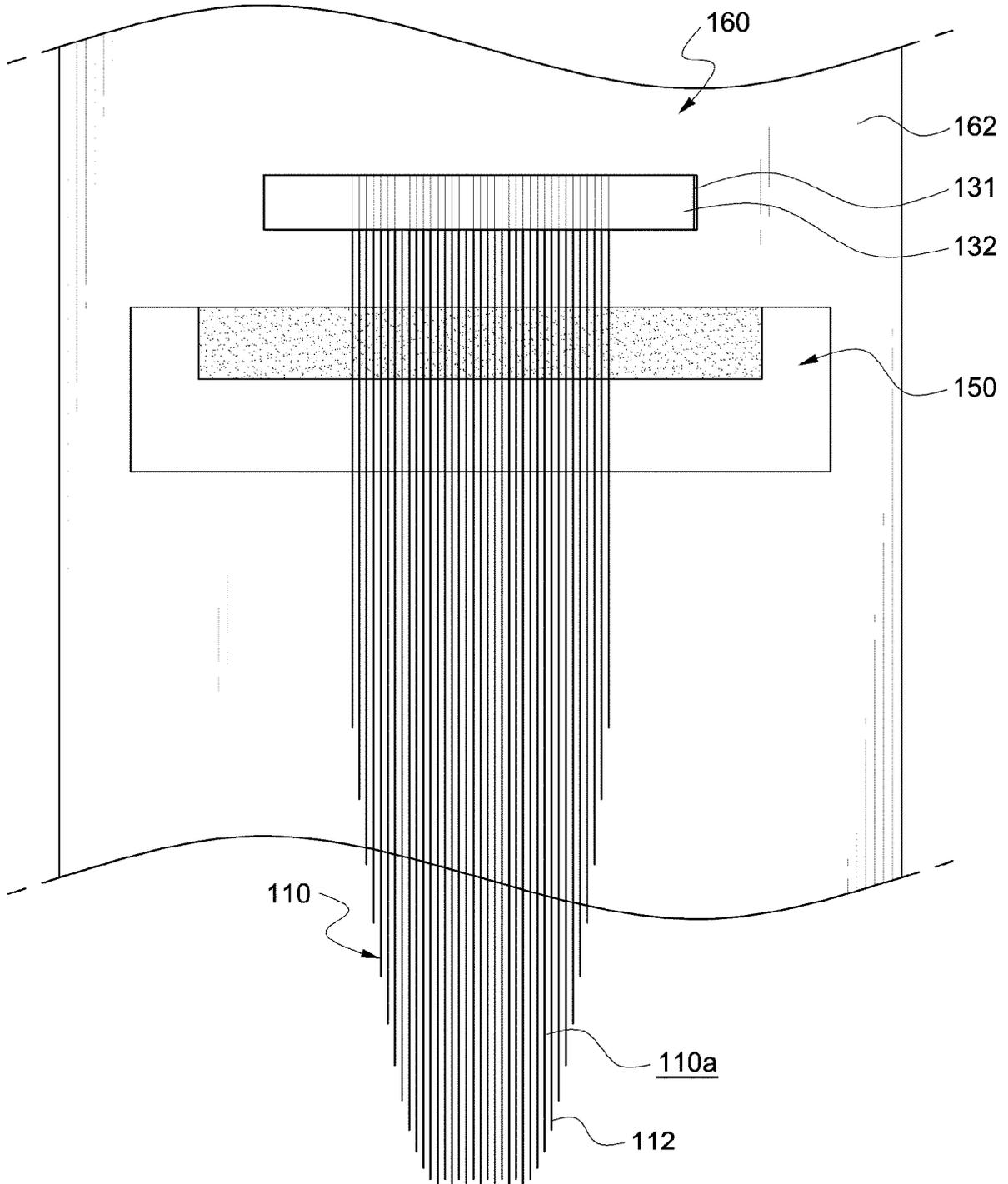
【Figure 6】



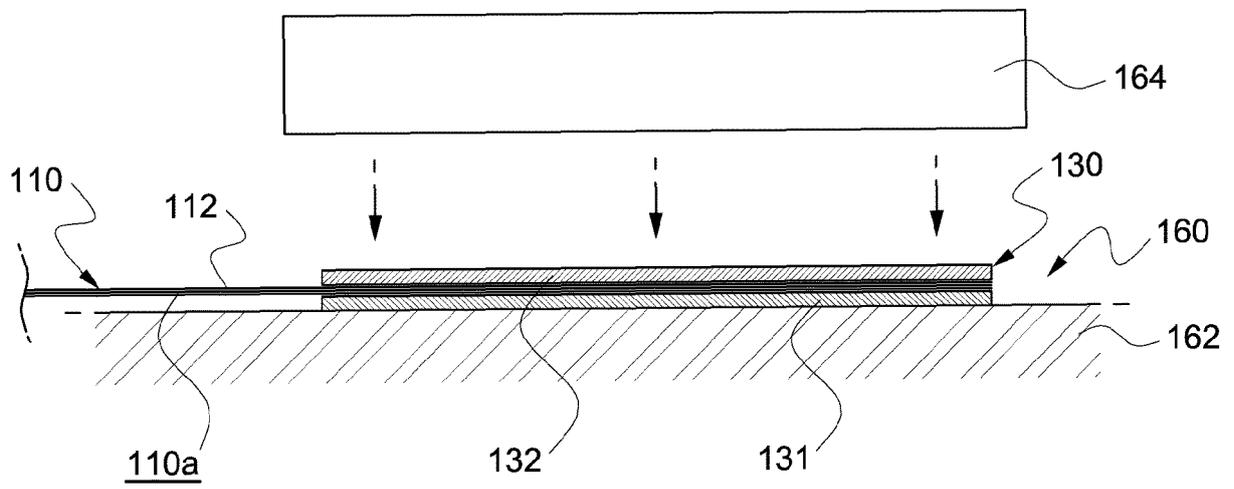
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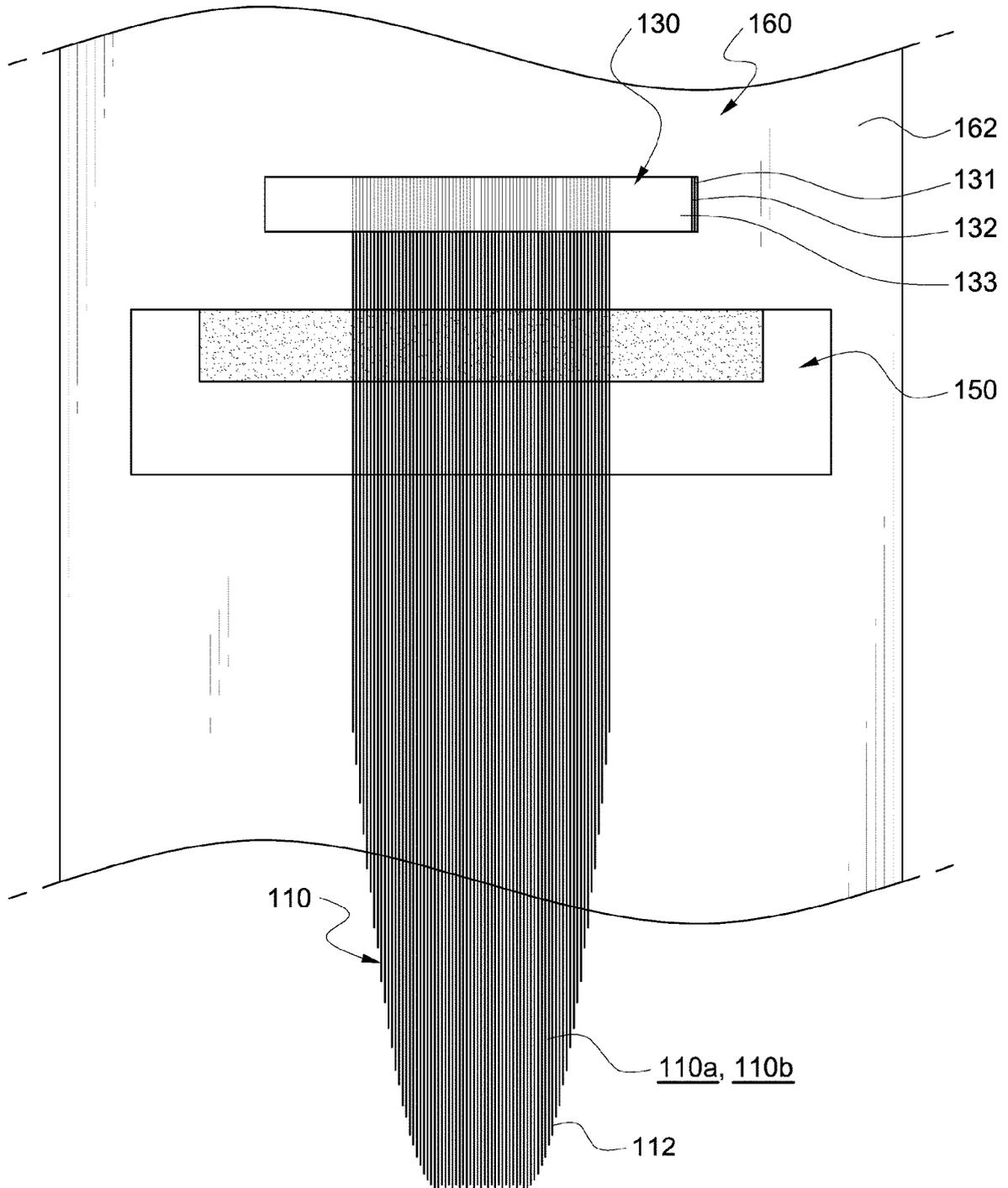
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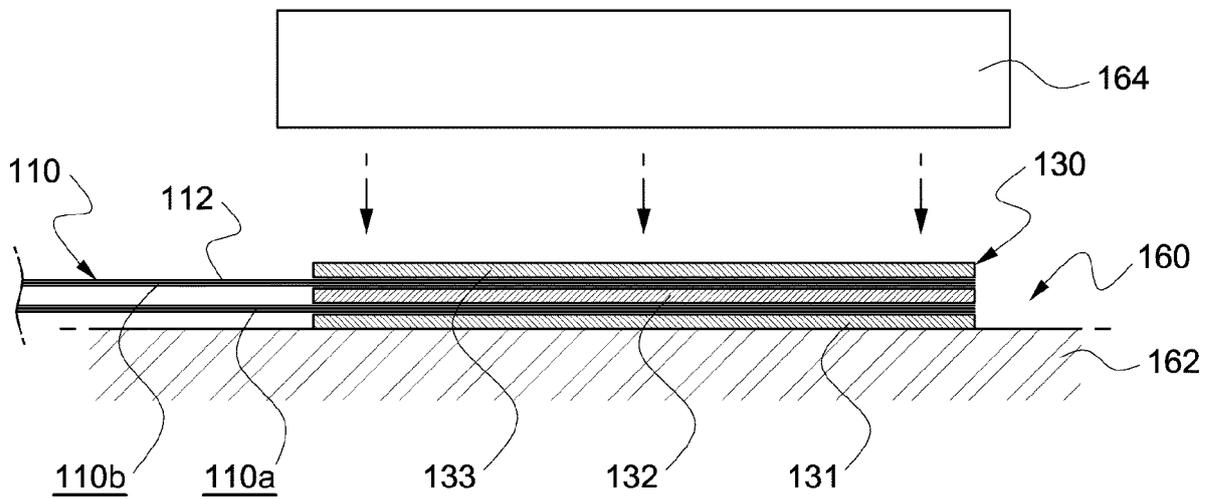
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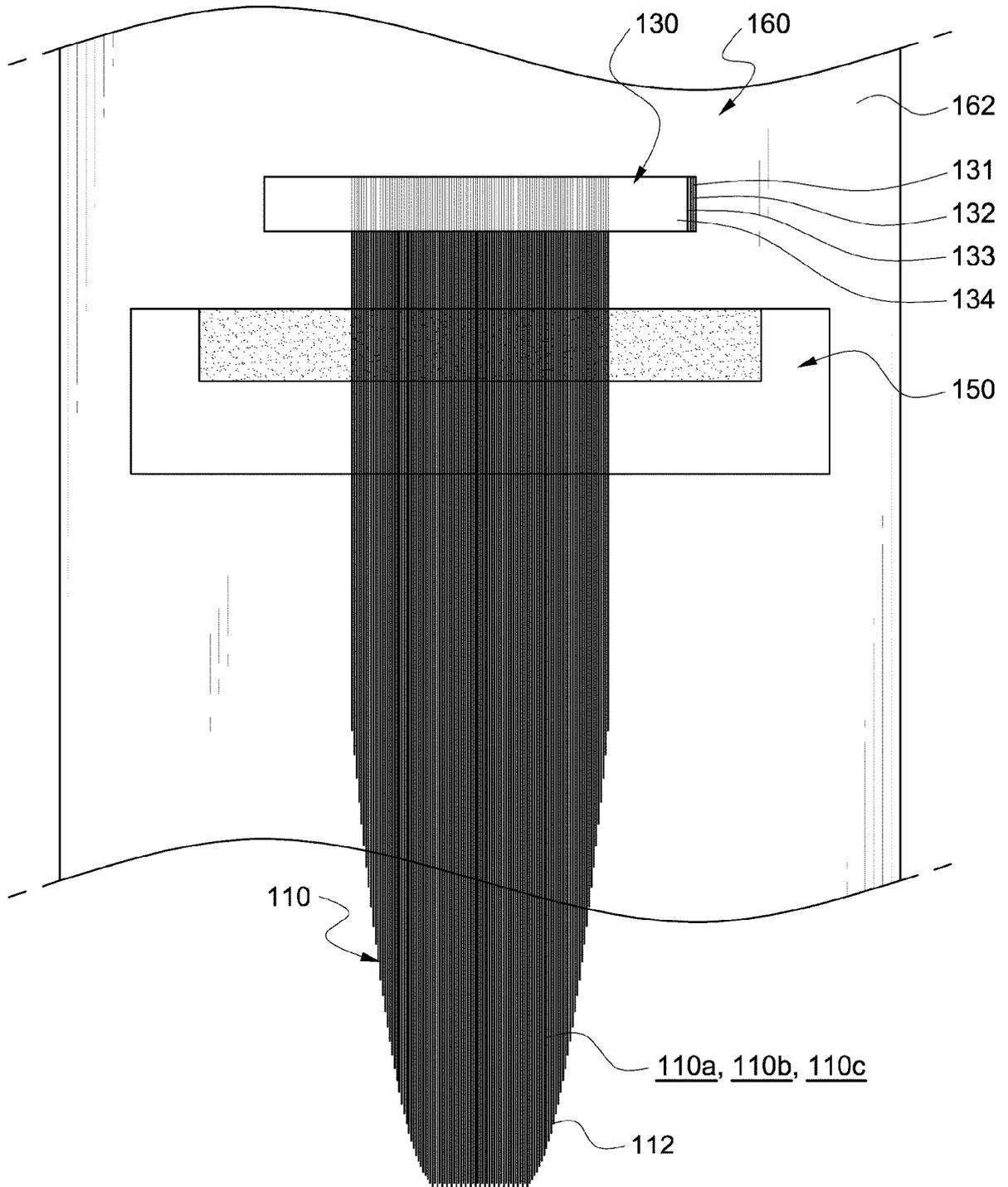
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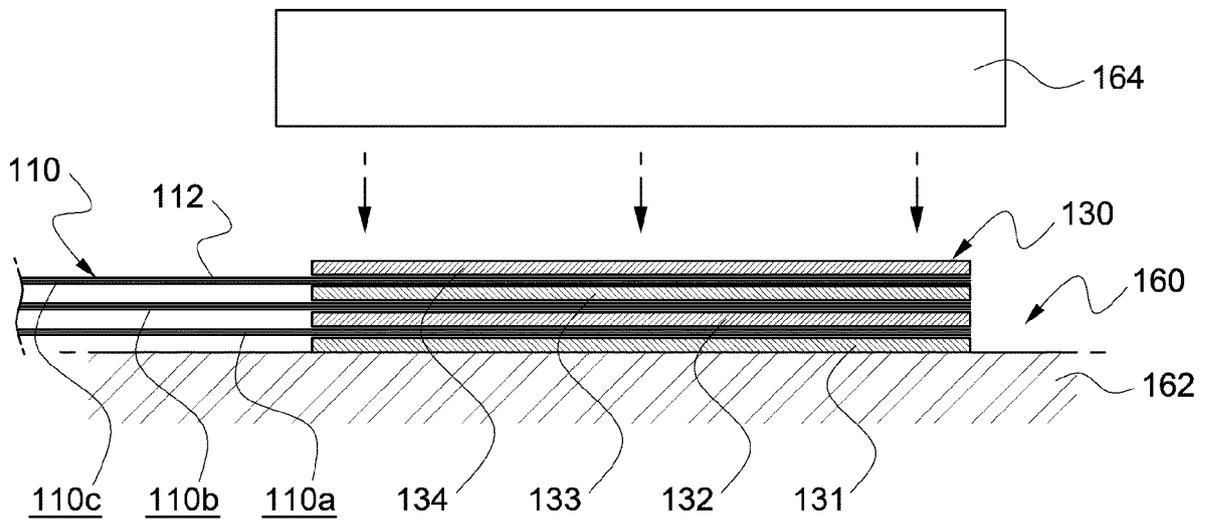
【Figure 11】



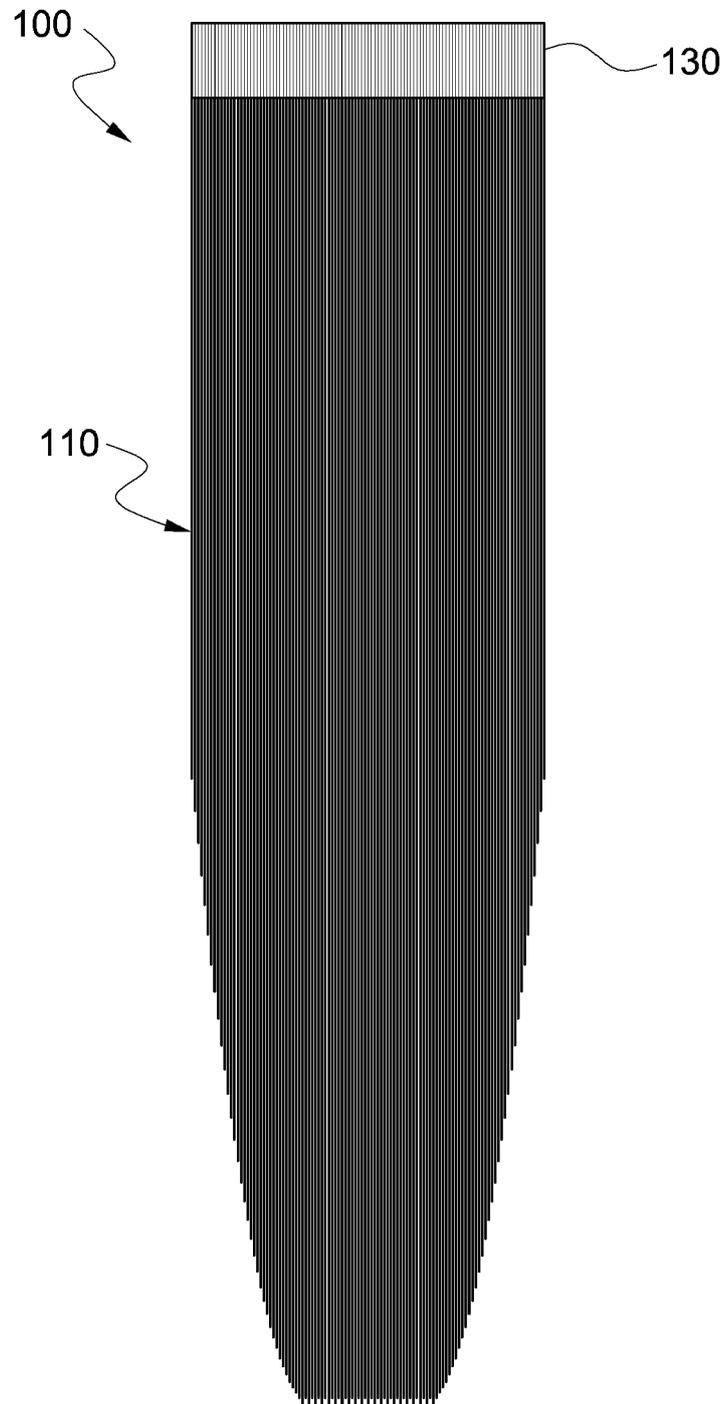
【Figure 12】



【Figure 13】

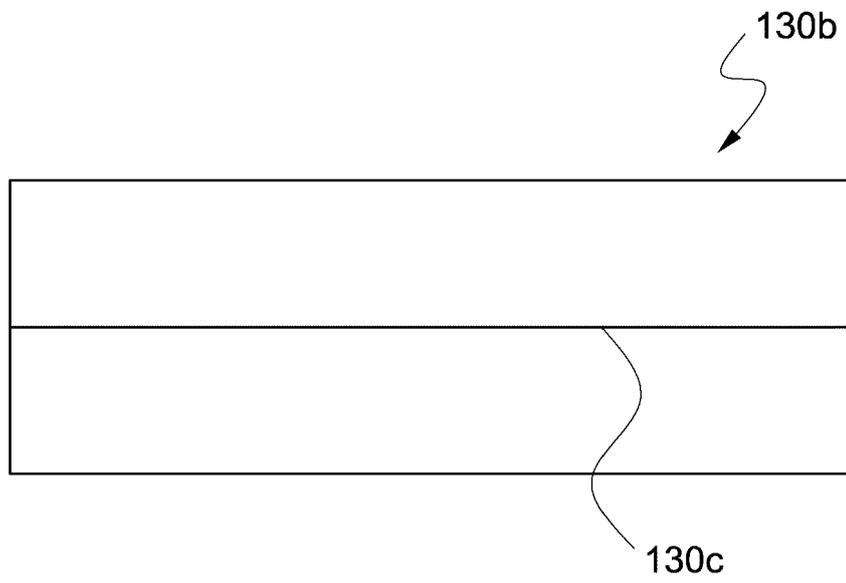


【Figure 14】

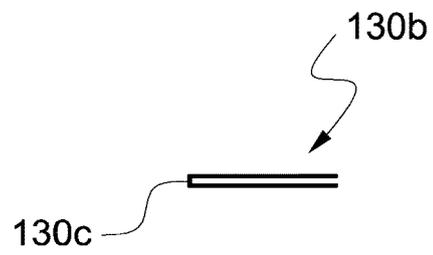


【Figure 15】

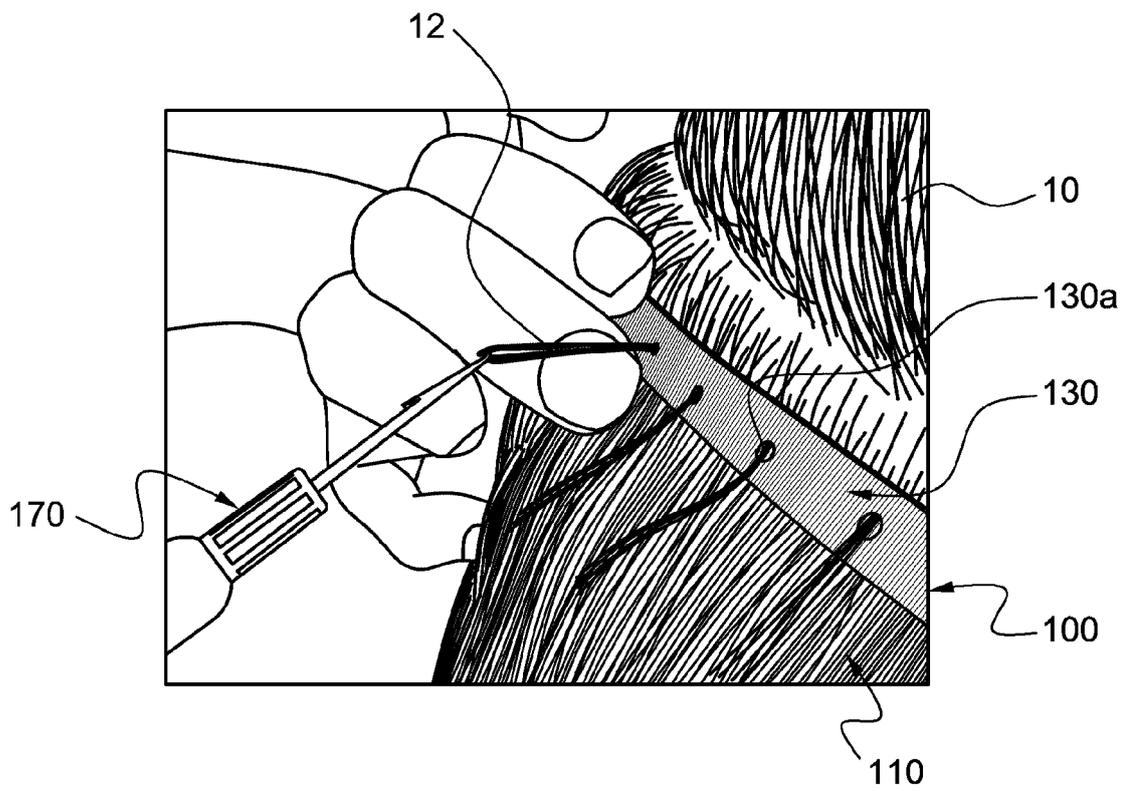
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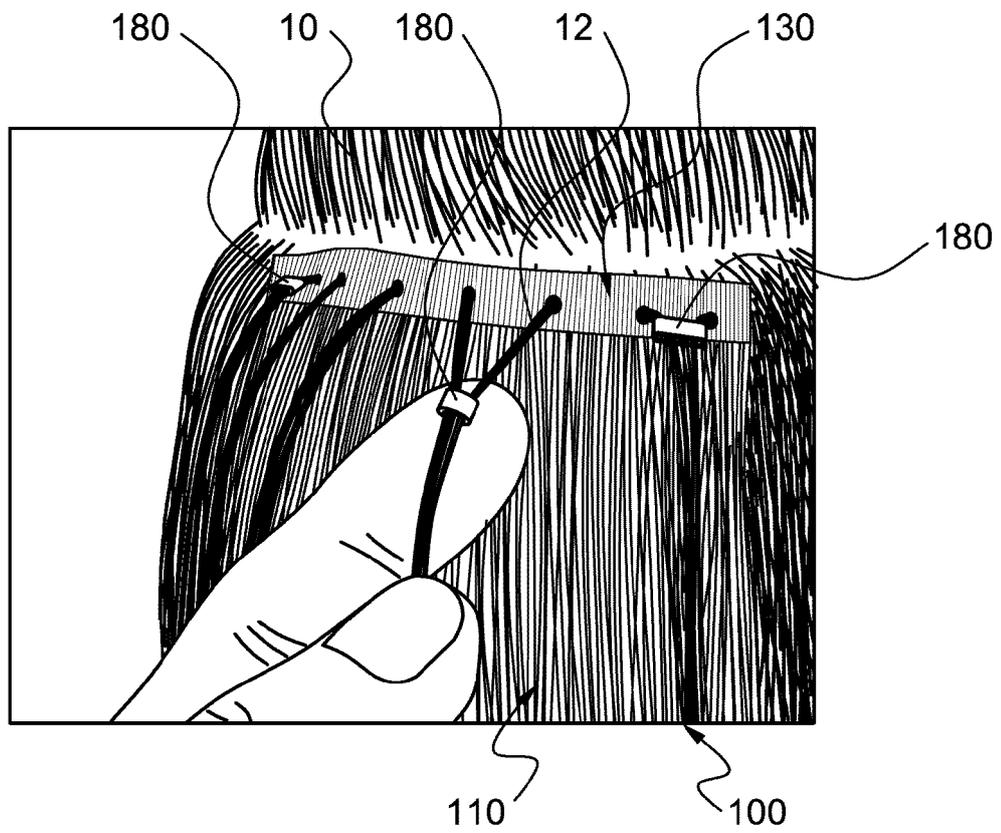
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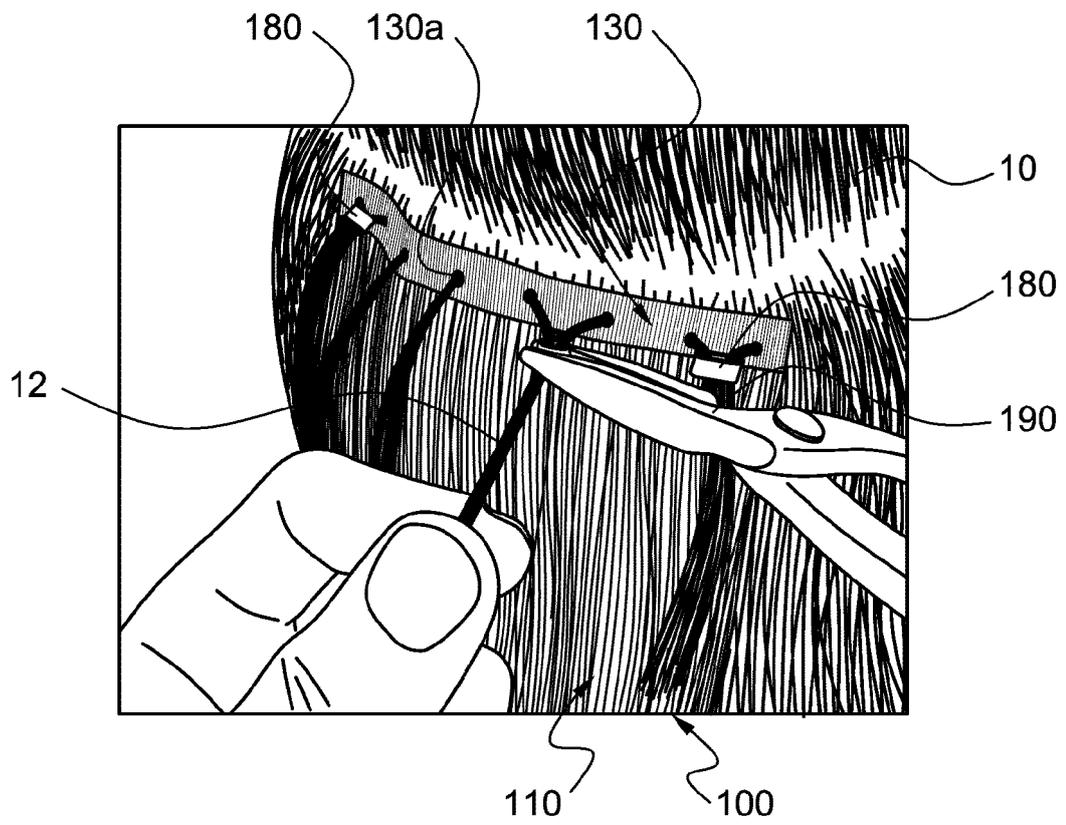
【Figure 16】



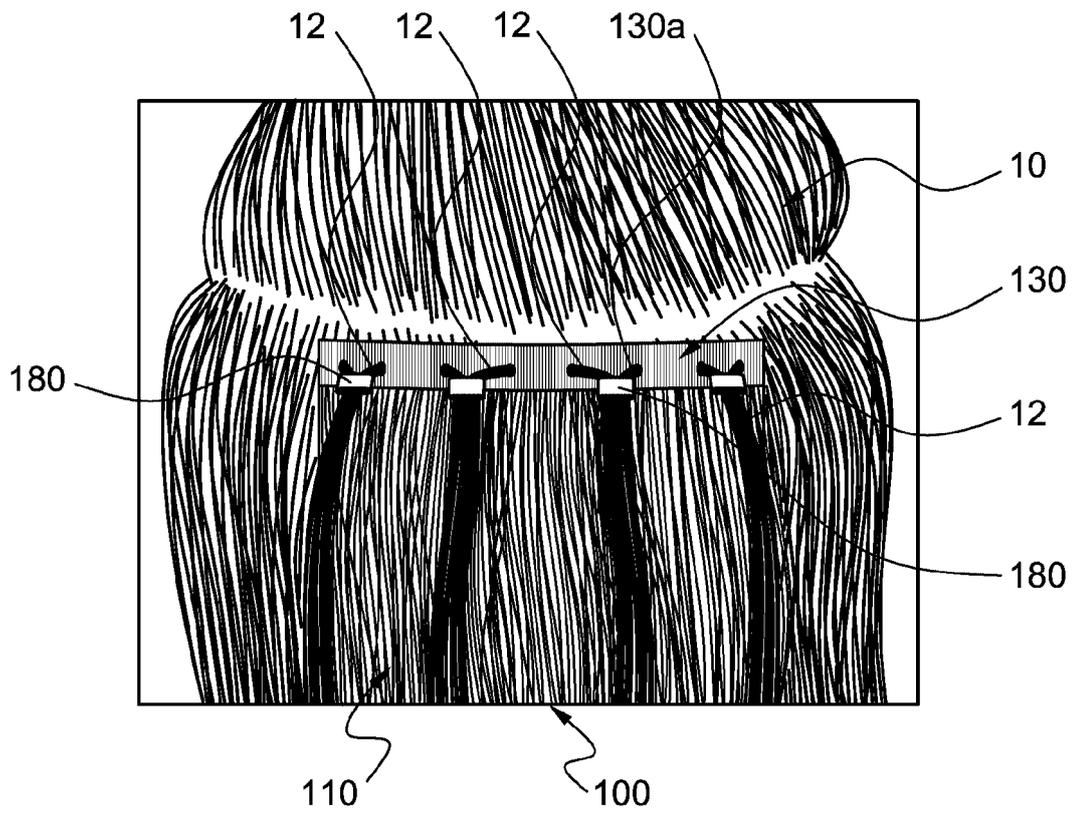
【Figure 17】



【Figure 18】



【Figure 19】





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Application Number  
EP 12 15 0652

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The present search report has been drawn up for all claims				
Place of search <b>The Hague</b>		Date of completion of the search <b>14 June 2012</b>	Examiner <b>Fonseca Fernandez, H</b>	
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document		

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EUROPEAN SEARCH REPORT

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