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(54) HAIR CUTTER AND BLADE ASSEMBLY THEREOF

(57) A hair cutter and a blade assembly thereof relate to the technical field of hair cutters, the blade assembly includes a fixed blade and movable blades moving back and forth along a length of the fixed blade. The movable blades are connected to a connecting component driving the movable blades to move. The fixed blade includes a contact part contacting with the skin, one set of opposite sides of the contact part is bent in a same direction, and ends of the two bent parts are connected to form a receiving chamber inside the fixed blade. The movable blades and the connecting component are both disposed in the receiving chamber, and the movable blades are tightly attached to the fixed blade. The structure of the blade assembly can be modular and easy for ordinary users to replace, enhancing the aesthetic appearance of the product.

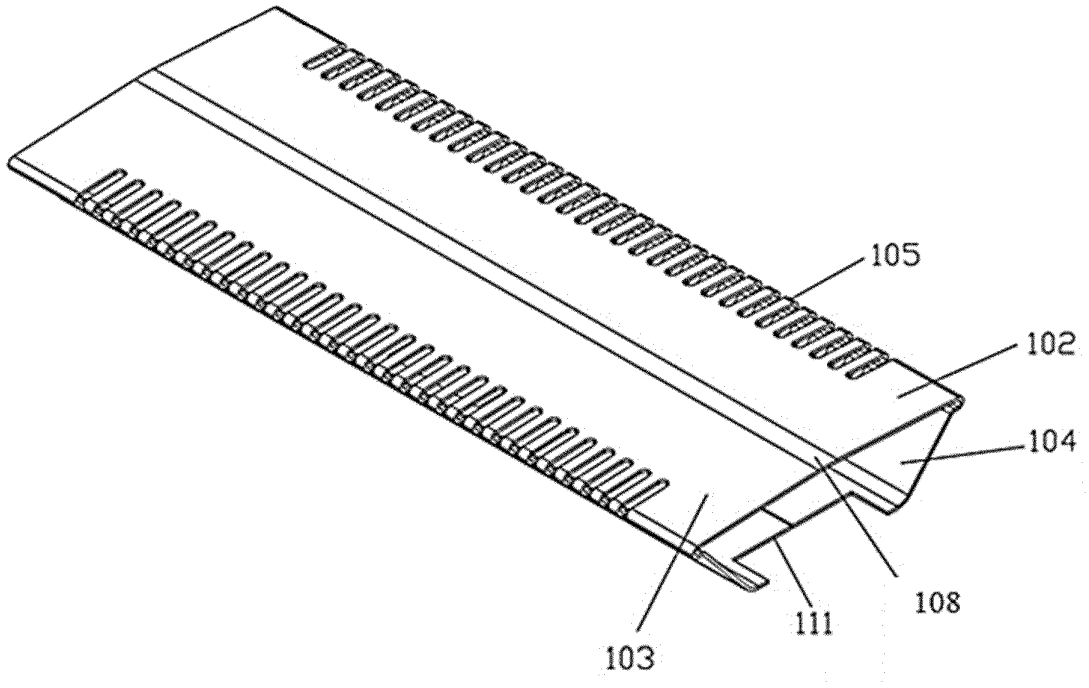

FIG. 2

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Description

TECHNICAL FIELD

[0001] The disclosure relates to the technical field of hair cutters, and particularly to a hair cutter and a blade assembly thereof.

BACKGROUND

[0002] A hair cutter is used to clean human hair, especially men's beards. A blade set and a manufacturing method thereof are disclosed in Chinese patent with application No. 201811137663.2 (corresponding to publication No. CN109623884B), the blade set for a hair cutter is arranged to move through hair in a movement direction to cut the hair, the blade set includes a stationary blade, the stationary blade includes a support insert and a metal member, the metal member and the support insert are press-fitted to each other, and the metal member is at least partially deformed to define at least one toothed leading edge having double-walled stationary blade teeth. The metal member forms a first wall and a second wall, the first wall is arranged to act as a skin facing wall in operation, the second wall is facing away from the first wall, and a guide groove for the movable blade is defined between the inward facing inner surface of the metal member and the support insert. The movable blade includes multiple movable blade teeth, the movable blade is movably arranged in the guide groove between the metal component and the support insert, and in the installed state, the movable blade is preloaded and movably arranged in the guide groove between the metal member and the support insert. However, the stationary blade in this patent is a semi-enclosed structure, which is connected to the movable blade and other connecting components through a connecting structure. When any component of the blade set needs to be replaced, the entire blade set needs to be disassembled and reassembled after replacing the component, this is difficult for ordinary users to operation, and even the components may be damaged due to operational errors. In addition, the movable blade and connecting components in the blade set are exposed, which makes the appearance of the hair cutter not aesthetically pleasing.

SUMMARY

[0003] The disclosure aims to solve the technical problem of difficult component replacement and unattractive product appearance in the prior art, and provides a modular and easily replaceable blade assembly for hair cutters for ordinary users, as well as a hair cutter with the blade assembly, to enhance the aesthetic appearance of the product.

[0004] To achieve the above objectives, the disclosure provides technical solutions as follows.

[0005] A blade assembly for a hair cutter includes a fixed blade, movable blades and a connecting component. The connecting component is connected to the movable blades and is configured to drive the movable blades to move relative to the fixed blade. Two opposite sides of the fixed blade are bent towards a back of the fixed blade to form two bending parts, ends of the two bending parts are connected to make the two bending parts fixedly connected to each other, thereby forming a semi-enclosed bottom surface. An interior of the fixed blade defines a receiving chamber, and the movable blades and the connecting component are both disposed in the receiving chamber. The movable blades are opposite to and in coordination with a top surface of the fixed blade, and the connecting component is opposite to the bottom surface of the fixed blade.

[0006] The disclosure discloses the blade assembly for the hair cutter, the two opposite sides of the fixed blade are bent in a same direction to form the two bending parts, the ends of the two bending parts are connected to form the semi-enclosed bottom surface, the interior of the fixed blade defines the receiving chamber, and the movable blades and the connecting component are both surrounded in the receiving chamber internally to form a complete blade module, thereby achieving modularization. When the blade or other components need to be replaced, in order to facilitate quick replacement by ordinary users without damaging the components, the complete blade module can be directly replaced to avoid disassembling the blade assembly, which is simple and easy to operate. Due to the receiving chamber defined in the interior of the fixed blade, the movable blades and the connecting component are enclosed internally to form the complete blade module, avoiding the exposure of components, making a more aesthetically pleasing appearance of the product. In addition, the movable blades are surrounded by the fixed blade, which effectively avoids damaging the user with the movable blades as well.

[0007] In an embodiment, a first contact slope and a second contact slope are formed on an outside of the top surface of the fixed blade, the first contact slope and the second contact slope are inclined relative to the bottom surface of the fixed blade, the first contact slope and the second contact slope are disposed at an angle, and an angle range of extension lines of the first contact slope and the second contact slope is $170° \leq \alpha \leq 180°$. The angle of α can be 170°, 171°, 172°, 173°, 174°, 175°, 176°, 177°, 178°, 179° or 180°, etc. By using the first contact slope and second contact slope to be in contact with human skin, especially the skin around the lips, the contact slopes can fit the skin more closely and the hair can be cleaned more cleanly.

[0008] In an embodiment, each of the two bending parts includes a first bending surface and a second bending surface, the first bending surface and the second bending surface are connected with each other, and ends of the second bending surfaces of the two bending parts are welded together to form the bottom surface. The first

bending surface is inclined relative to the second bending surface, and an angle between the first bending surface and the second bending surface is an obtuse angle. The top surface of the fixed blade, the two first bending surfaces of the fixed blade and the bottom surface of the fixed blade surround to form a cross-section, and the cross-section is in an inverted trapezoid or a pentagon.

[0009] In an embodiment, the first contact slope and the second contact slope are formed on the outside of the top surface of the fixed blade, the first contact slope and the second contact slope are inclined relative to the bottom surface of the fixed blade, and the first contact slope and the second contact slope are disposed at an angle. A transitional surface is disposed between the first contact slope and the second contact slope, and the ends of the two bending parts are opposite to the transitional surface. Bent positions of the top surface of the fixed blade respectively form cutting parts, each of the cutting parts includes multiple fixed teeth, and a through groove is defined between adjacent two of the multiple fixed teeth. The through groove extends from the top surface of the fixed blade to the first bending surface, multiple cutting teeth are formed on each of the movable blades, and the multiple cutting teeth are cut in conjunction with the multiple fixed teeth.

[0010] In an embodiment, ends of the two bending parts flip inward towards the top surface of the fixed blade and protrude upwards relative to the bottom surface of the fixed blade, thereby forming guide rails. The connecting component includes a sliding block, a bottom surface of the sliding block is formed with guide grooves and a connecting part, and the connecting part is configured to connect to a driving mechanism. The guide rails are slidingly fitted to the guide grooves, and the sliding block is configured to drive the movable blades to move back and forth relative to the top surface of the fixed blade and the bottom surface of the fixed blade under an external force. A connecting through hole is defined on the bottom surface of the fixed blade, and the connecting part is opposite to the connecting through hole.

[0011] In an embodiment, the connecting component includes two movable blade brackets, the two movable blade brackets are respectively connected to the movable blades, and the two movable blade brackets are flexibly connected to each other, which is beneficial for the movable blade on each of the two movable blade brackets to float independently and reduces a mutual influence of the two movable blades during a movement process.

[0012] In an embodiment, the connecting component includes the sliding block, the sliding block is disposed between the two movable blade brackets and the bottom surface of the fixed blade. The sliding block is provided with a protrusion, the protrusion is disposed between the two movable blade brackets to drive the two movable blade brackets and the movable blades on the two movable blade brackets to move. A bottom surface of the sliding block is formed with the connecting part, and the connecting part is configured to connect to the driving mechanism. The connecting through hole is defined on the bottom surface of the fixed blade, and the connecting part is matched with the connecting through hole.

[0013] In an embodiment, two opposite side walls of the protrusion define through slots, and convex columns are disposed on opposite side walls of the two movable blade brackets. When the protrusion of the sliding block is disposed between the two movable blade brackets, the convex columns are respectively embedded in the through slots of the protrusion. By a coordination of the protrusion on the sliding block and the convex columns on the two movable blade brackets, the sliding block drives the two movable blade brackets and the movable blades of the two movable blade brackets to move back and forth.

[0014] In an embodiment, the connecting component includes the sliding block, the sliding block is disposed between the two movable blade brackets and the bottom surface of the fixed blade. An elastic sheet is disposed between the sliding block and the two movable blade brackets, and the elastic sheet is supported between the two movable blade brackets and the sliding block and/or between the two movable blade brackets and the bottom surface of the fixed blade. The elastic sheet is configured to apply an elastic force towards the top surface of the fixed blade to make the movable blade brackets be in contact with the fixed blade.

[0015] In an embodiment, the elastic sheet includes a body of the elastic sheet, multiple first bending parts connected to the body of the elastic sheet and multiple second bending parts connected to the body of the elastic sheet. The body of the elastic sheet is limited between the two movable blade brackets and the sliding block, the multiple first bending parts are bent upwards relative to the body of the elastic sheet and supported on the two movable blade brackets correspondingly, and the multiple second bending parts are bent downwards relative to the body of the elastic sheet and supported on the bottom surface of the fixed blade. The movable blades, the two movable blade brackets, and the sliding block are suspended relative to the bottom surface of the fixed blade under a support of the elastic sheet, and the sliding block is configured to drive the two movable blade brackets to move back and forth relative to the elastic sheet under an external force.

[0016] In an embodiment, the connecting component includes an installation bracket disposed outside the receiving chamber and a fixed blade bracket disposed inside the receiving chamber. The fixed blade bracket is disposed above the two movable blade brackets, and two ends of the fixed blade bracket are bent towards the installation bracket, a part of the installation bracket extends into the interior of the receiving cavity of the fixed blade and is connected to bent parts of the fixed blade bracket. Two ends of the receiving cavity of the fixed blade respectively define openings, and the side covers are disposed at the openings to make the receiving cavity

closed, and the side covers are detachably connected to the fixed blade.

[0017] In an embodiment, the disclosure provides a hair cutter including a handle assembly and the blade assembly as described above, the handle assembly is provided with a driver and a rotating shaft, the driver is connected to the rotating shaft, the rotating shaft is provided with an eccentric shaft, the eccentric shaft passes through the bottom surface of the fixed blade and is connected to the connecting component. The rotating shaft is configured to drive the eccentric shaft to perform an eccentric rotation when the rotating shaft rotates under drive of the driver, and the eccentric shaft is configured to drive the connecting component and the movable blades to move back and forth relative to the fixed blade. Due to the fact that the hair cutter includes the blade assembly, which has all the beneficial technical effects brought about by the blade assembly, and do not be repeated here.

BRIEF DESCRIPTION OF DRAWINGS

[0018] Through the preferred embodiments of the disclosure shown in the attached drawings, the above and other purposes, features, and advantages of the disclosure will become clearer. The same reference numerals in all the attached drawings indicate the same parts, and the drawings are not intentionally scaled to the actual size, with the focus on demonstrating the main idea of the disclosure.

FIG. 1 illustrates an exploded diagram of a blade assembly in the disclosure.

FIGS. 2-3 illustrate structural diagrams of a fixed blade in different directions.

FIG. 4 illustrates a cross-sectional structural diagram of the fixed blade.

FIGS. 5-1 to 5-6 illustrate schematic diagrams of a welding method for ends of two bent parts of the fixed blade.

FIG. 6 illustrates a schematic diagram of a bottom structure of a sliding block.

FIG. 7 illustrates a cross-sectional schematic diagram of the blade assembly in a long side direction.

FIG. 8 illustrates a cross-sectional schematic diagram of the blade assembly in a wide edge direction.

FIG. 9 illustrates a schematic diagram of a connection structure between the blade assembly and a handle assembly.

FIG. 10 illustrates a schematic structural diagram of a fixed blade bracket.

[0019] Description of reference numerals: 1. fixed blade; 101. receiving chamber; 102. first contact slope; 103. second contact slope; 104. bending part; 1041. first bending surface; 1042. second bending surface; 105. fixed tooth; 106. recessed part; 107. guide rail; 108. transitional surface; 111. square notch; 112. bottom surface; 113. connecting through hole; 2. movable blade; 201. connecting member; 202. cutting tooth; 3. sliding block; 301. guide groove; 302. protrusion; 303. through slot; 304. connecting part; 305. threading groove; 4. connecting plate; 5. movable blade bracket; 501. flexible connecting piece; 502. convex column; 503. avoidance groove; 6. rotating shaft; 601. eccentric shaft; 7. elastic sheet; 701. first bending part; 702. through-hole; 703. arc-shaped flange; 704. second bending part; 8. installation bracket; 801. receiving part; 802. joint part; 803. square hole; 804. assembly hole; 9. fixed blade bracket; 901. horizontal connecting member; 902. guide boss; 903. ear plate; 10. handle; 12. side cover; 121. inner wall protrusion; 122. elastic hook; 123. avoidance hole.

DETAILED DESCRIPTION OF EMBODIMENTS

[0020] In order to facilitate the understanding of the disclosure, a more comprehensive description will be provided below with reference to the attached drawings.

[0021] It should be noted that when a component is considered to be "connected" to another component, it can be directly connected to and integrated with another component, or there may be a centering component. The terms "installation", "an end", "another end", and similar expressions used in the disclosure are for illustrative purposes only.

[0022] Unless otherwise defined, all technical and scientific terms used in the disclosure have the same meanings as those commonly understood by those skilled in this art. The terms used in the specification of the disclosure are only for the purpose of describing specific embodiments and are not intended to limit the disclosure. The term "and/or" used in the disclosure includes any and all combinations of one or more related listed items.

[0023] An embodiment specifically provides an implementation method of a blade assembly for a hair cutter, as shown in FIG. 1, the blade assembly includes a fixed blade 1, movable blades 2, and a connecting component. The connecting component is connected to the movable blades 2 and is configured to drive the movable blades 2 to move relative to the fixed blade 1. Two opposite sides of the fixed blade 1 are bent towards a back of the fixed blade 1 to form two bending parts 104, ends of the two bending parts 104 are connected to make the two bending parts 104 fixedly connected to each other, thereby forming a semi-enclosed bottom surface 112. An interior of the fixed blade 1 defines a receiving chamber 101, and the movable blades 2 and the connecting component are both disposed in the receiving chamber 101, the movable blades 2 are opposite to and in coordination with a top surface of the fixed blade 1, and the connecting component is opposite to the bottom surface 112 of the fixed blade 1.

[0024] In a specific embodiment, as shown in FIGS. 2-3, the fixed blade 1 includes a contact part, the contact part includes a first surface coming into contact with the

skin and a second surface facing away from the first surface, and the second surface is disposed in the receiving chamber 101. A first contact slope 102 and a second contact slope 103 are both disposed on the first surface of the contact part. The movable blades 2 are tightly attached to the second surface of the contact part, and a part of the movable blades 2 overlaps with the fixed blade 1 to ensure that the movable blades 2 can cut hair in conjunction with the fixed blade 1 during a back and forth movement of the movable blades 2. Two opposite ends of the contact part are bent in a same direction to form the two bending parts 104, and the two opposite ends of the two bending parts 104 are connected to form the semi-enclosed bottom surface 112 through a connection of the two opposite ends of the two bending parts 104. The semi-enclosed receiving chamber 101 is defined through the contact part and the two bending parts 104. Bent positions of the top surface of the fixed blade 1 respectively form cutting parts, that is, the cutting parts are formed between the contact part and corners of the two bending parts 104. The cutting parts include multiple fixed teeth 105, and edges of the multiple fixed teeth 105 are disposed on the contact part and other edges of the multiple fixed teeth 105 are disposed on the bending parts 104. Corners of the two edges are in arc-shape transition, so as to avoid damaging the user's skin due to the sharpness of the corners. A through groove is defined between adjacent two of the multiple fixed teeth 105, the through groove extends from the top surface of the fixed blade 1 to the first bending surface 1041, and multiple cutting teeth 202 are formed on each of the movable blades 2, which are cut in conjunction with the fixed teeth 105. In additions, recessed parts 106 facing towards an inner concave of the receiving chamber 101 are disposed on the two edges of the two bending part 104 to make a thickness of the fixed teeth 105 thinner, which can cut and clean shorter hair for a cleaner cleaning. Moreover, the semi-enclosed bottom surface 112 refers to a partially enclosed and partially unclosed part, which means that the receiving chamber 101 is in a semi-enclosed state.

[0025] In the embodiment, as shown in FIG. 1, each movable blade 2 includes a connecting member 201 configured to connect to a movable blade bracket 5, and multiple cutting teeth 202 are disposed on the connecting member 201 along a length direction of the connecting member 201. Due to two rows of the multiple fixed teeth 105 on the fixed blade 1, a number of the movable blades 2 is two, both of which are tightly attached to the fixed blade 1, and some surfaces of the multiple cutting teeth 202 on the two movable blade 2 overlap with the fixed teeth 105 on the fixed blade 1.

[0026] In the embodiment, as shown in FIGS. 2-4, a first contact slope 102 and a second contact slope 103 are formed on the top surface of the fixed blade 1, the first contact slope 102 and the second contact slope 103 are inclined relative to the bottom surface 112 of the fixed blade 1, and the first contact slope 102 and the second contact slope 103 are disposed at an angle, an angle range of extension lines of the first contact slope 102 and the second contact slope 103 is $170° \leq \alpha \leq 180°$. Specifically, two slopes are disposed on the first surface of the contact part of the fixed blade 1, namely the first contact slope 102 and the second contact slope 103. The first contact slope 102 is connected to the second contact slope 103 through a transition surface 108. During use of the hair cutter, the first contact slope 102 and the second contact slope 103 are alternately touched with the human skin according to the needs by swinging the blade assembly under human control.

[0027] In the embodiment, as shown in FIGS. 2-3, each of the two bending parts 104 includes a first bending surface 1041 and a second bending surface 1042, and the first bending surface 1041 and the second bending surface 1042 are connected with each other, ends of the second bending surfaces 1042 are welded together to form the bottom surface 112. The first bending surface 1041 is inclined relative to the second bending surface 1042, and an angle between the first bending surface 1041 and the second bending surface 1042 is an obtuse angle. It should be noted that a fillet transition can be used between the first bending surface 1041 and the second bending surface 1042. The angle between the first bending surface 1041 and the second bending surface 1042 refers to an angle between a main plane of the first bending surface 1041 and a main plane of the second bending surface 1042. The top surface of the fixed blade 1, the two first bending surfaces 1041 of the fixed blade 1 and the bottom surface 112 of the fixed blade 1 surround to form a cross-section, and the cross-section is in an inverted trapezoid or a pentagon. In some embodiments, when the top surface is a plane or a micro-arc surface, the cross-section is in the inverted pentagon. In other embodiments, when the first contact slope 102 and the second contact slope 103 are disposed at the obtuse angle on the top surface, the cross-section is in the pentagon. In addition, the inverted trapezoid and the pentagon in the disclosure do not refer to a very regular inverted trapezoid and a very regular pentagon, but refer to a roughly inverted trapezoid and a pentagon. Specifically, each of the two bending part 104 is bent once to form the first bending surface 1041, and then horizontally bent again to form the second bending surface 1042, and the ends of the two second bending surfaces 1042 are connected together through a process of a welding technology. In addition, the process of the welding the ends of the two second bending surfaces 1042 are shown in FIGS. 5-1 to 5-6. In FIG. 5-1, the ends of the two bending parts 104 flip inward towards the top surface of the fixed blade 1, and protrude upwards relative to the bottom surface 112 of the fixed blade 1 to form guide rails 107, and the guide rails 107 are matched with guide grooves 301 on the bottom surface of a sliding block 3 to finally ensure that the movable blades 2 move quickly back and forth along a length direction of the movable blades 2. The parts of the corners of the two second bending surfaces 1042 are welded inward through the process of welding

into an integrated structure. As shown in FIG. 5-2, by adding a connecting plate 4, the ends of the two bending parts 104 are connected, and the ends of the connecting plate 4 are welded together with the corresponding ends of the two bending parts 104 through the welding process. As shown in FIG. 5-3, the ends of the two bending parts 104 are directly welded into an integrated structure through the welding process. As shown in FIG. 5-4, after the ends of the two bending parts 104 joint together to form an S-shaped weld seam, and then the two bending parts 104 are welded together at the S-shaped weld seam through the welding process. As shown in FIG. 5-5, the ends of the two bending parts 104 are connected and arranged in a staggered manner, and a lower end of one bending part is welded to a bottom surface of an upper end of the other bending part. As shown in FIG. 5-6, the end of one bending part 104 is bent again to form a stepped-shape structure, and the end of the other bending part 104 is placed and welded on the stepped-shape structure. The embodiment shown in FIG. 5-1 is the preferred embodiment of the disclosure.

[0028] In the embodiment, as shown in FIGS. 1 to 6, the connecting component includes the sliding block 3, a bottom surface of the sliding block 3 is formed with guide grooves 301 and a connecting part 304, and the connecting part 304 is configured to connect to a driving mechanism. The guide rails 107 are slidably fitted to the guide grooves 301, and the sliding block 3 is configured to drive the two movable blades 2 to move back and forth relative to the top surface and bottom surface 112 of the fixed blade 1 under an external force. The bottom surface 112 of the fixed blade 1 defines a connecting through hole 113, and the connecting part 304 is opposite to the connecting through hole 113. Specifically, the connecting part 304 can be a sliding guide hole with a length greater than a width of a protrusion 302, then two ends of the long side of the sliding guide hole protrude to an outside of the protrusion 302, and a threading groove 305 is defined on the protrusion 302, which is connected to the sliding guide hole. When the protrusion 302 of the sliding block 3 extends between the two movable blade brackets 5, the threading groove 305 on the protrusion 302 and avoidance grooves 503 on the two movable blade brackets 5 intersect horizontally, Thus, an eccentric shaft 601 on a rotating shaft 6 can smoothly rotate to drive the sliding block 3, the two movable blade brackets 5, and the movable blade 2 to move back and forth. In addition, the guide grooves 301 are divided into two sections and disposed on two sides of the connecting part 304.

[0029] In the embodiment, as shown in FIG. 1, the connecting component includes the sliding block 3, the sliding block 3 is disposed between the two movable blade brackets 5 and the bottom surface 112 of the fixed blade 1; the sliding block 3 is provided with the protrusion 302, the protrusion 302 extends between the movable blade brackets 5 to drive the two movable blade brackets 5 and the movable blades 2 on the two movable blade brackets 5 to move. A bottom surface of the sliding block 3 is formed with the connecting part 304, and the connecting part 304 is configured to connect to a driving mechanism. Specifically, there is a gap between the two movable blade brackets 5, which can be inserted by the protrusion 302 on the sliding block 3. In order to achieve the movement of the two movable blade brackets 5 driven by the sliding block 3, the through slots 303 are respectively disposed on the two opposite side walls of the protrusion 302, and the through slots 303 on the two side walls can be symmetrically disposed. Convex columns 502 are respectively disposed on the opposite side walls of the two movable blade brackets 5, and a number of the convex columns 502 is consistent with a number of the through slots 303, and the convex columns 502 and the through slots 303 are respectively connected to each other. When the protrusion 302 of the sliding block 3 extends between the two movable blade brackets 5, the convex column 502 is embedded in the through slot 303 on the corresponding side of the protrusion 302. By matching the through groove 303 on the side wall of the protrusion 302 on sliding block 3 with the convex column 502 on the movable blade bracket 5, the sliding block 3 drives the two movable blade brackets 5 and movable blades 2 on the two movable blade brackets 5 to move back and forth. In the embodiment, two convex columns 502 are disposed on each of the two movable blade brackets 5, and correspondingly, two through slots 303 are respectively disposed on both sides of the protrusion 302 of the sliding block 3. Certainly, the number of through slots 303 and convex columns 502 may not necessarily be two, and settings can be selected according to the actual situation. In addition, when the through slots 303 on the two side walls are symmetrically arranged, the bottom of the two side walls of the through slots is not connected. The convex columns 502 are limited and pushed through walls of the through slots 303 to move the two movable blade brackets 5 back and forth with the sliding block 3.

[0030] In the embodiment, as shown in FIG. 1, the connecting component includes a pair of movable blade brackets 5, the movable blade brackets are respectively connected to the movable blades 2, and the two movable blade brackets 5 are flexibly connected to provide space for relative motion between the two movable blade brackets 5, and avoid a need for a synchronous motion due to a rigid connection. Through the flexible connection between the two movable blade brackets 5, it is beneficial for the movable blades 2 on the two movable blade brackets 5 to float independently, reducing a mutual influence of the two movable blades 2 during the moving process. The flexible connection between the two movable blade brackets 5 can be achieved through flexible connecting pieces 501, each flexible connecting piece 501 can be a wavy flexible metal sheet or a plastic sheet. Certainly, the two movable blade brackets 5 can also be connected through other flexible connection methods, such as a spring connection. In the embodiment, the number of the flexible connecting pieces 501 are two

used to ensure a smooth movement of the two movable blade brackets 5. In addition, the two movable blade brackets 5 are L-shaped, with a horizontal plane of each of the two movable blade brackets 5 used to connect with the connecting member 201 of the movable blade 2, and assembly holes are defined on the two movable blade brackets 5 to facilitate the fixed connection of the two movable blades 2 and the two movable blade brackets 5 by using fasteners such as bolts, screws, or pins. Vertical surfaces of the two movable blade brackets 5 are used for connecting the flexible connecting pieces 501 and facilitating a setting of the convex columns 502. Avoidance grooves 503 are defined on the vertical surfaces of the two movable blade brackets 5 to provide spaces for the movement of the eccentric shaft 601 on the rotating shaft 6. Moreover, the corners between the horizontal surfaces and the vertical surfaces of the two movable blade brackets 5 adopt rounded transitions.

[0031] In the embodiment, as shown in FIGS. 1, 7 and 8, an elastic sheet 7 is disposed between the sliding block 3 and the movable blade brackets 5. The elastic sheet 7 is supported between the movable blade brackets 5 and the sliding block 3, and/or the elastic sheet 7 is supported between the movable blade brackets 5 and the bottom surface 112 of the fixed blade 1. The elastic sheet 7 is configured to apply an elastic force towards the top surface of the fixed blade 1 to make the movable blades 2 be in contact with the fixed blade 1. Specifically, the elastic sheet 7 includes a body of the elastic sheet 7, multiple first bending parts 701 connected to the body of the elastic sheet 7 and multiple second bending parts 704 connected to the body of the elastic sheet 7. The body of the elastic sheet 7 is limited between the two movable blade brackets 5 and the sliding block 3, the multiple first bending parts 701 are bent upwards relative to the body of the elastic sheet 7 and supported on the movable blade brackets 5 correspondingly, and the multiple second bending parts 704 are bent downwards relative to the body of the elastic sheet 7 and supported on the bottom surface 112 of the fixed blade 1. The movable blades 2, the movable blade brackets 5, and the sliding block 3 are suspended relative to the bottom surface 112 of the fixed blade 1 under a support of the elastic sheet 7, and the sliding block 3 is configured to drive the movable blade brackets 5 to move back and forth relative to the elastic sheet 7 under an external force. The first bending parts 701 are disposed on length edges of the body of the elastic sheet 7, while the second bending parts 704 are disposed on wide edges of the body of the elastic sheet 7. The elastic sheet 7 includes a through-hole 702 for the protrusion 302 on the sliding block 3 to pass through, and arc-shaped flanges 703 protruding towards the edges of the elastic sheet 7 are disposed on a set of opposite ends of the through-hole 702. After the protrusion 302 of the sliding block 3 passes through the through-hole 702, each of the arc-shaped flanges 703 on the through-hole 702 is opposite to the threading groove 305 on the sidewall of the protrusion 302, further ensuring the smooth rotation of the eccentric shaft 601 on the rotating shaft 6. Circular holes are defined on the elastic sheet 7, and cylinders are disposed on the sliding block 3. When the sliding block 3 is assembled with the elastic sheet 7, the cylinders on the sliding block 3 extend into the circular holes on the elastic sheet 7 to achieve a rapid positioning and connection between the sliding block 3 and the elastic sheet 7. The first bending parts 701 are disposed on the two opposite ends of the elastic sheet 7, and the first bending parts 701 on the two opposite ends of the elastic sheet 7 are symmetrically disposed. The first bending parts 701 are bent towards the direction of the two movable blade brackets 5, and bending positions of the first bending parts 701 are pressed against the horizontal plane of the corresponding two movable blade brackets 5 to provide support force to the two movable blade brackets 5, so that the two movable blade brackets 5 and the movable blade 2 can tightly attach to the fixed blade 1.

[0032] In the embodiment, as shown in FIG. 1, the connecting component includes an installation bracket 8 disposed outside the receiving chamber 101 and a fixed blade bracket 9 disposed inside the receiving chamber 101. The fixed blade bracket 9 is disposed above the two movable blade brackets 5, and ends of the fixed blade bracket 9 are bent towards the installation bracket 8, a part of the installation bracket 8 extends into the interior of the receiving cavity 101 of the fixed blade 1 and is connected to bent parts of the fixed blade bracket 9. Through the above structure, it is convenient for the entire blade assembly to be connected to the handle 10 through the installation bracket 8. Specifically, the installation bracket 8 includes a receiving part 801, and two ends of the receiving portion 801 symmetrically extend to form joint parts 802. The joint parts 802 are bent towards the interior of the receiving cavity 101 of the fixed blade 1 and extend into the receiving cavity 101 to connect the fixed blade bracket 9. As shown in FIG. 9, the receiving part 801 of the installation bracket 8 can be a square, and a square hole 803 is disposed on the receiving part 801 (certainly, the hole is not limited to the square hole and can be another shape). The square hole 803 is configured for the rotation shaft 6 to pass through, and two assembly holes 804 are respectively disposed on two sides of the square hole 803 on the receiving part 801. The installation bracket 8 is disposed on the top of the handle 10 through the two assembly holes 804. The fixed blade bracket 9 includes a horizontal connecting member 901, which is pressed onto the upper surfaces of two movable blade brackets 5 to create a small gap between the horizontal connecting member 901 and the top surface of the protrusion 302 of the sliding block 3. The two wide edges of the horizontal connecting member 901 are bent towards the installation bracket 8, and the bent parts of the horizontal connecting member 901 are movably riveted to the joint parts 802 of the installation bracket 8, which makes the blade assembly swing relative to the installation bracket 8, and cooperate with the first contact

slope 102 and second contact slope 103 of the fixed blade 1 to cut hair more cleanly. As shown in FIG. 10, guide bosses 902 are disposed on the two length sides of the horizontal connecting member 901 of the fixed blade bracket 9. Through the guide bosses 902, support and guidance functions are provided for the movable blade blades 2, while reducing the friction force between the movable blade blades 2 and the fixed blade bracket 9. Installation holes are provided on the bent parts of the fixed blade bracket 9 and the joint parts 802 of the installation bracket 8. The movable rivets pass through the installation holes on the bent parts of the fixed blade bracket 9 and the joint parts 802 of the installation bracket 8 on a same side, and the fixed blade bracket 9 and the installation bracket 8 are connected together through the movable rivets.

[0033] In the embodiment, as shown in FIG. 1, two ends of the receiving cavity 101 of the fixed blade 1 define two openings, respectively. And side covers 12 are disposed at the openings to make the receiving cavity 101 closed, and the side covers 12 are detachably connected to the fixed blade 1. A shape of the side covers 12 is consistent with a shape of the two openings of the receiving cavity. On the side facing the receiving cavity 101, the side cover 12 is provided with inner wall protrusions 121, which are attached to the inner wall of the receiving cavity 101 to provide support. Elastic hooks 122 are disposed on the inner wall of the side cover 12 and on the inner periphery of the inner wall protrusions 121, and ear plates 903 are disposed on the bent parts of the fixed blade bracket 9 and are perpendicular to the bent parts of the fixed blade bracket 9. When the inner wall protrusions 121 of the side covers 12 are inserted into the receiving cavity 101, the elastic hooks 122 are clamped to the ear plates 903 on the bent parts of the fixed blade bracket 9 to achieve the clamping of the side covers 12. An avoidance hole 123 is disposed on the inner wall of the side cover 12 and on the inner periphery of the inner wall protrusions 121. After the side cover 12 is disposed in place, the avoidance hole 123 is opposite to the movable rivet, avoiding the head of the movable rivet and interference. In addition, as shown in FIG. 3, square notches 111 are disposed at two ends of the bottom surface 112 of the fixed blade 1. Before assembling the side covers 12, it is convenient for the joint parts 802 of the installation bracket 8 to extend from positions of the square notches 111 into the interior of the receiving cavity 101 and connect the joint parts 802 of the installation bracket 8 with the bent parts of the fixed blade bracket 9 on the corresponding sides. Then, the side covers 12 are assembled, and port ends of the square notches 111 are closed by the side covers 12 to avoid the installation bracket 8 from detaching from the square notches 111. A size of the square notches 111 is larger than the size of the joint parts 802 of the installation bracket 8, which provides space for the blade assembly to swing in the width direction.

[0034] In the embodiment, the connecting part 304 on the sliding block 3 can be rectangular or elliptical, with a long direction side of the sliding block 3 or a long axis direction of the sliding block 3 perpendicular to the movement direction of the movable blade 2, so that the eccentric shaft 601 on the rotating shaft 6 can drive the sliding block 3 to move back and forth only along its length direction.

[0035] In the blade assembly, due to the fact that the opposite two sides of the contact part of the fixed blade 1 are bent in the same direction to form the two bending parts and the ends of the two bending parts 104 are connected to define the semi-enclosed receiving chamber 101 inside the fixed blade 1. The receiving chamber 101 surrounds the movable blade 2 and the connecting components to form a complete blade module, thereby achieving modularization. When the blade or other components need to be replaced, in order to facilitate quick replacement by ordinary users without damaging the components, a complete blade module can be directly replaced to avoid disassembling the blade module, which is simple and easy to operate. Due to the receiving chamber 101 defined on the fixed blade 1, the movable blades 2 and the connecting component are enclosed internally to form the complete blade module, avoiding the exposure of components, resulting in a more aesthetically pleasing appearance of the product. In addition, as the movable blades 2 are surrounded by the fixed blade 1, which effectively avoids damaging the user with the movable blades 2.

[0036] The disclosure further specifically provides an embodiment of the hair cutter, as shown in FIGS. 1-10, the hair cutter includes a handle assembly and the blade assembly as described above, the handle assembly is provided with a driver and a rotating shaft 6, the driver is connected to the rotating shaft 6, the rotating shaft 6 is provided with an eccentric shaft 601, the eccentric shaft 601 passes through the bottom surface 112 of the fixed blade 1 and is connected to the connecting component. The rotating shaft 6 drives the eccentric shaft 601 to perform an eccentric rotation when the rotating shaft 6 rotates under the drive of the driver. The eccentric shaft 601 drives the connecting component and the movable blade 2 to move back and forth relative to the fixed blade 1. Specifically, the eccentric shaft 601 of the rotating shaft 6 passes through the connecting through hole on the bent parts 104 of the fixed blade 1 into the receiving chamber 101 and extends into the connecting part 304 of the bottom surface of the sliding block 3. The eccentric shaft 601 is driven to rotate by a rotation of the rotating shaft 6, and is matched with the connecting part 304 of the bottom surface of the sliding block 3 to drive the sliding block 3 to move back and forth along its length direction. Due to the fact that the hair cutter includes the blade assembly, which has all the beneficial technical effects brought about by the blade assembly, and will not be repeated here.

[0037] In this disclosure, unless otherwise specified and limited, the first feature "above" or "below" the second feature may be that the first feature is in direct contact

with the second feature, or the first and second features are in indirect contact through an intermediate media. Moreover, the first feature is "above", "on", and "over" the second feature, which can mean that the first feature is directly or diagonally above the second feature, or simply indicates that the first feature is horizontally higher than the second feature. The first feature is "down", "under", and "below" the second feature, which can indicate that the first feature is directly or diagonally below the second feature, or simply indicates that the horizontal height of the first feature is less than that of the second feature.

[0038] In the description of this specification, the reference terms "preferred embodiment", "further embodiment", "other embodiments", or "specific examples" mean that the specific features, structures, materials, or characteristics described in conjunction with the embodiment or example are included in at least one embodiment or example of this disclosure. In this specification, the schematic expressions of the above terms do not necessarily refer to the same embodiments or examples. Moreover, the specific features, structures, materials, or characteristics described can be combined in an appropriate manner in any one or more embodiments or examples. In addition, those skilled in the art may combine and integrate the different embodiments or examples described in this specification, as well as the features of different embodiments or examples, without mutual contradiction.

[0039] Although embodiments of the disclosure have been shown and described above, it can be understood that the above embodiments are exemplary and cannot be understood as limitations to the disclosure. Those skilled in the art may make changes, modifications, substitutions, and variations to the above embodiments within the scope of the disclosure.

Claims

1. A blade assembly for a hair cutter, comprising a fixed blade (1), movable blades (2) and a connecting component; wherein the connecting component is connected to the movable blades (2) and is configured to drive the movable blades (2) to move relative to the fixed blade (1); two opposite sides of the fixed blade (1) are bent towards a back of the fixed blade (1) to form two bending parts (104), ends of the two bending parts (104) are connected to make the two bending parts (104) fixedly connected to each other, thereby forming a semi-enclosed bottom surface (112), an interior of the fixed blade (1) defines a receiving chamber (101), and the movable blades (2) and the connecting component are both disposed in the receiving chamber (101); and the movable blades (2) are opposite to and in coordination with a top surface of the fixed blade (1), and the connecting component is opposite to the bottom surface (112) of the fixed blade (1).

2. The blade assembly as claimed in claim 1, wherein a first contact slope (102) and a second contact slope (103) are formed on an outside of the top surface of the fixed blade (1), and the first contact slope (102) and the second contact slope (103) are inclined relative to the bottom surface (112) of the fixed blade (1); and the first contact slope (102) and the second contact slope (103) are disposed at an angle, and an angle range of extension lines of the first contact slope (102) and the second contact slope (103) is $170° \leq \alpha \leq 180°$.

3. The blade assembly as claimed in claim 1, wherein each of the two bending parts (104) comprises a first bending surface (1041) and a second bending surface (1042) connected to the first bending surface (1041), and ends of the second bending surfaces (1042) of the two bending parts (104) are welded together to form the bottom surface (112); the first bending surface (1041) is inclined relative to the second bending surface (1042), and an angle between the first bending surface (1041) and the second bending surface (1042) is an obtuse angle; and the top surface of the fixed blade (1), the first bending surfaces (1041) of the two bending parts (104) and the bottom surface (112) of the fixed blade (1) surround to form a cross-section, and the cross-section is in an inverted trapezoid or a pentagon.

4. The blade assembly as claimed in claim 3, wherein the first contact slope (102) and the second contact slope (103) are formed on an outside of the top surface of the fixed blade (1), the first contact slope (102) and the second contact slope (103) are inclined relative to the bottom surface (112) of the fixed blade (1), and the first contact slope (102) and the second contact slope (103) are disposed at an angle; a transitional surface (108) is disposed between the first contact slope (102) and the second contact slope (103), and the ends of the two bending parts (104) are opposite to the transitional surface (108); bent positions of the top surface of the fixed blade (1) respectively form cutting parts, each of the cutting parts comprises a plurality of fixed teeth (105), and a through groove is defined between adjacent two of the plurality of fixed teeth (105); and the through groove extends from the top surface of the fixed blade (1) to the first bending surface (1041), a plurality of cutting teeth (202) are formed on each of the movable blades (2), and the plurality of cutting teeth (202) are cut in conjunction with the plurality of fixed teeth (105).

5. The blade assembly as claimed in claim 1, wherein ends of the two bending parts (104) flip inward towards the top surface of the fixed blade (1) and protrude upwards relative to the bottom surface (112) of the fixed blade (1), thereby forming guide

rails (107); the connecting component comprises a sliding block (3), a bottom surface of the sliding block (3) is formed with guide grooves (301) and a connecting part (304), and the connecting part (304) is configured to connect to a driving mechanism; the guide rails (107) are slidably fitted to the guide grooves (301), and the sliding block (3) is configured to drive the movable blades (2) to move back and forth relative to the top surface of the fixed blade (1) and the bottom surface (112) of the fixed blade (1) under an external force; the bottom surface (112) of the fixed blade (1) defines a connecting through hole (113), and the connecting part (304) is opposite to the connecting through hole (113).

6. The blade assembly as claimed in claim 1, wherein the connecting component comprises movable blade brackets (5), the movable blade brackets are respectively connected to the movable blades (2), and the movable blade brackets (5) are flexibly connected to each other.

7. The blade assembly as claimed in claim 6, wherein the connecting component comprises a sliding block (3), and the sliding block (3) is disposed between the movable blade brackets (5) and the bottom surface (112) of the fixed blade (1); the sliding block (3) is provided with a protrusion (302), and the protrusion (302) is disposed between the movable blade brackets (5) to drive the movable blade brackets (5) and the movable blades (2) on the movable blade brackets (5) to move; a bottom surface of the sliding block (3) is formed with the connecting part (304), and the connecting part (304) is configured to connect to a driving mechanism; and the bottom surface (112) of the fixed blade (1) defines a connecting through hole (113), and the connecting part (304) is matched with the connecting through hole (113).

8. The blade assembly as claimed in claim 7, wherein two opposite side walls of the protrusion (302) define through slots (303), and convex columns (502) are disposed on opposite side walls of the movable blade brackets (5); when the protrusion (302) of the sliding block (3) is disposed between the movable blade brackets (5), the convex columns (502) are respectively embedded in the through slots (303) of the protrusion (302).

9. The blade assembly as claimed in claim 6, wherein the connecting component comprises a sliding block (3), and the sliding block (3) is disposed between the movable blade brackets (5) and the bottom surface (112) of the fixed blade (1); an elastic sheet (7) is disposed between the sliding block (3) and the movable blade brackets (5); the elastic sheet (7) is supported between the movable blade brackets (5) and the sliding block (3) and/or between the movable blade brackets (5) and the bottom surface (112) of the fixed blade (1), and the elastic sheet (7) is configured to apply an elastic force towards the top surface of the fixed blade (1) to make the movable blades (2) be in contact with the fixed blade (1).

10. The blade assembly as claimed in claim 9, wherein the elastic sheet (7) comprises a body of the elastic sheet (7), a plurality of first bending parts (701) connected to the body of the elastic sheet (7) and a plurality of second bending parts (704) connected to the body of the elastic sheet (7); the body of the elastic sheet (7) is limited between the movable blade brackets (5) and the sliding block (3), the plurality of first bending parts (701) are bent upwards relative to the body of the elastic sheet (7) and supported on the movable blade brackets (5) correspondingly, and the plurality of second bending parts (704) are bent downwards relative to the body of the elastic sheet (7) and supported on the bottom surface (112) of the fixed blade (1); and the movable blades (2), the movable blade brackets (5), and the sliding block (3) are suspended relative to the bottom surface (112) of the fixed blade (1) under a support of the elastic sheet (7), and the sliding block (3) is configured to drive the movable blade brackets (5) to move back and forth relative to the elastic sheet (7) under an external force.

11. The blade assembly as claimed in any one of claims 1-10, wherein the connecting component comprises an installation bracket (8) disposed outside the receiving chamber (101) and a fixed blade bracket (9) disposed inside the receiving chamber (101); the fixed blade bracket (9) is disposed above the movable blade brackets (5), and two ends of the fixed blade bracket (9) are bent towards the installation bracket (8); a part of the installation bracket (8) extends into the interior of the receiving cavity (101) of the fixed blade (1) and is connected to bent parts of the fixed blade bracket (9); two ends of the receiving cavity (101) of the fixed blade (1) define openings, respectively; and side covers (12) are respectively disposed at the openings to make the receiving cavity (101) closed, and the side covers (12) are detachably connected to the fixed blade (1).

12. The hair cutter comprising a handle assembly and the blade assembly as claimed in any one of claims 1-11, wherein the handle assembly comprises a driver and a rotating shaft (6), the driver is connected to the rotating shaft (6), the rotating shaft (6) is provided with an eccentric shaft (601), and the eccentric shaft (601) passes through the bottom surface (112) of the fixed blade (1) and is connected to the connecting component; and the rotating shaft (6) is configured to drive the eccentric shaft (601) to perform an eccentric rotation when the rotating shaft

(6) rotates under drive of the driver, and the eccentric shaft (601) is configured to drive the connecting component and the movable blades (2) to move back and forth relative to the fixed blade (1).

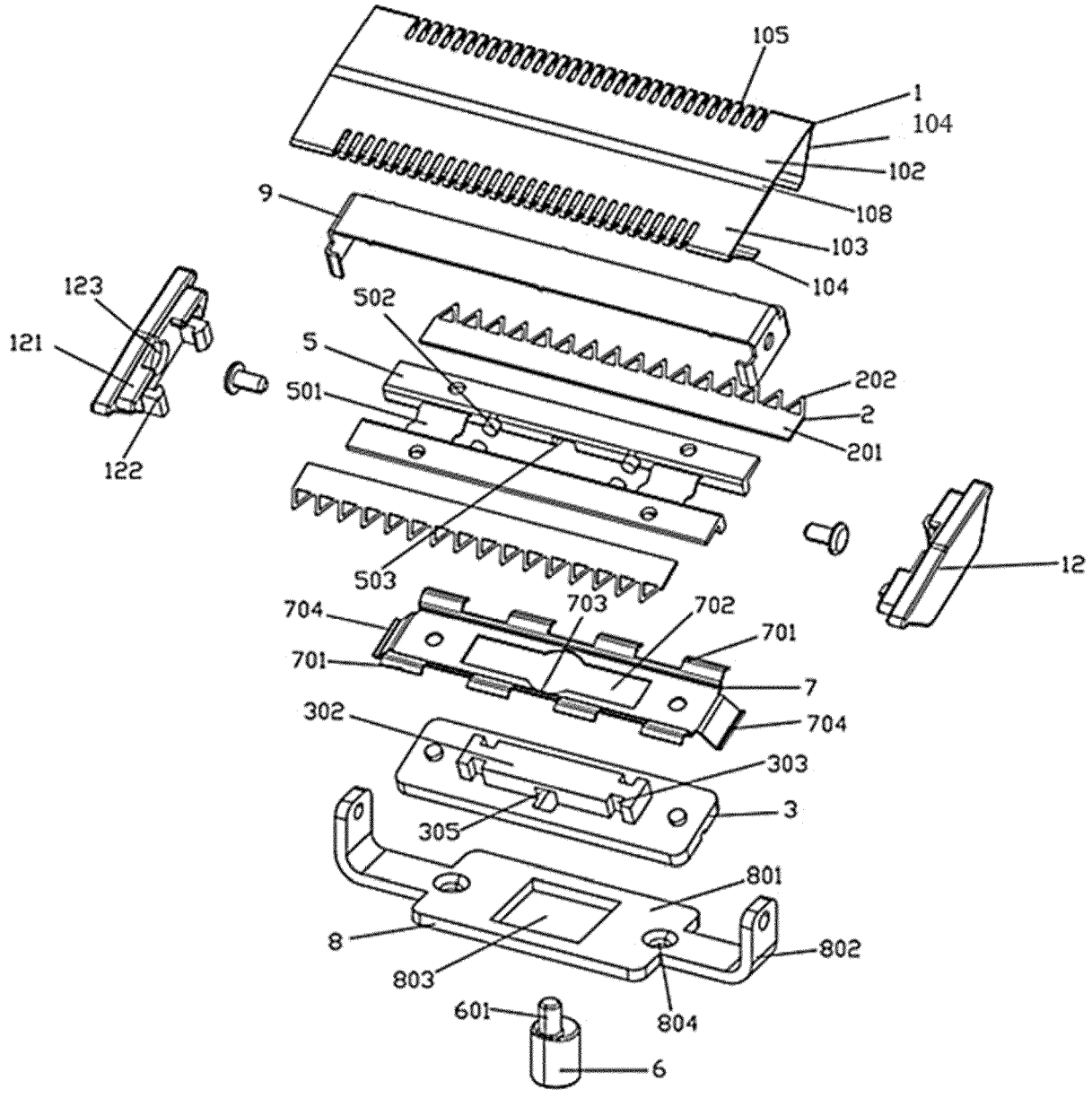
105
1
104
102
108
9
103
104
123
121
122
502
5
501
202
2
201
503
12
704
703
702
701
701
7
704
302
303
3
305
801
8
802
803
804
601
6

FIG. 1

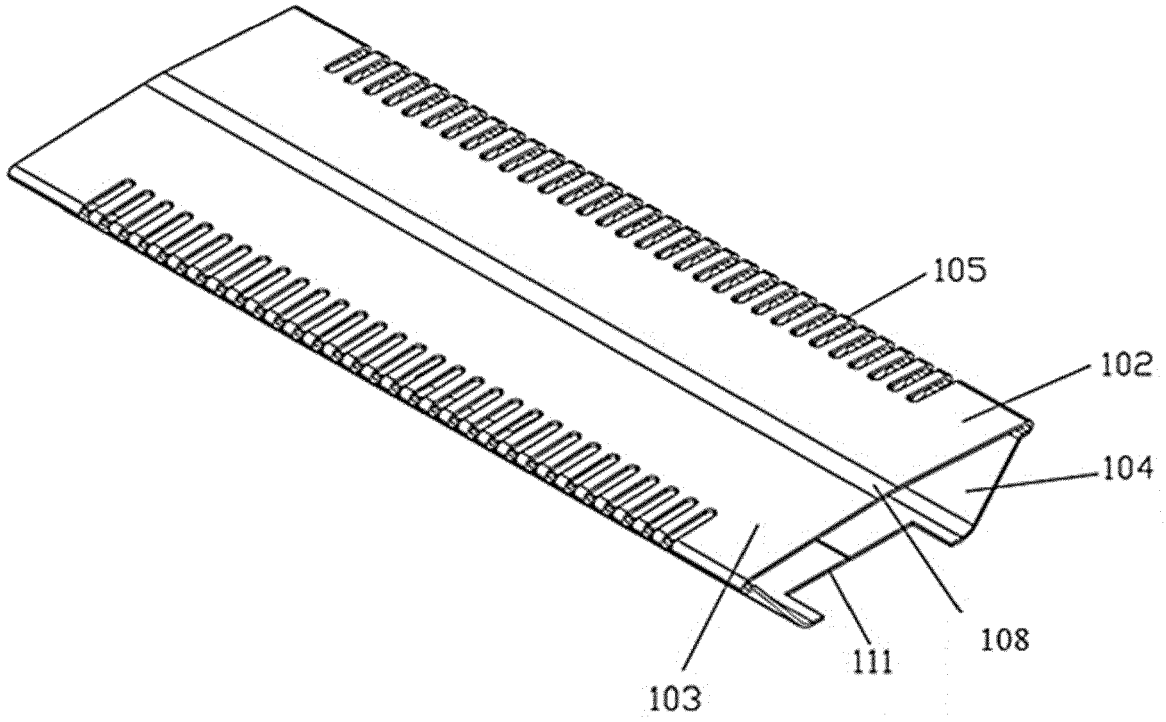

FIG. 2

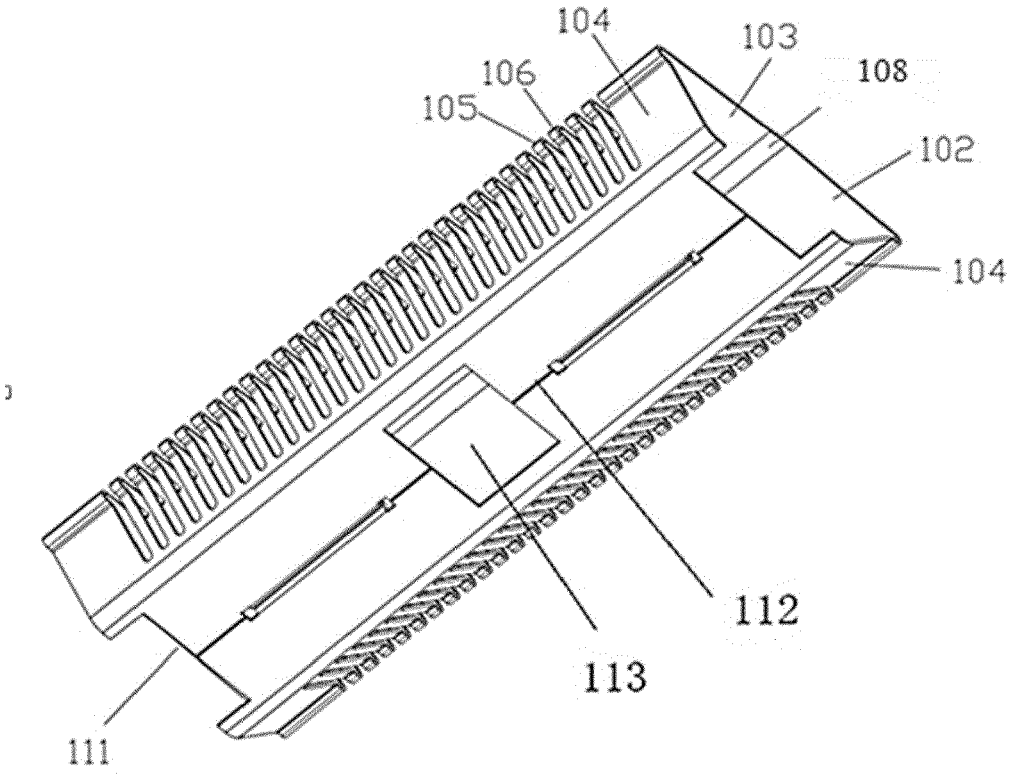

FIG. 3

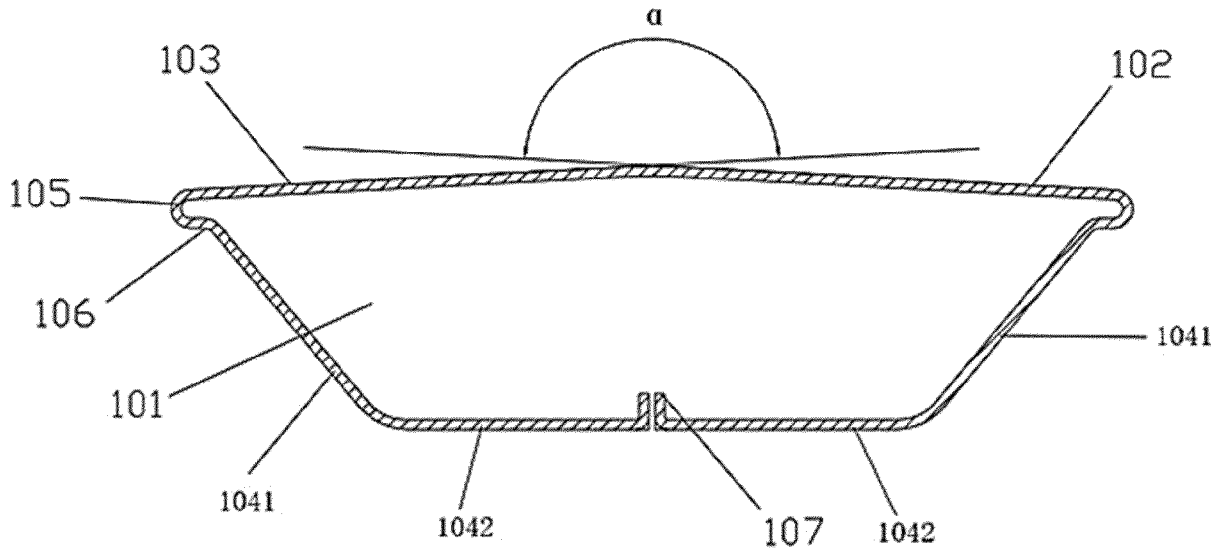
α
103
102
105
106
1041
101
1041
1042
107
1042

FIG. 4

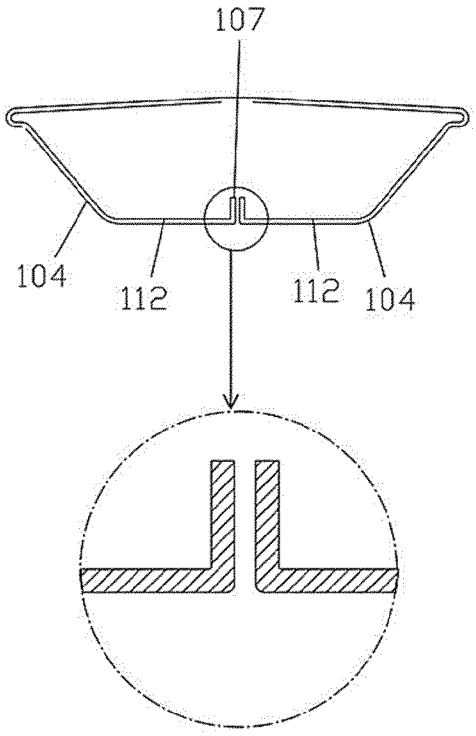
107
104
112
112
104

FIG. 5-1

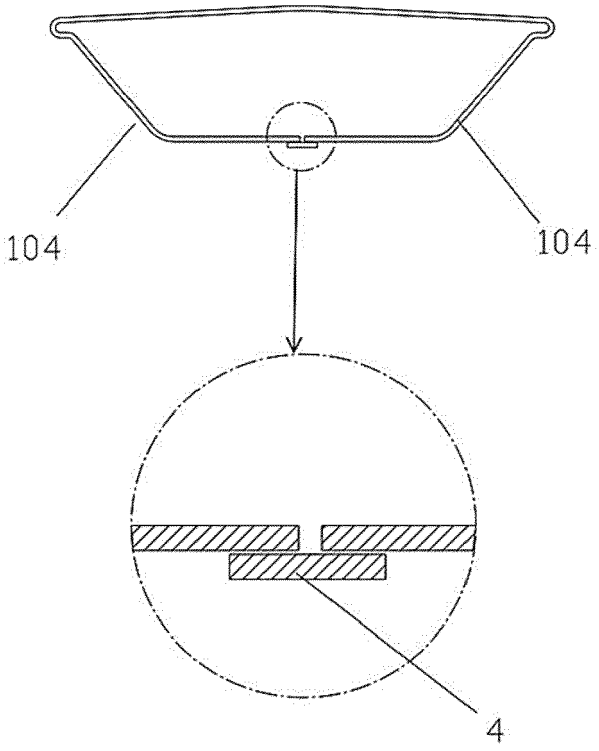

FIG. 5-2

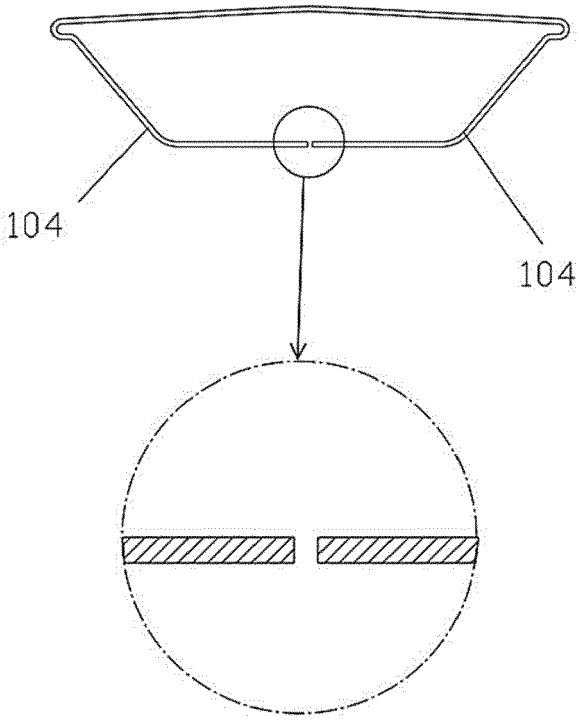

FIG. 5-3

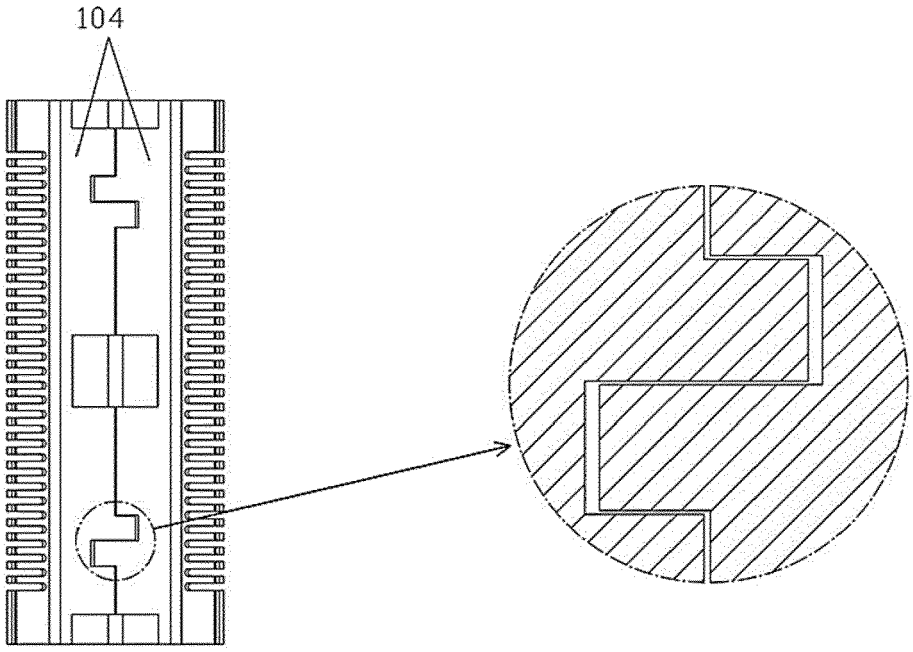

FIG. 5-4

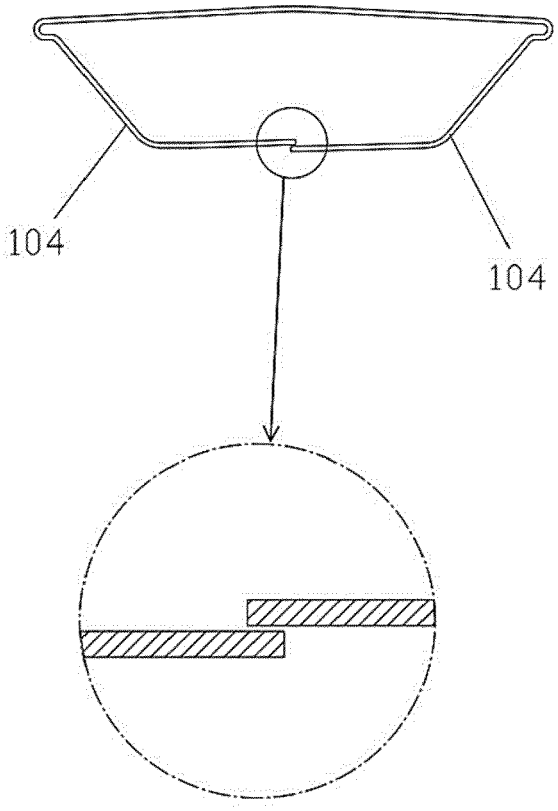

FIG. 5-5

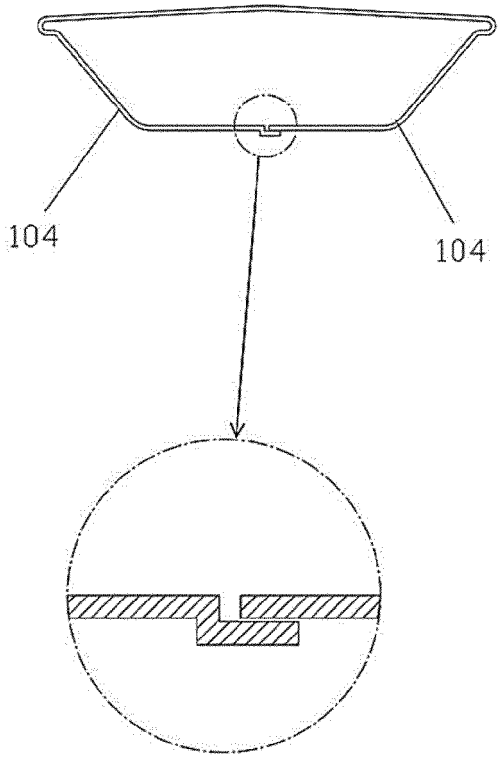

FIG. 5-6

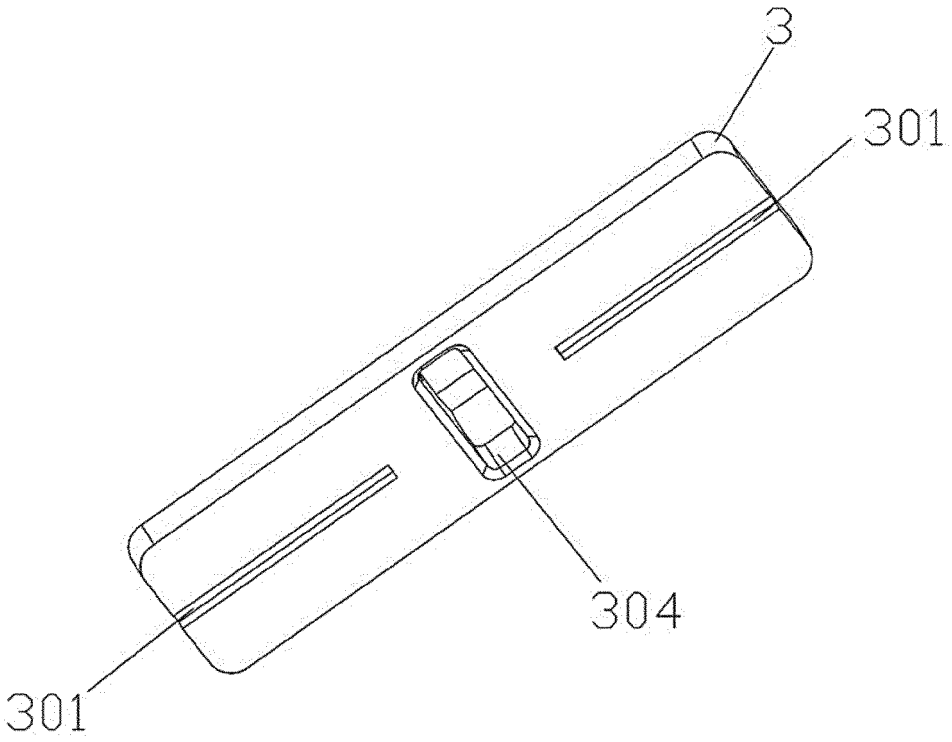

FIG. 6

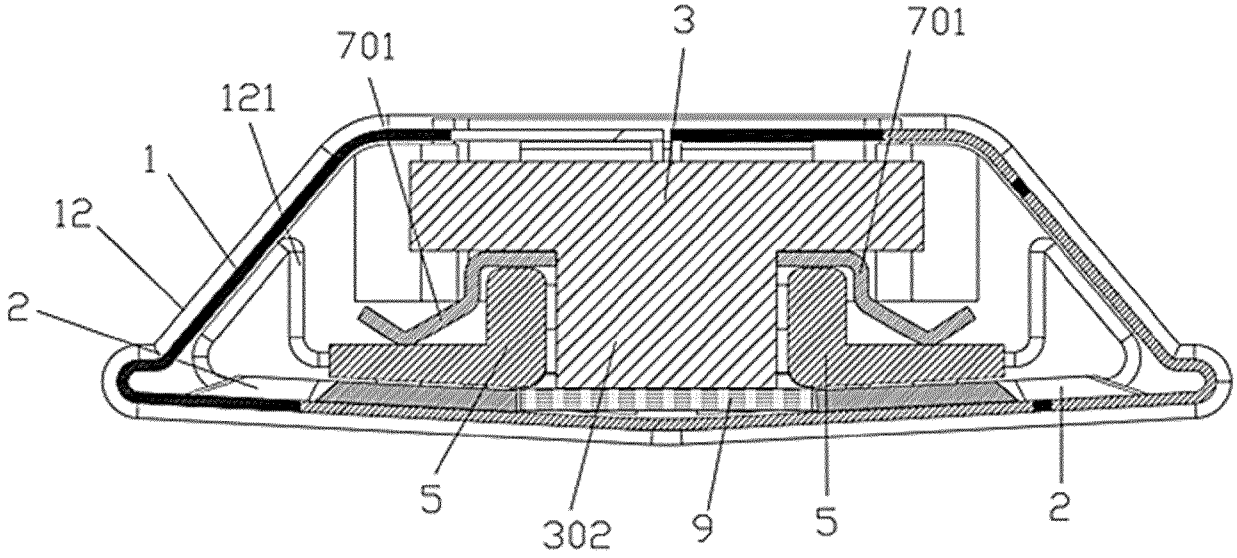

FIG. 7

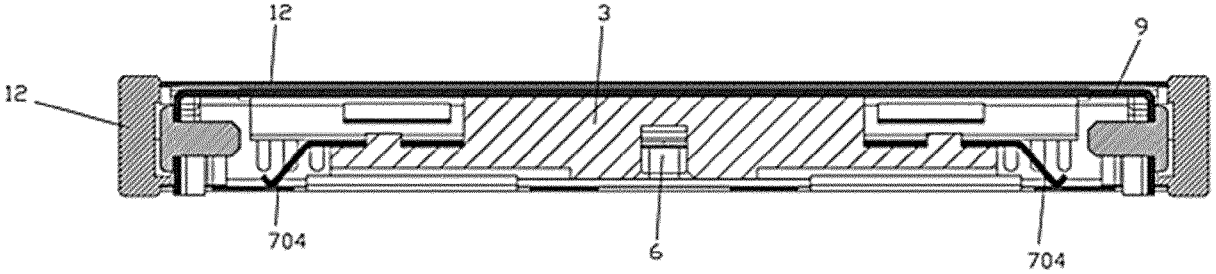

FIG. 8

FIG. 9

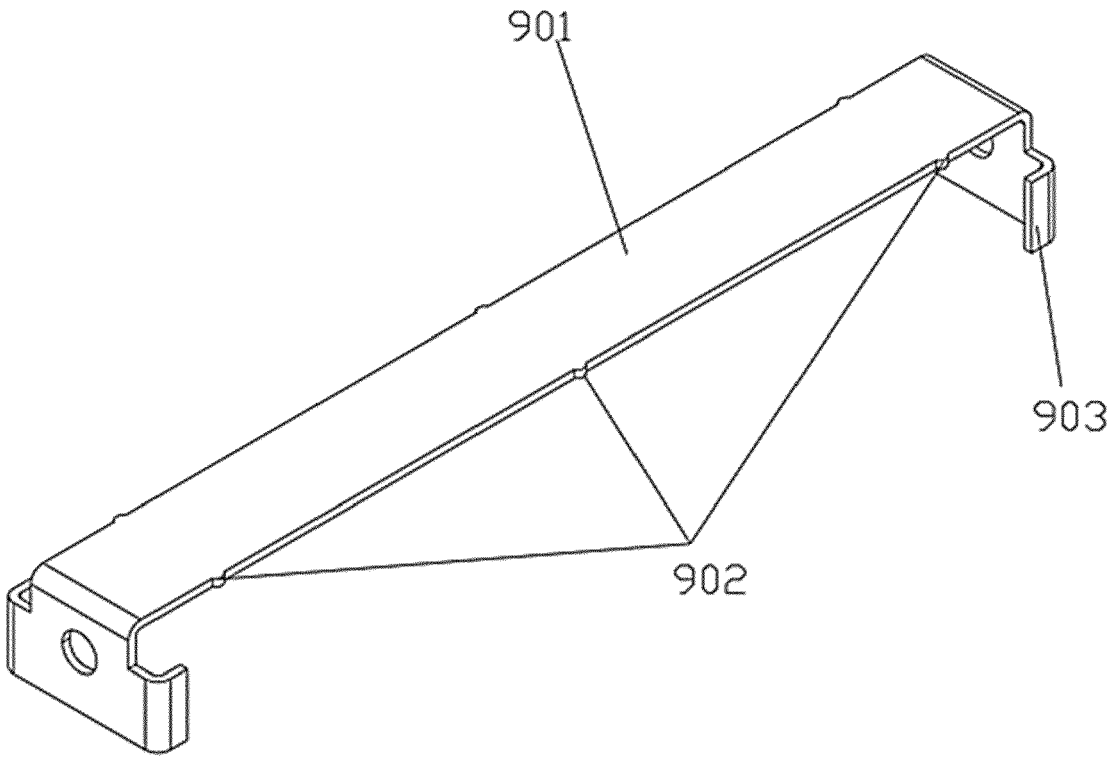

FIG. 10

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EUROPEAN SEARCH REPORT

Application Number
EP 23 21 2553

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	15 April 2024	Schouten, Adri

CATEGORY OF CITED DOCUMENTS

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L : document cited for other reasons

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