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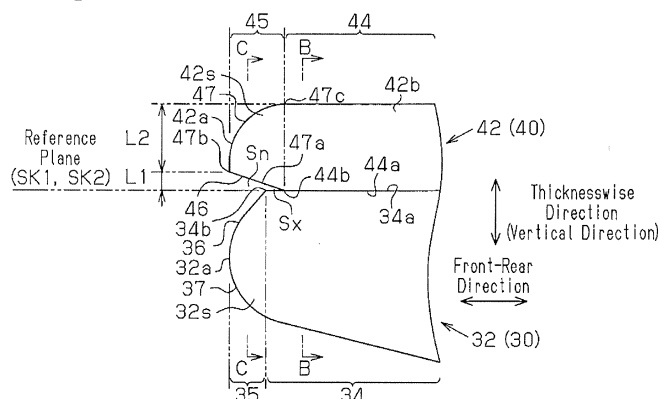
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(54) **HAIR CLIPPER BLADE, AND HAIR CLIPPER WITH HAIR CLIPPER BLADE**

(57) Provided are: a hair clipper blade which is less likely to damage the skin and which can be manufactured extremely efficiently; and a hair clipper which is provided with the hair clipper blade. A hair clipper blade is provided with: a stationary blade (30) which has blade bodies (32); and a movable blade (40) which has blade bodies (42) arranged in the same direction as the blade bodies (32) of the stationary blade (30). Each of the blade bodies (42) of the movable blade (40) has: a cutting section (44)

which has a movable sliding contact surface (44a) in contact with the stationary blade (30); and a blade body tip section (45) which is located closer to the tip than the cutting section (44). The blade body tip sections (45) of the movable blade (40) have inner surfaces (46) which are located closer to the movable blade (40) than a plane (reference surface (SK2)) including the movable sliding contact surfaces (44a).

Fig.8



Description

TECHNICAL FIELD

[0001] The present invention relates to clipper blades including a fixed blade and a movable blade and to a clipper including clipper blades.

BACKGROUND ART

[0002] Blades for a clipper, which cuts human hair or animal hair, include a fixed blade, which has a plurality of blade bodies, and a movable blade, which has a plurality of blade bodies. The movable blade and the fixed blade are held one above the other so that the movable blade is able to oscillate relative to the fixed blade.

[0003] Such type of a clipper needs to cut hair short without damaging the skin.

[0004] Patent document 1 describes technology that satisfies such a need. The blades of the clipper described in patent document 1 include a fixed blade and a movable blade that are held one above the other so that the distal ends of the blade bodies in the movable blade slide are in contact with the distal ends of the blade bodies in the fixed blade. The distal ends of the fixed blade and the distal ends of the movable blade are both formed by curved surfaces. This limits damage to the skin.

[0005] Patent document 2 describes clipper blades in which resin is applied to the distal end of the fixed blade and the distal ends of the movable blade. The application of resin forms curved surfaces on the distal ends of the fixed blade and the movable blade. This limits damage to the skin that would occur when the distal ends rub the skin.

PRIOR ART DOCUMENTS

PATENT DOCUMENTS

[0006]

Patent Document 1: Japanese Laid-Open Patent Publication No. 55-101286

Patent Document 2: Japanese Laid-Open Patent Publication No. 2-41353

SUMMARY OF THE INVENTION

PROBLEMS TO BE SOLVED BY THE INVENTION

[0007] The technologies described in the two patent documents described above have the following shortcomings. In the technology of patent document 1, if the movable blade is moved when the distal ends of the clipper blades are pressed against the skin, the skin may be caught between the distal ends of the fixed blade and the movable blade. This may damage the skin.

[0008] In the technology of patent document 2, when

applying resin to the distal ends of the fixed blade and the movable blade, the resin may adhere to a slide-contact surface of the fixed blade or a slide-contact surface of the movable blade. When resin adheres to the slide-contact surface of the fixed blade or the slide-contact surface of the movable blade, the hair cutting properties are adversely affected. Thus, the adhered resin needs to be removed, which is a burdensome task.

[0009] Accordingly, it is an object of the present invention to provide clipper blades that limit damage to the skin and have superior manufacturing characteristics and to provide a clipper including the clipper blades.

MEANS FOR SOLVING THE PROBLEM

[0010]

(1) The present means include "clipper blades provided with a fixed blade including a plurality of base bodies, and a movable blade including a plurality of base bodies laid out in a direction that is the same as a direction in which the blade bodies of the fixed blade are laid out. The blade bodies of the movable blade each include a cutting portion, which includes a movable slide-contact surface that contacts the fixed blade, and a blade body distal portion, which is located at a distal side of the cutting portion. The blade body distal portion of the movable blade includes an inner surface located at a side where the movable blade is located of a plane including the movable slide-contact surface.

In this structure, when the blade bodies of the movable blade move toward the blade bodies of the fixed blade and narrow the space between the two blade bodies, a gap is formed between the blade body distal portion of the blade body of the movable blade and the blade body distal portion of the blade body of the fixed blade. This limits entrapment of the skin between the two blade bodies. This limits damage to the skin.

(2) In one aspect of the above means, "each of the blade bodies of the movable blade includes a cutting blade arranged on each of two side surfaces of the blade body, and part of the cutting blade located in the blade body distal portion includes a chamfered blade edge."

(3) In one aspect of the above means, "the blade bodies of the fixed blade each include a cutting portion, which includes a fixed slide-contact surface that contacts the movable slide-contact surface, and a blade body distal portion, which is located at a distal side of the cutting portion; and the blade body distal portion of the fixed blade includes an inner surface located at a side where the fixed blade is located of a plane including the fixed slide-contact surface."

(4) In one aspect of the above means, "the fixed slide-contact surface of each of the blade bodies of the fixed blade includes a first distal edge, and the mov-

able slide-contact surface of each of the blade bodies of the movable blade includes a second distal edge that is located closer to a base of the base body of the movable blade than the first distal edge."

(5) In one aspect of the above means, "the blade body distal portion of the movable blade includes the inner surface and an outer surface that is continuous with the inner surface and faces an outside, a distal point on a borderline between the inner surface and the outer surface of the blade body distal portion of the movable blade exists between an upper surface of the blade body distal portion and the movable slide-contact surface, and a distance between the distal point and the upper surface is greater than a distance of the distal point and the movable slide-contact surface."

(6) One aspect of the above means includes "a clipper including the clipper blades."

EFFECT OF THE INVENTION

[0011] The clipper blades and the clipper limit damage to the skin and have superior manufacturing characteristics.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012]

Fig. 1 is a perspective view of a clipper in one embodiment.

Fig. 2 is a perspective view of a head in the present embodiment.

Fig. 3 is a plan view of the head in the present embodiment.

Fig. 4 is a side view of the head in the present embodiment.

Fig. 5 is a partial perspective view showing blades of the clipper in the present embodiment.

Fig. 6 is a partial plan view showing blades of the clipper in the present embodiment.

Fig. 7 is an enlarged partial side view showing the blades of the clipper in the present embodiment.

Fig. 8 is an enlarged side view showing portion A of Fig. 7.

Fig. 9 is a cross-sectional view taken along line B-B in Fig. 8.

Fig. 10 is a cross-sectional view taken along line C-C in Fig. 8.

Figs. 11A and 11B are schematic plan views showing deformation of the skin.

Fig. 12 is a schematic diagram showing deformation of the skin located between the movable blade and the fixed blade when using conventional clipper blades.

Fig. 13 is a schematic diagram showing deformation of the skin located between the movable blade and the fixed blade when using the blades of the clipper

in the present embodiment.

Fig. 14 is a side view showing a modified example of the blade body distal portions of the movable blade and the fixed blade.

Fig. 15 is a side view showing a modified example of the blade body distal portions of the movable blade and the fixed blade.

Fig. 16 is a side view showing a modified example of the blade body distal portions of the movable blade and the fixed blade.

Fig. 17 is a side view showing a modified example of the blade body distal portions of the movable blade and the fixed blade.

Fig. 18 is a side view showing a modified example of the blade body distal portions of the movable blade and the fixed blade.

EMBODIMENTS OF THE INVENTION

[0013] One embodiment of a clipper will now be described with reference to Fig. 1.

[0014] As shown in Fig. 1, a clipper 1 includes a main body device 2 and a head 3, which is attachable to the main body device 2. The main body device 2 includes a drive mechanism 21, a power supply unit 22, a control unit 23 that controls the drive mechanism 21 and the power supply unit 22, and an operation unit 24.

[0015] The drive mechanism 21 includes an output shaft 21a that transmits power and oscillates a movable component of the head 3 (movable blade 40, which will be described later). The drive mechanism 21 is formed by, for example, a motor and a power transmission mechanism that transmits the power of the motor. The power supply unit 22 supplies the drive mechanism 21 with power. The power supply unit 22 is formed by, for example, a rechargeable battery. The operation unit 24 switches the operational state of the movable component between an activated state and a deactivated state.

[0016] The head 3 will now be described with reference to Figs. 2 and 3.

[0017] As shown in Fig. 2, the head 3 includes clipper blades 4, a fixed frame 50, a holding frame 51, and a pushing device 54. The clipper blades 4 include a fixed blade 30 and a movable blade 40. The fixed blade 30 and the movable blade 40 are held one above the other. Further, the movable blade 40 is able to oscillate in a sideward direction (described later) relative to the fixed blade 30.

[0018] The fixed frame 50 supports the fixed blade 30 from the lower side (side opposite to the side of the fixed blade 30 where the movable blade 40 is arranged). The fixed frame 50 holds the fixed blade 30 so that the fixed blade 30 is not displaced relative to the fixed frame 50.

[0019] The holding frame 51 holds the movable blade 40 from the upper side (side of the movable blade 40 opposite to the side the fixed blade 30 is arranged). The holding frame 51 holds the movable blade 40 so that the movable blade 40 is not displaced relative to the holding

frame 51. The holding frame 51 includes a plate 52 forced against the movable blade 40. An engagement unit 53 engaged with the output shaft 21a of the drive mechanism 21 is arranged on the plate 52. The engagement unit 53 includes a fitting portion 53a. The output shaft 21 is fitted to the fitting portion 53a.

[0020] The pushing device 54 pushes the movable blade 40 and the plate 52 so that the fixed blade 30 and the movable blade 40 are pressed against each other. The pushing device 54 includes, for example, two coupled torsion springs 54a and 54b (refer to Fig. 3). The pushing device 54 is coupled to the fixed frame 50 so that an end 54c of the torsion spring 54a and an end 54d of the torsion spring 54b push the plate 52 and the movable blade 40 toward the fixed blade 30.

[0021] The layout of each component in the head 3 will now be described with reference to Fig. 4.

[0022] In the description of the head 3, the direction extending from the fixed blade 30 toward the movable blade 40 is referred to as "the upper direction" and a certain subject is located at "the upper side" when arranged in the upper direction from a predetermined object. The direction opposite to the upper direction is referred to as "the lower direction" and a certain subject is located at "the lower side" when arranged in the lower direction from a predetermined object.

[0023] The fixed blade 30 is located at the upper side of the fixed frame 50. The movable blade 40 is located at the upper side of the fixed blade 30. The movable blade 40 is held by the holding frame 51. The plate 52 of the holding frame 51 is located at the upper side of the movable blade 40. The torsion spring ends 54c and 54d (pushing device 54) are located at the upper side of the plate 52 and push the plate 52 in the lower direction. Such a structure presses the movable blade 40 against the fixed blade 30.

[0024] The structure of the fixed blade 30 will now be described with reference to Figs. 5 and 6.

[0025] In the description hereafter, in the direction in which blade bodies 32 (refer to Fig. 6) extend (front-rear direction), parts of an object or a portion closer to the distal ends of the blade bodies 32 are located at "the distal side."

[0026] The fixed blade 30 includes a plate-like main body 31 (refer to Fig. 2) and a plurality of blade bodies 32 extending from the main body 31. The blade bodies 32 are laid out along a straight line at substantially constant intervals. The direction in which the blade bodies 32 are laid out is referred to as "the sideward direction."

[0027] Each blade body 32 includes a base 33 (refer to Fig. 6) extending from the main body 31, a cutting portion 34 further extending from the base 33, and a blade body distal portion 35 further extending from the cutting portion 34.

[0028] The cutting portion 34 includes a fixed slide-contact surface 34a (refer to Fig. 7) that slides in contact with the movable blade 40. As shown in Fig. 6, the cutting portion 34 includes a section tapered toward the blade

body distal portion 35 in a plan view. More specifically, the cutting portion 34 has a width (length in sideward direction) that gradually decreases toward the blade body distal portion 35.

[0029] The structure of the movable blade 40 will now be described with reference to Figs. 5 and 6.

[0030] The movable blade 40 includes a plate-like main body 41 (refer to Fig. 2) and a plurality of blade bodies 42 extending from the main body 41. The blade bodies 42 are laid out along a straight line in substantially constant intervals. When the movable blade 40 and the fixed blade 30 are coupled with one held above the other, the blade bodies 42 are laid out in a direction that is the same as the layout direction (sideward direction) of the fixed blade 30.

[0031] Each blade body 42 includes a base 43 (refer to Fig. 6) extending from the main body 41, a cutting portion 44 further extending from the base 43, a blade body distal portion 45 further extending from the cutting portion 44, and a cutting blade 48 (refer to Fig. 9). The cutting blade 48 is arranged on each side surface 42b of the blade body 42 from the cutting portion 44 to the blade body distal portion 45. Figs. 5 and 6 do not show the cutting blade 48.

[0032] The base 43 is inclined relative to the main body 41 (refer to Fig. 5). The cutting portion 44 includes a plane that is substantially parallel to the main body 41.

[0033] The cutting portion 44 includes a movable slide-contact surface 44a (refer to Fig. 7) that slides in contact with the fixed blade 30. The movable slide-contact surface 44a is shorter in the front-rear direction than the fixed slide-contact surface 34a of the cutting portion 34 of the fixed blade 30 (refer to Fig. 7). The cutting portion 44 includes a section tapered toward the blade body distal portion 45 in a plan view. More specifically, the cutting portion 44 has a width (length in sideward direction) that gradually decreases toward the blade body distal portion 45.

[0034] The interval (pitch) of the blade bodies 42 of the movable blade 40 differs from the interval (pitch) of the blade bodies 32 of the fixed blade 30 due to the following reason.

[0035] If the interval of the blade bodies 32 of the fixed blade 30 were to be the same as the interval of the blade bodies 42 of the movable blade 40, the sets of blade bodies (blade body 32 of fixed blade 30 and corresponding blade body 42 of movable blade 40) that slide in contact with each other would cut hair at the same timing. As a result, when a large amount of hair enters the space between the blade bodies 32 and 42, the large amount of hair would all have to be cut at the same time. Thus, the power of the motor would have to be increased. However, the size requirements of the main body device 2 limit increases in the motor power. Due to such circumstances, the interval (pitch) of the blade bodies 32 of the fixed blade 30 differs from the interval (pitch) of the blade bodies 42 of the movable blade 40 so that a large amount of hair is not cut at the same time.

[0036] A structure obtained by combining the fixed blade 30 and the movable blade 40 (structure of clipper blades 4) will now be described with reference to Fig. 7.

[0037] The cutting portions 34 of the blade bodies 32 of the fixed blade 30 slide in contact with the cutting portions 44 of the blade bodies 42 of the movable blade 40.

[0038] In a side view, the most distal point 32a of each blade body 32 of the fixed blade 30 substantially conforms, in the front-rear direction of the blade bodies 32 and 42, to the most distal point 42a of each blade body 42. In the description hereafter, the distance in the front-rear direction between the most distal point 32a of the blade body 32 of the fixed blade 30 and the most distal point 42a of the blade body 42 of the movable blade 40 is referred to as "the level difference." In the example of Fig. 7, the level difference is set to substantially "0."

[0039] The structures of the blade body distal portions 35 and 45 will now be described with reference to Fig. 8. Fig. 8 is an enlarged view showing portion A of Fig. 7.

[0040] The blade body distal portion 35 of the blade body 32 of the fixed blade 30 includes an inner surface 36 facing the movable blade 40, an outer surface 37 continuous with the inner surface 36 and facing the outer side, and a side surface 32s facing the adjacent blade body 32. The outer surface 37 is curved.

[0041] The inner surface 36 is continuous with the fixed slide-contact surface 34a and extends to the distal end. The inner surface 36 includes a flat surface inclined relative to the fixed slide-contact surface 34a. When a plane (hypothetical plane) including the fixed slide-contact surface 34a is set as a reference plane SK1, the inner surface 36 is located at the side of the reference plane SK1 where the fixed blade 30 is arranged.

[0042] The blade body distal portion 45 of the blade body 42 of the movable blade 40 includes an inner surface 46 facing the movable blade 40, an outer surface 47 continuous with the inner surface 46 and facing the outer side, and a side surface 42s facing the adjacent blade body 42. The outer surface 47 is curved.

[0043] The inner surface 46 is continuous with the movable slide-contact surface 44a and extends to the distal end. The inner surface 46 includes a flat surface inclined relative to the movable slide-contact surface 44a. When a plane (hypothetical plane) including the movable slide-contact surface 44a is set as a reference plane SK2, the inner surface 46 is located at the side of the reference plane SK2 where the movable blade 40 is arranged.

[0044] The two inner surfaces 36 and 46 form a gap S_n between the blade body distal portion 35 of the blade body 32 of the fixed blade 30 and the blade body distal portion 45 of the blade body 42 of the movable blade 40. Due to the gap S_n , the fixed slide-contact surface 34a and the movable slide-contact surface 44a are located inwardly (toward bases 33 and 43) from the distal ends of the clipper blades 4.

[0045] The blade body distal portion 45 of the blade body 42 of the movable blade 40 has the following structure.

[0046] The movable slide-contact surface 44a of the blade body 42 of the movable blade 40 is located inwardly (toward base 33) from the fixed slide-contact surface 34a of the blade body 32 of the fixed blade 30. That is, a distal edge 44b of the movable slide-contact surface 44a is located inwardly (toward base 43) from a distal edge 34b of the fixed slide-contact surface 34a in the front-rear direction. Due to such a structure, a gap S_x , which is narrower than the gap S_n between the two inner surfaces 36 and 46, is formed between the inner surface 46 of the blade body 42 of the movable blade 40 and the fixed slide-contact surface 34a of the blade body 32 of the fixed blade 30.

[0047] Further, the structure of the blade body distal portion 45 of the blade body 42 of the movable blade 40 has the following structure.

[0048] A distal point 47b, which is the most frontward point in the front-rear direction on a borderline 47a (refer to Fig. 5) between the inner surface 46 and the outer surface 47 of the blade body distal portion 45, is located between an upper surface 47c of the blade body distal portion 45 and the movable slide-contact surface 44a. The distance L_2 between the distal point 47b and the upper surface 47c is set to be greater than the distance L_1 between the distal point 47b and the movable slide-contact surface 44a. More specifically, the outer surface 47 of the blade body distal portion 45 has a thickness (length in vertical direction) (distance L_2) that is greater than at least one half of the thickness of the blade body distal portion 45.

[0049] The upper surface 47c of the blade body distal portion 45 includes the vertically uppermost point in a line of intersection of the outer surface 47 and a hypothetical plane orthogonal to the movable slide-contact surface 44a extending from a distal edge 44b of the movable slide-contact surface 44a. Further, the upper surface 47c of the blade body distal portion 45 is a surface (double-dashed line in Fig. 8) that is parallel to the movable slide-contact surface 44a.

[0050] The side surface structure of the blade body 32 of the fixed blade 30 and the blade body 42 of the movable blade 40 will now be described with reference to Figs. 9 and 10.

[0051] Fig. 9 is a cross-sectional view taken along line B-B in Fig. 8. Fig. 10 is a cross-sectional view taken along line C-C in Fig. 8.

[0052] The blade body 42 of the movable blade 40 includes the cutting blade 48 at each of the two side surfaces 42b. In detail, the blade body 42 of the movable blade 40 includes the cutting blades 48 that project from the two side surfaces 42b toward the adjacent side surface (in the sideward direction).

[0053] A first section in the cutting portion 44 of each cutting blade 48 includes a blade edge 48b having an acute shape. More specifically, as shown in Fig. 9, the lower surface of the cutting blade 48 corresponds to an extended plane of the movable slide-contact surface 44a, and the angle of the blade edge 48b of the cutting blade

48 is 90 degrees or less.

[0054] A second section in the blade body distal portion 45 of each cutting blade 48 includes a blade edge 48a having an obtuse shape. For example, as shown in Fig. 10, the blade edge 48a of the cutting blade 48 has a curved surface.

[0055] The reason for employing such structure of the cutting blade 48 will now be described.

[0056] The inner surface 46 of the blade body distal portion 45 in the movable blade 40 is not in contact with the blade body distal portion 35 of the fixed blade 30. Accordingly, the clipper blades 4 are not designed to cut hair by sliding the blade body distal portion 45 of the movable blade 40 on the blade body distal portion 35 of the fixed blade 30. If the cutting blade 48, which is arranged on each side surface 42s of the blade body distal portion 45, were to have an acute shape, the skin S may be damaged when this portion contacts the skin S during oscillation of the movable blade 40. Thus, the blade edge 48a of the cutting blade 48 at this portion has a curved surface.

[0057] The operation of the blades 4 of the clipper will now be described with reference to Figs. 11 to 13.

[0058] Fig. 11 shows deformation of the skin S when the head 3 is pressed against the skin S.

[0059] Fig. 11 A shows deformation of the skin S when the blade bodies 32 of the fixed blade 30 are overlapped with the blade bodies 42 of the movable blade 40 in the sideward direction. In this case, at locations where the blade bodies 32 of the fixed blade 30 are overlapped with the blade bodies 42 of the movable blade 40, the skin S enters the space between the adjacent blade bodies 32 of the fixed blade 30 and the adjacent blade bodies 42 of the movable blade 40.

[0060] Fig. 11 B shows deformation of the skin S when the blade bodies 32 of the fixed blade 30 are not overlapped with the blade bodies 42 of the movable blade 40. More specifically, Fig. 11 B shows deformation of the skin S when the blade bodies 42 of the movable blade 40 are arranged between the adjacent blade bodies 32 of the fixed blade 30. In this situation, the movement of the movable blade 40 pushes back the skin S from between the blade bodies 32 of the fixed blade 30 and the blade bodies 42 of the movable blade 40. More specifically, as shown in Figs. 11 A and 11 B, due to the oscillation of the movable blade 40, the skin S is moved into or pushed out of the space between the blade bodies 32 of the fixed blade 30 and the space between the blade bodies 42 of the movable blade 40.

[0061] Figs. 12 and 13 are diagrams of views taken from the distal end of the blade bodies 32, 42, 132, and 142 toward the base when the blades 4 and 100 of the clipper pressed against the skin S cuts the skin S along a plane of the one of the blade bodies 32, 42, 132, and 142 that that contacts the skin S.

[0062] Fig. 12 is a diagram of clipper blades 100 having a prior art structure showing deformation of the skin S when the skin S enters the space between a blade body

142 of a movable blade 140 and a blade body 132 of a fixed blade 130. In the clipper blades 100 of the prior art structure, the gap Sn does not exist between a blade body distal portion 135 of the blade body 132 of the fixed blade 130 and a blade body distal portion 145 of the blade body 142 of the movable blade 140.

[0063] Fig. 13 is a diagram of the clipper blades 4 in the present embodiment showing deformation of the skin S when the skin S enters the space between the blade body 42 of the movable blade 40 and the blade body 32 of the fixed blade 30.

[0064] The following facts may be understood by comparing Figs. 12 and 13.

[0065] In the case of the clipper blades 100 having the prior art structure, as shown in Fig. 12, when the two blade body distal portions 135 and 145 move toward each other, the skin S remains in the space between the blade body 132 of the fixed blade 130 and the blade body 142 of the movable blade 140. Then, a portion of the skin S is caught at a portion where the two blade bodies 132 and 142 slide in contact with each other. This is caused by the extension of slide-contact surfaces 134a and 144a to pressing surfaces 135s and 145s, which press the skin S.

[0066] In the case of the clipper blades 4 of the present embodiment, as shown in Fig. 13, when the two blade body distal portions 35 and 45 move toward each other, the skin S is gradually pushed out from between the blade body 32 of the fixed blade 30 and the blade body 42 of the movable blade 40 as the two blade body distal portions 35 and 45 gradually approach toward each other. Thus, the skin S is not caught in the portion where the two blade body distal portions 35 and 45 slide in contact with each other. This is due to the gap Sn that exists between the blade body distal portion 35 and the blade body distal portion 45 when the two blade body distal portions 35 and 45 slide in contact with each other. More specifically, the fixed slide-contact surface 34a of the blade body distal portion 35 and the movable slide-contact surface 44a of the blade body distal portion 45 exist at the inner side of the pressing surfaces (outer surfaces 37 and 47) that push the skin at the blade body distal portion 35 and the blade body distal portion 45. This limits entrapment of the skin S.

[0067] The clipper blades 4 of the present embodiment also function in the following manner.

[0068] The outer surface 47 of the blade body distal portion 45 of the blade body 42 of the movable blade 40 is a curved surface having a distance (thickness) set to increase the area of contact with the skin S. Compared to a flat surface, a curved surface reduces the entrapment of the skin S. Further, the large area of contact with the skin S disperses the force of the blade body distal portion 45 of the blade body 42 of the movable blade 40 that acts to press the skin S. Thus, the clipper blades 4 limit damage to the skin S in comparison with a blade body distal portion having an acute shape or a distance L2 that is less than the distance L1.

[0069] The advantages of the clipper blades 4 and the clipper 1 will now be described.

(1) In the clipper blades 4 of the present embodiment, the inner surface 46 of the blade body distal portion 45 of the movable blade 40 is located at the side of the plane (reference plane SK2), which includes the movable slide-contact surface 44a of the movable blade 40, where the movable blade 40 is arranged. In this structure, the gap Sn is formed between the blade body distal portion 45 of the movable blade 40 and the fixed slide-contact surface 34a of the fixed blade 30.

[0070] More specifically, the gaps Sn and Sx are formed between the inner surface 46 of the blade body distal portion 45 of the movable blade 40 and the fixed slide-contact surface 34a of the fixed blade 30 to reduce the skin S caught between the blade bodies 32 and 42 that move toward each other. This limits damage to the skin S.

[0071] In this structure, even when the blade body 42 of the movable blade 40 and the blade body 32 of the fixed blade 30 move toward each other and narrow the space between the two blade bodies 32 and 42, the gaps Sn and Sx exist between the blade body distal portion 45 of the blade body 42 of the movable blade 40 and blade body distal portion 35 of the blade body 32 of the fixed blade 30. This limits damage to the skin S.

[0072] In the clipper blades 4 of the above structure, the blade body distal portion 45 of the movable blade 40 and the blade body distal portion 35 of the fixed blade 30 are formed by undergoing machining or the like. This facilitates manufacturing compared to the prior art that uses a resin to form a curved surface at the distal end of the blade body distal portion 45 of the movable blade 40. Thus, the clipper blades 4 have superior manufacturing characteristics compared to the prior art.

(2) In the clipper blades 4 of the present embodiment, the blade body 42 of the movable blade 40 includes the cutting blade 48 on each of the two side surfaces 42b. The portion of the cutting blade 48 where the blade body distal portion 45 is located is an obtuse structure, for example, a curved surface. This limits damage to the skin S. The blade edge 48a of the cutting blade 48 at the blade body distal portion 45 may have a shape (refer to Fig. 19, which will be described later) other than that of a curved surface.

(3) In the clipper blades 4 of the present embodiment, the inner surface 46 of the blade body distal portion 45 is located at the side of the plane (reference plane SK1), which includes the fixed slide-contact surface 34a of the fixed blade 30, where the fixed blade 30 is arranged.

[0073] In this structure, the gap Sn is formed between the inner surface 46 of the blade body distal portion 45

of the movable blade 40 and the inner surface 36 of the blade body distal portion 35 of the fixed blade 30. This lowers the frequency in which the skin S gets caught between the two blade body distal portions 35 and 45 and limits damage to the skin S.

(4) In the clipper blades 4 of the present embodiment, the distal edge 44b of the movable slide-contact surface 44a in the blade body 42 of the movable blade 40 is located closer to the base 43 of the blade body 42 of the movable blade 40 than the distal edge 34b of the fixed slide-contact surface 34a in the blade body 32 of the fixed blade 30. When contacting the skin S, the distal edge 44b may damage the skin S. To reduce the frequency the skin S is damaged, the above structure is employed. This limits damage to the skin S.

(5) In the clipper blades 4 of the present embodiment, the distal point 47b on the borderline 47a of the inner surface 46 of the blade body distal portion 45 of the movable blade 40 exists between the upper surface 47c of the blade body distal portion 45 and the movable slide-contact surface 44a. In such a structure, the distance L2 between the distal point 47b and the upper surface 47c of the blade body distal portion 45 is greater than the distance L1 between the distal point 47b and the movable slide-contact surface 44a of the blade body distal portion 45.

[0074] The blade body distal portion 45 of the movable blade 40 may be pressed against the skin S to cut hair.

[0075] For example, when cutting hair short, the blade body distal portions 35 of the fixed blade 30 and the blade body distal portions 45 of the movable blade 40 are pressed against the skin S. In such a case, if the area of the part of each blade body distal portion 45 pressed against the skin S is small, the oscillation of the movable blade 40 would rub the blade body distal portion 45 of the movable blade 40 against the skin S. This may damage (or abrade) the skin S. Thus, the distance L2 between the distal point 47b on the borderline 47a of the inner surface 46 and the upper surface 47c of the blade body distal portion 45 is set to be greater than the distance L1 between the distal point 47b and the movable slide-contact surface 44a. That is, the borderline 47a of the inner surface 46 and the outer surface 47 is set in the blade body distal portion 45 of the movable blade 40 to increase the area of the part that is likely to be pressed against the skin S. This structure limits damage (abrasion) to the skin as compared with clipper blades in which the distance L2 is set to be less than or equal to the distance L1.

(6) The clipper 1 of the above embodiment includes the clipper blades 4 of the above-described structure.

[0076] The clipper 1 having such a structure includes the clipper blades 4 of the above-described structure.

Thus, when cutting hair, damage to the skin S is limited.

[0077] The clipper 1 may include embodiments other than the above embodiment. Other embodiments will now be described as modified examples of the above embodiment. The modified examples described below may be combined.

[0078] In the present embodiment, when the plane including the fixed slide-contact surface 34a is set as the reference plane SK1, the inner surface 36 in the blade body distal portion 35 of the fixed blade 30 is located at the side of the reference plane where the fixed blade 30 is arranged. However, the inner surface 36 may have the following structure. The inner surface 36 may be omitted from the blade body distal portion 35 of the fixed blade 30, and the fixed slide-contact surface 34a may be extended toward the blade body distal portion 35. This case also includes the gap Sn between the blade body distal portion 35 of the fixed blade 30 and the blade body distal portion 45 of the movable blade 40. Thus, an advantage similar to advantage (1) is obtained.

[0079] In the present embodiment, the inner surface 46 of the blade body distal portion 45 of the movable blade 40 has a flat surface. However, the inner surface 46 is not limited to such a form.

[0080] Fig. 14 shows another form of the inner surface 46 of the blade body distal portion 45 of the movable blade 40. In this example, an inner surface 461 has a concave shape. This structure enlarges the gap Sn between the blade body distal portion 45 of the movable blade 40 and the fixed slide-contact surface 34a of the fixed blade 30 and limits entrapment of the skin S.

[0081] Fig. 15 shows a further form of the inner surface 46 of the blade body distal portion 45 of the movable blade 40. In this example, an inner surface 462 has a curved shape in which the middle portion of the surface is bulged upward. This structure functions to push back the skin S. Such a structure has an advantage similar to advantage (1).

[0082] Fig. 16 shows a further form of the inner surface 46 of the blade body distal portion 45 of the movable blade 40. In this example, the inner surface 463 is formed by two surfaces (first surface 463a and second surface 463b). The inner surface 463 includes the first surface 463a, which is generally orthogonal to the fixed slide-contact surface 34a of the fixed blade 30, and the second surface 463b, which is a sloped surface extending from the first surface 463a toward the distal side. Such a structure has an advantage similar to advantage (1).

[0083] In the present embodiment, the inner surface 46 of the blade body distal portion 45 of the movable blade 40 is flat, and the outer surface 47 is curved. However, the blade body distal portion 45 of the movable blade 40 is not limited to such a form.

[0084] Fig. 17 shows a further form of the blade body distal portion 45 of the movable blade 40. In this example, a border portion 470 including a curved surface is located between the inner surface 46 and the outer surface 47. In this structure, corners are omitted from the blade body

distal portion 45. This limits damage (abrasion) of the skin S caused by the movable blade 40. This structure eliminates the borderline 47a between the inner surface 46 and the outer surface 47. Thus, instead of the distal point 47b on the borderline 47a (refer to Fig. 8), the most distal point 42a of the blade body 42 is used to define the distances L1 and L2.

[0085] In the present embodiment, in the blade edge 48a of the blade body 42 of the movable blade 40, part of the blade body distal portion 45 in the cutting blade 48 includes the blade edge 48a that has a curved surface. However, the blade edge 48a is not limited to such a shape.

[0086] Fig. 18 shows a different form of the blade edge 48a at the blade body distal portion of the cutting blade 48. In this example, the blade edge 480a includes a chamfered portion. Such a structure also limits damage to the skin S.

[0087] In the present embodiment, the distance between the most distal point 32a of the blade body 32 of the fixed blade 30 and the most distal point 42a of the blade body 42 of the movable blade 40, that is, "the level difference," is set to substantially "0." However, the level difference is not limited to substantially "0." The allowed level difference is in the range of approximately 0 to 0.5 mm. In this case, it is preferred that the most distal point 32a of the blade body 32 of the fixed blade 30 be located in front of the most distal point 42a of the blade body 42 of the movable blade 40. If this structure were to be reversed, that is, if the most distal point 42a of the blade body 42 of the movable blade 40 were to be located in front of the most distal point 32a of the blade body 32 of the fixed blade 30, the movable blade 40 would contact the skin before the fixed blade. This may damage the skin.

DESCRIPTION OF REFERENCE CHARACTERS

[0088] 1: clipper, 2: main body device, 3: head, 4: clipper blades, 21: drive mechanism, 21a: output shaft, 22: power supply unit, 23: control unit, 24: operation unit, 30: fixed blade, 31: main body, 32: blade body, 32a: most distal point, 32s: side surface, 33: base, 34: cutting portion, 34a: fixed slide-contact surface, 34b: distal edge, 35: blade body distal portion, 36: inner surface, 37: outer surface, 40: movable blade, 41: main body, 42: blade body, 42a: most distal point, 42b: side surface, 42s: side surface, 43: base, 44: cutting portion, 44a: movable slide-contact surface, 44b: distal edge, 45: blade body distal portion, 46: inner surface, 47: outer surface, 47a: borderline, 47b: distal point, 47c: upper surface, 48: cutting blade, 48a and 48b: blade edges, 50: fixed frame, 51: holding frame, 52: plate, 53: engagement unit, 53a: fitting portion, 54: pushing device, 54a and 54b: torsion springs, 54c and 54d: ends, 100: clipper blades, 130: fixed blade, 140: movable blade, 132 and 142: blade bodies, 135 and 145: blade body distal portions, 134a and 144a: slide-contact surfaces, 135s and 145s: pressing surfaces, 461,

462, and 463: inner surfaces, 463a: first surface, 463b: second surface, 470: border portion, 480a: blade edge.

Claims

1. Clipper blades comprising:

a fixed blade including a plurality of base bodies;
and
a movable blade including a plurality of base bodies laid out in a direction that is the same as a direction in which the blade bodies of the fixed blade are laid out, wherein
the blade bodies of the movable blade each include a cutting portion, which includes a movable slide-contact surface that contacts the fixed blade, and a blade body distal portion, which is located at a distal side of the cutting portion, and the blade body distal portion of the movable blade includes an inner surface located at a side where the movable blade is located of a plane including the movable slide-contact surface.

2. The clipper blades according to claim 1, wherein each of the blade bodies of the movable blade includes a cutting blade arranged on each of two side surfaces of the blade body, and part of the cutting blade located in the blade body distal portion includes a chamfered blade edge.

3. The clipper blades according to claim 1 or 2, wherein the blade bodies of the fixed blade each include a cutting portion, which includes a fixed slide-contact surface that contacts the movable slide-contact surface, and a blade body distal portion, which is located at a distal side of the cutting portion; and the blade body distal portion of the fixed blade includes an inner surface located at a side where the fixed blade is located of a plane including the fixed slide-contact surface.

4. The clipper blades according to claim 3, wherein the fixed slide-contact surface of each of the blade bodies of the fixed blade includes a first distal edge, and the movable slide-contact surface of each of the blade bodies of the movable blade includes a second distal edge that is located closer to a base of the base body of the movable blade than the first distal edge.

5. The clipper blades according to any one of claims 1 to 4, wherein the blade body distal portion of the movable blade includes the inner surface and an outer surface that is continuous with the inner surface and faces an outer side,

a distal point on a borderline between the inner surface and the outer surface of the blade body distal portion of the movable blade exists between an upper surface of the blade body distal portion and the movable slide-contact surface, and a distance between the distal point and the upper surface is greater than a distance of the distal point and the movable slide-contact surface.

6. A clipper comprising the clipper blades according to any one of claims 1 to 5.

Fig.1

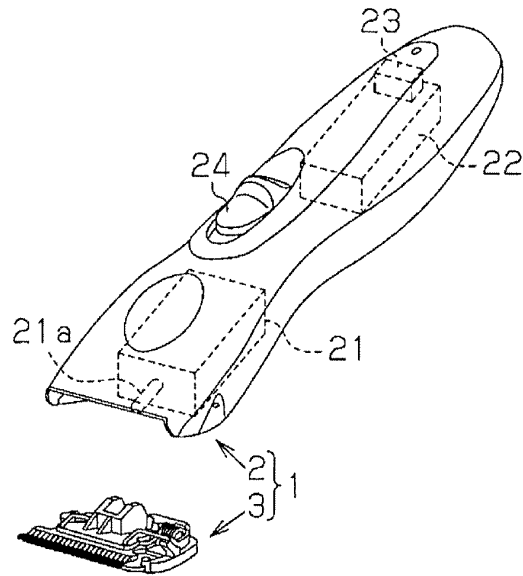


Fig.2

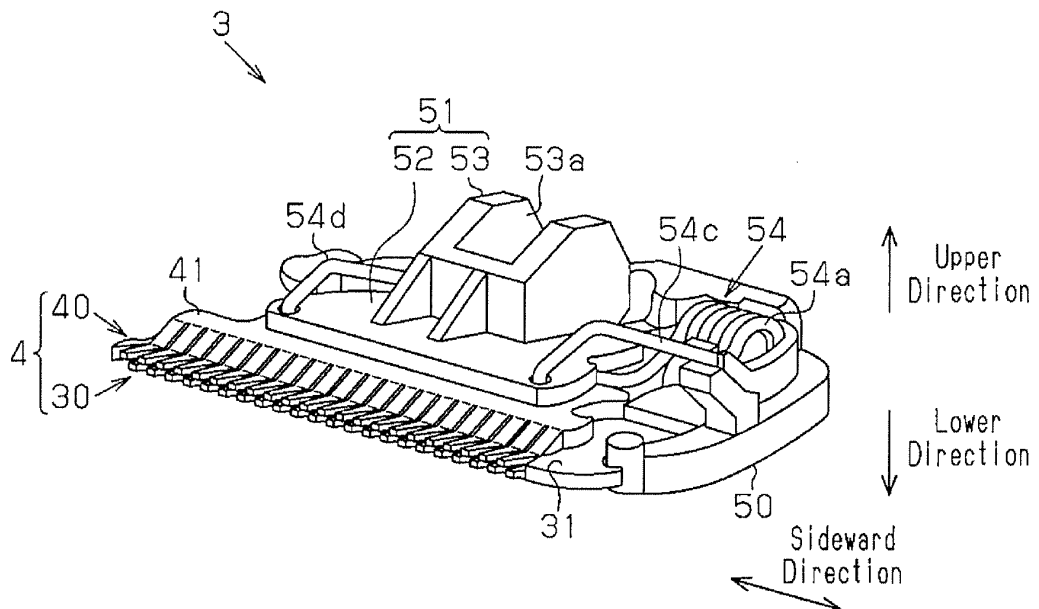


Fig.3

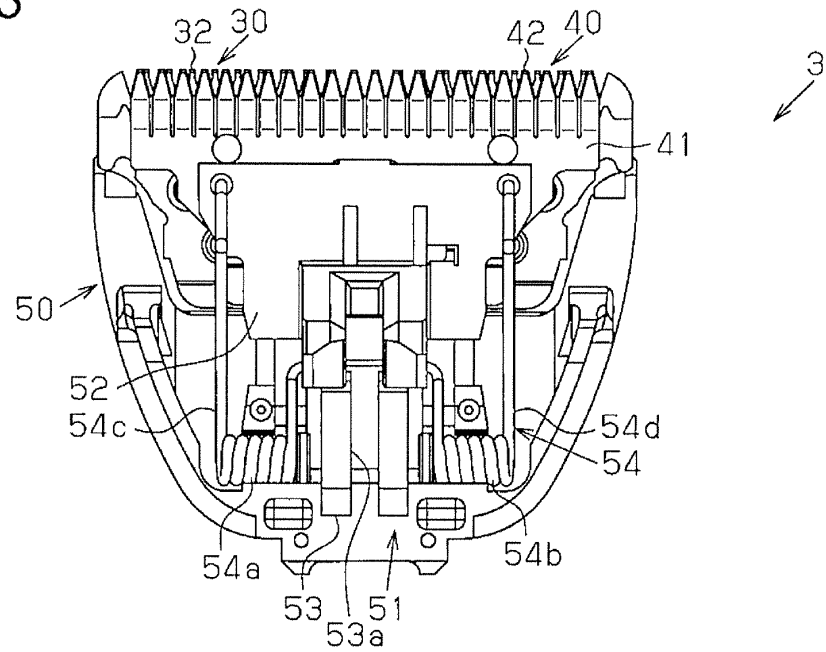


Fig.4

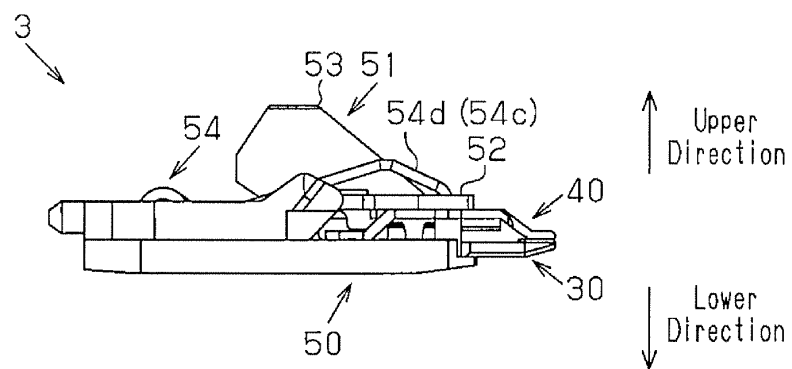


Fig.5

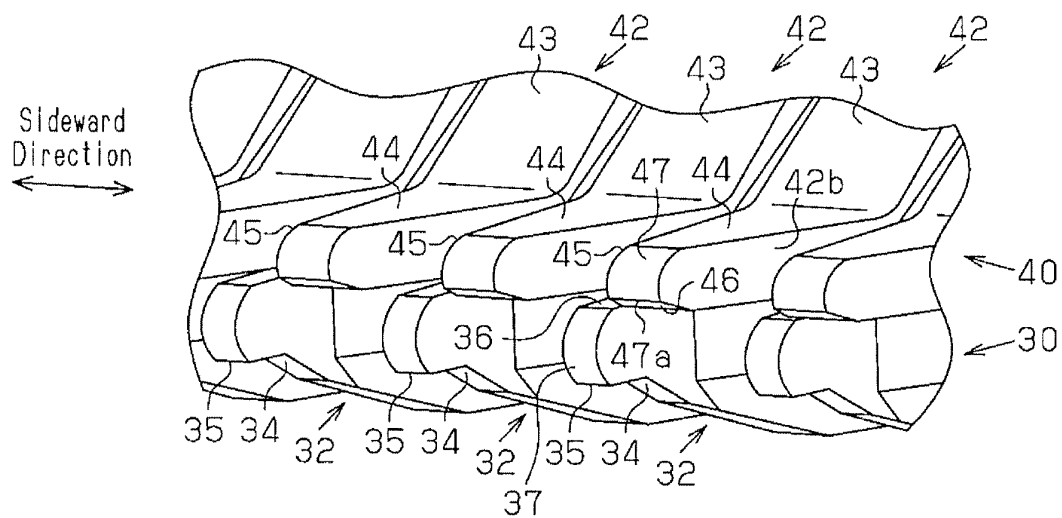


Fig.6

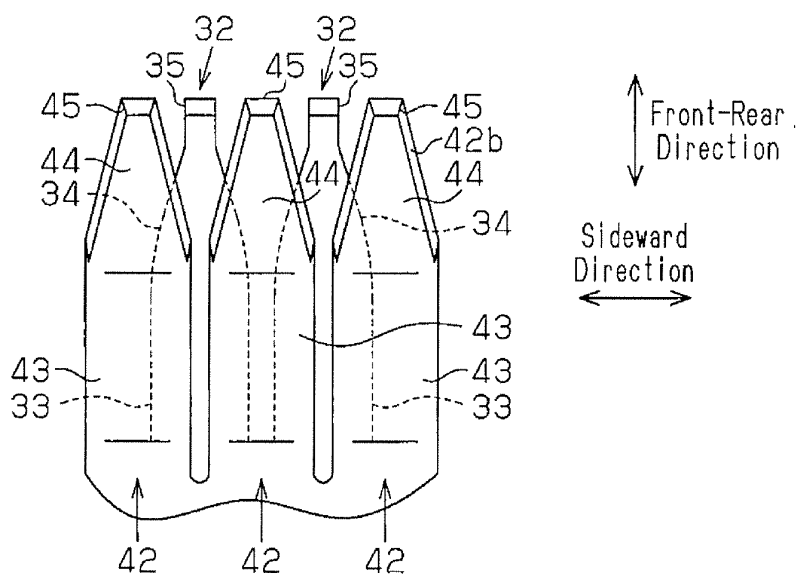


Fig.7

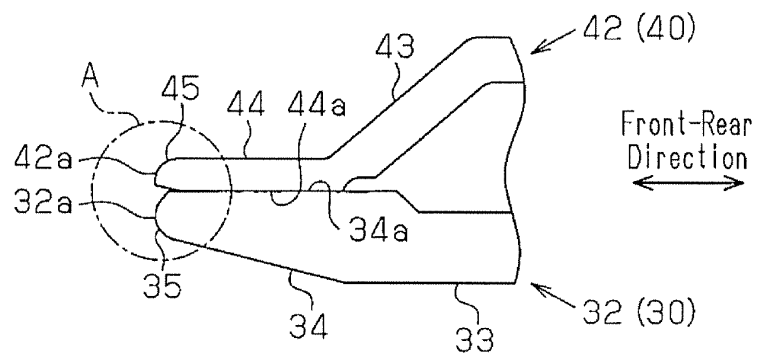


Fig.8

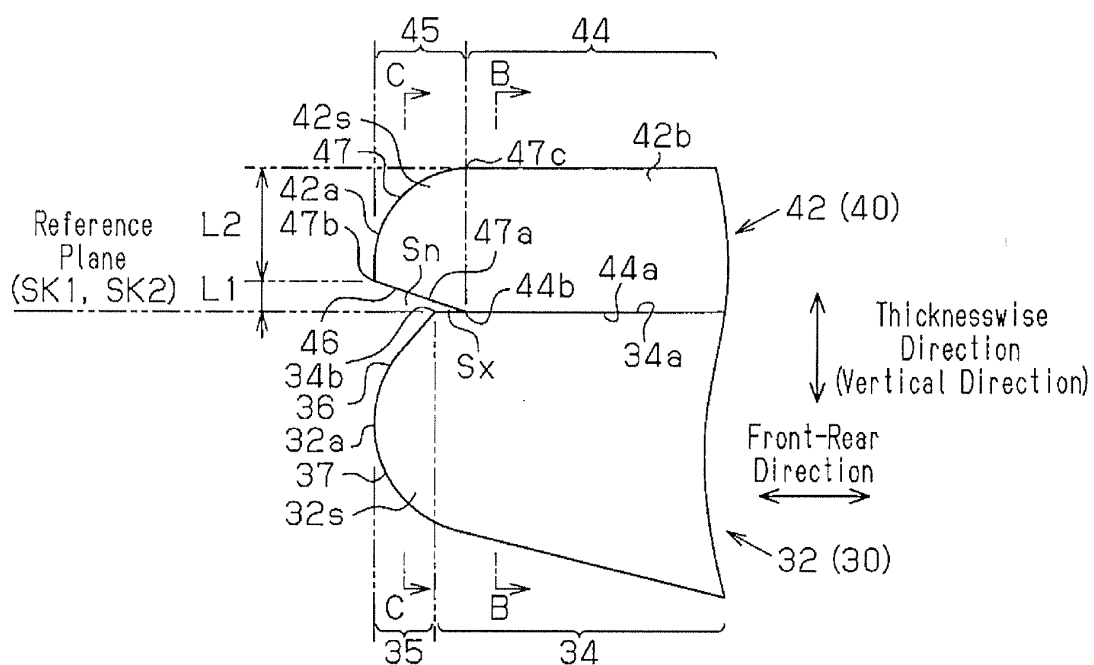


Fig.9

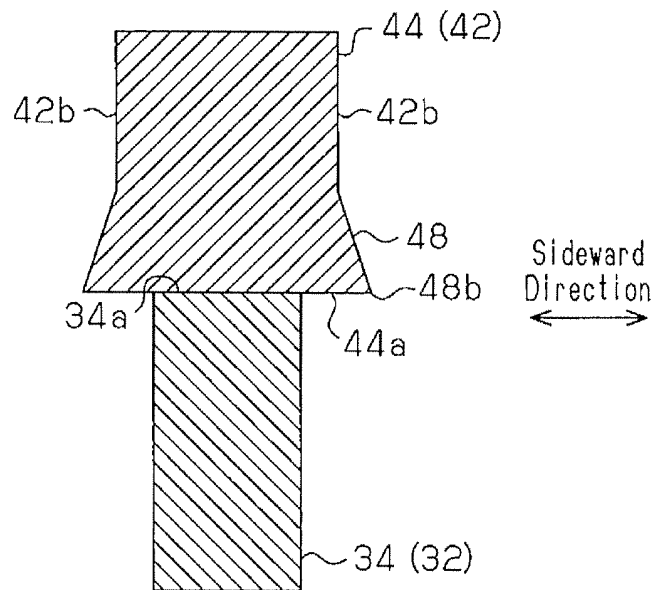


Fig.10

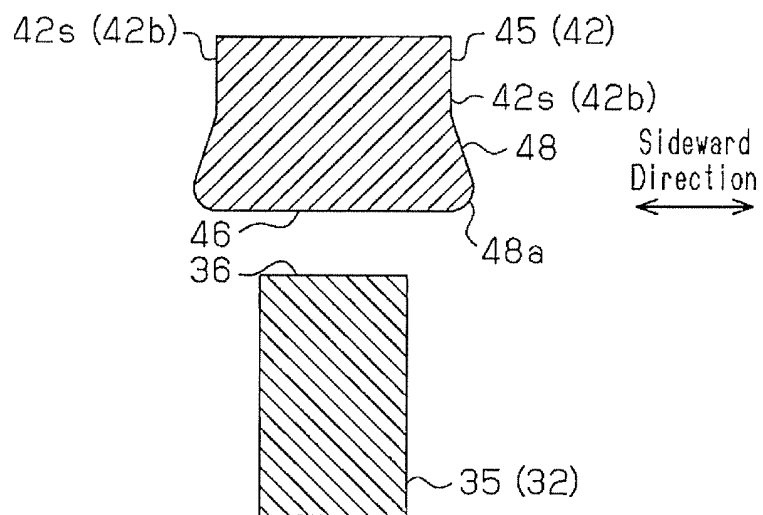


Fig.11A

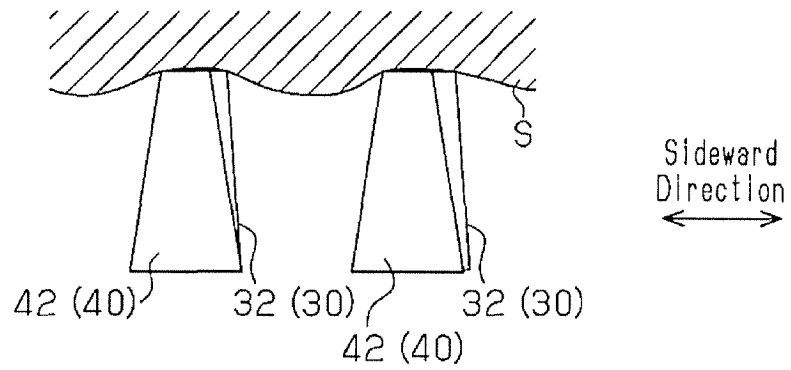


Fig.11B

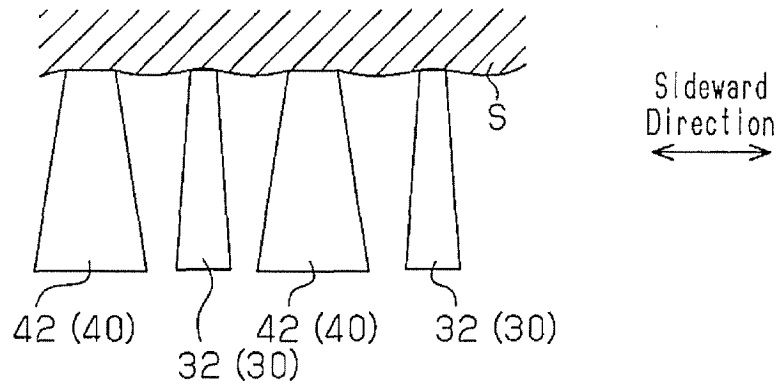


Fig.12

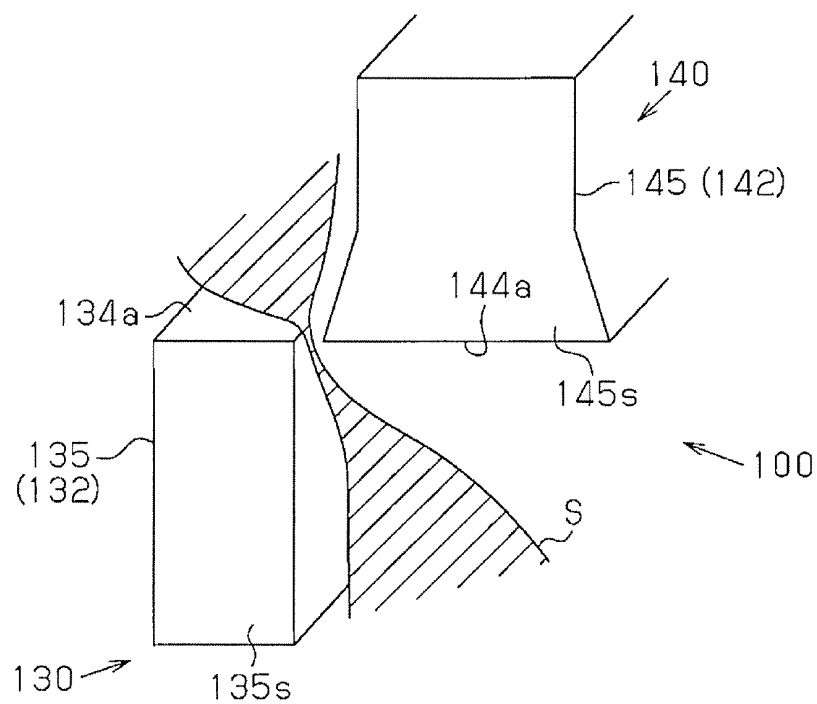


Fig.13

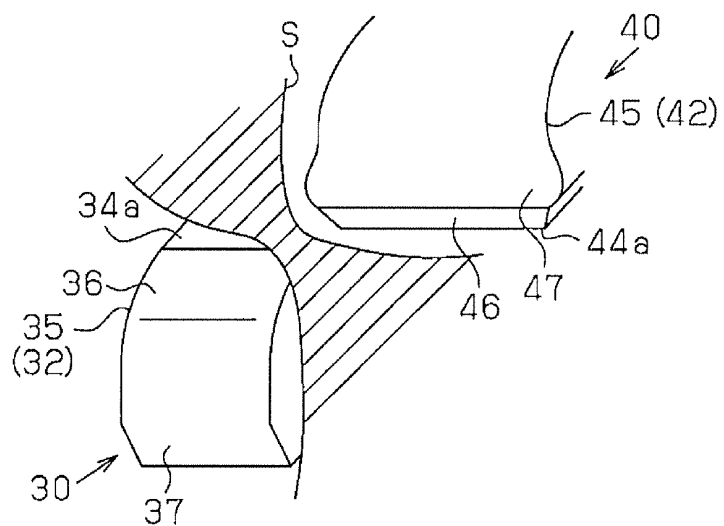


Fig.14

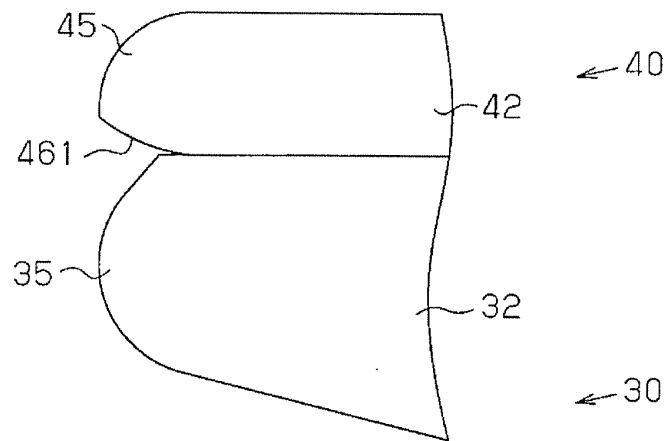


Fig.15

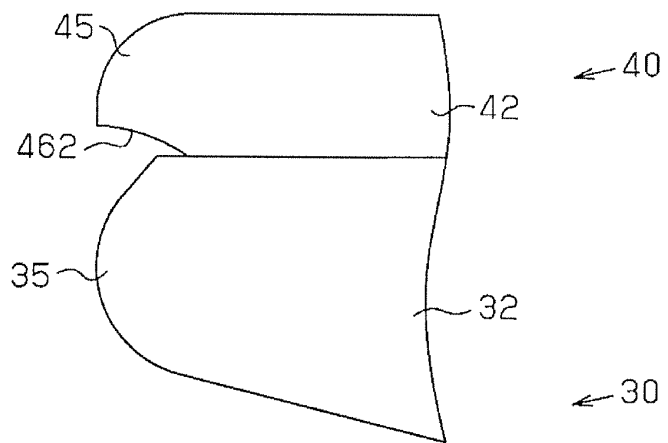


Fig.16

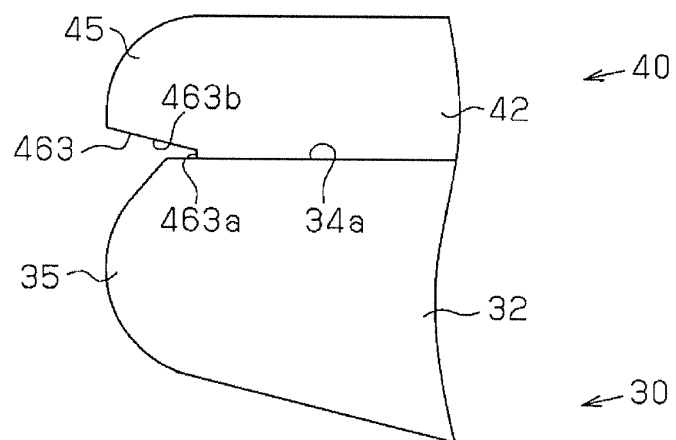


Fig.17

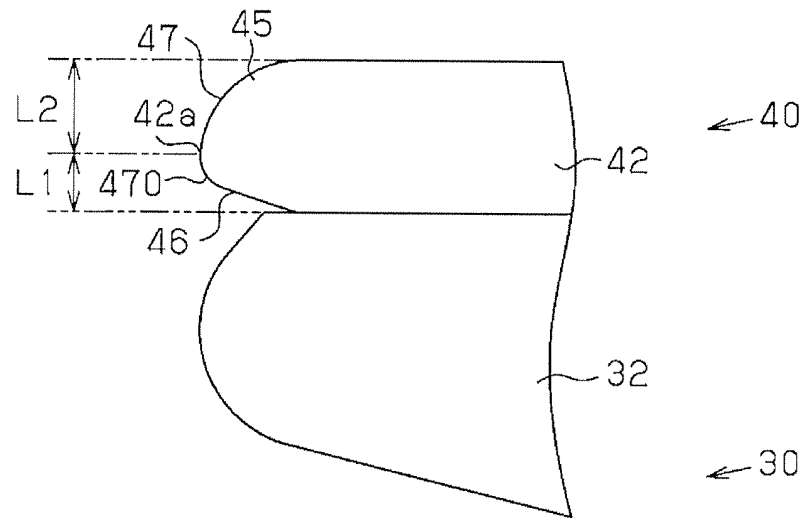
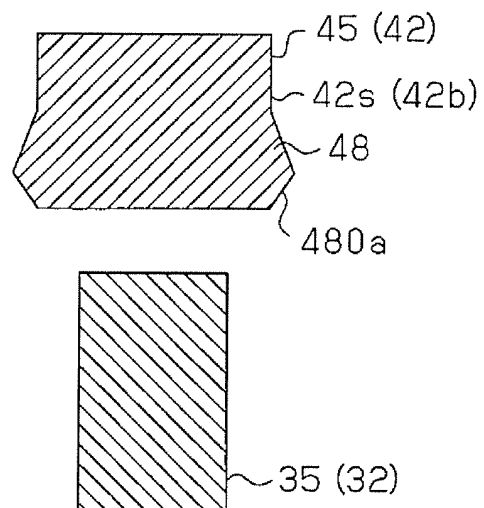


Fig.18



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2013/006908

A. CLASSIFICATION OF SUBJECT MATTER

B26B19/06(2006.01) i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B26B19/06

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2014

Kokai Jitsuyo Shinan Koho 1971-2014 Toroku Jitsuyo Shinan Koho 1994-2014

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	JP 54-8052 A (Matsushita Electric Works, Ltd.), 22 January 1979 (22.01.1979), entire text; fig. 7 (Family: none)	1-4, 6 5
X	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 103815/1976 (Laid-open No. 23690/1978) (Hitachi Maxell, Ltd.), 28 February 1978 (28.02.1978), claims; fig. 1, 3 (Family: none)	1, 6

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

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

09 January, 2014 (09.01.14)

Date of mailing of the international search report

21 January, 2014 (21.01.14)

Name and mailing address of the ISA/
Japanese Patent Office

Authorized officer

Facsimile No.

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2013/006908

C (Continuation).	DOCUMENTS CONSIDERED TO BE RELEVANT	
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 123442/1983 (Laid-open No. 85166/1984) (Hitachi Maxell, Ltd.), 08 June 1984 (08.06.1984), entire text; all drawings (Family: none)	1
A	EP 0278759 A1 (LISTER SHEARING EQUIPMENT LTD.), 17 August 1988 (17.08.1988), entire text; all drawings & GB 8703367 A & DE 3873935 A1	5
A	JP 2-305590 A (Matsuo TOTTORI), 19 December 1990 (19.12.1990), fig. 6 (Family: none)	1

Form PCT/ISA/210 (continuation of second sheet) (July 2009)

REFERENCES CITED IN THE DESCRIPTION

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- JP 55101286 A [0006]
- JP 2041353 A [0006]