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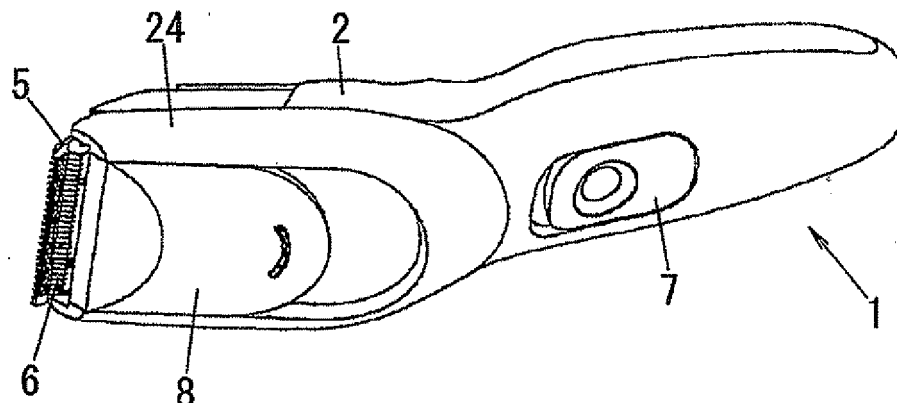
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(54) **Hair cutter**

(57) A hair cutter (1) includes: a body housing (2); a motor (3) put in the body housing; a stationary cutter (5) fixed to the body housing to extend outwardly; a movable cutter (6) adapted to be driven by the motor to slide

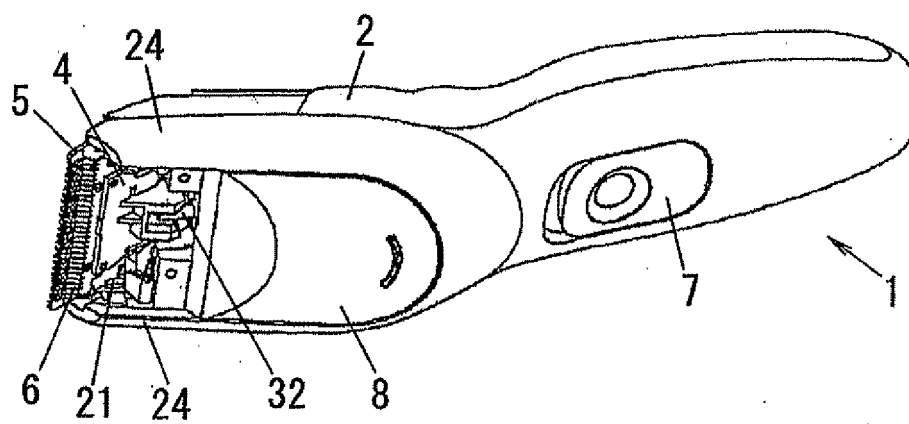
against the stationary cutter; a hair collection chamber (21) for collecting hairs sheared with the movable cutter and the stationary cutter; and a cover (8) adapted to be slid along an outer surface of the body housing to open and shut the hair collection chamber.

FIG. 2A



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FIG. 2B



Description

Technical Field

[0001] The invention relates generally to hair cutters and, more particularly, to a hair cutter comprising a hair collection chamber for collecting hairs sheared, and a cover for opening and shutting the hair collection chamber.

Background Art

[0002] There has been a conventional hair cutter 10 having a hair collection chamber 15 for collecting hairs sheared and a cover 16 for opening and shutting the hair collection chamber 15, as shown in FIGS. 4A and 4B (see Japanese Utility Model application examined-publication 59-7906).

[0003] As shown in FIG. 3, the hair cutter 10 is composed of: a body housing 11; a stationary cutter 12 fixed to the anterior end of the body housing 11; a motor 13 disposed within an intermediate part of the body housing 11; and a movable cutter 14 adapted to be driven by the motor 13 to slide against the stationary cutter 12.

[0004] The body housing 11 is provided at the anterior end with a hair collection chamber 15 for collecting hairs sheared with the stationary cutter 12 and the movable cutter 14. In addition, a cover 16 is hinged to the body housing 11 to open and shut the hair collection chamber 15.

[0005] In case the hair cutter 10 is inclined so that the movable cutter 14 is in a horizontal position in order to rinse the hair collection chamber 15, the cover 16 occupies a position above the hair collection chamber 15 even if the cover 16 is opened (see FIG. 3). Therefore, the cover 16 interferes and makes it hard to rinse the hair collection chamber 15.

Summary of Invention

[0006] It is an object of the present invention to make it easy to rinse a hair collection chamber for collecting hairs sheared.

[0007] A hair cutter (1) of the present invention for solving the problems comprises: a body housing (2); a motor (3) put in the body housing (2); a stationary cutter (5) fixed to the body housing (2) to extend outwardly; a movable cutter (6) adapted to be driven by the motor (3) to slide against the stationary cutter (5); a hair collection chamber (21) for collecting hairs sheared with the movable cutter (6) and the stationary cutter (5); and a cover (8) adapted to be slid along an outer surface of the body housing (2) to open and shut the hair collection chamber (21).

[0008] In an embodiment, the body housing (2) is provided with a shielded section (27) for shielding the back side of the cover (8) from the hair collection chamber (21) side with the cover (8) slid to open the hair collection

chamber (21).

[0009] In an embodiment, the cover (8) is releasably attached to the body housing (2).

[0010] In an embodiment, the hair collection chamber (21) comprises a weep hole communicating with the outside of the chamber.

[0011] In an embodiment, the stationary cutter (5) is fixed to the body housing (2) to extend outwardly from the hair collection chamber (21). When the cover (8) is slid to open the hair collection chamber (21), all of the stationary cutter (5) and the movable cutter (6) are exposed through the hair collection chamber (21) communicating with outer space.

[0012] In an embodiment, each of the stationary cutter (5) and the movable cutter (6) is a comb blade with teeth.

[0013] In an embodiment, when the cover (8) is slid to shut the hair collection chamber (21), portions of the stationary cutter (5) and the movable cutter (6) except their teeth are covered with the cover (8) with their teeth exposed.

[0014] In an embodiment, the body housing (2) extends in one direction and comprises a grip at a first end side of the body housing (2) in the one direction. The stationary cutter (5) is fixed to a second end of the body housing (2) in the one direction. The hair collection chamber (21) is disposed at the second end side of the body housing (2). The cover (8) opens the hair collection chamber (21) when being slid from the second end to the first end side of the body housing (2), and also shuts the hair collection chamber (21) when being slid from the first end side to the second end of the body housing (2).

[0015] The present invention can make it easy to rinse the hair collection chamber (21) for collecting hairs sheared.

Brief Description of Drawings

[0016] Preferred embodiments of the invention will now be described in further details. Other features and advantages of the present invention will become better understood with regard to the following detailed description and accompanying drawings where:

FIG. 1 is a longitudinal sectional view of a hair cutter in accordance with an embodiment of the present invention;

FIGS. 2A and 2B are perspective views of the hair cutter and the former illustrates the hair cutter with a cover shut and the latter illustrates the hair cutter with the cover opened maximally;

FIG. 3 is a longitudinal sectional view of a prior art hair cutter; and

FIGS. 4A and 4B are perspective views of the hair cutter and the former illustrates the hair cutter with a cover shut and the latter illustrates the hair cutter with the cover opened maximally.

Description of Embodiments

[0017] FIG. 1 shows a hair cutter (an electric hair cutter) 1 in accordance with an embodiment of the present invention. The hair cutter 1 includes a body housing 2, a motor 3 put in the body housing 2, a stationary cutter 5 fixed to the body housing 2 to extend outwardly, and a movable cutter 6 adapted to be driven by the motor 3 to slide against the stationary cutter 5. In the example of FIG. 1, the body housing 2 extends in one direction and includes a grip at a first end side of the body housing 2 in the one direction, and the stationary cutter 5 is fixed to a second end of the body housing 2 in the one direction. The hair cutter 1 further includes a hair collection chamber 21 for collecting hairs sheared with the stationary cutter 5 and the movable cutter 6, and a cover 8 adapted to be slid along an outer surface of the body housing 2 to open and shut the hair collection chamber 21. The hair cutter 1 of the embodiment is used to perform haircut while obtaining some hairs sheared with the stationary cutter 5 and the movable cutter 6 in the hair collection chamber 21 within the body housing 2. After haircut, it is possible to rinse or wash the hair collection chamber 21.

[0018] In the example shown in FIGS 1 and 2, the body housing 2 is in the shape of a cylinder which can be held in one hand (more specifically, is a hollow case which extends the aforementioned one direction and has a rectangular cross section). The body housing 2 is also provided with the hair collection chamber 21 at the second end side within the housing 2 and provided at the first end side, within the housing 2, next to the chamber 21 with a motor housing part 20 within which the motor 3 is disposed. A power supply part (not shown) which includes batteries and the like and is configured to supply power to the motor 3 is also disposed within the motor housing part 20. An operating portion 7 (e.g., an operational button or a slide switch) for electrically connecting and disconnecting the motor 3 with respect to the power supply part is attached to an outer surface of the body housing 2. The side of the body housing 2 which the hair collection chamber 21 can be opened or the operating portion 7 is attached to is hereinafter referred to, for example, as a "front side" of the body housing 2.

[0019] The operating portion 7 is adapted to slide along the outer surface of the body housing 2 in the aforementioned one direction. The motor 3 is electrically connected to the power supply part if the operating portion 7 is slid toward one of the first and second ends of the body housing 2, and also electrically disconnected from the power supply part if the operating portion 7 is slid toward the other.

[0020] The motor housing part 20 and the hair collection chamber 21 are separated from each other in the above-mentioned one direction with a separation barrier 22. The separation barrier 22 is formed with a hole into which a motor shaft 30 of the motor 3 is inserted, and the anterior end side of the motor shaft 30 is disposed within the hair collection chamber 21.

[0021] The motor shaft 30 is integrally provided with an eccentric pin 32 mounted off center (i.e., the shaft center of the motor 3) on the motor shaft 30. As shown in FIG. 2B, the hair collection chamber 21 is further provided with a driving force transmission mechanism 4 which is engaged with the eccentric pin 32 and configured to reciprocate (oscillate).

[0022] Each of the stationary cutter 5 and the movable cutter 6 is, for example, a comb blade with teeth aligned at a linear anterior end of the flat-shaped comb blade. The stationary cutter 5 is fixed to the body housing 2 to extend outwardly from the hair collection chamber 21. The movable cutter 6 is fixed at its base fixed to the driving force transmission mechanism 4, and is driven by rotation of the motor 3 to reciprocate (oscillate) in the direction that the teeth of the movable cutter 6 are aligned.

[0023] The hair collection chamber 21 is disposed at the second end side of the body housing 2, and is a space enclosed by the separation barrier 22, each part of the side walls 24 and 24 of the body housing 2, the second end of the body housing 2, and a part of the back wall of the body housing 2. The second end of the body housing 2 inclines towards the back side from the front side of the body housing 2, and functions as a guide wall 25. Specifically, the part of the back wall of the body housing 2 is approximately in parallel with the motor shaft 30 passing through the separation barrier 22, and the guide wall 25 is inclined towards a direction approaching the center of the motor shaft 30 from the front side of the body housing 2. As shown in Fig. 1, the hair collection chamber 21 has an opening 26 at the front side of the body housing 2.

[0024] The base of the stationary cutter 5 is fixed to the front end of the guide wall 25. The teeth of the stationary cutter 5 extend forwardly (outwardly) from the front end of the guide wall 25, and are approximately in parallel with an outer surface of the guide wall 25. That is, if the hair cutter 1 is inclined so that the teeth of the stationary cutter 5 is in a horizontal position, the outer surface of the guide wall 25 becomes in a horizontal position. The movable cutter 6 is arranged so that the teeth of the movable cutter 6 overlaps the teeth of the stationary cutter 5. The movable cutter 6 is reciprocated (oscillated) in the direction that the teeth of the stationary cutter 5 are aligned, and slides against or on the stationary cutter 5. The stationary cutter 5, the movable cutter 6 and the front end of the guide wall 25 are approximately in parallel with each other.

[0025] The opening 26 of the hair collection chamber 21 is opened and shut by the cover 8 attached to the front side (the outer surface) of the body housing 2. For example, the cover 8 is releasably attached to the body housing 2.

[0026] The cover 8 can slide in the aforementioned one direction along the outer surface of the body housing 2 above the motor housing part 20 and inner front faces of the side walls 24 and 24 between which the hair collection chamber 21 intervenes. As shown in FIG. 2A, the anterior end of the cover 8 can slide towards the second

end of the body housing 2 up to just before the teeth of the movable cutter 6. In other words, when the cover 8 is slid to shut the hair collection chamber 21, portions of the stationary cutter 5 and the movable cutter 6 except their teeth are covered with the cover 8 with their teeth exposed. A gap between the anterior end of the cover 8 and the movable cutter 6 forms an intake for collecting sheared hairs.

[0027] If the cover 8 is slid up to the maximum position of the second end side of the body housing 2 (up to the position shown in FIG. 2A), the hair collection chamber is concealed from outside. The maximum position is hereinafter referred to as a "second maximum position". If the cover 8 is slid up to the maximum position of the first end side of the body housing 2 (up to the position shown in FIG. 2B), the hair collection chamber 21 is maximally opened. The maximum position is hereinafter referred to as a "first maximum position". In short, the cover 8 opens the hair collection chamber 21 when being slid from the second end to the first end side of the body housing 2, and also shuts the hair collection chamber 21 when being slid from the first end side to the second end of the body housing 2.

[0028] As shown in FIG. 1, if the movable cutter 6 is in a horizontal position and the cover 8 is slid up to the first maximum position, the cover 8 does not exist in the vertical direction of the movable cutter 6. In other words, when the cover 8 is slid to open the hair collection chamber 21, all of the stationary cutter 5 and the movable cutter 6 are exposed through the hair collection chamber 21 communicating with outer space. Specifically, all of the front side of a shear part composed of the stationary cutter 5 and the movable cutter 6 are exposed. Therefore, in the hair cutter 1 of the embodiment, if the movable cutter 6 is in a horizontal position and the cover 8 is slid up to the first maximum position, water can be poured over the movable cutter 6 from above without disturbance by the cover 8. Accordingly, it is possible to make it easy to rinse (or wash) the hair collection chamber 21. It is also possible to lubricate the movable cutter 6, and accordingly galling (adhesive wear) of the movable cutter 6 can be prevented.

[0029] An example of usage of the hair cutter 1 is explained.

[0030] First, the opening 26 of the hair collection chamber 21 is shut with the cover 8. The operating portion 7 is then turned on, thereby energizing the motor 3 to drive the movable cutter 6. Head hair is sheared while moving the guide wall 25 of the hair cutter 1 along the head. At this time, some hairs sheared with the stationary cutter 5 and the movable cutter 6 are collected into the hair collection chamber 21. If shearing is completed, the operating portion 7 is turned off to stop the motor 3. The cover 8 is then slid and the hair collection chamber 21 is opened. Water is then poured over the stationary cutter 5, the movable cutter 6 and the hair collection chamber 21 from above in a vertical direction with the hair cutter 1 inclined so that the movable cutter 6 is in a horizontal

position. Thereby, it is possible to rinse the stationary cutter 5, the movable cutter 6 and the hair collection chamber 21.

[0031] Thus, the hair cutter 1 of the embodiment has the body housing 2, the motor 3 disposed within the body housing 2, the stationary cutter 5 fixed to the body housing 2 to extend outwardly, and the movable cutter 6 adapted to be driven by the motor 3 to slide against the stationary cutter 5. The cutter 1 further includes the hair collection chamber 21 for collecting hairs sheared with the movable cutter 6 and the stationary cutter 5, and the cover 8 adapted to be slid along the outer surface of the body housing 2 to open and shut the hair collection chamber 21.

[0032] In this configuration, when the movable cutter 6 is in a horizontal position and the cover 8 is slid up to the first maximum position, water can be poured over the movable cutter 6 from above without disturbance by the cover 8. Therefore, according to the hair cutter 1 of the embodiment, it is possible to make it easy to rinse the hair collection chamber 21. As the cover 8 is out of the way, it is possible to lubricate the movable cutter 6 from above while checking the position of the cutter 6. Accordingly, galling of the movable cutter 6 can be prevented.

[0033] In the hair cutter 1 of the embodiment, the cover 8 can be slid along the outer surface of the body housing 2 in the direction away from the movable cutter 6. Accordingly, when the hair cutter 1 is inclined so that the movable cutter 6 is in a horizontal position, the movable cutter 6 is opened in a vertical direction through the opening 26.

[0034] In the hair cutter 1 of the embodiment, the hair collection chamber 21 can be opened just by sliding the cover 8 along the outer surface of the body housing 2 in the one direction like the operating portion 7, thereby providing easy operation.

[0035] In the hair cutter 1 of the embodiment, even if the cover 8 is slid towards the first end of the body housing 2, the cover 8 is opened along the body housing 2 without projecting outwardly, and accordingly a compact hair cutter is obtained.

[0036] In an embodiment, the body housing 2 is provided with a shielded section 27 for shielding the back side 80 of the cover 8 from the hair collection chamber 21 side with the cover 8 slid to open the hair collection chamber 21. As shown in FIG. 1, when the cover 8 is slid up to the first maximum position, almost all of the back side 80 of the cover 8 overlaps the outer surface of the body housing 2 above the motor housing part 20. In this instance, the anterior end of the cover 8 is located at the opening 26 side of the hair collection chamber 21, but in this embodiment, the hair collection chamber 21 is provided with the shielded section 27 at the first end side of the body housing 2 in the front side of the hair collection chamber 21. Therefore, when the cover 8 is slid up to the first maximum position, all or almost all of the back side 80 of the cover 8 is to be shielded from the hair collection chamber 21 side.

[0037] In the hair cutter 1 of this configuration, even if the hair collection chamber 21 is rinsed with the cover 8 opened, the back side 80 of the cover 8 can be shielded from water while rinsing it. Therefore, even if the cover 8 is shut after rinsing the hair collection chamber 21, it is possible to reduce drops falling into the hair collection chamber 21 by moisture adhered to the cover 8. Accordingly, it is possible to suppress mold or the like.

[0038] In an embodiment, the hair collection chamber 21 comprises a weep hole (not shown) communicating with the outside of the chamber. For example, at least one weep hole is formed at least one of: each part of side walls 24 and 24, at the back wall side, of the body housing 2; the guide wall 25; and the part of the back wall of the body housing 2. In this configuration, when the movable cutter 6 is in a horizontal position and the cover 8 is slid up to the first maximum position, the weep hole(s) exists at a bottom side (the aforementioned back wall side) of the hair collection chamber 21. Accordingly, when the hair collection chamber 21 in which hair rubbish is piled up is rinsed, flow of water and the hair rubbish becomes smooth and it is possible to make it easy to discharge the hair rubbish.

[0039] In an embodiment, the hair cutter 1 is provided with a mechanism configured to space the movable cutter 6 apart from the stationary cutter 5 side when the cover 8 is slid to open the hair collection chamber 21. In this embodiment, if the cover 8 is opened before the hair collection chamber 21 is rinsed, clearance can be secured between the stationary cutter 5 and the movable cutter 6. Therefore, it is possible to easily discharge the hair rubbish intervened between the stationary cutter 5 and the movable cutter 6.

[0040] In an embodiment, the hair cutter 1 is provided with a mechanism configured to make the motor 3 operable when the cover 8 is slid to shut the hair collection chamber 21; and to make the motor 3 inoperable when the cover 8 is slid to open the hair collection chamber 21. In another embodiment, the hair cutter 1 is provided with a mechanism configured: to prohibit the cover 8 from being slid to open the hair collection chamber 21 when the motor 3 is driven; and to allow the cover 8 to be slid to open the hair collection chamber 21 when the motor 3 is stopped. In these embodiments, safety can be secured.

[0041] In an embodiment, the operating portion 7 is further provided with a rinse mode (switch) for driving the motor 3 at low speed in addition to an on/off switch. In this embodiment, when the hair collection chamber 21 is rinsed, the motor 3 can be driven at low speed and accordingly the cleaning effect can be enhanced.

[0042] Although the present invention has been described with reference to certain preferred embodiments, it is not intended that such details should be regarded as limitations upon the scope of the invention since numerous modifications can be made without departing from the true spirit and scope of this invention, namely claims.

Claims

1. A hair cutter (1), comprising:

- 5 a body housing (2);
- a motor (3) put in the body housing (2);
- a stationary cutter (5) fixed to the body housing (2) to extend outwardly;
- 10 a movable cutter (6) adapted to be driven by the motor (3) to slide against the stationary cutter (5);
- a hair collection chamber (21) for collecting hairs sheared with the movable cutter (6) and the stationary cutter (5); and
- 15 a cover (8) adapted to be slid along an outer surface of the body housing (2) to open and shut the hair collection chamber (21).

- 20 2. The hair cutter (1) of claim 1, wherein the body housing (2) is provided with a shielded section (27) for shielding the back side of the cover (8) from the hair collection chamber (21) side with the cover (8) slid to open the hair collection chamber (21).

- 25 3. The hair cutter (1) of claim 1 or 2, wherein the cover (8) is releasably attached to the body housing (2).

- 30 4. The hair cutter (1) of claim 1 or 2, wherein the hair collection chamber (21) comprises a weep hole communicating with the outside of the chamber.

- 35 5. The hair cutter (1) of claim 3, wherein the hair collection chamber (21) comprises a weep hole communicating with the outside of the chamber.

- 40 6. The hair cutter (1) of claim 1, wherein the stationary cutter (5) is fixed to the body housing (2) to extend outwardly from the hair collection chamber (21), and wherein when the cover (8) is slid to open the hair collection chamber (21), all of the stationary cutter (5) and the movable cutter (6) are exposed through the hair collection chamber (21) communicating with outer space.

- 45 7. The hair cutter (1) of claim 6, wherein each of the stationary cutter (5) and the movable cutter (6) is a comb blade with teeth.

- 50 8. The hair cutter (1) of claim 7, wherein when the cover (8) is slid to shut the hair collection chamber (21), portions of the stationary cutter (5) and the movable cutter (6) except their teeth are covered with the cover (8) with their teeth exposed.

- 55 9. The hair cutter (1) of claim 1, wherein the body housing (2) extends in one direction and comprises a grip at a first end side of the

body housing (2) in the one direction,
wherein the stationary cutter (5) is fixed to a second
end of the body housing (2) in the one direction,
wherein the hair collection chamber (21) is disposed
at the second end side of the body housing (2), 5
wherein the cover (8) opens the hair collection cham-
ber (21) when being slid from the second end to the
first end side of the body housing (2), and also shuts
the hair collection chamber (21) when being slid from
the first end side to the second end of the body hous- 10
ing (2).

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FIG. 1

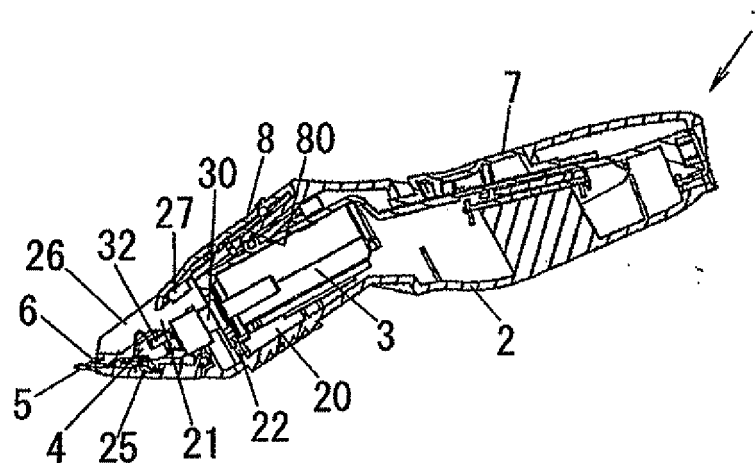


FIG. 2A

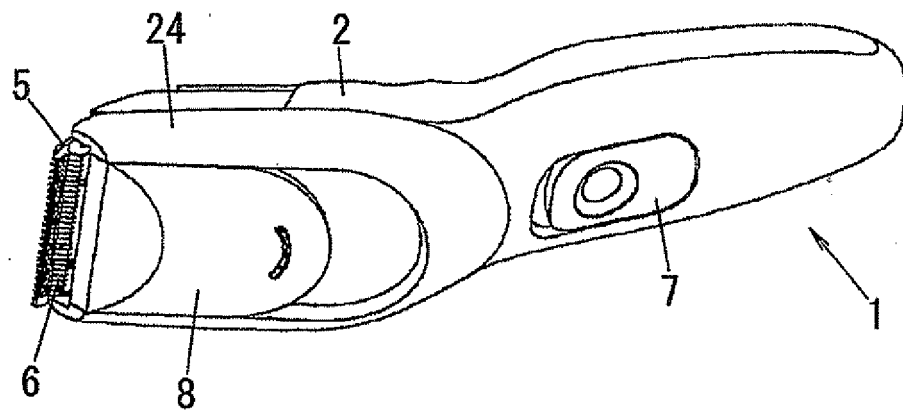
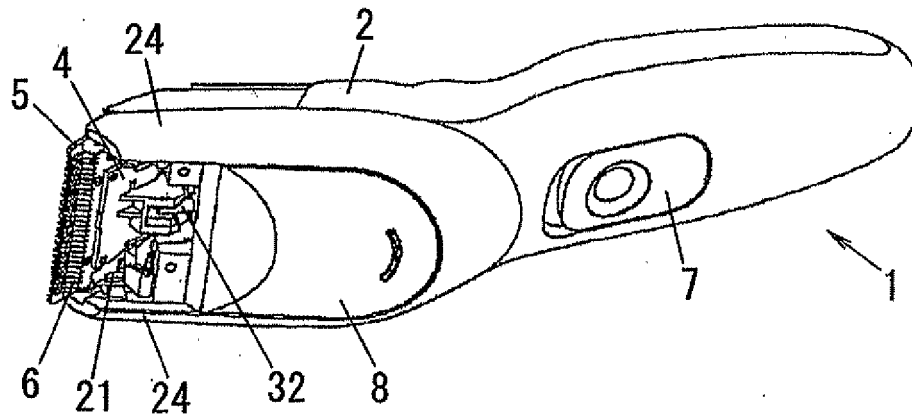
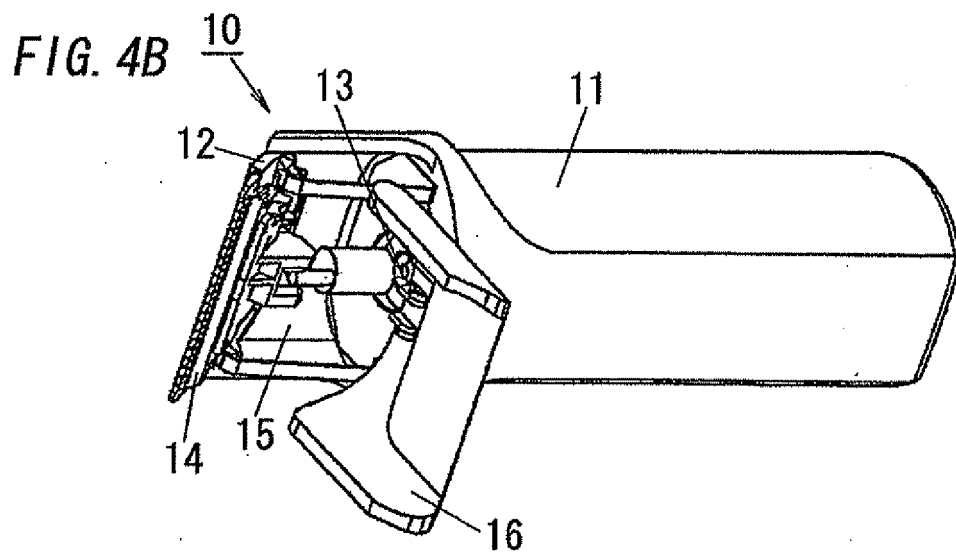
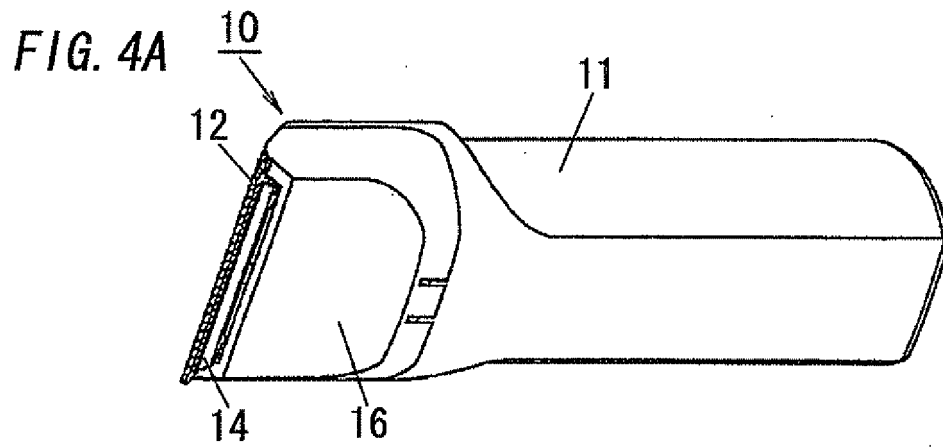
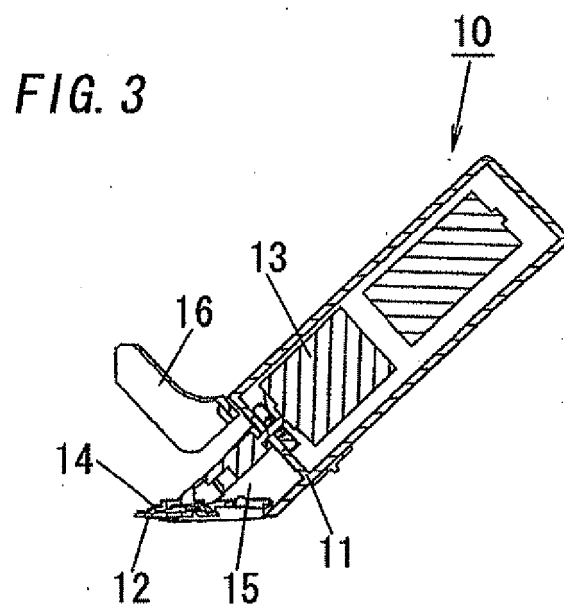


FIG. 2B







EUROPEAN SEARCH REPORT

Application Number
EP 11 18 0421

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 6 076 263 A (ANDIS MATHEW L [US] ET AL) 20 June 2000 (2000-06-20) * column 4, lines 5-41; figures 1-5 * * column 5, lines 22-55 * -----	1,3,6-8	INV. B26B19/06 B26B19/38
X	EP 1 775 079 A1 (MATSUSHITA ELECTRIC WORKS LTD [JP] PANASONIC ELEC WORKS CO LTD [JP]) 18 April 2007 (2007-04-18) * paragraph [0011]; figures 2-4,5A * -----	1,3	
X	WO 2007/044461 A1 (ANDIS CO [US]; TRINGALI RICHARD J [US]; DERBY ROBERT E [US]; GROSS JEF) 19 April 2007 (2007-04-19) * paragraph [0030]; figures 1,2,5A,5B * -----	1	
X	EP 2 177 327 A1 (PAYER INTERNAT TECHNOLOGIES GM [AT]) 21 April 2010 (2010-04-21) * column 1, line 25 - column 2, line 2; claim 1; figures 1,2 * -----	1	
A	US 1 956 042 A (JOHN OSTER) 24 April 1934 (1934-04-24) * page 2, lines 61-64; figures 1-3 * -----	1	TECHNICAL FIELDS SEARCHED (IPC) B26B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 4 January 2012	Examiner Rattenberger, B
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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04-01-2012

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 6076263	A	20-06-2000	NONE	

EP 1775079	A1	18-04-2007	AT 440709 T	15-09-2009
			CN 1947963 A	18-04-2007
			CN 200967208 Y	31-10-2007
			EP 1775079 A1	18-04-2007
			JP 4613785 B2	19-01-2011
			JP 2007105120 A	26-04-2007

WO 2007044461	A1	19-04-2007	US 2008250645 A1	16-10-2008
			WO 2007044461 A1	19-04-2007

EP 2177327	A1	21-04-2010	AT 10839 U1	15-11-2009
			EP 2177327 A1	21-04-2010

US 1956042	A	24-04-1934	NONE	

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- JP 59007906 A [0002]