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(54) **RAZOR HEAD AND RAZOR**

(57) This invention relates to a mechanical razor head (2) for attachment upon a handle (3) comprising a razor head housing (24) that comprises:
at least one of razor blades area (20) having an intended direction of movement (25);
at least one upper roller (21) and at least one lower roller (22) being positioned at the upper and lower sides respectively of the razor head housing (24) and extending laterally to the said direction of movement (25);
whereby, the rotation of one of the rollers (21, 22) is transmitted by at least one drive belt (23) to the other roller (22, 21). The invention also relates to modifications wherein at least one roller (21, 22) is power driven.

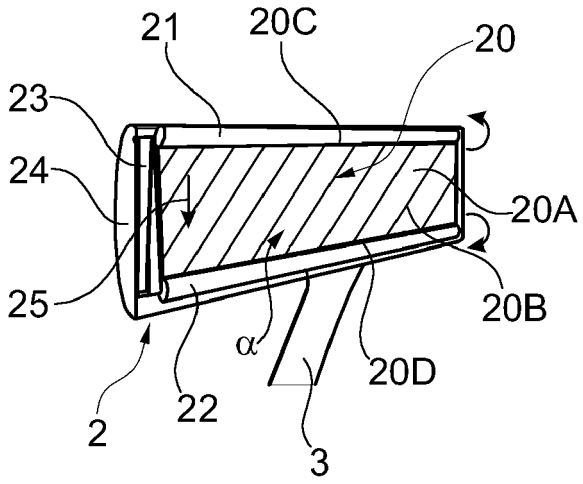

Fig. 2

EP 3 444 084 A1

Description

[0001] The present invention relates to a mechanical razor head for attachment upon a handle comprising a razor head housing that comprises at least one razor blades area having an intended direction of movement; at least one upper roller and at least one lower roller being positioned at the upper and lower sides respectively of the razor head housing and extending laterally to the said direction of movement.

BACKGROUND

[0002] Generally, the hair shaving on human body and specially the beard shaving is done in two ways, wet and dry shaving. When shaving an uneven skin it can be needed to exert an intense pressure on the razor and hence through the razor blade onto the skin causing some cuttings and also making the skin to be irritated. A reduced pressure put to the razor during the shaving avoids cuttings into the skin and in addition decreases the excessive wear of the blades.

[0003] For overcoming this problem two different attempts have been made as explained below. DE 19514228 introduces a method to stretch the skin at the area to be shaved. Two rollers are arranged at both sides of a razor. With the shaving strokes one roller is rolled because of the friction between the roller and the skin. The rotation of the said roller is transmitted to the second roller that is designed to move faster than the first roller. The speed difference of the two rollers and the friction between the rollers and the skin makes the skin to be stretched and making it even. Herewith a better shaving on an even skin is possible. It is to be mentioned that the transmission system for transmitting the rotation of one roller to the other one needs several cylindrical means that makes the construction quite complicated and the razor some voluminous.

[0004] US 6032372, GB 2117304 and DE 3303095 introduce a razor with a plurality of adjacently mounted short blades mounted in the razor head; whereby the blades having a high cutting angle. The high cutting angle has the advantage of an easier hair shaving with a lower pressure to be exerted to the razor. However, the problem with the uneven skin causing a higher pressure to be exerted to the razor is still present.

SUMMARY OF THE INVENTION

[0005] It is an object of the present invention to eliminate or at least minimize the above-mentioned problems, which is achieved by a mechanical razor having a razor housing that is mounted upon a handle; whereby the razor housing has an area of razor blades, two rollers, an upper one and a lower one, being positioned at the upper and lower sides of the razor housing; whereby the rotation of one of the rollers is transmitted to the other roller. The shaving stroke puts one of the rollers for example the upper roller in rotation.

[0006] Thanks to the invention the transmission of the rotation from one roller to the other one is done by a simple drive belt so that the razor becomes a very compact and simple one.

[0007] According to a further aspect of the invention, by twisting the drive belt, it is possible to role the two rollers in two different directions making it easier to stretch the skin and so leveling out the skin folds.

The mentioned easier stretching of the skin lowers the pressure to be exerted to the razor, reduces or removes the skin irritation. It reduces also the wear on the razor blades.

[0008] According to another aspect of the invention the razor has a razor housing with an area of razor blades encompassing a plurality of razor blades with gaps between them, whereby the razor blades are oblique with reference to the razor housing and having high cutting angle.

The high cutting angle has the advantage of an easier hair shaving with a lower pressure to be exerted to the razor.

It avoids cutting into the skin and reduces or removes the skin irritation.

[0009] According to another aspect of the invention the razor has a razor housing with an area of razor blades encompassing a unity razor having a plurality of blade edges with gaps between blade edges, whereby the razor blades are oblique. The unity razor can be a punched and polished foil with a plurality of sharp blade edges.

[0010] According to another aspect of the invention the razor is a powered razor that has only a single roller which is the upper roller, driven by an for example an electrical drive that has an electrical energy source as a battery, an accumulator or an electricity network. It is possible also to use a pneumatic drive with a static pressure as the energy source.

A switch can be employed to turn on and off the drive.

A control system can be used to adjust the needed rotation speed of the roller.

The advantage of the driven roller is that only one roller is enough to provide the skin stretching with a minimum pressure, which is even smaller than needed for the mechanical razor and it works still with some applied shaving lotion.

[0011] According to another aspect of the invention the razor is an electrical razor that has only a single powered roller which is a lower roller, rotating in the direction of the shaving stroke drawing the hair to be cut so that the following razor blades cut the hair very shortly.

[0012] According to another aspect of the invention the rollers of the razor are made of soft polymers with good friction against skin to enable a good stretching with a small pressure exerted to the razor.

[0013] According to another aspect of the invention the razor has a transmission means which can be for example a flexible shaft with a gear means that can be a worm gear having a worm that is connected to one end of the

said transmission means, and a worm wheel connected to the single roller.
This saves weight and space so that the razor becomes light and slender.

[0014] The razor can be used for both wet shaving and dry shaving.

BRIEF DESCRIPTION OF THE FIGURES

[0015] In the following the invention will be described in more detail with reference to the accompanying drawings, in which:

- Fig. 1 shows a perspective view of a mechanical razor with a handle and a razor head,
- Fig. 2 shows a perspective view of the razor head and razor head housing,
- Fig. 3 shows a front view of rollers with a drive belt,
- Fig. 4 shows a front view of rollers with the drive belt twisted,
- Fig. 5 shows a perspective front view of a powered razor with a roller placed at the upper side of the razor head housing,
- Fig. 6 shows a rear view of the powered razor,
- Fig. 7 shows a perspective rear view of the powered razor,
- Fig. 8 shows a perspective front view of the gear means of the powered razor,
- Fig. 9 shows a perspective front view of the powered razor with a roller placed at the lower side of the razor head housing.

DETAILED DESCRIPTION OF THE FIGURES

[0016] In Fig. 1, there is shown a mechanical razor 1 having a razor head 2 mounted upon a handle 3. The razor head 2 has a razor head housing 24 with a razor blades area 20, an upper roller 21 and a lower roller 22 being positioned at the upper and lower sides of the razor head housing 24.

[0017] In Fig. 2, there is shown a detailed view of the razor head 2. A drive belt 23 transmits the rotation of one of the rollers 21, 22 to the other roller 22, 21, wherein one of the rollers 21 (here the upper) is driven by means of friction, i.e. against the skin. In this embodiment, the drive belt 23 is a flat, twisted belt that transmits rotation in an opposite direction of one of the rollers 22 in relation to the driving roller 21, which in this first embodiment is the upper roller 21, when the direction of movement 25 is downwards. The directions of rotation of the rollers 21 and 22 are indicated by arrows. The shaving direction is shown by another arrow for the direction of intended movement 25 of the razor head 2. The razor blades area 20 comprises a plurality of razor blades 20A with gaps 20B between the razor blades 20A. A lower edge 20D of the razor blades area 20, and/or an upper edge 20C of the razor blades area 20, that preferably extend/s perpendicularly in relation to the direction of intended movement 25, may serve as a reference for the definition of the cutting angle α at the razor blades 20A. (However, it does not limit the invention to that preferred embodiment, i.e. the razor blades area 20 may have various shapes, e.g. rhomboid). As shown preferably the rollers 21 and 22 extend perpendicularly in relation to the direction of intended movement 25, i.e. preferably also in parallel with the upper edges and lower edge 20C, 20D of the razor blades area 20.

[0018] In Fig. 2 a lower edge 20D of razor head housing is indicated that serves as reference for the definition of a preferred cutting angle α, that may be inclined. The angle is shown between the lower edge 20D and the cutting edges of the razor blades 20A, which lower edge, in a preferred embodiment, extends perpendicular to the direction of movement 25. The inclined cutting angle α of the razor blades 20A may be between about 30 - 88 degrees preferably 50-88 degrees and more preferred about 80 degrees. The length of the razor blades 20A is preferably about 6-10 mm and the width is preferably about 2-4 mm.

[0019] In Figs. 3 and 4, there are shown schematic views of the rollers 21 and 22, having contact bodies 21A and 22A supported by axles 21C, 22C. The upper roller 21 comprises an axle 21C with support surfaces 21B that function as bearings, imbedded in (preferably integral with) the razor head housing 24. Similarly, the lower roller 22 comprises an axle 22C with a support surfaces 22B that function as bearings. The diameter of contact bodies 21A and 22A of the rollers 21 and 22 are preferably the same and larger than the diameter of the axles 21C and 22C. A contact part of each contact body 21A and 22A will be in contact with the skin during shaving.

[0020] Depending on which one of the rollers 21 and 22 is used as the driving roller and how the belt 23 is arranged to transmit movement to the other roller, one contact body can move in an opposite direction in relation to the direction of movement 25, to thereby assist in stretching the skin.

[0021] In Fig. 3 the belt 23 is taut on drive areas 21D, 22D of the axles 21C and 22C, which according to this embodiment is in the form of the axle surfaces themselves and with different axle diameters, thereby achieving different gear ratios related to axle diameters. Hence, the drive surface of the belt 23 may be flat interacting with flat surfaces 21D, 22D of the axles 21C, 22C. The lower roller 22 will be the driving roll and synchronised with the movement of the razor 1 due to contact with the skin. Thanks to the gear ratio due to the different diameters of the axles 21C, 22C, wherein the diameter of the upper roll 21 is smaller than the diameter of the lower roll 22, the rotation of the upper roll 21 will be faster than the rotation of the lower roll 22. Accordingly, the upper roller 21 will stretch the skin in the area of the razor blade area 20.

[0022] In order to increase friction of the lower roller 22, that is the driving roller, the material of the contact body 22A may be adapted to provide a better grip than

the upper roll 21. Moreover, it is foreseen that if shaving foam is being used there is arranged a removal device (not shown) acting to remove some of the foam to possibly improve the grip of the lower roller 22 against the skin. Another alternative is that no foam is applied beforehand but that a foam applying device (not shown) is arranged between the razorblade area 20 and the lower roller 22.

[0023] In Fig. 4, there is shown the rollers 21, 22 similar to that of Fig. 3, with the difference that the belt 23 is twisted, and also that the diameter of the axles 21C, 22C are the same, i.e. the two rollers 21, 22 may then be identical. However, also with a twisted drive belt 23, different gear ratios may be used, e.g. by means of different axle diameters.

[0024] In the above described embodiments, it is foreseen to possibly employ a plurality of belts, e.g. two belts 23, one on each side of the axles 21C and 22C.

[0025] In the embodiment shown in fig 4 (and also Fig. 2) the upper roller 21 is used as the driving roller. Accordingly, shaving strokes along the skin in the direction of intended movement 25 will put the upper roller 21 in rotation, due to higher friction of the shaved skin area, above upper edge 20C, than the unshaved skin area, below lower edge 20D. The lower roller 22 is then driven by the twisted belt 23 to have the contact part of the contact body 22A moving in the shaving direction 25, which results in the skin to be stretched between the two rollers 21 and 22. An advantage of this embodiment is that the counter rotation of the lower roller 22 against the shaving direction 25 may raise the hair up and making it easier for the following razor blades 20A to cut the hairs. As mentioned above, the diameters of the drive areas 21D, 22D of the axles 21C and 22C can be of the same sizes, but may also be of different sizes if adaption of the rotational speed of the lower roller 22 is desired.

[0026] In an alternative to the embodiment shown in Fig 3, shaving strokes along the skin in the intended shaving direction 25 may also use the upper roller 21 as drive, by having the surface of the upper roller following the skin and the lower rotating slower than the speed of movement 25. Also in this embodiment, the slow rotation of the lower roller 22 against the shaving direction may raise hair up and making it easier for the following razor blades 20A to cut the hairs. This inverted principle is also feasible with the twisted belt 23 as shown in Fig. 4, wherein the lower roller 22 will follow the skin and the contact part of the upper roller 21 rotates slower than the speed of movement 25.

[0027] The contact bodies 21A and 22A may be made in various materials (polymer, metal, etc) and formed in various ways (flat surface, dotted surface, dented surface, etc) that are skin friendly. Preferably the material is in the form of a soft polymer with good friction against skin.

[0028] It is also possible to achieve different gear ratios with axles 21C and 22C having the same diameter, arranged with transmission means (e.g. dented rubber wheels) where the diameter of one drive surface/portion 22D driving the belt 23 is to larger than the other one 21D.

[0029] It is furthermore possible to lay out the belt 23 as a toothed belt. In this case, also the portions 21D and 22D of the upper axle 21C and the lower axle 22C engaging to the toothed belt 23 will be laid out as gearwheels. If different diameter is used for the drive surfaces 21D, 22D the gear wheel associated with the larger surface will then have more teeth than the gearwheel associated with the smaller surface.

[0030] In order to achieve the desired effect of the invention of the mechanical razor head 2 described above, it is necessary to use friction to drive only one of the rollers 21 or 22, which may need different arrangements depending on the shaving conditions. As shown above preferably the upper roller 21 is the driving roller. However, it is also foreseen that any of the rollers 21, 22 may be the driving roller, i.e. forced by the design to enable the shaving stroke to drive either the roller 21 or 22 by contact with the skin to simultaneously transmit rotation to the other roller.

[0031] Generally, shaving can be performed in a dry condition, in a wet condition and / or in a wet condition with application of foam or similar substances.

[0032] When dry shaving the shaving friction against the skin is with regard to the rollers 21 or 22 indifferent, in that case improved function may be achieved by arranging for different frictions coefficients between the skin and the respective roller 21, 22, i.e. to arrange for higher friction at the drive roll 21. This may be achieved by using different materials in the roller having different frictions coefficients, and/or by using a means, e.g. a strip, below the non-driven roller, that adds a friction reducing layer on the skin to reduce friction of the non-driven roller, such a layer may be eliminated or at least reduced by the razor blade area 20, if the upper roller 21 is used as the driving roll.

[0033] When shaving wetly the latter effect will be "arranged for" automatically, i.e. water and/or foam will reduce friction between the skin and the lower roller 22, if the upper roller 21 is driven by the shaving stroke. In this case the razor blades area 20 may wipe a large part of the wetness/foam from the skin so that the following driven roller 21 "automatically" has a better condition regarding the available friction between the skin and the upper roller 21.

[0034] A toothed belt 23 together with engaging dented drive areas 21D, 22D of the upper axle 21C and the lower axle 22C, respectively, may be beneficial to reduce risk of slipping effect of the belt 23.

[0035] According to the embodiments above when shaving, the skin is stretched between the two rollers 21 and 22 enabling improved shaving. It may also avoid cutting into the skin and may reduce skin irritation.

[0036] In Fig. 5, 6 and 7, there is shown a powered razor 1 as a first modification to the mechanical razor of Figures 1 and 2, wherein merely one powered roller 21, 22 is used. The powered razor 1 preferably is an electrical

razor. The razor 1 has a razor head 2, with a razor head housing 24 that is mounted upon a handle 3. The razor head housing 24 comprises a razor blades area 20 and a roller 21 at the upper side of razor head housing 24, i. e. above razor blades area 20 in relation to direction of movement 25. The rotation direction of the roller 21 is indicated by an arrow in Fig. 5. A lower friction strip 122F may be arranged at the lower part of the razor head housing 24.

[0037] In Fig. 6, there is shown a rear view of a powered razor 1 of first modification, schematically disclosing that a drive 123 and an energy source 124 are integrated in the handle 3. The handle 3 further encompasses a transmission means 125 that together with the drive 123 are supported by a support member 103 in the handle 3. The transmission 125 comprises a hose 125H, preferably flexible, and a flexible shaft 125S that extends in a curved manner (see Figures 7 and 8), that transfers rotation from the drive 123 to the top of the handle 3. A worm gear 126 transfers movement to the single roller 121 by means of having a worm wheel 125W at the end of the flexible shaft 125S as explained more in detail in relation to Fig. 8 below.

[0038] The drive 123 can be an electrical drive powered by the energy source 124 that can be a battery, an accumulator and/or an electricity network. The electrical energy 124 can be turned on or out by means of a switch 127. A control system (not shown) can be used to adjust the needed rotation speed of the roller. The drive 123 can be a pneumatic drive with a static pressure as the energy source 124.

[0039] In a preferred embodiment of the electrical razor 1 of the first modification (Fig. 5, 6 and 7) it comprises only an upper roller 21 at the upper side of the razor head housing 24 and preferably a lower friction strip 122F that is arranged at the lower part of the razor head housing 24. The contact body 21A of the roller 21 and the lower friction strip 122F may be made of skin friendly, soft polymers with good friction against skin. When turning on the switch 127 (Fig. 6) the transmission means 125 is powered to put the flexible shaft 125S and thereby the worm wheel 125W into rotation that on its part rotates the upper roller 21, providing the roller 21 with a rotation in a direction to stretch the skin in a direction against the shaving direction 25. Accordingly, during the shaving procedure the skin is stretched between the roller 21 and the parts below of the razor housing 24, e.g. including a friction strip 122F, resulting in improved shaving result. It may also eliminate cutting into the skin and reduce skin irritation. Further, it may allow the pressure exerted to the razor and thus to the skin to be reduced.

[0040] In Fig. 8, there is shown a perspective detailed view of part of the transmission of a powered razor 1 according to the first modification of the invention. The roller 21 has a mid-section 121M, having a smaller diameter than the roller parts. The mid-section 121M is provided with dents 121W adapted to be driven by the worm wheel 125W of the transmission 126. The worm wheel 125W is positioned at the top of the transmission shaft 125S that extends within the transmission housing 125H within the handle. When turning on the switch 127 (see Fig. 6) the transmission means 125 is powered to put the roller 21 into rotation. The midsection 121M is covered by a bridge 24A of the housing 24 preventing the transmission 126 to be in contact with the skin to be shaved.

[0041] In Fig. 9, there is shown a second embodiment of powered razor 1 according to the first modification. A lower roller 22 is positioned at the lower side of the razor head housing 24 and an upper friction strip 121F may be positioned at the upper side of the razor head housing 24. The rotation direction of the single roller 22 is indicated by an arrow. The roller 22 and the upper friction strip 121F are preferably made of skin friendly, soft polymers with good friction against skin. When turning on the switch 127 (see Fig. 6) the transmission means 125 is powered to put the lower roller 22 into rotation. The lower roller 22 will rotate to stretch the skin in the same direction as that 125 of shaving direction. Accordingly, in this embodiment during shaving the skin is stretched between the roller 22 and the upper part of the shaving head 2, providing basically the same function as described above.

[0042] An advantage of the embodiments of the first modification shown in Fig. 5-7 and 9 is that only one roller is needed to provide the skin stretching, which is less than needed for the mechanical razor and it may work well despite some applied shaving foam because the razor blades area 20 will wipe the foam away so that the following roller 21 has good friction with the skin.

[0043] In a second modification of the invention the powered razor 1 (not shown) comprises an arrangement, wherein both rollers 21 and 22 are power driven. This may be achieved according to a first embodiment of the second modification by a combination of the embodiments of what is shown in Figures 1, 2 and Figures 5-9; i.e. by providing powered rotation to one roller 21, 22 and having a belt 23 (or more) transferring rotation to the other roller.

[0044] According to a second embodiment of the second modification both rollers 21, 22 may be directly driven by the flexible shaft 125S.

[0045] In a first alternative, according to this second embodiment of the second modification the transmission means 126 comprises an upper worm wheel 125W that rotates an upper worm wheel 121W associated with the upper roller 21, as presented in Fig 7. Further, there is a lower worm wheel (not shown, but basically the same principle as above) at a lower location of the flexible shaft 125S, that rotates the lower roller 22 in a direction opposite to the upper roller, as indicated in Fig 2, i.e. the lower roller 22 having a rotation stretching the skin in the same direction as the shaving direction 25 and the upper roller 21 stretching in an opposite direction. In this first alternative the shaft 125S is arranged with a worm 125W having two parts. One part is left threaded and the other part is right threaded (not shown). When turning on the switch

127 (Fig. 6) the shaft 125S is powered to put the worms into rotation that on its part rotates the upper worm wheel 121W associated with the upper roller 21 by the means of the left threads and the lower worm wheel (not shown) associated with the lower roller 22 by the means of the right threads. Accordingly, during the shaving procedure, the skin is stretched between the faster upper roller 21 and the slower lower roller 22 allowing the pressure exerted to the razor and thus to the skin to be reduced.

[0046] In a second alternative, of the second embodiment of the second modification, the two rollers 21, 22 may be powered to rotate in the same direction but with different rotational speeds by means of the same worm 125W at the shaft 125S. For example, the lower worm wheel 22 (not shown) may be arranged to rotate at a speed appropriate for movement of the razor head 2, i. e. possibly controlling the speed of movement by pushing in the intended direction of movement 125, and having the upper roller 21 rotating substantially faster. This may be achieved by having different gear ratios in relation to the rollers 21, 22, e.g. more teeth driving the lower roller 22 than at the upper worm wheel 121W. Hence, the transmission ratio makes the upper roller 21 rotating faster than the lower roller 22.

[0047] Also in the first alternative, different gear ratios may be used, e.g. the second thread may have a smaller thread gradient than the upper so that the lower worm wheel and hence the lower roller 22 rotates more slowly than the upper roller 21.

[0048] The invention is not limited to what has been described above, but may be varied within the scope of the appended claims. It is evident for the skilled person, for example, the razor blades area 20 may be designed in various ways, i.e. that the design thereof is not essential to achieve the basic function of the invention, e.g. preferably a plurality of separate blades are arranged in a desired pattern (as shown and described above) or the razor blades area 20 may be in the form of a unity razor blade having a plurality of blade edges with gaps 20B between blade edges, having punched blade foils with sharp blade edges. Moreover, it is evident for the skilled person, that further combinations of the embodiments described above may be used to adapt the basic function to different needs/desires. With the above mentioned features of the invention a plurality of basic embodiments are disclosed that serve in the following to design some further embodiments that are combinations thereof.

[0049] As is evident for the skilled person from what has been described above a number of various combinations are feasible to achieve the desired function and it is evident for the skilled person that a large variety of materials and shapes may be used to adapt to different desires, which adaptations fall within the ambit of the invention.

DRAWING REFERENCE NUMERALS

[0050]

1	razor
2	razor head
3	handle
20	razor blades area
20A	razor blades
20B	gap between two razor blades
20C	upper edge of razor head housing
20D	lower edge of razor head housing
21	upper roller
21A	contact body of upper roller
21B	support surface axle of upper roller
21C	axle of upper roller
21D	drive areas of upper roller
22	lower roller
22A	contact body of lower roller
22B	support surface axle of lower roller
22C	axle of lower roller
22D	drive area of lower roller
23	drive belt (Twisted flat belt drive)
24	razor head housing
24A	bridge of the housing 24
25	direction of movement
103	support member
121F	upper friction strip
121M	midsection
121W	(upper) worm wheel
122F	lower friction strip
123	drive
124	energy source
125S	transmission means, shaft
125H	transmission housing
125W	worm
126	gear means
127	switch
α	cutting angle

Claims

1. A mechanical razor head (2) for attachment upon a handle (3) comprising a razor head housing (24) that comprises:

at least one razor blades area (20) having an intended direction of movement (25);
at least one upper roller (21) and at least one lower roller (22) being positioned at the upper and lower sides respectively of the razor head housing (24) and extending laterally to the said direction of movement (25);
characterized in that,
the rotation of one of the rollers (21, 22) is transmitted by at least one drive belt (23) to the other roller (22, 21).

2. The razor head (2) according to claim 1,
characterized in that,
the at least one drive belt (23) is twisted.

3. The razor head (2) according to claims 1 or 2, **characterized in that,** the upper roller (21) having an axle (21C) and the lower roller (22) having an axle (22C), wherein the said axles (21C, 22C) have support surfaces (21B, 22B) arranged to provide rotational support within the said razor head housing (24) and drive surfaces (21D, 22D) arranged to transmit torque via said drive belt (23).

4. The razor head (2) according to claim 3, **characterized in that,** the diameter of one of said drive surfaces (21D, 22D) of one of the axles (21C, 22C) is larger than the diameter of the drive surface (22D, 21D) of the other axle (22C, 21C), wherein preferably axles (21C, 22C) of different diameter is being used.

5. The razor head (2) according to claim 4, **characterized in that,** the at least one drive belt (23) is straight, i.e. untwisted.

6. A razor (1) comprising:

razor head (2) that is mounted upon a handle (3); wherein the razor head (2) comprises a razor blades area (20) having an extended direction of movement (25) and at least one roller (21, 22) at one side of the razor blades area (20), the handle (3) comprising a drive (123), a transmission means (125), a gear means (126) connected to the transmission means (125) and an energy source (124);
whereby the transmission means (125) and the gear means (126) are driven by the drive (123) arranged to rotate the at least one roller (21), **characterized in that,**
said at least one roller (21, 22) is arranged at the upper side (20C) of the said razor blades area (20), to cause stretching of skin in contact with the said razor blades area (20).

7. The razor according to claim 6, **characterized in that,** the transmission means (125) is in the form of a flexible shaft (125S) positioned in a transmission housing (125H).

8. The razor according to claim 6 or 7, **characterized in that,** merely one roller (21, 22) is arranged along one side of the razor blades area (20).

9. The razor according to any of claims 6-7, **characterized in that,** the gear means (126) comprises a worm (125W) that is engaged with a worm wheel (121W) of said at least one roller (21,22).

10. The razor according to claim 9, **characterized by,** a second worm wheel (122W) associated with the other roller (22);
whereby the different gear ratios are provided by the worm wheels (121W, 122W), preferably by means of having different pitch of the worm wheels (121W, 122W).

11. The razor (1) according to claim 9, **characterized by,** the worm (125W) comprising one part being left threaded and the other part right threaded;
whereby an upper worm wheel (121W) is engaged with the left thread and a lower worm wheel (122W) is engaged with the right thread, wherein preferably the gear ratio of the upper worm wheel (121W) is equal to the number of teeth of the lower worm wheel (122W).

12. The razor (1) according to any of the claims 6 to 10, **characterized in that,** the razor (1) is an electrical razor, the drive (123) is an electrical drive and the energy source (124) is an electrical energy source as a battery, an accumulator and/or an electricity network.

13. The razor head (2) or razor (1) according to any of the preceding claims, **characterized in that,** the length of the razor blades (20A) are about 1 - 10 mm, preferably 4 - 6 mm and more preferred about 5 mm and the width of the razor blades (20A) is about 1-5 mm.

14. The razor head (2) or razor (1) according to any of the preceding claims, **characterized by,** the razor blades area (20) comprising a plurality of razor blades (20A) with gaps (20B) between the razor blades (20A), wherein said gaps (20B) extend a cutting angle (α) in relation to the lower edge (20D) of the razor head housing (24) of about 25 degrees to about 88 degrees, preferably 50-85 degrees and more preferred about 75-80 degrees.

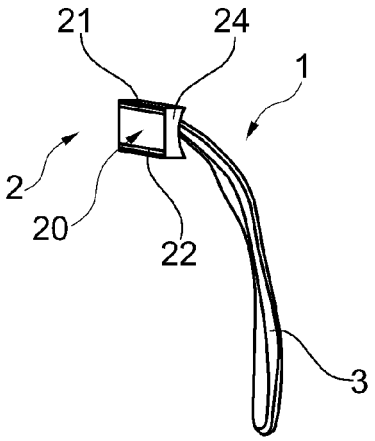

Fig. 1

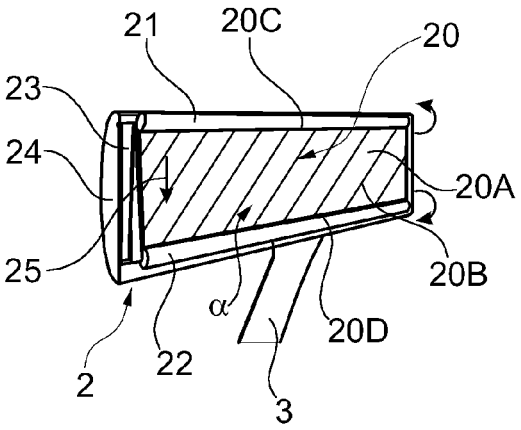

Fig. 2

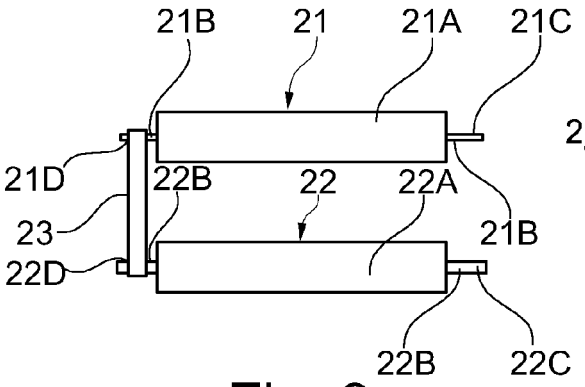

Fig. 3

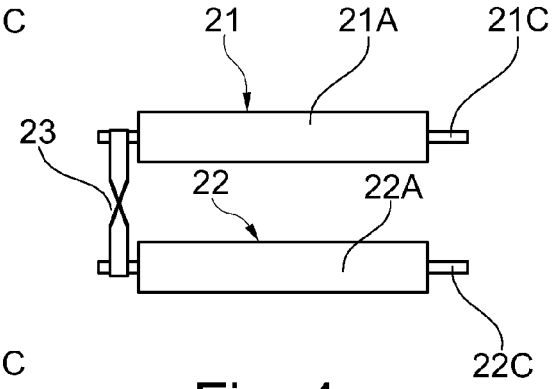

Fig. 4

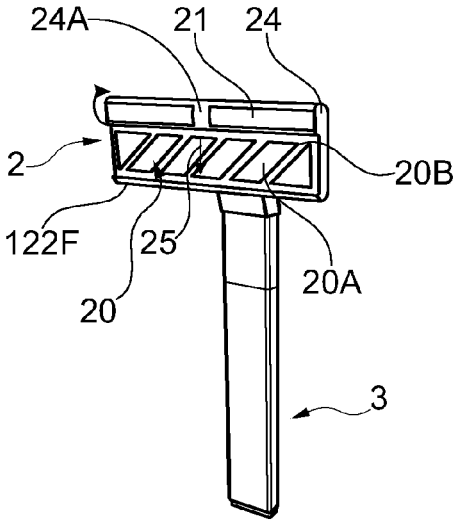

Fig. 5

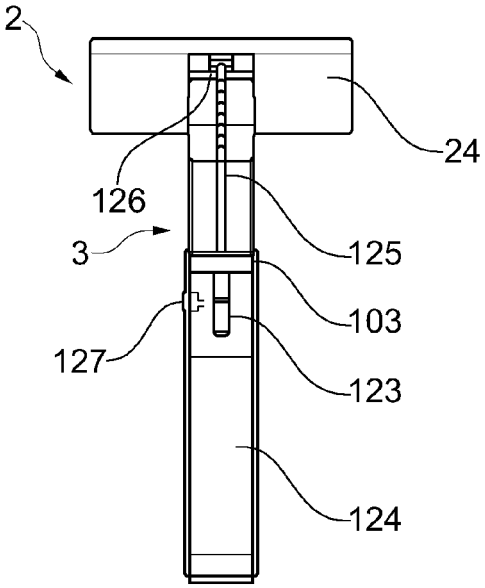

Fig. 6

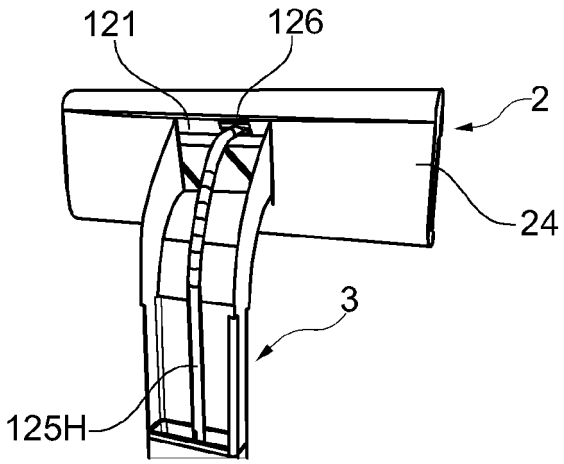

Fig. 7

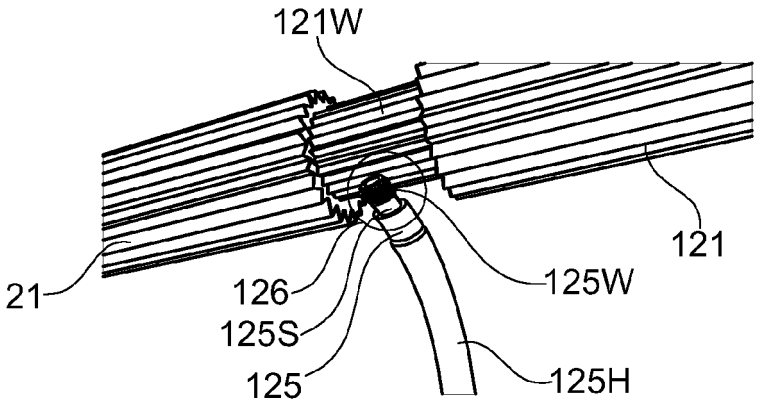

Fig. 8

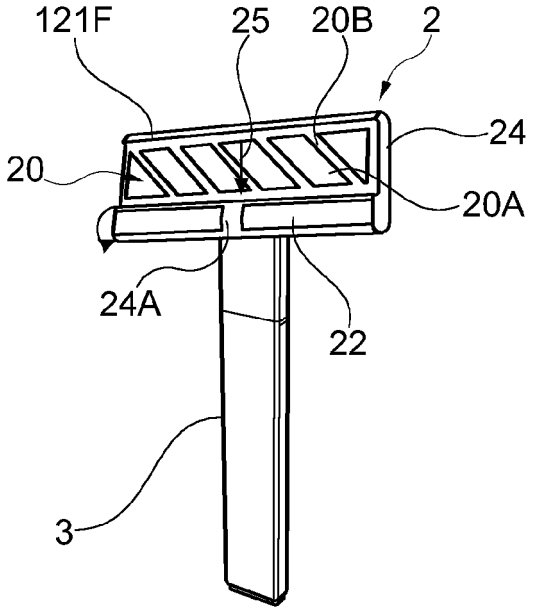

Fig. 9

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EUROPEAN SEARCH REPORT

Application Number
EP 18 18 9606

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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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	12 December 2018	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

EPO FORM 1503 03.82 (P04C01)

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Application Number
EP 18 18 9606

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☒ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).

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LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 18 18 9606

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-14

A mechanical razor head comprising inter alia at least one upper roller and at least one lower roller being positioned at the upper and lower sides respectively of the razor head housing, wherein the rotation of one of the rollers is transmitted by at least one drive belt to the other roller.

1.1. claims: 6-14

A razor comprising a razor head that is mounted upon a handle, wherein the razor head comprises a razor blades area having an extended direction of movement and at least one roller at the upper side of the razor blades area, the handle comprising a drive, a transmission means, a gear means connected to the transmission means and an energy source, whereby the transmission means and the gear means are driven by the drive arranged to rotate the at least one roller.

Please note that all inventions mentioned under item 1, although not necessarily linked by a common inventive concept, could be searched without effort justifying an additional fee.

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 18 18 9606

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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12-12-2018

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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