Dec. 3, 1968 K. BAUMANN 3,413,718

DRY ELECTRIC RAZOR WITH SHORT AND LONG HAIR CUTTERS

Filed Feb. 28, 1967 2 Sheets-Sheet 1

FIG. 1

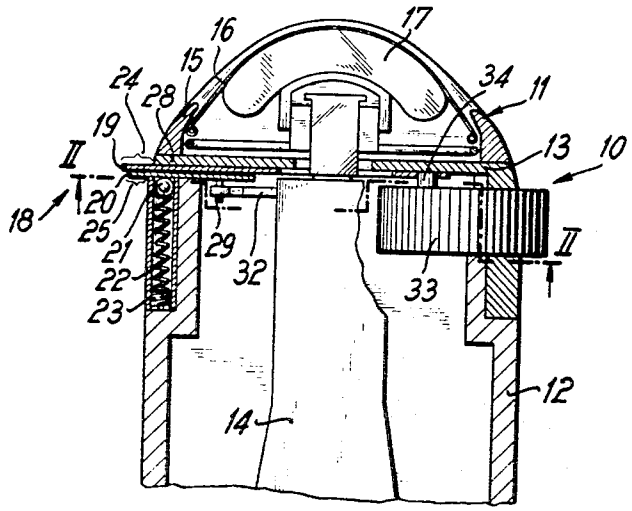
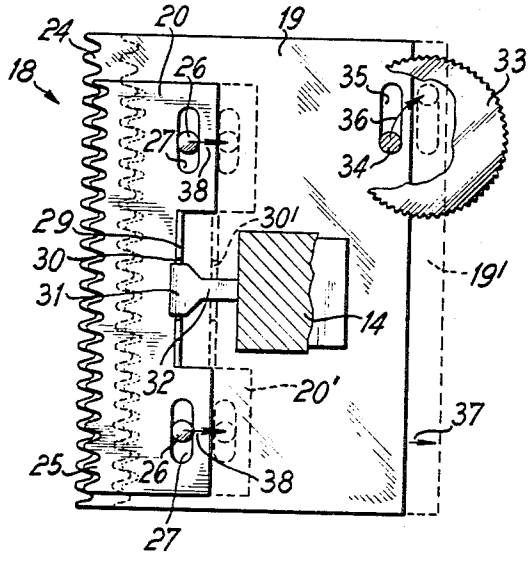


FIG. 2



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DRY ELECTRIC RAZOR WITH SHORT AND LONG HAIR CUTTERS

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FIG. 3

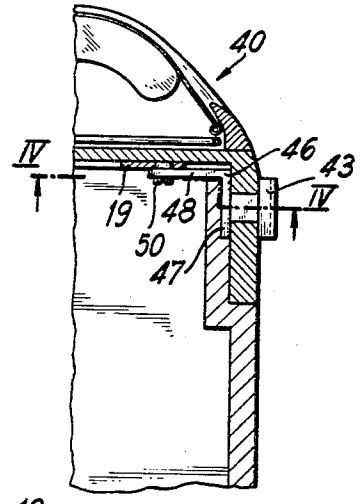
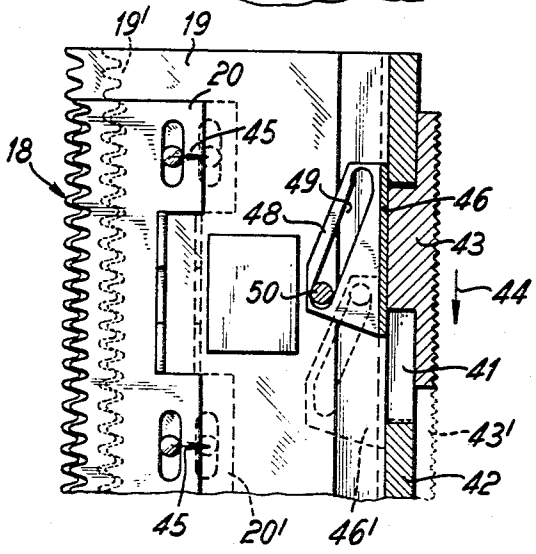


FIG. 4



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DRY ELECTRIC RAZOR WITH SHORT AND LONG HAIR CUTTERS

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7 Claims. (Cl. 30—34.1)

ABSTRACT OF THE DISCLOSURE

A dry electric razor having reciprocating type short and long hair cutters, the long hair cutter being positioned laterally and obliquely with respect to the short hair cutter and being extendable for use and retractable when not required and also being disconnected from the oscillating drive of the shaver when in the retracted position.

The invention relates to a dry electric razor.

In order to simplify the mechanism in certain razors that have been proposed, the parts used for cutting long hair are arranged near those for cutting short hair. In known electric razors of the above type the curved short hair cutter is arranged on a narrow side of the housing and the cutting surfaces of the long hair cutter near them and substantially parallel with the longitudinal axis of the housing.

One disadvantage of known razors is that when the long hair cutter is in its effective position its extended cutting surfaces are substantially parallel with the adjacent area of the cutting surfaces of the short hair cutter. Thus, when the long hair cutter is being used to cut hairs in a certain position, the short hair cutter often tends undesirably to engage and cut other hairs in another position. For instance, if the cutting surfaces of the short hair cutter are arranged parallel with and behind those of the long hair cutter, hairs located above where the long hair cutter is working, which should not in fact be shaved, may come accidentally into contact with the cutting surfaces of the short hair cutter. The long hair cutter is specifically designed to make clean cuts, so that if the short hair cutter also comes into action the resulting shave is incorrect and unpleasing. Great skill and extremely careful handling of the razor must be applied if such incorrect shaving in the region of the short hair cutter is to be avoided when using the long hair cutter.

Another serious disadvantage is that the short hair cutter has to be relatively narrow in order to leave room in the razor for the long hair cutter which is arranged beside it and parallel with the longitudinal axis of the housing. A final drawback is that a razor of this type is very tricky to handle when the long hair cutter is in use.

These disadvantages are overcome or substantially mitigated by the present invention. The problem underlying the invention is how to arrange the long hair cutter, which can be extended from the razor, in such a way that it can be used without being impeded by the short hair cutter so that the razor is easier to handle.

According to the invention there is provided a dry electric razor comprising a housing, a reciprocating type short hair cutter, a reciprocating type long hair cutter constituted by a comb blade having a cutting blade mounted thereon and reciprocable with respect thereto, means for extending and retracting said long hair cutter respectively out of said housing to a working position and into said housing to a non-working position, an oscillating electric motor, and means for transmitting oscillations of said motor to said short hair cutter and to said long hair cutter when it is in the working position, the said long hair cutter being positioned laterally of said short hair cutter and obliquely with respect to an adjacent portion of the short hair cutter.

According to the invention there is also provided a dry electric razor comprising a housing, a short hair cutter, a long hair cutter constituted by two blades arranged laterally of said short hair cutter and adapted to be brought into action and put out of action as required, the blades of the said long hair cutter being brought out of the housing of the razor when the long hair cutter is in a working position and withdrawn into the housing when the long hair cutter is in a nonworking position, in which the blades of the long hair cutter, which are moved out of the housing when the cutter is in its working position, are arranged at a sharp angle and in particular obliquely to the adjacent area of a cutting surface of the short hair cutter. With such arrangements the cutting surfaces of the long hair cutter may be arranged to point, when it has been brought out of the housing, in a different direction from that of the short hair cutter. Hairs projecting over the place where the long hair cutter is at work are therefore less likely to be engaged by the cutting surfaces of the short hair cutter.

In a specific embodiment of the invention, where the short hair cutting portions are arranged at the narrow end of an elongated housing, this can be achieved if the cutting surfaces of the long hair cutter are arranged substantially transversely to the longitudinal axis of the housing when extended from the housing and if they can be retracted into the housing in this transverse direction when moving into the ineffective position. With the extensible cutting surfaces in this oblique arrangement the razor can be held particularly comfortably in the hand when using the long hair cutter, so shaving can be carried out in comfort without any hindrance from the short hair cutter. Now with the long hair cutter thus positioned transversely of the housing, the whole width of the narrow side of the housing is available for the cutting surfaces of the short hair cutter.

Dry razors have been proposed in which the cutting surfaces of a long hair cutter are arranged stationary in a transverse direction and immovably mounted on a housing top which can be removed from the main housing of the razor. The top may be placed on the main housing in either of two positions 180° away from each other. In one arrangement of the top, the cutting portions are connected to the drive for the razor. In the other arrangement there is no connection with the drive. However, these dry razors have the disadvantage that the long hair cutter projects from the housing even when it is not in use. Hence injuries can easily be caused by the sharp edges of said cutter. This is particularly important when shaving with the short hair cutter since this is as already mentioned—generally arranged near the long hair cutter. This disadvantage is overcome in the embodiments specifically described herein by making the long hair cutter retractable. When the long hair cutter is not in use the razor has a clean outline.

The long hair cutter advantageously comprises a cutting comb, which is at rest during the shaving process, and a reciprocable cutting blade mounted thereon. A particularly simple method of mounting the long hair cutter in the housing of a razor according to the invention is to arrange the short-like comb blade on and in sliding contact with a base plate which shuts off the top of the housing from the main housing. No extra housing member is required to mount the long hair cutter in the housing, since the base plate is provided in any case to separate the top from the main housing.

It is advisable for the cutting blade to be pressed against the comb in the direction of the base plate by spring loaded balls. The sliding movement of the balls along the

blade results in quiet, easy movement and minimises wear.

The long hair cutter may be adjusted by an actuating member engaging the comb blade. As the cutting blade is attached only to the comb blade, displacement of the latter by means of the actuating member will cause the cutting blade to make the desired adjustment between the working and non-working position of the long hair cutter. As the comb blade of the long hair cutter is at rest even during the cutting process, the long hair cutter can easily be displaced even with the motor running.

The action of the actuating member on the comb blade to adjust the long hair cutter may be produced by various control means. One method found desirable is to construct the actuating member in the form of a rotary knob provided with an eccentric guiding pin and engaging in a guiding groove in the comb blade. When the knob is turned the pin slides within the groove and forces the comb blade, and therefore the cutting blade, to make the desired displacement.

It has equally been found desirable to make the actuating member in the form of a sliding knob with a guiding groove engaged by the guiding pin attached to the comb blade. This control means can be recommended particularly if it is desired to use the knob also to open the top of the housing. If the guiding groove and the recesses in the guiding members connected to the sliding knob are suitably shaped, the means locking the top of the housing can easily be released.

Finally it is advisable for the long hair cutter to be coupled with the drive of the razor only when extended and for it to be uncoupled when in the retracted position. This avoids any unnecessary expenditure of energy by the long hair cutter when in its non-working position and any premature wear on its components. Uncoupling brings the long hair cutter to rest in its non-working position.

Automatic coupling and uncoupling when extending or retracting the long hair cutter is achieved, in the embodiment specifically described herein, by using a coupling in which a coupling pin attached to an oscillating lever of an oscillating armature motor acting as the drive has a thickened portion at its free end, and in which the cutting blade has a coupling recess matching the size of the thickened portion and engaging about the coupling pin. In the extended position the coupling recess in the cutting blade automatically comes into contact with the thickened portion of the pin, thus transmitting the movement of the oscillating lever to the cutting blade. If, on the other hand, the long hair cutter is retracted into the housing, the coupling recess in the cutting blade will come to rest in the region of the narrow, central portion of the pin. In this way the oscillating movement of the lever will not be transmitted to the cutting blade, so in this latter position the cutting blade will be at rest although the motor is running.

Two examples of the invention will now be particularly described with reference to the accompanying drawings, in which:

FIGURE 1 is a longitudinal section through the upper part of a dry electric razor according to the invention, some portions being shown cut away,

FIGURE 2 is a section along the line II—II in FIG. 1, looking towards the uppermost part of the razor, with some portions shown cut away,

FIGURE 3 is a similar view to that of FIG. 1 of a different embodiment of a razor according to the invention, with unimportant parts omitted, and

FIGURE 4 is a section along the line IV—IV in FIG. 3 with unimportant parts omitted.

The upper part of a razor **10** shown in FIG. 1 comprises a housing top part **11** and a main housing **12**, separated from one another by a base plate **13**.

The main housing **12** includes an electric drive, of which only oscillating lever **14** of an oscillating armature motor (not shown) can be seen in the drawing. This lever **14** extends through an aperture in the base plate **13** into the interior of the housing top part **11**. The top part **11** consists of a hinged frame **15** carrying a perforated foil **16**. Inside the top part **11** is a blade block **17**. The foil **16** and blade block **17** are the parts of the razor responsible for cutting short hair.

Transversely to the length of the housing is a cutter **18** for long hair. Its cutting parts consists of a comb blade **19** which is stationary during the shaving process and a cutting blade **20** which is reciprocated for shaving. The comb blade **19** lies against the underside of the base plate **13**. The cutting blade **20** is kept pressed against the comb blade **19** in the direction of the plate **13** by a plurality of spring loaded balls **21**.

The balls **21** are loaded by helical springs **22** supported on adjustable bearings **23**. The bearings **23** are in the form of short screw threaded pins enabling the desired tension to be set for the springs **22**.

The relatively narrow cutting surfaces **24**, **25** of the comb blade **19** and cutting blade **20** project from the housing **12** of the razor through a slot **28**. Two guiding pins **26** are attached to the comb blade **19**, each engaging in a slot **27** in the cutting blade **20**. The cutting blade **20** is thus mounted solely on the comb blade **19**, with which it forms a unit.

The end of the cutting blade **20** inside the housing has an angled portion **29** extending over part of its width and containing a coupling recess **30**. The recess **30** is engaged by a thickened portion **31** at the free end of a coupling pin **32** fixed to the side of the lever **14**. In operation, the movement of the lever **14** is transmitted by way of the thickened portion **31** of the pin **32** to the side walls of the coupling recess **30**, thereby giving the cutting blade **20** its reciprocating movement.

At the side of the housing opposite the projecting cutting surfaces **24**, **25** of the long hair cutter **18** is an actuating member for moving the long hair cutter **18** out of its working position, shown in FIG. 1, into a retracted, non-working position, shown in dotted lines in FIG. 2.

In the embodiment in FIGS. 1 and 2 the actuating member is in the form of a rotary knob **33**. The knob **33** has a guiding pin **34** mounted eccentrically from its centre of rotation and engaging in a slot **35** in the comb blade **19**.

In the extended, working position of the long hair cutter **18**, shown in solid lines in FIG. 2, the pin **34** is in the lower end of the slot **35**. In this position it is just slightly beyond the dead centre position defined by a plumb line through the axis of the knob **33** longitudinally of the slot **35**. In this way the long hair cutter **18** cannot accidentally be pushed into the housing from its extended position by forces tending to slide it.

The long hair cutter **18** is moved from its extended position into the retracted position, shown in dotted lines in FIG. 2, by turning the knob **33** in the direction of arrow **36**. When the cutter **18** is thus retracted the pin **34** is in the top end of the slot **35**. The rotation of the knot causes the comb blade **19** to move in the direction of arrow **37** into position **19'**, shown in dotted lines in FIG. 2. As already mentioned, the cutting blade **20** is fixed to the comb blade **19** only by means of the slot **27** and guiding pins **26**, so it undergoes equal displacement in the direction of arrows **38** during this inward movement of the comb. The cutting blade **20** finally reaches position **20'**, shown in dotted lines in FIG. 2.

Furthermore, when the long hair cutter is in the retracted position, as shown in dotted lines in FIG. 2, coupling recess **30'** of cutting blade **20'** is located outside the thickened portion **31** at the end of the coupling pin **32**, substantially midway along the latter. As the pin **32** is thinner here than at the end, its oscillating movement emanating from the lever **14** is not transmitted to the cutting blade **20'**. In the retracted position the cutting blade **20'** will therefore be at rest although the motor is still running.

FIGS. 3 and 4 show a further example of a razor **40**. Unimportant parts have been omitted for the sake of

clarity. Components identical with those in the first example carry the same references.

In the second example the actuating member controlling the displacement of the long hair cutter **18** is in the form of a sliding knob **43** engaging in a slot **41** in the housing **42**. When the long hair cutter **18** is in the extended, working position, which is shown in full lines in FIG. 4, the knob **43** is in the top end of the slot **41**. When the long hair cutter **18** is in its retracted, non-working position, as shown in dotted lines in FIG. 4, the knob shown in dotted lines and indicated by reference **43'** is in the lower end of the slot **41**.

The abovementioned movement of the sliding knob **43** in the direction of arrow **44** in FIG. 4 is translated into a movement of the cutter **18** at right angles thereto in the direction of arrow **45** by means of a transfer member **46**. The member **46** has an angular shape and one of its two limbs, that is the limb **47**, is attached to the knob **43**. The other limb **48** contains a guiding slot **49** extending obliquely to the direction of the arrow **44** in its central portion. A guiding pin **50** fixed to the comb blade **19** engages through the slot **49**.

When the cutter **18** is extended the guiding pin **50** is in the lower end of the slot **49**, as illustrated in the full line position of the members in FIG. 4; when the cutter **18** is retracted, on the other hand, the pin **50** is in the top end of the solt **49** as illustrated in the dotted line position of the members in FIG. 4. In the retracted condition the transfer member assumes a position **46'**, shown in dotted lines in FIG. 4; the blade moves into position **20'** and the comb into position **19'**. In order to prevent any force acting on the long hair cutter **19** in the direction of arrow **45** from inadvertently moving the cutter out of its extended position into its retracted position, the ends of the slot **49** are substantially perpendicular to this direction.

It is advisable for the same actuating member as adjusts the long hair cutter to be used for opening the top **11** of the housing. In the case of the sliding knob in FIGS. 3 and 4 this could be done, for example, by providing apertures (not shown) in the limb of the transfer member **46** acting as a fastening; the apertures would then secure a closing pin to the top of the housing in the two positions of the sliding knob shown in FIG. 4. However, if the knob is slid in the opposite direction to that required to initiate the movement of the long hair cutter—for which purpose the slots **41** and **49** for the knob **43** and pin **50** would have to be extended beyond the length shown in FIG. 4—and if the apertures in the limb **47** of the transfer member **46** are suitably shaped. The closing pin at the top of the housing, which is usually under spring tension from the blade block, opens automatically.

In this last case—starting from the extended, working position of the long hair cutter—the cutter is moved into its non-working, retracted position by moving the knob **43** in one direction **44**, whereas if the knob **43** is moved in the opposite direction the top of the housing will be opened for cleaning purposes. This keeps down the number of operating parts in the razor and simplifies their construction.

It is further advisable to provide a notch to mark the central position of the sliding knob **43** so as to show whether the long hair cutter **18** is exactly in its extended position. For the same reason it is recommended to provide the sliding knob **43** with a spring which will automatically urge said knob back out of the position for opening the top of the housing into its central position. The various functions could be assigned differently to the abovementioned positions of the sliding knob **43** and all that this would involve would be appropriate adaption of the guiding slot and recesses.

I claim:

1. A dry electric razor comprising, in combination, housing means; a transverse plate extending through said housing means and dividing the latter into a main housing part and a top part, said main housing part being formed with a slot adjacent and substantially parallel to said transverse plate; a reciprocating short hair cutter in said top part and having a plane of symmetry substantially normal to said transverse plate; a reciprocating long hair cutter including a comb blade and a cutting blade mounted thereon arranged in said main housing part substantially parallel to said plate and extendable through said slot to a working position projecting laterally from said main housing part and retractable through said slot to a nonworking position in said main housing part; means cooperating with said long hair cutter for moving the same between said position thereof; and oscillating means for transmitting reciprocation to said short hair cutter and to said long hair cutter when the latter is in said working position.

2. An electric razor as defined in claim **1**, wherein said comb blade of said long hair cutter abuts with one of the main faces thereof against said transverse plate.

3. An electric razor as difined in claim **2**, wherein said cutting blade of said long hair cutter abuts with one of the main faces thereof against the other main face of said comb blade, and including resilient means engaging the other of the main faces of said cutting blade for pressing the latter in direction toward that transverse plate.

4. An electric razor as defined in claim **3**, wherein said resilient means includes at least one coil spring and a ball seated at one end of said coil spring and pressed by the latter in engagement with said cutting blade.

5. An electric razor as defined in claim **1**, wherein said means for moving said long hair cutter comprises a knob turnably mounted in said housing means about an axis substantially normal to said blades of the long hair cutter and a pin fixed to said knob eccentrically with respect to said axis and engaging in a slot formed in said comb blade.

6. An electric razor as defined in claim **1**, wherein said means for moving said long hair cutter comprises an actuating member mounted in said housing means for movement in direction of a longitudinal edge of said comb blade and being formed with a groove inclined to said direction of movement, and a pin fixed to said comb blade and projecting into said groove.

7. An electric razor as defined in claim **1**, wherein said oscillating means comprises an oscillating lever of an oscillating armature motor, a coupling pin fixed to at one end and having a thickened portion at its free end, said cutting blade of said long hair cutter having a coupling recess of a complementary size to that of said thickened portion and is engageable with the latter in said active postion of said long hair cutter.

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