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ELECTRIC RAZOR PIVOTALLY MOUNTED IN AN OUTER CASING

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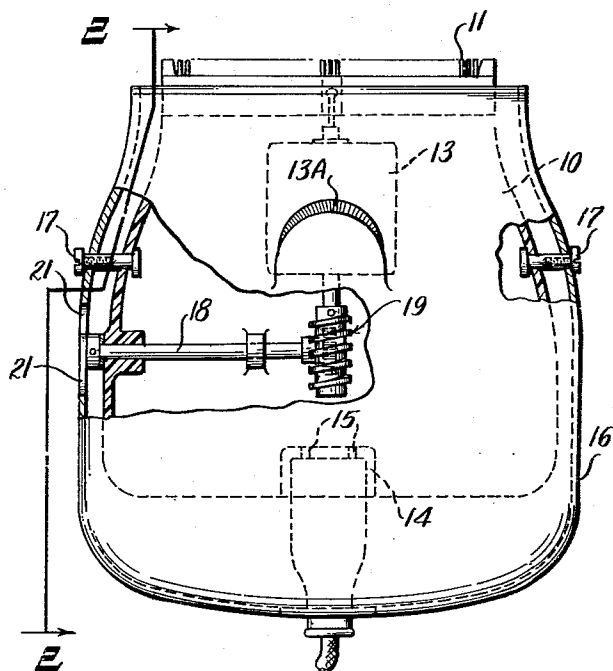


Fig. 1.

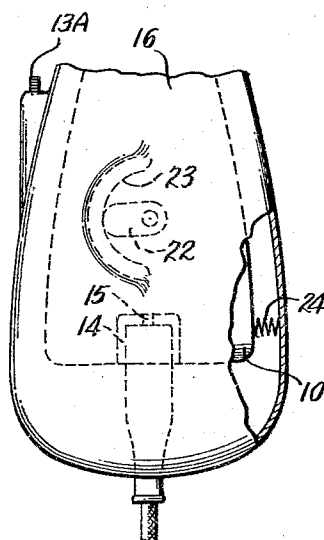
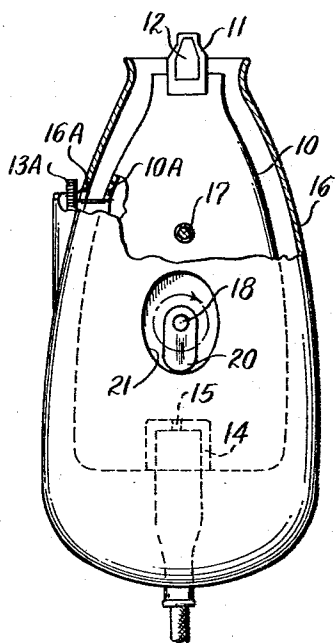


Fig. 3.

Fig. 2.



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1

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ELECTRIC RAZOR PIVOTALLY MOUNTED IN AN OUTER CASING

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This invention relates to an improvement in an electric razor of the type in common use in which an outer slotted or perforated cutting head remains stationary relative to the operating motor mechanism while an inner cutting head or blade reciprocates lengthwise inside the outer slotted or perforated shearing head.

In such razors, while the inner cutting head reciprocates lengthwise in the outer slotted head it is necessary for shavers to manually move the shaver forward and backward, over the face transversely of the slotted head.

The object of our invention is to provide a shaver in which both cutting heads are automatically and simultaneously reciprocated in a direction transverse to the direction in which the inner cutting head reciprocates, thus reducing or eliminating the necessity for manually imparting such a motion to the shaver.

Our invention comprises means for pivotally moving the entire shearing or cutting head and motor mechanism, which is carried by an inner shell or casing pivotally mounted within an outer shell or casing, and pivots as and when the inner cutting head reciprocates.

The extent of the pivotal movement of the inner shell relative to the outer shell or casing may be regulated by varying the location of the pivot relative to the point at which actuating means driven by the motor acts thereon and the rate or speed of the reciprocating movement may be regulated by varying the ratio of the transmission between the motor and actuating means.

One advantage of our invention is that it permits more rapid and positive backward and forward movement of the shaving head when guided and moved across the face being shaved than a manual backward and forward movement, thereby reducing the number of times the shaver must be guided and moved progressively over the face to accomplish efficient or close shaving.

Another advantage of our invention is that it permits an uninterrupted movement over the face or alternatively reduces the number of repeated backward movements required to pick up and cut stray hairs which have been missed.

A further advantage of our invention is that it reduces or eliminates the necessity for mounting additional or multiple shaving shears in a shaving head to speed shaving.

Yet another advantage of our invention is that the pivoting effect changes the plane of the shaving head and shears touching the face resulting in a closer and faster shave.

While this specification describes the adaptation of this invention to an electric razor in which the outer perforated or slotted shaving head is elongated in a straight line with the inner cutting shears travelling and reciprocating in the same direction, the same means for reciprocating the outer and inner cutting shears together in an opposite direction may be adapted and applied to a round or circular shaving head in which the inner cutting blade or shears rotates within the outer round slotted or perforated circular head.

One preferred embodiment of our invention will now be described, with reference to the accompanying drawings, in which:

FIG. 1 is a plan view of our new shaver, with part of the outer shell or casing broken away;

2

FIG. 2 is a side view of the same shaver, with the upper portion of the outer casing broken away; and

FIG. 3 is a side view of an alternative embodiment of our invention.

Like reference characters denote like parts throughout the several views.

Referring now to FIGURE 2, it will be seen that our shaver comprises an inner casing 10, an outer channel shaped cutting head 11 fixed to this inner casing, an inner cutting head 12 mounted to reciprocate within the outer cutting head, and a small electric motor 13 connected to reciprocally drive the inner cutting head. This motor is supplied from any convenient source of A.C. current through a cord attached to the socket 14 provided with prongs 15, which are electrically connected to the motor 13. The arrangement thus far described is entirely conventional.

In our invention, however, the inner casing 10 is pivotally mounted within an outer casing 16 by means of pivot pins 17. These pins may be fixed to the outer casing 16 and journaled in the inner casing 10, as shown, or be fixed to the inner casing and journaled in the outer casing.

The motor may be started by manually rotating the button 13A fixed to its rotor shaft. This button projects through an opening 10A in the inner casing, and at least an edge thereof projects through an opening 16A in the outer casing 16. The pivot point is near the motor so that the pivotal movement of the inner casing within the outer casing does not necessitate an excessive clearance between the edges of the opening 16A and the button 13A.

A cam shaft 18 extends through and is journaled in the inner casing 10, parallel to the cutting heads 11 and 12. This shaft is positioned on the opposite side of the pivot pins from these heads, and is driven by the motor 13, through a suitable transmission 19. The ratio between the frequency of the pivotal movement of the inner casing within the outer casing and the reciprocating movement of the inner cutting head within the outer casing may be regulated by adjusting the gear ratio of the transmission 19. The end of the cam shaft 18 carries a cam 20 which turns in hole 21 in the outer casing 16. The periphery of this hole is so contoured that its width in a plane perpendicular to the cam shaft axis is less than twice the distance between the cam shaft and the edge of the cam at its most remote point. Rotation of the cam consequently causes the inner casing 10, and the cutting heads mounted thereon, to pivot within the outer casing 16 about the pivot pins 17, sufficient clearance having been provided between the two casings to permit such relative movement.

It will be appreciated that an arm could be substituted for the cam 20, as could any other simple method for converting rotary to pivotal or reciprocating motion, and the inner casing could be affirmatively swung by the motor in only a single direction, and returned in the opposite direction by a spring or other resilient means, as indicated schematically in FIG. 3, which shows an arm 22 on the cam shaft which engages a curved flange 23 on the outer casing 16 during one half of its rotation only. In this embodiment the outer casing is biased in the opposite direction by spring 24. The shaver may of course be provided with a plurality of pairs of cutting heads and other modifications as to detail may obviously be made by those skilled in the art without departing from the spirit of our invention as defined by the following claims.

What we claim is:

1. An electric shaver comprising an inner casing, an elongated hollow outer cutting head fixed to said casing, an elongated inner cutting head longitudinally slidable

3

within said outer head, a motor within said casing connected to reciprocate said inner cutting head within the outer cutting head, an outer casing within which said inner casing is mounted on pivot means to swing relatively to said outer casing in a direction transverse to the path of travel of said inner cutting head, and power transmission means driven by said motor for periodically swinging said inner casing about said pivot means.

2. A shaver as claimed in claim 1 in which said power transmission means comprises a shaft rotatably mounted in said inner casing parallel to said cutting heads which is driven by said motor, and means on said shaft for periodically engaging said outer casing as said shaft rotates, thereby swinging said inner casing in one direction with respect to said outer casing, and spring means connecting said inner and outer casing to urge them in the opposite relative direction.

3. An electric shaver of the type comprising a pair of cooperating elongated cutting heads, one of which is reciprocated within the other, a motor connected to reciprocate said last mentioned cutting head, and an inner casing carrying said motor and heads, said shaver being pivotally mounted within an outer casing, and means driven by said motor for periodically swinging said shaver within said outer casing.

4. In combination an electric shaver comprising a pair of cooperating elongated cutting heads, one of which is reciprocable within the other, a motor connected to reciprocate said last mentioned cutting head, and an inner

4

casing carrying said motor and heads, together with an outer casing in which said shaver is pivotally mounted and means driven by said motor for periodically swinging said shaver within said outer casing.

5. An electric shaver comprising an inner casing, an elongated hollow outer cutting head fixed to said casing, an elongated inner cutting head longitudinally slidably within said outer head, a motor within said casing connected to reciprocate said inner cutting head within the outer cutting head, an outer casing, pivot means on which said inner casing is pivotally mounted within said outer casing to swing in a direction transverse to the path of travel of said inner cutting head, a cam shaft parallel to said path of travel journaled within said inner casing and driven by said motor, cam means on said shaft and a contoured surface on said outer casing, said cam means acting on said contoured surface to swing said inner casing about said pivot means.

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