POWER ACTUATED SHAVER

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FIG. 6

FIG. 7

FIG. 8

FIG. 9

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POWER ACTUATED SHAVER

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2 Claims.

This invention has general reference to power-actuated razors and more particularly to the species commonly known as "dry shavers" which are adapted for use without the aid of a lather or cream. In such shavers, removal of the hair is usually effected by rapid reciprocation of the cutter blade relative to a stationary blade or comb, and, while such means have attained a measure of popularity, they possess one serious disadvantage, namely that due to the rapid reciprocation of the cutting blade over the gaps between the teeth in the comb, such movement prevents the hair from proper erection, or straightening up, between the comb teeth, with the result the user must employ many strokes to ensure a clean shave.

The primary object of this invention is to overcome the above noted disadvantage by reciprocation of the cutter blade with definite dwell periods which augment the time for beard erection over all known types of dry shavers.

Another object is the provision of a motor-operated dry shaver, the power shaft whereof is equipped with a novel form of cutter blade actuating cam designed to permit gradual acceleration of blades after the dwell period, and its deceleration to such dwell period, both of which are effected during definite rotary movements of the power shaft. In other words, the actuating cam of this invention is preferably contoured as to define for each half-revolution of the power shaft a 30° dwell angle, a 60° accelerating angle, followed by a 60° decelerating angle and a 30° dwell angle during each stroke of the cutting blade.

A further object is the provision of a motion-translating eccentric-cam for the movable cutter of dry shavers embodying differential dwells paralleling the axis of rotation and angularly related correspondingly contoured camming faces, respectively active and inactive according to the direction of rotation of said cam.

A still further object is the provision of an actuator cam for the cutting blade of power operated dry shavers which enables reduction in the motor speed necessary, as compared with analogous types of shavers, whereby the life of said cutting blade, as well as that of the motor, is appreciably increased.

Other objects and ancillary advantages will hereinafter appear, or become apparent, from the following description of typical adaptations of the present invention considered in conjunction with the accompanying sheets of drawings, wherein like characters of reference are applied to corresponding parts in the respective views.

while the concluding claims more particularly define the features of invention.

In the drawings:

Fig. 1 is a longitudinal view of a known type of electrically operated dry shaver, with the cover removed and parts in section for clearer illustration of the details.

Fig. 2 is a relatively larger scale sectional view, taken approximately as indicated by the arrows II—II in Fig. 1.

Fig. 3 is a fragmentary view illustrating, on a still larger scale, the novel actuator cam of this invention and the coactive end of the cutter blade operating member in the "dwell" position of the latter.

Fig. 4 is a similar view to the preceding, with the respective parts in the active position.

Fig. 5 is a fragmentary detail section of the stationary and movable cutter elements.

Fig. 6 is a broken view, similar to Fig. 1, showing the adaptation of this invention to another type of dry-shaver.

Fig. 7 is a many-times enlarged scale section on the plane VII—VII of Fig. 6.

Fig. 8 is a further enlarged scale section on the plane VIII—VIII of Fig. 6; and,

Fig. 9 is a diagram illustrating the movement imparted to the cutting blade relative to the stationary blade, as effected by the novel actuator cam means of this invention.

Referring more in detail to the drawings, and first to the embodiment shown by Figs. 1—5, inclusive, the reference I comprehensively designates the hollow body portion of a known type dry shaver, the same including an electro-magnet 2 served with current through a pair of contact prongs 3; and having an associated stator or field 4, with a rotor or armature 5 and drive shaft 6, said drive shaft being journaled in a yoke 7, of insulative material and having an initiator or starting disc 8, all in accordance with known practice.

The shearing head 9 comprises a stationary cutter or comb 10, held in place by a securing means 11, and a movable cutter 12 reciprocative within said comb by aid of a rock-lever 13. This rock-lever 13 is pivotally mounted on a fulcrum pin 14, in the yoke 7, and has one end appropriately rounded at 15 for operative engagement in a suitable recess 16 in the base portion of the movable cutter 12; with the remote end appropriately forked at 17 for coaction with the special eccentric cam 18, of this invention, in turn rigidly fixed on or formed integral with the drive-shaft 6. As best understood from Figs. 3,
4 and 8, the eccentric cam 18 is of a special shape, or preferably embodies three corresponding curvatures 19, 20, and 21, the first two of which function as camming faces while the third is always a dwell, and each of said faces is of a radius common to that of an arc struck from the axis of rotation 22, of the shaft 5, with intervening curvatures 23, 24 and 25 also of a radius common to that struck from the axis of rotation 22; while the first of which 25 opposing the curve 21 always serves as a dwell, whereas 24 and 25 function for decelerating and accelerating areas, according to the direction of rotation imparted to the cam 18. For example, assuming the cam 18, Fig. 3 is to rotate counterclockwise, as indicated by the arrow 26, the fork 17 remains unaffected or stationary until the tangential commencement of the active curvature 19 coacts with the confronting face 27 of said fork 17, whereupon the lever 15 is rocked on the pin 14 with a gradual accelerating movement until the point of tangential merger of the curvature 19 into the curvature 25 is reached, and, as said curvature 25 coacts with the fork face 27, a decelerating movement of the fork 17 takes place until the corresponding tangential meeting point of the curvature 25 with the dwell 21 takes place when the cyclic operation just described ceases. As the cam 18 continues rotation in the direction aforesaid, it will be obvious that no further movement of the fork 17 to the left-hand of Fig. 3 takes place while the dwell 21 moves over the face 27 or until the tangential point of merger of the curvature 23 with the camming curvature 19 commences coaction with the other confronting face 28 of the fork 17 with the curvature 25 of the cam 18, where the reversion follows the rapid decelerating movement 24 which brings the cutter 12 to rest at the 150° line in Fig. 5, or as indicated by the dot-and-dash line showing 30 in Fig. 5. In other words, the removal of the hair during the dry shave is effected by aid of the means of this invention, while the movable cutter 12 is being more rapidly accelerated for a portion of its stroke than heretofore accomplished with known shavers of analogous type. This feature is readily appreciable upon an inspection of Fig. 9, more particularly, wherein the to-and-fro strokes of the cutter are indicated by the dot-and-dash line 39, and from which it will be clearly apparent that no appreciable "dwell" exists at either end of the respective strokes. It is, accordingly, emphasized herein that with the novel cam 18 of this invention a substantial "dwell" is positively obtained at the end of each stroke of the movable cutter 12 which leaves the cutter gaps between the teeth 36, 37 full open and affords ample time for the hair to erect between said teeth, such erection being essential to proper severance and the obtaining of a clean shave devoid of repeated "strokes" on the part of the user. Also, it is to be particularly noted that the novel cam 18 of this invention considerably increases the speed of the movable cutter 12 at the actual time of cutting or severing the hair, and not to the essential that the angular relation of the curvatures 19-21 and 23-25 be restricted as shown and described, as other angular curvatures may be adopted providing said curvatures correspond and define opposed differential dwells with flanking camming curvatures respectively active and inactive according to the direction of rotation of the cam drive.

Having thus described my invention, I claim:

1. In a power actuated shaving device including a drive shaft, and a movable cutter; an eccentric cam on said shaft, said cam being prefer
ably of substantially equilateral triangular contour with curved faces of corresponding shape, an adjoining pair whereof are mainly within the circumferential confines of said shaft and are respectively active and inactive according to the direction of rotation, the intervening curvature projecting wholly beyond such circumferential confines and always serving as a dwell; and means operatively coupling the cam to the movable cutter, whereby each half-revolution of the former imparts consecutive accelerative and decelerative reciprocatory movements to the latter of major degree with initial and terminal dwell periods of minor duration.

2. The combination of claim 1 wherein each cam face embodies a major arc of the same radius with complementary end arcs of equal minor radius, and one of said cam faces being positioned so that the point from which the major arc, as well as that from which the opposing minor arc, is struck both coincide with the axis of rotation of the drive shaft.

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