

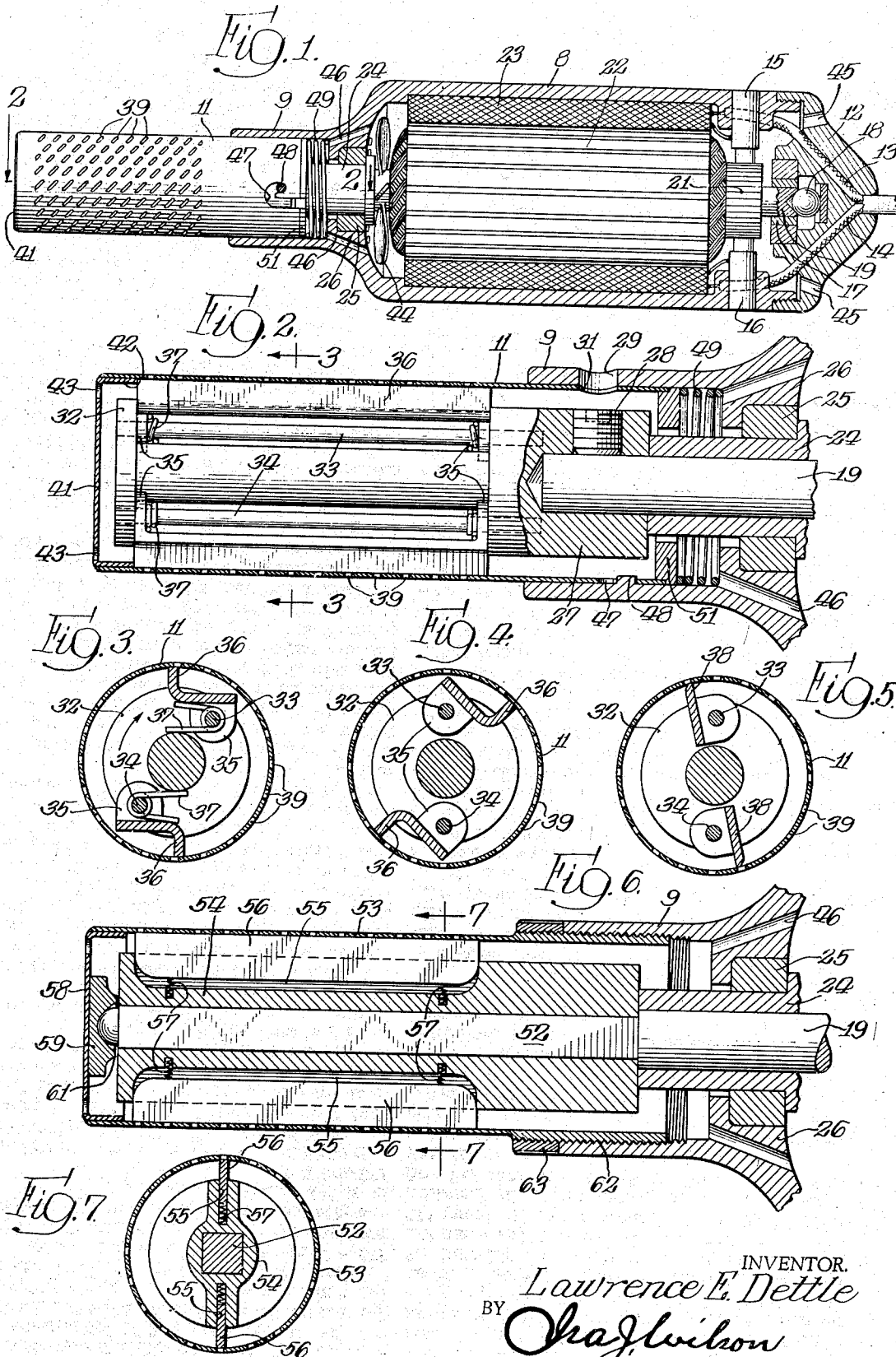
July 7, 1942.

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2,289,323

ELECTRIC SHAVER

Filed Feb. 13, 1939



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UNITED STATES PATENT OFFICE

2,289,323

ELECTRIC SHAVER

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Application February 13, 1939, Serial No. 256,075

2 Claims. (Cl. 30-43)

This invention relates to shavers of the type designed for the removal of a beard from the human face without the employment of lather.

One of the requisites of any shaver of this general type is that the skin engaging comb or guard be sufficiently thin to enable the hairs to be clipped close to the surface of the skin, otherwise, a close shave is not obtainable. In shavers which employ a reciprocatory cutter, the cutter itself is usually utilized as a support for the comb or guard. In shavers employing an oscillatory cutter, the guard is bent into arcuate form over curved supporting means. In both instances some form of support in addition to the guard itself is required to maintain the guard against deformation under pressure against the skin in use.

One of the purposes of my present invention is to provide a novel type of guard for a shaver which, while made of metal of sufficient thinness to enable the attainment of a close shave, possesses, because of its character and shape, maximum strength and consequent resistance against deformation in use.

Dry shavers comprise essentially a casing in which the drive mechanism is mounted and a cutter head carried by the casing. The casings are elongated in form and of various designs carrying the cutting head at one end thereof, but the guard which determines the line along which the shaving cut is made extends transversely of the casing, that is, the line of cut is disposed at right angles to the longitudinal axis of the casing. This arrangement is somewhat awkward for the user and precludes the delicacy of touch which is inherent in the old straight blade type of razor because of the manner in which it can be held between the thumb and the fingers.

Another purpose of my present invention is to provide a dry shaver in which the line of cut is disposed parallel with, instead of at right angles to, the longitudinal axis of the casing, thereby enabling the shaver to be held between the thumb and fingers similarly to a straight blade razor. This natural way of holding the shaver contributes toward a delicacy of touch and a satisfaction in its use unobtainable with other shavers in which the cutting head extends transversely of the casing.

Another purpose of my invention is to provide a shaver which will be small in size, compact in assembly, one which will comprise a minimum number of parts, one which will be economical to manufacture and operate and which can be

readily disassembled and reassembled when necessary.

Another purpose is to provide a shaver with a plurality of cutters which when in operation will be maintained in cutting contact with the interior walls of the surrounding cylindrical guard so as to insure a clipping of the hairs projecting through the guard, and which because of the employment of a plurality of cutters will enable the motor to run at a slower speed than is practical with shavers employing only a single cutter.

Another purpose is to provide a tubular guard, any portion of the perimeter of which may be presented against the skin for shaving purposes, thereby obviating the necessity of holding a small or narrow guard in a predetermined position with respect to the skin in order to obtain satisfactory shaving results.

A further feature of my invention resides in the provision of means for continuously expelling the clipped hairs from the interior of the guard as the shaving progresses, thereby avoiding an accumulation of hairs within the guard and obviating the necessity of frequent removal of the guard for cleaning purposes.

Other objects and many of the attendant advantages of my invention should be readily appreciated as the same becomes better understood by reference to the following description when considered in connection with the accompanying drawing.

Referring to the drawing:

Fig. 1 is a longitudinal sectional view through a shaver embodying my invention, the guard being shown in elevation;

Fig. 2 is an enlarged fragmentary sectional view on the line 2-2 of Fig. 1;

Fig. 3 is a transverse sectional view on the line 3-3 of Fig. 2 showing one type of cutter;

Figs. 4 and 5 are similar views showing modified forms of the cutter;

Fig. 6 is a view similar to Fig. 2 showing a modified construction; and

Fig. 7 is a sectional view on the line 7-7 of Fig. 6.

Referring to the drawing more in detail, reference character 8 designates generally a cylindrical casing made of synthetic composition or other material capable of being molded, the casing being elongated and provided at one end with a longitudinally extending, tubular sleeve 9 for the reception of the inner end of the tubular guard 11. The opposite end of the casing is closed by a removable closure member 12 adapted to be threaded into position and provided

with channels for the reception of the electric wires 13 and 14 leading to the motor field which is connected by suitable wiring with the brushes 15 and 16, respectively, mounted in the casing.

The closure member 12 also carries the motor shaft journal 17 and the end thrust ball bearing 18 for the motor shaft 19 carrying the usual commutator 21 and the rotor segments 22 of an ordinary electric motor. The stator 23 of the motor is mounted in the case 8 surrounding the rotor in the usual manner and the opposite end of the motor shaft 19 projects through a suitable bearing 24 carried by a ring 25 in the casing wall 26.

Upon the projecting end of the motor shaft, the head 27 of a spool shaped blade carrier is fixedly mounted by means of a set screw 28 or other means of attachment, and when such a set screw is employed, the sleeve 9 and the guard 11 are provided with suitably aligned apertures 29 and 31, respectively, through which access to the set screw may be had by means of a suitably shaped tool or wrench. The blade carrier is provided at its outer end with a disk shaped head 32, and pivot rods 33 and 34 extending between the heads 32 and 27 of the carrier afford pivotal bearings upon which the ears 35, formed at the ends of the angle shaped cutters 36, are pivotally mounted. Upon rotation of the carrier by the motor shaft 19 with which it is directly connected, the cutters 36 are urged by centrifugal force into cooperative cutting relation with the inner surface of the surrounding guard 11. If desired, torsion springs 37 may be employed to augment the action of centrifugal force.

In Fig. 3, assuming that the blade carrier rotates in a clockwise direction, the cutting portions of the cutters are disposed rearwardly of the pivot rods 33 and 34. In Fig. 4, the position of the cutters is reversed so that the cutting portions travel in advance of the pivot rods. In Fig. 5 a somewhat different type of cutter, designated by reference character 38, is disclosed. The particular design of the cutters, however, is of secondary importance, as any type which will satisfactorily cooperate with the tubular guard may be utilized.

The guard 11 in accordance with my invention is a very thin drawn metal tube provided throughout its circumferential walls with suitably arranged hair-receiving openings 39 of any preferred selected size and configuration. These holes, when the guard is pressed against and moved along the surface of the skin, permit the hairs to project therethrough into position to be clipped off by the revolving cutters, which in conjunction with the edges of the holes, provide opposed shearing edges which rapidly and cleanly clip off the inwardly projecting hairs at the inner surface of the tubular guard wall. The length of the uncut hairs projecting from the skin is determined by the thickness of the walls of the guard, and in the present instance because of the tubular shape of the guard, these walls may be of minimum thickness and still possess the requisite strength and rigidity to preclude deformation or bending out of round when lightly pressed against the skin.

This tubular guard is an important feature of my invention, since by reason of its shape and character, a guard wall of minimum thickness may be employed which because of its thinness enables the hairs to be cut very close to the skin and provides a closer shave than is attain-

able with other shavers with which I am familiar. Because this guard extends longitudinally from one end of the elongated casing, the user may grasp the casing between his thumb and fingers and move the guard transversely across the skin with a movement very similar to that employed in using an ordinary straight razor. Furthermore, any circumferential sector of the guard may be presented to the skin, thereby obviating the necessity of maintaining a narrow guard in a definite position with respect to the skin. An ease in handling, a delicacy of touch and a uniformity in the closeness of the shave are therefore obtainable to a far greater degree than is possible with shavers employing a narrow guard extending transversely instead of longitudinally of the casing.

The guard is closed at its outer end and strengthened against deformation by a closure cap 41 having a flange 42 snugly fitting the interior of the outer end of the guard. The cap is also provided with a series of perforations 43, preferably larger than the guard openings 39 through which the clipped hairs may be discharged from the interior of the guard during operation by a current of air blown through the guard by a fan or blower 44 mounted upon the motor shaft. The air is drawn into the casing by the fan 44 through openings 45 formed in the casing cap 12, passes around the motor to cool the same, and is delivered into the guard through a series of passages 46 formed in the wall 26 of the casing. In this manner not only is the motor kept cool in operation, but the clipped hairs are continuously expelled from the tubular guard, thus preventing an accumulation therein which would interfere with the efficient operation of the cutters. Furthermore, frequent removal of the guard for the purpose of cleaning out the clipped hairs is obviated.

The guard should extend into the sleeve 9 a sufficient distance and should fit sufficiently snugly therein to securely maintain the guard in concentric co-axial relation with the motor shaft and blade carrier. It may be secured in position in any preferred manner, and in Figs. 1 and 2 I have shown, for illustrative purposes, the guard as being provided at opposite sides with a bayonet slot 47 adapted to cooperate with a pin 48 projecting inwardly from the sleeve 9. An expansion spring 49 interposed between the wall 26 and a disk 51 urges the guard outwardly to maintain the locking relation between the guard and the sleeve. Longitudinal pressure exerted upon the guard toward the casing will compress the spring 49 sufficiently to permit disconnection of the guard from the case by slight rotary movement, whereupon the guard may be slipped off over the blade carrier to permit access to the blades when occasion requires.

In the form of my invention shown in Figs. 6 and 7, the motor shaft 19 is provided with a squared extension 52 projecting substantially to the outer end of the guard, in this instance indicated by reference character 53. The blade carrier 54 is cored throughout its length to slidably fit the shaft extension 52 and may be slipped over the end of the shaft and slid into position. The carrier is provided with oppositely opening grooves 55 adapted to receive the elongated flat cutter blades 56. These blades if loosely inserted into the slots will, upon rotation of the carrier, be urged into cutting relation with the surrounding guard by centrifugal force. If desired, however, light springs may be interposed

between the bottoms of the slots and the blades, as indicated by reference characters 57.

In this form of the invention, the guard 53 serves to hold the carrier against longitudinal displacement from the shaft and also provides assurance for the maintenance of co-axial relation between the guard, the carrier, and the motor shaft. For this purpose, the cap or closure 58 of the guard is equipped on its inner surface with a concave bearing block 59 adapted to accommodate the rounded end of the shaft so as to maintain a concentric relation between the shaft and the guard. The block is also provided with an annular shoulder 61 disposed in alignment with the body of the carrier to prevent the carrier from endwise displacement on the shaft.

The guard is rigidly and detachably connected with the sleeve 9 of the casing in this instance by cooperating threads 62 formed on the perimeter of the thickened inner end of the guard and upon the interior of the sleeve 9, respectively. The guard may be threaded into the sleeve until the requisitely snug but non-binding fit between the bearing block 59 and the end of the motor shaft is attained, whereupon the guard may be locked in this adjusted position by a lock ring 63. By loosening the lock ring and unthreading the guard, the guard may be withdrawn from the casing permitting access to the blades and the carrier, which carrier may also then be disconnected from the motor shaft, if desired, by simply withdrawing it endwise from the shaft.

My invention, its mode of operation, and its advantageous features should be apparent from the foregoing without further description, and while I have shown and described those embodi-

ments which at present seem preferable, it should be understood that the structural details are capable of considerable modification and variation within the scope of the invention as defined in the following claims.

I claim:

1. An electric shaver comprising a casing, a motor mounted therein, a tubular guard projecting longitudinally from the casing in co-axial alignment with the motor, said guard having thin, skin-engaging, circumferential walls provided with hair-receiving openings, a carrier disposed within said guard and directly connected to the motor shaft for rotation thereby, pivot rods extending longitudinally of the carrier parallel with the axis of rotation thereof, and cutters each comprising an elongated blade and supporting ears offset from the plane of said blade and pivoted on said rods to permit pivotal movement of said blades into cutting relation with said guard upon rotation of the carrier.

2. An electric shaver comprising a casing, an electric motor mounted therein, a tubular guard projecting longitudinally from the casing in co-axial alignment with the motor, a rotatable carrier disposed within said guard and connected to the motor shaft for rotation thereby, and a plurality of cutters pivotally mounted on the carrier upon axes parallel with the axis of rotation of the carrier, the cutting edges of said blades being offset circumferentially of the carrier from the pivotal mountings of said blades, whereby upon rotation of the carrier said blades will be urged by centrifugal force into cutting relation with the surrounding guard.

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