Oct. 8, 1940. J. M. WALL ET AL 2,216,994

POWER OPERATED RAZOR

Filed Aug. 26, 1936

FIG. 1.

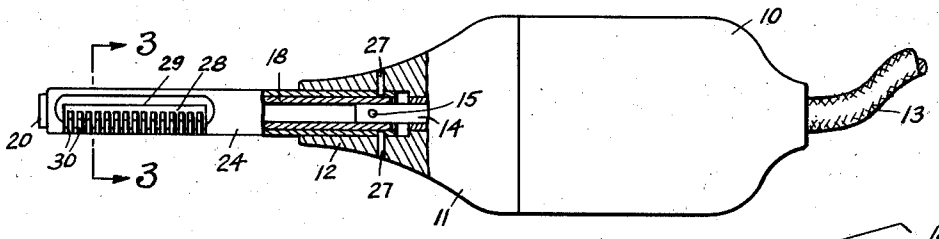


FIG. 2.

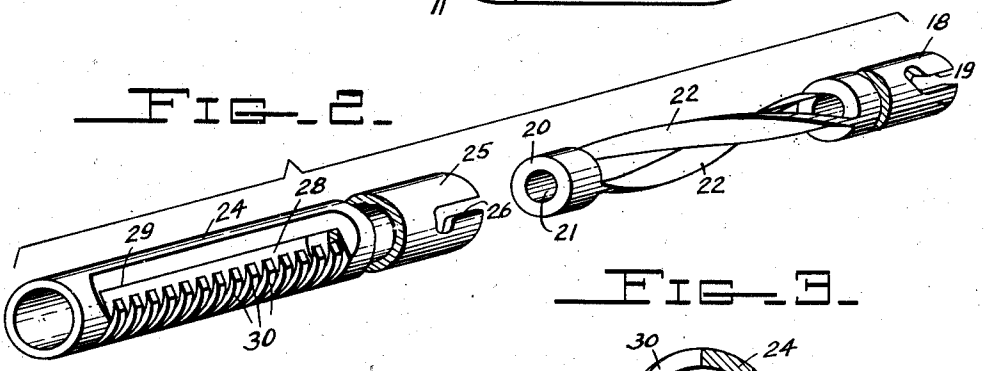


FIG. 3.

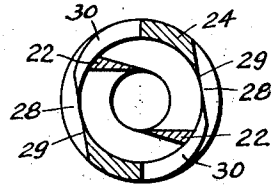


FIG. 4.

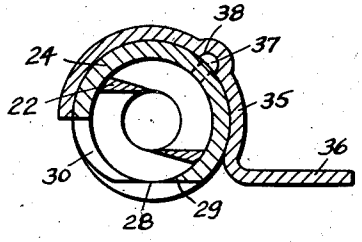


FIG. 5.

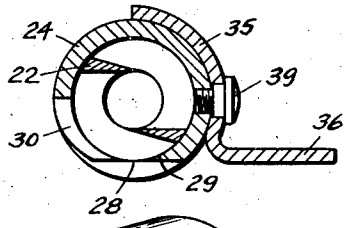
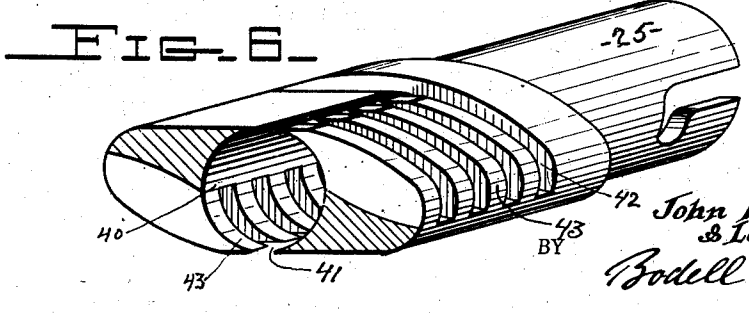


FIG. 6.



INVENTORS:
John M. Wall
& Leonard M. Thorn,
BY
Bodell & Thompson
ATTORNEYS.

Patented Oct. 8, 1940

2,216,994

UNITED STATES PATENT OFFICE

2,216,994

POWER OPERATED RAZOR

John M. Wall and Leonard M. Thorn, Syracuse, N. Y.; said Thorn assignor to General Theatres Equipment Corporation, New York, N. Y., a corporation of Delaware

Application August 26, 1936, Serial No. 97,989

3 Claims. (Cl. 30—43)

This invention relates to a power operated razor comprising a body, an electric motor mounted in the body, and a cutter and guard carried by the body, the cutter being operatively connected to the shaft of the motor.

An object of the invention is a razor of the type described of particularly simple and economical construction, and is particularly convenient to use.

A further object of the invention is a razor of the type referred to employing a rotary cutter mounted in a tubular guard with the cutter and guard of particularly small diameter, and the cutter so formed as to cooperate with the guard to effect a continuous sharpening of the cutter while the razor is in use.

A further object of the invention is a power operated razor of such construction that the guard and cutter may be readily and conveniently removed from the razor without the necessity of tools or the like, and when removed can be conveniently cleaned.

The invention further contemplates a particularly simple guide member which is detachably carried by the tubular guard and which functions to accurately position the razor on the skin.

The invention consists in the novel features and in the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawing, in which like characters designate corresponding parts in all the views.

Figure 1 is a side elevational view of the razor partly in section.

Figure 2 is a perspective view of the cutter and guard arranged in relative axial position.

Figure 3 is a cross sectional view taken on lines 3—3, Figure 1.

Figure 4 is a cross sectional view taken through the guard member illustrating one type of guide member attached thereto.

Figure 5 is a view, similar to Figure 4, showing a modified form of guide member.

Figure 6 is an enlarged fragmentary view of a modified form of guard.

The body 10 is of such dimensions as to permit it to be conveniently grasped in the hand of the user. Preferably, it is formed of light material, such as Bakelite, and includes a detachable end section 11 having an outwardly extending end portion 12 provided with an axial bore to receive the cutter and guard. The body 10 is hollow, and a suitable motor is mounted therein. Preferably, an electrical motor is employed and receives current through the attachment cord 13. The motor shaft 14 extends through the end section 11 into the recess formed in the reduced portion 12, and is provided with a pin 15 extending transversely of the shaft.

The cutter is of the rotary type, and comprises end portions between which are arranged a plurality of blades which are comparatively thin and flexible. The inner end or base 18 of the cutter is provided with a bore to slidably receive the end of the motor shaft 14, and is formed with a bayonet recess 19 which cooperates with the ends of the pins 15 to interlock the cutter with the motor shaft 14. The outer end portion 20 may be formed with a bore 21 extending axially thereof. The cutting blades 22 are connected at their ends to the end portions 18, 20, preferably, however, the entire cutter is formed from an integral piece of metal. The blades 22 are of helical formation, and the outer longitudinal edge thereof is sharpened and coacts with the guard member to effect cutting action. The blades 22 are comparatively thin and somewhat flexible, and due to the comparatively high speed at which the cutter is rotated, the blades have a tendency to expand radially against the bore of the guard 24. This action maintains the cutting edges of the blade in contact with the bore of the guard 24, effecting a perfect shearing action in the manner hereinafter described, and also maintains a keen cutting edge on the blades.

The inner end 25 of the guard is provided with a bayonet groove 26, similar to the groove 19 in the cutter, and the projecting end 12 of the body contains one or more pins 27 extending radially inwardly through the side wall of the bore in said end portion. The bore in the end portion 12 of the body is such as to slidably receive the inner end 25 of the guard and, the inner ends of these pins coact with the bayonet groove 26 to attach the guard to the end of the body. Thus, both the cutter and the guard are detachably secured to the razor by relative axial and rotary movement with the motor shaft and body, and are detachable in the same manner.

It will be understood that the bayonet groove 19, in the inner end 18 of the cutter, is formed in accordance with the direction of rotation of the motor shaft 14, so that the cutter is held in engagement with the shaft during operation of the razor.

The tubular guard 24 is substantially the same length as the cutter, and is provided with an elongated opening 28, one side 29 of which forms a cutting edge coacting with the cutting edge of the blades 22 of the cutter to effect a continuous shearing operation. The opposite side of the opening 28 is provided, or formed, with a plurality of circumferentially extending spaced apart guard fingers 30. The guard 24 may be formed with an opening on opposite sides, as indicated in Figure 3. The outer ends of the fingers 30 and the opposite side 29 of the opening are arranged

in a plane extending tangentially to the bore of the guard.

Electric razors now on the market employ a shield which holds the skin of the user away from the cutting blade so as to prevent cutting the skin. In razors of such a type this was necessary but the fact remains that such razors would not give a close shave, for of necessity stubble of the beard would remain, the hair thereof being at least as long as the thickness of the guard. In the present construction, however, we provide a guard which at the cutting point has a thickness of substantially zero, for the plane of the guard adjacent the elongated opening 28 forms a tangent to the circle described by the blades. In this manner a shave may be obtained which may be substantially as close as could be obtained with a hand razor. We believe that we are the first to provide an electric razor which will shave without cutting the skin and still leave no appreciable length of beard.

It would, of course, be fatal to make the plane adjacent the opening 28 so as to cut across the circle formed by the cutters such as is shown in Figure 3 of the patent to Keislar No. 1,143,832. In that case the cutters would project through the opening and would cut into the flesh. By making the plane as a tangent to the circle formed by the cutters, it is impossible to cut the flesh and the hair is cut off, leaving substantially a zero length thereof.

Attention is also called to the fact that the spiral blades 22 would naturally be distorted if they encountered resistance to their rotation. This distortion would expand the blades outwardly into a closer engagement with the inner sides of the guard. The beard presents such a resistance so that as the blades cut into the beard, the blades are pressed closely against the guard, not only by the centrifugal force of the blades, but by the torsion of the blades, caused by the cutting act itself. It may truly be said that the cutting act is shearing the beard, but our structure is an improvement over any shearing action known to us. In shearing such as with a pair of scissors, the obstruction tends to force the blades apart, producing poor results, but in our structure such shearing tends to force the blades and the cutting edge of the guard into closer contact.

In operation, the opening 28 of the guard is pressed lightly against the skin, and the guard moved over the skin, with the guard fingers 30 preceding the opposite side 29 of the opening. The hairs extend between the guard fingers 30 into the bore of the guard, and are severed by the rotating blades 22 coacting with the shearing side 29 of the opening in the guard, and due to the high speed at which the cutter is revolved by the motor, the hairs are instantaneously severed without any pulling effect.

If desired, the razor may be equipped with a guide 35 which is shown in Figure 4, and is formed with a cylindrical body portion as slidably mounted on the outside of the guard 24. The guide is formed with an outwardly extending portion 36 arranged in the same plane as the outer ends of the fingers 30, and the shearing edge 29 of the opening in the guard. The guide 35 is maintained in this position by a screw 37, the head of which extends radially out from the guard 24 and coacts with a lengthwise extending groove 38 formed in the guide 35.

A modified guide structure is shown in Figure 5, wherein the guide 35 is detachably secured to the guard 24 by means of screw 39.

In Figure 6, the guard member is substantially elliptical in cross section rather than cylindrical, and preferably is formed by being cast of Bakelite or similar material. The guard member is provided with a cylindrical base portion 25 provided with the bayonet joint construction as illustrated in Figures 1 and 2. The guard member is formed with a cylindrical bore 40, which is of slightly greater diameter than the minor axis of the guard, and accordingly forms lengthwise extending slots 41. Also, the guard is formed with a plurality of spaced apart slots 42 defining guard fingers 43 which extend from one side of the slot 41 to the outer edge of the guard. The rotary cutter is mounted in the bore 40 and the blades 22 extend slightly beyond the top and bottom sides of the guard member to effect the cutting operation. With this type of guard, no guide is necessary, as the flattened oval top and bottom sides of the guard perform this function.

It will be observed that the razor described embodies a minimum number of moving parts, and due to the fact that the cutter and guard which are of comparatively small diameter, not exceeding the dimensions of Figure 1 of the drawing, and the fact that they extend axially from one end of the body, renders the razor convenient to use, whereby all parts of the face may be shaved without inconvenience on the part of the user. Also, because there are no reciprocating parts involved in the construction of the razor, and the cutter is mounted axially of the motor shaft, the device is substantially free from vibration.

What we claim is:

1. In a shaving instrument comprising a body including a drive shaft, a pair of spaced bearing members and a helical cutting member supported therebetween, one of said bearing members having driving engagement with said drive shaft, a U-shaped covering for said helical cutting member, said covering having slits formed in its bight portion, and an opening formed axially through said bearing members whereby shorn hair may be passed from the instrument when the cutting member is rotated.

2. A power razor comprising a guard having a cylindrical bore extending throughout the length thereof and having a slot extending longitudinally thereof for a portion of the length of the guard, a cutter within the bore of the guard, means to rotate the cutter, the cutter consisting of thin flexible blades adapted to be urged by centrifugal action into close contact with the side walls of the bore of the guard, and cylindrical collars at each end of said blades.

3. A power razor comprising a guard having a cylindrical bore extending throughout the length thereof and having a slot extending longitudinally thereof for a portion of the length of the guard, a cutter within the bore of the guard, means to rotate the cutter, the cutter consisting of two cylindrical collars having integral blades extending between the collars, the blades being adapted to be urged by centrifugal action into close contact with the walls of the bore of the guard.

JOHN M. WALL.
LEONARD M. THORN.