

Dec. 10, 1940.

H. L. FORSTER

2,224,342

ELECTRICALLY OPERATED RAZOR

Filed Sept. 17, 1937

2 Sheets-Sheet 1

Fig. 1.

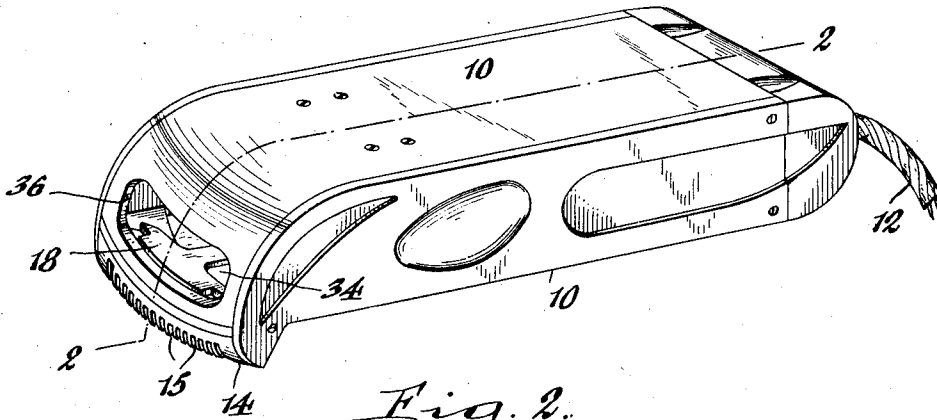


Fig. 2.

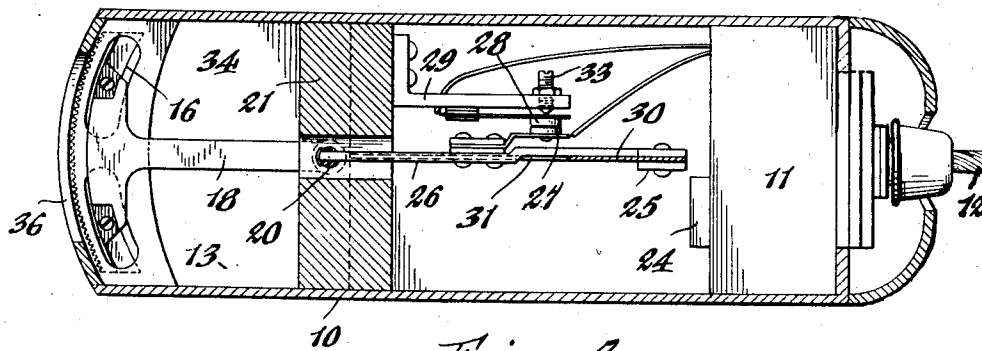
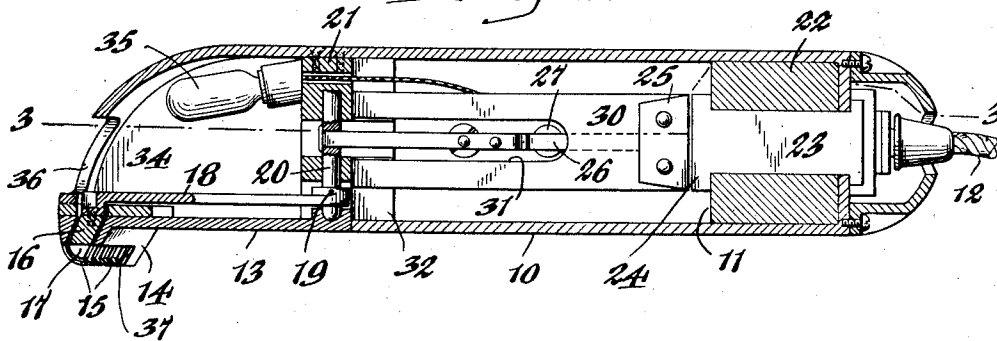


Fig. 3.

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Fig. 4.

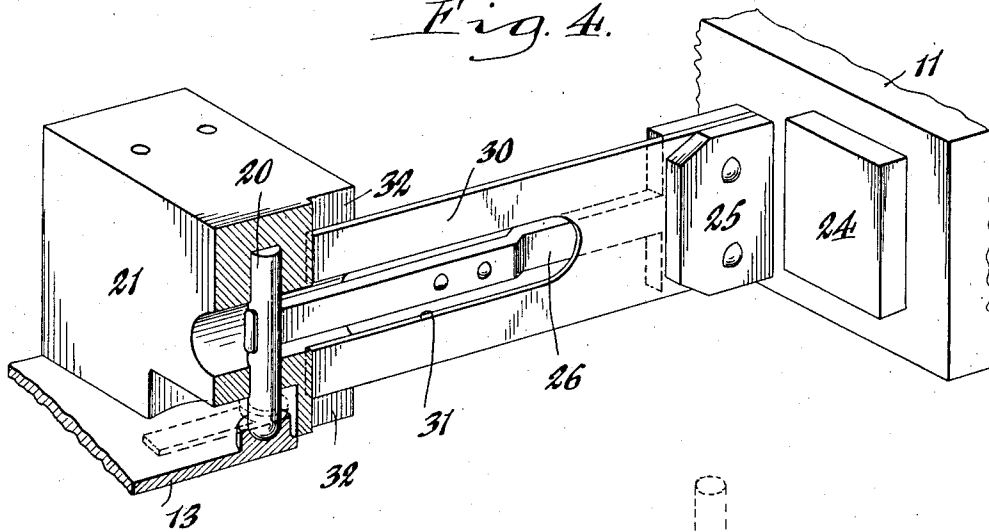
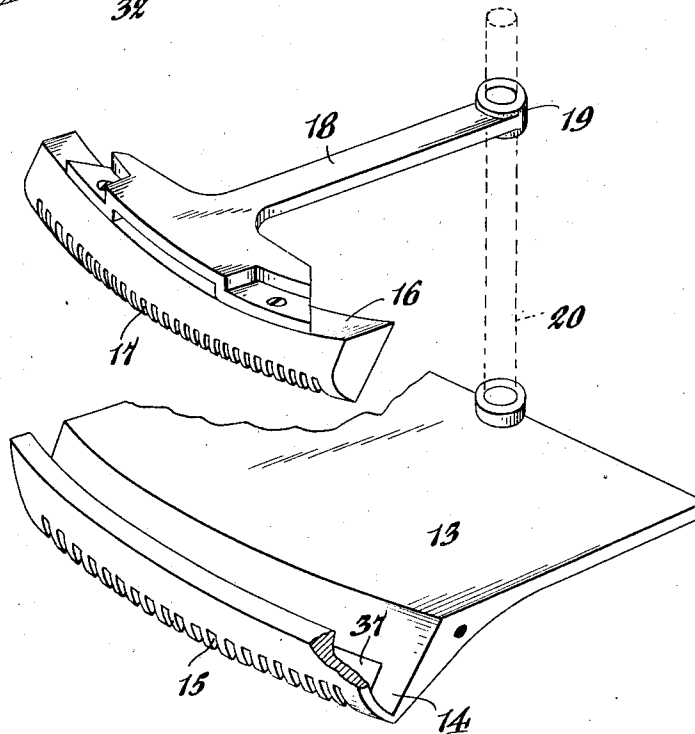


Fig. 5.



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UNITED STATES PATENT OFFICE

2,224,342

ELECTRICALLY OPERATED RAZOR

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Application September 17, 1937, Serial No. 164,343

7 Claims. (Cl. 30—43)

This invention relates generally to new and useful improvements in shaving devices or razors, but more particularly to an electric razor.

One of the objects of my invention is to provide an electric razor which is so designed and constructed as to operate smoothly and silently and whose cutting-face is so shaped as to dry shave cleanly and closely all parts of the face efficiently without irritating the skin.

Another object is to provide a razor of this character which is provided with novel and efficient means for actuating its relatively movable cutter members.

A further object of the invention is to provide an electrically-operated razor which is simple, compact and inexpensive in construction, which is light in weight and which is composed of a minimum number of parts not liable to get out of order.

Other features of the invention reside in the construction and arrangement of parts herein-after described and particularly pointed out in the appended claims.

In the accompanying drawings:

Figure 1 is a perspective view of the electric razor embodying my invention. Figure 2 is an enlarged vertical longitudinal section taken substantially in the plane of line 2—2, Figure 1. Figure 3 is an enlarged horizontal section taken in the plane of line 3—3, Figure 2. Figure 4 is a fragmentary perspective view of the means for actuating the reciprocatory cutter. Figure 5 is a separated perspective view of the stationary and relatively movable cutter members.

Similar characters of reference indicate corresponding parts throughout the several views.

The working parts of the razor are encased within a housing or casing 10 made of hard rubber or other well known composition material and so shaped as to easily fit the hand of the user during the act of shaving. Arranged within the rear portion of the housing is an electrically-operated mechanism or motivating unit for actuating the cutter assembly, such unit being indicated generally by the numeral 11 and being adapted for connection by a suitable wire and fitting 12 with the socket of a domestic service supply line.

Arranged at the front end of the casing 10 and borne by a plate 13 secured to the adjoining bottom side of the casing is a stationary channel-shaped cutter member 14 which extends transversely of and projects laterally from and below the lower front end of the casing adjacent the corner thereof, in the manner shown in Figures

1 and 2 and which is provided with a plurality of transverse slots 15 to form cutting edges. By preference, the plan contour of this stationary cutter is arcuate, being convex on its front side and concave on its rear side, the degree of curvature being determined from a point centrally of the housing and rearwardly of the cutter, as shown in Figure 3. Cooperating with this stationary cutter for reciprocatory movement in the channeled portion thereof, is a movable cutter 16 which is preferably solid in cross section and of like transverse curvature as the stationary cutter, being provided with transverse slots 17 forming cutting edges cooperating with those of the stationary cutter. This reciprocatory cutter is mounted on a pivoted actuating arm 18 extending rearwardly therefrom and which is disposed centrally over the plate 13 and fixedly secured at 19 to the lower end of an oscillating pivot-pin 20 suitably journaled in a block 21 secured within the casing between the cutters 14, 16 and the cutter-actuating unit 11. When the pivot-pin 20 is oscillated back and forth it transmits a like motion to the movable cutter 16 relative to the stationary cutter 14, the curvature of the cutters being described from the axis of the pivot-pin.

The motivating mechanism for oscillating the pivot-pin 20 and the movable cutter 16 preferably consists of a magnetic coil 22 having a laminated core 23. Cooperating with the pole piece 24 of this magnetic coil is an armature 25 having an arm 26 extending forwardly therefrom which is fixedly connected to the pivot-pin 20 in the manner shown in Figures 2 and 4 so that when the armature is actuated an oscillating movement is transmitted to the pivot-pin. Included in the circuit of the magnetic coil which is connected to the service fitting 12, are make and break contacts 27, 28, the contact 27 being borne by and insulated from the armature-arm 26 and the companion contact 28 being mounted on a bracket 29 secured to the pivot-block 21, as shown in Figure 3. Connected to the armature 25 is a flat spring 30 which is disposed substantially in the plane of the armature-arm 26, being notched at 31 for this purpose, the front end of this spring being arranged in aligning slots 32 formed in the pivot-block 21 as depicted at Figures 2 and 4. This spring provides for the return stroke of the armature after being attracted to the magnetic coil. If desired, maximum efficiency of operation of the make and break contacts 27, 28 may be effected through an adjustable set screw 33 ap-

plied to the bracket 29 for adjusting the contact 28.

Arranged in the housing 10 forwardly of the pivot-block 21 is a compartment 34 containing an electric lamp 35 included in the usual connector circuit of the razor and arranged in the front curved portion of the housing is a light opening 36, whereby the rays of light from the lamp 35 are directed onto the face of the user during shaving.

By preference, the cross sectional contour of the cutters 14 and 16 is as shown in Figure 5, wherein it will be noted that the front face and contiguous bottom face of the cutter 14 are uniformly convexly curved while its back wall or face extends sharply toward the bottom side of the plate 13 at a substantially obtuse angle thereto. The bearing faces of the movable cutter 16 are similarly shaped and by this construction in conjunction with the arcuate transverse curvature of the cutters it is possible to conveniently and efficiently shave the jaw and other bony portions of the face and neck as well as the fleshy portions, the cross sectional contour of the face-engaging cutter readily adapting itself to these facial contours to the end that a close shave can be effected.

In operation, when the razor is connected to the service line, the electro-magnetic motivating unit 11 is operated to effect the rapid oscillation of the pivot-pin 20 and thence the like movement of the reciprocatory cutter 16, the movement of this cutter relative to the stationary one shearing off the beard in an obvious manner. As shown in Figures 2 and 5, the transverse slots 15 of the stationary cutter terminate at the lower edge thereof and the rear wall of this cutter is provided with an opening or slot 37 through which the severed hairs are adapted to escape.

I claim as my invention:

1. A razor of the character described, comprising a housing, a stationary cutter member applied to said housing, a reciprocatory cutter guided in said stationary cutter, a pivoted actuating arm for said reciprocatory cutter, and electro-magnetic means including a magnetic coil having a pole piece, an armature disposed lengthwise between said pole piece and said arm and having one end connected to the pivot of said arm for actuating the latter and said reciprocatory cutter, make and break contacts in the circuit of said coil and governed by said armature, and a spring connected to the armature for effecting its return stroke.

2. A razor of the character described, comprising a housing, cooperating stationary and movable cutters applied thereto, and means for actuating said movable cutter including an electromagnetic unit having a magnetic coil, an armature having one end thereof in endwise relation to the coil, make and break contacts in the circuit of said coil, an oscillating pivot for the other end of said armature rendered operative in response to the movements of the latter, a flat spring substantially co-extensive with the armature and connected at one end to the latter and at its opposite end to the housing adjacent said pivot, and a connection between said pivot and said movable cutter for transmitting motion thereto.

3. A razor of the character described, comprising a housing, a stationary cutter member applied to said housing, a reciprocatory cutter guided in said stationary cutter, a pivoted actuating arm for said reciprocatory cutter, electrically-operated means for oscillating said arm about its pivot for actuating said reciprocatory cutter, an oscillating pivot for said actuating arm interposed between the reciprocatory cutter and said electrically-operated means, and an operating connection between the latter and said pivot.

4. A razor of the character described, comprising a housing, a stationary cutter member applied to said housing, a reciprocatory cutter guided in said stationary cutter, a pivoted actuating arm for said reciprocatory cutter, electro-magnetic means for oscillating said arm, and a pivot-block disposed between said arm and said electro-magnetic means and having an oscillating pivot journaled therein and to which the actuating arm is connected for actuation thereby, said electro-magnetic means including an armature fixed at one end to said oscillating pivot and a spring connected at one end to said pivot-block and at its other end to the free end of said armature.

5. A razor of the character described, comprising a housing, a stationary cutter member extending transversely of and projecting laterally from one end of said housing and of a cross section to provide front and bottom cutting faces and an obliquely-disposed rear face, said cutting faces being substantially convexly-curved in contiguous blending fashion and having transverse slots therein to form cutting edges, a reciprocatory cutter of substantially like cross section guided in said stationary cutter and having transverse slots therein forming cutting edges cooperating with those of the stationary cutter, and means for actuating said reciprocatory cutter.

6. A razor of the character described, comprising a housing, a stationary channel-shaped cutter extending transversely of and projecting laterally from one end of said housing and having transverse slots therein to form cutting edges, said cutter being curved uniformly transversely of the housing to provide a convex front face and a concave rear face, the cross-sectional shape of the cutter being such as to provide convexly-curved, contiguous front and bottom faces and a straight-obliquely disposed rear face, a reciprocating cutter of a cross-section like and guided in said stationary cutter and having transverse slots therein forming cutting edges cooperating with those of the stationary cutter, and means for actuating said reciprocatory cutter.

7. A razor of the character described, comprising a stationary cutter and a relatively reciprocating cutter, said cutters being operatively arranged one within the other and being of a cross section to provide front and bottom cutting faces and an obliquely-disposed rear face, said cutting faces being substantially convexly-curved in contiguous blending fashion and having transverse slots therein to form cutting edges, the rear face of said stationary cutter having an opening therein registering with the slots of the reciprocating cutter for the escape of the severed hairs.