Feb. 25, 1941. G. MONNET 2,232,717

SHAVING DEVICE

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Fig. 1.

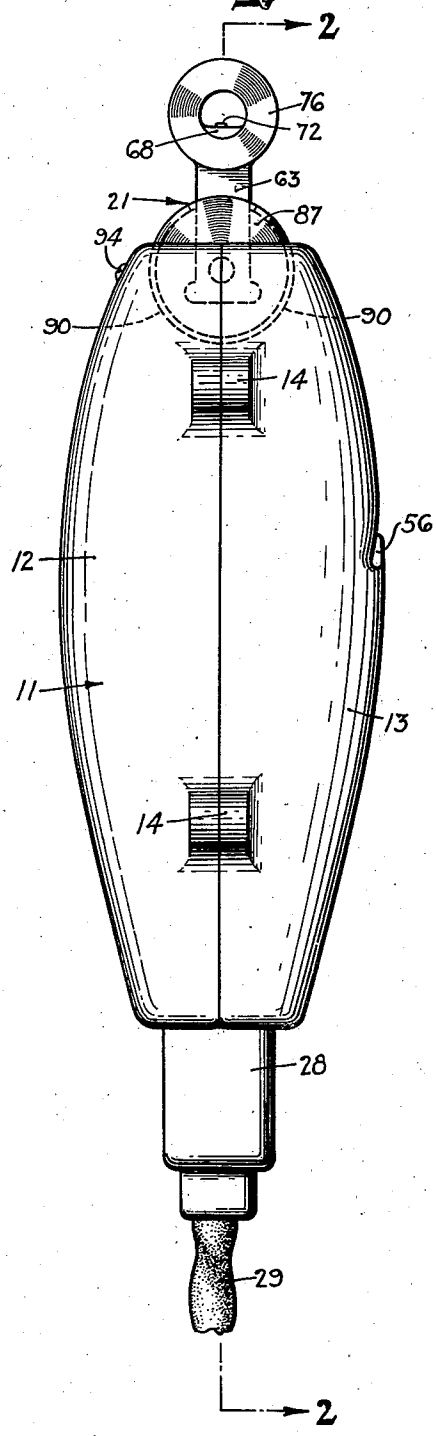
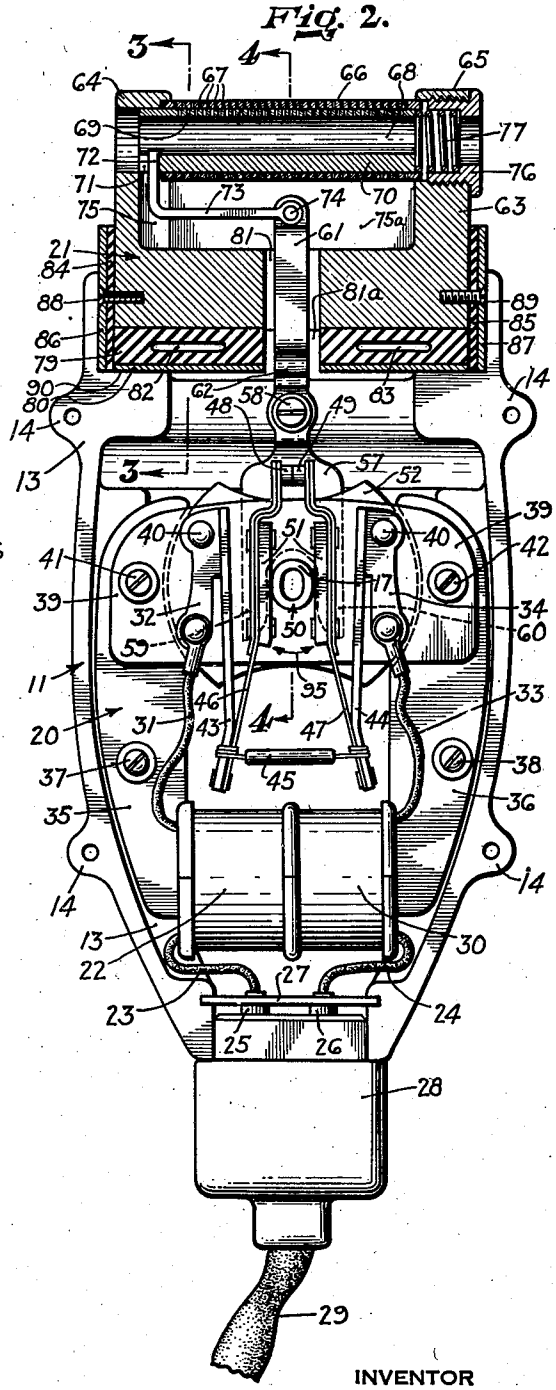


Fig. 2.



INVENTOR
GEORGES MONNET
BY
Richards & Geier
ATTORNEYS

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Fig. 3.

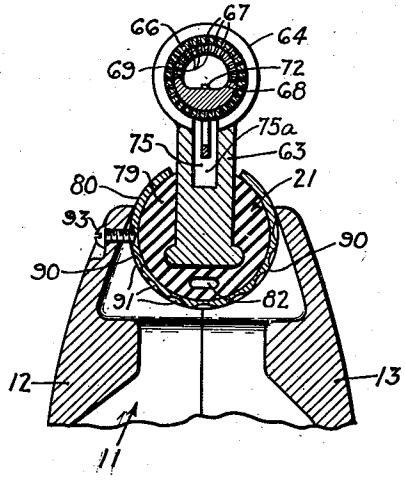


Fig. 4.

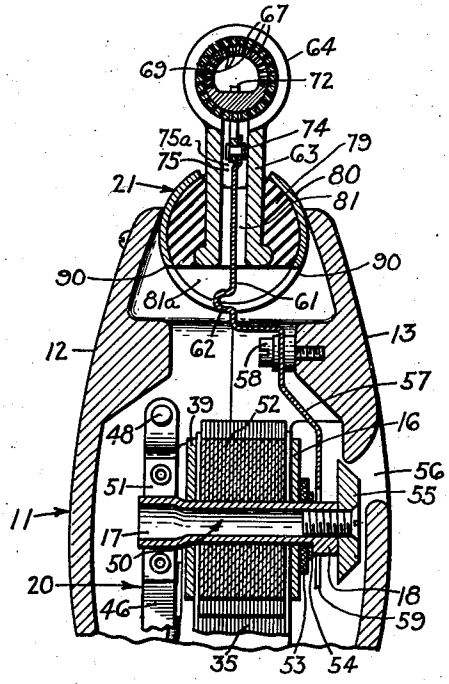


Fig. 5.

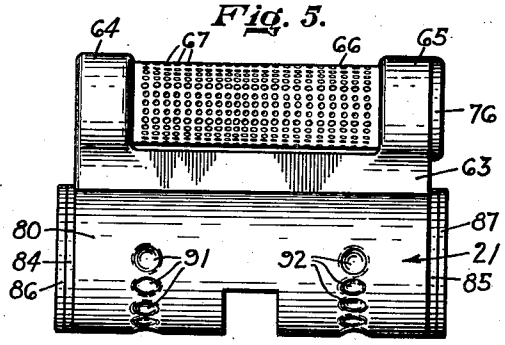


Fig. 7.

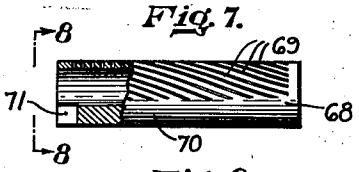


Fig. 8.

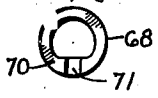


Fig. 6.

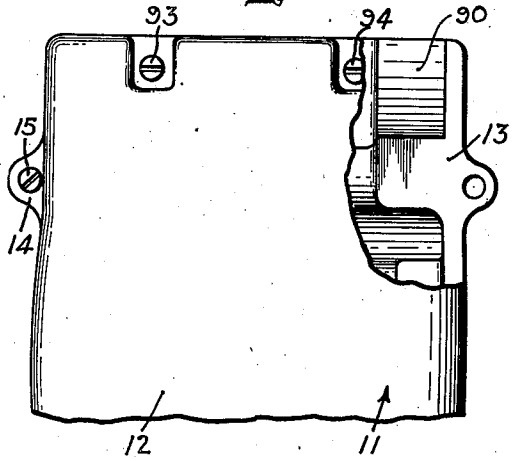
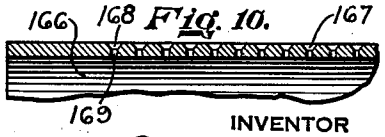


Fig. 9.



Fig. 10.



INVENTOR
GEORGES MONNET
BY
Richards & Geier
ATTORNEYS

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UNITED STATES PATENT OFFICE

2,232,717

SHAVING DEVICE

Georges Monnet, New York, N. Y.

Application December 16, 1937, Serial No. 180,064

12 Claims. (Cl. 30—43)

This invention relates to a shaving device, and refers more particularly to an electrically operated shaver.

Electrical shavers now in use often cut the skin of the user and are rather inconvenient to handle, since they must be always held in a predetermined position relatively to the skin.

An object of the present invention is to diminish or eliminate the danger of injury to the person shaving himself with an electrical shaver.

Another object is the provision of an electrical shaver having a yieldable resilient and/or elastic support interposed between the cutting means and the handle for the purpose of adjusting the pressure exerted upon the skin in the course of the shaving.

A further object is the provision of a shaver the cutting means of which may by easily and freely moved over the skin of the user.

A still further object is the provision of a shaver the cutting means of which may be inclined at any desired angle to the handle, thereby facilitating the holding of the device in the course of the shaving.

The above and other objects of the present invention may be realized through the provision of a shaver the cutting means of which are separated from the handle portion containing the driving means by an elastic and/or resilient element consisting, for example, of a rubber support or a pneumatic support. This element has preferably the form of a cylinder, which is adjustably mounted in the handle so that the cutting means may be inclined at any desired angle relatively to the handle.

The cutting means comprise preferably an outer rotatably mounted cylinder provided with perforations co-operating with a reciprocable cutting device which is supported within the rotary cylinder and which shaves off the beard extending through these perforations.

The invention will appear more clearly from the following detailed description when taken in connection with the accompanying drawings, showing by way of example preferred embodiments of the inventive idea.

In the drawings:

Figure 1 is a side view of an electrical shaver constructed in accordance with the principles of the present invention;

Figure 2 is a section along the line 2—2 of Figure 1;

Figure 3 is a section along the line 3—3 of Figure 2;

Figure 4 is a section along the line 4—4 of Figure 2;

Figure 5 is a front view of the cutting means of the shaver;

Figure 6 is a detail view showing that portion of the casing which supports the cutting means, some parts of the casing being broken off;

Figure 7 is a detail view showing the cutter partly in side elevation and partly in section;

Figure 8 is a side view of the cutter shown in Figure 7, looking in the direction of the arrows 8—8 of that figure, and

Figures 9 and 10 show modified constructions of the cutter and the roller, respectively.

The shaver shown in Figures 1 to 8 of the drawings comprises a casing or handle portion 11 consisting of two elongated shells 12 and 13 which are provided with projections or ear portions 14 (Figs. 1, 2 and 6). These projections are provided with openings for the bolts 15 (Fig. 6) which hold together the two halves of the casing 11. The projections 14 are so located that the middle portion of the casing 11 may be conveniently grasped by the hand of the user.

The casing 11 contains a driving mechanism which is generally designated by the numeral 20 and a cutter which is generally designated by the numeral 21 and which projects in part outside of the casing and is adjustable relatively thereto.

In driving mechanism 20 which in Figure 2 comprises field coils 22 and 30 which are connected by wires 23 and 24 with terminals or prongs 25 and 26, are carried by an insulating plate 27. The plate 27 is mounted within suitable recesses provided within the casing 11. The prongs 25 and 26 may be connected electrically with the terminals carried by a plug 28, which is preferably made of rubber and which is connected to a source of electrical energy by a wire or cord 29.

The coil 22 is connected by means of a wire 31 to a conducting plate 32, while the coil 30 is connected by the wire 33 to a similar plate 34.

Two magnetic poles 35 and 36 are connected by bolts 37 and 38 to the casing 11. The conducting plates 32 and 34 are fixed upon an insulating plate 39 by the bolts 40, the plate 39 being attached to the magnets 35 and 36 by the bolts 41 and 42, which also extend through another insulating plate 16 situated on the opposite side of the magnets 35 and 36 (Fig. 4).

Each of the plates 32 and 34 is integral with an elongated conducting bar 43 or 44 (Fig. 2); a condenser 45 used to provide a smooth uninterrupted flow of the electrical current, is connected with the two bars 43 and 44.

A resilient conducting spring 46 is connected at one end with the adjacent end of the bar 43. A similar conducting spring 47 is situated opposite the spring 46 and is connected to the member 44. The opposite ends of the springs 46 and 47 carry contacts 48 and 49, which may be brought into engagement with each other or separated one from the other, thereby establishing a make-and-break connection and making the device avail-

able for use with direct current, as well as alternating current.

A hollow shaft 50, has an oval or ellipsoidal portion 17, which is situated between the springs 46 and 47 and is in engagement with insulation pieces 51, carried by these two springs.

The shaft 50 carries the armature 52, which is rotatable along with the shaft and which is situated between opposed ends of the two poles 35 and 36.

As shown more clearly in Figure 4, washers 53 and 54 enclose the shaft 50, one end of which carries a starting wheel 55. A portion of the wheel 55 is situated close to an opening 56 provided in the casing 11, so that the starting wheel 55 may be conveniently operated by the user.

As shown in Figures 2 and 4, a driving member 57 is mounted upon a pivot 58 and is oscillatable around that pivot. The lower portion of the member 57 is bifurcated and comprises two prongs 59 and 60, which embrace an eccentric portion 18 of the shaft 50.

The upper portion of the member 57 has the form of a leaf spring 61, which is provided with one or more folds 62 used to supply additional metal whenever the spring 61 is extended.

The cutting device generally designated by the numeral 21 comprises a stand 63 having two opposed rounded supporting portions 64 and 65. A roller 66 is rotatably mounted in suitable cut-out portions provided in the supports 64 and 65. The roller 66 comprises a plurality of openings 67 through which the beard extends immediately prior to the cutting operation.

A cutter 68 is snugly fitted within the roller 66. The cutter 68, which is shown separately in Figure 7, has the form of a cylinder, one half of which is comparatively thin and is provided with diagonal cutting slots 69. The lower non-perforated part 70 of the cylindrical cutter 68 is much thicker and is provided with a slot 71 containing the end 72 of a hook 73, the opposite end of which is mounted at 74 upon the upper end of the spring 61.

The stand 63 is provided with slots 75, 75a and 81 through which the spring 61 and the hook 73 extend.

The support 65 is hollow and carries a threaded cap 76, which is also hollow and which comprises a chamber containing a coiled spring 77. One end of the spring 77 presses against a recess formed in the cap 76, while the opposite end of the spring 77 presses against one end of the cutter 68.

The stand 63 is carried by a rubber cylinder 79, which is enclosed by a metallic casing 80. The rubber cylinder 79 which is provided with the central slot 81a, may enclose hollow chambers or pockets 82 and 83 filled with compressed air or any other suitable fluid.

Rubber washers 84 and 85 are situated on opposite sides of the support 63. Steel washers 86 and 87 cover the rubber washers 84 and 85 and are connected by bolts 88 and 89 to the support 63.

As shown more clearly in Figures 1, 2, 3, 4 and 6 of the drawings, the upper ends of the two shells 12 and 13 of the casing 11 form a recess 90 within which the rubber cylinder 79 is situated. The adjacent side walls of the casing 11 are cylindrical in form so that the cylinder 79 enclosed in the casing 80 fits snugly within the casing 11 and is enclosed to about two-thirds by the casing 11. The lower part of the outer surface of the casing 80 is provided with two sets of cavities 91 and 92, (Fig. 5) which may be engaged by the ends of the set-screws 93 and 94 (Figs. 3 and 6). The set-screws 93 and 94 are situated within cut-out portions of the casing 11 and may be conveniently manipulated by hand to adjust the position of the cutting mechanism 21.

It is apparent that due to the described arrangement the cutting mechanism 21 may be rotated to the extent of about 60° or 90° relatively to the casing 11 and may be fixed in any suitable inclined position in relation to the casing. In order to change the position of the cutting device 21, it is merely necessary to unscrew the bolts 93 and 94, set the cutting device 21 as desired, and then insert the set-screws 93 and 94 into those cavities 91 and 92, which are situated opposite the ends of the set-screws. Then the cutting device 21 is held firmly in the desired position.

Due to the rotation of the cutting device 21 the spring 61 may be somewhat extended, the fold 62 of the spring 61 being used to provide any additional required metal.

The device is operated as follows:

If the armature 52 is in its neutral position in relation to the poles 35 and 36, it may be necessary for the user to turn the wheel 55, in order to start the device.

The electrical current supplied through the wire 29 and the plug 28 reaches the terminals 25 and 26 and energizes the field coils 22 and 30 through the wires 23 and 24, thereby causing a magnetization of the poles 35 and 36. The current is transmitted to the make-and-break connection 48, 49 through the wires 31 and 33, the plates 32 and 34, the bars 43 and 44 and the springs 46 and 47. The armature 52 will rotate along with the shaft 50 due to the magnetization of the poles 35 and 36 and the make-and-break connection 48, 49 will make it possible to cause the operation of the device with direct current as well as with alternating current.

The prongs 59 and 60 of the oscillatable driving member 57 which are mounted upon an eccentric portion 18 of the shaft 50 will oscillate around the pivot 58 in the directions of the arrows 95 shown in Figure 2. Since the hook 73 is firmly connected with the spring 61 of the driving member 57, the end 72 of the spring will reciprocate in the direction of the central axis of the cutter 68.

When the end 72 is moved toward the support 65, the cutter 68 will compress the spring 77. When the end 72 is moved in the opposite direction, the compressed spring 77 will be released and will move the cutter 68 toward the support 64. Due to this arrangement, the cutter 68 will carry out small rapid strokes within the roller 66 and the sharp edges of the slots 69 will cut the hair extending through the openings 67 and 69.

Due to the adjustability of the cutting device 21, the shaver is convenient and easy to handle. Since the cylinder 66 may roll in the course of the shaving, the movement of the cutting device over the skin will be considerably facilitated. The provision of the elastic and/or resilient supporting member 79, which may consist of a rubber cylinder or an inflated pneumatic chamber, will further the smoothness of the shave and will prevent the cutting of the skin.

Figure 9 shows a modified cutter construction, the openings 169a of the cutter 168a converging toward the outer surface of the cutter.

Figure 10 shows a modified form of a roller 166 the openings 167 of which diverge in the direction toward the exterior of the roller and consist actu-

ally of two portions, namely, a conical outer portion 168 and a cylindrical inner portion 169.

It has been found that through the use of openings of this type the cutting of human hair at its root is considerably facilitated and the danger of cutting hairs below the roots and thereby injuring the skin are avoided. On the other hand, the combination of the openings 167 and 169a would ensure that the hair is cut substantially closely to the root without leaving the lower portion of the hair uncut.

It is apparent that the specific illustrations shown above have been given by way of illustration and not by way of limitation, and that the structures above described are subject to wide variation and modification without departing from the scope or intent of the invention, all of which variations and modifications are to be included within the scope of the present invention.

What is claimed is:

1. The electrical shaver which comprises a perforated roller, a cutter within said roller, means connected with said cutter for preventing rotary movement of said cutter, means connected with the first-mentioned means for reciprocating said cutter relatively to said roller, a casing, and means carried by said casing and connected with said roller for adjusting the position of said roller relatively to the casing to facilitate the shaving.

2. In an electrical shaver, a cutting device comprising a perforated roller, a support rotatably supporting said roller, a cutter within said roller, and means connected with said cutter to prevent rotary movement of said cutter relatively to said roller, said cutter being reciprocable in the longitudinal direction of said roller and having edges situated adjacent the perforations of said roller.

3. A device in accordance with claim 2, the perforations of said perforated roller having side walls at least a part of which diverges in the direction toward the outer surface of said roller.

4. A device in accordance with claim 2, said cutter having the form of a perforated cylinder fitting within said roller, the perforations of said cutter having side walls substantially Y-shaped in cross section of the cutter.

5. The electrical shaver which comprises, a casing, a perforated roller movably mounted in said casing and adapted to be inclined at various angles relatively to said casing, a cutter within said roller means connected with said cutter for operating the same, and mechanical means carried by said casing for holding said roller at predetermined angles of inclination relatively to said casing.

6. In an electrical shaver, the combination of a pair of cutting elements and a casing, with a stand for said cutting elements, elastic means carrying said stand and adjustably mounted in said casing, releasable means carried by said casing for holding the first-mentioned means within said casing, and means extending through the first mentioned means and connected with at least one of said cutting elements for actuating the same.

7. In an electrical shaver, the combination of a pair of cutting elements and a casing, with a stand for said cutting elements, pneumatic means carrying said stand and adjustably mounted in said casing, releasable means carried by said casing for holding the first-mentioned means within said casing and means connected with at least one of said cutting elements for actuating the same.

8. In an electrical shaver, the combination of a pair of cutting elements and a casing, with a stand for said cutting elements, a rubber cylinder enclosing a portion of said stand and being adjustably mounted in said casing, releasable means carried by said casing for holding said stand and said rubber cylinder within said casing, and means extending through said rubber cylinder and connected with at least one of said cutting elements for actuating the same.

9. In an electrical shaver, the combination of a pair of cutting elements and a casing, with a stand for said cutting elements, a rubber cylinder enclosing a portion of said stand, a casing enclosing said rubber cylinder and adjustably carried by the first-mentioned casing, a set-screw carried by the first-mentioned casing and engaging the second-mentioned casing for holding said stand, said rubber cylinder and the second mentioned casing in a predetermined position relatively to the first-mentioned casing, and means extending through said rubber cylinder and connected with at least one of said cutting elements for actuating the same.

10. In an electrical shaver, the combination of a cutter with a rotatable perforated roller enclosing said cutter, the cutting edges of said cutter being situated adjacent the perforations of said roller, supports rotatably supporting said roller at both ends thereof, means engaging said cutter to prevent rotation of the same and for periodically moving the same from its original position in a predetermined direction relatively to said roller to provide a cutting movement between the cutting edges of the cutter and the edges of the perforations of said roller, and means carried by one of said supports and engaging said cutter for returning it to its original position.

11. In an electrical shaver, a cutter, a rotatable perforated roller enclosing said cutter, the cutting edges of said cutter being situated adjacent the perforations of said roller, supports rotatably supporting said roller at both ends thereof, a hook-shaped member extending through an opening formed in said roller and engaging one end of said cutter, a pivoted driving member having one end carrying said hook-shaped member, said end of the driving member having at least one fold formed therein, means rotatably carrying said supports, resilient means carried by one of said supports and engaging the opposite end of said cutter, and means carried by the first-mentioned means for actuating said pivoted driving member to provide a cutting movement between the cutting edges of the cutter and the edges of the perforations of said roller.

12. In an electrical shaver, a cutting device comprising a perforated roller, a support rotatably supporting said roller, a cutter within said roller, said cutter having cutting edges situated adjacent the perforations of said roller, means connected with said cutter for reciprocating it relatively to said roller, a casing enclosing said means and constituting a handle, and means connected with said support and said casing for rotatably and adjustably supporting said support within said casing.

GEORGES MONNET.