Oct. 1, 1940. P. K. McGALL 2,216,672

SHAVING DEVICE

Filed Aug. 13, 1936

Fig. 1.

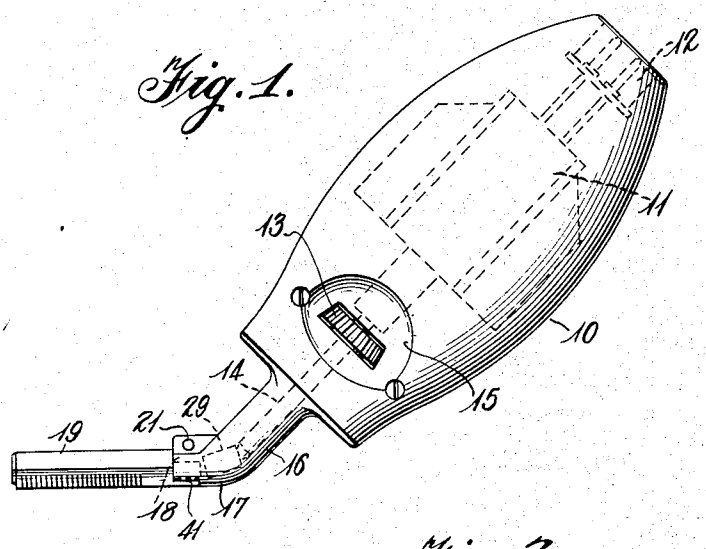


Fig. 2.

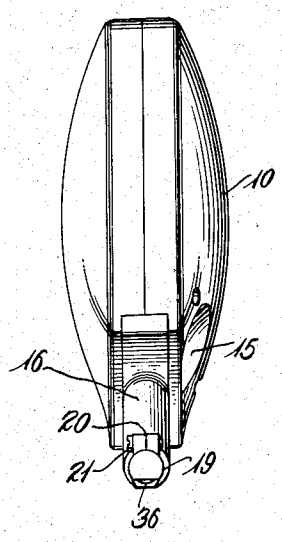


Fig. 3.

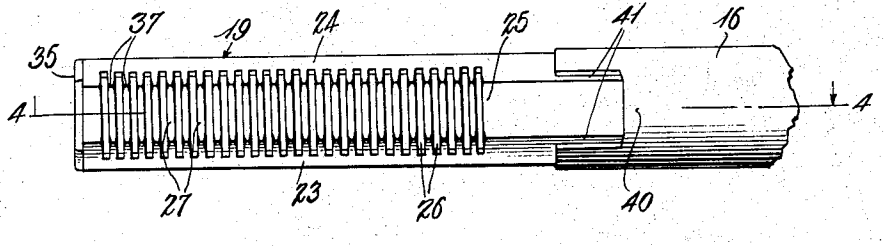


Fig. 4.

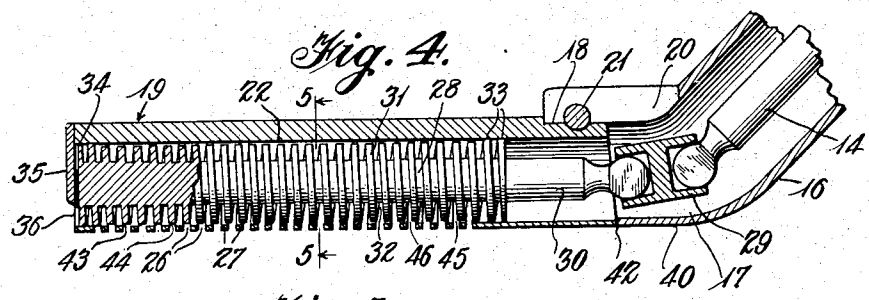
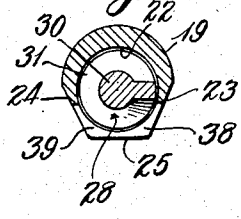


Fig. 5.



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SHAVING DEVICE

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Application August 13, 1936, Serial No. 95,908

4 Claims. (Cl. 30—43)

The invention relates to shaving devices and has as an object the provision of a device of this character operating purely by rotary motion.

It is an object of the invention to provide a device having a rotor provided with a helical cutting edge of relatively close turns cooperating with cutter bars presenting cutting edges opposed to the action of said helical edge to provide a shearing action therewith.

It is a further object of the invention to provide a helical cutting edge revolving closely adjacent but out of actual contact with cutting edges carried by cutter bars, the edges spaced from each other a distance less than the diameter of a hair.

It is a further object of the invention to provide a device of this character wherein separated hairs are conveyed to an end of the device for discharge.

It is a further object of the invention to provide cutting edges of the character described forming with each other an angle such as to avoid pulling upon the hairs.

It is a further object of the invention to provide a device of this character having the shaving portion arranged at a convenient angle to the casing containing the motor.

Further objects of the invention will appear from the following description when read in connection with the accompanying drawing showing an illustrative embodiment of the invention, and wherein:

Figure 1 is a side elevation;

Fig. 2 is an edge view seen from the left of Figure 1;

Fig. 3 is a bottom plan view of the cutter portion of the device shown upon an enlarged scale;

Fig. 4 is a longitudinal section on line 4—4 of Fig. 3; and

Fig. 5 is a vertical transverse section on line 5—5 of Figure 4.

As shown the device comprises a handle portion 10 containing an electric motor 11 of any desired character provided with an attachment receptacle 12.

To start the motor into operation there is shown a thumb wheel 13 rigidly mounted upon the shaft 14 of the motor, the thumb wheel 13 being exposed in a cavity 15 at a side of the handle 10. When the current is turned on, the motor may or may not start immediately into rotation. If it does not, the thumb of the operator may be applied to the wheel 13 to give an initial movement, when the motor will start and continue to operate but may be stalled at any time by pressure upon the wheel 13.

The handle 10 is shown as provided with an extension 16 terminating in an angularly related portion 17 having a socket portion 18 for reception of the casing 19 of the cutter apparatus. The portion 17 of the handle is desirably split as shown at 20 and a clamp screw 21 is provided to clamp the casing 19 in position.

The casing 19 is shown as formed with a cylindrical bore 22 eccentric therewith and for convenience in use portions of this casing are cut away to provide longitudinal plane surfaces 23, 24 and a face-contacting plane surface 25. Although the angles between these surfaces are not necessarily 60°, yet the three surfaces may be described as substantially one-half of a hexagon.

The surface 25 is provided with a plurality of slits 26 to leave cutter bars 27, the inner portions of which present cutting edges.

Rotatable in the casing 19 is a rotor 28 driven from the motor shaft 14 through the medium of a universal joint 29. It will be obvious that the end portion of the motor shaft 14 may be a flexible shaft having a coupling of any character with the shaft 30 of the rotor 28. The rotor 28 is shown as formed with a helix 31 comprising spaced turns separated by helical groove 32 so as to provide a helical cutting edge upon the leading edge of the turns of the helix.

To keep the outer face of the helix 31 from actual contact with the cutter bars 27, non-cutting portions 33, 34 thereof are made slightly larger than the remainder and of such a dimension as to form a close turning fit with the bore of the casing. The clearance thus provided between the helical cutting edge and the cutter bars 27 may be of the order of .0005 of an inch, in other words, the portions 33, 34 are .001 of an inch larger in dimension than the cutting portion.

To permit the discharge of particles of hair clipped by the helical edge coacting with the edges of the cutter bars, the end 35 of the casing is shown as cut away at its lower portion to provide a discharge opening 36.

Dimensions for the device which are found to be satisfactory are a diameter of substantially three-sixteenths of an inch for the outer edges of the helix and with a pitch of the helix of substantially thirty turns per inch. With these dimensions and this pitch, the angle of the helical cutting edge to the axis of the rotor is substantially 3.25 degrees. It is found that if the slits separating the cutter bars 27 are at right angles

to the axis, the resulting angles of the helical turns to the cutting edges carried by the bars of substantially 3.25 degrees will tend to cause the hairs to be dragged laterally before they are severed, resulting in a pulling on the beard. On the other hand, if the angle between the helical cutting edge and the edges carried by the bars is too small, the hairs will tend to be rolled along.

It is therefore preferred as shown to form the slits **26** separating the cutting bars at an angle to the axis of the rotor and it has been found by experiment that with the rotor formed as described, this angle of the slits to the axis should be about 2.50 degrees, thus providing an angle between the relatively moving cutting edges of substantially .75 of a degree. This angle is found to be somewhat critical and it is at present preferred to make this angle not substantially more than one degree or less than about .50 of a degree.

To guide the hairs into the spaces between the cutter bars, the ends of the bars at the angles between the surfaces **23**, **24** and the surface **25** are desirably pointed as indicated at **37**, Figure 3.

The thickness of the cutter bars **27** at the lowest portion of the bore **22** is made as little as possible consistent with the necessary strength of the bars, and this strength is assisted by their thickening at the points **38**, **39**, Figure 5.

The lower surface **25** of the casing **19** is desirably made continuous with the lower surface **40** of the handle portion **17** and to this end the socket for reception of the casing **19** may be cut away as indicated at **41**, Figure 3, the portion **17** being formed with a shoulder **42** to be abutted by the lower wall of the casing **19**.

If the spacing between the turns **31** of the helix be made exactly the same as the spacing of the cutter bars **27**, the entire length of the helical cutting edge will be coacting with the edges of the cutter bars at the same instant, placing an undue strain upon the motor. To avoid this action, the spacing is, as indicated in Figure 4, made slightly different so that when the portions indicated between the lines **43**, **44** and for instance the space indicated between lines **45** and **46** are in the act of cutting, other portions will be out of action, therefore separating the cutting action into traveling zones, non-active zones being represented at any instant by portions wherein the edges of the helical turns **31** have closed the slits.

Minor changes may be made in the physical embodiment of the invention within the scope of the appended claims without departing from the spirit thereof.

I claim:

1. A shaving device comprising: a casing having a bore and a plurality of transverse slits opening through a wall thereof to form cutter bars each presenting a cutting edge at the surface of said bore; a rotor revoluble in said bore; a closely spiraled helical cutting edge carried by said rotor coacting in shear with said first named cutting edges; means to hold said coacting cutting edges out of actual contact; and means to cause revolution of said rotor.

2. A shaving device comprising: a cutter casing having a bore eccentric therein and an end wall; said casing exteriorly semi-cylindrical at the thickest portion of its wall and substantially semi-hexagonal about the remainder of its exterior; the plane surface standing between the remaining plane surfaces of the semi-hexagonal portion of the casing being at the thinnest portion of the wall; said first named plane surface wall having a plurality of transverse slits defining cutter bars presenting cutting edges at a surface of said bore with the slit adjacent the closed end of the casing spaced therefrom; a rotor revoluble in said casing and abutting said closed end; a closely spiraled helical rib carried by said rotor extending to said casing abutting end thereof and presenting a helical cutting edge to coact with said cutting edges; a non-cutting portion of said rib adjacent the casing abutting end thereof and a non-cutting portion of the rotor adjacent the remaining end thereof having a close running fit in said bore and the cutting portion of the rotor of slightly less diameter to hold the cutting edges out of actual contact; and means to drive said rotor.

3. A shaving device comprising: a rotor comprising a central rigid core and a helical rib carried by said core presenting a helical cutting edge; a casing having a bore housing said rotor; transverse, spaced cutter bars carried by said casing at one portion of said bore each presenting a cutting edge at the surface of said bore to coact with said helical cutting edge; the spacing of said cutter bars differing from the pitch of said helical cutting edge to cause the turns of said helical cutting edge to coact at all times with a non-successive plurality of said cutter bar edges; and means to cause revolution of said rotor.

4. A shaving device comprising: a rotor comprising a central rigid core and a helical rib carried by said core presenting a helical cutting edge; a casing having a bore housing said rotor; transverse, spaced cutter bars carried by said casing at one portion of said bore each presenting a cutting edge at the surface of said bore to coact with said helical cutting edge; the spacing of said cutter bars differing from the pitch of said helical cutting edge to cause the turns of said helical cutting edge to coact at all times with a non-successive plurality of said cutter bar edges; bearings for the rotor in the casing adjacent the respective ends of said helical cutting edge.

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