June 11, 1957 L. G. RITCHEY ET AL 2,795,042

ROTARY ELECTRIC SHAVER

Filed Nov. 18, 1954

FIG. 1.

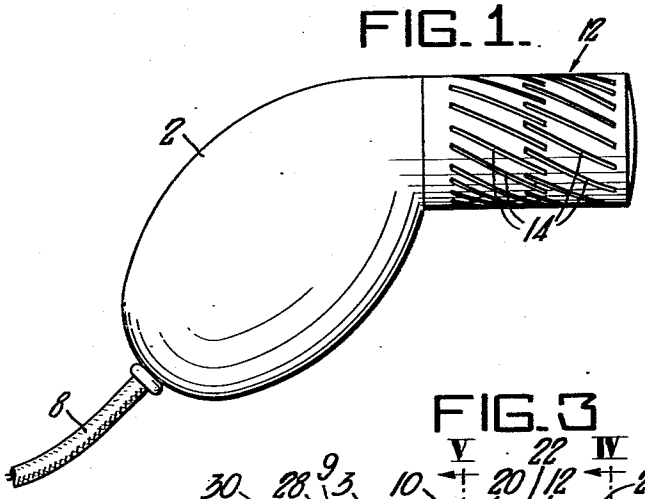


FIG. 2.

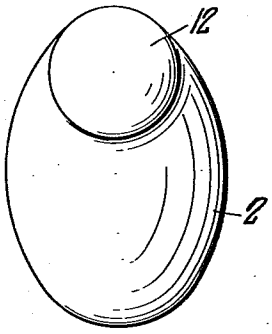


FIG. 3

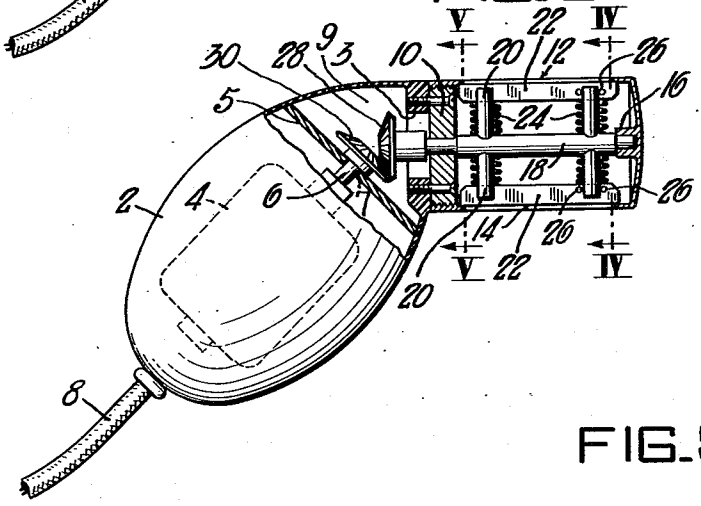


FIG. 4.

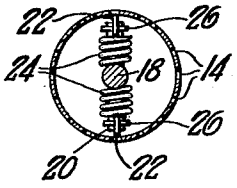


FIG. 5.

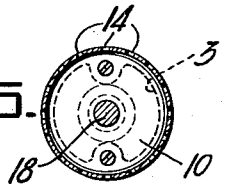


FIG. 6.

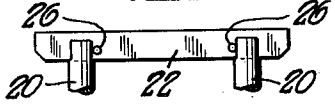
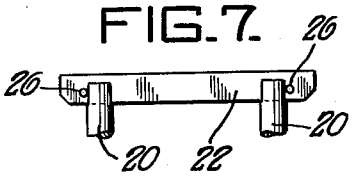


FIG. 7.



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ROTARY ELECTRIC SHAVER

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4 Claims. (Cl. 30—43)

The present invention relates to dry shavers and more particularly to an improved electrically powered dry shaver.

It is well known that dry shavers of the electrically powered type are old and many modifications thereof are currently available on the market. The prior are electric shavers with which we are familiar are of complex construction and involve intricate mechanisms made up of large numbers of parts. The complexity of construction of these devices not only made their manufacturing costs high but also caused them to be more difficult and expensive to maintain and repair.

It is, accordingly the primary object of our invention to provide an improved electric shaver that is light in weight, simple and sturdy in construction, inexpensive to manufacture, and easily disassembled for purposes of cleaning and maintenance.

It is another object of our invention to provide an electric shaver having a simple balanced shearing mechanism which functions free of vibration in a highly efficient manner.

It is a further object of our invention to provide an electric shaver having a rotatable cutting blade carrier so arranged that the blades are self-sharpened as the shaver is used.

These and other objects will become more apparent after referring to the following specification and attached drawings, in which:

Figure 1 is a side elevational view;

Fig. 2 is an end view looking to the left of Figure 1;

Figure 3 is a longitudinal sectional view;

Figure 4 is a cross-sectional view taken on the line IV—IV of Figure 3.

Figure 5 is a cross-sectional view taken on the line V—V of Figure 3;

Figure 6 is a side elevational view showing a modified arrangement in the positioning of the cutter blades of the invention; and

Figure 7 is a side elevational view similar to Figure 6 showing another modified blade arrangement.

Referring more particularly to the drawings, reference numeral 2 designates a substantially oval shaped combination handle-and-motor housing having an opening 3 in one end and containing an electric motor 4 provided with a drive shaft 6 a partition wall 5 having a center hole 7 therethrough is provided in the housing 2 spaced a short distance inwardly from the opening 3, as best shown in Figure 3. The drive shaft 6 of the motor 4 projects through the hole 7. The housing 2 is preferably made of synthetic plastic material suitable to be molded into the desired oval shape. As best shown in Figure 3, the opening 3 in the end of the housing 2 is directed in a plane disposed at an angle in excess of 90 degrees, preferably in the range of 120–135 degrees, to the plane of the longitudinal axis of the housing for a purpose which will become manifest as this description proceeds. The motor 4 is of small size and of the type presently widely used for powering dry shavers. Electric current is supplied to the motor in the conventional manner by means of an insert plug and cord 8.

A circumferentially threaded base plate 10 having a center hole therethrough is removably affixed, by means of screws or the like, to the housing 2 over its open end 3.

A hollow cylindrical cutter head 12 having an internally threaded open end and a closed end is threaded onto the base plate 10 by its internally threaded open end

and extends from the housing 2 in the plane in which the open end 3 thereof is directed. The cutter head is made of thin gauge metal and is provided with a plurality of diagonal slots 14 through its side wall. A bearing 16 is provided on the inner surface of the closed end of the cutter head for supporting one end of a cutter blade carrier.

The cutter blade carrier is rotatably disposed in the cutter head and includes a shaft 18 having reduced diameter end portions. Two pairs of aligned arms 20, having radial slots in the free ends thereof, are mounted on the shaft 18. The arms in each pair are axially spaced from each other and extend normal to the shaft. The two pairs of arms are arranged at an angle of 180 degrees to each other and have their arms equidistantly axially spaced so as to insure perfect balance and minimize the possibility of vibration while shaft 18 is rotating. If desired, more than two pairs of arms may be provided on the shaft so long as the pairs are disposed an equal distance apart so that the blade carrier is perfectly balanced. One reduced end of the shaft 18 is rotatably supported by the bearing 16 while the opposite reduced end projects through the center hole in the base plate 10 to extend into the interior of the housing 2.

A cutter blade 22 is carried by each pair of arms 20 slidably fitted in the radial end slots thereof. A helical spring 24 is circumferentially mounted on each of the arms with one end bearing against the shaft 18 and the opposite end bearing against the blade carried by the arm to urge the blades radially outwardly against the inner surface of the cutter head wall. Two spaced pegs 26 are attached to and project laterally from both faces of each of the cutter blades on opposite sides of one of the arms carrying the blade, as shown in Figure 3, or on opposite sides of the two arms, as shown in Figures 6 and 7, for the purpose of preventing axial movement of the blade. If preferred the pegs 26 may be positioned on only one face of each blade.

A bevel gear 28 is mounted on the reduced end portion of the shaft 18 which projects into the interior of the housing 2 and is in mesh with a bevel gear 30 which is affixed to the end of the motor drive shaft 6 which projects through the hole 7 in the partition 5 for transmitting rotative power from the motor 4 to the rotatable shaft 18. It is preferred that the bevel gears 28 and 30 be made of fiber or similar material which is self-lubricating so that it will not be necessary to provide a pool of oil or other lubricant in the compartment 9 of the housing 2 which is defined by the partition 5 and the base plate 10.

The cutting edges of the blades 22 are disposed normal to the inner surface of the thin side wall of the cutter head and are urged radially thereagainst by the pressure of the helical springs 24 so that, as the blade carrier is rotated, the cutting blades, in cooperation with the slots 14, exert a slicing action on the hairs which project through the slots as the shaver is moved along the face of the user. This slicing action results in faster and more efficient shaving. The arrangement whereby the cutting edges are always in contact with the inner surface of the side wall of the cutter head causes the cutter blades to be self-sharpening as the blade carrier rotates in use.

It will be noted that the cutter head 12 may be easily removed from the base plate 10 simply by unscrewing it from the circumferential threads on the plate so that the instrument may be easily cleaned and maintained.

The angulated disposition of the cutter head relative to the handle-housing makes it possible for the user to comfortably hold the shaver and move the cutter head along the bearded area of his face without obstructing his view in a mirror.

While one embodiment of our invention has been shown and described, it will be apparent that other adaptations and modifications may be made without departing from the scope of the following claims.

We claim:

1. An electric shaver comprising a housing having an opening in one end, an electric motor in said housing, a drive shaft on said motor extending co-axially of said housing toward said opening, a hollow cutter head removably attached to said one end of said housing, said cutter head being cylindrical in shape and having a plurality of spaced diagonal slots through the side wall thereof, a blade carrier rotatably disposed in said cutter head, said blade carrier including a shaft rotatably mounted in said cutter head, a first pair of aligned arms on said last-mentioned shaft extending in close proximity to normal thereto in axially spaced relation to each other, each of said arms having a radial slot therein, a second pair of aligned arms on said last-mentioned shaft extending in close proximity to normal thereto in axially spaced relation to each other, said second pair of arms arranged at an angle to the first pair of arms, each of said second pair of arms having a radial slot therein, a cutter blade adapted to be received in the slots of said first pair of arms, a second cutter blade adapted to be received in the slots of said second pair of arms, means for preventing axial movement of said blades in said slots, said means consisting of at least two spaced pegs attached to and projecting laterally from each of said cutter blades, the pegs on each of said blades disposed adjacent opposite sides of at least one of the arms carrying the blade, spring means bearing against said cutter blades to urge them radially outward, and means connecting said blade carrier with the shaft of said motor for rotating said blade carrier.

2. An electric shaver comprising a housing having an opening in one end, an electric motor in said housing, a drive shaft on said motor extending co-axially of said housing toward said opening, a hollow cutter head removably attached to said one end of said housing, said cutter head being cylindrical in shape and having a plurality of spaced diagonal slots through the side wall thereof, a blade carrier rotatably disposed in said cutter head, said blade carrier including a shaft rotatably mounted in said cutter head, a first pair of aligned arms on said last-mentioned shaft extending in close proximity to normal thereto in and axially spaced relation to each other, each of said arms having a radial slot in the outer end thereof, a second pair of aligned arms on said last-mentioned shaft extending in close proximity to normal thereto in axially spaced relation to each other, said second pair of arms arranged at an angle of approximately 180 degrees to the first pair of arms, each of said second pair of arms having a radial slot in the outer end thereof, a cutter blade adapted to be received in the slots of said first pair of arms, a second cutter blade adapted to be received in the slots of said second pair of arms, means for preventing axial movement of said blades in said slots, said means consisting of at least two spaced pegs attached to and projecting laterally from each of said cutter blades, the pegs on each of said blades disposed adjacent opposite sides of at least one of the arms carrying the blade, a helical spring surrounding each of said arms with one end bearing against said shaft and the opposite end bearing against the bottom of the cutter blade carried by the arm to urge the blades radially outward, and means connecting said blade carrier with the shaft of said motor for rotating said blade carrier.

3. An electric shaver comprising a housing having an opening in one end, an electric motor in said housing, a drive shaft on said motor extending co-axially of said housing toward said opening, a gear on the end of said shaft remote from said motor, an externally threaded base plate having a center hole therethrough detachably affixed to said one end of said housing and covering said opening with said hole communicating with said opening, a hollow cutter head having an internally threaded open end and a closed end threaded on said plate by its internally threaded open end, a bearing on the inner surface of said closed end, said cutter head being cylindrical in shape and having a plurality of spaced diagonal slots through the side wall thereof, a blade carrier rotatably disposed in said cutter head, said blade carrier including a shaft having reduced diameter end portions rotatably mounted in said cutter head with one end rotatably supported in said bearing and its opposite end projecting through the hole in said base plate with a portion thereof projecting into said housing, a first pair of aligned arms on said shaft extending in close proximity to normal thereto in axially spaced relation to each other, each of said arms having a radial slot in the outer end thereof, a second pair of aligned arms on said shaft extending in close proximity to normal thereto in axially spaced relation to each other, each of said second pair of arms having a radial slot in the outer end thereof, said second pair of arms arranged at an angle of approximately 180 degrees to the first pair of arms, a cutter blade slidably mounted in the slots of said first pair of arms, a second cutter blade slidably mounted in the slots of said second pair of arms, means for preventing axial movement of said blades in said slots, said means consisting of at least two spaced pegs attached to and projecting laterally from each of said cutter blades, the pegs on each of said blades disposed adjacent opposite sides of at least one of the arms carrying the blade, a helical spring surrounding each of said arms with one end bearing against said shaft and the opposite end bearing against the bottom of the cutter blade carried by the arm to urge the blades radially outward, and a gear on the projecting end of said shaft adapted to mesh with the gear on the end of said motor drive shaft to thereby rotate said blade carrier.

4. An electric shaver comprising a housing having an opening in one end, an electric motor in said housing, a partition in said housing spaced inwardly from said opening, a drive shaft on said motor extending co-axially of said housing through an opening in said partition toward first named opening in said housing, a gear on the end of said shaft remote from said motor, an externally threaded base plate having a center hole therethrough detachably affixed to said one end of said housing and covering said housing opening with said center hole communicating with said housing opening, a hollow cutter head having an internally threaded open end and a closed end threaded on said plate by its internally threaded open end, the longitudinal axis of said cutter head disposed at an angle to the longitudinal axis of said housing, a bearing on the inner surface of said closed end, said cutter head being cylindrical in shape and having a plurality of spaced diagonal slots through the side wall thereof, a blade carrier rotatably disposed in said cutter head, said blade carrier including a shaft rotatably mounted in said cutter head co-axially therewith with one end rotatably supported in said bearing and its opposite end projecting through the hole in said base plate with a portion thereof projecting into said housing, means on said last-named shaft for supporting a pair of cutter blades spaced axially around said last-named shaft, and a gear on the projecting end of said shaft adapted to mesh with the gear on the end of said motor drive shaft to thereby rotate said blade carrier; said gears disposed in the compartment defined by said partition and said base plate.

References Cited in the file of this patent

UNITED STATES PATENTS

2,265,281	Hale	Dec. 9, 1941
2,289,323	Dettle	July 7, 1942
2,555,621	Williamson et al.	June 5, 1951

FOREIGN PATENTS

254,608	Switzerland	Dec. 16, 1948