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N. OWENS

3,225,440

ELECTRIC SHAVER HAVING ANGLED BLADES ADAPTED TO BE
INSERTED IN CORRESPONDING ANGLED SLOTS IN
A BLADE SUPPORTING MEMBER

Filed Sept. 19, 1963

3 Sheets-Sheet 1

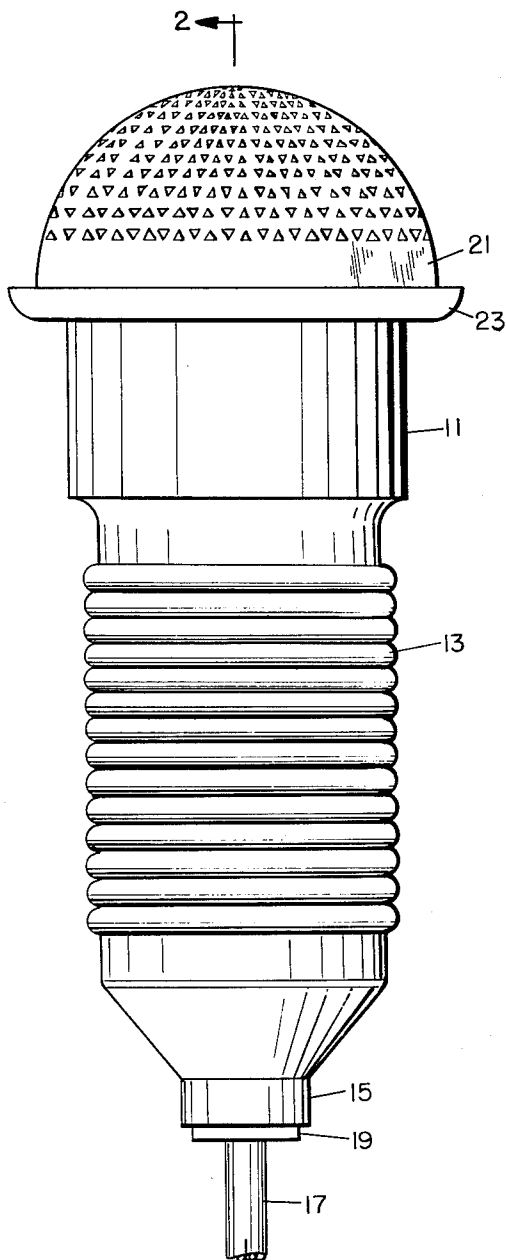


Fig. 1

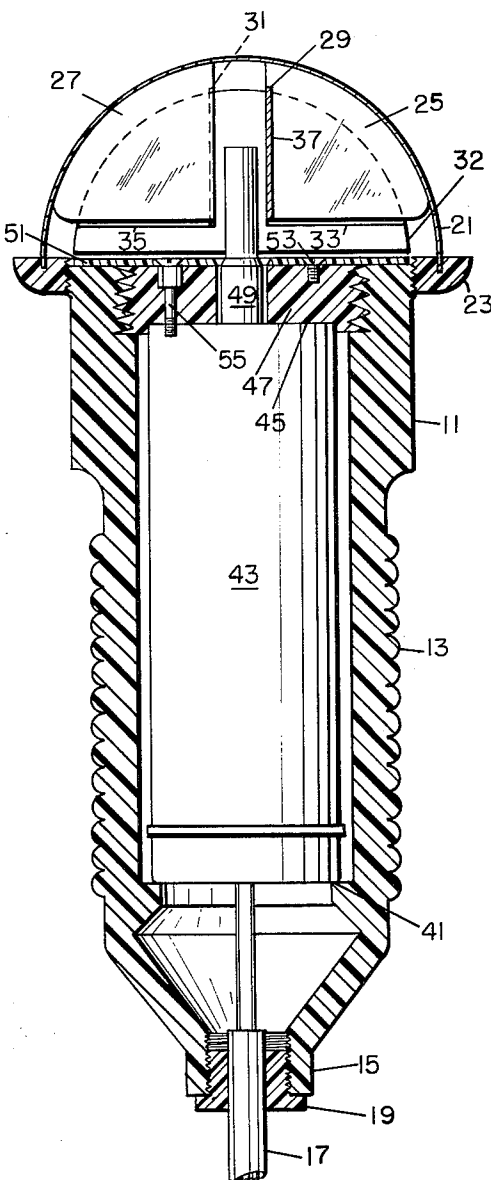


Fig. 2

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NEAL OWENS

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3 Sheets-Sheet 2

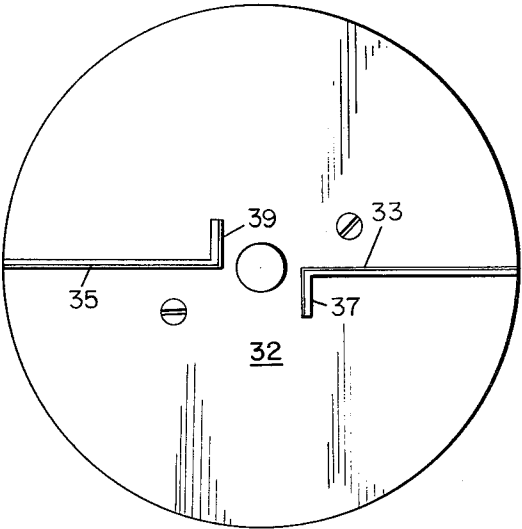


Fig 3

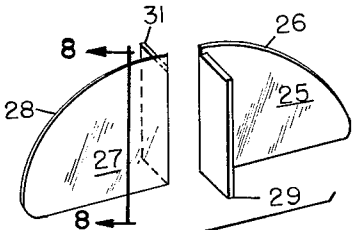


Fig. 4

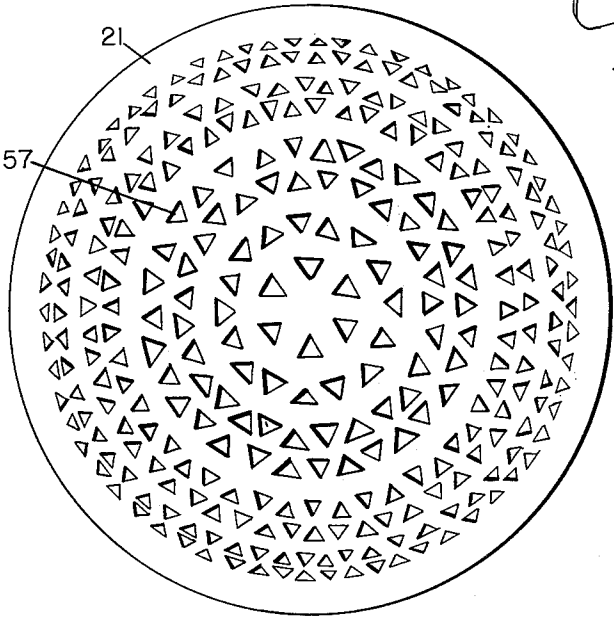


Fig 5

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3 Sheets-Sheet 3

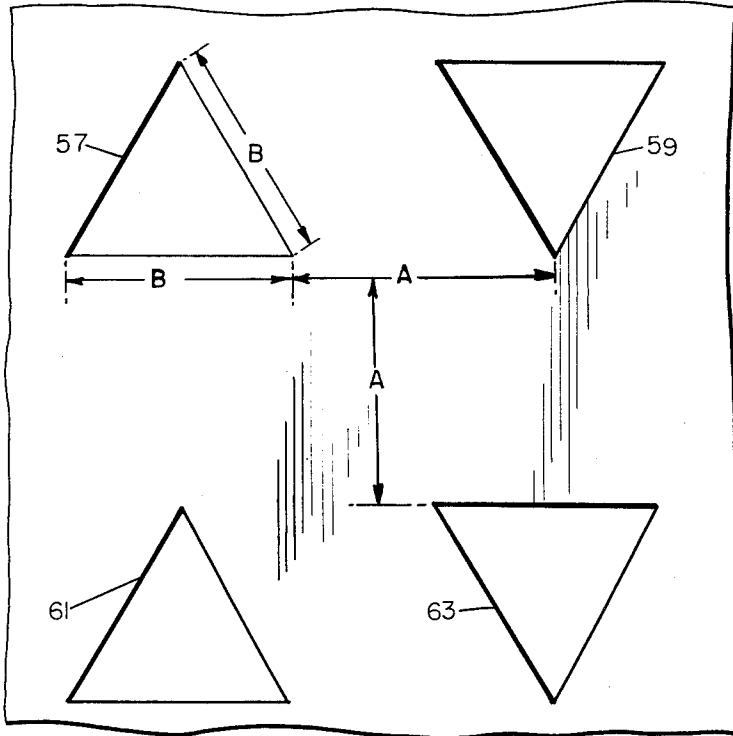


Fig. 6

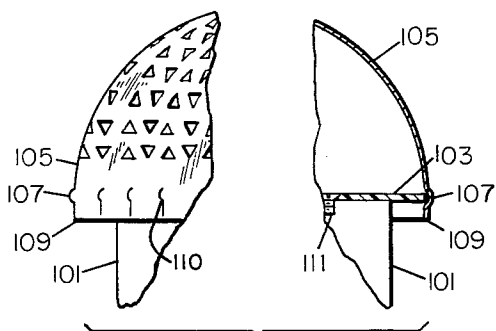


Fig. 7

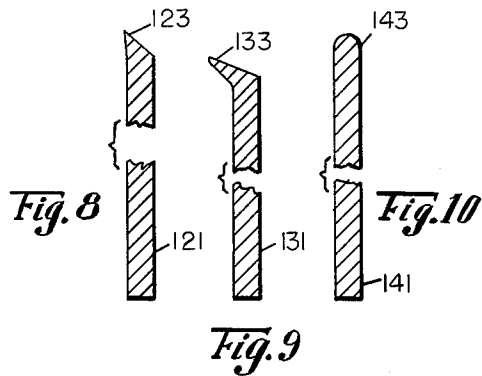


Fig. 8

Fig. 9

Fig. 10

INVENTOR
NEAL OWENS

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ELECTRIC SHAVER HAVING ANGLED BLADES ADAPTED TO BE INSERTED IN CORRESPONDING ANGLED SLOTS IN A BLADE SUPPORTING MEMBER

Neal Owens, 2223 Carondelet St., New Orleans, La.

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3 Claims. (Cl. 30—43.4)

This invention relates in general to electric shavers and more particularly to an electric shaver having a unique comb and blade arrangement.

Many types and sizes of electric shavers are available commercially at the present time. All of these razors have various types of comb and blade arrangements. In an effort to obtain optimum shaving results many of these razors have complicated mechanisms such as shaft gearing and/or spring arrangements to assure proper contact of the blade with the comb. Not only do these arrangements increase the cost of the completed device but they also increase the possibility of improper operation due to damage or breakage of these parts.

Accordingly, it is an object of this invention to provide an electric shaver having a minimum number of parts, thus providing an economical and simplified construction technique.

A further object of this invention is to provide an electric shaver employing a substantially hemispherical comb.

A still further object of this invention is to provide an electrical shaver having a substantially hemispherical comb having angled slots therein, and angled blades corresponding to the angled slots in said comb with cutting edges of substantially the same curvature as the comb.

Another object of this invention is to provide an electric razor wherein the contact between the blade and the comb is obtained by means of the centrifugal force developed by the rotation of the motor shaft.

Yet another object of this invention is to provide a comb having a unique aperture arrangement.

These and other objects will become obvious from the following description when taken in conjunction with the drawings wherein:

FIG. 1 is a side elevational view of the assembled device;

FIG. 2 is a sectional view taken along the lines 2—2 of FIG. 1;

FIG. 3 is a plan view of the cutter head;

FIG. 4 is an isometric view of the cutter blade arrangement;

FIG. 5 is a plan view of the comb;

FIG. 6 is an enlarged view illustrating a preferred arrangement of the apertures of the comb;

FIG. 7 is a partial view of a modified means for securing the comb to the body of the device; and

FIG. 8 is a sectional view taken along the line 8—8 of FIG. 4;

FIGS. 9 and 10 are sectional views of two modifications of the cutting blade which may be used.

Turning now more specifically to the drawings, FIGS. 1 and 2 illustrate a housing 11 which may be formed of plastic material and may have a gripping contour 13 thereon. At the bottom of the housing is a reduced section 15 through which the electrical cord 17 may pass. In order to firmly secure the cord to the housing a plug 19 may be threadably secured within the reduced section 15.

A comb 21 is secured within an annular ring 23 which is threaded on its interior circumference in order that it may be secured to the upper part of the housing 11.

FIG. 2 illustrates the device during operation wherein

the blades 25 and 27 are in contact with the inner surface of the comb 21.

A small electrical motor 43 is secured within the housing 11 and rests on the lip 41 within the lower part of the housing. A plug 47 is threadably inserted within the upper part of the housing and contacts the upper part of the electrical motor 43. A retaining plate 51 is fitted over the upper edge of the housing 11 and may be secured to the plug 47 by means of a screw 53. Additionally, a screw 55 may be used to secure the plug and retainer plate to the motor 43. Electric motor shaft 49 extends upwardly from the motor 43 and through a borehole in the plug 47.

A blade supporting member, which may be made of material such as plastic, is firmly secured to the shaft 49 by means such as a press fit so that it will rotate with the shaft. The blade supporting member as illustrated is of a solid hemispherical shape and, as shown more clearly in FIG. 3, has two inwardly extending opposed slots 33, 35 which terminate short of the motor shaft 49. Additionally, each of the slots 33, 35 has an interconnecting slotted leg 37 and 39, respectively, extending at substantially right angles thereto. The lower inner edge of slots 33, 35 terminates above the bottom of the hemispherical blade supporting member as more clearly shown in FIG. 2.

Blades 25 and 27 are designed so as to have a configuration substantially identical to the slots 33, 35 of the blade supporting member 32. These blades, as shown in FIG. 4, have a width less than the width of the slots in the blade supporting member so that they are free to move within these slots. The legs 29 and 31 of the blades 25 and 27 match the extension slots 37 and 39 of the slots 33 and 35 of the blade supporting member. The respective distances from the inner edges of the cutter blades 25 and 27 to their cutting edges 26 and 28 are less than the distance between the inner edges of the slots 33 and 35 to the inner surface of the comb. Therefore, when the motor 43 is not rotating the shaft 49, the blades will sit on the bottom surface of the slots. However, when the motor 43 rotates shaft 49, the blades are forced outwardly and upwardly in the slots and contact the inner surface of the comb 21. The use of the legs 29 and 31 of the cutter blades enables the blades to move outwardly in a direction so that the entire cutting surface contacts the comb at substantially the same time, thus avoiding excessive wear on any particular point of the cutting edge.

FIG. 5 shows a plan view of one arrangement of the apertures 57 within the hemispherical comb 21 which view is intended to be merely illustrative.

FIG. 6 is an enlarged view of a preferred aperture arrangement. As illustrated, the apertures are triangular, and adjacent rows are alternately inverted. The preferred relative distances are also indicated on FIG. 6 wherein the distance between adjacent horizontal apertures A is substantially equal to the distance A between adjacent horizontal apertures. It is also found to be preferable that the sides B of the triangle be equal, thus providing substantially an equilateral triangle.

These dimensions will, of course, depend upon the actual size of the shaver. Suitable dimensions for a shaver measuring four inches from the base of the housing 11 to the top of comb 21, with a comb diameter of $1\frac{1}{16}$ inches have been found to be $\frac{1}{32}$ of an inch for dimension A and .027 of an inch for dimension B.

FIG. 7 shows a modified construction technique for maintaining the comb 105 in firm contact with the housing 101. In this case, the retaining plate 103, which is secured to the housing by means of screw 111 in a manner similar to that illustrated in FIG. 2, is extended outwardly from the housing 101. The lower edge of the circum-

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ferential comb 105 is dimpled outwardly as at 107 and also has a plurality of slits 110 so as to provide a spring action. Therefore, the comb 105 may be press fit onto plate 103 and held there by the spring action of the comb itself.

FIG. 8 is a sectional view taken along lines 8—8 of FIG. 4 and illustrates one type of blade which may be used while FIGS. 9 and 10 illustrate various modifications of the cutter blade. These blades create the shearing action in conjunction with the apertures of the comb as shown in FIG. 6 and may have a pointed edge 123 of FIG. 8 or a more flattened edge 133 of FIG. 9 and even may have the rounded cutting edge 143 as shown in FIG. 10. The blades as illustrated in these figures are rotating to the right as seen in the drawings.

As will now be obvious the device of the present invention has eliminated all gearing and needs no spring mechanism to maintain the blade in contact with the comb. This structure reduces the number of parts required to a minimum. In so doing, it obviously reduces the required size of the overall shaver to a minimum, thus providing a very compact and efficient device.

Various modifications of the invention will now be apparent. The actual slot configuration within the blade supporting member may be varied so long as the configuration of the blades substantially matches the slots therein. The particular housing and motor mounting may also be varied within the scope of the invention. Accordingly, the description and drawings are to be considered to be illustrative only and in no way limitative of the device as claimed.

I claim:

1. A shaving device comprising a housing, an electrical motor mounted within said housing, a shaft connected to said motor and extending outwardly from one end of said housing, a solid substantially hemispherical blade supporting member mounted on said shaft, a plurality of arcuate slots in said blade supporting member extending from the periphery of said member inwardly towards the axis of said shaft, a substantially hemispherical comb having a plurality of apertures therein secured to said one end of said housing, the radius of said comb being greater than the radius of said blade supporting member, a blade having an arcuate cutting edge slidably positioned within each of said slots, the cutting edge of said blades having a curvature substantially equal to the curvature of said comb and being spaced therefrom when said blade is rest-

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ing in said slot, and a continuation of each of said slots at substantially right angles thereto, said continuation being substantially parallel to the axis of said shaft, and an extension connected to each of said blades which conforms to the configuration of said continuation of each of said slots.

2. A shaving device comprising a housing, an electric motor enclosed in said housing, a shaft coupled to said motor and extending outwardly from one end of said housing, a blade supporting member secured to said shaft, a plurality of retaining slots in said blade supporting member, each of said slots being in a plane through the axis of said shaft and terminating short thereof, a substantially semicircular comb including apertures therethrough secured to said one end of said housing and extending beyond said blade supporting member, a blade slidably fitted within each of said slots, said blades having an outer arcuate cutting edge of substantially the same curvature as said comb and an inner edge conforming to the inner configuration of said slot, the distance between said termination of said slot and said comb being greater than the distance between said inner edge of said blade and said comb, and a second slot extending from each of said retaining slots, said second slots being substantially parallel to said axis of said shaft, and an extension to the inner edge of each of said blades conforming to the configuration of said second slots.

3. The device of claim 1 wherein said hemispherical comb is flexible and is removably press fit onto said housing.

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WILLIAM FELDMAN, *Primary Examiner*.

45 MYRON C. KRUSE, *Examiner*.