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A. J. PARRELLO

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SHAVER HEAD ASSEMBLY WITH ANTI-NOISE MEANS

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FIG. 1.

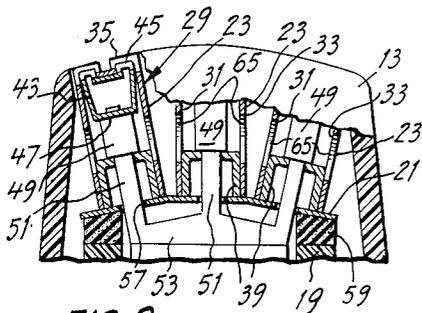
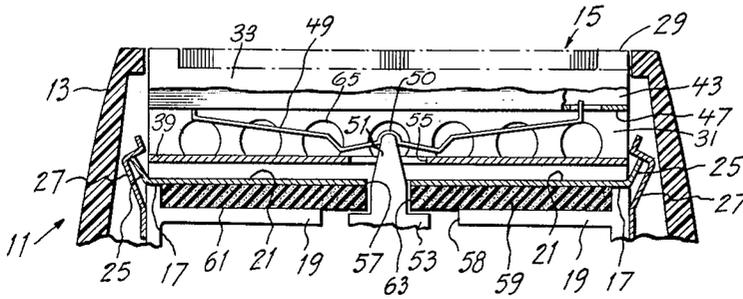


FIG. 2.

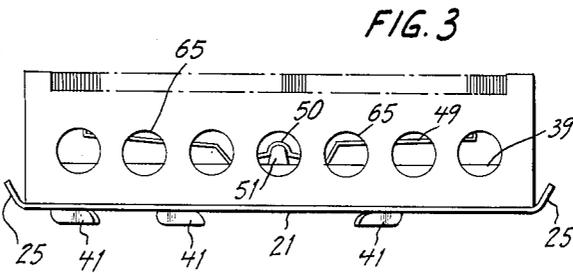


FIG. 3.

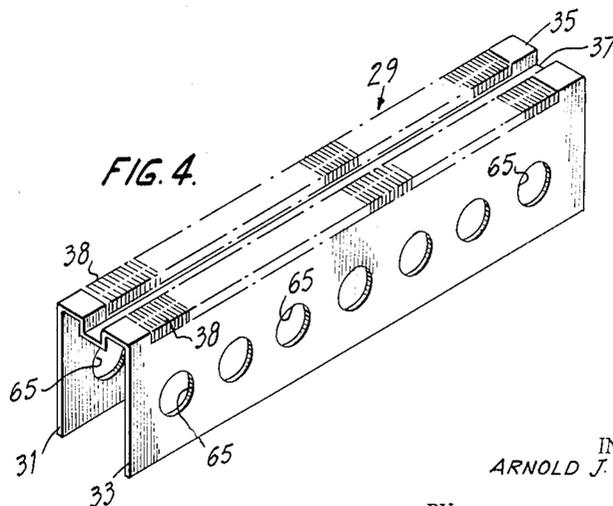


FIG. 4.

INVENTOR.  
ARNOLD J. PARRELLO.

BY

C. H. Miranda

ATTORNEY.

1

2

3,201,866

**SHAVER HEAD ASSEMBLY WITH ANTI-NOISE MEANS**

Arnold J. Parrello, Fairfield, Conn., assignor to Sperry Rand Corporation, New York, N.Y., a corporation of Delaware

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2 Claims. (Cl. 30-43.92)

This invention relates to electric shavers and more particularly to the cutter head assembly of such shavers.

A type of shaver in present use includes a cutter head assembly having a stationary outer cutter member with an upper slotted surface forming cutter teeth for reception of hair therebetween. The cutter member is of rectangular configuration, in transverse cross-section, and disposed for movement therein is an inner cutter member having a slotted surface forming cutter teeth resiliently biased into contact with the slotted surface of the outer cutter. Motor-operated driving means are operatively connected to the inner cutter member for moving the latter in a reciprocatory path within the outer cutter member. In the operation of such shavers it has been found that an undesirable noise is produced as a result of movement of the inner cutter member within the outer cutter member.

An object of the present invention is to provide a cutter head assembly for an electric shaver which embodies novel means for reducing undesirable noise generated by movement of one cutter member relative to a stationary cutter member.

Another object is to provide a cutter head assembly for an electric shaver wherein means are provided in the stationary cutter member to permit escape of sound waves generated by the movement of the inner cutter member.

The present invention comprises a cutter head assembly for an electric shaver which includes an elongated stationary outer cutter member of substantially rectangular configuration, in transverse cross-section, and which has a surface provided with slots to form cutter teeth. An inner cutter member of similar configuration is disposed within the outer cutter member for sliding movement therein. The inner cutter member has a surface slotted to form cutter teeth and said member is resiliently biased into engagement with the outer cutter member so that the cutter teeth surfaces of both members are in contact. Motor-driven means are drivingly connected to the inner cutter member to move same in a reciprocatory path within the outer cutter member. The outer cutter member has a pair of oppositely disposed and parallel side walls which extend substantially normal to a plane containing the cutter teeth surface. An arrangement of apertures is provided in the oppositely disposed walls of the outer cutter member to reduce undesirable noise produced by the movement of the inner cutter member within the outer cutter member.

The above and other objects and advantages of the present invention will appear more fully hereinafter from a consideration of the detailed description which follows, taken together with the accompanying drawing which illustrates one embodiment of the present invention.

In the drawing wherein like reference numerals refer to like parts,

FIG. 1 is a fragmentary view, in elevation, of the cutter head assembly mounted in an electric shaver;

FIG. 2 is a fragmentary, side elevational view, of the assembly shown in FIG. 1;

FIG. 3 is a elevational view of the cutter head assembly of FIG. 2 removed from the electric shaver; and

FIG. 4 is a perspective view of the outer cutter member alone.

Referring now to the drawing and more particularly to FIG. 1 thereof an electric shaver (partly shown) is designated generally by numeral 11 and comprises an upper casing section 13 which may be detachable from the shaver casing (not shown). A cutter head assembly 15 is mounted within section 13 and is seated on horizontal surfaces 17 of a mounting wall 19. Cutter head assembly 15 includes a base plate 21 having surfaces inclined from the midpoint thereof (FIG. 2) to support three cutter heads 23. The side edges of plate 21 each has an upstanding lug 25 (FIGS. 1 and 3) which cooperates with a latch member 27 suitably secured to mounting wall 19, whereby cutter head assembly 15 is detachably mounted on wall 19. Each cutter head 23 comprises an outer cutter member 29 which is substantially U-shaped in transverse cross-section (FIG. 2) and has a pair of oppositely disposed and parallel walls or legs 31 and 33 and a bight or upper surface portion 35. A channel like recess 37 is formed in surface portion 35 and the latter has slotted areas 38 forming the cutter portion for the outer cutter. An inverted U-shaped spacer member 39 is provided in the lower portions of each outer cutter member 29 and is secured to base plate 21 by bent lugs 41 (FIG. 3) which are integral with the spacer member and extend through appropriate openings (not shown) formed in plate 21. Walls 31 and 33 in turn, are secured to spacer member 39 in any suitable manner as for example, by spot welding walls 31 and 33 to the walls of spacer member 39 along the length thereof adjacent plate 21.

Disposed for sliding movement within each outer cutter member 29 is an inner cutter member 43 having a slotted area 45 which forms the cutter portion of such member, and which, when in sliding engagement with the slotted areas 38 of the outer cutter member serves to shear hair entering the last mentioned slotted areas. Inner cutter member 43 has a lower wall 47 with apertures (not shown) to receive the ends of a pressure leaf spring 49 which resiliently biases the inner cutter member 43 into engagement with the outer cutter member 29. The midpoint of spring 49 has a partial loop 50 which is engaged by an arm 51 of an oscillator 53. Arm 51 extends through aligned openings 55, 57 and 58 formed in spacer member 39, base plate 21 and mounting wall 19, respectively. As best seen in FIG. 2, oscillator 53 is provided with three arms 51, one for each cutter head 23, and such oscillator is driven from an electric motor (not shown) below wall 19 to effect reciprocatory movement of the inner cutter members 43 by way of leaf springs 49. A strip or pad 59 of resilient material is provided in a recess 61 of wall 19 and serves to prevent cut hair from passing downwardly through opening 58. Pad 59 also is provided with openings 63 through which the arm 51 of oscillator 53 extend.

The structure described up to this point represents more or less structure in some presently used electric shavers. It has been found that the foregoing construction produces undesirable noise which appears to arise from the reverberation of the pressure sound waves caused by the movement of the inner cutter member 43 within the outer cutter member 29. It is known that after sound has been produced in an enclosed space it will be reflected by the boundaries of the enclosure. Although some energy is lost at each reflection several seconds may lapse before the sound decays to inaudibility. It would appear in the structure above described that the sound waves caused by movement of the inner cutter 43 are generated with such rapidity that at any instant, countless superimposed sound waves exist which give rise to the undesirable noise. The present invention therefore contemplates a novel cutter head assembly which alleviates the foregoing problem. To this end,

3

walls 31 and 33 provided with plurality of spaced apertures 65 which are spaced longitudinally along the walls. Corresponding apertures 65 in walls 31 and 33 are disposed in alignment and the imaginary centers of such apertures are equidistant, or stated in another way, the distances between centers of pair of adjacent apertures are equal. With apertures provided in walls 31 and 33 it is found that the undesirable noise is reduced. This result apparently is based upon the escape of sound waves through the apertures 65 which reduces to a minimum the number of sound waves reverberating within the outer cutter member 29 at any one time. Different configurations of apertures 65 were tried in an attempt to provide the most efficient and effective escape of sound waves from the cutter head. It was found that apertures of circular configuration best solved the problem. Accordingly, cutter head assembly with apertures 65, as seen in the drawing, are considered to constitute the preferred embodiment of the present invention.

It is now apparent that the present invention provides a novel cutter head assembly for an electric shaver which produces minimum undesired noise attributed to the cutter head. By providing means in the form of apertures in the walls of the outer cutter member, sound waves are caused to escape from said member to reduce the number of sound waves reverberating therein at any particular instant.

Although one embodiment of the present invention has been illustrated and described in detail, it is expressly understood that the invention is not limited thereto. Various changes can be made in the design and arrangement of parts without the departing from the spirit and scope of the invention as the same will now be understood by those skilled in the art.

I claim:

1. A cutter head assembly for an electric shaver, comprising an inner cutter member and an outer cutter member, said outer cutter member having a substantially U-shaped frame portion with cutter teeth formed on the

4

bight of said frame portion and the inner cutter member having a wall thereof formed with cutter teeth, means for biasing the inner cutter member into engagement with the outer cutter member to bring the cutter teeth of each member into contact, means connected to said biasing means for moving said inner cutter member in a reciprocatory path between and parallel to the legs of said U-shaped frame portion whereby sound waves are generated which reverberate within the outer cutter member, and apertures formed in the spaced legs of the U-shaped frame portion to permit escape of sound waves therethrough to thereby reduce undesired noise caused by the movement of the inner cutter member within the said outer cutter, said apertures having centers located at an imaginary point approximately midway of the bight portion and the ends of said legs of said outer cutter frame portion.

2. The cutter head assembly of claim 1 wherein said apertures in the spaced legs of said outer cutter frame portion are in alignment one with the other and are spaced at equal distances along the longitudinal length of said legs of said outer cutter frame portion.

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WILLIAM FELDMAN, *Primary Examiner.*