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[54] CUTTERHEAD FOR ELECTRIC DRY SHAVER

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[58] Field of Search: 30/43.6, 43.4, 43.91, 43.92, 30/346.51

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[57]

ABSTRACT

A cutterhead for an electric dry shaver which includes a stationary outer cutter having a plurality of hair reception slots and a movable inner cutter having a plurality of cutter teeth wherein the cutter teeth are provided with buffed surfaces adjacent the hair entry portions of the hair reception slots in the outer cutter.

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6 Claims, 8 Drawing Figures

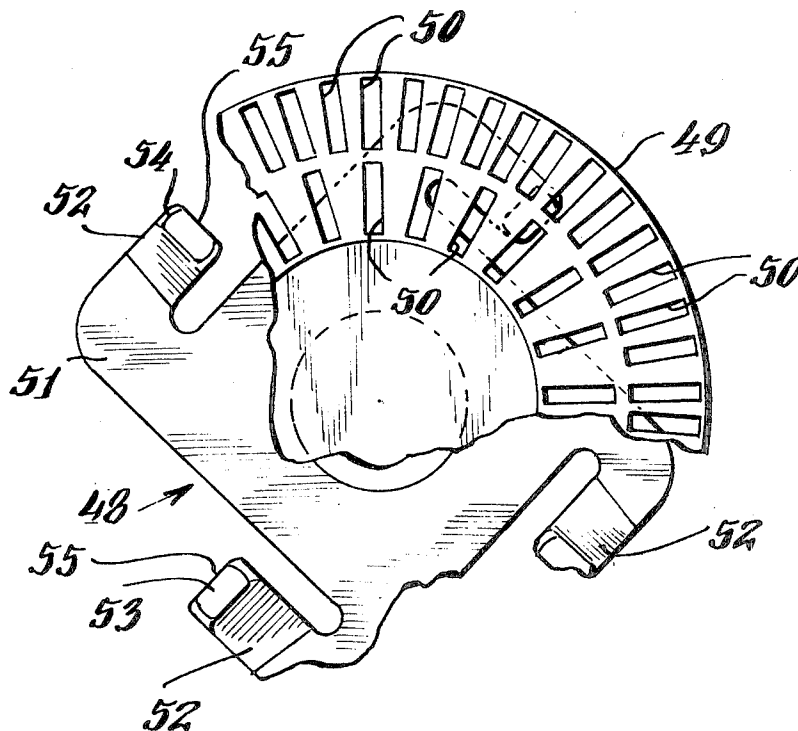


Fig. 1.

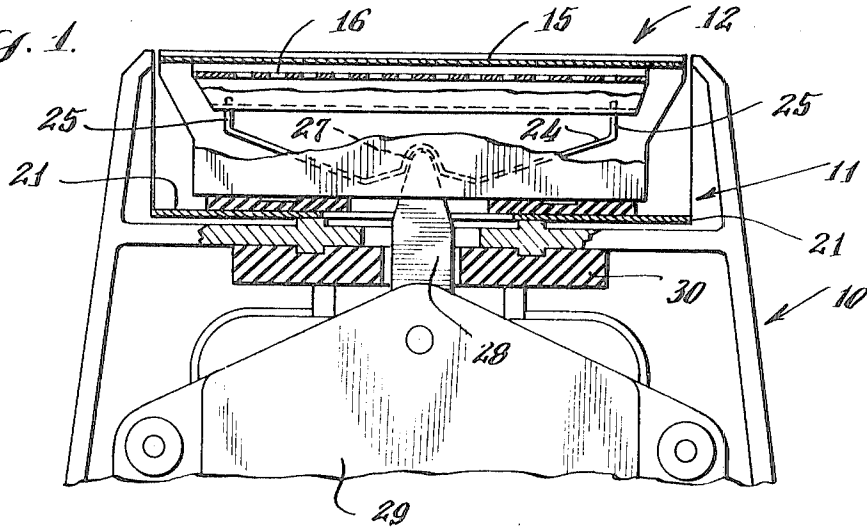


Fig. 2.

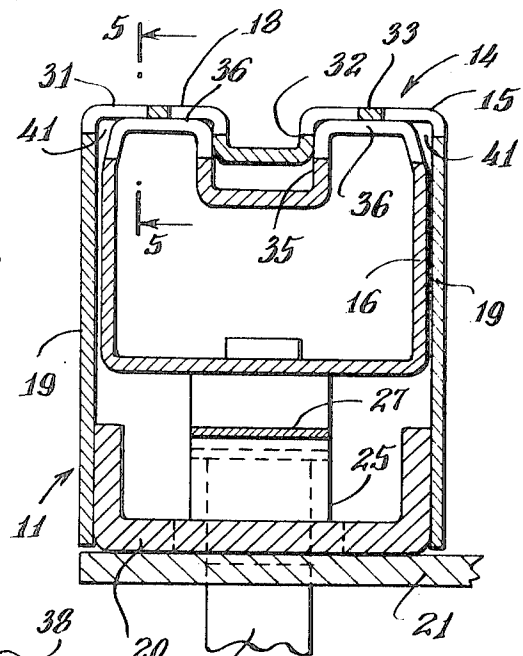
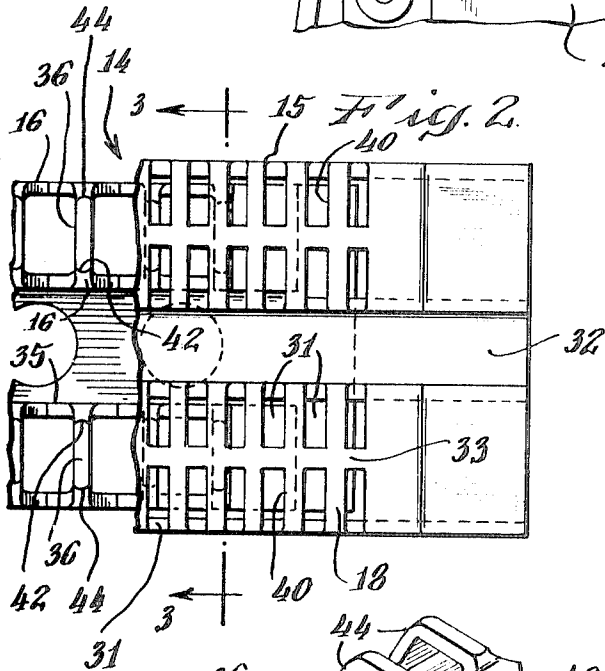
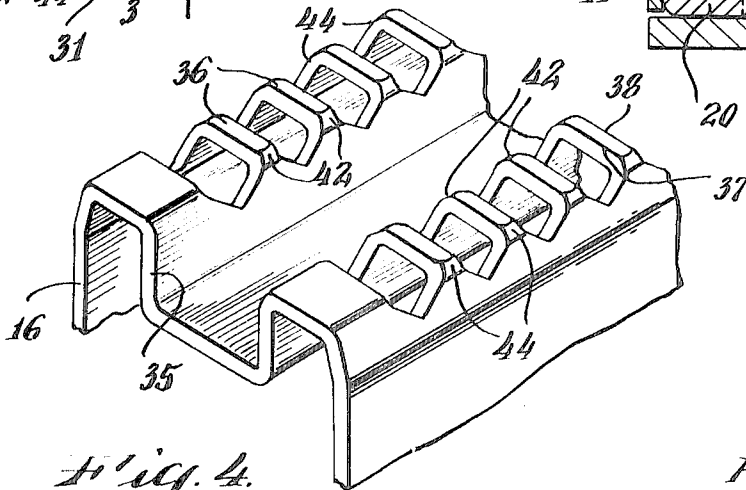
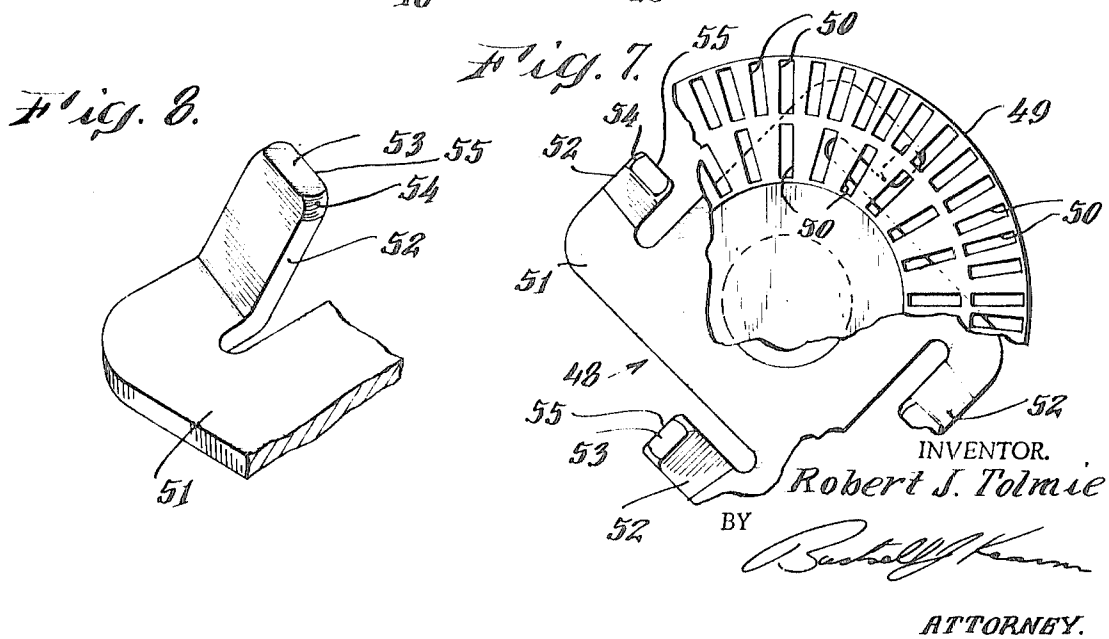
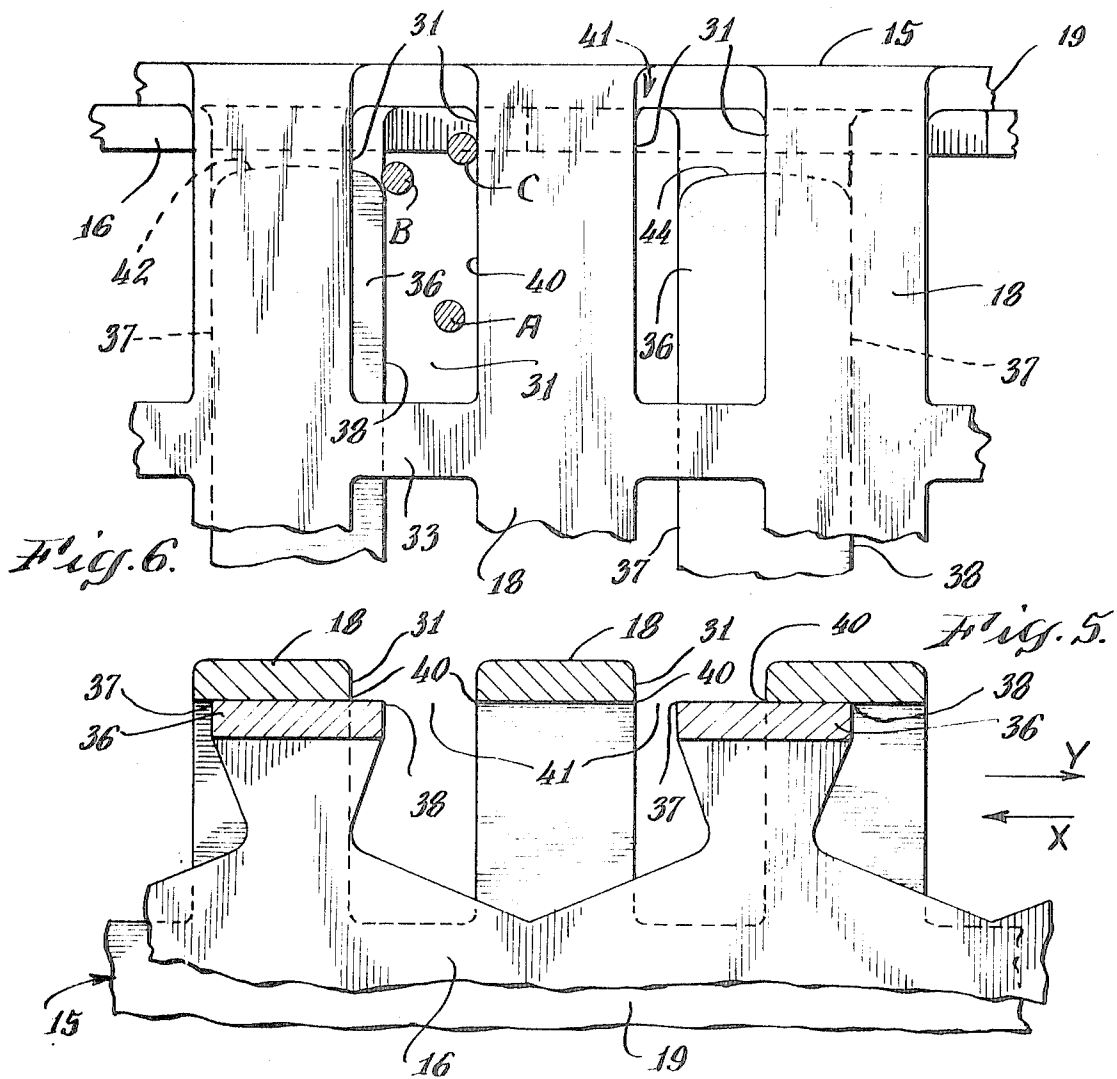


Fig. 3.

Fig. 4.



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CUTTERHEAD FOR ELECTRIC DRY SHAVER

BACKGROUND OF INVENTION

This invention relates to new and useful improvements in electric dry shavers and more particularly to the cutterheads thereof.

The cutterheads of most known electric dry shavers include a movable inner cutter disposed within a stationary outer cutter and which cutters are arranged in mutual cutting cooperation. The outer cutter is provided with a plurality of hair reception slots or apertures which extend across the top of the outer cutter and into the sides thereof. The inner cutter is formed with teeth having sharpened edges for shaving hair bristles that enter the hair reception slots in the sides of the outer cutter as the shaver is manually moved over the face of the user.

In certain cutterheads the inner cutter is adapted for reciprocating movement within the outer cutter in a linear path defined by drive means provided in the shaver casing and in certain other shavers the inner cutter is mounted for rotation within the outer cutter. In electric dry shavers of the latter types in addition to the hair bristles being combed into the cutterhead, portions of the skin adjacent the base of the hair bristles are also pressed into the hair reception slots and into contact with the movable inner cutter. The teeth of these known inner cutters have usually been provided with sharp right angular shaped corner portions which are positioned adjacent the hair entry area in the shaver reception slots in the sides of the outer cutter. It has been found that these corner portions tend to pinch the skin prior to the hair bristles being moved into shearing position with the cutting or shearing portions at the top surface of the inner and outer cutters.

In the past various means have been used to counteract and lessen any irritating effects that result from skin entering the cutterhead. In some shavers means are provided adjacent the outer cutter to tension the skin in advance of entry of the hair into the cutterhead and in others the corners of the inner cutter are beveled to provide additional space between the corners of the inner cutter teeth and the hair reception slots in the outer cutter. Although these devices have met with varying success and acceptance discomfort is likely to occur when the skin contacts the inner cutter or if a hair bristle is not sheared correctly.

It is an object of this invention to provide a novel cutterhead for an electric dry shaver.

Another object is to provide a novel inner cutter for an electric dry shaver.

A still further object is to provide a novel inner cutter which is formed with a sharp cutting edge for cutting hair bristles closer to the skin and which inner cutter is provided with novel means effective to substantially reduce any discomforting effects when skin is combed into the cutterhead.

SUMMARY OF THE INVENTION

The present invention contemplates a novel inner cutter for an electric dry shaver cutterhead. In one embodiment the cutterhead comprises an elongated inner and outer cutter. The outer cutter includes a plurality of transverse hair reception slots. The inner cutter is mounted for reciprocating movement within the outer cutter and has a plurality of transverse cutter teeth wherein the inner and outer corners of the teeth adjacent the hair entry areas of the slots in the outer cutter are buffed to engage and prevent skin at said entry area from entering the cutting portions of the inner and outer cutters in operation of the shaver.

The above and other objects and advantages of the present invention will appear more fully herein after from a consideration of the detailed description which follows taken together with the accompanying drawings where two embodiments of the invention are illustrated.

DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 is a fragmentary partly cross sectional elevational view of an electric dry shaver taken through a cutterhead unit incorporating the present invention;

FIG. 2 is a plan view of one end of the cutterhead unit of FIG. 1;

FIG. 3 is a sectional view taken on the line 3—3 of FIG. 2;

FIG. 4 is a perspective fragmentary view of the end portion of the inner cutter of the cutterhead unit;

FIG. 5 is an enlarged sectional view taken on the line 5—5 of FIG. 3;

FIG. 6 is a plan view of the enlarged portion of the cutterhead unit of FIG. 5;

FIG. 7 illustrates another embodiment of the present invention incorporated in a rotary-type cutterhead; and

FIG. 8 is a fragmentary perspective view of a portion of the inner cutter of FIG. 7.

DETAILED DESCRIPTION

Referring now to the drawings for a more detailed description of the present invention an upper portion of shaver casing is generally indicated by the reference numeral 10 in FIG. 1. A cutterhead receptacle 11 is provided in casing 10 and in which receptacle 11 is disposed a cutterhead assembly 12. Cutterhead assembly 12 is of type construction which includes at least one cutterhead unit 14 and which unit comprises a stationary outer cutter 15 in which is disposed a movable inner cutter 16. Outer cutter 15 comprises an elongated inverted U-shaped metal member having a bight portion 18 and spaced depending sidewalls 19 (FIG. 3). The lower marginal portions of sidewall 19 are rigidly secured to the arms of an elongated U-shaped base spacer partially shown in FIG. 3 which is seated on a baseplate 21 (FIGS. 1 and 3) in a conventional manner.

Inner cutter 16 comprises an open-ended elongated metal member substantially rectangular in transverse cross section (FIG. 3) maintained in cutting cooperation with outer cutter 15 against the underside of bight portion 18 in a known manner, as for example by a leaf spring 24 (FIGS. 1 and 3). Leaf spring 24 is provided with arms 25 secured to the base of inner cutter 16 and with a central loop portion 27 seated on a drive arm 28. Drive arm 28 extends from a motor indicated by reference numeral 29 in FIG. 1 disposed in shaver casing 10 through aligned openings in casing 10, a hair stopper pad 30 and in cutterhead 14 to engage loop 27 and move inner cutter 15 in a linear reciprocatory path upon operation of motor 29.

Bight portion 18 of outer cutter 15 is provided with two rows of hair reception slots 31 at each side of a longitudinal channel 38. Each row of a pair of rows of slots 31 is separated by a longitudinally extending rib 33 (FIGS. 2 and 3). The top surface (FIG. 3) of inner cutter 16 engages the underside of bight portion 18 of outer cutter 15 and is provided with a longitudinally extending channel 35 in which is disposed the corresponding channel 32 in outer cutter 16. A pair of rows of rectangular-shaped cutter teeth 36 are formed in inner cutter 15 with one row of teeth 36 formed at each side of channel 35. Each tooth 36 is thereby arranged to extend transversely of outer cutter 16 beneath rib 33 a distance of a pair of hair reception slots 31.

In FIGS. 5 and 6 are shown the side edges 37 and 38 respectively of each rectangular tooth 36 which are formed to a predetermined degree of sharpness. Edges 37 and 38 are to shear hair bristles (as for example diagrammatically indicated at A, B and C in FIG. 6) as the edges 37 and 38 thereof pass bottom edge 40 of slots 31 when the hair bristles are combed through the entry areas indicated at 41 in FIGS. 3, 5 and 6 in the outer cutter 15 and as inner cutter 15 is reciprocated by drive arm 28 in the direction indicated by the arrows X and Y in FIG. 5.

In previous cutterheads of the general type described, the remaining sides or the corners of the teeth of the inner cutter have been formed at a right angle. It has been found that as a result any hair or skin pressed into the cutterhead is engaged and pinched by these corners as the butting edges 37 and 38,

for example, engaged the bottom edge 40 of the hair reception slot in the outer cutter. As mentioned, it is an object of the present invention to provide a cutter of increased cutting efficiency and which cutter results in less irritation and discomfort to a user. In accordance with the present invention, the corners 42 and 44 of each tooth 36 are buffed to present curved surfaces adjacent the hair entry areas 41.

In operation of the described cutterhead unit 14, as inner cutter 16 thereof travels in the linear path indicated by arrows X and Y in FIG. 5, any hair bristles not contacting a cutting edge 37 or 38 as for example hair bristle B or C FIG. 6 are engaged by rounded corner 42 or 44 and pushed aside as the teeth 36 pass beneath edges 40 of slots 31. In this manner only the hair bristles (such as bristle A) positioned at a cutting edge 37 or 38 are sheared, the hair bristles (such as bristles B and C) are moved away from the shearing edges 37 or 38 of the outer cutter at a predetermined position of the inner cutter.

In FIGS. 7 and 8 a further embodiment of the present invention is shown incorporated in a rotary type cutterhead generally indicated by the reference numeral 48. Cutterhead 48 is of a usual type well-known in the art and comprises a circular metal outer cutter 49 (partially shown in FIG. 7) having hair reception slots 50 in the top surface thereof. An inner cutter 51 mounted in a suitable manner (not shown) for rotation within outer cutter 49 and is provided with a plurality of arms 52 having cutting teeth 53. In accordance with the present invention the corners 54 of teeth 53 are buffed. As inner cutter 51 is rotated the buffed corners 54 operate in a manner similar to the previously described buffed corners 42 and 44 of cutterhead unit 12 (FIGS. 5 and 6) as hair enters outer cutter 48 and insures that only hair bristles at the cutting edge 55 is sheared.

It will be apparent from the foregoing description that novel cutterhead unit has many advantages in use. The cutting edges, as for example edges 37, 38 or 55 of an inner cutter may be formed to a greater degree of sharpness without discomfort to the user since the buffed corners of the cutter teeth displace the hair bristles and skin in such a manner that only the hair to be cut is positioned at the cutting edges. The elimination of the sharp corners of the cutter teeth further substantially lessen any pinching of the skin by the corners and

allows for cutter bars of greater length, if desired, since the combing or entry area between the sides of inner cutter 16 and the hair reception slots 31 can be lessened.

It is to be expressly understood that the present invention is not limited to the embodiments illustrated and described. Various changes can be made in the design and arrangement of parts without 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. An inner cutter adapted for movement within an outer cutter of an electric dry shaver cutterhead assembly having a feeding area, said inner cutter comprising a body portion, a plurality of cutter teeth formed on said body portion, each of said cutter teeth provided with at least one cutting edge for shearing hair bristles fed thereto by the outer cutter, said teeth respectively further including an arcuately shaped edge portion adjacent the feeding area, the arcuately shaped edge portion of each tooth merging with the cutting edge of said cutter tooth and adapted to move hair bristles away from the cutting edge of said cutter tooth.

2. The device of claim 1 wherein the body portion comprises an elongated body member of rectangular cross section, said cutter teeth extending transversely of a top surface of the body portion.

3. The device of claim 2 wherein said cutter teeth are substantially rectangular and are provided with at least two spaced and parallel cutting edges and a pair of said arcuately shaped edge portions.

4. The device of claim 3 wherein said arcuately shaped edge portions are adapted to move hair bristles away from the cutting edges of the outer cutter at a predetermined shearing position of said inner cutter.

5. The device of claim 1 wherein said inner cutter is adapted for rotation within the outer cutter, a plurality of arms formed on said body portion, and said cutter teeth being formed on the ends of said arms.

6. The device of claim 5 wherein said teeth are provided with at least two cutting edges and a pair of arcuately shaped edge portions.

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