

PATENT SPECIFICATION

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(54) CUTTER HEAD FOR ELECTRIC DRY SHAVER

(71) We, SPERRY RAND CORPORATION, a Corporation organized under the laws of the State of Delaware, United States of America of 1290 Avenue of the Americas, New York 19, New York, United States of America, do hereby declare the invention, for which we pray that a Patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement: —

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

The cutter heads of most known electric dry shavers include a movable inner cutter disposed within a stationary outer cutter, 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 outer cutter as the shaver is manually moved over the face of the user.

In certain cutter heads the inner cutter is adapted for reciprocating movement in a linear path within the outer cutter, 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 cutter head, 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 areas of the hair 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 surfaces 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 cutter head. In some shavers means are provided adjacent the outer cutter to tension the skin in advance of entry of the hair into the cutter head 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 cutter head for an electric dry shaver, and which is effective to substantially reduce any discomforting effects when skin is combed into the cutter head.

The present invention consists in an electric dry shaver cutter head having an outer cutter provided with hair reception slots, and an inner cutter adapted for movement within the outer cutter, the inner cutter comprising a body portion having cutter teeth formed thereon, these cutter teeth each having at least one cutting edge for shearing hair bristles fed thereto through the hair reception slots in the outer cutter, the inner cutter teeth each having an arcuately shaped corner merging with the cutting edge or edges of the tooth and being rounded in the direction of movement of the inner cutter so as to present a convex curved surface adapted to engage and deflect away from the cutting edge or edges of the tooth hair bristles entering a hair entry area provided between said arcuately shaped corner of the tooth and said outer cutter.

According to a further feature of the invention the inner cutter teeth each have a substantially straight cutting edge or edges.

In one embodiment the cutter head comprises elongate inner and outer cutters, the outer cutter having transverse hair reception slots. The inner cutter is mounted for reciprocating

cating movement within the outer cutter and has transverse cutter teeth the corners of which are arcuately shaped and rounded as described.

In order that the present invention may be more fully understood and readily practised, reference is made to the detailed description which follows taken together with the accompanying drawings wherein two embodiments of the invention are illustrated.

In the drawings:

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

FIG. 2 is a plan view of one end of the cutter head 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 cutter head 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 portion of the cutter head unit of FIG. 5;

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

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

Referring now to the drawings an upper portion of a shaver casing is generally indicated by the reference numeral 10 in FIG. 1. A cutter head receptacle 11 is provided in casing 10 and in receptacle 11 is disposed a cutter head assembly 12. Cutter head assembly 12 is of the type of construction which includes a cutter head unit 14 comprising a stationary outer cutter 15 in which is disposed a movable inner cutter 16. Outer cutter 15 comprises an elongate inverted U-shaped metal member having a bight portion 18 and spaced depending side walls 19 (FIG. 3). The lower marginal portions of side walls 19 are rigidly secured to the arms of an elongate U-shaped base spacer 20 partially shown in FIG. 3 which is seated on a base plate 21 (FIGS. 1 and 3) in a conventional manner.

Inner cutter 16 comprises an open ended elongate 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 cutter head 14 to engage loop 27 and move inner cutter 16 in a linear reciprocatory path upon operation of motor 29.

Bight portion 18 of outer cutter 15 is provided with two pairs of rows of hair reception slots 31, a pair at each side of a longitudinal channel 32, and the rows of each pair being 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. One 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 and disposed beneath one pair of rows of hair reception slots 31. Each tooth 36 is thereby arranged to extend transversely of outer cutter 16 beneath rib 33 and a pair of hair reception slots 31, separated by the rib.

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 pass the bottom edges 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 16 is reciprocated by drive arm 28 in the direction indicated by the arrows X and Y in FIG. 5.

In previous cutter heads of the general type described, 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 cutter head is engaged and pinched by these corners as the cutting 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 arcuately shaped to present curved surfaces adjacent the hair entry areas 41.

In operation of the described cutter head 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.

In FIGS. 7 and 8 a further embodiment of the present invention is shown incorporated in a rotary type cutter head generally indicated by the reference numeral 48. Cutter head 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 is 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 each of which is formed on the end of an arm 52 and with a straight cutting edge 55. In accordance with the present invention the corners 54 of teeth 53 are arcuately shaped. As inner cutter 51 is rotated the arcuately shaped corners 54 operate in a manner similar to the previously described arcuately shaped corners 42 and 44 of cutter head unit 12 (FIGS. 5 and 6) as hair enters outer cutter 48 and ensure that only hair bristles at the cutting edge 55 are sheared.

It will be apparent from the foregoing description that the novel cutter head 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 arcuately shaped 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 sharp corners of the inner cutter teeth further substantially lessens pinching of the skin by the corners, and allows for inner cutter teeth of greater length, if desired, since by the elimination of sharp corners the combing or entry areas 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 scope of the invention as defined in the appended claims.

WHAT WE CLAIM IS:—

1. An electric dry shaver cutter head having an outer cutter provided with hair reception slots, and an inner cutter adapted for movement within the outer cutter, the inner cutter comprising a body portion having cutter teeth formed thereon, these cutter teeth each having at least one cutting edge for shearing hair bristles fed thereto through the hair reception slots in the outer cutter, the inner cutter teeth each

having an arcuately shaped corner merging with the cutting edge or edges of the tooth and being rounded in the direction of movement of the inner cutter so as to present a convex curved surface adapted to engage and deflect away from the cutting edge or edges of the tooth hair bristles entering a hair entry area provided between said arcuately shaped corner of the tooth and said outer cutter.

2. An electric dry shaver cutter head as claimed in claim 1 wherein the inner cutter teeth each have a substantially straight cutting edge or edges.

3. An electric dry shaver cutter head as claimed in claim 1 or 2 having elongate outer and inner cutters wherein the inner cutter is adapted for reciprocating movement in a linear path longitudinally within the outer cutter, the outer cutter has transverse hair reception slots and the inner cutter comprises an elongate body member substantially rectangular in transverse cross section having the inner cutter teeth extending transversely of the body member.

4. An electric dry shaver cutter head as claimed in claim 3 wherein the inner cutter teeth are substantially rectangular and are each provided with two spaced and parallel cutting edges and a pair of said arcuately shaped corners.

5. An electric dry shaver cutter head as claimed in claim 1 or 2 wherein the inner cutter is adapted for rotation within the outer cutter, the body portion of the inner cutter has a plurality of arms formed thereon, and the inner cutter teeth are formed on the ends of said arms.

6. An electric dry shaver cutter head as claimed in Claim 5 wherein the inner cutter teeth are each provided with a cutting edge and a pair of said arcuately shaped corners.

7. An electric dry shaver cutter head as claimed in Claim 1 substantially as hereinbefore described with reference to and as shown in Figs. 1 to 6, or Figs. 7 and 8, of the accompanying drawings.

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(partially shown in FIG. 7) having hair reception slots 50 in the top surface thereof. An inner cutter 51 is 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 each of which is formed on the end of an arm 52 and with a straight cutting edge 55. In accordance with the present invention the corners 54 of teeth 53 are arcuately shaped. As inner cutter 51 is rotated the arcuately shaped corners 54 operate in a manner similar to the previously described arcuately shaped corners 42 and 44 of cutter head unit 12 (FIGS. 5 and 6) as hair enters outer cutter 48 and ensure that only hair bristles at the cutting edge 55 are sheared.

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having an arcuately shaped corner merging with the cutting edge or edges of the tooth and being rounded in the direction of movement of the inner cutter so as to present a convex curved surface adapted to engage and deflect away from the cutting edge or edges of the tooth hair bristles entering a hair entry area provided between said arcuately shaped corner of the tooth and said outer cutter.

2. An electric dry shaver cutter head as claimed in claim 1 wherein the inner cutter teeth each have a substantially straight cutting edge or edges.

3. An electric dry shaver cutter head as claimed in claim 1 or 2 having elongate outer and inner cutters wherein the inner cutter is adapted for reciprocating movement in a linear path longitudinally within the outer cutter, the outer cutter has transverse hair reception slots and the inner cutter comprises an elongate body member substantially rectangular in transverse cross section having the inner cutter teeth extending transversely of the body member.

4. An electric dry shaver cutter head as claimed in claim 3 wherein the inner cutter teeth are substantially rectangular and are each provided with two spaced and parallel cutting edges and a pair of said arcuately shaped corners.

5. An electric dry shaver cutter head as claimed in claim 1 or 2 wherein the inner cutter is adapted for rotation within the outer cutter, the body portion of the inner cutter has a plurality of arms formed thereon, and the inner cutter teeth are formed on the ends of said arms.

6. An electric dry shaver cutter head as claimed in Claim 5 wherein the inner cutter teeth are each provided with a cutting edge and a pair of said arcuately shaped corners.

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