

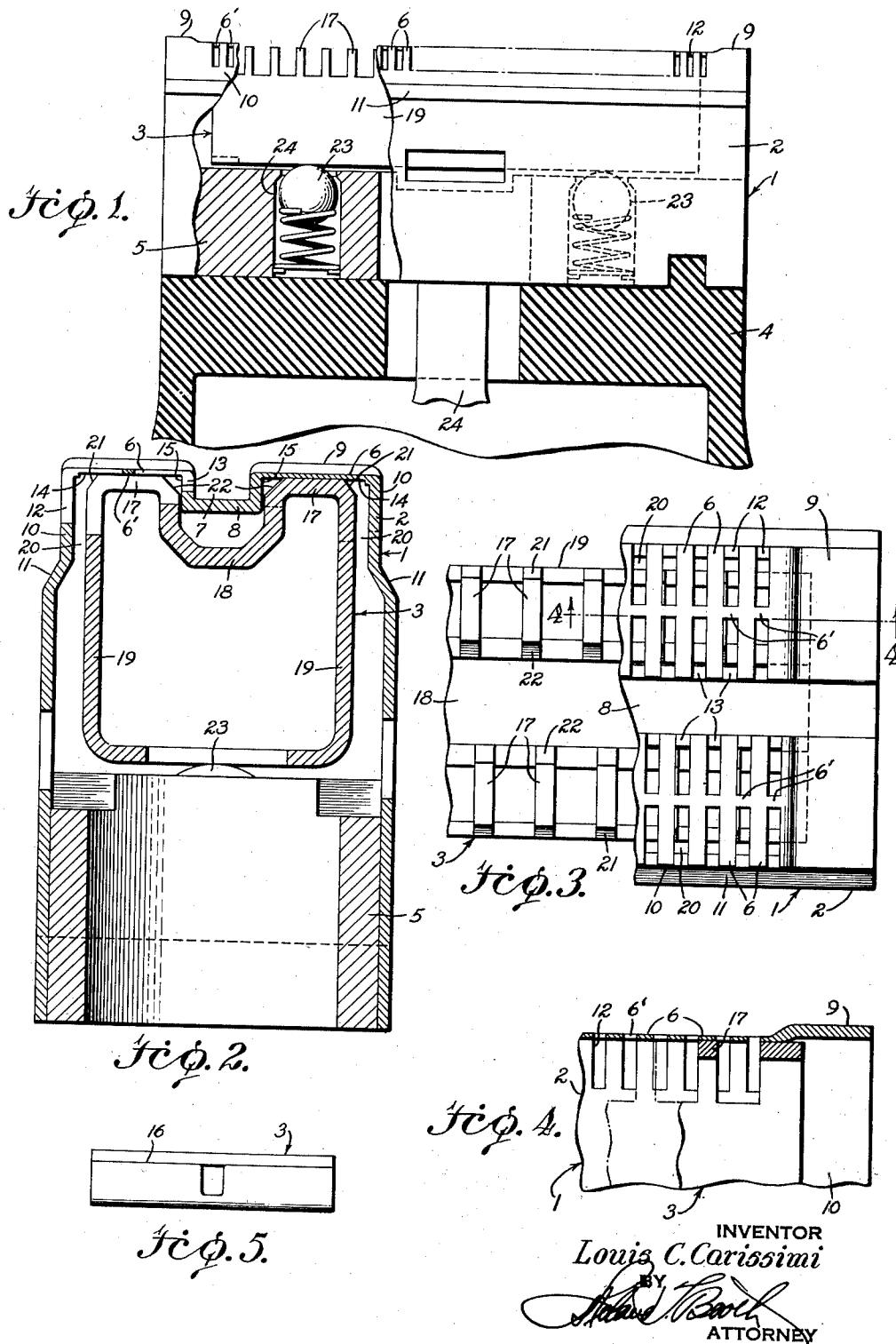
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SHAVER HEAD

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SHAVER HEAD

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This invention relates to improvements in the construction of heads for dry shavers.

It is characteristic of the operation of dry shavers that the bristles over which the shaver head is traversed in normal operation are not all shaved off at one sweep. In practice it is necessary to move the shaver back and forth several times in contact with each area of skin to be shaved before it can be shaved smooth. In fact, not all the hairs and/or bristles which enter through the slots of the outer cutter are severed, many of them being rejected or forced out again by the inner cutter bars. With many types of head, some bristles, especially if they are more than ordinarily long, and hair, for example, such as the hair at the edges of a mustache and the bottom edges of the side burns, instead of being severed, can be gripped between non-cutting regions of the cooperating cutter bars and the result is an unpleasant and somewhat painful dragging action.

It is an object of the present invention to provide a dry shaver head in which those disadvantages are minimized. To that end a dry shaver head, according to the present invention, comprises a stationary outer cutter and a cooperating reciprocating inner cutter, both of which have flat cutter bars extending transversely, the inner cutter being narrower than the interior of the outer cutter and being located therein so that a space is left in the outer cutter at each side of the inner cutter into which space the ends of the longer bristles and hair can project free of contact with the inner cutter, and, in addition, the edges of the inner cutter are beveled so that the ends of hair and/or bristle in the spaces can be caught between the cutter bars of the inner cutter before, with normal traversal of the shaver head across the skin, the entrapped bristles and/or hair pass to the cutting zone, where the inner cutter is reciprocating with its outer face in engagement with the back of the cutter bars of the outer cutter.

In the drawing:

Fig. 1 is an enlarged side elevation of a portion of one end of an electric shaver showing a cutter head, constructed according to the invention, in side elevation with portions broken away and shown in section to illustrate details of construction.

Fig. 2 is a transverse section taken substantially centrally through the head structure shown in Fig. 1.

Fig. 3 is a fragmentary plan view on the enlarged scale of Fig. 2 showing one end of the inner

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and outer cutter in assembled relation illustrating details of construction.

Fig. 4 is an enlarged fragmentary longitudinal cross-section taken on line 4-4 of Fig. 3.

Fig. 5 is a bottom plan view of the inner cutter on a reduced scale from that shown in the previous figures.

Shearing head 1 according to the present invention is formed of a stationary outer cutter 2 and an inner cutter 3 mounted in outer cutter 2 for reciprocating movement. Fig. 1 shows the shearing head mounted on a handle 4 in a manner well-known in the art.

Stationary outer cutter 2 has a base 5 extending longitudinally and the sides of a sheet metal shear plate of inverted substantially channel formation secured to opposite sides thereof, in the manner shown in Fig. 2. The shear plate is formed on the outer end opposite base 5 with a plurality of spaced parallel, straight, flat cutter bars 6 separated in the central portion by groove 7 formed by an inwardly projecting guide rib 8.

The shear plate is formed with upwardly offset ends 9 at opposite ends to provide a rigid cutter structure. Side walls 10 of outer cutter 2 are offset at 11 in longitudinally extending relation below the ends of cutter bars 6 for cooperation with offset ends 9 and rib 8 to further increase the rigidity of the outer cutter structure. It will be noted that the outer cutter in being slotted to form spaced parallel cutter bars 6 is constructed so that the cutter bar and slot structure extends down side walls 10 leaving openings 12 so that long hair can move into the shaver head between cutter bars 6. Rib structure 8 is also slotted below the ends of cutter bars 6, as shown in Fig. 2 at 13, to facilitate the entry of hair between the cutter bars. Cutter bars 6 have the central portions joined by lands 6'.

The outer cutter has the inner sides of cutter bars 6 and the outer sides of rib 8 as indicated at 14 and 15, respectively, accurately ground and lapped to provide a desired thickness of cutter bars and the desired dimension between opposite outer side faces of rib 8. This grinding and lapping provides a substantially flat inner surface on the cutter bars and flat guide faces on rib 8.

Inner cutter 3 is formed of sheet metal bent into a substantially rectangular shape in cross-section, as shown in Fig. 2. The meeting edges of the strip forming inner cutter 3 are at the bottom on one side, as illustrated at 16 in Fig. 5. Inner cutter 3 is formed with a pair of spaced rows of cutter bars 17 in spaced parallel relation to provide slots between said bars. These spaced

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rows of cutter bars 17 are separated by inwardly extending rib 18 having the inner side faces spaced apart a distance slightly greater than the distance between the ground outer sides 15 of guide rib 8, so that rib 18 will cooperate with rib 8 to provide a guide for the inner cutter in its reciprocating movement in the outer cutter with just sufficient clearance between the ribs to provide free movement of the inner cutter.

Side walls 19 of inner cutter 3 are spaced apart a distance substantially less than the distance between the upper ends of side walls 10 of outer cutter 2, as shown in Fig. 2, to provide open hair-receiving chambers 20 between the inner faces of side walls 10 and the outer faces of side walls 19 of outer and inner cutters 2 and 3 respectively. This provides for the combing action of the outer cutter receiving long as well as short hair between cutter bars 6 so the hair may be freely combed into the open slots between cutter bars 6 and into hair-receiving chambers 20 before reaching the cutting zone of the shearing head.

Cutter bars 17 of inner cutter 3 have a pitch equal to twice the pitch of cutter bars 6 so that they are, therefore, spaced apart a distance equal to two cutter bars 6 and, therefore, engage every other cutter bar in normal operation of the shaver head as clearly shown in Figs. 3 and 4. Cutter bars 6 on one side of groove 7 and the corresponding cutter bars 17 of inner cutter 3 are arranged in staggered relation to the cutter bars on the opposite side of groove 7. This is clearly shown in Fig. 3. The offset of cutter bars 17 on inner cutter 3 at opposite sides of the inner cutter is equal to and the same as the offset of cutter bars 6 on opposite sides of groove 7. Cutter bars 6 on opposite sides of groove 7 are arranged in alternate relation and staggered so that the cutting edge of the cutter bars on one side of groove 7 are staggered to an extent equal to one-half of the pitch of the cutter bars on the other side. Cutter bars 17 on inner cutter 3 are also wider than cutter bars 6, as shown in Figs. 3 and 4, in order that a portion of each of the cutter bars always has bearing engagement with the under faces of one or more cutter bars 6 of the outer cutter.

In order to increase the cutting efficiency of the cutter heads, the inner cutter has the outer faces of cutter bars 17 ground and lapped to produce flat outer surfaces for accurate registry and cutting cooperation with the inner flat lapped surfaces on cutter bars 6 to obtain efficient cutting cooperation between the cutter bars of the inner and outer cutters. To further increase the cutting efficiency of the shearing head, inner cutter 3 has the ends of cutter bars 17 where they join sides 19, beveled on a substantially 30° angle, as indicated at 21, and the inner ends of these cutter bars joined with rib 18 beveled on a substantially 45° angle, as indicated at 22. These beveled ends on cutter bars 17 are formed by a grinding operation for accurately grinding the ends of the bars to provide sharp cutting corners on cutter bars 17 for cooperation with cutter bars 6 in providing an efficient cutting cooperation at points spaced inwardly from the ends of cutter bars 6, as shown in Fig. 2.

The usual spring-pressed balls 23, or other equivalent means may be provided in shearing head base 5 for resiliently projecting inner cutter 3 so that cutter bars 17 have bearing engagement for cutting cooperation with cutter bars 6 of the outer cutter. An oscillating arm 24 operated by an electric motor, not shown, is utilized in a manner well-known in the art to reciprocate inner

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cutter 3 in the operation of the shaver head. Balls 23 are larger than those usually used and have the upper ends of pockets 24 formed in base 5 receiving them, of a sufficiently larger size, to provide for oscillating movement of balls 23 back and forth with inner cutter 3 to reduce wear on the under side of the inner cutter.

With a shearing head constructed as hereinabove described, guide rib 8 interrupting the central portion of straight cutter bars 6, the ground inner faces of the cutter bars and the outer faces of rib 8, provide for accurate cooperation of inner cutter 3 therewith, so that it is accurately guided in the outer cutter. The ground guide faces 15 on rib 8 provide for this accurate guiding of the inner cutter and maintain it in position so hair receiving chambers 20 will receive hair combed by the ends of cutter bars 6 for the efficient cutting of both long and short hair as soon as it engages between the sharp corners at the outer ends of cutter bars 17 of inner cutter 3 formed by ground beveled ends 21. The beveled ends 22 on cutter bars 17 at the inner ends thereof, will also provide sharp cutting corners for cooperation with cutter bars 6 to cut both short and long hairs entering between cutter bars 17 from central slots 7 at points spaced inwardly from the ends of cutter bars 6, as clearly shown in the enlarged disclosure in Fig. 2. Lands 6' also cooperate to pick up short hair and straighten it for close cutting. Lands 6' aid in obtaining transverse close cutting of hair and to avoid cutting on a bias.

The invention claimed is:

1. In a dry shaver head including a stationary outer cutter of inverted substantially channel form having plural transverse laterally offset cutting bars, the outer ends of which define the upper terminals of downwardly extending vertical open slots, an inner cutter of inverted substantially channel form, slidable longitudinally in said outer cutter having an operative face defined by transversely extending spaced cutter bars for cutting engagement with the cutter bars of said outer cutter, the outer ends of said inner cutter bars being bevelled to provide cutter bar portions extending outwardly beyond the cutting portions thereof and defining the upper terminals of downwardly extending vertical open slots, means for resiliently urging the outer face of said inner cutter into sliding cutting engagement with the backs of said cutter bars of said outer cutter, said outer bevelled ends of the inner cutter bars being spaced inwardly from the inner side walls of said outer cutter a distance greater than the thickness of said outer cutter and greater than the size of hair to be cut, and said vertical slots of said inner cutter being parallel to and spaced from the respective outer cutter vertical slots whereby hair and bristle may enter said outer cutter slots to freely project into the spaces between outer cutter bars and into the space between the outer ends of said inner cutter bars and the inner sides of said outer cutter before engagement with said inner cutter, with subsequent entry of said hair and bristle between the bevelled outer ends of said inner cutter bars for being firmly gripped therebetween before reaching the portions of said inner cutter bars engaged with said outer cutter bars for cutting of said hair and bristle.

2. A dry shaver head as set forth in claim 1, wherein the outer cutter is formed of sheet metal having a flat top portion formed with depending side walls at opposite edges of said top portion, said top portion and side walls having said cutter

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bars formed with intervening slots therein, and an inner cutter formed of sheet metal having a plurality of cutter bars with transverse slots formed in a flat top portion, side walls depending from opposite sides of said inner cutter top portion having continuations of said slots therein, said inner cutter top portions and side walls having a spaced relation to the inner surfaces of said outer cutter side walls greater than the thickness of said walls and greater by several times the thickness of human hair.

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