Nov. 26, 1940. R. E. BENNER 2,223,156

ELECTRIC DRY SHAVER

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FIG. 1.

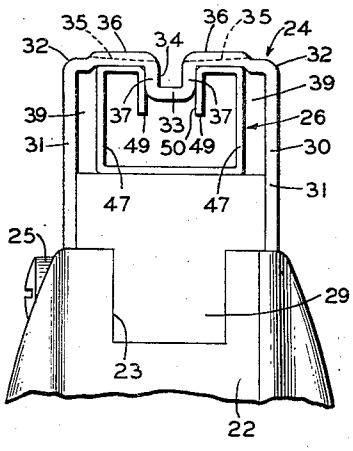


FIG. 4.

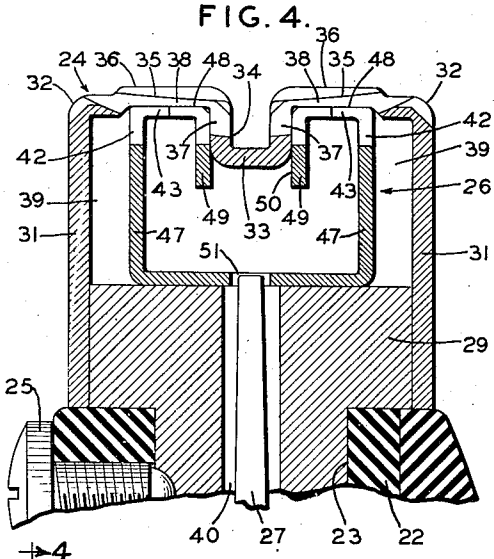


FIG. 2.

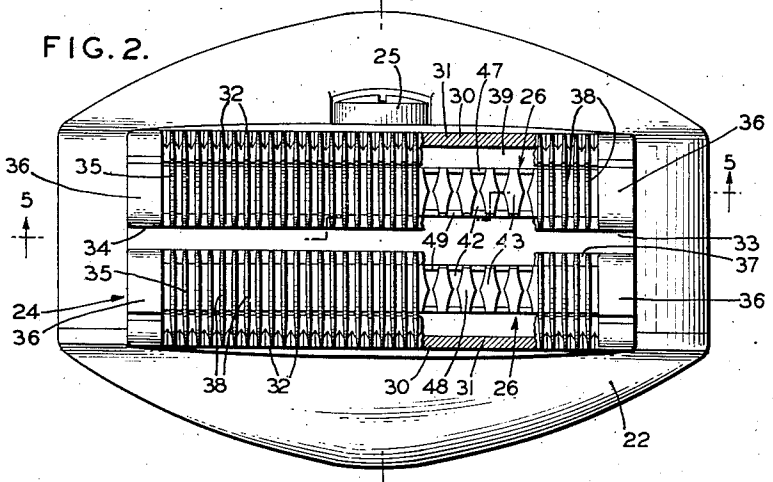
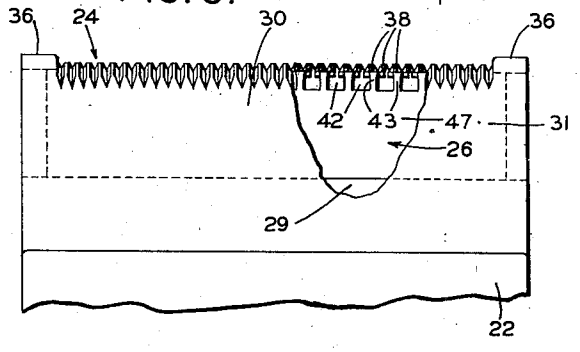


FIG. 3.



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FIG. 5.

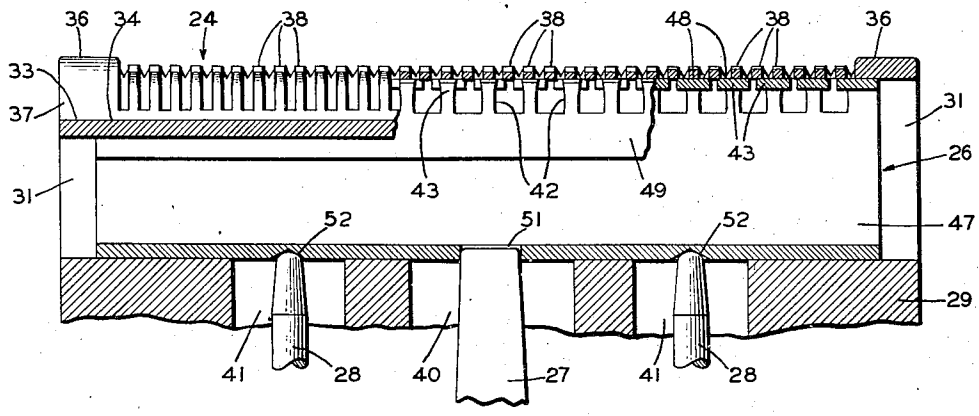
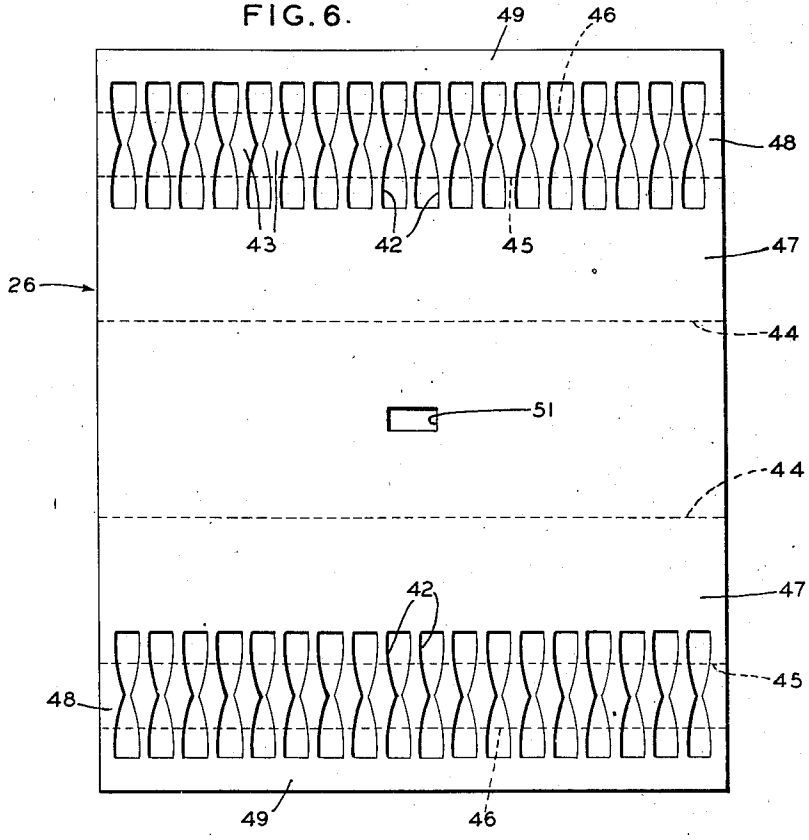


FIG. 6.



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FIG. 7.

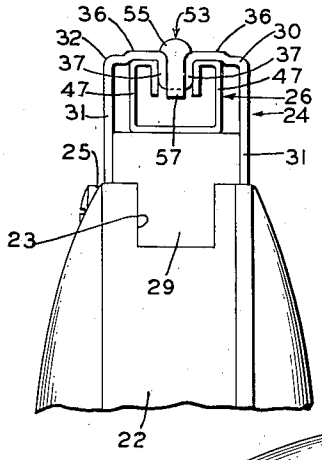


FIG. 9.

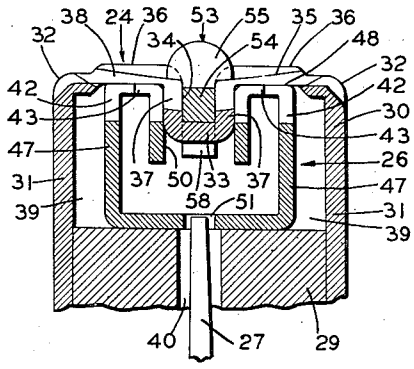


FIG. 8.

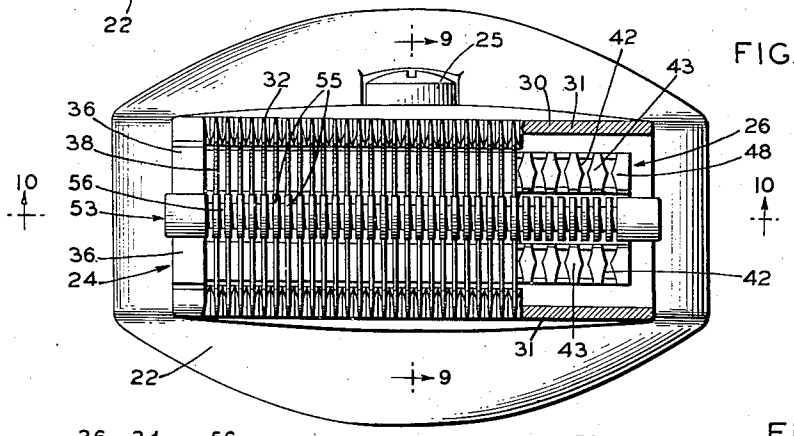
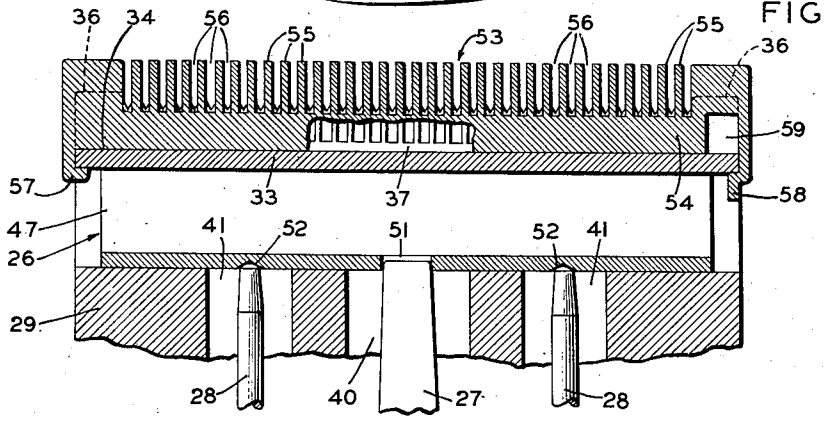


FIG. 10.



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Patented Nov. 26, 1940 2,223,156

UNITED STATES PATENT OFFICE

2,223,156

ELECTRIC DRY SHAVER

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Application December 7, 1937, Serial No. 178,464

14 Claims. (Cl. 30—43)

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

While the prior teaching contains many varied types of electric dry shavers, a very select few of them have come into commercial use. This is apparently due to the extreme precision required in their manufacture. It is for this same reason that electric dry shavers are now so prohibitive in price that they are luxuries which comparatively few people may enjoy.

It is one of the main objects of this invention to provide a construction of cutters for electric dry shavers not entailing any of the exacting details of manufacture now prevalent. Both the cutters are made of thin sheets of metal, easily moulded into the shape and form hereinbelow more fully described. This simplified construction makes it possible to produce unlimited quantities of these shavers at a moderate cost and to retail them at a relatively low price.

A further object of this invention is to provide a deep longitudinal groove in the outer cutter, which serves to stretch the skin. Combing edges about this groove then bring the hairs into effective shearing relation with the inner cutter.

A further object of this invention is to provide a slotted guard movably secured to the outer cutter over the longitudinal groove thereof that will render the shaver safe and effective for use on tender and more delicate surfaces of the skin. It also facilitates the cutting of longer hairs on the arms and legs.

Other objects will be apparent from a full and detailed description of my invention as contained in the following specification.

This invention resides substantially in the combination, construction, arrangement, and relative location of parts, as will be more fully described in the following specification when read in connection with the accompanying drawings, in which:

Fig. 1 is an end elevational view of the shaver head and a portion of a casing to which it is secured, all in accordance with the invention claimed herein;

Fig. 2 is a top plan view thereof with parts of outer cutter bars broken away to reveal the structure and shape of the inner cutter bars and their relative position;

Fig. 3 is a side elevational view thereof with parts broken away;

Fig. 4 is a cross sectional view taken substantially along line 4—4 of Fig. 2;

Fig. 5 is a cross sectional view taken substantially along line 5—5 of Fig. 2;

Fig. 6 is a plan view of the inner cutter before being bent into shape;

Fig. 7 is an end elevational view showing a guard secured to the device herein;

Fig. 8 is a plan view of the same device shown in Fig. 7 with parts broken away;

Fig. 9 is an end elevational view in cross section taken substantially along line 9—9 of Fig. 8; and

Fig. 10 is a view thereof taken substantially along line 10—10 of Fig. 8.

Like characters of references refer to like parts in all the drawings.

Referring to the drawings and particularly to Figs. 1 to 6, inclusive, the upper portion of a casing 22 of a well known dry shaver is shown. Within casing 22 is a motor which, save for a few parts, is not described here, since it forms no part of this invention. At the top of the casing is a groove 23 in which is positioned an outer cutter 24, said outer cutter being secured in place by screw 25. Reciprocally mounted within the outer cutter is an inner cutter 26.

Within the casing 22 is shown part of a rock lever 27, said rock lever extending through an opening in casing 22. Resilient pins 28 (Fig. 5) also extend through openings in casing 22.

Outer cutter 24 consists of a base plate 29 and a frame 30. Base plate 29 is formed out of a block of any suitable metal, shaped substantially into a T-shape. The outer cutter is made of a thin sheet of suitable metal formed substantially into an inverted U-shape. Extending upwardly in a parallel direction are arms 31 of the outer cutter which are rounded at their extreme ends 32 and then are bent inward extending horizontally towards the center. At the central point of the top of the outer cutter, ends 32 then come together, substantially in a U-shaped portion 33, forming a longitudinal groove 34. On each side of longitudinal groove 34, the top surfaces of frame 30 are cut or ground away and form two concave plane surfaces 35, having their maximum thickness at their outer edges and gradually reaching their minimum thickness at points adjacent to U-shaped portion 33. In grinding ribs are formed between each of the concave surfaces to provide the teeth of a comb 36. Plane surfaces 35 and part of arm 37 of U-shaped portion 33 are slotted or ground away to form cutter bars 38. The extreme ends 32 of arms 31 are smoothly rounded and serve as guides and combing surfaces for the hair. The lower ends of arms 31 of frame 30 are bolted to the base plate 29, forming, between base plate 29 and frame 30, a large open chamber 39 into which inner cutter 26 is reciprocally mounted. Base plate 29 has openings 40 and 41 for lever 27 and pins 28, respectively.

Inner cutter 26 is made of a thin sheet of suitable metal as shown in Fig. 6, having two rows of slots 42 on each side thereof which are punched out, substantially in the shape as shown leaving a plurality of diamond shaped cutter bars

43, each of said slots having their sides convexed and their longitudinal ends squared. The slotted sides of this sheet of metal are then bent upward at a point indicated substantially by dotted lines 44 and the upright walls formed thereby are then bent inward along dotted lines 45 to form horizontal surfaces which are again bent downward along dotted lines 46. By this relatively simple means, a substantially U-shaped inner cutter is formed having upright arms 47, top surfaces 48 and the dependent arms 49. The portion between dotted lines 44 forms the base of inner cutter 26, the portions between dotted lines 44 and 45 on each side of lines 44 form the upright arms 47, portions between dotted lines 45 and 46 on each side form the top surfaces 48 and portions between dotted lines 46 and the extreme ends form arms 49. The same structure may be formed by reversing the order of bending the metal, as for example by bending same first on each side of dotted lines 46 and so on. By this process of manufacture end portions of slots 42 forming cutter bars 43 will ultimately lie on upright arms 47 and on arms 49. The arms 49 form between them a channel 50.

Inner cutter 26 is mounted within outer cutter 24 so that inner cutter bars 43 are in close coactive engagement with outer cutter bars 38 and U-shaped portion 33 of the outer cutter lies within channel 50. Arms 37 of U-shaped portion 33 serve as runways for depending arms 49 of inner cutter 26. Opening 51 and notches 52 in inner cutter 26 engage lever 27 and pins 28, respectively.

In operation, inner cutter 26 has a reciprocatory motion imparted to it through lock lever 27 and its movement is guided by U-shaped portion 33 of outer cutter 24. As the shaver is moved along the face, groove 34 draws into it a part of the skin surface, thereby stretching the skin to effect a better shearing action of the shaver.

Figs. 7 to 10, inclusive, disclose a guard member 53 made of a block of suitable material shaped substantially as shown. Said guard 53 has a base 54, substantially rectangular in shape, which is removably secured in longitudinal groove 34 of outer cutter 24. Integral with said base 54 is a semi-circular top 55 forming substantially an arched bridge for groove 34. Upon semicircular top 55, except on the immediate ends thereof, is ground away or cut a plurality of slots or small grooves 56. On each end of guard 53 are extensions 57 and 58 which serve as clamps to hold guard 53 firmly secured to outer cutter 24. One of these extensions 57 is rigid and fits snugly under the base of U-shaped portion 33 of outer cutter. The other extension 58 by reason of cut-out portion 59 has some resiliency and permits the removal or securing of guard 53.

In operation, with guard 53 secured in and over longitudinal groove 34 of the outer cutter, arched portion 53, extending above cutter bars 38, provides means for safely and effectively shaving long hairs on the arms or legs where the skin is most tender.

While I have described what I consider to be a highly desirable embodiment of my invention, it is obvious that many changes in form could be made without departing from the spirit of my invention, and I, therefore, do not limit myself to the exact form herein shown and described, nor to anything less than the whole of my invention as hereinbefore set forth, and as hereinafter claimed.

What I claim as new, and desire to secure by Letters Patent, is:

1. A dry shaver as described herein including a motor casing, an outer shearing head consisting of a frame formed substantially out of a sheet of suitable metal into an inverted U-shaped cutter and a T-shaped base plate riveted to the lower part of the arms of said frame, a U-shaped longitudinal groove extending through the top of said frame, convexed top surfaces on each side of said longitudinal groove, a plurality of slots forming cutter bars on said top surfaces and on each arm of said groove, said cutter bars having their maximum thickness nearest said groove, an inner cutter reciprocally mounted within said outer shearing, said inner cutter being likewise formed of a sheet of metal substantially into a U-shape having its arms bent inward at the top and then downward to form overhanging arms, a runway for said overhanging arms formed by the arms of said longitudinal groove, a plurality of bow-shaped slots forming cutter bars on the top surfaces of said inner cutter and on the overhanging arms thereof, each cutter bar having a diamond shape with its longitudinal edges squared and its sides convexed, and combing surfaces and edges to guide the hair into said slots for cutting action.

2. A dry shaver as described herein including a motor casing, an outer shearing head consisting of a frame formed substantially out of a sheet of suitable metal into an inverted U-shaped cutter and a T-shaped base plate riveted to the lower part of the arms of said frame, a U-shaped longitudinal groove extending through the top of said frame, convexed top surfaces on each side of said longitudinal groove, a plurality of slots forming cutter bars on said top surfaces and on each arm of said groove, said cutter bars having their minimum thickness nearest said groove, and gradually reaching their maximum thinness at each outer end thereof, an inner cutter reciprocally mounted within said outer shearing head, said inner cutter being likewise formed of a sheet of metal substantially into a U-shape having its arms bent inward at the top and then downward to form overhanging arms, a runway for said overhanging arms formed by the arms of said longitudinal groove, a plurality of bow shaped slots forming cutter bars on the top surfaces of said inner cutter and on the overhanging arms thereof, each cutter bar having a diamond shape with its longitudinal edges squared and its sides convexed, and combing surfaces and edges to guide the hair into said slots for cutting action.

3. A dry shaver as described herein including a motor casing, an outer shearing head consisting of a frame formed substantially out of a sheet of suitable metal into an inverted U-shaped cutter and a T-shaped base plate riveted to the lower part of the arms of said frame, a U-shaped longitudinal groove extending through the top of said frame, a plurality of slots forming cutter bars at the top of said frame and on each side of said groove, an inner cutter reciprocally mounted within said outer shearing head, said inner cutter being likewise formed of a sheet of metal substantially into a U-shape having its arms bent inward at the top and then downward to form appending arms, a runway for said appending arms formed by the arms of said longitudinal groove, a plurality

of slots formng diamond shaped cutter bars on the top surfaces of said inner cutter and on the appending arms thereof, each of said cutter bars having convexed sides, and a guard secured in and over said longitudinal groove having substantially the form of a keyway, said guard being slotted on its semi-circular top and clamped to the outer cutter frame on each end thereof.

4. A dry shaver as described herein including a motor casing, an outer shearing head consisting of a frame formed substantially out of a sheet of suitable metal into an inverted U-shaped cutter and a T-shaped base plate riveted to the lower part of the arms of said frame, a U-shaped longitudinal groove extending through the top of said frame, a plurality of slots forming cutter bars at the top of said frame and on each side of said groove, an inner cutter reciprocally mounted within said outer shearing head, said inner cutter being likewise formed of a sheet of metal substantially into a U-shape having its arms bent inward at the top and then downward to form appending arms, a plurality of slots forming cutter bars on the top surfaces of said inner cutter and on the appending arms thereof, all of said cutter bars having diamond shape, and a guard secured in and over said longitudinal groove having substantially the form of a keyway, said guard being slotted on its semi-circular top and clamped to the outer cutter frame on each end thereof.

5. A dry shaver as described herein including a motor casing, an outer shearing head formed into an inverted U-shaped cutter, a U-shaped longitudinal groove extending through the top of said frame, a plurality of slots forming cutter bars at the top of said frame and on each side of said groove, an inner cutter reciprocally mounted within said outer shearing head, said inner cutter being formed substantially into a U-shape having its arms bent inward at the top and then downward to form appending arms, a plurality of slots forming diamond shaped cutter bars on the top surfaces of said inner cutter and on the appending arms thereof, and a guard secured in and over said longitudinal groove having substantially the form of a keyway, said guard being slotted on its semi-circular top and clamped to the outer cutter frame on each end thereof.

6. The combination in a dry shaver of a motor housing, an inverted U-shaped outer cutter having a T-shaped base plate and a U-shaped portion midway on its top surface, a U-shaped inner cutter having overhanging arms formed from bent-in portions of its outer arms, said inner cutter being slidably mounted to reciprocate along said U-shaped portion of the outer cutter, cutter bars on the top surfaces of both the inner and outer cutters, the inner cutter bars being diamond shaped having convex sides slotted and a semi-cylindrical guard movably secured within said U-shaped portion of the outer cutter.

7. The combination in a dry shaver of a motor housing, an inverted U-shaped outer cutter having a T-shaped base plate and a U-shaped portion midway on its top surface, a U-shaped inner cutter having overhanging arms formed from bent-in portions of its outer arms, said inner cutter being slidably mounted to reciprocate along said U-shaped portion of the outer cutter, cutter bars on the top surfaces of both the inner and outer cutters, the cutter bars of at least one of said cutters having a uniform cutting surface and a slotted guard detachably secured within and completely bridging said U-shaped portion.

8. The combination in a dry shaver of a motor housing, an inverted U-shaped outer cutter having a T-shaped base plate and a U-shaped portion midway on its top surface, a U-shaped inner cutter having overhanging arms formed from bent-in portions of its outer arms, said inner cutter being slidably mounted to reciprocate along said U-shaped portion of the outer cutter, and a guard within the U-shaped portion of the outer cutter having its ends clamped to the bottom surfaces thereof, said guard having a semi-circular top transversely slotted.

9. The combination in a dry shaver, an inverted U-shaped outer cutter having a groove on its top surface and the combination of cutting and combing surfaces adjacent said groove, a U-shaped inner cutter having overhanging arms formed from bent-in portions of its outer arms, said inner cutter being slidably mounted to reciprocate along said groove as a guideway, and a combing guard removably secured over and completely bridging said groove.

10. A dry shaver including a grip handle, cutters substantially U-shaped and reversely mounted within one another, a channeled portion of one serving as a runway for the other, and a guard removably secured to the outer of said cutters and over said channeled portion, said guard having substantially the shape in cross section of a keyway and further having a semi-cylindrical head cut into a plurality of transversely disposed slots.

11. A dry shaver including a grip handle, cutters substantially U-shaped and reversely mounted within one another, a channeled portion of one serving as a runway for the other, and a guard member removably secured within said channeled portion and overlapping the outer cutter having clamping means on its base for securing said member to said outer cutter.

12. A dry shaver including channeled cutters substantially U-shaped and reversely mounted within one another, the channel portion of one serving as a runway for the other, a guard including a semi-circular head, a substantially rectangular base formed integral therewith adapted to be positioned in said channel portion and means on said base for detachably securing said guard to said shaver.

13. A dry shaver including channeled cutters substantially U-shaped and reversely mounted within one another, the channel portion of one serving as a guideway for the other, a guard including a semi-circular head, a substantially rectangular base formed integral therewith adapted to be positioned in said channel portion and hook-shaped clamps integral with and projecting from said base, one of said clamps being rigid and the other resilient.

14. In a dry shaver of type described, a channeled outer cutter, a guard detachably secured over and within said channeled portion, said guard having a semi-circular head and a rectangular base having attaching means formed thereon and a plurality of slots in said head adapted to form a comb member.

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