

Feb. 27, 1945.

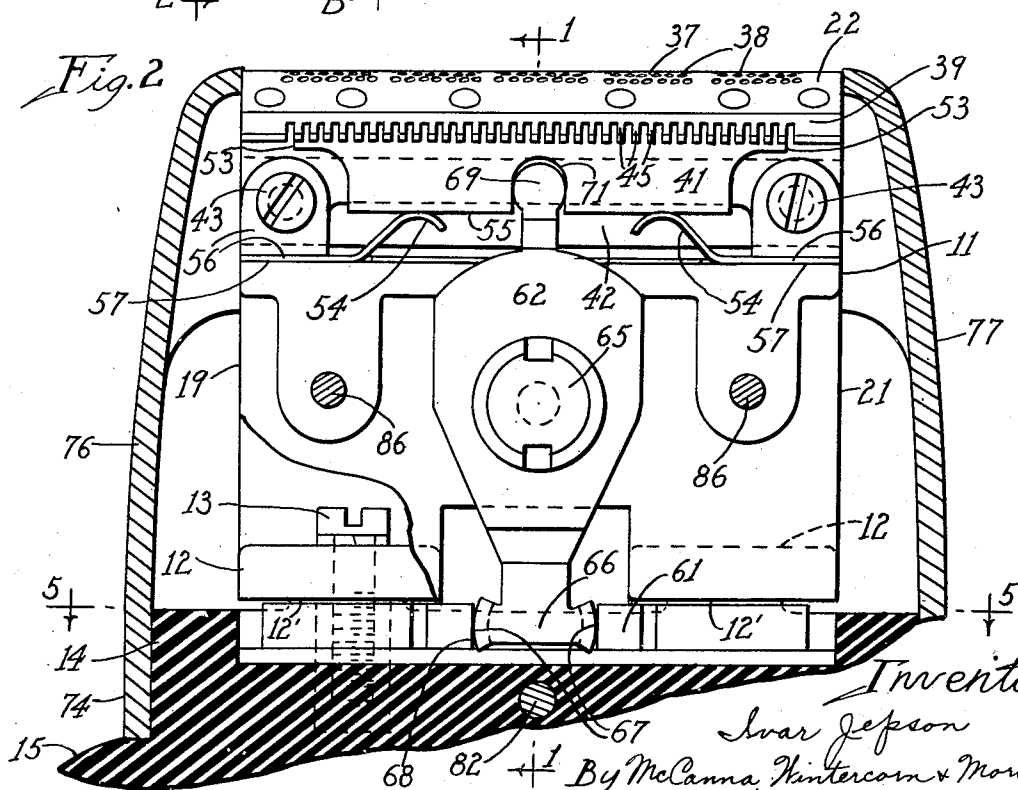
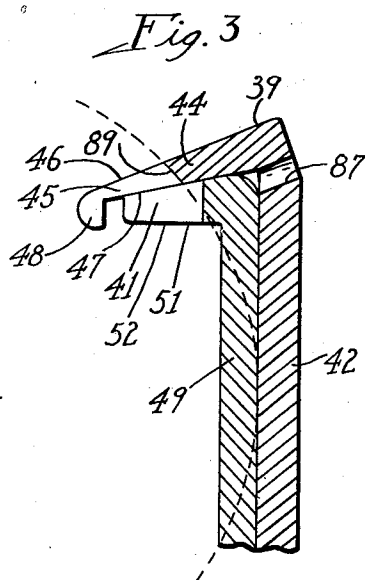
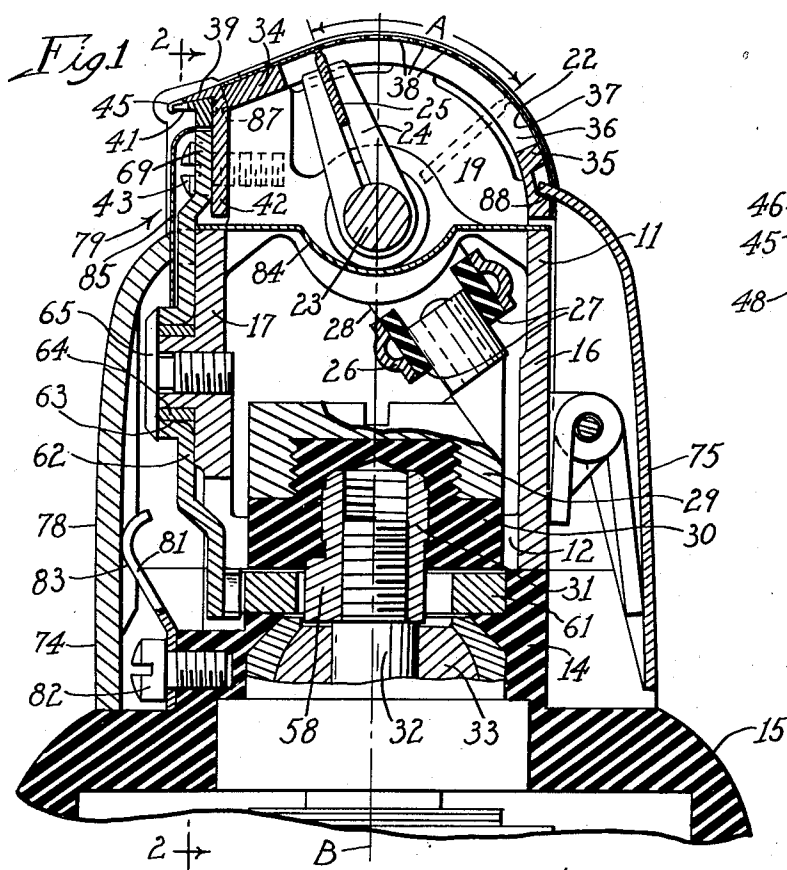
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2,370,543

SHAVING IMPLEMENT

Filed May 3, 1943

3 Sheets-Sheet 1



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Fig. 4

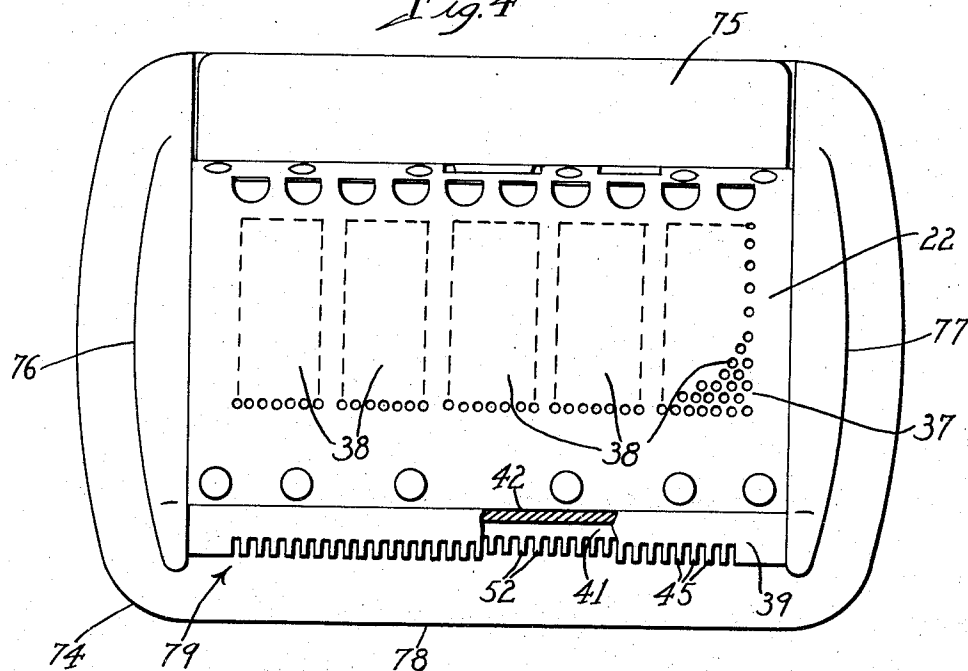
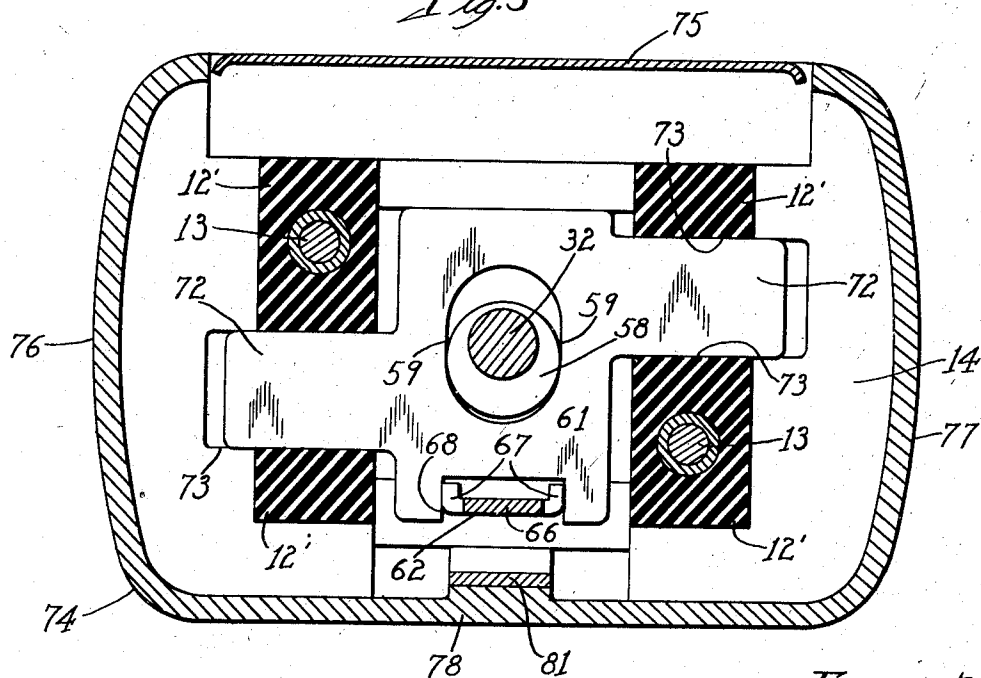


Fig. 5



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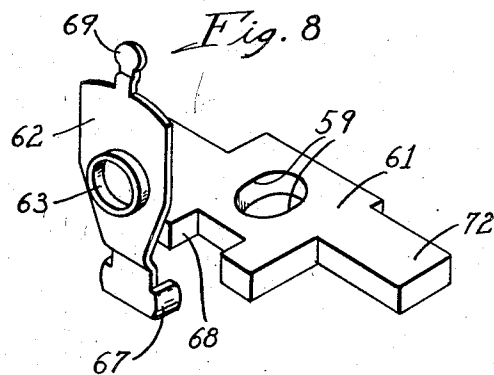
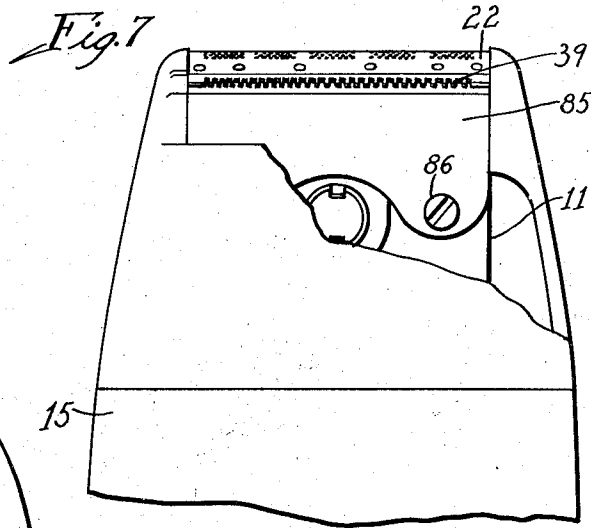
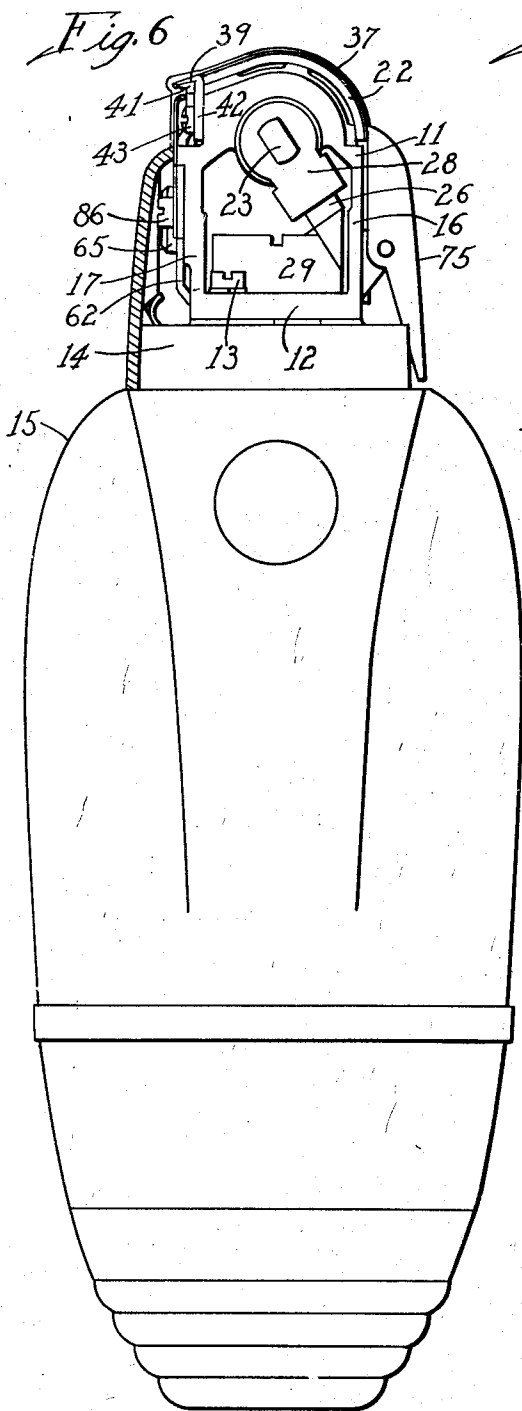
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,370,543

SHAVING IMPLEMENT

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Application May 3, 1943, Serial No. 485,479

9 Claims. (Cl. 30—34)

This invention relates to shaving implements of the kind known as dry shavers. It also relates in certain respects to the clipping of hair either in combination with a close shaving means or independently thereof.

One of the objects of my invention is to provide an improved shaving implement of the type having a comb and cutter adapted for close shaving and a separate comb and cutter in co-relation therewith adapted for cutting long hairs.

Another object of my invention is to provide an improved cutter driving mechanism whereby the cutters of both the long and short hair cutting assemblies are driven through separate drive-transmitting means from individual eccentric means in turn driven from a single rotary drive member or suitable source of power such as an electric motor which usually constitutes the handle of the implement.

Another object of my invention consists in a novel organization of parts in a dry shaver of the type described in which the close shaving cutter is oscillated transversely of the cutter head and the long hair cutter is reciprocated lengthwise of the cutter head.

Another object of my invention consists in organizing the cutter parts and the cutter driving parts in a shaver of the type described so that they will be compactly arranged in coacting relation and the drive-transmitting parts will operate with a comparatively small amount of friction and will be capable of high speed operation for comparatively long periods.

Another object is to provide an instrument for cutting hair, characterized by a comb member having a row of teeth and a movable cutter in coaction with the comb teeth, including improved shape characteristics in the comb member for the purpose of definitely picking up loose or long hairs and guiding them into the cutting area, whereby to facilitate the clipping or shearing of hair.

Another object is to provide a shaving implement of the type having a motor in the handle casing and an arcuate shear plate or comb at the shearing end coacting with an oscillatory cutter driven by the motor, and in which the effective shaving arc as defined by the arc in which the cutter oscillates is located in laterally offset relation to the longitudinal axis of the handle which usually is coincident with the motor axis. This relationship is advantageous in that it positions the effective shaving arc at one side of the handle where it is adapted for more convenient shaving operation. Also, where a clipper comb and cutter are incorporated in the shaving head this feature is particularly advantageous because it enables compactness of parts and close cooperative relation between the clipping and shaving functions.

Another object is to provide an improved hair clipper and driving mechanism therefor.

Still another object is to generally improve the structure of a dry shaver of the type described.

Other objects and attendant advantages will be appreciated by those skilled in this art as the invention becomes better understood by reference to the following description when considered in connection with the accompanying drawings, in which:

Figure 1 is a longitudinal section through a shaving implement embodying my invention, taken on the section line 1—1 of Fig. 2, on a scale approximately four times actual size;

Fig. 2 is a section taken substantially on the section line 2—2 of Fig. 1 with some of the parts in elevation;

Fig. 3 is a further enlarged detail section crosswise through the clipping comb and cutter, removed from the implement;

Fig. 4 is a top plan view of the shaving head, partly in section;

Fig. 5 is a section taken substantially on the section line 5—5 of Fig. 2;

Fig. 6 is a side elevation of the entire shaving implement, partly in section to show the near end of the shaving head in elevation, on a scale approximately twice actual size of the implement;

Fig. 7 is a fragmentary side view of the implement, looking at the left hand side of Fig. 6; and Fig. 8 is a perspective view of a cutter operating slide and lever removed from the implement.

In this embodiment of the invention one of the features is the provision of separate comb and cutter assemblies or units, one for close shaving and another for long hair cutting, arranged in cooperative relation and operated from a single rotary drive member. This feature has the advantage that the comb and cutter set for each assembly is individually replaceable. Also, the cutting elements of each set are independently mounted and maintained in the desired coaction one with respect to the other without dependence on the cutting elements of the other set. However, the respective comb and cutter sets are arranged in juxtaposition and in cooperative relation for simultaneous clipping and shaving. My invention in its broader aspect insofar as the drive mechanism is concerned, contemplates the use of both comb and cutter sets on a single comb unit such, for example, as disclosed in my application Serial No. 311,969, filed January 2, 1940, for Shaving implement. Also, my invention in some respects is not limited to the use of a transversely oscillating cutter for close shaving but contemplates any suitable or desired arrangement of the two types of combs and cutters. It should be noted, however, that a particular problem is presented in the objective of a satisfactory

drive mechanism for a reciprocating type cutter for long hair cutting when combined with an oscillating type cutter for close shaving, where it is desired to drive both cutters from a single rotary drive member such as from one end of an armature shaft as used in electric dry shavers. This problem is complicated by the desire to keep the structure compact and within certain size limits; also, by the problem of providing electrical insulation between the armature shaft and the driven parts; the problems of friction, wear, and lubrication, particularly in view of the comparatively high speed at which the parts operate; the desire for minimum load on the motor; and the avoidance of service troubles by reason of the tendency of users to disregard directions for oiling and cleaning. My invention, therefore, contemplates the provision of a single rotary drive member provided with two eccentrics or eccentric means, one for transmitting drive to the close shaving cutter and the other to the long hair cutter. In the embodiment shown, one eccentric means is arranged at the terminal end of the drive member for oscillating the close shaving cutter transversely of the shaving head, and the other eccentric means is arranged adjacent to the first at an intermediate position on the drive member for reciprocating the long hair cutter lengthwise of the head.

Referring now to the drawings, it will be observed that in the present embodiment the close shaving comb unit and the long hair cutting or clipper comb unit are separately mounted on a supporting structure comprising a head casing designated generally by 11 which has a bifurcated base portion 12 suitably connected by screws 13 to the outer end 14 of a main casing 15 which serves as a motor casing and also as a handle for manipulating the implement. In this embodiment the base portions 12 of the head casing seats on raised pads 12' and the head casing has parallel side walls 16 and 17 joined by end walls 19 and 21. These end walls are shaped at the top to support a close shaving comb unit designated generally by 22 and also to provide bearing support for a rock shaft 23 of a cutter holder 24 which carries a removable cutter blade 25. The cutter holder is adapted to be oscillated at a high speed by a crank member 26 operating between parallel bearing plates 27 which are fixed to a yoke 28 which in turn is fixed to the ends of the rock shaft 23. The crank member 26 may comprise a roller journaled on a pin which is fixed eccentrically to a rotary drive member part 29 which in turn is fixed to the end 31 of the armature shaft 32 of the electric motor. In this embodiment the drive member comprises the part 29, a body 30 of electrical insulation material, and a metal part 31 threaded to the shaft 32 and integral with an eccentric 38 hereinafter described. The parts 29 and 31 are in the nature of inserts in the material 30 by molding. The armature shaft is journaled at one end in an adjustable spherical bearing 33 in the main casing, and a suitable bearing (not shown) is provided in said housing for the opposite end of the armature shaft.

The comb 22 and cutter 25, as well as the drive therefor, are of a type described more fully in Patent No. 2,234,891, granted March 11, 1941. In the present case the comb unit comprises a supporting frame having longitudinal side bars 34 and 35 joined by a plurality of arched ribs 36, and a comb plate 37 of thin metal conforming to the outer face of the supporting frame and suit-

ably fixed thereto. The comb or shear plate, as it is sometimes called, is perforated in areas 38 to provide hair-receiving openings of a size and shape suitable for receiving the beard stubble. The cutter blade 25 is urged against the inner side of the arched comb plate by suitable spring means and by centrifugal force when oscillated at a high speed, thereby coacting with the cutting edges at the inner ends of the openings 38 to cut or shear beard stubble which enters these openings. This type of comb and cutter gives close shaving in a manner known in this art. It should be understood, however, that my invention in its broader phase is not limited to a close shaving comb and cutter of this particular type.

Another feature of my invention is the arrangement of the comb with its shaving area designated by the arc A laterally offset with relation to the longitudinal center axis B of the implement. In this case the axis B is coincident with the motor axis. The cutter 25 oscillates in this arc A as indicated in Fig. 1. To obtain this result the cutter holder 24 is set in angular relation to its yoke or operating part 28, as shown in Fig. 1. This not only positions the effective shaving area at one side of the shaving head to facilitate the application of the shaver to the face but it also enables a compact arrangement of the close shaving comb with relation to a clipper comb and cutter designated generally by 39 and 41, respectively, presently to be described.

In the preferred embodiment the comb 39 and cutter 41 are each formed from sheet steel. The comb has a flat body portion 42 which seats against an outer side of the head casing 11 parallel with the wall 17 and is clamped to the casing by screws 43. The outer end portion 44 of this comb plate is bent outwardly in a plane tangential with respect to the curvature of the comb plate 37, and is slotted and shaped to provide a row of clipper teeth 45 having outwardly converging top and bottom surfaces 46 and 47, respectively, and a depending cutter guard 48, as shown in Fig. 3. The cutter 41 has a flat body portion 49 which seats against the front face of the comb plate body 42 and is further shaped to provide an outwardly turned portion 51 which seats against the under surface 47 of the comb plate portion 44 and is slotted to provide cutter teeth 52. As shown in Figs. 2 and 4, the clipper comb plate 39 extends the full length of the head casing and as shown in Fig. 2, the cutter may be shorter, as indicated by its ends 53. Suitable means such as spring elements 54 bear against the lower edge 55 of the cutter blade 41 and constantly urge the blade upwardly to maintain the cutting edges of its teeth in shearing relation with the cutting edges on the underside of the clipper comb teeth. By reason of the acute angle relation between the comb surface 47 and the adjacent vertical face of the comb plate 42 against which the cutter bears, the upward pressure of the spring elements 54 serves to urge the cutter upwardly in a slightly wedging action against the comb plate, thereby maintaining the cutting edges of the cutter teeth in good shearing relation to the cutting edges of the clipper comb teeth. These spring elements may be suitably mounted, in this instance each spring being integral with a portion 56 which is clamped in position by the screws 43 and which also seats at the bottom on an extension 57 of the head casing.

The clipper cutter 41 is reciprocated lengthwise by means operated directly from the armature

shaft. In the present embodiment this cutter operating means comprises an annular eccentric 58 fixed to the armature shaft 32 and operating against opposed bearing surfaces 59 of a horizontal slide designated generally by 61. Reciprocating motion of this slide is translated to the clipper cutter 41 through the intermediary of a lever 62. This lever has a relatively large annular bearing 63 on a bearing member 64 which in turn is supported on the side wall 17, the lever 62 being retained in position by a cap screw 65. The lower end 66 of the lever has opposed arcuate faces 67 engaging the opposite faces of a slot 68 in the slide 61; and the upper end 69 likewise has arcuate faces engaging the opposite walls of a slot 71 in the clipper cutter 41. The slide structure is designed to provide ample bearing surface and to be self-lubricating so as to be adapted for long life without appreciable wear or attention on the part of the user. In this case I have made the slide of comparatively large width and length dimensions and formed it from a sheet of non-metallic self-lubricating material of the kind known as Micarta. As shown in Fig. 5, the slide has end portions 72 slideable against ways 73 machined in the outer end portion 14 of the main housing body.

Viewing Fig. 2, it will be noted that the face of the long hair cutting or clipper comb 39 is in a plane substantially tangential to the face of the close shaving comb 37 and that in this position the clipper comb is disposed below the highest point of the comb 37 on the centerline of the shaving implement. This is of particular advantage in certain shaving operations as, for example, when shaving the upper lip, for the reason that it permits the close shaving comb to be used to the highest point of the lip without interference of the other comb. At the same time this relationship of the two combs permits of their simultaneous use with the stroke in the other direction wherein the comb 39 functions for cutting long hairs and the comb 37 simultaneously functions for close shaving. In these operations it will be manifest that the single rotating driving member transmits oscillating motion to the cutter 25 transversely of the head and reciprocating motion to the cutter 41 lengthwise of the head, through the intermediary of the eccentric means 26 and 58, respectively.

A removable casing section 74 is provided to enclose three sides of the shaving head, the remaining side being closed by a presser plate 75. This casing section comprises end walls 76 and 77 joined by a side wall 78, the end walls being shaped to conform with the contour of the combs 37 and 39 and the side wall 78 terminating at its upper end short of the clipper comb and cutter so as to provide in effect an opening 79 to expose this comb for the free entrance of hair at the open end of the teeth and also for the purpose of allowing free discharge of the cut hair. This opening 79 also communicates with the interior of the oscillating cutter compartment between the end walls 19 and 21 above the walls 16 and 17. The casing section 74 may be slid vertically upward, viewing Fig. 1, to remove it from the implement, the casing section having sliding engagement along its end walls with the ends of the head casing. Suitable means is provided for releasably retaining this casing section in the closed position, in this instance comprising a spring blade 81 fastened by screw 82 to the main casing 15 and shaped to snap into a retaining recess 83 on the inner side of the casing wall 78.

A partition or guard 84 removable after the comb 37 is removed, closes the upper end of the compartment containing the eccentric cutter driving means and keeps out cut hair and foreign material. A removable guard plate 85 held in position by screws 86 prevents hair from the clipper from entering the compartment below. The comb unit 22 is retained in working position by small lugs 87 on the longitudinal bar 34, Fig. 1, which fit into corresponding recesses in the clipper comb body 42, and by the upper end of the presser plate 75 which engages in a recess 88 in the longitudinal bar 35. Obviously, by pressing inwardly on the lower end of 75 (which is spring pressed to a closing position) the upper end will be withdrawn from the comb unit 22, permitting said comb unit to be removed.

Another feature of my invention is shown in Fig. 3 from which it will be noted that the toothed portion of the clipper comb is undercut at 89, this being at the inner end or bottom of each slot which defines the side walls of adjoining teeth 45. This undercut is at an acute angle with respect to the outer face 46 of these teeth, that is, the top face in the position of the comb shown in Fig. 3, so as to provide individual sharp edges and inclined faces leading inwardly to the cutting plane. These sharp edges serve to pick up loose or long hairs by motion of the clipper over the skin. Such edges and undercut faces also serve to guide the hairs to the cutting edges and thereby facilitate the cutting of hairs which are otherwise difficult to engage in clipping devices, particularly in devices used for shaving. In this instance the undercut is made by a milling cutter the outer diameter of which is indicated by dotted lines in Fig. 3. This feature of the invention is not, however, limited to use in combination with a close shaving comb and cutter as herein shown, but it is adapted for independent use in hair clippers.

The term "eccentric means" is used in the claims to mean any motion transmitting means having eccentricity with respect to a shaft center about which such means revolves for translating rotary motion to oscillatory motion or reciprocatory motion; and illustrative forms of such means are shown herein consisting of the eccentric 58 which translates rotary motion from drive shaft 32 into reciprocatory motion as applied to the cutter slide 61, and the crank 26 which translates rotary motion from said shaft into oscillatory motion as applied to the cutter carrier 24.

While I have shown a particular embodiment of the invention, it will be understood that I do not wish to be limited thereto since many modifications may be made, and I therefore contemplate by the appended claims to cover any such modifications as fall within the true spirit and scope of the invention.

I claim:

1. A shaving implement having an arcuate comb adapted for close shaving and a cutter in coaction therewith, a comb extending along one side of the first mentioned comb having a row of clipper teeth, a cutter adapted to be reciprocated in shearing coaction with the clipper teeth of the second mentioned comb, and mechanism for simultaneously operating the cutters including a rotary drive having an eccentric means at its extremity and a second eccentric means spaced inwardly from the first mentioned eccentric means, and separate drive transmitting connections between the first mentioned ec-

centric means and the first mentioned cutter and between the second mentioned eccentric means and the second mentioned cutter.

2. A shaving implement as set forth in claim 1, in which the first and second mentioned eccentric means rotate about an axis extending longitudinally of the shaving implement and in which the drive transmitting connection for the second mentioned cutter includes a slide member reciprocable in a direction at right angles to said axis of rotation.

3. A hair clipper having a comb plate provided with clipper teeth, a cutter coacting with the inner side of said teeth, the comb plate being undercut between its adjoining teeth to provide relatively sharp undercut edges at the outer face of the comb.

4. In a hair clipper, a comb structure having a body portion and a row of teeth projecting therefrom, the outer face of said teeth adapted for engaging the skin and the inner face having cutting edges, a cutter having teeth coacting with the cutting edges of the comb, the body portion of the comb being undercut between its adjoining teeth from the face edge inwardly to the cutting edge to provide relatively sharp undercut edges at the outer face of the comb adapted for intercepting hair at said outer face and guiding it inwardly of the comb body to the cutting edges by movement of the comb body in a direction toward the outer end of the teeth.

5. A shaving implement of the character described having a longitudinal center axis, an arcuate comb at one end of the implement having hair receiving openings in a limited arcuate shaving area, a cutter coacting with the comb mounted to oscillate in an arc corresponding with that of said shaving area, the axis about which the cutter oscillates being at right angles to and substantially in the plane of said longitudinal center axis, the arc of said shearing area as well as the arc of movement of the cutter being laterally offset in relation to said center axis so that there is a major portion of the shaving area at one side of said longitudinal center axis and a minor portion on the other side of said longitudinal center axis, in combination with a clipper comb and cutter in juxtaposition to the comb at the side thereof adjacent to the minor portion of its shaving area.

6. A shaving implement having an arcuate comb adapted for close shaving and a cutter adapted to be oscillated in coaction therewith, a comb arranged in juxtaposition to the first mentioned comb having a row of clipper teeth, a cutter adapted to be reciprocated in coaction with the second mentioned comb, and power drive means for simultaneously operating said cutters including a rotary drive member having an eccentric means connected for transmitting oscillatory motion to the first mentioned cutter and a second eccentric means connected for transmitting reciprocating motion to the second mentioned cutter, the power drive means including a motor armature shaft to which the rotary drive member is fixedly connected and electrically insulated therefrom, said drive member having the first mentioned eccentric means located at its end remote from the armature and having its second mentioned eccentric means located between the armature and the first mentioned eccentric means.

7. A shaving implement having an arcuate comb adapted for close shaving and a cutter

adapted to be oscillated in coaction therewith, a comb arranged in juxtaposition to the first mentioned comb having a row of clipper teeth, a cutter adapted to be reciprocated in coaction with the second mentioned comb, and power drive means for simultaneously operating said cutters including a rotary drive member having an eccentric means connected for transmitting oscillatory motion to the first mentioned cutter and a second eccentric means connected for transmitting reciprocating motion to the second mentioned cutter, the second eccentric means having an eccentric member driven by the power drive means, and including a slide coplanar with the eccentric member and reciprocated thereby, and a lever pivoted intermediate its ends and having one end in coaction with the slide and its opposite end in coaction with the second mentioned cutter for reciprocating this cutter by reciprocation of the slide.

8. A shaving implement having an arcuate comb adapted for close shaving and a cutter adapted to be oscillated in coaction therewith, a comb arranged in juxtaposition to the first mentioned comb having a row of clipper teeth, a cutter adapted to be reciprocated in coaction with the second mentioned comb, and power drive means for simultaneously operating said cutters including a rotary drive member having an eccentric means connected for transmitting oscillatory motion to the first mentioned cutter and a second eccentric means connected for transmitting reciprocating motion to the second mentioned cutter, the combs being disposed at one end of the shaving implement extending transversely thereof and the power drive means including a drive shaft extending lengthwise of the shaving implement, and including an eccentric member fixed to the drive shaft, a slide adapted to be reciprocated by said eccentric member in a plane at right angles to said drive shaft, and a lever substantially parallel with the drive shaft connected at one end in coaction with the slide and its opposite end in coaction with the second mentioned cutter for reciprocating this cutter by reciprocation of the slide.

9. A shaving implement having an arcuate comb adapted for close shaving and a cutter adapted to be oscillated in coaction therewith, a comb arranged in juxtaposition to the first mentioned comb having a row of clipper teeth, a cutter adapted to be reciprocated in coaction with the second mentioned comb, and power drive means for simultaneously operating said cutters including a rotary drive member having an eccentric means connected for transmitting oscillatory motion to the first mentioned cutter and a second eccentric means connected for transmitting reciprocating motion to the second mentioned cutter, a main casing for the power drive means, a casing removably attached to the main casing for supporting the combs, the arcuate comb extending across one end of the second mentioned casing and removable therefrom, means at one side of the second mentioned casing to releasably engage the arcuate comb for holding it in working position and for permitting its removal from such position, and a casing section enclosing the remaining sides of the second mentioned casing and shaped to provide a restricted opening in which the clipper comb is disposed with its clipper teeth exposed for clipping.

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