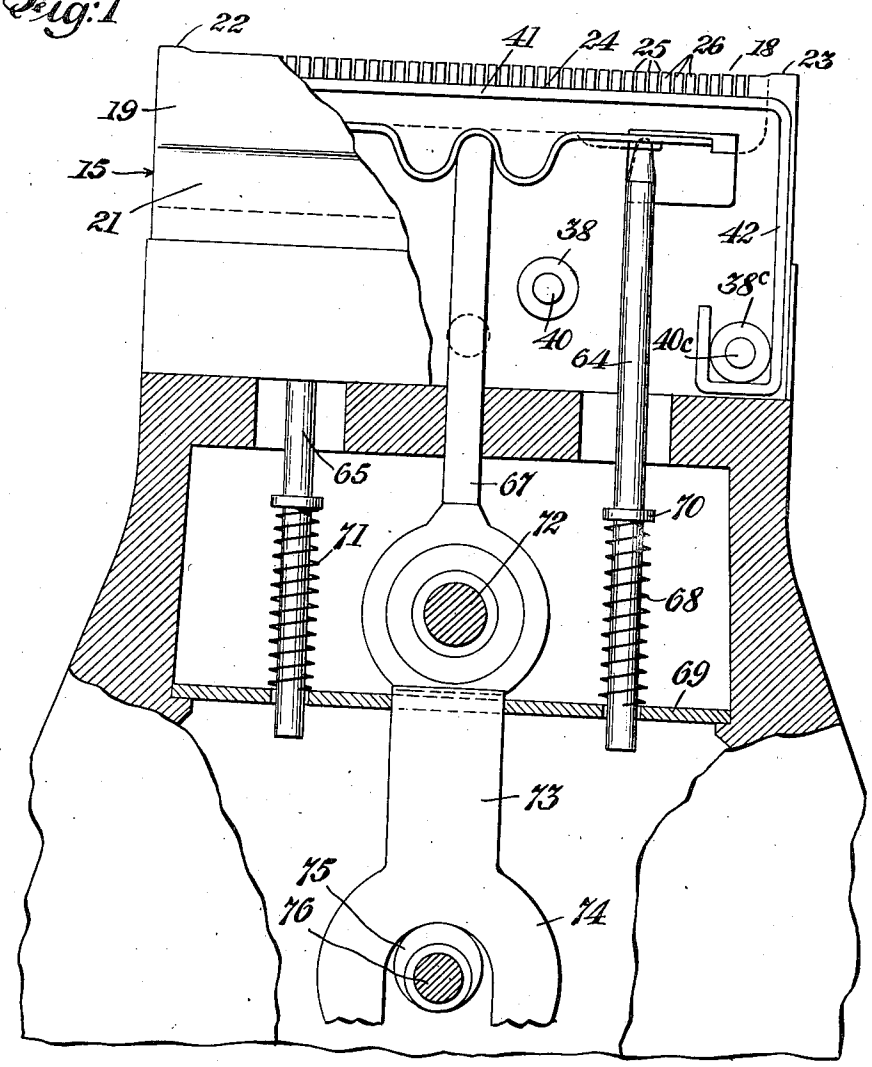
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SHAVING DEVICE

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Fig. 1



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Fig. 2.

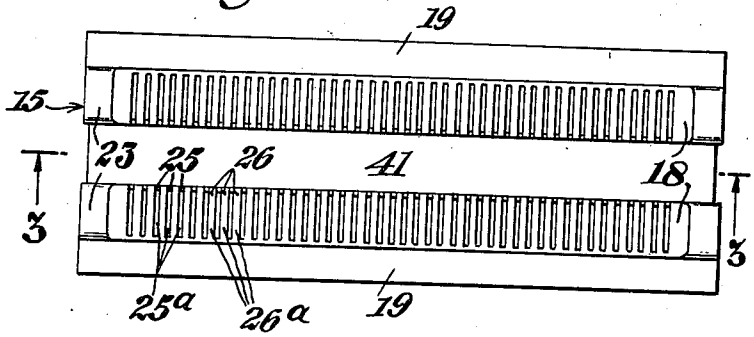


Fig. 4.

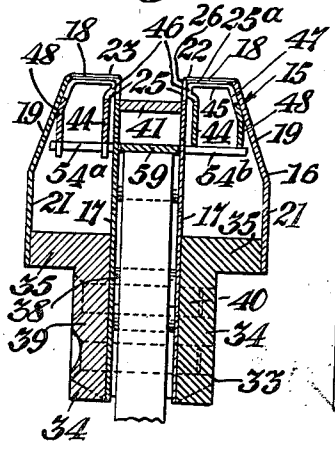


Fig. 3.

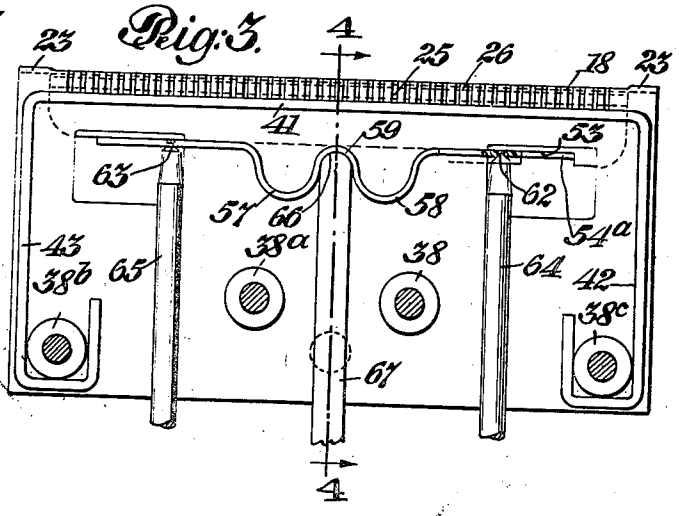
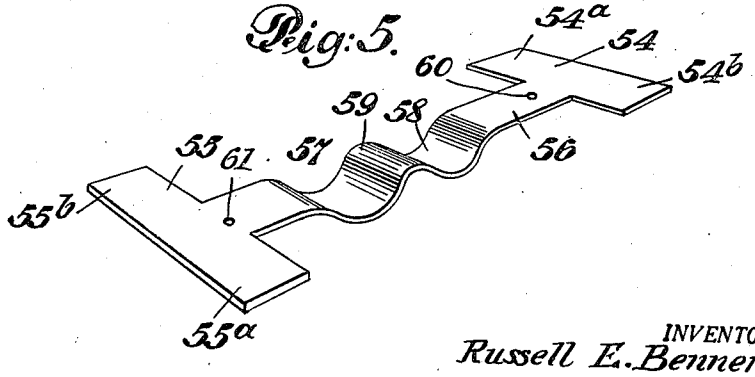


Fig. 5.



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Fig:6.

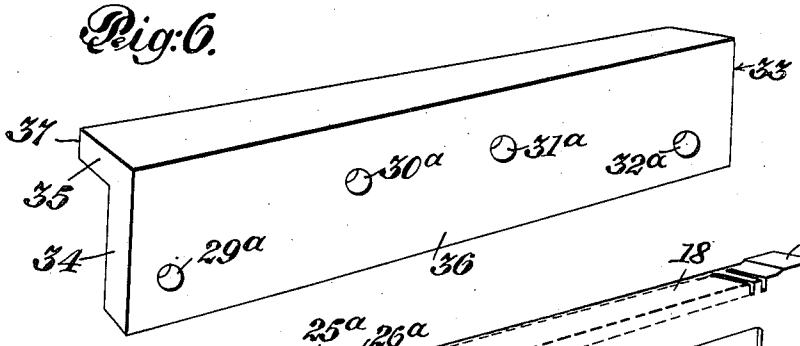


Fig:7.

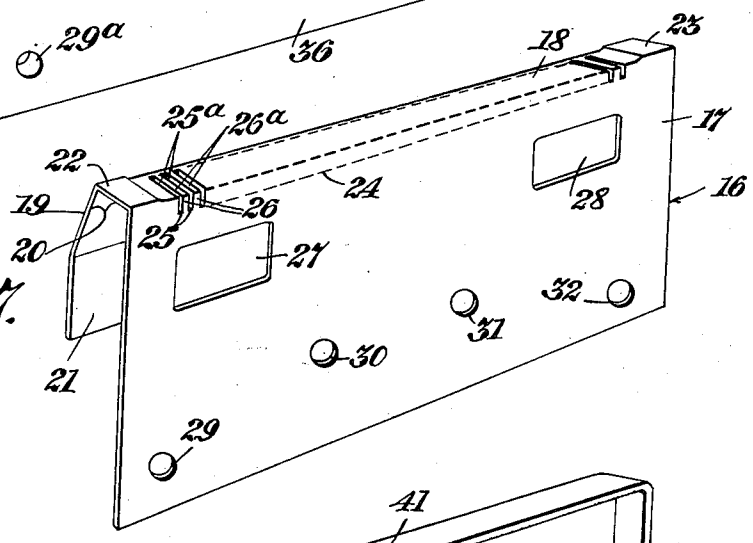


Fig:8.

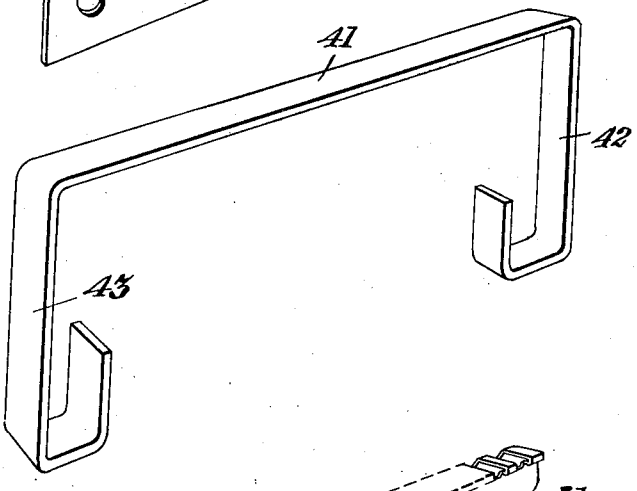
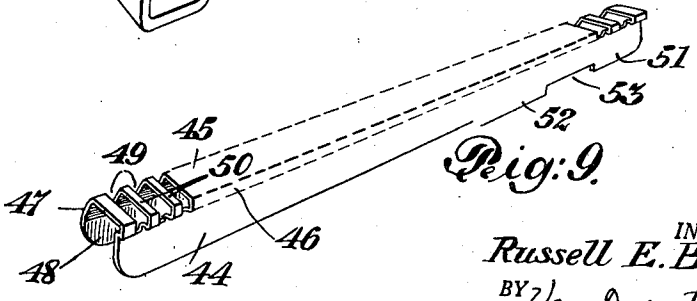


Fig:9.



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UNITED STATES PATENT OFFICE

2,314,068

SHAVING DEVICE

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Application December 13, 1939, Serial No. 308,925

6 Claims. (Cl. 30—43)

This invention relates to improvements in shaving devices, and has for an object the provision of a dry shaver in which two zones in which cutting occurs are provided in spaced relation to each other, a depressed area being formed between said zones, thereby forming a bulge in the skin of the user whereby the hair is cut in the trailing zone (depending on the direction in which the device is moved along the skin).

Another object of the invention is the provision, in a shaving device, of a cutting head having a longitudinal channel extending thereacross, the lateral edges of which form zones in which the hair is cut.

A further object of the invention is the provision of a cutting head, for a shaving device, including a pair of identical, oppositely disposed and inverted channel-like members spaced apart from each other. The sides of the channels facing each other have slots formed therein and moving cutter members therein have side slots formed thereon to cooperate with the slots formed in the sides of said channels to cut hair, thereby forming two distinct cutting zones spaced apart from each other.

Yet another object of the invention is the provision in a shaving device, of a cutting head having two cutting zones spaced apart from each other, and a spacing member therebetween including a flat plane surface for defining the size of the bulge formed in the user's skin when the skin is encountered by the device.

Other objects and advantages of the invention will be evident to those skilled in the art after reading the following specification.

Referring to the drawings:

Figure 1 is an elevation, partly in section, showing the new and improved cutting head mounted on a handle including a motor;

Figure 2 is a plan view of the cutting head shown in Figure 1;

Figure 3 is a longitudinal sectional elevation taken along the line 3—3 of Figure 2;

Figure 4 is a transverse sectional elevation of the cutter head taken along the line 4—4 of Figure 3;

Figure 5 is a perspective view of the driving member which is engaged by an oscillating arm of the motor and which in turn oscillates the inner cutter bars shown in Figure 9;

Figure 6 is a perspective view of the L-shaped base of one of the stationary members of the cutter head;

Figure 7 is a perspective view of an outer cutter member and guard;

Figure 8 is a perspective view of the spacing member positioned between the two cutting heads; and

Figure 9 is a perspective view of one of the inner cutter bars.

The cutter head, which may be seen in Figures 1, 2 and 4 and generally designated by the numeral 15 in the preferred embodiment of the invention, consists of two complete cutting devices spaced apart from each other so that the skin of the user forms a bulge between the devices.

The cutting zones face each other and the cutting is preferably effected on lateral faces instead of along the end faces of these devices which normally contact the skin.

Referring now to Figure 7, a plate of thin steel or the like, generally designated by the numeral 16 and forming an outer guard, is bent as shown in the drawing to form a long side 17, a flat top portion 18, a flat portion 19 which is at an angle with respect to the portion 18, the inner angle 20 being greater than 90°, and a short flat portion 21 which is parallel to and spaced apart from the long side. At one end of the flat top portion 18 the surface 22 is elevated slightly above the surface of the flat top 18. On the other end, the surface 23 is also elevated slightly above the surface of the flat top 18.

Terminating along a line 24 on the face of the long side 17 is formed a plurality of slots 25 leaving webs therebetween. The webs 26 cooperating with similar webs on a cutter bar to be presently described, form a series of cutters on the face of the long side 17 adjacent to the flat top 18. In cutting or forming the slots 25, continuations of these slots designated by the numeral 25a are incidentally formed in the surface of the flat top 18. These slots are preferably not employed in actually cutting the hair.

The long side 17 has formed therein near one end thereof and adjacent to the line 24, a rectangular hole 27 and a like second hole 28 formed near the other end thereof. These holes form a clearance for driving means to be presently described.

The long side also has formed therein holes 29, 30, 31 and 32, the purpose of which will also be presently described.

The steel blade, after being formed as above described, may be hardened and the inner surfaces of the webs 26, 26a may be ground forming surfaces at right angles to each other.

The outer guard base 33 is of substantially L-shaped cross section having a vertical portion 34 and a horizontal portion 35. The outer guard

plate 16 is applied to the base 33 with the inner face of the long side 17 contacting the face 36 of the base and with the holes 29, 30, 31 and 32 in alignment with the holes 29a, 30a, 31a and 32a respectively. The short flat portion 21 contacts the face 37 of the horizontal portion 35. The guard may be secured to the base in any suitable manner, for example, by spot welding or silver soldering or other known means.

Referring now to Figure 4, it will be seen that two outer guard structures are spaced apart from each other with the lateral cutting portions of the webs 26 facing each other. In the left hand member outer guard assembly in Figure 4, it will be noted that the holes 29a, 30a, 31a and 32a are countersunk.

Four studs, one of which is designated in Figure 4 by the numeral 38, have shank portions 39 which are riveted into the countersunk holes in the left hand base member. The studs 38 also have shanks 40 which fit the holes 29a, 30a, 31a, 32a in the right hand outer guard assembly shown in Figure 4 and serve as dowel pins.

In Figure 3, the studs are indicated by the numerals 38, 38a, 38b and 38c. These studs also serve to space the opposed outer guard assemblies in definite spaced relation to each other. A filler member lying between these assemblies has a flat portion 41 which is postioned adjacent to the lines 24 on the outer guards and has end portions bent downwardly and up again to form L's, one L being designated by the numeral 42 and the other by the numeral 43. The L 42 embraces the stud 38c and the L 43 embraces the stud 38b, as may be seen in Figure 3.

The cutter bar shown in perspective in Figures 4 and 9 is of generally inverted U-shaped cross section having a flat top 45 and a straight leg 44 on one side with a bead 46 therebetween. Adjoining the other edge of the flat top 45 is an angular face 47 for matching the angular portion 19 of the outer guard, and a straight portion 48 paralleling the straight leg 44. A plurality of transverse slots 49 are formed in the cutter bar at least as deep as the width of the bead 46.

In the embodiment shown in the drawings, particularly Figure 4, it will be noted that these slots 49 are slightly deeper than the width of the bead. Between the slots 49 are a series of webs 50 which form cutter bars. The leg 44 on one end thereof is provided with the downwardly projecting portion 51 and spaced apart from the projecting portion 51 is a second downwardly projecting portion 52. The space 53 between these downwardly projecting portions forms a notch adapted to be engaged by a driving member to be presently described.

The straight face 48 is also provided with downwardly projecting portions (not shown in Figure 9) similar to the portions 51 and 52 and parallel thereto, thereby providing a notch on the portion 48 in line with the notch 53 on the portion 44.

After the cutter bar is formed and hardened, the flat top surface 45 is ground, and a surface at right angles thereto is ground on the bead 46, thereby forming on the faces of the webs 50 along the face of the bead, cutting edges which cooperate with the inner surface of the webs 26, along the face of the long side 17 of the outer guard for cutting hair.

A cutter bar is positioned in each outer guard assembly as shown in Figure 4.

A driving link shown in perspective in Figure 5 and also shown in Figures 1, 3 and 4 preferably consists of a metallic stamping having rectangular end portions 54 and 55 joined together by a strip 56. The strip 56 is bent and has two downwardly extending curved portions 57, 58, with an upwardly extending curved portion 59 therebetween. Conical holes 60, 61 are formed in the strip 56 adjacent to the rectangular end portions 54 and 55 and are adapted to be engaged by the conical points 62 and 63 of the spring loaded pins 64 and 65 carried by the motor. The upwardly extending curved portion 59 is engaged by the curved end 66 of the oscillating bar 67. The rectangular end portions 54, 55 are of such width as will fit the notches 53. When the driving link is in position in the device as shown in Figures 3 and 4, the projecting portions of the ends 54 and 55 extend through the holes 27 and 28 formed in the long side 17 of the outer guards, said holes being of sufficient size to permit the driving link to be oscillated and to transmit oscillatory movement to the cutter bars as will now be described. The projection 54a of the end portion 54 engages the notches 53 in the cutter bar of the rear outer guard as seen in Figure 3 (which is the left hand one as seen in Figure 4). At the same time (still looking at Figure 4), the portion 54b bears against the flat surfaces of the legs 44 and 48 of the cutter bar in the right hand outer guard.

Due to the urge of the spring 68, one end of which acts against the bar 69 in the motor and the other end of which acts against the collar 70 carried on the pin 64, the end portion 54 is urged upwardly and this urge is in turn imparted to the cutter bars, forcing them upwardly as viewed in Figure 4, and due to the inclined surface of 47 acting against the inclined surface 19, the ground faces of the webs in the bead 46 are held in intimate contact with the inner surfaces of the webs 26. Likewise, the projection 55a of the end portion 55 engages notches 53 in the right hand cutter bar of Figure 4, while the projection 55b rests against the flat surface of the cutter bar of the left outer guard in Figure 4.

The end portion 55 is urged upwardly by the pin 65 due to the action of the spring 71 in the motor and this in turn urges the cutter bars upwardly in the same manner as described for the end portion 54. The oscillating bar 67 is mounted on a pivot shaft 72 in the motor and an arm 73 extending downwardly, carries a yoke 74 which is oscillated by a cam 75 carried on the motor shaft 76. Therefore, when the motor armature rotates the shaft 76 and the cam carried thereby oscillates the yoke 74 and in turn oscillates the bar 67, this movement is imparted to the cutter bars through the medium of the projections 54a and 55a of the end portions 54 and 55.

Although each half of the cutter head structure shown and described herein will admirably cut hair, the act of placing two such members with their cutting zones facing each other and at the same time spaced apart, obtains a new effect and it is believed that this effect is due to the following reasons.

When the double cutting head (referring to Figure 4) is placed against the skin so that the two flat tops 18 both engage the skin, the skin between these flat tops bulges inwardly toward the flat portion surface 41, the depth of these bulges depending upon the pressure under which the device is applied against the skin. As the device is moved along the surface of the skin, one side of the bulge flows out of the depression

and therefore the skin flows in to the depression from the other side to take the place of that which flowed out. Now the skin flowing out of the depression is flexed and the hair thereon is directed into the cutting zone, for example, if the device (still viewing Figure 4) were moved to the right, the skin of the bulge would flow out past the cutting zone of the left hand outer guard and the hairs would be directed to the slots **25** of its cutting zone, with the result that as the skin flows, the hair cutting progresses in accordance with the flow of skin. At the same time, skin flows into the depression over the right hand guard to replace that which flowed out over the left hand guard. The closest cutting is effected by the "trailing" cutters. For different types of skin, I may make the spacing between the cutting zones greater or less proportionately than shown. It can be readily seen that by changing the spacing, the device may be made ideally suited to skins of different characteristics.

Although, referring to Figure 7, the slots **25** in the portion **17** and the continuation of these slots **25***a* and partially across the surface of the flat top **18** is shown, it is not material where the continuations **25***a* end. These continuations are, in fact, incidental to the milling cutter with which the slots **25** are milled. In instances where the slots **25** are punched into the plate before the same is bent, the slots **25** may terminate along the front edge of the flat top **18**, as viewed in Figure 7. Likewise, in Figure 9, the slots **49**, instead of crossing the flat top **45** of the cutter bar, may be formed only in the beaded portion **46**, due to the fact that the cutting zones are lateral instead of along the flat top.

Although a preferred embodiment of the invention is herein shown and described, it must be understood that I do not wish to be limited to the specific arrangement shown, as many changes may be made in the structure shown without departing from the spirit of the invention as set forth in the annexed claims.

What is claimed is:

1. In a shaving device, a shaving head comprised of a pair of outer guards spaced apart from each other and each carrying a series of cutters on the opposed faces thereof, a member positioned between said guards and presenting a recessed surface to the skin of the user, clearance holes formed in said guards below said surface, a cutter bar in each of said guards, each of said cutter bars carrying cutters cooperating with the series of cutters on its guard and also having notches formed therein in spaced relation to said series of cutters, a driving link positioned between said guards and beneath the surface of said member and having portions projecting through said clearance holes and engaging said cutter bars, one of said projections engaging the notches on a cutter bar in one of said guards and the other projection engaging notches in a cutter bar in the other guard, a motor carrying an oscillating arm engaging said driving linkage at a midpoint therein, and spring means in said motor acting against said driving link and urging said cutter bars into intimate shearing engagement with the cutting zones in said outer guards through the medium of the projections of said driving link.

2. The invention according to claim 1 in which said outer guards include solid members of inverted L-shaped cross section maintained in said spaced relation by shouldered studs which also support said member, the width of the vertical legs of said solid L-shaped portions and the shoulder therebetween approximating the width of the mounting slot in said motor, and one of said legs having a depression formed therein to be engaged by a set screw in the housing of said motor.

3. In a shaving device, a hollow outer guard having a skin engaging face, a lateral face at right angles to one edge thereof, a series of cutters formed in said lateral face and terminating along said edge, a second side extending from the opposite edge of said skin engaging face and forming an obtuse angle therewith within the hollow of said guard, a cutter bar adapted to reciprocate within said guard, said cutter bar having a vertical side with a laterally extending longitudinal bead formed thereon and having a side opposite said vertical side for cooperating with said second side of said guard, a plurality of transverse slots formed in said bead, the webs between said slots forming cutting members adapted to cooperate with said series of cutters, and a spring loaded driving link connected to said cutter bar and adapted to drive said cutter bar and at the same time to press the same against the angular surface of said guard, thereby maintaining said bead in intimate contact with the rear faces of the cutters in said series zone.

4. In a shaving device, a pair of shaving head outer guard members each having a flat skin engaging face, a side portion having a surface at right angles with respect to said face, a second side portion parallel to and spaced apart from said first side portion, a portion joining said skin engaging face and said last mentioned portion, a series of cutters formed in said first side portion adjacent to said skin engaging face, and a rigid member secured to both said side portions to form a rigid unitary structure; a plurality of shouldered dowels mounted in one of said members, holes formed in the other of said members matching said dowels, a strip of material lying between said shaving head members embracing at least some of said dowels and including a flat portion parallel to and recessed with respect to said skin engaging faces, and moving cutter bars within said outer guard members.

5. In a shaving device, a pair of shaving head outer guard members each having a flat skin engaging face, a side portion having a surface at right angles with respect to said face, a second side portion parallel to and spaced apart from said first side portion, a portion joining said skin engaging face and said last mentioned portion, a series of cutters formed in said side portion adjacent to said skin engaging face, and a rigid member secured to both said side portions to form a rigid unitary structure; means for holding said members in spaced relation to each other with said first mentioned side portions facing each other, a spacing member between said outer guard members, clearance holes formed in said first side portions below said cutting zones, cutter bars in each of said members, a driving link mounted in the space between said outer guard members and having portions projecting through said clearance holes to engage said cutter bars, said link being positioned below said spacing member, and means for oscillating said driving link.

6. In a shaving device, an outer guard having a series of cutters formed in a lateral face thereof, a cutter bar adapted to reciprocate within

said guard, said cutter bar having a vertical side with a laterally extending longitudinal bead formed thereon, a plurality of transverse slots in said bead, the webs between said slots forming cutting members adapted to cooperate with the cutters in said series, notches formed in said cutter bar near at least one end thereof to be engaged by a driving member, and spring means engaged by said driving means and having portions urging said cutter bar toward the cutters of said series, said spring means having one of said portions engaging said notches and thereby forming the driving member.

RUSSELL E. BENNER.