March 11, 1941. J. BRUECKER 2,234,892

SHAVER

Filed April 8, 1938 2 Sheets-Sheet 1

Fig. 1

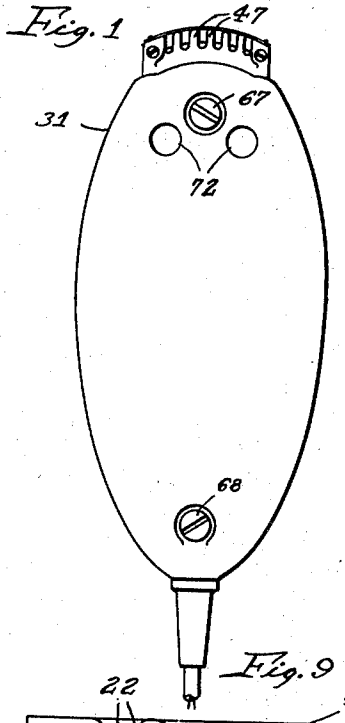


Fig. 2

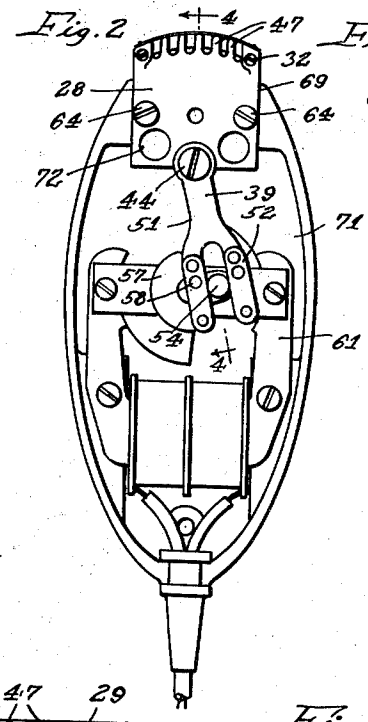


Fig. 3

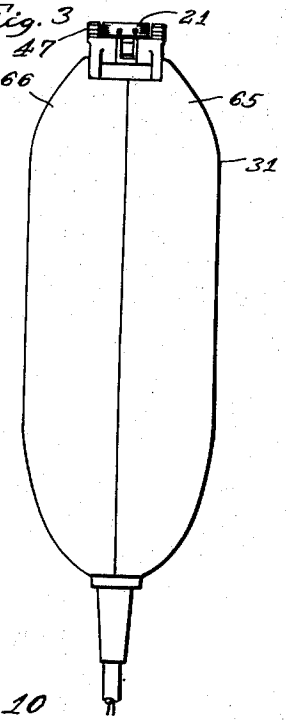


Fig. 9

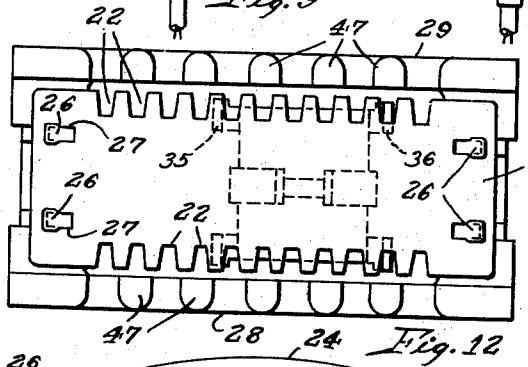


Fig. 10

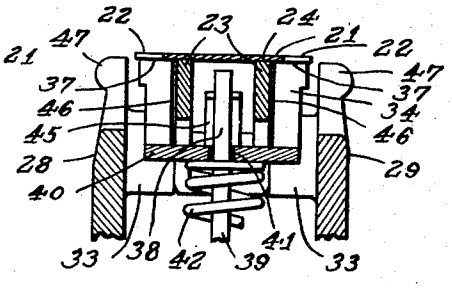


Fig. 12

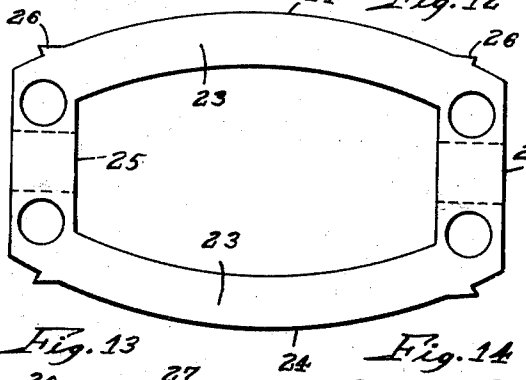


Fig. 11

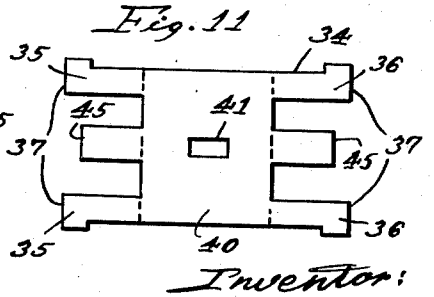


Fig. 13

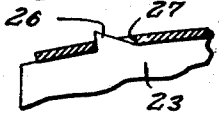
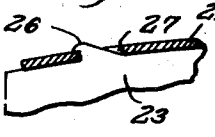


Fig. 14



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Fig. 4

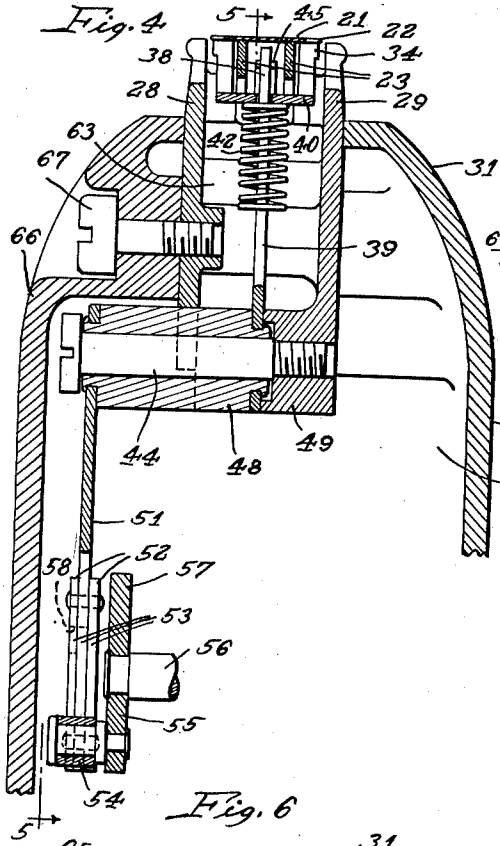


Fig. 5

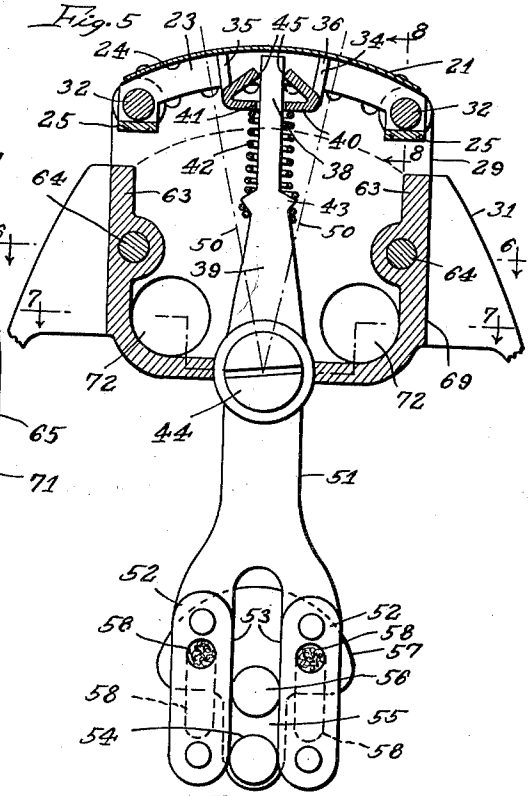


Fig. 6

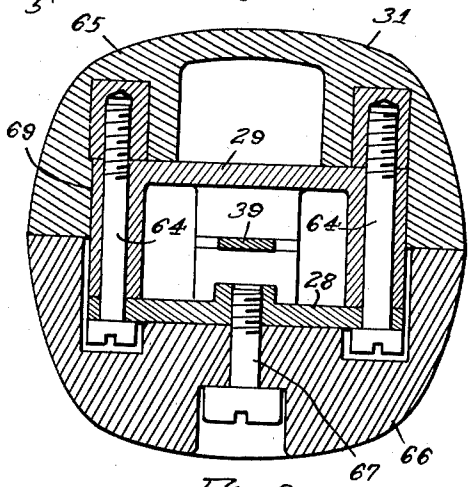


Fig. 7

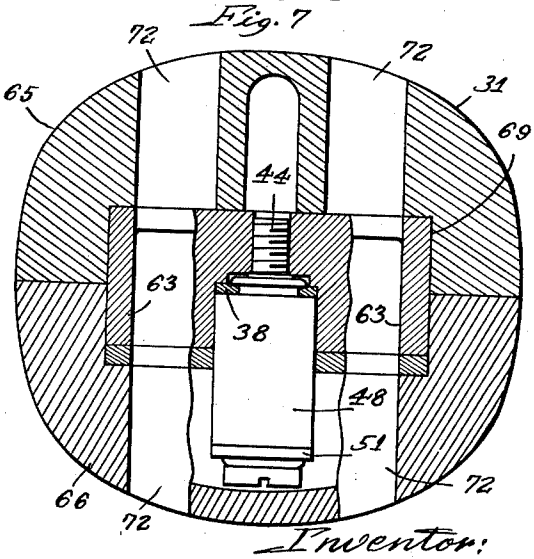
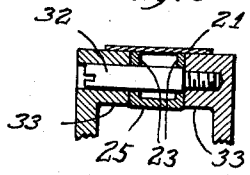


Fig. 8



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UNITED STATES PATENT OFFICE

2,234,892

SHAVER

John Bruecker, Chicago, Ill.

Application April 8, 1938, Serial No. 200,899

12 Claims. (Cl. 30—43)

This invention relates to shaving implements of the type known as dry shavers and is an improvement on the invention covered by my Patent No. 2,081,694, granted May 25, 1937.

Among the objects of the present invention are to provide a simplified and improved shaving implement of the kind described with the view to reducing the cost of manufacture; to provide an improved comb and cutter which will serve efficiently for both shaving and clipping purposes; to provide a comb structure of novel form intended to increase the usefulness of a shaver of this type; to provide improved cutting means including what I term a three point cutter, that is, one having spaced cutting members having individual shearing engagement with the comb constituting two points of cutting spaced apart in the direction of travel of the cutter together with means for applying the motive force to the cutter at an intermediate point, the third point, in such manner as to maintain the cutting edges in the desired shearing engagement with the comb; to provide an improved form of cutter in cooperation with a comb of the kind adapted for shaving; to provide improved means for supporting and mounting the comb; to provide improved means for oscillating the cutter; to provide an improved driving connection between the motor and the cutter operating means; to so construct the operating parts as to promote smooth, silent operation and long life to the comb and cutter parts; to provide improved spring means for applying yielding pressure to the cutter to press it against the comb and to provide a simplified means of adjusting the spring tension; and to provide a simplified construction which will enable replacement of parts at a comparatively low cost.

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 side view of a shaving implement embodying my invention;

Fig. 2 is a similar view with the near side of the housing cover removed, showing the interior parts;

Fig. 3 is a view of the shaver as viewed from the right hand side of Fig. 1;

Fig. 4 is an enlarged longitudinal sectional view taken substantially on the section line 4—4 of Fig. 2, with the motor proper removed;

Fig. 5 is a sectional view taken substantially on the section line 5—5 of Fig. 4;

Figs. 6 and 7 are horizontal sections taken substantially on the section lines 6—6 and 7—7, respectively, of Fig. 5;

Fig. 8 is a section taken on the section line 8—8 of Fig. 5;

Fig. 9 is an enlarged top view of the cutting head assembly;

Fig. 10 is a cross-section through the cutting head assembly on the scale shown in Fig. 9;

Fig. 11 shows the cutter blank before it is formed to the finished shape;

Fig. 12 shows the comb support blank before it is formed to the finished shape, Figs. 9 to 12, inclusive, being approximately four times actual size of the embodiment here illustrated; and

Figs. 13 and 14 are further enlarged detail sections showing the attachment of the comb to its support.

My invention contemplates the provision of a comb and cutter of improved construction having characteristics making them particularly suitable for the functions of clipping long hairs and also for close shaving. The comb designated generally by 21 is preferably a strip of extremely thin spring steel of approximately .003" thickness although it will be understood that my invention in its broader aspect is not confined to a comb constructed in this manner. As shown best in Figs. 4, 9, and 10, the comb is of rectangular shape and has a series of hair-receiving openings preferably in the form of slots 22 formed in its opposite longitudinal edges. The comb is preferably flexed to arcuate form as shown in Fig. 5 and is supported in this form by a pair of spaced supports 23 on the arcuate tops 24 of which the comb is seated. In this instance, the supports 23 are formed of sheet metal from a single stamping, the blank of which is shown in Fig. 12, the ends of the arcuate supports being joined by cross-members 25. The comb is stretched lengthwise and held taut against the seats 24 so as to be firmly retained in the desired arcuate position. At this end each support 23 is provided with a projecting lug or spur 26, as shown in Fig. 13, adapted to project through an opening 27 in the comb. When applying the comb, the openings 27 at one end are engaged over the complemental spurs and the openings and spurs at the opposite end are so located as to make it necessary to put the comb under lengthwise tension so that it will be stretched lengthwise and will snap over the spurs at this end and be retained taut against the arcuate

seats 24. The ends of the spurs are then peened over the comb as shown in Fig. 14, thus securing the comb in working position with the marginal slotted sides overreaching the supports, as shown plainly in Figs. 4 and 10. The comb support in turn is supported upon and intermediate the spaced vertical walls 28 and 29 of a casing which constitutes part of a cutting head assembly and constitutes a unit supported in the main housing designated generally by 31. As shown in Figs. 5 and 8, screws 32 serve to tie the side walls 28 and 29 together and to carry the interposed comb support, the bosses 33 serving on the side walls to locate and hold the comb support in a central position. The cutter designated generally by 34 is of general U-shape defined by spaced cutting members 35 and 36 and a base member 40. The cutter is stamped from a single piece of sheet steel to the shape shown in Fig. 11. Since in this embodiment of my invention the comb is shaped for cutting at the opposed longitudinal sides, the cutter blank is shaped to provide spaced cutter members 35—35 and 36—36 at opposite ends and the blank is formed to the U-shape shown in Fig. 5 to bring the cutting members into cooperative relation with the slotted marginal portions of the comb. Each cutting member is finished at its outer end as by grinding to seat flat against the inner surface of the comb and, therefore, provides laterally spaced pairs of cutting members each having opposed cutting edges 70 adapted to have shearing engagement with the inner edges of the slots in the comb. As shown in Fig. 10, the cutting edges 70 terminate short of the outer ends of the slots 22 so that the comb actually projects beyond or overhangs the outer edges of the cutters so as to prevent the skin from being engaged by the edges of the cutters. The cutter in turn is carried on the end 38 of an oscillating lever designated generally by 39, the base of the cutter having an opening 41 for clearance of the lever arm, the cutter being supported upon the lever arm through the intermediary of a suitable spring. I prefer to employ a coiled compression spring 42 slipped over the end of the lever arm and having compression outwardly against the base portion of the cutter and thereby serving to yieldingly and constantly press the cutter against the inner side of the comb. By threading the coiled spring over the toothed portion 43 on the lever arm the spring may be threaded thereon to increase or diminish the tension against the cutter and consequently the tension of the cutter against the comb. The set position of the operation will be maintained by reason of the clamping effect of the distorted coils at the threaded point on the lever arm. It will be manifest that the spring pressure is applied against the cutter at a point centrally between the spaced cutting members 35 and 36, thereby equalizing the applied pressure and always maintaining the cutting edges in shearing relation with the edges of the comb. The lever arm, mounted to oscillate on a fulcrum 44 concentric with the arc of the comb, is rapidly oscillated in a uniform stroke by means which will be presently described. The motive force of the lever arm is transmitted to the cutter through means of opposite thrust points 45 which are formed from each end of the cutting blank intermediate the spaced cutting members thereof. These thrust points are located in proximity to the cutting edges of the cutters so that the lever force for moving the cutter back and forth is applied close to the cutting edges, thereby minimizing any tendency to tilt the cutter but on the contrary serving to maintain the cutting edges in the most effective shearing engagement with the comb in a smooth action free from chatter. As shown in Fig. 10, the inner edges 46 of the cutting members are in parallel relation with the outer sides of the comb supports 23 and slight clearance is provided between these faces so that there will be no binding between the cutter and the comb support but at the same time the comb support serves as a guide to prevent sidewise displacement of the cutter and, therefore, to maintain the cutting edges in proper operating relation with the slots in the comb. In the preferred embodiment of my invention the side walls 28 and 29 are shaped to provide guard teeth 47, the upper ends of which terminate approximately coplanar with the comb and serve in addition to the teeth of the comb to prevent the skin from entering the slot openings sufficiently to be irritated or cut by the cutting edges. As shown in Fig. 9, these teeth 47 are located opposite each alternating slot 22 and they cover sufficient area to prevent the skin from bulging or being squeezed into the cutter path. The lever arm 39 is driven back and forth in a definite length of stroke by the motor, as will be presently described, the extreme positions of the lever being indicated by the center lines 50. In this connection it will be observed that the cutter members 35 and 36 are spaced apart a distance greater than half of the lineal travel of the cutter measured along the comb, with the result that each such cutter member overlaps the comb area traversed by the other cutter member at the center of the comb.

In the embodiment here shown the opposite arms of the cutter operating lever 39 are located in offset relation, as shown in Fig. 4, to allow for positioning of the motor and the cutting head in alignment longitudinally of the main housing 31. As here shown, the arm 38 is fixed to an elongated hub 48 mounted to turn freely on a fulcrum bolt 44 above mentioned, this bolt being threaded into a boss 49 on the casing wall 28. To the outer end of the hub 48 is fixed a lever arm 51 which is bifurcated at its lower end. Strips of micarta 52 are attached to opposite sides of the bifurcated portions of the lever so as to provide opposed parallel bearing faces 53 flush with the corresponding faces of the metal portions of the lever. A roller faced crank pin 54 operates between the bearing faces 53, the crank pin being carried on an arm 55 fixed to a motor-driven shaft 56 which may be the armature of an electric motor. The arm 55 has a counterweight 57 to counterbalance the crank pin. The bifurcated end portions of the lever arm 51 are recessed at 58 to provide oil reservoirs each supplied with oil through an opening 59 in one of its micarta members. Each reservoir contains suitable wick material to aid in retaining the oil. With this construction the oil has slow capillary action through the micarta material and serves to keep the roller bearing face lubricated for an unusually long period. This construction gives a silent drive. The electric motor designated generally by 61 supported within the main housing 31 may be of any suitable or preferred construction, the present construction permitting of comparatively large sized parts in a compact and advantageous arrangement within a housing of comparatively small overall dimensions.

It will be apparent from the foregoing that the comb and cutter as well as the means for

operating the cutter are all assembled in working relation in connection with the casing of which the walls 28 and 29 above-mentioned are a part. The wall 28 constitutes a cover closing the open side of the casing, and this cover seats against a bottom wall 62 and end walls 63 integral with the side wall 29. As shown in Fig. 6, the cover wall 28 is fixed to the opposite wall 29 of the casing by through bolts 64, these bolts passing on through the wall 29 and being threaded into the housing section 65, and as here shown the opposite housing section 66 is secured to the front wall 28 of the casing by means of a screw bolt 67. The housing sections 65 and 66 are fastened together at the opposite end by a screw bolt 68. The casing is therefore retained in a cavity 69 in one end of the main housing, which in this instance is formed of two half sections, and this casing separates the cutting means from the compartment 71 in which the motor and part of the cutter operating means are located. The casing forms an enclosure for the cutting means except for the exposed comb at the cutting end. Since the hairs are cut off at the inner side of the comb they collect within the casing and will be discharged therefrom through openings 72 best shown in Figs. 1, 5 and 7, which openings pass through the opposite side walls of the casing and through the side sections of the housing. Passage of the cut hairs or foreign material from the casing into the motor compartment is prevented because of the sealed construction, it being noted that the side walls of the casing have bearing contact with the periphery of the oscillating hub 48 as shown in Figs. 4 and 5.

In use, the shaver is held at a position approximately perpendicular to the surface from which the hair is to be removed, and it will be manipulated in a cutting stroke at approximately right angles to the longitudinal side of the comb and in a direction to advance the open end of the teeth along the skin. Because of the arcuate shape of the comb and the relation between the comb teeth and the cutter the hair will be clipped or shaved very closely and quickly regardless of whether the hairs are long or short. In this connection it will be observed that pressure is exerted outwardly against the cutter not only by the spring but by centrifugal force during each stroke, thereby maintaining the cutter under tension against the inner side of the comb. This promotes greater efficiency in the shearing relation between the cutting edges of the comb and the cutter. Furthermore, a longer cutting area is traversed with a comparatively short cutting stroke due to the construction and arrangement of the cutter with relation to the comb. The three-point cutter is a further feature promoting cutting efficiency although this is not essential to all phases of my invention.

It is believed that the foregoing conveys a clear disclosure of the objects prefaced above and it should be manifest that in applying my invention to actual practice changes may be made in the construction and arrangement without departing from the spirit and scope of the invention as expressed in the appended claims, in which I claim:

1. In a shaving implement, a comb of extremely thin material of greater length than width having hair-receiving openings uniformly spaced apart in an area extending substantially its full length, a U-shaped cutter, each spaced member of which constitutes a separate cutter, and means for rapidly moving the cutter back and forth lengthwise of the comb with its cutting members in shearing engagement with the inner side of the comb and with one cutting member spaced in advance of the other in the direction of travel, the cutter members being spaced apart a distance greater than the spacing of a plurality of the hair receiving openings in the comb.

2. In a shaving implement, a comb of thin sheet steel of greater length than width arched lengthwise, a U-shaped cutter having spaced cutting members joined by a base member, the spaced members bearing against the inner side of the comb in shearing engagement therewith with one cutting member spaced in advance of the other lengthwise of the comb, and means having a motion-transmitting part operatively engaging the cutter at a point intermediate the spaced cutting members for moving the cutter back and forth in the plane of the comb arc with the cutting members pressed against the comb.

3. A shaving implement as set forth in claim 2, in which the pressure exerted against the cutter to press it against the comb is applied to the base member at a point intermediate the spaced members of the cutter and in which the cutter is freely responsive to said pressure and the pressure is equalized between the spaced cutting members.

4. A shaving implement as set forth in claim 2, in which the cutter is moved back and forth by pressure applied thereto at a point intermediate the spaced members and intermediate the inner and outer ends of said members.

5. A shaving implement as set forth in claim 2, in which the cutter is formed of sheet material and each spaced member has portions providing opposed thrust points intermediate the inner and outer ends of the members, and the cutter operating means is located between said thrust points and acts directly against the same for moving the cutter in the cutting action.

6. A shaving implement as set forth in claim 2, in which an oscillating lever is employed to move the cutter in the cutting action, and a coiled compression spring on the lever acting against the base member of the cutter to press it against the comb.

7. In a shaving implement, an arcuate comb having hair-receiving openings, a cutter, a pivoted lever for oscillating the cutter against the inner side of the comb in a shearing action, a crank pin for oscillating the lever, the lever having opposed bearing members between and against which the crank pin operates, each bearing member comprising spaced sheets of fabricated material, and lubrication means between said spaced sheets providing lubrication for the bearing faces thereof.

8. A shaving implement as set forth in claim 7, in which said lubrication means includes an oil reservoir provided in association with each bearing member for slow capillary feeding of oil to the bearing surfaces through the body of the respective bearing members.

9. In a shaving implement, a comb of thin sheet steel, a comb support of U-shape in cross-section having the top of each spaced member shaped to provide an arcuate supporting seat, means holding the comb against the arcuate seats and supported thereon with the side marginal portions overreaching the outer sides of the arcuate seats, hair-receiving openings in the marginal portions of the comb, cutting means having a cutting member bearing against the inner side of each marginal portion of the comb

in shearing relation with the inner edges of the hair-receiving openings therein, and means for moving the cutting means back and forth in the arc of the comb in a cutting action.

10. A shaving implement as set forth in claim 9, in which the hair-receiving openings are in the form of slots extending inwardly from the outer edges of the marginal portions, and a toothed guard positioned at the outer side of each slotted edge in closely spaced relation thereto and with the ends of the teeth approximately coplanar with the arcuate plane of the comb.

11. In a shaving implement, a comb of thin spring steel, a comb support having arcuate supporting seats and one or more comb retaining spurs projecting from the seats adjacent to each end thereof, the comb having openings to receive said spurs, the spurs projecting into said openings and engaging over contiguous edges of the comb, said engagement serving to draw the comb against the arcuate seats and hold it in such position, and a cutter in cooperation with the inner side of the comb.

12. In a shaving implement, a comb of extremely thin sheet steel of greater length than width and having a row of cutting teeth along each longitudinal edge, a support for the comb comprising a member positioned at the inner side of the comb normal to its inner surface and extending longitudinally substantially from end to end of the comb, the outer surface of said member being curved in a comparatively flat arc extending lengthwise of the comb, means holding the comb seated against said curved surface, said member being positioned intermediate the opposite rows of teeth and in proximity thereto for accurately supporting the toothed portions of the comb, a cutter coacting with the teeth at the inner side of the comb, means for rapidly traversing the cutter back and forth in cutting strokes lengthwise ofthe comb, and means for causing the comb to be urged outwardly into intimate shearing contact with the teeth.

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