

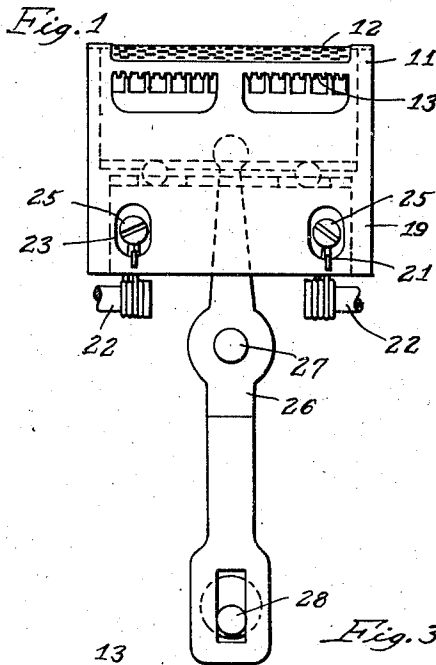
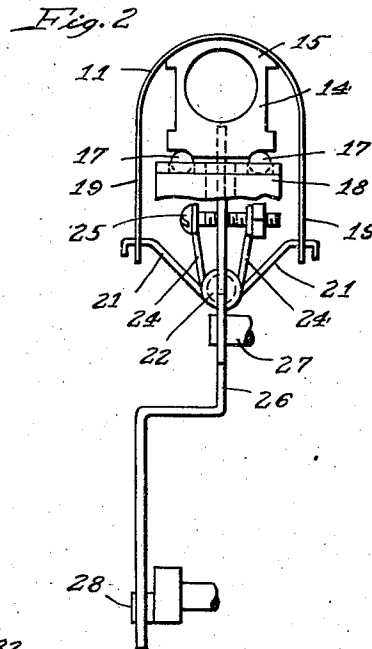
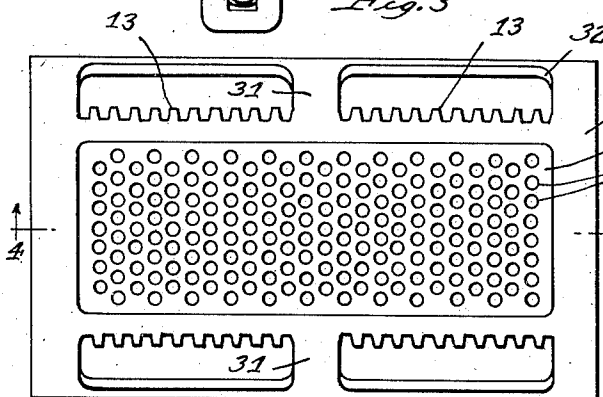
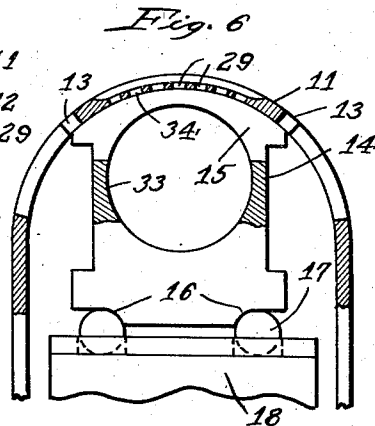
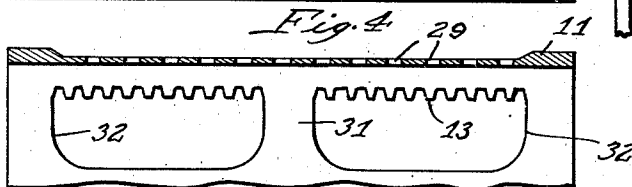
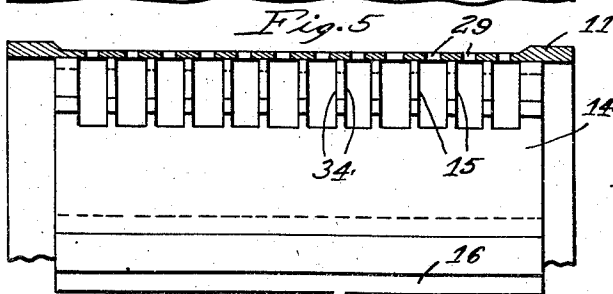
Nov. 18, 1941.

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2,263,155

SHAVING IMPLEMENT

Filed April 2, 1938



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UNITED STATES PATENT OFFICE

2,263,155

SHAVING IMPLEMENT

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Application April 2, 1938, Serial No. 199,588

7 Claims. (Cl. 30-43)

This invention relates to shaving implements of the type known as dry shavers.

One of the objects of my invention is to provide an improved shaver of this type.

Another object of my invention is to provide an improved shaver of this type which combines, in a novel manner, means for close shaving and means for cutting long hairs.

Another object is to provide an improved comb and cutter for a shaver of this type wherein the cutter reciprocates endwise and the comb is provided with an area of small, closely positioned hair-receiving openings and with teeth along the longitudinal edge of said area and wherein the cutter has a shearing action simultaneously against the small openings and the teeth so as to effectively remove long hairs and at the same time effect close shaving.

Another object is to provide a shaving implement of this type in which the comb is formed preferably of thin spring steel and the cutter is mounted to reciprocate endwise on an anti-friction bearing, together with means for maintaining the comb and the cutter in effective shearing engagement one with the other without undue friction.

Another object is to provide an improved comb for a shaving implement.

Another object of my invention is to provide an improved shaving implement capable of being manufactured at a low cost.

Other objects and attendant advantages thereof 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 drawing, in which—

Figure 1 is a side elevation, partly fragmentary, of parts of a shaving implement embodying my invention;

Fig. 2 is an end elevation of the parts shown in Fig. 1;

Fig. 3 is an enlarged top view of the comb member removed from the shaver;

Fig. 4 is a section taken substantially on the section line 4-4 of Fig. 3;

Fig. 5 is a section similar to Fig. 4, but showing the cutter in cooperative relation with the comb; and

Fig. 6 is a cross-section through the comb and cutter on the scale shown in Fig. 3.

My invention is here illustrated in a form in which the comb is formed of thin material preferably a sheet of spring steel, flexed to semi-circular shape when in the operative condition; although as to certain phases of my invention the comb may be embodied in other forms and shapes as will be understood from the disclosure herein. In this form, the comb designated generally by 11 is preferably elongated in the direc-

tion of the axis of its curved portion so as to present an area 12 of greater length than width having small closely arranged perforations for close shaving. This comb is adapted to be moved over the face in a movement substantially at right angles to the length of such area. Along the longitudinal sides of the comb and in juxtaposition to the area 12, I have shaped the comb to provide rows of teeth designated generally by 13, designed for cutting long hairs simultaneously with and during the stroke or movement of the comb in the shaving operation. This cooperative relation of small hair-receiving openings for close shaving in a given area flanked by teeth at one or both longitudinal sides of such area so as to permit of the simultaneous functioning of the close and long hair cutting in the normal operation of the shaver is contemplated as one of the broader phases of my invention and capable of embodiment in forms other than shown in the drawing. This comb is maintained in cooperative relation with a cutter designated generally by 14 having a series of teeth 15 spaced apart longitudinally of the comb and shaped to have shearing engagement with the inner side of the perforated area 12 and the teeth 13 and mounted to be reciprocated endwise in the comb. In the present example, the cutter has parallel races 16 on its under side resting on anti-friction ball bearings 17 which in turn are suitably supported and retained on a body portion 18. The comb is drawn down onto the cutter by means designed to exert a definite tension against the cutter and to permit of increasing or decreasing this tension by a convenient means of adjustment. As illustrative of this relation between the comb and cutter I have shown spring pressed means engaging the side walls 19 of the comb and serving to yieldingly draw the comb down against the cutter, this means comprising spring arms 21 mounted on suitable supports 22 at opposite ends of the comb, each arm being engaged in an opening 23 in the comb and having its opposite end 24 connected by a suitable adjusting screw 25 with an adjacent opposite spring end. The supports 22 being fixed with respect to the body of the shaver it will be apparent that by adjustment of the screw 25 to separate the ends 24 the outer ends 21 of the springs will be pressed downwardly with greater tension to increase the pressure of the comb against the cutter. The cutter will be rapidly reciprocated in a short cutting stroke by suitable means such as a lever 26 pivotally mounted at 27 on the body and actuated by an eccentric or crank pin 28 in turn operated by suitable power means such as an electric motor arranged in the body or handle member of the shaver. The comb will, of course, be retained against lengthwise movement in opposite directions.

One phase of my invention relates to the construction of the comb. In the form shown, the comb comprises a strip of normally flat spring steel of approximately .012". By suitable punching and forming operations the small hair-receiving openings or perforations 29 are formed in the area 12 and the teeth 13 are formed. In the embodiment shown the perforations 29 are each of approximately .025 of an inch in diameter. This dimension, as well as the others given herein, is for purpose of illustration and not as a limitation. The teeth at each side of the area 12 are preferably but not necessarily divided into two groups by leaving an intermediate imperforate portion 31 which serves as a reinforcement. The enlarged cut-away portions or perforations 32 provide ample clearance for the skin and hairs to enter between the teeth 13 in a movement which carries the open side of the teeth toward the hairs, thus to effect close clipping of the hairs. These large perforations also allow for free discharge of the cut hair. After the forming operations described, the comb is hardened and the inner surface is ground and lapped preferably in accordance with the method claimed in the application of John Bruecker, Serial No. 189,573, filed February 2, 1938, now Patent No. 2,182,067, granted December 5, 1939. Briefly, this involves the step of grinding and lapping the inner face of the comb, that is, the area 12 and the teeth 13 while the comb is held in the arcuate form which it occupies in the operative position. The comb is then placed on a mandrel and the outer surface of the perforated area is ground to reduce the thickness of the comb, preferably to provide the area 12 of less thickness than the teeth 13, thus giving greater strength to the teeth and extreme thinness to the area 12. In the form shown only the area 12 has been appreciably reduced to approximately .003 of an inch. The outer surface of the comb is then polished preferably by a buffing wheel or the like to round or baffle the edges of the perforations and the teeth.

The cutter 14 is machined to shape from a solid piece of high carbon tool steel or other suitable material, the body being bored lengthwise at 23 to provide a hollow structure and the top portion being milled transversely to provide a series of narrow transverse teeth 15 above mentioned. The cutter is hardened and the top surface of the teeth is ground and lapped on a radius coincident with the inner surface of the comb to insure proper fit against such surface. This also provides cutting edges 34 on the cutter having perfect shearing engagement with the cutting edges at the inner end of the perforations 29 and the teeth 13. As shown in Fig. 5, the cutting edges 34 terminate at their ends short of the extremities of the teeth 13 so as not to cut or mar the skin. The race bearings 16 are also ground for accurate support of the cutter. In the commercial form of my invention suitable means would be provided for closing these bearings against the admission of hair and foreign matter.

Any suitable body structure or casing may be provided, such, for example, as one embodying a small electric motor for operating the cutter 14. A construction of this kind may be held in the palm of the hand for convenient manipulation of the cutting end. In the shaving operation, the comb is moved over the skin in a direction crosswise of the elongated area 12 and by proper tilting in manipulation of the shaver, the area

12 may be used independently for close shaving or the teeth 13 at either side may be used independently for clipping long hairs, or both the area 12 and teeth 13 at one side may be used simultaneously, it being apparent, of course, that the cutter is at all times operating in shearing relation with both the area 12 and the teeth 13 so as to be immediately effective, depending upon the manipulation. It will be observed that the teeth 13 project into the open area formed by the elongated perforations 32 and that these projecting teeth serve to engage beneath long hairs and thereby position such hairs across the cutting edges at the inner side of the teeth. This construction and arrangement of the teeth 13 enables quick cutting of long hairs which, combined with the close shaving action of the small perforations gives improved shaving results. In the form of my invention here shown, the comb is drawn down upon the cutter with a definite tension and this tension may be lessened or increased by means of the adjustment described, or by any equivalent means. By reason of this construction, a most effective shearing engagement may be maintained between the comb and the cutter with the minimum amount of friction. The adjustment of this tension is particularly advantageous under different conditions of use.

My invention contemplates broadly the application of the comb features in different forms and embodiments including embodiment of an area corresponding to 12, together with teeth 13 in a flat surface, or a curved plane, or a spherical surface, and also the embodiment of these features in a disk member and in a cylindrical member. It will be manifest, therefore, that many changes may be made in form and construction without departing from the spirit and scope of the invention as expressed in the appended claims.

I claim:

1. In a shaving implement, a comb having an elongated central area perforated to provide small hair-receiving openings for close shaving and having an elongated perforation at each opposite longitudinal side of the central perforated area parallel with such side, each longitudinal edge of said elongated perforation at the side thereof adjacent to the central area being shaped to provide a series of teeth projecting into the open area formed by such perforation, the small perforations and the teeth each having cutting edges at the inner side of the comb, said projecting teeth serving to engage beneath long hairs and thereby position such hairs across the cutting edges at the inner side of the teeth, and cutting means in cooperation with the cutting edges of the small perforations and the teeth at the inner side of the comb operative for simultaneous cutting operations.

2. In a shaving implement, a comb structure having an elongated area of extremely thin sheet metal provided with small hair-receiving openings for close shaving, and having a body contiguous to one of the longitudinal sides of said closely perforated area provided with an elongated wide perforation parallel with said longitudinal side, the longitudinal edge of said wide perforation adjacent to said longitudinal side being shaped to provide a series of teeth projecting into the open area formed by the wide perforation, the small perforations and the teeth each having cutting edges at the inner side of the comb, said projecting teeth serving to engage beneath long hairs and thereby position

such hairs across the cutting edges at the inner side of the teeth, and cutting means in cooperation with the cutting edges of the small perforations and the teeth at the inner side of the comb operative for simultaneous cutting operation.

3. In a shaving implement, a comb having an elongated area perforated to provide small hair-receiving openings for close shaving and having an elongated perforation extending along one of the longitudinal sides of the perforated area, the longitudinal edge of said elongated perforation at the side thereof adjacent to the central area being shaped to provide a series of teeth projecting into the open area formed by such perforation, the small perforations and the teeth each having cutting edges at the inner side of the comb, said projecting teeth serving to engage beneath long hairs and thereby position such hairs across the cutting edges at the inner side of the teeth, and cutting means in cooperation with the cutting edges of the small perforations and the teeth at the inner side of the comb operative for simultaneous cutting operations.

4. In a shaving implement, a comb having an area provided with small closely positioned hair-receiving openings having cutting edges at the inner side adapted for close shaving, a row of comb teeth along one side of said close shaving area extending laterally therefrom, the laterally extending edges of said teeth at the inner side thereof constituting cutting edges, and cutter means coacting with the cutting edges of said close shaving area and having a row of laterally extending teeth coacting with the cutting edges of said comb teeth, the cutter teeth having movement in a cutting action lengthwise of the comb teeth, the comb teeth projecting outwardly beyond the outer extremity of the cutter teeth to provide a guard extending beyond the outer extremity of the cutter teeth and serving to engage beneath long hairs to guide and position such hairs across the coacting cutting edges of the comb and cutter teeth to be severed thereby, the comb comprising a strip of thin sheet metal having the hair-receiving openings and the first mentioned teeth formed therein, the comb being formed to arcuate shape and the cutter means having its cutting edges conforming to such shape, the inner surface of the comb being ground with the inner edges of the small opening perforations and the inner edges of the teeth in a common arcuate surface and the perforated area being of less thickness than the body of the teeth.

5. In a shaving implement, a comb having an area provided with small closely positioned hair-receiving openings having cutting edges at the inner side adapted for close shaving, a row of comb teeth along one side of said close shaving area extending laterally therefrom, the laterally extending edges of said teeth at the inner side thereof constituting cutting edges, and cutter means coacting with the cutting edges of said close shaving area and having a row of laterally extending teeth coacting with the cutting edges of said comb teeth, the cutter teeth having movement in a cutting action lengthwise of the comb teeth, the comb teeth projecting outwardly beyond the outer extremity of the cutter teeth to provide a guard extending beyond the outer extremity of the cutter teeth and serving to engage beneath long hairs to guide and position such hairs across the coacting cutting edges of the comb and cutter teeth to be severed thereby, the comb comprising a strip of thin sheet metal

having the hair-receiving openings and the first mentioned teeth formed therein, the comb being formed to arcuate shape and the cutter means having its cutting edges conforming to such shape, the inner surface of the comb being ground to finish the inner edges of the small opening perforations and the inner edges of the teeth in a common arcuate surface and the outer surface of the perforated area being ground to reduce the thickness of this area with respect to the toothed portion of the comb body.

6. In a shaving implement, a comb having an area provided with small closely positioned hair-receiving openings having cutting edges at the inner side adapted for close shaving, a row of comb teeth along one side of said close shaving area extending laterally therefrom, the laterally extending edges of said teeth at the inner side thereof constituting cutting edges, and cutter means coacting with the cutting edges of said close shaving area and having a row of laterally extending teeth coacting with the cutting edges of said comb teeth, the cutter teeth having movement in a cutting action lengthwise of the comb teeth, the comb teeth projecting outwardly beyond the outer extremity of the cutter teeth to provide a guard extending beyond the outer extremity of the cutter teeth and serving to engage beneath long hairs to guide and position such hairs across the coacting cutting edges of the comb and cutter teeth to be severed thereby, the comb comprising a strip of thin sheet metal having the hair-receiving openings and the first mentioned teeth formed therein, the comb being formed to arcuate shape and the cutter means having its cutting edges conforming to such shape, the inner surface of the comb being ground to finish the inner edges of the perforations and the inner edges of the teeth in a common arcuate surface, the outer surface of the perforated area being ground to reduce the thickness of this area with respect to the toothed portion of the comb body, the perforated area and the toothed portion of the comb being in a curved surface.

7. In a shaving implement, a comb having an area provided with small closely positioned hair-receiving openings having cutting edges at the inner side adapted for close shaving, a row of comb teeth along one side of said close shaving area extending laterally therefrom, the laterally extending edges of said teeth at the inner side thereof constituting cutting edges, and cutter means coacting with the cutting edges of said close shaving area and having a row of laterally extending teeth coacting with the cutting edges of said comb teeth, the cutter teeth having movement in a cutting action lengthwise of the comb teeth, the comb teeth projecting outwardly beyond the outer extremity of the cutter teeth to provide a guard extending beyond the outer extremity of the cutter teeth and serving to engage beneath long hairs to guide and position such hairs across the coacting cutting edges of the comb and cutter teeth to be severed thereby, the comb comprising a strip of normally flat spring steel formed to provide the close shaving opening and the first mentioned row of teeth, the comb being flexed to arcuate form and the cutter means having its cutting edges in said arcuate form, the outer surface of the comb being ground to an extremely thin dimension at said hair-receiving openings, leaving the teeth and the area contiguous thereto of greater thickness.

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