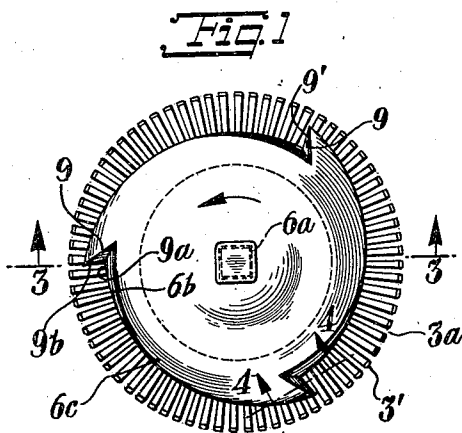
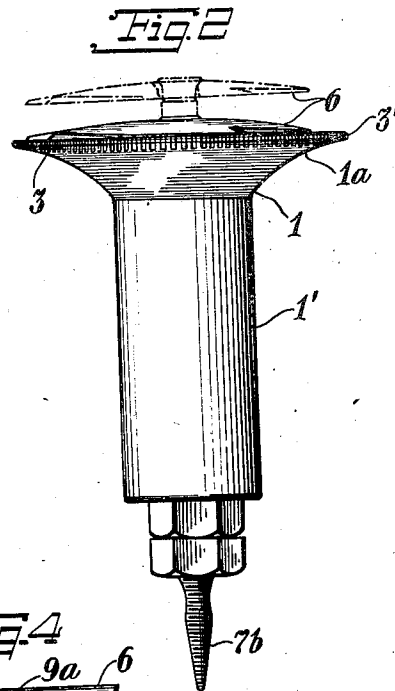
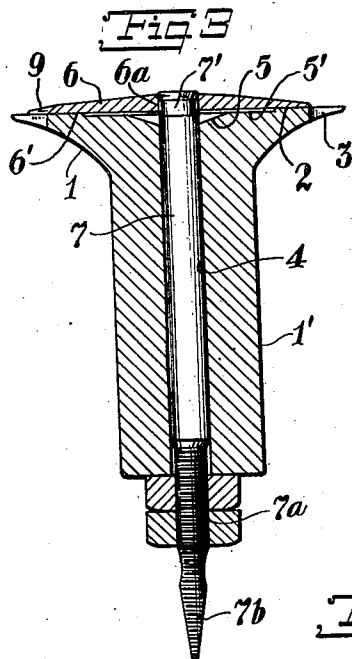
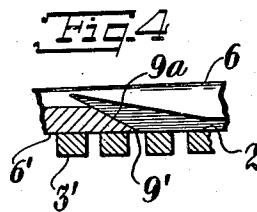
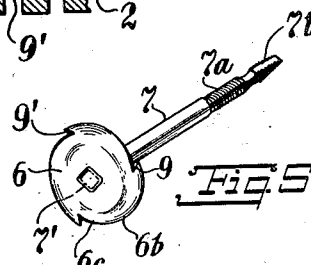
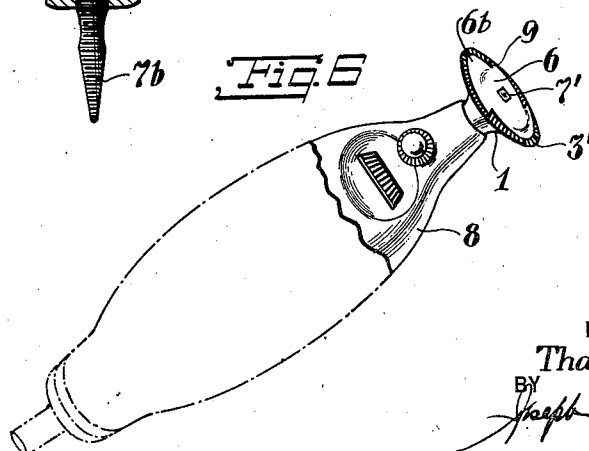


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T. S. CASNER
ROTARY SHAVING MACHINE
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INVENTOR
Thaddeus S. Casner
BY *Joseph D. O'Brien*
ATTORNEY

UNITED STATES PATENT OFFICE

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ROTARY SHAVING MACHINE

Thaddens S. Casner, Plainfield, N. J.

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6 Claims. (Cl. 30-43)

This invention relates to improvements in rotary shaving machines.

One of the objects of this invention is to provide a simple construction of rotary shaving machine of a minimum number of parts in which a stationary circular flat-topped comb member having, at and intersecting its perimetric edge, an annular comb band or strip portion provided with radially-disposed skin-contacting comb-teeth and interdental spaces to receive the hair to be severed is employed in combination with a rotatable, disc-like cutter carrier of smaller diameter mounted coaxially on the flat top of said comb member and having a rounded blunt skin-contacting edge rotatable over said band of comb teeth and provided with a plurality of spaced integral cutters having sharp inwardly-extending cutting edges intersecting said blunt edge and movable circumferentially in contact with said band of comb-teeth to cut hair inserted therebetween, said cutter-carrying disc and cutters being provided with bottom portions conforming to and closely abutting the flat top of the comb band, and said blunt edge and intersecting spaced cutters being so positioned inwardly in relation to the skin-contacting edge of said comb band that the top of the rotatable disc-shaped cutter-carrier will cooperate with the circular comb member to provide a guard whereby the user will be enabled to shave hair from a skin surface without danger of cutting the skin.

Another object of my invention is to provide a rotary shaving machine construction in which the outer end of one spaced cutter will merge with the inner end of the next cutter in a long gradually curved and blunt peripheral edge to provide, during rotation, an inter-cutter zone into which hairs can be inserted during the intervals between movement of the cutters over a given spot or space on the annular comb band.

Another object of my invention is to utilize cutters in which the top surface is inclined upwardly from said sharp edge and merges with a rounded top surface of the disc-shaped carrier to produce a guarded skin-contacting surface.

Another object of this invention is, in a rotary razor of the type specified, to position the cutters in angular relationship to the radially-disposed interdental spaces between the teeth of the comb so that in the hair-cutting operation of such cutters, the movement of the cutter in relation to the hair will tend to force the hairs inwardly toward the bottom of the interdental spaces, and to this end each of my cutters has an angularity which causes the sharp edge to extend obliquely

across interdental spaces of the comb band with the outer end of such sharp edges leading in the movement of such cutters, said edge of the cutters extending in a secantial direction in relation to the comb member as a whole.

Another object of my invention is to provide the comb member with a beveled or inclined bottom surface to provide an edge thin enough to comb the hair of the user and to cause insertion of such hair in the interdental spaces when the edge of said comb band and the top surface of the rotating disc are pressed against the skin whereupon the cutters will, by the rotating movement of the disc, cut such inserted hair, and during such shaving or cutting of the hair, the skin surface to which the top surface of the shaving machine is applied will be fully protected from cutting or injury.

Another object of my invention is to provide a construction which may be used safely to cut hair from the nostrils, ears and other sensitive surfaces without danger of cutting the part shaved.

Another object of my invention is to provide a loose connection between the blade and shaft which will permit rotation of the blade on a flat surface which is not truly horizontal and thus to enable use and compensate for slight inaccuracies in the cutting or grinding of the table.

With these and other objects in view, the invention comprises the combination of members and arrangement of parts so combined as to coact and co-operate with each other in the performance of the functions and the accomplishment of the results herein contemplated, and comprises in one of its adaptations the species or preferred form illustrated in the accompanying drawing, in which:

Fig. 1 is a view in plan of a blade and blade holder of a rotary shaving machine embodying my invention;

Fig. 2 is a view in side elevation of the blade and blade holder and adjacent parts shown in Fig. 1;

Fig. 3 is a section on the line 3-3 of Fig. 1, looking in the direction of the arrows;

Fig. 4 is a section on the line 4-4 of Fig. 1, looking in the direction of the arrows;

Fig. 5 is a view in perspective of the blade and its shaft removed from the comb member, and

Fig. 6 is a view in perspective and partially in outline of the blade and holder mounted in an electric motor casing.

Referring now to the drawing which illustrates a preferred embodiment of my invention, I in-

dicates a circular comb member embodying, as shown, a cylindrical body portion 1' having an outwardly-extending circular head portion 1^a provided with a flat top 2 and having at its perimetric edge a comb band 3 composed of a series of comb teeth 3' and interdental spaces 3^a intersecting said perimetric edge of the head portion 1^a. The comb member 1 is provided with an axial bore 4 preferably extending to an axial beveled depression 5 which merges with a shallow annular depression 5' of lesser depth outside of the axial beveled depression so as to leave, at said outer side of the latter depression, an annular, flat, top-portion 2 which is level with the top portion of the comb band 3.

In accordance with the preferred form of my invention, a cutter-carrier 6 of disc-like conformation and provided with a flat bottom 6' adapted to closely coincide with the flat top-portion 2 is connected to the outer end of a shaft 7 to provide rotation while flexibly accommodating itself to the flat top and, as shown, is provided with a square top 7' mounted in a similarly-shaped aperture 6^a so that the shaft and cutter member 6 will constitute a single unit and rotate together. As shown, the shaft 7 is passed downwardly through the axial bore 4 and is provided, at its lower end, with a screw-threaded portion 7^a having a tapered end 7^b adapted to be inserted into and connected, within a suitable conventional casing 8, with a motor adapted to turn the shaft 7 and to rotate the cutter-carrier with its bottom surface 6' abutting the flat top 2 of the comb member 1.

The rotatable cutter-carrier 6 is provided with integrally-formed cutters 9 intersecting the edge of the cutter-carrying disc 6 and formed at intervals or spaced positions around said edge. As illustrated, I have shown three of these cutters equally spaced apart about the edge of the cutter-disc. Each of these cutters comprises an inwardly-extending blade having a sharp edge 9' and an upwardly-inclined surface portion 9^a merging with the top of the cutter-carrying disc which is preferably rounded at 9^b and gradually slopes toward and merges with a blunt though thin inter-cutter curved edge 9^c. This inter-cutter edge 9^c extends from the inner end 9^a of one tooth to the outer end 9^b of the next tooth in a gradually-curved skin-contacting edge which assists in guiding hairs with which it contacts in the shaving operation into contact with the next succeeding cutter, a space or cutting zone being formed between the outer end of one cutter and the inner end of the next cutter, this space completely overlying the comb band and providing a zone or strip over such comb band into which hairs may be inserted between the comb teeth and then cut. This zone, at a given tooth or interdental space, gradually widens or deepens until it finally has a depth adjacent to a cutter equal to the length of said cutter. In my embodiment shown there are three of such zones and an inter-cutter space over a comb band section is thus provided into which hairs on the skin will be guided between the comb teeth and when a cutter, in its rotary path, moves over such interdental space the hair will be cut. It is desirable to make each cutter relatively short though each of them will be sufficiently long to cut at least one hair inserted in the interdental spaces of the comb band.

The bottom portion of the comb head 3 is beveled to a thin though blunt edge which is intersected by the interdental spaces 3^a and thus,

with the blunt though thin edge of the cutter-carrier, forms a thin edged and thorough guard for the cutters as they rotate over the comb band. I have thus provided a skin-contacting shaving edge one element of which is continuously rotated and the other element of which is stationary and provided with comb teeth and which may be pressed against the skin of the user to force the hairs into the interdental spaces between the comb teeth and to cut the same without in any way injuring the skin of the user.

In accordance with the preferred embodiment of my invention, the cutting edges of the cutters are so positioned in angular relationship to the radially-disposed interdental spaces between the teeth of the comb that, in the hair cutting operation of such cutters, the edge of the cutter contacting with the hair will tend to force the latter inwardly toward the bottom of the interdental spaces and to this end each of my cutters has an angularity which causes the sharp edge to extend obliquely across the interdental spaces of the comb band in such relationship that the outer end of such sharp edges leads in the movement of such cutters and the inner end trails a slight distance behind the same and said edges of the cutters extend in a secantial direction in relation to the circular top of the comb member.

It will be seen from the above that I have provided a rotary shaving head which is formed of two unitary parts, one comprising the disc-like cutter-carrier and shaft and the other comprising the axially bored comb member and that notwithstanding the fact that the cutter-carrier is rotated the shaving operation may be accomplished without injuring or cutting the face in any way; that this shaving head may be used with or without lather and is particularly useful for shaving hair from places inaccessible by other razors such as from the nostrils, ears and beneath the arms and also is useful to cut hair close to wounds or incisions made in surgical operations or the like.

Having described my invention, I claim:

1. A shaving machine embodying, in combination, a circular comb member having, at its perimetric edge, an annular comb band or strip of angular cross-section, having a cutter-contact surface and provided with radially-disposed skin-contacting comb-teeth and interdental spaces, and a disc-like cutter-carrier of smaller diameter mounted coaxially with said comb member and rotatable over said comb member, said cutter-carrier having a bottom surface flush with and contacting the surface of said annular comb member and a free top surface, said cutter-carrier being provided with an arcuate edge having a plurality of spaced cutter members provided with sharp cutting edges at an angle to said arcuate edge and movable circumferentially in contact with said band of comb-teeth to cut hair inserted therebetween, said cutter members also being provided with bottom portions conforming to and closely contacting the top of the comb band and each cutter member having a bevelled portion extending in the direction of rotation and bridging the top and bottom surfaces of the edge of the carrier to provide a sharp cutting edge, said arcuate edge and spaced cutters being so positioned inwardly in relation to the skin-contacting edge of said comb band that the top of the rotatable disc-shaped cutter-carrier will cooperate with the circular comb member to provide a guard whereby the user will be enabled

to shave hair from a skin surface without danger of cutting the skin.

2. A shaving machine embodying, in combination, a circular comb member having, at its perimetric edge, an annular comb band or strip of angular cross-section, having a cutter-contact surface and provided with radially-disposed skin-contacting comb-teeth and interdental spaces, and a disc-like cutter-carrier of smaller diameter mounted coaxially with said comb member and rotatable over said comb member, said cutter-carrier having a bottom surface flush with and contacting the surface of said annular comb member and a free top surface, said cutter-carrier being provided with an arcuate edge having a plurality of spaced cutter-members provided with sharp cutting edges at an angle to said arcuate edge and movable circumferentially in contact with said band of comb-teeth to cut hair inserted therebetween, said cutter-members being spaced from each other and the outer end of one of such cutters merging with the inner end of the next cutter in a long gradually-curved peripheral edge to provide, during rotation, a relatively long inter-cutter zone into which hairs can, in the shaving operation, be inserted during the intervals between movement of the cutters over a given interdental space on the annular comb band, and said cutter-members also being provided with bottom portions conforming to and closely contacting the top of the comb band and each cutter-member having a bevelled portion extending in the direction of rotation and bridging the top and bottom surfaces of the edge of the carrier to provide a sharp cutting edge, said arcuate edge and spaced cutters being so positioned inwardly in relation to the skin-contacting edge of said comb band that the top of the rotatable disc-shaped cutter-carrier will cooperate with the circular comb member to provide a guard whereby the user will be enabled to shave hair from a skin surface without danger of cutting the skin.

3. A shaving machine embodying, in combination, a circular comb member having, at its perimetric edge, an annular comb band or strip of angular cross-section, having a cutter-contact surface and provided with radially-disposed skin-contacting comb-teeth and interdental spaces, and a disc-like cutter-carrier of smaller diameter mounted coaxially with said comb member and rotatable over said comb member, said cutter-carrier having a bottom surface flush with and contacting the surface of said annular comb member and a free top surface, said cutter-carrier being provided with an arcuate edge having a plurality of spaced cutter members provided with sharp cutting edges at an angle to said arcuate edge and movable circumferentially in contact with said band of comb-teeth to cut hair inserted therebetween, said cutter members being spaced from each other and the outer end of one of such cutters merging with the inner end of the next cutter in a long gradually-curved peripheral edge to provide, during rotation, a relatively long inter-cutter zone into which hairs can, in the shaving operation, be inserted during the intervals between movement of the cutters over a given interdental space on the annular comb band, and said cutter-members also being provided with bottom portions conforming to and closely contacting the top of the comb band and each cutter member having a bevelled portion extending in the direction of rotation and bridging the top and bottom surfaces of the edge of the carrier to pro-

vide a sharp cutting edge, said arcuate edge and spaced cutters being so positioned inwardly in relation to the skin-contacting edge of said comb band that the top of the rotatable disc-shaped cutter-carrier will cooperate with the circular comb member to provide a guard whereby the user will be enabled to shave hair from a skin surface without danger of cutting the skin, the said long gradually curved peripheral edge being provided, adjacent to the cutter-member, with a gradually beveled portion extending from the bottom surface to the top surface and merging at said top surface with the bevel of the cutter-member.

4. A shaving machine embodying, in combination, a circular comb member having, at its perimetric edge, an annular comb band or strip of angular cross-section, having a cutter-contact surface and provided with radially-disposed skin-contacting comb-teeth and interdental spaces, and a disc-like cutter-carrier of smaller diameter mounted coaxially with said comb member and rotatable over said comb member, said cutter-carrier having a bottom surface flush with and contacting the surface of said annular comb member and a free top surface, said cutter-carrier being provided with an arcuate edge having a plurality of spaced cutter members provided with sharp cutting edges at an angle to said arcuate edge and movable circumferentially in contact with said band of comb-teeth to cut hair inserted therebetween, said cutter members also being provided with bottom portions conforming to and closely contacting the top of the comb band and each cutter member having a bevelled portion extending in the direction of rotation and bridging the top and bottom surfaces of the edge of the carrier to provide a sharp cutting edge, said arcuate edge and spaced cutters being so positioned inwardly in relation to the skin-contacting edge of said comb band, said cutter edges being positioned in angular relationship to the radially-disposed interdental spaces between the teeth of the comb so as to extend obliquely across such interdental spaces of the comb band with the outer end of the sharp edges leading in the movement of such cutters while the inner ends of such cutters trail in such movement, whereby the top of the rotatable disc-shaped cutter-carrier will cooperate with the circular comb member to provide a guard to enable the user to shave hair from a skin surface without danger of cutting the skin, and the oblique edges of the cutter members will cut the hairs with an oblique sweep in relation to the interdental spaces.

5. A shaving machine embodying, in combination, a circular comb member having, at its perimetric edge, an annular comb band or strip of angular cross-section, having a cutter-contact surface and provided with radially-disposed skin-contacting comb-teeth and interdental spaces, and a disc-like cutter-carrier of smaller diameter mounted coaxially with said comb member and rotatable over said comb member, said cutter-carrier having a bottom surface flush with and contacting the surface of said annular comb member and a free top surface, said cutter-carrier being provided with an arcuate edge having a plurality of spaced cutter members provided with sharp cutting edges at an angle to said arcuate edge and movable circumferentially in contact with said band of comb-teeth to cut hair inserted therebetween, said cutter members also being provided with bottom portions conforming

to and closely contacting the top of the comb band and each cutter member having a bevelled portion extending in the direction of rotation and bridging the top and bottom surfaces of the edge of the carrier to provide a sharp cutting edge, said arcuate edge and spaced cutters being positioned inwardly in relation to the skin-contacting edge of said comb band, the said cutter members being positioned to extend rearwardly in a secantial direction in relation to the comb member as a whole, so that the top of the rotatable disc-shaped cutter-carrier will cooperate with the circular comb member to provide a guard whereby the user will be enabled to shave hair from a skin surface without danger of cutting the skin, and the oblique edges of the cutter members will cut the hairs while being held against outward movement in the interdental spaces.

6. A shaving machine embodying, in combination, a circular comb member having, at its perimetric edge, an annular comb band or strip of angular cross-section, having a cutter-contact surface and provided with radially-disposed skin-contacting comb-teeth and interdental spaces, and a disc-like cutter-carrier of smaller diameter mounted coaxially with said comb member on a rotatable shaft and movable over said comb

member, said cutter-carrier having a bottom surface flush with and contacting the surface of said annular comb member and a free top surface, said cutter-carrier being provided with an arcuate edge having a plurality of spaced cutter members provided with sharp cutting edges at an angle to said arcuate edge and movable circumferentially in contact with said band of comb-teeth to cut hair inserted therebetween, said cutter members also being provided with bottom portions conforming to and closely contacting the top of the comb band and each cutter member having a bevelled portion extending in the direction of rotation and bridging the top and bottom surfaces of the edge of the carrier to provide a sharp cutting edge, said edge and spaced cutters being positioned inwardly in relation to the skin-contacting edge of said comb band, whereby the top of the rotatable disc-shaped cutter-carrier will cooperate with the circular comb member to provide a guard to enable the user to shave hair from a skin surface without danger of cutting the skin, said shaft and disc being tiltably-connected to compensate for variations between the top surface and the axis of the shaft bore.

THADDEUS S. CASNER.