May 4, 1965 I. JEPSON ETAL 3,181,237

ELECTRIC DRY SHAVER

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Fig. 1

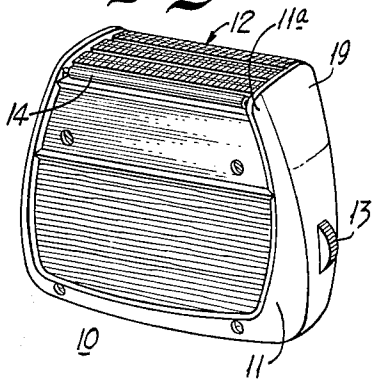


Fig. 3

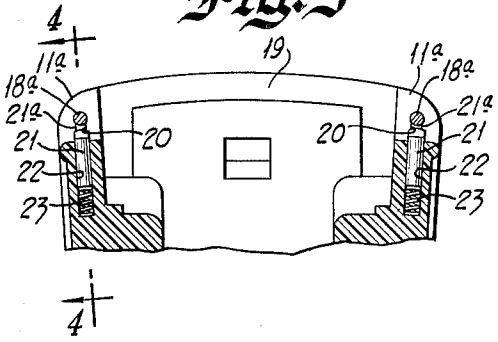
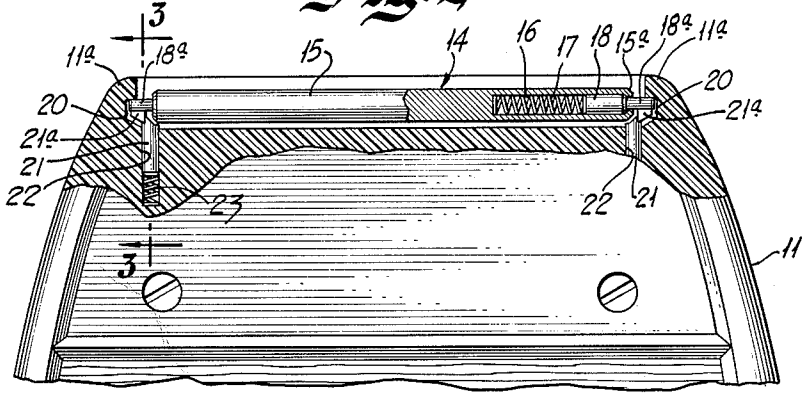


Fig. 2



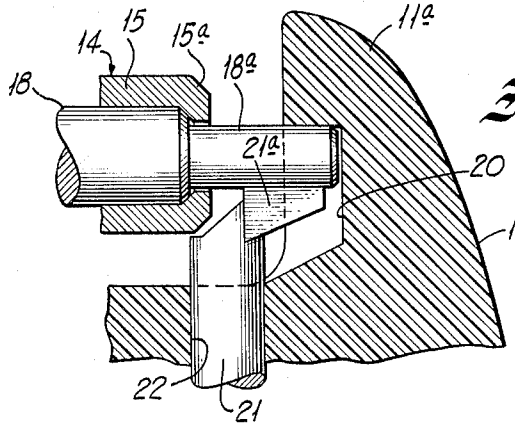


Fig. 4

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Fig. 5

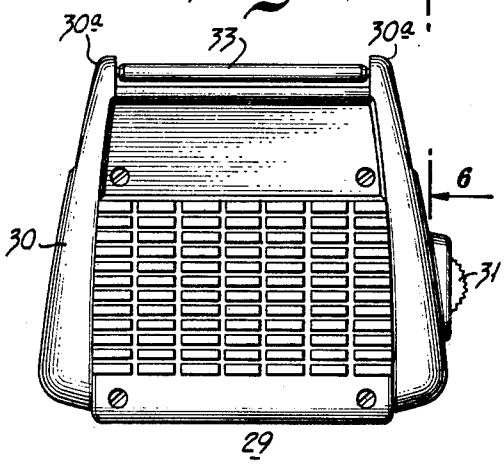


Fig. 6

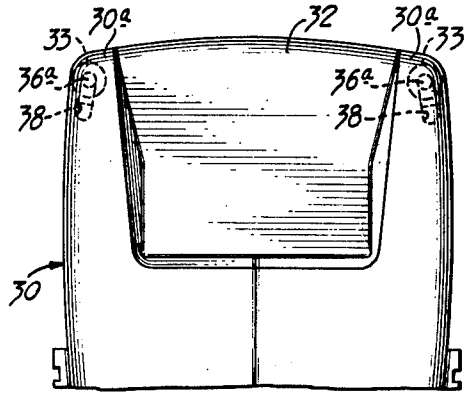


Fig. 7

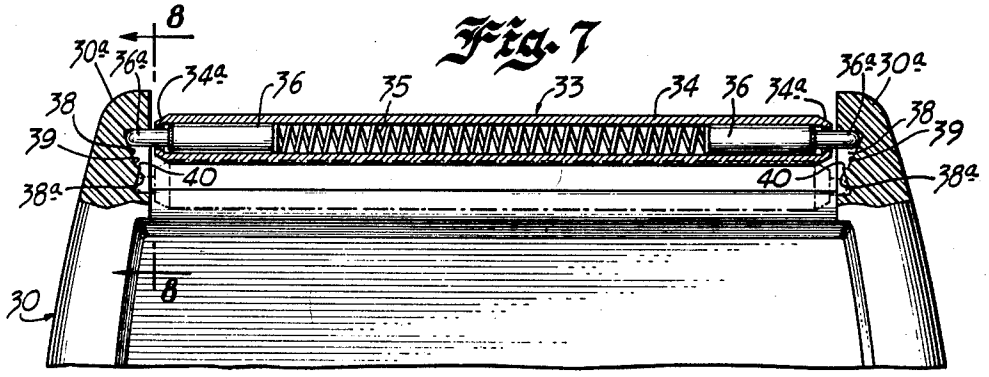
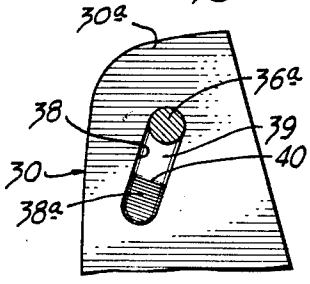


Fig. 8



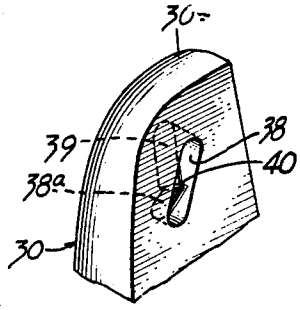


Fig. 9

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United States Patent Office 3,181,237 Patented May 4, 1965

3,181,237

ELECTRIC DRY SHAVER

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Filed Dec. 18, 1961, Ser. No. 159,893
5 Claims. (Cl. 30—34.2)

This invention relates to an electric dry shaver and specifically is a continuation-in-part of copending Jepson application, Serial No. 848,102, filed October 22, 1959, now Patent No. 3,090,119, granted May 21, 1963, and assigned to the same assignee as the instant application.

In connection with shaving apparatus, it has been common practice for more than fifty years to provide guard means ahead of the cutting device for protecting the skin, and also to act as skin stretchers. Such guard means in the form of rollers have been used for more than thirty years and have been suggested and applied to all sorts of shaving devices including the so-called electric dry shaver. In fact, to aid in moving the cutting surface of the cutting head of the dry shaver across the skin of the user, rollers have been suggested and used for more than twenty years. These rollers have ben defined variously as roller combs, skin stretchers and the like. Essentially, they are rotatable elements which are moved in advance of the cutting element to contact the skin first and permit the shaver to be moved smoothly and easily over the face of the user. In connection with electric shavers which can be moved across the face in one of several directions, the rollers or rolling comb elements are provided on either side of the cutting head or element. The present invention is concerned with improved rolling comb elements for use with an electric shaver which are automatically adjustable in dependence upon the pressure applied.

Accordingly, it is an object of the present invention to provide a new and improved roller comb arrangement for electric dry shavers.

It is another object of the present invention to provide improved mounting means for roller combs in connection with electric dry shavers.

A still further object of the present invention resides in the provision of roller combs for an electric dry shaver which may be locked in an inoperative position when their use is not desired.

Further objects and advantages of the present invention will become apparent as the following description proceeds and the features of novelty which characterize the invention will be pointed out with particularity in the claims annexed to and forming a part of this specification.

For a better understanding of the present invention, reference may be had to the accompanying drawings in which:

FIG. 1 is a perspective view of an electric dry shaver embodying the present invention;

FIG. 2 is an enlarged fragmentary elevational view of the dry shaver of FIG. 1 with certain portions cut away more clearly to illustrate the present invention;

FIG. 3 is a sectional fragmentary view taken on line 3—3 of FIG. 2, assuming that FIG. 2 shows the complete structure;

FIG. 4 is a greatly enlarged fragmentary sectional view taken on line 4—4 of FIG. 3, assuming that FIG. 3 shows the complete structure;

FIG. 5 is an elevational view of another electric dry shaver embodying the present invention and illustrating a modification thereof;

FIG. 6 is an enlarged fragmentary end view of FIG. 5, looking in the direction of the arrows 6—6 of FIG. 5;

FIG. 7 is an enlarged fragmentary view of the upper portion of FIG. 5 with certain portions shown in section, more clearly to illustrate the present invention;

FIG. 8 is a fragmentary sectional view taken on line 8—8 of FIG. 7, assuming that FIG. 7 shows the complete structure; and

FIG. 9 is a fragmentary perspective view of the portion of the shaver shown in FIG. 8 of the drawings.

Briefly, the present invention is concerned with improved rolling comb elements associated with an electric dry shaver and FIGS. 1 to 4 illustrate the embodiment disclosed in the above-referred to copending application of which this is a continuation-in-part, and FIGS. 5 to 9 are concerned with another modification which is presently considered the preferred embodiment. In each of the modifications, rolling comb elements are mounted on either side of the cutting head of an electric dry shaver, and these rolling comb elements are continually biased by suitable means in a skin engaging direction. In one of the embodiments, means are provided for locking the rolling comb elements in a non-skin engaging position merely by depressing them slightly, and they can be restored to their skin-engaging position by merely manually moving them in that direction. In the preferred embodiment of the present invention, the same means for holding the rolling comb elements in position also cooperates with cam means for biasing the rolling comb elements into a skin-engaging position.

Referring now to the drawings, and specifically FIGS. 1 to 4 thereof, there is illustrated an electric dry shaver, generally indicated at 10, which is merely representative of electric dry shavers with which the rolling comb elements of the present invention may be employed, and the specific electric dry shaver disclosed is merely by way of illustration. Such electric dry shaver is illustrated as of the type shown in Jepson Patent No. 2,702,938, assigned to the same assignee as the instant application. As in the above-mentioned Jepson patent, the shaver 10 comprises a casing, generally indicated at 11, having attached thereto one or more cutting units, specifically illustrated as a multiple cutting or shaving head 12, extending almost completely across one of the longer dimensions of the generally rectangular housing or casing 11. As is well understood by those skilled in the art, multiple cutting head 12 comprises for each cutting unit a comb and an associated cutter, with the cutter reciprocably movable in shearing engagement with a comb. Such reciprocating relative movement between the cutters and combs of the shaving head 12 is caused by a suitable electric motor, such as shown in the above-mentioned Jepson patent, mounted within the casing 11 and drivingly connected to the cutters of the multiple cutting head 12. The starting wheel 13 for such motor is visible in FIG. 1 of the drawings.

In order to aid in moving the cutting surfaec of the multiple cutting head 12 over the skin of the user, there are provided a pair of roller comb elements 14 which are identical in every respect, one of which is mounted at either side of the cutting head 12, and only one of which is visible in FIG. 1 of the drawings. These roller comb elements 14 automatically adjust to the face and beard of the user. Effectively they define the top edges of the casing 11 on either side of the multiple cutting head 12. These roller comb elements 14, which are identical, preferably comprise a hollow tube, as shown in FIG. 7 of the drawings, or may comprise a rod 15, as best shown in FIG. 2 of the drawings, having a longitudinal recess 16 defined in each end thereof for containing a suitable compression spring 17 and a part of a trunnion supporting member 18, including a trunnion 18a biased to extend beyond the end of the rod 15 by the spring 17. The end of the recessed rod 15 is deformed to define an annular depending flange 15a at each end thereof after the springs 17 and the trunnion supporting members 18 are

inserted therein to hold the parts in assembled relationship as shown in FIG. 2 of the drawings. The trunnions 18*a* can readily be pushed inwardly a sufficient extent to permit them to be readily inserted within suitable trunnion receiving recesses, described hereinafter, two being provided at either end of the casing 11. It should be understood that the roller comb elements 14 might be provided with a fixed trunnion at one end thereof and the described trunnion at the other end, or, in a preferred embodiment of FIG. 7 of the drawings, the rod 15 might be a tubular member and then a single spring may be used for biasing both trunnion supporting members 18 in opposed directions, as is described in more detail hereinafter.

For the purpose of supporting the roller comb elements 14 at the desired position with respect to the casing 11, the casing is provided at the ends thereof adjacent the ends of the rollers 14 with upstanding fingers 11*a* between which fingers a suitable pivotally mounted hair retainer 19 is disposed. The upstanding fingers 11*a* at each end are provided with facing trunnion receiving recesses 20, as clearly shown in FIGS. 2, 3 and 4 of the drawings. In order that the rolling comb elements 14 may be vertically adjusted for any type of beard, thereby to be automatically positioned at different levels relative to the cutting surface defined by the multiple cutting head 12, the recesses 20 are preferably elongated in a vertical direction so that the trunnions 18*a* may be moved vertically variably to position the rolling comb elements or rollers 14. So that these rollers are self-adjusting, a suitable spring biased support 21 is disposed in elongated recesses 22 defined in the casing 11 immediately beneath the recesses 20 and suitable compression springs 23 are disposed in these recesses beneath these supports 21 to bias these supports upwardly. A projection 21*a* of each of the supports 21 extends into the associated one of trunnion-receiving recesses 20 and directly supports the trunnion 18*a* disposed in that recess. Consequently, the roller comb elements 14 are biased to the position shown in FIGS. 2, 3 and 4 of the drawings with the trunnions 18*a* engaging the top of the elongated recesses 20. These rollers 14 will then adjust themselves to any desired vertical position limited by the extent of elongation of the notches or recesses 20. It will be apparent that the trunnions 18*a* of rollers 14 can readily be inserted into the recesses 20 by first inserting one trunnion into one recess and then by merely grasping and moving the roller 14 toward that one end to a sufficient extent to insert the other trunnion 18*a* into the other recesses 20. It will be understood that when a particular rolling comb element 14 is removed, the support means 21 will move upwardly to the position wherein the support portions 21*a* thereof engage the upper ends of the recesses 20.

In the preferred embodiment of the present invention, the means for biasing the trunnion supporting members outwardly with respect to the ends of the roller portion of the rolling comb elements is also utilized to provide the biasing means for biasing the rollers in a skin-engaging direction. Such a modification of the present invention is shown in FIGS. 5 to 9 of the drawings. As there illustrated, an electric shaver 29 is illustrated which comprises the casing 30 with which may be associated the multiple cutting head 12, not shown in the drawings, but identical or very similar to the cutting head in the modification of FIG. 1. A suitable electric motor is contained within casing 29, the starting wheel 31 of which is visible in FIG. 5 of the drawings. The casing 30 is illustrated as having end portions 30*a* of somewhat U-shaped construction extending upwardly at either end thereof, and between which projections at each end may be a pivotally mounted hair-retaining member 32. A pair of rolling comb elements 33 are provided, one on either side of the multiple cutting head. As best shown in FIG. 7, each of the rolling comb elements 33 comprises a tube 34 housing a compression spring 35. A pair of trunnion-supporting members 36 are provided, which are inserted in the respective ends of the tube 33 so that the trunnions 36*a* thereof extend out beyond the end of the tube and are both biased outwardly by the same spring 35. The ends of the tubular member 34 are deformed to define at each end the annular flange 34*a* after the spring 35 and the trunnion-supporting members 36 are inserted to hold these parts in the assembled relationship shown in FIG. 7 of the drawings. Defined in the upstanding portions 30*a* at each end of the housing 30 are elongated recesses 38 which are disposed at a slight angle, as clearly indicated in FIGS. 7 and 9 of the drawings. In accordance with the present invention, the bottom of these recesses define a cam surface 39 which is deepest at the top of the recess and is shallowest at an intermediate point, the intermediate point being designated as 40 in the drawings. It will be apparent that the force of the spring 35 tending to bias the trunnion-supporting members 36 outwardly will also tend to bias the rollers 33 upwardly by virtue of the cam surfaces 39 to assume the position shown in solid lines in FIG. 7 of the drawings. Consequently, the spring 35 performs a dual function of biasing the trunnion-supporting members 36 outwardly to maintain them in the recesses 38 and at the same time, by virtue of the cam surfaces 40, biases the roller comb elements 33 in a skin-engaging direction. The portion 40 of the recesses 38 is a sort of a shoulder beneath which the recess 38 again has a somewhat greater depth, as designated by the reference numeral 38*a* in FIGS. 7 and 9 of the drawings. When the roller is moved below the shoulder 40, it is locked below this shoulder until released. Consequently, the user, by merely depressing the roller 35 manually, can move it completely out of the way, if desired, whereby it is locked in the lower portion 38*a* of the recesses 38 as indicated in dashed lines in FIG. 7 of the drawings. It will normally be disposed in the solid line position of FIG. 7 whereby it will be adjustably positioned, depending upon the external force applied thereto by the face or skin of the user.

In view of the detailed description included above, the operation of the arrangement described will readily be understood by those skilled in the art and no further discussion is included herewith.

While there have been shown and described several embodiments of the present invention, it will be understood that changes and modifications are likely to occur to those skilled in the art, and it is intended in the appended claims to cover all those changes and modifications which fall within the true spirit and scope of the present invention.

What is claimed as new and desired to be secured by Letters Patent of the United States is:

1. An electric dry shaving device comprising a casing defining a chamber, a cutting head associated with said casing, means defining a pair of elongated recesses one at each end of said casing, a roller having trunnions at the ends thereof, spring means biasing said trunnions outwardly from the ends of said roller, said trunnions being receivable one in each of said recesses, and cam means in said recesses for engaging the ends of said trunnions, said cam means having such a configuration that the force of said spring means moving said trunnions into engagement with said cam means causes said roller to move toward corresponding ends of said recesses.

2. An electric dry shaving device comprising a casing defining a chamber, a cutting head associated with said casing, means defining a pair of elongated recesses one at each end of said casing, an elongated roller having a trunnion at each end, said trunnions being receivable in said recesses, said recesses being elongated in a direction generally perpendicular to the cutting surfaces of said cutting head whereby said roller is movable toward and away from the skin of the user during a shaving operation, and spring means biasing said trunnions outwardly

into said recesses, means in said recesses for engaging the ends of said trunnions, said last mentioned means being so constructed and arranged to cause said spring means to also bias said roller toward corresponding ends of said recesses.

3. An electric dry shaving device comprising a casing defining a chamber, a cutting head associated with said casing, means defining a pair of vertically elongated recesses one at each end of said casing, said recesses having a bottom wall inclined outwardly toward the top defining a cam surface which is deepest at the top of the recess, an elongated roller having trunnions biased outwardly, said trunnions being receivable in said recesses and engageable with said cam surface to cause said roller to move toward corresponding upper ends of said recesses.

4. An electric dry shaving device comprising a casing defining a chamber, a cutting head associated with said casing, means defining a pair of vertically elongated recesses one at each end of said casing, an elongated roller having trunnions biased outwardly at each end, said trunnions being receivable in said recesses, cam means in said recesses engaging the ends of said spring-biased trunnions for urging said roller toward corresponding upper ends of said recesses, and means in said recesses for locking said roller in a depressed position.

5. An electric dry shaving device comprising a casing defining a chamber, a cutting head associated with said

casing, means defining a pair of vertically elongated recesses one at each end of said casing having a bottom surface inclined outwardly toward the top to define a cam surface which is deepest at the top of the recess and which is shallowest at an intermediate point and additionally including a lower portion below said intermediate point of somewhat greater depth than said intermediate point forming a locking means for locking said roller toward the bottom of said recess, and an elongated roller having trunnions at each end biased outwardly relative to each other, said trunnions being receivable in said recesses and engaging the bottom surfaces thereof to urge said roller toward the upper ends of said recesses when said trunnions engage said cam surfaces and to lock said rollers into a depressed position when said trunnions are depressed below said intermediate point into engagement with said lower portion.

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