

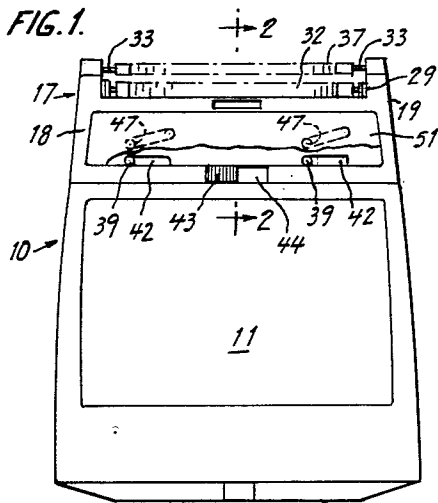
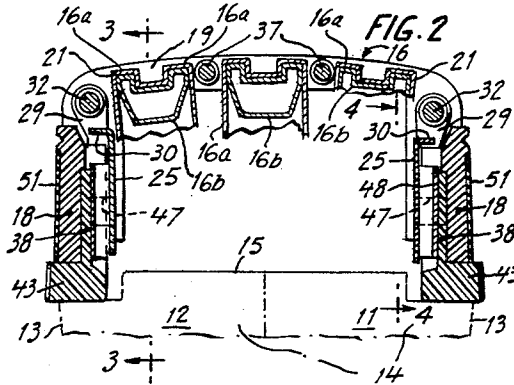
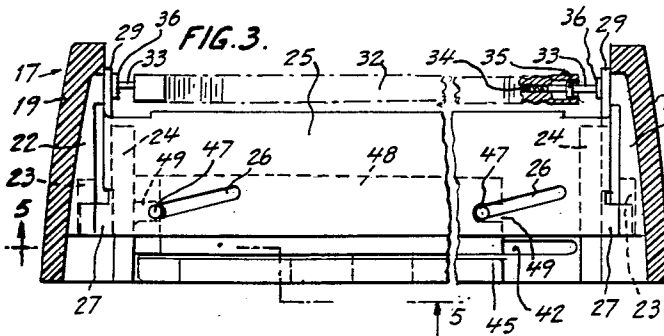
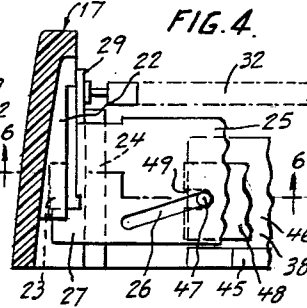
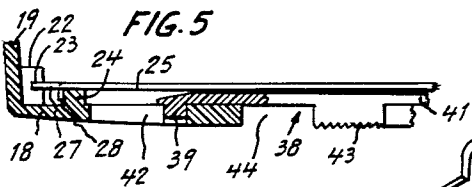
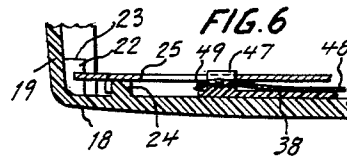
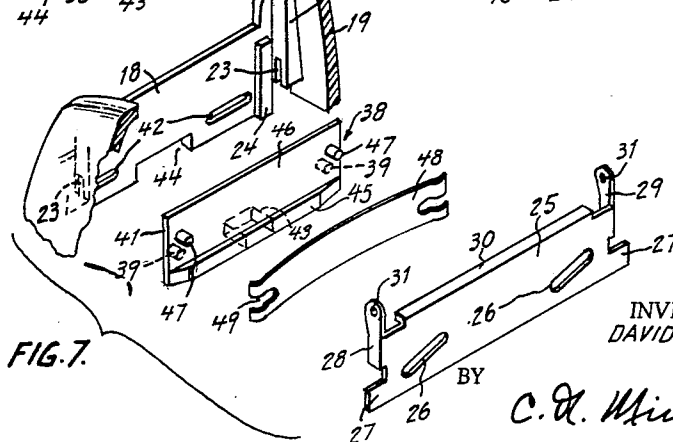
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3,148,447

COMB ROLLER ADJUSTMENT MECHANISM FOR ELECTRIC DRY SHAVERS

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COMB ROLLER ADJUSTMENT MECHANISM FOR ELECTRIC DRY SHAVERS

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This invention relates to new and useful improvements in electric dry shavers and more particularly to a comb roller adjustment mechanism and the mounting therefor.

The present invention is an improvement on the electric dry shaver shown and described in U.S. Patent No. 2,991,554 patented July 11, 1961 and entitled "Shaver With Adjustable Rollers."

In electric dry shavers which employ comb rollers mounted on supporting frames, it has been the practice to mount a frame actuating member on the outer surface of the shaver casing which upon manipulation effects movement of the supporting frame to position the comb roller a desired distance from the edge of the cutting surface of the shaver cutter head. The actuating member of the type disclosed in the above patent, for example, is provided with pins thereon which extend through slots in the shaver casing and which pins are connected to the supporting frame to move the frame toward or away from the cutter head when the actuating member is moved across the outer surface of the shaver casing. Other known adjustable comb roller devices include mechanisms which are adjusted or strapped to the outer surface of the shaver casing.

In these known devices the width of the shaver casing adjacent the cutter head, which portion of the casing is usually referred to as the hair pocket, is materially increased by the comb roller adjustment mechanism and its appurtenances disposed on the outer surface of the shaver casing. In addition, the disposition of a portion of the mechanism exteriorly of the hair pocket makes it susceptible to damage.

An object of the present invention is to provide a novel and compact roller adjustment mechanism for an electric dry shaver.

Another object of this invention is to provide a novel comb roller adjustment mechanism which is mounted entirely within the casing of an electric dry shaver and which mechanism does not interfere with the operation of the shaver.

Still another object of this invention is to provide a novel and compact comb roller adjustment mechanism and mounting therefor which does not increase the overall width of the shaver casing or hair pocket portion section thereof.

A still further object of this invention is to provide a novel compact comb roller adjustment mechanism that may be detachably mounted as a unit on an inner sidewall surface of an electric dry shaver.

The present invention contemplates an electric dry shaver wherein a comb roller and movable supporting frame and frame actuating member therefor are detachably mounted within the shaver casing on an inner sidewall surface of the casing. A button formed on the frame actuating member extends through an opening provided in the casing sidewall and is substantially flush with the outer surface of the sidewall providing means whereby the actuating member may be moved to position the comb roller and frame a desired distance from the side cutting edge of the cutter head. The invention further comprehends an adjustable comb roller mechanism of relatively few and simple parts and which mechanism may be detachably mounted as a unit on the inner sidewall surface of an electric dry shaver.

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The above and other objects and advantages of the present invention will appear more fully hereinafter from a consideration of the detailed description which follows taken with the accompanying drawing wherein one embodiment of the invention is illustrated.

In the drawing:

FIG. 1 is a front elevation view of an electric dry shaver showing an adjustable comb roller at the lowest limit of movement;

FIG. 2 is an enlarged sectional view taken on the line 2—2 of FIG. 1 showing on the right the comb roller of FIG. 1 and showing on the left a comb roller on the opposite side of the casing at the highest limit of movement;

FIG. 3 is a sectional view taken on the line 3—3 of FIG. 2;

FIG. 4 is a fragmentary sectional partial view taken on the line 4—4 of FIG. 2;

FIG. 5 is an enlarged fragmentary sectional view taken on the line 5—5 of FIG. 3;

FIG. 6 is an enlarged fragmentary sectional view taken on the line 6—6 of FIG. 4; and

FIG. 7 is an exploded perspective view of the parts and mounting for the adjustable comb roller mechanism.

Referring now to the drawing for a more detailed description of the present invention an electric dry shaver is generally indicated by the reference numeral 10 in FIG. 1. Electric dry shaver 10 is made in two opposite casing sections 11 and 12 respectively and each of said sections is formed oppositely to the other of molded plastic material. Each casing section 11 and 12 has a sidewall 13 together with laterally extending endwalls 14 projecting in the same direction from sidewall 13. Endwalls 14 of casing section 11 are so constructed that the edges thereof engage the edges of endwalls 14 of casing section 12 to provide a closed shaver casing. Screws (not shown) or other suitable fastening means may be used to secure the casing sections together in a well-known manner. An upper wall 15 (FIG. 2) is provided in each casing section to define the top wall of the usual motor compartment. A cutter head assembly 16 having outer cutters 16a and inner cutters 16b as shown in FIG. 2 is mounted on the top wall 15 by clips (not shown) or other well-known fastening means. A removable hair pocket section 17 is fitted over the cutter head assembly and detachably fastened to the casing by latches (not shown). Hair pocket 17 has opposite sidewalls 18 and opposite endwalls 19. The upper edges (FIG. 2) of the hair pocket endwalls 19 are substantially flush with the top surface of the cutter head assembly 16 and the upper edges of the hair pocket sidewalls 18 are formed to expose the side cutting edge 21 of the cutter head assembly 16.

It will be understood, however, by those skilled in the art that the adjustable comb roller mechanism and mounting therefor which is to be hereinafter described in detail is not limited to use with the particular shaver casing described. The drawing has been simplified so as to show only those parts of the shaver casing necessary to illustrate an environment for a pair of adjustable comb roller mechanisms which are herein illustrated as mounted on opposite inner sidewall surfaces of the removable hair pocket 17 of the shaver 10 on each longitudinal side of the cutter head assembly. However, as will be seen the novel mechanism is readily adaptable for use in other types of electric dry shaver casings.

As shown in FIG. 7, the inner surface of each hair pocket endwall 19 is provided with a pair of spaced projections 22 which merge with the inner surface of the hair pocket sidewalls 18. A guide slot 23 is cut out at the base (FIG. 7) of each projection 22 and which guide slot 23 is open at the base of each projection 22 and extends part way along a side surface of the projection

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parallel to the sidewall 18. Each slot 23 is in alignment with a slot in a similar projection 22 disposed in the same plane on the opposite endwall of the hair pocket (FIG. 7). Guide ribs 24 are formed on the inner surface of the hair pocket sidewall 18 adjacent each projection 22 for purposes to be hereinafter explained.

A rectangular frame plate or supporting member 25 having spaced sloped slots 26 is disposed within the hair pocket 17 on each side of the cutter head assembly 16. Frame plate 25 is provided with spaced ears 27 at opposite lower corner portions thereof (FIG. 7) and which ears 27 are slidably fitted in the guide slots 23 (FIG. 3) of spaced projections 22 adjacent the inner surface of one sidewall 18. Spaced side flanges 28 are formed on the frame plate 25 and each flange 28 overlies a guide rib 24 to properly align the frame 25 relative to its adjacent sidewall. An integral extension 29 of each flange 28 extends above a top inturned edge 30 of frame 25. An aperture 31 is provided in each flange extension 29 to receive one end of a comb roller 32. Cylindrical comb roller 32 is of hollow construction and has a corrugated outer surface. Movable pins 33 project from opposite ends of comb roller 32 and each pin 33 has a reduced diameter portion located within the hollow roller (FIG. 3) urged outwardly of the roller by spring 34. A circular flange 35 is provided on the comb roller 32 to prevent the pin 33 from escaping from the interior of the roller. An additional circular flange 36 is provided on the free end of each pin. The comb roller 32 is mounted on frame plate 25 in a well-known manner by inserting the free end of a pin 33 into an aperture 31 of the frame extension 29 with the circular flange 36 abutting against the surface of the extension. If slight pressure is applied to the comb roller in the axial direction of the inserted pin 33 the pin 33 on the opposite end of the comb roller may be snapped into the aperture 31 on its adjacent flange extension 29. Additional comb rollers 37 of similar construction to comb roller 33 but not adjustable, are set in the hair pocket between the individual cutter heads of the cutter head assembly 16 as shown in FIGS. 1 and 2.

Disposed against the inner surface of hair pocket sidewall 18 is a frame actuator member 38 formed of a relatively thin strip of material as for example plastic. Spaced pins 39 are formed on the front surface 41 of the actuator 38 and which pins 39 ride in spaced elongated horizontal slots 42 formed in sidewall 18. An operating button 43 is formed on the front surface 41 of the actuator and is disposed in an elongated recess portion 44 cut out of the lower edge of wall 18 of hair pocket 17. A reinforcing rib 45 is provided on the rear surface 46 of actuator 38 to strengthen the thin strip 38. Two spaced pins 47 are formed on rear surface 46 which ride in the sloped slots 26 of the frame plate 25. A spring plate 48 is disposed between the actuator 38 and frame plate 25. Opposite side edges of the spring plate have curved portions which urge ears 27 of frame plate 25 against the walls of their respective guide slots 23 (FIG. 6). Recesses 49 are cut out in each side edge of the spring plate 48 through which pass pins 47 of the actuator 38. Spring plate 48 is bowed toward the actuator 38 and engages the rear surface 46 of the latter to maintain the actuator in frictional engagement with the inner sidewall surface of the hair pocket 17.

In order to move the comb roller 32 and its supporting frame 25 downwardly relative to the side cutting edge 21 of the cutter head assembly 16 the actuator is moved to the left as seen in FIG. 4 which illustrates the comb roller at the lowest limit of movement. FIG. 3 illustrates the comb roller at the highest limit of movement.

Actuator pins 39 in the elongated horizontal slots 42 upon horizontal movement of button 43 will move in a linear or horizontal direction and the pins 47 on the rear surface 46 of the actuator engaged in the sloped slots 26 of the frame plate 25 move in a similar direction. The

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last mentioned pins 47 engage the walls of the sloped slots 26 of the frame plate 25 causing the frame plate to move upwardly relative to the side cutting edge 21 of the cutter head assembly 16 and parallel to the sidewall 18 of the hair pocket when button 43 is moved to the right. If the button 43 is moved in a reverse direction, the supporting frame 25 is moved downwardly with respect to the cutter head assembly to its lowest limit of movement (FIG. 4). The spring plate 48 provides sufficient tension to hold the frame plate in any adjusted position intermediate the mentioned limits of movement.

The mentioned parts of the comb roller adjustment mechanism are mounted as a unit on the inner surface of hair pocket sidewall 18 by holding the frame plate 25, spring plate 48 and actuator member 38 in assembled condition between the user's thumb and forefinger. The ears of frame 27 are inserted in spaced guide slots 23 in the hair pocket 17 as above described and pins 39 on the front surface 41 of the actuator 38 are fitted in horizontal slots 42 of the hair pocket sidewall 18. The spring plate 48 disposed between the frame plate 25 and actuator 38 maintains the mentioned parts in position within the casing when the parts are released and the mechanism is ready for operation as above described. It should also be noted that the slots 42 formed in the hair pocket sidewall 18 need not extend through the sidewall as shown in FIG. 1 since the pins project only part way into slots 42 and no opening is required in the front surface of the sidewall to detract from the appearance of the casing. If the slots 42 do extend through the casing as shown in FIGS. 1 and 7, a nameplate 51 may be pasted on the outer surface of the hair pocket to cover the slot opening.

It is apparent from the foregoing that the novel adjustable comb roller mechanism and mounting structure therefore has many advantages in use. One advantage is the fact that the mechanism is mounted entirely within the casing and requires a relatively small operating area therein. This is of importance in a compact structure of an electric dry shaver. This invention provides not only a savings in manufacturing costs both in labor and in materials due to relatively few simple parts used, but also permits ready assembly and disassembly of the adjustable comb roller mechanism in servicing or cleaning an electric dry shaver. Although one embodiment of the present invention has been illustrated and described in detail, it is to be expressly understood that the invention is not limited thereto. Various changes can be made in design and arrangement of parts without departing from the spirit and scope of the invention, that the same will now be understood by those skilled in the art.

What is claimed is:

1. In an electric dry shaver,
- (a) a casing having a cutter head mounted therein,
- (b) a movable supporting member mounted in said casing for movement parallel to the longitudinal axis of said cutter head,
- (c) means for guiding the movement of said supporting member provided on said casing adjacent a sidewall of said cutter head,
- (d) portions of said supporting member mounted in said guide means
- (e) a comb roller carried by said supporting member for movement with said supporting member toward and away from a side cutting edge of said cutter head,
- (f) an actuator member connected to said supporting member and slidably disposed within the shaver casing against an inner sidewall surface thereof,
- (g) actuator operating means projecting through an opening in said casing sidewall operable to move said actuator member along said inner sidewall surface, and
- (h) means on said actuator member to provide movement of said supporting member toward and away

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- from the side cutting edge of said cutter head when said actuator member is moved.
2. In an electric dry shaver,
 - (a) a casing having oppositely disposed sidewalls and endwalls defining a recessed portion, 5
 - (b) a cutter head disposed in said recess portion,
 - (c) aligned guide means formed on the inner surfaces of said opposite endwalls of said casing,
 - (d) a frame plate disposed parallel to the inner surface of one of said sidewalls within said recessed 10 portion,
 - (e) said frame plate having portions mounted for movement in said aligned guide means,
 - (f) a comb roller mounted on said frame plate for movement with said frame plate toward and away 15 from a side cutting edge of said cutter head,
 - (g) an actuator connected to said frame plate and disposed against the said inner surface of the said one sidewall,
 - (h) said one sidewall having an opening therein, and 20
 - (i) a manually operable button on said actuator disposed in said opening for effecting manual movement of said actuator to move said frame plate toward and away from a said side cutting edge of the cutter head. 25
 3. In an electric dry shaver,
 - (a) a casing having oppositely disposed sidewalls and endwalls defining a recessed portion,
 - (b) a cutter head disposed in said recessed portion,
 - (c) spaced projections formed on the inner surface 30 of said endwalls,
 - (d) guide slots formed in said projections,
 - (e) a frame plate mounted parallel to the inner surface of one of said sidewalls,
 - (f) said frame plate having ear portions slidably 35 mounted in aligned guide slots of opposite endwalls,
 - (g) a comb roller mounted on said frame plate for movement with said frame plate toward and away from a side cutting edge of said cutter head,
 - (h) an actuator for said frame plate slidably engag- 40 ing the inner surface of the said one sidewall and connected to said frame plate,
 - (i) said one sidewall having an elongated opening therein,
 - (j) a movable button on said actuator disposed in 45 said opening to provide for movement of said actuator to move said frame plate toward or away from the said side cutting edge of the cutter head upon movement of said button.
 4. The electric shaver of claim 3, wherein 50

- (a) spring means are disposed between said frame plate and said actuator member,
- (b) portions of said spring means urging said actuator into frictional engagement with the inner surface of said one sidewall, and
- (c) second portions of said spring means maintaining said frame plate ear portions within said guide slots.
5. In an electric dry shaver
 - (a) a casing having opposite sidewalls and endwalls defining a recessed portion,
 - (b) a cutter head disposed in said recessed portion,
 - (c) aligned guide means formed on the inner endwalls of said casing,
 - (d) a comb roller,
 - (e) a movable frame plate carrying said comb roller and disposed in said recessed portion parallel to the inner surface of one sidewall of said casing,
 - (f) said frame plate having portions mounted for movement in said guide means,
 - (g) said frame plate having elongated spaced sloped slots formed therein,
 - (h) an actuator member slidably engaged with the said inner surface of the said one sidewall,
 - (i) spaced pins on one side of said actuator member engaged in the sloped slots of said frame plate,
 - (j) a second set of spaced pins formed on the opposite side of said actuator member and set in elongated slots provided in said one sidewall, and
 - (k) actuator operating means projecting through an opening in said casing operable to slide said actuator along said inner surface of said sidewall whereby said second mentioned pins move in said elongated slots and said first mentioned pins cause said frame plate to move in a direction perpendicular to the direction of movement of said actuator member.
6. The electric dry shaver of claim 5, wherein
 - (a) spaced intumed flange portions are provided on said frame plate,
 - (b) spaced aligning ribs are formed on said inner surface of said one sidewall, and
 - (c) said intumed flange portions are disposed over said aligning ribs whereby said frame plate may move in a direction perpendicular to the direction of movement of the actuator member.

References Cited in the file of this patent

UNITED STATES PATENTS

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2,991,554	Somers et al. -----	July 11, 1961