

Sept. 5, 1967

R. J. TOLMIE ET AL
ELECTRIC DRY SHAVER HOUSING SELECTIVELY
POSITIONABLE CUTTER MEANS

3,339,276

Filed April 6, 1965

3 Sheets-Sheet 1

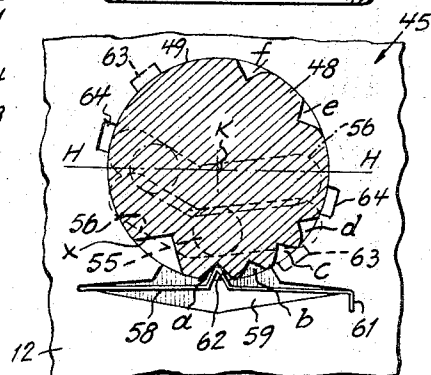
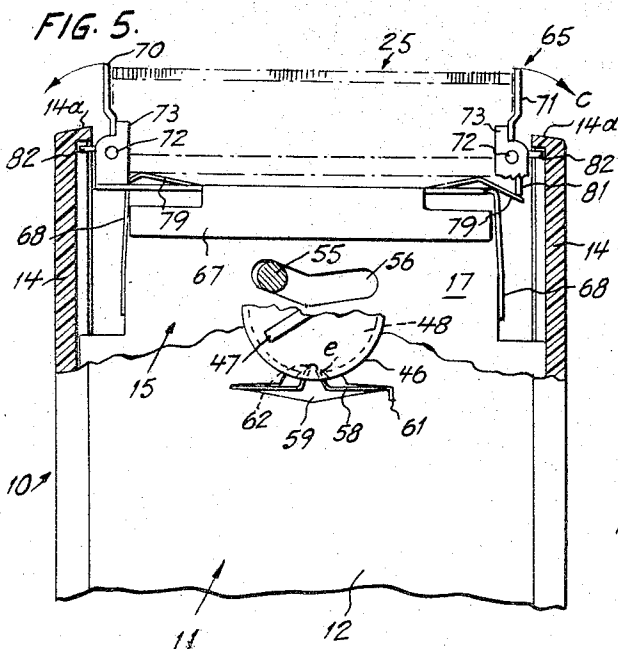
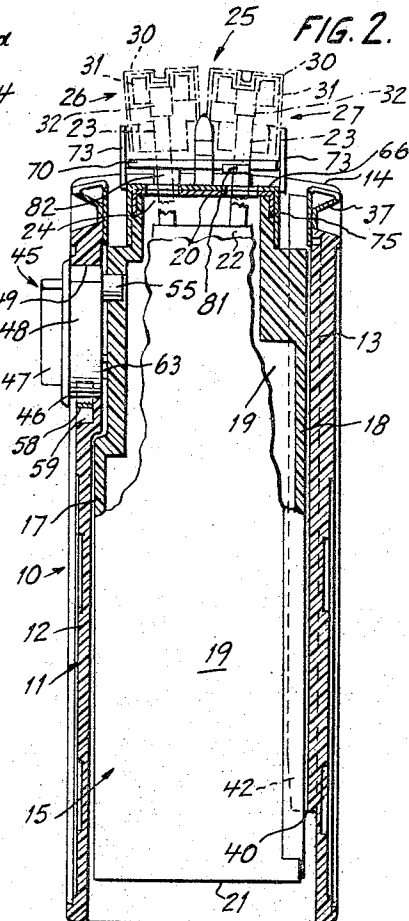
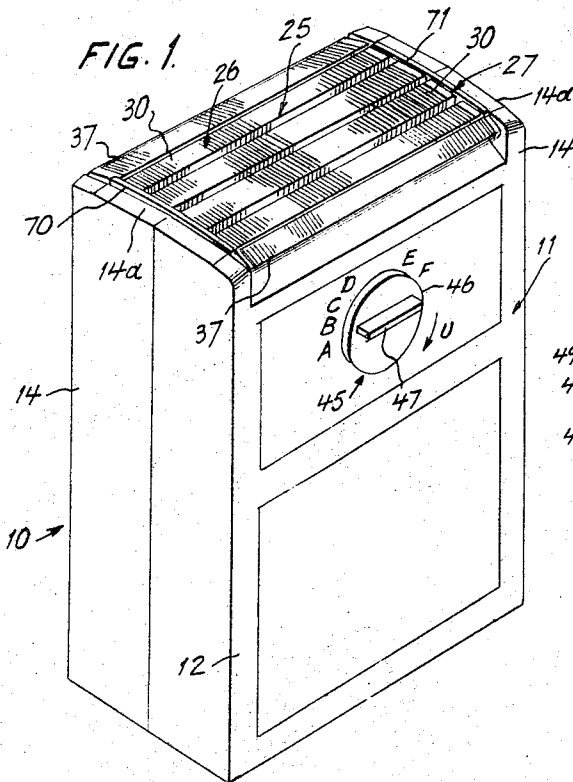


FIG. 6.

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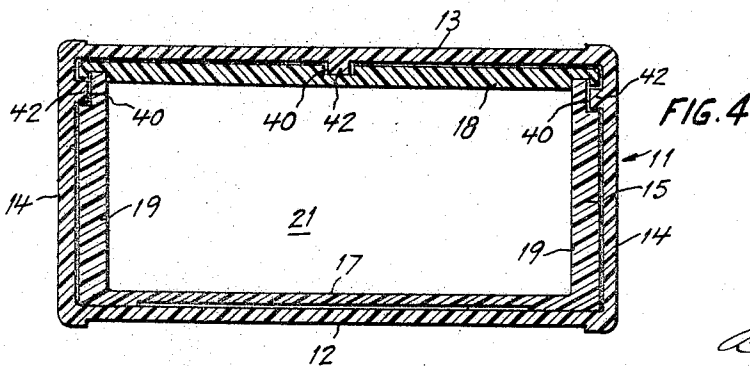
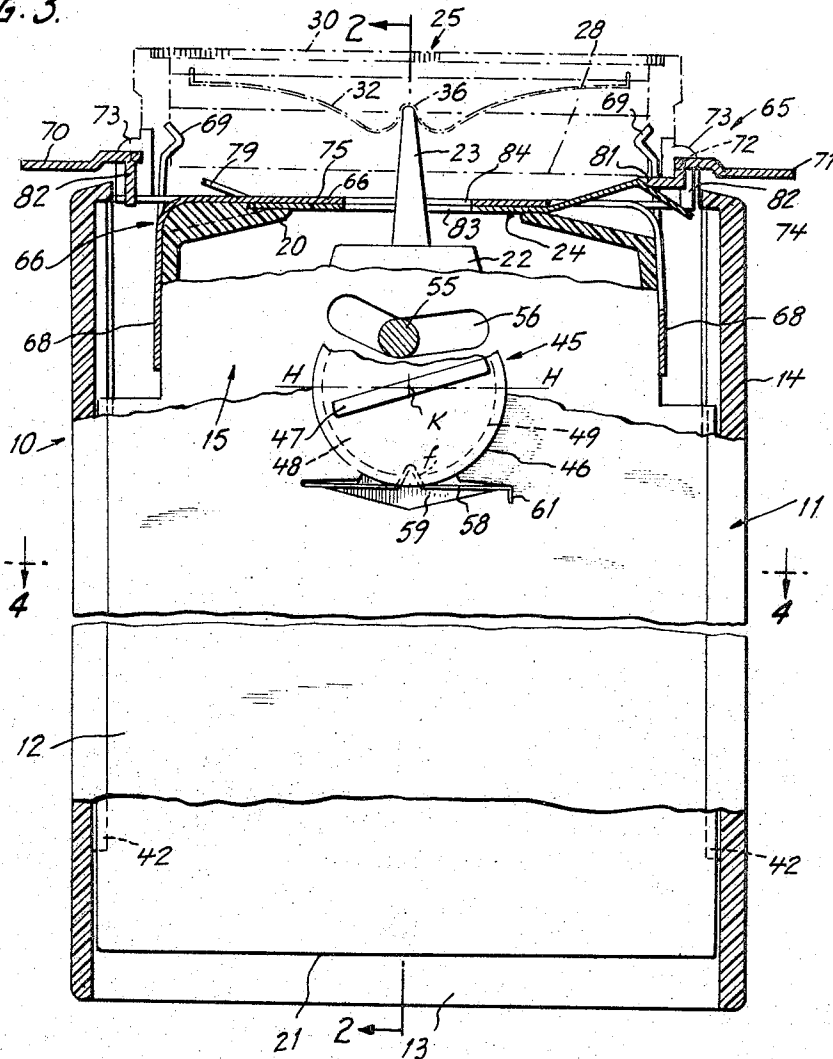
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3,339,276

Filed April 8, 1965

3 Sheets-Sheet 2

FIG. 3.



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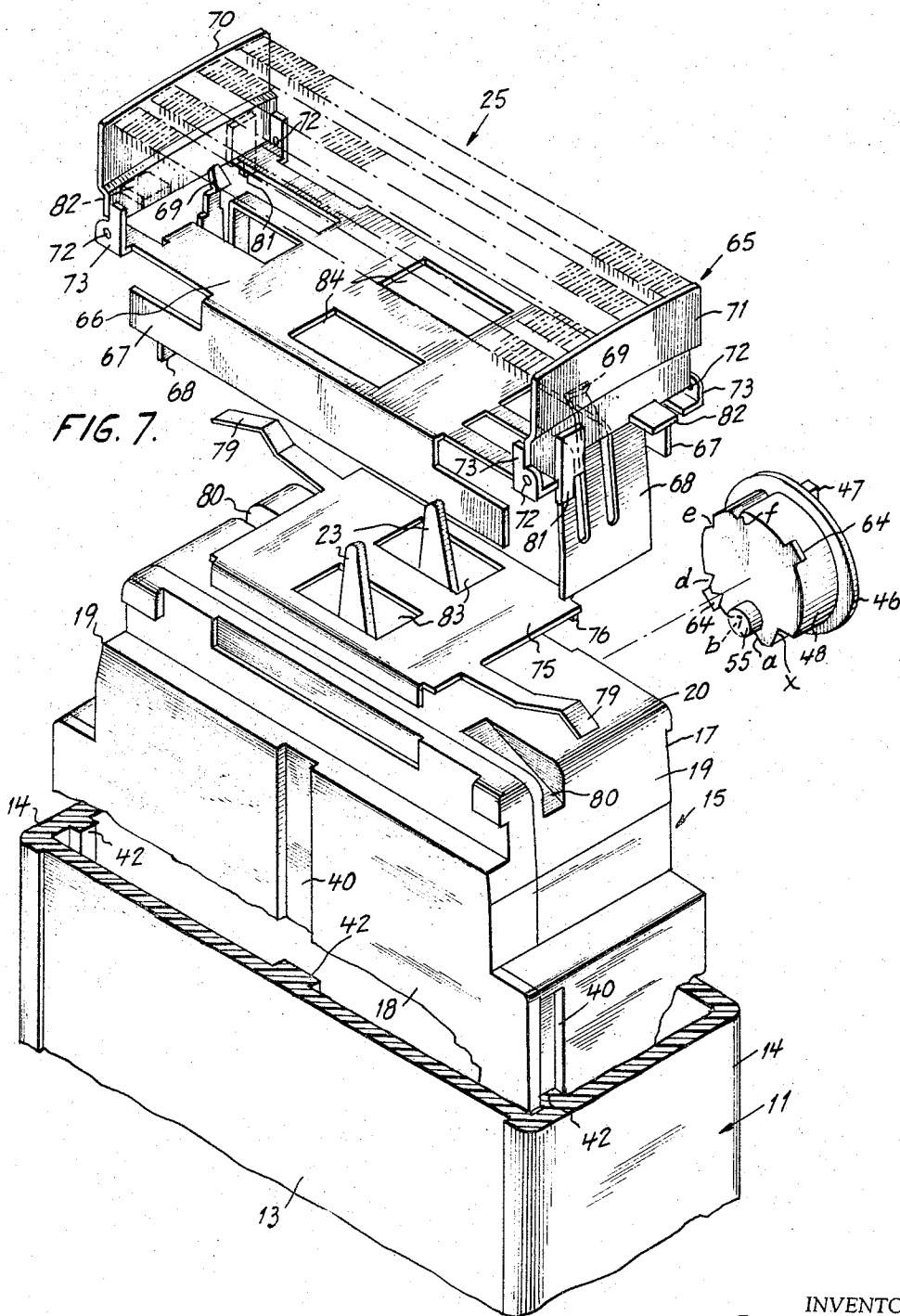
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Filed April 6, 1965

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3,339,276

ELECTRIC DRY SHAVER HAVING SELECTIVELY POSITIONABLE CUTTER MEANS

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Filed Apr. 6, 1965, Ser. No. 445,906

9 Claims. (Cl. 30—34.1)

This invention relates to new and useful improvements in electric dry shavers.

In some electric dry shavers it is the usual practice to provide a casing having a cutter head disposed within a recessed portion in the casing. The skin engaging surface of the cutter head, which includes hair receiving slots formed in the outer surface of the cutter head, is exposed in the recessed portion and which exposed surface is arranged substantially flush with the exterior walls of the casing which protect the cutter head from damage. In the course of repeated use of the shaver, hair cuttings, facial powder and like matter is accumulated within the cutter head and in the recessed portion which necessitates that the cutter head be periodically removed from the casing for cleaning.

Various means have been used in the past for gaining access to the cutter head for cleaning. In some shavers, latch means are provided to detachably mount the cutter head to the casing whereby a person is enabled to manually remove the cutter head from the casing. In other shavers a detachable hair pocket section is mounted over the cutter head and which section must be removed to gain access to the cutter head. In other shavers pivotal flap members are mounted on the casing at opposite ends of the cutter head and which flap members are pivoted to an open position away from the cutter head to expose the cutter head.

Satisfactory use has been made of these devices, however, it has been found that where access to the cutter head requires the manipulation of latch mechanisms or the removal and remounting of casing parts, there is a tendency to avoid the task of cleaning the cutter head as often as is desirable to maintain the shaver in effective operating condition.

Further, in shavers of this type the set position of the cutter head in the casing, substantially flush with the exterior walls or other appurtenances of the casing does not provide for comfortable and effective positions for all shaving conditions, as for example, in accommodating hairs of different lengths and varying coarseness. Further, the set position of the cutter head interferes with the use of the cutter head for trimming sideburns and mustaches.

It is an object of the present invention to provide an electric dry shaver of novel construction.

Another object is to provide novel means for adjusting the position of the cutter head to selected elevated positions in the shaver for effecting various hair trimming operations.

Another object is to provide a novel electric dry shaver wherein novel means are provided for adjusting the position of the cutter head in the casing to selected elevated operative positions for accommodating all shaving conditions.

A further object is to provide novel means for gaining access to a cutter head for cleaning or servicing without removing the cutter head from the casing or removing protective casing structure therefrom.

Another object is to provide novel end flap means for protecting a cutter head and which means includes means for automatically releasing the end flaps to an open condition when access to the cutter head is desired.

The present invention contemplates an electric shaver of novel construction. According to the present invention

the electric shaver comprises an outer sleeve casing in which is disposed an inner casing supported for movement between spaced limit positions within the outer casing. A cutter head is mounted on one end of the inner casing and in a first limit position of the inner casing the cutting surface of the cutter head is exposed at one end of the outer casing substantially flush with the exterior walls thereof. Actuating means are provided which are operable to effect and control movement of the inner casing to the other limit position in a direction outwardly of the outer casing whereby the cutting surface of the cutter head is raised above the walls of the outer casing to selected elevated positions intermediate the limit positions. In addition, protective end flaps are provided at opposite ends of the cutter head to protect the cutter head at selected intermediate elevated positions between the spaced limit positions. Means are also provided to release the end flaps to open condition upon arrival of the inner casing at the other limit position whereat the cutter head is fully exposed for cleaning.

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 together with the accompanying drawings wherein one embodiment of the invention is illustrated.

In the drawings:

FIG. 1 is a perspective view of an electric dry shaver in which is incorporated the present invention and illustrates the cutter head thereof at the lower limit position;

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

FIG. 3 is a fragmentary partly cross sectional elevational view of the electric shaver of FIG. 1 with the cutter head and inner casing in upper limit position;

FIG. 4 is a sectional view taken on the line 4—4 of FIG. 3;

FIG. 5 is a view similar to FIG. 3 and illustrates the cutter head and inner casing at an intermediate elevated position;

FIG. 6 is a fragmentary front elevational view of the actuating means under conditions where the cutter head is at the position shown in FIG. 1; and

FIG. 7 is an exploded rear perspective view of the cutter head protective end flap mechanism and illustrates portions of the inner and outer casings.

Referring now to the drawings for a more detailed description of the present invention and more particularly to FIGS. 1, 2 and 3 an electric shaver is generally indicated by the reference numeral 10. Electric shaver 10 (FIG. 2) includes an outer sleeve or enclosure casing 11 open at each end thereof and having spaced sidewalls 12 and 13 respectively and spaced endwalls 14. An inner casing 15 (FIGS. 2, 3, 4 and 7) is disposed within outer sleeve casing 11 and is mounted for movement therein between spaced limit positions in a manner to be hereinafter fully described. Inner casing 15 is of substantially box-shaped configuration and includes spaced sidewalls 17 and 18 respectively, endwalls 19, top wall 20 and bottom wall 21. A motor of any conventional form and diagrammatically indicated at 22 in FIGS. 2 and 3 is mounted in inner casing 15 and includes oscillatable drive arms 23 which project outwardly of casing 15 through aperture 24 in top wall 20 for operating a cutter head 25.

Cutter head 25 (FIG. 2) is of a known type construction, such as that shown in U.S. Patent No. 2,793,430 to L. C. Carissimi dated May 28, 1957 and as illustrated comprises two cutter head units 26 and 27 secured in a suitable manner in spaced side-by-side relationship on a rectangular mounting plate 28 (shown in dot-dash lines in FIG. 3). Each cutter head unit 26 and 27 includes a stationary elongated inverted U-shaped outer cutter

member 30 which is open at each end thereof and in which is disposed an elongated movable inner cutter 31. Inner cutter 31 is maintained in cutting cooperation with its associated outer cutter 30 by a leaf spring 32 (FIG. 3), of the general type shown in the mentioned patent, which is provided with arms attached to the opposite ends of movable inner cutter 31. Loop portion 36 (FIG. 3) of each leaf spring 32 is seated on a drive arm 23 of motor 22 and which drive arms 23 reciprocate inner cutters 31 relative to outer cutters 30 in a well known manner to effect a shaving operation upon operation of motor 22.

It is a feature of this invention to provide means for raising inner casing 15 in outer casing 11 to position cutter head 25 at selected elevated positions relative to outer casing 11 for shaving and trimming operations which would otherwise be interfered with by the exterior wall portions of outer casing 11. To this end, means are provided to support inner casing 15 within outer casing 11 for movement from a lower limit position as shown in FIG. 1 to an upper limit position as shown in FIGS. 2 and 3. In the lower position the exposed surface of cutter head 25 is substantially flush with edges 14a of end walls 14 of outer casing 11 and with elongated comb members 37 secured to the upper edges of sidewalls 12 and 13 in any suitable manner. The support means include longitudinally extending channel portions 40 (FIGS. 4 and 7) provided in endwalls 19 and sidewall 18 of inner casing 15 and which channel portions 40 are disposed over elongated guide ribs 42 formed in endwalls 14 and sidewall 13 of outer casing 11. Actuating and control means generally designated by the numeral 45 in FIGS. 1 and 2 are provided to effect and control movement of inner casing 15 between the lower position (FIG. 1) and upper limit position (FIGS. 2 and 3) and to selected intermediate positions therebetween. Actuating means 45 include a rotatable disc-shaped button member 46 disposed on the outer surface of sidewall 12 of outer casing 11 (FIGS. 1, 2 and 3) and having a finger gripping piece 47. Button 46 is provided with a hub portion 48 (FIGS. 2 and 7) rotatably disposed in an aperture 49 (FIGS. 2 and 3) provided in sidewall 12.

An actuating projection 55 (FIG. 2) extends outwardly from hub 48 of button 46 and is disposed in a cam slot 56 (FIGS. 2, 3 and 6) formed in the outer surface of sidewall 17 of inner casing 15 to provide means for moving casing 15 on guide ribs 42 when button 46 is rotated. Detent means are provided to maintain button 46 in any one of a plurality of moved positions which are designated as A, B, C, D, E, and F on the outer surface of sidewall 12 in FIG. 1 and which detent means include a spring 58 disposed in a recess 59 provided in the rear surface of sidewall 12 of outer casing 11. An end portion spring 58 is press-fitted in a slot 61 at one end of recess 59 to prevent accidental dislodgement of spring 58 from casing 11. A detent portion 62 is provided intermediate the ends of spring 58 and which detent portion 62 projects upwardly into aperture 49 in sidewall 12 and which detent 62 is adapted to engage in a selected one of a plurality of stop notches in hub 48 of button 46 in accordance with the selected position of finger piece 47 on outer casing 11. The stop notches are designated a, b, c, d, e and f respectively in FIG. 6 and which designations correspond to stop positions A to F inclusive (FIG. 1) of finger piece 47. With finger piece 47 at position A (FIG. 1) and inner casing 15 at lower limit position detent 62 rests in notch a of hub 48. When finger piece 47 is rotated by an operator from the position A to another position such, as for example position F which designates the upper limit position of casing 15, detent 62 is cammed out of notch a as hub 48 is rotated clockwise (FIG. 1). When finger piece 47 is positioned at F detent 62 enters into notch f on hub 48 to restrain ready movement of button 46 when finger piece 47 is then released by the operator. As will now be apparent, detent

62 snaps into and out of notches b to e inclusive as hub 48 is rotated. The tension of spring 58 is such that if hub 48 is stopped at any of the intermediate positions B to E detent 62 in engagement with the corresponding one of the notches b to e restrains ready movement of hub 48 from the moved position.

Button 46 is mounted on casing 11 in aperture 49 by aligning a pair of ear projections 63 (FIG. 6) which are formed on hub 48 with a pair of slots 64 provided in the surface of sidewall 11 about the periphery of aperture 49. Hub 48 is then inserted into aperture 49. An oversized notch designated x in FIG. 6 is provided in the hub 48 and is adapted to pass over detent 62 in the aligned position of ears 63 with slots 64 as hub 48 is moved into aperture 49. A slight rotation of a finger piece portion 47 of button 46 places ear projections 63 against the rear surface of sidewall 12 to thereby lock button 46 to outer casing 11 for rotation in aperture 49.

An end flap mechanism 65 (FIGS. 3 and 7) is provided for protecting the ends of cutter head 25 and which mechanism 65 includes a cover plate 66 (FIG. 7) having spaced downwardly depending resilient side flanges 67 and end flanges 68 clamped to the spaced upper edge portions of inner casing sidewalls 17-18 and endwalls 19 respectively. Resilient latch fingers 69 extend upwardly from opposite ends of cover plate 66 and are adapted to engage portions (not shown) of cutter head mounting plate 28 in a known manner to detachably mount cutter head 25 to top wall 20 of inner casing 15. Spaced end flaps 70 and 71 are disposed at opposite ends of cover plate 66 and are hinged thereto by a pair of trunnion pins 72 formed on the lower opposite corners of each flap 70-71 and which pins 72 are disposed in apertures provided in spaced upstanding ear portions 73 of cover plate 66. Means are provided to normally maintain flaps 70-71 against the ends of cutter head 25 (FIG. 5) to protect the end portions thereto from damage and which means include a plate member 75 (FIGS. 3, 5 and 7) disposed intermediate cover plate 66 and top wall 20 of inner casing 15. Plate member 75 is provided with resilient side flanges 76 (FIG. 7) clamped to the spaced sidewalls 17 and 18 of casing 15 within cutout portions (one shown in FIG. 7) provided therein. Elongated resilient fingers 79 extend from the opposite side edges of plate member 75 and lie in channel portions 80 of top wall 20. An end portion of each finger 79 is biased into engagement with depending lugs 81 formed on each end flap 70-71 to maintain flaps 70 and 71 in a normally closed position against the ends of cutter head 25 to protect the ends in the intermediate raised positions of inner casing 15. Release means are included to move flaps 70-71 to an open position (FIGS. 2 and 3) when cutter head 25 is moved clear of casing 11 in a manner to be explained and which means include lugs 82 extending at right angles from the lower edge of each flap 70 and 71. Apertures 83 (FIG. 7) are provided in plate 75 and which aperture 80 registers with corresponding apertures 84 in cover plate 66 and through which apertures 83 and 84 (FIG. 3) drive arms 23 of motor 22.

Operation

In accordance with the described arrangement, let it be assumed that a person elects to raise inner casing 15 from the lower limit position (FIG. 1) to the upper limit position (FIGS. 2 and 3) to elevate cutter head 25 clear of outer casing 11. Under such conditions as previously mentioned, finger piece 47 of button 46 is aligned with position A on sidewall 12 of outer casing 11 and detent portion 62 of spring 58 rests in stop notch a on hub 48 of button 46 (FIG. 6). In order to elevate inner casing 15 one grasps and rotates finger piece 47 clockwise (FIG. 1) in the direction designated by the arrow U in FIG. 1 to move finger piece 47 from position A in the direction of position F and which latter position as previously mentioned, designates the upper limit position of inner cas-

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ing 15. As button 46 is rotated from position A projection 55 on hub 48 which is in camming engagement with the walls of slot 56 in inner casing 15 drives inner casing 15 upwardly in outer casing 11 on guide ribs 42. As projection 55 is rotated over center K of button 46 (FIG. 6) which lies on the imaginary horizontal line designated H—H in FIG. 6 projection 55 is located approximately at the left end of slot 56 (dot-dash lines FIG. 6). Continued rotation of button 46 causes projection 55 to pass over line H—H and move to the right in slot 56 as it drives casing 15 upwardly in outer casing 11. As inner casing 15 reaches an intermediate position as shown in FIG. 5 lugs 82 on protective end flaps 70 and 71 are brought into engagement with the protruding edges 14a of endwalls 14 of outer casing 11. Further upward movement of inner casing 15 causes edges 14a to drive lugs 82 downwardly to pivot flaps 70 and 71 on pins 72 in the direction designated by the arrows C in FIG. 5.

As flaps 70 and 71 are pivoted on pins 72 depending lugs 81 on the lower edge of each flap 70—71 in engagement with latch fingers 79 moves inwardly along the surface of fingers 79 to permit flaps 70 and 71 to move to open condition at each side of cutter head 25 as inner casing 15 reaches upper limit position. In upper limit position (FIG. 3) button 46 is rotated to align finger piece 47 thereof with position F and cutter head 25 is raised completely clear of outer casing 11 with end flaps 70 and 71 in open position whereby cutter head 25 is fully accessible for cleaning. In the course of the described movement to the upper limit position as detent portion 62 of spring 58 is successively cammed into and out of engagement with stop notches a through e inclusive on hub until finger piece 47 aligns with position F whereat detent 62 engages in stop notch f.

If it is desired to return cutter head 25 and inner casing 15 to lower limit position a reverse procedure is followed by rotating button 46 counterclockwise (FIG. 3) from position F to A whereby projection 55 in cooperation with slot 56 drives casing 15 downwardly to its lower position. If desired, however, button 46 may be rotated clockwise from the position shown in FIG. 3 to the position of FIG. 1 to lower casing 16. If button 46 is rotated clockwise (FIG. 3) projection 55 moves to the right in slot 56 (FIG. 3) and commences to drive inner casing 15 downwardly projection 55 passes over center line H—H at the right of center K of button 46 (FIG. 3) it is located approximately at the right end of slot 56. Further, clockwise rotation of button 46 moves projection 55 over line H—H and to the left in slot 56. As inner casing 15 reaches lower limit position projection 55 attains the start position thereof in slot 56 (FIG. 6). In the course of the return movement as inner casing 15 moves downwardly from upper limit position open end flaps 70 and 71 engage edges 14a of casing endwalls 14 and are pivoted by edges 14a back into closed condition as cutter head 25 reenters outer casing 11.

As will now be appreciated, cutter head 25 may be moved by an operator and maintained at any selected elevated intermediate positions B, C, D and E intermediate the limit positions A and F. In the intermediate positions cutter head 25 projects above endwalls 14 and combs 37 of outer casing 11 for providing selected positions for various trimming and shaving operations. In any of the intermediate positions detent 62 will be positioned in the stop notch on hub 48 corresponding to the selected position of cutter head 25 to hold inner casing 15 and cutter head 25 in the selected adjusted position. In these intermediate positions end flaps 70 and 71 are maintained in closed condition to protect the opposite end portions of cutter head 25 which at these positions project above outer casing 11.

It will be apparent from the foregoing description that the novel electric dry shaver has many advantages in use. One advantage is that the cutter head may be readily positioned at predetermined elevated positions to provide

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selected positions of cutter head 25 for shaving and trimming operations according to the comforts and needs of the operator. Further, the novel means for adjusting the position of cutter head 25 in the shaver provides for ready access thereto for cleaning without removing the same from the 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 the design and arrangement of parts without departing from the spirit and scope of the invention as the same will now be understood by those skilled in the art.

What is claimed is:

1. An electric dry shaver comprising,
 - (a) an outer casing having an opening in one end thereof,
 - (b) an inner casing disposed within said outer casing,
 - (c) means supporting said inner casing for movement between spaced limit positions within said outer casing,
 - (d) a cutter head mounted on said inner casing and having a cutting surface exposed in the opening of said outer casing, and
 - (e) actuating means carried by said casings and operable to effect and control movement of said inner casing on said supporting means between said spaced limit positions to position said cutter head in the opening at selected elevated positions intermediate said limit positions.
2. The electric shaver of claim 1 wherein said actuating means include,
 - (a) a manually rotatable button member mounted on said outer casing,
 - (b) a cam slot provided on said inner casing, and
 - (c) a drive projection extending laterally from said button into said outer casing and in driving engagement with said cam slot,
 - (d) said drive projection movable in said cam slot and operable to move said inner casing between said limit positions upon rotation of said button.
3. A electric dry shaver comprising,
 - (a) an outer casing having an opening in one end thereof,
 - (b) an inner casing disposed within said outer casing,
 - (c) means supporting said inner casing for movement between spaced limit positions within said outer casing,
 - (d) a cutter head mounted on said inner casing and having a cutting surface exposed in the opening of said outer casing,
 - (e) spaced end flap members pivotally mounted at opposite ends of said cutter head adapted to lie against the ends of said cutter head in one of said limit positions of said inner casing,
 - (f) actuating means operable to move said inner casing to the other of said limit positions in a direction outwardly of said opening to place said cutter head at selected elevated positions in said opening, and
 - (g) release means operable to move said end flaps to an open condition away from the ends of said cutter head upon arrival of said casing at said other limit position.
4. An electric dry shaver comprising,
 - (a) an outer casing having an opening in one end thereof,
 - (b) an inner casing disposed within said outer casing,
 - (c) means supporting said inner casing for movement between spaced limit positions within said outer casings,
 - (d) a cutter head mounted on said inner casing and having a cutting surface exposed in the opening of said outer casing,
 - (e) actuating means carried by said casings and operable to effect and control movement of said inner cas-

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ing between said spaced limit positions in a direction outwardly of said opening to place said cutter head at selected elevated positions in said opening relative to said outer casing, and

- (f) detent means carried by said outer casing and adapted to coact with said actuating means to maintain said cutter head at any of said selected elevated positions.

5. An electric dry shaver comprising,

- (a) an outer casing having an opening in one end thereof,

- (b) an inner casing disposed within said outer casing,

- (c) means supporting said inner casing for movement between said spaced limit position within said outer casing,

- (d) a cutter head mounted on said inner casing and having a cutting surface exposed in the opening of said outer casing,

- (e) spaced end flaps pivotally mounted at opposite ends of said cutter head and adapted to lie against the ends of said cutter head,

- (f) actuating means operable to move said inner casing to the other of said limit positions in a direction outwardly of said opening to place said cutter head at elevated positions relative to said outer casing,

- (g) latch means on said inner casing adapted to maintain said flap members in normally closed condition, and

- (h) release means on said flap members adapted to cooperate with portions of said outer casing to release said flap members to an open condition upon arrival of said inner casing at the other limit position.

6. The electric shaver of claim 5 wherein said latch means include a plate member mounted on said inner casing and having spaced resilient finger portions, and lug members on said flap members in engagement with said resilient fingers to normally maintain said flap members in closed condition.

7. The electric shaver of claim 6 wherein said release means include projections on said flap members adapted to engage wall portions of said outer casing to pivot said flap members to open condition.

8. An electric dry shaver comprising,

- (a) an outer casing having an opening in one end thereof,

- (b) an inner casing disposed within said outer casing,

- (c) means supporting said inner casing for movement between spaced limit positions within said outer casing,

- (d) a cutter head mounted on said inner casing and having a cutting surface exposed in the opening of said outer casing,

- (e) actuating means on said casings operable to move said inner casing between said spaced limit positions in a direction outwardly of said opening to place said cutter head at selected elevated positions in said opening,

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- (f) said actuating means including a manually rotatable member carried by said outer casing and having a portion in camming engagement with said inner casing adapted to move said inner casing between said positions upon rotation of said rotatable member, and

- (g) detent means operable to maintain said cutter head at any of the selected elevated positions,

- (h) said detent means including a spring member mounted on said outer casing and having a detent portion formed thereon and notch means formed on said rotatable member adapted to cooperate with said detent portion to restrain movement of said rotatable member in any of the selected elevated positions of the cutter head.

9. An electric dry shave comprising,

- (a) an outer casing having an opening in one end thereof,

- (b) an inner casing disposed within said outer casing,

- (c) guide means provided on adjacent wall portions of said casings including rib members on one casing disposed in corresponding channel portions of the other casing to support said inner casing for movement between spaced limit positions in said outer casing,

- (d) a cutter head mounted on one end of said inner casing and having a cutting surface exposed within the opening of said outer casing, and

- (e) actuating means carried by said casings and operable from without said outer casing to effect said movement of said inner casing on said guide means in a direction outwardly of said one end of said outer casing to position said cutter head at selected elevated positions in said opening,

- (f) said actuating means including a manually rotatable member mounted on said outer casing, a cam slot on said inner casing, and a projection extending laterally from said rotatable member and in driving engagement with said cam slot, said projection adapted to move said inner casing between said spaced limit positions upon rotation of the rotatable member.

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