

PATENT SPECIFICATION

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DRAWINGS ATTACHED

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(54) ELECTRIC DRY SHAVER

(71) We, SPERRY RAND CORPORATION, a corporation organized and existing under the laws of the State of Delaware, United States of America, of 1290 Avenue of The Americas, New York, New York, 10019, United States of America, do hereby declare the invention, for which we pray that a Patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

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

Electric dry shavers generally include a casing having a receptacle or other portions of the casing in which is mounted the cutter head. The cutter head comprises at least one stationary slotted outer cutter and an inner cutter which is mounted for movement relative to the outer cutter and provided with teeth for shearing whiskers which enter the outer cutter. The inner cutter is connected to motor operated drive means which move the cutter either in a rotary, linear or oscillatory path in accordance with the parameters of the design of the particular shaver. In the course of the use of the shaver, hair clippings, facial powders and the like pass through the slots in the outer cutter and accumulate within the cutter head. Further it has been found that after repeated use the inner cutter will become dull and it is desirable that the same be replaced to restore the cutting efficiency of the cutter head.

In most electric shavers only the slotted portion of the cutter head is exposed at the outer surface of the shaver with the wall portions of the casing protecting the unexposed portions from damage. Various means have been provided therefore for detachably mounting the cutter head on the shaver whereby the same may be readily removed by a user for cleaning and if necessary for replacing the movable cutter. In most

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shavers the cutter head is held within the receptacle either by clips, screws, latch means or the like. Certain of these latter latch mechanisms include spring biased ejection or release devices which are operable for releasing the cutter head from the cutter head receptacle upon actuation of the mechanism from without the casing. In another type shaver the cutter head and drive means are mounted within a casing which is disposed within an outer sleeve like enclosure casing. Means are provided for shifting the inner casing relative to the sleeve casing to move the cutter head to a position clear of the sleeve casing whereat it may be cleaned.

Although these shavers have proven satisfactory, certain inconveniences are present in use. In those shavers where the cutter head is released or partially ejected from the cutter head receptacle, for instance, the cutter head is usually detached from the drive means and must be manually grasped and removed for cleaning and then pressed back into the receptacle to restore the same into operative engagement with the cutter drive means and into attached position with the mounting mechanism. In other shavers where the cutter means is extended from the shaver casing for cleaning, the cutter head is secured to the drive means and the complete cutter head assembly must be removed from the shaver when the inner cutters are to be replaced or individually cleaned.

It is an object of the present invention to provide a electric dry shaver having means for mounting a cutter head assembly.

Another object is to provide means for supporting the cutter head for movement from an operative position in engagement with the cutter drive means to a cleaning position clear of the shaver casing and free of the drive means.

A still further object is to provide means

for moving a cutter head between shaving and cleaning positions where the cutter head may be moved in paths which extend either in or out of the plane of the longitudinal axis of the shaver casing in accordance with the design of the shaver.

A still further object is to provide a cutter head mounting and elevating means which requires a minimum number of parts and area of operation within a shaver casing and which means does not interfere with the other and adjacent mechanism of the shaver.

The present invention contemplates an electric shaver having means for mounting a cutter head within the casing and for supporting the cutter head for movement between shaving and cleaning positions. In one embodiment of the present invention, the shaver comprises a casing having a receptacle provided in one end thereof in which is disposed the cutter head. The cutter head comprises a plurality of stationary cutters having a cutting surface exposed in the receptacle and in which outer cutters are arranged movable inner cutters. Support means are provided upon which the cutter head assembly is mounted and which support means are mounted for movement within the casing. Actuating means are provided for moving the support means whereby the cutter head assembly is elevated clear of the cutter head receptacle. The actuating means is further operable to restore the cutter head from the cleaning position into operative engagement with the drive means.

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 two embodiments of the invention are illustrated.

In the drawings:

FIG. 1 is a perspective view of an electric dry shaver in which is incorporated an embodiment of the present invention and shows the cutter head assembly of the shaver in an elevated cleaning position;

FIG. 2 is a cross sectional side elevational view of the shaver with the cutter head assembly in a restored and operative position within the shaver casing;

FIG. 3 is a partly fragmentary sectional view taken on the line 3-3 of FIG. 2;

FIG. 4 is a fragmentary side elevational view of the upper portion of the shaver and shows portions of the cutter head support and actuating means in the lower position of the cutter head assembly;

FIG. 5 is a view similar to FIG. 4 and shows the support means in upper position with the cutter head in cleaning position;

FIG. 6 is a perspective view of the cutter

head supporting frame;

FIG. 7 illustrates a further embodiment of the invention in another shaver with portions of the shaver casing broken away to show the cutter head support means;

FIG. 8 is a sectional view taken on the line 8-8 of FIG. 7 with parts of the shaver removed; and

FIG. 9 is a sectional view taken on the line 9-9 of FIG. 8.

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 FIGS. 1, 2 and 3. Shaver 10 is of premolded plastic material and formed of two casing sections 11 and 12 respectively (FIG. 1). Each casing section 11 and 12 is formed oppositely to the other and each section has sidewalls 13 and 14 respectively (FIG. 2) together with laterally extending end walls 15 (FIG. 1). End walls of casing section 11 are so constructed that the edges thereof engage the edges of end walls 15 of casing section 12 to provide a substantially closed casing having an open portion at one end thereof defining a cutter head receptacle portion 16 (FIG. 2) in which is arranged a cutter head assembly 17. Suitable means such as clamps, screws or the like (not shown) are provided to maintain casing sections 11 and 12 in assembled relationship.

The lower wall of cutter head receptacle 16 is defined by a rectangular partition plate (FIGS. 2 & 3) having a depending flange 22 secured to end wall 15 of section 12 by screws 24. Plate 20 separates cutter head receptacle 16 from the motor compartment 25 of the shaver. A motor 27 (FIG. 3) of any suitable well-known construction having a rotatable drive shaft 28 is disposed within compartment 28. A battery pack 29 is arranged adjacent motor 27. A switch 30 is provided for establishing an electrical connection between battery pack 29 and motor 27 to effect rotation of drive shaft 28.

Cutter drive means 32 for cutter head assembly 17 are arranged in compartment 25 and include a support plate 34 secured to motor 27. Cutter drive means 32 include a cutter drive member 37 of known construction having a plurality of known construction 39 which extend through aligned openings 41 (FIG. 3) in plate 20 and the cutter head receptacle 16. Cutter drive member 37 is adapted to reciprocate on flexible jointed legs 43 and 45 in a known manner and comprises three movable surfaces (one shown and indicated at 47 in FIG. 3) each having a drive arm 39 (FIG. 2). The ends of legs 43-45 are seated on flanges 49-50 of plate 34 and upon operation of motor 27 eccentrics 48 on shaft 28 drive arms 39 in a reciprocatory path on flexible leg portions

43-45.

Cutter head assembly 16 (FIG. 3) includes three cutter head units 52 secured in any suitable manner in spaced side-by-side relationship on a mounting plate 53. Each cutter head unit 52 includes a stationary U-shaped tabular outer cutter 56 which is open at opposite ends thereof and in which outer cutter 56 is disposed an elongated inner cutter 58. Inner cutters 58 are 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. Inner cutters 58 are maintained in cutting cooperation with their associated outer cutters 56 by each a leaf spring member 60 (one partially shown in FIG. 2) of the general type shown in the mentioned patent.

Cutter arms 39 of drive member 37 extend through opening 41 in plate 20 and through aligned openings 62 in cutter assembly 17 to engage leaf springs 60 for reciprocating inner cutters 58 relative to outer cutters 56 in a well known manner upon operation of motor 27. Hair guide combs 61 are provided adjacent the sides of cutter head assembly 17 for combing whiskers into outer cutters 56.

As mentioned it is a feature of the present invention to provide means for raising cutter head assembly 17 out of cutter head receptacle 16 clear of drive arms 39. To this end support means comprising a frame 64 (FIGS. 2, 3 and 6) is provided. Frame 64 includes a flat body portion 66 having a pair of side flanges 67. Cutter head assembly 17 is seated on body portion 66 between flanges 67 and which flanges 67 support the combs 61. Cutter head 17 is secured to body 66 in any suitable manner such as by clamps 68. A pair of legs 69 and 70 depend from the opposite ends of body portion 66. Legs 69 and 70 extend from cutter head receptacle 16 into motor compartment 25 and lie against the inner surface of end walls 15 of casing sections 11 and 12. Shallow recesses 72 are provided on the opposite inner surface of end walls 15 as shown with respect to one end wall in Figs. 4 and 5 to receive legs 69-70 and which recesses have spaced edge portions 73 to position legs 69-70 therein.

Means for mounting frame 64 further include a T-shaped actuating plate 76 lying adjacent the inner surface of sidewall 14. A pair of elongated slots 78 and 80 (FIGS. 3 and 4) are provided in plate 76 and lie over spaced bosses 79 and 81 of wall 14 to maintain frame plate in slidable position thereon. A pair of tab end portions 83 are provided on arms 84-85 of plate 76 and which tabs 83 are inserted in elongated slots 88-90 respectively in depending legs 69-70.

An extension 92 of arm 85 projects out-

wardly through an opening 94 in end wall 15 (FIG. 3) and is secured to an actuator member comprising a button 96 slidably positioned on the outer surface of casing 10. As seen in FIG. 3 in operative position of cutter head 17 a pair of spring detents 98 on plate 20 engage the upper ends of resilient fingers 99 formed on legs 69 and 70 to prevent movement of cutter head support frame 64.

In accordance with the described arrangement, if it is assumed that a person desires to elevate cutter head assembly 17 to a cleaning position from the operative position in engagement with cutter drive means 32 (FIGS. 2 and 3), he slides button 96 in the direction designated by arrow A in FIG. 3. As button 96 moves actuating plate 76 slides on bosses 81 and tabs 83 on arms 84-85 of actuating plate 76 in slots 88-90 of support frame 64 cam against the edge surfaces of slots 88-90 to cause support frames 64 to move upwardly in guide recesses 72. As frame 64 moves upwardly fingers 99 are released from detents 98 and simultaneously cutter head assembly 17 is elevated off drive arms 39 and moves outwardly of receptacle 17.

As will be appreciated the limits of upward movement of cutter frame 64 and actuating plate 76 is determined by the engagement of bosses 81 with the base of slots 78 (FIG. 5). In this position (FIG. 5) cutter head assembly 17 is raised to position clear of the walls of the cutter head receptacle 16 and in which position the cutter head may be cleaned by inserting a brush (not shown) or the like through the open ends of the cutter units. Further in this position inner cutters 58 are clear of drive arms 39 and may be removed from the outer cutters 56.

If it is desired to return cutter head assembly 17 into receptacle 16, from the position of FIG. 5 then button 96 is moved in the direction designated by the arrow B in FIG. 3 causing tabs 83 on arms 84-85 of plate 76 to press down on the edges of slots 89-90 of frames 64 moving the frame downwardly in casing 10, guided by bosses 79-81 to a point where the latter engages the tops of slots 78-80 at lower limit position restoring cutter head assembly 17 into receptacle 16. As frame 64 reaches its lower limit position (FIGS. 3 and 4) detents 98 reengage fingers 99 and cutter head is restored to operative engagement on drive arms 39.

As will be appreciated the arrangement of legs 69 and 70 on the end walls of the casing at an angle to the longitudinal axis of the casing together with the arrangement of tabs 83 of arms 84-85 in elongated slots 88-90 of the legs causes actuator plate 76 to move in a direction parallel to the longitudinal axis of casing 10 (FIG. 2) while at

the same time cutter head assembly 17 in frame 64 move in a plane which intersects the plane of movement of the actuator plate 76.

- 5 In FIGS. 7 to 9 there is shown another embodiment of the present invention wherein a modification thereof is illustrated as adapted for use with a shaver 102. Shaver 102 comprises a casing 103 wherein the cutter head receptacle 107 (FIG. 7) is provided in a sidewall 104. A cutter head assembly 109 of any selected type, such as that previously described is shown in broken line outline in FIG. 7. Support means for 10 cutter head assembly 109 comprise a frame plate 110 having a pair of depending leg portions 112-114 (FIG. 8) extending from the cutter head receptacle of casing 103 into the motor compartment 115. Spaced leg portions 112 and 114 are each provided with a pair of elongated slots 116 mounted on bosses 118 (FIG. 8) in the surfaces of the inner walls of casing 103.
- A motor 122 and batteries 123 are provided within motor compartment 115. A 25 cutter drive member 125 is mounted on end plate 126 of motor 122 and is provided with cutter drive arms 128 extending through wall portion 129 into cutter head receptacle 107 for engagement with the inner cutters of the cutter head assembly 109. An extension arm 131 (FIG. 9) is provided on leg 114 and is formed with an open slot 132 which is disposed on a lug 134. Lug 134 30 is secured to an actuator button 135 (FIGS. 7 and 9) which is slidably mounted for movement in the direction of arrows C and D (FIG. 9). A spring plate 136 is also secured to button 135 within casing 103 and is provided with a detent portion 137 which is slidably disposed against a keeper plate 138 affixed to the inner walls of casing 103 in any suitable manner.
- In FIG. 7 cutter head 109 is shown in 45 the cleaning or elevated position clear of receptacle 107 and drive member 125. If it is desired to lower cutter head assembly 109 into receptacle 107 from this position then button 135 is moved downwardly (arrow 50 D) causing lug 134 to bear against the edges of slot 132 and thereby moving frame 110 downwardly on bosses 118 until the cutter head 109 engages drive member 125. The inter-connection of lug 134 to slot 132 55 allows for the angular displacement of frame 110 relative to button 136 as button 136 moves along the outer surface of casing 103.
- Cutter head 109 is raised to the position of FIG. 7 (from that shown in FIG. 9) by sliding button 136 in the direction of arrow C causing frame 110 to move upwardly on bosses 118 to the upper position. In this position (as seen in FIG. 7) 60 detent 137 is seated in the indented por-

tion of keeper plate 138 to hold the cutter head in elevated position for cleaning.

It will be apparent from the foregoing description that the electric dry shaver has many advantages in use. One advantage 70 among others is that the cutter head can be moved between operative and cleaning positions without being manually grasped by the user. The support and actuator means for the cutter head further permit the cutter 75 head and support means to be moved in a different direction than the actuator mechanism thereby providing elevating means which are adapted for use in shavers having casings of varying and diverse configura- 80 tions and is not limited to any one type casing concept.

WHAT WE CLAIM IS:—

1. An electric dry shaver comprising.
 - a. a casing,
 - b. cutter head support means mounted 85 for movement within said casing between first and second moved positions.
 - c. cutter drive means in said casing.
 - d. a cutter head mounted on said support 90 means and arranged in operative engagement with said cutter drive means in the first moved position of said support means.
 - e. actuating means operable from without said casing to move said support means 95 to said second moved position to disengage said cutter head from said drive means, and
 - f. said actuating means being operable to return said support means to said first position to restore said cutter head into opera- 100 tive engagement with said drive means.
2. The shaver of Claim 1 wherein said support means lies in a first plane and said actuating means lies in a second plane, said 105 latter means including interconnecting means for moving said support means and cutter head in said first plane in a direction intersecting said second plane.
3. An electric dry shaver comprising. 110
 - a. a casing,
 - b. cutter head support means within said casing,
 - c. a cutter head arranged on said support means,
 - d. means mounting said support means 115 for movement between spaced limit positions in said casing.
 - e. said mounting means including actuating means in said casing for effecting movement of said support means between said spaced limit positions.
 - f. means operable from without said casing for controlling operation of said actuating means in movement of said support means to and between said limit positions,
 - g. cutter drive means disposed within said casing and operably engaged with said cutter head in the first limit position. 130

the same time cutter head assembly 17 in frame 64 move in a plane which intersects the plane of movement of the actuator plate 76.

- 5 In FIGS. 7 to 9 there is shown another embodiment of the present invention wherein a modification thereof is illustrated as adapted for use with a shaver 102. Shaver 102 comprises a casing 103 wherein
10 the cutter head receptacle 107 (FIG. 7) is provided in a sidewall 104. A cutter head assembly 109 of any selected type, such as that previously described is shown in broken line outline in FIG. 7. Support means for
15 cutter head assembly 109 comprise a frame plate 110 having a pair of depending leg portions 112-114 (FIG. 8) extending from the cutter head receptacle of casing 103 into the motor compartment 115. Spaced leg
20 portions 112 and 114 are each provided with a pair of elongated slots 116 mounted on bosses 118 (FIG. 8) in the surfaces of the inner walls of casing 103.

- A motor 122 and batteries 123 are provided within motor compartment 115. A
25 cutter drive member 125 is mounted on end plate 126 of motor 122 and is provided with cutter drive arms 128 extending through wall portion 129 into cutter head receptacle
30 107 for engagement with the inner cutters of the cutter head assembly 109. An extension arm 131 (FIG. 9) is provided on leg 114 and is formed with an open slot 132 which is disposed on a lug 134. Lug 134
35 is secured to an actuator button 135 (FIGS. 7 and 9) which is slidably mounted for movement in the direction of arrows C and D (FIG. 9). A spring plate 136 is also secured to button 135 within casing 103 and
40 is provided with a detent portion 137 which is slidably disposed against a keeper plate 138 affixed to the inner walls of casing 103 in any suitable manner.

- In FIG. 7 cutter head 109 is shown in
45 the cleaning or elevated position clear of receptacle 107 and drive member 125. If it is desired to lower cutter head assembly 109 into receptacle 107 from this position then button 135 is moved downwardly (arrow
50 D) causing lug 134 to bear against the edges of slot 132 and thereby moving frame 110 downwardly on bosses 118 until the cutter head 109 engages drive member 125. The inter-connection of lug 134 to slot 132
55 allows for the angular displacement of frame 110 relative to button 136 as button 136 moves along the outer surface of casing 103.

- Cutter head 109 is raised to the position of FIG. 7 (from that shown in FIG. 9) by sliding button 136 in the direction of arrow C causing frame 110 to move
60 upwardly on bosses 118 to the upper position. In this position (as seen in FIG. 7) detent 137 is seated in the indented por-

tion of keeper plate 138 to hold the cutter head in elevated position for cleaning.

It will be apparent from the foregoing description that the electric dry shaver has many advantages in use. One advantage
70 among others is that the cutter head can be moved between operative and cleaning positions without being manually grasped by the user. The support and actuator means for the cutter head further permit the cutter
75 head and support means to be moved in a different direction than the actuator mechanism thereby providing elevating means which are adapted for use in shavers having casings of varying and diverse configura-
80 tions and is not limited to any one type casing concept.

WHAT WE CLAIM IS:—

1. An electric dry shaver comprising. 85
 - a. a casing,
 - b. cutter head support means mounted for movement within said casing between first and second moved positions.
 - c. cutter drive means in said casing,
 - d. a cutter head mounted on said support means and arranged in operative engage- 90
 - ment with said cutter drive means in the first moved position of said support means,
 - e. actuating means operable from without said casing to move said support means to said second moved position to disen- 95
 - gage said cutter head from said drive means, and
 - f. said actuating means being operable to return said support means to said first position to restore said cutter head into opera- 100
 - tive engagement with said drive means.
 2. The shaver of Claim 1 wherein said support means lies in a first plane and said actuating means lies in a second plane, said 105
 - latter means including interconnecting means for moving said support means and cutter head in said first plane in a direction intersecting said second plane.
 3. An electric dry shaver comprising. 110
 - a. a casing,
 - b. cutter head support means within said casing,
 - c. a cutter head arranged on said support means, 115
 - d. means mounting said support means for movement between spaced limit positions in said casing,
 - e. said mounting means including actuating means in said casing for effecting move- 120
 - ment of said support means between said spaced limit positions.
 - f. means operable from without said casing for controlling operation of said actuating means in movement of said sup- 125
 - port means to and between said limit positions,
 - g. cutter drive means disposed within said casing and operably engaged with said cutter head in the first limit position. 130



h. said actuator control means being operable to move said support means to the second limit position to disengage said cutter head from the drive means and being further operable to return said support means to the second position to re-engage said cutter with said drive means.

4. The shaver of Claim 3 wherein said mounting means include means for displacing said cutter head and support means in a direction other than normal to the plane of movement of said actuating means during movement of the support means between said limit positions.

5. The shaver of Claim 3 wherein said cutter head is disposed within a cutter head receptacle in said casing in the first limit position of said support means and is elevated clear of said receptacle in the second limit position.

6. The shaver of Claim 3 wherein said support means comprise a frame member, said frame member having a body portion supporting said cutter head and a leg portion depending from said frame member, and said actuating means being interconnected to said leg portion.

7. The shaver of Claim 6 wherein said interconnecting means include an elongated slot in said leg and wherein said actuating means include a cam member movable in said slot to effect movement of said support frame.

8. The shaver of Claim 6 wherein said actuating means include a plate member having a slot therein, boss means formed on the inner surfaces of said casing and disposed in said slot, said interconnecting means including a second slot formed on said leg member of the support frame, cam means on said plate movable in said second slot to effect movement of said frame, and means in said casing for guiding the movement of said frame on said boss means when said actuator control means is operated.

9. The shaver of Claim 8 wherein said actuator control means include a slide member slidably mounted on the outer surface of the shaver casing and having a portion extending into said casing and connected to said actuator plate.

10. The shaver of Claim 9 wherein

detent means are provided in said casing for detenting said support means in either of said limit positions.

11. The shaver of Claim 8 wherein said support frame includes a second leg member spaced from the first leg member and wherein said actuator plate includes second cam means engaged in a slot provided in said second leg.

12. An electric dry shaver comprising,

a. a casing having a cutter head receptacle,

b. support means in said casing,

c. a cutter head arranged within said receptacle on said support means,

d. cutter drive means within said casing and operatively engaged with said cutter head,

e. means mounting said support means for movement between a pair of spaced limit positions within said casing,

f. control means for moving said cutter head out of said cutter head receptacle to disengage said cutter head from said drive means and further operable to restore said cutter head to said receptacle into operative engagement,

g. said support means including a frame member having a pair of legs depending into said casing beneath said receptacle.

h. said mounting means including bosses on the walls of said casing slidably engaged in slots formed in said frame legs, and

i. said control means including a slide member on the outer surface of said casing having a portion extending into said casing, a second slot on one of said legs, a cam member on said extended portion of said slide member disposed in said second slot and operable to bear against the walls of said second slot to effect movement of said frame and cutter head when said slide member is manually moved on said casing.

13. An electric dry shaver substantially as hereinbefore described with reference to the accompanying drawings.

CLEVELAND AND JOHNSON,
Chartered Patent Agents,
Agents for the Applicants,
Chancery House,
Chancery Lane,
London, W.C.2.

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