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Frantz et al.

[11] **3,748,732**

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[54] **CONTROL UNIT FOR ELECTRIC SHAVER**

[75] Inventors: **Dale E. Frantz**, Lititz; **Donald L. Shortlidge**, Lancaster, both of Pa.

[73] Assignee: **Schick Incorporated**, Lancaster, Pa.

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[52] **U.S. Cl.** **30/43.1**

[51] **Int. Cl.** **B26b 19/02**

[58] **Field of Search** 30/43.1, 43.91, 43.92, 30/346.51, 32

[56] **References Cited**

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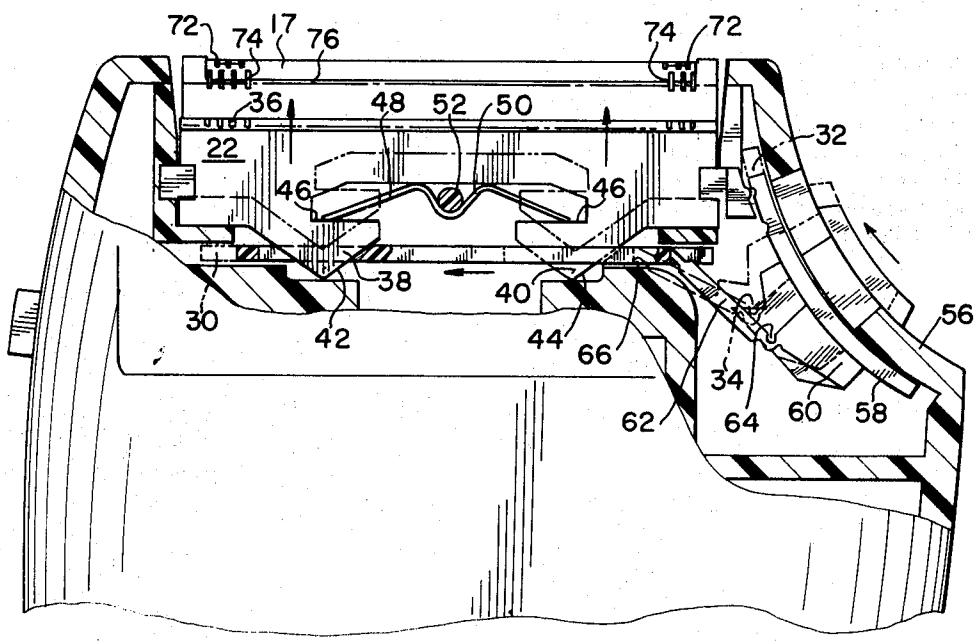
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Primary Examiner—Othell M. Simpson
Assistant Examiner—Gary L. Smith
Attorney—Fred S. Lockwood, Joseph P. O'Halloran and Eugene M. Cummings et al.

[57] **ABSTRACT**

A control unit for an electric shaver including means for controlling the degree of exposure of the cutting head and means for initiating removal of the cutting head from the razor unit for cleaning purposes. The razor unit preferably includes a pair of cutting heads, a center spacer lying adjacent the inner edges of each cutting head and a pair of positionally adjustable edge guards, one adjacent the outer edge of each head. Each guard is mounted for vertical movement to position the upper surfaces thereof more or less close to the cutting plane of the heads. Edge guard movement is controlled by movement of a control button moving in an arcuate slot, with an integral hinge arrangement connecting the button to a pair of horizontally disposed slides having cam surfaces thereon which engage inclines formed of the lower portions of the edge guide. A cutting head lifter is formed on the control assembly in a position such that movement of the control button to an extreme upward position unlocks the heads from their position of use within the razor and lifts them a short distance to facilitate removal thereof.

9 Claims, 5 Drawing Figures



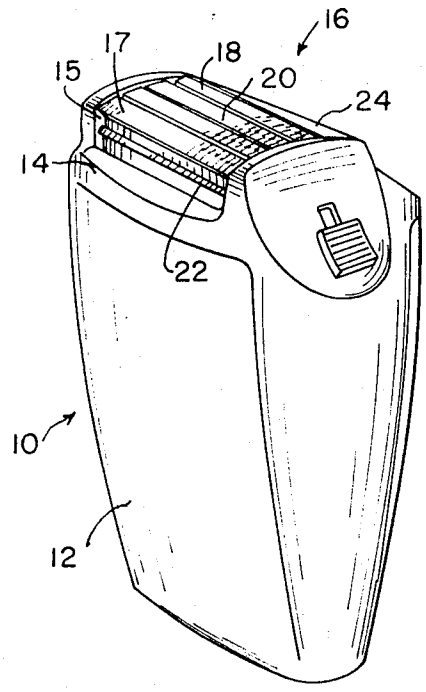


FIG-1

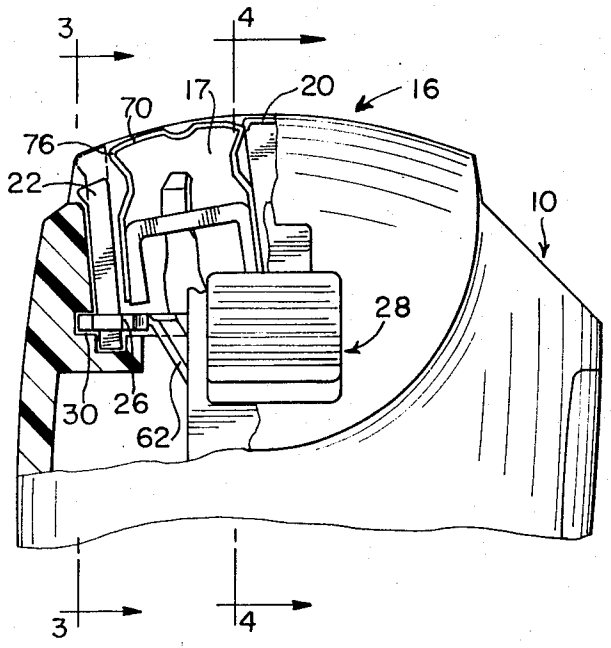


FIG-2

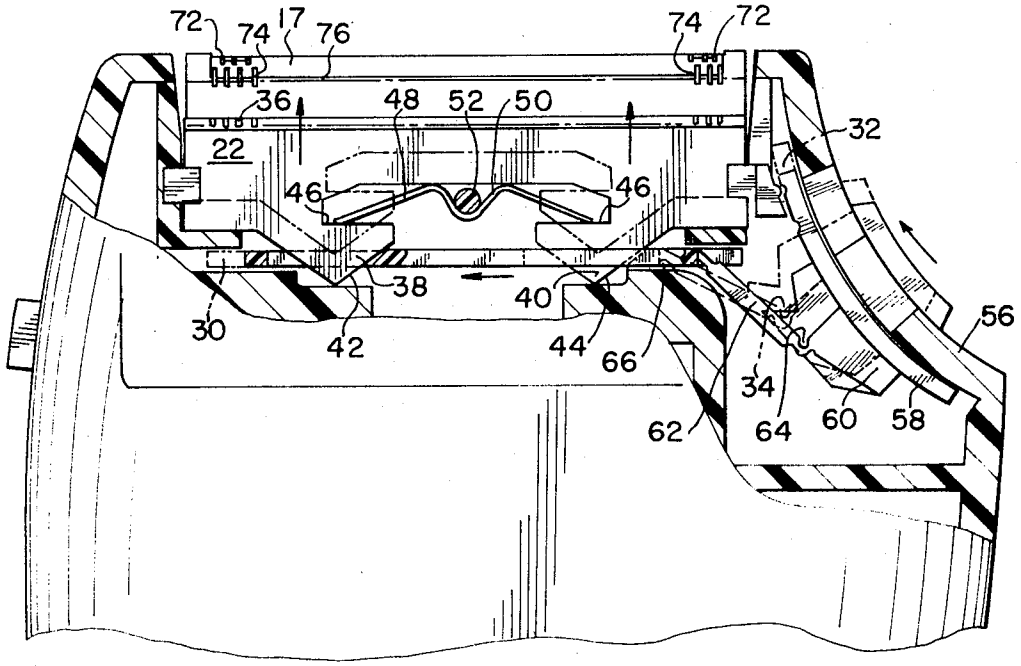


FIG-3

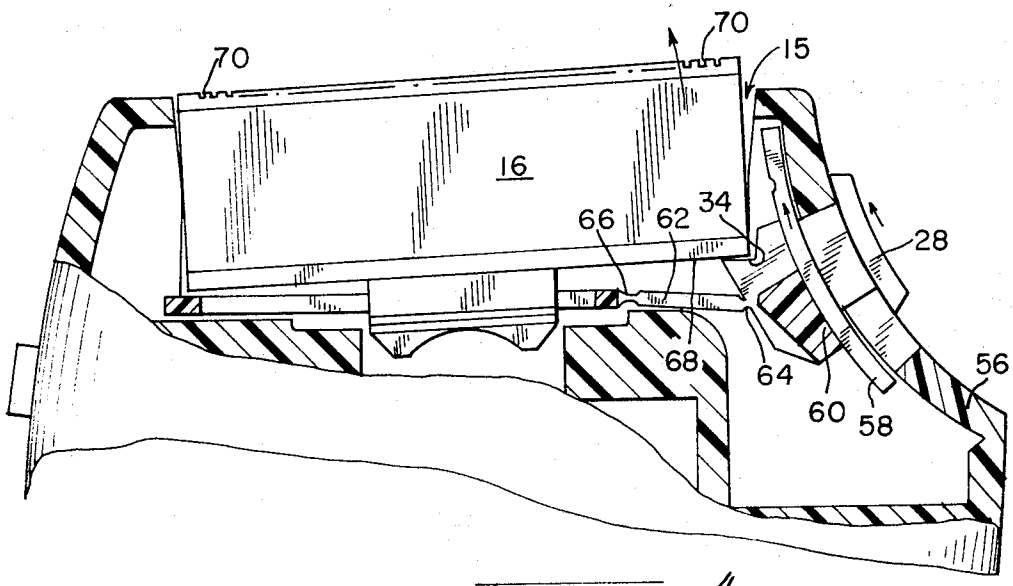

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FIG. 4.

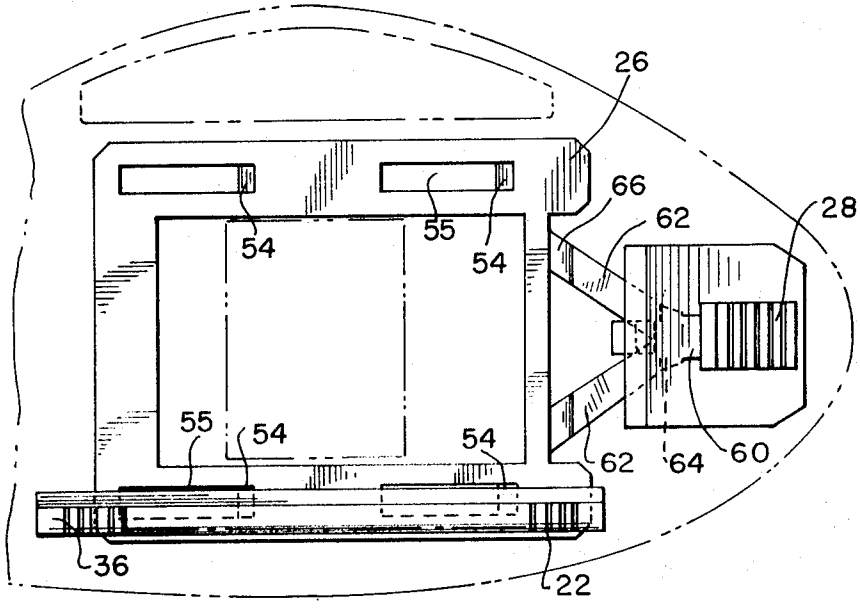

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FIG. 5.

CONTROL UNIT FOR ELECTRIC SHAVER

BACKGROUND OF THE INVENTION

The present invention relates to electric shavers, and more particularly, to electric shavers having a system for controlling the degree of cutting head exposure. The preferred form of electric razor unit is intended for use by women and includes features most sought by women users. The simplified cutting edge exposure control system is intended to make practical the combination of the advantages of large head size for rapid shaving rate, a thin outer shaving head shell for close shaving, and the inclusion of means for preventing skin damage or irritation in sensitive areas. For simplicity, the edge guards are adapted to move in generally the same direction as the control button. The button may be manipulated by a user while the razor is held in a normal position of use, and the system also includes means for unlocking the shaving head assembly and initiating upward movement thereof so that it may be easily removed for cleaning purposes.

In the past, electric razors specifically intended for use by women have been characterized by narrow shaving heads primarily adapted to provide comfort in shaving sensitive skin areas, such as underarm areas, for example. However, units of this type were commonly characterized by the inability to produce as close a shave as was desired for leg areas, and were also commonly characterized by a low cutting rate, causing shaving to be unnecessarily time consuming.

Inasmuch as electric and other dry mechanical razors ordinarily intended for use by men have been characterized by the ability to provide a closer shave and higher shaving rate, the use thereof by women has been suggested. However, such shavers are uncomfortable and sometimes even dangerous when used in underarm areas, and accordingly, manufacturers have not desired to sell men's shavers for use by women. Accordingly, there has been a need for a razor which would satisfy these diverse requirements without requiring expensive or complex modifications to known systems.

There has also been a need for a razor having a control system enabling it to be used with maximum effect for several purposes, and particularly, for a dry shaver embodying a control system which is easy to understand and manipulate. Furthermore, a desirable razor is one which incorporates means rendering it easy to clean and to disassemble to the extent necessary for such cleaning.

In view of the foregoing desirable characteristics of an improved razor unit, and in view of the failure of the prior art to provide these features, particularly in desirable combinations, an object of the present invention is to provide an improved electric razor.

Another object is to provide an electric shaver having means associated therewith for controlling the degree of exposure of the cutting head portions of the shaver.

Another object is to provide a simplified control system permitting an improved electric shaver to operate in a high speed, close shaving mode and also in a mode offering greater protection to the skin for shaving in sensitive areas.

A still further object is to provide a razor which includes a single control for adjustment of the degree of shaving closeness or shaving comfort and means for unlocking the shaving head assembly to facilitate removal thereof for cleaning.

Another object is to provide a dry shaver unit having a shaving head assembly with at least a pair of opposed outer edges, edge guards disposed closely adjacent the edges and movable between positions providing greater or less exposure of said edges, a slide unit having camming surfaces thereon and adapted to engage complementary cam surface portions of said edge guards, whereby slide movement causes movement of said edge guards, and a control unit operatively associated with said slide, whereby movement of said control unit will cause movement of the guards from a position providing the least exposure to a position providing the greatest exposure, and to a number of intermediate positions.

The foregoing and other objects and advantages of the invention, including inherent objects and advantages thereof, are accomplished by providing an electric razor having a shaving head assembly and at least one shaving head edge guard movable in a plane substantially perpendicular to the cutting plane, and means for moving the guard between lowered and raised positions in response to movement of a control button having an operative connection to a slide unit controlling guard movement, and means associated with said control button engaging a portion of the shaving head assembly and unlocking it to initiate removal for cleaning.

The manner in which these objects and advantages, and others, are carried into practice will become more clearly apparent when reference is made to the accompanying detailed description of a preferred embodiment of the invention set forth by way of example and shown in the accompanying drawings, wherein like reference numerals indicate corresponding parts throughout.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of an electric razor embodying the control and cutting head release system of the invention;

FIG. 2 is an enlarged fragmentary end view, partly in elevation and partly in section, showing certain features of the control system;

FIG. 3 is a front view, on an enlarged scale, partly in elevation and partly in section, and taken along lines 3—3 of FIG. 2;

FIG. 4 is a vertical sectional view of the cutting head release mechanism of the invention, taken along lines 4—4 of FIG. 2; and

FIG. 5 is a top plan view of the actuator button, cutting head release and slide assembly of the invention, and showing one edge guard associated therewith in position ofusc.

DESCRIPTION OF THE PREFERRED EMBODIMENTS OF THE INVENTION

Although it will be understood that the invention may be embodied in different forms, one preferred form of construction thereof will be illustrated in which an electric razor having a pair of cutting head units is provided with an adjustable edge guard for the edge of the front element, a edge guard for the rear edge of the rear element, and a slide actuator for simultaneously adjusting both guides, with the slide actuator also including means for initiating removal of the cutting heads of the unit for cleaning purposes.

Referring now to FIG. 1, there is shown an electric razor generally designated 10 made according to the invention and having a lower body portion 12, and an upper body portion 14 having a slot 15 in which is received a cutting assembly 16 comprising front and rear cutting heads 17 and 18, separated from each other by a center divider 20.

Referring again to FIG. 1, and also to FIGS. 2–4, it may be seen that the invention is typically carried into practice by the combination of a number of principal elements, namely, a front edge guard 22, a rear edge guard 24, a slide member 26 for actuating the edge guard, a button assembly 28 for manipulation by the user, a channel or guide 30 for the slide 26, a channel or guide 32 for the button assembly, and means in the form of a shoulder 34 associated with the button 28 for lifting a portion of the cutting assembly 16 upwardly from the slot 15 in which they are disposed for removal for cleaning purposes.

Referring now to FIG. 3 in greater detail, the front edge guard 22 is shown to include a serrated top surface portion 36 and a pair of lower extensions 38, 40 each of which has an inclined or beveled edge 42, 44. A recess 46 just above the lower extensions 38, 40 receives a leaf type spring 48, the center portion 50 of which is secured by a pin 52 against upward movement. Only guard 22 is shown in detail, it being understood that the rear guard 24 is substantially identical thereto. Referring now also to FIG. 2, it is shown that the edge guard 22 moves in a nearly vertical direction, substantially perpendicular to the cutting plane of the shaving head 17.

Vertical movement of the guard 22 is caused by reciprocating movement of the slide 26 within the channel 30 (FIG. 2) which secures the slide 26 against vertical movement. Cam or beveled surfaces 54 are provided in cutouts 55 the slide 26 for engaging the surfaces 42, 44 respectively in the lower extensions 38, 40 of the edge guard 22.

Movement is imparted to the edge guard 22 by reason of movement of the control button assembly 28, which is located for arcuate rotation by engagment with a track 56, the button 28 having an inner, arcuately formed flange 58 formed on the button body 60 and sized for snug engagement with the track 56. In addition to the shoulder 34 formed in the body 60 of the button, a bifurcated link 62 extends between the slide 26 and the body 60 of the button assembly 28, with integral hinges 64, 66 locating the link. As is apparent from a consideration of FIG. 3, movement of the button assembly from the solid line position to the phantom line position will reciprocate or translate the slide 26, with a consequent raising and lowering of the front edge guard 22, it being understood that the same action is simultaneously taking place in respect to the rear edge guard 24.

Referring now to FIG. 4, it is shown that the entire cutting assembly 16 is removably received in the slot 15, but that since the razor design prevents access to the end portions of the cutting assembly 16 for cleaning, the assembly 16 is removed for this purpose. To provide this feature providing room for the adjustment mechanism a smooth appearance in the finished article, the shoulder 34 is provided on the body 60 of the button assembly 28. In use, after the extreme upward limit of blade edge guard movement is accomplished, further movement of the button assembly 28 to the position shown in FIG. 4 will cause a lifting and unlocking of the cutting edge 16 and an initial lifting and tilting thereof so that the assembly 16 may be removed for cleaning purposes. However, it will be understood that since the shoulder 34 lies beneath the bottom portion 68 of the cutting assembly 16, movement of the button assembly 28 through its normal adjustment range does not result in unlocking movement of the cutting assembly 16.

Referring now to FIG. 5, the relation between the button assembly 28, an edge guard 22 and the slide 26 is shown. From a consideration of FIG. 5, it will be apparent that the slide 26 is in the form of an open rectangle having a pair of legs extending transversely of the razor, and that the beveled edges 54 on the front portion of the slide have counterparts 54 thereof for engaging the lower extensions of the rear edge guard 24. It is also shown that front and rear portions of the bifurcated link 62 are provided for engagement with the body 60 of the button. Accordingly, movement of the single button produces simultaneous adjustment of the edge exposure, making the adjustment proper regardless of the direction in which the user moves the shaving head.

Referring now again to FIG. 3, the operational principle behind the adjustment feature may be appreciated. FIG. 3 shows that the top surface 70 of the cutting head 17 is slightly arcuate, and that a plurality of slots or openings 72 are disposed in the top portion thereof, while additional openings 74 are disposed in a position to extend below the reversely curved or inflection point 76 on the front of the cutting head 17. Accordingly, the degree of exposure of the opening 74 determines the degree of cutting exposure or the closeness of the shave. The guards 22, 24 are accordingly sized so as to leave these openings 74 entirely exposed, or to shroud them totally or almost totally, as well as to provide a number of intermediate positions. Accordingly, in the use of the razor, a close and rapid shave is obtained by moving the button assembly 28 to the lower position thereof, to provide maximum exposure of the slots 74 for leg shaving or the like. When sensitive areas such as the underarm are intended to be shaved, the adjustment button may be moved to the fully raised position of the shaving head 16. This prevents discomfort or damage to the skin. Of course, when shaving other areas, an intermedaite position may be selected, and in this respect it will be noted that the button provides a wide range of positions for the guards 22, 24. The spring 48 urges the guards 22, 24 to a lowered position, but because of the inclination of the surfaces 42, 44, and 54, the downward force thereof is insufficient to permit movement of the edge guard 22 unless the button 28 is moved; however, the spring provides the guards 22, 24 with a positive slide following action so that no slack is present in the mechanism. In practice, it has been found that the razor offers excellent comfort and for shaving sensitive areas and that it provides the ability to shave closely and rapidly in another position of adjustment, while allowing a plurality of intermediate positions and providing for easy removal of the shaving head.

It will thus be seen that the present invention provides a novel edge control and cutting head removal apparatus having a number of advantages and characteristics, including those expressly pointed out herein and others which are inherent in the invention. An illustrative embodiment of the invention only having

been shown, it is contemplated that modifications to the form of unit shown may occur to those skilled in the art and it is contemplated that such changes may be made without departing from the spirit of the invention or the scope of the appended claims.

We claim:

1. An electric razor comprising, in combination:
a razor body;
a shaving head assembly detachably engaged in said body;
at least one shaving head edge guard movable in a plane substantially perpendicular to the cutting plane of said shaving head for controlling the shaving characteristic of said head;
control means comprising a user-actuated control member movable over a predetermined adjustment range for positioning said edge guard to obtain a desired shaving characteristic; and
head ejection means responsive to movement of said control member beyond said predetermined adjustment range for urging said head assembly from engagement with said razor body.

2. An electric razor as defined in claim 1 wherein said control means further comprise a slidably mounted actuator member operatively engaged to said edge guard and movable generally perpendicular to the movement plane thereof.

3. An electric razor as defined in claim 2 wherein said user-actuated control member is slidably mounted in said razor body for movement generally perpendicular to the movement plane of said actuator member.

4. An electric razor as defined in claim 3 wherein said head ejection means comprise a surface on said control member for operatively engaging said head assembly when said control member is moved beyond said predetermined control range.

5. An electric razor as defined in claim 4 wherein said control means further comprise a link member extending between said actuator member and said user-actuated control member, said link member being integrally formed with and of the same material as said actuator and control members.

6. An electric razor comprising, in combination:
a razor body;
a shaving head assembly detachably engaged in said body;
at least one shaving head edge guard movable in a plane substantially perpendicular to th cutting plane of said shaving head for controlling the shaving characteristic of said head;
a slidably mounted actuator member operatively engaged to said edge guard and movable generally perpendicular to the movement plane thereof;
means comprising a user-actuator control member slidably mounted in said razor body and movable over a predetermined adjustment range generally perpendicular to the movement plane of said actuator member for positioning said edge guard to obtain a desired shaving characteristic; and
means on said control member for operatively engaging said head assembly to urge said assembly from engagement with said razor body when said control member is moved beyond said predetermined adjustment range.

7. An electric razor as defined in claim 6 which further comprises a link member extending between said actuator member and said user-actuator control members, said link being integrally formed with and of the same material as said actuator and control members.

8. An electric razor unit comprising:
a razor body;
at least one shaving head assembly received in said body;
at least one shaving head edge guard movable in a plane substantially perpendicular to the normal cutting plane of said cutting head between raised, lowered, and intermediate positions;
slide means disposed within a channel in said body for movement generally transverse to the movement plane of said edge guard;
a manually operable control unit movable between at least first and second positions;
a second channel in said body receiving said control unit;
a link extending between said control unit and said slide means, said link being integrally formed with and of the same material as said control unit and said slide;
an inclined surface in a lower portion of said edge guard and at least one beveled surface on said slide means for cooperative engagement with said inclined surface; and
spring means normally urging said edge guard to one of said raised or lowered positions thereof, whereby movement of said control unit within said second channel produces movement of said slide means in another direction within said first channel, thereby causing vertical movement of said edge guard.

9. An electric razor unit comprising:
a razor body;
at least one shaving head assembly received in said body;
at least one shaving head edge guard movable in a plane substantially perpendicular to the normal cutting plane of said cutting head between raised, lowered, and intermediate positions;
slide means disposed within a channel in said body for movement generally transverse to the movement plane of said edge guard;
a manually operable control unit movable between at least first and second positions;
a second channel in said body receiving said control unit;
a link extending between said control unit and said slide means;
an inclined surface in a lower portion of said edge guard and at least one beveled surface on said slide means for cooperative engagement with said inclined surface;
spring means normally urging said edge guard to one of said raised or lowered positions thereof, whereby movement of said control unit within said second channel produces movement of said slide means in another direction within said first channel, thereby causing vertical movement of said edge guard; and
means associated with said control unit for engaging a portion of said shaving head assembly, whereby, upon movement of said control unit toward an uppermost position, said head assembly is unlocked and slightly raised from said position of reception in said razor body.

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