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Douglass et al.

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[45] **Nov. 20, 1973**

[54] **SAFETY RAZOR**

[75] Inventors: **Paul W. Douglass**, Winchester; **Joseph E. Koehler**, Norwell, both of Mass.

[73] Assignee: **The Gillette Company**, Boston, Mass.

[22] Filed: **July 19, 1971**

[21] Appl. No.: **163,957**

Related U.S. Application Data

[62] Division of Ser. No. 21,860, March 23, 1970, Pat. No. 3,648,368.

[52] **U.S. Cl.** **30/45**

[51] **Int. Cl.** **B26b 21/38**

[58] **Field of Search** ..... 30/42, 44, 45, 59–61, 30/32, 34 R, 86

[56] **References Cited**

UNITED STATES PATENTS

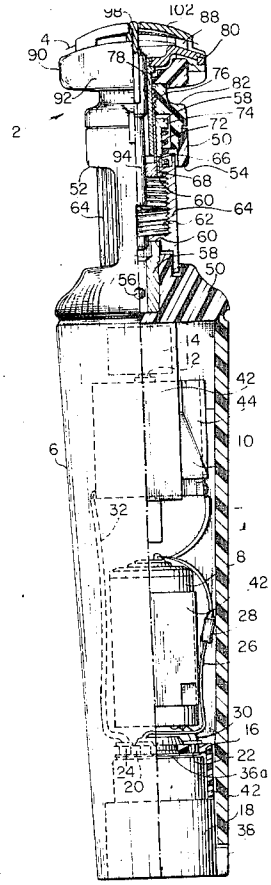
2,048,560	7/1936	Muros	30/60.5
2,054,287	9/1936	Bohm	30/45
3,038,254	6/1962	Scheminger	30/60.5
3,169,314	2/1965	Watson	30/60.5
3,636,627	1/1972	Tiffin	30/45
1,824,779	9/1931	Isdale	30/34 R X
2,597,653	5/1952	Mansfield	30/34 R UX

Primary Examiner—Othell M. Simpson
Assistant Examiner—Gary L. Smith
Attorney—Philip Colman et al.

[57] **ABSTRACT**

A safety razor including a head portion having guard means and a platform for supporting a razor blade. The razor further includes a handle portion connected to the head portion and having means disposed thereon for adjusting the position of the platform relative to the guard means, means proximate to the adjusting means for opening and closing the razor, and means for causing vibration of the head portion.

2 Claims, 8 Drawing Figures



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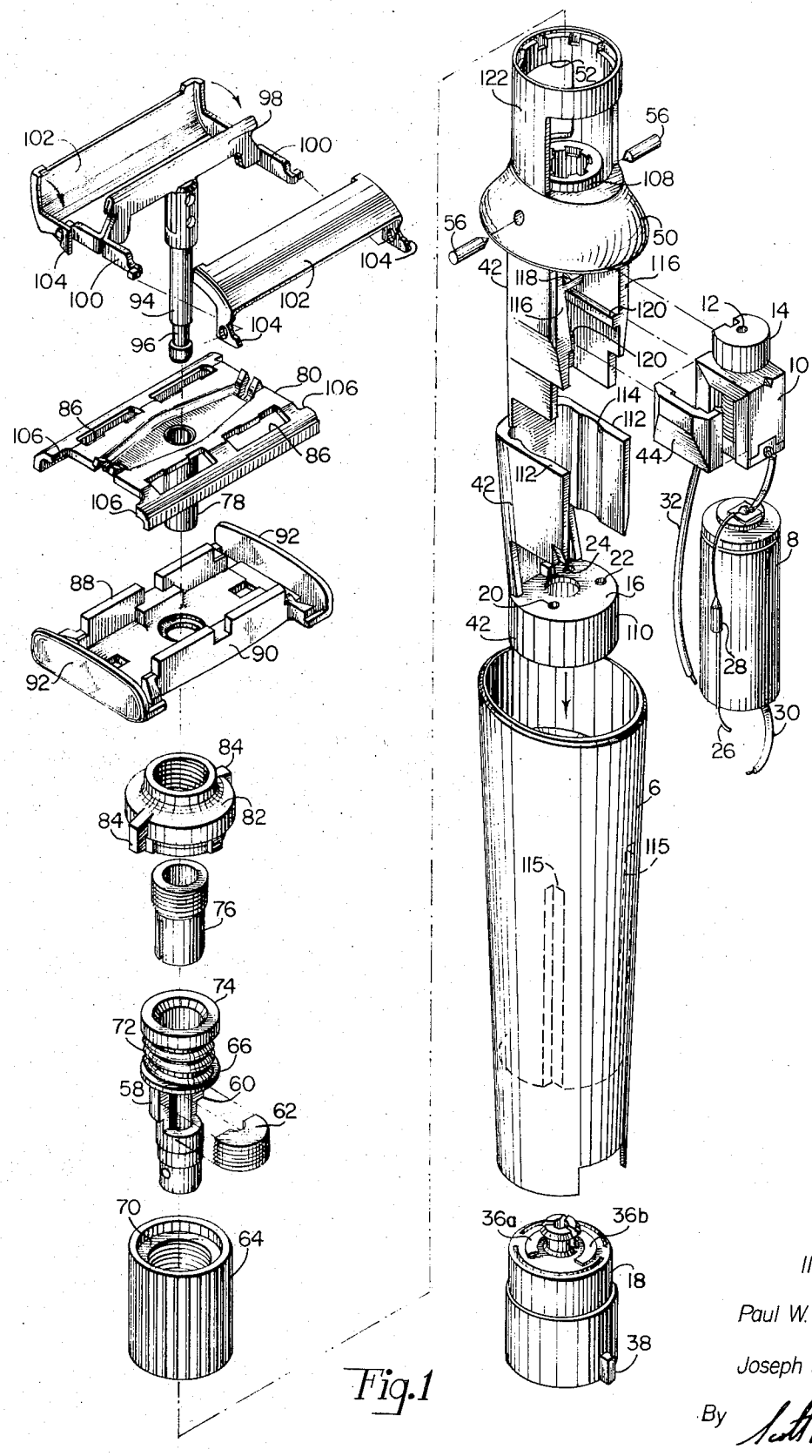

Fig.1

INVENTORS

Paul W. Douglass

Joseph E. Koehler

By Scott R. Foster

Attorney

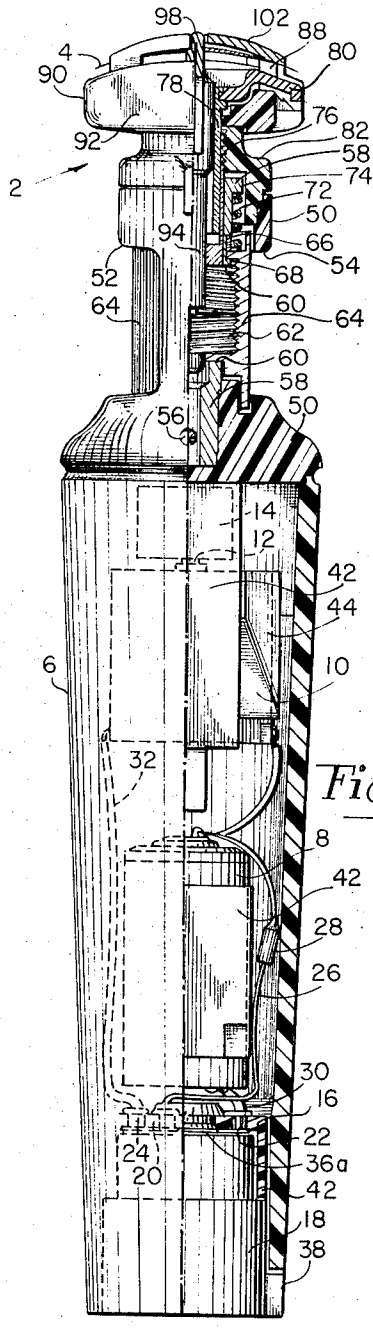

Fig. 2

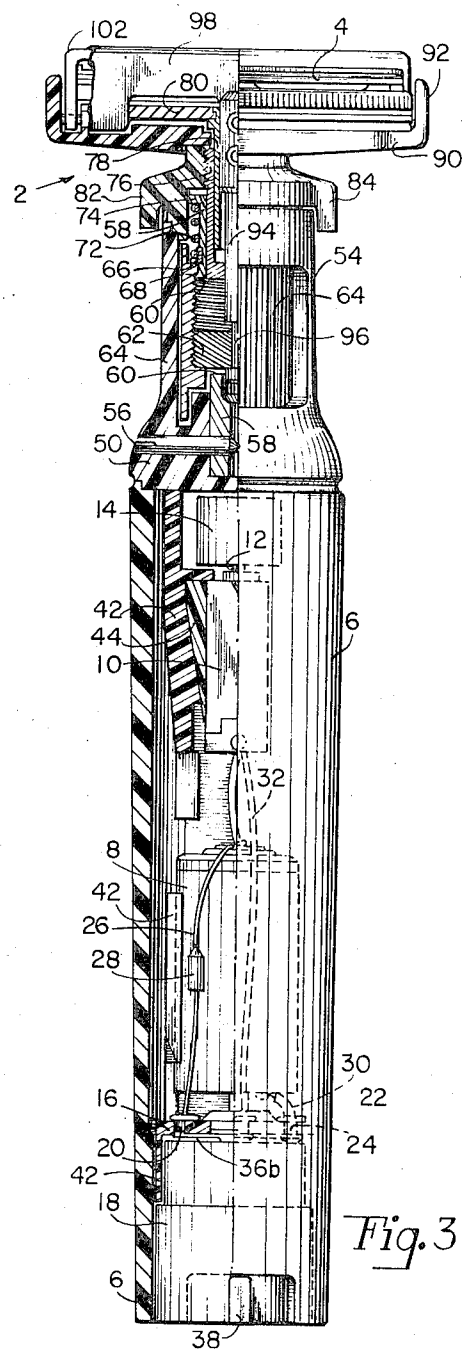

Fig. 3

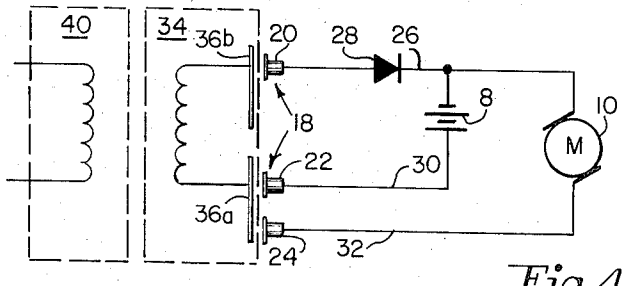

Fig. 4

INVENTORS

Paul W. Douglass

Joseph E. Koehler

By

Attorney

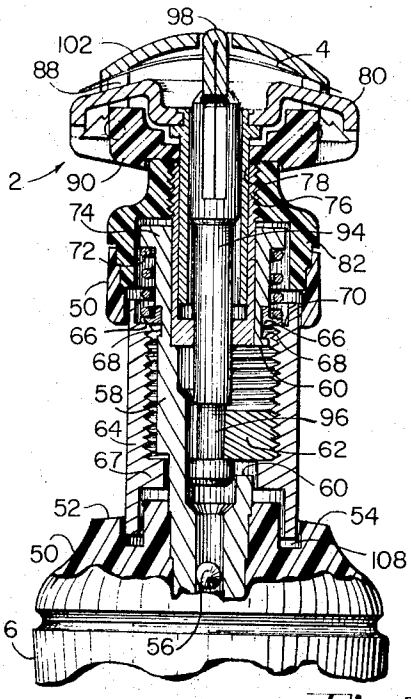

Fig. 5

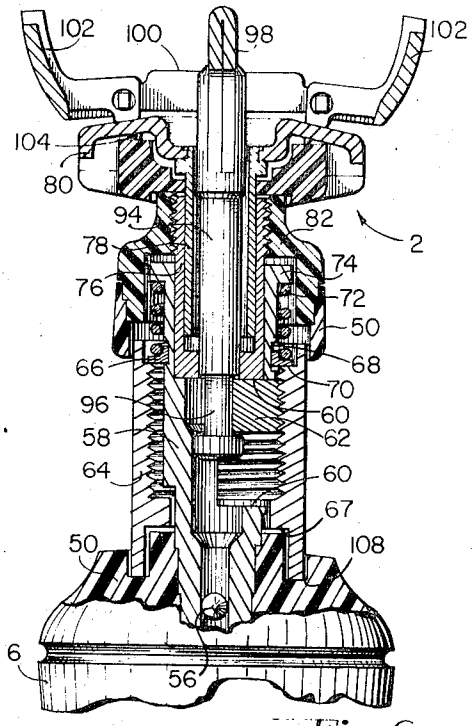

Fig. 6

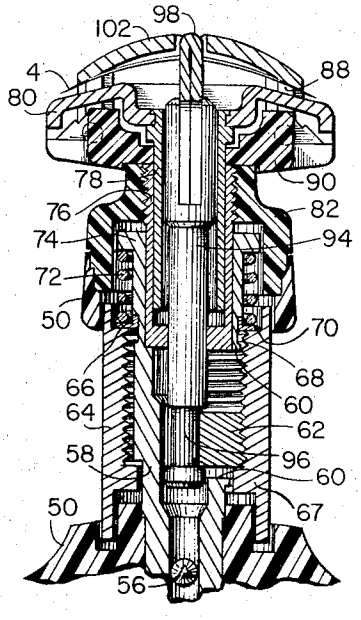

Fig. 7

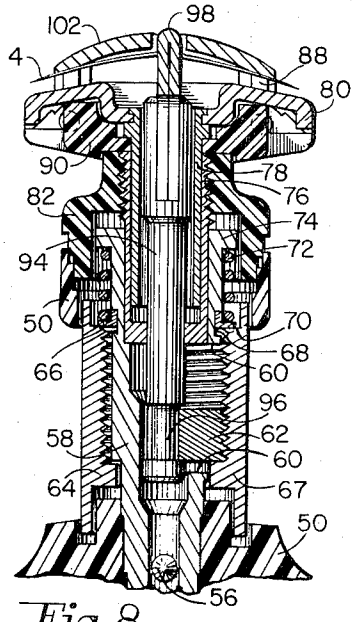

Fig. 8

INVENTORS

Paul W. Douglass

Joseph E. Koehler

By

Attorney

SAFETY RAZOR

This is a division of application Ser. No. 21860, filed Mar. 23, 1970, in the name of Paul W. Douglass, et al, since issued as U. S. Pat. No. 3,648,368.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to safety razors and is directed more particularly to a double edge safety razor having means for vibrating the head portion thereof, means for adjusting the position of cutting edges relative to the razor, and opening and closing means proximate to the adjusting means.

2. Description of the Prior Art

In the use of safety razors it has been found to be advantageous for the razor blade to be moved generally lengthwise, or in directions having vectors lengthwise of its edge whereby to exercise a slicing motion. Several devices have been provided which include means for moving a razor blade longitudinally within a razor, or for moving razor guard members relative to a stationary blade. Such razors have proven to be rather complex in construction and operation and generally expensive to manufacture. Accordingly, public acceptance of the prior art devices has been relatively limited.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a safety razor suitable for a double edge blade and having relatively simple and inexpensive means for causing the razor blade to exercise a slicing motion while the razor is in use.

It is a further object of the present invention to provide such razor with means for adjusting the disposition of the razor blade cutting edges relative to the razor.

It is a still further object to provide such razor having opening and closing means disposed proximate to the blade adjusting means, whereby to facilitate opening and closing of the razor, as well as blade adjustment, with a single hand of an operator holding the razor.

With the above and other objects in view, as will hereinafter appear, a feature of the present invention is the provision of a safety razor comprising a head portion adapted for double edge cutting means mounted therein, and a handle portion having an electric motor mounted therein. A rotatable shaft is connected to the motor and extends therefrom. A weight is eccentrically mounted on the free end of the shaft and is rotatable by the shaft, the weight being disposed proximate to the head portion of the razor, whereby upon rotation of the shaft and weight, the head portion is caused to vibrate and effect a slicing motion of the cutting means.

A further feature of the present invention is the provision in the handle portion of the razor of means for adjusting the position of the razor cutting edges relative to the razor.

A still further feature of the invention is the provision in the handle portion, and proximate to the blade adjusting means, of razor opening and closing means.

The above and other features of the invention, including various novel details of construction and combinations of parts, will now be more particularly described with reference to the accompanying drawings and pointed out in the claims. It will be understood that the particular device embodying the invention is shown by way of illustration only and not as a limitation of the invention. The principles and features of this invention may be employed in various and numerous embodiments without departing from the scope of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

Reference is made to the accompanying drawings in which there is shown an illustrative embodiment of the invention from which its novel features and advantages will be apparent.

FIG. 1 is a perspective exploded view of one form of razor illustrative of an embodiment of the invention;

FIG. 2 is a side elevational view, partly broken away and partly in section;

FIG. 3 is a front elevational view, partly broken away and partly in section;

FIG. 4 is a diagrammatic view of the electrical circuit of the razor;

FIGS. 5 and 6 are enlarged detailed sectional views of the head portion of the razor, illustrating in particular the operation of the opening and closing means;

FIGS. 7 and 8 are similar to FIGS. 5 and 6 but illustrate in particular the operation of the blade adjustment means.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIGS. 2 and 3, it will be seen that the illustrative device includes a head portion 2 in which is disposed a double edge razor blade means 4, connected to one end of a tubular handle member 6 which houses a vibration-inducing means to be described below.

Disposed in the handle member 6 is a battery 8 (see also Fig. 1) and an electric motor 10. Extending from the motor 10 in the direction of the head portion 2 of the razor is a rotatable shaft 12 on the free end of which is disposed a weight 14. The weight 14 is mounted eccentrically on the shaft so that the center of gravity of the weight is removed from the axis of rotation of the weight. Illustrated in the drawings is a flywheel type weight, mounted such that its center of gravity is removed from the axis of rotation of the shaft 12. Also disposed in the handle member 6, but separated from the battery 8 by a wall 16 is a switch means 18. In the wall 16 are mounted three electrically conductive eyelets 20, 22, and 24. An electrical lead 26 connects the eyelet 20 with the battery 8 and the motor 10 (see also FIG. 4). The lead 26 includes a diode 28 which prevents reverse current flow through the switch 18. An electrical lead 30 connects the eyelet 22 with the battery 8. An electrical lead 32 connects the eyelet 24 with the motor 10.

The switch 18 includes a secondary coil 34 (FIG. 4) which is connected to a pair of contact plates 36*a*, 36*b* (FIGS. 1 and 4). The switch 18 is mounted for rotative motion and may be rotated by movement of a tab 38, as by a thumb or finger of an operator. Rotation of the switch 18 causes movement of the contact 36*a* relative to the eyelets 22 and 24, the contact 36*b* moving relative to the eyelet 20 but nevertheless maintaining engagement with the eyelet 20.

A primary coil 40 (FIG. 4) may be disposed in a base or stand member (not shown) for the purposes of inducing a current in the secondary coil 34 for purposes to be described below.

Referring to FIGS. 1–3, it will be seen that a frame member 42 is received by the handle member 6, which

frame member in turn receives the motor **10**, the weight **12**, the battery **8** and the electrical leads **26, 30, 32**. The frame member **42** also receives a wedge member **44** (FIGS. **1** and **3**) which operates to press the motor **10** firmly against an opposing wall of the frame member **42** whereby to prevent undesired movement of the motor within the handle member **6**.

In operation, the razor is removed from its stand and the tab **38** moved by an operator to rotate switch **18**, and thereby the contact **36***a* to a first position in which the contact **36***a* engages the eyelets **22** and **24**. In this position, electrical energy from the battery **8** is directed to the motor **10**. Energization of the motor **10** causes rotation of the shaft **12** and thereby rotation of the eccentrically mounted or unbalanced weight **14**. The eccentricity of the weight mounting i.e., the displacement of the center of gravity of the weight from the axis of rotation of the weight, and the disposition of the weight proximate to the head portion **2** induces vibration of the head portion **2** and therefore the blade **4**. Such vibration imparts a slicing motion to the blade **4** whereby to facilitate ease of cutting.

It is to be understood that in describing the movement of the head the term vibration is intended in a broad or general sense, including a rapid movement in various directions, as for example a gyratory motion or other such motions which may not be included in some technical or restrictive interpretations of the term vibration.

After completion of a shaving operation, the tab **38** is switched to a second position in which the contact **36***a* engages the eyelet **22** only. Such arrangement interrupts the circuit of the motor **10**, but inasmuch as the contact **36***b* continues engagement with eyelet **20**, operates to maintain a circuit interconnecting the secondary coil **34** and the battery **8**. The switch **18**, and thereby the secondary coil **34**, is then placed in the magnetic field of the primary coil **40** whereby to charge the battery **8**.

In addition to the vibratory facility, the razor of the present invention is provided with means for adjusting the position of the razor blade **4** in the head portion **2** of the razor.

Referring again to FIGS. **2** and **3**, it will be seen that the head portion is connected to one end of the handle member **6**. A neck portion **50** is attached to the handle member **6** or may be an integral extension thereof and includes opposed windows **52, 54**. A pair of pins **56** (see also FIG. **1**) disposed in the neck portion **50** engage a spindle **58** which has a cut-away portion **60** adapted to receive a threaded insert **62**. Received by the neck member **50** is a nut **64** having internal threads engaged with the external threads of the insert **62**, whereby upon rotation of the nut **64** the insert **62** is caused to move axially of the razor. A retainer ring **66** is slidably disposed in an annular groove **68** in the spindle **58** and is urged into engagement with an inwardly directed shoulder portion **70** (FIG. **1**) of the nut **64** by a coil spring **72** disposed about the spindle **58** and between the ring **66** and a flange **74** disposed on one end of the spindle.

Fixed to the spindle **58** is an externally threaded sleeve **76** and fixed to the interior of the sleeve **76** is a guard member sleeve **78** supporting at its free end a razor guard member **80** (FIG. **2**). Received by the neck member **50** and threadedly engaged with the externally threaded sleeve **76** is a rotatable internally threaded sleeve **82**. As shown in FIGS. **1** and **3**, the sleeve **82** is provided with a pair of lugs **84** to facilitate manual rotation thereof.

Referring to FIG. **1**, it will be seen that the guard member **80** has slots **86** therein which receive spaced upright arm portions **88** of a platform **90**. The rotatable sleeve **82** abuts at one end the platform **90** and upon rotation of the sleeve **82** causes movement of the platform, as will be fully described herein below. The platform **90** is provided with end members **92** which receive the guard member **80** therebetween.

A rod **94** (FIGS. **2** and **3**) is received by the guard member sleeve **78**, the externally threaded sleeve **76**, the nut **64** and the spindle **58**. The rod **94** includes a portion of reduced diameter **96** (FIGS. **1** and **3**) which receives the threaded insert **62**. Thus, axial movement of the insert **62** causes axial movement of the rod **94**, as will be further described below.

To the free end of the rod **94** there is fixed a central bar **98** which receives the razor blade **4**. On either end of the bar **98** there are disposed arms **100** extending transversely of the bar **98**, the free ends of the arms **100** being pivotally connected to a pair of cap sections **102**.

Referring now to FIGS. **5** and **6**, there will be discussed the operation of the above described mechanism for the purpose of opening the razor head to permit changing of razor blades. FIG. **5** shows the cap sections **102** in the closed position retaining a razor blade **4** upon the central bar **98** and clamped between the cap sections **102** and the arm portions **88** of the platform **90**. In order to open the cap sections **102**, an operator engages the exterior of the nut **64**, which is readily accessible through the windows **52, 54** in the neck member **50**, and rotates the nut **64**. Such rotation of the nut **64** initially causes axial movement of the nut in a direction downwardly, or toward the handle portion **6** of the razor. Such movement is facilitated by an annular groove **108** which receives one end of the nut **64**. Downward movement of the nut **64** causes downward movement of the shoulder **70**, permitting downward movement of the retainer ring **66** in the groove **68**, the ring **66** being urged downwardly by pressure of the spring **72**. Continued rotation of the nut **64** causes axial movement of the insert **62** in a direction towards the head **2** of the razor. In FIG. **6** the insert **62** is shown having travelled to its limit in the direction of the head **2**. As the insert moves it carries with it the rod **94** which is slidingly disposed in the sleeves **76, 78**. Such movement of the rod **94** causes like movement of the bar **98** fixed to the rod **94**. Referring again to FIG. **1**, it will be seen that the cap sections **102** are provided with lugs **104** which are engageable with extension **106** of the guard member **80**. Returning to FIG. **6**, as the bar **98** and therefore the arms **100**, are caused to move upwardly, as viewed in the drawings, the lugs **104** are carried upwardly until they engage the guard member **80**, which remains stationary. Engagement of the lugs **104** with the guard member **80**, with further upward travel of the arms **100**, causes the cap sections to pivot to the open position, as shown in FIG. **6**. Counter-rotation of the nut **64** causes downward movement of the insert **62** carrying downwardly the rod **94**, until the insert **62** reaches its lower-most position. Further rotation of the nut **64** operates to move the nut axially upwardly, forcing the ring **66** upwardly against spring pressure until the insert **62** is engaged by an inner projection **67** of the nut **64**. Downward travel of the rod **94** operates to

close the cap sections, as shown in Fig. 5. Thus, the razor may be held in one hand and the cap opening and closing operation accomplished by movement of the fingers of that hand, leaving a second hand free for installation of a new razor blade.

Referring to FIGS. 7 and 8, there will now be described the operation of the mechanism for varying the exposure of the razor blade relative to the razor. The sleeve 82 includes the lugs 84 (FIG. 3), readily engageable by an operator for manual rotation of the sleeve 82. Such rotation causes the sleeve 82 to move axially upwardly. Inasmuch as the sleeve 82 abuts the platform 90, upward movement of the sleeve causes upward movement of the platform 90, including the arm portions 88 bearing against the blade 4. Movement of the arm portions 88 causes upward movement of the cap sections 102 and thereby upward movement of the rod 94. As the rod 94 moves axially upwardly, it carries with it the insert 62 which is threadedly engaged with the nut 64. Accordingly, the nut 64 is urged upwardly against the pressure of the spring 72. Thus, by rotating the sleeve 82 the exposure of the blade 4 is variable from substantially as illustrated in FIG. 7 to substantially as illustrated in FIG. 8. The sleeve 82 is disposed adjacent the nut 64 whereby to facilitate blade adjustment in much the same manner, from the operator's viewpoint, as opening and closing of the razor. Thus, opening and closing and blade adjustment can be accomplished with one hand, the same hand as is holding the razor.

Referring again to FIG. 1, it will be seen that the frame member 42 is particularly configured to receive and retain the various components. A cylindrically shaped portion 110 receives the switch means 18. A pair of opposed wing portions 112 provided with curved recesses 114 receive the battery 8 therebetween and act as leaf springs to retain the battery firmly in place. A pair of rails 115 projecting inwardly from the interior wall of the handle member 6 engage free ends of the wing portions 112 to force the wing portions toward each other, whereby to clamp the battery 8 therebetween. A pair of opposed walls 116, a platform 118 and a pair of runners 120 cooperate to receive the motor 10, the shaft 12, the weight 14, and the wedge member 44, the latter serving to press the motor 10 against the opposing wall and downwardly against the runners 120. The neck portion 50, which may be an integral or fixed-on extension of the frame member 42, includes the annular groove 108 as well as a cylindrically shaped portion 122 which cooperate to receive the nut 64. Thus, the frame member 42 is specially configured to retain the operating components securely in place whereby to prevent undesirable movement of components, as might otherwise be caused by long periods of vibration.

It is to be understood that the present invention is by no means limited to the particular construction herein disclosed and/or shown in the drawings, but also comprises any modifications or equivalents within the scope of the disclosure.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent of the United States is:

1. A razor comprising a head portion, guard means disposed in said head portion, platform means disposed in said head portion for supporting razor blade means thereon, a handle portion connected at one end to said head portion, means disposed on said handle portion and substantially adjacent said head portion for adjusting the position of said platform means and thereby a blade means supported thereon relative to said guard means, means associated with said handle portion and proximate to said adjusting means for opening and closing said razor, and means disposed in said handle for causing vibration of said head portion.

2. The invention according to claim 1 wherein said vibration causing means comprises a motor, a shaft extending from said motor towards said head portion, and a weight eccentrically mounted on the free end of said shaft, whereby rotation of said weight by said motor causes vibration of said head portion.

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