Feb. 22, 1966 R. H. GREENLY 3,235,962

SAFETY RAZOR BLADE HOLDER AND ELECTRIC RAZOR

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Fig. 1

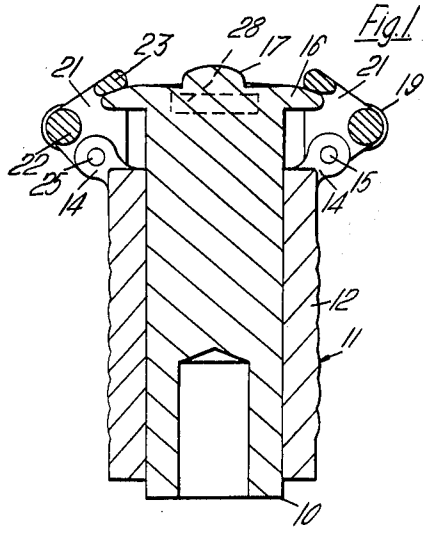
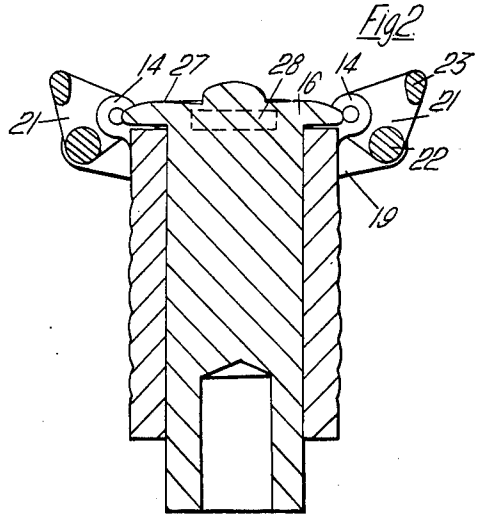


Fig. 2



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SAFETY RAZOR BLADE HOLDER AND ELECTRIC RAZOR

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Fig. 3

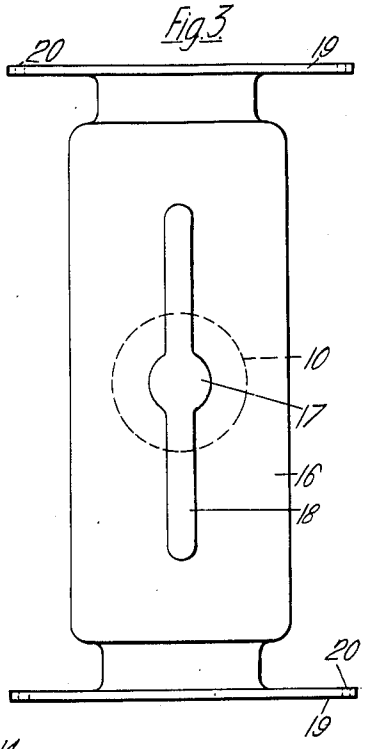


Fig. 4

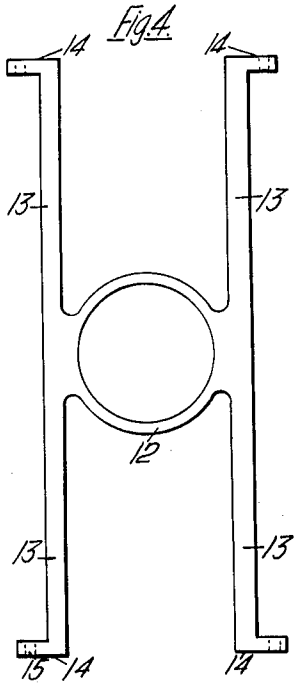
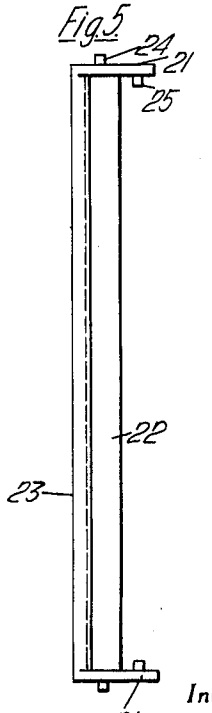


Fig. 5



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SAFETY RAZOR BLADE HOLDER AND ELECTRIC RAZOR

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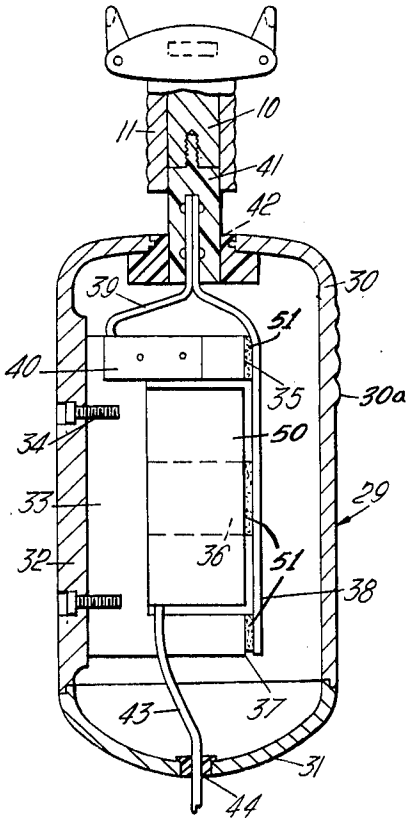
Fig. 6



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SAFETY RAZOR BLADE HOLDER AND ELECTRIC RAZOR

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Claims priority, application Great Britain, Oct. 7, 1963, 39,449/63
6 Claims. (Cl. 30—60.5)

The present invention relates to safety razor blade holders and to electric razors using such holders.

Conventional safety razor blade holders comprise a body member to the upper surface of which is adapted to locate a razor, the latter being held in place either by a hinged clamping member operated by turning a rotatable member mounted on the shank or by means of a screw connection between the shank and a clamping plate placed on the upper side of the razor blade.

It is an object of the present invention to find a new or improved safety razor blade holder. According to one aspect of the present invention there is provided a safety razor blade holder comprising a body portion adapted to locate a safety razor blade and being provided with a shank, a sleeve member slidable axially relative to said shank and having a toggle connection with said body portion whereby, upon relative axial movement between the body portion and the sleeve member, a clamp secured to said toggle connection is moved into and out of a closed position in which it clamps a razor blade in position on said body portion.

The holder of the present invention may be of a simple construction and may readily be made from only four parts. At the same time it can easily be opened and closed simply by relative axial movement between the sleeve member and the shank. Preferably the toggle connection comprises four toggle members each pivoted to the body portion and to the sleeve member, in which case the clamp may comprise two clamping bars extending longitudinally over the body portion and secured to the toggle member at each end of the body portion.

Advantageously the upper surface of the body portion includes a permanent magnet, whereby a blade may be held in contact with the body portion even when the clamp is in the open position.

According to another aspect of the invention, I provide a safety razor blade holder comprising a shank, a body portion adapted to locate a safety razor blade, a releasable clamp for securing a blade to said body portion and a magnet located in said body portion whereby a blade may be held against said body portion even when the clamp is in the open position. With such a holder, when a user desires to clean the razor blade after shaving all he has to do is to open the releasable clamp so that the edges of the blade are themselves released and then to position the holder, so that the blade is under a running tap. The blade will be held against the body portion of the holder by the permanent magnet but the edges of the blade will be sufficiently released for the water to remove the undesired shaving soap, etc.

According to a further aspect of the present invention I provide a safety razor including a holder of the invention the shank being connected to a motor which is adapted to vibrate the shank in a direction normal to the length of the body portion and to the shank axis, whereby a blade held in said holder is vibrated in its own plane transverse to its edge.

Existing shaving machines employ rotating, vibrating, or oscillating blades or sets of blades which move over metal shields in the form of suitably designed grilles which themselves are stationary or receive a motion which

is different from that of the blade. Since the shields or grilles prevent the blades from being in direct contact with the skin or at least render such contact only partial, such machines cannot give a perfectly smooth shave, since the shaving action can take place only at a distance from the skin. With the razor of the present invention, a very much closer and smoother shave can be obtained than with the conventional shaving machine referred to above as the blade is in direct contact with the skin. As compared with ordinary safety razors and cut throat razors, the razor of this invention provides a closer shave due to the vibration of the blade. The machine can be used either for wet shaving or dry shaving and indeed it can also be used for cutting or trimming hair.

The motor, advantageously comprises a casing, an armature pivotally mounted with respect to said casing, the shank of said holder being secured to or integral with the armature, an E-shaped coil core secured within the casing with the pole pieces adjacent said armature on the side of the pivotal connection remote from the shank, elastic foam material between the pole pieces and armature, and an electromagnetic coil wound on said core and adapted to be connected to an A.C. supply.

According to a still further aspect of the present invention I provide a safety razor comprising a holder adapted to hold a safety razor blade, a casing, an armature pivotally mounted with respect to said casing, the shank of said holder being secured to or integral with the armature, an E-shaped coil core secured within the casing with the pole pieces adjacent to the armature on the side of the pivotal connection remote from the shank, elastic foam material between the pole pieces and armature and an electro-magnetic coil wound on the core and adapted to be connected to an A.C. supply. Preferably the pivotable connection between the armature and casing is provided by a leaf spring secured to the armature. The leaf spring may also be secured to the E-shaped coil core.

Preferably the blade is caused to perform 25 to 200 cycles per second and the amplitude of motion is desirably in the range of 0.1 to 3.0 mm., when the blade is not in contact with the skin. The amplitude may well be reduced when the razor is in use due to the pressure applied.

In order that the present invention may more readily be understood the following description is given of one embodiment of holder according to the invention and of one embodiment of razor using such a holder. Reference is made to the accompanying drawings in which:

FIGURE 1 is a cross sectional view showing the holder shown in the closed position;

FIGURE 2 is a view similar to FIGURE 1 of the holder shown in the open position;

FIGURE 3 is a top plan view of the body portion of the holder of FIGURES 1 and 2;

FIGURE 4 is a top plan view to a reduced scale of the sleeve member of the holder illustrated in FIGURES 1 and 2;

FIGURE 5 is a top plan view of one pair of toggle connections of the holder of FIGURES 1 and 2; and

FIGURE 6 is a schematic view partly in cross section of a razor according to the invention using the holder of FIGURES 1 to 5.

Referring now to FIGURES 1 through 5 of the drawings there is illustrated therein a holder comprising a shank or handle **10** surrounded by a sleeve member **11** which includes cylindrical sleeve **12** and four longitudinal arms **13** (FIGURE 4). At their outer ends the arms **13** are provided with bearings plates **14** having central bearing apertures **15**.

The shank **10** is formed integral with a substantially rectangular body portion **16** on which a razor blade may be mounted. The body portion **16** has a central boss **17**, from which extend two longitudinal ribs **18** for locating

a blade in the correct position on the body portion **16**, which has at each end a bearing plate **19** of substantially elliptical cross-section each plate **19** being provided with two bearing apertures **20**.

A toggle connection is provided between the plates **19** and the arms **13** by four toggle plates **21**. These plates are connected in pairs by a longitudinal extending bar **22** and by a clamping bar **23**. A stud **24** extends outwardly from each plate on the same axis as the bar **22** and seats in bearing stud aperture **20** of end plates **19**. A further bearing stud **25** on each plate engages in the bearing aperture **15** of the end plates **14** on arms **13** of sleeve member **11**. Obviously, the connection described above renders the sleeve non-rotatable relative to the shank so that it slides axially thereon without any rotation.

In use of the holder described above, the sleeve member **11** is raised to the position shown in FIGURE 2 and a razor blade is located on the body portion **16**, the slot in the razor blade registering with the boss **17** and rib **18**. The sleeve member **11** is then pulled downwardly relative to the shank **11** during which movement the arms **13** of the sleeve member flex inwardly towards the axis of the member and permit the studs **25** to move beyond the over-centre position, i.e. the plane between the axes of studs **24** thereby creating a snap-action connection. It will be appreciated in so doing that the toggle plates **21** move from the position shown in FIGURE 2 to the position shown in FIGURE 1 so that the clamp bars **23** press against the upper surface of the razor blade mounted on the body portion **16**. The resilience of the arms **13** maintains the toggle plates in the position shown in FIGURE 1, thus urging the razor blade against the upper surface **27**. In order to release the razor blade all that is necessary to do is to once again raise the sleeve member to the position shown in FIGURE 2, whereupon the toggle plates **21** will revert to the position shown in FIGURE 2 the clamping bars **23** releasing the blade from the upper surface **27**.

Just beneath the upper surface **27** the holder is preferably provided with a permanent magnet **28** shown in phantom in FIGURES 1 and 2. When the holder is in the position shown in FIGURE 2 this magnet **28** prevents the blade readily dislodging from the upper surface **27** of body portion **16**. Thus, when a user has finished shaving he can simply open the holder, to the position shown in FIGURE 2 thus releasing the cutting edges of the blade from the holder itself and place the holder complete with blade in water or preferably under a running tap and thus clean off the shaving soap etc., from the blade edges.

Referring now to FIGURE 6, there is illustrated therein an electric razor incorporating the holder shown in FIGURES 1 to 5. The razor comprises a casing **29** formed in two halves **30** and **31** of a plastics material each half having in its end an aperture. The upper half **30** is formed on one side with a ribbed portion **30***a* to facilitate handling of the casing and on the opposite side with a thickened wall **32**. Secured to the wall **32** by means of bolts **34** is an E shaped coil core **33** having three pole pieces **35**, **36** and **37**, an electro magnetic coil **50** being wrapped round the core in a conventional manner. An armature **38**, positioned adjacent to pole pieces **35**, **36** and **37**, extends upwardly out through the aperture in the casing half **30** and is riveted to a leaf spring **39** carried by a mounting bracket **40** which is held to the upper pole piece **35** by means of rivets. The upper riveted end of the armature and the leaf spring are moulded into an insulating connector **41** having an integral threaded stud which is screwed into the shank **10** of the safety razor holder, illustrated in FIGURES 1 to 5. The moulded connector **41** is encircled by an elastic grommet **42** which serves to seal the aperture in the casing half **30** and yet permits limited movement of the armature, spring and connector.

Between each of the pole pieces and the adjacent portion of the armature **38** there is provided a cushion **51** of foam plastic material. The leads **43** to the coil wound on the core **33** pass out through the aperture in the lower casing half **31** and are sealed with respect to the lower casing half by a grommet **44**. The junction between the upper and lower casing halves may be made water-tight by any suitable means, and, if desired, the whole interior of the casing may be filled with a foam plastic material to reduce the vibration of the casing.

In operation of the above described electric razor the lead **43** is connected to an A.C. supply and the alternating electro-magnetic field created at the pole pieces causes the armature **38** to vibrate against the action of the lead spring **39**, which restricts the movement of the armature to simulate oscillation about a pivot, normal to the plane of FIGURE 6 and passing substantially through the aperture in the upper casing half **30**. This movement of the armature is transmitted by the connector **41** to the shank **10** of the razor blade holder so that a blade secured therein is used to vibrate in the plane of the blade in a direction normal to the edge of the blade.

The provision of the foam plastic material between the pole pieces and the armature prevents the armature from attaching itself to the pole pieces and also keeps the armature at a distance from the pole pieces so that the motor is highly efficient and enough power is given to the blade without a very large motor which would be inconvenient because of its size, over-heating and power consumption.

In place of the leaf spring **39** shown in the drawings the armature may simply be pivoted to the casing and a spring of the coil compression type positioned between the pole face **37** and the armature **38**.

The razor of the present invention may be used either dry or with shaving soap, creams, oils, lotions and emulsions of the kind which would clog and hinder or prevent satisfactory performance of other types of electric razors. These lotions may serve the purpose of combined pre- and after-shave lotion and the machine can enable all these advantages to be combined with the simple application of a lotion before using the razor. Not only does the razor provide a more satisfactory shave than can be achieved either by using the conventional dry shavers or by using safety razors but also benefits are obtained from the vibratory effect massaging the skin, tuning up the facial muscles and giving a pleasurable effect of vibration while shaving. The pull or drag which is experienced with ordinary safety razors is substantially reduced or eliminated.

I claim:

1. A safety razor blade holder comprising:
- a body member having an upper surface shaped to locate a safety razor blade;
- a shank secured to said body member;
- a sleeve member encircling and non-rotatably axially slidably relative to said shank;
- means providing a snap-action connection between said sleeve member and said body; and
- clamp means secured to said connection means for securing said blade on said upper surface of said body member upon relative axial movement in one direction between said sleeve member and said shank, said clamp means being released upon relative axial movement in the opposite direction between said sleeve member and said shank so that said blade can be removed.

2. The safety razor blade holder defined in claim **1** including a magnet located in said upper surface, said magnet holding said blade in contact with said upper surface when said clamp means is removed from said blade.

3. The safety razor blade holder defined in claim **1** wherein said connecting means comprises four resilient arms affixed to said sleeve member and extending in a plane transverse to said body member and four toggle members movably pivoted to the free end of said resilient

arms and fixedly pivoted to said body member, said clamp means being connected to and extending between pairs of said toggle members.

4. The safety razor blade holder defined in claim 3 wherein each of said pivotal connections between said free ends of said resilient arms and said toggle members moves in an arcuate path equiradially disposed from the axis defining the fixed pivot of associated pairs of toggle members and wherein said free ends of said resilient arms are flexed inwardly of said fixed pivotal axis and toward said shank so that said arms are passed over center defined by a plane extending between all of said fixed pivotal axes.

5. The safety razor blade holder defined in claim 1 wherein said clamp means comprises a bar which is adapted to be brought to bear against said blade in its closed position.

6. The safety razor blade holder defined in claim 1 including vibratory motor means for oscillating said holder so that when said blade having a cutting edge is located on said surface of said holder, said blade moves in a direction transverse to its cutting edge and substantially in the plane of said blade.

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