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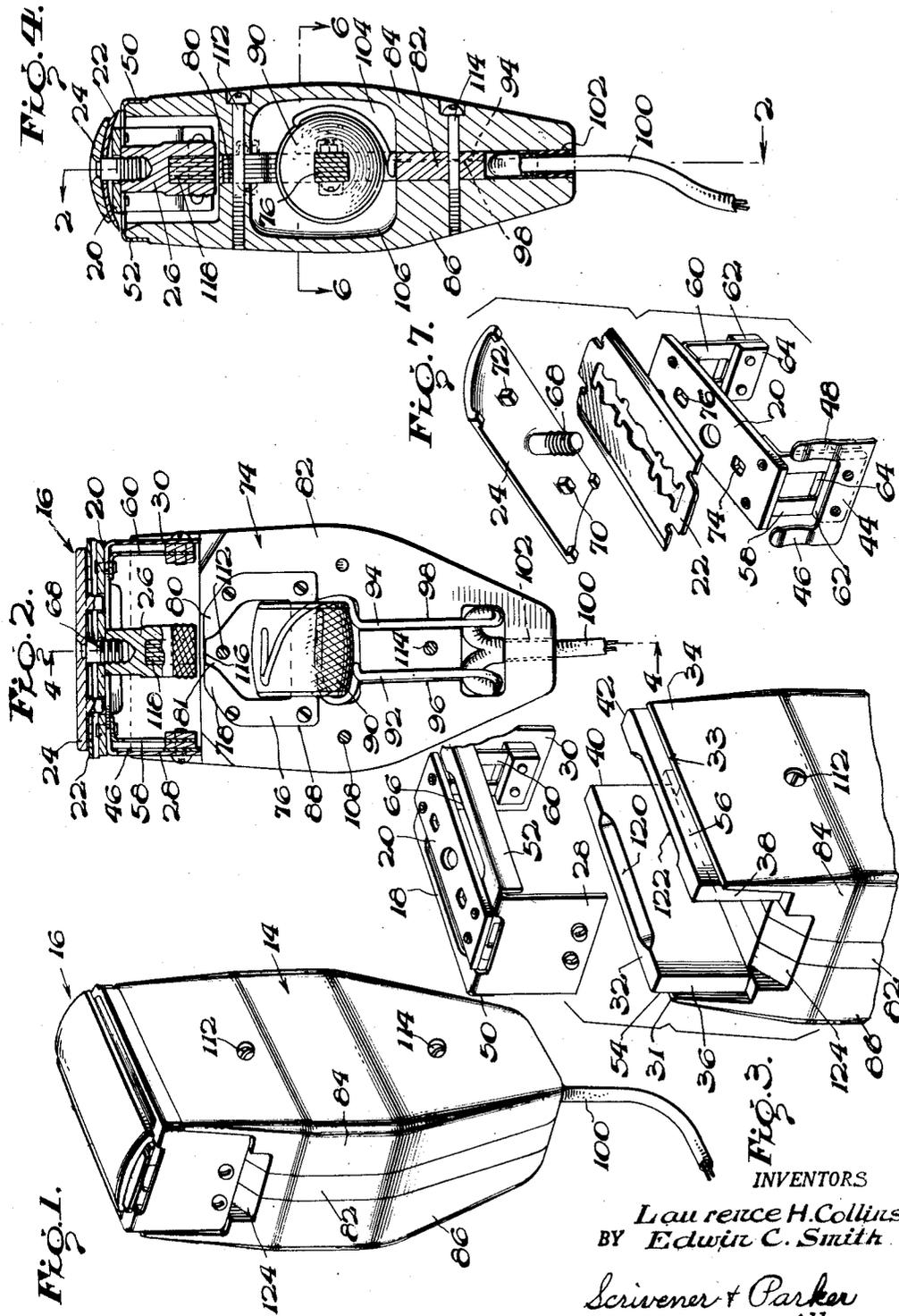
L. H. COLLINS ET AL

2,530,759

ELECTRIC RAZOR

Filed Dec. 5, 1946

3 Sheets-Sheet 1



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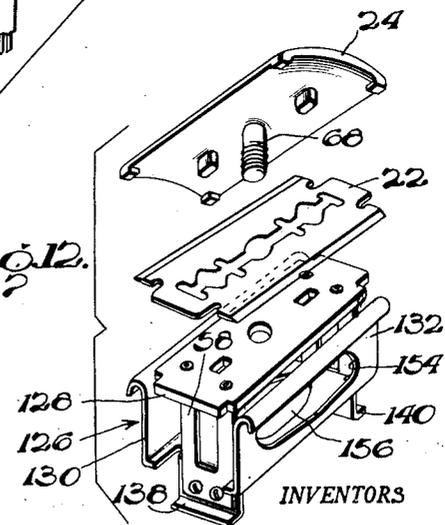
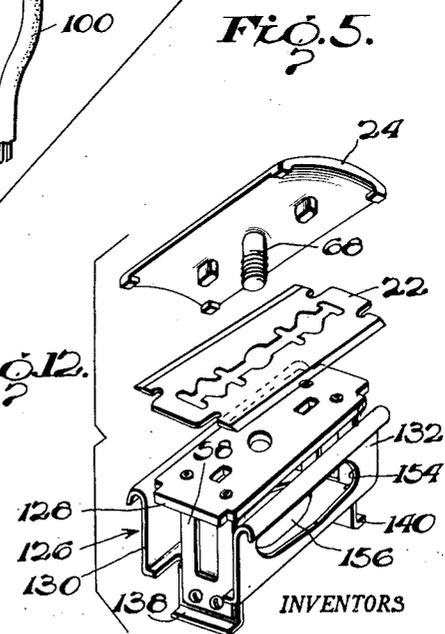
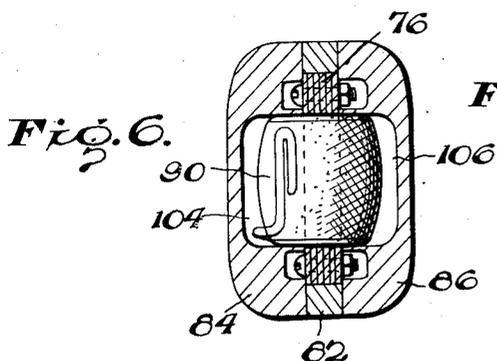
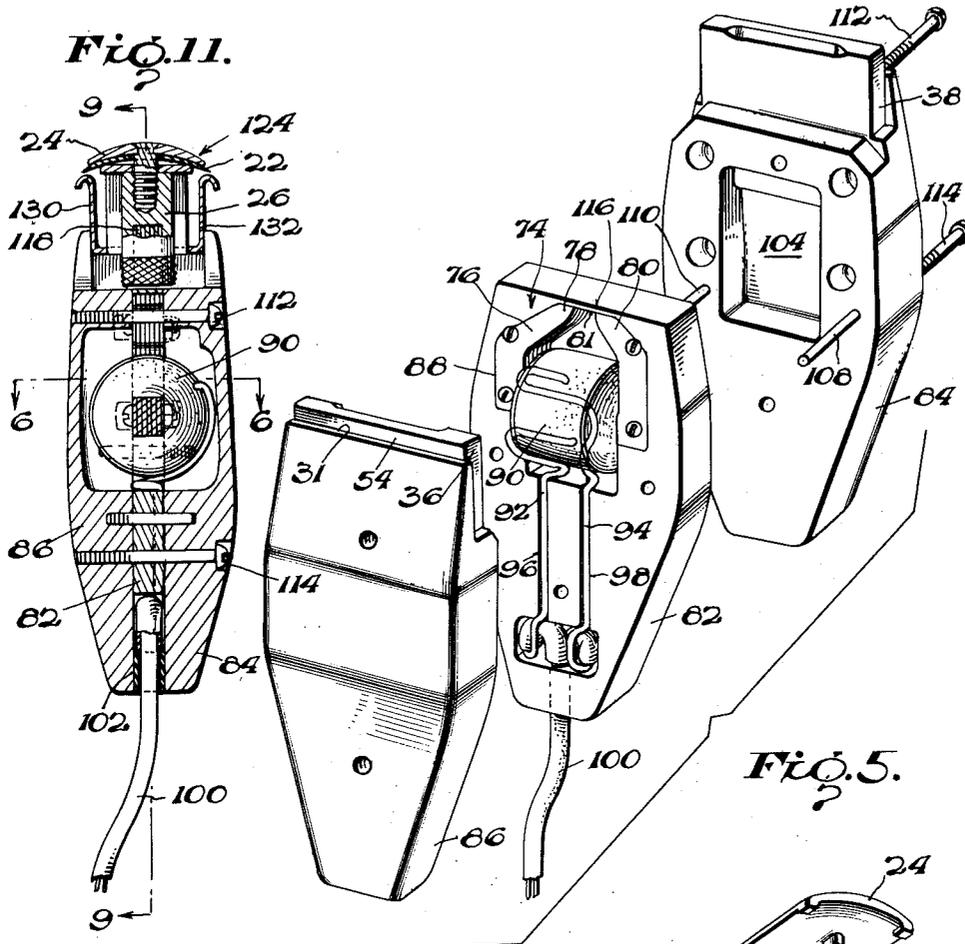
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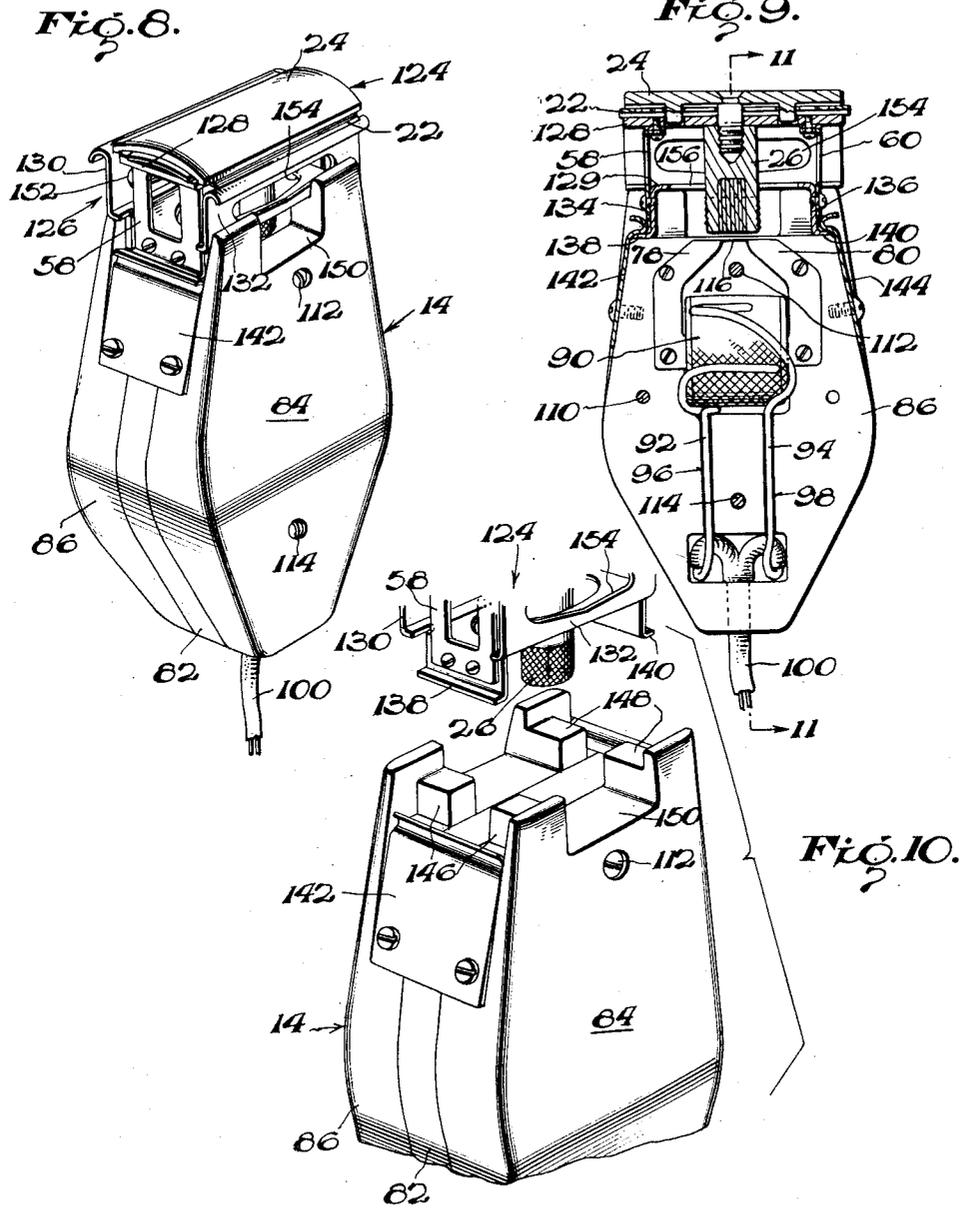
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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ELECTRIC RAZOR

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21 Claims. (Cl. 30—45)

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This invention relates to safety razors and more particularly to electric safety razors wherein the razor blade is caused to be reciprocated in a direction parallel to its cutting edge or edges to obtain a highly effective cutting or shearing action.

It has heretofore been proposed to provide electric razors of the reciprocating blade type, which have included a casing for the electric motor, a razor blade assembly, and a driving connection between the motor and blade assembly for reciprocating the latter. Such prior devices, however, were not found to be entirely satisfactory. For example, complicated and expensive motor constructions were utilized which included oscillating arms projecting outwardly from the casing. These arrangements were not only cumbersome and costly, but also prevented the effective sealing of the casing against the entrance of water and moisture. It was also found that the use of make-and-break contacts in the prior motor constructions not only caused radiation of radio frequencies, thereby resulting in objectionable radio disturbance, but also necessitated frequent inspection, adjustment and renewal of the contacts. In addition, the parts constituting the head of the razor were numerous and the design and construction thereof were such that considerable time was involved in changing blades, cleaning, and re-assembling the parts after use.

It is accordingly a prime object of the present invention to provide an electric razor of the reciprocating blade type which is so constructed and arranged as to avoid the above mentioned disadvantages and objectionable features.

Another object is to provide in a razor of the above type, a novel electric drive for the blade, which is so constituted as to avoid the necessity of providing an opening in the casing through which any movable part projects, thereby enabling the casing to be rendered completely and effectively water- and moisture-proof.

A further object includes the provision of a water-proof casing for housing the driving member of the electric vibrator motor, together with a razor head including the driven member of the electric motor, the construction being such that the head may be readily removed from the casing without the necessity of manipulating any parts whatsoever.

Still another object resides in providing a novel removable head construction comprising a minimum number of parts which are so constructed and related as to avoid any rubbing friction

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during operation, and being capable of quick disassembly for ease in changing the blade and for cleaning after use.

Another object is to provide a head construction which includes a stationary guard or support, frictionally carried by the upper portion of the casing, together with a novel spring-supported blade-carrying bed, the arrangement being such that the bed and blade carried thereby are reciprocated at a relatively high frequency with respect to the stationary guard during operation.

A still further object comprehends an electric razor of the above character which is not only self-starting and noiseless during operation, but which is effective to give closer shaves without the burns and cuts due to the scraping action incident with known types of razors.

Other objects and novel features of the invention will appear more fully hereinafter from the following detailed description of the invention when taken in connection with the accompanying drawings, wherein two embodiments of the invention are illustrated. It is to be expressly understood however, that the drawings are utilized for purposes of illustration only and are not designed as a definition of the limits of the invention, reference being had for this purpose to the appended claims.

In the drawings wherein similar reference characters refer to similar parts throughout the several views:

Fig. 1 is a perspective view of one form of electric razor, constructed in accordance with the principles of the present invention;

Fig. 2 is a longitudinal sectional view of the razor of Fig. 1 taken along line 2—2 of Fig. 4;

Fig. 3 is a partial perspective view of the top of the razor casing and a portion of the removable head;

Fig. 4 is a longitudinal sectional view taken substantially along line 2—2 of Fig. 2;

Fig. 5 is an exploded view in perspective of the razor casing of Fig. 1, and illustrates the manner of housing the stationary portion of the vibrator motor;

Fig. 6 is a longitudinal sectional view of the casing taken substantially along line 6—6 of Fig. 4;

Fig. 7 is an exploded view in perspective of certain of the parts constituting the removable head of the razor of Fig. 1;

Fig. 8 is a perspective view of a modified form of electric razor;

Fig. 9 is a longitudinal sectional view of the

modified form taken substantially along line 9—9 of Fig. 11;

Fig. 10 is a partial perspective view of the top of the casing and a portion of the removable head of the modification form;

Fig. 11 is a longitudinal view in section of the razor of Fig. 8, and taken substantially along line 11—11 of Fig. 9, and

Fig. 12 is an exploded view in perspective of the parts comprising the removable head of the modified form of razor.

Referring more particularly to Figs. 1—7 inclusive, an electric razor embodying the principles of the present invention is illustrated therein as comprising a casing 14, of insulating material and generally formed as a handle, said casing housing a portion of the electric drive and being provided with a removable head 16, the latter being readily separable from the casing as a unit and having no mechanical connection with the casing or any part within the latter. By reason of this construction, it will be seen that the casing may be readily sealed against the entrance of water or moisture, thus protecting the electrical apparatus within the casing from damage due to moisture and protecting the user from all danger of electric shock. Also, as will appear more particularly hereinafter, the head 16 comprises a minimum number of parts which may be quickly disassembled for changing a blade or for cleaning purposes, and thereafter quickly slipped into position to re-establish the electric drive for further use.

In order to secure the above mentioned advantages, the removable head 16 includes a guard or support member 18, adapted to resiliently support a blade-carrying bed or carriage 20, a suitable double edge razor blade 22 being secured thereto as by means of a cap 24 and a threaded ferrule 26. More particularly, the guard 18 is provided with downwardly bent end portions 28 and 30 which are adapted to be slidably received by the upper end of the casing 14 and frictionally held in position. As will be readily seen from Figs. 3 and 5, the casing 14 is provided with a pair of extensions 32 and 34 which are cut away on opposite sides to form pairs of abutments 36, 38 and 40, 42 for slidably and frictionally receiving the end portions 28 and 30. To secure a firm frictional engagement between these parts to prevent accidental displacement of the head, one of the portions 28 or 30 carries on its inner surface a leaf spring 44 having a pair of arms 46, 48, each of which are slightly bent intermediate the ends thereof, see Fig. 7. In this manner, when the guard 18 is slipped on the top of the casing, the bent spring arms 46 and 48 will be slightly compressed between the portion 28 for example, and the abutments 36 and 38. With the parts in this position, downwardly bent guard rails 50 and 52 are received by cut-away portions 54 and 56 formed at the top of the extensions 32 and 34 respectively, the lower edges 31 and 33 of such portions thus constituting stops to properly position the head 16 with respect to the casing 14. It will be understood that the spring 44 may be associated with either of the portions 28 and 30 and that the arms 46 and 48 thereof will bear against abutments 36, 38 or 42, 40 depending upon the relative position of the casing and guard when the latter is slipped on the casing top as described.

A novel construction is provided for resiliently mounting the blade-carrying bed 20 on the guard 18, so that the former, together with the blade

22 may be supported for reciprocating movement in a direction parallel with the edges of the blade. As shown, such means include a pair of double-armed leaf springs 58 and 60 which are secured at their upper portions to the bed 20 in any suitable manner, such as by riveting. The lower ends of the springs may be interposed between blocks 62 and 64 which are thereafter riveted to the portions 28 and 30, it being noted that the spring 44 is included in this assembly prior to securing the parts together in the manner described, see Fig. 7. As shown particularly in Figs. 2, 3 and 4, the bed 20 projects upwardly through an opening 66 in the guard 18, a sufficient distance so that the blade 22, when assembled on the bed, will occupy a proper cutting relation with respect to the guard rails 50 and 52. With the bed 20 thus assembled with the guard 18, the blade 22 may be readily secured upon the bed through the cooperation of the cap 24 and the ferrule 26, it being noted that the cap is formed with a threaded stud 68 which projects through openings in the blade and the bed, for receiving the ferrule, and is also provided with integral lugs 70 and 72 which enter suitable openings in blade 22 and openings 74 and 76 in the bed 20 for properly positioning the blade with respect to cap 24, the bed 20 and guard 18. Thus the bed 20, together with the blade 22, cap 24 and ferrule 26, constitutes a rigid assembly which is resiliently supported by the springs 58 and 60 upon the stationary guard 18, in such a manner, that such assembly may be reciprocated back and forth with respect to the guard, and in a direction parallel with the cutting edges of the blade.

In addition to the foregoing, a further important and novel feature of the invention resides in the construction of the electric motor for vibrating the bed 20 and blade 22 assembled thereon. As heretofore pointed out, the motor construction is such that no parts are projected through openings in the casing, in order to vibrate the blade assembly. More particularly, the motor construction includes an electrically excited stator or driving member 74 which comprises an electromagnet core 76 built up of a plurality of magnetically permeable C-shaped laminations, the ends or pole pieces 78 and 80 of which are spaced apart to constitute an air gap 81. As shown in Fig. 5, the casing includes a central member 82 and two oppositely disposed side members 84 and 86, the member 82 being formed with a suitable opening 88, shaped to receive the core 76 and an energizing winding 90 wound around one leg of the core. The terminals 92 and 94 of the winding 90 are preferably positioned within slots 96 and 98 formed in the member 82 and are connected to an external supply lead 100 which enters the member 82 through an opening 102. Suitable recesses 104 and 106 are formed in the side members 84 and 86 respectively, for accommodating the winding 90, when the parts are assembled in the position shown in Fig. 4. It must be understood that during assembly, dowel pins 108 and 110 may be employed for maintaining the members 82, 84 and 86 in proper alignment, after which screws 112 and 114 are utilized to secure the members firmly together in water-tight relation.

It is to be particularly noted, that in forming the opening 88, for receiving the core 74, the opening is located entirely within the member 82 adjacent the upper part thereof. This insures that the core 74 will be completely surrounded by portions of the member 82, and as shown in

Figs. 2 and 5, this arrangement provides a relatively thin but integral partition 116 immediately above the pole pieces 78 and 80 and the air gap 81. While it is contemplated, that the casing will be water and moisture tight after assembly and with the screws 112 and 114 in position, it will be understood that suitable gaskets or a sealing compound may be employed between the faces of the members 82, 84 and 86, if found desirable. After the lead 100 is connected to the terminals 92 and 94, the opening 102 is sealed with a suitable water-tight compound in order to provide a water-proof joint at this point.

In order to secure an electrically operated driving connection between the stator 74 and the reciprocable bed 20 and blade 22 carried thereby, the present invention provides a novel construction which is preferably associated with the ferrule 26. As shown, such construction comprises a permanent magnet member 118 which may be cylindrical in cross section and which is pressed within a suitable bore formed in the ferrule 26. The latter is made of suitable non-magnetic material such as aluminum, for example, and it will be observed from Figs. 2 and 4 that when the head 16 is completely assembled with respect to the casing 14, the lower end of the magnet 118 is located closely adjacent the partition 116 and the air gap 81, and in position to be influenced by the magnetic field produced by the pole pieces 78 and 80. The magnet 118 thus constitutes a driven member of the electric motor while the ferrule serves not only as a means for connecting the cap 24 and blade 22 to the bed 20, but also as a holder for the magnet 118, which latter, during energization of the winding 90 from an alternating current source, serves to rapidly reciprocate or vibrate the bed 20 and blade 22 in a direction parallel to the cutting edges of the blade.

In operation and assuming that the head 16 has been assembled in the manner heretofore described, it will be understood that the same may be readily slipped onto the top of the casing where it will be frictionally maintained in position by reason of the slight compression of the spring arms 46 and 48 between the portion 28 of the guard and the abutments 36, 38 or 42, 40. With the parts in this relation, it will be observed that the magnet member 118 is located adjacent the pole pieces 78 and 80 so as to be influenced by the magnetic field. It is thereafter only necessary to connect the lead 100 to a suitable source of alternating current, such as the usual electrical outlet, whereupon the pole pieces 78 and 80 will alternately become north and south poles in accordance with the frequency of the source. Assuming that the lower end of the magnet 118 is a north pole and that at a particular instant the pole piece 78 is a north pole while the pole piece 80 is a south pole, it will be readily understood that the magnet 118 will move to the right, as viewed in Fig. 2, because of the repelling and attracting magnetic forces acting thereon. Such action will cause the bed 20, blade 22 and cap 24 to be also moved to right with respect to the guard 18, in a direction parallel to the cutting edges of the blade 22, this action being permitted by the resilient support of the bed 20 through the leaf springs 58 and 60. During the next half cycle of current, the polarity of the pole pieces will be reversed, and here again, the magnet 118, and parts connected therewith will be caused to be moved to the left in response to the repelling and attracting forces acting thereon. Thus it will be readily seen that the bed 20 and blade 22

will be caused to reciprocate or vibrate back and forth in a direction parallel to the blade edges, in accordance with the frequency of the supply source, in order to obtain a highly effective cutting or shearing action.

It is desired to point out that in use, it is not necessary to wet or lather the skin surface to be shaved, as a close shave may be obtained with a dry surface. If desired, however, the surface of the skin may be lathered with a suitable shaving cream before shaving, in which event, the lather accumulated on the razor may be readily washed off, without danger of electric shock to the user or moisture damage to the winding 90. This desirable advantage is due to the particular construction utilized, and including the waterproof casing 14, which contains no openings whatsoever, through which movable parts are projected for vibrating the head of the razor. It will be noted from Fig. 3, that the opening 66 at the top of the guard 18 is enlarged on either side of the bed for a substantial portion of the length thereof. In like manner, the upper ends of the extensions 32 and 34 are cut away at 120 and 122. This construction defines elongated passageways on opposite sides of the blade through which the lather flows to and accumulates in the space between the extensions 32 and 34, during shaving. Preferably, the casing 14 is provided with angularly disposed openings 124 and 126 immediately below the portions 28 and 30 of the guard, so that the accumulated lather may be readily removed by directing a stream of water through one of the openings and allowing the water and lather to flow out through the other opening. It is therefore readily apparent that the razor may be quickly cleaned after use, without any danger of electric shock to the user.

Figs. 8-12 illustrate a slightly different form of the invention, which is the same as the form previously described except for the construction of the removable head and the shape of the upper portion of the casing which receives the head. More particularly, the removable head 124 in this form includes a guard 126 which resiliently supports a blade-carrying bed 128, having the blade 22 secured thereto as by means of the cap 24 and ferrule 26. The guard 126 is U-shaped in cross section, as particularly shown in Figs. 8, 9 and 12, and includes a base 129 having a pair of upwardly extending guard rails 130, 132 together with downwardly projecting end portions 134 and 136, the latter being provided with outwardly bent ears 138 and 140 respectively for a purpose which will appear more fully hereinafter. The bed 128 is resiliently supported by the guard 126 as by means of the leaf springs 58 and 60, so as to be capable of vibration or reciprocation in a direction parallel to the blade edges, and as shown, the bed 128 is positioned above the upper edges of the guard rails 130 and 132 in order that the blade 22, when assembled on the bed 128 will occupy the proper position with respect to the guard rails.

In order to frictionally secure the head 124 to the top of the casing 14, the latter is provided with oppositely disposed leaf spring latches 142 and 144 which are adapted to frictionally engage the ears 138 and 140 of the guard 126 as clearly shown in Figs. 8 and 9. With the parts in the position shown in Fig. 9, the ears 138 and 140 contact the top of the casing 14 and bear upon the outer sides of abutments 146 and 148, while the base 129 engages the tops of the abutments, this construction serving to properly position the head 124 with respect to the casing. As in the first

form of the invention, the electric drive for the bed 128 and blade 22 comprises the core 76, winding 90 and permanent magnet member 118, and in operation, the bed 128 and blade 22 are reciprocated in the same manner, when the parts are assembled with the magnet 118 in position to be influenced by the magnetic field from the pole pieces 78 and 80.

For the purpose of enabling efficient cleaning of the head by a stream of water, the casing 14 is cut away at the top to provide a through opening 150 and the guard rails 130 and 132 are formed with apertures 152 and 154. To further assist in the cleansing operation, the base 129 of the guard 126 may be formed with an enlarged central opening 156 through which accumulated lather may flow to the through opening 150 when the razor is in use.

It will be understood that in the form of the invention just described, the casing 14 is also of water and moisture-proof construction and that the opening through which the lead 100 projects, is sealed with a suitable sealing compound to prevent the entrance of any water or moisture. If desired, a detachable connection may be employed between the lead or cord 100 and the terminals 92 and 94 in both forms of the invention. In such case, the connection may take the form of the usual pin and plug type of detachable connection, and the plug so arranged as to provide a water-tight joint at the bottom of the casing when the connection is made.

From the foregoing, it will be readily apparent that a highly efficient and greatly simplified electric razor construction has been provided by the present invention. The particular type of electric motor employed, and the arrangement of the parts thereof is such that a water-tight casing or housing is secured, which eliminates all possibility of moisture damage to the motor parts within the casing or electric shock to the user. In operation, the razor is entirely noiseless, it being recalled that the reciprocating bed is spring mounted in order to avoid all rubbing and sliding friction, and to insure long life of the parts. One of the important features of the invention resides in the simplified and readily removable head construction which includes a minimum number of parts which are constructed in such a manner as to be capable of quick disassembly for blade changing and cleaning. A further distinctive and novel feature includes the incorporation of the permanent magnet as a part of the means utilized to secure the razor blade to the reciprocating bed, thereby reducing the number of separate parts and providing with the core 76 within the water tight casing 14, an effective electric drive for the blade.

While two embodiments of the invention have been shown and described herein with considerable particularity, it will be understood by those skilled in the art, that many modifications, changes and rearrangements of the parts may be resorted to, without departing from the spirit of the invention. For example, it will be apparent that a single edge blade may be utilized instead of the double edge blade described, in which event the magnet member may be rigidly and permanently connected with the reciprocating blade-carrying bed. Also, if desired, the casing may be formed by a pair of complementary sections, rather than three, as set forth herein. Other changes may be made within the scope of the appended claims.

What is claimed is:

1. An electric safety razor comprising a casing of insulating material having an imperforate top portion, an electromagnet core within the casing, said core having a pair of opposed pole pieces positioned entirely within the casing adjacent the inner surface of the top portion of the casing, and a razor head frictionally associated with the exterior of the casing at the top thereof, and readily removable therefrom as a unit, said head including a reciprocable blade-carrying bed, and a permanent magnet armature carried by the bed wholly outside of the casing and having an end spaced from but arranged closely adjacent the outer surface of the top portion of the casing and in inductive relationship with said pole pieces.

2. An electric safety razor comprising a casing of insulating material having an imperforate top portion, an electromagnet core within the casing, said core having a pair of opposed pole pieces positioned entirely within the casing adjacent the inner surface of the top portion of the casing, and a razor head frictionally associated with the exterior of the casing at the top thereof, and readily removable therefrom as a unit, said head including a stationary guard, a blade-carrying bed, spring means connecting said guard and bed for resiliently supporting the bed on said guard for reciprocating movement with respect thereto, a blade, and means for securing the blade to the bed, and a permanent magnet armature carried by said securing means wholly outside of the casing and having an end positioned in inductive relationship with said pole pieces.

3. An electric safety razor comprising a casing of insulating material having an imperforate top portion, an electromagnet core within the casing, said core having a pair of opposed pole pieces positioned entirely within the casing adjacent the inner surface of the top portion of the casing, and a razor head frictionally associated with the exterior of the casing at the top thereof, and readily removable therefrom as a unit, said head including a stationary guard, a reciprocable blade-carrying bed resiliently supported on said guard, a blade, and means for securing the blade to the bed comprising a cap overlying the blade and a ferrule secured to the cap, and a permanent magnet armature carried by said ferrule and positioned wholly outside of the casing, said magnet having an end positioned in inductive relationship with said pole pieces.

4. An electric safety razor comprising a water-tight casing of insulating material, a razor guard frictionally and removably associated with the top portion of said casing, a blade-carrying bed, spring means connecting said guard and bed for resiliently supporting the bed on said guard for reciprocable movement with respect thereto, a blade on the bed, means to secure the blade to the bed, and means to reciprocate said bed and blade including a U-shaped electromagnet core disposed entirely within the casing and a permanent magnet carried by the bed exteriorly of the casing and having an end positioned in inductive relationship with said core.

5. An electric safety razor comprising a water-tight casing of insulating material having an imperforate top portion, a razor guard frictionally and removably associated with the top portion of said casing, a blade-carrying bed spaced from said guard and resiliently supported by said guard for reciprocable movement, a blade on the bed, means to secure the blade to the bed, and means to reciprocate said bed and blade with respect to

the guard comprising a pair of cooperating electric motor elements, one of which is completely housed within the casing and is provided with pole pieces positioned adjacent the inner surface of said top portion, and the other of which is carried by the bed and is positioned wholly without the casing and adjacent the outer surface of said top portion.

6. An electric razor comprising a water-tight casing of insulating material formed at the top portion thereof with a pair of spaced apart upwardly projecting extensions, each of which is provided with a pair of vertically extending abutments, and a separable razor head comprising a guard provided with a pair of parallel extensions slidably and frictionally engaging said abutments, a blade carrying bed spaced from said guard and resiliently supported by said guard for reciprocable movement, a blade on said bed, and means for securing said blade to said bed, and means to reciprocate said bed and blade including a U-shaped electromagnet core disposed entirely within the casing and a permanent magnet carried by the bed exteriorly of the casing and having an end positioned in inductive relationship with said core.

7. An electric razor comprising a water-tight casing of insulating material formed at the top portion thereof with a pair of spaced-apart upwardly projecting extensions, each of which is provided with a pair of vertically extending abutments, and a separable razor head comprising a guard provided with a pair of parallel extensions slidably and frictionally engaging said abutments, a blade carrying bed spaced from said guard and resiliently supported by said guard for reciprocable movement, a blade on said bed, and means for securing said blade to said bed, and means to reciprocate said bed and blade comprising a pair of cooperating electric motor elements, one of which is completely housed within the casing and the other of which is carried by the bed and is positioned wholly without the casing.

8. An electric razor comprising a water-tight casing of insulating material formed at the top portion thereof with a pair of spaced apart upwardly projecting extensions, each of which is provided with a pair of vertically extending abutments, and a separable razor head comprising a guard provided with a pair of parallel extensions adapted to be received on said abutments, means including a leaf spring interposed between one of the guard extensions and one of the abutments to frictionally maintain said guard in position on said abutments, said head also including a blade-carrying bed spaced from said guard and resiliently supported by said guard for reciprocable movement, a blade on said bed, and means for securing said blade to said bed, and means to reciprocate said bed and blade including a U-shaped electromagnet core disposed entirely within the casing and a permanent magnet carried by the bed exteriorly of the casing and having an end positioned in inductive relationship with said core.

9. An electric razor comprising a water-tight casing of insulating material formed at the top portion thereof with a pair of spaced apart upwardly projecting extensions, each of which is provided with a pair of vertically extending abutments and a separable razor head comprising a guard provided with a pair of parallel extensions adapted to be received on said abutments, means including a leaf spring interposed between one of the guard extensions and one of the abutments

to frictionally maintain said guard in position on said abutments, said head also including a blade-carrying bed spaced from said guard and resiliently supported by said guard for reciprocable movement, a blade on said bed, and means for securing said blade to said bed, and means to reciprocate said bed and blade comprising a pair of cooperating electric motor elements, one of which is completely housed within the casing and the other of which is carried by the bed and is positioned wholly without the casing.

10. An electric razor comprising a water-tight casing of insulating material, a razor head including a guard, a reciprocating bed, means for resiliently supporting the bed from the guard, a razor blade on the bed, a cap fitting over the blade, and means for firmly securing said cap and blade to the bed for reciprocating movement therewith, said head thus constituting a unitary assembly, means formed at the top of the casing to slidably and frictionally receive the razor head, and means to reciprocate said bed, blade and cap comprising an electromagnet core disposed entirely within the casing, and a permanent magnet armature carried by said securing means and having an end portion in inductive relation with said core when the head is slipped into position on the top of the casing.

11. In a razor, a guard having a pair of spaced apart side guard edges defining an opening and being also provided with a pair of downwardly extending end portions, a blade carrying bed positioned above said opening and intermediate said edges, said bed being narrower than said opening to provide passageways on opposite sides of the bed, resilient means to support said bed for reciprocating movement in a direction parallel with said edges, a blade on said bed, means to secure the blade to the bed, and means to reciprocate the bed and blade carried thereby.

12. An electric razor comprising a water-tight casing of insulating material, a razor head comprising a guard, a reciprocating bed, means for resiliently supporting the bed on the guard, a razor blade on the bed and means for securing the blade on the bed, said head thus constituting a unitary assembly, means formed at the top of the casing to slidably and frictionally receive the razor head so that the latter may be assembled on the casing and removed therefrom as a unit, and means to reciprocate the bed and blade in a direction parallel to a cutting edge of the blade comprising an electromagnet core disposed entirely within the casing and including spaced apart pole pieces and an energizing winding arranged to energize the core from an alternating current source, and a permanent magnet armature carried by said bed and having an end portion arranged in inductive relation with said pole pieces when the razor head is positioned on the top of the casing.

13. An electric razor comprising a water-tight casing of insulating material, a razor head comprising a guard, a reciprocating bed, means for resiliently supporting the bed on the guard, a razor blade on the bed and means including a permanent magnet for securing the blade on the bed, said head thus constituting a unitary assembly, means formed at the top of the casing to slidably receive and frictionally hold the razor head in position on the casing with an end portion of said magnet arranged above but slightly spaced from the top wall of the casing, and means to reciprocate the magnet, bed and blade with respect to said guard and in a direction

parallel to a cutting edge of the blade comprising an electromagnet core disposed entirely within the casing and including spaced apart pole shoes positioned in inductive relationship with the end portion of said magnet.

14. An electric razor comprising a plurality of hollow sections of insulating material adapted to be secured together to form a water-tight casing having parallel side extensions projecting upwardly beyond the top of the casing to define a recess, the top of the casing between the ends of the recess having a relatively thin wall section, a unitary razor head assembly comprising a guard having downwardly extending end portions, a blade bed, means resiliently supporting said bed from said end portions to allow reciprocating movement of the bed with respect to the guard, a blade on said bed, and means to secure the blade on the bed, means formed on said side extensions to slidably and frictionally receive the end portions of said guard whereby said head assembly is removably positioned on the casing, and means to reciprocate said bed and blade with respect to the guard comprising an electromagnet core positioned wholly within the casing and having spaced apart pole pieces adjacent the inner side of said wall section, together with a permanent magnet armature carried by said bed and positioned within said recess with an end located a slight distance above said wall section and in inductive relation with the pole pieces when the head assembly is frictionally positioned on said extensions.

15. An electric razor as set forth in claim 14 wherein the permanent magnet is carried by the means for securing the blade to the bed.

16. A razor comprising a unitary head assembly having a guard provided with spaced apart guard edges defining an opening and also provided with a pair of parallel downwardly extending end portions, a blade carrying bed resiliently supported by said end portions and positioned above said opening and intermediate said edges, said bed being narrower than said opening to provide passageways on opposite sides of the bed, and a blade secured to the bed, a casing, means formed at the top of the casing to slidably and frictionally receive the end portions of said guard, said means defining a recess communicating with said openings to which lather may flow by way of said passageways when the razor is in use, and cooperating means within the casing and carried by said bed for reciprocating the latter.

17. A razor as defined in claim 16 wherein the top of the casing is cut away at the sides to establish communication between the recess and the exterior at opposite sides of the casing.

18. A razor as defined in claim 16 wherein the top of the casing is angularly cut away at the edges and immediately below said end portions to establish communication between the recess and the exterior at opposite edges of the casing.

19. In a razor, a guard provided with a flat top portion having an elongated opening therein, said guard also provided with downwardly extending side guard rails and a pair of downwardly extending end portions, a blade carrying bed of less width than said opening, a pair of leaf springs respectively connected to each of said end portions and supporting said bed above said top portion for reciprocating movement in a direction

parallel with said side rails, a blade on said bed, means to secure the blade to the bed, and means to reciprocate the bed and the blade carried thereby.

20. An electric razor comprising a closed casing of insulating material, a razor head comprising a guard having a pair of spaced apart side guard rails defining an elongated opening and being also provided with a pair of downwardly extending end portions, a blade carrying bed of less width than said opening, a pair of leaf springs respectively connected to each of said end portions and supporting said bed above said opening, a razor blade on the bed and means for securing the blade on the bed, said head thus comprising a unitary assembly, means at the top of the casing to slidably and frictionally receive the razor head so that the latter may be assembled on the casing and removed therefrom as a unit, and means to reciprocate the bed and blade in a direction parallel to a cutting edge of the blade comprising an electromagnet core disposed entirely within the casing and including spaced apart pole pieces and an energizing winding arranged to energize the core from an alternating current source, and a magnetic armature carried by said bed and having an end portion arranged in inductive relation with said pole pieces when the razor head is positioned at the top of the casing.

21. An electric razor comprising a closed casing of insulating material, a razor head comprising a guard having a pair of spaced apart side guard rails defining an elongated opening and being also provided with a pair of downwardly extending end portions, a blade carrying bed of less width than said opening, a pair of leaf springs respectively connected to each of said end portions and supporting said bed above said opening, a razor blade on the bed, and means for securing the blade to the bed comprising a cap overlying the blade and a ferrule secured to the cap, said head thus comprising a unitary assembly, means at the top of the casing to slidably and frictionally receive the razor head so that the latter may be assembled on the casing and removed therefrom as a unit, and means to reciprocate the bed and blade in a direction parallel to a cutting edge of the blade comprising an electromagnet core disposed entirely within the casing and including spaced apart pole pieces and an energizing winding arranged to energize the core from an alternating current source, and a permanent magnet armature carried by said ferrule and having an end portion arranged in inductive relation with said pole pieces when the razor head is positioned at the top of the casing.

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