March 27, 1928.

1,663,809

S. W. MOON

ELECTRIC SAFETY RAZOR

Filed April 3, 1925

Fig. 3

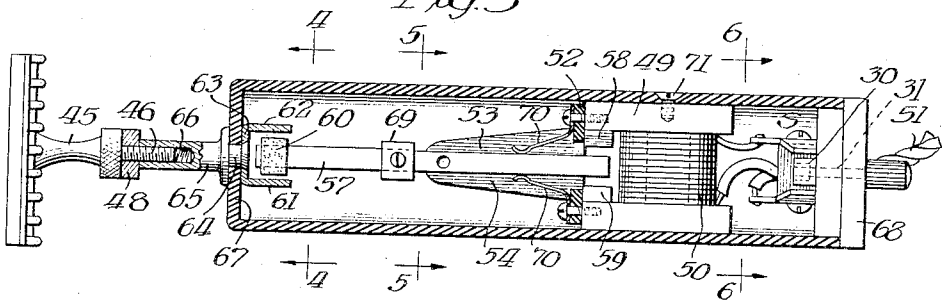


Fig. 4

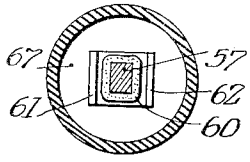


Fig. 5

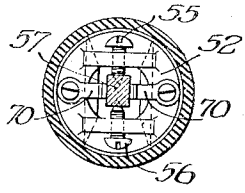


Fig. 6

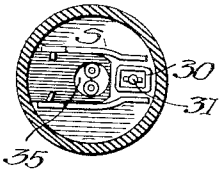


Fig. 1

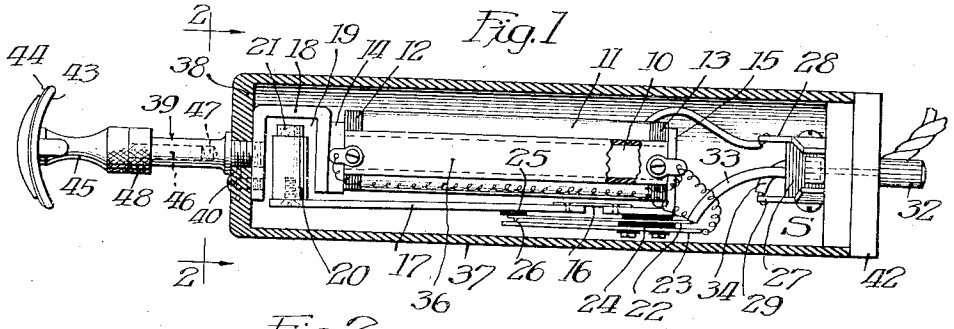
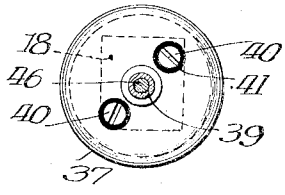


Fig. 2



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Patented Mar. 27, 1928. 1,663,809

UNITED STATES PATENT OFFICE.

SAMPSON W. MOON, OF CHICAGO, ILLINOIS.

ELECTRIC SAFETY RAZOR.

Application filed April 3, 1925. Serial No. 20,343.

My invention relates to electric safety razors and may be considered as an improvement over the construction disclosed in my Patent No. 1,072,634, dated September 9, 1913. In the structure of this patent the main feature is the reciprocation or vibration of the blade as it is being drawn over the face during a shaving operation. In the arrangement of the patent, the supporting post for the blade extends from the electromagnet frame which is tapped by the vibrating armature so that the grip or handle structure must be provided with an opening for the stem and for providing clearance for such vibration. However, this opening may permit the entrance of water into the grip structure and interference with the electrical circuit, the customary way of cleaning the blade being to slush it back and forth in water.

One of the important objects of my present invention is to make the grip or enclosing frame water tight. Another feature of the invention is the mounting of the tool support directly on the grip or housing frame and to subject this frame to the vibration blows of an armature so that the blows of vibrations will be transmitted to the tool. By exerting a lighter or heavier grip on the grip frame, the vibration effect of the tool can be readily adjusted during the operation of using the tool.

Another object of the invention is to provide an improved construction particularly adaptable to be driven by alternating current and in which construction contacts are eliminated.

Another object is to provide improved arrangement which will permit the operating parts to be withdrawn as a unit from the grip or housing structure.

The above and other features of the invention are disclosed in the structure shown on the drawing.

On the drawing:—

Fig. 1 is a plan view with the grip shell in diametral section of a structure adapted for both alternating current or direct current driving;

Fig. 2 is a sectional view on plane 2—2 of Fig. 1;

Fig. 3 is a plan view partly in section of a structure adapted particularly for connection with an alternating current source;

Fig. 4 is a sectional view on the plane 4—4 of Fig. 3;

Fig. 5 is a sectional view on plane 5—5 of Fig. 3; and

Fig. 6 is a sectional view on plane 6—6 of Fig. 3.

In the construction of Fig. 1, an electromagnet core 10 has a winding 11 wound thereon between insulating ends 12 and 13. At its outer end the core terminates in a pole head 14. At its other end an L-shaped pole piece 15 is secured to the core end and extends a distance along one side thereof to form a support for the flat spring 16 from which extends the armature bar 17, the spring 16 being of magnetic material so that when current flows through the coil the armature bar will be attracted toward the pole piece 14. A U-shaped frame 18 of non-magnetic material is secured to the pole piece 14 and provides the space 19 for accommodating the weight 20 secured to the end of the armature bar, the yoke of the frame 18 being struck by the weight as the armature vibrates. To cushion the blow and prevent noise, a shoe 21 of rubber or other suitable material may be interposed between the weight and the frame, the shoe being shown secured to the end of the weight. The weight may be of some heavy substance, such as lead, in order that a small volume will give the necessary weight and striking power.

Mounted on the pole piece 15 are the inner and outer contact springs 22 and 23 insulated from each other and from the pole piece by insulating washers 24. The inner spring at its outer end rests against the armature bar 17, but is insulated therefrom by insulation 25. The spring has a contact point 26 which engages with the outer spring when the armature bar is retracted. When the armature is attracted, the springs are electrically disengaged and the electromagnet energizing circuit will be opened. To control the circuit, switch mechanism S is employed, which may be of any suitable construction. As shown, it comprises a block 27 of insulating material to which are secured the contact plates 28 and 29 between whose outer ends the contact member 30 is rotatable, being supported on the shaft 31 rotatable by means of the button 32. When the blade extends longitudinally between the contact blades, these blades will be disconnected, but when the blade extends transversely, the contact plates will be electrically connected and the circuit closed at that point. In the circuit arrangement shown,

the terminal 32 of an electrical circuit connects with the inner contact spring 22, the outer spring being connected with one terminal of the winding 11, the other terminal of which connects with the contact plate 28. The other switch plate 29 connects with the circuit conductor 34 and the circuit conductor extends through a suitable opening 35 through the block 27. To prevent sparking at the contact point, a condenser 36 is connected with the contact springs and is secured on the electromagnet coil. The arrangement shown will operate equally well with direct current or alternating current, the armature being rapidly vibrated and the frame 18 being rapidly struck by the armature weight.

The grip or housing frame 37 is in the form of a cylindrical shell of insulating material, such as rubber, fiber, bakelite, or any other suitable material, and its outer end is closed by the wall 38 preferably integral with the cylindrical shell. Secured centrally in this end wall is the post 39 to which shaving, massaging, or other tools may be applied. The electromagnetic structure described is slipped into the open end of the shell with the outer leg of the frame 18 against the inner side of the end wall 38, and then screws 40 are applied to securely hold the frame 18 to the wall so that the taps or blows of the armature are conducted from the frame to the end wall and tool supporting post 59. Sealing material, as for example, rubber washers 41, is associated with the screws 40 to prevent entrance of moisture into the grip frame. The end of the frame is closed by a plug 42 which may be an extension of the switch block 27.

I have shown a frame 43 for supporting a safety razor blade 44, the frame stem 45 having the threaded stud 46 for engaging in the threaded bore 47 of the post 39. A lock nut 48 will secure the tool frame in any adjusted position on the post. The blade supporting frame shown is the well known Gillette head, it being evident that the head of other well known types of safety razors may be substituted. Massaging tools of various kinds can also be applied to the post 39 so that my improved device has a wide range of use. When the device is to be used, it is connected with an ordinary electric light circuit whereupon the armature will vibrate and strike the frame 18 which will communicate the blows or oscillations to the post 39 and the tool. If it is a shaving tool, it is drawn along the skin and, depending upon the setting of the tool, the blade will be oscillated or rapidly reciprocated. In the arrangement of Fig. 1, the oscillations will be in a direction transverse of the blade so that the blade will operate more or less like a chisel when drawn across the skin. The tool may be adjusted so that the oscillations will be lengthwise thereof or diagonally. Such vibrations or oscillations will greatly facilitate the ease and efficiency of shaving and will prevent pulling out of the hair. The grip shell being sealed at its outer end, the tool can be readily cleaned by slushing back and forth in water without danger of any moisture getting into the frame and to the surface.

In Figs. 3 to 6, the modified arrangement is shown which is particularly adaptable for operation by an alternating current circuit and in which contacts are avoided. The electromagnet frame 49 is of **H** shape and supports the winding 50 connected through the switch mechanism S with the external circuit 51. A frame 52 of nonmagnetic material is secured against the inner end of the legs of the electromagnet frame, and has parallel arms 53 and 54 extending therefrom for supporting the pivot screws 55 and 56 which pivot the armature bar 57. The inner end of the bar extends between the poles 58 and 59 on the electromagnet frame and the armature is polarized so that when alternating current flows through the magnet winding, the armature will be oscillated. At its outer end, the armature bar carries a bumper sleeve 60 for softening and quieting the blows of the armature end against the legs 61 and 62 of a **U**-frame 63 which is secured to the end of the stud 64 on the post 65 which supports the tools. The post has the threaded bore 66 for receiving the threaded stud 46 of the tool supporting frame. The stud 64 is securely anchored to the end wall 67 and the blows from the armature will therefore be transmitted from the frame 63 to the grip shell and to the post 65, the tool secured to the post partaking of this vibration. The end of the shell is closed by the plug 68 which also supports the switch mechanism S.

In order to adjust the armature bar for synchronous cooperation with the alternation of the alternating current circuit, a weight 69 may be adjustably mounted on the armature bar. Springs 70 may also be provided which engage against opposite sides of the armature bar and tend to hold them in normal position. The springs may be secured by the screws which support the frame 52 on the electromagnet frame and they will assist in making the oscillations of the armature uniform and regular.

The electromagnet frame with the armature supported therefrom, constitutes a unit which can be removed from or inserted into the grip frame, and when inserted a screw 71 will lock it in proper position relative to the abutment frame 63. When the plug 68 is then inserted, the structure will be water and dust proof. The device is operated in the same way as that shown in Fig. 1, the grip frame being held in the hand with more or less firm hold so that the blows or

taps of the armature can be correspondingly conveyed to the tool for shaving, massaging, or other treatment, depending upon the tool used. As the grip frame itself partakes of the blows of vibration, it may be applied directly to the body for massaging or treating.

I thus provide a simple, efficient device which can be connected directly with an ordinary lighting circuit and used for shaving, massaging and for other purposes, the structure being moisture and dust proof.

I do not desire to be limited to the exact construction, arrangement and operation shown and described, as modifications can be made which will still come within the scope of the invention.

I claim as follows:—

1. In an electric safety razor, a hollow grip having an end wall, an abutment member disposed within said grip in proximity to said end wall, a tool post having a shoulder thereon rigidly and directly attached to said abutment member, said end wall being clamped between said abutment member and said shoulder, a shaving blade head on said post, an electromagnet in said grip, and an armature for said electromagnet mounted to strike said abutment member on actuation.

2. In an electric safety razor, a hollow grip having an end wall, an abutment member disposed within said grip in proximity to said end wall, a tool post rigidly and directly attached to said abutment member and to said end wall, a shaving blade head on said post, an electromagnet in said grip, and an armature for said electromagnet mounted to strike said abutment member in a direction at right angles with the tool post axis.

In witness whereof, I hereunto subscribe my name this 28th day of March, 1925.

SAMPSON W. MOON.