April 23, 1940. H. A. AMENT 2,197,910

ELECTRIC RAZOR APPARATUS

Filed May 29, 1939

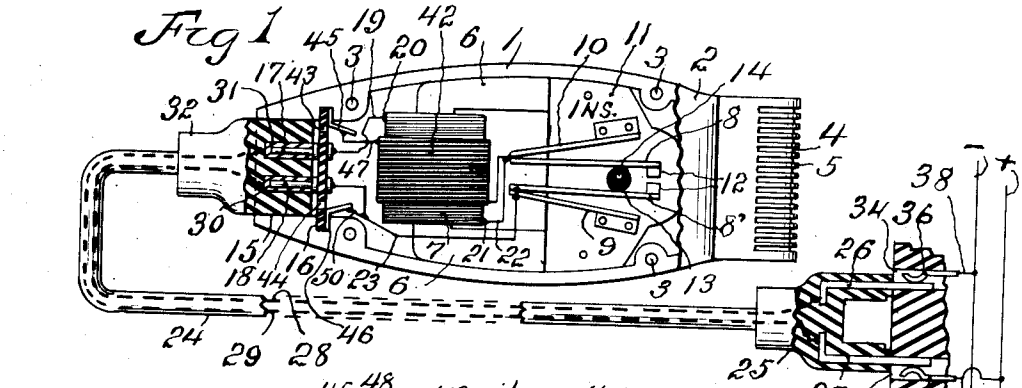


Fig 1

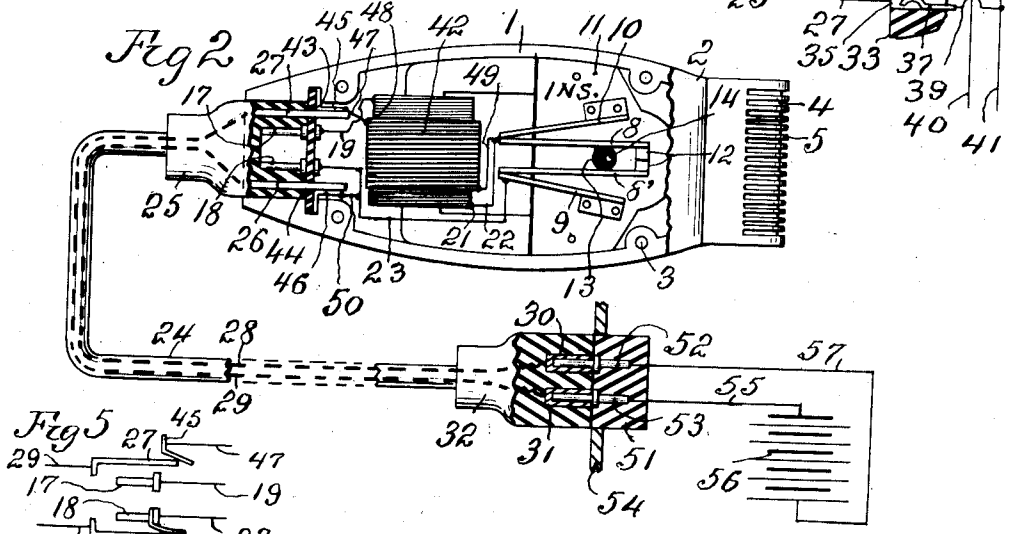


Fig 2

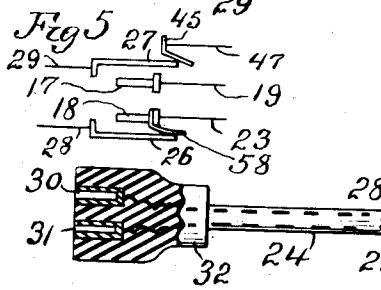


Fig 5

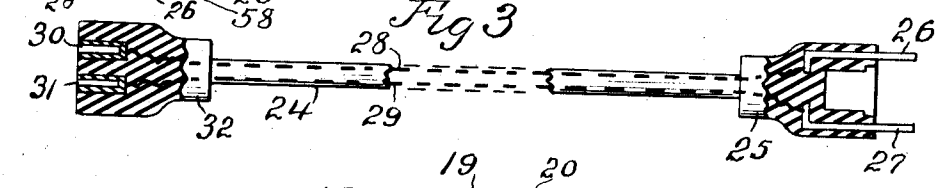


Fig 3

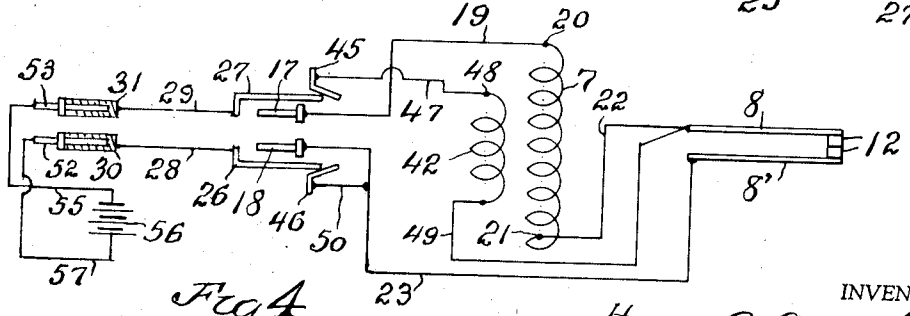


Fig 4

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ELECTRIC RAZOR APPARATUS

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4 Claims. (Cl. 172—179)

My invention relates to electric razor apparatus of the type in which the razor blade is operated by an electric motor contained in a casing which provides a support for the razor blade, and its guard and motor connections.

The usual type of electric razors are provided with a motor having a single energizing winding adapted for use only with relatively high voltage, such as the usual A. C. or D. C. house service, as 110 volts.

One of the objects of applicant's invention is to provide an electric razor apparatus of the kind described, which can be used on high voltage, and also with batteries, as of 6–8 volts, such as are carried on automobiles, whereby the owner of my improved razor can employ the usual house electric system, or the battery of his car, when shaving.

A further object of my invention is the provision of novel means for connecting the improved razor selectively to the high voltage electric source of supply, or to a battery without possibility of making a wrong connection with possible disastrous results to the razor, and which connection construction is rendered "foolproof."

Still another object of my invention is the provision of a novel electric razor apparatus which is simple, cheap, strong, durable, not likely to get out of order, and which is efficient in its operation.

Another object of my invention, is the provision of a novel construction which enables an electric razor of usual type to be easily and cheaply altered so as to embody my improvements.

The novel features of my invention are hereinafter fully described and claimed.

In the accompanying drawing, which illustrates my invention:

Fig. 1 is a view partly in plan, partly in horizontal section, partly broken away, and partly diagrammatic of my improved razor apparatus, in which the motor is shown with its high resistance winding connected to a source of current supply of relatively high voltage.

Fig. 2 is a view similar to Fig. 1, showing the connector reversed and connecting the low resistance winding of the motor to a battery of relatively low voltage.

Fig. 3 is a view of the connector, partly in plan, partly in horizontal section, and partly broken away.

Fig. 4 is a diagrammatic view of the circuit in which the low resistance winding of the motor is connected with the battery.

Fig. 5 is a plan view of a modification in which two of the contacts on the razor support are integral with each other the projecting contacts of the connector being shown contacting with the contacts which are connected to the ends of the low resistance winding.

Similar characters of reference designate similar parts in the different views.

In the drawing I have shown my invention embodied in an electric razor apparatus of ordinary construction, in which there is a casing comprising a bottom member, on which is removably fastened an upper cover member 2, shown partly broken away, normally secured by screws (not shown) adapted to fit in threaded holes 3 in the bottom member 1. The oscillating razor blade 4 is disposed in a transversely slotted guard 5 at the front end of the bottom member 1.

The blade 4 is reciprocated by driving means, of any well known construction, actuated by any usual type of electric motor having the usual U shaped field magnet 6 encircled by an energizing winding 7 having the number of coils of length and cross sectional area and resistance adapting the winding for energization by current from the usual house lighting system, having a voltage, as for example, 110 A. C. or D. C.

For successively making and breaking the circuit in which is included the winding 7, there are provided two contact springs 8 and 8' respectively fastened at one set of ends to two bars 9 and 10 mounted on a plate of insulation 11 in the casing. The inner sides of the free ends of the spring plates 8 and 9 are respectively provided with two contacts 12, normally held by the spring plates 8 and 9 in contact with each other. A cam 13 of insulation material mounted on the armature shaft 14 of the motor, contacts with the inner sides of the spring plates 8 and 9, and at each revolution of the shaft 14 swings the spring plates 8 and 9 away from each other, so as to separate from each other the contacts 12.

The rear end of the casing, comprising the members 1 and 2, has a socket 15 at the inner end of which is a transverse plate 16 of insulation, having mounted in it the inner ends of two outwardly projecting contacts 17 and 18. A conductor 19 connects the contact 17 with one terminal 20 of the winding 7, the other terminal 21 of which is connected by a wire 22 with the spring 8. The other spring 9 is connected by a wire 23 with the contact 18.

In so far as has been described, the razor construction is of usual type. It is connected to a source of current supply, as the usual house

lighting system, by a cord connector of usual construction, comprising a flexible insulating member 24, having at one end a plug 25 having two insulated projecting contacts 26 and 27, respectively connected by two wires 28 and 29 to two insulated socket contacts 30 and 31 in a socket member 32 attached to the other end of the member 24.

Referring to Fig. 1, the house lighting system has a socket 33 usually mounted in the wall having two openings 34 and 35 in which are respectively mounted two contacts 36 and 37, respectively connected by wires 38 and 39 with the return and supply conductors 40 and 41 respectively.

In using the razor in connection with the house lighting system, the plug 25 has its contacts 26 and 27 inserted into the openings 34 and 35 and contacting respectively with the contacts 36 and 37.

The socket member 32 is inserted into the socket 15 with its socket contacts 31 and 30 respectively fitted on the contacts 17 and 18.

The current will then pass from the positive conductor 41 by the conducting wire 39, contact 37, contact 27, conducting wire 29, contact 31, contact 17, conductor 19, through winding 7, conductor 22, spring plate 8, contacts 12, spring plate 8', conductor 23, contact 18, contact 30, conductor wire 28, contact 26, contact 36, and wire conductor 38 to the minus conductor 40.

The winding 7 will thus be energized by the relatively high voltage from the house supply system, thereby operating the motor of the razor, which will reciprocate the blade 4 in the usual manner.

Applicant's improvement starts at this point, and comprises the following described construction.

Around the winding 7 is wound a winding 42, comprising a conductor wire having less coils, less length and greater cross sectional area than the wire of winding 7, and having less resistance, so as to adapt it for use with a relative low voltage, as that from a usual storage battery such as are used on automobiles.

The insulation plate 16 is provided at the outer sides respectively of the contacts 17 and 18 two openings 43 and 44 adapted to receive respectively the projecting contacts 26 and 27 of the connector plug 25.

Respectively mounted adjacent to the openings 43 and 44 on the insulation plate 16 are two contacts 45 and 46. The contact 45 is connected by a conductor wire 47 with one terminal 48 of the winding 42, the other terminal of which is connected by a conductor wire 49 with the spring plate 8. The contact 46 is connected by a conductor wire 50 with the conductor wire 23.

A plug 51 having two contacts 52 and 53 is mounted where desired, as on the instrument board 54 of a car. The contact 53 is connected by a conductor 55 with the positive pole of a battery 56, as a car battery of say 6–8 voltage. The contact 52 is connected by a conductor 57 with the other pole of the battery 56, see Figs. 2 and 4.

In connecting the razor with the battery 56, the plug 25 is inserted in the socket 15 of the razor casing with the contacts 27 and 26 respectively inserted through the openings 43 and 44 of the insulation plate 16, and respectively in contact with the spring contacts 45 and 46.

The socket member 32 of the connector is mounted in the instrument board 54 with its contacts 30 and 31 respectively contacting with the contacts 52 and 53, as shown in Figs. 2 and 4.

The current will pass from the battery 56 through the conductor 55, contacts 53 and 31, conductor 29, contacts 27 and 45, conductor 47, winding 42, conductor 49, spring plate 8, contacts 12, conductor 23 and conductor 50, contacts 46 and 26, conductor 28, contacts 30 and 52 and conductor 57 back to the battery 56, whereby the winding 42 is energized and the motor operated to reciprocate the razor blade.

When it is desired to employ the razor with the high voltage source of current supply, the plug 25 is withdrawn from the razor socket 15, and the connector is reversed and the plug or socket member 32 is fitted in the socket 15, as shown in Fig. 1, and the plug 25 has its contacts 26 and 27 respectively engaged with the contacts 36 and 37 of the wall socket 33, as has been described.

The socket member 32 has its contacts 30 and 31 so formed, spaced and arranged that its contacts can not be connected with the contacts of the usual wall socket 33, so that there is no liability of the high voltage of the house system being sent through the low resistance winding 42, with possible destruction of the razor, or the burning out of the winding 42. The improved apparatus, therefore, is "foolproof," and can be safely used, by an operator, on either high or low voltage currents, thereby enabling him to utilize the battery of his car when away from home and on the road, and to utilize the house lighting system, when at home.

In Fig. 5 is shown a slight modification, in which the conductor 50 and the contact 46 are eliminated, and a spring extension 58 substituted therefor and made integral with the contact 18. The spring extension 58 is disposed so as to contact with either of the projecting contacts 26 or 27, depending on the disposition of the plug 25, when inserted into the razor socket 15. In other respects the parts are arranged and function as has been described in connection with the form shown in Figs. 1 and 2.

Other modifications of my invention, within the scope of the appended claims, may be made without departing from the spirit of my invention.

What I claim is:

1. In an electric razor, in combination, a support, electric motor razor blade operating means mounted on said support and having two energizing windings, two conductors on said support having at one set of ends two contacts and connected at the other ends with one set of terminals of said windings, conducting means on said support connecting with the other terminals of said windings and having contact means, and a connector for supplying current to said windings having means for detachably connecting either of its ends with said support and provided with two conductors extending from end to end of said connector and having one set of ends disposed so as to respectively contact with one of said two contacts and with contacting means, when the adjacent end of said connector is attached to said support, the other ends of said connector conductors being disposed so as to contact with the other of said two contacts, and with said contact means respectively, when the other end of said connector is attached to said support.

2. In an electric razor, in combination, a support, electric motor blade operating means on said support and having two energizing windings

comprising respectively two conductors one of greater length and less cross sectional area than the other, two conductors respectively connected to one set of terminals of said windings and having respectively two contacts, conducting means on said support connecting with the other terminals of said windings and having contact means, and a connector for supplying current to said windings and having means for detachable connection at either end with said support and having two conductors with one set of ends disposed so as to contact respectively with one of said contacts and with said contact means when the adjacent end of said connector is attached to said support, the other ends of said connector conductors being disposed so as to contact with the other of said two contacts, and with said contact means respectively, when the other end of said connector is attached to said support.

3. In an electric razor apparatus of the kind described, in combination, a support, electric motor blade operating means on said support and having two energizing windings comprising respectively two conductors one of greater length and less cross sectional area than the other, two conductors respectively connected to one set of terminals of said windings and having respectively two contacts, conducting means on said support connecting with the other terminals of said windings and having contact means, a connector having means for detachable connection at either end with said support, and having two conductors with one set of ends so disposed as to respectively contact with said contact which is connected to said winding of greater length, and with said contact means, the other ends of said conductors of said connector being so disposed as to respectively contact with said contact connected with said winding of shorter length and with said contact means, a source of current supply of one voltage having two contacts disposed so as to respectively contact with the ends of said connector conductors which are disposed so as to contact respectively with said contact connected to said winding of greater length and said contact means, and not contact with the other ends of said connector conductors, and another source of current supply of greater voltage than that of the other said source of current supply, and having two contacts disposed respectively so as to contact with the ends of said connector conductors which are disposed to contact respectively with said contact connected to said shorter winding and said contact means, said contacts of said source of current supply of greater voltage, being so disposed as not to afford operative contact respectively with the ends of said connector conductors, which are adapted to make contact respectively with said contact that is connected with said longer winding and with said contact means.

4. In an electric razor apparatus of the kind described, in combination, a support, electric motor blade operating means on said support and having two energizing windings comprising respectively two conductors one of greater length and less cross sectional area and greater resistance than the other, two conductors respectively connected to one set of terminals of said windings and having respectively two contacts, conducting means on said support connecting with the other terminals of said windings and having contact means, a connector having means for detachable connection at either end with said support, and having two conductors provided respectively at one set of ends with two projecting contacts, and having at their other ends respectively two socket contacts, said socket contacts being so disposed as to make contact respectively with said contact connected with said longer winding and with said contact means, said projecting contacts being so disposed as to make contact respectively with said contact connected with said shorter winding and with said contact means, a source of current supply of one voltage having two contacts so disposed as to respectively contact with said socket contacts and not with said projecting contacts, and a source of current supply of greater voltage than that of the other source of current supply, and having two contacts disposed so as to respectively contact with said projecting contacts and not with said socket contacts.

HARRY A. AMENT.