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ELECTRIC RAZOR

Filed May 17, 1965

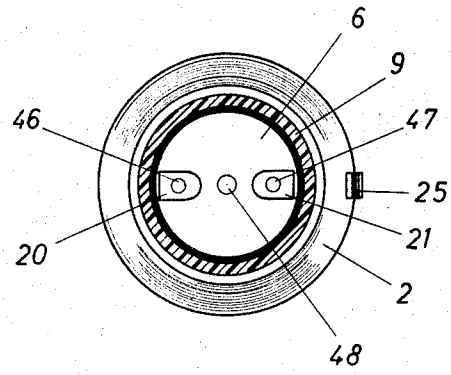


Fig. 3

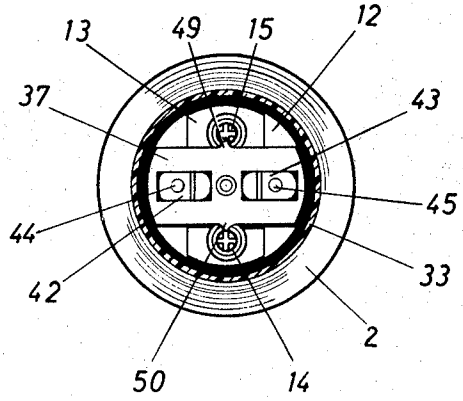


Fig. 4

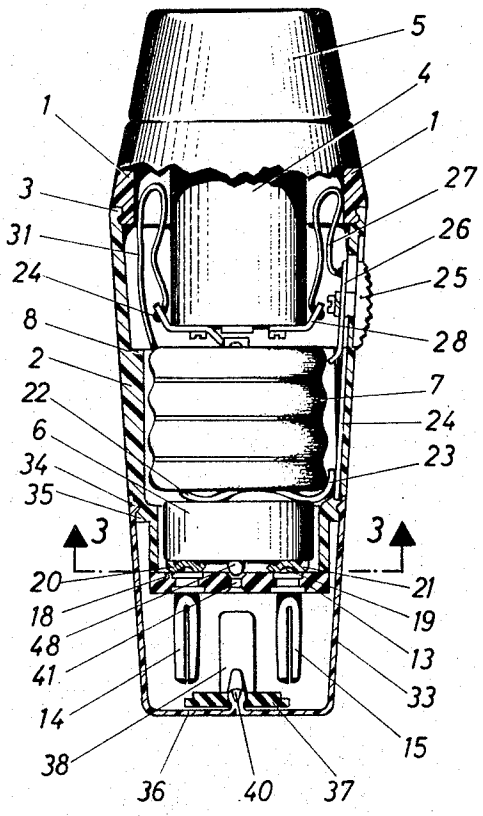


Fig. 1

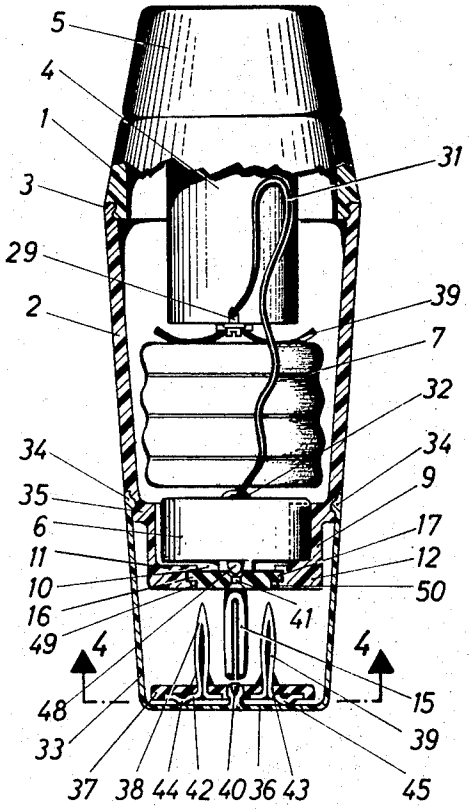


Fig. 2

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ELECTRIC RAZOR

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ABSTRACT OF THE DISCLOSURE

In an electric razor carrying its own chargeable source of electric energy and adapted to be plugged in an outlet for charging the source of energy and comprising two contact means having each a pair of differently spaced prongs and means for interchangeably attaching the two contact means to the housing of the razor so that the latter may be selectively plugged into electrical outlets having female contacts of different spacing.

The present invention relates to an electrical implement carrying its own chargeable source of electrical energy and adapted to be plugged in an outlet of an electric current supply for charging the chargeable source of energy carried by the implement.

More specifically, the present invention relates to an electric razor carrying an accumulator and a charging device for charging the accumulator and provided with contact means to be plugged in an electric outlet so that the accumulator may be charged by the charging device while the electrical razor is carried on the outlet.

The female contact elements of electrical outlets or sockets are spaced and dimensioned in different countries according to different standards, for instance the female contact elements in various European countries have an internal diameter of 4 mm. and are spaced 19 mm. from each other, whereas in the United States and many other countries rectangular shaped female contact elements are provided which are spaced from each other a distance of approximately 12 mm. Since electrical implements and especially electric razors are used by travellers passing through many countries, it is obvious that due to the different standardization of the contacts of electrical outlets in different countries, a razor, which is provided with male contact elements suitable for engagement with female contact elements of outlets made according to the standards in one country, can not be used or charged in another country in which the outlets are provided with female contact elements differing in spacing or cross section from that of the male contact elements on the razor.

It is an object of the present invention to overcome the aforementioned difficulties resulting from different standardization of electrical outlets in different countries.

It is an additional object of the present invention to provide an electrical implement and especially an electric razor carrying its own accumulator and charging device and which is constructed in such a manner that the accumulator can be charged by plugging the contact means into an outlet regardless to what standards the female contact elements in the outlet are made and arranged.

It is a further object of the present invention to provide an electrical implement and especially an electric razor of the aforeemntioned type which can quickly and without the use of any tools be adapted for plugging into outlets of different standardization.

With these objects in view, the present invention includes in an electrical implement carrying its own chargeable source of electrical energy and adapted to be plugged in an outlet of an electrical current supply for charging the chargeable source of energy, first contact means including a first insulating member and a pair of prongs mounted on the insulating member spaced a fixed given distance from each other, second contact means including a second insulating member and a pair of prongs mounted on the second insulating member spaced a fixed distance from each other which is different from the aforementioned distance, and mounting means on the implement for interchangeably attaching the first and the second contact means in a rigid manner thereon so that when the attached contact means is plugged into a socket of an electric current supply, the implement is carried on the socket, while the attached contact means will provide electrical connection between the current supply and the chargeable source of electric energy, whereby the implement may be plugged into sockets having female contact elements of different spacing.

More specifically, the invention includes in an electric razor, an elongated housing having opposite ends, motor means mounted in the housing adjacent one end thereof, accumulator means in the housing electrically connected to the motor means, a charging device mounted in the housing adjacent the other end thereof and electrically connected to the accumulator means, wherein the charging device has a pair of spaced contacts facing the other end of the housing, first contact means including a first insulating member and a pair of prongs extending through the first insulating member and having inner ends spaced from each other a distance equal to the spacing of the pair of contacts on the charging device and outer end portions projecting from the insulating member spaced a given distance from each other, second contact means including a second insulating member and having a pair of prongs extending through the second insulating member and having inner ends spaced from each other a distance equal to the spacing of the pair of contacts and outer end portions projecting from the second insulating member spaced from each other a distance differing from the aforementioned given distance. The electric razor includes further mounting means on the other end of the housing for interchangeably attaching the first or the second contact means in a rigid manner thereon so that, when the attached contact means is plugged into a socket of an electric current supply, the razor is carried on the socket while the attached contact means will provide an electric connection between the current supply and the charging device, whereby the razor may be plugged into sockets having female contact elements of different spacing for charging the accumulator means therein.

The electric razor preferably includes also hollow cover means releasably connected to the other end of the housing for covering the contact means connected to the cover means of the housing when the razor is used and not charged, and means are provided in the cover means for releasably holding the contact means therein which are not connected to the other end of the housing.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings, in which:

FIG. 1 is a partially sectioned front view of the electric razor according to the present invention;

FIG. 2 is a partially sectional side view of the razor shown in FIG. 1;

FIG. 3 is a cross section through the razor taken along the line 3—3 of FIG. 1 and viewed in the direction of the arrows; and

FIG. 4 is a cross section taken along the line 4—4 of FIG. 2 and viewed in the direction of the arrows.

Referring now to the drawings, and more particularly to FIGS. 1 and 2 of the same, it will be seen that the electric razor according to the present invention includes an elongated housing having an upper part **1** and a lower part **2** releasably connected to each other at **3**, and as can be seen from the drawings the upper part **1** is at its bottom end provided with a groove and an annular projection cooperating with corresponding groove and projection on the upper end of the lower part **3** so that the two parts, which are preferably made from plastic material, can be connected with a snap fit to each other. The parts **1** and **2** can however also be connected to each other by providing cooperating male and female threads at the lower end of the upper part **1** and the upper end of the lower part **2**. Mounted in the upper part **1** in any convenient manner is a small electro-motor **4** for driving the actual razor mechanism in a known manner. The razor mechanism of known construction is not shown in the drawing, but this mechanism is covered by a protective removable cover **5**. A charging device **6** of known construction and an accumulator **7** are located in the lower part **2** of the housing removable therefrom when the two housing parts are disconnected from each other. A plurality of ribs **8** circumferentially spaced from each other and projecting inwardly from the wall of the lower housing part **2** position the accumulator **7** along the axis of the housing. The part **2** has a lower cylindrical portion **9** in which the charging device **6** is housed, resting on the bottom of the lower housing part **2**. The bottom of the lower housing part **2** is formed with a transverse slot **10** therethrough so as to leave two circular segments **11** and **12** on opposite sides of the slot **10**. A plate **13** of insulating material is inserted in the slot **10** and the plate **13** has along opposite side faces thereof longitudinal guide ribs **16** and **17** which fit into appropriate grooves extending from the side faces of the slot **10** into the bottom parts **11** and **12**. A pair of contact prongs **14** and **15** are riveted with their upper ends into appropriate openings in the plate **13** and project with the main portions thereof from the bottom surface of this plate. The prongs **14** and **15** are spaced a given distance from each other so as to be adapted to fit into female contact elements of an electrical outlet socket. The rivet heads **18** and **19** of the prongs **14** and **15** are projecting beyond the upper surface of the plate **13** and resiliently engage with curved contact springs **20** and **21**, respectively, which are electrically connected to the charging device **6**. The charging device **6** is electrically connected to the accumulator **7** by a curved leaf spring **22** which is fixed to the charging device **6** and which presses against a conductive bottom face of the accumulator **7**. The spring **22** engages with its curved right end **23**, as viewed in FIG. 1, which projects beyond the charging device, a longitudinally extending electrically conductive flat leaf spring **24** at one end thereof, the other end of which is engaged by a springy contact **26** of the sliding switch **25** when the switch is in position as shown in FIG. 1. The switch **25** is movable in longitudinal direction of the housing to open the contact between springs **24** and **26**. The contact **26** of the switch **25** is connected by an insulated flexible conductor **27** to one terminal contact **28** on the motor **4**. The other terminal contact **29** of the motor **4** is electrically connected to a curved leaf spring **30** and through a flexible insulated conductor **31** with the second terminal **32** of the charging device **6**. The aforementioned spring **30** presses against an electrical conductive end face of the accumulator **7** and forms thereby the second terminal contact of the accumulator.

The contact prongs **14** and **15** are normally covered by a cup-shaped cover **33** which is removed from the

housing of the razor only when the accumulator **7** is to be charged and the prongs **14** and **15** are plugged into corresponding contact elements of an outlet socket of an electrical current supply. The cover **33** is formed from resilient material, for instance plastic, and is provided at its upper rim with an annular inwardly extending projection **34** which fits into an appropriate groove in the lower housing part **2** so that the cover may be connected with a snap fit to the lower housing part.

The plate **13** with the prongs **14** and **15** connected thereto constitutes first contact means and according to the present invention the electric razor is provided with second contact means which are constituted by an insulating plate **37**, of the same outer configuration as plate **13**, to which a pair of contact prongs **38** and **39** are fixedly connected extending with portions **42** and **43** thereof respectively through appropriate openings in the insulating plate **37** and having curved contact portions **44** and **45**, respectively, which are spaced from each other the same distance as the contact springs **20** and **21** on the charging device **6** so as to be adapted to resiliently engage the aforementioned contact springs when the plate **37** is pushed instead of the plate **13** into the slot **10** at the bottom of the lower housing part **2**. The prongs **38** and **39** are spaced from each other a distance different from the spacing between the prongs **14** and **15** and the spacing of the prongs **38** and **39** corresponds to the spacing between female contact elements in electrical outlet sockets according to United States standards. Whereas the prongs **14** and **15** are substantially cylindrical in cross section corresponding to the cross sections of female contact elements in outlet sockets of certain European countries, the prongs **38** and **39** are substantially rectangular in cross section according to the standards of female socket elements in the United States.

To secure the plate **13**, or the plate **37**, when inserted into the slot **10** in the bottom of the housing part **2**, against longitudinal displacement, the springs **20** and **21** are preferably formed with cavities **46** and **47** (FIG. 3) into which the rivet heads **18** and **19** of the prongs **14** and **15** or the curved portions **44** and **45** of the prongs **38** and **39** are adapted to fit when the plate **13** or the plate **37** is pushed into the slot **10**. For the same purpose a projection **48** may also be provided on the charging device **6** which is adapted to engage into a central opening **41** of the plate **13** or into a corresponding opening of the plate **37** when the latter is pushed instead of the plate **13** into the slot **10**. The side faces of the plates **13** and **37** may also be provided with short projections **49** and **50** (FIG. 4) which are adapted to engage into corresponding notches in the bottom parts **11** and **12** to secure the plates **13** or **37** respectively against longitudinal displacement in the slot **10**. Any of the aforementioned complementary engaging means may be used for securing the plate **13** or **37** against longitudinal displacement in the slot **10** and these complementary engaging means may be used either singly or in combination. A substantially spherical button **40** projects upwardly from the bottom **36** of the cup-shaped cover **33** which serves to releasably hold the insulating plate **13** or **37**, that is that insulating plate which is not pushed into the slot **10** of the lower housing part **2**.

The slot **10** in the lower housing part **2** with its guide grooves forms mounting means on the lower end of the housing for interchangeably attaching first contact means constituted by the plate **13** and the contact prongs **14** and **15** or second contact means that is the plate **37** with the prongs **38** and **39** in a rigid manner on the housing so that the electric razor of the present invention may be plugged into electrical outlet sockets the female contact elements of which are constructed either to European or United States standards. The contact means which are not in use are resiliently held on the cover **33** while the other contact means are placed in the slot **10** and are electrically connected to the charging device so as to be usable for charging the accumulator of the razor.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of electrical implements carrying their own chargeable source of electrical energy and adapted to be plugged in an outlet of an electric current supply for charging the chargeable source of energy differing from the types described above.

While the invention has been illustrated and described as embodied in an electric razor having an accumulator and a charging device and being adapted to be plugged in an outlet, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

What is claimed is:

1. An electric razor comprising, in combination, an elongated housing having a bottom wall and being formed in said bottom wall with a slot extending transversely therethrough and being defined by a pair of edge faces each formed with a longitudinally extending groove; motor means in said housing at a portion thereof spaced from said bottom wall; a charging device in said housing adjacent said bottom wall and having a pair of spaced resilient contacts facing said slot; an accumulator in said housing arranged between and electrically connected to said motor means and said charging device; first contact means including a first insulating plate of a width substantially equal to the width of said slot and having longitudinal edge portions adapted to fit into said grooves so that said edge portions of said first insulating plate may be slid into said grooves to releasably connect said first contact means to said bottom wall of said housing, said first contact means further include a pair of prongs extending through said first insulating plate and having inner ends spaced from each other a distance equal to the spacing of said pair of contacts so as to resiliently engage the latter when said first insulating plate is placed in said slot, and a pair of outer end portions spaced a given distance from each other; and second contact means including a second insulating plate having a width substantially equal to the width of said slot and having a pair of longitudinal edge portions adapted to fit into said grooves so that said edge portions of said second insulating plate may be slid into said grooves after said first contact means are removed therefrom to releasably connect said second contact means to said bottom wall of said housing, said second contact means further include a pair of prongs having inner ends spaced from each other a distance equal to the spacing of said pair of contacts so as to resiliently engage the latter when said second insulating plate is placed in said slot, and a pair of outer end portions spaced a distance from each other which is different from said given distance, said resilient contacts of said charging device and said inner ends of said prongs of said first and second contact means having complementary portions adapted to resiliently engage each other for resiliently locking the inserted contact means in place on said bottom wall of said housing, whereby, depending on the contact means inserted in said bottom wall, said razor may be inserted into sockets having female contact elements of different spacing for charging the accumulator in the housing.

2. A razor as set forth in claim 1, wherein said housing includes two parts releasably connected to each other, wherein said accumulator means and said charging device are removably mounted in said housing, and including conductor means for electrically connecting said accumulator to said motor means and said charging device and for providing electrical contact between the prongs of that contact means which is inserted in said slot, said conductor means including contact springs for providing resilient contact between the inner ends of the prongs of that contact means which is inserted in said slot and said contacts of said charging device.

3. An electric razor comprising, in combination, an elongated housing having a bottom wall and being formed in said bottom wall with a slot extending transversely therethrough and being defined by a pair of edge faces each formed with a longitudinally extending groove; motor means in said housing at a portion thereof spaced from said bottom wall; a charging device in said housing adjacent said bottom wall and having a pair of spaced resilient contacts facing said slot; an accumulator in said housing arranged between said motor means and said charging device; conductor means for electrically connecting said accumulator to said motor means and to said charging device, said conductor means including a springy conductor element sandwiched between said accumulator and said charging device and biased so as to resiliently press said charging device toward said bottom wall of said housing; first contact means including a first insulating plate of a width substantially equal to the width of said slot and having longitudinal edge portions adapted to fit into said grooves so that said edge portions of said first insulating plate may be slid into said grooves to releasably connect said first contact means to said bottom wall of said housing, said first contact means further include a pair of prongs extending through said first insulating plate and having inner ends spaced from each other a distance equal to the spacing of said pair of contacts so as to resiliently engage the latter when said first insulating plate is placed in said slot, and a pair of outer end portions spaced a given distance from each other; second contact means including a second insulating plate having a width substantially equal to the width of said slot and having a pair of longitudinal edge portions adapted to fit into said grooves so that said edge portions of said second insulating plate may be slid into said grooves after said first contact means are removed therefrom to releasably connect said second contact means to said bottom wall of said housing, said second contact means further include a pair of prongs having inner ends spaced from each other a distance equal to the spacing of said pair of contacts so as to resiliently engage the latter when said second insulating plate is placed in said slot, and a pair of outer end portions spaced a distance from each other which is different from said given distance, said resilient contacts of said charging device and said inner ends of said prongs of said first and second contact means having complementary portions adapted to resiliently engage each other for resiliently locking the inserted contact means in place on said bottom wall of said housing, whereby, depending on the contact means inserted in said bottom wall, said razor may be inserted into sockets having female contact elements of different spacing for charging the accumulator in the housing; and complementary engaging means on said charging device and said insulating plates, said springy conductor element keeping said complementary engaging means on said charging device and the insulating plate of the inserted contact means in engagement with each other.

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