

Jan. 6, 1959

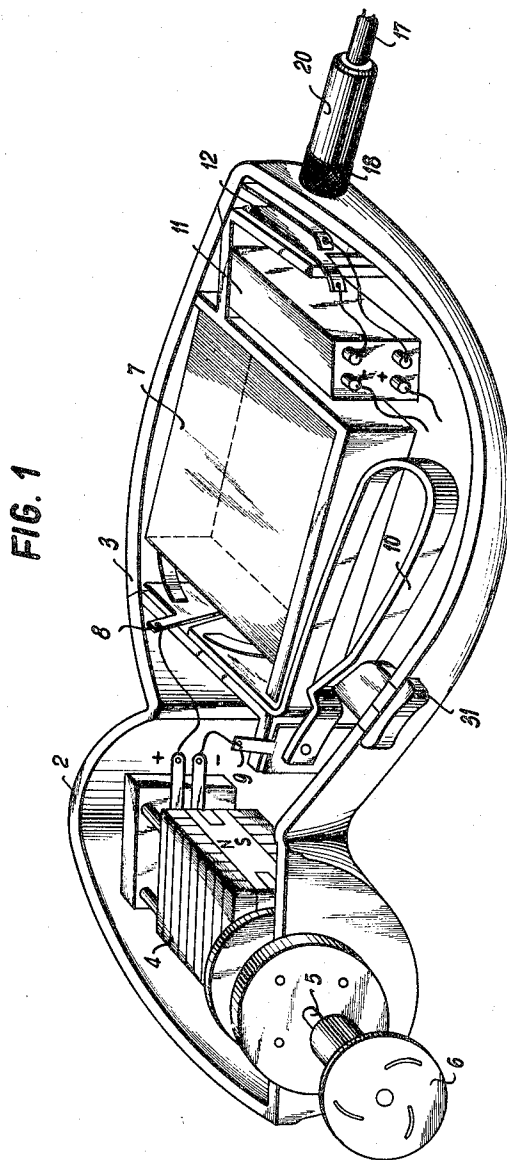
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2,867,039

ELECTRIC DRY SHAVING APPARATUS

Filed Feb. 7, 1956

3 Sheets-Sheet 1



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FIG. 2

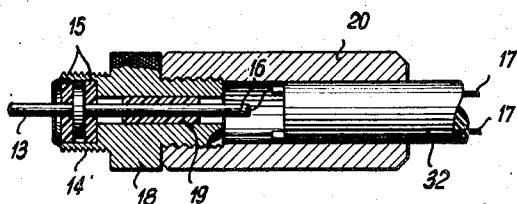


FIG. 4

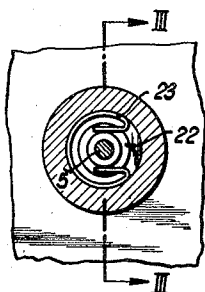
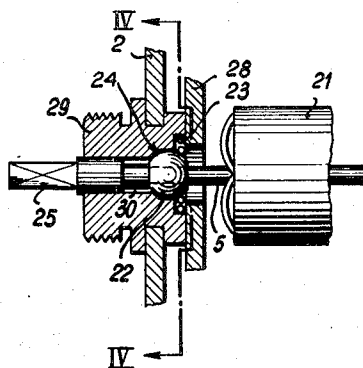


FIG. 3



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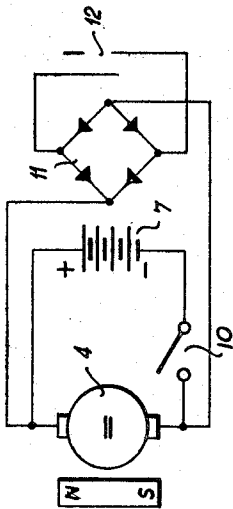


FIG. 5

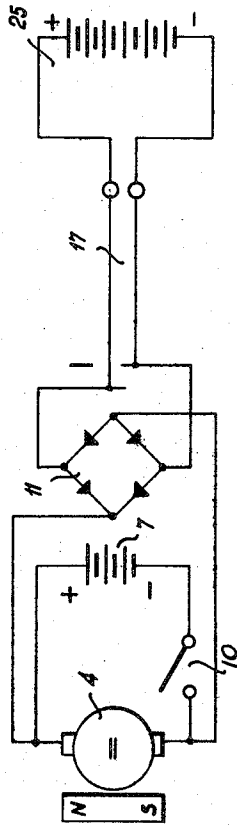


FIG. 6

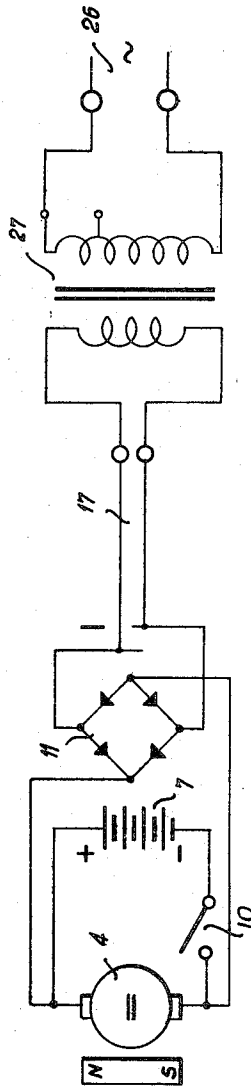


FIG. 7

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ELECTRIC DRY SHAVING APPARATUS

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Application February 7, 1956, Serial No. 564,045

Claims priority, application Germany February 26, 1955

3 Claims. (Cl. 30—43)

This invention relates to an electric dry shaving apparatus provided with a rotating cutter and adapted for low voltage actuation.

Electric shaving apparatus of this type, having to the driving motor, a switch, and a battery mounted in the handle, is already known to the art.

According to the present invention dry shaving apparatus for low voltage actuation is improved by the addition of a rectifier in the handle and by provision of a plug socket in the housing to receive the plug end of a low voltage cable. Apparatus of this kind can be operated not only from the source of direct current arranged in the apparatus, but also selectively from a low voltage battery outside the apparatus, or from an alternating current power supply.

For connection to the low voltage outside battery or to the alternating current power supply there is provided a special cable which at one end fits into the plug socket in the handle. The cable connection to the alternating current power supply includes a transformer, permitting only a harmless low voltage to be present at the connecting means of the apparatus.

According to the present invention the source of direct current arranged in the handle of the apparatus is preferably an accumulator, as this ensures constant voltage for a considerable length of time. Also it can be subjected to higher voltage or loading than a Leclanché cell and carries a higher capacity.

The plug socket in the handle is composed, in known manner, preferably of a metallic cylindrical recess having an inner thread and forming one of the two poles, while the other pole is formed by a plug receptacle centrally extending from the bottom of the cylindrical recess and insulated from the latter. In cooperation herewith, the cable is provided at the end to be inserted in the plug socket of the handle with a metallic sleeve having an exterior thread and a central plug extending through and insulated from said exteriorly threaded sleeve. The sleeve carrying the exterior thread is then screwed into the cylindrical recess carrying the inner thread, when simultaneously the central plug of the cable engages the plug receptacle extending from the bottom of the cylindrical recess. In this way the cable is mechanically, as well as electrically detachably secured to the handle.

In the apparatus described herein by way of example, the shaft of the motor extends, differing herein from the motor-shafts of similar apparatus energized by batteries, at a right angle to the axis of the handle of the apparatus, penetrating the wall of the casing. The place where the shaft penetrates the wall of the casing is closed by a threaded collar having a hemispherical recess against which the shaft bears by means of a perforated ball mounted on the shaft. The ball is secured on the shaft, on one side by a shouldered portion of the shaft, and on the other side by a spring clip. In this way the shaving pressure is absorbed, while a reduction in working capacity of the motor through friction is avoided. For

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the same reason the cutter is preferably elastically mounted, so that the sheet-metal screen can come in contact with the rotating knives in repressed position only.

The wiring means of the apparatus are so arranged that the said connecting means for the cable are permanently connected to the rectifier and that the rectifier is likewise permanently connected to the motor, while the source of current (direct current) is connected via a switch with the motor parallel to the rectifier. At the same time the polarity of the source of direct current is such that, with the said switch closed, a short-circuit via the rectifier is blocked. The rectifier is preferably a bridge-rectifier, so that the direction of rotation of the motor is independent of the polarity of an outside direct current source applied to the rectifier.

Additional features and advantages of the invention will be understood from a consideration of the following detailed description taken in connection with the accompanying drawings, forming a part of this specification and in which an embodiment of the invention has been shown by way of example. While the invention has been illustrated and described as embodied in an electric dry shaving apparatus, 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.

In the drawings, in which like parts are referred to by the same reference numerals throughout the several figures,

Fig. 1 is a perspective view of the shaving apparatus, with a portion of the casing removed to show the interior;

Fig. 2 is a central longitudinal section through the plug at the end of the cable;

Fig. 3 is a central vertical section of the portion of the casing where the shaft of the motor is extended through it, showing the perforated ball in the cap-like hemispherical recess, the section being taken on line III—III of Fig. 4;

Fig. 4 is a cross-section on line IV—IV of Fig. 3;

Fig. 5 shows a wiring plan as used with the source of direct current inside the apparatus of Fig. 1;

Fig. 6 shows a wiring plan as used when a low voltage battery outside the apparatus of Fig. 1 is employed;

Fig. 7 shows a wiring plan as used when an alternating current network is employed.

Referring now to the drawings in detail, the reference numeral 2 designates the casing consisting of synthetic resin material, while 3 is the handle of the apparatus. Accommodated in the casing 2 is the permanent magnet motor 4 having its one-piece shaft 5 extended through the casing 2 (see Fig. 3). For this purpose the apparatus is provided within the casing 2 with a drilled plate 28. Clampingly secured in position between the two halves of the casing 2 is the threaded collar 29. The collar 29 is provided with a recessed portion 24 having the shape of a hemispherical cap, in which rotates a perforated ball 22 mounted on the shaft 5. The ball 22 on one side is seated on a shouldered portion 30 of the shaft 5 and on the opposite side is secured in position by the pressure of a spring clip 23. This also considerably facilitates assembly. 21 is the armature of the motor 4. 25 is the four-sided portion of the shaft 5 on which the cutter is seated. 7 is a source of direct current of the accumulator type having its terminals 8 and 9 connected with the motor 4, one of them via the switch 10 operable by means of the handle 31. Positioned behind the battery 7 are the rectifier 11 and the connecting means 12 for the cable. From the connecting means 12 the cable 17, provided with the rubber sleeve 32, leads to the low voltage battery (see Fig. 6), or, via a transformer 27 to the alternating current network 26. The connecting means for the cable within the casing 2 consist of an

interiorly threaded recess provided with a centrally positioned plug receptacle, so that, as the thread 14 is screwed into the threaded recess, the plug 13 engages the plug receptacle. The plug 13 is provided with a disk-like projecting portion by means of which it is secured in position between the insulating disks 15 within the plug body (see Fig. 2). The internal end of the plug 13 is supported in an insulating sleeve 19 and connected at 16 to one cable line. The threaded portion 14 is adjoined by a knurled cylindrical portion 18 which is rotatably attached to the plug body 20. Connected to this cylindrical member 18 is the other wire 17 of the cable 32 (see Fig. 2).

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A dry shaver comprising, in combination, a housing; a low voltage D. C. motor located in said housing and having two motor terminals; a rotary cutter device attached to said motor; a storage battery located in said housing and connected to said motor terminals as a source of low voltage direct current for energizing said motor with a predetermined direction of turn; a normally open switch connected in circuit with said motor and said storage battery for applying voltage to said motor from said battery by closing said switch whenever desired; a bridge-type rectifier device having a positive and a negative output terminal and two input terminals, and being located in said housing, said positive output terminal being connected to the positive pole of said storage battery and said negative output terminal being connected to the negative pole of said storage battery; and a plug socket arranged in said housing and adapted to receive the plug end of a low voltage cable, said socket being connected to said input terminals of said rectifier device, said bridge-type rectifier providing unalterable polarity of energy supply to said D. C. motor, so that by connecting said plug socket to an outside low voltage source of direct current said motor is energized with said predetermined direction of turn and said storage battery is charged by said outside source of direct current, and that by connecting said plug socket to an outside low voltage source of alternating current said motor is energized with the same direction of turn and said storage battery is charged by said outside source of alternating current through said rectifier while alternatively said motor may be energized by said storage battery alone independently of any one of said other sources.

2. A dry shaver comprising, in combination, a housing; a low voltage D. C. motor located in said housing and having two motor terminals; a rotary cutter device attached to said motor; a storage battery located in said housing and connected to said motor terminals with fixed polarity as a source of low voltage direct current for energizing said motor with a predetermined direction of turn; a normally open switch connected in circuit with said motor and said storage battery for applying voltage to said motor from said battery by closing said switch whenever desired; a bridge-type rectifier device connected to said motor terminals with the same polarity as said battery; and a plug socket arranged in said housing and adapted to receive the plug end of a low voltage cable, said socket being connected to said rectifier device, said

bridge-type rectifier providing unalterable polarity of energy supply to said D. C. motor, so that by connecting said plug socket to an outside low voltage source of direct current said motor is energized with said predetermined direction of turn and said storage battery is charged by said outside source of direct current, and that by connecting said plug socket to an outside low voltage source of alternating current said motor is energized with the same direction of turn and said storage battery is charged by said outside source of alternating current through said rectifier while alternatively said motor may be energized by said storage battery alone independently of any one of said other sources.

3. A dry shaver comprising, in combination, a housing; a low voltage D. C. motor located in said housing and having two motor terminals; a rotary cutter device attached to said motor; a storage battery located in said housing and connected to said motor terminals as a source of low voltage direct current for energizing said motor with a predetermined direction of turn; a normally open switch connected in circuit with said motor and said storage battery for applying voltage to said motor from said battery by closing said switch whenever desired; a bridge-type rectifier device having a positive and a negative output terminal and two input terminals, and being located in said housing, said positive output terminal being connected to the positive pole of said storage battery and said negative output terminal being connected to the negative pole of said storage battery, said bridge-type rectifier providing unalterable polarity of energy supply to said D. C. motor; a source of direct current of low voltage of at least the same potential as said storage battery, said source of D. C. being connected with said input terminals for energizing said motor with said predetermined direction of turn and simultaneously charging said storage battery; a plug socket arranged in said housing and adapted to receive the plug end of a low voltage cable, said socket being connected to said input terminals; and a low voltage cable having a plug device at one end for being connected with said plug circuit, and having connecting means at the other end for being connected with said source of direct current, so that by connecting said plug socket to an outside low voltage source of direct current said motor is energized with the same direction of turn and said storage battery is charged by said outside source of direct current while alternatively said motor may be energized by said storage battery alone independently of any one of said other sources.

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