

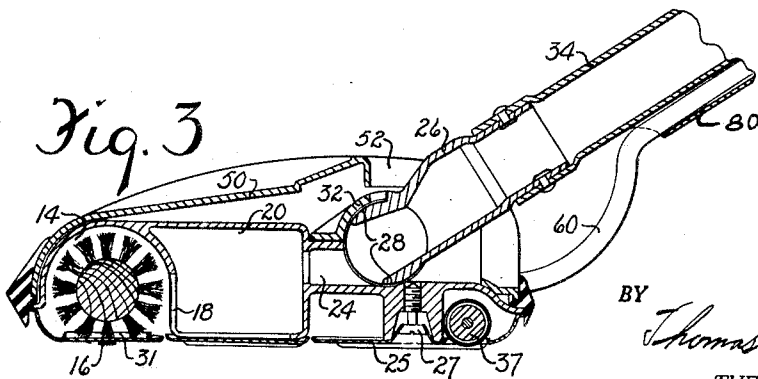
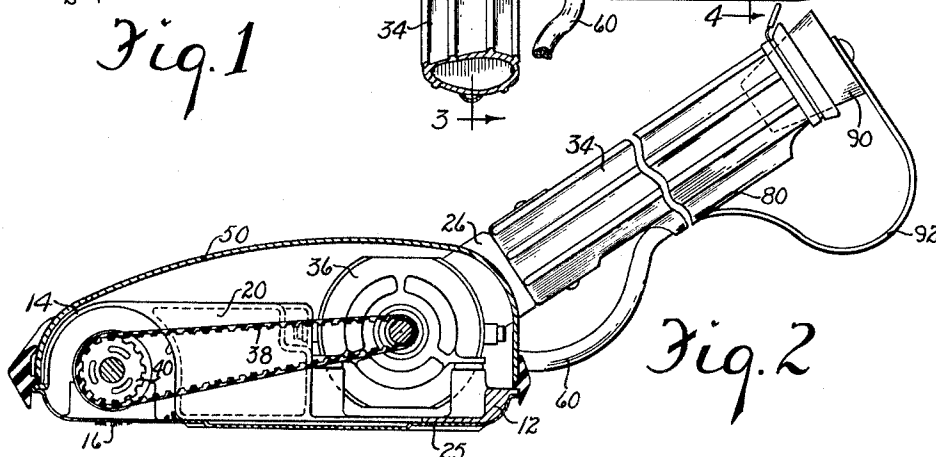
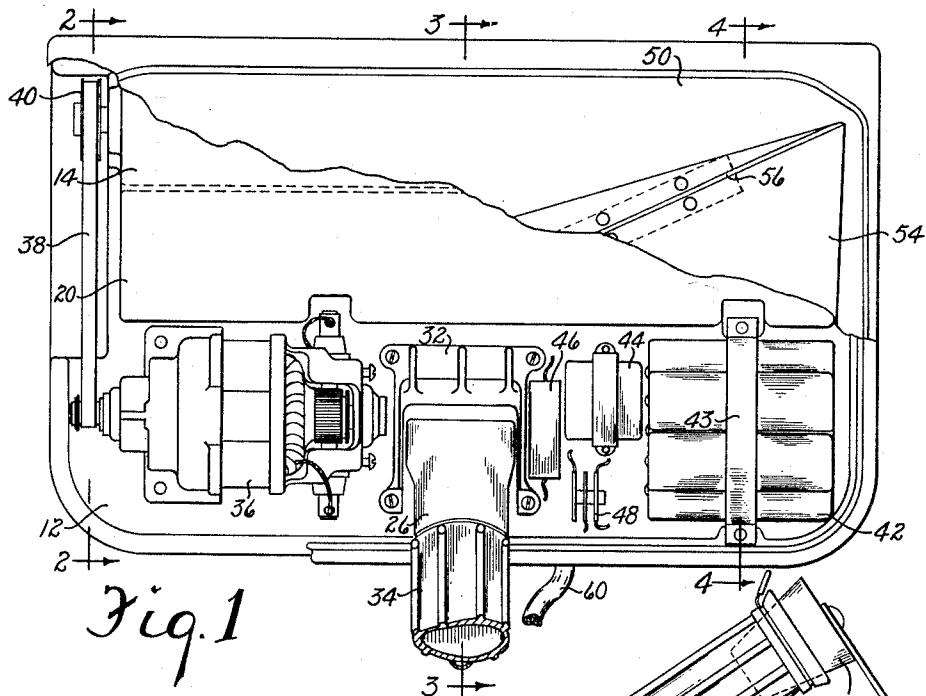
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D. F. DOWNEY ETAL
ELECTRIC CARPET SWEEPERS

3,184,775

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2 Sheets-Sheet 1



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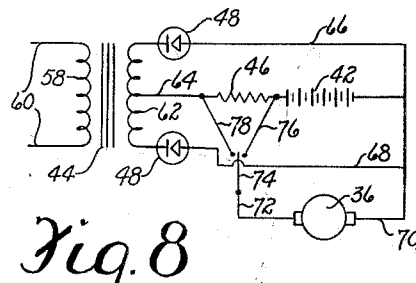
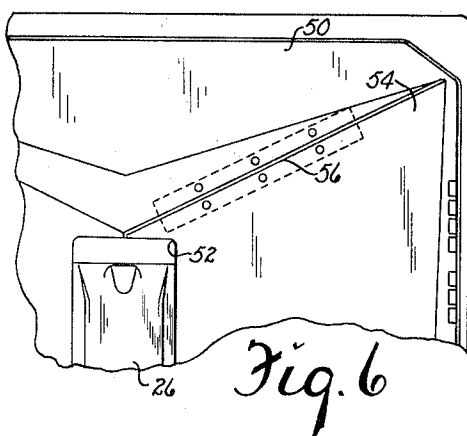
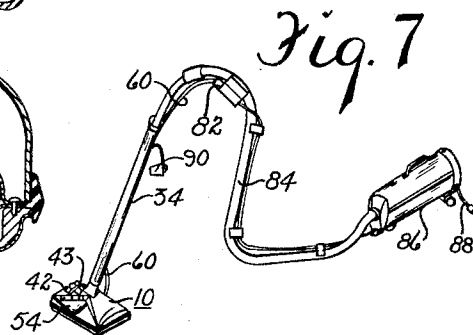
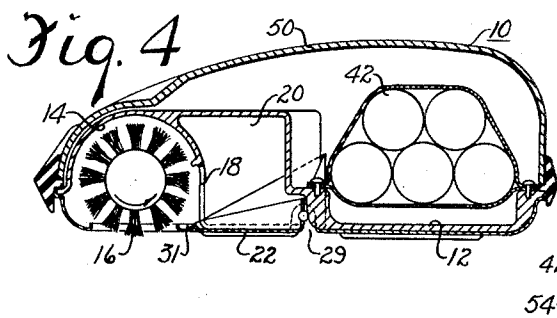
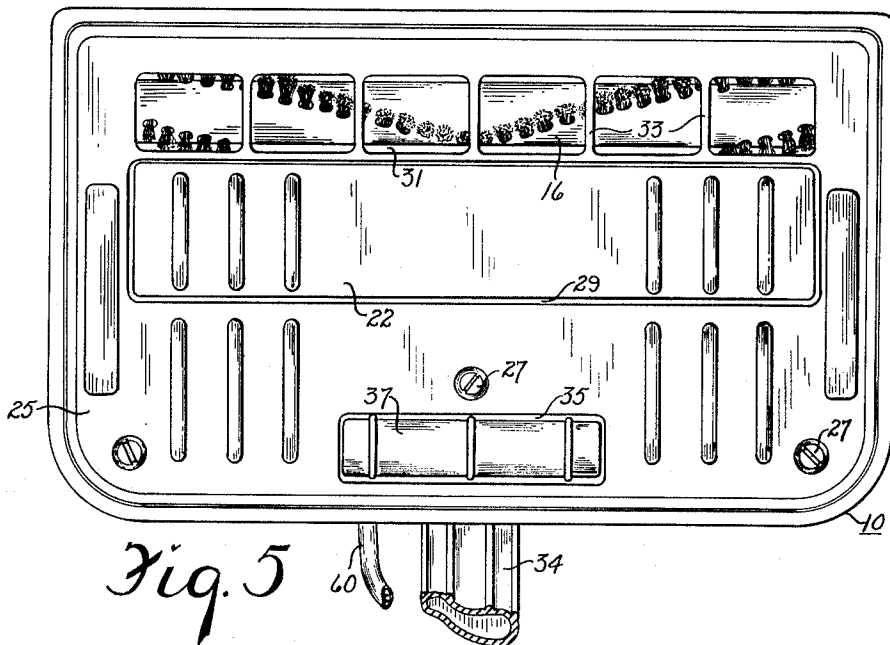


Fig. 8

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3,184,775

ELECTRIC CARPET SWEEPERS

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Filed May 22, 1962, Ser. No. 196,781
9 Claims. (Cl. 15—328)

Our invention relates to a combined carpet sweeper and suction nozzle for a vacuum cleaner.

In according with our invention there is provided a device including a rotary brush driven by a low voltage electric motor. This brush is arranged to sweep dirt and other surface litter from a rug into a dirt receiving compartment where it remains if the device is being used as a carpet sweeper. A rechargeable storage battery provides the power for operating the motor under these conditions. The device is provided with a hollow handle for moving it back and forth over the floor and which communicates with the dirt receiving compartment and which may be connected to a vacuum cleaner when it is desired to use it as a suction nozzle. Under these conditions air is caused to flow inwardly through the dirt receiving compartment and through the handle to the vacuum cleaner, thus carrying along dirt removed from the rug or other surface being cleaned, as well as picking up and removing any dirt which has previously been accumulated in the dirt receiving compartment. When used as a suction nozzle an electric cord is preferably provided which may be connected to the circuit in the vacuum cleaner to thereby supply current to a step-down transformer in the nozzle which supplies low voltage current to operate the motor for driving the brush and also for recharging the storage battery, a suitable rectifier being provided for converting the alternating current from the transformer to direct current for charging the battery.

Further objects and advantages of our invention will be apparent from the following description when considered in connection with the accompanying drawings which form part of this specification and of which:

FIG. 1 is a top view of a combined carpet sweeper and vacuum cleaner nozzle in accordance with our invention, part of the cover being broken away;

FIG. 2 is a cross-sectional view taken on the line 2—2 of FIG. 1;

FIG. 3 is a cross-sectional view taken on the line 3—3 of FIG. 1;

FIG. 4 is a cross-sectional view taken on the line 4—4 of FIG. 1;

FIG. 5 is a bottom view of the device shown in the preceding figures;

FIG. 6 is a fragmentary view of a portion of the device as shown in FIG. 1;

FIG. 7 is a view on a reduced scale of the combined carpet sweeper and nozzle connected to a vacuum cleaner; and

FIG. 8 is a wiring diagram showing the circuitry of the device shown in the preceding figures.

Referring to the drawings, reference character 10 designates generally the combined carpet sweeper and vacuum cleaner nozzle. It includes a base member 12 which preferably is a die casting. One longitudinal edge of the base member 12 is formed as a tunnel 14 within which is rotatably mounted a cylindrical brush member 16. The rear wall of the tunnel 14 is formed with an opening 18, shown in FIGS. 3 and 4, which communicates with a dirt receiving compartment 20 formed in the base member 12. Compartment 20 is formed with an open bottom which, however, is normally closed by means of a pivoted cover member 22.

Base member 12 is formed with a passageway 24 shown

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in FIG. 3 which communicates with the center of dirt receiving compartment 20 and extends backwardly therefrom to a semi-circular seat formed in the base member. A coupling member 26 having a cylindrical end portion 28 is pivotally mounted on the semi-cylindrical seat and is secured in place by means of a cap member 32 which is likewise formed with a semi-cylindrical seat. A preferably rigid hollow member 34 is secured to coupling member 26 and consequently may be pivoted with respect to the base member and associated parts while remaining in communication with passageway 24.

The lower surface of base member 12 is covered by a surface contacting plate 25 secured to the base member by screws 27. This plate is formed with an elongated opening 29 in line with the open bottom of compartment 20 and which is normally occupied by the pivoted cover member 22. Plate 25 is also formed with an elongated opening 31 in line with tunnel 14 and brush 16, the bristles of the latter extending through opening 31 so as to contact and sweep over the surface being cleaned. Preferably a number of bridges 33 extend across opening 31 to prevent a rug or the like from being drawn too far into the opening when the device is used as a suction nozzle. In addition, an opening 35 may be provided in plate 25 through which projects a roller 37 which is rotatably mounted in base member 12 and serves to support the rear edge of the device, particularly when it is used on a hard surface.

A low voltage direct current electric motor 36 is mounted on the upper surface of base member 12 behind the dirt receiving compartment 20 and to one side of the coupling member 26. A flexible belt 38 driven by the motor 36 engages a pulley 40 mounted on the shaft of brush 16 so as to rotate the latter.

A rechargeable storage battery 42 is removably mounted by means of a strap 43 on the upper surface of base member 12 behind the dirt compartment 20 and on the opposite side of coupling member 26 from the electric motor. Also mounted in this space are a step-down transformer 44, a resistor 46 and a full wave rectifier 48, the electrical connection of which are shown in detail in FIG. 8. The motor, storage battery, transformer, resistor and rectifier are enclosed by means of a hood member 50 which is secured to the base member 12 in any suitable manner and is provided with an opening 52 through which the coupling member 26 extends. Preferably the portion 54 of the hood member which is over the storage battery 42 is connected to the remainder of the hood member by means of a hinge 56 so that it may be readily pivoted to the position shown in FIG. 7 so as to expose the battery 42 in the event it is necessary to replace the latter.

As is shown in the wiring diagram of FIG. 8, the primary winding 58 of the transformer 44 is supplied with normal house current at 120 volts and 60 cycles through a pair of conductors 60. The secondary winding 62 of the transformer is provided with a center tap which is connected by means of a conductor 64 to one terminal of the resistor 46, the other terminal being connected to one side of the battery 42. The other side of the battery is connected by conductors 66 and 68 to the opposite terminals of secondary 62, the rectifiers 48 being interposed in these conductors so as to provide full wave rectification.

One terminal of the motor 36 is connected to one side of the battery 42 by means of a conductor 70, while the other terminal of the motor is connected by a conductor 72 with the blade 74 of a single pole, double throw switch. One pole of the switch is connected by conductor 76 with the opposite side of the battery 42, while the other pole is connected by means of the conductor 78 with the conductor 64 which connects the center tap of the secondary with the resistor 46.

The pair of conductors 60 which supply the primary of the transformer are incorporated in an electric cord which extends along the handle 34, preferably through a channel 30 formed on the exterior of the handle. At the upper end the cord 60 may be provided with an electric plug 32 which may be connected to a suitable receptacle on the exterior of a flexible hose 84 which extends from the upper end of hollow handle 34 to the inlet of an electric vacuum cleaner 86, and the hose carries suitable electric conductors which may be connected in well known manner to the electric circuit of the vacuum cleaner, which includes a cord 83 adapted to be plugged into any suitable outlet. A plug or stopper 90 is preferably secured to the upper end of the handle 34 by means of a flexible strap or chain 92 and may be inserted into the upper end of the handle when the hose 84 is disconnected therefrom.

The above described device operates as follows:

If it is desired to use the device simply as a carpet sweeper, the plug 90 is placed in the upper end of the handle 34 and the switch shown in FIG. 8 is thrown to the right-hand position, thus supplying the motor 36 with direct current from the battery 32. Operation of the motor rotates the brush 16 and if the device is moved by the handle over a surface of a rug or the like, the rotating brush sweeps surface dirt and other litter therefrom through the openings 31 and 18 into the dirt receiving compartment 20, where it is retained in the manner usual with carpet sweepers. The plug 90 prevents any dirt or dust from escaping through the hollow handle. The dirt may be removed from the compartment 20 by holding the device over a suitable receptacle and pivoting the cover member 22 to open position, thus permitting the dirt to fall out the now open bottom of the dirt receiving compartment.

On the other hand, the dirt may be allowed to remain within the compartment to be removed therefrom by air-flow when the device is next used as a vacuum cleaner nozzle. This is accomplished by removing the plug 90 and connecting the hose 84 to the upper end of the handle 34 and by connecting the electric plug 32 to the receptacle on the hose 84. When the vacuum cleaner is operated air is caused to enter the compartment 20 through the openings 31 and 18 and to leave through the passageway 24 leading to the coupling member 26 and hollow handle 34. This flow of air picks up any dirt which may be in the dirt receiving compartment 20.

At the same time, the supply of electric current through the conductor 60 energizes the transformer 44 and causes a low voltage alternating current to appear at the terminals of the secondary winding 62. This alternating current is rectified by the rectifiers 48 and if the switch 74 is thrown to the left-hand position, the motor 36 is supplied with low voltage rectified current, while at the same time this rectified current is supplied to the battery 42 through the resistor 46 so as to recharge the battery during the time the device is used as a suction nozzle.

Operation of the motor rotates the brush 16 as previously described, and the brush aids the stream of air in removing dirt from the surface being cleaned, and this dirt is carried along through the compartment 20 and the passageway 24 to the hollow handle 34 and thence through the hose 84 to the vacuum cleaner.

Should it occur that the device is not used as a suction nozzle a sufficient proportion of the time to maintain the battery properly charged, the plug 32 may be connected directly to any 120 volt outlet while the device is stored, in this case the switch 74 being in its open position. Under these conditions rectified low voltage direct current will be supplied through the resistor 46 to recharge the battery, but the motor 36 will not operate.

We have thus provided a device which may be used as an electric carpet sweeper which is particularly adapted for quick clean up jobs, and which also may be used as a power nozzle in conjunction with a vacuum cleaner for a more thorough and extensive cleaning using both the

sweeping action of the brush and the cleaning action of the air. Under normal conditions of use the battery will be kept charged automatically and without conscious attention on the part of the operator due to the fact that it is recharged whenever the device is used as a vacuum cleaner nozzle.

While we have shown a more or less specific embodiment of our invention, it is to be understood that this has been done for the purpose of illustration only and that the scope of our invention is not to be limited thereby, but is to be determined from the appended claims.

What we claim is:

1. In an electric carpet sweeper, a hollow body formed with a lower elongated inlet opening adapted to be moved over a surface to be cleaned, walls forming a dirt-receiving compartment within said body and communicating with said opening, a brush rotatably mounted in said body and extending through said opening whereby rotation thereof sweeps dirt from said surface through said opening into said compartment, an electric motor for driving said brush, a rechargeable electric battery within said body for supplying current to said motor, conduit means for connecting said compartment to an electric vacuum cleaner for removing accumulated dirt from the compartment and for inducing flow of air through said inlet opening to aid said brush in removing dirt from said surface, and electric conductor means associated with said conduit means for supplying current from said vacuum cleaner for recharging said battery.

2. In an electric carpet sweeper, a hollow body formed with a lower elongated inlet opening adapted to be moved over a surface to be cleaned, walls forming a dirt-receiving compartment within said body and communicating with said opening, a brush rotatably mounted in said body and extending through said opening whereby rotation thereof sweeps dirt from said surface through said opening into said compartment, an electric motor for driving said brush, a rechargeable electric battery within said body for supplying current to said motor, a rigid conduit pivotally mounted on said body for moving the latter over said surface and for connecting said compartment to an electric vacuum cleaner for removing accumulated dirt from the compartment and for inducing flow of air through said inlet opening to aid said brush in removing dirt from said surface, electric conductor means for supplying current from said vacuum cleaner for recharging said battery, and means for closing said rigid conduit when the latter is disconnected from said vacuum cleaner.

3. In an electric carpet sweeper, a hollow body formed with a lower elongated inlet opening adapted to be moved over a surface to be cleaned, walls forming a dirt-receiving compartment within said body and communicating with said opening, a brush rotatably mounted in said body and extending through said opening whereby rotation thereof sweeps dirt from said surface through said opening into said compartment, said compartment having an opening, closure means for the latter openable for the emptying of accumulated dirt from the compartment, an electric motor for driving said brush, a rechargeable electric battery within said body for supplying current to said motor, conduit means for connecting said compartment to an electric vacuum cleaner for removing accumulated dirt from the compartment and for inducing flow of air through said inlet opening for aiding said brush in removing dirt from said surface, and electric conductor means associated with said conduit means for supplying current from said vacuum cleaner for recharging said battery.

4. In an electric carpet sweeper, a hollow body formed with a lower elongated inlet opening adapted to be moved over a surface to be cleaned, a brush rotatably mounted in said body and extending through said opening, walls forming an elongated dirt-receiving compartment within said body parallel to said brush and having a side aper-

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ture immediately adjacent to said brush whereby rotation of the latter sweeps dirt from said surface through said opening and said aperture into said compartment, said compartment having a bottom opening, closure means for the latter openable for the emptying of accumulated dirt from the compartment, an electric motor for driving said brush, a rechargeable electric battery within said body for supplying current to said motor, conduit means for connecting said compartment to an electric vacuum cleaner for removing accumulated dirt from the compartment and for inducing flow of air through said inlet opening and aperture for aiding said brush in removing dirt from said surface, and electric conductor means associated with said conduit means for supplying current from said vacuum cleaner for recharging said battery.

5. In an electric carpet sweeper, a hollow base structure formed with a lower elongated inlet opening adapted to be moved over a surface to be cleaned, walls forming a dirt-receiving compartment within said structure and communicating with said opening, a brush rotatably mounted in said structure and extending through said opening whereby rotation thereof sweeps dirt from said surface through said opening into said compartment, a hood mounted on said structure and enclosing a space above said structure, an electric motor in said space for driving said brush, a rechargeable electric battery in said space for supplying current to said motor, conduit means for connecting said compartment to an electric vacuum cleaner for removing accumulated dirt from the compartment and for inducing flow of air through said inlet opening to aid said brush in removing dirt from said surface, and electric conductor means associated with said conduit means for supplying current from said vacuum cleaner for recharging said battery.

6. In an electric carpet sweeper, a hollow base structure formed with a lower elongated inlet opening adapted to be moved over a surface to be cleaned, walls forming a dirt-receiving compartment within said structure and communicating with said opening, a brush rotatably mounted in said structure and extending through said opening whereby rotation thereof sweeps dirt from said surface through said opening into said compartment, a hood mounted on said structure and enclosing a space above said structure, an electric motor in one end of said space for driving said brush, a rechargeable electric battery in the other end of said space for supplying current to said motor, conduit means extending into said space between said motor and said battery for connecting said compartment to an electric vacuum cleaner for removing accumulated dirt from the compartment and for inducing flow of air through said inlet opening to aid said brush in removing dirt from said surface, and electric conductor means associated with said conduit means for supplying current from said vacuum cleaner for recharging said battery.

7. In an electric carpet sweeper, a hollow base structure formed with a lower elongated inlet opening adapted to be moved over a surface to be cleaned, walls forming a dirt-receiving compartment within said structure and

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communicating with said opening, a brush rotatably mounted in said structure and extending through said opening whereby rotation thereof sweeps dirt from said surface through said opening into said compartment, a hood mounted on said structure and enclosing a space above said structure, an electric motor in said space for driving said brush, a rechargeable electric battery in said space for supplying current to said motor, said hood having an opening above said battery, a hinged cover for said opening, conduit means for connecting said compartment to an electric vacuum cleaner for removing accumulated dirt from the compartment and for inducing flow of air through said inlet opening to aid said brush in removing dirt from said surface, and electric conductor means associated with said conduit means for supplying current from said vacuum cleaner for recharging said battery.

8. In an electric carpet sweeper, a hollow body formed with a lower elongated inlet opening adapted to be moved over a surface to be cleaned, walls forming a dirt-receiving compartment within said body and communicating with said opening, a brush rotatably mounted in said body and extending through said opening whereby rotation thereof sweeps dirt from said surface through said opening into said compartment, an electric motor for driving said brush, a rechargeable electric battery within said body for supplying current to said motor, conduit means for connecting said compartment to an electric vacuum cleaner for removing accumulated dirt from the compartment and for inducing flow of air through said inlet opening to aid said brush in removing dirt from said surface, and electric conductor means associated with said conduit means for supplying current from said vacuum cleaner to said carpet sweeper, said battery being connected to be recharged by said current, and switching means for selectively connecting said motor to be supplied with current from said electric conductor means or from said battery.

9. A device as defined in claim 8 wherein said switching means selectively disconnects said motor from both said conductor means and said battery.

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