April 1, 1947. G. E. LOFGREN 2,418,130

VACUUM CLEANER

Filed Dec. 26, 1942

Fig. 1.

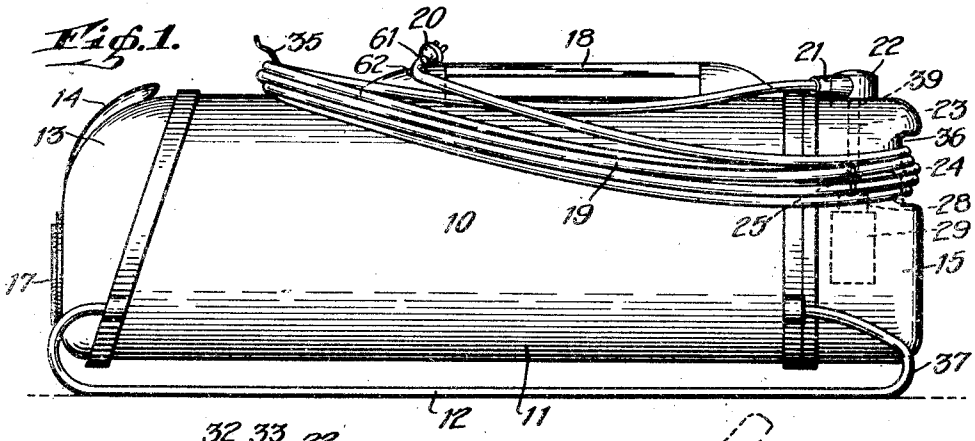


Fig. 2.

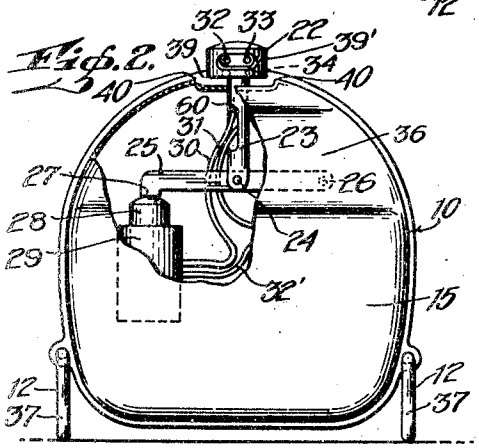


Fig. 3.

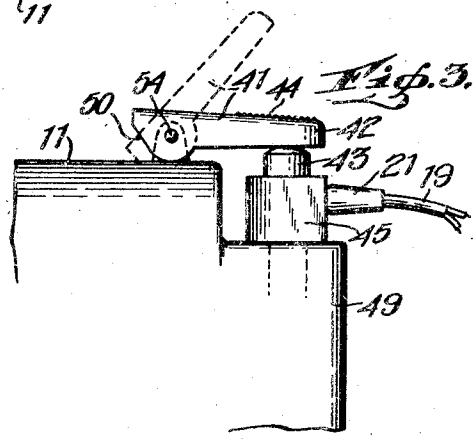


Fig. 4.

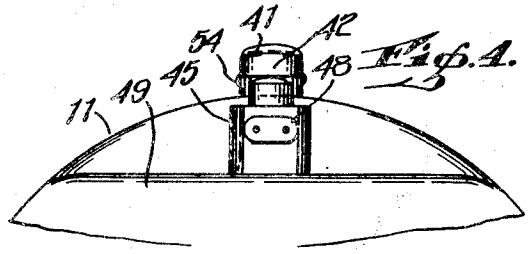
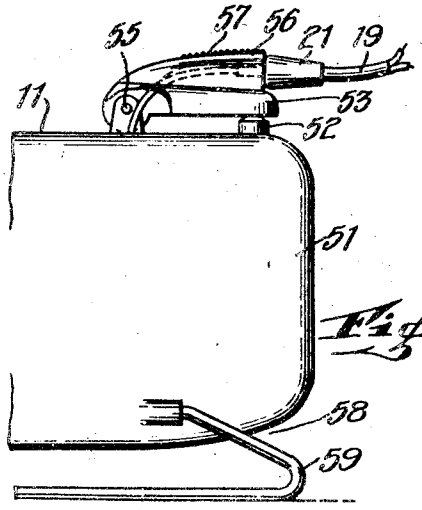


Fig. 5.



INVENTOR
Gustaf Einar Lofgren
BY
Murray Robinson
ATTORNEY

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VACUUM CLEANER

Gustaf Einar Lofgren, Riverside, Conn., assignor to Electrolux Corporation, New York, N. Y., a corporation of Delaware

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8 Claims. (Cl. 200—51)

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This invention relates to vacuum cleaners and more particularly to means for switching the vacuum cleaner on and off and for connecting an electric cord thereto.

It is an object of this invention to provide means for connecting a cord to an electric vacuum cleaner in which the cord never makes a sharp bend at the point of connection to the cleaner, either when the cleaner is in use or when the cord is wound around the cleaner during storage. Another object of the invention is to provide a single member serving as a step button for operating the switch and also as means for connecting an electric cord to the cleaner. A further object of the invention is to provide a single member serving to retain a portion of the electric cord and also as a step button for actuating the switch. A still further object of the invention is to provide a swivel mounted cord connector located in position in which it will not interfere with the cleaner being turned on end. Another object of the invention is to provide means for connecting a swivel cord connector and a push button operated switch so that a slight motion of the cord connector will cause a larger motion of the push button and thereby actuate the switch. Other objects and advantages of the invention will become apparent as the description thereof proceeds.

Referring to the drawings, Fig. 1 is a side elevation of a vacuum cleaner embodying one form of my invention. Fig. 2 is a vertical section through the right-hand end of the cleaner shown in Fig. 1. Figs. 3 and 4 are side and end views of a portion of the cleaner illustrating a modified form of my invention, and Fig. 5 is a side elevation of a portion of the cleaner illustrating a further modification.

Referring to Fig. 1, there is shown a vacuum cleaner designated generally by the reference character 10. This cleaner is of the type embodying a unit for producing a flow of air and filtering the air flowing therethrough, which unit is connected by a hose to a suction cleaning tool. The unit is pulled around by means of the hose when the operator desires to clean in different places. The unit is connected by an electric cord to a source of electricity to supply energy for operating the unit. The cleaner shown comprises a tubular casing 11 supported on runners 12. In one end of the casing 11 there is mounted a dust bag (not shown). This end of the casing is closed by a cover 13 which may be removed by operation of handle 14 when it is

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desired to empty the dust bag. At the other end of the casing there is mounted a motor fan unit (not shown) for producing a flow of air through the cleaner. This end of the casing is closed by cover 15. There is an inlet port 17 at the dust bag end of the cleaner and an outlet (not shown) at the other end thereof. The cleaner is provided with a handle 18 for carrying it about. An electric cord 19 having terminal connection members 20 and 21 is provided for connecting the cleaner to an electric service outlet. The connector 21 engages a combined connection member and step button 22.

Referring now to Fig. 2, it will be seen that the button 22 is connected by a member 23 to a pivot 24 on the lever 25. This lever is pivotally mounted on the cleaner at one end 26 and is provided at the other end with a bearing surface 27 which engages a push button 28 for actuating switch 29. Electric conductors 30 and 31 are connected respectively to contact terminals 32 and 33 in the button 22. The other ends of these conductors are connected to the switch 29 and the motor of the motor fan unit (not shown). A conductor 32' is connected to the switch 29 and to the motor thereby completing a circuit to the motor through the switch 29 from the electrical connector button 22. The button 22 is connected to the member 23 by a ball and socket joint 34 which permits the button 22 to rotate about member 23 as an axis and also permits it to rock slightly with respect to the member 23 as is necessary when the member 23 is reciprocated to actuate the switch 29. The member 23 is shown to be in the form of a hollow tube having an opening 80 through which the conductors 30 and 31 pass into the interior of the button 22. In order to actuate the switch 29, the bottom portion thereof must be spaced as shown at 39 from the top of the adjacent portion of cover 15. For the sake of appearance, the surrounding portions of cover 15 are brought up higher than the portion immediately below the button 22, thereby forming shoulders 40. Because of this, the socket 39' which receives the connector 21 must be located a distance above the bottom of the button 22 at least as great as the height of the shoulders 40. If the opening 39' were not thus located, the connector 21 would engage the shoulders 40 and prevent actuation of the button 22.

Referring again to Fig. 1, there is shown the manner of storing the cord 19 on the cleaner when it is not in use. The connector 21 may be left connected to the button 22 and the rest of

the cord wound around the cleaner engaging spring pressed hook 35 at one end and the recess 36 in the cover 15 in the other end of the cleaner. When the full length of the cord has been wound about the cleaner, the end of the cord is inserted in a slot 61 formed at one end of the handle 18. This slot, in cooperation with the connector 20, serves to retain the end of the cord and prevent it from unwinding. If the cord has resilient insulation on the exterior thereof, the inlet 62 to the slot may be somewhat smaller than the cord so that after the cord is pressed through the opening 62 into the slot 61, it will expand and be retained therein.

Some of the advantages of construction just described will now be pointed out. When the cleaner is in operation and the connector 20 of the cord 19 is connected to an electric outlet, the cleaner 10 may be moved around into any position with respect to the cord without producing a sharp bend at the point where the cord connects to the cleaner. This is because the point of connection 22 is free to swivel and thereby relieve any strain on the cord. This is a highly desirable feature because it has been found that the electric cord frequently fails at a point immediately adjacent at the end connected to the cleaner due to the repeated sharp bending thereof.

When it is desired to empty the dust bag, the cleaner may be turned up on its end 15 with the motor fan unit still running. The dust bag may then be removed and emptied and the suction produced by the motor fan unit aids in replacing the bag in the cleaner. Because the electrical connector 21 can swivel, the cord 19 and connector 21 will not interfere with the cleaner being set on its end. It is to be noted that were the swivel connector located at the bottom of the cover 15, there would be more likelihood of the connector 21 remaining in a dead center position as the cleaner was pivoted about the ends 37 of the runners 12. This is because the radial distance from the connector to the center of rotation 37 is shorter when the connector is mounted at the bottom of the cover 15.

When it is desired to stop the cleaning operation and put away the cleaner, it is necessary only to step on the button 22 and remove the connector 20 from the electric service outlet. The cord may then be wound about the cleaner as previously described and the whole may be stored without disconnecting the electric cord from the cleaner.

In Figs. 3 and 4, there is illustrated a modified form of the invention. In this embodiment the switch 45 itself is rotatably mounted on the top of the cover 49. The switch 45, together with the connector 48 at one side thereof, form a single pivotal unit. The connector 48 is adapted to receive the connector 21 on the end of the electric cord 19. The top portion of the cover 49 is cut away so that the button 43 does not project very far above the upper surface of the casing 11. Unless the casing 11 is cut away adjacent the cover 49, or unless the switch 45 is pivoted at some distance from the end of the casing 11, the angle through which the connectors 21 and 48 may swivel will be somewhat less than the angle through which the connectors 21 and 22 of the first embodiment can swivel. However, by proper design, the angle of swivel in both embodiments may be in the neighborhood of 300°, which angle is found to be sufficient. If desired, the connector could be made to rotate 360° but it is preferable, unless sliding contacts are used, to limit the angle of swivel to prevent the flexible leads from the connector to the motor-fan unit from being twisted off.

In the embodiment shown in Fig. 3, the cord retaining recess 36 of the first embodiment is eliminated. To take its place there is provided a member 41 pivotally mounted at 54 on the top of the casing 11. The member 41 is so weighted that the end 42 thereof gravitates to a position overlying push button 43 of the switch 45. The member 41 has an abutment 50 to limit its rotation so that when it is rotated into the position shown in dotted lines, it may serve as a cord retaining hook similar to the cord retaining hook 35. If desired, the member 41 may be spring biased into its full line position instead of relying on gravity. This would reduce rattling and also aid in taking up the slack in the cord. The member 41 also serves as an actuator for the button 43 and is provided with a corrugated wear surface 44 to prevent the foot of the operator from slipping off the actuator. The portion of the cleaner not shown in Fig. 3 may be the same as shown in Fig. 1.

In Fig. 5, there is shown another modification of the invention in which the electric switch is totally enclosed within the cover 15, as it was in the first embodiment. Member 52 represents a push button which may be connected to actuate the switch in a manner similar to that which button 22 actuates switch 29 or may be directly connected to the switch, as is button 43 to switch 45. A member 53 is pivotally mounted at 55 on the top of the casing 11 with its free end overlying the member 52. On top of the member 52 there is mounted a connector 56 for engaging the electrical connector 21 on the end of cord 19. The top of the connector 56 is roughened as at 57 to provide a friction surface to prevent the foot of the operator from slipping when he steps on the connector 56 to actuate the member 52 and the switch connected thereto. As a means for retaining the loops of the cord at the switch end of the cleaner, the ends 59 of the runners 12 may be formed so as to leave a recess 58 between the runners and the cover 51 on the end of the casing. The portion of the cleaner not shown in Fig. 5 may be the same as that shown in Fig. 1. With this embodiment, when it is desired to wind up the cord, the member 53 and connector 56 are pivoted in a vertical plane about the horizontal pivot 55 to a position in which the cord 19 projects from the connector 56 in a direction toward the hook 35 at the other end of the cleaner so that the cord will not be bent sharply adjacent the connector when the cord is wound up for storage purposes.

Many of the features shown in the three disclosed embodiments of this invention are interchangeable. For example, the recess 36 and recess 58 both serve to retain cord loops at the motor end of the cleaner and either can be used in either embodiment. Likewise, the dust bag end of the cleaner shown in Fig. 1 might be formed with recess similar to recesses 36 or 58 to serve in place of the hook 35. Instead of connecting the button 22 to the switch 29 through the lever system shown in Fig. 2, it might be connected directly to the switch, as shown in Fig. 3. In such an arrangement the button would swivel while the switch would remain stationary. It is also obvious that many other changes and modifications could be made without departing from the spirit of the invention and it is intended to cover by these Letters Patent all forms of the invention

falling within the scope of the appended claims.

What I claim is:

1. In an electrical device and in combination, a circuit controller, a movable actuator for said circuit controller, a conductor receiving means carried by said actuator, and means for pivotally mounting said conductor receiving means for pivotal movement with respect to said circuit controller.

2. In an electrical device and in combination, a circuit controller, a movable actuator for said circuit controller, a conductor receiving means carried by said actuator, and means for pivotally mounting said conductor receiving means for pivotal movement with respect to said circuit controller, said means being bodily movable with said actuator.

3. In an electrical device and in combination, a circuit controller, a movable actuator for said circuit controller, a conductor receiving means carried by said actuator, and means for pivotally mounting said conductor receiving means for pivotal movement with respect to said circuit controller, said means being pivotally movable independently of said actuator.

4. In an electrical device and in combination, a circuit controller, a movable actuator for said circuit controller, a conductor receiving means carried by said actuator, and means for pivotally mounting said conductor receiving means for pivotal movement with respect to said circuit controller, said actuator being movable independently of said means.

5. In an electrical device and in combination, a circuit controller, a movable actuator for said circuit controller, a conductor receiving means carried by said actuator, and means for pivotally mounting said conductor receiving means for pivotal movement with respect to said circuit controller, said means comprising the pivotal mounting of said actuator.

6. In an electrical device and in combination, a circuit controller, an actuator for said controller constituting a reciprocable plunger, a pivotally mounted actuator, for said plunger, manually operable means for actuating said pivotally mounted actuator and a rotatably mounted conductor receiving member carried by said manually operable means.

7. In an electrical device and in combination, a circuit controller, a reciprocable plunger for actuating said circuit controller, a pivotally mounted member for actuating said reciprocable plunger, and a conductor receiving member rotatably mounted on said reciprocable plunger.

8. In an electrical device and in combination, a circuit controller, a reciprocable plunger for actuating said controller, a pivotally and rotatably mounted actuating member for said reciprocable member, and a conductor receiving means carried by said pivotally and rotatably mounted member.

GUSTAF EINAR LOFGREN.

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