June 17, 1958 E. F. MARTINEC 2,839,156

SUCTION CLEANER MOTOR PROTECTIVE CONSTRUCTION

Filed Sept. 21, 1956

Fig. 2

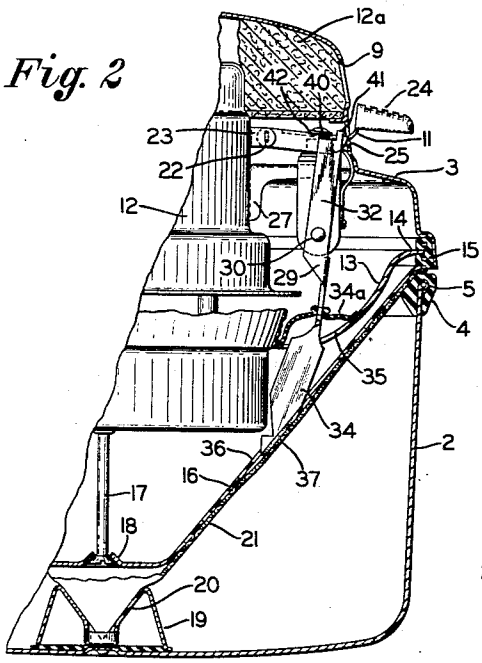
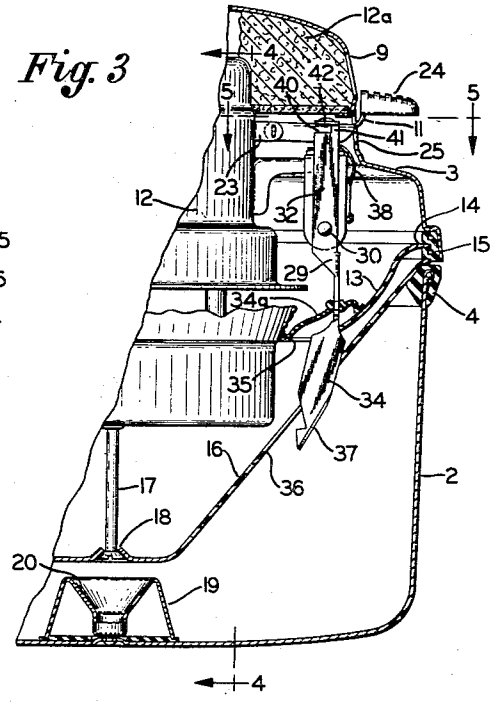


Fig. 3



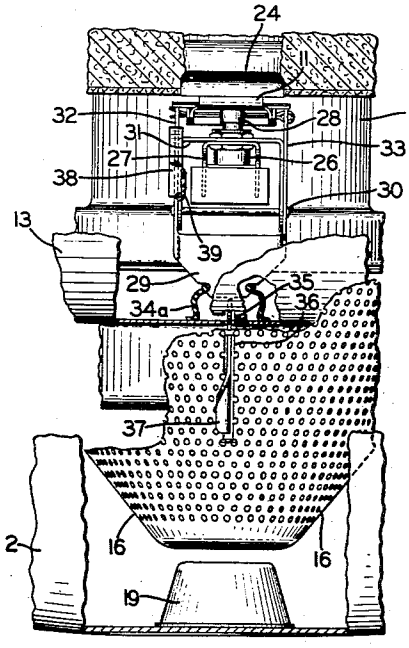


Fig. 4

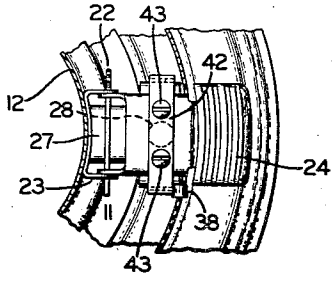


Fig. 5

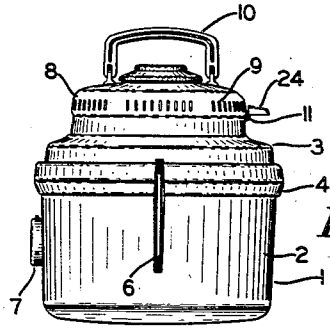


Fig. 1

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SUCTION CLEANER MOTOR PROTECTIVE CONSTRUCTION

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3 Claims. (Cl. 183—37)

This invention relates to suction cleaners and pertains particularly to the tank type suction cleaner having a removable air filter member.

It frequently happens with suction cleaners having removable filters or dust bags that the operator will remove a used dust bag and not install a new bag. As a result, when the cleaner is used thereafter, dust and dirt are drawn into the cleaner including the electric motor which is eventually damaged due to the accumulation of dirt.

Various devices have been proposed for overcoming this problem. Most of these devices have included a blocking element to prevent closing of the cover member of the cleaner when the filter is not used. However, such devices have not prevented operation of the electric motor even with the cover member open or partially closed, and thereby permit the passage of unfiltered air through the cleaner.

Moreover, the blocking elements of such devices are necessarily located at the junction of the tank and cover and are often easily manipulated manually to an inoperative position which permits closing the cover. Thus, the purpose of the blocking element is readily defeated by a persistent operator.

The device of the present invention prevents the electric motor from being turned on when the air filter is absent from the cleaner even when the cover member is closed.

Generally, it is an object of this invention to provide means for preventing operation of a suction cleaner when the air filter member is not installed.

It is another object of this invention to provide means for preventing actuation of the electric switch when the air filter means is not in position for use within the cleaner.

Another object of this invention is to provide means for preventing operation of the cleaner without the filter, which means is not readily manipulated to an inoperative position.

It is another object of this invention to provide control lever means actuated by the filter to an inoperative position when the filter is in place, and to a position operative to prevent actuation of the motor switch when the filter is not in place.

Finally, it is an object of the present invention to provide a switch for a suction cleaner by which the described difficulties are overcome and the foregoing objects and desiderata are obtained in a simple, effective and inexpensive manner.

These and other objects and advantages apparent to those skilled in the art from the foregoing description and claims may be obtained, the stated results achieved, and the described difficulties and problems overcome and solved by the parts, elements, constructions, mechanisms, combinations, subcombinations and arrangements which comprise the present invention, the nature of which is set forth in the following general statement, a preferred embodiment of which—illustrative of the best mode in which applicant has contemplated applying the principles—is set forth in the following description and shown in the drawing, and which is particularly and distinctly pointed out and set forth in the appended claims forming part hereof.

Generally, the nature of the apparatus of the present invention may be stated as including a suction cleaner having a cleaner tank, a removable cover for the tank, an electric switch on the tank, a removable air-pervious filter member in the tank and secured in place by the removable cover, a lever mounted for operation between the switch and the filter member, the lever being movable between blocking and retracted positions with respect to the switch, a leaf spring biasing the lever in the blocking position in the absence of the filter member whereby the electric switch is inoperable when the assembled cleaner includes no filter member.

An embodiment of the invention is illustrated, by way of example, in the accompanying drawing:

Fig. 1 is an elevational view of a tank type suction cleaner having a switch pedal extending from one side thereof;

Fig. 2 is an enlarged, fragmentary, vertical sectional view showing the cleaner with an air filter member installed and showing the lever means in an inoperative or retracted position;

Fig. 3 is a view similar to Fig. 1 without the air filter member and showing the lever means in a position operative to prevent depression of the switch pedal;

Fig. 4 is a vertical sectional view taken on the line 4—4 of Fig. 3 showing the switch lever in a position blocking movement of the switch pedal; and

Fig. 5 is a fragmentary plan view of the switch pedal and the switch lever.

Similar numerals refer to similar parts throughout the several views of the drawings.

A tank type suction cleaner **1** is shown in Fig. 1. It includes a lower housing or pot **2** and an upper housing **3**, which housings are separated by an annular gasket **4** mounted on and over an upper beaded edge **5** (Fig. 2) of the lower housing. A clamp **6** is mounted on the exterior of the cleaner **1** for holding the housings **2** and **3** together and a similar clamp (not shown) is mounted on the opposite side of the cleaner. An air inlet port **7** is provided in the lower housing **2** to which a flexible air hose may be attached in the usual manner.

The upper housing **3** includes a dome-like portion **8** having air outlet apertures **9** therearound and a handle **10** surmounts the cleaner **1**. As shown in Figs. 1, 2 and 3, a starter switch pedal **11** extends outwardly from the dome-like portion **8**.

Within the cleaner **1** a motor-fan unit **12** is centrally mounted and an annulus **12***a* of sound insulating and air disbursing material is mounted between the unit and the apertures **9**. Around the unit **12** is an annular upwardly and outwardly flared member **13** serving as an air barrier between the unit and the upper housing **3**. The outer periphery of the annular member **13** is an outturned flange **14** which is seated within a hollow rubber mounting ring **15** that is attached to the inner wall at the lower end of the upper housing **3**. Below and around the unit **12** is a foraminous conical filter support member **16**, the lower end of which is secured to the undersurface of the unit **12** by a screw **17** that engages the cone centrally at **18**, and the outer periphery of which is seated against the hollow rubber mounting ring **15**. Thus, when the upper and lower housings **2** and **3** are separated, the fan unit **12** and cone **16** are lifted out of the lower housing **2**.

On the inside surface of the bottom wall of the lower housing **2** is mounted a filter locating support member **19** having a central conically formed portion **20** therein. As shown in Fig. 2, the central conical portion **20** of the

member 19 is adapted to receive the apex of an air-pervious, conical, filter member 21 preferably composed of paper for separating the dust from the air. The filter 21 is coextensive with the conical filter support member 16 and the outer periphery of the filter 21 is normally seated between the outer periphery of the support member 16 and the annular gasket 4 as shown in Fig. 2.

When the cleaner is in operation, air enters the inlet port 7, passes through the filter 21 and cone 16, and then through the unit 12 to the upper end where the air passes through the annulus 12*a* to the outlet apertures 9.

As shown in Figs. 2–5, the switch pedal 11, which is normally actuated by the toe of the operator of the cleaner, is a lever having its inner end pivotally mounted by a cotter pin 22 on a support bracket 23 (Fig. 5) on the outer surface of the unit 12. The outer end of the pedal 11 includes a resilient member 24, and the switch pedal 11 extends through a slot 25 in the wall of the upper housing or cover 3. Below the lever pedal 11 is an electric switch 26 (Fig. 4) which is mounted on a bracket 27 extending from and attached to the unit 12 below the bracket 23. The switch 26 includes electric wires (not shown) leading to the motor-fan unit 12. A plunger 28 is spring biased upwardly from the top of the switch 26 and contacts the surface of the pedal 11. Thus, by repeatedly depressing the pedal 11, the switch 26 may be actuated alternately between off and on positions.

To prevent depression of the pedal 11 and actuation of the electric switch 26 when the filter 21 is not in place as shown in Fig. 3, the cleaner 1 is provided with means for blocking actuation of the switch in the absence of the filter. The means includes a lever 29 pivotally mounted at 30 on a U-shaped bracket 31 which is attached to the assembly of the switch 26 and switch bracket 27 (Fig. 4). The lever 29 is preferably a Y-shaped member, the upper end of which is bifurcated to include similar furcations 32 and 33 on opposite sides of the U-shaped bracket 31.

The lower portion 34 of the lever 29 extends vertically through a slot 35 in the annular member 13 and through a slot 36 in the conical support member 16. Both slots 35 and 36 are long enough to allow actuation of the lever 34. To prevent air leakage through the slot 35 a bellows gasket 34*a* may be attached in airtight manner to the member 13 around the slot and the lower lever portion 34. The slots 35 and 36 are aligned and the lower end of the member 34 includes a laterally turned flange 37 which overlaps the portion of the support member 16 adjacent the slot 36 (Fig. 4).

The flange 37 contacts the inner surface of the filter 21 when the filter is used whereby the lever 29 is actuated by the filter to the inoperative or retracted position as shown in Fig. 2. When the filter 21 is absent, as shown in Fig. 3, the lever 29 is spring biased by a leaf spring 38 to the operative position whereby the lower end of the lever extends beyond the normal location of the filter 21 and the upper end of the lever blocks the depression of the switch pedal 11. As shown in Fig. 4, the leaf spring 38 is attached by a weld 39 to one portion of the U-shaped bracket 31 for holding the lever 29 in the operative position (Fig. 3). However, means other than the spring 38 may be used to hold the lever 29 in the operative position. For example, the lever 29 may be actuated to that position by gravity.

The upper end of the lever 29 is notched at 40 to provide an ear 41. A crossbar 42 (Fig. 5) is attached to the pedal 11 by screws 43 so that opposite extremities of the bar overlap the sides of the pedal 11 for contact with the upper ends of the ears 41.

Accordingly, when the filter 21 is in place within the cleaner as shown in Fig. 2, the lever 29 is in the inoperative position and the switch pedal 11 is movable in the normal manner for turning the cleaner motor on and off. On the other hand, when the filter 21 is not in place within the cleaner, as shown in Fig. 3, the lever 29 is actuated to the operative position by the spring 38 so that the ends of the bar 42 contact the ears 41 of the furcations 32 and 33 to prevent the depression of the switch pedal 11 and actuation of the electric switch 26.

The particular construction and arrangement of the device of the present invention provides a positive means for preventing the operation of a suction cleaner when the air filter member is not installed, thereby preventing the deposition of dirt and dust in the motor and fan unit with subsequent permanent damage to the motor.

In the foregoing description, certain terms have been used for brevity, clearness and understanding; but no unnecessary limitations are to be implied therefrom beyond the requirements of the prior art, because such terms are utilized for descriptive purposes herein and not for the purpose of limitation and are intended to be broadly construed.

Moreover, the description of the improvements is by way of example and the scope of the present invention is not limited to the exact details illustrated, or to the specific mechanisms shown.

Having now described the features, discoveries and principles of the invention, the construction, operation and use of the improved mechanisms and the advantageous, new and useful results obtained thereby; the new and useful parts, elements, constructions, mechanisms, combinations, subcombinations, and arrangements, and mechanical equivalents obvious to those skilled in the art, are set forth in the appended claims.

I claim:

1. A suction cleaner including a cleaner tank, a motor in the tank, a removable air-pervious filter member located in the tank, an electric switch for the motor, a switch-actuation pedal adjacent the switch, a lever between the pedal and the filter member, the lever having positions blocking and unblocking movement of the pedal, the lever having a pedal-contacting end and a filter-contacting end, spring means biasing the lever to the blocking position, and the lever being moved to unblocking position by contact with the filter member against the force of the spring means.

2. A suction cleaner including a cleaner tank, a motor in the tank, a removable air-pervious filter member located in the tank, an electric switch for the motor and having a plunger spring-biased outwardly to an extended position, the switch being actuated alternately between the on and off positions by the plunger, a switch-actuation pedal adjacent the plunger, a lever extending between the pedal and the position of the filter member, one end of the lever having positions for blocking and unblocking movement of the pedal, the lever having a pedal-contacting end and a filter-contacting end, the other end of the lever being moved by contact with the filter, spring means biasing the lever to the blocking position, and said one end of the lever being held in the non-blocking position when said other end is contacted by the filter member.

3. A suction cleaner including a cleaner tank, a motor centrally disposed in the tank, an annular air barrier between the motor and the tank, a removable air-pervious filter member located in the tank below the air barrier, an electric switch for the motor above the air barrier and having a plunger spring biased outwardly to an extended position, the switch being actuated alternately between the on and off positions by the plunger, a switch-actuation pedal adjacent the plunger, the air barrier having an elongated slot substantially below the pedal, a lever extending between the pedal and the position of the filter

member, the lever extending through and being movable in the slot, one end of the lever having positions for blocking and unblocking movement of the pedal, the other end of the lever being moved by contact with the filter, spring means biasing the lever to the blocking position, and said one end of the lever being held in the non-blocking position when said other end is contacted by the filter member.

References Cited in the file of this patent

UNITED STATES PATENTS

2,516,707	Lewyt et al.	July 25, 1950
2,587,565	Yonkers	Feb. 26, 1952
2,626,012	Persons	Jan. 20, 1953
2,627,936	Martinec	Feb. 10, 1953
2,742,105	Dow	Apr. 17, 1956