United States Patent [19]

Ruby

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[54] **SUCTION CLEANER**

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[52] **U.S. Cl.** **55/213,** 15/319, 55/361, 55/410, 55/471

[51] **Int. Cl.** **B01d 46/42**

[58] **Field of Search** 55/213, 471, 472, 55/378, 361, 410, 418; 15/319, 339; 200/61.2, 61.21

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[57] **ABSTRACT**

This invention is characterized by a rigid support mounted beneath the resilient lid of a suction cleaner. A motor cut off switch is mounted in the lid and this cut off switch has a plunger positioned against the support. A suction motor is mounted in the suction cleaner and whenever the flow of air is decreased through the suction motor, as when a filter bag is clogged, or in the case of a wet pick-up suction cleaner, when the level of liquid in the tank of the suction cleaner stops the flow of air through the suction motor, the decreased pressure inside the suction tank causes the resilient lid to flex inwardly into the tank. This causes the plunger of the cut off switch to press against the rigid support and thereby cut off power to the motor.

6 Claims, 4 Drawing Figures

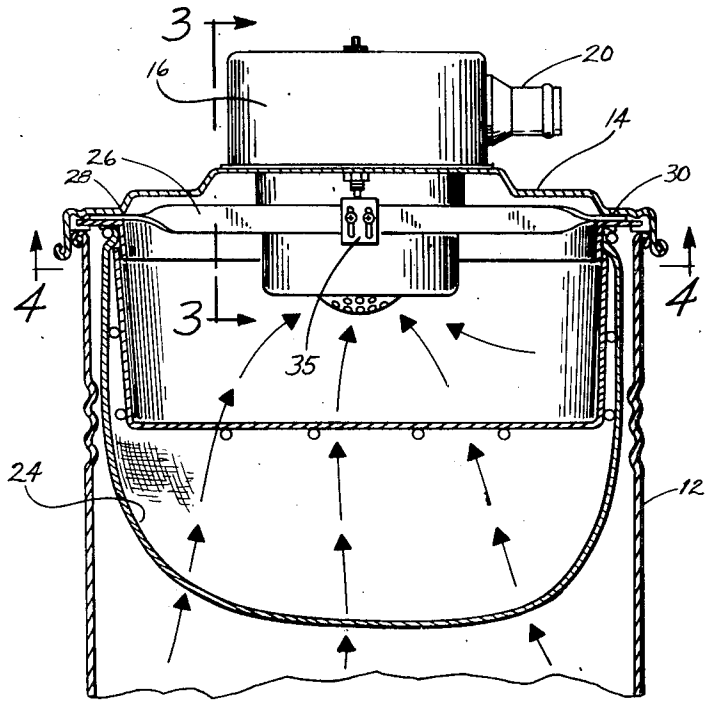


FIG. 1

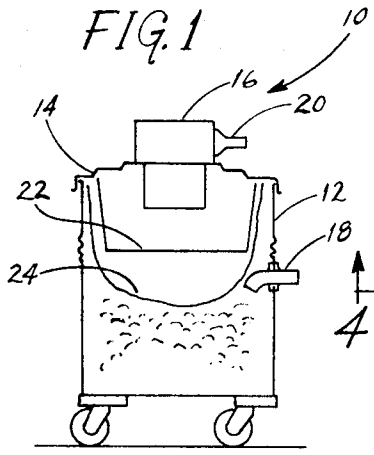


FIG. 2

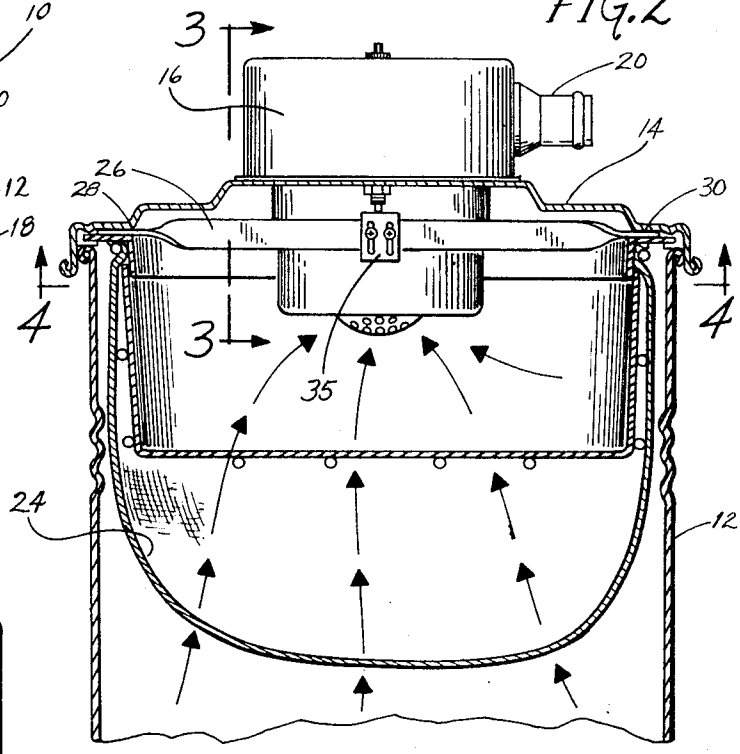


FIG. 3

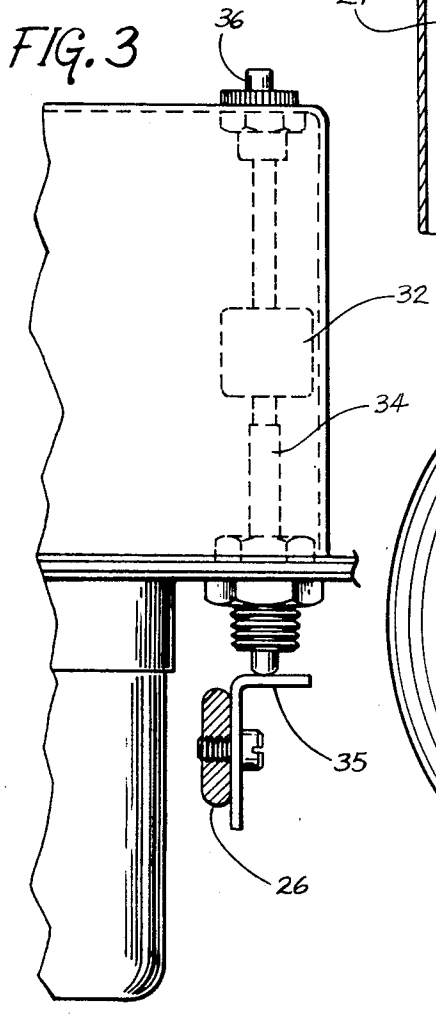
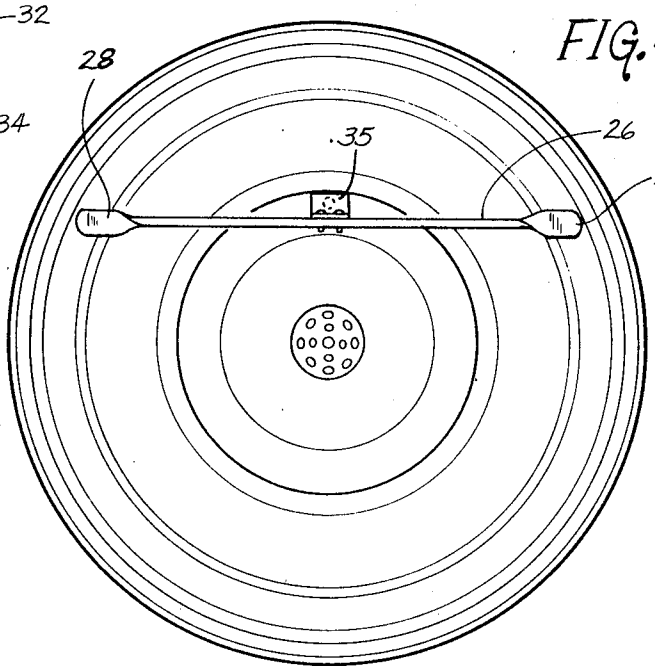


FIG. 4



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SUCTION CLEANER

BACKGROUND AND BRIEF SUMMARY

An automatic cut off switch in suction cleaners that stops power to the motor whenever the flow of air through the suction cleaner motor is cut off or reduced, is desirable for two reasons. First, many suction cleaners use the flow of air to the exhaust to cool the motor and operation of the suction cleaner when the flow of air to the exhaust is cut off can cause the temperature of a motor to rise high enough to cause the motor to break down. Secondly, when a suction cleaner is used by employees for cleaning purposes, an automatic motor cut off forces the employee to change the filter bag or empty the suction cleaner tank and prevents useless operation of a suction cleaner as when the cleaner motor is operating but no air is being drawn through the cleaner.

Heretofore, some suction cleaners have been provided with an automatic cut off switch, but those previously constructed have been rather expensive and complicated.

What is needed therefor, and comprises an important object of this invention, is to provide a simple, inexpensive and reliable structure to automatically cut off power to the motor whenever the flow of air through the suction cleaner is reduced or cut off.

These and other objects of the invention will become more apparent and better understood in light of the accompanying drawings and Specification, wherein:

FIG. 1 is a diagramatic elevational view of a suction cleaner embodying the principles of this invention.

FIG. 2 is en enlarged elevational view of a suction cleaner showing the structure of the apparatus for operating the automatic cut off switch.

FIG. 3 is a sectional view taken on a line 3—3 of FIG. 2.

FIG. 4 is a sectional view taken on line 4—4 of FIG. 2.

Referring now to FIG. 1 of the drawing, a suction cleaner **10** comprises a receptical can **12** and a removable lid **14.** The lid in the particular embodiment shown has an electric motor **16** mounted thereon. The can **12** is provided with a suction inlet **18** and the motor **16** is designed so in operation air moves through the motor to cool it and exits through the motor exhaust **20.** A wire basket **22** is mounted inside can **12** and a filter bag **24,** in this particular embodiment, is mounted beneath the basket **22.**

In operation, dirt or, in the case of a wet pick-up suction cleaner, water, is drawn through the suction inlet **18.** The dirt is prevented from moving through the motor by the action of the filter **24** and so the dirt falls to the bottom of the can while clean air is drawn through the motor and out the motor exhaust **20.**

To this point the suction cleaner is conventional. However, the lid **14** is formed from a resilient material. A support bar **26** is attached to the periphery of the lid at it's opposite ends **28** and **30,** see FIGS. **2** and **4.** As best seen in FIG. **2,** the lid **14** is somewhat dome shaped and the support bar **26** extends below the lid in spaced relation with respect thereto. An electric cut off switch **32** is mounted inside the motor **16** by any suitable means, and this switch is provided with an actuating plunger **34.** The actuating plunger **34** extends downwardly through the lid into engagement with an L-shaped member **35** mounted on the support bar **26,** see

FIG. **3.** With this arrangement, when the filter bag gets clogged (or in the case of a wet pick-up suction cleaner the water level rises to a predetermined level), the suction through the cleaner at inlet **18** stops. However, this causes a decrease in pressure inside the can **12** so that the external air pressure acting onthe resilient lid **14** forces the lid downwardly a small distance. This distance, however, is sufficient to move the operating plunger **34** against the support bar **26** with enough force to actuate switch **32** and cut off power to the motor. The switch is provided with a conventional reset button to close the switch after it has been opened.

Although the invention has been illustrated in a configuration wherein the motor is mounted in the lid, in some suction cleaners the motor is mounted beneath the can. However, the principles of this invention are applicable to suction cleaners regardless of whether the motor is mounted in the lid, as shown in the drawing, or below the can. In either case, when the air pressure inside the can decreases, the resilient lid is drawn inwardly a small distance into the can. This distance is sufficient to cause the operating plunger to actuate the cut off switch.

Having described the invention, what I claim as new is:

1. In a suction cleaner, a combined suction cleaner cover and diaphragm, said combined suction cleaner cover and diaphragm formed from a resilient material, a motor cut off switch in said combined suction clean cover and diaphragm, an operating plunger connected to said motor cut off switch, a support bar mounted beneath the combined suction cleaner cover and diaphragm, in cooperative relationship with said operating plunger, whereby flexture of said combined suction cleaner cover and diaphragm causes said operating plunger to move against said support bar with enough force to actuate the motor cut off switch.

2. The apparatus described in claim **1** wherein said operating plunger is positioned so it abuts the support bar at all times.

3. The apparatus described in claim **1** wherein a motor is mounted in said combined suction cleaner cover and diaphragm, said motor cut off switch electrically connected to the motor to cut off power to said motor when the switch is actuated.

4. In a suction cleaner, a combined suction cleaner cover and diaphragm, said combined suction cleaner cover and diaphragm dome shaped and formed from a resilient material, a motor cut off switch mounted in the combined suction cleaner cover and diaphram, an operating plunger connected to said motor cut off switch and extending through said combined suction cleaner cover and diaphragm, a support bar secured to spaced portions of the combined suction cleaner cover and diaphram at its opposed ends, said operating plunger in abutting relation to the support bar, whereby flexture of said combined suction cleaner cover and diaphram causes said operating plunger to move against said support bar with enough force to actuate the motor cut off switch.

5. The apparatus described in claim **4** wherein a motor is mounted in said combined suction cleaner and diaphragm, said motor cut off switch electrically connected to the motor to cut off power to said motor when the switch is actuated.

6. A suction cleaner of the class described comprising a combined suction cleaner cover and diaphragm

and a container can, an electric motor mounted in the combined suction cleaner cover and diaphragm, said container can having a suction inlet, said electric motor connected to fan means for creating a flow of air through said container can, a fliter mounted in the container can between said combined suction chamber cover and diaphragm and the suction inlet, said combined suction cleaner cover and diaphragm generally dome shaped and formed from a resilient material, a support bar secured to spaced portions of said combined suction cleaner cover and diaphragm at its opposed ends, a motor cut off switch mounted in said combined suction cleaner cover and diaphragm and electrically connected to the motor to cut off power to

the motor when the switch is actuated, an operating plunger connected to said motor cut off switch and extending through said combined suction cleaner cover and diaphragm into abutting relationship with the support bar, whereby if the filter becomes clogged while the motor is operating, the decreased flow of air through the container can cause a decrease of pressure inside the can relative to the external pressure whereby the external pressure forces said combined suction cleaner cover and diaphragm to flex inwardly causing said operating plunger to move against the support bar with enough force to actuate the motor cut off switch and stop the motor.

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