

Jan. 12, 1960

R. DESCARRIES

2,921,153

VACUUM CLEANER

Filed April 1, 1958

4 Sheets-Sheet 1

FIG. 1

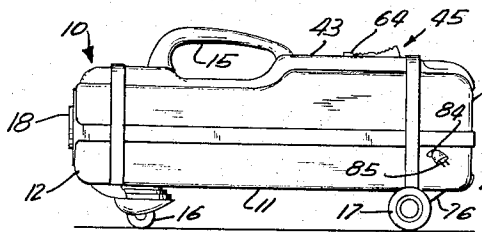


FIG. 2

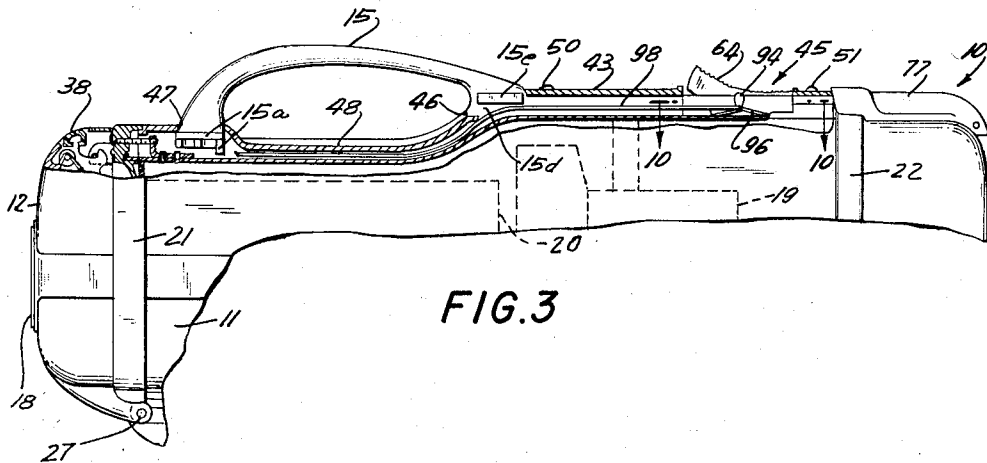
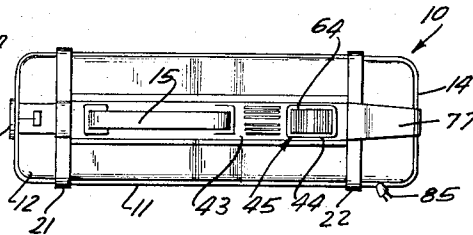


FIG. 3

FIG. 4

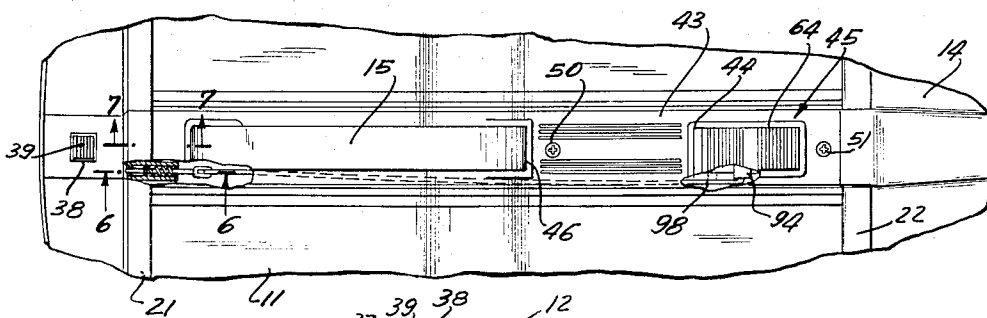
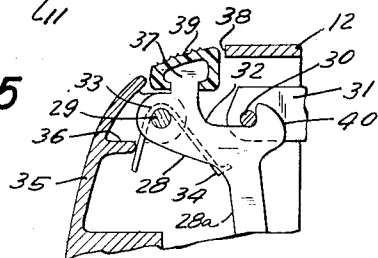


FIG. 5



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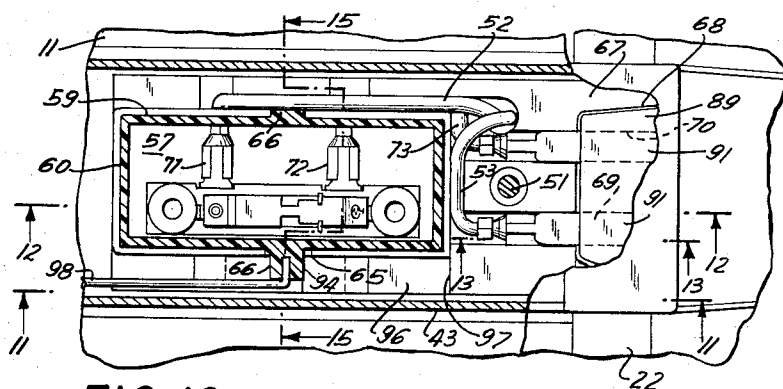


FIG. 10

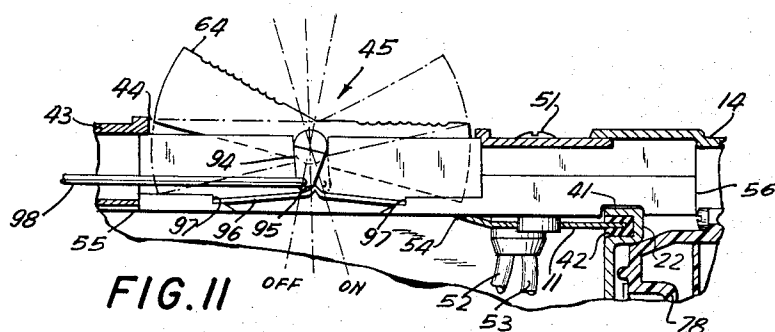


FIG. 11

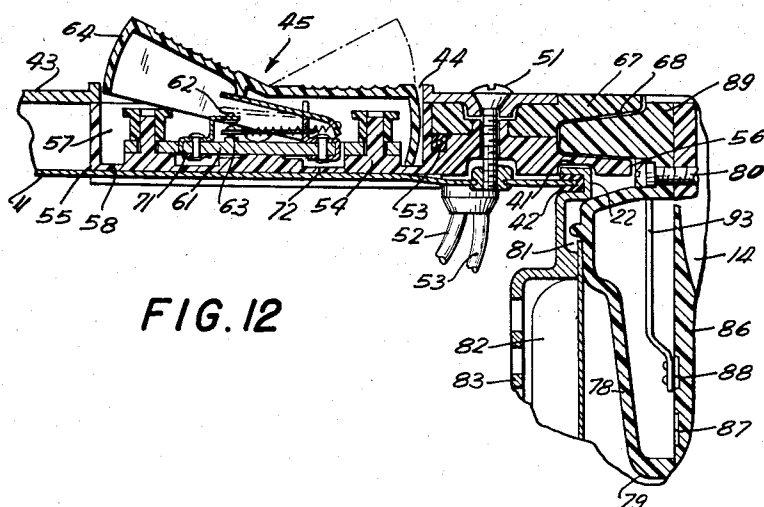


FIG. 12

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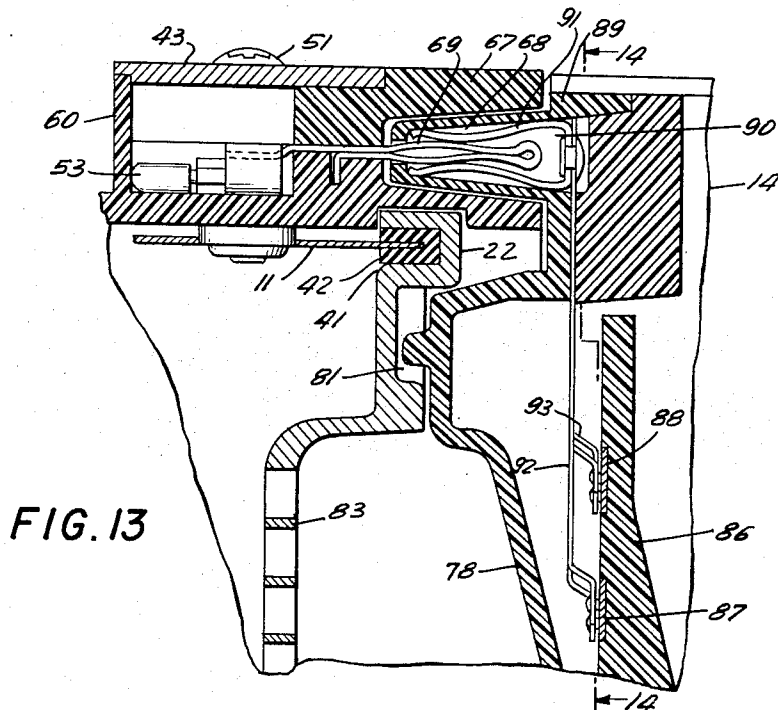


FIG. 13

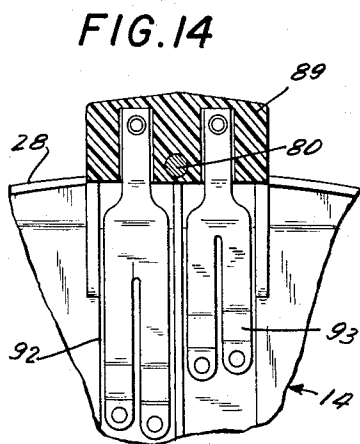


FIG. 14

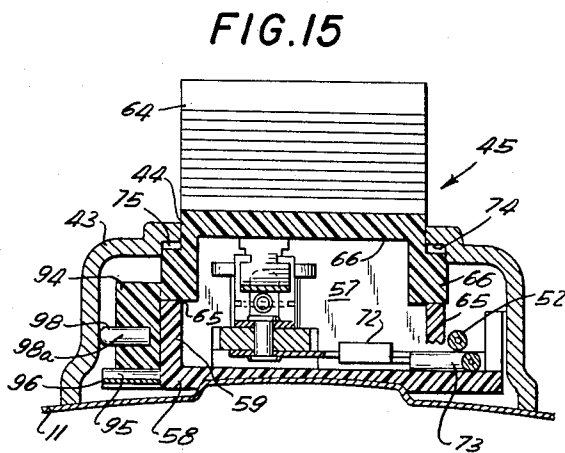


FIG. 15

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2,921,153

VACUUM CLEANER

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Application April 1, 1958, Serial No. 725,726

15 Claims. (Cl. 200—50)

My invention relates to suction cleaners.

It has already been proposed to provide a control to open an electrical switch and disconnect a motor-fan unit of a suction cleaner from a source of electrical supply when a cover at the air inlet end of the cleaner, which may be hinged thereto, moves from its closed position.

An object of my invention is to provide an improved control of this type to open an electrical switch of a suction cleaner and stop its operation when the cover at the air inlet end thereof moves from its closed position, which is of simplified construction.

Another object of the invention is to provide in a horizontal-type suction cleaner, having a casing provided with two top portions at different levels and a sloping wall portion therebetween, an improved control of this type which can be readily assembled and in which the parts are accurately aligned.

A further object of the invention is to provide an improved electrical switch having a pivotally mounted operating member which effectively remains in its "on" or "off" positions when moved to either position and can be effectively employed in a control of this type for controlling the operation of a suction cleaner.

Further objects and advantages of the invention will become apparent as the following description proceeds, and the features of novelty which characterize the invention will be pointed out with particularity in the claims annexed to and forming a part of this specification.

For a better understanding of the invention, reference may be had to the following description taken in connection with the accompanying drawings, in which:

Fig. 1 is a side elevational view of a suction cleaner embodying the invention;

Fig. 2 is a top plan view of the cleaner illustrated in Fig. 1;

Fig. 3 is an enlarged side elevational view of the cleaner shown in Fig. 1, partly broken away and in section, to illustrate parts more clearly;

Fig. 4 is a fragmentary top plan view, partly broken away and in section, of the cleaner shown in Fig. 3;

Fig. 5 is an enlarged fragmentary sectional view of parts illustrated in Fig. 3 to illustrate details;

Figs. 6 and 7 are enlarged fragmentary vertical sectional views taken at lines 6—6 and 7—7, respectively, of Fig. 4;

Fig. 8 is a vertical sectional view taken at line 8—8 of Fig. 6;

Fig. 9 is a horizontal sectional view taken at line 9—9 of Fig. 8;

Fig. 10 is an enlarged fragmentary horizontal sectional view taken at line 10—10 of Fig. 3;

Figs. 11 and 12 are vertical sectional views taken at lines 11—11 and 12—12, respectively, of Fig. 10;

Fig. 13 is an enlarged fragmentary vertical sectional view taken at line 13—13 of Fig. 10;

Fig. 14 is a fragmentary vertical sectional view taken at line 14—14 of Fig. 13; and

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Fig. 15 is an enlarged vertical sectional view taken at line 15—15 of Fig. 10.

Referring to the drawings, I have shown my invention embodied in a horizontal tank-type suction cleaner 10 comprising a casing 11, a front end cover 12 and rear end cover 14. The casing is provided with a handle 15 and wheels 16 and 17 to facilitate movement thereof on a supporting surface, the wheels 17 being at opposing sides of the casing and the single caster wheel 16 at the front end of the casing being disposed between the side walls of the cleaner.

The front end cover 12 is formed with an inlet 18 to which a suction hose (not shown) is adapted to be removably connected. Suitable cleaning tools may be connected to a wand which in turn is connected to the outer free end of the suction hose and through which air flows into the front end of the casing by a suitable motor-fan unit 19 disposed therein. Dirt entrained in air drawn into the inlet 18 is separated from air when it passes through a dust collecting member 20, and air from which dirt has been removed is discharged from the casing 11 through an opening (not shown) in the rear end cover 14.

End rings 21 and 22 are fixed to the front and rear ends, respectively, of the casing 11. The front end ring 21 is provided with a U-shaped groove 23 about the periphery thereof which receives the front or forward edge of the casing 11, as best shown in Figs. 6 and 7. A suitable sealing gasket 24 is provided in the groove about the extreme edge of the casing 11 to provide an air-tight joint. At the top of the cleaner 10, between the opposing sides thereof, the front end ring 21 is provided with a raised part 21a at which region it is secured at 25 to an angle bracket 26 fixed to the top of the casing 11. The front end ring 21 also may be secured in any suitable manner (not shown) to the bottom part of the casing 11.

The bottom of the front end cover 12 is pivoted at 27 to the front end ring 21 and suitable latching mechanism is provided for latching the end cover to the casing 11. As best shown in Fig. 5, the latching mechanism includes a latch member 28 pivotally mounted on a pin 29 fixed within the front end cover 12, and a latch keeper 30 in the form of a pin extending between spaced lugs 31 projecting forward from the front end ring 21.

The latch member 28 may be formed of sheet metal and provided with a latching detent or catch 32. A hairpin spring 33 surrounds the pivot pin 29 at the side of the latch member 28 with one leg 34 engaging the latch member and the leg 35 engaging a stop 36 in the cover 12. Thus, spring 33 yieldingly rocks the latch member 28 toward latching position.

A lug 37 extends upwardly from the latch member 28 between the pivot pin 29 and catch 32 and projects into an opening 38 in the front end cover 12. A push button 39 is mounted on the lug 37 for manually pressing the latch member against the action of spring 33 to an unlatching position. Latching member 28 also has a depending arm 28a which may be connected to other parts (not shown) in the end cover 12 in such a manner that, when the push button 39 is released and the spring 33 becomes effective to rock the latch member 28 counterclockwise, such upward rocking movement will be arrested to position the cam surface 40 on the nose of the latch member at a region at which the cam surface will engage the pin 30 when the end cover 12 is again moved to its closed position. With such arrangement, the pin 30 will automatically rock the latch member 28 clockwise until it moves to its locked position illustrated in Fig. 5.

The latching mechanism illustrated in Figs. 3 and 5 and just described also may be rendered operable to move the latch member 28 to its latch releasing position responsive to a condition affected by the accumulation of dirt in the dust bag. Suitable mechanism of this type

is described and illustrated in my copending application Serial No. 725,730, filed April 1, 1958.

The rear end ring 22, which is suitably fastened to the rear end of the casing 11, is provided with a U-shaped groove 41 about the periphery thereof which receives the rear edge of the casing, the latter being embedded in suitable sealing material 42 to provide an air-tight joint, as shown in Figs. 11, 12 and 13.

As best shown in Fig. 3, the top of casing 11 includes two portions at different elevations which are joined by a sloping wall portion. A trim strip 43, which conforms to the top of the casing 11 and includes two sections at different elevations, extends lengthwise of the casing top. The higher level section of the trim strip 43, which is of inverted U-shape, is provided with an elongated slot 44 at the region of a switch 45 and an opening 46 at its juncture with the sloping portion. The outer end of the lower trim strip section is provided with an opening 47 at the vicinity of the front end cover 12.

Between the openings 46 and 47 in the trim strip 43 the top surface thereof is depressed and of concave shape to form a smooth-walled pocket 48 directly opposite the handle 15. The handle 15 desirably is formed of a material, such as a suitable plastic, for example, to provide a hand grip which essentially keeps its shape and yet is slightly flexible and resilient in character to facilitate its connection to the trim strip 43. The forward end 15a of the handle 15, which is essentially square, is formed with a shoulder 49 which fits snugly about the underside of the periphery of the trim strip opening 47. The front and rear walls 15b and 15c of the forward end 15a of the handle 15 rest against the bracket 26 and top wall of the casing 11, as shown in Figs. 6 and 7.

The rear end 15d of the handle 15 extends into the trim strip opening 46 and is provided with side ledges 15e, one of which is shown in Fig. 3. The side ledges 15e engage inner surface portions of the trim strip at the vicinity of the opening 46 and anchor the rear end 15d of the handle to the trim strip 43.

The raised part 21a of the front end ring 21, which is of inverted U-shape and serves as a front extension of the trim strip 43, is formed with a rearwardly extending lip 21b across the top and both sides thereof, as illustrated in Figs. 6, 7 and 9. The forward edge of the trim strip 43 is provided with a shoulder 43a which engages the front end ring lip 21b, the extreme forward edge of the trim strip being positioned within the lip to anchor and lock the front end of the trim strip to the casing 11. After the front end of the trim strip 43 is locked in position to the front end ring 21 in the manner just explained, the trim strip can be fastened to the casing 11 by screws 50 and 51.

The electric switch 45 is provided at the top of the casing 11 for controlling the supply of electrical energy through conductors 52 and 53 to the motor-fan unit 19, as shown in Figs. 11 and 12. The switch 45 comprises a part 54 formed of insulating material, the extreme left-hand and right-hand ends of which are indicated at 55 and 56, respectively, in Figs. 11 and 12. The left-hand portion of part 54 provides an open-top receptacle 57 of rectangular shape having a bottom 58 and upstanding side and end walls 59 and 60, respectively, for housing an insulating member 61 upon which are mounted normally open stationary and movable switch contacts 62 and 63, respectively. The contacts 62 and 63 are actuated by a manually operable member 64 having a top wall formed of two lever arms or sections which slope upwardly from a central region of the member.

The side walls 59 of the receptacle 57 are formed with notches 65 having round bottom portions for fulcruming the outwardly extending lugs 66 of circular form provided at the opposing side walls of the switch operating member 64. With this construction, the member 64 is angularly movable within the receptacle 57 about an axis coinciding with that of the lugs 66, the opposite end walls of the

member 64 striking the bottom 58 to limit downward movement of each half thereof, as illustrated in Fig. 12.

Over the right-hand portion of the switch part 54 rests an apertured element 67, the latter and extreme right-hand end of the part 54 being formed to provide a cavity 68 into which extend contact fingers 69 and 70, as illustrated in Figs. 10 and 13. These contact fingers are connected by the conductors 52 and 53, switch terminals 71 and 72, and another conductor indicated at 73 in Fig. 10, to complete a circuit across the contact fingers 69 and 70 for the motor-fan unit when the switch operating member 64 is moved to close the switch contacts 62 and 63.

The switch 45 is clamped tightly between the top of the casing 11 and the underside of the trim strip 43 by the tightening screws 50 and 51. The switch operating member 64 projects upwardly through the elongated slot 44 in the trim strip, the underside thereof at the peripheral edge of the slot having a shoulder 74 engaged by the top edges of the walls 59 and 60 of the switch receptacle 57. This leaves a slight clearance 75 for the lugs 66 in the notches 65 at the sides 59 of the receptacle 57, so that the switch operating member 64 will see-saw and rock back and forth freely about its fulcrum when it is moved to close and open the contacts 62 and 63 of the switch 45.

As best shown in Fig. 12, the screw 51 passes through apertured parts of the element 67 and the right-hand portion of the switch part 54 for firmly securing these parts to the casing 11. A part of the element 67, which is formed of suitable insulating material, projects beyond the end of the trim strip 43.

The rear end cover 14 is provided with a pair of spaced apart arms or brackets at the bottom thereof which project downwardly and also toward the casing 11, one of which is indicated at 76 in Fig. 1. The lower ends of the arms 76 are pivoted on the rear end of the casing 11 in any suitable manner (not shown) for rocking movement about an axis below the bottom of the casing. Referring to Figs. 2 and 3, a latch 77 is provided at the top of the rear end cover 14 for releasably latching the end cover at the rear end of the casing 11.

A cover plate 78 for the rear end cover 14, having a central opening 79 therein, nests within the open end of the cover and may be secured thereto by a number of screws, one of which is indicated at 80 in Figs. 11 and 12. The cover plate 78 and rear end ring 22 are closely adjacent to one another when the rear end cover 14 is closed, as seen in Figs. 12 and 13, and a suitable sealing gasket (not shown) may be provided at 81 about the periphery of the rear end ring 22 to provide an air-tight seal between these parts. As seen in Fig. 12, a filter pad 82 may be positioned in the space between the end cover 14 and rear end ring 22 which may be provided with a transverse apertured wall 83.

Referring to Fig. 1, an opening 84 is formed in a side wall of the rear end cover 14 through which is adapted to pass an electrical cord (not shown) having a conventional connecting plug 85 at the end thereof, which arrests inward movement of the cord through the opening. A suitable cord reel, a side wall 86 of which is illustrated in Fig. 13, may be provided for the electrical cord within the rear end cover 14 from which electrical connections may extend to a pair of slip rings 87 and 88 which are provided in circular grooves in the reel side wall which is formed of suitable insulating material.

The cover plate 78 for the rear end cover is formed of suitable insulating material, such as plastic, for example, which includes an arm or projecting part 89 at the top part thereof having a pair of recessed portions, one of which is indicated at 90 in Fig. 13. The part 89 forms a terminal block having resilient clips 91 in the recessed portions thereof which are engaged by the contact fingers 69 and 70 when the rear end cover 14 is latched to the casing 11 and the cavity 68 receives the terminal block 89. To the resilient clips 91 are connected downwardly

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resilient leaf springs 92 and 93 having contact buttons at their lower ends which are in good intimate contact with the slip rings 87 and 88, respectively.

Cord reel structure mounted in a rear end cover of a horizontal tank-type suction cleaner, and of a type which can conveniently be employed in the preferred embodiment being described is illustrated and described in my copending application Serial No. 725,732, filed April 1, 1958. Such cord reel structure includes a reel, having a side wall like the wall 86 illustrated and described, with resilient leaf springs for completing the electrical connection from the inner end of the electrical cord to a terminal block at the top of the rear end cover. If desired, reference may be made to my aforementioned application for a description of the complete cord reel structure, the disclosure of which may be considered to be incorporated in this application.

As best shown in Figs. 11 and 15, a short lever arm 94 is adjacent to and extends downwardly from one of the lugs 66 and moves over the outer surface of a side wall 59 of the switch receptacle 57. The lever arm 13, whose length is less than one-half of that of the lever arms or sections of operating member 64 which extend in opposite directions from the lugs 66, is also angularly movable about these lugs. The bottom pointed end of the lever arm 94 is arranged to ride over a bump 95 formed in a leaf spring 96 whose ends are held in notches 97 formed in a side of the switch part 54. After the lever 94 rides over and depresses the bump 95 in the leaf spring, the latter flexes upward sufficiently to hold the switch operating member 64 to the position to which it has just been moved.

In the preferred embodiment being described, the switch 45 is arranged to open the contacts 62 and 63 and disconnect the motor-fan unit 19 from the source of electrical supply when the front end cover 12 moves from its closed latched position. Mechanism for opening the switch 45 responsive to opening of the end cover 12 includes an elongated rod 98 formed of wire which extends lengthwise of the casing from the switch 45 to the front end cover 12 and includes two substantially straight sections at different levels which are joined by an inclined section at the region of the top sloping wall portion of the casing 11, as shown in Fig. 3. The lever arm 94, at a region removed from its axis of rocking movement, is apertured to receive a bent end portion 98a of the rod 98, as best illustrated in Fig. 15.

The rod 98 is closely adjacent to the top of the casing 11 and is concealed from view by the inverted U-shaped trim strip 43 which overlies the rod. The end of the rod 98 at the front end of the casing 11 passes through an elongated slot 99 formed in a pin 100 and is bent back upon itself to form a hook 101, as shown in Fig. 6. The pin 100 is axially movable in a hollow sleeve 102 which forms a unitary part of and may be formed integrally with the top part 21a of the front end ring 21 and projects rearwardly therefrom.

The hollow passage in the sleeve 102 is of greater diameter than the pin 100 about which is disposed a helical spring 103, one end of which bears against an apertured collar or ring 104 which is tightly fitted within the rear end of the hollow sleeve 102 and through which the pin 100 extends. The opposite end of spring 103, which is maintained under tension in the hollow sleeve 102, bears against a washer 105 fixed at 106 to the pin 100. The raised part 21a of the front end ring 21 is apertured at 107 to provide a passage through which the pin 100 projects forward from the front end of the casing 11.

When the front end cover 12 is latched in its closed position, a part 108 within the cover engages the forward end of the pin 100 and moves the latter rearwardly within the hollow sleeve 102 against the tension of the spring 103. With the front end cover 12 closed and the switch 45 open, which is indicated by the solid line position of

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the switch operating member 64 in Figs. 11 and 12, the rod 98 moves toward the front end cover 12 and the hooked end 101 assumes the solid line position illustrated in Fig. 6. Assuming that the front end cover 12 continues to remain in its closed position, the operating member 64 of switch 45 can be shifted to its dotted line position in Figs. 11 and 12 to move contact 63 upward and close the contacts 62 and 63 to complete the circuit for the motor-fan unit 19. When this occurs, the rod 98 is moved rearwardly by the lever arm 94 and the hooked end 101 thereof is shifted to the dotted line position in Fig. 6. The slot 99 at the rear end of pin 100 is of sufficient length for the hooked end 101 of rod 98 to move from its solid to its dotted line positions in Fig. 6 while the front end cover remains in its closed position.

If the latch push button 39 in Fig. 5 should now be depressed to release the catch 32 from the pin 30, the spring 103, which is under tension, becomes operable to move the front end cover sufficiently to lose the suction at the end cover and the latter will fall forward by gravity about the pivotal connection 27. When this occurs the part 108 in the front end cover 12 will no longer be effective to engage the front end of pin 100, the cover being in a position out of reach of the pin, as indicated by the dotted line position of the cover in Fig. 6, whereupon the spring 103 will become effective to move the pin forward and move the rod 98 so that the hooked end thereof will move from the dotted line position to the solid line position in Fig. 6. Under these conditions, the rod 98 will exert a forward pull on the lever arm 94 and move the switch operating member 64 from its dotted line to its solid line position in Figs. 11 and 12 and automatically open switch 45.

Also, when the front end cover 12 is latched in its closed position, as illustrated in Fig. 6, the switch operating member 64 may be moved at will to close and open switch 45, the relative position of the slot 99 and hooked end 101 of rod 98, and the length of the slot, being such that the switch operating member can be manually moved to the switch open position when the front end cover is closed or moved automatically from the switch closed position to the switch open position responsive to movement of the front end cover latch to its "release" position.

While a particular embodiment of the invention has been shown and described, such variations and modifications are contemplated as fall within the true spirit and scope of the invention, as pointed out in the following claims.

I claim:

1. In a suction cleaner having an inlet and an outlet for air and electrically operable means for moving air therethrough, a wall member forming an exterior wall of the cleaner, the wall member having an opening, means including an electrical switch having an operating member movable between "on" and "off" positions for controlling the electrically operable means, means for mounting the switch in the cleaner with at least a part of the operating member projecting through the opening and accessible exteriorly of the cleaner, means for pivoting the operating member for see-saw movement about a fulcrum intermediate the ends thereof, the operating member having first and second lever arms projecting in opposite directions from the fulcrum which forms an axis about which the arms are angularly movable, the operating member having an element which forms a unitary part thereof and is disposed at the inner side of the wall member, the element forming a third lever arm which is angularly movable about the axis and whose length is less than one-half of that of said first and second lever arms and disposed therebetween, a stop in the path of movement of the third lever arm for holding the operating member to either one of its positions to which it is moved, and structure for yieldingly supporting the stop so that it will yield and move

out of the path of movement of the third lever arm responsive to movement imparted to the operating member.

2. A suction cleaner as set forth in claim 1 in which the structure for supporting the stop comprises resilient means.

3. A suction cleaner as set forth in claim 2 in which the resilient means comprises a bowed leaf spring.

4. A suction cleaner as set forth in claim 3 in which the stop is positioned intermediate the ends of the bowed leaf spring.

5. A suction cleaner as set forth in claim 1 in which the structure for supporting the stop comprises a leaf spring, the stop being disposed intermediate the ends of the bowed spring and projecting from the convex side thereof.

6. A suction cleaner as set forth in claim 1 in which the switch operating member intermediate its ends is provided with outwardly extending parts, means at the inner side of the wall member for pivotally supporting the outwardly extending parts for angularly moving the operating member about the axis intermediate the ends thereof, the structure for yieldingly supporting the stop including a bowed leaf spring, the stop comprising a bump provided at the convex side of the leaf spring intermediate the ends thereof, and the stop normally being supported in the path of movement of the outer end of the third lever arm.

7. A suction cleaner as set forth in claim 6 in which the structure for yieldingly supporting the stop includes a pair of walls having notches which receive the ends of the leaf spring and are spaced apart a distance less than that of the spring when flat.

8. In a suction cleaner having an inlet and an outlet for air and electrically operable means for moving air therethrough, a wall member forming an exterior wall of the cleaner, the wall member having an opening, an open-top receptacle having a bottom and side wall, means to support the receptacle at the inner side of the wall member with the side wall thereof engaging such inner side at the peripheral edge of the opening, means including an electrical switch having an operating member movable between "on" and "off" positions for controlling the electrically operable means, means for mounting the switch in the receptacle, the operating member at a region intermediate its ends having projecting parts at opposing sides thereof, the side wall of the receptacle being notched at the open end thereof to receive the projecting parts to provide a fulcrum, the operating member projecting through the opening and being accessible exteriorly of the cleaner, the operating member having first and second lever arms projecting in opposite directions from the fulcrum about which the arms are angularly movable, the operating member having an element which forms a unitary part thereof and is disposed at the inner side of the wall member, the element forming a third lever arm which is angularly movable about the axis and whose length is less than one-half of that of said first and second lever arms and disposed therebetween, a stop in the path of movement of the third lever arm for holding the operating member to either one of its positions to which it is moved, and structure for yieldingly supporting the stop so that it will yield and move out of the path of movement of the third lever arm responsive to movement imparted to the operating member.

9. A suction cleaner as set forth in claim 8 which includes a casing, an elongated member of inverted U-shape extending lengthwise of the casing with the side walls thereof extending upward from the top of the casing and the closed end thereof forming a ridge, the ridge forming the exterior wall of the cleaner having the opening through which the operating member projects, means to support the receptacle at the top of the casing within the elongated member, the receptacle having a base which extends beyond at least one side of the receptacle to

provide a gap between the receptacle and an upwardly extending side of the elongated member, the element on the operating member being disposed in the gap, the structure for supporting the stop comprising a bowed leaf spring positioned in the gap, the stop comprising a bump provided at the convex side of the bowed leaf spring.

10. A suction cleaner as set forth in claim 9 in which the portion of the base in the gap is provided with spaced apart notches to receive the bowed leaf spring.

11. A suction cleaner as set forth in claim 10 in which the third lever arm is always in contact with the bowed spring in either its "on" or "off" positions or in any position therebetween.

12. A suction cleaner as set forth in claim 11 in which the stop comprises an intermediate bent section of the bowed leaf spring.

13. In a horizontal-type suction cleaner having an open-ended casing and apertured front and rear end covers therefor providing an air inlet and an air outlet, respectively, and electrically operable means for moving air therethrough, an end ring fixed to the air inlet end of the casing, means for positioning the front end cover on the end ring, means including an electrical switch having an operating member removable from the front end cover which is angularly movable between "on" and "off" positions for manually controlling the electrically operable means, means for pivoting the operating member for angular movement about an axis intermediate the ends thereof, the operating member having an element which is angularly movable therewith, and control means operable to move the operating member from its "on" to its "off" position responsive to movement of the front end cover from its closed position, the control means comprising a pin, the end ring being apertured to receive the pin, resilient means to bias the pin to project it forward from the end ring when the front end cover opens, the pin being movable rearward against the action of the biasing means upon closing the front end cover, the rear end of the pin having an elongated slot extending lengthwise of the casing, an elongated member having its rear end connected to the angularly movable element at a fixed region removed from the axis about which the operating member is angularly movable, the front end of the elongated member having a hook connected to the elongated slot in the pin, and the hook and slot connection being so constructed and formed that the pin imparts forward movement to the elongated member responsive to movement of the front end cover from its closed position only when the switch operating member is in its "on" position.

14. A suction cleaner as set forth in claim 13 in which the top wall of the casing is provided with adjoining sections at different levels which extend from the opposite ends of the casing toward a region intermediate the ends thereof and a sloping top wall section therebetween, the switch being disposed at the higher level section of the casing and the pin being disposed at the lower level section of the casing, and the elongated member connected to the angularly movable element of the switch operating member and to the elongated slot of the pin having a sloping section intermediate the ends thereof at the vicinity of the sloping top wall section.

15. In a horizontal-type suction cleaner, an open-ended casing and apertured front and rear end covers therefor providing an air inlet and outlet, respectively, and electrically operable means for moving air therethrough, an end ring fixed to the air inlet end of the casing, the end ring having a raised top part of inverted U-shape, means for positioning the front end cover on the end ring, the top wall of the casing having adjoining sections at different levels which extend from the opposite ends of the casing toward a region intermediate the ends thereof and a sloping top wall section therebetween, an elongated strip which conforms to the shape of the top

wall and is disposed over both top wall sections at different levels and the sloping wall section therebetween, the elongated strip being of inverted U-shape with its sides extending upward from the top wall of the casing and its closed end forming a horizontally disposed ridge between the opposing sides of the casing, the elongated strip at its forward end at the lower level section abutting the raised top part of the end ring and conforming to the shape of the latter, means including an electrical switch having an operating member angularly movable between "on" and "off" positions for manually controlling the electrically operable means, means for pivoting the operating member for angular movement about an axis intermediate the ends thereof, the operating member having an element which is angularly movable therewith, the ridge having an opening at the higher level section of the top wall, the operating member projecting upwardly through the opening and being accessible exteriorly of the casing and the angularly movable element being disposed within the elongated strip, and control means operable to move the operating member from its "on" to its "off" position responsive to movement of the front end cover from its closed position, the control means comprising a pin, the raised top part of the end ring being apertured to receive the pin, resilient means to

bias the pin to project it forward from the end ring when the front cover opens, the pin being movable rearward against the action of the biasing means upon closing the front end cover, an elongated member extending within the elongated strip from the rear end of the pin to the angularly movable element, the elongated member having a sloping section intermediate the ends thereof conforming to the sloping top wall section of the casing, and means for connecting the front and rear ends of the elongated member to the rear of the pin and to the angularly movable element, respectively, the last-mentioned connecting means being so constructed and arranged that the switch operating member is manually movable from its "on" to "off" position and vice versa when the front end cover is closed and is also movable from its "on" to its "off" position by the control means responsive to movement of the front end cover from its closed position.

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