Nov. 29, 1960 R. DESCARRIES 2,961,688

HORIZONTAL TANK-TYPE SUCTION CLEANER

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FIG. 1

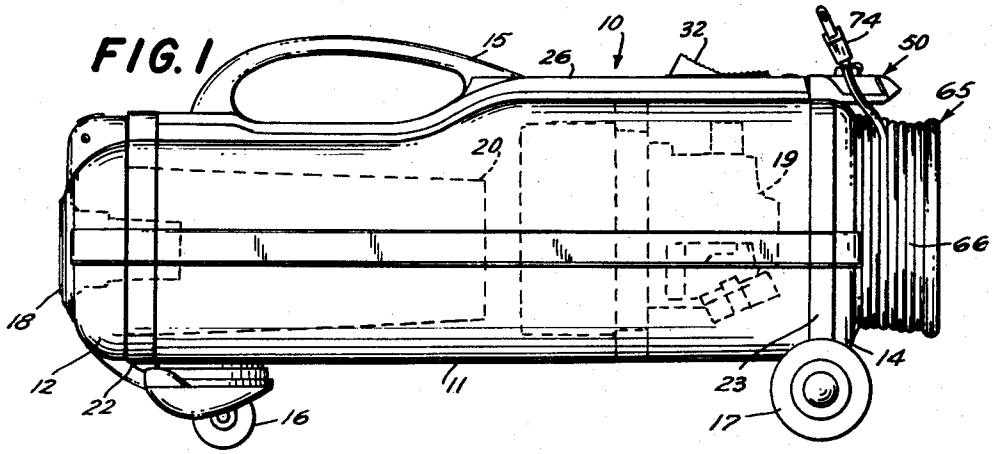


FIG. 3

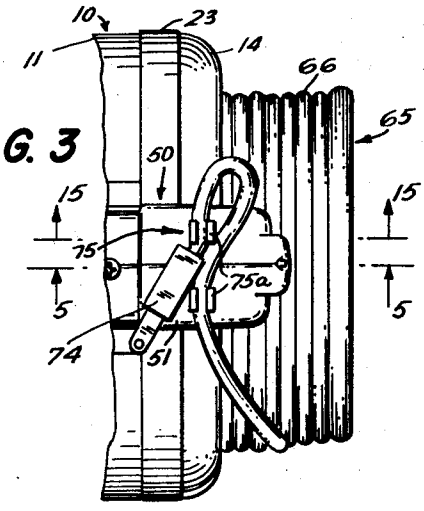


FIG. 2

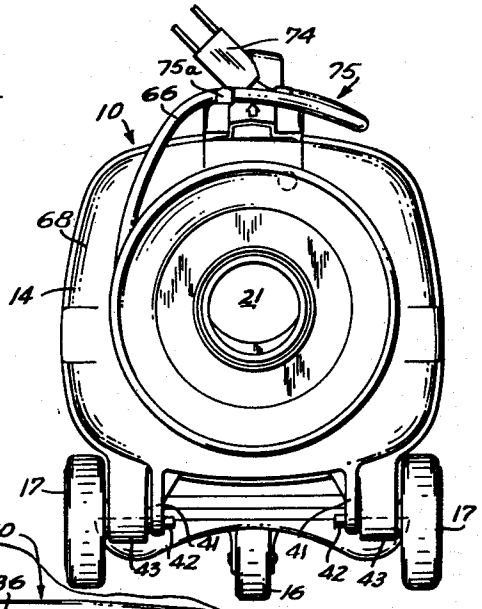
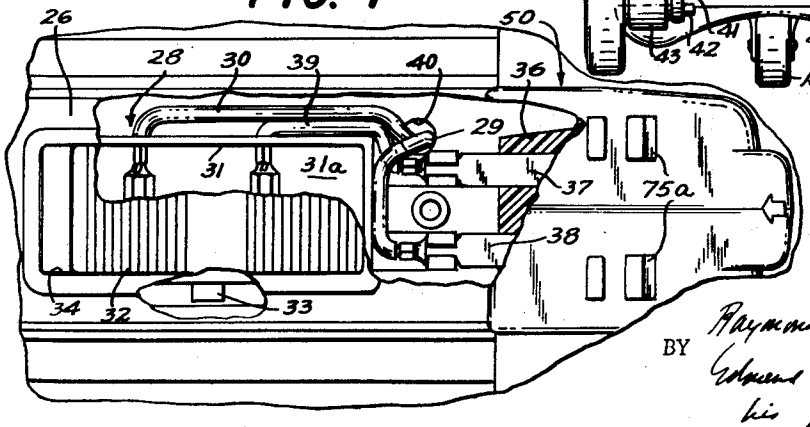


FIG. 4



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HORIZONTAL TANK-TYPE SUCTION CLEANER

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FIG. 5

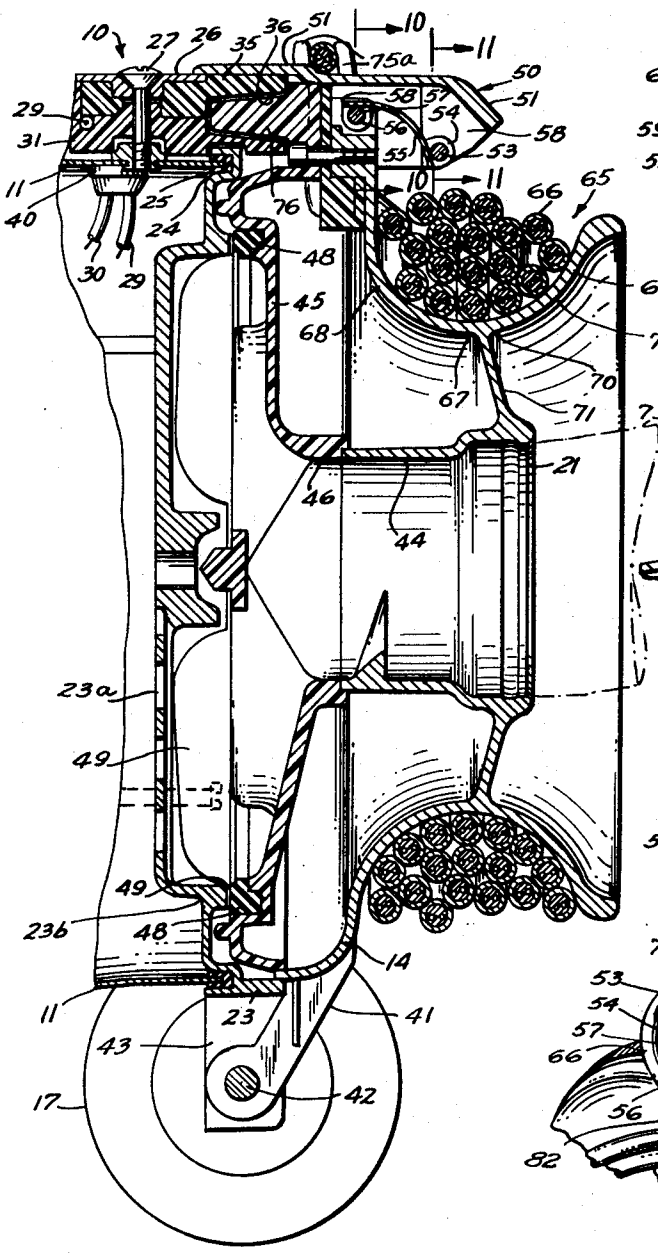


FIG. 9

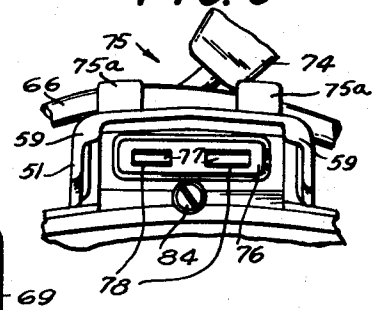


FIG. 10

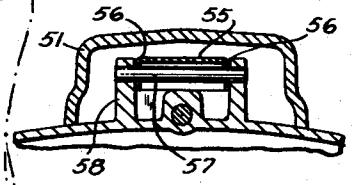


FIG. 11

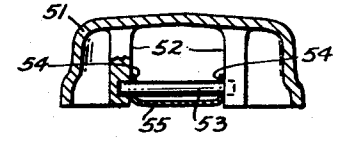
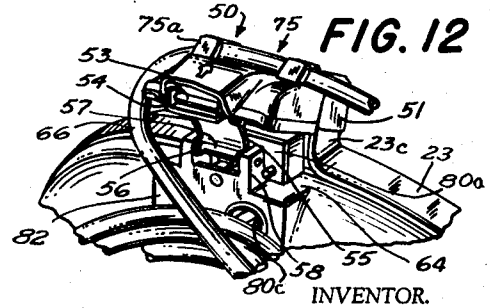


FIG. 12



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HORIZONTAL TANK-TYPE SUCTION CLEANER

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FIG. 6

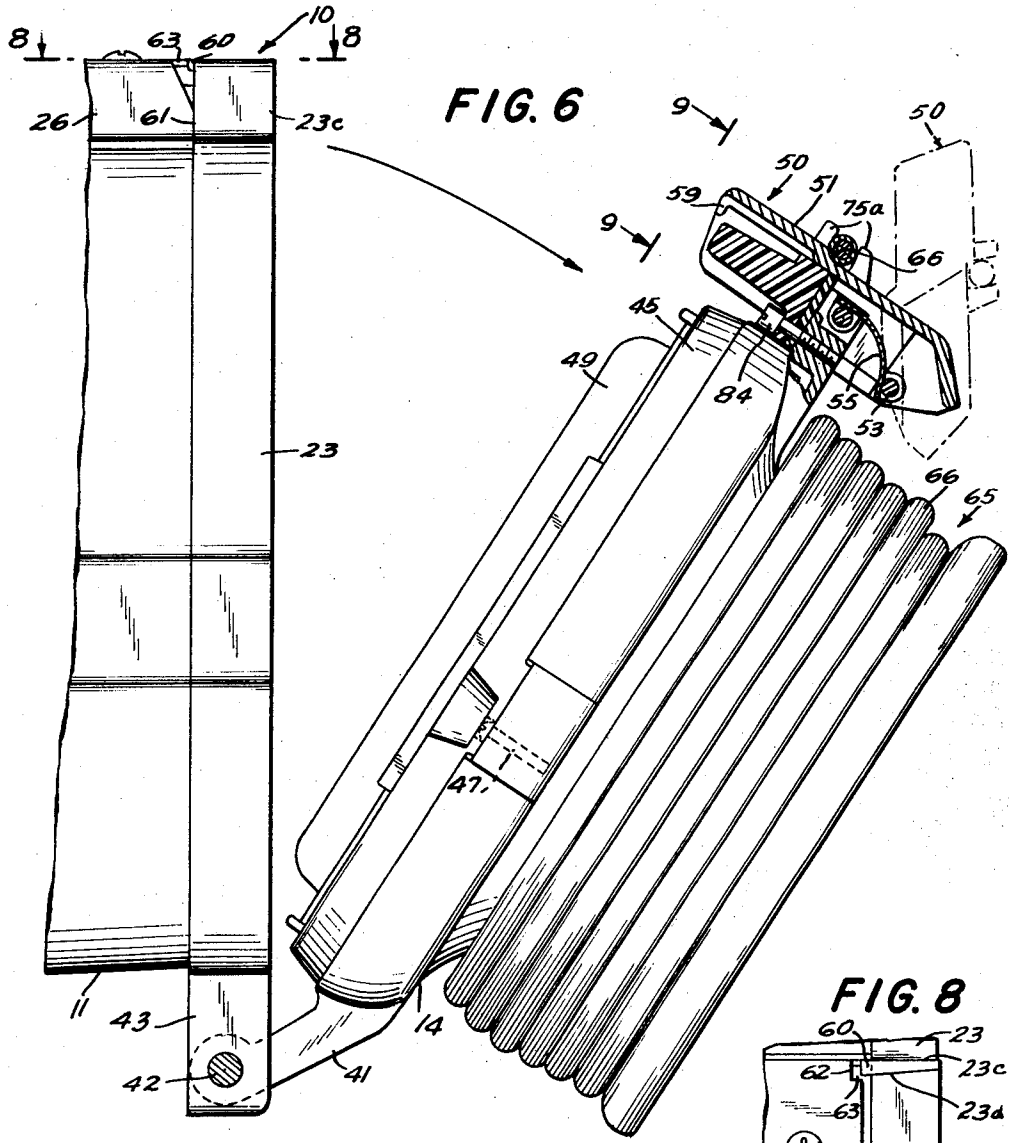


FIG. 8

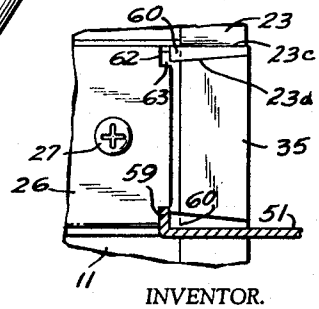
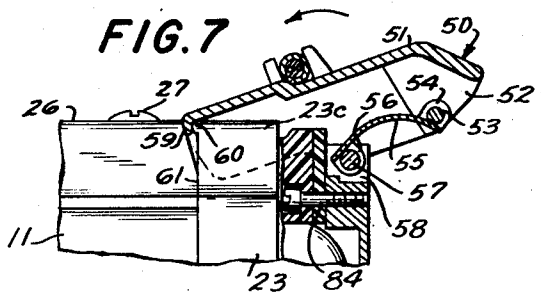


FIG. 7



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HORIZONTAL TANK-TYPE SUCTION CLEANER

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FIG. 13

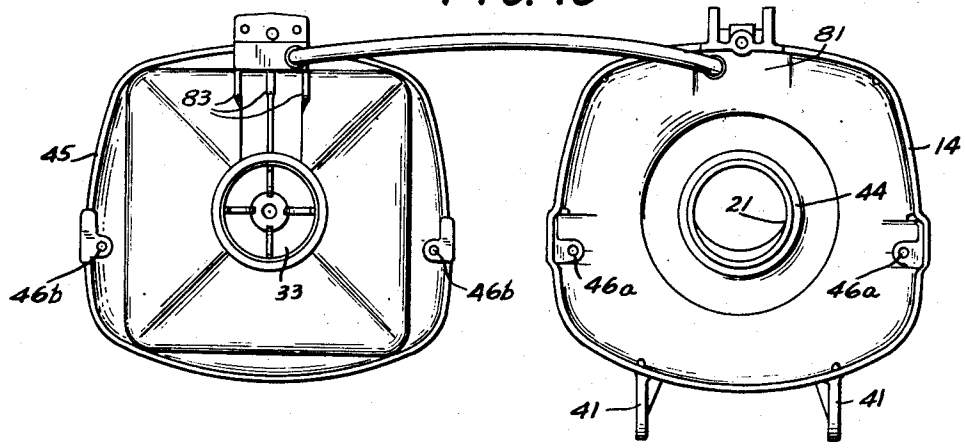


FIG. 14

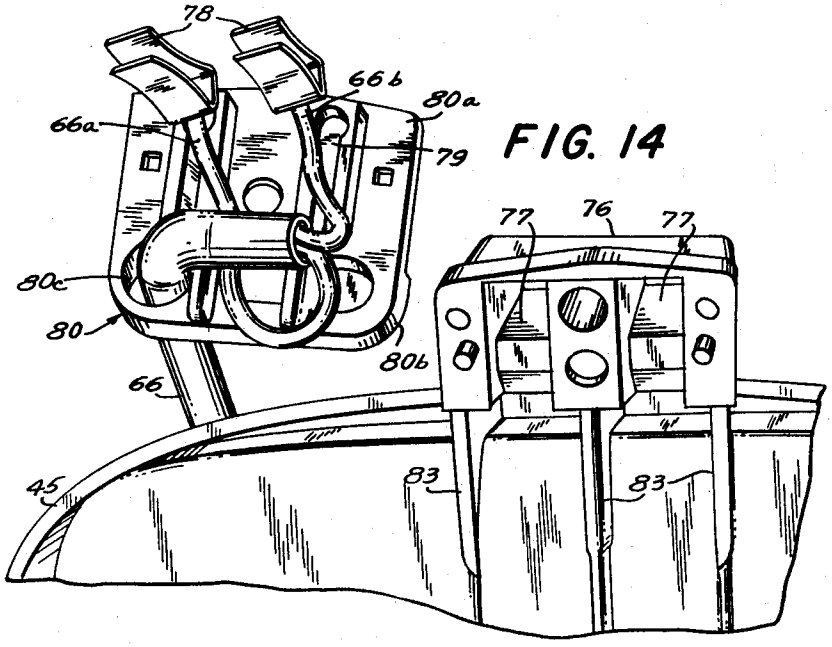
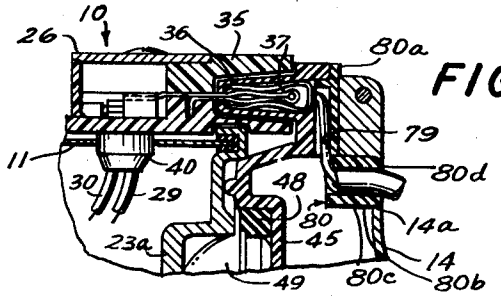


FIG. 15



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United States Patent Office 2,961,688
Patented Nov. 29, 1960

2,961,688

HORIZONTAL TANK-TYPE SUCTION CLEANER

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Filed Sept. 24, 1958, Ser. No. 763,001

8 Claims. (Cl. 15—323)

This invention relates to suction cleaners and is especially concerned with horizontal tank-type suction cleaners.

An object of the invention is to provide an improved horizontal tank-type suction cleaner provided with a spool-shaped cord-carrying structure which is disposed lengthwise of the cleaner at one end thereof.

Another object is to provide an improved horizontal tank-type suction cleaner having a spool-shaped cord-carrying structure at one end thereof which forms an end cover of the cleaner.

A further object is to provide an improved horizontal tank-type suction cleaner having a pivotally mounted cord-carrying structure at one end thereof which forms an end cover of the cleaner.

A still further object is to provide an improved suction cleaner of this type having a separable electrical connection between the pivoted cord-carrying structure and main body of the cleaner and a releasable fastener for latching the pivoted cord-carrying structure in its closed position.

A still further object is to provide an improved suction cleaner of this type in which the fastener is provided with a holder for detachably holding the outer free end of a cord wound about the cord-carrying structure.

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 an end elevational view of the cleaner illustrated in Fig. 1;

Fig. 3 is a fragmentary top plan view of the cleaner shown in Figs. 1 and 2;

Fig. 4 is an enlarged fragmentary top plan view, partly broken away and in section, of the cleaner shown in Figs. 1 to 3;

Fig. 5 is a vertical sectional view taken at line 5—5 of Fig. 3;

Fig. 6 is an enlarged fragmentary view, partly broken away and in section, of the right-hand end of the cleaner shown in Fig. 1 with the rear end cover in a partially open position;

Fig. 7 is an enlarged fragmentary sectional view, partly broken away and in section, to illustrate details of the latch shown in Figs. 5 and 6;

Fig. 8 is a fragmentary top plan view, partly in section, taken at line 8—8 of Fig. 6, to illustrate details more clearly;

Fig. 9 is a fragmentary vertical elevational view taken at line 9—9 of Fig. 6;

Figs. 10 and 11 are fragmentary vertical sectional views taken at lines 10—10 and 11—11, respectively, of Fig. 5;

Fig. 12 is a fragmentary perspective view of the latch in a position like that illustrated in Fig. 7;

Fig. 13 is an elevational view of parts of the rear end cover illustrated in Figs. 5 and 6;

Fig. 14 is a fragmentary perspective view of parts of the rear end cover to illustrate details more clearly; and

Fig. 15 is a fragmentary vertical sectional view taken at line 15—15 of Fig. 3.

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 11 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 side walls 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, which is removably secured to the casing 11 in any suitable manner, is formed with an inlet 18 to which a suction hose (not shown) is adapted to be removably connected. Suitable cleaning appliances 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 the 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 21 in the rear end cover 14.

Front and rear end rings 22 and 23 are secured to the front and rear ends, respectively, of the casing 11 in any suitable manner (not shown). However, the front end ring 22 may be fitted on the casing 11 in a manner similar to the end ring 23, as best shown in Fig. 5. The rear end ring 23, which is suitably fastened to the interior of the casing 11, is provided with a U-shape groove 24 about the periphery thereof which receives the rear edge of the casing, the latter being embedded in suitable sealing material 25 to provide an air-tight joint.

A horizontally extending trim strip 26, which is of inverted U-shape in transverse section, is provided at the top of the casing 11. The handle 15 is fixed to the trim strip 26 which is anchored at one end in any suitable manner to the front end ring 22 and secured at its opposite end to the casing 11 by a screw 27, as best shown in Fig. 5.

An electrical switch 28 is provided at the top of the casing 11 for controlling the supply of electrical energy through conductors 29 and 30 to the motor-fan unit 19, as shown in Figs. 4 and 5. The switch 28 comprises an insulating base 31 including an open-topped receptacle 31*a* for housing suitable switch contacts (not shown) which are controlled by a manually operable member 32 having a top wall formed of two sections which slope upwardly from a central region of the member. The member 32 rocks up and down about its central region at 33 and extends upwardly through an opening 34 in the trim strip 26.

Over the right-hand end of switch base 31 rests an apertured element 35, the latter and extreme right-hand end of the base 31 being formed to provide a cavity 36 into which extend contact fingers 37 and 38, as illustrated in Figs. 4 and 15. These contact fingers are connected by the conductors 29 and 30, switch 28 and another conductor 39 to complete a circuit across the contact fingers 37 and 38 for the motor-fan unit 19 when the switch-operating member 32 is moved to close switch 28. In Figs. 4 and 5 it will be seen that conductors 29 and 30

pass into the interior of casing **11** through a grommet **40** fixed in an opening at the top wall of the casing.

The rear end cover **14** is provided with a pair of spaced arms **41** at the bottom thereof which project downwardly and also toward the casing **11**, as best seen in Figs. 2 and 5. The lower ends of the arms **41** are pivotally connected at **42** to a pair of brackets **43** depending downward and formed integrally with the rear end ring **23**. As seen in Figs. 2 and 5, the rear wheels **17** are also rotatably mounted at **42** to the brackets **43**. The rear end cover **14** is provided with an axially disposed tubular part or hollow sleeve **44** which projects forward from the rear discharge opening **21**. A closure plate **45** for the rear end cover **14**, having a central opening **46** therein, nests within the open end of the end cover. The closure plate **45**, which may be formed of a suitable plastic material, for example, cooperates with the forward end of the tube **44** for flowing therein air passing from the casing **11**. As best shown in Figs. 6 and 13, the closure plate **45** is apertured at **46***b* to receive fastening screws **47** for securing it in position at the open end of the rear end cover **14** the latter being formed with threaded bosses **46***a* to receive the fastening screws.

The cover plate **45** and rear end ring **23** are adjacent to one another when the rear end cover **14** is closed, as seen in Fig. 5, a suitable sealing gasket **48** being provided on the outer face of the cover plate. A suitable filter pad **49** is adapted to be positioned between the rear end cover closure plate **45** and the rear end ring **23** which is provided with a transverse apertured wall **23***a*. The sealing gasket **48** is adapted to hold the peripheral edge of the filter pad **49** firmly against a rim **23***b* of the rear end ring **23** to provide an airtight seal between these parts when the rear end cover **14** is closed.

The rear end cover **14** is provided with a quick releasable latch **50** for resiliently holding the rear end cover **14** in its closed position. As shown in Figs. 6 to 11, the latch **50** comprises a latch plate **51** of inverted U-shape which overlies the top of the rear end cover **14** when the latter is closed. Within the rear part of the latch plate **51** are provided spaced apertured bosses **52** to receive a pin **53** upon which are pivoted a pair of upwardly extending ears **54** which are formed at the rear end of a relatively stiff leaf spring **55**. A pair of ears **56** at the forward end of the spring **55** are pivoted on a pin **57** at regions between a pair of spaced vertical bosses **58** formed at the top of the rear end cover **14**, as shown in Figs. 5, 10 and 12.

With the latch **50** holding the cover **14** in its closed position, as illustrated in Fig. 5, the latch plate **51** overlies the element **35** forming the top portion of the cavity **36** and also the extreme end of the trim strip **26**. Referring now to Figs. 6 and 9, it will be seen that the opposing corners of the latch plate **51**, at the forward end thereof, are provided with inwardly extending flanges **59** which serve as catches or clips to hold the rear end cover **14** against the rear end ring **23**. As best seen in Figs. 6, 7 and 8, the latching clips **59** fit over lugs **60** forming a keeper at the top of the casing **11** at the rear end ring **23**.

At the top part of the rear end ring **23** are provided a pair of spaced upright members **23***c* which form extensions of the sides of the inverted U-shape trim strip **26** and whose top edges are inturned slightly at **23***d*, as seen in Fig. 8, to hold the element **35** in position. The forward ends of the top inturned edges **23***b* are formed with the forwardly projecting parts or lugs **60** which are adapted to be engaged by the latching clips **59**.

Referring to Figs. 6 and 7, it will be seen that the side walls of the trim strip **26** abut the upright parts **23***c* of the rear end ring **23** at **61**. The top corners of the trim strip **26**, at the extreme rear end thereof, are notched at **62**, the notches being formed by removing material both at the top and side walls of the trim strip. As seen in Fig. 8, the notches **62** form gaps **63** providing adequate clearance between the trim strip and lugs **60** to facilitate positioning the latch clips **59** into the gaps for engagement with the lugs.

In the unlatched position of the latch **50** the latch plate **51** is movable about the pin **53** between the solid and dotted line positions illustrated in Fig. 6. The latch plate **51** moves angularly about the forward pin **57** when the latching clips **59** are inserted into the notches **62** for engagement with the lugs **60**, as illustrated in Fig. 7. Thereafter, the rear part of the latch plate **51** is pushed downward against the shoulders **64**, which are illustrated in Fig. 12, to move the latch plate to the position seen in Fig. 5 in which the rear end cover **14** is held tightly against the rear end ring **23**.

When the latch plate **51** is being moved downwardly in Fig. 7, it becomes effective to resiliently hold the plate in the position illustrated in Fig. 5 after the rear pin **53** moves through a "dead-center" position coinciding with a horizontally extending plane passing through the lugs **60** and the forward pin **57**. Conversely, when the latch plate **51** is lifted from its lower position in Fig. 5, the tension of the spring **55** initially must be overcome by sufficient force to raise the rear pin **53** upwardly past the "dead-center" position at which the spring **55** becomes ineffective to hold down the latch plate.

It will now be understood that the stiff leaf spring **55** and latch plate **51** form levers of a toggle latch, both of which extend in the same direction toward the end of the casing **11** from the pivotal connections at **53** which constitute the knuckle of the toggle. When the rear end cover **14** is in its latched position, as seen in Fig. 5, the knuckle of the toggle is under tension on the end cover.

In accordance with this invention, the rear end cover **14** forms a generally spool-shaped cord-carrying structure **65** for an electrical cord **66**. The cord-carrying structure **65** includes a center portion **67** and end portions **68** and **69** at opposite ends of the center portion which extend transversely of and radially outward from the center portion, as shown in Fig. 5. With the rear end cover **14** in its closed position, as seen in Fig. 2, the end portion **68** nearer to the casing **11** extends radially outward toward the rear end ring **23** and serves as the outer part of the rear end wall of suction cleaner **10**. The center portion **67** and end portion **69** together essentially form a member which is bell-shaped and flares outwardly from a central region **70** of the cord-carrying structure **65** to the extreme outer end of the end portion **69**.

The cord-carrying structure **65** encircles the axis of the air discharge opening or exhaust port **21** with all parts thereof of larger diameter than that of the exhaust port, as illustrated in Fig. 5. The rear end cover **14** is provided with a collar or flange **71** which extends radially inward from the center portion **67** of the cord-carrying structure **65** and is fixed at its inner peripheral edge to the hollow tubular part **44**. With the rear end cover **14** in its closed position, as seen in Fig. 2, the flange or collar **71** serves as the inner part of the rear end wall of the suction cleaner **10**. Hence, the rear end wall of the cleaner **10** comprises the collar or flange **71** and the part of the cord-carrying structure **65** at the left-hand side of the region **70** to which the outer periphery of the collar is fixed, as shown in Fig. 5.

The part of the cord-carrying structure to the right of the region **70** in Fig. 5 is spaced radially from the axis of the air discharge opening or exhaust port **21** to form a passage **72** in the cord-carrying structure which is large enough for a hose to be inserted therethrough and connected to the hollow tubular member **44**, as diagrammatically indicated by dotted lines at **73** in Fig. 5. In this way, the air discharged from the cleaner **10** may be employed to operate a device like an atomizer or sprayer, for example, which is adapted to be connected to the outer free end of the hose.

With the electrical cord **66** wound on the cord-carry-

ing structure 65 and the suction cleaner in a horizontal position, as shown in Fig. 1, the cord 66 can be manually unwound without difficulty to connect a plug 74 at the outer free end thereof to an outlet socket. When it is desired to operate the cleaner, it is only necessary to grasp the plug 74 and walk from the cleaner in a direction more or less in alignment with the casing 11. In this way, successive turns of the cord readily slip off the outer end portion 69 of the cord-carrying structure 65, so that the cord can be unwound in a continuous fashion. When the cleaner 10 is not in use, the cord-carrying structure 65 may be used as a base for supporting the cleaner in an upright position.

When the cord 66 is wound on the cord-carrying structure 65, the plug 74 at the outer free end of the cord may be fixed to a holder 75 provided at the top of the latch plate 51. As shown in Figs. 3 and 5, the holder 75 may comprise two pairs of spaced lugs 75*a* extending upwardly from the latch plate 51. Each pair of spaced lugs 75*a* forms a clip for frictionally holding a region of the cord when it is pushed downwardly in the gap between the lugs, the cord usually being provided with an insulating covering formed of rubber or plastic, for example, which is resilient in character. As seen in Fig. 3, the two pairs of spaced lugs 75*a* are disposed in a plane transverse to the axis of the spool-shaped cord-carrying structure 65.

The inner end of the electrical cord 66 is connected to the cleaner 10 in such a way that an electrical circuit will be completed for the motor-fan unit 19 when the rear end cover 14 is closed and the switch-operating member 32 is moved to close the switch 28. The cover plate 45, which desirably is formed of an insulating material like plastic, for example, includes an arm or projecting part 76 at the top part thereof, as best shown in Fig. 5. The part 76 which is formed with a pair of spaced recesses 77, as seen in Fig. 9, forms a terminal block having resilient clips 78 in the recessed portions thereof which are engaged by the contact fingers 37 and 38 when the rear end cover 14 is latched to the casing 11 and the cavity 36 receives the terminal block 76.

As best shown in Fig. 14, the conductors 66*a* and 66*b* at the inner end of the electrical cord 66 are secured to the clips 78. The conductors 66*a* and 66*b*, which extend downwardly from the clips 78, fit in spaced vertically extending grooves 79 of a strain relief member 80 formed of suitable insulating material like plastic, for example. When the rear end cover 14 and cover plate 45 are secured together by the fastening screws 47, the strain relief member 80 is clamped between these parts, as shown in Fig. 15. In such clamped position, the member 80 bears directly against the inner surface 81 of boss 82 formed at the top part of the outer wall member 14, as shown in Figs. 12 and 13, the upright narrower part 80*a* of the member 80 projecting upwardly from the shoulders 64. The bottom wider part 80*b* of the member 80 is clamped between the inner surface 81 of the boss 82 and a region of the rear face of the closure plate 45 formed with vertical ribbing 83, as shown in Fig. 13. The wider part 80*b* of the member 80 is apertured to form a hollow bushing 80*c* which is slightly wider than the remaining portion of part 80*b* and extends through an opening 14*a* in the rear end cover 14, as indicated at 80*d* in Fig. 15. As shown in Figs. 6 and 9, an additional fastening screw 84 is provided at the vicinity of the latch 50 for clamping the strain relief member 80 between the rear face of closure plate 45 and the inner surface of the rear end cover 14.

When the cord 66 is unwound from the spool-shaped cord-carrying structure 65, the inner end thereof extends rearwardly through the opening 14*a* in the rear end cover. When the cord 66 is wound on the cord-carrying structure 65, the part of the cord adjacent the inner end thereof and projecting from the opening 14*a* in the rear

end cover 14 initially will be wound on the spool-shaped structure. This can be readily accomplished in a continuous circular motion, the cord slipping through the hand which guides the cord and is employed to effect such circular motion.

By providing a filter pad 49 in the space between the apertured end ring wall 23*a* and rear end cover closure plate 45, all of the air flowing from the casing 11 will pass through the filter. Further, the filter pad 49 is easily accessible for inspection and replacement by providing the hinged rear end cover 14 and a quick releasable latch 50 therefor. By providing the cord holder 75 at the top of the latch plate 51, the latch 50 can be readily operated to unlatch the rear end cover 14 to inspect the filter pad 49 while the cord 66 is coiled about the cord-carrying structure 65 and the outer free end of the cord is attached to the cord holder 75.

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.

What is claimed is:

1. In a horizontal tank-type suction cleaner, a shell having an opening, a motor-driven suction unit in said shell, an end cover for closing the opening in said shell, said end cover comprising first and second cooperating sections and means for removably securing them together, said first section including a spool-shaped cord-carrying structure disposed lengthwise of the cleaner at one end thereof and a hollow tubular member and a collar which extends radially inward from said cord-carrying structure to said tubular member for supporting the latter within said structure, said cord-carrying structure including a tubular center portion and end portions at opposite ends of the center portion which extend transversely of and radially outward from the center portion, said tubular member having an inlet and an exhaust port to which a hose is adapted to be connected for blowing air therethrough, said second section comprising a closure plate for said end cover which is concealed from view when the latter closes the opening, said closure plate having an aperture communicating with the inlet of said tubular member and cooperating with said first section to form a hollow interior therebetween encircling said tubular member, an electrical cord normally wound on said structure when the cleaner is not in use, said cord-carrying structure defining the end wall of the cleaner and having an opening through which the inner end of said cord extends into the hollow interior, and a separable electrical connection including a first element on said shell connected to said motor and a cooperating second element at said closure plate connected to the inner end of said cord, said elements being connected to one another when said end cover is positioned on said shell to close the opening therein and separable when said end cover is moved from its closed position.

2. A suction cleaner as set forth in claim 1 which includes a strain relief member for said cord at the inner end thereof, said strain relief member being disposed within said hollow interior and clamped between said cord-carrying structure and said closure plate.

3. A suction cleaner as set forth in claim 2 in which said closure plate includes means forming a terminal block, the second element of said electrical connection being associated with said block, and said strain relief member being clamped between said cord-carrying structure and said terminal block.

4. A suction cleaner as set forth in claim 1 including means for pivotally mounting said end cover for rocking movement on said shell to close the open end thereof, releasable fastening means for latching the pivoted end cover in a closed position on said shell and releasing said structure to open the end of said shell, said shell having a perforate plate at the opening therein, said

perforate plate cooperating with said apertured closure plate to form a chamber therebetween when said end cover is latched in its closed position by said fastening means, and a filter pad mounted in said chamber and held in place between said perforate plate and said closure plate whereby the pivoted cord-carrying structure forming a part of said end cover provides quick access to the chamber to inspect or replace the filter pad.

5. A suction cleaner as set forth in claim 1 including means for pivotally mounting said end cover for rocking movement on said shell to close the open end thereof, releasable fastening means for latching the pivoted end cover in a closed position on said shell and releasing said structure to open the end of said casing, said releasable fastening means comprising latch mechanism including means on said casing providing a keeper and lever means pivotally mounted on said cord-carrying structure and having a catch to engage said keeper, said lever means including provisions to detachably hold the outer free end of said cord.

6. A suction cleaner as set forth in claim 5 in which said lever means includes a first lever having said catch at one end thereof, a second lever pivoted at one end to a region of said cord-carrying structure, the opposite ends of the levers being pivoted to one another to form a knuckle of a toggle latch from which both levers extend

in the same direction toward the end of said shell when the catch engages the keeper, the knuckle being under tension on said cord-carrying structure when the latter is in its latched position, said first lever being provided with said provisions to detachably hold the outer free end of said cord.

7. A suction cleaner as set forth in claim 6 in which said second lever comprises a bowed leaf spring, the surface of the spring facing said cord-carrying structure, when the latter is in its latched position, being concave.

8. A suction cleaner as set forth in claim 7 in which said first lever is disposed at the top part of said cord-carrying structure, and said provisions to detachably hold the outer free end of said cord is provided at the top surface of said first lever.

References Cited in the file of this patent

UNITED STATES PATENTS

2,323,275	Lofgren	June 29, 1943
2,719,600	Brace	Oct. 4, 1955
2,810,114	Shaw	Oct. 15, 1957
2,848,731	Tamarin	Aug. 26, 1958

FOREIGN PATENTS

770,652	Great Britain	Mar. 20, 1957
784,606	Great Britain	Oct. 9, 1957