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Fromknecht et al.

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[54] VACUUM CLEANER

[75] Inventors: **Charles T. Fromknecht; Martin E. Harbeck,** both of Anderson, S.C.

[73] Assignee: **The Singer Company,** New York, N.Y.

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[52] **U.S. Cl.**.....**55/373,** 15/323, 15/327 D, 55/337, 55/378, 55/380, 55/458, 55/471, 55/DIG. 3

[51] **Int. Cl.** **B01d 46/02**

[58] **Field of Search**.....55/467, 471, 472, 55/373, DIG. 3, 337, 378, 380, 458; 15/323, 327 D

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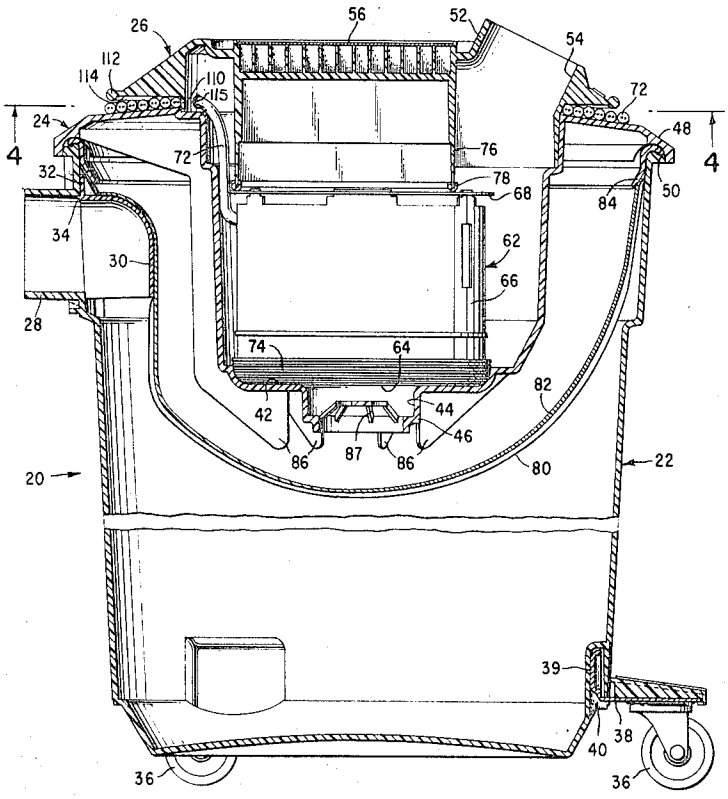
Primary Examiner—Dennis E. Talbert, Jr.

Attorney—Marshall J. Breen, Chester A. Williams, Jr., and Alan Ruderman

[57] **ABSTRACT**

A vacuum cleaner including an open top dirt container having an air inlet located adjacent to the upper portion thereof and having a baffle mounted behind the suction inlet to direct the inlet air downwardly and circumferentially toward the lower walls of the container. A cover housing assembly is mounted in and removably secured to the upper peripheral portion of the dirt container by a pair of plastic latches having cam surfaces which snap over cooperating surfaces on the container. A top housing having a carrying handle and an exhaust port formed therein is secured to the cover housing by four screws to entrap the motor-blower unit and the latches therebetween. A peripheral slot within which the electric power cord of the motor-blower unit is adapted to be stored is formed between the peripheral edge of the top housing and the upper surface of the cover housing. The motor blower unit sits in a seat formed in the cover housing with its inlet communicating with the interior of the dirt container by means of an aperture formed within the seat, and has its discharge outlet in communication with the exhaust port of the top housing. Both a disposable paper filter and a cloth secondary filter may be mounted between the dirt container and the cover housing about the entire periphery thereof to prevent dirt from being drawn through the motor blower unit from the dirt container.

4 Claims, 4 Drawing Figures



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SHEET 1 OF 2

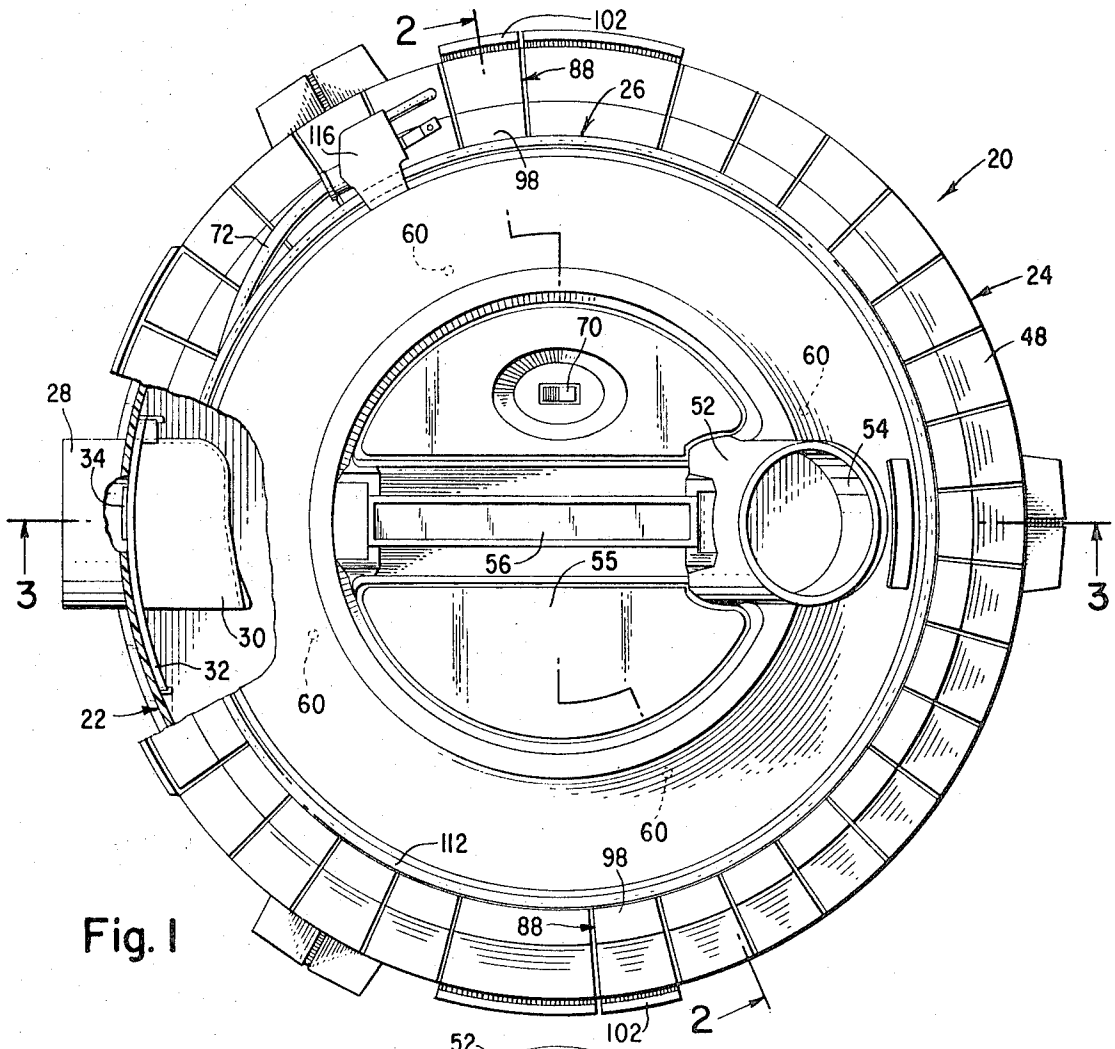


Fig. 1

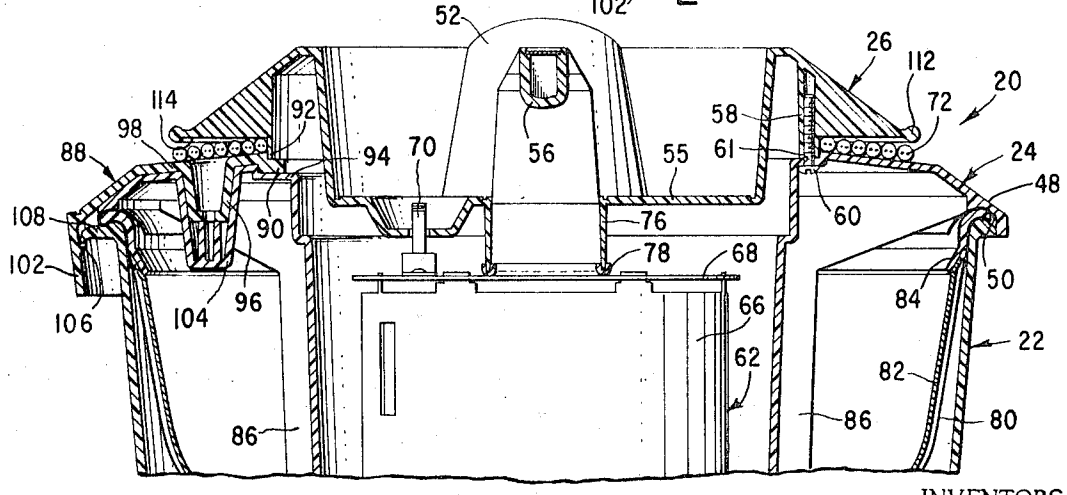


Fig. 2

INVENTORS
Charles T. Fromknecht
BY Martin E. Harbeck

WITNESS:
Marvin Rothenberg

Marshall J. Breen
ATTORNEY

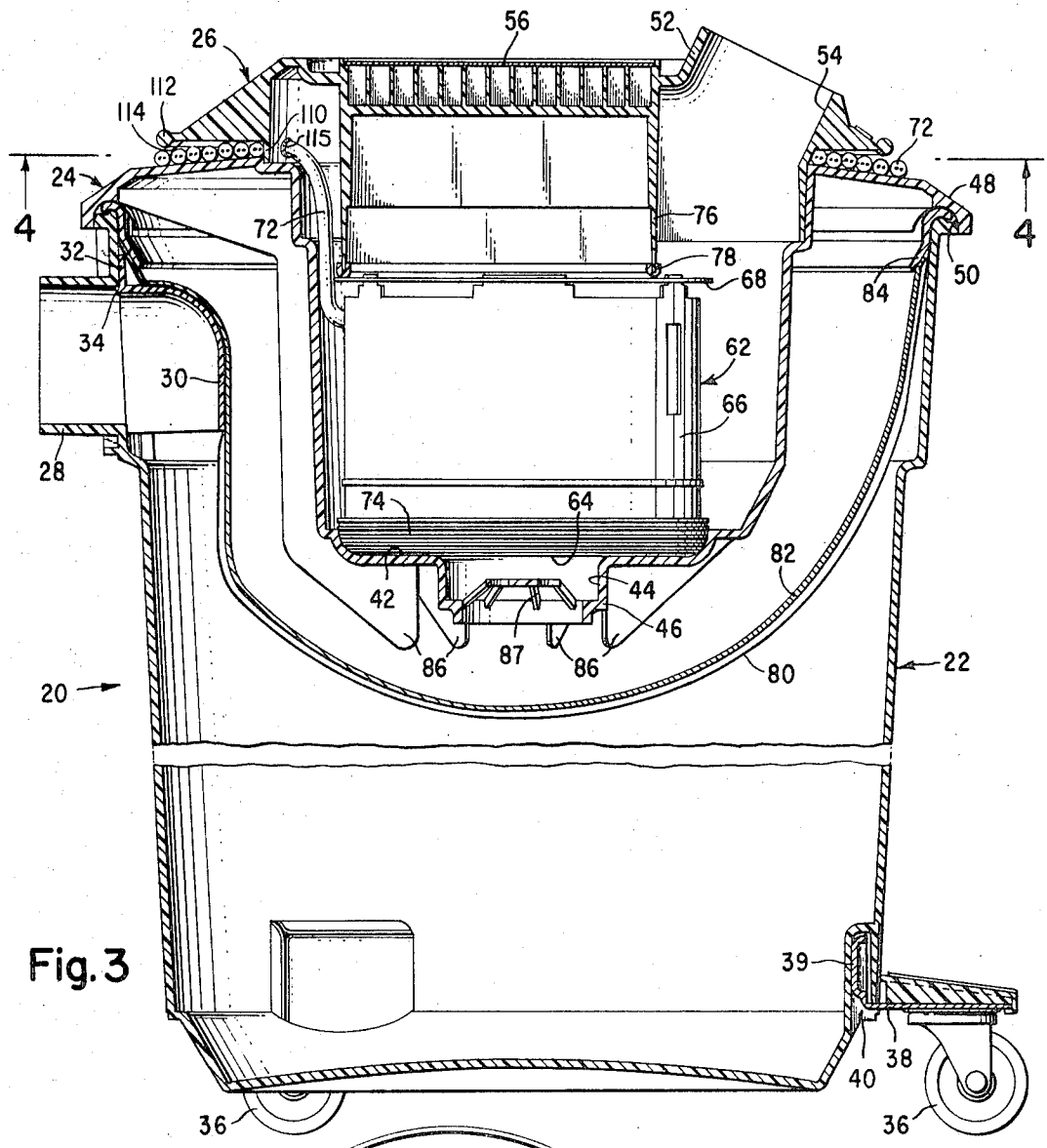


Fig. 3

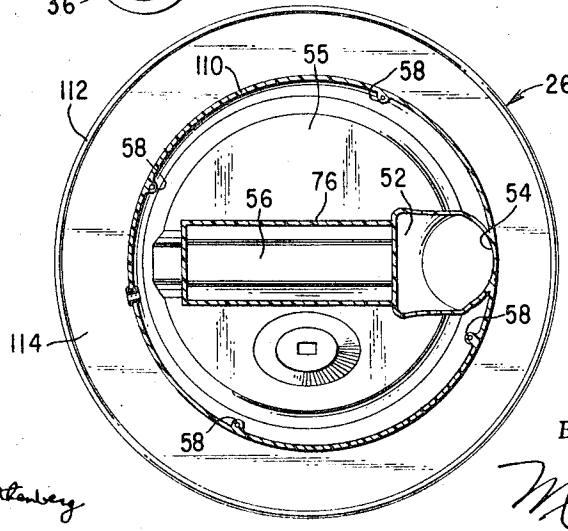


Fig. 4

INVENTORS
Charles T. Fromknecht
BY Martin E. Harbeck

WITNESS:
Marvin Rottenberg

Marshall J. Breen
ATTORNEY

VACUUM CLEANER

BACKGROUND OF THE INVENTION

The present invention relates to vacuum cleaners and more particularly to an improved casing construction thereof. It is particularly well suited for a canister type vacuum cleaner in which the principal axis is vertical, and may be embodied in a domestic vacuum cleaner for use in the home, shop, on a patio, or in an industrial type vacuum cleaner.

A large portion of the manufacturing cost in the highly competitive vacuum cleaner art results from assembling the many components into the completed unit. In the known vacuum cleaners of the prior art the motor blower unit, which creates the suction within a suction chamber, is secured directly to a housing forming a part of the casing or frame. Generally, the motor blower unit includes a peripheral flange which is secured by screws to the housing. Furthermore, inasmuch as canister type vacuum cleaners require a dirt filter bag of some sort there must be some means provided whereby operator entry into the vacuum chamber is permitted. This is normally accomplished by means of latches or other locking elements which are secured to a housing by means of some fastening device, generally screws. Many canister vacuum cleaners are designed with latches on one end and hinge members on another end so that one housing can be pivoted upwardly relative to another housing for access into the vacuum chamber. Moreover, the electrical power cord for the motor of the motor blower unit requires some storage compartment when the unit is not in use, and this generally requires either a reel type mechanism or storage within a pivoted housing.

The provision of these features in the prior art vacuum cleaners has required a multitude of assembly operations to be performed in the final assembly of the vacuum cleaner, thereby adding to its manufacturing cost and increasing its bulkiness, weight and complexity.

SUMMARY

It is a primary object of this invention to provide an improved, low cost and compact vacuum cleaner.

It is another object of this invention to provide a vacuum cleaner which lends itself to mass production techniques of fabrication and assembly.

It is a further object of this invention to provide a vacuum cleaner casing comprising a plurality of housings between which are entrapped the major components of the vacuum cleaner.

A still further object of this invention is to provide a vacuum cleaner casing comprising an open-topped dirt-retaining container upon which is supported and nested therein a first housing which carries the motor blower unit and a top housing secured to the first housing and entrapping the motor blower unit and a plurality of latch means therebetween, and defining a peripheral slot for storage of the motor power line cord.

The present invention achieves these objects by providing a vacuum cleaner having an open top dirt container with a suction inlet therein, a first housing nested within the container and including a motor blower unit positioned on an apertured seat formed in the first housing, and a top housing positioned on and secured to the first housing to constrain the motor blower unit in the seat by entrapment, a porous filter positioned around the peripheral edge of the dirt container, a plurality of resilient latching members entrapped between the first housing and the top housing for securing the first housing to the dirt container, and wherein the top housing and the first housing define a peripheral slot therebetween for storage of the motor blower power line cord in a reeled condition.

BRIEF DESCRIPTION OF THE DRAWINGS

The particular features and advantages of the invention as well as other objects will become apparent from the following description taken in connection with the accompanying drawings, in which:

FIG. 1 is a top plan view, partially broken away for clarity, of a vacuum cleaner embodying the novel features of the present invention;

FIG. 2 is a fragmentary cross sectional view taken substantially along line 2—2 of FIG. 1, illustrating the mounting of one of the latch members;

FIG. 3 is a cross sectional view taken substantially along the line 3—3 of FIG. 1, illustrating the mounting of the motor blower unit between the first housing and the top housing, and

FIG. 4 is a cross sectional view taken substantially along line 4—4 of FIG. 3.

DESCRIPTION OF PREFERRED EMBODIMENT

Referring now to the accompanying drawings wherein like reference numerals denote similar parts throughout the various views, there is disclosed a canister vacuum cleaner, generally designated as 20, which incorporates the improved casing construction of the present invention. The casing comprises an open top substantially cylindrical dirt container 22, a cover or first housing 24 and a top housing 26. The container and each of the housings preferably is comprised of plastic and is manufactured by molding. Formed adjacent to the open end of the dirt container 22 is an air suction inlet conduit 28 opening into the container and adapted to couple a conventional vacuum cleaner flexible hose (not shown) in the usual manner. Preferably, a styrene baffle 30 is mounted behind the inlet aperture defined by the conduit 28 by means of slots (not shown) formed in the wall of the dirt container adjacent to the inlet which slots received corresponding flanges 32 of the baffle. A projection 34 on the baffle cams under the top edge of the inlet opening to further aid in locking the baffle in place. The baffle is placed to direct the inlet air downwardly and circumferentially toward the lower side walls of the container. Externally mounted at the bottom of the container are preferably three casters 36. An L-shaped bracket 38 forms the upper raceway of each of the casters, and the upstanding portion 39 of each bracket is pressed fitted into a cavity 40 formed adjacent the bottom of the container. The use of three casters provides a very stable support for the cleaner on a floor surface. The first housing or cover housing 24 is substantially cup shaped having a flange periphery. At the bottom of the cup shaped housing there is formed a substantially flat circular seating portion 42 having an aperture 44 formed centrally therein with an downwardly extending neck 46 communicating with the interior of the dirt container 22. The outer periphery of the first housing 24 includes a peripheral rim 48 substantially corresponding in shape to the periphery of the top of the dirt container 22, and includes an annular groove 50 at its underside

for receiving the top peripheral portion of the dirt container. In this manner the first housing **24** is supported on the dirt container with the cup shaped portion of the housing nested within the dirt container, and is detachably secured thereto as will herein after be described. The top housing **26** includes an upwardly projecting annular wall **52** defining an aperture **54** which forms the exhaust port of the vacuum cleaner which communicates with the interior of the cup shaped portion of the first housing **24.** Centrally bridging a recessed surface **55** of the top housing is a carrying handle **56** by which the vacuum cleaner may be manipulated. Projecting downwardly from a lower surface of the top housing are four bosses **58** which threadly receive a corresponding screw **60** passing through a hole **61** formed in the first housing thereby to secure the housing together.

A motor blower unit **62** of any conventional design is mounted on the housing seat **42** with the blower inlet **64** in registration with the opening **44** in the first housing. Surrounding the motor blower unit is a perforated motor guard **66** which is secured to a motor guard top plate **68** by a tab and slot arrangement. Conveniently, all of the electrical wiring including a conventional switch **70** is contained within the motor casing **66** with the electrical motor power cord **72** exiting through an opening in the motor guard. An annular seal **74** is secured about the bottom of the motor guard and the motor blower unit is fitted onto the seat **42.** The top housing **26** includes a downwardly projecting rectangularly extending rib **76** at the central portion of the bottom surface of the housing **26.** Mounted about the free end of the rib **76** is a grooved seal **78** which abuts the plate **68** of the motor blower unit when the housings **26** and **24** are secured together. Thus, the motor blower unit **62** is entrapped between the housings **24** and **26** and more particularly between the seat **42** and the rib **76** when the screws **60** are properly positioned within the bosses **58** to secure the housings together. Clearly, the assembly of the housing **24** to **26** is such that no screws or other securing means pass directly into the motor blower unit so that assembly and disassembly may be accomplished in a minimum amount of time and with a minimum amount of effort.

Both a disposable paper filter **80** and a cloth secondary filter **82** are mounted between the dirt container **22** and the housing **24** about the entire periphery thereof and separates the motor blower unit from the dirt container. The cloth filter **82** includes a resilient ring **84** to seal the dirt container from the housing **24.** The cloth filter is of a substantially hemispherical shape and the paper filter is similarly shaped and wrapped about the cloth filter and secured in position by turning its peripheral edges inwardly toward the center and over the ring **84** of the cloth filter. Formed on the outer wall of the cup shaped portion of a housing **24** to aid in maintaining the filter shape by preventing the filters from being drawn against the surfaces of the housing **24** is a plurality of ribs **86,** while a grid like structure **87** located in the aperture **44** in the neck portion **46** of the housing **24** prevents the filters from being drawn into the inlet of the motor blower.

To secure the first housing, and thus also the assembled motor blower unit and top housing, to the dirt container in a substantially air tight relationship therewith the cleaner is provided with at least two resilient latching members, generally designated **88,** preferably comprising flexible plastic. Each latching member or latch **88** is supported at one end **90** in cantilever fashion by entrapment between a downwardly extending rib **92** of the top housing **26** and an upper surface **94** of the first housing **24.** Adjacent to the cantilevered portion **90** the latch includes a downwardly extending tapered cylindrical plug **96** and beyond that includes a laterally extending portion **98** which rests upon the first housing and may be moved manually upwardly relative thereto. The latch extends beyond the periphery of the first housing and includes at the free end a downwardly extending locking portion **102.** The plug **96** is positioned within a cavity or recess **104** formed in the upper surface of the first housing **24** and the rib **92** secures it in place. The arrangement is such that a living hinge is formed by the mounting of the latching member **88** between the first housing and the top housing so that the latching members **88** may be pivoted vertically relative to the container and housings. On the inside of the locking portion **102** facing the container **22** there is formed an outwardly extending protuberance or camming finger **106** which cooperates with a downwardly projecting flange **108** formed on the periphery of the dirt container at locations adapted to register with the corresponding latching member. Thus, in order to securely mount the motor blower and the housings on the dirt container in a substantially air tight relationship the first housing is set upon the dirt container with the filter seal **84** properly positioned on the periphery of the dirt container and each locking portion **102** of a latching member **88** is pushed downwardly until the protuberance **106** is below the flange **108** and in abutting relationship therewith. This compresses the seal **84** between the first housing and the dirt container and prevents linkage of air therebetween which wound tend to reduce the suction within the interior of the dirt container. To remove the first housing and the associated motor blower and top housing from the dirt container, when the dirt container is to be emptied or when the filters are to be cleaned or changed, the locking portions **102** are simply pulled outwardly to release the finger **106** from the flange **108** and the first housing is lifted from the dirt container.

In order to store the electrical cord **72** conveniently, the top housing **26,** as illustrated in FIGS. **3** and **4,** includes an annular wall **110** which extends downwardly into abutting relationship with a top surface portion of the first housing **24,** and the periphery of the top housing **26,** which includes a peripheral bead **112,** is spaced above the upper surface of the housing **24.** This arrangement defines a peripheral slot **114** between the wall **110,** the lower surface of the peripheral wall of the top housing and the upper surface of the first housing As clearly illustrated in FIG. **3** the power line cord **72** extends upwardly from the motor-blower and exits into the slot **114** from between the housings **24** and **26** through a hole **115** formed in the annular wall **110.** To store the power line cord **72** within the slot **114** merely requires reeling the cord within the slot spirally. This is easily accomplished manually by guiding the cord into the slot while the handle **56** is used to turn the cleaner about its vertical axis. A conventional plug **116** having a groove at one edge thereof may then be affixed to the bead **112** of the top housing.

It should be clear that a unique and novel construction of a vacuum cleaner casing is disclosed which provides simplicity of fabrication and assembly so that it

may be manufactured at a minimum of cost without sacrificing its performance. Furthermore, it may be noted that the motor blower assembly including the top housing and the first housing as a unit, may be utilized with dirt containers of various dirt carrying capacity merely by increasing the vertical height of the dirt container.

Numerous alterations of the structure herein disclosed will suggest themselves to those skilled in the art. For example, the particular circular shape of the disclosed structure may be varied to different cross sectional configurations; the only requirement being the upper housing, the top housing, the filter shape and the periphery of the dirt container be of substantially the same cross sectional configuration. Also, the exhaust port of the vacuum cleaner may be in the upper housing rather than in the top housing as disclosed. However, it is to be understood that the present disclosure relates to a preferred embodiment of the invention which is for purposes of illustration only and not to be construed as a limitation of the invention. All such modifications which do not depart from the spirit of the invention are intended to be included within the scope of the appended claims.

We claim:

1. In a suction cleaner, in combination, a container having an open top and a suction inlet therein, a first housing nested within the container and having an outer periphery substantially corresponding in shape to the periphery of the top of the container and supported thereon, a seat formed in said housing, means defining an aperture in said seat communicating with the interior of said container, a motor-blower unit positioned on the seat with the blower inlet in registration with said aperture, a top housing positioned on said first housing and having a portion thereof abutting said motor-blower unit, means for securing said top housing to said first housing to constrain said motor-blower unit in the seat, an air porous filter positioned intermediate said container and said first housing, said filter having a resilient seal extending about its peripheral edge, said seal having a peripheral edge substantially corresponding in shape to the periphery of the top of the container and supported thereon, said first housing being positioned on the peripheral edge of said seal, and latch means comprising at least a pair of resilient latching members for removably securing said first housing to said container, each of said members being positioned on and spaced about the periphery of said first housing and having a portion thereof extending beyond the periphery of said housing, means on said top housing abutting said members remote from said portions to secure said members between said housings, at least a pair of flanges spaced about the periphery of said container at locations adapted to register with said members, a protuberance on said extending portion of each member at a location opposite a respective flange for camming under said flange to secure said members to said container.

2. In a suction cleaner, in combination, a container having an open top and a suction inlet therein, a first housing nested within the container and having an outer periphery substantially corresponding in shape to the periphery of the top of the container and supported thereon, a seat formed in said housing, means defining an aperture in said seat communicating with the interior of said container, an electric motor-blower unit having an electric power cord positioned on the seat with the blower inlet in registration with said aperture, a top housing positioned on said first housing and having a portion thereof abutting said motor-blower unit, means for securing said top housing to said first housing to constrain said motor-blower unit in the seat, said top housing comprising an annular wall spaced inwardly from its periphery, said wall abutting and extending above the first housing, the periphery of said top housing being spaced above an upper surface of said first housing to define a peripheral slot between the annular wall, the periphery of the top housing and said upper surface of the first housing, said annular wall including an aperture through which said electric power cord exits to the peripheral slot for storage therein in a reeled condition.

3. In a suction cleaner as recited in claim 2 wherein an air porous filter is positioned intermediate said container and said first housing, said filter having a resilient seal extending about its peripheral edge, said seal having a peripheral edge substantially corresponding in shape to the periphery of the top of the container and supported thereon, said first housing being positioned on the peripheral edge of said seal, and latch means comprising at least a pair of resilient latching members for removably securing said first housing to said container, each of said members being positioned on and spaced about the periphery of said first housing and having a portion thereof extending beyond the periphery of said housing, means on said top housing abutting said members remote from said portions to secure said members between said housings, at least a pair of flanges spaced about the periphery of said container at locations adapted to register with said members, a protuberance on said extending portion of each member at a location opposite a respective flange for camming under said flange to secure said members to said container.

4. A suction cleaner comprising a dirt container, a first housing cooperating with said dirt container to provide a closed compartment and having a motor-blower unit receiving seat, an electric motor-blower unit disposed on said seat, an electric power cord exiting from said unit, and a top housing secured to said first housing and shaped to contact said motor-blower unit and retain it on said seat, said top housing having a flange overlying and spaced vertically from the first housing to provide an annular slot, means defining a power cord exit opening in said top housing communicating with said slot, said power cord extending through said opening for storage in a wound condition in said slot.

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