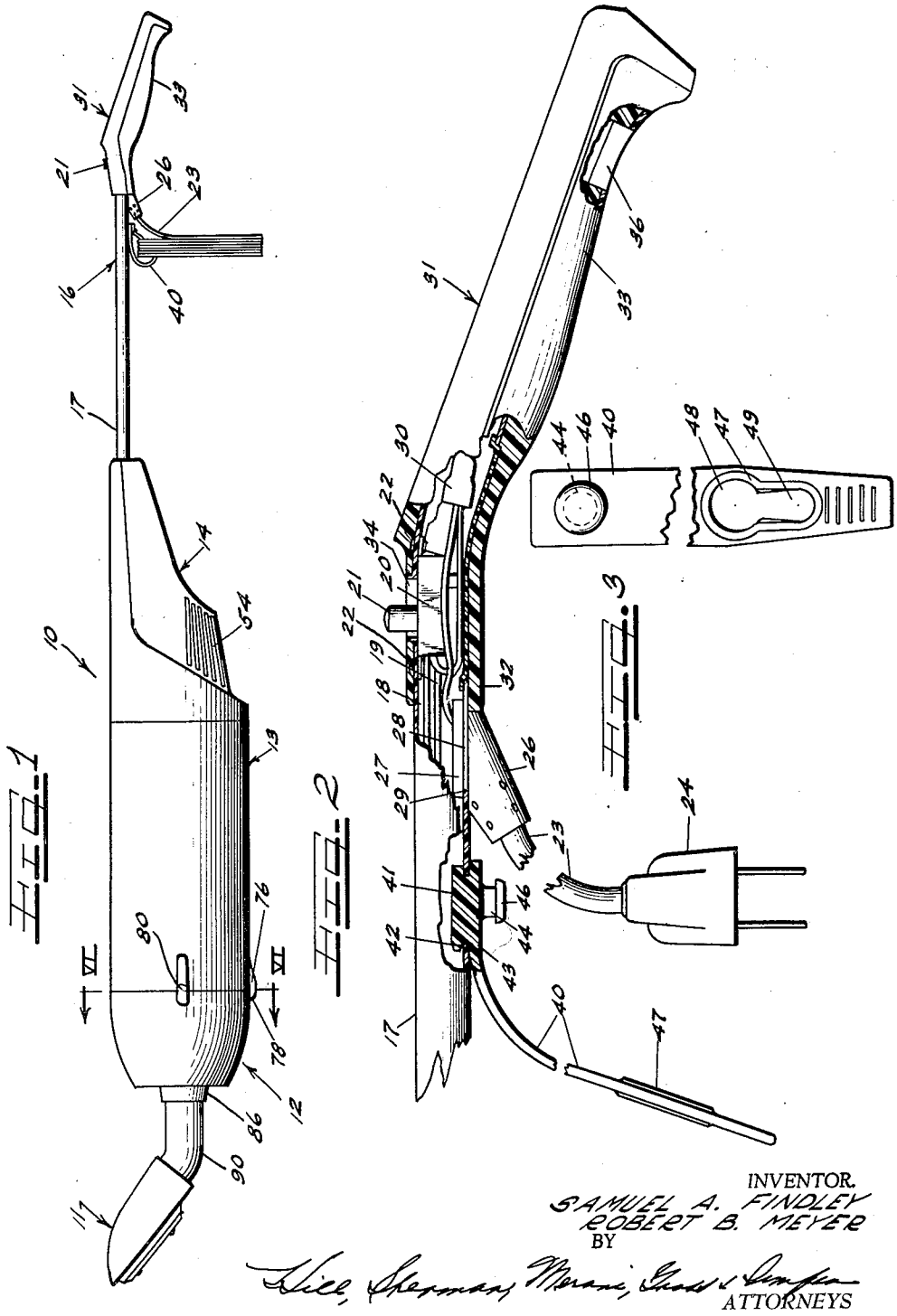
July 13, 1965 S. A. FINDLEY ETAL 3,193,992

UPRIGHT VACUUM CLEANER

Filed Dec. 20, 1962 3 Sheets-Sheet 1

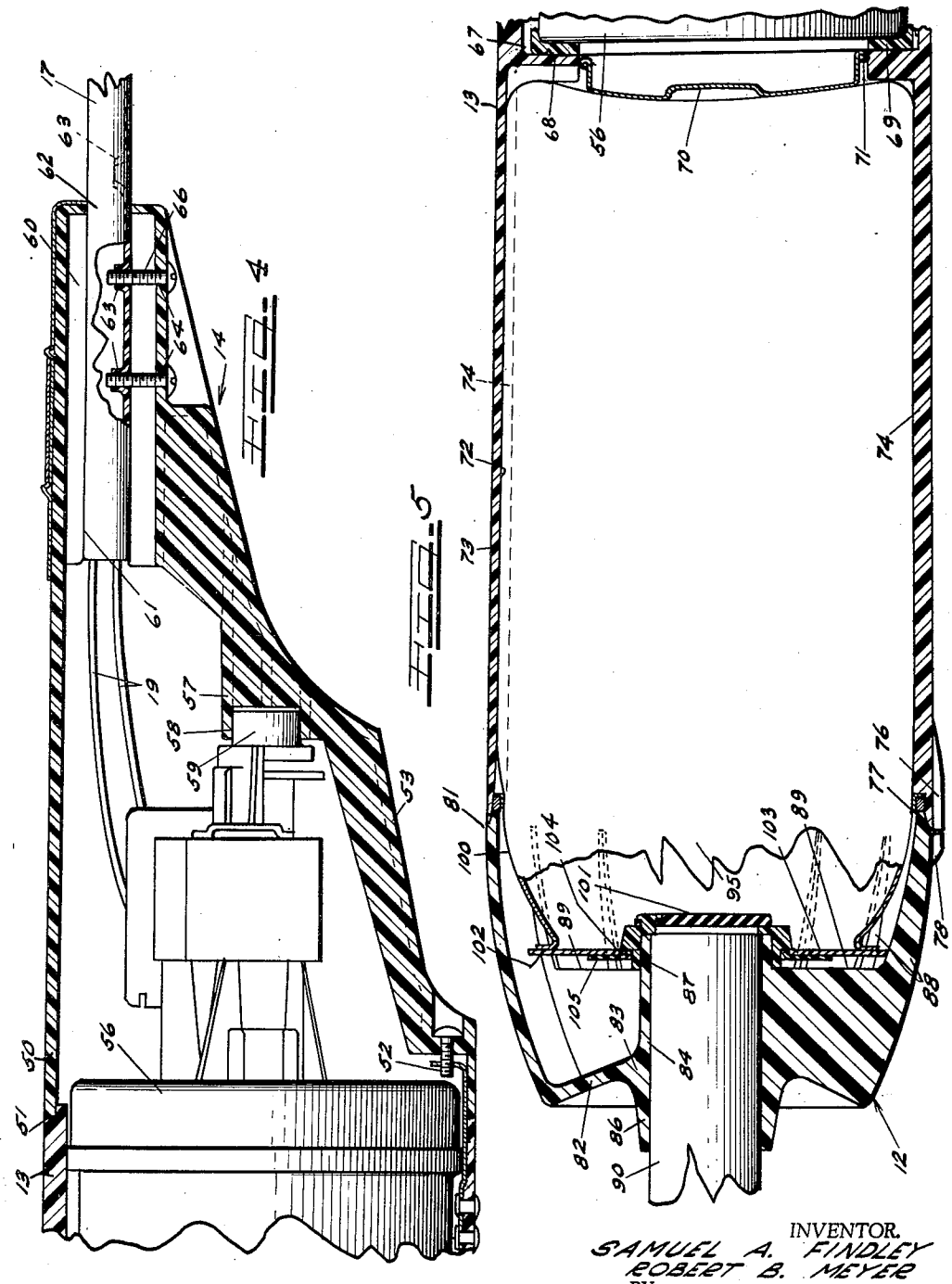


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Filed Dec. 20, 1962 3 Sheets-Sheet 3

FIG. 6

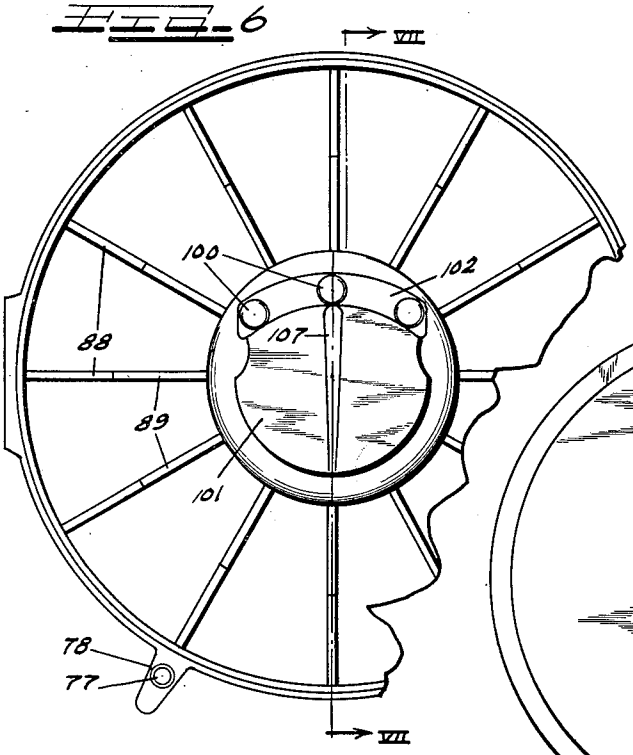
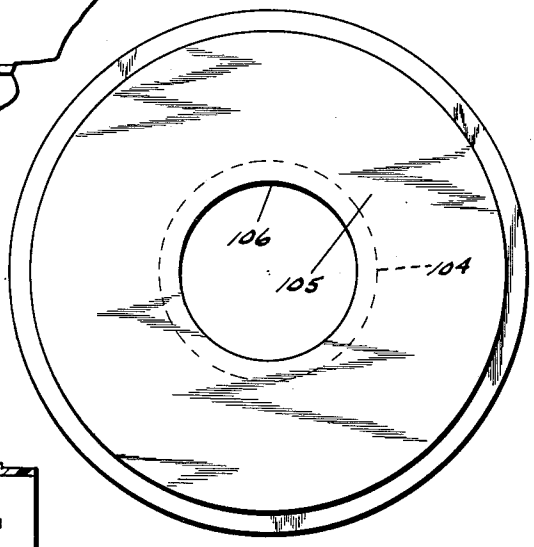


FIG. 8



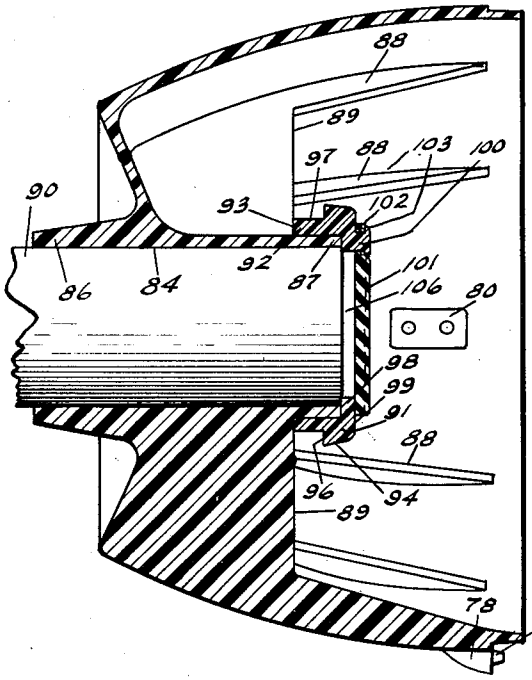


FIG. 7

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UPRIGHT VACUUM CLEANER

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3 Claims. (Cl. 55—367)

This invention relates generally to vacuum cleaner assemblies and more particularly to an upright vacuum cleaner having a rigid casing of lightweight impact-resisting plastic with an adjustable handle means by means of which the length of the unit can be selectively varied and including improved bag-retaining means for quickly and conveniently changing throw-away dirt separator bags associated with the cleaner.

Yet another object of the present invention is to provide an improved inlet end assembly wherein an inlet tube is supported concentrically inwardly of a thin shell by means of radial ribs.

A still further object of the present invention is to provide an inlet end assembly for an upright vacuum cleaner wherein a thin shell ribbed reinforced casing member has an inlet tube extending therethrough and wherein an annular recess is formed between the ribs and a collar on the end of the tube by means of which a dirt-separating bag may be snapped over the inlet tube and into engagement with the recess.

Many other features, advantages and additional objects of the present invention will become manifest to those versed in the art upon making reference to the detailed description which follows and the accompanying sheets of drawings in which a preferred structural embodiment of an upright vacuum cleaner embodying the improvements of the present invention are shown by way of illustrative example.

On the drawings:

FIGURE 1 is a side elevational view of an upright vacuum cleaner incorporating the principles of the present invention;

FIGURE 2 is an enlarged fragmentary view with parts broken away and with parts shown in cross-section illustrating additional details of construction of the handle assembly incorporated in the vacuum cleaner of FIGURE 1;

FIGURE 3 is a broken elevational view of the cord retaining strap;

FIGURE 4 is a fragmentary cross-sectional view with parts shown in elevation and with parts broken away illustrating additional details of construction of the rear casing or upper housing of the casing means;

FIGURE 5 is a cross-sectional view showing a subassembly of the inlet end assembly and the main housing of the casing;

FIGURE 6 is a view taken on line VI—VI of FIGURE 1 and with the dirt-separating bag removed therefrom to illustrate additional details of construction of the inlet end assembly;

FIGURE 7 is a fragmentary cross-sectional view taken on line VII—VII of FIGURE 6; and

FIGURE 8 is an end elevational view of a dirt-separating bag provided for the cleaner of FIGURES 1–7.

As shown on the drawings:

An upright vacuum cleaner incorporating the principles of the present invention is shown generally at **10** and includes a floor tool assembly shown generally at **11**, an inlet end assembly shown generally at **12**, a main housing shown generally at **13**, an upper housing assembly shown at **14** and a handle assembly shown generally at **16**.

Referring, first of all, to the handle assembly **16**, an elongated hollow handle **17** is provided which may take the form of a sheet metal tube having a hollow interior

18 through which may extend electrical conductor wires **19** forming electrical circuitry which is regulated or controlled by an electrical switch **20** having an actuator button **21**. The switch **20** is connected to the handle **17** by means of fasteners **22**.

In order to supply electrical energy from a usual source of supply, an elongated appliance cord or electrical conductor wire **23** is provided having a plug **24** at one end and a lead-in shield **26** is provided at the other end. The lead-in shield includes a flexible somewhat tapered but generally cylindrical sleeve which terminates in a boss **27** recessed as at **28** to receive and seat the edges **29** of an opening formed in the walls of the handle **17**. Thus, the conductor cord **23** is protected against bending and flexure at the point of entry into the hollow interior of the handle **17**. The wires from the cord **23** may be connected with the wires from the switch **20** by means of quick connecting means **30** located within the interior of the handle **17**.

At the extreme end of the handle **17**, there is provided a handle grip shown generally at **31**. The handle **31** comprises a sleeve made of plastic material which includes a reduced end portion **32** which snugly engages the handle **17** and conceals such parts as the connectors **22** and further includes a shaped portion **33** which is formed to conform to the hand of an opeartor. An opening **34** is formed in the sleeve as at **34**, thereby to permit the actuator button **21** to extend into a manually accessible position directly adajcent the handle grip portion **31**.

The handle grip **31** is particularly characterized by the formation of an opening **36** which is adapted to engage with a hook and by means of which the entire cleaner **10** may be suspended for storage purposes, for example, on a clothes hook in a closet.

In order to retain the appliance cord **23** for storage purposes, the upright cleaner **10** of the present invention is provided with an improved cord retaining means which takes the form of a strap **40** made of a flexible material such as a flexible plastic. The cord-retaining strap **40** is a strip form member having on one end thereof an enlarged boss **41** which is recessed as at **42** in order to receive the edges of an opening formed in the walls of the handle **17**. The boss **41** has a portion disposed on the outside of the handle **17** which is shown at **43** and which is particularly characterized by an outwardly projecting button having a shank portion **44** and an enlarged head **46**.

At the opposite end of the strap **40** there is provided a reinforced portion **47** in which is formed a keyhole opening having an enlarged circular aperture **48** and a reduced slot **49** extending out of one side thereof. The aperture **48** is sized to receive the head portion **46** of the button and the shank **44** is received in the slot **49** so that the strap **40** may be looped through the coils of the conductor wire **23**, as shown in FIGURE 1, and the double backed end forms a closed loop by inserting the button with the head **46** extending through the aperture **48**, the strap being moved in locked-closed position by moving the shank **44** into the slot **49**.

The upper housing **14** has an enlarged end **50** which merges with the main housing **13** as at **51** and is fastened in firm assembly therewith by means of fastening means shown at **52**. The upper housing then tapers as at **53** to a smaller configuration and the tapered portion **53** is characterized by the formation therein of a plurality of slots **54** (FIGURE 1) constituting air outlets through which clean air is discharged by a motor fan unit shown generally at **56**.

The upper housing **14** has a boss **57** formed therein recessed as at **58** in order to receive and seat one end of the motor fan unit as at **59**. At the smallest end of the upper housing unit **14**, there is formed an elongated neck

60 having an opening 61 in which is telescopically received a coupling end 62 of the handle 17. The coupling end 62 is characterized by the formation therein of plural embossed openings 63 adapted to be placed in selective register with openings 64 each receiving a screw fastener 66. Thus, by extending the handle 17 with the coupling portion 62 positioned either all the way into the opening 61 or partially out of the opening 61, the effective spacing dimension between the handle grip 31 and the floor tool assembly 11 may be selectively varied. Whenever the proper length desired by the operator is obtained, a corresponding set of embossed apertures 63 are placed in register with the openings 64 and the fasteners 66 are used to lock the handle 17 in adjusted assembly.

The motor fan unit 56 is housed within a motor fan compartment 67 formed rearwardly of a radially inwardly extending partition 68 (FIGURE 5).

The partition 68 retains a rubber cushion ring 69 in which the end of the motor fan unit 56 is nested. The opening prescribed by the inner edges of the partition 68 is closed by a permanent filter 70 held in place by a snap ring 71 engaged behind an edge of the partition 68, thereby separating the motor fan unit 56 from a dirt-separating compartment 72 formed in the main housing 13.

The main housing 13 is particularly characterized by a thin shell wall 73 having a plurality of circumferentially spaced radially inwardly extending strengthening ribs 74 which lend rigidity to the wall construction.

At the end of the main housing 13 there is formed a pair of locating bosses 76 each recessed to receive and seat an axially projecting locating lug 77 extending axially from a pair of bosses 78 formed on the inlet end assembly 12.

The detent cooperation between the bosses 76 and 78 serves not only to properly align the housing parts but also to retain the same against angular shifting. Thus, both housing parts can be locked together by appropriate toggle latches shown at 80 (FIGURE 1).

The inlet end assembly 12 is particularly characterized by a thin shell wall 81 which tapers progressively inwardly towards an end wall 82 and which is characterized by formation therein of a boss 83 forming a generally cylindrical inlet tube 84 which is spaced concentrically inwardly of the wall 81 and which extends axially to provide an outwardly projecting portion 86 and an inwardly projecting portion 87 extending into the interior of the housing.

In order to maintain the wall 81 of optimum thinness, but yet to retain the strength advantages of high impact resistance, there is formed a plurality of ribs which are circumferentially spaced and which extend radially inwardly as at 88. The ribs 88 engagingly support the cylindrical tube 84. Each rib 88 is particularly characterized by a radially extending portion 89 spaced axially inwardly of the end 87 of the tube 84. All of the edges 89 of the respective ribs 88 are disposed in coplanar relation and together with one another form spaced support points on a common plane.

A metal tube 90 is fastened in firm assembly in the inlet tube 84, for example, by means of an adhesive such as an epoxy resin, or some other suitable fastening means and the floor tool assembly 11 which may be of any desired configuration is then swivably connected to the metal tube 90 for engagement with a surface to be cleaned.

At the inner end of the inlet tube 84, a collar 91 is connected to the inner end 87 of the inlet tube 84. The collar 91 is a member made of suitable plastic material and is placed in firm assembly with the inlet tube 84 by means of a fastening means taking the form of a suitable adhesive such as an epoxy resin. The collar member 91 has a cylindrical body portion 92 having an end surface 93 which bottoms against the surfaces 89 of the ribs 88. There is also formed on the collar 91 a radially outwardly projecting flange 94, thereby forming a radial shoulder 96 which is spaced axially from the surfaces 89 in order to form an annular recess 97.

The collar member 91 also has a radially inwardly extending flange 98 which overlies the inner end 87 of the inlet tube 84 and which has formed on the axially innermost surface thereof a radial valve seating surface 99 which circumscribes the inlet provided by the inlet tube 84.

The valve surface 99 is particularly characterized by the formation on one side thereof of three axially projecting lugs or buttons 100 which serve to retain a disk of elastic material such as rubber, thereby to form a flapper-type check valve 101.

Preferably, the rubber disk 101 is suitably apertured and placed on the buttons 100 whereupon a thin retainer plate 102 made of a rigid material such as metal is placed over the buttons and the buttons are then headed or flattened as at 103 to place the flapper-type check valve 101 in firm assembly with the collar 91.

The valve 101 is an ordinary disk of rubber or a similar elastic material and is selected to be of a size large enough to overlie the edges of a central opening 106 in the collar 91, thereby to develop a valving function on the valve surface or valve seat 99. The face of the rubber disk is characterized by a central strengthening rib 107 which serves to somewhat rigidify the disk 101 and which also functions to urge the disk towards a normally closed position, yet permitting the disk to yield in response to the flow of dirt-laden air through the inlet tube.

In order to separate dirt from a stream of air directed through the inlet tube a dirt-separating bag is provided shown generally at 100 and consisting of a pouch-shaped container or gusseted bag 101 made of a porous material such as paper, the mouth of which is connected as by stitching at 102 to a stiff cardboard disk 103 sized to conform to the shape prescribed by the radial plane 89 and having a central opening formed therein as at 104 which is larger than the shoulder 96 on the flange 94, thereby to freely pass thereover.

Adhesively secured to one face of the cardboard disk 102 is a sheet form elastic means such as a sheet of rubber 105. The rubber sheet 105 is provided with a central opening 106 smaller than the shoulder 96 so that the elastic means wil snap into the annular recess 97, thereby to seal the bag 100 on the inlet tube and also retain the bag in assembly with the inlet tube.

It will be noted from examining the assembly arrangement illustrated in FIGURE 5, that the flapper-type check valve 101 actually opens up within the interior of the dirt-separating bag 100 and when closed prevents dirt from re-entering the inlet tube 90.

Although minor modifications might be suggested by those versed in the art, it should be understood and we wish to embody within the scope of the patent warranted hereon all such modifications as reasonably and properly come within the scope of our contribution to the art.

We claim as our invention:

1. In an upright vacuum cleaner, a casing having an inlet end assembly comprising a cup-shaped member made of plastic and having a thin peripheral wall tapering towards one end,

said one end having a generally cylindrical inlet tube extending axially therethrough concentrically inwardly of said wall,

and plural circumferentially spaced ribs extending radially inwardly from said peripheral wall and engaging said inlet tube,

each rib on the side facing the other end of said inlet end assembly including a radially extending portion axially inwardly of one end of said tube and together with one another forming spaced parts on a common radial plane,

and a collar on said one end of said tube forming a radially outwardly extending circumferentially continuous annular shoulder spaced axially from said plane, thereby to form an annular recess inwardly of the end of said inlet tube,

and a dirt-separating bag having elastic sheet form means forming an inlet opening of lesser diameter than said shoulder,

and a stiff disk carrying said elastic sheet form means and sized to conform to the shape prescribed by said plane, and having an opening larger than said annular shoulder,

said elastic sheet form means snapping on said collar into said recess when said disk is engaged against said ribs.

2. In an upright vacuum cleaner as defined in claim 1, said collar having a radial valve seat at said one end of said inlet tube and a rubber disc on said seat forming a flapper-type check valve to control the flow of dirt-laden air into said bag.

3. In an upright vacuum cleaner as defned in claim 1, said collar being made of plastic and being integrated with said tube, said collar having axially projecting retainer lugs extending through apertures formed in one side of said flapper valve.

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