



April 30, 1935.

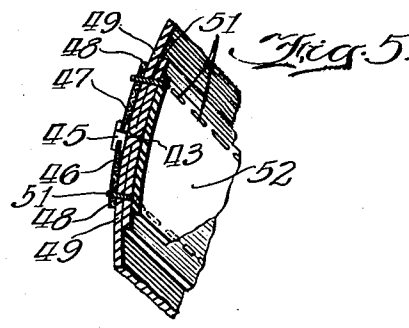
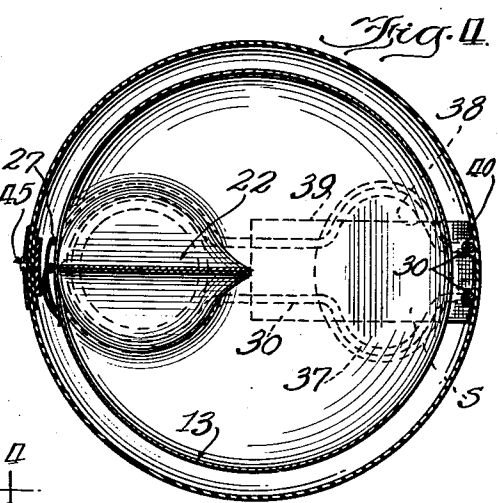
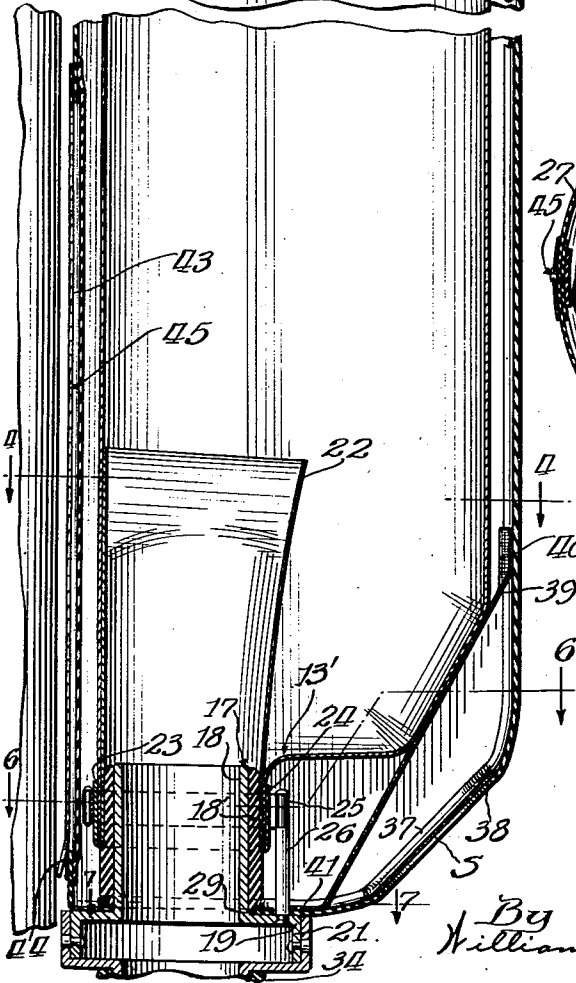
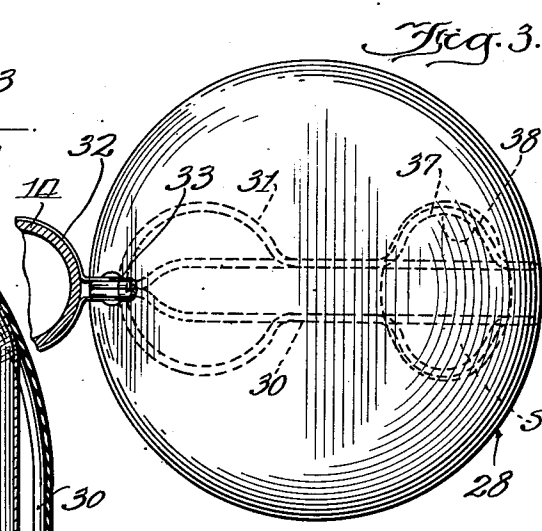
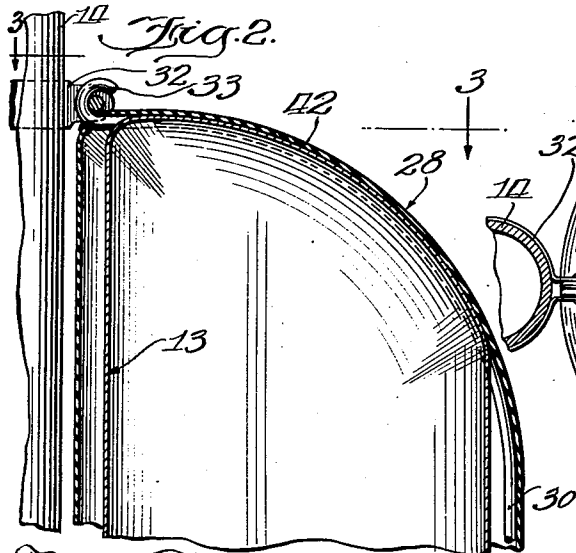
R. J. SNELL

1,999,826

VACUUM CLEANER BAG

Filed March 20, 1933

2 Sheets-Sheet 2



Inventor:  
Roy J. Snell  
By Williams, Bradbury, McCaleb & Hinkle.  
Attys.

# UNITED STATES PATENT OFFICE

1,999,826

## VACUUM CLEANER BAG

Roy J. Snell, Chicago, Ill.

Application March 20, 1933, Serial No. 661,643

9 Claims. (Cl. 183—51)

This invention relates in general to the art of cleaning, and while it has for a general object a novel and improved vacuum cleaner, it has more particular reference to a bag or collector for vacuum cleaners.

The objects of the invention include the provision of a novel and an improved bag or collector, suitable for use in vacuum cleaners, which, instead of diffusing the exhaust of the machine or cleaner in all directions, returns it to the surface being cleaned, at the intake of the cleaner; which has a flexible coupler for connecting the bag or collector to the exhaust side of the cleaner, whereby relative movement between the bag and the cleaning apparatus is permitted without necessarily flexing or bending the bag or collector material; and which may be of convenient dimensions and yet will effectively collect the solid particles exhausted by the cleaning apparatus and separate such solid particles from the air.

Other objects of the invention include certain novel details of construction, such as a fabric impervious to air, forming an outer bag for enclosing a removable inner bag permeable by, and pervious to air, means responsive to the pressures in the outer bag for sealing the opening which closes the outer bag about the inner bag, means for fastening the inner bag in operating position to facilitate replacements, and means protecting the inner bag against the pressures likely to be produced by a sudden inrush of air from the exhaust of the cleaner, all adapted for use or assembly in cleaning machines.

Other objects of the invention will be apparent from the following description, and from the accompanying drawings, in which similar characters of reference indicate similar parts throughout the several views.

Referring to the drawings;

Fig. 1 diagrammatically illustrates a cleaning machine embodying the features of the invention;

Fig. 2 is an enlarged fragmentary view similar to Fig. 1, showing the bag or collector in longitudinal cross-section;

Fig. 3 is a top plan view of Fig. 2;

Fig. 4 is a section taken substantially on the line 4—4 of Fig. 2;

Fig. 5 is an enlarged fragmentary sectional detail of a portion of the outer bag shown in Fig. 2;

Fig. 6 is a fragmentary cross-section taken substantially along the line 6—6 of Fig. 2; and

Fig. 7 is a sectional detail taken substantially along the line 7—7 of Fig. 2.

In order to accomplish the foregoing objects, a cleaning machine of the vacuum type is diagram-

matically illustrated in Fig. 1 as having an intake 11, an exhaust 12, and a bag or collector 13. A handle 14 and rollers or wheels 15 facilitate moving or propelling the machine over a surface to be cleaned. It will be understood that the vacuum cleaner of the present invention includes means M for creating a suction at the intake 11 for causing air and any solid particles entrained thereby to enter the intake and to be exhausted through the exhaust 12 into the bag or collector 13 as the machine is moved over a surface to be cleaned by the handle 14. The suction at the intake 11 may be created in any suitable manner, as, for example, by an electrically driven pump or suction fan M receiving electrical energy from any suitable source, diagrammatically illustrated at 16.

The bag or collector 13 having a neck portion 13' is formed of a material permeable by, or pervious to air, whereby it will separate solid particles from the air passed into the bag from the exhaust 12, the air passing through the walls of the bag, leaving the solid particles therein. A connector 17 having a tubular body portion 18 embraced by a rubber sleeve 18' is provided with an external flange 19 turned outwardly to form an enlarged portion 21 for connecting the bag 13 with the exhaust 12.

A valve in the form of a flat tube 22 is adapted to be inserted through the neck portion 13' of the bag 13 and has a portion 23 which extends outside the neck portion 13' and which may, if desired, be folded back as at 24 about the outer end of the neck portion. The portion 23 of the valve 22, and the neck portion 13' of the bag 13, are slidably receivable on or about the rubber sleeve 18'. When they are in this position, a clamping ring 25 is arranged about the neck portion and the enclosed valve on the rubber sleeve 18' to form an air-tight connection between the bag 13 and the connector 17. This clamping ring 25 may be carried on a lug or pin 26 projecting from the flange 19 of the connector 17 and is provided with a catch or fastener 27 of any suitable construction for releasably locking the ring 25 in clamping position.

As the novel cleaning machine thus far described is propelled over a surface to be cleaned, the air and any solid particles entering the intake 11 will pass through the valve 22 into the bag 13, which permits the air to pass through its walls, leaving most of the solid particles in the bag 13, the valve 22 serving to prevent the solid particles from passing back into the connector 17.

In order to prevent the diffusion in all direc-

tions of the exhaust air passing through the walls of the bag 13, I provide an outer bag 28 formed of a material that is impermeable by, or impervious to air. An aperture 29 in an end of the bag 28 readily adapts the bag for attachment to the connector 17. This outer bag 28 is preferably so constructed and mounted as to move as a substantially integral part of the handle 14, whereby to avoid undue flexing of the material when the handle 14 is manipulated for cleaning partially obstructed spaces or under, for example, articles of furniture. Such flexing of the bag tends to destroy its impermeability to air.

One construction which I have found suitably adapted for such a mounting, is illustrated in Figs. 2 and 7. The bag is provided with spaced ribs 30 which may be formed from a single rod or strip of metal that is formed as at 31 to engage at one end of the bag about the rubber sleeve 18' on the connector 17. At the other end of the bag, the strip or rod is suitably secured to the handle 14 by any suitable means, such as a bracket 32 and the ends of the rod or strip formed as a hook or catch 33 for engaging the bracket 32.

Cooperating with the ribs 30 is a flexible tube 34 having an adapter or coupler 35 at one end for connection with the enlarged portion 21 of the connector 17 and having at the other end an adapter or a coupler 36 for connection to the exhaust 12. By virtue of such a construction any flexing between the bracket 32 and the exhaust 12 due to the manipulation of the handle 14 will take place outside of the bag 28 and in the flexible tube 34.

Thus, instead of diffusing the air in all directions I diffuse it into the outer bag 28 and thereby avoid the unsanitary condition resulting from diffusing exhaust air which may include in suspension minute germ-laden solids. From this outer bag 28 the air with any solid particles which may have been passed through the inner bag 13 is returned to the surface being cleaned at the intake 11. This may be accomplished, for example, by forming the ribs 30 as at 37 to define an aperture 38 provided in the lower end of the bag 28. If desired, a screen S may be mounted to cover the aperture 38.

In addition to this return circuit feature of the invention, I provide means in the outer bag 28 for protecting or reinforcing the inner bag 13 which, I may mention, may be made of a more or less porous paper or other suitable fabric.

Such a means includes a fabric strip 39 having an end 41 suitably secured adjacent the connector 17 inside of the outer bag 28 and having its other end 40 secured inside of the outer bag 28 intermediate the ends of the inner bag 13, whereby the strip 39 serves as a support for the lower end of the inner bag.

For the purpose of protecting the inner bag against a sudden application of pressure due to a sudden inrush of air at for example, starting the cleaner, I prefer to provide the inner bag of such length that its upper end 42 will rest against the upper end of the outer bag or against the ribs 30 when the inner bag 13 is expanded by the air from the exhaust 12.

To facilitate the removal and the replacement of the inner bag 13, I provide an opening or aperture 43 in the side of the outer bag 28 adjacent the handle 14. This opening 43 may be opened and closed by manipulating a handle 44 of a fastening device 45 of the progressively operable type. Such a fastening device 45 is usu-

ally attached to edge portions 46 and 47 of fabric or tape strips 48 and is adapted to separably secure these two strips together along their marginal portions. I make use of this construction for the purpose of providing a substantially airtight seal for the opening 43.

The bag 28 is provided with relatively thick marginal portions 49 about the opening 43. The strips 48 are secured to the marginal portions 49 by any suitable means 51 in such manner that when the fastening device 45 is closed, the marginal portions 49 are drawn into abutting engagement for sealing the opening 43. As a further sealing means for this opening 43, I provide a valve responsive to the air pressure within the outer bag 28. This may be accomplished by a strip of air impervious material 52 such as rubber or rubberized fabric secured by the means 51 to a marginal portion 49 inside of the bag 28. This strip 52 is of sufficient width to extend across the opening 43 when it is closed, so that the internal air pressure in the bag 28 tends to urge the strip against the marginal portions 49 whereby to seal the opening 43.

In operation, as the vacuum cleaner is propelled over a surface to be cleaned, the air and any solid particles are transmitted through the exhaust 12, the flexible tubing 34, the connector 17, the valve 22, into the inner bag 13, causing this bag to expand during which expansion the bag is reinforced at the bottom by the strip 39 and at the top by the top of the outer bag 28. The air passes through the walls of the inner bag, leaving most of the solid particles therein. This air cannot escape through the walls of the outer bag, but is directed by the aperture 38 at the bottom of the outer bag to the surface being cleaned at or near the intake of the cleaning machine.

Thus I have provided a vacuum cleaner which does not diffuse the foul air in all directions to be breathed or inhaled by an operator of the machine, or by others near the machine, but which instead returns this air to the surface being cleaned. Any dirt or solid particles which were passed through the inner bag are, as a consequence of this return circuit, returned with the air and may again be drawn into the intake 11. The solid particles taken from the surface being cleaned by the vacuum cleaner are in this manner collected in an inner bag, which when desired, may be removed through the opening 43 in the outer bag and destroyed. Another inner bag may then be assembled within the outer bag by clamping the neck portion 13' of the bag and the portion 23 of the valve 22 about the sleeve 18' on the tubular portion 18.

While I have described a preferred embodiment of my invention, many modifications may be made without departing from the spirit of the invention, and I do not wish to be limited to the precise details of construction set forth, but desire to avail myself of all changes within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is:

1. A suction cleaner having intake and exhaust ports in combination with a flexible connector releasably connected in communication with said exhaust port, and having a tubular extension, an outer bag of a fabric impervious to air having an aperture secured about said tubular extension and having an outlet aperture adjacent the first said aperture, an inner bag of paper

pervious to air for separating solid particles from the air exhausted by said suction cleaner and collecting such solid particles within said inner bag while permitting the exhausted air to pass through the walls thereof, said inner bag having a neck portion for attachment about said tubular extension inwardly of said outer bag and being arranged to engage said outer bag at the end thereof opposite said aperture under the influence of the exhaust from said suction cleaner, means in the opposite end of said outer bag engaging the lower end of said inner bag and cooperating with the engagement between said outer and inner bags at the end opposite said aperture to cause said inner bag to coact with said outer bag in the manipulation of said suction cleaner, and stiffening means longitudinally coextensive with said outer bag and conforming to the configuration thereof, whereby to locate the flexing due to manipulation of the suction cleaner exteriorly of said bags and in said flexible connector.

2. A suction cleaner having a swiveled handle and a pair of coacting fabric bags one within the other, adapted to be connected with the exhaust of said suction cleaner and attached at their upper ends to said handle, in combination with stiffening means longitudinally coextensive with the outer bag to prevent flexing of said pair of bags during the manipulation of said handle, and a flexible connector extending between the exhaust of said suction cleaner and said pair of bags forming the locus of flexibility between the exhaust of said suction cleaner and the lower ends of said pair of bags.

3. A vacuum cleaner having intake and exhaust ports in combination with an outer air impervious bag having a mouth for connection with said exhaust port and an outlet adjacent thereto, an inner air pervious fabric bag having a neck portion for connection with said exhaust port and adapted in the operation of said vacuum cleaner to separate solid particles from the air exhausted through said exhaust port and to collect such solid particles while passing the exhausted air through the walls thereof into said outer bag, said inner bag being arranged to engage said outer bag at the end thereof opposite said mouth under the influence of the exhaust pressure derived from said exhaust port, whereby said inner bag is reinforced by said outer bag, and a fabric strip above said outlet in said outer bag for supporting the solids collected in said inner bag during the operation of said vacuum cleaner.

4. A vacuum cleaner having intake and exhaust ports in combination with an outer air impervious bag having a mouth for connection with said exhaust port and an outlet adjacent thereto, an inner air pervious fabric bag having a neck portion for connection with said exhaust port and adapted in the operation of said vacuum cleaner to separate solid particles from the air exhausted through said exhaust port and to collect such solid particles while passing the exhausted air through the walls thereof into said outer bag, means at the lower end of said outer bag engaging said inner bag for supporting the solids collected in said inner bag during the operation of said vacuum cleaner, and supporting means at the upper end of said outer bag engaging said inner bag for reinforcing it against the sudden exhaust pressure derived from said exhaust port upon starting the vacuum cleaner.

5. In a suction cleaner, an outer bag of an air impervious fabric having stiffening ribs substan-

tially co-extensive with said bag and having an operative opening therein, an inner bag of paper pervious to air positionable within said outer bag through said operative opening and having a tubular neck portion, an expansible tubular valve of fabric having a portion extending through said neck portion and folded back on the marginal portion thereof, coupling means for connecting said outer and inner bags to a vacuum cleaner, said coupling means having a tubular portion extending into said outer bag and into said portion of said valve in said neck portion, and means releasably clamping about said valve portion folded back around said neck portion for removably securing said inner bag and said valve in communication with said coupler within said outer bag.

6. A suction cleaner having a tubular exhaust member in combination with an inner fabric bag pervious to air having a neck portion engageable about said tubular exhaust member to provide a conduit for leading the exhaust of said suction cleaner into said inner bag, said inner bag being adapted to separate solid particles from the air exhausted by said suction cleaner and to collect such solid particles within said inner bag while permitting the exhausted air to pass through the walls thereof; operative securing means releasably securing said neck portion about said tubular exhaust member for connecting said inner bag in communication with said tubular exhaust member and for disconnecting it therefrom; an outer fabric bag impervious to air having an aperture at one end secured about said tubular exhaust member between said suction cleaner and said securing means and having an exhaust port adjacent said aperture, said outer bag being of greater diameter than said inner bag whereby, when the bags are inflated during the operation of the suction cleaner, an air space will be provided inside of said outer bag about said inner bag, and having a sealable opening through which said inner bag may be inserted into and removed from said outer bag for connection to and disconnection from said tubular exhaust member; a swiveled suction cleaner handle; and means for securing said outer bag to said swiveled handle at the end of said outer bag opposite said exhaust port whereby said outer bag is swingable with said swiveled handle.

7. A suction cleaner having intake and exhaust ports in combination with an outer bag of a fabric impervious to air having inlet and outlet ports at one end thereof and a sealable opening; an inner bag of a fabric pervious to air positionable within said outer bag through said sealable opening and having an inlet port; a connector extending between said exhaust port of said cleaner and said inlet port of said inner bag through said inlet port of said outer bag to provide communication between said exhaust port and the inside of said inner bag; means for securing said outer bag about said connector at said inlet port of said outer bag; means accessible through said sealable opening for removably securing said inner bag about said connector at said inlet port of said inner bag within said outer bag; and a swiveled suction cleaner handle having a connection with the end of said outer bag opposite said inlet and outlet ports whereby said outer bag is swingable with said swiveled handle.

8. In a suction cleaner, a swiveled suction cleaner handle; an outer bag of an air impervious fabric secured at its upper end to said swiveled handle and movable therewith, said outer bag having inlet and exhaust ports at its opposite end

- and a sealable opening; an inner bag of an air pervious fabric positionable within said outer bag through said sealable opening and having a tubular neck portion; coupling means having a tubular member extending through said inlet port into said tubular neck portion for connecting said outer and inner bags to the suction cleaner; and means releasably clamping about said tubular neck portion on said tubular member, said means being accessible through said sealable opening for removably securing said inner bag in communication with said coupling means within said outer bag.
9. In a suction cleaner, a swiveled suction cleaner handle; an outer bag of an air impervious fabric secured at one end to said swiveled handle and swingable therewith, said outer bag having inlet and exhaust ports at its other end and a sealable opening; an inner bag of an air pervious fabric positionable within said outer bag through said sealable opening; coupling means having a tubular member extending through said inlet port of said outer bag for connecting said outer bag to the suction cleaner, said inner bag having an inlet port engageable about said tubular member in said outer bag; and means releasably clamping about said inner bag at its said inlet port on said tubular member and accessible through said sealable opening for removably securing said inner bag in communication with said coupling means within said outer bag.

ROY J. SNELL.