Oct. 5, 1965 C. B. SMITHSON 3,209,523

FILTER BAG MOUNTING MEANS FOR SUCTION CLEANER

Filed Nov. 1, 1960 2 Sheets-Sheet 1

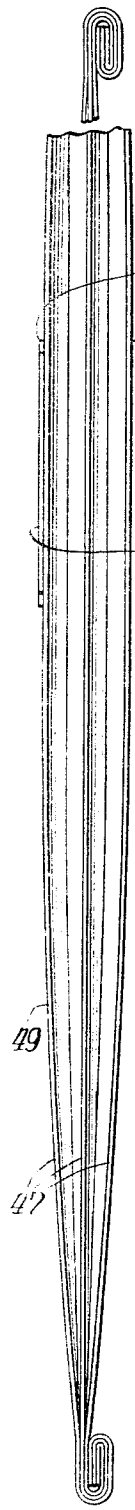


Fig. 9.

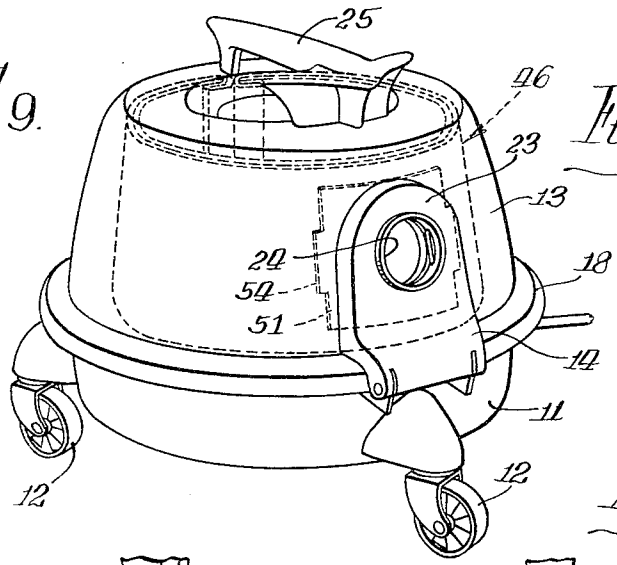


Fig. 1.

Fig. 2.

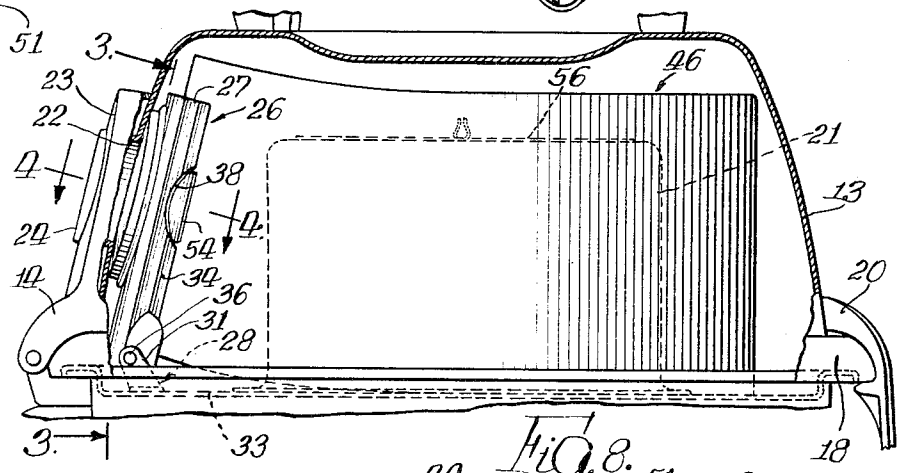
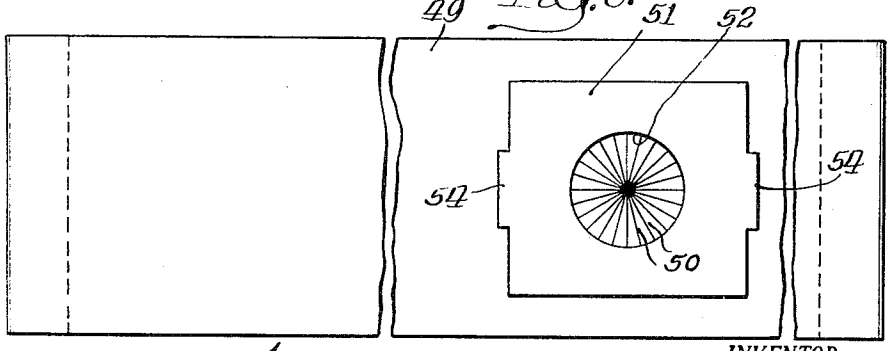


Fig. 8.



INVENTOR.
Charles B. Smithson,
BY
Davis, Lindsey, Hibben & Noyes
Attys.

Oct. 5, 1965 C. B. SMITHSON 3,209,523

FILTER BAG MOUNTING MEANS FOR SUCTION CLEANER

Filed Nov. 1, 1960 2 Sheets-Sheet 2

Fig. 3.

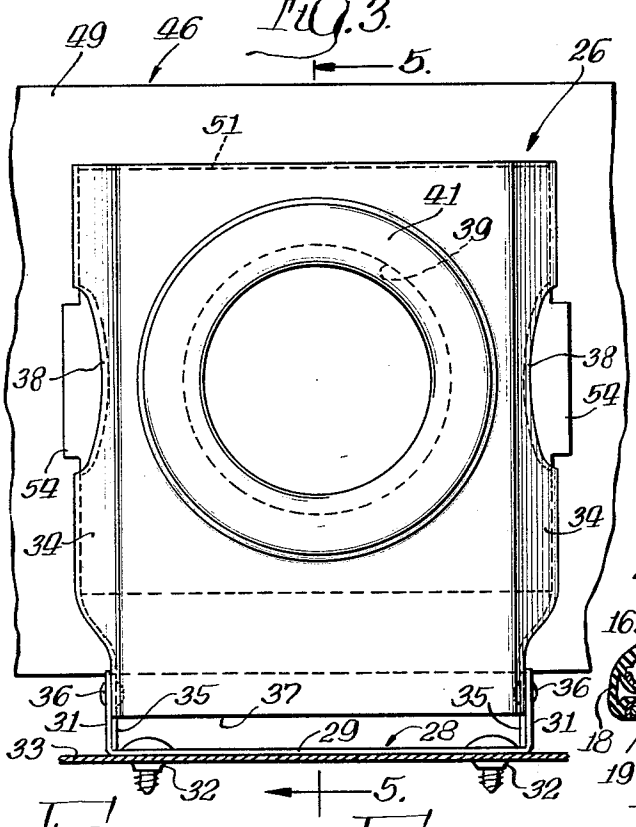


Fig. 5.

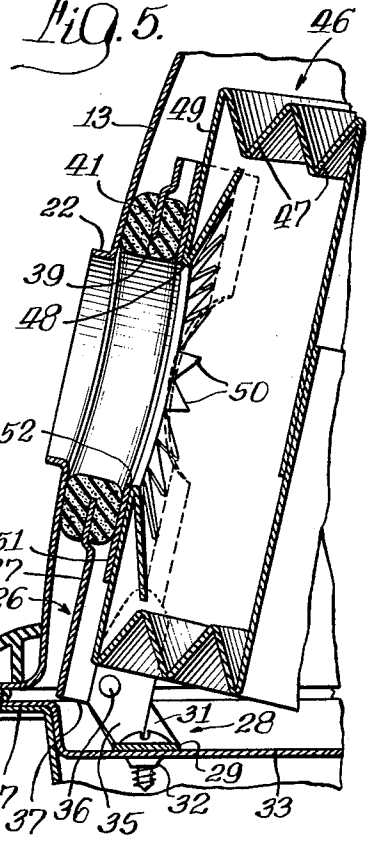


Fig. 6.

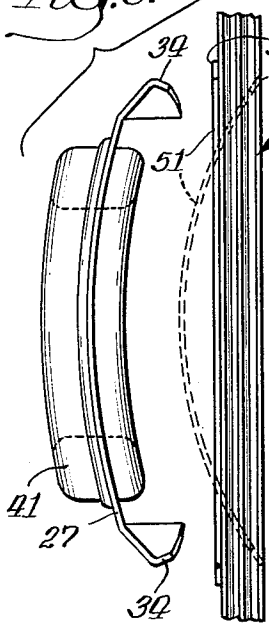


Fig. 7.

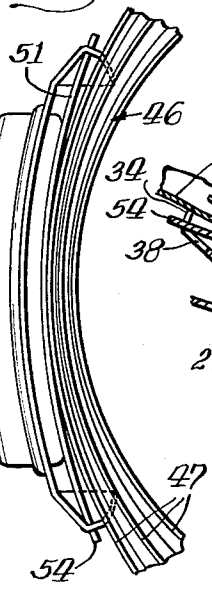
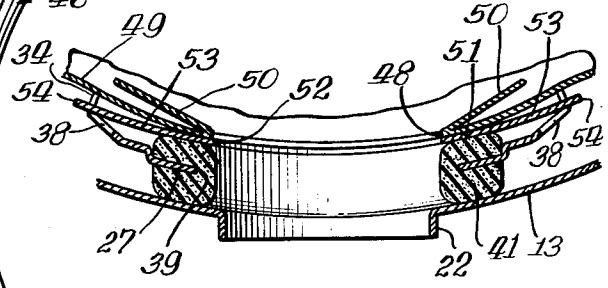


Fig. 4.



INVENTOR.
Charles B. Smithson;
BY
Davis, Lindsey, Hibben & Noyes
Attys.

United States Patent Office 3,209,523 Patented Oct. 5, 1965

3,209,523

FILTER BAG MOUNTING MEANS FOR SUCTION CLEANER

Charles B. Smithson, Bloomington, Ill., assignor to National Union Electric Corporation, Stamford, Conn., a corporation of Delaware

Filed Nov. 1, 1960, Ser. No. 66,543
10 Claims. (Cl. 55—374)

This invention relates to suction cleaners and more particularly to a novel means for mounting a filter bag therein.

In suction cleaners of the type utilizing an inexpensive disposable filter bag of air pervious paper or the like, it is quite important to provide a simple and effective mounting means enabling housewives and other users to replace a used filter bag in a rapid and troublefree manner. Various means for detachably supporting such filter bags have been proposed heretofore but the present invention affords a novel mounting arrangement which is simple and inexpensive. Furthermore, the invention embodies an inexpensive filter bag having a unique cooperation with the mounting structure within the cleaner.

Accordingly, a primary object of the invention is to provide a novel and improved means for detachably mounting a disposable filter bag in a suction cleaner.

A further object of the invention is to provide a novel combination in a suction cleaner of a bag support means and a replaceable filter bag.

Another object of the invention is to provide a novel and improved filter bag for a suction cleaner.

Other objects and advantages of the invention will become evident from the subsequent detailed description taken in conjunction with the accompanying drawings, wherein:

FIG. 1 is a small scale perspective view of a suction cleaner embodying one specific form of the bag mounting arrangement of the present invention;

FIG. 2 is a fragmentary vertical sectional view taken substantially diametrically through the cleaner shown in FIG. 1 but on a slightly larger scale;

FIG. 3 is an enlarged fragmentary elevational view taken substantially along the line 3—3 of FIG. 2 and showing certain structural details of the bag mounting arrangement;

FIG. 4 is an enlarged fragmentary cross-sectional view taken substantially along the line 4—4 of FIG. 2;

FIG. 5 is a sectional view taken substantially along the line 5—5 of FIG. 3;

FIG. 6 is an exploded view showing the manner in which the filter bag is manipulated during attachment to the mounting device;

FIG. 7 is a view similar to FIG. 6 showing the relationship of the parts after the bag has been secured to the mounting device;

FIG. 8 is a top plan view of a filter bag embodying the features of the invention, the bag being shown in its flat unmounted condition; and

FIG. 9 is an enlarged scale side view of the bag shown in FIG. 8.

Referring first to FIG. 1, a suction cleaner is shown which includes a generally circular external casing comprising a lower section **11** having a plurality of supporting rollers or casters **12** and an upper section or cover **13** connected to the lower section **11** by means of a hinge structure **14**. As best seen in FIG. 5, the cover **13** has a peripheral rim portion **16** which mates with a complementary peripheral rim portion **17** on the lower section **11**, and a furniture guard **18** of rubber or the like is mounted on the rim portion **16** with an inwardly projecting gasket portion **19** extending between the rim portions **16** and **17** for insuring an airtight seal therebetween when

the cover is closed. Diametrically opposite the hinge **14**, a resilient latch **20**, shown in FIG. 2, is mounted on the cover **13** and cooperates with the rim portion **17** on the lower casing section **11** for releasably securing the casing sections together. The details of the latch arrangement are described and claimed in my copending application Serial No. 65,995, filed October 31, 1960, now U.S. Patent No. 3,081,478, issued March 19, 1963. A handle **25** is attached to the upper surface of the cover **13** for carrying the cleaner from one location to another. The lower casing section **11** has mounted centrally therein a motor-fan unit **21** which discharges air in the usual manner through a laterally extending outlet (not shown) in the side wall of the casing section **11**.

As best seen in FIGS. 2 and 5, the side wall of the cover **13** is formed with a tubular air inlet **22**. Affixed to the exterior of the casing section **13** is a nozzle connector plate **23** having an opening **24** in register with the inlet **22** for detachably mounting a cleaning tool hose connection (not shown). The nozzle connector plate **23** is combined in an integral structural unit with the upper half of the hingle structure **14**, but the details of this arrangement form no part of the present invention and are described and claimed in my copending application Serial No. 66,465, filed November 1, 1960, now Patent No. 3,149,362.

The filter bag support, designated generally at **26**, comprises a generally upright plate member **27** extending upwardly from the lower casing section **11** at a slight inward inclination (FIGS. 2 and 5) so as to be spaced inwardly in generally parallel relation to the inclined side wall of the cover **13**. The plate member **27** is attached to the lower casing section **11** by means of a U-shaped mounting bracket **28** (FIG. 3) having a base portion **29** and a pair of spaced upstanding ears **31**. The base portion **29** is secured, as by screws **32**, to a depressed circular tray **33** extending across the lower casing section **11** and also providing a support for the motor-fan unit **21**.

The plate member **27** has an arcuate transverse contour (FIG. 6) to conform to the side wall curvature of the cover **13** and to impart stiffness and strength to the structure. Moreover, as described below, the transverse curvature of the plate member **27** accommodates and conforms to the curvature of the bowed collar portion of the filter bag when the latter is installed on the bag holder **26**.

The upright lateral edges of the plate member **27** are bent inwardly to provide side flanges **34** which are pivotally secured at their lower ends, as by rivets **36**, to the upright bracket ears **31**. The main body portion of the plate member **27** terminates at a lower edge **37** in spaced relation above the bracket base **29** to allow sufficient clearance for outward pivoting of the plate member **27**. However, the side flanges **34** depend below the pivots **36**, as at **35** (FIGS. 3 and 5), for abutment with the bracket base **29** so as to limit the inward pivotal position of the plate member **27**. The side flanges **34** also have centrally located curved recesses **38** (FIG. 3) for the purpose hereinafter described. The plate member **27** also has a central opening **39** (FIGS. 4 and 5) adapted to be aligned with the air inlet **22** when the cover **13** is closed. An annular resilient seal or gasket **41** of sponge rubber or the like is mounted in the opening **39** and projects axially at each side of the plate member **27**.

Referring now to FIGS. 8 and 9, the filter bag of the present invention is indicated generally at **46** and is of the type which is initially folded flat with a plurality of pleats **47** formed in the side walls thereof in a well known manner so as to permit expansion of the bag during operation of the cleaner. The bag **46** is elongated in shape and is closed at each end with a centrally disposed mouth or inlet **48** (FIGS. 4 and 5) in one of the flat walls **49** thereof. A rectangular mounting collar **51** of stiff but

bendable material, such as cardboard or the like, is adhesively secured to the filter bag wall **49** around the bag mouth **48**, the collar **51** having an opening **52** overlying the bag mouth **48**. The bag wall **49** beneath the opening **48** has a plurality of radial slits thereby forming triangular gores **50** (FIGS. 5 and 8) which are folded inwardly to provide the bag mouth **48**. The opposite marginal edges of the collar **51** facing the ends of the bag are free end unattached with respect to the bag wall **49**, as indicated at **53** in FIG. 4, and are provided with outwardly projecting tabs **54** (FIG. 8) adapted to be received in the recesses **38** of the plate member **27**, as will now be described.

To install the bag **46**, the user grasps the collar **51** and bends or curves the same in the manner shown in broken lines in FIG. 6 in order to fit the collar between the side flanges **34** of the plate member **27**. The lateral distance between the side flanges **34** is slightly less than the width of the collar **51** so that the collar must be deflected or bowed, as shown, in order to insert the same in the bag holder. The material, such as cardboard, of the collar **51** has a certain degree of resilience when in the bowed condition of FIG. 6 so that the side edges of the collar **51** may be snapped into retaining position within the flanges **34** and are thereby held firmly in place as shown in FIG. 7. The tabs **54** are received in the cut-outs or recesses **38** of the side flanges so as to prevent vertical displacement of the collar **51** and to insure proper registry between the bag mouth and the air inlet **22**. Moreover, the tabs **54** function as convenient finger pieces to facilitate handling of the bag during installation and removal. As shown in a slightly exaggerated degree in FIG. 7, the inwardly projecting portion of the gasket or seal **41** is compressed by contact with the bag collar **51** so that the bowed collar is urged resiliently outwardly and the side edges thereof are thereby snugly retained in engagement with the flanges **34**. As previously pointed out, the curvature of the plate member **27**, and also the gasket **41** mounted thereon, accommodates and conforms to the curvature of the bowed collar **51** when the latter is mounted on the bag holder **26**.

After securement of the bag collar **51** in the holder **26** as just described, the closed end portions of the bag extending on either side of the collar may be curved in opposite directions (FIG. 7) around the motor-fan unit **21** within the confines of the cleaner casing so as to provide a generally circular bag configuration surrounding the motor-fan unit (FIG. 1). If desired, the plate member **27** may be pivoted outwardly, i.e. to the left as viewed in FIGS. 2 and 5, in order to facilitate installation or removal of a bag, this feature being particularly convenient during removal of a full bag. The depending legs **35** on the flanges **34** provide a stop means for limiting inward pivotal movement of the plate member **27** and thereby retaining the bag holder in generally upright position for proper registry of the bag mouth **48** with the air inlet **22**.

When the cover **13** is closed, as shown in FIGS. 2 and 5, the side wall portion of the cover adjacent the air inlet **22** engages the outwardly projecting portion of the gasket **41** so as to compress the latter slightly and insure an airtight seal. Although the depending lower ends **35** of the flanges **34** provide a stop action to limit inward pivoting of the plate member **27**, nevertheless, the plate member **27** has essentially a cantilever type support which may be arranged to provide a slight degree of resilient inward yield when the cover **13** is closed against the gasket **41**, thereby further insuring a tight seal at this juncture. Thus, it will be seen that at the inner side of the plate member **27** the gasket **41** is compressed between the plate member and the inwardly bowed bag collar **51** and at the outer side of the plate member **27** the gasket **41** is compressed between the plate member and the side wall of the cover **13** so that the air pasage between the inlet **22** and the bag **46** is sealed against leakage.

In use, dirty air is drawn inwardly by the motor-fan unit **21** through a cleaning tool and hose (not shown) connected to the inlet **22–24** and the filtered air passes through the walls of the permeable bag **46** and thence through a filter disk **56** (FIG. 2) at the top of the motor-fan unit and is discharged from the lower section **11** through an outlet (not shown).

Although the invention has been described with particular reference to a specific structural embodiment thereof, it is to be understood that various modifications and equivalents may be resorted to without departing from the scope of the invention as defined in the appended claims.

I claim:

1. In a suction cleaner including a lower casing section mounting a motor-fan unit and a movable upper casing section comprising a cover having a dirty air inlet, the combination of a generally upright bag holder having spaced side flanges, means pivotally supporting the bag holder on the lower casing section in a position adjacent the air inlet when the cover is closed, a filter bag having a mouth in a wall thereof for registry with the air inlet, a mounting collar secured to said bag around said mouth and having spaced edge portions engageable by said flanges for securing the bag to the holder, said holder being pivotally movable in one direction outwardly of the lower casing section when the cover is open for facilitating attachment and detachment of the bag collar with respect to the holder, and stop means limiting pivotal movement of the holder in the opposite direction inwardly of the lower casing section whereby the holder is retained in generally upright position for registry of the bag mouth with the air inlet when the cover is closed and said bag and collar are mounted in operative relation on said holder.

2. The structure of claim **1** further characterized in that the said lower casing section includes a transverse support for said motor-fan unit, said holder comprises a generally upright plate member having its lower end portion pivotally connected to said support, and said stop means comprises abutment means cooperating between said lower end portion of said plate member and said support.

3. The structure of claim **1** further characterized in that said holder has an opening for registry with the air inlet and a compressible annular seal is mounted on said holder around said opening and projecting axially therefrom, the distance between said flanges being slightly less than the distance between said edge portions of said collar whereby, when said bag and collar are mounted in operative relation on said holder, the collar must be deflected toward the axially projecting portion of said seal to permit engagement of said edge portions with said flanges, and said seal thereby being compressed by the deflected collar whereby said edge portions thereof are resiliently urged into engagement with said flanges.

4. The structure of claim **3** further characterized in that said holder is transversely curved between said flanges and said collar is adapted to be bowed into compressing engagement with said seal whereby the curvature of the holder accommodates and substantially conforms to the curvature of the bowed collar.

5. In a suction cleaner including a casing having a dirty air inlet, the combination of a bag holder supported within the casing adjacent the air inlet and having an opening for registry with the air inlet, a compressible annular seal mounted on said holder around said opening and projecting axially therefrom, a pair of spaced flanges on said holder disposed at opposite sides of said opening, a filter bag having a mouth in a wall thereof for registry with said opening and with the air inlet, and a mounting collar of relatively stiff but bendable material secured to said bag around said mouth and having spaced edge portions receivable by said holder between said flanges, the distance between said flanges being slightly less than the distance between said edge portions of said collar whereby,

when said bag and collar are mounted in operative relation on said holder, the collar must be deflected toward the axially projecting portion of said seal to permit engagement of said edge portions with said flanges, and said seal thereby being compressed by the deflected collar whereby said edge portions thereof are resiliently urged into engagement with said flanges.

6. The combination of claim 5 further characterized in that said holder is transversely curved between said flanges and said collar is adapted to be bowed into compressing engagement with said seal whereby the curvature of the holder accommodates and substantially conforms to the curvature of the bowed collar.

7. The combination of claim 5 further characterized in that said flanges are provided with recesses and said edge portions of said collar are provided with tabs receivable in said recesses for securing the collar against displacement relative to said holder.

8. In a suction cleaner having a casing, the combination of a movable casing section having a dirty air inlet, a bag holder supported within the casing adjacent the air inlet and having an opening for registry with the air inlet, a compressible annular gasket mounted on said holder around said opening and projecting axially at opposite sides of said holder, a pair of spaced flanges on said holder disposed at opposite sides of said opening, a filter bag having a mouth in a wall thereof for registry with said opening and with the air inlet, and a mounting collar of relatively stiff but bendable material secured to said bag around said mouth and having spaced edge portions receivable by said holder between said flanges, the distance between said flanges being slightly less than the distance between said edge portions of said collar whereby, when said bag and collar are mounted in operative relation on said holder, the collar must be deflected

toward said gasket to permit engagement of said edge portions with said flanges, said gasket thereby being compressed axially at one side of said holder by the deflected collar whereby said edge portions thereof are resiliently urged into engagement with said flanges and whereby to provide an airtight seal between said bag and said gasket, and said gasket being compressed axially at the other side of said holder by said movable casing section when the latter is closed whereby to provide an airtight seal between said air inlet and said gasket.

9. The combination of claim 8 further characterized in that said holder is transversely curved between said flanges and said collar is adapted to be bowed into compressing engagement with said gasket whereby the curvature of the holder accommodates and substantially conforms to the curvature of the bowed collar.

10. The combination of claim 8 further characterized in that said holder is mounted in said casing for limited resilient yielding movement for further compressing said gasket between said holder and said movable casing section.

References Cited by the Examiner

UNITED STATES PATENTS

2,766,844	10/56	Humphrey.	
2,771,152	11/56	Bramhall et al.	
2,781,103	2/57	Daiger et al.	
2,810,453	10/57	Kemmitz.	
2,870,863	1/59	Bramhall	55—376
3,088,260	5/63	Seyfried	55—374

HARRY B. THORNTON, *Primary Examiner.*

HERBERT L. MARTIN, GEORGE D. MITCHELL, WALTER BERLOWITZ, *Examiners.*