MEANS FOR REMOVABLY CONNECTING
A DIRT COLLECTING RECEPTACLE IN A
VACUUM CLEANER

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A structure for releasably connecting a dirt collecting
receptacle of a vacuum cleaner to the outer end of an
air flow duct. The connecting structure includes piv-
otal lever structure for selectivity releasing a retained
association between the dirt collecting receptacle and
air duct and for urging the receptacle connector ele-
ment outwardly from the duct end as a concomitant of
the releasing action. The lever and fulcrum therefor
may be integrally formed with the dirt collecting re-
ceptacle connector portion.

13 Claims, 4 Drawing Figures
MEANS FOR REMOVABLY CONNECTING A DIRT COLLECTING RECEPTACLE IN A VACUUM CLEANER

BACKGROUND OF THE INVENTION

1. Field of the Invention
This invention relates to vacuum cleaners, and in particular to means for connecting a dirt collecting receptacle to the air duct portion of the vacuum cleaner.

2. Description of the Prior Art
In one conventional form of vacuum cleaner, an upright arrangement is provided wherein a dirt collecting receptacle conventionally comprising a flexible bag, is carried on a handle portion of the vacuum cleaner, and includes a lower connecting portion adapted to be removably connected to the outer end of air flow duct adapted to discharge dirt-laden air into the dirt collecting bag. Conventionally, the lower portion of the vacuum cleaner includes a motor driven air moving means for sucking the dirt from the surface to be cleaned and delivering the dirt-laden air through the air duct to the collecting receptacle.

Different devices have been provided heretofore for connecting the dirt collecting bag to the air duct of the base portion of the vacuum cleaner. One such device is shown in the D. H. Brennan et al., U.S. Letters Pat. No. 2,755,106, wherein a pivoted floating latch is provided for the suction cleaner tube or hose coupling of a vacuum cleaner. As shown in that patent, the floating latch comprises a mechanism attached to the vacuum cleaner structure by suitable attaching means. Another form of latching means is shown in the C. T. Fromknecht U.S. Letters Pat. No. 3,245,698, wherein the latch member is secured to a tubular section of a vacuum cleaner wand by rivets and includes a latching shoulder which engages the far side of the catch portion to maintain the desired retained association.

SUMMARY OF THE INVENTION
The present invention comprehends an improved means for releasably connecting the dirt collecting receptacle of a vacuum cleaner to the outer end of the air duct means thereof including means defining a downwardly facing shoulder on the duct spaced from the duct outer end, tubular means on the duct collecting receptacle adapted to be removably fitted about the duct outer end to provide an air flow connection between the duct and the receptacle, and means carried by the tubular means defining a lever having a first end movably disposed in retained engagement with the shoulder when the tubular means is fitted to the duct outer end, and an opposite, manipulating end. The lever defining means further defines a fulcrum swingably mounting a mid-portion of the lever to the tubular means to arrange the lever as a first class lever whereby depression of the manipulating end of the lever swings the first end free of engagement with the shoulder to permit removal of the tubular means and dirt collecting receptacle from the air flow duct as for disposal of collected dirt therefrom. The fulcrum may be disposed relative to the shoulder whereby a component of the force of depression of the lever manipulating portion is directed outwardly to urge the tubular means outwardly from the duct outer end.

The invention further comprehends providing a connecting means for connecting the dirt collecting receptacle to the duct end including means defining an upwardly facing shoulder on the duct upwardly of the downwardly facing shoulder and adapted to be engaged by the tubular means to limit the inward movement thereof onto the duct outer end to a position wherein the lever first end is disposed adjacent the downwardly facing shoulder.

The shoulder means may be integral with the duct end, and in the illustrated embodiment, each of the duct end and tubular means of the receptacle comprise molded synthetic resin elements wherein the shoulder means, lever and fulcrum means are integrally formed with the corresponding element.

In the illustrated embodiment, the dirt collecting receptacle comprises a conventional flexible bag having the connection tubular means sealingly secured to the lower end thereof.

BRIEF DESCRIPTION OF THE DRAWING
Other features and advantages of the invention will be apparent from the following description taken in connection with the accompanying drawing wherein:

FIG. 1 is a perspective view of an upright vacuum cleaner having a dirt collecting receptacle connection means embodying the invention;

FIG. 2 is a fragmentary enlarged elevation taken substantially along the line 2—2 of FIG. 1;

FIG. 3 is a vertical section taken substantially along the line 3-3 of FIG. 2; and

FIG. 4 is a further enlarged fragmentary section illustrating in greater detail a portion of the structure of FIG. 3.

DESCRIPTION OF THE PREFERRED EMBODIMENT
In the exemplary embodiment of the invention as disclosed in the drawing, a vacuum cleaner generally designated illustratively comprises an upright vacuum cleaner having a wheeled base portion 11 and an upper handle 12. A dirt collecting receptacle illustratively comprising a dirt collecting bag 13, is carried on the upper portion 14 of the handle by a suitable spring connector 15 and includes a lower connector portion 16 adapted to be sealingly connected to the outer end 17 of an air flow duct 18 on the base 11.

Base 11 may be provided with a conventional motor driven air flow means (not shown) for sucking dirt from the subjacent surface to be cleaned and delivering the dirt-laden air through the duct 18 into the dirt collecting bag 13 which traps the dirt in the conventional manner.

From time to time, the collected dirt must be removed from bag 13 and, thus, it is desirable to provide a releasable connection of the bag to the air duct 18. The present invention comprehends an improved means for effecting such releasable connection.

More specifically, as seen in FIGS. 2-4, duct end 17 comprises a tubular wall which, in the illustrated embodiment, may be formed of molded synthetic resin. A projection 19 may be provided on the duct wall spaced from the distal end 20 thereof. Projection 19 defines a downwardly facing shoulder 21 and an upwardly facing shoulder 22. Projection 19 may be provided with a stepped portion 23 downwardly of shoulder 21 with upper shoulder 22 and stepped portion 23 being rounded, as best seen in FIG. 4.

Bag connector portion 16 comprises a tubular element having an inner configuration conforming to the
outer configuration of duct end 17 to permit the telescoped mounting of the connector 16 to the duct end 17, as best seen in FIG. 3. The upper end 31 of connector 16 includes an inwardly directed flange 32 which is sized to just overlie distal end 20 of duct end 17 to substantially prevent collected dirt from becoming lodged between distal end 17 and connector 16. At its lower end, the tubular connector means 16 may be provided with an outturned flange 24 adapted to form a seat for bag 13 and rigidify the tubular end and to have engagement with the outer shoulder 22 of duct end projection 19 when the connector portion 16 is fully telescoped onto the duct end 17, as shown in FIG. 3.

An improved structure for releasably latching the connector means 16 to the duct end is provided herein comprising a lever generally designated 25 carried on tubular connector means 16, and more specifically as shown in FIG. 4, formed integrally with flange portion 24 thereof to extend downwardly along the outer surface of duct 17 beyond projection 19 when the connector means 16 is installed on the duct end 17. Lever 25 includes a mounting portion 26 connected to the flange 24, and a pivot fulcrum portion 27 disposed to engage the outer surface of the duct end downwardly of projection 19 in the assembled association of the elements, as shown in FIG. 4. Lever 25 further includes a second, opposite manipulating end 30 downwardly of fulcrum 27 which, when urged toward duct end surface 28, causes lever 25 to act as a first class lever in moving end 29 outwardly from behind shoulder 21 and permitting upward movement of tubular connector means 16 from the duct end 17. Pivot fulcrum 27, as shown in FIG. 4, is preferably rounded to facilitate pivoting thereabout.

As shown in FIG. 4, the force F acting against the lever end 30 has a component F' acting parallel to the surface 28 thereby urging the tubular connector means 16 outwardly from the duct end 17 for facilitating the disconnection of the bag from the vacuum cleaner base 11. Upon such disconnection, the vacuum cleaner bag may be removed from the vacuum cleaner by removal of the connecting portion 15 from handle 12, and the collected dirt may be disposed of in the normal manner. The bag may then be readily reinstalled in the vacuum cleaner by reconnecting bag support means 15, and moving the tubular connector means 16 telescopically back onto duct end 17 with the lever end 29 being cammed around projection 19 by the rounded shoulder 22 back to the position of FIG. 3 wherein flange 24 limits the telescopic movement to position the lever end 29 behind downwardly facing shoulder 21 thereby again latching the tubular connector means 16 to the duct end for further use of the vacuum cleaner in the normal manner.

As the projection 19 may be integrally molded with the duct end 17 and connecting means 25, 26, 27, 29 and 30 may be integrally molded with the tubular connector means 16, the connector structure of the present invention is extremely simple and economical of construction while yet providing facilitated installation and removal of the dirt collecting receptacle from the vacuum cleaner as discussed above.

The foregoing disclosure of specific embodiments is illustrative of the broad inventive concepts comprehended by the invention.

Having described the invention, the embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. In a vacuum cleaner having an air flow means including a duct having an outer end, and a dirt collecting receptacle, means for releasably connecting the dirt collecting receptacle to the outer end of the duct comprising: means defining a first shoulder on said duct spaced from said duct outer end; tubular connector means on said dirt collecting receptacle removably fitted about said duct outer end to provide an air flow connection between said duct and receptacle; means carried by said tubular connector means defining a lever having a first end normally disposed in retained engagement with said first shoulder when end of tubular connector means is fitted to said duct outer end, and an opposite, manipulating end; and means defining a fulcrum adjacent the mid-portion of the lever to arrange said lever as a first class lever, depression of said manipulating end of the lever causing swinging of said first lever end free of engagement with said first shoulder to permit removal of said tubular connector means and dirt collecting receptacle from said air flow duct as for disposal of collected dirt therefrom, said fulcrum being spaced relative to said first shoulder to cause a component of the force of depression of said lever manipulating portion to be directed to urge said tubular connector means away from the fitted connection with said duct outer end.

2. The vacuum cleaner connecting means of claim 1 wherein said lever and fulcrum means are integral.

3. The vacuum cleaner connecting means of claim 1 wherein said lever and fulcrum means are integral with said tubular connector means.

4. The vacuum cleaner connecting means of claim 1 wherein said fulcrum means is integral with said tubular connector means.

5. The vacuum cleaner connecting means of claim 1 wherein said fulcrum means defines a rounded surface engaging said duct end.

6. The vacuum cleaner connecting means of claim 1 wherein said shoulder means is integral with said duct end.

7. The vacuum cleaner connecting means of claim 1 further including means defining a second shoulder on said duct spaced from said first shoulder and adapted to be engaged by the tubular connector means to limit the movement thereof onto the duct outer end, wherein said lever first end is disposed adjacent said first shoulder.

8. In a vacuum cleaner having an air flow means including a duct having an outer end and a dirt collecting receptacle, means for releasably connecting the dirt collecting receptacle to the outer end of the duct comprising: means defining a first shoulder on said duct spaced from said duct outer end; tubular connector means on said dirt collecting receptacle adapted to be removably fitted about said duct outer end to provide an air flow connection between said duct and receptacle; means carried by said tubular connector means defining a lever having a first end normally disposed in retained engagement with said first shoulder when said tubular connector means is fitted to said duct outer end, and an opposite, manipulating end; and means de-
fining a fulcrum adjacent the mid-portion of the lever to arrange said lever as a first class lever, depression of said manipulating end of the lever causing swinging of said first end free of engagement with said first shoulder to permit removal of said tubular connector means and dirt collecting receptacle from said air flow duct as for disposal of collected dirt therefrom, said lever and fulcrum means being formed unitarily integral with said tubular connector means.

9. The vacuum cleaner connecting means of claim 8 wherein said first shoulder means is integral with said duct end.

10. The vacuum cleaner connecting means of claim 8 wherein said tubular connector means comprises a molded synthetic resin element, said lever and fulcrum means being molded integrally therewith.

11. The vacuum cleaner connecting means of claim 8 wherein said dirt collecting receptacle comprises a flexible bag attached to said tubular connector.

12. The vacuum cleaner connecting means of claim 8 wherein said vacuum cleaner comprises an upright vacuum cleaner.

13. The vacuum cleaner connecting means of claim 8 further including means defining a second shoulder on said duct spaced from said first shoulder and adapted to be engaged by the tubular connector means to limit the inward movement thereof onto the duct outer end to a position wherein said lever first end is disposed adjacent said first shoulder.