UPRIGHT VACUUM CLEANER WITH REMOVABLE AIR PATH COVER FOR CANISTER ASSEMBLY

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ABSTRACT
An upright vacuum cleaner includes a nozzle assembly and a canister assembly pivotally connected to the nozzle assembly. The nozzle assembly includes a suction inlet. The canister assembly includes a first housing member and a removable cover that cooperate together to form a wand receiver, a hose connector and an integral air path between the wand receiver and the hose connector.
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TECHNICAL FIELD

[0002] The present invention relates generally to the floor care appliance field and, more particularly, to an upright vacuum cleaner incorporating a removable air path cover.

BACKGROUND OF THE INVENTION

[0003] Upright vacuum cleaners in all of their designs and permutations have become increasingly popular over the years. The upright vacuum cleaners generally incorporate a nozzle assembly and a canister assembly pivotally mounted to the nozzle assembly. Wheels on the nozzle and canister assemblies allow the vacuum cleaner to smoothly ride over the surface to be cleaned.

[0004] The canister assembly includes an operating handle that is manipulated by the user to move the vacuum cleaner back-and-forth across the floor. The canister assembly also includes either a bag-like filter or a cyclonic separation chamber and filter combination that trap dirt and debris while substantially clean air is exhausted by a fan that is driven by an onboard electric motor. It is this fan and motor arrangement that generates the drop in air pressure necessary to provide the desired cleaning action.

[0005] In most upright vacuum cleaners sold today, a rotary agitator is also provided in the nozzle assembly. The rotary agitator includes tufts of bristles, brushes, beater bars or the like to beat dirt and debris from the nap of a carpet being cleaned while the pressure drop or vacuum is used to force air entrained with this dirt and debris into the nozzle of the vacuum cleaner.

[0006] Over the years many different conduit systems have been designed to route the air path from the suction inlet on the nozzle assembly to the dirt collection vessel on the canister assembly. The routing is somewhat complicated by the pivotal connection between the nozzle assembly and canister assembly. With any conduit system there is always the possibility that a clog may develop and thereby effectively close the pathway and inhibit the cleaning efficiency of the vacuum cleaner. The present invention relates to a vacuum cleaner assembly that allows quick and total access for the efficient and effective cleaning of any clog that might possibly form in the air path in the area of the transition from the nozzle assembly to the canister assembly.

SUMMARY OF THE INVENTION

[0007] In accordance with the purposes of the present invention as described herein, an improved upright vacuum cleaner is provided. That upright vacuum cleaner comprises a housing including a nozzle assembly with a suction inlet and a canister assembly pivotally connected to the nozzle assembly. The canister assembly includes a first housing member and a removable cover that cooperate together to form a wand receiver, a hose connector and an integral air path between the wand receiver and the hose connector.

[0008] The upright vacuum cleaner also includes a suction generator carried on one of the nozzle assembly and the canister assembly and a dirt collection vessel carried on the canister assembly.

[0009] Still further, the upright vacuum cleaner includes a wand assembly comprising a removable wand and a first flexible hose connected between the wand and the dirt collection vessel. In addition a second flexible hose is connected between the suction inlet and the hose connector.

[0010] In one possible embodiment the dirt collection vessel is a filter bag. In another possible embodiment the dirt collection vessel is a dirt cup. That dirt cup may include a substantially cylindrical dirt collection chamber, a tangentially directed inlet and an axially directed outlet in order to provide for cyclonic airflow.

[0011] In addition the upright vacuum cleaner may include at least one rotary agitator carried on the nozzle assembly adjacent the suction inlet. Further the canister assembly may include an upright control handle. In addition the removable wand may be a two piece telescoping wand. Further the hose connector may take the form of a hose cuff. Still further a seal may be provided between the first housing member and the removable cover. In addition, a lever for releasing the wand assembly is captured between the first housing member and the removable cover.

[0012] In the following description there is shown and described one possible embodiment of the present invention, simply by way of illustration of one of the modes best suited to carry out the invention. As it will be realized, the invention is capable of other different embodiments and its several details are capable of modification in various, obvious aspects all without departing from the invention. Accordingly, the drawings and descriptions will be regarded as illustrative in nature and not as restrictive.

BRIEF DESCRIPTION OF THE DRAWING

[0013] The accompanying drawing incorporated in and forming a part of the specification, illustrates several aspects of the present invention, and together with the description serves to explain certain principles of the invention. In the drawing:

[0014] FIG. 1 is a partially cutaway, perspective view of the upright vacuum cleaner of the present invention;

[0015] FIG. 2 is a perspective view of the dirt collection vessel of the upright vacuum cleaner of the present invention;

[0016] FIG. 3 is a detailed, exploded perspective view of the first housing member and removable cover of the canister assembly;

[0017] FIG. 4 is a schematic view of the air flow circuit through the vacuum cleaner;

[0018] FIG. 5a is a detailed rear elevational view with the housing cover removed to clearly show the release lever and detent when the wand assembly is in the locked position;

[0019] FIG. 5b is a view similar to FIG. 5a but showing the lever in position to release the wand from the wand receiver; and

[0020] FIG. 6 is a detailed cross sectional view illustrating the seal provided between the first housing member and removable cover of the canister assembly.

DETAILED DESCRIPTION OF THE INVENTION

[0021] Reference is now made to FIGS. 1 and 3 showing an upright vacuum cleaner 10 equipped with a removable air
path cover 12 for allowing quick and easy access to the air path for the inspection and cleaning of clogs and debris from that air path. The upright vacuum cleaner 10 includes a nozzle assembly 14 and a canister assembly 16. The nozzle assembly 14 includes a suction inlet 18. A rotary agitator 20 is carried on the nozzle assembly 14 and extends across the suction inlet 18. The rotary agitator 20 includes a series of projecting cleaning elements 22. The cleaning elements may take the form of, for example, brushes, wipers, beater bars, bristle tufts or the like.

[0022] The canister assembly includes a control handle 24 and a hand grip 26. A control switch 28 is provided adjacent the hand grip 26 so that the operator may conveniently control the functions of the vacuum cleaner 10. Electrical power may be supplied to the vacuum cleaner 10 from a standard electrical wall outlet through an electric cord (not shown). Alternatively, the vacuum cleaner 10 may be powered by an on-board battery, fuel cell or other power source.

[0023] A pair of rear wheels 30 are provided on the lower portion of the canister assembly 16 and a pair of front wheels (not shown) are provided on the nozzle assembly 14. Together these wheels 30 support the vacuum cleaner 10 for movement across the floor. To allow for convenient storage of the vacuum cleaner 10 a foot latch (not shown) functions to lock the canister assembly 16 in an upright position as illustrated in FIG. 1. When the foot latch is released, the canister assembly 16 may be pivoted relative to the nozzle assembly 14 as the vacuum cleaner is manipulated to-and-fro to clean the floor.

[0024] The canister assembly 16 also includes a cavity 32 adapted to receive and hold a dirt collection vessel 34. In the illustrated embodiment (see FIG. 2), the dirt collection vessel 34 includes a substantially cylindrically shaped dirt collection chamber 36, a substantially tangentially directed inlet 38 and a substantially axially directed outlet 40. This structural arrangement promotes cyclonic airflow within the chamber 36 in order to enhance the cleaning efficiency of the vacuum cleaner. A main filter 42 of cylindrical shape is held in the chamber over the outlet 40. The filter 42 insures that even relatively fine particles of dirt and debris are captured in the dirt collection vessel 34.

[0025] As illustrated schematically in FIG. 4, the canister assembly 16 also carries a suction generator 44 consisting of a cooperating fan and drive motor. The suction generator 44 functions to generate a vacuum airstream for drawing dirt and debris from the surface to be cleaned. While the suction generator 44 is illustrated as being carried on the canister assembly 16, it should be appreciated that it could likewise be carried on the nozzle assembly 14 if desired.

[0026] A conduit system, generally designated by reference mark 50 provides an air path from the suction inlet 18 to the tangentially directed inlet 38 on the dirt collection vessel 34. More specifically, the canister assembly 16 includes a first or main housing member 52 and a cooperating movable air path cover 12 that when connected together define an integral air path 54. More specifically, the integral air path 54 may be formed by two cooperating half pipes 56 molded in the first housing member 52 and the removable cover 12 (see also FIGS. 5a, 5b and 6).

[0027] As illustrated, a flexible hose 58 connects the suction inlet 18 on the nozzle assembly 14 with the integral air path 54. Advantageously, the flexible hose 58 insures the integrity of the air path between the two assemblies 14, 16 during vacuum cleaner operation. More specifically, the flexible hose 58 has a first end that is secured in a fitting 60 on the nozzle assembly 14 and a second end that is secured in a hose cuff 62 formed by or integrally molded in the first housing member 52 and removable cover 12.

[0028] The opposite end of the integral air path 54 formed by the housing member 52 and cover 12 includes a receiver 64 that receives and holds the inlet end of a removable wand 66. If desired, the wand 66 may be a two-piece telescoping wand such as, for example, disclosed and described in issued U.S. Pat. No. 6,148,474 to Ohara et al. owned by the assignee of the present invention. The receiver 64 may simply comprise a tapered wall adapted to provide a friction fit with the end of the wand 66. A spring loaded detent 65 carried on the wand 66 engages in a locking aperture 67 formed in the housing member 52 and cover 12 in order to complete a secure connection. The opposite or outlet end of the wand 66 is connected by a flexible hose 68 to the inlet 38 of the dirt collection vessel 34 through a conduit or plenum 69.

[0029] During normal upright vacuum cleaner operation, the rotary agitator 20 loosens and lifts dirt and debris from the nap of an underlying carpet being cleaned. That dirt and debris is then drawn into the suction inlet by the vacuum airstream generated by the suction generator 44. That airstream travels from the suction inlet 18 through the flexible hose 58, the integral air path 54, the wand 66 and the flexible hose 68 through the inlet 38 into the chamber 36 of the dirt collection vessel 34. Dirt and debris is then captured in the chamber 36 and clean air passes through the main filter 42 and along the axial outlet 40 through a passageway to the suction generator 44. As the clean air passes over the motor of the suction generator 44, it provides cooling before that clean air is exhausted back into the environment. A secondary filter 70 may be provided between the outlet 40 of the dirt collection vessel 34 and the suction generator 44 and a final filter 72 may be provided downstream from the suction generator 44 but upstream from the exhaust port 74 through which the clean air is exhausted from the vacuum cleaner 10.

[0030] When the operator wishes to perform above floor cleaning, the operator depresses the release lever 76 that is pivotally mounted by a pivot pin 77 on the housing member 52 and captures between that housing member and the cover 12 (see specifically FIG. 5b). A lug 78 on the lever 76 then depresses the spring loaded detent 65 so that the detent is disengaged from the locking aperture 67. The operator then simply grasps the wand 66 and withdraws the inlet or distal end thereof from the receiver 64. Air may then be drawn directly through the wand 66 and the hose 68 into the dirt collection vessel 34. The wand 66 may then be easily manipulated to clean in tight corners or above the floor for special cleaning applications. The normal floor cleaning mode may be reestablished by reinserting the distal or inlet end of the wand 66 into the receiver 64 to thereby reestablish communication between the suction inlet 18, the dirt collection vessel 34 and the suction generator 44. When this is done the detent 65 is biased into the locking aperture 67 to secure the wand 66 in position (see FIG. 5b).

[0031] It should be appreciated that numerous benefits result from employing the concepts of the present invention.
For example, the removable air path cover 12 may be made from transparent material if desired in order to allow free and easy visual inspection of the air path 54. In the event of a clog, the cover 12 may be quickly and easily removed from the housing member 52 effectively opening the air path 54 along the midline thereof so as to allow quick and convenient removal of the clog therefrom. The cover 12 may then be quickly and easily replaced on the housing member 52 to close the air path 54 for normal vacuum cleaner operation. It should be appreciated that the cover 12 may be held in place by any appropriate means including snap fasteners, screws or the like.

[0032] The foregoing description of the preferred embodiment of the invention has been presented for purposes of illustration and description. It is not intended to be exhaustive or to limit the invention to the precise form disclosed. Obvious modifications or variations are possible in light of the above teachings. For example, the dirt collection vessel may comprise a simple filter bag held in a sealed compartment in the canister assembly 16 instead of the illustrated cyclonic dirt cup. Further a simple non-cyclonic dirt cup could be provided. In addition, the main filter could be provided downstream from the dirt cup instead of in the dirt cup. A rubber seal such as an O-ring could be provided in a groove formed in the mating edges of the half pipes 56 of the housing member 52 and cover 12. Of course other sealing arrangements could be utilized including, for example, a labyrinth seal if desired.

[0033] The embodiment was chosen and described to provide the best illustration of the principles of the invention and its practical application to thereby enable one of ordinary skill in the art to utilize the invention in various embodiments and with various modifications as are suited to the particular use contemplated. All such modifications and variations are within the scope of the invention as determined by the appended claims when interpreted in accordance with the breadth to which they are fairly, legally and equitably entitled.

What is claimed:

1. An upright vacuum cleaner, comprising:
   a housing including a nozzle assembly and a canister assembly pivotally connected to said nozzle assembly;
   a suction inlet on said nozzle assembly;
   a suction generator carried on said housing;
   a dirt collection vessel carried on said housing;
   said canister assembly including a first housing member and a removable cover that cooperate together to form a wand receiver, a hose connector and an integral air path between said wand receiver and said hose connector;
   a wand assembly including a removable wand and a first flexible hose connected between said wand and said dirt collection vessel; and
   a second flexible hose connected between said suction inlet and said hose connector.

2. The vacuum cleaner of claim 1, wherein said dirt collection vessel is a filter bag.

3. The vacuum cleaner of claim 1, wherein said dirt collection vessel is a dirt cup.

4. The vacuum cleaner of claim 3, wherein said dirt cup includes a substantially cylindrical dirt collection chamber, a tangentially directed inlet and an axially directed outlet.

5. The vacuum cleaner of claim 1, further including at least one rotary agitator carried on said nozzle assembly adjacent said suction inlet.

6. The vacuum cleaner of claim 1, wherein said canister assembly further includes an upright control handle.

7. The vacuum cleaner of claim 6, wherein said removable wand is a two piece telescoping wand.

8. The vacuum cleaner of claim 7, wherein said hose connector is a hose cuff.

9. The vacuum cleaner of claim 1, wherein a seal is provided between said first housing member and said removable cover.

10. The vacuum cleaner of claim 1, further including a lever for releasing said wand assembly from said wand receiver, said lever being captured between said first housing member and said removable cover.

11. An upright vacuum cleaner, comprising:
   a nozzle assembly including a suction inlet;
   a canister assembly pivotally connected to said nozzle assembly, said canister assembly including a first housing member and a removable cover that cooperate together to form a first receiver, a second receiver and an integral air path between said first and said second receivers;
   a suction generator carried on one of said nozzle assembly and said canister assembly; and
   a dirt collection vessel carried on said canister assembly.