
(12) **UK Patent**

(19) **GB**

(11) **2 419 276**

(13) **B**

(45) Date of publication: **15.08.2007**

(54) Title of the invention: **Cleaning head for a surface cleaning apparatus**

(51) INT CL: **A47L 9/02** (2006.01) **A47L 7/02** (2006.01) **A47L 11/22** (2006.01) **A47L 9/04** (2006.01)

(21) Application No: **0521289.9**

(22) Date of Filing: **19.10.2005**

(30) Priority Data:
(31) **60621029** (32) **22.10.2004** (33) **US**

(43) Date A Publication: **26.04.2006**

(52) UK CL (Edition X):
NOT CLASSIFIED

(56) Documents Cited:
GB 1392150 A **WO 2005/096907 A1**
US 5018240 A

(58) Field of Search:
As for published application 2419276 A viz:
UK CL (Edition X) **A4F**
INT CL ⁷ **A47L**
Other
WPI, EPODOC
updated as appropriate

(72) Inventor(s):
Wayne Ernest Conrad

(73) Proprietor(s):
Polar Light Limited
(Incorporated in China)
1/F 2 Dai Wang Street,
Tai Po Industrial Estate, Tai Po, N.T.,
Hong Kong

(74) Agent and/or Address for Service:
Mewburn Ellis LLP
York House, 23 Kingsway, LONDON,
WC2B 6HP, United Kingdom

Title: CLEANING HEAD FOR A SURFACE CLEANING APPARATUS

Field of the invention

[0001] This application relates to dirt bin or dirt container for an apparatus for cleaning a surface, such as a vacuum cleaner, carpet extractor or the like. The dirt container has a first chamber for collecting larger particulate matter and a second chamber for collecting finer particulate matter. Each chamber is in communication with the surface being cleaned by a separate entrance. In one aspect of the invention, the first chamber comprises a settling chamber and the second chamber comprises a cyclone.

Background of the invention

[0002] Various different formats of vacuum cleaners are known in the art. These include upright vacuum cleaners, canister vacuum cleaners, stick vacuum cleaners and central vacuum systems. Typically, a vacuum cleaner uses a combination of mechanical action (e.g. a rotating brush) and suction to entrain material in a dirty air stream that enters the vacuum cleaner. One or more filtration members are provided for removing particulate matter from the dirty air stream. In the past, vacuum cleaners used filter bags to filter the dirt air. More recently, vacuum cleaners have used a plurality of cyclones or at least one cyclone with additional physical filter mechanisms downstream from the cyclone to treat the dirty air.

[0003] If a vacuum cleaner uses more than one treatment step, then, typically, the dirty air stream is treated sequentially in each step as the dirty air passes through the vacuum cleaner. Accordingly, the surface cleaning head of the vacuum cleaner has a single dirty air inlet. An airflow path extends from the dirty air inlet through the vacuum cleaner to the cleaned air outlet of the vacuum cleaner. Accordingly, the filtration mechanisms are provided in a series of stages along the airflow path and each treatment stage must be sized to permit all of the air stream to pass therethrough.

Summary of the invention

[0004] In accordance with one aspect of the present invention there is provided a cleaning head for a surface cleaning apparatus comprising:

(a) a housing having a surface contacting surface;

5 (b) a first inlet having an associated brushing member provided in the surface contacting surface and in communication with a first treatment stage not comprising a cyclone and which comprises a settling chamber and, in use, is in airflow communication with a source of suction; and,

10 (c) a second inlet positioned rearward from the first inlet and provided in the surface contacting surface and, in use, in communication with a second treatment stage comprising at least one cyclone and the source of suction.

[0005] The first inlet is associated with a brushing member and is in communication with a first treatment stage. As the surface cleaning head is passed over a surface, some particulate matter enters the surface cleaning head via the first inlet and other particulate matter enters the surface cleaning head via the second inlet.

[0006] Preferably, the first treatment stage receives larger and heavier particulate matter, such as that which may be swept up by a rotating brush. Such material will tend to settle out of air by gravity and, accordingly, the first treatment stage comprises a settling chamber. Preferably, the second inlet is upstream from a source of suction and the second treatment stage receives smaller and lighter particulate matter, such as that which will be entrained in an air stream but will tend to not settle out of air by gravity. The second treatment stage may comprise a filter in addition to the at least one cyclone. The chamber is, in use, in airflow communication with the source of suction.

The surface cleaning apparatus is preferably configured so that most of the air drawn by the suction source enters through the second inlet. By providing a bleed stream of air to pass through the chamber, the finer particulate matter that enters the chamber and which will tend not to settle, or which may not remain settled as the surface cleaning head is moved, may be removed from the chamber and conveyed to a further treatment stage.

[0007] Preferably, the brushing member is a rotatably mounted brush. The chamber is positioned to receive particulate matter swept up by the brush. Preferably, the bottom of the chamber is positioned below the inlet to the chamber so that particulate matter will be retained in the chamber. For example, the chamber may be located at the end of a ramp that extends upwardly from the inlet associated with the brush to the inlet of the chamber.

[0008] The chamber is preferably configured to permit particulate material to settle out under the influence of gravity.

[0009] The second treatment stage comprises at least one cyclone, for removing particulate matter from the air stream drawn through the second inlet. If some air is drawn through the first inlet, then the cyclone may be

downstream from both the first treatment stage and the second inlet. Alternately, the cyclone may not be downstream from the first treatment stage, in which case the cyclone outlet and the outlet from the chamber may be conveyed to a further treatment stage.

5

Brief description of the drawings

[0010] These and other advantages of the instant invention will be more fully and completely understood in accordance with the following description of the preferred embodiments of the vacuum cleaner in which:

10 [0011] Figure 1 is a perspective view of a surface cleaning apparatus using a dirt container according to an example useful for understanding the instant invention;

[0012] Figure 2 is a top plan view, with the cover of the ground engaging head removed, of the ground engaging head of Figure 1;

15 [0013] Figure 3 is a side elevation view of the ground engaging head of Figure 2, with the side panel of the ground engaging head removed;

[0014] Figure 4 is a perspective view of an alternate surface cleaning apparatus using a dirt container according to another example useful for understanding the instant invention;

20 [0015] Figure 5 is a perspective view of the surface cleaning apparatus of Figure 1 with both the dirt container and the cover of the recess for receiving the dirt container removed from the ground engaging head;

[0016] Figure 6 is a perspective view from below of the dirt container of Figure 5 when separated from the cover; and,

25 [0017] Figure 7 is an side elevation view of the dirt container of Figure 5 when installed in the cover.

**Description of Examples Useful for Understanding the instant Invention
and an Embodiment of the instant Invention**

[0018] The dirt container of the instant invention maybe used with an upright vacuum cleaner, a canister vacuum cleaner, a stick vacuum cleaner, a central vacuum cleaner, a carpet extractor or other surface cleaning apparatus of any configuration.

[0019] As shown in Figure 1, surface cleaning apparatus 10 comprises a surface cleaning head 12 and handle 14 pivotally mounted thereto. Surface cleaning apparatus 10 has rear wheels 16 and may optionally have front wheels (not shown) if desired. Surface cleaning head 12 has a front end 18 and a rear end 20.

[0020] The dirt container 28 collects particulate matter that enters surface cleaning head 12. Accordingly, dirt container 28 is removable from surface cleaning apparatus 10 for emptying or disposal. Dirt container 28 may be removably mounted on or in surface cleaning apparatus 10 by any means known in the surface cleaning art.

[0021] In the example of Figure 1, a top cover 22 is provided. Top cover 22 is removably upwardly, e.g., by means of handle 24, so as to reveal recess 26 (see Figure 5). Dirt container 28 is removably receivable in recess 26 and may be removably mounted on the lower surface of top cover 22 (see Figures 6 and 7).

[0022] As shown in Figures 2 and 3, surface cleaning head 12 is provided with a brush 30 which is rotatably driven by brush motor 32 via drive belt 34. Brush 30 sweeps particulate matter up ramp 36 into settling chamber 38 of dirt container 28. To this end, surface cleaning head 12 is provided with inlet 40 adjacent brush 30.

[0023] Surface cleaning head 12 is also provided with a second inlet 42 which is in fluid flow communication with cyclone chamber 44 via inlet passage 46 and cyclone inlet 48.

[0024] Accordingly, dirt container 28 comprises settling chamber 38 and cyclone chamber 44. Further, each of settling chamber 38 and cyclone chamber 44 are provided with a separate inlet. Inlet 42 for the lighter dirt is positioned rearward (in the normal direction of travel of surface cleaning head 12) from the first inlet 40. In this construction, useful for understanding the instant invention, the cyclone chamber 44 is not in fluid flow communication with settling chamber 38. However, in accordance with an embodiment of the instant invention, the construction is alternatively arranged so that some bleed air may be drawn from settling chamber 38 into cyclone chamber 44. In operation, heavier or larger particulate matter is swept up by brush 30 and deposited in settling chamber 38. Lighter and finer particulate matter is entrained in an air stream entering second inlet 42 and is separated from the dirty air via the cyclonic action in cyclone chamber 44.

[0025] Cyclone chamber 44 is provided with an outlet 50 which is in fluid flow communication with motor and fan blade assembly 52 via passage 54. An optional air filter 56 may be provided downstream from motor and fan blade assembly 52 so as to further filter the air prior to the air being exhausted from surface cleaning apparatus 10.

[0026] In the alternate example useful for understanding the instant invention, shown in Figure 4, surface cleaning apparatus 10 comprises a vacuum cleaner. In this particular example, the dirt container 38 in surface cleaning head 12 comprises a single settling chamber 38. Second inlet 42 is upstream from cyclone chamber 44 which is mounted on handle 14. As dirt is conveyed through second inlet 42 due to air flow therethrough, it will be appreciated that the filtration means for treating the dirty air entering through inlet 42 need not be located in the cleaning head 12. In this particular example, vacuum cleaner 10 is designed as a clean air system and, accordingly, motor and fan blade assembly 52 is positioned downstream from cyclone 44. It will be appreciated that motor and fan blade assembly 52 may be positioned upstream from the cyclone 44 as is known in dirty air systems. Accordingly, the example vacuum cleaner shown in Figure 4 utilizes two

separate dirt containers 28, each of which is may removed by the user for emptying or disposal.

[0027] As shown in Figures 5 and 6, dirt container 28 of Figures 2 and 3 is vertically removable from recess 26 of surface cleaning apparatus 10. Alternately, dirt container 28 may be inserted into surface cleaning head 12 such as by sliding dirt container 28 laterally through an opening provided in a sidewall surface cleaning head 12.

[0028] In order to assist the removal of dirt container 28 from surface cleaning apparatus 10, a handle may be provided on dirt container 28. Alternately, as shown in Figure 5, dirt container 38 may be removably received in a cover 22 which is provided with a handle 24.

[0029] In accordance such an example, dirt container 28 may be removably mounted to cover 22 of recess. Cover 22 may be of any particular construction which will permit dirt container 28 to be a removably fixed thereto. Dirt container 28 may be removably affixed thereto by any mechanical or adhesive means known in the mechanical or chemical arts. As shown in Figures 6 and 7, cover 22 is provided with sidewalls 58 having flanges 60. Lower surface 62 of cover 22 is preferable also provided with a support member 64 having a curved engagement surface 66. Dirt container 28 is provided with forward and rearward flanges 68. Accordingly, as shown in Figure 6, dirt container 28 may be slidably received in cover 22. As shown in Figure 7, cyclone 44 of dirt container 28 may abut against curved engagement surface 66 of support member 64. Dirt container 28 is held in position in cover 22 by means of the engagement between flanges 60 and 66 (see Figure 7).

[0030] It will be appreciated by those skilled in the art that various modifications and variations of the dirt container and its method of use may be utilized and each of those is within the scope of the following claims. In particular, it will be appreciated that the shape, size, configuration, the type and number of filtration members included in the dirt container, as well as the number of dirt containers which are utilized in a single surface cleaning apparatus may be varied. In addition, while the dirt container may be

8

transparent, it will also be appreciated that the exterior walls of the dirt container may be translucent or opaque.

Claims:

1. A cleaning head for a surface cleaning apparatus comprising:
 - (a) a housing having a surface contacting surface;
 - (b) a first inlet having an associated brushing member provided in the surface contacting surface and in communication with a first treatment stage not comprising a cyclone and which comprises a settling chamber and, in use, is in airflow communication with a source of suction; and,
 - (c) a second inlet positioned rearward from the first inlet and provided in the surface contacting surface and, in use, in communication with a second treatment stage comprising at least one cyclone and the source of suction.
2. The cleaning head of claim 1 wherein the first treatment stage is upstream from the cyclone.
3. The cleaning head of claim 2 wherein a bleed stream of air is drawn from the first treatment stage to the cyclone.

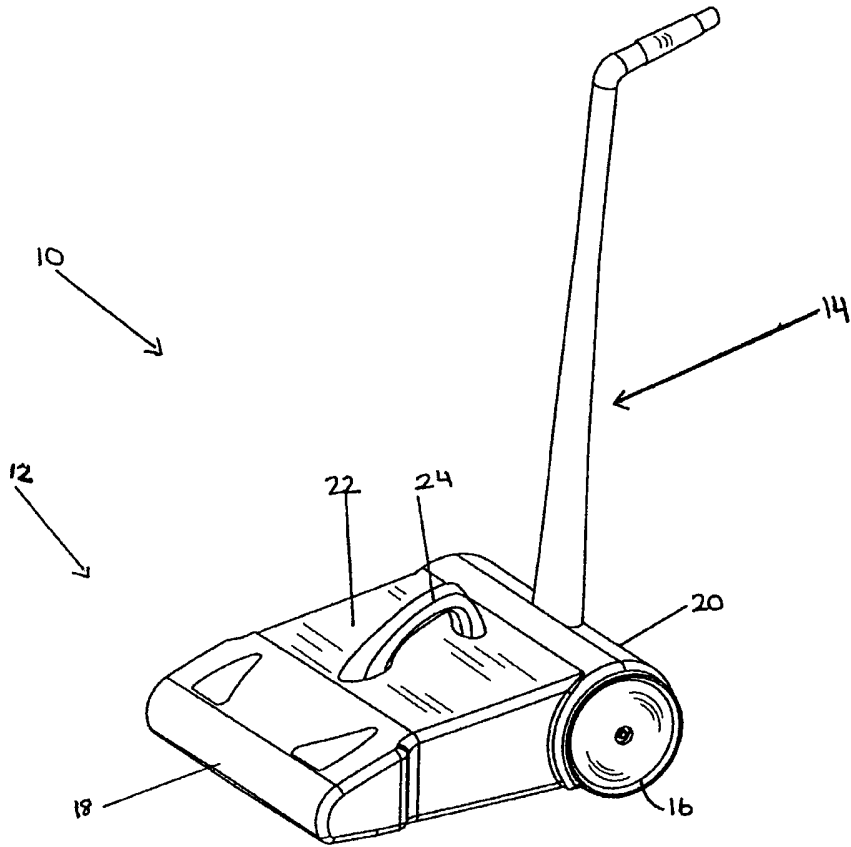
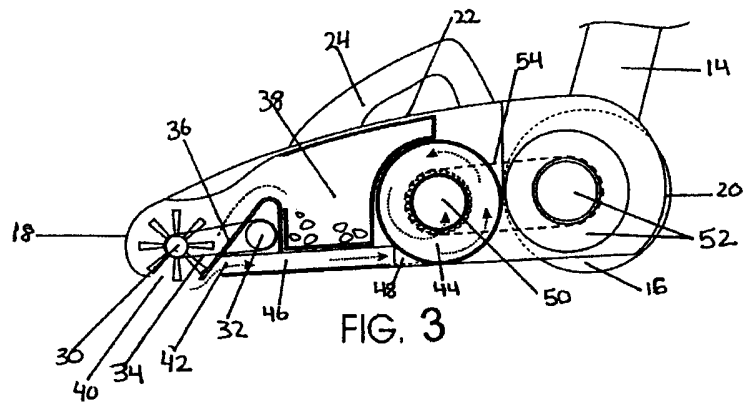
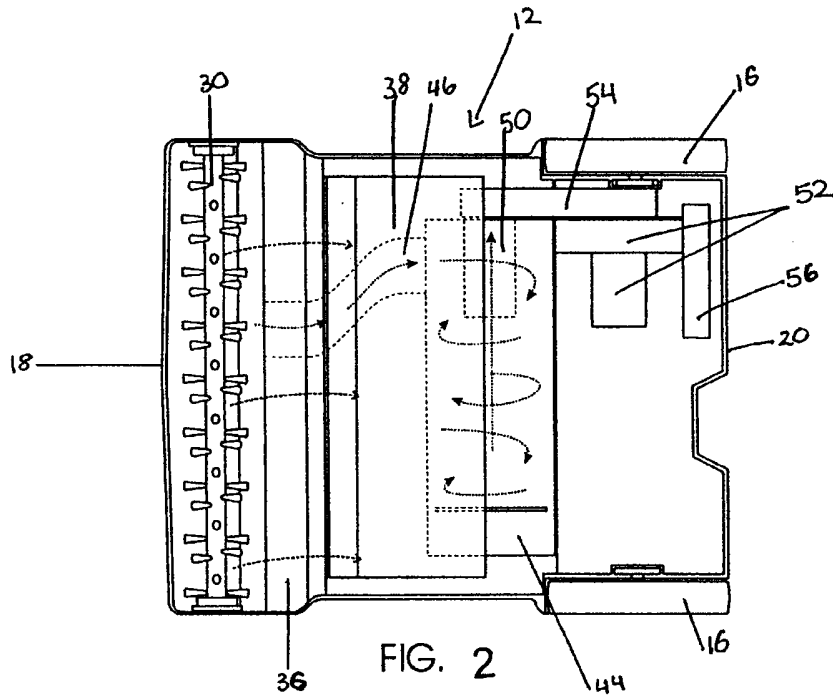


FIG. 1



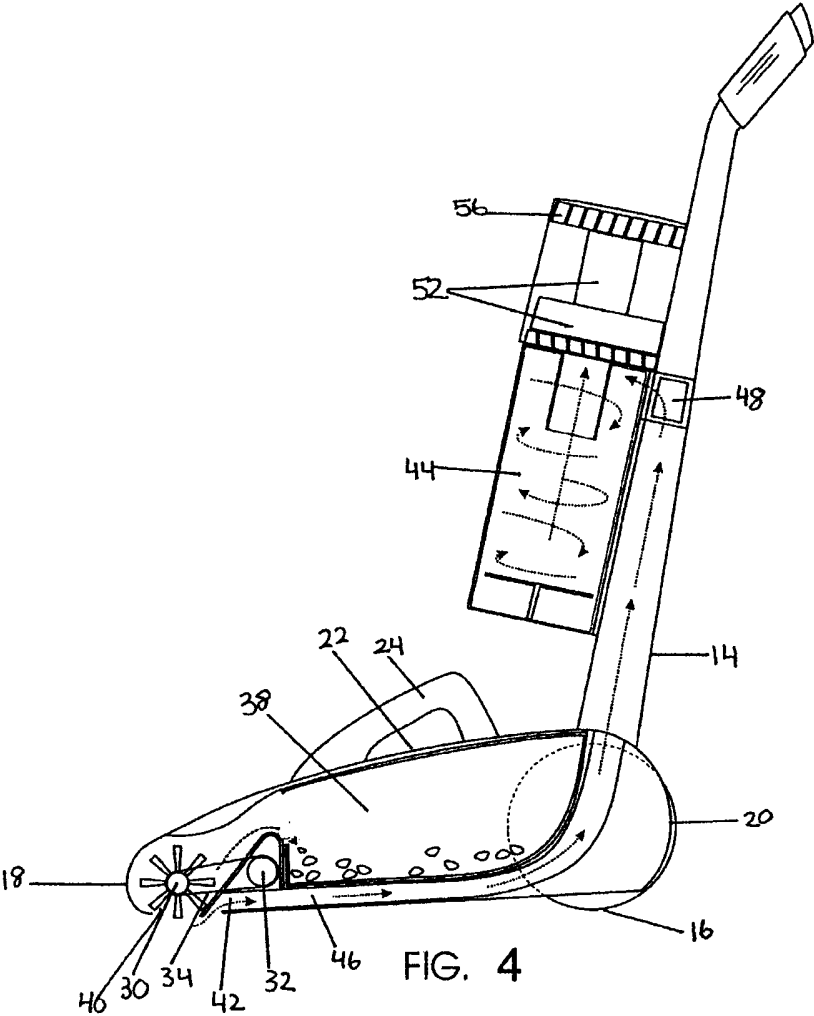


FIG. 4

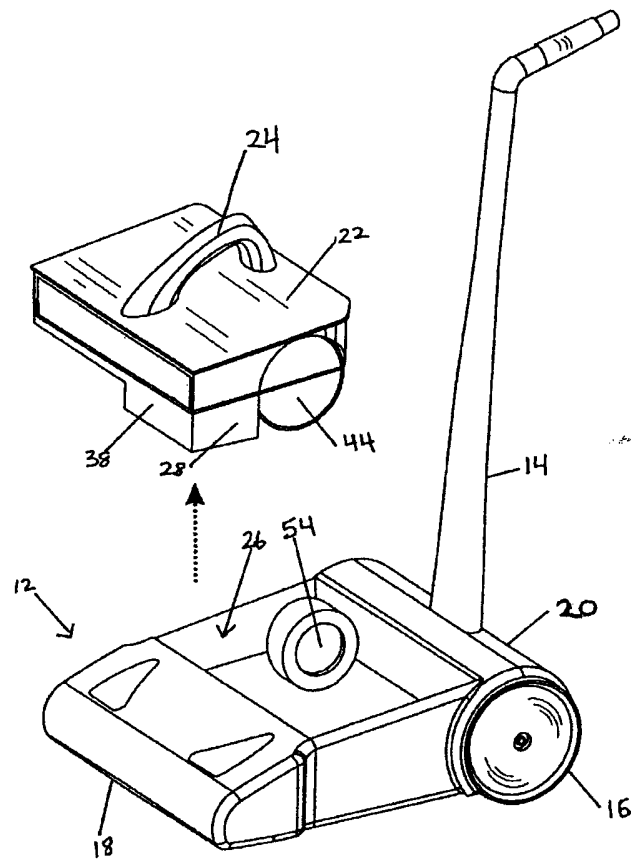


FIG. 5

Sheet 5/5

