(72) Inventors; and


(54) Title: DUST CONTAINER FOR A VACUUM CLEANER

(57) Abstract: This invention relates to a dust container for a vacuum cleaner. The container (13) comprises a mainly air tight shell having an inlet (16) for dust laden air flowing to the container and a container air outlet (21) having a filter (22). The filter is retained at the shell by means of a permanent magnet arrangement.
Dust container for a vacuum cleaner

This invention relates to a dust container for a vacuum cleaner the container comprising a mainly air tight shell having an inlet for dust laden air flowing to the container and a container air outlet having a filter.

Dust containers of the type mentioned above are previously known and are preferably used for hand held vacuum cleaners, i.e. such vacuum cleaners that are battery driven and used to take up smaller amounts of dirt for instance on surfaces that are placed above the floor surface, i.e. table surfaces, shelves and so on. The filters being used usually comprise plate shaped sheets that are rather flabby and it is often difficult to replace them in the right position between the container and the part where the container is fastened to the vacuum cleaner or between the container and a fastening device belonging to the container. In case the lastmentioned type of the fastening device is used it often comprises a snap arrangement for the parts being involved that, with the exception of the risk for deformation of the plastic parts, means complications with regard to the manufacturing of the plastic tools.

It is also previously known, see EP 140 234, to store accessories in a vacuum cleaner by putting them in the same space as the dust container the accessories being separated from the dust container by means of a lid arranged at the cover. The lid is retained at the cover by means of a combined snap and magnet arrangement.

The purpose of this invention is to achieve a dust container which primarily is intended to be used in a vacuum cleaner robot and which does not have the drawbacks mentioned previously and which moreover should be easy to empty and clean and to change filter on. This is achieved by means of a device having the characteristics mentioned in the claims.

An embodiment of the invention will now be described with reference to the accompanying drawings on which Fig. 1 shows a perspective view of the type of vacuum cleaners on which this invention primarily is to be used, Fig. 2 is an exploded view of the dust container in question, Fig. 3 is a vertical section through the dust container, Fig. 4 is an enlarged vertical section of a part of the dust container, Fig. 5 is a perspective view of the filter being used in the dust container, Fig. 6 is a
perspective view of a filter holder belonging to the dust container, Fig. 7 is a plan view of one of the sides of the filter holder whereas Fig. 8 is a plan view of the other side of the filter holder.

The vacuum cleaner shown in Fig. 1 comprises a housing 10 enclosing a vacuum source which is a battery driven motor fan unit. The housing is supported on a floor surface by several wheels two of them being individually driven by electric motors connected to an electric guide and control system. The front part 11 of the vacuum cleaner is shaped as an obstacle sensing shock absorber which is provided with an emitter and receiver arrangement 12 for a navigation system by means of which the vacuum cleaner is moved on the floor surface. Further the vacuum cleaner is provided with a nozzle, not shown, which is placed at the bottom side of the vacuum cleaner and by means of which dust particles are sucked up by the air flow through the vacuum cleaner created by the fan unit. The nozzle is by means of a tube connected to a removable dust container 13 comprising a separation system for particles arranged below a cover 14 at the upper part of the vacuum cleaner. The vacuum cleaner is, in a way described below, also connected to an air outlet 15 through which the cleaned air leaves to the surrounding. The details of the vacuum cleaner mentioned above are more closely described in for instance EP 753160, GB 2290143, EP 803224, EP 841868.

The dust container 13 comprises two joint parts 13a and 13b, for instance of plastic, one part being trough shaped whereas the other part is a covering part of the trough, see Fig. 2. By this arrangement an air tight shell is created surrounding a space K in which the dust can be collected. The upper part 13a of the shell is preferably made of a transparent material and the shell encloses a tube shaped channel 15 extending from the bottom side of the shell to the upper part of the shell. The channel 15 has a lower inlet opening 16 for the dust laden air surrounded by a sealing 17 and an upper outlet opening 18 through which air flows into the chamber K. The outlet opening 18 is provided with a check valve having a turnable flap 19 preventing separated particles from falling out of the channel 15 when the vacuum cleaner is cut off.

One wall part 20 of the dust container is provided with a large opening 21 normally covered by a filter 22 the filter comprising two combined plate shaped parts 22a and 22b of different filter materials, a first part 22a having a greater thickness and takes up larger particles and being directed towards the inner part of the container.
whereas the second part 22b has a less thickness and takes up smaller particles. The part 22a is shaped such that its outer boundary line is placed somewhat inside the outer boundary line of the part 22b which means that an abutting surface 23 is created which rests against a shoulder 24 arranged at the container and surrounding the opening 21.

In order to secure the filter 22 at the container it is provided with a filter holder 25, preferably of plastic, which is designed as a plate shaped grating structure with a flat surface resting against the filter the surface being surrounded by a flange 26 intended to clamp the abutting surface 23 against the shoulder 24. The filter holder is provided with a grip surface 27 designed as a flange that extends from the container. The filter holder also has two permanent magnets 28, so called neodym magnets, arranged to cooperate with the same type of magnets 29 on the shoulder 24 the attracting poles of the magnet 28,29 being turned against one another such that the filter holder 25 and the filter 22 are retained at the container 13. Of course one of the cooperating magnets can be replaced by a ferromagnetic material or the like.

The dust container 13 operates and is used in the following manner. When the vacuum cleaner is in operation dust laden air flows from the nozzle, not shown, through the channel 15 to the chamber K. In the chamber K the dust particles are separated by the filter 22 before the cleaned air flows further through the filter to the fan unit, not shown. Thus the separated dust will be collected in the container.

When the dust container is emptied the cover 14 is opened and the dust container is removed from the vacuum cleaner. Since the slot 19 is closed the dust is prevented from falling out when the container is moved to a bin or the like. Then the filter holder is removed and the operator grips the grip part and pulls the filter holder outwards which means that the magnetic force between the parts 28 and 29 ceases and the filter becomes free such that the dust particles together with the filter can be emptied into the bin. Then a new filter is applied after which the container can again be inserted into the vacuum cleaner.
Claims

1. Dust container for a vacuum cleaner the container (13) comprising a mainly air tight shell having an inlet (16) for dust laden air flowing to the container and a container air outlet (21) having a filter (22), characterized in that the filter is retained at the shell by means of a permanent magnet arrangement (28,29).

2. Dust container according to claim 1, characterized in that the shell comprises at least one removable filter holder (25) the magnets, preferably being so called neodym magnets, being arranged at the shell and/or at the filter holder.

3. Dust container according to claim 2, characterized in that the filter holder (25) has a grating structure.

4. Dust container according to claim 2 or 3, characterized in that the filter holder is provided with a grip part (27).

5. Dust container according to any of claims 2-4, characterized in that the filter holder (25) and the air outlet (21) are provided with cooperating edge parts (26,24) between which the filter (22) is intended to be clamped.

6. Dust container according to claim 5, characterized in that said edge parts (26,24) support the magnets.

7. Dust container according to any of claims 2-6, characterized in that the air outlet (21) with the filter holder (25) and the filter (22) being removed form a single opening to the interior of the shell.

8. Dust container according to any of claims 5-7, characterized in that the filter (22) is plate shaped and comprises two layers, one of the layers (22b) extending out from the other layer (22a) and whereby the extending surface (23) is intended to be clamped between the cooperating edge parts (26,24).
9 Dust container according to any of the previous claims, characterized in that the inlet (16) is provided with a check valve (19).

10 Dust container according to any of the preceding claims, characterized in that at least some part of the shell is transparent.
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: A47L 9/10
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: A47L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE, DK, FI, NO classes as above

Electronic database consulted during the international search (name of database and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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<td>EP 0783865 A2 (BLACK &amp; DECKER INC.), 16 July 1997 (16.07.97), figure 2, abstract</td>
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☐ Further documents are listed in the continuation of Box C.  
☐ See patent family annex.

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Date of the actual completion of the international search: 7 November 2002

Date of mailing of the international search report: 14-11-2002

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