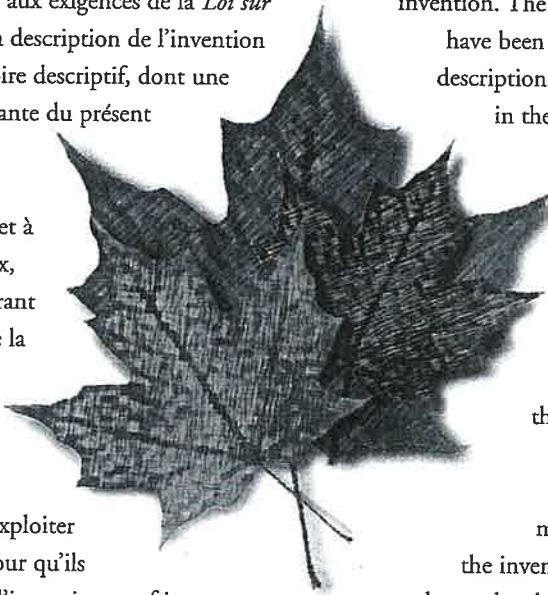




Brevet canadien / Canadian Patent

★ Le commissaire aux brevets a reçu une demande de délivrance de brevet visant une invention. Ladite requête satisfait aux exigences de la *Loi sur les brevets*. Le titre et la description de l'invention figurent dans le mémoire descriptif, dont une copie fait partie intégrante du présent document.

Le présent brevet confère à son titulaire et à ses représentants légaux, pour une période expirant vingt ans à compter de la date du dépôt de la demande au Canada, le droit, la faculté et le privilège exclusif de fabriquer, construire, exploiter et vendre à d'autres, pour qu'ils l'exploitent, l'objet de l'invention, sauf jugement en l'espèce rendu par un tribunal compétent, et sous réserve du paiement des taxes périodiques.



★ The Commissioner of Patents has received a petition for the grant of a patent for an invention. The requirements of the *Patent Act* have been complied with. The title and a description of the invention are contained in the specification, a copy of which forms an integral part of this document.

The present patent grants to its owner and to the legal representatives of its owner, for a term which expires twenty years from the filing date of the application in Canada, the exclusive right, privilege and liberty of making, constructing and using the invention and selling it to others to be used, subject to adjudication before any court of competent jurisdiction, and subject to the payment of maintenance fees.

B R E V E T C A N A D I E N

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C A N A D I A N P A T E N T

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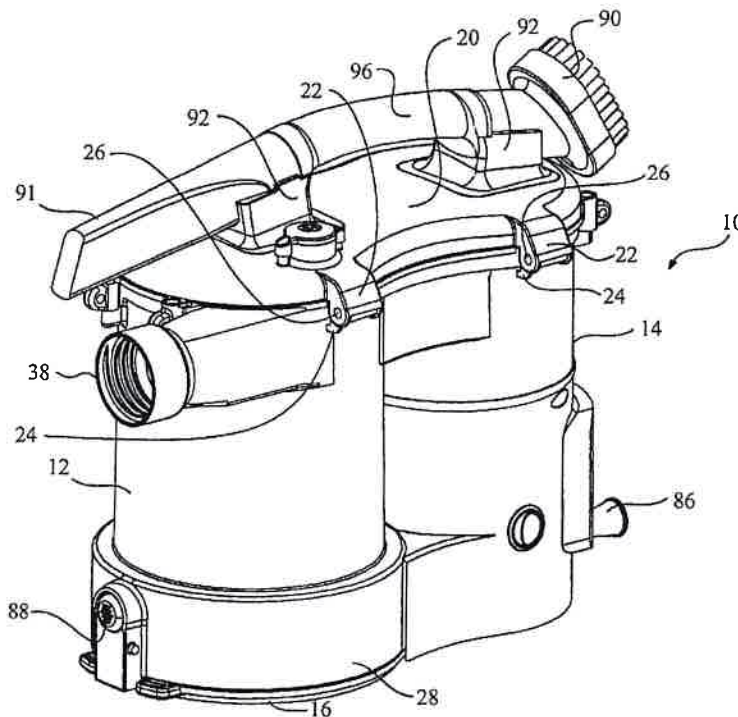
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(54) Titre : APPAREIL DE NETTOYAGE DE SURFACES

(54) Title: SURFACE CLEANING APPARATUS



(57) Abrégé/Abstract:

A vacuum cleaner comprises adjacent housings, which contain the filtration and suction fan motor assembly of the vacuum cleaner.



28. The surface cleaning apparatus as claimed in claim 27 wherein the surface cleaning apparatus has a carry handle for carrying the surface cleaning apparatus while the surface cleaning apparatus is in use.
29. The surface cleaning apparatus as claimed in claim 27 wherein the surface cleaning apparatus has a shoulder strap.
30. The surface cleaning apparatus of claim 1 wherein the dirt collection chamber has an openable end wall spaced from a dirt outlet of the cyclone.
31. The surface cleaning apparatus of claim 1 wherein the at least one cyclone has a dirt outlet end and the surface cleaning apparatus is emptyable from the dirt outlet end.
32. A surface cleaning apparatus comprising:
- (a) a dirt air inlet and a cleaned air outlet and a fluid flow path extending therebetween; and,
 - (b) a first housing comprising at least one cyclone and having a longitudinally extending first cyclone axis and a dirt container associated with the at least one cyclone;
 - (c) a suction motor having a longitudinally extending motor axis positioned adjacent the at least one cyclone wherein the longitudinally extending cyclone axis and the longitudinally extending motor axis are spaced apart and generally parallel and wherein the at least one cyclone and the suction motor are part of the fluid flow path; and,
 - (d) the first housing has an end and a plate is provided in the first housing spaced from the end and the end of the first housing is openable while positioned adjacent to the suction motor.
33. The surface cleaning apparatus as claimed in claim 32 wherein the plate is mounted to the end.
34. A surface cleaning apparatus comprising:

- (a) a dirt air inlet and a cleaned air outlet and a fluid flow path extending therebetween; and,
- (b) a first housing comprising at least one cyclone and having a longitudinally extending first cyclone axis and a dirt container associated with the at least one cyclone;
- (c) a suction motor having a longitudinally extending motor axis positioned adjacent the at least one cyclone wherein the longitudinally extending cyclone axis and the longitudinally extending motor axis are spaced apart and generally parallel and wherein the at least one cyclone and the suction motor are part of the fluid flow path; and,
- (d) the first housing comprises a single cyclone, a dirt collection chamber, and an openable end wall, and the end wall of the first housing is openable when the entire dirt collection chamber is positioned adjacent to the suction motor.

35. A surface cleaning apparatus comprising:

- (a) a dirt air inlet and a cleaned air outlet and a fluid flow path extending therebetween; and,
- (b) first and second housings positioned side by side, the first housing comprises at least one cyclone having a dirt collection chamber, the dirt collection chamber having [[an]] a pivotally openable end wall and the at least one cyclone has an exterior wall and the second housing comprises a suction motor and has an exterior wall wherein the at least one cyclone and the suction motor are part of the fluid flow path;

wherein the first and second housings are non-removably secured in position with respect to each other and the surface cleaning apparatus has an absence of a housing inhibiting opening of the end wall of the dirt collection chamber.

36. The surface cleaning apparatus of claim 35 wherein the first and second housings are integrally molded.

37. The surface cleaning apparatus of any of claims 35 to 36 wherein the first and second housings are constructed from a transparent plastic.

38. The surface cleaning apparatus of claim 34 wherein the at least one cyclone has an exterior wall that forms at least a portion of an exterior wall of the surface cleaning apparatus and the exterior wall of the second housing forms at least part of the outer wall of the surface cleaning apparatus.

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ABSTRACT OF THE DISCLOSURE

A vacuum cleaner comprises adjacent housings, which contain the filtration and suction fan motor assembly of the vacuum cleaner.

1. A surface cleaning apparatus comprising:
 - (a) a dirt air inlet and a cleaned air outlet and a fluid flow path extending therebetween;
 - (b) at least one cyclone having a longitudinally extending cyclone axis and a suction motor having a longitudinally extending motor axis positioned adjacent the at least one cyclone wherein the longitudinally extending cyclone axis and the longitudinally extending motor axis are laterally spaced apart and generally parallel and wherein the at least one cyclone and the suction motor are part of the fluid flow path;
 - (c) a dirt collection chamber in communication with the at least one cyclone, the dirt collection chamber having an openable end wall; and,
 - (d) the at least one cyclone and the entire dirt collection chamber are non-removably secured to the surface cleaning apparatus and are emptyable while connected together.
2. The surface cleaning apparatus of claim 1 wherein the at least one cyclone is provided in a first housing and the suction motor is provided in a second housing and the first and second housings are secured together.
3. The surface cleaning apparatus of claim 2 wherein the first and second housings are integrally molded.
4. The surface cleaning apparatus of claim 2 wherein the first and second housings are constructed from a transparent plastic.
5. The surface cleaning apparatus of claim 2 wherein an exterior wall of the at least one cyclone forms at least a portion of the exterior wall of the first housing.
6. The surface cleaning apparatus of claim 1 wherein the surface cleaning apparatus is portable and further comprises a flexible hose positioned between a cleaning tool having the dirt inlet and the first housing and at least one of a strap and a handle.
7. The surface cleaning apparatus as claimed in claim 6 wherein the strap comprises at least one of a shoulder strap and a waist strap.

8. The surface cleaning apparatus as claimed in claim 6 further comprising a rigid conduit extending between the cleaning tool and the flexible hose, the rigid conduit having a handle.
9. The surface cleaning apparatus as claimed in claim 2 wherein the second housing includes at least one filter positioned upstream from the suction motor.
10. The surface cleaning apparatus as claimed in claim 9 wherein the filter is mounted in a filter housing and the housing is removable provided in the second housing and has handles.
11. The surface cleaning apparatus as claimed in claim 9 wherein each housing has an end portion, an air flow passage is provided from the first housing to the second housing and at least one openable door is provided on the end portions, whereby, when the door is opened, the filter is visible.
12. The surface cleaning apparatus as claimed in claim 11 wherein when the door is opened, the airflow passage is accessible.
13. The surface cleaning apparatus as claimed in claim 2 wherein the second housing further comprises a second cyclonic cleaning stage.
14. The surface cleaning apparatus as claimed in claim 13 wherein the second cyclonic cleaning stage comprises a plurality of cyclones in parallel.
15. The surface cleaning apparatus as claimed in claim 2 wherein each housing has an end portion, an air flow passage is provided from the first housing to the second housing and at least one openable door is provided on the end portions, whereby, when the door is opened, the airflow passage is opened.
16. The surface cleaning apparatus as claimed in claim 15 wherein the door has an inner surface and the airflow passage is defined as a volume between the inner surface of the door and the end portions of the first and second housings.
17. The surface cleaning apparatus as claimed in claim 15 wherein a single door closes the upper portions.

18. The surface cleaning apparatus as claimed in claim 1 wherein a plate is provided in the at least one cyclone spaced from the openable end wall.
19. The surface cleaning apparatus as claimed in claim 18 wherein the plate is mounted to the openable end wall.
20. The surface cleaning apparatus as claimed in claim 1 wherein the at least one cyclone comprises a single cyclone and, a plate is provided in the first housing spaced from the openable end wall.
21. The surface cleaning apparatus as claimed in claim 2 wherein the first and second housings have a volume and the at least one cyclone has a volume that is at least 40% of the volume of the first and second housings.
22. The surface cleaning apparatus as claimed in claim 21 wherein the at least one cyclone has a volume that is at least 60% of the volume of the first and second housings.
23. The surface cleaning apparatus as claimed in claim 2 wherein the first and second housings are each generally vertically extending.
24. The surface cleaning apparatus as claimed in claim 2 wherein each housing has a height and the ratio of height of the first housing to the height of the second housing is from 0.6:1 to 1:0.6.
25. The surface cleaning apparatus as claimed in claim 2 wherein each housing has a height and the ratio of height of the first housing to the height of the second housing is from 0.75:1 to 1:0.75.
26. The surface cleaning apparatus as claimed in claim 2 wherein each housing has a height and the ratio of height of the first housing to the height of the second housing is from 0.9:1 to 1:0.9.
27. The surface cleaning apparatus as claimed in claim 1 wherein the surface cleaning apparatus is portable.

TITLE: Surface Cleaning Apparatus

FIELD OF THE INVENTION

[0001] This application relates to surface cleaning apparatus that have adjacent housings. Preferably, one of the housings contains a cyclonic cleaning stage and a second housing has a suction motor. This application also relates to
5 surface cleaning apparatus that may be carried by a strap (i.e., strap carryable), such as a shoulder strap or a waist strap and, preferably, strap carryable vacuum cleaners, which utilize a cyclone.

BACKGROUND OF THE INVENTION

[0002] Cyclonic vacuum cleaners have been developed that utilize one or
10 more cyclonic cleaning stages. Each cyclonic cleaning stage may have its own dirt collection chamber. Cyclonic vacuum cleaner that have a cyclonic cleaning stage comprising a plurality of cyclones in parallel are also known. Such cleaning stages may have a dirt collection chamber for each cyclone, or a single common dirt collection chamber for all of the cyclones in the stage. In all such cases, the
15 frequency with which the vacuum cleaner must be emptied is based on the capacity of the dirt collection chamber.

[0003] Various types of vacuum cleaners are known in the art. The vacuum cleaner that may be selected for a particular application will vary depending upon a number of factors. For example, vacuum cleaners that are
20 used for cleaning an office or a residence require a large capacity dirt container and maneuverability. In order to increase the dirt capacity of a vacuum cleaner, the size of the dirt collection receptacle must be increased. Increasing the size of the dirt collection receptacle may result in the overall size of the vacuum cleaner being increased to such an extent that the maneuverability of the vacuum cleaner
25 decreases.

SUMMARY OF THE INVENTION

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[0004] In accordance with the instant invention, a surface cleaning apparatus, preferably a vacuum cleaner, is provided with at least two adjacent or side-by-side housings wherein one of the housings includes at least one cyclone and the other includes a suction motor. "Side-by-side" is used to refer to housings that extend in the same generally direction (e.g., they may each have a linear axis wherein the axis are generally parallel) such that the lateral displacement of the bottoms of the first and second housings is approximately the same as the lateral displacement of the tops of the first and second housings. Preferably, if the axis are not parallel and accordingly they intersect, the angle between adjacent linear axis is less than 20 degrees, preferably less than 10 degrees and most preferably, they are parallel.

[0005] The use of adjacent housings to contain part or all of the air cleaning members of a surface cleaning apparatus and the suction motor permits the surface cleaning apparatus to be more compact. For example, upright vacuum cleaners typically have the air-cleaning members and suction motor positioned one above the other. Therefore, the height, or the linear length, of these components is relatively large. The height of the surface cleaning apparatus may be reduced by having units positioned side-by-side as opposed to stacked or linearly extending as is known in the art. Alternately, or in addition, the length of a cyclone may be increased without increasing the overall height or linear extent of a surface cleaning apparatus.

[0006] Accordingly, the overall height of the surface cleaning apparatus may be reduced by effectively increasing the width of the surface cleaning apparatus. For example, if the two housings are each cylindrical, then the width of the surface cleaning apparatus (from one side of the first housing to the other side of the second housing) equal to the sum of the diameter of each of the two housings.

[0007] Further, by providing housings that are generally parallel, the centre of gravity of the housings is positioned more centrally, thereby increasing the

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maneuverability of the surface cleaning apparatus, particularly if it is designed to be used while being carried (e.g., strap carryable).

[0008] Preferably, the surface cleaning apparatus is a portable surface cleaning apparatus, such as a hand vacuum cleaner and a strap carryable vacuum cleaner. However, in an alternate embodiment, the surface cleaning apparatus may be mounted on wheels. For example, the surface cleaning apparatus may be a wet/dry vacuum cleaner, which is also known as Shop Vac™ vacuum cleaners.

[0009] It will be appreciated that more than two side-by-side housings maybe used. Preferably, each housing is circular in cross section (e.g., cylindrical or conical). However, any shape may be utilized.

[0010] The two housings may be positioned so that they touch or they may be proximate each other.

[0011] The air may enter the first housing, which houses a first cyclonic stage comprising at least one cyclone, and then travels to the second housing, which houses the suction motor and fan assembly. The first housing may contain a plurality of cyclone stages. Each cyclone stage may contain one cyclone or a plurality of cyclones in parallel. In a particularly preferred embodiment, only a single cyclone is provided in the first housing. In another particularly preferred embodiment, a second cyclonic stage is provided which comprises a plurality of cyclones in parallel. This second cyclonic stage is preferably positioned in the first housing and, more preferably, above the first cyclonic stage.

[0012] The second housing may contain a pre-motor and/or a post-motor filter. A screen or the like may be associated with the air outlet from the cyclone to prevent elongate material, such as hair, from passing downstream from the cyclone towards the motor.

[0013] In one aspect, a strap carryable vacuum cleaner of this general construction may have a plate positioned towards the bottom of the cyclone so

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as to essentially divide the cyclone into an upper cyclone chamber (i.e. in the portion of the housing above the plate) and a lower dirt container (i.e. in the portion of the housing below the plate).

[0014] In a particularly preferred embodiment of this aspect, the bottom of the first housing may be pivotally mounted for opening. Accordingly, when a user is carrying a strap carriable vacuum cleaner on the user's shoulder, the bottom of the first housing may be opened while the user is standing beside a garbage receptacle (e.g. a garbage bin). Accordingly, the dirt may be emptied directly from the cyclone housing into the garbage bin. An advantage of this design with a strap carriable vacuum cleaner is that the user may have both hands available for manipulating the vacuum cleaner without having to support any weight of the vacuum cleaner in the user's hands since the weight of the vacuum cleaner will be borne by the shoulder of the user.

[0015] In a second aspect, the upper portions of the first and second housings may be covered by an openable lid. Accordingly, for example, a plenum for connecting the first housing in airflow communication with the second housing may be defined by the volume between the inside of the lid and the upper portions of the first and second housings. Preferably, the first and second housings may have a common lid, which is openable. However, it will be appreciated that each housing may have a separate lid that are connected together when both lids are closed. Preferably, the lid is pivotally connected to the first and second housings. However, the lid may be removably mounted. When the lid is opened, a user is provided access to the top of the first housing and the top of the second housing. Accordingly, a user may clean any debris that accumulates in the plenum. Further, if a screen is associated with the cyclone outlet for preventing hair or the like from passing downstream to the suction motor and fan assembly, the user may remove the screen from the first housing for cleaning. In addition, if a pre-motor filter is positioned in the second housing, the user may remove the pre-motor filter for cleaning. It will be appreciated that in

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some designs each aspect may be used separately and, in other designs, both may be utilized.

[0016] Alternately, or in addition to one or both aspects, the first housing (which contains the cyclone) is preferably fixed to the strap carryable vacuum cleaner. Since the first housing does not have to be removed from the vacuum cleaner to empty the dirt chamber of the cyclone, then the overall strength of the vacuum cleaner is enhanced by providing the first housing such that it forms a structural part of the vacuum cleaner. For example, it may be non-removably secured to the vacuum cleaner (e.g., an adhesive, welding) or it may be removably mounted (e.g., a bayonet mount, screws).

[0017] Alternately, or in addition to any embodiment or aspect, it is preferred that the cyclone does not have a porous member, e.g. a fluff screen or filter in the cyclone chamber. Such items, even if accessible, can be difficult to remove without the user getting their hands dirty. In accordance with this embodiment, any such screen or filter may be provided in or adjacent to the plenum.

[0018] Alternately, or in addition to any embodiment or aspect, one or more screens and/or filters may be provided in a housing wherein the housing has one or more handles. Therefore, a user need not touch the screen and/or filter to remove it from the vacuum cleaner.

[0019] Alternately, or in addition to any embodiment or aspect, the strap carryable vacuum cleaner may use a single cyclone, and the cyclone (the cyclone chamber and the dirt container combined) comprises at least 40%, preferably at least 50% and more preferably at least 60% of the should strap vacuum cleaner (i.e. of the first and second housings, or more housings if provided) without an optional wheeled base from and the suction hose that is connected to the inlet to the cyclone chamber. In an alternate embodiment, the vacuum cleaner has at least two cyclones and the combined volume of the cyclones comprises at least

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40%, preferably at least 50% and more preferably at least 60% of the should strap vacuum cleaner.

[0020] Alternately, or in addition to any embodiment or aspect, the vacuum cleaner has a first stage cyclone that has an efficiency of 95% or more of IEC™ test dust (i.e., it separates 95% or more of IEC™ test dust that is fed to the cyclone) and has 50 air watts or more at the cyclone inlet.

[0021] The vacuum cleaner may weight less then 10 pounds, preferably less than 8 pounds and more preferably less then 6 pounds, without the cord, yet have more than 25 air watts.

[0022] Alternately, or in addition to any embodiment or aspect, the electrical cord is removably mounted to the vacuum cleaner. Alternately, or in addition, the vacuum cleaner may include one or more batteries such that the vacuum cleaner may be operated on household AC current and also on DC power from the batteries (e.g., if the cord is removed or wound on a reel to increase maneuverability).

[0023] In any embodiment, the vacuum cleaner may be provided with wheels, such that it could be used optionally as a canister vacuum cleaner. The wheels may be detachable, e.g., the vacuum cleaner may be removably mounted on a wheeled base.

[0024] In any embodiment, the vacuum cleaner may be provided with a waist strap, which may be used in lieu of or in addition to the shoulder strap.

[0025] In accordance with one aspect, there is provided a surface cleaning apparatus comprising:

(a) a dirt air inlet and a cleaned air outlet and a fluid flow path extending therebetween; and,

(b) first and second housings positioned side by side, the first housing comprises at least one cyclone and has an exterior wall and the second

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housing comprises a suction motor wherein the at least one cyclone and the suction motor are part of the fluid flow path.

[0026] In one embodiment, the first and second housings are secured together, such as by an adhesive, welding, or mechanical means, such as
5 screws. Preferably, the first and second housings are integrally molded.

[0027] In another embodiment, the first and second housings are constructed from a transparent plastic. It will be appreciated that only part or all of the cyclone may be transparent, or the dirt chamber therefore. However, if the first and second housings are integrally formed, then both housing are preferably
10 transparent.

[0028] In another embodiment, the exterior wall of the at least one cyclone forms at least a portion of the exterior wall of the first housing. Preferably, the exterior walls of the first and second housing form exterior walls of the surface cleaning apparatus. However, in an optional embodiment, an exterior casing may
15 surround part or all of the first and second housings.

[0029] In another embodiment, the surface cleaning apparatus is portable and further comprises a flexible hose positioned between a cleaning tool having the dirt inlet and the first housing and at least one of a strap and a handle.

[0030] In another embodiment, the strap comprises at least one of a
20 shoulder strap and a waist strap.

[0031] In another embodiment, the surface cleaning apparatus further comprises a rigid conduit extending between the cleaning tool and the flexible hose, the rigid conduit having a handle.

[0032] In another embodiment, the second housing includes at least one
25 filter positioned upstream from the suction motor.

[0033] In another embodiment, the filter is mounted in a filter housing and the housing is removable provided in the second housing and has handles.

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[0034] In another embodiment, each housing has an upper portion, an air flow passage is provided from the first housing to the second housing and at least one openable lid is provided on the upper portions, whereby, when the lid is opened, the filter is visible.

5 **[0035]** In another embodiment, when the lid is opened, the airflow passage is accessible.

[0036] In another embodiment, the second housing further comprises a second cyclonic cleaning stage.

10 **[0037]** In another embodiment, the second cyclonic cleaning stage comprises a plurality of cyclones in parallel.

[0038] In another embodiment, each housing has an upper portion, an air flow passage is provided from the first housing to the second housing and at least one openable lid is provided on the upper portions, whereby, when the lid is opened, the airflow passage is accessible.

15 **[0039]** In another embodiment, the lid has an inner surface and the airflow passage is defined as a volume between the inner surface of the lid and the upper portions of the first and second housings.

[0040] In another embodiment, a single lid closes the upper portions.

20 **[0041]** In another embodiment, the first housing has a bottom and a plate is provided in the first housing above the bottom and the bottom of the first housing is openable.

[0042] In another embodiment, the plate is mounted to the bottom.

25 **[0043]** In another embodiment, the first housing comprises a single cyclone and has a bottom, a plate is provided in the first housing above the bottom and the bottom of the first housing is openable.

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[0044] In another embodiment, the first and second housings have a volume and the at least one cyclone has a volume that is at least 40% of the volume of the first and second housings.

[0045] In another embodiment, the at least one cyclone has a volume that
5 is a least 60% of the volume of the first and second housings.

[0046] In another embodiment, the first and second housings are each generally vertically extending.

[0047] In another embodiment, each housing has a height and the ratio of
10 height of the first housing to the height of the second housing is from 0.6:1 to 1:0.6.

[0048] In another embodiment, each housing has a height and the ratio of height of the first housing to the height of the second housing is from 0.75:1 to 1:0.75.

[0049] In another embodiment, each housing has a height and the ratio of
15 height of the first housing to the height of the second housing is from 0.9:1 to 1:0.9.

[0050] In accordance with another alternate aspect, there is provided a strap carriable vacuum cleaner comprising:

20 (a) at least first and second adjacent housings, each housing having an upper portion, the first housing having a bottom, the first and second housings having a volume;

(b) at least one openable lid provided on the upper portions, the lid having an inner surface; and,

25 (c) an air flow passage from the first housing to the second housing and defined as a volume between the inner surface of the lid and the upper portions of the first and second housings,

whereby, when the lid is opened, the airflow passage is accessible.

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- [0051]** In one embodiment, a single lid closes the upper portions.
- [0052]** In another embodiment, the lid is pivotally mounted.
- [0053]** In another embodiment, the first housing includes a cyclone and the second housing includes a suction motor and fan assembly.
- 5 **[0054]** In another embodiment, a plate is provided in the cyclone and the bottom of the first housing is pivotally mounted.
- [0055]** In another embodiment, the plate is mounted to the bottom.
- [0056]** In another embodiment, the first housing comprises a single cyclone.
- 10 **[0057]** In another embodiment, the vacuum cleaner has at least one cyclone and the at least one cyclone has a volume that is a least 40% of the volume of the first and second housings.
- [0058]** In another embodiment, the vacuum cleaner has at least one cyclone and the at least one cyclone has a volume that is a least 60% of the
15 volume of the first and second housings.
- [0059]** In another embodiment, the vacuum cleaner has dirt separation efficiency of at least 95% of IEC test dirt and at least 50 air watts at the cyclone inlet.
- [0060]** In another embodiment, the vacuum cleaner has at least one
20 cyclone having a cyclone chamber and a cyclone chamber outlet and air travels from the cyclone chamber to the cyclone chamber outlet without passing through a porous member..
- [0061]** In another embodiment, the second housing includes at least one filter mounted in a filter housing and the housing is removable provided in the
25 second housing and has handles.

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[0062] In another embodiment, at least one filter is removably mounted in the filter housing.

[0063] In accordance with a further alternate aspect there is provided a strap carryable vacuum cleaner comprising at least first and second adjacent
5 housings, each housing having an upper portion, the first housing having a bottom, the first and second housings having a volume, the first housing comprising at least one cyclone and the second housing comprising a suction motor and fan assembly wherein the at least one cyclone has a volume that is a least 40% of the volume of the first and second housings.

10 **[0064]** In one embodiment, the at least one cyclone has a volume that is a least 50% of the volume of the first and second housings.

[0065] In another embodiment, the at least one cyclone has a volume that is a least 60% of the volume of the first and second housings.

[0066] In another embodiment, a single lid closes the upper portions.

15 **[0067]** In another embodiment, the lid is pivotally mounted.

[0068] In another embodiment, a plate is provided in the cyclone and the bottom of the first housing is pivotally mounted.

[0069] In another embodiment, the plate is mounted to the bottom.

[0070] In another embodiment, the first housing comprises a single
20 cyclone.

[0071] In another embodiment, the vacuum cleaner has dirt separation efficiency of at least 95% of IEC test dirt and at least 50 air watts at the cyclone inlet.

[0072] In another embodiment, the at least one cyclone has a cyclone
25 chamber and a cyclone chamber outlet and air travels from the cyclone chamber to the cyclone chamber outlet without passing through a porous member.

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[0073] In another embodiment, the second housing includes at least one filter mounted in a filter housing and the housing is removably provided in the second housing and has handles.

[0074] In another embodiment, at least one filter is removably mounted in
5 the filter housing.

[0075] In accordance with a further alternate aspect, there is provided a strap carriable vacuum cleaner comprising:

(a) at least first and second adjacent housings, each housing having an upper portion, the first housing having a bottom, the first and second
10 housings having a volume, the bottom of the first housing is pivotally mounted, the first housing includes a cyclone and the second housing includes a suction motor and fan assembly;

(b) at least one lid provided on the upper portions, the lid having an inner surface; and,

15 (c) an air flow passage from the first housing to the second housing and defined as a volume between the inner surface of the lid and the upper portions of the first and second housings.

[0076] In one embodiment, a single lid closes the upper portions.

[0077] In another embodiment, the lid is openable.

20 **[0078]** In another embodiment, a plate is provided in the cyclone.

[0079] In another embodiment, the plate is mounted to the bottom.

[0080] In another embodiment, the first housing comprises a single cyclone.

[0081] In another embodiment, the vacuum cleaner has at least one
25 cyclone and the at least one cyclone has a volume that is a least 40% of the volume of the first and second housings.