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(54) **Main body structure of vacuum cleaner**

(57) Provided is a main body structure of a vacuum cleaner. The main body (100) structure includes a motor chamber (130), a lower case (140), an intermediate unit (150), a dust collecting structure, and a dust collecting unit cover (170). The motor chamber (130) receives a motor (131) and generates a suction force. The lower case (140) receives the motor chamber (130) and part of an upper side of which is open so that an air discharged from the motor chamber (130) may be discharged upward. The intermediate (150) unit is placed on an upper

portion of the lower case (140) and has at least a dust collecting unit (152). The dust collecting structure is placed in an inside of the dust collecting unit (152) so as to filter foreign particles included in an air sucked from the dust collecting unit (152). The dust collecting unit cover (170) is formed on an upper portion of the intermediate unit (150) so that an inner space of the dust collecting unit (152) may be selectively open.

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Description

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention relates to vacuum cleaners, and more particularly, to a main body of a vacuum cleaner in which convenience in use is improved.

Description of the Related Art

[0002] A vacuum cleaner is an electric product capable of collecting dusts or foreign particles using a dust bag installed in an inside of a main body of the vacuum cleaner, by sucking dusts or foreign particles on a polluted floor or a corner using strong suction force from a rotating motor. Vacuum cleaners are generally classified into canister vacuum cleaners and upright vacuum cleaners. Particularly, the canister vacuum cleaner includes a vacuum cleaner main body separately formed, and a nozzle unit and a knob unit which are integrally formed. If a user grips a knob unit to push and pull it, the vacuum cleaner main body remains fixed and just the nozzle unit and the knob unit are moved. Under such a state, an outer air is sucked through the nozzle unit together with foreign particles on the floor, the sucked air is flowed into the vacuum cleaner main body, and the foreign particles included in the sucked air are filtered, so that a cleaning work is performed. A general configuration of such a canister vacuum cleaner is already well known in many documents, thus detail description thereof is omitted.

[0003] In the meantime, the vacuum cleaner main body includes a suction fan for sucking an outer air, a motor for providing rotational force with which the suction fan is rotated, and a dust collecting assembly for filtering foreign particles included in the sucked air.

[0004] Operation of the vacuum cleaner will be briefly described in the following. If the motor rotates in an inside of the vacuum cleaner main body, rotational force of the motor is delivered to the suction fan, by which a negative pressure is generated. The negative pressure works in cooperation with the nozzle unit so that an outer air is sucked through the nozzle unit and foreign particles included in the sucked outer air is filtered by the dust collecting assembly and then the sucked air is flowed into the suction fan and the motor. After passing through the motor, the sucked air is discharged to the outside.

[0005] In the meantime, the general canister vacuum cleaner includes, as separate parts, a lower cover on which the motor, the suction fan, and the dust collecting assembly are seated, and an upper cover for covering the lower cover. The upper cover has a dust bag as the dust collecting assembly in its inside so that foreign particles included in a sucked air may be filtered while the air is passing through the dust bag, whereby a cleaning work is performed. The dust bag is received within a dust collecting room, space or cavity formed by subsiding in

a predetermined position of the lower cover.

[0006] However, in the related art vacuum cleaner as described above, the lower cover is deformed by an excessive negative pressure applied to the dust collecting space, thus an appearance of the vacuum cleaner is not very good. Furthermore, in case the lower cover is deformed, fitting and contact states between parts are deteriorated and an outer air is sucked, so that malfunction may be generated. Therefore, a predetermined reinforcing structure capable of reinforcing the dust collecting room or space is highly required.

SUMMARY OF THE INVENTION

[0007] Accordingly, the present invention is directed to a main body structure of a vacuum cleaner, that addresses one or more problems due to limitations and disadvantages of the related art.

[0008] It would be desirable to provide a main body structure of a vacuum cleaner, capable of preventing deformation of parts generated during operation of the vacuum cleaner, by additionally mounting a separate part formed in a dust collecting space.

[0009] It would also be desirable to provide a main body structure of a vacuum cleaner whose handling can be performed conveniently by preventing tearing of a dust bag, which may be generated during operation of the vacuum cleaner.

[0010] It would also be desirable to provide a main body structure of a vacuum cleaner whose appearance can be elegantly realized.

[0011] Additional advantages, objects, and features of the invention will be set forth in part in the description which follows and in part will become apparent to those having ordinary skill in the art upon examination of the following or may be learned from practice of the invention. The objectives and other advantages of the invention may be realized and attained by the structure particularly pointed out in the written description and claims hereof as well as the appended drawings.

[0012] To achieve these objects and other advantages and in accordance with the purpose of the invention, as embodied and broadly described herein, a main body structure of a vacuum cleaner includes: a motor chamber for receiving at least a motor to generate a suction force; a lower case in which the motor chamber is received and part of an upper portion of which is open so that an air discharged from the motor chamber may be discharged upward; an intermediate unit positioned on an upper side of the lower case and in which at least a dust collecting unit is formed; a dust collecting structure placed in an inside of the dust collecting unit, for filtering foreign particles included in the air flowed into the dust collecting unit; and a dust collecting unit cover formed on an upper portion of the intermediate unit so that an inner space of the dust collecting unit may be selectively open.

[0013] According to the present invention, deformation of a vacuum cleaner cover which may be generated dur-

ing operation of the vacuum cleaner can be prevented and the appearance of the vacuum cleaner can be improved.

[0014] Furthermore, handling of the vacuum cleaner can be performed in a more easy and convenient manner.

[0015] It is to be understood that both the foregoing general description and the following detailed description of the present invention are exemplary and explanatory and are intended to provide further explanation of the invention as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this application, illustrate embodiment(s) of the invention and together with the description serve to explain the principle of the invention. In the drawings:

Fig. 1 is a perspective view illustrating a construction of a vacuum cleaner according to the present invention;

Fig. 2 is an exploded, perspective view of a vacuum cleaner main body according to the present invention;

Fig. 3 is a cross-sectional view taken along line I-I' of Fig. 1; and

Fig. 4 is a cross-sectional view taken along line II-II' of Fig. 2.

DETAILED DESCRIPTION OF THE INVENTION

[0017] Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings.

[0018] Fig. 1 is a perspective view illustrating a construction of a vacuum cleaner according to the present invention.

[0019] Referring to Fig. 1, the vacuum cleaner includes a main body 100 for generating a suction force, a connection hose 200 connected so as to communicate with an inside of the main body 100 and made of flexible material, an extension tube 300 connected with the connection hose 200 in a length-adjustable manner, and a suction nozzle 400 joined to an end of the extension tube 300, for sucking foreign particles on a floor.

[0020] More specifically, a pair of wheels 110 are installed on a rear side of the main body 100 so as to possibly rotate while contacting the floor, which enables a user to move the main body 100 to a desired direction.

[0021] Operation of the vacuum cleaner will be briefly described. To move the cleaner to other place while in use, a user grips a hose knob 210 formed in the connection hose 200 to move to a desired direction. However, in case the place to move is a stairway or a threshold, not a plane floor, a user grips a main body knob 120 protruded in a predetermined height from an upper por-

tion of the main body 100 to lift up and move the vacuum cleaner.

[0022] Fig. 2 is an exploded, perspective view of a vacuum cleaner main body according to the present invention, and Fig. 3 is a cross-sectional view taken along line I-I' of Fig. 1, in which a longitudinal, cross-sectional view of the vacuum cleaner main body is illustrated.

[0023] Referring to Figs. 2 and 3, the main body 100 has, in its lower portion: a motor chamber in an inside of which a motor for generating a suction force is received; a lower case 140 for receiving the motor chamber in its inside and forming a lower appearance of the main body 100; an intermediate unit 150 formed on an upper side of the lower case 140 and in which a dust collecting unit 152 is formed; and a dust collecting unit cover 170 for making the dust collecting unit 152 opened/closed on an upper side of the intermediate unit 150.

[0024] More specifically, a discharging unit 134 configured in an about net-shape to have a predetermined air permeability so that an air flowed into the motor chamber 130 may be discharged to the outside of the main body 100, is formed on an upper portion of the motor chamber 130. The discharging unit 134 is open in an upward direction from the main body 100 so that an air flowed into an inside of the motor chamber 130 may be discharged to an upward direction of the main body 100. In addition, an inlet 132 for allowing an air to flow into an inside of the motor chamber 130 is protruded on a front portion of the motor chamber 130. The inlet 132 gets close to a separation wall 142 which will be described below, so that the air flowing into the inside of the motor chamber 130 may not leak out. The separation wall 142 protruded vertically upward in a predetermined thickness is provided to an approximately central portion of the lower case 140. The separation wall 142 partitions an inner space of the lower case 140 into left and right areas, so that the motor chamber 130 may be possibly mounted on the right side of the separation wall 142.

[0025] More specifically, the intermediate unit 150 which shields a front portion of the motor chamber 130 and in which the discharging unit 134 is inserted is provided to an upper side of the lower case 140. The dust collecting unit 152 formed by subsiding downward in a predetermined depth so that the dust bag 151 for filtering dusts can be stored is provided to a front portion of the intermediate unit 150. In addition, a bottom side of the dust collecting unit 152 has a shape that corresponds to a front bottom side of the lower case 140 so that a vibration noise generated due to collisions between the intermediate unit 150 and the lower case 140 during operation of the vacuum cleaner may be reduced. For that purpose, a predetermined buffering member may be further provided to a gap where the intermediate unit 150 and the lower case 140 contact each other so as to absorb the vibration in a reliable manner. Of course, other type dust collecting structure such as a cyclone dust collecting unit may be mounted instead of the dust bag 151.

[0026] In addition, a discharging unit through hole 154

punched in a size that corresponds to the size of the discharging unit 134 is provided to a rear portion of the dust collecting unit 152. The discharging unit through hole 154 is a portion into which the discharging unit 134 is inserted. After inserted, the discharging unit 134 is exposed to the outside of the main body 100. As described above, an air can be discharged through the discharging unit 134.

[0027] In addition, a partition plate 156 constituting one side of the dust collecting unit 152 is formed on an approximately central portion of the intermediate unit 150. The partition plate 156 is formed in a plate shape including a plurality of air permeable holes so that an air purified by the dust bag 151 of the dust collecting unit 152 may flow into the motor chamber 130 through the air permeable holes. The dust bag 151 operates in such a way that an outer air flows into an inside of the dust bag 151 and foreign particles included in the flowed outer air is filtered by an external film of the dust bag 151 and then the air is discharged to the outside.

[0028] In the meantime, if the intermediate unit 150 is combined with the lower case 140, the dust collecting unit 152 covers and shields a front portion of the lower case 140, so that the dust collecting unit 152 is completed, and the discharging unit through hole 154 receives the discharging unit 134, whereby the discharging unit 134 is exposed to the outside of the main body 100.

[0029] More specifically, a dust bag fixing unit 160 is provided to an upper portion of the intermediate unit 150. The dust bag fixing unit 160, which has a shape that corresponds to an opening of the dust collecting unit 150, shields an upper side of the dust collecting unit 152 with its one side fastened to the dust bag 151 for filtering dusts, thereby preventing dusts from leaking out to the outside of the dust collecting unit 152.

[0030] More specifically, the dust collecting unit cover 170 is provided to an upper portion of the dust bag fixing unit 160. The dust collecting unit cover 170 allows the upper side of the dust collecting unit 152 to be selectively opened so that the dust collecting unit 152 may be easily opened when the dust bag 151 is replaced. In addition, hinges 172 acting as a rotational shaft of the dust collecting cover 170 are protruded on both ends on an upper portion of the dust collecting cover 170. The hinges 172 are inserted and fixed to both ends of the knob 120 of the main body, thereby allowing the dust collecting unit cover 170 to rotate around the hinges 172.

[0031] Further, a connection hole 174 punched in a shape that corresponds to a shape of an end of the extension tube 300 is provided to an upper surface of the dust collecting unit cover 170. The connection hole 174 is connected with the extension tube 300, whereby an air including foreign particles and sucked from the suction nozzle 400 goes through the extension tube 300 and the connection hose 200 and finally flows into the dust bag 151 of the dust collecting unit 152.

[0032] Air flowing during operation of the vacuum cleaner main body having the above-described configuration

will be sequentially described in the following.

[0033] First, if a power is applied to the main body 100, a suction force is generated by a motor 131 mounted in an inside of the main body 100. The suction force generated by the motor 131 is delivered to the suction nozzle 400 to inhale foreign particles included in an air on a floor. The air including the foreign particles flowed into the suction nozzle 400 goes through the extension tube 300, the connection hose 200, and the connection hole 174 and finally flows into an inside of the dust bag 151. The foreign particles flowed into the inside of the dust bag 151 are purified by the dust bag 151 and the purified air goes through an outside of the dust bag 151, i.e., the dust collecting unit 152 and the partition plate 156 and flows into the motor chamber 130 provided to the rear portion of the cleaner main body 100. After that, the air flowed into the motor chamber 130 goes through an inside of the motor 131 and is discharged to an outside of the main body 100 through the discharging unit 134 formed in a punching manner on an upper portion of the motor chamber 130, whereby a cleaning work is performed.

[0034] In addition, if lots of foreign particles are accumulated in an inside of the dust bag 151 as a result of cleaning works for a long time, suction force is deteriorated and the dust bag 151 should be replaced. To replace the dust bag 151, the dust collecting unit cover 170 is rotated upward around the hinges 172 so that the dust collecting unit 152 is open.

After that, the dust bag fixing unit 160 is detached from the main body 100, so that the dust bag 151 fixedly mounted on a back side of the dust bag fixing unit 160 can be replaced.

[0035] In the meantime, when the vacuum cleaner operates, a strong negative pressure is generated in an inside of the dust collecting unit 152 as described above. Injected parts of the intermediate unit 150 constituting the dust collecting unit 152 may be deformed by such a negative pressure. For prevention of such deformation, the intermediate unit 150 is formed in a double structure. Construction of the intermediate unit 150 will be described in detail in the following.

[0036] Fig. 4 is a cross-sectional view taken along line II-II' of Fig. 2.

[0037] Referring to Fig. 4, an intermediate unit's outline constituting the dust collecting unit 152 includes an inner case 155 to which a negative pressure from the inside of the dust collecting unit 152 is directly applied, and a skirt 153 extended downward from an upper end of the inner case 155. The skirt 153 is a part touched to an outer periphery of the lower case 140 and thus observed by a user's natural eye.

[0038] As described above, the inner case 155 is a part to which a negative pressure generated from the motor chamber 130 is directly applied. Thus, the inner case 155 further includes a separate structure so that the inner case 155 may not be deformed even by the above-described negative pressure. More specifically, the inner case 155 further includes a vertical rib 158

formed long in an up/down direction of the dust collecting unit 152 and a horizontal rib 157 formed in a left/right direction of the dust collecting unit 152. Here, the vertical rib 158 is a part formed by being bent in a relatively wide area of the intermediate unit 150 when injection process is performed and forms the same thickness as the whole thickness of the intermediate unit 150.

[0039] In addition, the horizontal rib 157 is a part formed thick on a relatively narrow area of the intermediate unit 150 unlike the thickness of the intermediate unit 150 itself. Thus, even in case the dust bag 151 is touched to the horizontal rib 157 when the dust bag 151 is detached/attached, there is low possibility that the dust bag 151 is torn.

[0040] Since the vertical rib 158 is formed large as described above, the case of the intermediate unit 150 can be maintained without deformation against the strong negative pressure. The vertical rib 158 formed large is bent in the same thickness as the intermediate unit 150 itself, thus the injection process can be performed conveniently and shrinkage generated upon cooling after the injection process is performed can be reduced.

[0041] Thanks to the vertical and the horizontal ribs 158 and 157, strength of the dust collecting unit 152 can be reinforced and the intermediate unit 150 may not be bent or broken even by the negative pressure from the inside of the dust collecting unit 152.

[0042] The part observed by a user's natural eye is the skirt 153 and the inner case 155 is a part not observed by a user's natural eye. Thus, a user comes to see just the skirt 153 whose appearance is clean and elegant, so that a user's purchasing desire is promoted. Further, since the part possibly observed by a user's natural eye is just the skirt 153, the inner case 155 does not highly require great elaborateness in its injection process, thus convenience in the manufacturing process is enhanced.

[0043] According to the present invention, deformations of the parts, which may be generated during operation of the vacuum cleaner, can be prevented and the appearance of the vacuum cleaner becomes elegant. Further, convenience in the manufacturing process of the vacuum cleaner is enhanced.

[0044] In addition, since tearing of the dust bag which might be generated during operation of the vacuum cleaner can be prevented, handling of the vacuum cleaner by a user is convenient.

[0045] Further, the vacuum cleaner main body in which the appearance of the vacuum cleaner can be elegantly realized is provided.

[0046] Still further, since the discharging unit is provided to the upper portion of the vacuum cleaner, flying of goods or scattering of dusts in the neighborhood of the vacuum cleaner is prevented.

[0047] It will be apparent to those skilled in the art that various modifications and variations can be made in the present invention. Thus, it is intended that the present invention covers the modifications and variations of this invention provided they come within the scope of the ap-

pended claims.

Claims

1. A vacuum cleaner including a suction nozzle for sucking an outer air, a connection hose whose one end is connected with the suction nozzle, for guiding the air sucked from the suction nozzle, a main body whose one end is connected with the connection hose, for filtering foreign particles included in the sucked air, the main body comprising:

a motor chamber for receiving at least a motor to generate a suction force;

a lower case in which the motor chamber is received and part of an upper portion of which is open such that an air discharged from the motor chamber is discharged upward;

an intermediate unit positioned on an upper portion of the lower case and in which at least a dust collecting unit is formed;

a dust collecting structure placed in an inside of the dust collecting unit, for filtering foreign particles included in the air flowed into the dust collecting unit; and

a dust collecting unit cover formed on an upper side of the intermediate unit such that an inner space of the dust collecting unit is selectively open.

2. The main body according to claim 1, wherein the intermediate unit has an opening formed at a portion aligned vertically with the motor chamber.

3. The main body according to claim 1 or 2, wherein the motor chamber has a discharging unit formed at an upper portion thereof, for guiding an air discharged from the motor chamber upward.

4. The main body according to any of the preceding claims, wherein the intermediate unit comprises:

an inner case constituting the dust collecting unit; and

a skirt extended downward from an upper end of the inner case.

5. The main body according to any of the preceding claims, wherein the dust collecting unit cover performs a hinge motion with respect to the intermediate unit.

6. The main body according to any of the preceding claims, wherein the lower case is partitioned with a predetermined inlet opened at front and rear portions of the lower case.

7. The main body according to any of the preceding claims, further comprising a plurality of ribs formed on an inner wall of the dust collecting unit and extended horizontally and/or vertically. 5
8. The main body according to any of the preceding claims, further comprising a rib formed on an inner wall of the dust collecting unit and bent in a similar thickness to a thickness of the lower case. 10
9. The main body according to any of the preceding claims, further comprising a rib having a larger thickness than a thickness of the lower case such that the dust collecting unit is prevented from being deformed. 15
10. The main body according to any of the preceding claims, further comprising a knob formed on an upper portion of the intermediate unit. 20
11. The main body according to any of the preceding claims, wherein the dust collecting structure is a dust bag and a dust bag fixing unit for fixing the dust bag to an upper portion of the dust collecting unit is provided. 25

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FIG. 1

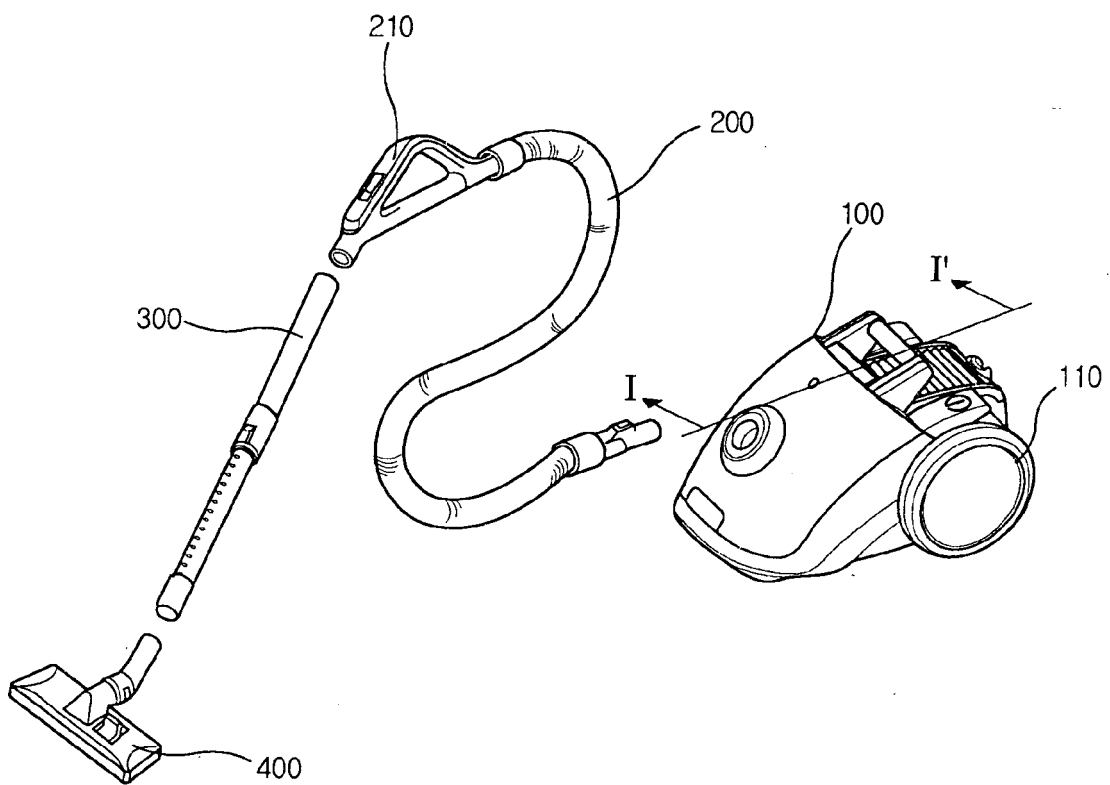


FIG. 2

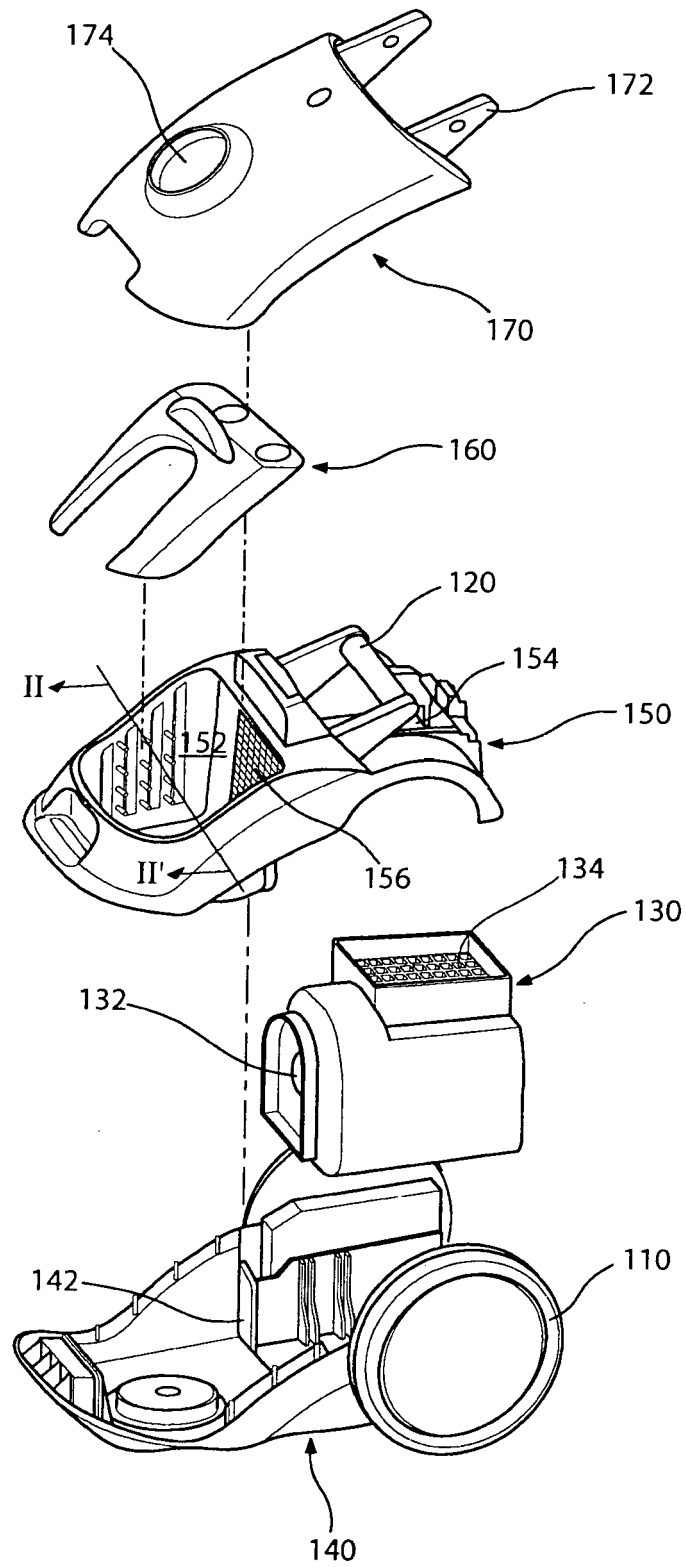


FIG. 3

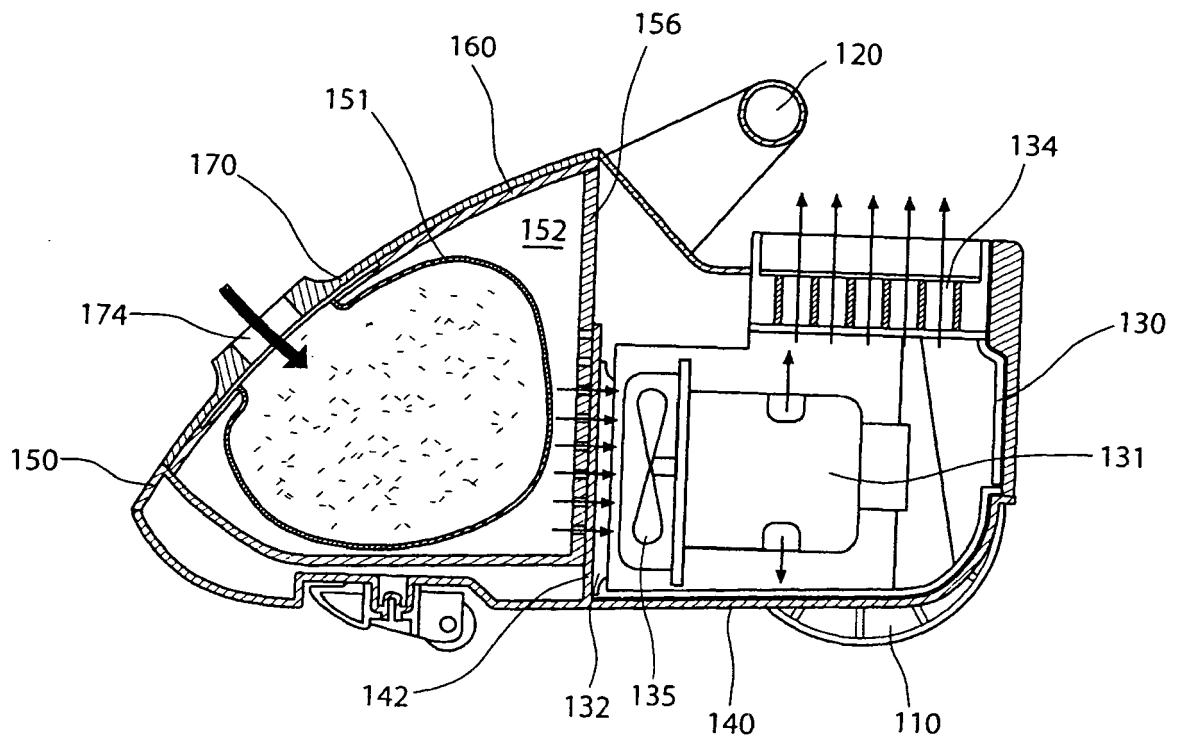
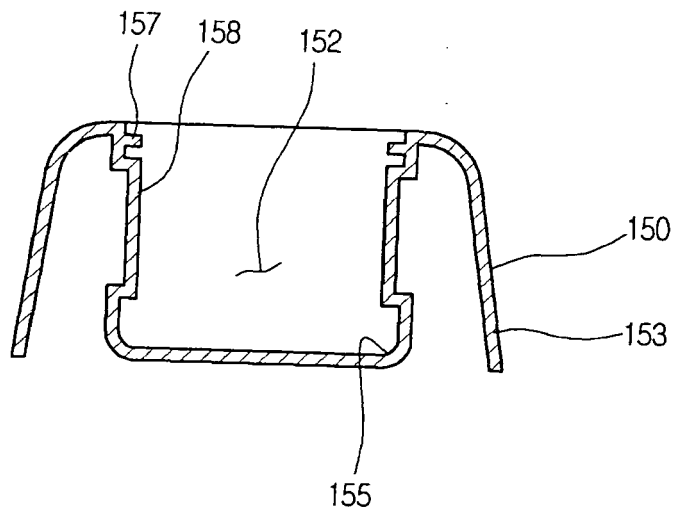


FIG. 4





European Patent
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EUROPEAN SEARCH REPORT

Application Number
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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 0 378 191 A (MOULINEX) 18 July 1990 (1990-07-18) * column 1, line 50 - column 2, line 22 * * column 2, line 48 - column 3, line 30 * * column 3, line 42 - line 47 * * figure * -----	1,2,11	A47L9/00 A47L5/36
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			TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 15 February 2006	Examiner Bourseau, A-M
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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15-02-2006

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