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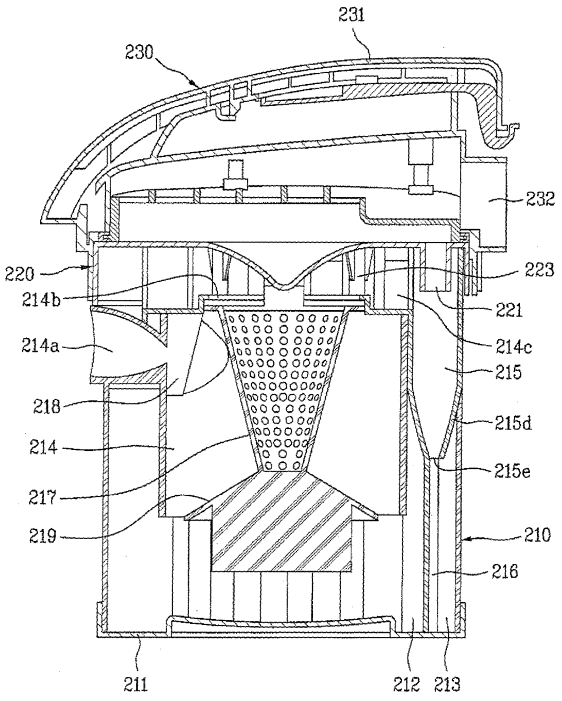
(54) Apparatus for collecting dust and vacuum cleaner having the same

(57) An apparatus for collecting dust and vacuum cleaner having the same are disclosed, by which airtightness is enhanced. The present invention includes a dust collecting container (210) collecting the dust by separating the dust from an introduced air, a dust collecting container cover (220) detachably assembled to one end of the dust collecting container (210) to open/close the dust collecting container (210), and a plurality of bending-preventing protrusions (223) provided to either the dust collecting container (210) or the dust collecting container cover (220) to enable the dust collecting container cover (220) to adhere closely to the dust collecting container (210).

FIG. 5



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Description

[0001] This application claims the benefit of the Korean Patent Application No. P2005-0000446, filed on January 4, 2005, which is hereby incorporated by reference as if fully set forth herein.

BACKGROUND OF THE INVENTION

Field of the Invention

[0002] The present invention relates to an apparatus for collecting dust in a vacuum cleaner, and more particularly, to an apparatus for collecting particles by a cyclonic principle.

Discussion of the Related Art

[0003] Generally, a vacuum cleaner is an appliance for cleaning a carpet, a normal room floor and the like. In the vacuum cleaner, polluted air containing particles is sucked by driving an air intake device provided within a cleaner body to generate an air-sucking force, the particles are separated from the polluted air for dust collecting, and the particle-removed air is then discharged to an outside of the cleaner.

[0004] A cyclone is a device for collecting particles contained in air such as dust and the like. The cyclone is applicable to various fields. For example, the cyclone is applied to a vacuum cleaner as a home appliance.

[0005] Recently, a multi-cyclone having a plurality of cyclone parts is used to enhance dust collecting performance.

[0006] A dust collector in a vacuum cleaner according to a related art is explained with reference to FIG. 1 as follows.

[0007] Referring to FIG. 1, a dust collector according to a related art consists of a dust collecting container 1 having a dust collecting part and a dust collecting container cover 30 covering a lower part of the dust collecting container 1.

[0008] In this case, the dust collecting container 1 consists of a primary cyclone dust collecting part 10 collecting relatively large dust by sucking polluted air from outside and a secondary cyclone dust collecting part 20 connected to the primary cyclone dust collecting part 10 to collect relatively small dust.

[0009] The primary cyclone dust collecting part 10 is a cylindrical receptacle of which lower end adheres closely to a bottom of the dust collecting container 1. In the primary cyclone dust collecting part 10, a first inlet 11 is formed at an upper lateral side to lead the polluted air having particles to be introduced in a tangential direction and a first outlet 12 is provided to a center of an upper end to discharge primarily cleaned air.

[0010] Hence, an upper space of the primary cyclone dust collecting part 10 configures a first cyclone 13 that separates particles by a centrifugal force and a lower space of the first cyclone dust collecting part 10 configures a primary dust storing part 14 storing the particles separated by the centrifugal force.

[0011] The air discharged from the first outlet 12 is introduced into the secondary cyclone dust collecting part and is then discharged upward through a secondary dust-separating process.

[0012] In particular, the secondary cyclone dust collecting part 20 consists of a plurality of small secondary cyclones 21 provided to an upper circumference of the primary cyclone dust collecting part 10 in a circumferential direction and a secondary dust storing part 22 storing dust separated from the secondary cyclones 21.

[0013] The secondary dust storing part 22 is provided under the secondary cyclones 21. And, the primary and secondary dust storing parts 14 and 22 are partitioned from each other by a sidewall of the primary cyclone dust collecting part 10.

[0014] Meanwhile, the dust collecting container cover 30 is joined to an upper part of the dust collecting container 1 to guide the air discharged from the first outlet 12 to the secondary cyclones 21 and discharges the air coming from the secondary cyclones 21 to an upper part of the dust collecting container cover 30.

[0015] However, in the related art dust collector, the dust collecting container cover 30 is transformed or is bent in the process of being joined to the dust collecting container 1, whereby it is difficult to sustain the airtightness between the dust collecting container 1 and the dust collecting container cover 30 to degrade dust collecting performance.

SUMMARY OF THE INVENTION

[0016] Accordingly, the present invention is directed to an apparatus for collecting dust and vacuum cleaner having the same that substantially obviate one or more problems due to limitations and disadvantages of the related art.

[0017] An object of the present invention is to provide an apparatus for collecting dust and vacuum cleaner having the same, by which airtightness is enhanced.

[0018] 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.

[0019] To achieve these objects and other advantages and in accordance with the purpose of the invention, as embodied and broadly described herein, an apparatus for collecting dust in a vacuum cleaner according to the present invention includes a dust collecting container collecting the dust by separating the dust from an introduced air, a dust collecting container cover detachably assem-

bled to one end of the dust collecting container to open/close the dust collecting container, and a plurality of bending-preventing protrusions provided to either the dust collecting container or the dust collecting container cover to enable the dust collecting container cover to adhere closely to the dust collecting container.

[0020] Preferably, a plurality of the bending-preventing protrusions are provided to the dust collecting container cover to be projected toward the dust collecting container.

[0021] More preferably, the dust collecting container includes a support surface having an opening via which the dust-separated air is discharged. More preferably, a plurality of the bending-preventing protrusions are projected to a same height from an inner side of the dust collecting container cover to be evenly spaced from one another in a circumferential direction and keep a flat shape of the dust collecting container cover by a repulsive force applied from the support surface in assembling the dust collecting container cover to the dust collecting container.

[0022] More preferably, the opening of the support surface is configured to penetrate a center of the support surface and a plurality of the bending-preventing protrusions are supported by a rim of the opening. More preferably, the dust collecting container cover includes a guide protrusion provided to a central portion of a bottom of the dust collecting container cover to radially guide the air discharged from the opening of the dust collecting container, a multitude of outlets provided along a rim of the dust collecting container cover, and a sealing member provided to the inner side of the dust collecting container cover to prevent the air from leaking between one end of the dust collecting container and the dust collecting container.

[0023] Preferably, a plurality of screw holes are provided to the dust collecting container cover to be parallel with a plurality of the bending-preventing protrusions.

[0024] More preferably, the dust collecting container includes a plurality of support protrusions projected from one end of the dust collecting container toward the dust collecting container cover to support rims of a plurality of the screw holes and to be locked by a plurality of screws, respectively.

[0025] Preferably, the dust collecting container includes a cylindrical primary cyclone separating the dust from the introduced air according to a cyclone principle wherein an opening is formed at an upper end of the primary cyclone to be vertically perforated and a plurality of secondary cyclones provided along a circumference of the primary cyclone to receive the air discharged from the primary cyclone.

[0026] More preferably, the dust collecting container cover is detachably assembled to an upper side of the dust collecting container and a plurality of the bending-preventing protrusions are downwardly projected from a bottom of the dust collecting container cover to be supported by the upper end of the primary cyclone.

[0027] Preferably, the dust collecting container includes a lower panel configuring a bottom of the dust collecting container to be opened/closed.

[0028] In another aspect of the present invention, a vacuum cleaner includes the above-described apparatus.

[0029] 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

[0030] 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 schematic cross-sectional diagram of a dust collector according to a related art;

FIG. 2 is a perspective diagram of a cleaner body of a vacuum cleaner having a dust collector according to the present invention;

FIG. 3 is an exploded perspective diagram of a cleaner body and a dust collector according to the present invention;

FIG. 4 is a schematic perspective diagram of a dust collector according to one embodiment of the present invention;

FIG. 5 is a schematic cross-sectional diagram of a dust collector according to one embodiment of the present invention;

FIG. 6 is a perspective diagram of a dust collecting container provided to the dust collector according to one embodiment of the present invention shown in FIG. 5; and

FIG. 7 is a perspective diagram of a dust collecting container cover provided to the dust collector according to one embodiment of the present invention shown in FIG. 5.

DETAILED DESCRIPTION OF THE INVENTION

[0031] Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings. Wherever possible, the same reference numbers will be used throughout the drawings to refer to the same or like parts.

[0032] A canister type vacuum cleaner as one embodiment of a vacuum cleaner having a dust collector according to the present invention is explained with reference to FIG. 2 and FIG. 3 as follows.

[0033] FIG. 2 is a perspective diagram of a cleaner body of a vacuum cleaner having a dust collector for col-

lecting dust according to the present invention and FIG. 3 is an exploded perspective diagram of a cleaner body and a dust collector for collecting dust according to the present invention.

[0034] Referring to FIG. 2 and FIG. 3, a vacuum cleaner according to the present invention includes an intake nozzle (not shown in the drawings) moving along a room floor to be cleaned to suck air containing particles, a cleaner body 100 provided separate from the intake nozzle, and a connecting pipe (not shown in the drawings) connecting the intake nozzle to the cleaner body 100 to guide the polluted air sucked via the intake nozzle to the cleaner body 100.

[0035] In this case, a nozzle inlet having a prescribed size is provided to a bottom of the intake nozzle to suck dust piled up on the room floor and the air by an air intake force generated from an air intake device built in the cleaner body 100.

[0036] And, in the cleaner body 100, an electronic part controlling the vacuum cleaner and a motor-fan assembly configuring the air intake device are built.

[0037] In particular, a hose connecting part 110 connected to the connecting pipe is provided to an upper front end of the cleaner body 100, wheels 120 are rotatably provided to both rear sides of the cleaner body 100 to enable the cleaner body 100 to smoothly move on the room floor, respectively, and a caster (not shown in the drawing) as a rotating member for changing a direction of the cleaner body 100 is connected to a front bottom of the cleaner body 100.

[0038] A dust collector 200 for collecting dust is detachably provided to a front side of the cleaner body 100. The dust collector 200 plays a role in collecting dust by separating particles from the air introduced into the dust collector 200 via the intake nozzle and the connecting pipe.

[0039] The air discharged from the dust collector 200 is discharged to a rear side of the cleaner body 100 via a prescribed passage configured within the cleaner body 100 and the motor-fan assembly (not shown in the drawing).

[0040] A dust collector 200 according to one embodiment of the present invention is explained with reference to FIGs. 4 to 7 as follows.

[0041] FIG. 4 is a schematic perspective diagram of a dust collector according to one embodiment of the present invention, FIG. 5 is a schematic cross-sectional diagram of a dust collector according to one embodiment of the present invention, FIG. 6 is a perspective diagram of a dust collecting container provided to the dust collector according to one embodiment of the present invention shown in FIG. 5, and FIG. 7 is a perspective diagram of a dust collecting container cover provided to the dust collector according to one embodiment of the present invention shown in FIG. 5.

[0042] Referring to FIGs. 4 to 7, a dust collector 200 includes an approximately cylindrical dust collecting container 210, a dust collecting container cover 220 opening/closing one end of the dust collecting container 210, and more particularly, an upper end of the dust collecting container 210, and an upper cover 230 detachably joined to the dust collecting container cover 220 to have a grip 231 at its upper surface.

[0043] In this case, a primary dust collecting part and a secondary dust collecting part are provided within the dust collecting container 210 to collect dust by separating particles such as dust and the like. And, a bottom of the dust collecting container 210 includes a lower panel 211 that can be opened/closed.

[0044] The primary dust collecting part includes a primary dust separating part and a primary dust storing part 212 storing the dust separated from the primary dust separating part. And, the primary dust separating part substantially includes a cylindrical receptacle provided within the dust collecting container 210.

[0045] And, the secondary dust collecting part includes a secondary dust separating part provided to a circumference of the primary dust separating part to separate particles from the air discharged from the primary dust collecting part and a secondary dust storing part 213 storing dust separated by the secondary dust separating part.

[0046] In the present invention, the primary dust separating part includes a primary cyclone 214 separating particles by a cyclone system, while the secondary dust separating part includes a plurality of small secondary cyclones 215 separating particles by the cyclone system each.

[0047] In particular, the primary cyclone 214 has a cylindrical receptacle shape of which lower end is open. A first inlet 214a communicating with the hose connecting part 110 is provided to an upper lateral side of the primary cyclone 214. An opening perforated in a vertical direction is formed at a center of a ceiling of the primary cyclone 214 to configure a first outlet 214b via which the air is discharged from the primary cyclone 214.

[0048] In this case, the primary cyclone 214 is provided to a central portion of the dust collecting container 210 in a vertical direction. The first inlet 214a guides the polluted air introduced from outside to an inner wall of the primary cyclone 214 in a tangential direction. Hence, the air introduced into the first inlet 214a can flow spirally along the inner wall of the primary cyclone 214.

[0049] A plurality of the small secondary cyclones 215 built in one body of an outer wall of the primary cyclone 214 are arranged on an upper circumference of the primary cyclone 214. An upper end of each of the secondary cyclones 215 is projected higher than that of the primary cyclone 214.

[0050] Meanwhile, a second inlet 215a communicating with the first outlet 214b is provided to a lateral side of each of the secondary cyclones 215 projected higher than the upper end of the primary cyclone 214. An upper end of each of the secondary cyclones 215 is open to configure a second outlet 215b.

[0051] In particular, to enable the air introduced into the second inlet 215a to flow along an inner wall of the

secondary cyclone 215, the second inlet 215a guides the air discharged from the first outlet 214b in a tangential direction to the inner wall of the secondary cyclone 215.

[0052] Preferably, a guide vane 215c is built in one body of an outer sidewall of the second inlet 215a to extend toward the first outlet 214b.

[0053] Meanwhile, a cone portion 215d having a conoid shape having a decreasing diameter downwardly is provided to one side of the secondary cyclone 215, and more particularly, to a lower part of the secondary cyclone 215. A vertically perforated particle discharging hole 215e is provided to a lower end of the secondary cyclone 215 to discharge particles such as dust and the like.

[0054] In this case, the secondary cyclones 215 are built in one body to be adjacent to one another. Hence, air is prevented from leaking between the secondary cyclones 215.

[0055] The dust collecting container cover 220 is mounted on the upper ends of the secondary cyclones 215.

[0056] Third outlets 221, which are vertically perforated, are provided to a rim of the dust collecting container cover 220 to oppose the second outlets 215b of the secondary cyclones 215, respectively.

[0057] The upper cover 230 having an open lower end is detachably assembled to an upper part of the dust collecting container cover 220.

[0058] For this, three hanging protrusions 222 are provided to an outer circumference of the dust collecting container cover 220. And, three hanging recesses (not shown in the drawings) are provided to an inner circumference of the upper cover 230 so that the hanging protrusions 222 can be fitted into the hanging recesses, respectively. It is a matter of course that the positions and shapes of the hanging protrusions and recesses can be variously modified.

[0059] A fourth outlet 232 is provided to a rear side of the upper cover 230 to discharge air to a prescribed passage provided to a rear part of the cleaner body 100. And, a prescribed space is provided within the upper cover 230 to communicate with the fourth outlet 232.

[0060] Preferably, a filter accommodating portion is provided to the inner space of the upper cover 230 to accommodate a filter (not shown in the drawing) filtering off micro-dust from the air discharged via the third outlets 221.

[0061] The dust having been separated by the above-configured primary cyclone 214 and the above-configured secondary cyclones 215 is preferentially stored in a dust storing part configured by an outer wall of the dust collecting container 210 and the lower panel 211 and is then discharged outside by gravity if the lower panel 211 forming the bottom of the dust storing parts 212 and 213 is open.

[0062] The dust storing part includes the primary dust storing part 212 and the secondary dust storing part 213. The primary dust storing part 212 stores the dust separated by the primary cyclone 214, whereas the secondary dust storing part 213 stores the dust separated by the secondary cyclones 215.

[0063] In this case, the primary and secondary dust storing parts 212 and 213 are connected in one body of the lower sides of the secondary cyclones 215 and are partitioned from each other by a boundary wall 216 having an approximately cylindrical shape of which radius is smaller than that of the outer wall of the dust collecting container 210.

[0064] A lower end of the boundary wall 216 is formed longer than that of the primary cyclone 214 in a lower direction to extend to a bottom of the dust collecting container 210, i.e., an upper lateral side of the lower panel 211.

[0065] Hence, the boundary wall 216 prevents the primary and secondary dust storing parts 212 and 213 from communicating with each other.

[0066] Preferably, in addition to the above-explained configuration, the vacuum cleaner according to the present invention further includes an exhaust member 217 vertically provided within the primary cyclone 214 to have a multitude of perforated holes formed at its later side to communicate with the first outlet of the primary cyclone 214 and a guide rib 218 provided to the primary cyclone 214 to guide the air introduced into the first inlet 214a.

[0067] In this case, the exhaust member 217 is provided in an axial direction to a center of the primary cyclone 214 and preferably has an approximately conoid shape, of which upper end is open and of which lower end is closed, having a downwardly decreasing diameter.

[0068] This is to prevent the dust descending along the inner wall of the primary cyclone 214 from being affected by a sucking force of the exhaust member 217 since a speed of a spiral flow tends to decrease toward a lower side of the primary cyclone 214.

[0069] Preferably, the upper end of the exhaust member 217 is detachably assembled to a rim of the first outlet 214b.

[0070] Preferably, a scatter-preventing member 219 is provided beneath the exhaust member 217 to prevent the dust stored in the primary dust storing part 212 from being scattered.

[0071] The scatter-preventing member 219 plays a role in preventing the dust collected in the primary dust storing part 212 from ascending by a spiral flow to be introduced into the second cyclones 215.

[0072] For this, the scatter-preventing member 219 preferably provided to the lower end of the exhaust member 217 to have a shape extending radially.

[0073] Preferably, an upper surface of the scatter-preventing member 219 is tilted downwardly. In particular, the scatter-preventing member 219 has a conoid shape having a diameter increasing downwardly.

[0074] The guide rib 218 is configured to guide the air introduced into the first inlet 214a in a tangential direction of the inner wall of the primary cyclone 214 so that the air introduced into the first inlet 214a is prevented from

being directly introduced into the exhaust member.

[0075] Meanwhile, the dust collecting container cover 220 is detachably assembled to the upper part of the dust collecting container 210 to open/close the dust collecting container 210.

[0076] In this case, a plurality of bending-preventing protrusions 223 are provided to either the dust collecting container or the dust collecting container cover to prevent the dust collecting container cover 220 from being bent.

[0077] Referring to FIG. 6 and FIG. 7, the bending-preventing protrusions 223 are projected downwardly from a bottom of the dust collecting container cover 220 to play a role in keeping the dust collecting container cover to be flat when the dust collecting container cover 220 is assembled to the dust collecting container 210.

[0078] In particular, the bending-preventing protrusions 223 are downwardly projected to the same height in the same radius from a center of the dust collecting container cover 220 to be uniformly spaced apart from one another in a circumferential direction.

[0079] In this case, at least three bending-preventing protrusions 223 are preferably provided. More preferably, six bending-preventing protrusions 223 are provided in the present embodiment.

[0080] An upper end of the dust collecting container 210, i.e., the upper end of the primary cyclone 214 leaving a prescribed distance from the upper ends of the secondary cyclones 215 configures a support surface that supports the bending-preventing protrusions 223.

[0081] In the present embodiment, the bending-preventing protrusions 223 are configured to be supported by the rim of the first outlet 214b provided to a center of the upper end of the primary cyclone 214 but can be variously modified.

[0082] A plurality of screw holes parallel to the bending-preventing protrusions 223 are provided to the dust collecting container cover 220 to be vertically perforated.

[0083] In this case, the screw holes 224 are preferably provided between the third outlets 221 and the bending-preventing protrusions 223, respectively.

[0084] A plurality of support protrusions 214c projected toward the dust collecting container 210 are provided to one end of the dust collecting container 210 to support rims of the screw holes 224, respectively.

[0085] In particular, the support protrusions 214c are projected upwardly from an upper side of the primary cyclone 214 and are screw-coupled with the screw holes 224 in assembling the dust collecting container cover 220 to the dust collecting container 210.

[0086] Once the dust collecting container cover 220 is assembled to the above-configured dust collecting container 210 by screws, the bending-preventing protrusions 223 are supported by the rim of the first outlet 214b.

[0087] By a repulsive force applied from the upper side of the primary cyclone 214 configuring the support surface of the bending-preventing protrusions 223, the bending-preventing protrusions 223 can keep a flat shape of a disc configuring the ceiling of the dust collecting container cover 220. Hence, the dust collecting container cover 220 and the dust collecting container 210 can adhere closely to each other to maintain airtightness in-between.

[0088] To secure the airtightness between the dust collecting container cover 220 and the dust collecting container 210, a prescribed second sealing member (not shown in the drawings) is provided to an inner side of the dust collecting container cover 220, and more particularly, to a bottom of the dust collecting container cover 220 to which upper ends of the secondary cyclones 215 adhere closely.

[0089] Meanwhile, a conoid protrusion 225 is preferably provided to a central portion of a bottom of the dust collecting container cover 220 to radially guide the air discharged from the first outlet 214b.

[0090] An operation of the vacuum cleaner having the dust collector according to one embodiment of the present invention is explained as follows.

[0091] First of all, once the vacuum cleaner is driven, the external polluted air is introduced into the primary cyclone 214 via the intake nozzle and the connecting pipe.

[0092] The air introduced into the primary cyclone 214 is not directly introduced into the exhaust member 217 by the first inlet 214a and the guide rib 218 but is guided in the direction tangential to the inner wall of the primary cyclone 214 to form the spiral flow.

[0093] According to the cyclone principle, the relatively large and heavy dust is separated and falls to be stored in the primary dust storing part 212. The dust stored in the primary dust storing part 212 is prevented from being scattered by the scatter-preventing member 219 and the curved boundary wall 216.

[0094] The air, from which the relatively large dust was separated, is discharged to the first outlet 214b communicating with a multitude of the perforated holes provided to the lateral side of the exhaust member 217 and is then introduced into a plurality of the secondary cyclones 215 for dust separation.

[0095] The air, from which the relatively small dust was separated, is introduced into the upper cover 230 via the second outlets 215b and the third outlets 221.

[0096] The air introduced into the upper cover 230 is filtered by the filter and is then discharged to a rear side via the fourth outlet 232. The air discharged from the fourth outlet 232 passes through the prescribed passage provided to the rear part of the cleaner body and is then discharged outside the cleaner body.

[0097] Meanwhile, the above-explained dust collector according to the present invention is applicable to a canister type vacuum cleaner or a stand type cleaner.

[0098] Accordingly, the present invention provides the following effects or advantages.

[0099] First of all, in the dust collector of the vacuum cleaner according to the present invention, since the bending-preventing protrusions are provided to the dust collecting container cover to prevent the dust collecting

container cover from being bent in assembling the dust collecting container cover to the dust collecting container, the airtightness between the dust collecting container cover and the dust collecting container can be sustained.

[0100] Secondly, in the dust collector of the vacuum cleaner according to the present invention, since the guide protrusion is provided to the dust collecting container cover, airflow resistance is reduced.

[0101] Thirdly, in the dust collector of the vacuum cleaner according to the present invention, since a plurality of the secondary cyclones are provided to the circumference of the primary cyclone, the dust collector can have a compact configuration and dust collecting performance is enhanced.

[0102] It will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the spirit or scope of the inventions. Thus, it is intended that the present invention covers the modifications and variations of this invention provided they come within the scope of the appended claims and their equivalents.

Claims

1. An apparatus for collecting dust in a vacuum cleaner, comprising:

   a dust collecting container (210) for collecting dust by separating the dust from an introduced air;
   a dust collecting container cover (220) detachably assembled to one end of the dust collecting container (210) to open/close the dust collecting container (210); and
   a plurality of bending-preventing protrusions (223) provided to either the dust collecting container (210) or the dust collecting container cover (220) to enable the dust collecting container cover (220) to adhere closely to the dust collecting container (210).

2. The apparatus of claim 1, wherein a plurality of the bending-preventing protrusions (223) are provided to the dust collecting container cover (220) so as to project toward the dust collecting container (210).

3. The apparatus of claim 1 or 2, wherein the dust collecting container (210) includes a support surface having an opening (214b) via which the dust-separated air is discharged.

4. The apparatus of claim 3, wherein a plurality of the bending-preventing protrusions (223) are projected to a same height from an inner side of the dust collecting container cover (220) to be evenly spaced from one another in a circumferential direction and keep a flat shape of the dust collecting container cover (220) by a repulsive force applied from the support surface in assembling the dust collecting container cover (220) to the dust collecting container (210).

5. The apparatus of claim 3 or 4, wherein the opening (214b) of the support surface is configured to penetrate a center of the support surface and wherein a plurality of the bending-preventing protrusions (223) are supported by a rim of the opening (214b).

6. The apparatus of claim 5, the dust collecting container cover (220) comprising:

   a guide protrusion provided to a central portion of a bottom of the dust collecting container cover (220) to radially guide the air discharged from the opening (214b) of the dust collecting container (210);
   a multitude of outlets provided along a rim of the dust collecting container cover (220); and
   a sealing member provided to the inner side of the dust collecting container cover (220) to prevent the air from leaking between one end of the dust collecting container (210) and the dust collecting container (210).

7. The apparatus of any one of claims 1 to 6, wherein a plurality of screw holes (224) are provided to the dust collecting container cover (220) to be parallel with a plurality of the bending-preventing protrusions (223).

8. The apparatus of claim 7, wherein the dust collecting container (210) includes a plurality of support protrusions (214c) projected from one end of the dust collecting container (210) toward the dust collecting container cover (220) to support rims of a plurality of the screw holes (224) and to be locked by a plurality of screws, respectively.

9. The apparatus of any one of claims 1 to 8, the dust collecting container (210) comprising:

   a cylindrical primary cyclone (214) for separating the dust from the introduced air according to a cyclone principle wherein an opening is formed at an upper end of the primary cyclone (214) to be vertically perforated; and
   a plurality of secondary cyclones (215) provided along a circumference of the primary cyclone (214) to receive the air discharged from the primary cyclone (214).

10. The apparatus of claim 9, wherein the dust collecting container cover (220) is detachably assembled to an upper side of the dust collecting container (210) and wherein a plurality of the bending-preventing protrusions (223) are downwardly projected from a bottom

of the dust collecting container cover (220) to be supported by the upper end of the primary cyclone (214).

11. The apparatus of any one of claims 1 to 10, wherein the dust collecting container (210) includes a lower panel (211) configuring a bottom of the dust collecting container (210) to be opened/closed.

12. A vacuum cleaner including the apparatus for collecting dust according to any one of claims 1 to 11.

FIG. 1

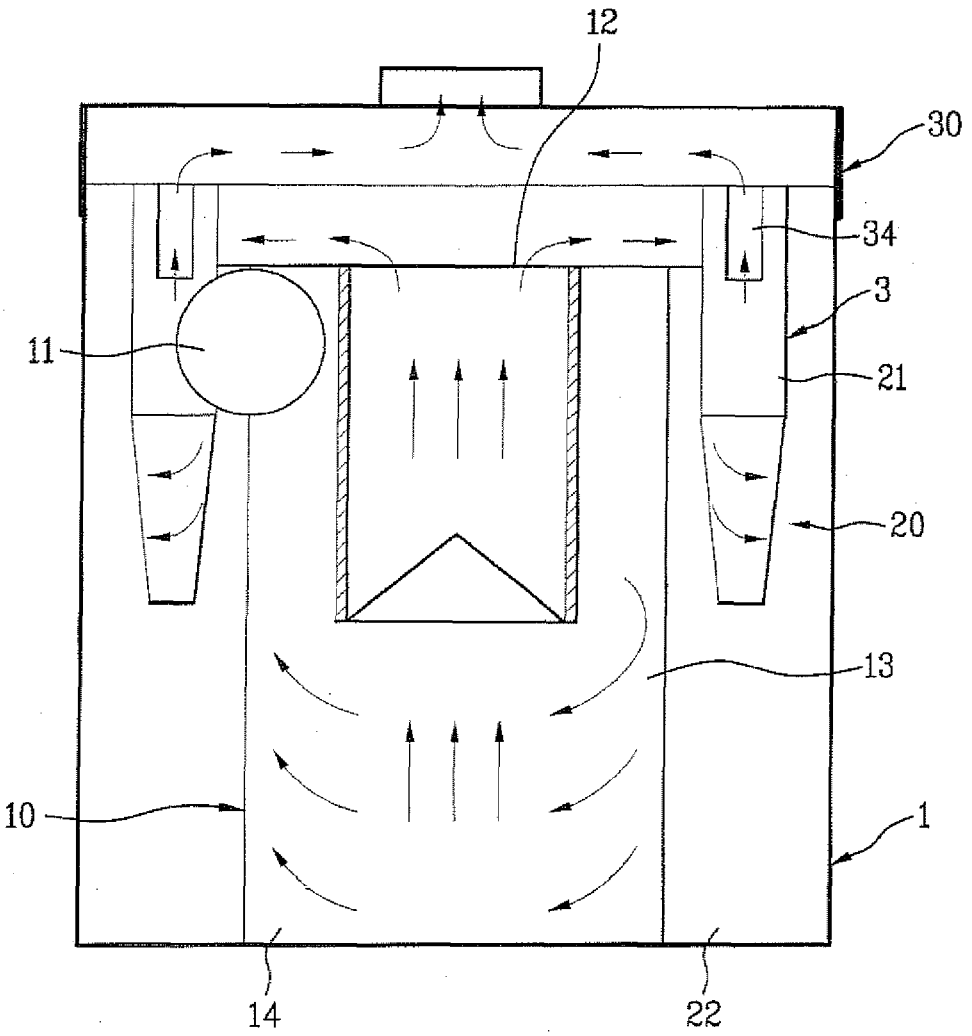

FIG. 2

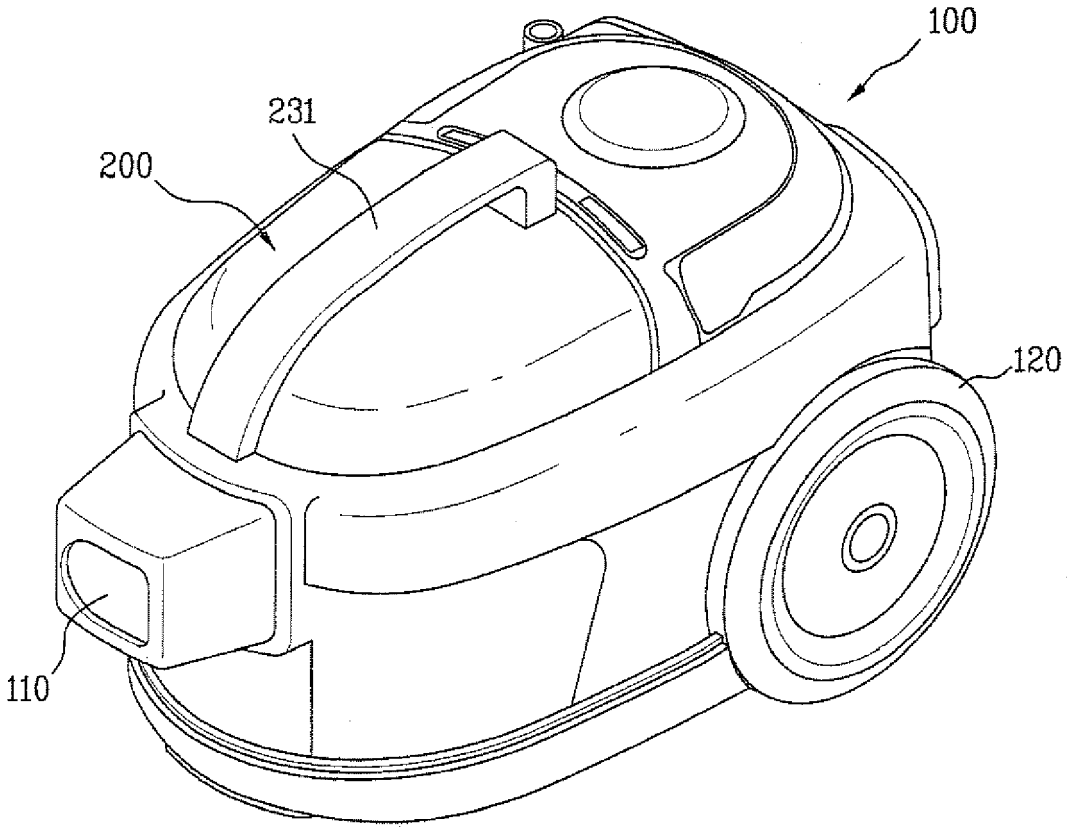

FIG. 3

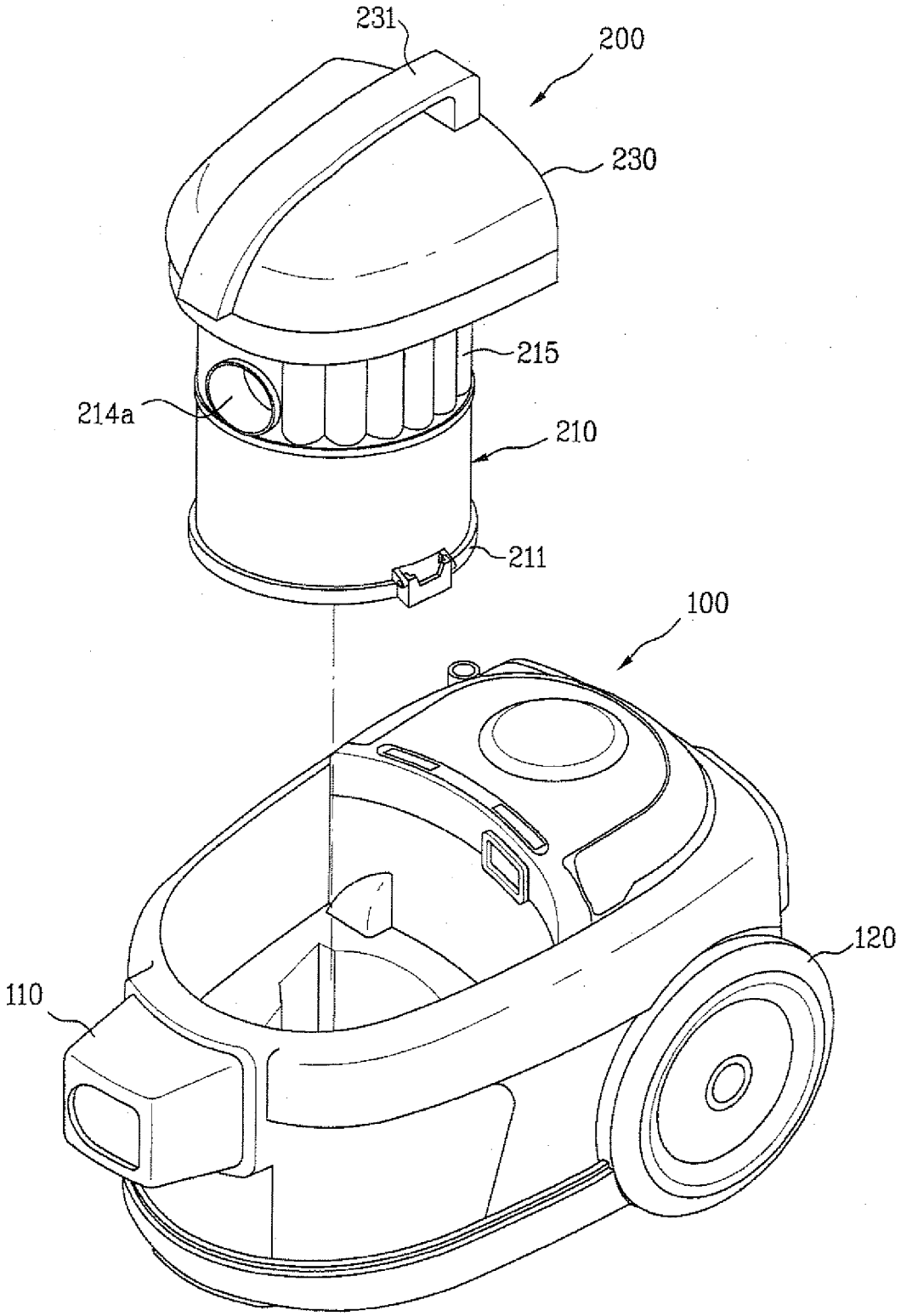

FIG. 4

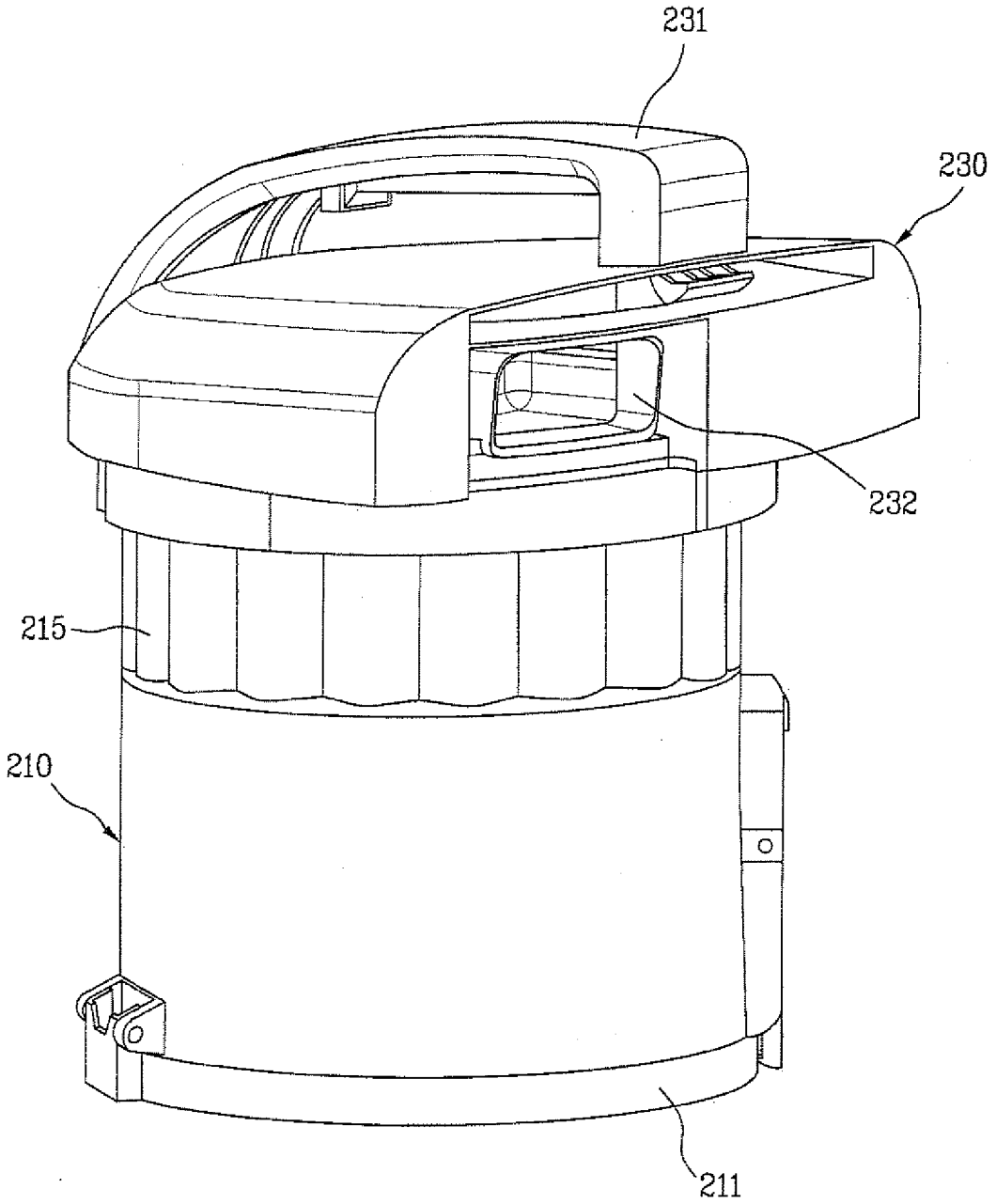

FIG. 5

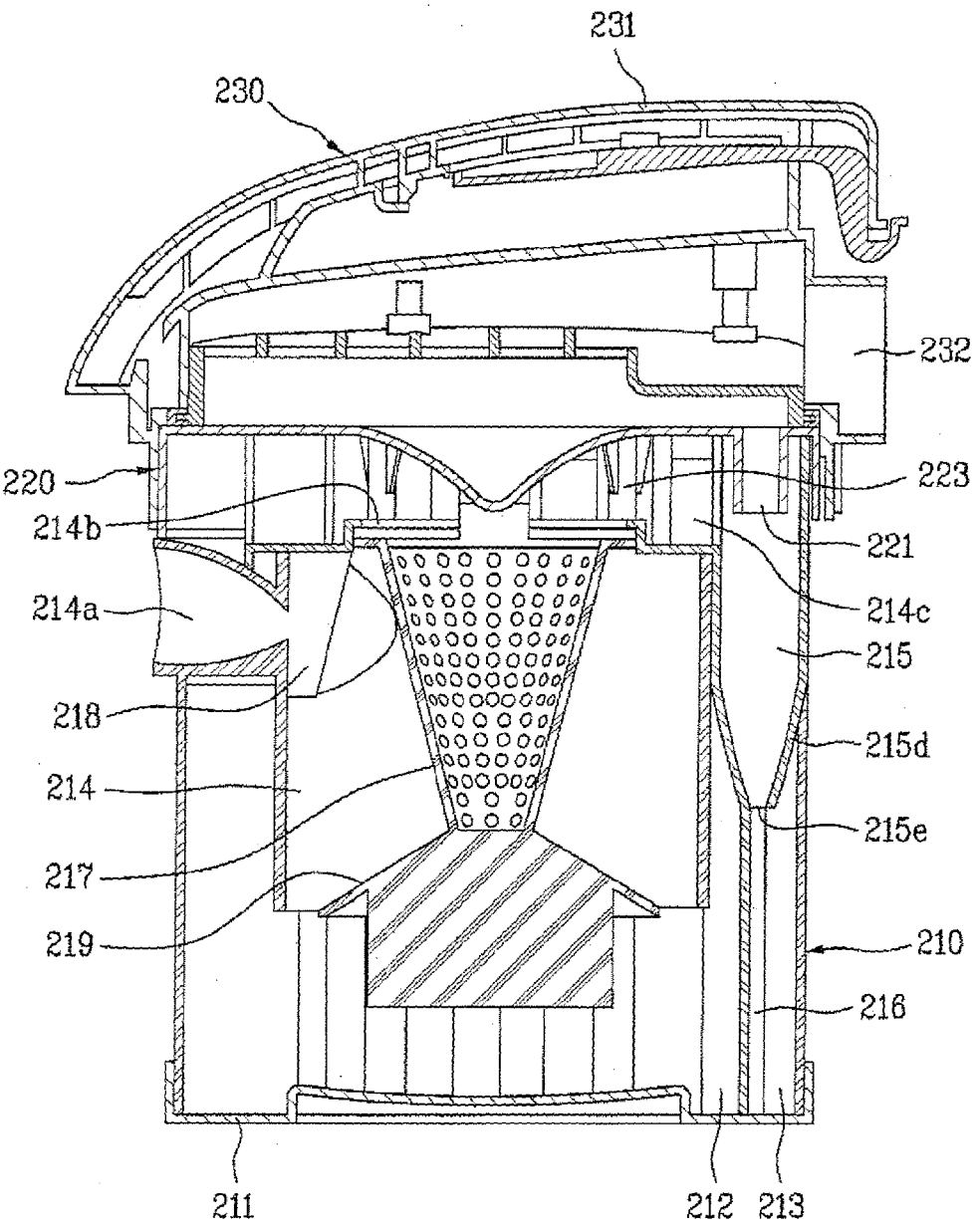
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FIG. 6

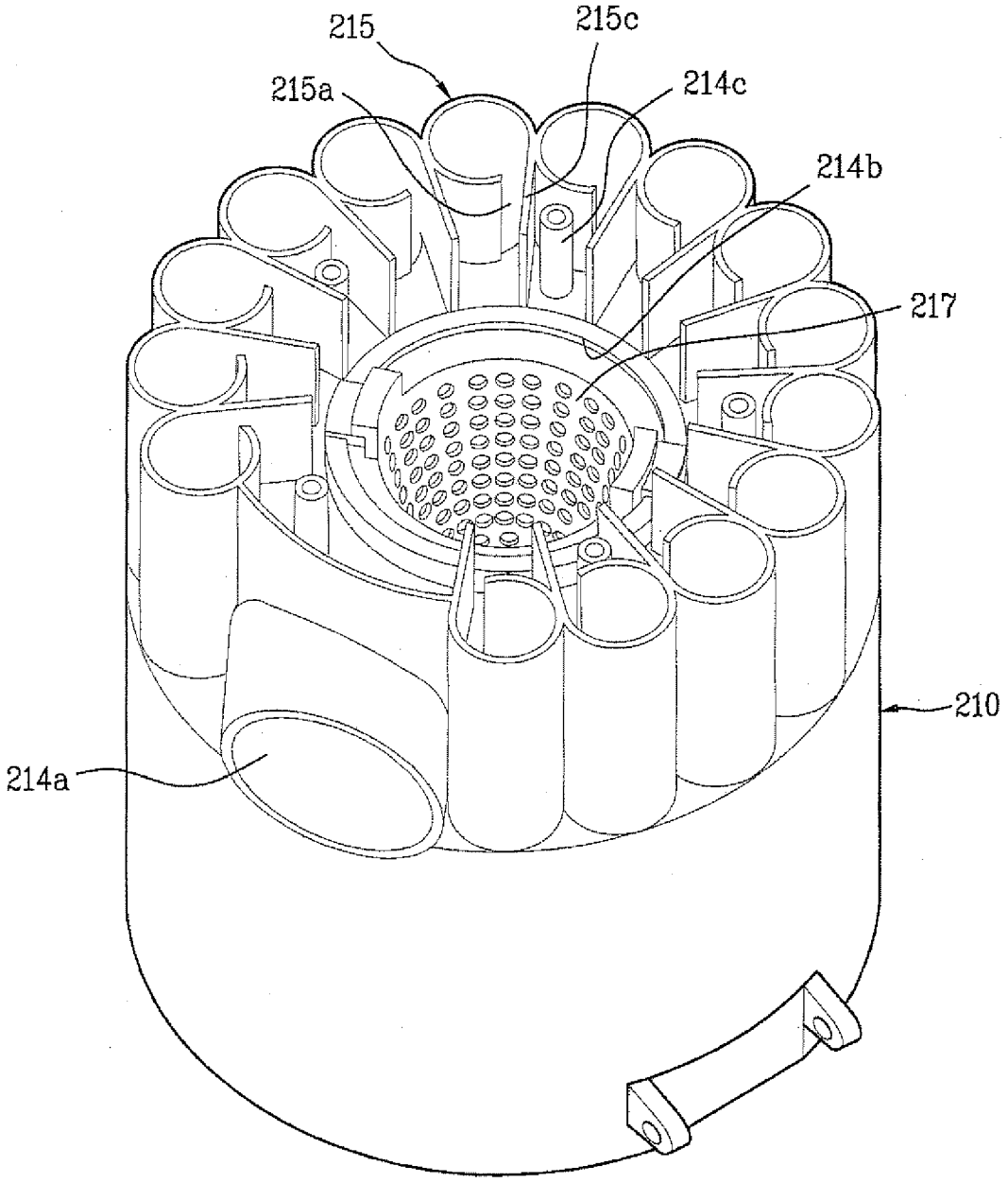

FIG. 7