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(72) Inventors:
• **JEONG, Yeonghan**
Seoul 08592 (KR)
• **RYU, Jungwan**
Seoul 08592 (KR)
• **CHANG, Daeho**
Seoul 08592 (KR)
• **HONG, Jeongsoon**
Seoul 08592 (KR)

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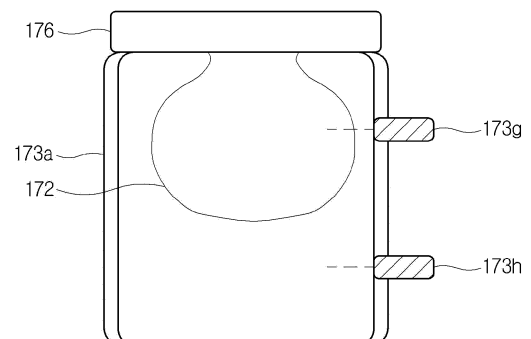
(74) Representative: **Ter Meer Steinmeister & Partner**
Patentanwälte mbB
Nymphenburger Straße 4
80335 München (DE)

(71) Applicant: **LG Electronics Inc.**
Yeongdeungpo-gu
Seoul 07336 (KR)

(54) **VACUUM CLEANER STATION AND VACUUM CLEANER STATION CONTROL METHOD**

(57) There is disclosed a vacuum cleaner station including a housing; a mounting portion disposed in the housing and comprising a coupling surface to which at least predetermined area of a vacuum cleaner is coupled; a dust collection unit accommodated within the housing and disposed below the mounting portion, the dust collection unit configured to collect dust inside a dust bin of the vacuum cleaner; and a dust collection motor accommodated within the housing and disposed below the dust collection unit, the dust collection motor configured to generate a suction force for sucking in dust inside the dust bin, and the dust collection unit may include a dust bag configured to store dust; a bag support portion configured to accommodate the dust bag; and a dust bag sensor disposed in the bag support portion and configured to sense the dust bag, so the dust bag may be discharged to the outside of the vacuum cleaner station by j ointing the dust bag through the jointer when the amount of dust stored in the dust bag is a preset reference amount or more.

[FIG. 19]



Description

[BACKGROUND]

[Technical Field]

[0001] The present disclosure relates to a vacuum cleaner station and a controlling method thereof, more particularly, a vacuum cleaner station configured to separate dust contained in the air and collect it in a dust bag, and only allow user to empty the dust bag, and a controlling method thereof.

[Background of the Disclosure]

[0002] Generally, a cleaner is an electrical appliance configured to suck in small pieces of trash or dust by sucking air and filling a dust bin provided therein, and is commonly called a vacuum cleaner.

[0003] Such vacuum cleaners may be classified into manual cleaners that perform cleaning while the user moves the cleaner, and automatic cleaners that perform cleaning while driving on their own. The manual vacuum cleaners may be classified into canister type vacuum cleaners, upright type vacuum cleaners, handheld vacuum cleaners and stick type vacuum cleaners, depending on the shape

[0004] In the past, canister-type vacuum cleaners were widely used for home vacuum cleaners, but recently, handheld vacuum cleaners stick type vacuum cleaners, which can a dust bin and vacuum cleaner body as one unit to improve convenience, are being widely used.

[0005] A canister-type vacuum cleaner has a cleaner body and a suction inlet that are connected by a rubber hose or pipe, and in some cases, a brush may be fitted to the suction inlet for use.

[0006] A handheld vacuum cleaner is designed to maximize portability. The handheld vacuum cleaner is light in weight but short in length, so the cleaning area may be limited when sitting down. Accordingly, it is used to clean localized areas such as a desk, sofa or inside a car.

[0007] A stick vacuum cleaner may be used standing up so a user can clean without bending down. This makes the stick vacuum cleaner ideal for cleaning wide areas while moving around. While the handheld vacuum cleaner can clean narrow spaces, the stick vacuum cleaner can clean wider spaces and high places that are hard to reach. Recently, the stick vacuum cleaner is being provided in modular form, allowing user to actively change the vacuum cleaner type for user on various cleaning targets.

[0008] In addition, robot vacuum cleaners configured to clean on their own without user manipulation are being used. A robot vacuum cleaner automatically cleans the cleaning target area by moving around the area on their own and sucking up foreign substances such as dust from the floor.

[0009] However, conventional handheld vacuum cleaners, stick vacuum cleaners, and robot vacuum cleaners have small dust bins for storing collected dust, which is inconvenient for user to have to empty the dust bags every time.

[0010] In addition, there is a problem that when the dust bin was emptied, dust is scattered and has a harmful effect on the user's health.

[0011] In addition, there is another problem that the suction power of the vacuum cleaner is reduced when the remaining dust bin.

[0012] In addition, there is a further problem that a bad smell occurs due to the residue if the remaining dust in the dust bin is not removed.

[0013] As the prior art, Korean Patent Publication No. KR2161708B1 discloses a cleaner station including a dust bag.

[0014] The prior art may include a station to which a dust bin of the vacuum cleaner is coupled, and the dust bag may be provided in the station. At this time, the dust bag may be mounted in a housing along a sliding groove and an outer surface of the dust bag may be formed of a material capable of filtering air while the air is passing therethrough.

[0015] However, such a permeable or semi-permeable dust bag has a disadvantage that dust inside the dust bag might leak out of the dust bag and bad smells might also leak out of the dust bag.

[0016] In addition, as the prior art, Korean Patent Publication No. KR20210019940A discloses a vacuum cleaner station that separates dust collected in a dust bin.

[0017] The prior art includes a vacuum cleaner sucking and storing dust contained in the air, a vacuum cleaner station coupled to a dust bin to empty the dust stored in the dust bin. The vacuum station may include a dust collection motor sucking foreign substances and air inside the dust bin coupled to the vacuum cleaner station, and a vinyl bag type dust collection unit.

[0018] However, in the vacuum cleaner station, when the dust collection motor is operation, the vinyl bag might be pulled toward the dust collection motor only to be flattened.

[0019] Accordingly, the inner space of the vinyl dust bag becomes narrower when the dust collection motor is operating, and it could be difficult to collect and capture dust inside the vinyl dust bag the vacuum cleaner station.

[0020] In addition, the vacuum cleaner station might fail to measure the amount of dust inside the vinyl dust bag.

[0021] Due to that, the above vacuum cleaner station might joint the vinyl dust back regardless of the amount of dust inside the dust bag, so the vinyl bag could be wasted while only a small amount of dust is store.

[0022] Or, if the vinyl dust bag too full of dust is sealed, it might burst or the sealing might not be done properly. Due to that, dust might fly inside the vacuum cleaner station disadvantageously.

[0023] In addition, even if the vinyl bag is jointed or

bonded, there is a limit that the vinyl bag remains inside the vacuum cleaner station.

[0024] Meanwhile, as the prior art, Korean Patent Publication No. KR10-2021-0029583 discloses a vacuum cleaner that can detect the dust amount.

[0025] The vacuum cleaner includes a light-emitting element and a light-receiving element. The light-emitting element irradiates infrared rays into the dust bin, and the amount of dust may be determined through the voltage value output by the light-receiving element.

[0026] However, the vacuum cleaner can determine only the dust amount inside the dust bin, and have the limitation of not being able to automatically empty the dust bin.

[DETAILED DESCRIPTION OF THE INVENTION]

[Technical Problem]

[0027] Accordingly, one object of the present disclosure is to solve the above-noted disadvantages of the prior art, and to provide a vacuum cleaner station that may maintain the shape of a dust bag while collecting dust.

[0028] Another object of the present disclosure is to provide a vacuum cleaner station that may separate dust from the air and collect it in a dust bag, while the air containing dust is flowing toward a dust collection motor.

[0029] A further object of the present disclosure is to provide a vacuum cleaner station that does not require users to tie a dust bag themselves.

[0030] A still further object of the present disclosure is to provide a vacuum cleaner station that may empty the dust bin by the user removing only dust bag.

[0031] A still further object of the present disclosure is to provide a vacuum cleaner station that may measure the amount of dust collected in the dust bag.

[0032] A still further object of the present disclosure is to provide a vacuum cleaner station that may remove the dust bag by automatically sealing the dust bag when the amount of dust collected in the dust bag is a predetermined reference amount or more.

[0033] A still further object of the present disclosure is to provide a vacuum cleaner station that if the sealed dust bag is not discharged outside the vacuum cleaner station, may notify the user and allow the user to discharge the dust bag.

[Technical Solution]

[0034] To solve the objects of the present disclosure, a vacuum cleaner station may include a housing; a mounting portion disposed in the housing and comprising a coupling surface to which at least predetermined area of a vacuum cleaner is coupled; a dust collection unit accommodated within the housing and disposed below the mounting portion, the dust collection unit configured to collect dust inside a dust bin of the vacuum cleaner; and a

dust collection motor accommodated within the housing and disposed below the dust collection unit, the dust collection motor configured to generate a suction force for sucking in dust inside the dust bin.

5 **[0035]** At this time, the dust collection unit may include a dust bag configured to store dust; a bag support portion configured to accommodate the dust bag; and a dust bag sensor disposed in the bag support portion and configured to sense the dust bag.

10 **[0036]** The dust bag sensor may include a first dust bag sensor configured to measure the amount of dust stored in the dust bag.

[0037] The dust bag sensor may include a second dust bag sensor disposed closer to the ground than the first dust bag sensor and configured to sense presence of the dust bag.

[0038] Meanwhile, the bag support portion may include a support main body; a bag extracting portion movably accommodated in the support main body and configured to transfer the dust bag.

20 **[0039]** The bag support portion may further include a stopper configured to be supported on the bag extracting portion in contact, along with rotation.

[0040] The bag support portion may further include a spring coupled to the support main body and the bag extracting portion, and configured to linearly move the bag extracting portion.

25 **[0041]** The dust collection unit may further include a jointer configured to joint the dust bag; and a bag discharge actuator configured to apply a rotational force to the stopper, and the bag discharge actuator may be operated after the jointer is operated.

30 **[0042]** To solve the objects of the present disclosure, a controlling method of a vacuum cleaner station coupled to a vacuum cleaner comprising a dust bin; and a discharge cover configured to selectively open and close the dust bin, and configured to collect dust inside the dust bin in a dust bag, the controlling method may include a dust amount sensing step of sensing the amount of dust stored in the dust bag; and a bag jointing step of jointing the dust bag when the amount of dust stored in the dust bag is more than a preset reference dust amount.

35 **[0043]** The controlling method of the vacuum cleaner station may further include a bag discharging step of discharging the dust bag jointed in the bag jointing step.

[0044] The controlling method of the vacuum cleaner station may further include a bag checking step of sensing whether the dust bag jointed in the bag jointing step is present.

40 **[0045]** At this time, when it is sensed in the bag checking step that the jointed dust bag is removed, the dust bag may be expanded.

[0046] When it is sensed in the bag checking step that the jointed dust bag is present, need to remove the dust bag may be displayed.

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[Advantageous Effects]

[0047] The vacuum cleaner station according to the embodiments of the present disclosure has an effect of maintaining the shape of a dust bag while collecting dust. 5

[0048] Furthermore, the vacuum cleaner station according to the embodiments of the present disclosure has an effect of separating dust from the air and collect it in a dust bag, while the air containing dust is flowing toward a dust collection motor. 10

[0049] Still further, the vacuum cleaner station according to the embodiments of the present disclosure has an effect of sealing the dust bag without having to tie the dust bag directly by the jointer joining the upper portion of the dust bag. 15

[0050] Still further, the vacuum cleaner station according to the embodiments of the present disclosure may have an effect of emptying the dust bin by the user removing only dust bag.

[0051] Still further, the vacuum cleaner station according to the embodiments of the present disclosure may have an effect of measuring the amount of dust collected in the dust bag. 20

[0052] Still further, the vacuum cleaner according to the embodiments may have an effect of removing the dust bag by automatically sealing the dust bag when the amount of dust collected in the dust bag is a predetermined reference amount or more. 25

[0053] Still further, the vacuum cleaner may have an effect of discharging the sealed dust bag by notifying the user and allowing the user to discharge the dust bag if the sealed dust bag is not discharged outside the vacuum cleaner station. 30

[Description of Drawings]

[0054]

FIG. 1 is a diagram to describe a vacuum cleaner system according to one embodiment; 40

FIG. 2 is a schematic diagram showing the configuration of a vacuum cleaner according to one embodiment;

FIG. 3 is a diagram of the vacuum cleaner shown in FIG. 2, seen from a different angle; 45

FIG. 4 is a diagram to describe a lower surface of a dust bin of the vacuum cleaner in the vacuum cleaner system according to one embodiment;

FIG. 5 is a diagram to describe the inner structure of the vacuum cleaner station according to one embodiment; 50

FIG. 6 is a diagram to describe a coupling portion provided in the vacuum cleaner station according to one embodiment;

FIG. 7 is a perspective view to describe a fixing unit in the vacuum cleaner station according to one embodiment; 55

FIGS. 8 and 9 are diagrams to describe the relation-

ship between the vacuum cleaner and a door unit in the vacuum cleaner station according to one embodiment;

FIG. 10 is a diagram to describe the relationship between the vacuum cleaner and a door unit in the vacuum cleaner station according to one embodiment;

FIG. 11 is a diagram to describe the specific arrangement and configuration of a dust collection unit in the vacuum cleaner station according to one embodiment;

FIG. 12 is a diagram to describe a process in which dust flows through a dust collection unit and a flow path unit in the vacuum cleaner station according to one embodiment;

FIG. 13 is a front view to describe a dust collection unit in the vacuum cleaner station according to one embodiment;

FIG. 14 is a perspective view to describe a dust separation unit in the vacuum cleaner station according to one embodiment;

FIG. 15 is a perspective view to describe a bag support portion in the vacuum cleaner station according to one embodiment;

FIG. 16 is a view to describe a flow path unit and a prefilter in the vacuum cleaner station according to one embodiment;

FIG. 17 is a block view to describe the control configuration in the vacuum cleaner station according to one embodiment;

FIG. 18 is a flow chart to describe a controlling method of the vacuum cleaner station according to one embodiment;

FIG. 19 is a schematic view to describe a process in which a first dust bag sensor measures the dust amount in the controlling method of the vacuum cleaner station according to one embodiment;

FIG. 20 is a schematic view to describe a state where a jointed dust bag is accommodated in a bag discharge unit in the controlling method of the vacuum cleaner station according to one embodiment;

FIG. 21 is a schematic view to describe a process of discharging the jointed dust bag through the movement of the bag discharge unit in the controlling method of the vacuum cleaner station according to one embodiment;

FIG. 22 is a schematic view to describe a state where a jointed dust bag is accommodated in a bag discharge unit in the controlling method of the vacuum cleaner station according to another embodiment;

FIG. 23 is a schematic view to describe a process of discharging the jointed dust bag through the movement of the bag discharge unit in the controlling method of the vacuum cleaner station according to one embodiment; and

FIG. 24 is a schematic view to describe a process of detecting whether the jointed dust bag is present by using a second dust bag detecting sensor in the

controlling method of the vacuum cleaner station according to one embodiment.

[DESCRIPTION OF SPECIFIC EMBODIMENTS]

[0055] Description will now be given in detail according to exemplary embodiments disclosed herein, with reference to the accompanying drawings.

[0056] The present disclosure may be variously modified and may have various embodiments, and particular embodiments illustrated in the drawings will be specifically described below. The description of the embodiments is not intended to limit the present disclosure to the particular embodiments, but it should be interpreted that the present disclosure is to cover all modifications, equivalents and alternatives falling within the spirit and technical scope of the present disclosure.

[0057] Terminology that is used in the present disclosure is limited to only for embodiments herewith but made only to make it easy to understand the present disclosure.

[0058] Terms of respective elements used in the following description are terms defined taking into consideration of the functions obtained in the present invention. Therefore, these terms do not limit technical elements in the present invention. Further, the defined terms of the respective elements will be called other terms in the art.

[0059] FIG. 1 is a diagram to describe a vacuum cleaner system according to one embodiment.

[0060] Referring to FIG. 1, the vacuum cleaner system 1 according to the embodiment of the present disclosure may include a vacuum cleaner 200 and a vacuum cleaner 100.

[0061] The vacuum cleaner system 1 may include the vacuum cleaner station 100. The vacuum cleaner 200 may be coupled to the vacuum cleaner station 100. The vacuum cleaner 2 may be coupled to a lateral surface of the vacuum cleaner station 100. The vacuum cleaner station 100 may be configured to remove dust inside a dust bin 220 of the vacuum cleaner 100.

[0062] FIG. 2 is a schematic diagram showing the configuration of a vacuum cleaner according to one embodiment. FIG. 3 is a diagram of the vacuum cleaner shown in FIG. 2, seen from a different angle. FIG. 4 is a diagram to describe a lower surface of a dust bin of the vacuum cleaner in the vacuum cleaner system according to one embodiment.

[0063] First, referring to FIGS. 2 to 4, the structure of the vacuum cleaner 200 will be described as follows.

[0064] The vacuum cleaner 200 may mean a vacuum cleaner that is manually operated by a user. For example, the vacuum cleaner 200 may mean a handheld vacuum cleaner or a still vacuum cleaner.

[0065] The vacuum cleaner 200 may be mounted on the vacuum cleaner station 100. The vacuum cleaner 200 can be supported by the vacuum cleaner station 100. The vacuum cleaner 200 may be coupled to the vacuum cleaner station 100.

[0066] Meanwhile, in one embodiment, the direction of

the vacuum cleaner 200 may be defined based on the time when the dust bin 220 and a lower surface of a battery housing 230 are placed on the floor.

[0067] At this time, forward may refer to the direction in which a suction part 212 is disposed with respect to a suction motor 214, and rearward may refer to the direction in which a handle 216 is disposed with respect to the suction motor 214. When looking at the suction part 212 from the suction motor 214, the direction on the right may be called rightward, and the direction on the left may be called leftward. In addition, upward and downward may be defined along the direction perpendicular to the ground when the lower surface of the dust bin 220 and the battery housing 230 are disposed on the floor.

[0068] The vacuum cleaner 200 may include a cleaner body 210. The cleaner body 210 may include a cleaner body housing 211, a suction part 212, a dust separation part 213, a suction motor 214, an air discharge cover 215, a handle 216, and an operation unit 218.

[0069] The cleaner body housing 211 may define the exterior of the vacuum cleaner 200. The cleaner body housing 211 may provide a space that can accommodate the suction motor 214 and a filter (not shown). The cleaner body housing 211 may be provided in a shape similar to a cylinder.

[0070] The suction part 212 may protrude outward from the cleaner body housing 211. For example, the suction part 212 may be formed in a cylindrical shape with an open inside. The suction part 212 may be coupled to an extension pipe 240. The suction part 212 may provide a flow path through which air containing dust can flow (hereinafter, a suction flow path).

[0071] Meanwhile, a virtual line penetrating the interior of the suction part 212 having the cylindrical shape may be formed.

[0072] First, the dust separation part 213 may be in communication with the suction part 212. The dust separation part 213 may be configured to separate dust sucked inward through the suction part 212. The inner space of the dust separation unit 213 may be in communication with the inner space of the dust bin 220.

[0073] For example, the dust separation unit 213 may include at least one cyclone unit configured to dust by using cyclone flow. The inner space of the dust separation unit 213 may be in communication with the suction flow path. Accordingly, the air and dust sucked through the suction part 212 may spirally flow along an inner circumferential surface of the dust separation unit 213. Accordingly, cyclonic flow may occur in the inner space of the dust separation unit 213.

[0074] The dust separation unit 213 may be in communication with the suction part 212, and may be the configuration to which the principle of a dust collector is applied to separate dust sucked into the vacuum cleaner body 210 through the suction part 212.

[0075] The dust separation unit 213 may further include a secondary cyclone configured to secondarily separate dust from the air discharged from the cyclone.

At this time, the secondary cyclone may be disposed inside the cyclone to maximize the size of the dust separation unit. The secondary cyclone may include a plurality of cyclone bodies disposed in parallel. The air discharged from the cyclone may dividedly pass through the plurality of cyclone bodies.

[0076] At this time, the axis of the cyclone flow of the secondary cyclone may also be extended in a vertical direction, and the axis of the cyclone flow of the cyclone and the axis of the cyclone flow of the secondary cyclone may form a coaxial line in the vertical direction, which may be collectively referred to as the axis of the cyclone flow of the dust separation unit 213.

[0077] The suction motor 214 may be configured to generate a suction force to suck in air. The suction motor 214 may be accommodated in the cleaner body housing 211. The suction motor 214 may generate the suction force, using rotation. As one example, the suction motor 214 may be provided in a cylinder-like shape.

[0078] Meanwhile, in this embodiment, a virtual suction motor axial line may be formed by extending the rotation axis of the suction motor 214.

[0079] The air discharge cover 215 may be provided on one axial side of the cleaner body housing 211. The air discharge cover 215 may communicate a filter for filtering air. As one example, the air discharge cover 215 may accommodate a HEPA filter.

[0080] An air outlet hole may be formed in the air discharge cover 215 to discharge air sucked by the suction force.

[0081] A flow guide may be disposed in the air discharge cover 215. The flow guide may be configured to guide the flow of air discharged through the air outlet hole.

[0082] The handle 216 may be held by the user. The handle 216 may be disposed behind the suction motor 214. As one example, the handle 216 may be formed in a shape similar to a cylinder. Alternatively, the handle 216 may be formed in a curved cylinder shape. The handle 216 may be disposed at a predetermined angle with respect to the cleaner body housing 211, the suction motor 214, or the dust separation unit 213.

[0083] The handle 216 may include a holding portion 216a formed in a cylindrical shape to be held by the user; a first extension 216b connected to one longitudinal (i.e., axial) end of the holding portion 216a and extending toward the suction motor 214; and a second extension 216c connected to the other longitudinal (i.e., axial) end of the holding portion 216a and extending toward the dust bin 220.

[0084] Meanwhile, in this embodiment, a virtual line penetrating the holding portion 216a may be formed by extending along the longitudinal direction of the holding portion 216a (i.e., the axial direction of the cylindrical shape).

[0085] For example, the holding portion penetration line may be a virtual line formed inside the cylindrical handle 216, and may be a virtual line formed parallel to at least predetermined area of the outer surface of the

holding portion 216a.

[0086] The upper surface of the handle 216 may define the exterior of some area of the upper surface of the vacuum cleaner 200. Through this, it is possible to prevent the components of the vacuum cleaner 200 from coming into contact with the user's arm when the user holds the handle 216.

[0087] The first extension may extend toward the cleaner body housing 211 or the suction motor 214. At least predetermined area of the first extension may extend in a horizontal direction.

[0088] The second extension may extend toward the dust bin 220 from the holding portion 216a. At least predetermined area of the second extension may extend in a horizontal direction.

[0089] The operation unit 218 may be disposed on the handle 216. The operation unit 218 may be disposed on an inclined surface formed on the top of the handle 216. The user may input an operation command or stop command for the vacuum cleaner 200 through the operation unit 218.

[0090] The vacuum cleaner 200 may include the dust bin 220. The dust bin 220 may be in communication with the dust separation unit 213. The dust bin 220 may be configured to store dust separated from the dust separation unit 213.

[0091] The dust bin 220 may include a dust bin body 221, a discharge cover 222, a dust bin compression lever 223, and a compressor (not shown).

[0092] The dust bin body 221 may provide a predetermined space for storing dust separated from the dust separation unit 213. For example, the dust bin body 221 may be formed in a shape similar to a cylinder.

[0093] Meanwhile, in this embodiment, a virtual dust bin penetration line may be formed by penetrating the inner space of the dust bin body 221 and extending along the longitudinal direction (i.e., the axial direction in the cylindrical dust bin body 221).

[0094] A lower surface (i.e., bottom surface) of the dust bin body 221 may be partially open. Also, a lower surface extension 221a may be formed on the lower surface (i.e., bottom surface) of the dust bin body 221. The lower surface extension 221a may be formed block some area of the lower surface of the dust bin body 221.

[0095] The dust bin 220 may include the discharge cover 222. The discharge cover 222 may be disposed on the lower surface of the dust bin 220.

[0096] The discharge cover 220 may be configured to open and close one longitudinal end of the dust bin body 221. Specifically, the discharge cover 222 may selectively open and close the bottom of the dust bin 220 which is opened downward.

[0097] The discharge cover 222 may include a cover body 222a and a hinge portion 222b. the cover body 222a may be configured to partially block the lower surface of the dust bin body 2221. The cover body 222a may be rotatable downward with respect to the hinge portion 222b. The hinge portion 222b may include a torsion

spring 22b. Accordingly, when the discharge cover 22 is separated from the dust bin body 221, the cover body 222a may be supported in a state of being rotated at a predetermined angle or more with respect to the hinge portion 222b in the dust bin body 221 by the elastic force of the torsion spring 222d.

[0098] The discharge cover 222 may be coupled to the dust bin 220 through hook coupling. Meanwhile, the discharge cover 222 may be separated from the dust bin 220 through a coupling lever 222c. Specifically, the coupling lever 222c may be disposed on a front outer surface of the dust bin 220. When an external force is applied, the coupling lever 222c may elastically deform a hook formed by extending from the cover body 222a to release the hook-coupling between the cover body 222a and the dust bin body 221.

[0099] When the discharge cover 222 is closed, the lower surface of the dust bin 220 may be blocked (i.e., sealed) by the discharge cover 222 and the lower surface extension 221a.

[0100] The dust bin 220 may include the dust bin compression lever 223 (see FIG. 8). The dust bin compression lever 223 may be disposed outside the dust bin 220 or the dust separation unit 213. The dust bin compression lever 223 may be disposed to be movable upward/downward outside the dust bin 220 or the dust separation unit 213. The dust bin compression lever 223 may be connected to the compressor (not shown). When the dust bin compression lever 223 is moved downward by the external force, the compressor (not shown) may be also moved downward together. This may provide the user with use convenience. The compressor (not shown) and the dust bin compression lever 223 may be restituted by an elastic member (not shown). Specifically, when the external force applied to the dust bin compression lever 223 is removed, the elastic member may move the dust bin compression lever 223 and the compressor (not shown) upward.

[0101] The compressor (not shown) may be disposed inside the dust bin body 221. The compressor may be movable in the inner space of the dust bin body 221. Specifically, the compressor may be movable vertically inside the dust bin body 221. Through this, the compressor may compress dust inside the dust bin body 221 downward. In addition, when the discharge cover 222 is separated only to open the bottom of the dust bin 220, the compressor may remove foreign substances such as residual dust in the dust bin 220 by moving to the bottom from the top. Through this, the suction force of the vacuum cleaner may be improved by preventing dust from remaining inside the dust bin 220. In addition, it is possible to eliminate bad smell caused by residue by preventing residual dust from remaining in the dust bin 220.

[0102] The vacuum cleaner 200 may include a battery housing 230. The battery housing 230 may accommodate the battery 240. The battery housing 230 may be disposed under the handle 216. For example, the battery housing 230 may have a hexahedral shape with an open

bottom. The rear of the battery housing 230 may be connected to the handle 216.

[0103] The battery housing 230 may include an accommodating portion that is open downward. The battery 240 may be mounted or demounted through the accommodating portion of the battery housing 230.

[0104] The vacuum cleaner 200 may include the battery 240.

[0105] For example, the battery 240 may be detachably connected to the vacuum cleaner 200. The battery 240 may be detachably mounted to the battery housing 230. For example, the battery 240 may be inserted into the battery housing 230 from the lower portion of the battery housing 230. With this configuration, the portability of the vacuum cleaner 200 can be improved.

[0106] Alternatively, the battery 240 may be integrally formed within the battery housing 230. At this time, the lower surface of the battery 240 may not be exposed to the outside.

[0107] The battery 240 may be configured to provide power to the suction motor 214. The battery 240 may be disposed under the handle 216. The battery 240 may be disposed behind the dust bin 220.

[0108] According to the embodiment, when the battery 240 is mounted in the battery housing 230, the lower surface of the battery 240 may be exposed to the outside. When the vacuum cleaner 200 is put down on the floor, the battery 240 may be placed on the floor, so the battery 240 can be demounted from the battery housing 230. In addition, the lower surface of the battery 240 may be exposed to the outside and may then directly come into contact with external air of the battery 240, thereby improving the cooling performance of the battery 240.

[0109] Meanwhile, if the battery 240 is integrally formed in the battery housing 230 as one body, the structure configured for the connection between the battery 240 and the battery housing 230 may be reduced, thereby reducing the overall size of the vacuum cleaner 200 and the weight of the vacuum cleaner 200.

[0110] The vacuum cleaner 200 may include the extension pipe 250. The extension pipe may be in communication with a cleaning module 260. The extension pipe 250 may be in communication with the cleaner body 210. The extension pipe 250 may be in communication with the suction part 212 of the cleaner body 210. The extension pipe 250 may be formed in a long cylindrical shape.

[0111] The cleaner body 210 may be connected with the extension pipe 250. The cleaner body 210 may be connected to the cleaning module 260 through the extension pipe 250. The cleaner body 210 may be configured to generate a suction force by using the suction motor 214, and provide the suction force to the cleaning module 260 through the extension pipe 250. Dust may be introduced into the cleaner body 210 through the cleaning module 260 and the extension pipe 250.

[0112] The vacuum cleaner 200 may include the cleaning module 260. The cleaning module 260 may be in communication with the extension pipe 250. Accordingly,

external air may pass through the cleaning module 260 and the extension pipe 250 and may be introduced into the cleaner body 210 of the vacuum cleaner 200 by the suction force generated in the cleaner body 210 of the vacuum cleaner 200.

[0113] Dust inside the dust bin 220 of the vacuum cleaner 200 may be collected in a dust collection unit 170 of the vacuum cleaner station 200 by the gravity and the suction force of a dust collection motor 191. Through this, user convenience may be provided by removing dust inside the dust bin without the user's separate operation. In addition, this may eliminate the inconvenience of the user having to empty the dust bin every time. Also, this can prevent dust from flying when the dust bin is emptied.

[0114] The vacuum cleaner 200 may be coupled to a lateral surface of a housing 110. Specifically, the cleaner body 210 of the vacuum cleaner 200 may be mounted to a mounting portion 120. More specifically, the dust bin 220 of the vacuum cleaner 200 and the battery housing 230 may be coupled to a coupling surface 121, and an outer circumferential surface of the dust bin body 221 may be coupled to a dust bin guide surface 122. The suction part 212 may be coupled to a suction part guide surface 126 of the mounting portion 120. In this instance, the central axis of the dust bin 220 may be disposed parallel to the ground, and the extension pipe 250 may be disposed along a direction perpendicular to the ground.

[0115] FIG. 5 is a diagram to describe the inner structure of the vacuum cleaner station according to one embodiment. FIG. 6 is a diagram to describe a coupling portion provided in the vacuum cleaner station according to one embodiment. FIG. 7 is a perspective view to describe a fixing unit in the vacuum cleaner station according to one embodiment. FIGS. 8 and 9 are diagrams to describe the relationship between the vacuum cleaner and a door unit in the vacuum cleaner station according to one embodiment. FIG. 10 is a diagram to describe the relationship between the vacuum cleaner and a door unit in the vacuum cleaner station according to one embodiment.

[0116] Referring to FIGS. 5 to 10, the vacuum cleaner station 100 according to the present disclosure will be described as follows.

[0117] The vacuum cleaner 200 may be connected to the vacuum cleaner station 100. Specifically, the cleaner body of the vacuum cleaner 200 may be coupled to the lateral surface of the vacuum cleaner station 100. The vacuum cleaner station 100 may be configured to remove dust inside the dust bin of the vacuum cleaner 200.

[0118] The vacuum cleaner station 100 may include the housing 110. The housing 110 may define the exterior of the vacuum cleaner station 100. Specifically, the housing 110 may be formed in a cylindrical shape having at least one outer wall surface. For example, the housing 110 may be formed in a shape similar to a square pillar.

[0119] The housing 110 may have an inner space formed to accommodate the dust collection unit 170

configured to store dust therein and a dust suction module 190 configured to generate a flow force for collecting dust in the dust collection unit 170.

[0120] The housing 110 may include a bottom surface 111, an outer wall surface 112, and a top surface 113.

[0121] The bottom surface 111 may support the gravity-direction lower portion of the dust suction module 190. That is, the bottom surface 111 may support the lower portion of a dust collection motor 191 of the dust suction module 190.

[0122] At this time, the bottom surface 111 may be disposed toward the ground. The bottom surface 111 may be disposed parallel to the ground, but also be disposed at a predetermined angle relative to the ground.

This configuration has an advantage of stably supporting the dust collection motor 191 and balancing the overall weight even when the vacuum cleaner 200 is connected.

[0123] Meanwhile, according to the embodiment, the bottom surface 111 may further include ground supporting portion 311a configured to increase the area in contact with the ground in order to prevent the vacuum cleaner station 100 from falling over and maintain balance. For example, the ground supporting portion 311a may have a plate-shaped member formed by extending from the bottom surface 111, and one or more frames may protrude and extend along the ground direction from the bottom surface 111.

[0124] The outer wall surface 112 may mean a surface formed along the gravity direction, and may mean a surface connected to the bottom surface 111. For example, the outer wall surface 111 may mean a surface perpendicularly connected to the bottom surface 111. Alternatively, the outer wall surface 112 may be arranged to be inclined at a predetermined angle with respect to the bottom surface 111.

[0125] The outer wall surface 112 may include at least one surface. For example, the outer wall surface 112 may include a first outer wall surface 112a, a second outer wall surface 112b, a third outer wall surface 112c, and a fourth outer wall surface 112d.

[0126] At this time, in this embodiment, the first outer wall surface 112a may be disposed on the front side of the vacuum cleaner station 100. Here, the front side may mean the surface on which the vacuum cleaner 200 is exposed in a state where the vacuum cleaner 200 is coupled to the vacuum cleaner station 100. Accordingly, the first outer wall surface 112a may form the exterior of the front side of the vacuum cleaner station 100.

[0127] Meanwhile, in order to understand this embodiment, the direction is defined as follows. In this embodiment, the direction may be defined as the direction in a state where the vacuum cleaner 200 is placed on the vacuum cleaner station 100.

[0128] When the vacuum cleaner 200 is mounted on the vacuum cleaner station 100, the direction in which the vacuum cleaner 200 is exposed to the outside of the vacuum cleaner station 100 may be called the front direction.

[0129] In another aspect, when the vacuum cleaner 200 is mounted on the vacuum cleaner station 100, the direction in which the suction motor 214 of the vacuum cleaner 200 is disposed may be called forward. The direction opposite to the direction in which the suction motor 214 of the vacuum cleaner station 100 is placed may be called rearward. Accordingly, the rear surface or rearward may mean the direction in which the second outer wall surface 112b is formed.

[0130] When looking at the front side based on the inner space of the housing 110, the left side may be called the left surface and the right side may be called the right surface. Accordingly, the rear surface may mean the direction in which the second outer wall surface 112b is formed.

[0131] When looking at the front surface with respect to the inner surface of the housing 110, the left side may be called the left surface and the right side may be called the right surface. Accordingly, the left surface may mean the direction in which the third outer wall surface 112c is formed, and the right surface may mean the direction in which the fourth outer wall surface 112d is formed.

[0132] The first outer wall surface 112a may be a flat surface and it may be an entirely curved surface, or a surface having a partially curved area.

[0133] The mounting portion 120 may be disposed on the first outer wall surface 112a. With this configuration, the vacuum cleaner 200 may be mounted to the vacuum cleaner station 100, and may be supported by the vacuum cleaner station 100. The detailed configuration of the mounting portion 120 will be described later.

[0134] Meanwhile, it is also possible to add a structure formed in various types to the first outer wall surface 112a so as to mount the cleaning module 260.

[0135] In this embodiment, the second outer wall surface 112b may be a surface facing the first outer wall surface 112a. That is, the second outer wall surface 112b may be disposed on a rear surface of the vacuum cleaner 100. The second outer wall surface 112b may define the exterior of the rear surface of the vacuum cleaner station 100.

[0136] In this embodiment, the third outer wall surface 112c and the fourth outer wall surface 112d may refer to the surfaces connecting the first outer wall surface 112a and the second outer wall surface 112b. at this time, the third outer wall surface 112c may be disposed on the left surface of the vacuum cleaner station 100, and the fourth outer wall surface 112d may be disposed on the right surface of the vacuum cleaner station 100. Alternatively, the third outer wall surface 112c may be disposed on the right surface of the vacuum cleaner station 100, and the fourth outer wall surface 112d may be disposed on the left surface of the vacuum cleaner station 100.

[0137] The third outer wall surface 112c or the fourth outer wall surface 112d may be a flat surface and it may be a curved surface or a surface having a curved area.

[0138] Meanwhile, it is also possible to add a structure formed in various types to the third outer wall surface

112c or the fourth outer wall surface 112d so as to mount the cleaning module 260.

[0139] The top surface 113 may define the top exterior of the vacuum cleaner station. That is, the top surface 113 may mean the surface disposed on the uppermost portion in the gravity direction within the vacuum cleaner station, and exposed to the outside.

[0140] For reference, in this embodiment, the top and bottom portion may mean the upper portion and the lower portion, respectively, along the direction of gravity (i.e., the direction perpendicular to the ground) when the vacuum cleaner station 100 is installed on the ground.

[0141] At this time, the top surface 113 may be disposed parallel to the ground and also may be inclined at a predetermined angle with respect to the ground.

[0142] A display unit may be disposed on the top surface 113. The display unit may be configured to display a state of the vacuum cleaner station 100, a state of the vacuum cleaner 200, and may also display information such as the cleaning progress and a map of the cleaning area.

[0143] Meanwhile, according to the embodiment, the top surface 113 may be separable from the outer wall surface 112. At this time, when the top surface 113 is separated, the battery separated from the vacuum cleaner 200 may be disposed in the inner space surrounded by the outer wall surface 112 and a terminal (not shown) configured to charge the separated battery may be provided therein.

[0144] Meanwhile, a bag accommodating space 115 may be formed within the housing 110. The bag accommodating space 115 may be placed below the gravity direction of the mounting portion 120 and above the gravity direction of the dust suction module 190.

[0145] A dust collection unit 170 may be provided in the bag accommodating space 115. Specifically, a bag supporting portion 173 which will be described later may be movably accommodated in the bag accommodating space 115. A dust bag cartridge 174 which will be described later may be detachably coupled to the bag accommodating space 115. A jointer 176 which will be described later may be mounted in the bag accommodating space 115. The bag accommodating space 115 may be in communication with a first flow path 181, a second flow path 182, and a bypass flow path 183, which will be described later. This configuration may provide the space in which the air and dust introduced from the dust bin 220 can flow and be collected in a dust bag 172.

[0146] In the present disclosure, the vacuum cleaner 200 may be mounted to the outer wall surface of the vacuum cleaner station 100. For example, the dust bin 220 of the vacuum cleaner 200 and the battery housing 230 may be coupled to the coupling surface 121 of the vacuum cleaner station 100. That is, the vacuum cleaner 200 may be mounted on the first outer wall surface 112a.

[0147] At this time, an axial line of the suction motor 214 may be perpendicular to the first outer wall surface 112a. That is, the axial line of the suction motor 214 may be

formed parallel to the ground.

[0148] A virtual line penetrating the dust bin 220 may be formed perpendicular to the first outer wall surface 112a.

[0149] A longitudinal axis C of the housing 110 may be formed perpendicular to the ground. The longitudinal axis C of the housing 110 may be formed parallel to at least one of the first outer wall surface 112a, the second outer wall surface 112b, the third outer wall surface 112c, and the fourth outer wall surface 112d.

[0150] When the vacuum cleaner 200 is mounted to the vacuum cleaner station 100, the axis of the suction motor 214 may intersect the longitudinal axis of the vacuum cleaner station 100. That is, the rotation axis of the suction motor 214 may intersect the longitudinal axis of the vacuum cleaner station 100.

[0151] When the vacuum cleaner 200 is mounted to the vacuum cleaner station 100, the battery 240 may be placed at a distance from the ground farther than the rotation axis of the suction motor 214. With this configuration, the vacuum cleaner 200 may be stably supported on the vacuum cleaner station 100.

[0152] When the vacuum cleaner 200 is mounted to the vacuum cleaner station 100, a virtual line penetrating the dust bin 220 may intersect the longitudinal axis of the vacuum cleaner station 100. That is, the longitudinal axis of the dust bin 220 may intersect the longitudinal axis of the vacuum cleaner station 100. At this time, the intersection of the longitudinal axis of the dust bin 220 and the longitudinal axis of the vacuum cleaner station 100 may be located inside the housing 110, and more specifically, inside the flow path unit 180.

[0153] Meanwhile, when the vacuum cleaner 100 is mounted to the vacuum cleaner station 100, the handle 216 may be disposed at a preset distance from the ground farther than a virtual line penetrating the dust bin 220. With this configuration, when the user holds the handle 216, the convenience of being able to mount or demount the vacuum cleaner 200 to or from the vacuum cleaner station 100 may be provided by simply moving the vacuum cleaner 200 in a direction parallel to the ground.

[0154] Referring to FIG. 6, the mounting portion 120 of the vacuum cleaner station 100 according to the present disclosure will be described as follows.

[0155] The vacuum cleaner station 100 may include the mounting portion 120 for coupling the vacuum cleaner 200. Specifically, the mounting portion 120 may be disposed on the first outer wall surface 112a. The cleaner body 210, the dust bin 220, and the battery housing 230 of the vacuum cleaner 200 may be coupled to the mounting portion 120.

[0156] The mounting portion 120 may include a coupling surface 121. The coupling surface 121 may be disposed on a lateral surface of the housing 110. For example, the coupling surface 121 may be a groove-shaped surface recessed inwardly from the first outer wall surface 112a toward the inside of the vacuum cleaner

station 100. That is, the coupling surface 121 may mean a surface forming a step with the first outer wall surface 112a.

[0157] The vacuum cleaner 200 may be coupled to the coupling surface 121. For example, the coupling surface 121 may be in contact with the dust bin 220 of the vacuum cleaner 200 and the lower surface of the battery housing 230. Here, the lower surface means the surface toward the ground when the user places the vacuum cleaner 200 on the ground.

[0158] For example, the angle formed by the coupling surface 121 with the ground may be a right angle. Through this, the space of the vacuum cleaner station 100 may be minimized when the vacuum cleaner 200 is coupled to the coupling surface 121.

[0159] As another example, the coupling surface 121 may be disposed at a predetermined angle with respect to the ground. Through this, when the vacuum cleaner 200 is coupled to the coupling surface 121, the vacuum cleaner station 100 may be stably supported.

[0160] A dust passage hole 121a may be formed in the coupling surface 121 to introduce external air into the housing 110. The dust passage hole 121a may be formed in a hole shape corresponding to the shape of the dust bin 220 so that dust inside the dust bin 220 can be introduced into the dust collection unit 170. The dust bin 220 and the hole 121a may be formed to in a shape corresponding to the shape of the discharge cover 222 of the dust bin 220. The dust passage hole 121a may be formed be in communication with the flow path unit 180 which will be described later.

[0161] The mounting portion 120 may include a dust bin guide surface 122. The dust bin guide surface 122 may be disposed on the first outer wall surface 112a. the dust bin guide surface 122 may be connected to the first outer wall surface 112a. also, the dust bin guide surface 122 may be connected to the coupling surface 121.

[0162] The dust bin guide surface 122 may be formed in a shape corresponding to the outer surface of the dust bin 220. A front outer surface of the dust bin 220 may be coupled to the dust bin guide surface 122. This may provide convenience of coupling the vacuum cleaner 200 to the coupling surface 121.

[0163] Meanwhile, a protrusion moving hole 122a may be formed on the dust bin guide surface 122, and a push protrusion 151, which will be described later, may be linearly movable along the protrusion moving hole 122a. in addition, a gear box 155 configured to accommodate gears of a cover opening unit 150, which will be described later, may be provided on the lower portion of the dust bin guide surface 122 in the direction of gravity. At this time, a guide space 122b in which a push protrusion 151 can move may be formed between the dust bin guide surface 122, the bottom surface and the upper surface of the gear box 155. The guide space 122b may become in communication with a first flow path 181 through a bypass hole 122c. that is, the protrusion moving hole 122a, the guide space 122b, the bypass hole

122c, and the first flow path 181 may form one flow path. With this configuration, when the dust collection motor 191 is put into operation in a state where the dust bin 220 is coupled to the mounting portion 120, there is an advantage that dust remaining in the dust bin 220 and the dust bin guide surface 122 can be sucked through the flow path mentioned above.

[0164] The mounting portion 120 may include a guide protrusion 123. The guide protrusion 123 may be disposed on the coupling surface 121. The guide protrusion 123 may protrude upward from the coupling surface 121. Two guide protrusions 123 may be spaced apart a distance from each other. The distance between the two guide protrusions 123 may be corresponding to the width of the battery housing 230 of the vacuum cleaner 200. This may provide convenient coupling process of coupling the vacuum cleaner 200 to the coupling surface 121.

[0165] The mounting portion 120 may include a mounting portion lateral wall 124. The mounting portion lateral wall 124 may mean a wall surface disposed on each of the both lateral surfaces of the coupling surface 121, and may be perpendicularly connected to the coupling surface 121. The mounting portion lateral wall 124 may be connected to the first outer wall surface 112a. The mounting portion lateral wall 124 may form a surface connected to the dust bin guide surface 122. Through this, the vacuum cleaner 200 may be accommodated stably.

[0166] The mounting portion 120 may include a mounting sensor 125. The mounting sensor 125 may be configured to detect whether the vacuum cleaner 200 is mounted to the mounting portion 120.

[0167] The mounting sensor 125 may include a contact. As one example, the mounting sensor 125 may include a micro switch. At this time, the mounting sensor 125 may be provided on the guide protrusion 123. Accordingly, when the battery housing 230 or the battery 240 of the vacuum cleaner 200 is mounted between the pair of guide protrusions 123, the mounting sensor 125 may be contacted and the mounting sensor 125 may detect that the vacuum cleaner 200 is mounted.

[0168] Meanwhile, the mounting sensor 125 may include a non-contact sensor. For example, the mounting sensor 125 may include an IR sensor. At this time, the mounting sensor 125 may be disposed on the mounting portion lateral wall 124. Accordingly, when the dust bin 220 or the cleaner body 210 of the vacuum cleaner 200 passes the mounting portion lateral wall 124 and reaches the coupling surface 121, the mounting sensor 125 may sense the presence of the dust bin 220 or the cleaner body 210.

[0169] In a state where the vacuum cleaner 200 is mounted to the vacuum cleaner station 100, the mounting sensor 125 may face the dust bin 220 of the vacuum cleaner 200 or the battery housing 230.

[0170] The mounting sensor 125 may be means for determining whether the vacuum cleaner 200 is mounted together with power supplied to the battery of the vacuum cleaner 200.

[0171] The mounting portion 120 may include a suction part guide surface 126. The suction part guide surface 126 may be disposed on the first outer wall surface 112a. The suction part guide surface 126 may be connected to the dust bin guide surface 122. The suction part 212 may be coupled to the suction part guide surface 126. The shape of the suction part guide surface 126 may be corresponding to the shape of the suction part 212.

[0172] The mounting portion 120 may further include a fixing member introduction hole 127. The fixing member introduction hole 127 may be formed in a shape of a long hole formed along the mounting portion lateral wall 124 so that the fixing member 131 can be introduced.

[0173] With this configuration, when the user mounts the vacuum cleaner 200 to the mounting portion 120 of the vacuum cleaner station 100, the cleaner body 210 of the vacuum cleaner 200 may be stably mounted to the mounting portion 120 by the dust bin guide surface 122, the guide protrusion 123, and the suction part guide surface 126. Through this, the convenience of coupling the dust bin 220 of the vacuum cleaner 200 and the battery housing 230 to the coupling surface 121 may be provided.

[0174] Meanwhile, the vacuum cleaner station 100 may further include a charging unit 128. The charging unit 128 may be mounted on the mounting portion. The charging unit 128 may be electrically connected to the vacuum cleaner 200 mounted to the mounting portion 120. The charging unit 128 may be configured to supply power to the battery of the vacuum cleaner 200 mounted to the mounting portion 120.

[0175] In addition, the vacuum cleaner station 100 may further include a side door (not shown). The side door may be disposed in the housing 110. The side door may selectively expose the dust collection unit 170 to the outside. Through this, the user can easily remove the dust bag 172 from the vacuum cleaner station 100.

[0176] Referring to FIG. 7, the fixing unit 130 according to the present disclosure will be described as follows.

[0177] The vacuum cleaner 100 according to the present disclosure may include a fixing unit 130. The fixing unit 130 may be disposed on the mounting portion lateral wall 124. Alternatively, the fixing unit 130 may be disposed on the back surface of the coupling surface 121. The fixing unit 130 may be configured to fix the vacuum cleaner 200 coupled to the coupling surface 121. Specifically, the fixing unit 130 may fix the dust bin 220 and the battery housing 230 of the vacuum cleaner 200.

[0178] The fixing unit 130 may include a fixing member 141 configured to fix the dust bin 220 and the battery housing 230 of the vacuum cleaner 200; and a fixing unit motor 133 configured to drive the fixing member 131. The fixing unit 130 may further include a fixing unit link 135 configured to transmit a power of the fixing unit motor 133 to the fixing member 131.

[0179] The fixing member 131 may be disposed on the mounting portion lateral wall 124, and may be configured to reciprocate on the mounting portion lateral wall 124.

Specifically, the fixing member 131 may be received inside the fixing member introduction hole 127.

[0180] The fixing member 131 may be disposed on each of both sides of the mounting portion 120. For example, two fixing members may be arranged in a pair symmetrically centered on the coupling surface 121.

[0181] The fixing unit motor 133 may be configured to supply power for moving the fixing member 131.

[0182] The fixing unit link 135 may be configured to convert the rotational force of the fixing motor 133 into reciprocating motion of the fixing member 131.

[0183] A fixing sealer 136 may be disposed on the dust bin guide surface 122 to seal the dust bin 220 when the vacuum cleaner 200 is mounted. with this configuration, when the dust bin 220 of the vacuum cleaner 200 is coupled, the fixing sealer 136 may be pressurized by the weight of the vacuum cleaner 200, and the dust bin 220 and the dust bin guide surface 122 may be sealed.

[0184] The fixing sealer 136 may be disposed on a virtual extension line of the fixing member 131. With this configuration, when the fixing unit motor 133 is operated and the fixing member 131 pressurizes the dust bin 220, the circumference of the dust bin at the same height may be sealed.

[0185] According to one embodiment, the fixing sealer 136 may be disposed on the dust bin guide surface 122 in a bent line shape corresponding to arrangement of a cover opening unit 150, which will be described later.

[0186] Accordingly, when the cleaner body 210 of the vacuum cleaner 200 is mounted to the mounting portion 120, the fixing unit 130 may fix the cleaner body 210 of the vacuum cleaner 200. Specifically, when the mounting sensor 125 detects that the cleaner body 210 of the vacuum cleaner 200 is mounted to the mounting portion 120 of the vacuum cleaner station 100, the fixing unit motor 133 may move the fixing member 131 and fix the cleaner body 210 of the vacuum cleaner 200.

[0187] Through this, the suction force of the vacuum cleaner may be improved by preventing dust from remaining inside the dust bin. In addition, bad smell generated by residual dust may be removed by preventing dust from remaining inside the dust bin.

[0188] Referring to FIGS. 8 and 9, the door unit 140 according to the present disclosure will be described as follows.

[0189] The vacuum cleaner station 100 according to the present disclosure may include the door unit 140. The door unit 140 may be configured to open and close the dust passage hole 121a.

[0190] The door unit 140 may include a door 141, a door motor 142, and a door arm 143.

[0191] The door 141 may be hingedly coupled to the coupling surface 121 and configured to open and close the dust passage hole 121a. the door 141 may include a door main body 141a.

[0192] The door main body 141a may be formed in a shape that can block the dust passage hole 121a. For example, the door main body 141 may be formed in a

shape similar to a disc.

[0193] With respect to the state where the door main body 141a blocks the dust passage hole 121a, a hinge portion may be provided an upper portion of the door main body 141a and an arm coupling portion 141b may be disposed in a lower portion of the door main body 141a.

[0194] The door main body 141a may be formed in a shape that can seal the dust passage hole 121a. for example, in the door main body 141a, an outer surface exposed to the outside of the vacuum cleaner station 100 may be formed to have a diameter corresponding to a diameter of the dust passage hole 121a. also, a step may be generated between the outer surface and the inner surface. Meanwhile, at least one reinforcing rib may be projectedly formed on the inner surface to connect the hinge portion and the arm coupling portion 141b and to reinforce the supporting of the door main body 141a.

[0195] The hinge portion may be the means for hingedly coupling the door 141 to the coupling surface 121. The hinge portion may be disposed on an upper end of the door main body 141a and coupled to the coupling surface 121.

[0196] The arm coupling portion 141b may be the means for rotatably coupling the door arm 143. The arm coupling portion 141b may be provided in a lower portion of the door main body 141a and rotatably coupled to the door main body 141a so that a door arm 143 can be rotatably coupled to the arm coupling portion 141b.

[0197] With this configuration, when the door arm 143 pulls the door main body 141a in a state where the door 141 closes the dust passage hole 121a, the door main body 141a may rotatably move toward the inside of the vacuum cleaner station 100 with respect to the hinge portion as a rotation axis and the dust passage hole 121a may be open. Meanwhile, when the door arm 143 pushes the door main body 141a in a state where the dust passage hole 121a is open, the door main body 141a may rotatably move toward the outside of the vacuum cleaner station 100 with respect to the hinge portion as the rotation axis and the dust passage hole 121a may be blocked.

[0198] Meanwhile, in a state where the vacuum cleaner 200 is mounted to the vacuum cleaner station 100 and the discharge cover 222 is separated from the dust bin body 211, the door 141 may become in contact with the discharge cover 222. The discharge cover 222 may be rotated in relation with the door 141 based on the rotation of the door 141.

[0199] The door motor 142 may be configured to provide a power to rotate the door 141. Specifically, the door motor 142 may be configured to rotate the door arm 143 in a forward direction or reverse direction. Here, the forward direction may mean a direction in which the door arm 143 pulls the door 141. Accordingly, when the door arm 143 is rotated in the forward direction, the dust passage hole 121a may be open. In addition, the reverse direction may mean a direction in which the door arm 143 pushes the

door 141. Accordingly, when the door arm 143 is rotated in the reverse direction, at least some area of the dust passage hole 121a may be closed. The forward direction may be the opposite of the reverse direction.

[0200] The door arm 143 may be configured to connect the door 141 to the door motor 142, and open and close the door 141, using the power generated by the door motor 142.

[0201] For example, the door arm 143 may include a first door arm 143a and a second door arm 143b. One end of the first door arm 143a may be coupled to the door motor 142. The first door arm 143a may be rotated by the power of the door motor 142. The other end of the first door arm 143a may be rotatably coupled to the second door arm 143b. the first door arm 143a may transmit the power from the door motor 143 to the second door arm 143b. One end of the second door arm 143b may be coupled to the first door arm 143a. The other end of the second door arm 143b may be coupled to the door 141. The second door arm 143b may be configured to push or pull to open and close the dust passage hole 121a.

[0202] The door unit 140 may further include a door opening/closing sensor unit 144. The door opening/closing sensor unit 144 may be provided in the housing 110, and configured to sense whether the door 141 is open or not.

[0203] As one example, the door opening/closing sensor unit 144 may be provided on each of both ends of the rotation movement area. As another example, the door opening/closing sensor unit 144 may be provided on each of both ends of the movement area of the door 141.

[0204] Accordingly, when the door arm 143 is moved up to a preset door opening position DP1 or the door 141 is opened to a preset position, the door opening/closing sensor unit 144 may sense that the door is open. In addition, when the door arm 143 is moved to a preset door closing position DP2 or the door 141 is opened to a predetermined position, the door opening/closing sensor unit 144 may sense that the door is opened.

[0205] The door opening/closing sensor unit 144 may include a contact sensor. As one example, the door opening/closing sensor unit 144 may include a micro switch.

[0206] Meanwhile, the door opening/closing sensor unit 144 may also include a non-contact sensor. As one example, the door opening/closing sensor unit 144 may include an IR sensor.

[0207] With this configuration, the door unit 140 may be configured to selectively open or close at least area of the coupling surface 121, to connect the outside of the first outer wall surface 112a to the flow path 180 and/or the dust collection unit 170.

[0208] The door unit 140 may also be opened when the discharge cover 222 of the vacuum cleaner 200 is opened. In addition, when the door unit 140 is closed, the discharge cover 222 of the vacuum cleaner 200 may be closed together with it.

[0209] When dust is removed from the dust bin 220 of

the vacuum cleaner 200, the door motor 142 may rotate the door 141 and coupled the discharge cover 222 to the dust bin body 221. Specifically, the door motor 142 may rotate the door 141 with respect to the hinge portion 141b by rotating the door 141, and the door 141 rotated with respect to the hinge portion 141b may push the discharge cover 222 toward the dust bin body 221.

[0210] Referring to FIG. 10, the cover opening unit 150 according to the present disclosure will be described as follows.

[0211] The vacuum cleaner station 100 of the present disclosure may include the cover opening unit 150. The cover opening unit 150 may be provided in the mounting portion 120, and configured to open the discharge cover 222 of the vacuum cleaner 200.

[0212] The cover opening unit 150 may include a push protrusion 151, a cover opening motor 152, a cover opening gear 153, a support plate 154, and a gear box 155.

[0213] The push protrusion 151 may move to pressurize the coupling lever 222c.

[0214] The push protrusion 151 may be disposed on the dust bin guide surface 122. Specifically, a protrusion moving hole may be formed in the dust bin guide surface 122, and the push protrusion 151 may pass through the protrusion moving hole to be exposed to the outside.

[0215] The push protrusion 151 may be disposed at a position that may push the coupling lever 222c, when the vacuum cleaner 200 is mounted. that is, the coupling lever 22c may be disposed on the protrusion moving hole. Also, the coupling lever 222c may be disposed on the moving area of the push protrusion 151.

[0216] The push protrusion 151 may be configured to linearly reciprocate so as to pressurize the coupling lever 222c. Specifically, the push protrusion 151 may be coupled to the gear box 155 so that its linear movement can be guided. The push protrusion 151 may be coupled to the cover opening gear 153 to be moved together along the movement of the cover opening gear 153.

[0217] The cover opening motor 152 may be configured to provide a power for moving the push protrusion 151. Specifically, the cover opening motor 152 may be configured to rotate a motor shaft (not shown) in a forward direction or reverse direction. Here, the forward direction means the direction in which the push protrusion 151 pressurize the coupling lever 222c. Aso, the reverse direction means the direction in which the push protrusion 151 pushing the coupling lever 222c is restituted. The forward direction may be the opposite of the reverse direction.

[0218] The cover opening gear 153 may be coupled to the cover opening motor 152, and configured to move the push protrusion 151, using the power of the cover opening motor 152. Specifically, the cover opening gear 153 may be disposed within the gear box 155. A driving gear 153a of the cover opening gear 153 may be coupled may be coupled to a motor shaft of the cover opening motor 152 to receive a power. A driven gear 153b of the cover

opening gear 153 may be coupled to the push protrusion 151 and can move the push protrusion 151. For example, the driven gear 153b may be provided in the form of a rack gear and engage with the driving gear 153a and may receive power from the driving gear 153a.

[0219] At this time, a torsion spring 222d may be provided on the discharge cover 222. The elasticity of the torsion spring 222d may rotate the discharge cover 222 by a predetermined angle or more and support it at a rotated position. Accordingly, the discharge cover 222 may be opened and the dust passage hole 121a and the dust bin 220 may be in communication with each other.

[0220] The gear box 155 may be provided in the housing 110 and disposed below the direction of gravity, and the cover opening gear 153 may be mounted within the gear box 155.

[0221] The cover opening sensor unit 155 may be provided in the gear box 155. At this time, the cover opening sensor unit 155f may include a contact sensor. For example, the cover opening sensor unit 155f may include a micro switch. Meanwhile, the cover opening sensor unit 155 may include a non-contact sensor. For example, the cover opening sensor unit 155f may include an IR sensor.

[0222] At least one cover opening sensor unit 155f may be disposed on an inner surface or outer surface of the gear box 155. For example, one cover opening sensor unit 155f may be disposed on an inner surface of the gear box 155. At this time, the cover opening sensor unit 155f may be configured to sense that the push protrusion 151 is located at an initial position.

[0223] Accordingly, according to the present disclosure, the cover opening unit 150 may allow the user to open the dust bin 220 without separately opening the discharge cover 222 of the vacuum cleaner, thereby improving user convenience.

[0224] In addition, the discharge cover 222 may be opened in a state where the vacuum cleaner 200 is mounted to the vacuum cleaner station 100. Accordingly, there is an advantage of preventing dust from scattering.

[0225] FIGS. 11 to 16 are diagrams to describe the configuration and arrangement of the dust collection unit in the vacuum cleaner according to one embodiment of the present disclosure.

[0226] Meanwhile, referring to FIGS. 11 to 16, the dust collection unit 170 will be described as follows.

[0227] The vacuum cleaner 100 may include the dust collection unit 170. The dust collection unit 170 may be provided in the housing 110. The dust collection unit 170 may be disposed in the bag accommodating space 115. The dust collection unit 170 may be disposed above of the dust collection motor 191 in the direction of gravity.

[0228] The dust collection unit 170 may be configured to collect dust inside the dust bin 220 of the vacuum cleaner 200. Specifically, when the dust collection motor 191 is put into operation in a state where the vacuum cleaner 200 may be mounted to the vacuum cleaner station 100 and the inside of the dust bin 220 is in

communication with the flow path unit 180, dust inside the dust bin 220 may flow along the flow path unit 180 to be collected in the dust collection unit 170.

[0229] Meanwhile, in the conventional vacuum cleaner station, dust is collected in a dust bag without being separated from the air, so some of the dust might flow into the dust collecting motor. Therefore, dust flowing into the dust collecting motor may cause the dust collecting motor to malfunction.

[0230] To solve that, it is possible to place a prefilter on the flow path, but there is a limitation in that if the prefilter alone is used to filter dust, the prefilter may become clogged with a large amount of dust, reducing the suction power of the dust collection motor.

[0231] To this end, the dust collection unit 170 of the vacuum cleaner station 100 according to the present disclosure may include a dust separation portion 171 configured to separate and collect dust contained in the air introduced through the flow path unit 180.

[0232] Specifically, the dust collection unit 170 may include a dust separation part 171, a dust bag 172, a bag supporting portion 173, a dust bag cartridge 174, a prefilter 175, and a jointer 176.

[0233] The dust separation part 171 may be configured to separate dust from the air introduced from the dust bin 220.

[0234] The dust separation part 171 may be disposed above the dust bag 172, the bag support portion 173, the dust bag cartridge 174, and the jointer 176. That is, the dust bag cartridge 174, the bag support portion 173, the dust bag cartridge 174, and the jointer 176 may be disposed below the dust separation unit 172.

[0235] The dust separation part 171 may be disposed on a longitudinal axial line C of the vacuum cleaner station 300.

[0236] The dust separation part 171 may include a dust separation case 171a.

[0237] The dust separation unit case 171a may be configured to define the exterior of the dust separation part.

[0238] First, a cyclone may be provided within the dust separation case 171a. That is, a cyclone unit 171b may be disposed within the dust separation case 171a.

[0239] In addition, a dust passage pipe 171c may be formed in the dust separation part case 171a. For example, a flow path through which dust can pass may be formed on a lower surface of the dust separation part case 171a.

[0240] A sealer may be provided on the lower surface of the dust separation part case 171a, and the sealer may come into contact with the dust bag cartridge 174. For example, the sealer may be formed in a square shape surrounding the periphery of the dust passage pipe 171c.

[0241] The dust separation part 171 may be in communication with the first flow path 181. The dust separation part 171 may be configured to separate dust sucked therein through the first flow path 181. The inner space of the dust separation part 171 may be in communication

with the dust bag cartridge 174. The inner space of the dust separation part 171 may be in communication with the inner space of the bag support portion 173.

[0242] For example, the dust separation part 171 may include at least one cyclone unit 171b configured to separate dust through cyclone flow. Accordingly, cyclone flow may occur in the inner space of the dust separation part 171.

[0243] Meanwhile, in this embodiment, the cyclone unit 171b may include a cylindrical mesh. Here, an axial direction of a mesh may be provided parallel to the ground. With this configuration, when the cyclone unit 171b is pulled on the lateral surface of the vacuum cleaner station 100, it may be separated from the dust collection unit 170. Accordingly, according to this embodiment, the user can easily separate the cyclone unit 171b and wash the mesh.

[0244] In addition, the dust separation part 171 may include a dust passage pipe 171c configured to guide the dust separated from the cyclone unit 171b to the dust bag 172. The dust passage pipe 171c may be formed downward from one axial side of the cyclone unit 171b. That is, the dust passage pipe 171c may be formed below the dust separation part case 171a. accordingly, the flow path formed in the dust passage pipe 171c may allow the dust bag cartridge 174 and the inner space of the bag support portion 173 to communicate with the cyclone unit 171b.

[0245] The dust separation part 171 may further include a secondary cyclone configured to re-separate dust from the air discharged from the cyclone. At this time, the secondary cyclone may be provided inside the cyclone to minimize the size of the dust separation part 171.

[0246] The dust separation part 171 may be in communication with the first flow path 181, and may be the element to which the principle of the dust collector using the centrifugal force is applied to separate dust introduced into the housing 110 through the dust passage hole 121a.

[0247] The dust bag 172 may be disposed within the housing 110, the dust bag 172 may be disposed under the dust separation part 171 in the direction of gravity.

[0248] The dust bag 172 may be made of an impermeable material. For example, the dust bag 172 may include a roll of vinyl (not shown). With this configuration, it is possible to prevent dust collected in the dust bag 172 or bad smell from coming out of the dust bag 172 when the dust bag 172 is sealed or jointed.

[0249] The dust bag 172 may be secured to the housing 110 through the dust bag cartridge 174. As necessity arises, the dust bag 172 may be replaced through the dust bag cartridge 174. That is, the dust collection unit 170 can be defined as a consumable part. The dust bag 172 may increase in volume due to the suction force (negative pressure) generated the operation of the dust collection motor 191, while mounted in the housing 110.

[0250] At this time, the unfolded dust bag 172 may be disposed within the bag support portion 173. That is,

when the dust collection motor 191 is put into operation, the dust bag 172 can be expanded inside the bag support portion 173. In addition, the unfolded dust bag 172 may be supported by the bag support portion 173 and its shape can be maintained.

[0251] The dust bag 172 may store dust separated in the dust separation part 171. An upper area of the dust bag 172 may be cut and jointed by the jointer 176. The dust bag 172 may be separated from the bag support portion 173, in a state where the upper area of the dust bag 172 is cut and jointed.

[0252] With this configuration, the user does not have to tie the dust bag having collected dust separately, thereby improving user convenience.

[0253] Meanwhile, a roll vinyl type dust bag that is a conventional type may be pulled toward the dust collection motor and become flattened, when the dust collection motor operates. Therefore, it is difficult to collect dust in the dust bag, because the inner space of the dust bag becomes narrow when the dust collection motor operates.

[0254] To solve this, the dust collection unit 170 of the vacuum cleaner station 100 according to one embodiment may further include the bag support portion 173 to stably spread the dust bag.

[0255] The bag support portion 173 may support the dust bag 172. The bag support portion 173 may accommodate the dust bag 172, when the dust bag 172 is expanded. The bag support portion 173 may support the exterior of the dust bag 172.

[0256] The bag support portion 173 may be disposed below the dust separation part 171. With this configuration, the dust separated in the dust separation part 171 may be collected within the bag support portion 173.

[0257] The bag support portion 173 may be disposed below the dust bag cartridge 174. With this configuration, when the dust bag 172 is expanded downward from the dust bag cartridge 174, at least predetermined area of the dust bag 172 may be accommodated in the bag support portion 173.

[0258] The bag support portion 173 may be disposed below the jointer 176. With this configuration, the expanded dust bag 172 may be jointed and separated by the jointer 176, and may be received in the bag support portion 173 as it falls down due to gravity.

[0259] Specifically, the bag support portion 173 may include a support main body 173a and a suction hole 173b.

[0260] A space may be formed between a lower surface of the support main body 173a and a lower surface of the bag accommodating space 115. The space may provide a path through which the suction force of the dust collection motor 191 is transmitted.

[0261] With this configuration, when the dust collection motor 191 operates, the air inside the bag accommodating space 115 may be sucked into the dust collection motor 191 by the suction force of the dust collection motor 191, and a negative pressure for expanding the dust bag

172 may be formed in the bag accommodating space 115.

[0262] When the dust bag 172 is expanded, the support main body 173a may be formed to accommodate dust in the dust bag 172. For example, the support main body 173a may be formed in a cylindrical shape with an open top, and at least predetermined area of a lower surface of the support main body 173a may be closed.

[0263] As another example, the support main body 173a may be formed in a hexahedron, the upper surface of the support body 173a may be open, and a front surface of the support body 173a can be opened. With this configuration, the dust bag 172 can be removed through the open front surface.

[0264] At least predetermined area of the dust bag 172 may be disposed above the support main body 173a. When the dust bag 172 is expanded, the dust bag 172 may fill in the inner space of the support main body 173a as it is being expanded.

[0265] The suction hole 173b may be formed in the support main body 173a in plural. For example, a plurality of suction holes 173a may be formed along an outer surface of the support main body 173a. At least one suction hole 173b may be formed on a lower surface of the support main body 173a. with this configuration, when the dust collection motor 191 operates, air inside the support main body 173a may flow to the outside the support main body 173a through the suction hole 173b. In addition, in a state where the dust bag 172 is expanded within the support main body 173a, a negative pressure may be applied toward the outside of the support main body 173a with respect to the dust bag 172, and the dust bag 172 may be expanded to become in close contact with the inner surface and lower surface of the support main body 173a. That is, the dust bag 172 may be expanded along the inner shape of the bag support portion 173.

[0266] Especially, when the plurality of suction holes 173b are formed at preset intervals, a uniform negative pressure may be applied to the entire dust bag 172 evenly, and the expanded state may be maintained.

[0267] Meanwhile, even if the dust amount exceeds a preset reference amount, the conventional vacuum cleaner capable of sensing the amount of dust may only notify the user of it but has limitation that it cannot automatically empty the dust bag.

[0268] To solve that, the vacuum cleaner station according to one embodiment may be configured to automatically joint the dust bag 172 and discharge the jointed dust bag to the outside of the vacuum cleaner station 100.

[0269] That is, in the vacuum cleaner station, the bag support part 173 may be extractable within the housing 110.

[0270] FIGS. 19 to 24 are diagrams to describe a process of pulling the bag suction portion 173 out from the vacuum cleaner station.

[0271] Specifically, referring to FIGS. 19 to 24, the bag suction portion 173 may include a bag extracting portion

173c. The bag extracting portion 173c may be movably disposed in the support main body 173a, and configured to transfer the dust bag 172.

[0272] For example, the bag extracting portion 173c may be formed in a box shape with an open top, and a wheel (not shown) may be provided on a lower surface. As another example, the bag extracting portion 173c may be formed in a box shape with an open top, and a rail (not shown) may be formed on the support main body 173a to be able to slide.

[0273] With this configuration, after jointed by the jointer 176, the dust bag 172 may fall down due to the gravity to be accommodated in the bag extracting portion 173c. The bag extracting portion 173c may be configured to linearly reciprocate with respect to the support main body 173a.

[0274] Accordingly, the bag extracting portion 173c may linearly reciprocate in a state of accommodating the jointed dust bag 172.

[0275] With this configuration, the bag extracting portion 173c may be configured to discharge the jointed dust bag 172 to the outside of the vacuum cleaner station 100.

[0276] A stopper 173d may be supported by contact with the envelope extracting part 173c as it moves.

[0277] For example, the stopper 173d may be rotatably provided in the support main body 173a, and contact the bag extracting portion 173c as it rotates, to limit the movement of the bag extracting portion 173c. That is, the stopper 173d may be formed in a bar shape, with one side connected to a bag discharge actuator 173e, which will be described later, to be rotatably moved by the operation of the bag discharge actuator 173e and the other side contactable with the bag extracting portion 173c along the rotation movement.

[0278] At this time, at least predetermined area of the stopper may be formed in a shape with a curved surface. With this configuration, the stopper 173d may improve the supporting force for supporting the bag extracting portion 173c.

[0279] According to another embodiment, a stopper 273d' as shown in FIGS. 22 and 23 may be provided in the support main body 173a and configured to linearly reciprocate. The stopper may contact the bag extracting portion 173c along the linear movement, to limit the movement of the bag extracting portion 173c. That is, the stopper 173d' may be formed in a bar shape, with one side connected to a bag discharge actuator 173e', which will be described later, to move in a straight stroke when the bag discharge actuator 173e' is operated, and the other side provided to come into contact with the bag extracting portion 173c along the linear movement.

[0280] Accordingly, the stopper 173d and 173d' may limit the movement of the bag extracting portion 173c by coming into contact with the bag extracting portion 173c, and release the movement limit of the bag extracting portion 173c as it is moved by the operation of the bag discharge actuator 173e and 173e'.

[0281] The bag discharge actuator 173e may provide a

power for moving the stopper 173d. For example, the bag discharge actuator 173e may be a motor. At this time, the bag discharge actuator 173e may be rotatable in both directions. Accordingly, when the bag discharge actuator 173e rotates in one direction, the stopper 173d may move in a direction in which the contact with the bag extracting portion 173c can be released. When the bag discharge actuator 173e rotates in the other direction different from the above direction, the stopper 173d may move in a direction in which it can contact the bag extracting portion 173c.

[0282] Accordingly, as the bag discharge actuator 173e operates, the movement of the bag extracting portion 173c may be limited or the limit of the movement may be released.

[0283] A spring 173f may provide an elastic force to the bag extracting portion 173c. For example, the spring 173f may be a coil spring. For example, one side of the spring 173f may be coupled to the support main body 173a, and the other side thereof may be coupled to the bag extracting portion 173c. At this time, if the bag extracting portion 173c is in contact with the stopper 173d, the spring 173f may be in a state of being pressurized. In a state where the contact of the stopper 173d with the bag extracting portion 173c is released, the pressurizing of the spring 173f may be released and the bag extracting portion 173c may be pushed. Accordingly, the bag extracting portion 173c may be linearly moved by the spring 173f.

[0284] According to the present disclosure, if the amount of dust inside the dust bag 172 is more than a preset reference dust amount, the bag discharge actuator 173e may operate and the contact of the stopper 173d with the bag extracting portion 173c may be released. Then, the bag extracting portion 173c may be extracted to the outside of the vacuum cleaner station 100. Accordingly, the user may only remove the dust bag 172 discharged to the outside of the vacuum cleaner station 100.

[0285] Dust bag sensors 173g and 173h may be disposed in the bag support port 173 and may be configured to detect the dust bag 172.

[0286] For example, the dust bag sensors 173g and 173h may be disposed within the support main body 173a. As another example, the dust bag sensor 173g and 173h may be disposed, passing through the support main body 173a. With this configuration, the dust bag sensor 173g and 174h may be provided at a position allowing it to radiate light toward the dust bag 172 within the support main body 173a.

[0287] The dust bag sensor 173g and 173h may be configured to sense the amount of dust inside the dust bag 172 and presence of the dust bag 172 by irradiating light. For example, the dust bag sensor 173g and 173h may be a laser sensor.

[0288] The dust bag sensor 173g and 173h may include a light emitting element and a light receiving element. At this time, the light emitting element and the light receiving element may be disposed adjacent to each other. One light emitting element may be disposed be-

tween at least two or more light receiving elements in a line. However, this is one of examples but may not be limited thereto. That is, the number and positions of the light emitting elements and light receiving elements may be variable according to embodiments.

[0289] The light emitting element (not show) may be configured to emit light. Specifically, the light emitting element may be disposed toward the inside of the support main body 173a, to emit light toward a direction toward the inside from the outside of the support main body 173a. The light emitted from the light emitting element may be reflected by the dust bag 172 and dust or foreign substances inside the dust bag 172.

[0290] The light receiving element (not shown) may be configured to receive light. Specifically, the light receiving light may receive the light reflected by the light emitting element. The light receiving element may be disposed toward the inside of the support main body 173a, like the light emitting element. Accordingly, the light receiving element may receive the light reflected by the dust bag 172 and dust or foreign substances inside the dust bag 172.

[0291] Meanwhile, the conventional vacuum cleaner capable of sensing the amount of dust may determine the amount of dust inside a dust bin through an optical sensor, and only notify the user of the determined amount. However, that conventional vacuum cleaner has limitations that it cannot automatically discharge the dust bag containing the collected dust and determine whether the dust bag has been discharged.

[0292] To solve the limitations, the vacuum cleaner station according to one embodiment may include a plurality of dust bag sensors 173g and 173h that are disposed at different heights, to determine whether the dust bag 172 is discharged or not.

[0293] That is, the dust bag sensors 173g and 173h may include a first dust bag sensor 173g and a second dust bag sensor 173h.

[0294] The first dust bag sensor 173g and the second dust bag sensor 173h may be disposed in the support main body 173a. At this time, the first dust bag sensor 173g may be disposed farther from the ground than the second dust bag sensor 173h. That is, the second dust bag sensor 173h may be disposed below the first dust bag sensor 173g.

[0295] With this configuration, while the dust bag 172 is expanded and hung on the dust bag cartridge 174, the light irradiated by the first dust bag sensor 173g may reach the dust bag 172. While the dust bag 172 is jointed and separated, and falling down from the dust bag cartridge 174, the light irradiated by the second dust bag sensor 173h may reach the dust bag 172.

[0296] Accordingly, the first dust bag sensor 173g may be configured to sense the dust bag 172 in a state where the dust bag 172 is expanded, and the second dust bag sensor 173h may be configured to sense the jointed dust bag 172.

[0297] The first dust bag sensor 173g may measure the

amount of dust stored in the dust bag 172. For example, the first dust bag sensor 173g may irradiate light toward the dust bag 172, and the amount of reflected light may be varied based on the amount of dust stored in the dust bag 172. Accordingly, the first dust bag sensor 173g may receive the light reflected by the dust bag 172 and the dust stored in the dust bag 172 and measure the amount of dust stored in the dust bag 172.

[0298] The second dust bag 173h may sense presence of the dust bag 172. For example, the second dust bag sensor 174h may irradiate light toward the dust bag 172 and the light may be reflected by the dust bag 172. Accordingly, the second dust bag sensor 173h may receive the light reflected by the dust bag 172 and sense whether the dust bag 172 is present or not.

[0299] Therefore, the first dust bag sensor 173g may sense the amount of dust inside the dust bag 172 in a state where the dust bag 172 is expanded. The second dust bag sensor 173h may sense whether the dust bag 172 is present below the bag support portion 173 after jointed and falling down.

[0300] Meanwhile, in a roll vinyl type vacuum cleaner station, if all of consumable dust bags are used up, the dust bag needs to be replaced. At this time, the user can install the dust bag by inserting it into the housing of the vacuum cleaner station, but there is a risk of malfunction when the user opens the inside of the vacuum cleaner station, and also, if the dust bag is installed incorrectly, dust collection might be performed without the dust bag being opened, causing dust to fly.

[0301] To solve this, according to the present disclosure, the dust bag may be easily supplied through the dust bag cartridge by the user's simply replacing the cartridge.

[0302] The dust bag cartridge 174 may be separably coupled to the housing 110 and configured to supply dust bags 172.

[0303] The dust bag cartridge 174 may be detachably coupled to the housing 110. Specifically, the dust bag cartridge 174 may be detachably coupled in space formed between the dust separation part 171 and the jointer 176.

[0304] When the user pulls the dust bag cartridge 174 toward the outside of the vacuum cleaner station 100 in a state where the dust bag cartridge 174 is coupled to the housing 110, the dust bag cartridge 174 may be separated from the housing 110. With this configuration, the user can easily couple or separate the dust bag cartridge 174 to or from the housing.

[0305] The dust bag cartridge 174 may include the dust bag 172. For example, at least predetermined area of the dust bag 172 that is a roll vinyl type may be coupled to the dust bag cartridge 174, and the dust bag 172 may be expanded toward the bag suction portion 173 as the dust collection motor 191 operates. Some area of the dust bag 172 may be separated from the dust bag cartridge 174 as the dust bag 172 is jointed along with the operation of the jointer 176 which will be described later. With this config-

uration, the user does not have to separately tie up the dust bag having collected dust, thereby improving user convenience.

[0306] The dust bag cartridge 174 may be disposed below the dust separation part 171. For example, an upper surface of the dust bag cartridge 174 may be in contact with a lower surface of the dust separation part 171.

[0307] The dust bag cartridge 174 may be disposed above the jointer 176. For example, the lower surface of the dust bag cartridge 175 may be in contact with the upper surface of the jointer 176.

[0308] The dust bag cartridge 174 may define a space which will accommodate the dust bag 172. At this time, the dust bag cartridge 174 may be formed in a square pipe shape. That is, a space in which air can flow may be formed in (i.e., in a center area) the dust bag cartridge 174. At least predetermined area of the dust bag 172 may be expanded through the space.

[0309] A hole may be formed in the dust bag cartridge 174 and the dust bag 172 can be extracted through the hole. For example, the hole may be formed on an inner circumferential surface of the dust bag cartridge 174. With this configuration, the space formed in the center of the dust bag cartridge 174 may be blocked by the dust bag 172, in a state where the dust bag 172 is extracted. Accordingly, when the dust collection motor 191 operates, the dust bag 172 may be sucked toward the dust collection motor 191 and expanded.

[0310] Meanwhile, as described above, when the space is provided between the dust bag cartridge and an adjacent structure or the dust bag cartridge is detachably provided, there might be a problem that dust contained in the air flies through the space to which the dust bag cartridge is coupled.

[0311] To solve that, in the vacuum cleaner station according to one embodiment, the dust bag cartridge 174 may include at least one sealer to seal the gap in which dust could fly.

[0312] That is, the sealer may be provided on the upper surface of the dust bag cartridge 174. With this configuration, it is possible to prevent foreign substances from leaking between the dust bag cartridge 174 and the dust separation part 171.

[0313] The sealer may be provided on the lower surface of the dust bag cartridge 174. With this configuration, it is possible to prevent foreign substances having passed the dust bag cartridge 174 from leaking between the dust bag cartridge 174 and the jointer 176.

[0314] The dust collection unit 170 may further include a prefilter 175. The prefilter 175 may be disposed on the second flow path 182 and configured to separate foreign substances from air flowing through the second flow path 182. For example, the prefilter 175 may be disposed in the inlet of the second flow path 182 and configured to separate dust contained in the air having passed through the dust separation part 171. With this configuration, it is possible to prevent foreign substances from flowing into

the dust collection motor 191.

[0315] The prefilter 175 may be detachably coupled to the second flow path 182. The prefilter 175 may be detachably coupled to the second flow path in the front side of the vacuum cleaner station 100.

[0316] The dust collection unit 170 may further include the jointer 176.

[0317] The jointer 176 may be disposed blow the dust bag cartridge 174. For example, an upper surface of the jointer 176 may be in contact with a lower surface of the dust bag cartridge 174. With this configuration, the jointer 176 may guide the coupling or decoupling of the dust bag cartridge 174.

[0318] The jointer 176 may be disposed above the bag suction portion 173. For example, the lower surface of the jointer 176 may be in contact with the upper surface of the bag suction portion 173.

[0319] The jointer 176 may be configured to cut and joint the upper area of the dust bag 172 storing dust. Specifically, the jointer 176 can be configured to heat-bond the upper area of the dust bag 172 by gathering dust in the central area of the dust bag 172. For example, the jointer 176 may include a first joint member (not shown) and a second joint member (not shown). The first joint member (not shown) may move in a first direction through a first joint driving unit, and the second joint member (not shown) may move in a second direction, which is perpendicular to the first direction, through a second joint driving unit.

[0320] With this configuration, the dust collected from the outside may be gathered in the roll vinyl and the roll vinyl may be automatically jointed. Accordingly, the user does not have to tie up the dust bag storing dust, thereby improving user convenience.

[0321] A sealer may be disposed on the upper surface of the jointer 176 and come into contact with the dust bag cartridge 174. For example, the sealer may be disposed in a square shape surrounding an outer area with respect to the flow path unit 180. The sealer may seal foreign substances from leaking between the jointer 176 and the dust bag cartridge 174.

[0322] The vacuum cleaner station 100 may include the flow path unit 180. The flow path unit 180 may connect the vacuum cleaner 200 to the dust collection unit 170 and the dust collection motor 191.

[0323] The flow path unit 180 may include a first flow path 181, a second flow path 182, and a bypass flow path 183.

[0324] The first flow path 181 may be configured to connect the dust bin 220 of the vacuum cleaner 200 to the dust collection unit. The first flow path 181 may mean the space between the dust bin 220 of the vacuum cleaner 200 and the dust collection unit 170. The first flow path 181 may be the space formed toward the rear from the dust passage hole 121a, and may be a path formed downward from the dust passage hole 121a through which dust and air can flow.

[0325] For example, the first flow path 181 may include

a first area 181a configured to communicate with the inner space of the dust bin 220, when the dust passage hole 121a is opened after the vacuum cleaner 200 is mounted to the vacuum cleaner station 100; and a second area 181b configured to allow the first area 181a to communicate with the bag accommodating space 115 (or the inner space of the dust collection unit 170). At this time, the direction in which the first area 181a is formed may be parallel to the axial direction (i.e., longitudinal direction) of the dust bin. In addition, the direction in which the second area 181b is formed may be arranged parallel to the longitudinal axial line C of the housing 110. At this time, the first area 181a may be formed at a predetermined angle with the second region 181b. With this configuration, it is possible to minimize the reduction in the suction power of the dust collection motor 191 in the first area 181a and the second area 181b.

[0326] Accordingly, when the dust collection motor 191 operates, dust inside the dust bin 220 of the vacuum cleaner 200 may flow to the dust collection unit 170 through the first flow path 181.

[0327] The second flow path 182 may connect the dust collection unit 170 to the dust suction module 190. Specifically, the second flow path 182 may be a path connecting the top of the dust collection unit 170 to the top of the dust suction module 190.

[0328] With this configuration, air having passed through the dust collection unit 170 may be guided to the dust collection motor 191 through the second flow path 182.

[0329] The bypass flow path 183 may connect the bag suction portion 173 and the dust collection motor 191 in a flow path manner.

[0330] The bypass flow path 183 may connect the bag accommodating space 115 and the inner space of the dust suction module 190. For example, the bypass flow path 183 may be a path formed along the gravity direction to connect the bag accommodating space 115 and the dust suction module 190. With this configuration, the bypass flow path 183 may guide air inside the bag accommodating space 115 to the dust collection motor 191.

[0331] The second flow path 182 and the bypass flow path 183 may be in communication with each other to be collected to the dust suction module 190. For example, the second flow path 182 may be connected to the bypass flow path 183. As another example, the bypass flow path 183 may be connected to the second flow path 182, and the second flow path 182 may be connected to the dust suction module 190. Accordingly, the second flow path 182 and the bypass flow path 183 may be connected to the dust collection unit 170 and the dust collection motor 191, respectively.

[0332] This configuration has the effect of maintaining the shape of the dust bag while simultaneously sucking in outside air by operating the dust collection motor 191.

[0333] The vacuum cleaner station 100 may include the dust suction module 190. The dust suction module 190 may include the dust collection motor 191.

[0334] The dust collection motor 191 may be configured to generate a suction force in the flow path unit 180. Through this, the dust collection motor 191 may provide a suction force capable of sucking in dust inside the dust bin 220 of the vacuum cleaner 200.

[0335] The dust collection motor 191 may be configured to generate the suction force due to rotation. For example, the dust collection motor 191 may be formed in a shape similar to a cylinder, and configured to generate the suction force while rotating on a rotation axis. At this time, the rotation axial direction of the dust collection motor 191 may be arranged parallel to the ground.

[0336] Meanwhile, FIG. 17 is a block view to describe the control configuration in the vacuum cleaner station according to one embodiment.

[0337] Referring to FIG. 17, the control configuration of the vacuum cleaner station 100 will be described as follows.

[0338] The vacuum cleaner station 100 according to the embodiment may further include a controller 400 configured to control the mounting portion 120, the fixing unit 130, the door unit 140, the cover opening unit 150, the dust collection unit 170, the flow path unit 180, and the dust suction module 190.

[0339] The controller 400 may be configured of a printed circuit board and elements mounted on the printed circuit board.

[0340] When the mounting sensor 125 senses the mounting of the vacuum cleaner 200, the mounting sensor 125 may be configured to transmit a signal indicating that the vacuum cleaner 200 is mounted to the mounting portion 120. At this time, the controller 400 may receive the signal of the mounting sensor 125 and determine that the vacuum cleaner 200 is mounted to the mounting portion 120.

[0341] In addition, when the charging portion 128 supplies power to the battery 240 of the vacuum cleaner 200, the controller 400 may determine that the vacuum cleaner 200 is mounted to the mounting portion 120.

[0342] When determining that the vacuum cleaner 200 is mounted to the mounting portion 120, the controller 400 may operate the fixing part motor 133 and fix the vacuum cleaner 200.

[0343] When the fixing member 131 or the fixing portion link 135 move to a predetermined fixing point FP1, a fixing sensor unit may transmit a signal indicating that the vacuum cleaner 200 is fixed. The station controller 400 may receive the signal indicating that the vacuum cleaner 200 is fixed from the fixing sensor unit 137, and determine that the vacuum cleaner 200 is fixed. The station controller 400 may stop the operation of the fixing part motor 133, when determining that the vacuum cleaner 200 is fixed.

[0344] Meanwhile, the controller 400 may be configured to release the fixing of the vacuum cleaner 200 by rotating the fixing part motor 133 in the reverse direction, when the emptying of the dust bin 220 is terminated.

[0345] When determining that the vacuum cleaner 200

is fixed to the mounting portion 120, the controller 400 may operate the door motor 142 and open the door 141 of the vacuum cleaner station 100.

[0346] The door opening/closing sensor unit 144 may transmit a signal indicating that the door 141 is opened, when the door 141 or the door arm 143 reaches a predetermined opening position DP1. The controller 400 may receive the signal indicating that the door 141 is opened from the door opening/closing sensor unit 137, and determine that the door 141 is opened. The controller 400 may stop the operation of the door motor 142 when determining that the door 141 is opened.

[0347] Meanwhile, the controller 400 may close the door 141 by rotating the door motor 142 in the reverse direction, when the emptying of the dust bin 220 is terminated.

[0348] The controller 400 may operate the cover opening motor 152 and open the discharge cover 222 of the vacuum cleaner 200, when determining that the door 141 is opened.

[0349] When the guide frame 351e reaches a predetermined opening position CP1, the cover opening sensor unit 155f may transmit a signal indicating that the discharge cover 222 is opened. The controller 400 may receive a signal indicating that the discharge cover 222 is opened from the cover opening sensor unit 155f and determine that the discharge cover 222 is opened. When determining that the discharge cover 222 is opened, the controller 400 may stop the operation of the cover opening motor 152.

[0350] The controller 400 may receive information about whether the dust bag 172 is present and/or information about the amount of dust stored in the dust bag 172 from the dust bag sensors 173g and 173h.

[0351] The controller 400 may drive the bag discharge motor 173e and move the stopper 173d. for example, while the stopper 173d and the bag extracting portion 173c are supported in contact, the controller 400 may drive the bag discharge motor 173e and move the stopper 173d in the direction in which the stopper 173d releases the contact with the bag extracting portion 173c.

[0352] The controller 400 may drive the jointer 176 and joint the dust bag 172. For example, the controller 400 may operate the first joint member to move it in the first direction, and operate the second joint member to move it in the second direction perpendicular to the first direction.

[0353] Meanwhile, in this embodiment, the controller 400 may operate the jointer 176, after the operation of the dust collection motor 191 is terminated. For example, the controller 400 may operate the jointer 176 in a preset time after the operation of the dust collection motor 191 is terminated. As another example, the controller 400 may operate the jointer 176 in a preset time after the dust collection motor 191 is operated a preset number of times. As a further example, the controller 400 may operate the jointer 176 at preset intervals, and when the dust collection motor 191 is operating, the controller 400 may operate the jointer 176 after a preset time

period. Rather than those examples, the controller 400 may operate the jointer 176 when the amount of dust measured by the dust amount sensor (not shown) is more than a preset reference value.

[0354] With this configuration, the dust bag 172 may be sealed in a state where dust is not flying in the vacuum cleaner station 100 but settling within the dust bag 172, thereby improving sanitation.

[0355] The controller 400 may be configured to suck dust inside the dust bin 220 by operating the dust collection motor 191.

[0356] The controller 400 may operate the display 410 to display a state of emptying the dust bin and a state of charging the vacuum cleaner 200. For example, in this embodiment, if the amount of dust measured by the dust amount sensor is more than a preset reference value, the controller 400 may control the display 410 to display that it is necessary to replace the dust bag 172.

[0357] Meanwhile, the vacuum cleaner station 100 of the present disclosure may include the display 410.

[0358] The display 410 may be disposed in the housing 110 or may be disposed in a separate display device. Also, it may be provided in a terminal including a mobile phone.

[0359] The display 410 may include at least one of a display panel configured to output characters and/or figures, and a speaker configured to output voice signals and sounds. The user can easily figure out the state of the current process, the remaining time, etc. through the information output through the display.

[0360] Meanwhile, the vacuum cleaner station 100 according to the embodiment of the present disclosure may include a memory 430. The memory 430 may contain various data for driving and operating the vacuum cleaner station 100.

[0361] Meanwhile, the vacuum cleaner station 100 according to the embodiment may include an input unit 440. The input unit 440 may be configured to generate key input data input by the user to control the operation of the vacuum cleaner station 100. To this end, the input unit 440 may include a key pad, a dome switch, a touchpad (static/capacitive), etc. In particular, when the touch pad forms a mutual layer structure with the display unit 410, it can be called a touch screen.

[0362] FIG. 18 is a flow chart to describe a controlling method of the vacuum cleaner station according to one embodiment. FIG. 19 is a schematic view to describe a process in which a first dust bag sensor measures the dust amount in the controlling method of the vacuum cleaner station according to one embodiment. FIG. 20 is a schematic view to describe a state where a jointed dust bag is accommodated in a bag discharge unit in the controlling method of the vacuum cleaner station according to one embodiment. FIG. 21 is a schematic view to describe a process of discharging the jointed dust bag through the movement of the bag discharge unit in the controlling method of the vacuum cleaner station according to one embodiment. FIG. 22 is a schematic view to

describe a state where a jointed dust bag is accommodated in a bag discharge unit in the controlling method of the vacuum cleaner station according to another embodiment. FIG. 23 is a schematic view to describe a process of discharging the jointed dust bag through the movement of the bag discharge unit in the controlling method of the vacuum cleaner station according to one embodiment. FIG. 24 is a schematic view to describe a process of detecting whether the jointed dust bag is present by using a second dust bag detecting sensor in the controlling method of the vacuum cleaner station according to one embodiment.

[0363] Referring to FIGS. 18 to 24, the controlling method of the vacuum cleaner station according to one embodiment will be described as follows.

[0364] First, the controlling method of the vacuum cleaner station according to this embodiment may include a dust amount sensing step S10. In the dust amount sensing step S10, the amount of dust stored in the dust bag 172 may be sensed.

[0365] That is, in the dust amount sensing step S10, the controller 400 of the vacuum cleaner station 100 may be configured to sense the amount of dust stored in the dust bag 172 through the first dust bag sensor 173g.

[0366] At this time, the dust bag 172 may be in a state of being expanded by the operation of the dust collection motor 191.

[0367] Specifically, the first dust bag sensor 173g may irradiate light to the dust bag 172, and sense the light reflected by the dust bag 172 or foreign substances stored inside the dust bag 172.

[0368] The first dust bag sensor 173g may transmit information about the amount of light irradiated by the first dust bag sensor 173g and the amount of light sensed by the first dust bag sensor 173g to the controller 400.

[0369] The controller 400 may derive the amount of dust stored in the dust bag 172 based on the information received from the first dust bag sensor 173g. For example, the memory 430 may store information about the amount of dust based on the light sensed by the first dust bag sensor 173g. Accordingly, the controller 400 may compute the amount of dust stored in the dust bag 172 based on the light sensed by the first dust bag sensor 173g.

[0370] Meanwhile, the controller 400 may determine whether the amount of dust Q stored in the dust bag 172 exceeds a preset reference dust amount Q_r S20.

[0371] Here, if the dust amount Q is a reference dust amount Q_r or less, the controlling method of the vacuum cleaner according to this embodiment may be ended.

[0372] Meanwhile, the controlling method of the vacuum cleaner station according to this embodiment may include a bag joint step S30. In the bag joint step S30, the dust bag 172 may be jointed if the amount of dust stored in the dust bag 172 exceeds the preset reference dust amount.

[0373] If the dust amount Q exceeds the reference dust amount Q_r, the controller 400 may operate the jointer 176

S30.

[0374] For example, the controller 400 may operate the first joint driving unit (not shown) and the second joint driving unit (not shown). Accordingly, the first joint member (not shown) and the second joint member (not shown) may move.

[0375] Accordingly, when the jointer 176 operates, the upper area of the dust bag 172 may be cut and jointed. Specifically, the jointer 176 may gather dust in the center area of the dust bag 172 and heat-bond or heat-joint the upper area of the dust bag 172.

[0376] The dust bag 172 heat-bonded or heat-jointed as described above may be separated from the dust bag cartridge 174 and fall into the bag extracting portion 173c. accordingly, the heat-jointed dust bag 172 may be accommodated in the bag extracting portion 173c.

[0377] The controlling method of the vacuum cleaner station according to this embodiment may include a bag discharging step S40. In the bag discharging step S40, the dust bag 172 jointed in the bag jointing step S30 may be discharged.

[0378] In the bag discharging step S40, the controller 400 may move the stopper 173d by driving the bag discharge motor 173e.

[0379] In the bag jointing step S30, the stopper 173d and the bag extracting portion 173c may be supported in contact with each other. After that, in the bag discharging step S40, the contact between the bag extracting portion 173c and the stopper may be released. When the contact between the stopper 173d and the bag extracting portion 173c is released, the spring 173f may be expanded to move the bag extracting portion 173c.

[0380] Accordingly, at least predetermined area of the bag extracting portion 173c may be extracted to the outside of the suction main body 173a. At this time, at least predetermined area of the dust bag 172 may be discharged to the outside of the support main body 173a together with the bag extracting portion 173c.

[0381] Meanwhile, in the bag discharging step S40, the controller 400 may notify the user that the dust bag 172 is discharged through the display 410. For example, in the bag discharging step S40, the discharge of the dust bag 172 may be indicated by text through the display panel. As another example, the discharge of the dust bag 172 may be indicated by a voice signal and sound through the speaker.

[0382] After the bag discharging step S40, the user may remove the dust bag 172 accommodated in the support main body 173a. For example, the user may pull the support main body 173a and then raise the dust bag 172 accommodated in the support main body 173a to remove.

[0383] Accordingly, the jointed dust bag 172 may be removed from the vacuum cleaner station 100.

[0384] The controlling method of the vacuum cleaner station according to this embodiment may include a bag checking step S60. The bag checking step S60 may sense whether the dust bag 172 jointed in the bag jointing

step S40 is present.

[0385] That is, in the bag checking step S60, the controller 400 of the vacuum cleaner station 100 may sense whether the dust bag 172 is present under the support main body 173a through the second dust bag sensor 173h.

[0386] Here, the dust bag 172 may be in a state of being disposed below the support main body 173a after jointed by the jointer 176 and falling down. At this time, the dust bag 172 may be in a state of being accommodated in the bag extracting portion 173c and also in a state of being placed on the bottom surface (not shown) of the support main body 173a, not being accommodated in the bag extracting portion 173c.

[0387] Specifically, the second dust bag sensor 173h may irradiate light to the dust bag 172 and sense the light reflected by the dust bag 172 or foreign substances (i.e., dust) stored in the dust bag 172.

[0388] The second dust bag sensor 173h may transmit information about the amount of light irradiated by itself and the amount of light sensed by itself to the controller 400.

[0389] The controller 400 may determine whether the dust bag 172 is present below the bag extracting portion 173c based on the information received from the second dust bag sensor 173h. For example, the memory 430 may store information about the amount of light sensed by the second dust bag sensor 173h if the dust bag 172 is present. Accordingly, the controller 400 may determine whether the dust bag 172 separated and falling from the dust bag cartridge 174 is present below the bag support portion 173 based on the light sensed by the second dust bag sensor 173h.

[0390] Here, if the dust bag 172 is present below the bag support portion 173 after jointed and falling, the controller 400 may notify the user that the dust bag 172 has to be removed S65.

[0391] At this time, the controller 400 may indicate through the display 410 that removal of the dust bag 172 is necessary. For example, the controller 400 may display a prerecorded voice or a pre-set sound through the display 410 to audibly indicate that the dust bag 172 needs to be removed. As another example, the controller 400 may display a pre-stored character, symbol, or shape through the display 410 to visually indicate that the dust bag 172 needs to be removed. As a further example, the controller 400 may transmit a signal to a user's terminal (e.g., a smartphone), and the user can be informed of the need to remove the dust bag 172 through a screen, sound, or vibration notifying the user on the terminal.

[0392] After notifying the user of the need to remove the dust bag 172, the controller 400 may perform the bag discharging step S40.

[0393] Meanwhile, if the dust bag 172 is not present below the bag support portion 173 (i.e., it is sensed through the second dust bag sensor 173h that the dust bag 172 is removed), the controller 400 may operate the dust collection motor 191 S70.

[0394] Before the bag jointing step S30, the dust bag 172 containing the collected dust is supported on the dust bag cartridge 174. After that, when the dust bag 172 storing dust is separated from the dust bag cartridge 174, the dust bag in a state of being pulled may remain in the dust bag cartridge 174 in the bag jointing step S30.

[0395] At this time, when the dust collection motor 191 is operated, the dust bag 172 may be expanded by the suction force (i.e., negative pressure) of the dust collection motor 191.

[0396] Accordingly, as a new dust bag is being expanded by the operation of the dust collection motor 191, the dust bag 172 may be in a state of being ready to collect dust.

[0397] Although the present invention has been described with reference to the exemplified drawings, it is to be understood that the present invention is not limited to the embodiments and drawings disclosed in this specification, and those skilled in the art will appreciate that various modifications are possible without departing from the scope and spirit of the present invention.

[0398] Further, although the operating effects according to the configuration of the present invention are not explicitly described while describing an embodiment of the present invention, it should be appreciated that predictable effects are also to be recognized by the configuration.

Claims

1. A vacuum cleaner station comprising:

a housing;
a mounting portion disposed in the housing and comprising a coupling surface to which at least predetermined area of a vacuum cleaner is coupled;
a dust collection unit accommodated within the housing and disposed below the mounting portion, the dust collection unit configured to collect dust inside a dust bin of the vacuum cleaner; and
a dust collection motor accommodated within the housing and disposed below the dust collection unit, the dust collection motor configured to generate a suction force for sucking in dust inside the dust bin,
wherein the dust collection unit comprises,
a dust bag configured to store dust;
a bag support portion configured to accommodate the dust bag; and
a dust bag sensor disposed in the bag support portion and configured to sense the dust bag.

2. The vacuum cleaner station of claim 1, wherein the dust bag sensor comprises a first dust bag sensor configured to measure the amount of dust stored in the dust bag.

3. The vacuum cleaner station of claim 2, wherein the dust bag sensor comprises a second dust bag sensor disposed closer to the ground than the first dust bag sensor and configured to sense presence of the dust bag.

4. The vacuum cleaner station of claim 1, wherein the bag support portion comprises,

a support main body;
a bag extracting portion movably accommodated in the support main body and configured to transfer the dust bag.

5. The vacuum cleaner station of claim 4, wherein the bag support portion further comprises, a stopper configured to be supported on the bag extracting portion in contact, along with rotation.

6. The vacuum cleaner station of claim 4, wherein the bag support portion further comprises, a spring coupled to the support main body and the bag extracting portion, and configured to linearly move the bag extracting portion.

7. The vacuum cleaner station of claim 5, wherein the dust collection unit further comprises,

a jointer configured to joint the dust bag; and
a bag discharge actuator configured to apply a rotational force to the stopper, and
the bag discharge actuator is operated after the jointer is operated.

8. A controlling method of a vacuum cleaner station coupled to a vacuum cleaner comprising a dust bin; and a discharge cover configured to selectively open and close the dust bin, and configured to collect dust inside the dust bin in a dust bag, the controlling method comprising:

a dust amount sensing step of sensing the amount of dust stored in the dust bag; and
a bag jointing step of jointing the dust bag when the amount of dust stored in the dust bag is more than a preset reference dust amount.

9. The controlling method of the vacuum cleaner station of claim 8, further comprising:
a bag discharging step of discharging the dust bag jointed in the bag jointing step.

10. The controlling method of the vacuum cleaner station of claim 8, further comprising:
a bag checking step of sensing whether the dust bag jointed in the bag jointing step is present.

11. The controlling method of the vacuum cleaner sta-

tion of claim 10, wherein when it is sensed in the bag checking step that the jointed dust bag is removed, the dust bag is expanded.

12. The controlling method of the vacuum cleaner station of claim 10, wherein when it is sensed in the bag checking step that the jointed dust bag is present, need to remove the dust bag is displayed.

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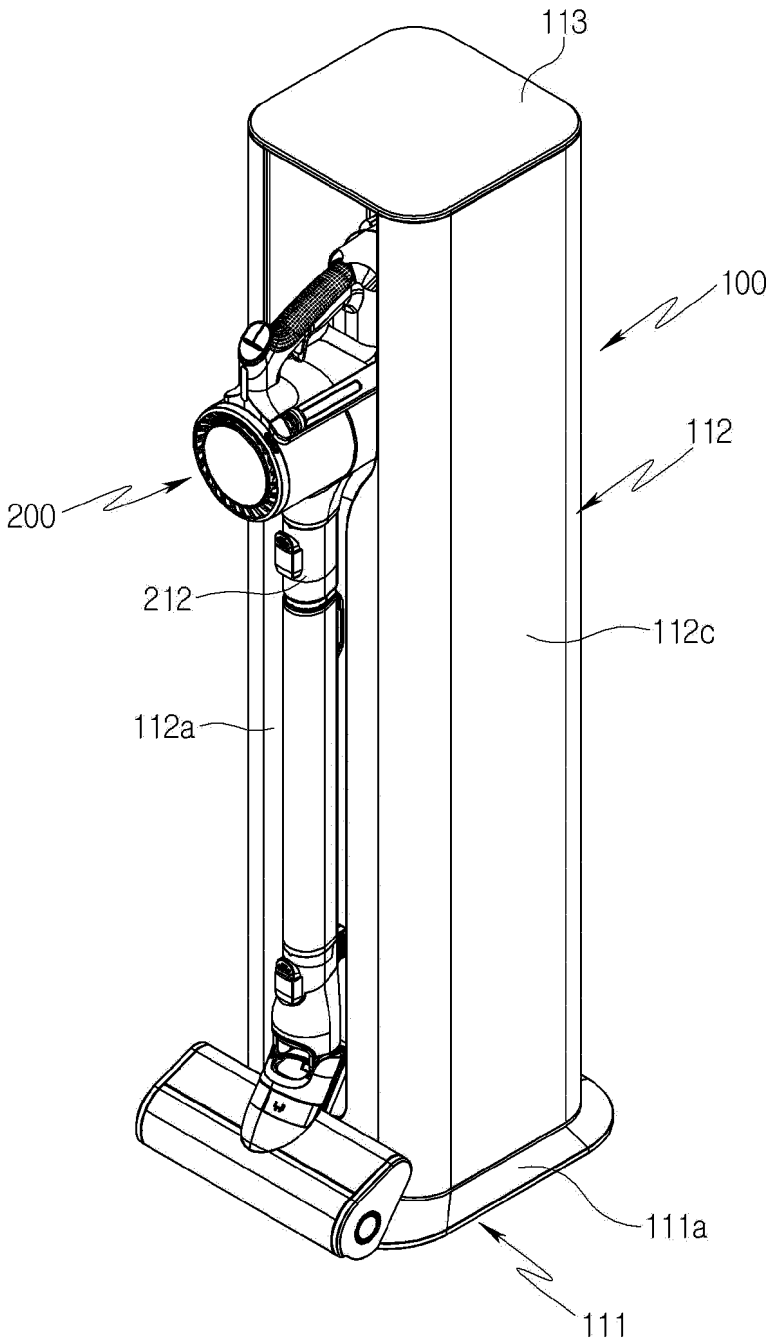
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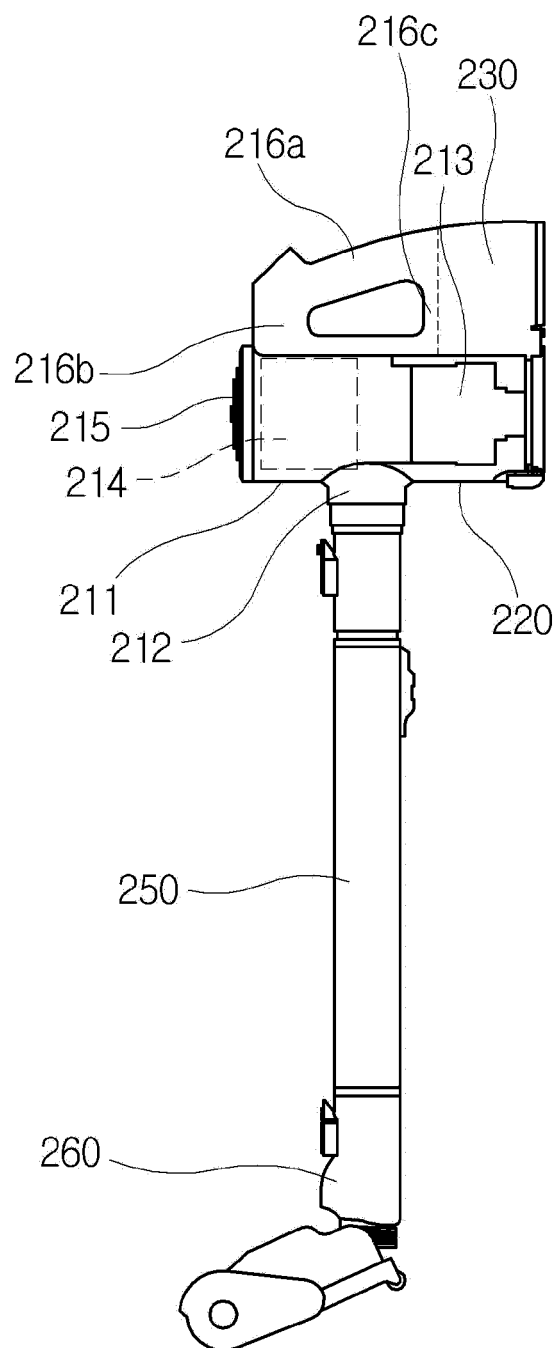
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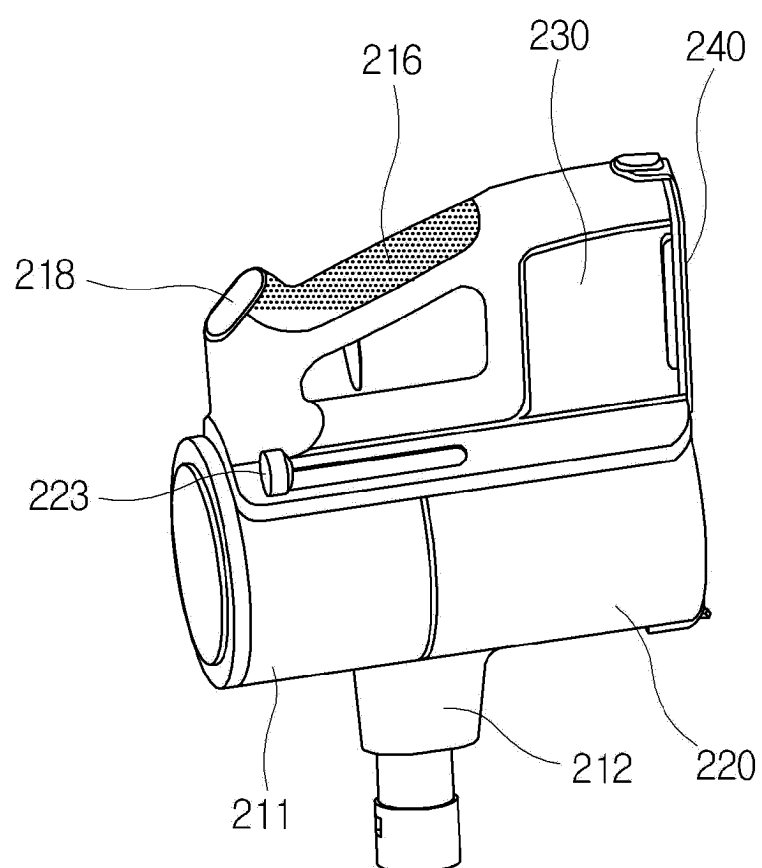
[FIG. 1]



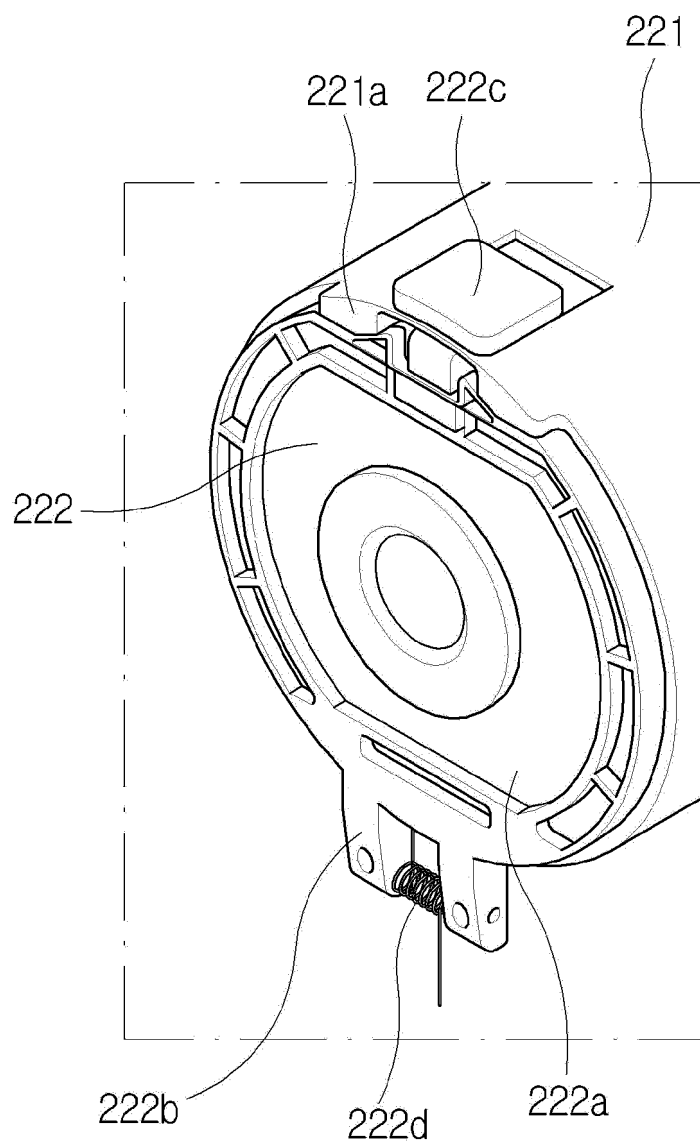
[FIG. 2]



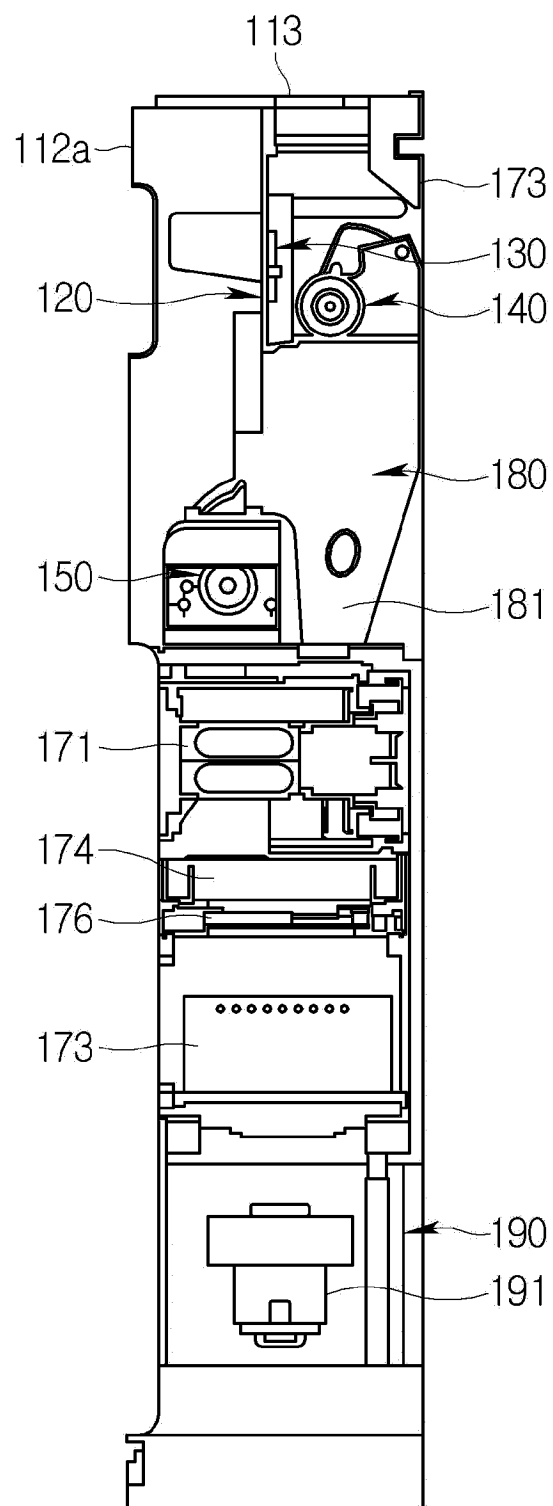
[FIG. 3]



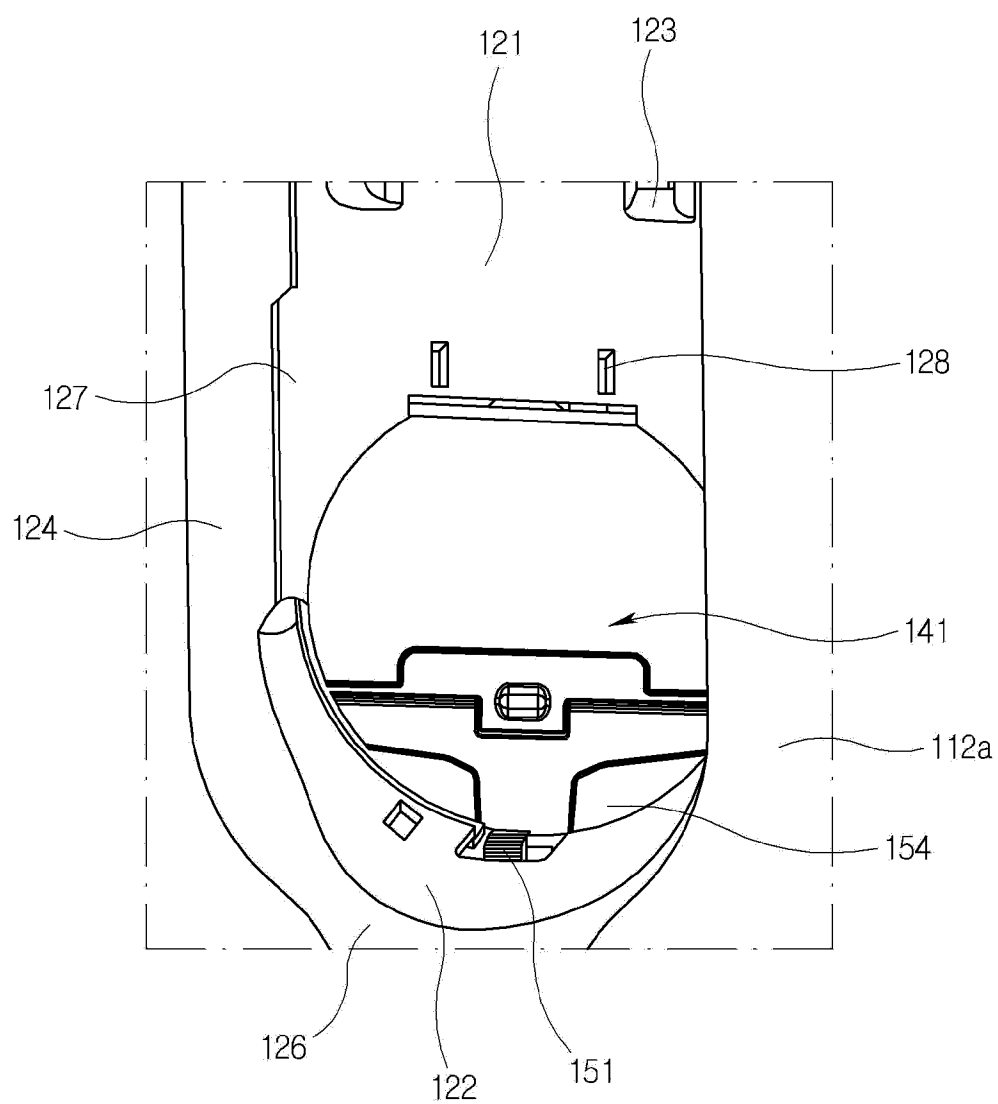
[FIG. 4]



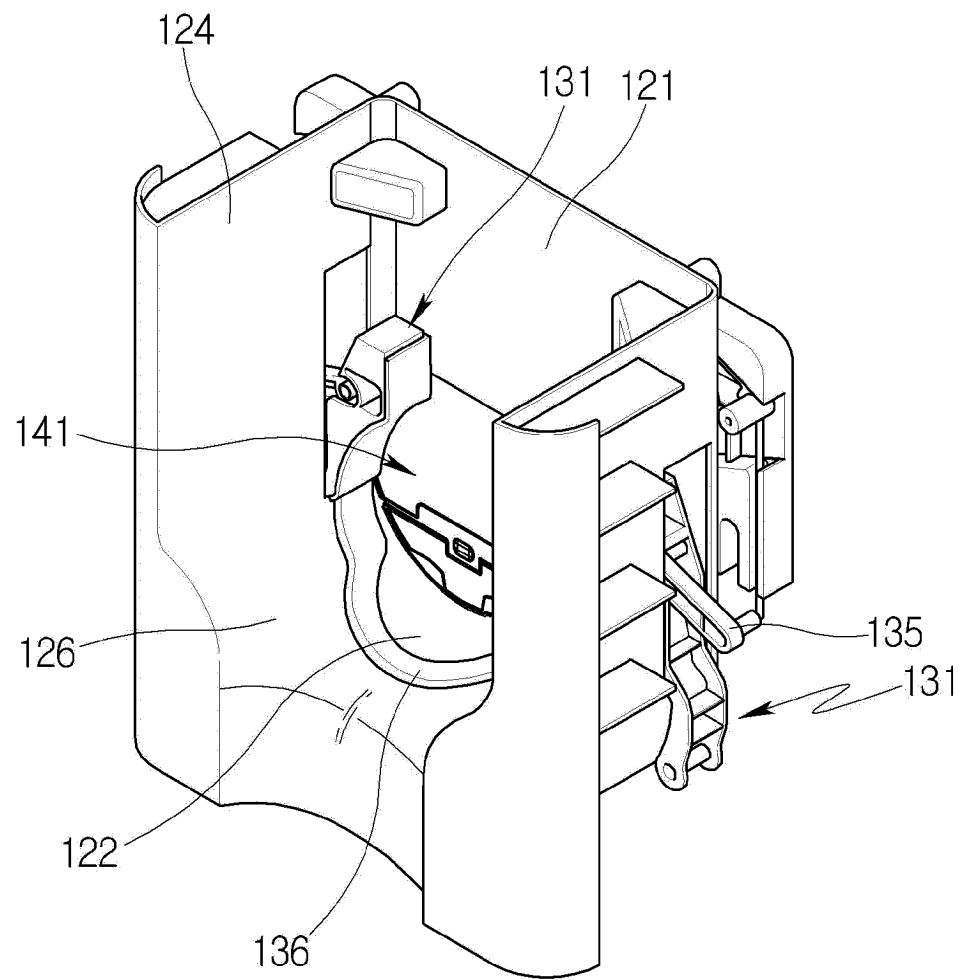
[FIG. 5]



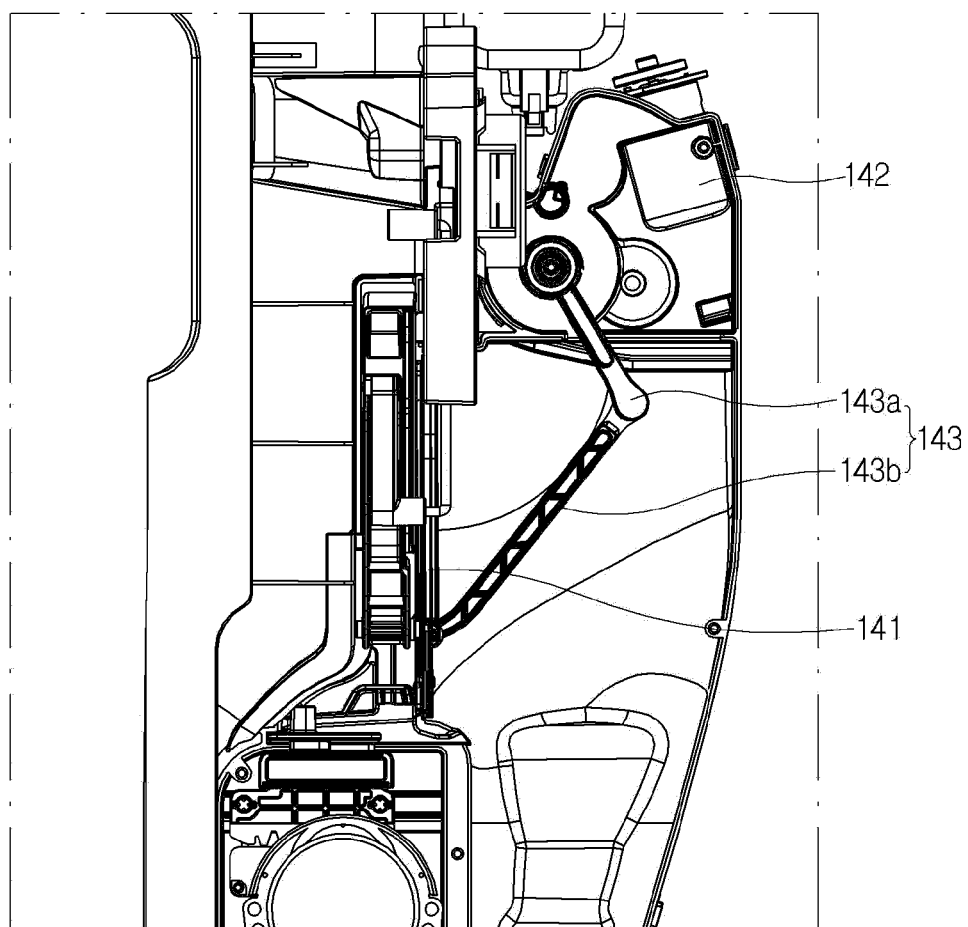
[FIG. 6]



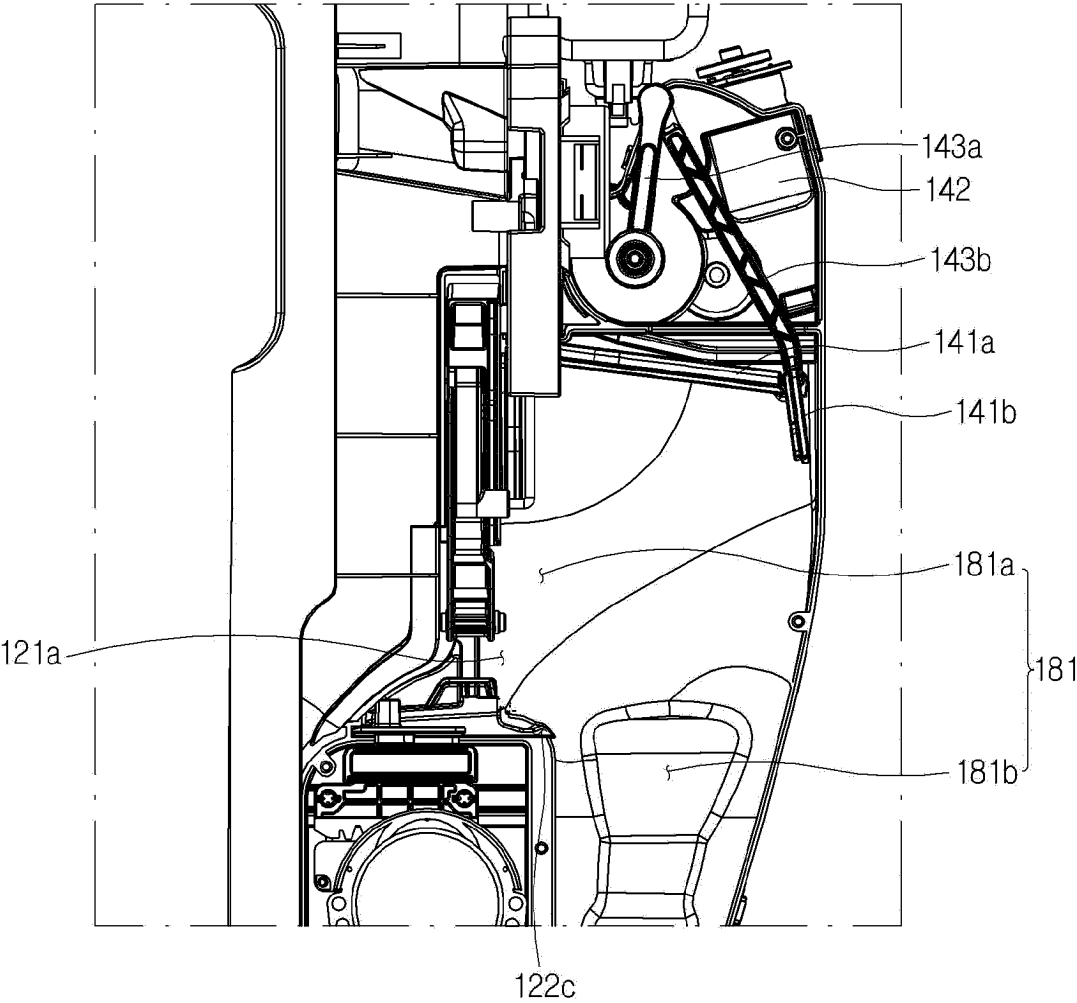
[FIG. 7]



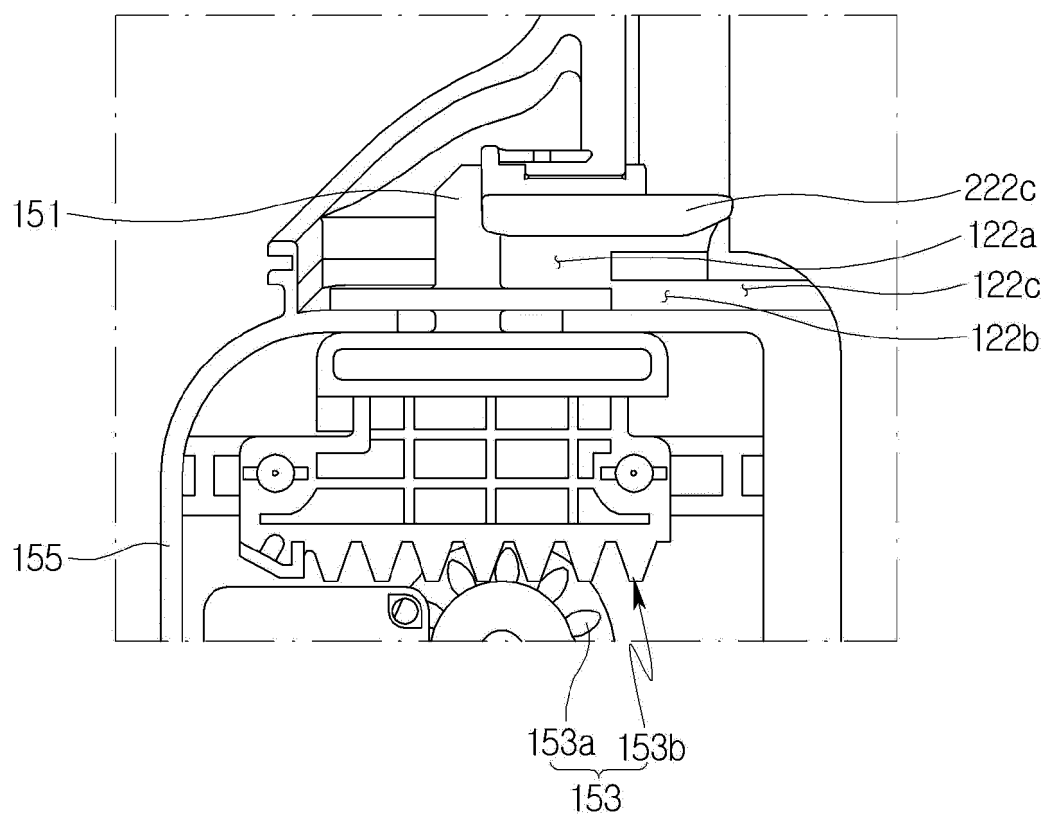
[FIG. 8]



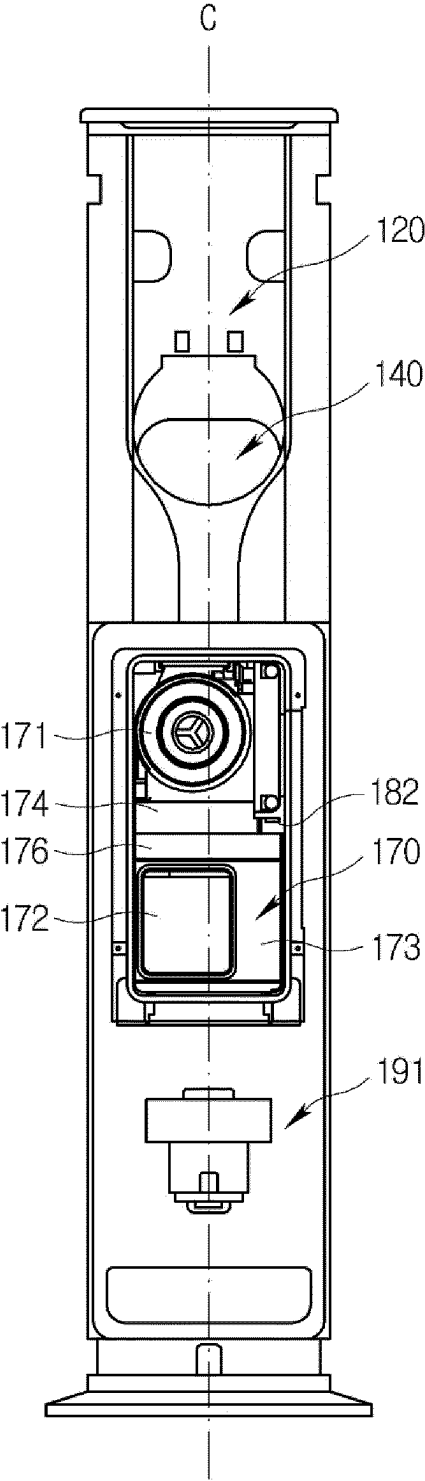
[FIG. 9]



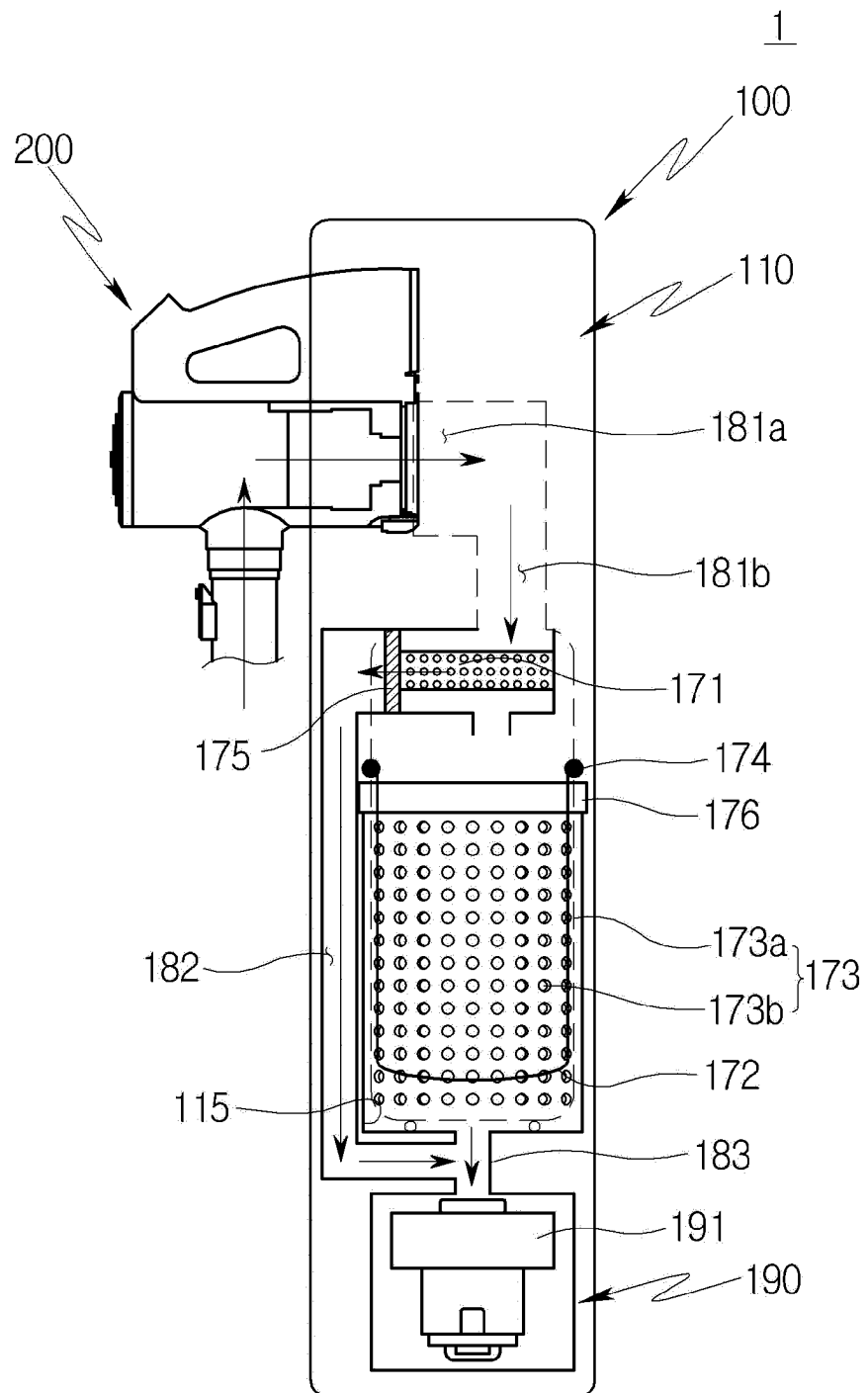
[FIG. 10]



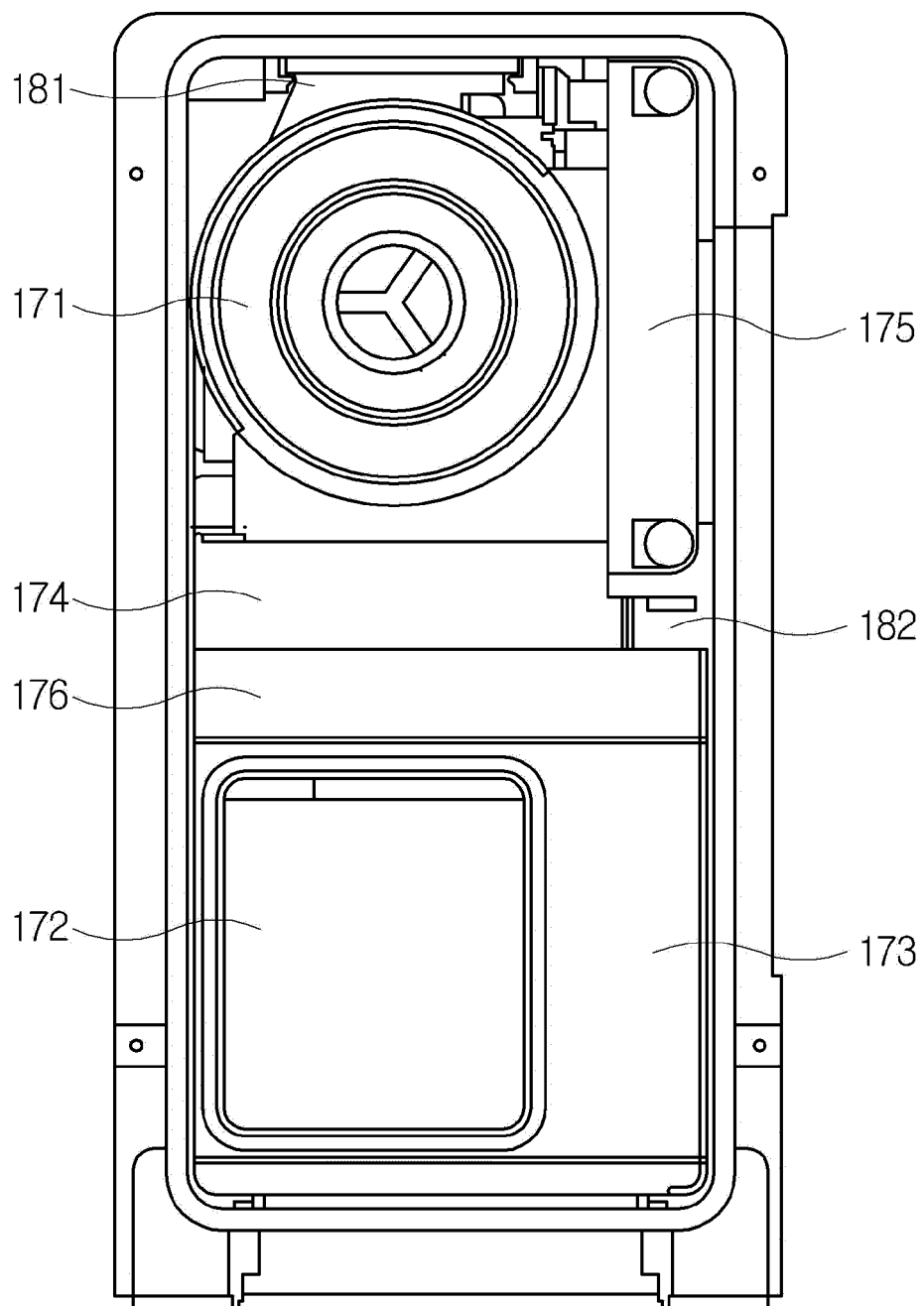
[FIG. 11]



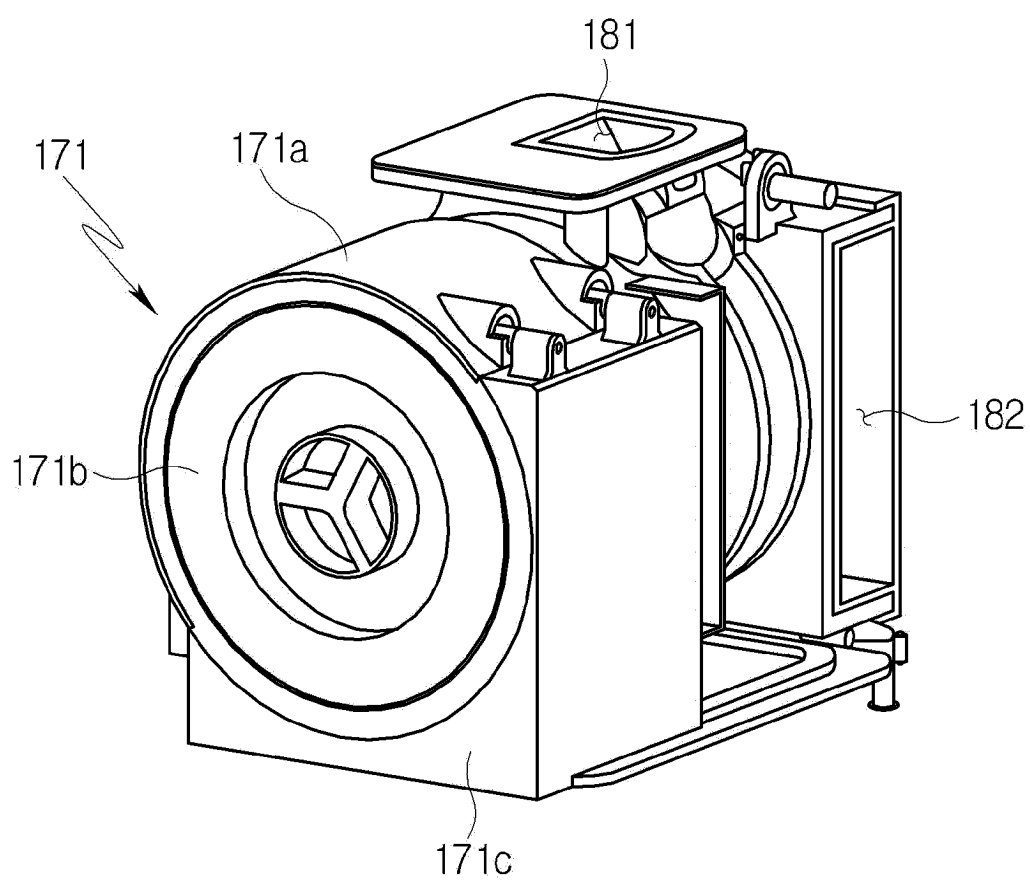
[FIG. 12]



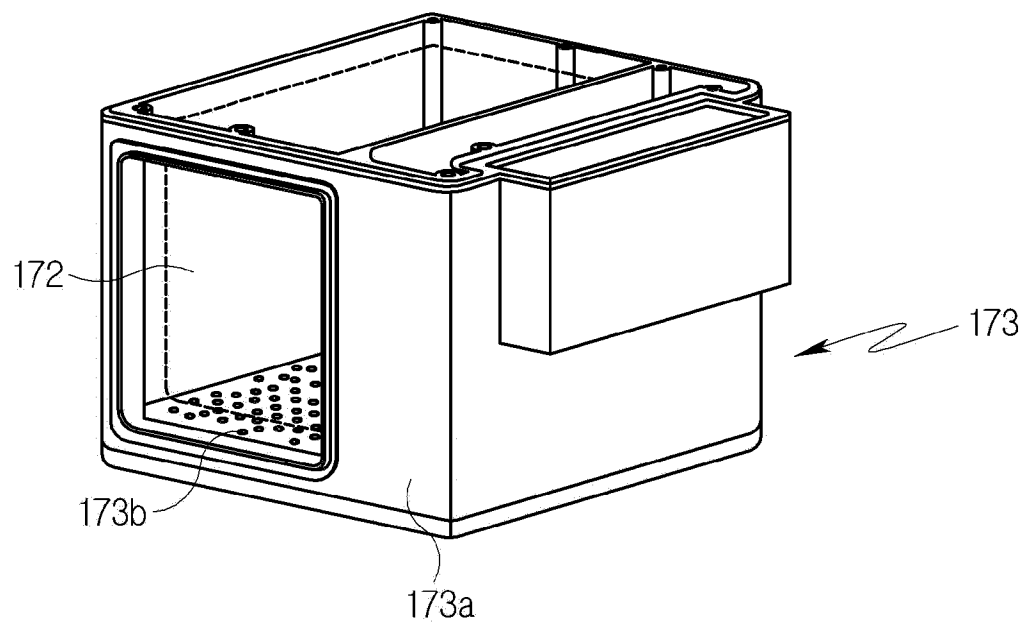
[FIG. 13]



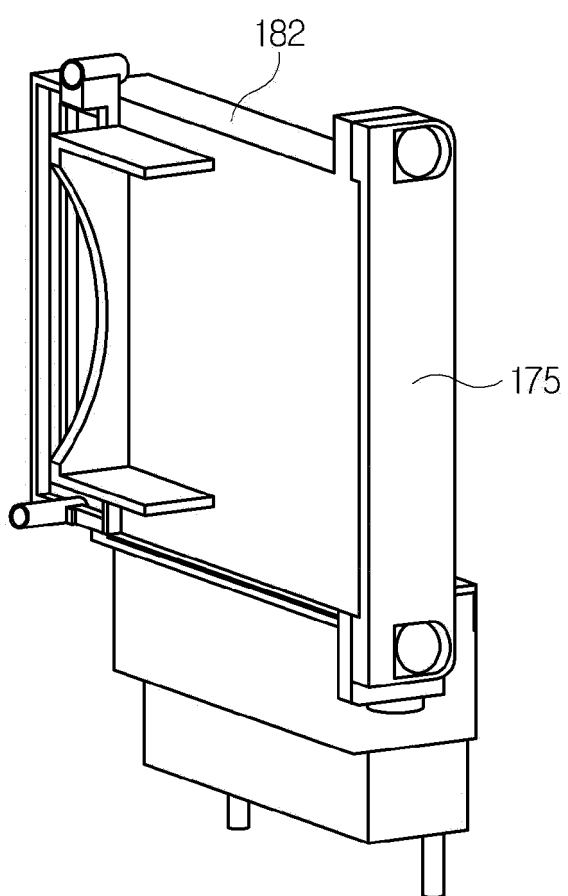
[FIG. 14]



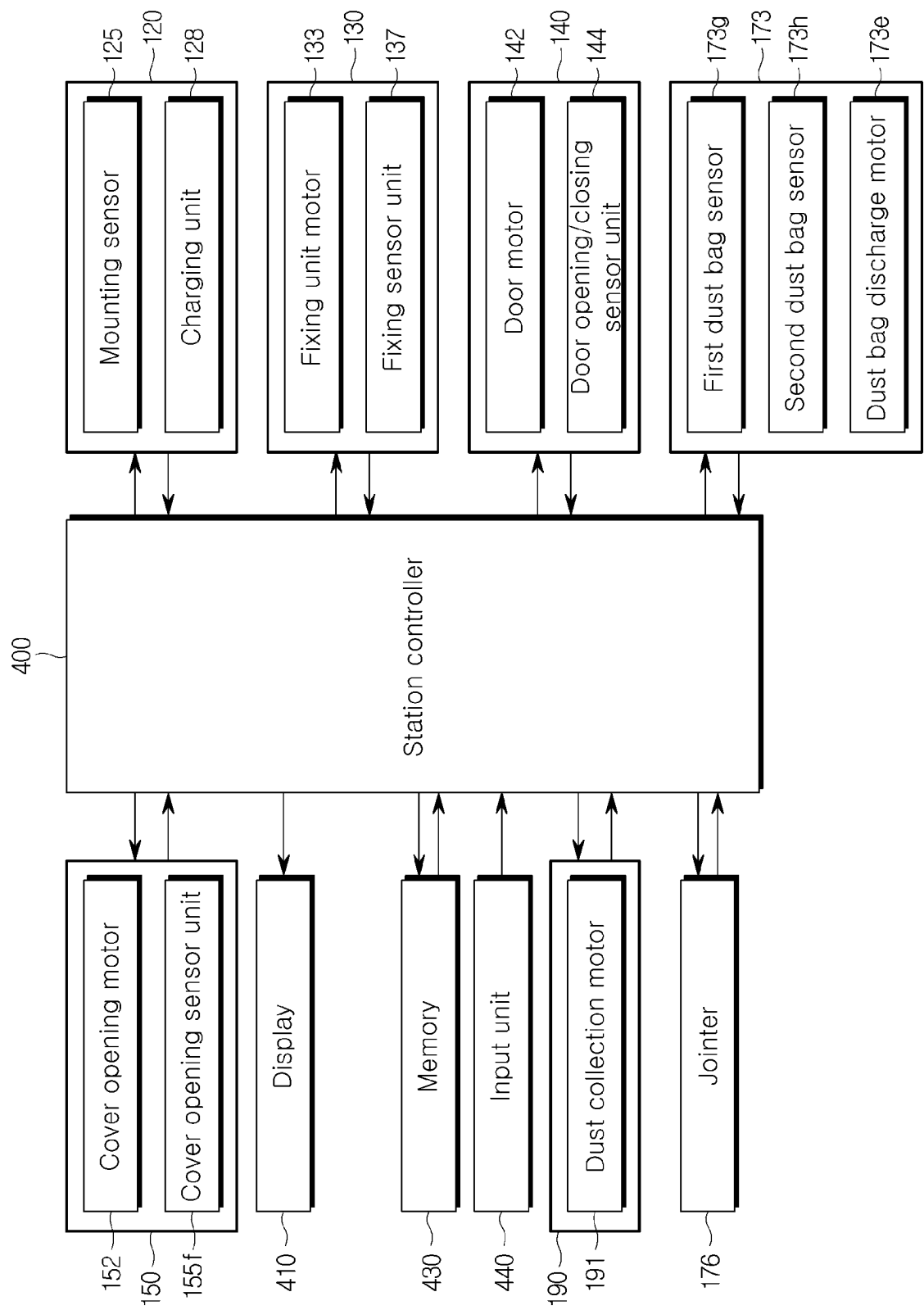
[FIG. 15]



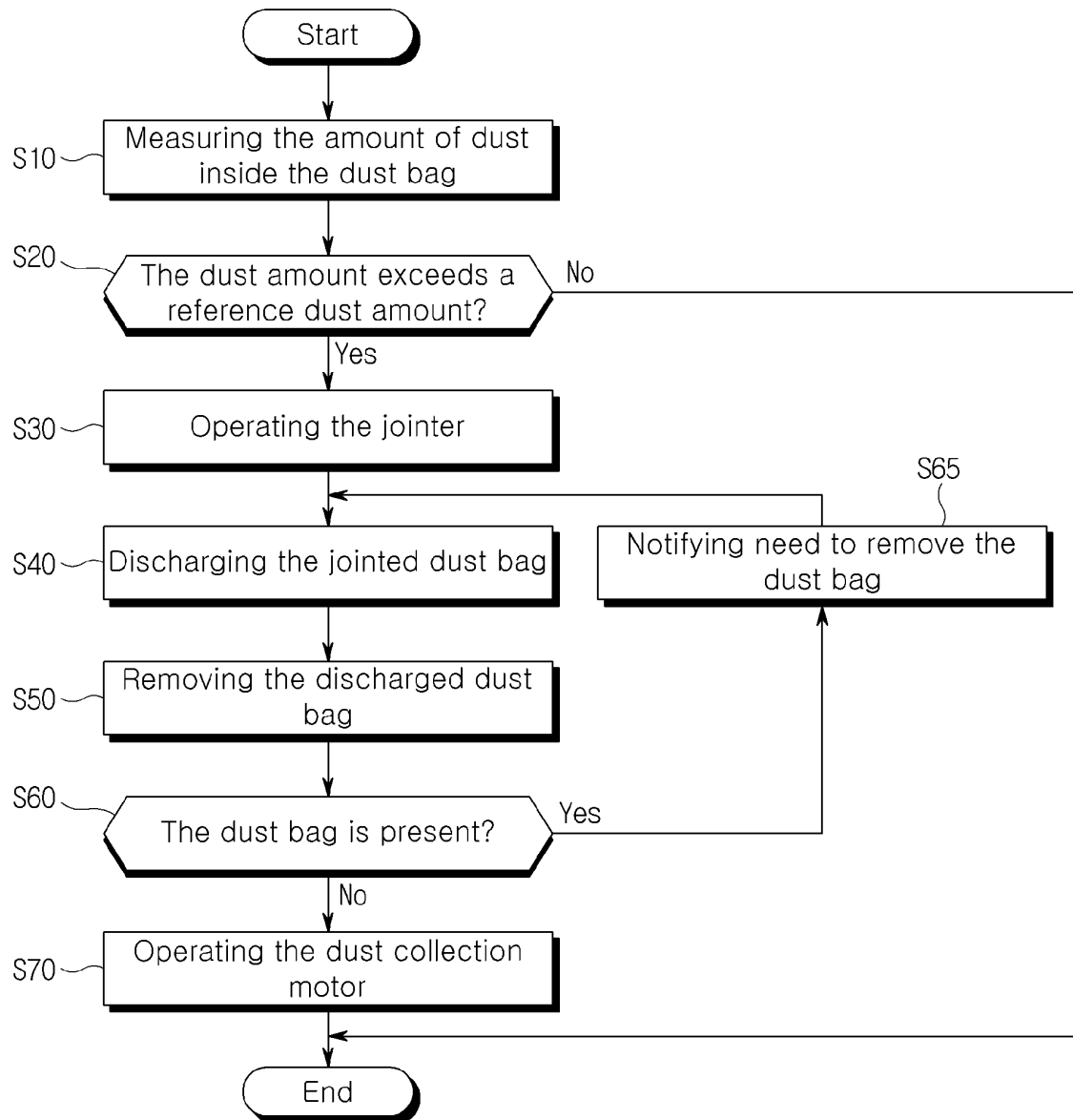
[FIG. 16]



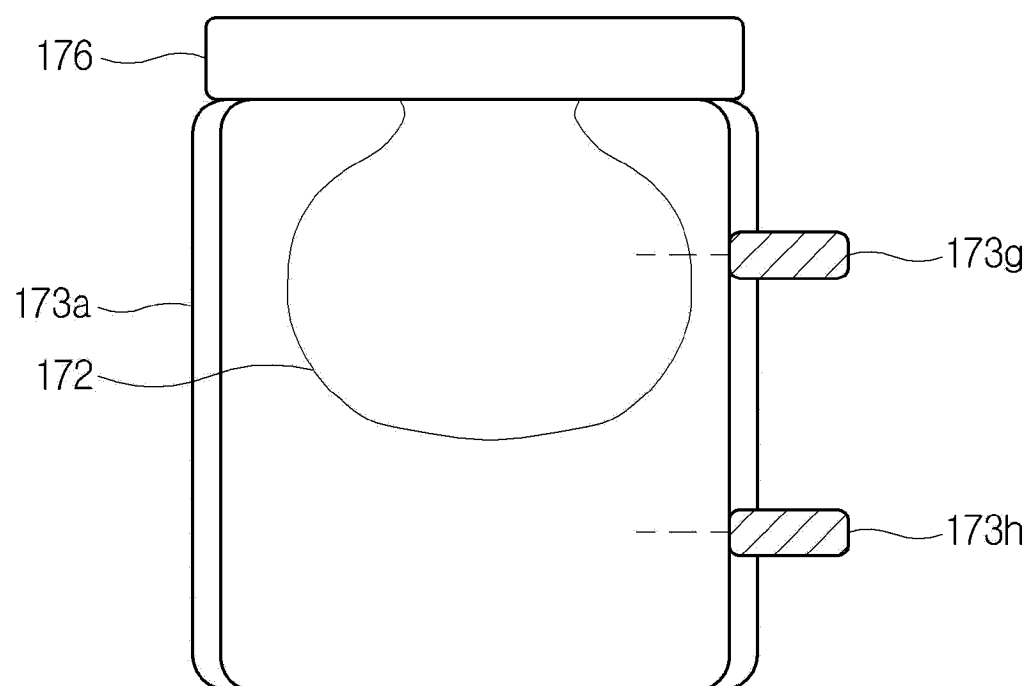
[FIG. 17]



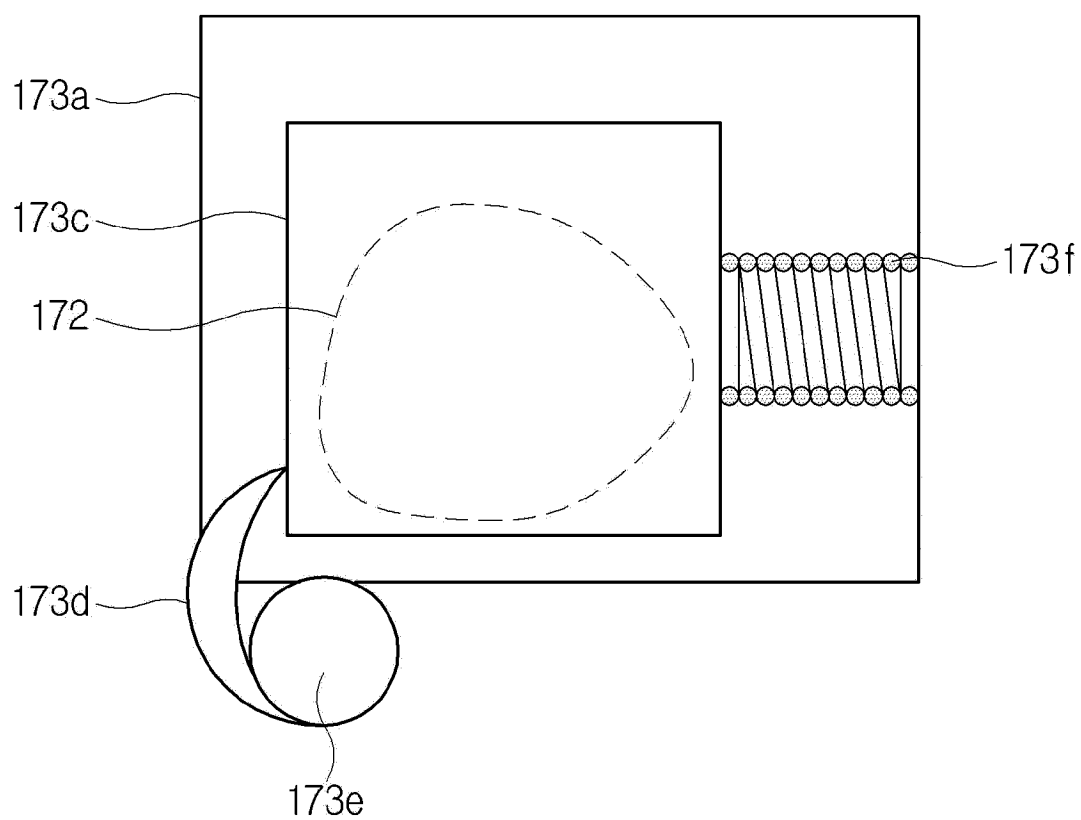
[FIG. 18]



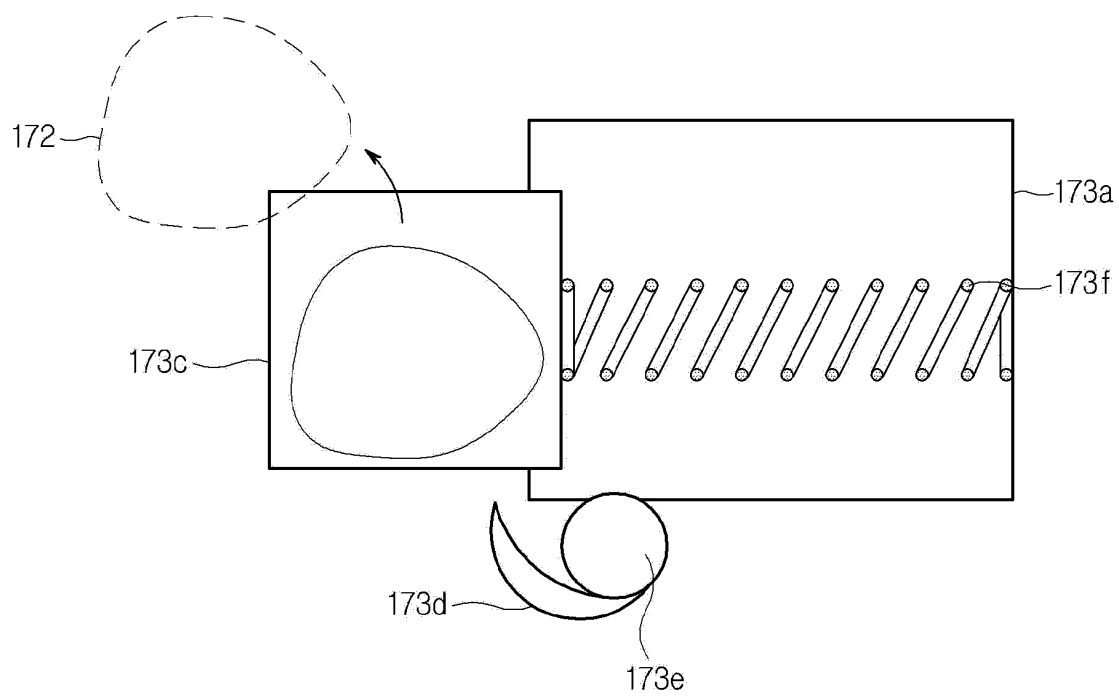
[FIG. 19]



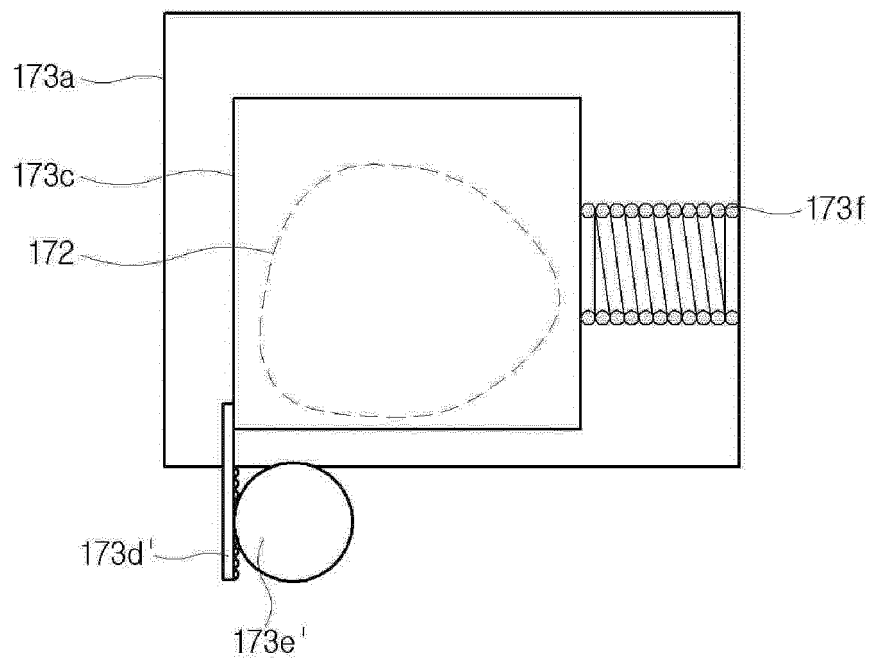
[FIG. 20]



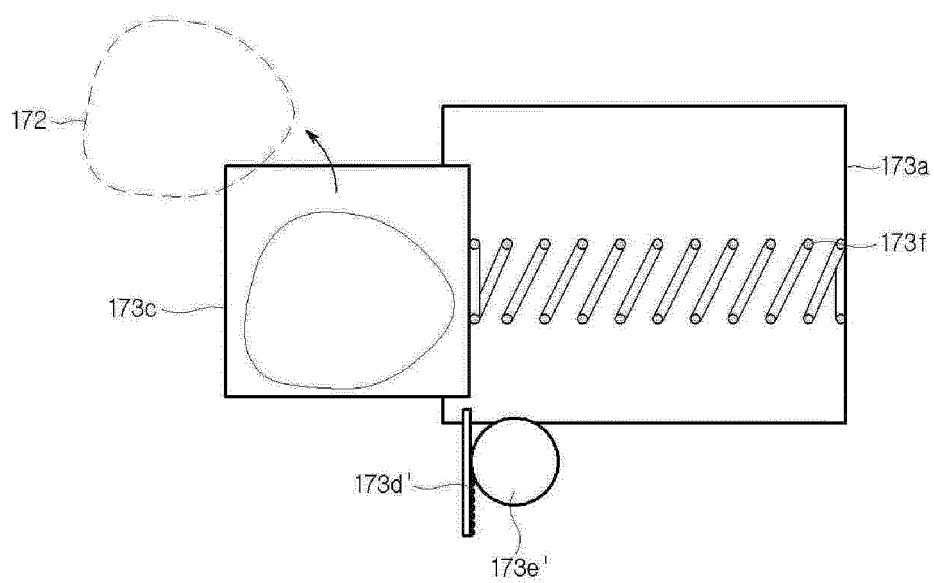
[FIG. 21]



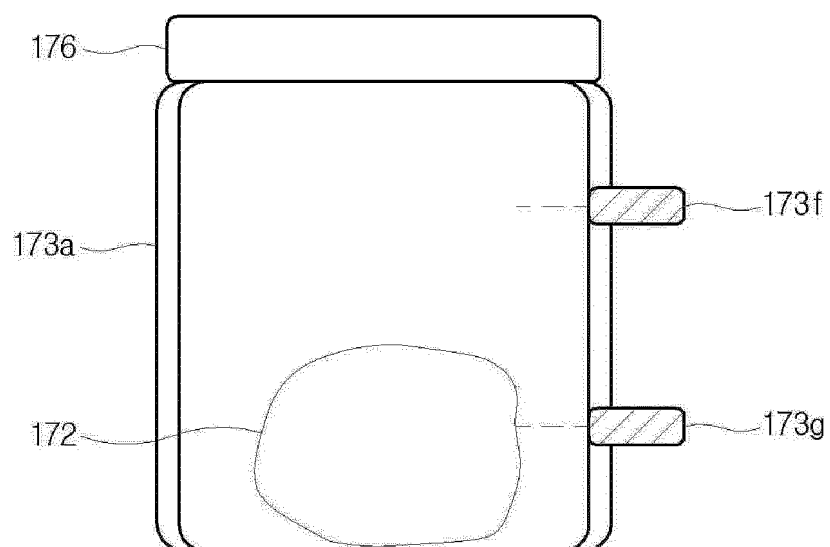
[FIG. 22]



[FIG. 23]



[FIG. 24]



INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2023/007696

A. CLASSIFICATION OF SUBJECT MATTER

A47L 9/14(2006.01)i; A47L 9/28(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A47L 9/14(2006.01); A47L 9/28(2006.01); B02C 18/00(2006.01); B65B 7/02(2006.01); B65F 1/06(2006.01); B65F 1/14(2006.01)

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

Korean utility models and applications for utility models: IPC as above

Japanese utility models and applications for utility models: IPC as above

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

eKOMPASS (KIPO internal) & keywords: 스테이션(station), 청소기(vacuum cleaner), 먼지 봉투(dust bag), 접합(bond), 먼지 봉투 감지 센서(dust bag detection sensor), 인출부(drawer), 스토퍼(stopper), 스프링(spring)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	KR 10-2022-0092057 A (LG ELECTRONICS INC.) 01 July 2022 (2022-07-01) See paragraphs [0072], [0095]-[0125], [0164]-[0167] and [0269] and figures 1-2.	1-12
Y	KR 10-2063063 B1 (TEBAH) 07 January 2020 (2020-01-07) See paragraphs [0025]-[0032], [0041]-[0044] and [0051]-[0058], claim 8 and figures 3 and 6-7.	1-7,10-12
Y	JP WO2017-209285 A1 (NAKABAYASHI CO., LTD.) 04 April 2019 (2019-04-04) See paragraphs [0039]-[0040] and [0047]-[0050] and figures 9-15.	4-12
A	KR 10-2022-0057764 A (LG ELECTRONICS INC.) 09 May 2022 (2022-05-09) See paragraphs [0077]-[0188] and [0208] and figures 1-14.	1-12
A	JP 2020-036899 A (I ROBOT CORP.) 12 March 2020 (2020-03-12) See paragraphs [0044]-[0045] and figures 2A-2B.	1-12

☐ Further documents are listed in the continuation of Box C.
 ☒ See patent family annex.

* Special categories of cited documents:

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“P” document published prior to the international filing date but later than the priority date claimed

“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

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Date of the actual completion of the international search

15 September 2023

Date of mailing of the international search report

15 September 2023

Name and mailing address of the ISA/KR

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Government Complex-Daejeon Building 4, 189 Cheongsaro, Seo-gu, Daejeon 35208

Facsimile No. +82-42-481-8578

Authorized officer

Telephone No.

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/KR2023/007696

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Patent document cited in search report			Publication date (day/month/year)		Patent family member(s)			Publication date (day/month/year)	
KR	10-2022-0092057	A	01 July 2022		None				
KR	10-2063063	B1	07 January 2020		None				
JP	WO2017-209285	A1	04 April 2019		CN	109311543	A	05 February 2019	
					JP	6845849	B2	24 March 2021	
					US	2020-0317443	A1	08 October 2020	
					WO	2017-209285	A1	07 December 2017	
KR	10-2022-0057764	A	09 May 2022		None				
JP	2020-036899	A	12 March 2020		AU	2019-219856	A1	19 March 2020	
					AU	2019-219856	B2	21 April 2022	
					AU	2022-206790	A1	18 August 2022	
					CN	110876587	A	13 March 2020	
					CN	110876587	B	24 May 2022	
					CN	114983270	A	02 September 2022	
					EP	3626144	A1	25 March 2020	
					EP	3626144	B1	07 July 2021	
					EP	3967199	A1	16 March 2022	
					EP	3967199	B1	21 December 2022	
					EP	4212081	A1	19 July 2023	
					JP	2022-019717	A	27 January 2022	
					JP	6957571	B2	02 November 2021	
					US	11039725	B2	22 June 2021	
					US	2020-0069139	A1	05 March 2020	
					US	2021-0307582	A1	07 October 2021	

Form PCT/ISA/210 (patent family annex) (July 2022)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- KR 2161708 B1 [0013]
- KR 20210019940 A [0016]
- KR 1020210029583 [0024]