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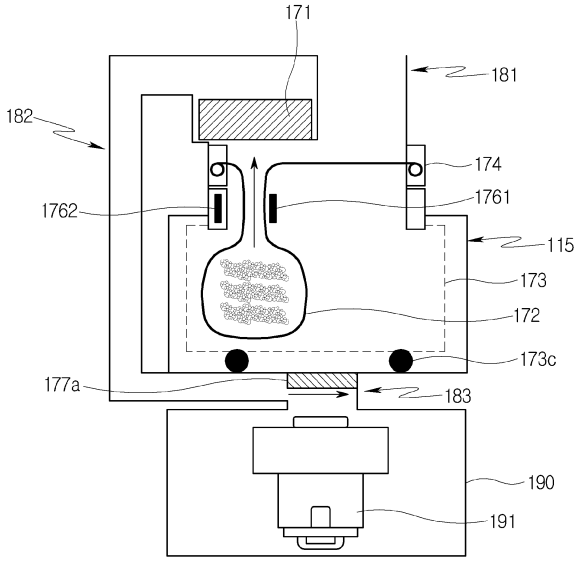
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(54) **CLEANER STATION AND METHOD FOR CONTROLLING CLEANER STATION**

(57) The present disclosure relates to a cleaner station, to which a cleaner may be coupled, and a method of controlling the same, and more particularly, to a cleaner station and a method of controlling the same, in which the cleaner station has a dust bag and a dust collection device for emptying a dust bin of the cleaner, and the cleaner station includes a bag compressing member and a bag joining device, which may reduce a volume of the dust bag by discharging air in the dust bag and compressing the dust bag, and seal the dust bag to prevent dust from scattering at the time of removing the dust bag, such that user convenience may be improved during the process of removing the dust bag, diseases such as respiratory diseases caused by dust spoilage and scattering may be prevented, and hygiene may be improved.

[FIG. 21]




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## Description

### [Technical Field]

**[0001]** The present disclosure relates to a cleaner station and a method of controlling the same, and more particularly, to a cleaner station capable of separating dust contained in air, capturing the dust in a dust bag, and emptying only the dust bag, and a method of controlling the same.

### [Background Art]

**[0002]** In general, a cleaner refers to an electrical appliance that draws in small garbage or dust by sucking air using electricity and fills a dust bin provided in a product with the garbage or dust. Such a cleaner is generally called a vacuum cleaner.

**[0003]** The cleaners may be classified into a manual cleaner which is moved directly by a user to perform a cleaning operation, and an automatic cleaner which performs a cleaning operation while autonomously traveling. Depending on the shape of the cleaner, the manual cleaners may be classified into a canister cleaner, an upright cleaner, a handy cleaner, a stick cleaner, and the like.

**[0004]** The canister cleaners were widely used in the past as household cleaners. However, recently, there is an increasing tendency to use the handy cleaner and the stick cleaner in which a dust bin and a cleaner main body are integrally provided to improve convenience of use.

**[0005]** In the case of the canister cleaner, a main body and a suction port are connected by a rubber hose or pipe, and in some instances, the canister cleaner may be used in a state in which a brush is fitted into the suction port.

**[0006]** The handy cleaner (hand vacuum cleaner) has maximized portability and is light in weight. However, because the handy cleaner has a short length, there may be a limitation to a cleaning region. Therefore, the handy cleaner is used to clean a local place such as a desk, a sofa, or an interior of a vehicle.

**[0007]** A user may use the stick cleaner while standing and thus may perform a cleaning operation without bending his/her waist. Therefore, the stick cleaner is advantageous for the user to clean a wide region while moving in the region. The handy cleaner may be used to clean a narrow space, whereas the stick cleaner may be used to clean a wide space and also used to a high place that the user's hand cannot reach. Recently, modularized stick cleaners are provided, such that types of cleaners are actively changed and used to clean various places.

**[0008]** In addition, recently, a robot cleaner, which autonomously performs a cleaning operation without a user's manipulation, is used. The robot cleaner automatically cleans a zone to be cleaned by sucking debris such as dust from the floor while autonomously traveling in the zone to be cleaned.

**[0009]** However, a capacity of the dust bin of the cleaner is limited, which inconveniences the user because the user needs to empty the dust bin frequently.

**[0010]** In order to eliminate the inconvenience, a cleaner station has been developed to be equipped with a dust collection device, a dust storage part, and a dust bag to automatically empty the dust bin of the cleaner and store dust.

**[0011]** However, a cleaner station in the related art captures air and dust in a state in which the air and the dust are not separated. For this reason, the air occupies a large volume in the dust bag, which makes it difficult to remove the dust bag. In addition, when the user removes the dust bag from the cleaner station, the dust scatters together with the air in the dust bag. The scattering dust may contaminate the user's space and cause diseases such as respiratory diseases.

**[0012]** Accordingly, there is a need for a cleaner station and a method of controlling the same, which are capable of compressing dust in the cleaner station and removing air to minimize a volume of the dust bag, sealing the dust bag to prevent the dust from scattering at the time of removing the dust bag, and improving user convenience and hygiene.

### [Disclosure]

### [Technical Problem]

**[0013]** The present disclosure has been made in an effort to solve the above-mentioned problem in the related art, and an object of the present disclosure is to provide a cleaner station, which may include a bag compressing member and a joining device to automatically discharge air from the inside of a dust bag, compress a volume of the dust bag, and seal the dust bag, and a method of controlling the same.

### [Technical Solution]

**[0014]** In order to achieve the above-mentioned object, a cleaner station according to the present disclosure may include: a housing configured to define an external appearance and having a space formed therein; a coupling part disposed in the housing and including a coupling surface to which at least a part of a cleaner is coupled; a dust collecting part including a dust separating part accommodated in the housing, disposed at a lower side of the coupling part, and configured to separate dust from air introduced from a dust bin of the cleaner, a dust bag configured to store the dust separated by the dust separating part, a bag support part configured to support the dust bag, and a joining device configured to join the dust bag; a bag accommodation space formed in the housing and configured to accommodate the bag support part; a dust collecting motor accommodated in the housing, disposed at the lower side of the dust collecting part, and configured to generate a suction force for sucking dust

in the dust bin; and a flow path part including a first flow path configured to connect the dust bin of the cleaner and the dust collecting part, a second flow path configured to guide air, which has passed through the dust collecting part, to the dust collecting motor, and a bypass flow path configured to connect the bag support part and the dust collecting motor, in which the dust collecting part may further include a bag compressing member movably coupled to the bag accommodation space and configured to discharge the air in the dust bag by compressing the dust bag.

**[0015]** Meanwhile, the bag compressing member may include a flow path closing member hingedly coupled to the bag accommodation space, and the flow path closing member may be capable of opening or closing the bypass flow path by rotating.

**[0016]** In addition, the bag compressing member may include a flow path closing member coupled to the bag accommodation space in a sliding manner, and the flow path closing member may be capable of opening or closing the bypass flow path by rectilinearly moving.

**[0017]** Further, the bag compressing member may include a pressing member hingedly coupled to the inside of the bag support part, and the pressing member may be capable of compressing an outer surface of the dust bag by rotating.

**[0018]** Further, the bag compressing member may include a pressing member disposed in the bag support part, and the pressing member may be capable of compressing an outer surface of the dust bag by rectilinearly moving.

**[0019]** Meanwhile, the joining device may include: a stationary joining member; and a movable joining member configured to be movable toward the stationary joining member, and the dust collecting motor may enable the movable joining member to operate in a state in which the movable joining member is spaced apart from the stationary joining member at a predetermined distance.

**[0020]** In addition, the joining device may include a heating wire capable of joining the dust bag by the heating wire.

**[0021]** Further, the joining device may further include a stationary joining member; and a movable joining member configured to close the dust bag by moving toward the stationary joining member, and the heating wire may be disposed on at least any one of the stationary joining member and the movable joining member.

**[0022]** The movable joining member may include: a first movable joining member configured to rectilinearly move toward the stationary joining member in a first direction; and a second movable joining member configured to rectilinearly move toward the stationary joining member in a second direction perpendicular to the first direction.

**[0023]** Meanwhile, the dust collecting part may further include a dust bag cartridge separably coupled to the housing and configured to supply the dust bag.

**[0024]** In addition, the dust bag may be supported by the bag support part and configured to be discharged from the bag accommodation space.

**[0025]** Further, the first flow path may be connected to an upper side of the bag accommodation space, and the second flow path may be connected to the upper side of the bag accommodation space.

**[0026]** In addition, the bypass flow path may be connected to a lower side of the bag accommodation space.

**[0027]** Meanwhile, a method of controlling a cleaner station according to the present disclosure may include: a capturing step of capturing dust in a dust bin of a cleaner into a dust bag provided in the cleaner station by operating a dust collecting motor; a tightening step of limiting an inlet of the dust bag to a predetermined area by moving a movable joining member after the capturing step; a bag compressing step of compressing the dust bag by moving a bag compressing member after the tightening step; and a packing step of closing an inlet of the dust bag by moving the movable joining member and joining and packing the inlet of the dust bag by using a heating wire after the bag compressing step.

**[0028]** In this case, the bag compressing step may further include: a flow path closing step of closing a bypass flow path, which connects the dust collecting motor and a bag accommodation space for accommodating the dust bag, by moving the bag compressing member; and an air sucking step of discharging air in the dust bag by operating the dust collecting motor after the flow path closing step.

**[0029]** Further, the bag compressing step may further include a pressing step of discharging air in the dust bag by compressing an outer surface of the dust bag by moving the bag compressing member.

**[0030]** Meanwhile, the tightening step may further include: a first tightening step of moving a first movable joining member included in the movable joining member in a first direction; and a second tightening step of moving a second movable joining member included in the movable joining member in a second direction perpendicular to the first direction, and the packing step may further include: a first packing step of moving the first movable joining member in the first direction; and a second packing step of moving the second movable joining member in the second direction.

**[Advantageous Effects]**

**[0031]** According to the cleaner station and the method of controlling the same according to the present disclosure described above, the bag compressing member may be provided to reduce the volume of the dust bag by discharging air contained in the dust bag and compressing the dust bag, and the joining device may be provided to seal the dust bag and prevent dust from scattering at the time of removing the dust bag from the cleaner station.

**[Description of Drawings]**

**[0032]**

FIG. 1 is a view for explaining a cleaner capable of being coupled to a cleaner station according to an embodiment of the present disclosure.

FIG. 2 is a view illustrating the cleaner in FIG. 1 when viewed at another angle.

FIG. 3 is a view for explaining a dust bin of the cleaner in FIG. 1.

FIG. 4 is a view for explaining a state in which the cleaner is coupled to the cleaner station according to the embodiment of the present disclosure.

FIG. 5 is a view for explaining a coupling part of the cleaner station according to the embodiment of the present disclosure.

FIG. 6 is a view for explaining a fixing unit of the cleaner station according to the embodiment of the present disclosure.

FIGS. 7 and 8 are views for explaining a relationship between the cleaner and a door unit of the cleaner station according to the embodiment of the present disclosure.

FIG. 9 is a view for explaining a relationship between the cleaner and a cover opening unit in the cleaner station according to the embodiment of the present disclosure.

FIG. 10 is a view for explaining a process of guiding dust to a dust collecting part and a flow path part in the cleaner station according to the embodiment of the present disclosure.

FIG. 11 is a view for explaining a configuration of the cleaner station according to the embodiment of the present disclosure.

FIG. 12 is a view for explaining the dust collecting part of the cleaner station according to the embodiment of the present disclosure.

FIGS. 13 to 16 are views for explaining a process of joining a dust bag by using a joining device in the dust collecting part of the cleaner station according to the embodiment of the present disclosure and discharging the dust bag.

FIG. 17 is a block diagram for explaining a control configuration of the cleaner station according to the embodiment of the present disclosure.

FIGS. 18 and 19 are views for explaining a two-axis movable joining device of the cleaner station according to the embodiment of the present disclosure.

FIGS. 20 to 27 are views for explaining a process of compressing the dust bag in the dust collecting part of the cleaner station to reduce a volume of the dust bag and sealing the dust bag according to other embodiments of the present disclosure.

FIGS. 28 and 29 are flowcharts for explaining a process of compressing and sealing the dust bag in the dust collecting part by a method of controlling the cleaner station according to other embodiments of the present disclosure.

**[Mode for Invention]**

**[0033]** Hereinafter, exemplary embodiments of the present disclosure will be described in detail with reference to the accompanying drawings.

**[0034]** The exemplary embodiments to be described below are illustrative for helping understand the present disclosure, and it should be understood that the present disclosure may be carried out by being modified in various ways different from the exemplary embodiments described herein. However, in the description of the present disclosure, the specific descriptions and illustrations of publicly known functions or constituent elements will be omitted when it is determined that the specific descriptions may unnecessarily obscure the subject matter of the present disclosure. In addition, to help understand the present disclosure, the accompanying drawings are not illustrated based on actual scales, but some constituent elements may be exaggerated in magnitude.

**[0035]** 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.

**[0036]** The terminology used herein is used for the purpose of describing particular embodiments only and is not intended to limit the present disclosure. Singular expressions may include plural expressions unless clearly described as different meanings in the context.

**[0037]** Unless otherwise defined, all terms used herein, including technical or scientific terms, may have the same meaning as commonly understood by those skilled in the art to which the present disclosure pertains. The terms such as those defined in a commonly used dictionary may be interpreted as having meanings consistent with meanings in the context of related technologies and may not be interpreted as ideal or excessively formal meanings unless explicitly defined in the present application.

**[0038]** In addition, like reference numerals or symbols indicated in the respective drawings in the present specification refer to members or constituent elements which perform substantially the same functions.

**[0039]** In addition, the terms used in the present specification are used only for the purpose of describing particular embodiments and are not intended to restrict and/or limit the disclosed present disclosure. Singular expressions include plural expressions unless clearly described as different meanings in the context.

**[0040]** In the present specification, the terms "including" and "having" are intended to designate the existence of characteristics, numbers, steps, operations, constitu-

ent elements, and components described in the specification or a combination thereof, and do not exclude a possibility of the existence or addition of one or more other characteristics, numbers, steps, operations, constituent elements, and components, or a combination thereof in advance.

**[0041]** In addition, the terms including ordinal numbers such as "first" and "second" used in the present specification may be used to describe various constituent elements, but the constituent elements should not be limited by the terms, and these terms are used only to distinguish one constituent element from another constituent element. For example, a first component may be named a second component, and similarly, the second component may also be named the first component, without departing from the scope of the present disclosure. The term "and/or" includes any and all combinations of a plurality of the related and listed items.

**[0042]** Hereinafter, embodiments according to the present disclosure will be described in detail with reference to the accompanying drawings.

**[0043]** FIG. 1 is a view for explaining a cleaner 200 capable of being coupled to a cleaner station 100 according to an embodiment of the present disclosure, FIG. 2 is a view illustrating the cleaner 200 in FIG. 1 when viewed at another angle, FIG. 3 is a view for explaining a dust bin 220 of the cleaner 200 in FIG. 1, and FIG. 4 is a view for explaining a state in which the cleaner 200 is coupled to the cleaner station 100 according to the embodiment of the present disclosure.

**[0044]** With reference to FIGS. 1 to 4, the cleaner 200 may be coupled to the cleaner station 100 according to the embodiment of the present specification. The cleaner station 100 may remove dust from the dust bin 220 of the cleaner 200.

**[0045]** First, a structure of the cleaner 200 will be described below with reference to FIGS. 1 to 3.

**[0046]** The cleaner 200 may mean a cleaner configured to be manually operated by the user. For example, the cleaner 200 may mean a handy cleaner or a stick cleaner.

**[0047]** The cleaner 200 may be mounted on the cleaner station 100. The cleaner 200 may be supported by the cleaner station 100. The cleaner 200 may be coupled to the cleaner station 100.

**[0048]** Meanwhile, the directions are defined as follows to assist in understanding the present disclosure. In the present embodiment, the directions may be defined in the state in which the cleaner 200 is mounted on the cleaner station 100 (see FIG. 4).

**[0049]** In the state in which the cleaner 200 is mounted on the cleaner station 100, a direction in which the cleaner 200 is exposed to the outside of the cleaner station 100 may be referred to as a forward direction.

**[0050]** In another point of view, in the state in which the cleaner 200 is mounted on the cleaner station 100, a direction in which the suction motor 214 of the cleaner 200 is disposed may be referred to as the forward direction. Further, a direction opposite to the direction in which the suction motor 214 is disposed on the cleaner station 100 may be referred to as a rearward direction.

**[0051]** Further, based on an internal space of a housing 110, a surface facing the front surface may be referred to as a rear surface of the cleaner station 100.

**[0052]** Further, based on the internal space of the housing 110, a left surface when viewing the front surface may be referred to as a left surface, and a right surface when viewing the front surface may be referred to as a right surface.

**[0053]** Therefore, the left surface may mean a direction in which the third outer wall surface 112c is formed, and the right surface may mean a direction in which the fourth outer wall surface 112d is formed.

**[0054]** Further, based on the internal space of the housing 110, a surface facing the front surface may be referred to as a rear surface of the cleaner station 100. Therefore, the rear surface may mean a direction in which the second outer wall surface 112b is formed.

**[0055]** Further, based on the internal space of the housing 110, a left surface when viewing the front surface may be referred to as a left surface, and a right surface when viewing the front surface may be referred to as a right surface. Therefore, the left surface may mean a direction in which the third outer wall surface 112c is formed, and the right surface may mean a direction in which the fourth outer wall surface 112d is formed.

**[0056]** The cleaner 200 may include a main body 210. The main body 210 may include a main body housing 211, a suction part 212, a dust separating part 213, the suction motor 214, an air discharge cover 215, a handle 216, and an operating part 218.

**[0057]** The main body housing 211 may define an external appearance of the cleaner 200. The main body housing 211 may provide a space that may accommodate the suction motor 214 and a filter (not illustrated) therein. The main body housing 211 may be formed in a shape similar to a cylindrical shape.

**[0058]** The suction part 212 may protrude outward from the main body housing 211. For example, the suction part 212 may be formed in a cylindrical shape with an opened inside. The suction part 212 may be coupled to an extension tube 250. The suction part 212 may provide a flow path (hereinafter, referred to as a 'suction flow path') through which air containing dust may flow.

**[0059]** Meanwhile, in the present embodiment, an imaginary line may be defined to penetrate the inside of the suction part 212 having a cylindrical shape.

**[0060]** The dust separating part 213 may communicate with the suction part 212. The dust separating part 213 may separate dust sucked into the dust separating part 213 through the suction part 212. A space in the dust separating part 213 may communicate with a space in the dust bin 220.

**[0061]** For example, the dust separating part 213 may have one or more cyclone parts capable of separating dust by using a cyclone flow. Further, the space in the

dust separating part 213 may communicate with the suction flow path. Therefore, air and dust, which are sucked through the suction part 212, spirally flow along an inner circumferential surface of the dust separating part 213. Therefore, the cyclone flow may be generated in an internal space of the dust separating part 213.

**[0062]** The dust separating part 213 communicates with the suction part 212. The dust separating part 213 adopts a principle of a dust collector using a centrifugal force to separate the dust sucked into the main body 210 through the suction part 212.

**[0063]** The dust separating part 213 may further include a secondary cyclone part configured to separate again dust from the air discharged from the cyclone part. In this case, the secondary cyclone part may be positioned in the cyclone part to minimize a size of the dust separating part. The secondary cyclone part may include a plurality of cyclone bodies disposed in parallel. The air discharged from the cyclone part may be distributed to and pass through the plurality of cyclone bodies.

**[0064]** In this case, an axis of a cyclone flow of the secondary cyclone part may also extend in an upward/downward direction. The axis of the cyclone flow of the cyclone part and the axis of the cyclone flow of the secondary cyclone part may be disposed coaxially in the upward/downward direction and collectively called an axis of the cyclone flow of the dust separating part 213.

**[0065]** The suction motor 214 may generate a suction force for sucking air. The suction motor 214 may be accommodated in the main body housing 211. The suction motor 214 may generate the suction force while rotating. For example, the suction motor 214 may be formed in a shape similar to a cylindrical shape.

**[0066]** Meanwhile, in the present embodiment, an imaginary suction motor axis may be formed by extending a rotation axis of the suction motor 214.

**[0067]** The air discharge cover 215 may be disposed at one side of the main body housing 211 based on an axial direction. The air discharge cover 215 may accommodate the filter for filtering air. For example, an HEPA filter may be accommodated in the air discharge cover 215.

**[0068]** The air discharge cover 215 may have an air discharge port 215a for discharging the air introduced by the suction force of the suction motor 214.

**[0069]** A flow guide may be disposed on the air discharge cover 215. The flow guide may guide a flow of the air to be discharged through the air discharge port 215a.

**[0070]** The handle 216 may be gripped by the user. The handle 216 may be disposed rearward of the suction motor 214. For example, the handle 216 may be formed in a shape similar to a cylindrical shape. Alternatively, the handle 216 may be formed in a curved cylindrical shape. The handle 216 may be disposed at a predetermined angle with respect to the main body housing 211, the suction motor 214, or the dust separating part 213.

**[0071]** The handle 216 may include a grip portion 216a formed in a column shape so that the user may grip the grip portion 216a, a first extension portion 216b connected to one end of the grip portion 216a based on the longitudinal direction (axial direction) and extending toward the suction motor 214, and a second extension portion 216c connected to the other end of the grip portion 216a based on the longitudinal direction (axial direction) and extending toward the dust bin 220.

**[0072]** Meanwhile, in the present embodiment, an imaginary grip portion through line may be formed to extend in the longitudinal direction of the grip portion 216a (the axial direction of the column) and penetrate the grip portion 216a.

**[0073]** For example, the grip portion through line may be an imaginary line formed in the handle 216 having a cylindrical shape, that is, an imaginary line formed in parallel with at least a part of an outer surface (outer circumferential surface) of the grip portion 216a.

**[0074]** An upper side of the handle 216 may define an external appearance of a part of an upper side of the cleaner 200. Therefore, it is possible to prevent a component of the cleaner 200 from coming into contact with the user's arm when the user grips the handle 216.

**[0075]** The first extension portion may extend from the grip portion 216a toward the main body housing 211 or the suction motor 214. At least a part of the first extension portion may extend in a horizontal direction.

**[0076]** The second extension portion may extend from the grip portion 216a toward the dust bin 220. At least a part of the second extension portion may extend in the horizontal direction.

**[0077]** The operating part 218 may be disposed on the handle 216. The operating part 218 may be disposed on an inclined surface formed in an upper region of the handle 216. The user may input a command for operating or stopping the cleaner 200 through the operating part 218.

**[0078]** The cleaner 200 may include the dust bin 220. The dust bin 220 may communicate with the dust separating part 213. The dust bin 220 may store the dust separated by the dust separating part 213.

**[0079]** The dust bin 220 may include a dust bin main body 221, a discharge cover 222, a dust bin compression lever 223, and a compression member (not illustrated).

**[0080]** The dust bin main body 221 may provide a space capable of storing the dust separated by the dust separating part 213. For example, the dust bin main body 221 may be formed in a shape similar to a cylindrical shape.

**[0081]** Meanwhile, in the present embodiment, an imaginary dust bin through line may be formed to penetrate the inside (internal space) of the dust bin main body 221 and extend in the longitudinal direction of the dust bin main body 221 (that means the axial direction of the cylindrical dust bin main body 221).

**[0082]** A part of a rear side of the dust bin main body 221 may be opened. In addition, a rear extension portion 221a may be formed at the rear side of the dust bin main body 221. The rear extension portion 221a may be

formed to block a part of the rear side of the dust bin main body 221.

**[0083]** The dust bin 220 may include the discharge cover 222. The discharge cover 222 may be disposed at the rear side of the dust bin 220.

**[0084]** The discharge cover 222 may be provided to open or close one end of the dust bin main body 221 based on the longitudinal direction. Specifically, the discharge cover 222 may selectively open or close the rear side of the dust bin 220 that is opened downward.

**[0085]** The discharge cover 222 may include a cover main body 222a and a hinge part 222b. The cover main body 222a may be formed to block a part of the rear side of the dust bin main body 221. The cover main body 222a may rotate downward relative to the hinge portion 222b. The hinge part 222b may be disposed adjacent to a battery housing 230. The hinge part 222b may have a torsion spring 222d. Therefore, when the discharge cover 222 is separated from the dust bin main body 221, an elastic force of the torsion spring 222d may support the cover main body 222a in a state in which the cover main body 222a is rotated by a predetermined angle or more about the hinge part 222b with respect to the dust bin main body 221.

**[0086]** The discharge cover 222 may be coupled to the dust bin 220 by a hook engagement. Meanwhile, the discharge cover 222 may be separated from the dust bin 220 by means of a coupling lever 222c. The coupling lever 222c may be disposed at an outer side of the dust bin. When an external force is applied, the coupling lever 222c may elastically deform a hook, which extends from the cover main body 222a, in order to release the hook engagement between the cover main body 222a and the dust bin main body 221.

**[0087]** When the discharge cover 222 is closed, the rear side of the dust bin 220 may be blocked (sealed) by the discharge cover 222 and the rear extension portion 221a.

**[0088]** The dust bin 220 may include the dust bin compression lever 223 (see FIG. 2). The dust bin compression lever 223 may be disposed outside the dust bin 220 or the dust separating part 213. The dust bin compression lever 223 may be disposed outside the dust bin 220 or the dust separating part 213 and configured to be rectilinearly movable forward or rearward. The dust bin compression lever 223 may be connected to the compression member (not illustrated). When the dust bin compression lever 223 is moved rearward by an external force, the compression member (not illustrated) may also be moved rearward. Therefore, it is possible to provide convenience for the user. The compression member (not illustrated) and the dust bin compression lever 223 may return back to original positions by an elastic member (not illustrated). Specifically, when the external force applied to the dust bin compression lever 223 is eliminated, the elastic member may move the dust bin compression lever 223 and the compression member (not illustrated) forward.

**[0089]** The compression member (not illustrated) may be disposed in the dust bin main body 221. The compression member may move in the internal space of the dust bin main body 221. Specifically, the compression member may rectilinearly move forward or rearward in the dust bin main body 221. Therefore, the compression member may compress rearward the dust in the dust bin main body 221. In addition, when the discharge cover 222 is separated from the dust bin main body 221 and thus the rear side of the dust bin 220 is opened, the compression member may move from a front side of the dust bin 220 to the rear side of the dust bin 220, thereby removing debris such as residual dust in the dust bin 220. Therefore, it is possible to improve the suction force of the cleaner by preventing the residual dust from remaining in the dust bin 220. Further, it is possible to remove an offensive odor caused by the residual dust by preventing the residual dust from remaining in the dust bin 220.

**[0090]** The cleaner 200 may include the battery housing 230. A battery 240 may be accommodated in the battery housing 230. The battery housing 230 may be disposed rearward of the handle 216. For example, the battery housing 230 may have a hexahedral shape opened at one side thereof. One side of the battery housing 230 may be connected to the handle 216.

**[0091]** The battery housing 230 may include an accommodation portion opened rearward. The battery 240 may be attached or detached through the accommodation portion of the battery housing 230.

**[0092]** The cleaner 200 may include the battery 240.

**[0093]** For example, the battery 240 may be separably coupled to the cleaner 200. The battery 240 may be separably coupled to the battery housing 230. For example, the battery 240 may be inserted into the battery housing 230 from the lower side of the battery housing 230. With this configuration, the portability of the cleaner 200 may be improved.

**[0094]** On the contrary, the battery 240 may be integrally provided in the battery housing 230. In this case, a rear surface of the battery 240 is not exposed to the outside.

**[0095]** The battery 240 may supply power to the suction motor 214 of the cleaner 200. The battery 240 may be disposed rearward of the handle 216. The battery 240 may be disposed above the dust bin 220.

**[0096]** In a case in which the battery 240 is coupled to the battery housing 230, the rear surface of the battery 240 may be exposed to the outside. Because the battery 240 may be placed on the floor when the cleaner 200 is placed on the floor, the battery 240 may be immediately separated from the battery housing 230. In addition, because the rear surface of the battery 240 is exposed to the outside and thus in direct contact with the air present outside the battery 240, the performance in cooling the battery 240 may be improved.

**[0097]** Meanwhile, in case that the battery 240 is fixed integrally to the battery housing 230, the number of struc-

tures for attaching or detaching the battery 240 and the battery housing 230 may be reduced, and as a result, it is possible to reduce an overall size of the cleaner 200 and a weight of the cleaner 200.

**[0098]** The cleaner 200 may include the extension tube 250. The extension tube 250 may communicate with a cleaning module 260. The extension tube 250 may communicate with the main body 210. The extension tube 250 may communicate with the suction part 212 of the main body 210. The extension tube 250 may be formed in a long cylindrical shape.

**[0099]** The main body 210 may be connected to the extension tube 250. The main body 210 may be connected to the cleaning module 260 through the extension tube 250. The main body 210 may generate the suction force by means of the suction motor 214 and provide the suction force to the cleaning module 260 through the extension tube 250. The outside dust may be introduced into the main body 210 through the cleaning module 260 and the extension tube 250.

**[0100]** The cleaner 200 may include the cleaning module 260. The cleaning module 260 may communicate with the extension tube 250. Therefore, the outside air may be introduced into the main body 210 of the cleaner 200 via the cleaning module 260 and the extension tube 250 by the suction force generated in the main body 210 of the cleaner 200.

**[0101]** The dust in the dust bin 220 of the cleaner 200 may be captured by a dust collecting part 170 of the cleaner station 100 by gravity and a suction force of a dust collecting motor 191. Therefore, it is possible to remove the dust in the dust bin without the user's separate manipulation, thereby providing convenience for the user. In addition, it is possible to eliminate the inconvenience of the user having to empty the dust bin all the time. In addition, it is possible to prevent the dust from scattering when emptying the dust bin.

**[0102]** The cleaner 200 may be coupled to a front surface of the housing 110. Specifically, the main body 210 of the cleaner 200 may be mounted on a coupling part 120. More specifically, the dust bin 220 and the battery housing 230 of the cleaner 200 may be coupled to a coupling surface 121, an outer circumferential surface of the dust bin main body 221 may be coupled to a dust bin guide surface 122, and the suction part 212 may be coupled to a suction part guide surface 126 of the coupling part 120. In this case, a central axis of the dust bin 220 may be disposed in a direction parallel to the ground surface, and the extension tube 250 may be disposed in a direction perpendicular to the ground surface.

**[0103]** FIG. 5 is a view for explaining the coupling part in the cleaner station according to the embodiment of the present disclosure, FIG. 6 is a view for explaining a fixing unit in the cleaner station according to the embodiment of the present disclosure, FIGS. 7 and 8 are views for explaining a relationship between the cleaner and a door unit in the cleaner station according to the embodiment of the present disclosure, FIG. 9 is a view for explaining a relationship between the cleaner and a cover opening unit in the cleaner station according to the embodiment of the present disclosure, and FIG. 10 is a view for explaining a process of guiding the dust to the dust collecting part and the flow path part in the cleaner station according to the embodiment of the present disclosure.

**[0104]** The cleaner station 100 of the present disclosure will be described below with reference to FIGS. 5 to 10.

**[0105]** The cleaner 200 may be coupled to the cleaner station 100. Specifically, the main body of the cleaner 200 may be coupled to the front surface of the cleaner station 100. The cleaner station 100 may remove dust from the inside of the dust bin 220 of the cleaner 200.

**[0106]** The cleaner station 100 may include the housing 110. The housing 110 may define an external appearance of the cleaner station 100 and have a space formed therein. Specifically, the housing 110 may be provided in the form of a column including one or more outer wall surfaces. For example, the housing 110 may be formed in a shape similar to a quadrangular column.

**[0107]** The housing 110 may have a space capable of accommodating the dust collecting part 170 configured to store dust therein, and a dust suction module 190 configured to generate a flow force for collecting the dust in the dust collecting part 170.

**[0108]** The housing 110 may include a bottom surface 111, an outer wall surface 112, and an upper surface 113.

**[0109]** The bottom surface 111 may support a lower side of the dust suction module 190 based on the gravitational direction. That is, the bottom surface 111 may support a lower side of the dust collecting motor 191 of the dust suction module 190.

**[0110]** In this case, the bottom surface 111 may be disposed toward the ground surface. The bottom surface 111 may also be disposed in parallel with the ground surface or disposed to be inclined at a predetermined angle with respect to the ground surface. The above-mentioned configuration may be advantageous in stably supporting the dust collecting motor 191 and maintaining balance of an overall weight even in a case in which the cleaner 200 is coupled.

**[0111]** Meanwhile, the bottom surface 111 may further include a ground surface support portion 111a in order to prevent the cleaner station 100 from falling down and increase an area being in contact with the ground surface to maintain the balance. For example, the ground surface support portion 111a may have a plate shape extending from the bottom surface 111, and one or more frames may protrude and extend from the bottom surface 111 in the direction of the ground surface.

**[0112]** The outer wall surface 112 may mean a surface formed in the gravitational direction or a surface connected to the bottom surface 111. For example, the outer wall surface 112 may mean a surface connected to the bottom surface 111 so as to be perpendicular to the bottom surface 111. As another embodiment, the outer wall surface 112 may be disposed to be inclined at a predetermined

angle with respect to the bottom surface 111.

**[0113]** 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, the second outer wall surface 112b, the third outer wall surface 112c, and the fourth outer wall surface 112d.

**[0114]** In this case, in the present embodiment, the first outer wall surface 112a may be disposed at the front side of the cleaner station 100. In this case, the front side may mean a side at which the cleaner 200 is exposed in the state in which the cleaner 200 is coupled to the cleaner station 100. Therefore, the first outer wall surface 112a may define an external appearance of the front side of the cleaner station 100.

**[0115]** The first outer wall surface 112a may be formed in the form of a flat surface, or the first outer wall surface 112a may be formed in the form of a curved surface as a whole or formed to partially include a curved surface.

**[0116]** The coupling part 120 may be disposed on the first outer wall surface 112a. With this configuration, the cleaner 200 may be coupled to the cleaner station 100 and supported by the cleaner station 100. The specific configuration of the coupling part 120 will be described below.

**[0117]** Meanwhile, a structure for mounting various types of cleaning modules 260 used for the cleaner 200 may be additionally provided on the first outer wall surface 112a.

**[0118]** In the present 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 the rear surface of the cleaner station 100. The second outer wall surface 112b may define an external appearance of the rear surface of the cleaner station 100.

**[0119]** In the present embodiment, the third outer wall surface 112c and the fourth outer wall surface 112d may mean surfaces that connect the first outer wall surface 112a and the second outer wall surface 112b. In this case, the third outer wall surface 112c may be disposed on the left surface of the cleaner station 100, and the fourth outer wall surface 112d may be disposed on the right surface of the cleaner station 100. On the contrary, the third outer wall surface 112c may be disposed on the right surface of the cleaner station 100, and the fourth outer wall surface 112d may be disposed on the left surface of the cleaner station 100.

**[0120]** The third outer wall surface 112c or the fourth outer wall surface 112d may be formed in the form of a flat surface, or the third outer wall surface 112c or the fourth outer wall surface 112d may be formed in the form of a curved surface as a whole or formed to partially include a curved surface.

**[0121]** Meanwhile, the structure for mounting various types of cleaning modules 290 used for the cleaner 200 may be additionally provided on the third outer wall surface 112c or the fourth outer wall surface 112d.

**[0122]** The upper surface 113 may define an upper external appearance of the cleaner station. That is, the upper surface 113 may mean a surface disposed at an outermost side of the cleaner station in the gravitational direction and exposed to the outside.

**[0123]** For reference, in the present embodiment, the terms 'upper side' and 'lower side' may mean the upper and lower sides in the gravitational direction (a direction perpendicular to the ground surface) in the state in which the cleaner station 100 is installed on the ground surface.

**[0124]** In this case, the upper surface 113 may also be disposed in parallel with the ground surface or disposed to be inclined at a predetermined angle with respect to the ground surface.

**[0125]** A display part may be disposed on the upper surface 113. For example, the display part may display a state of the cleaner station 100 and a state of the cleaner 200. The display part may further display information such as a cleaning process situation, a map of the cleaning zone, and the like.

**[0126]** Meanwhile, the upper surface 113 may be separable from the outer wall surface 112. In this case, when the upper surface 113 is separated, the battery separated from the cleaner 200 may be accommodated in the internal space surrounded by the outer wall surface 112, and a terminal (not illustrated) capable of charging the separated battery may be provided in the internal space.

**[0127]** Meanwhile, a bag accommodation space 115 may be formed in the housing 110. The bag accommodation space 115 may be disposed at a lower side of the coupling part 120 based on the gravitational direction and disposed above the dust suction module 190 based on the gravitational direction.

**[0128]** The dust collecting part 170 may be provided in the bag accommodation space 115. Specifically, a bag support part 173 to be described below may be accommodated in the bag accommodation space 115 so that the bag support part 173 may enter or exit the bag accommodation space 115. Further, a dust bag cartridge 174 to be described below may be detachably coupled to the bag accommodation space 115. In addition, a joining device 176 to be described below may be mounted in the bag accommodation space 115. In addition, a bag compressing member 177 to be described below may be disposed in the bag accommodation space 115. The bag accommodation space 115 may communicate with a first flow path 181, a second flow path 182, and a bypass flow path 183 that will be described below. With this configuration, the bag accommodation space 115 may provide a space in which air and dust, which are introduced into the dust bin 220, may flow and be captured in a dust bag 172, and the dust bag 172 may be compressed and sealed.

**[0129]** Meanwhile, the state in which the cleaner 200 is coupled to the cleaner station 100 will be described below with reference to FIGS. 4 and 10.

**[0130]** In the present disclosure, the cleaner 200 may be mounted on the outer wall surface 112 of the cleaner station 100. For example, the dust bin 220 and the battery

housing 230 of the cleaner 200 may be coupled to the coupling surface 121 of the cleaner station 100. That is, the cleaner 200 may be mounted on the first outer wall surface 112a.

**[0131]** In this case, an axis of the suction motor 214 may be defined to be perpendicular to the first outer wall surface 112a. That is, the axis of the suction motor 214 may be defined in parallel with the ground surface.

**[0132]** An imaginary line, which penetrates the dust bin 220, may be defined to be perpendicular to the first outer wall surface 112a.

**[0133]** A longitudinal axis C of the housing 110 may be defined to be perpendicular to the ground surface. The longitudinal axis C of the housing 110 may be defined in parallel with at least any 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.

**[0134]** When the cleaner 200 is coupled to the cleaner station 100, the axis of the suction motor 214 may intersect the longitudinal axis of the cleaner station 100. That is, a rotation axis of the suction motor 214 may intersect the longitudinal axis of the cleaner station 100.

**[0135]** In addition, when the cleaner 200 is coupled to the cleaner station 100, the battery 240 may be disposed to be farther from the ground surface than the rotation axis of the suction motor 214 from the ground surface. With this configuration, the cleaner 200 may be stably supported on the cleaner station 100.

**[0136]** When the cleaner 200 is coupled to the cleaner station 100, the imaginary line, which penetrates the dust bin 220, may intersect the longitudinal axis of the cleaner station 100. That is, the longitudinal axis of the dust bin 220 may intersect the longitudinal axis of the cleaner station 100. In this case, an intersection point between the longitudinal axis of the dust bin 220 and the longitudinal axis of the cleaner station 100 may be positioned in the housing 110, and more particularly, positioned in a flow path part 180.

**[0137]** Meanwhile, when the cleaner 200 is coupled to the cleaner station 100, the handle 216 may be disposed to be farther from the ground surface than the imaginary line, which penetrates the dust bin 220, from the ground surface. With this configuration, when the user grips the handle 216, the user may couple or separate the cleaner 200 to/from the cleaner station 100 only by simply moving the cleaner 200 in the direction parallel to the ground surface. As a result, it is possible to provide convenience for the user.

**[0138]** The coupling part 120 of the cleaner station 100 according to the present disclosure will be described below with reference to FIG. 5.

**[0139]** The cleaner station 100 may include the coupling part 120 to which the cleaner 200 is coupled. Specifically, the coupling part 120 may be disposed in the first outer wall surface 112a, and the main body 210, the dust bin 220, and the battery housing 230 of the cleaner 200 may be coupled to the coupling part 120.

**[0140]** The coupling part 120 may include the coupling surface 121. The coupling surface 121 may be disposed on the front surface of the housing 110. For example, the coupling surface 121 may mean a surface formed in the form of a groove which is concave toward the inside of the cleaner station 100 from the first outer wall surface 112a. That is, the coupling surface 121 may mean a surface formed to have a stepped portion with respect to the first outer wall surface 112a.

**[0141]** The cleaner 200 may be coupled to the coupling surface 121. For example, the coupling surface 121 may be in contact with the rear surface of the dust bin 220 and the rear surface of the battery housing 230 of the cleaner 200.

**[0142]** For example, an angle of the coupling surface 121 with respect to the ground surface may be a right angle. Therefore, it is possible to minimize a space of the cleaner station 100 when the cleaner 200 is coupled to the coupling surface 121.

**[0143]** As another example, the coupling surface 121 may be disposed to be inclined at a predetermined angle with respect to the ground surface. Therefore, the cleaner station 100 may be stably supported when the cleaner 200 is coupled to the coupling surface 121.

**[0144]** The coupling surface 121 may have a dust passage hole 121a through which air present outside the housing 110 may be introduced into the housing 110. The dust passage hole 121a may be formed in the form of a hole corresponding to the shape of the dust bin 220 so that the dust in the dust bin 220 may be introduced into the dust collecting part 170. The dust passage hole 121a may be formed to correspond to the shape of the discharge cover 222 of the dust bin 220. The dust passage hole 121a may be formed to communicate with the flow path part 180 to be described below.

**[0145]** The coupling part 120 may include the 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. In addition, the dust bin guide surface 122 may be connected to the coupling surface 121.

**[0146]** The dust bin guide surface 122 may be formed in a shape corresponding to the outer surface of the dust bin 220. A lower outer surface of the dust bin 220 may be coupled to the dust bin guide surface 122. Therefore, it is possible to provide the convenience when coupling the cleaner 200 to the coupling surface 121.

**[0147]** Meanwhile, a protrusion moving hole 122a may be formed in the dust bin guide surface 122, and a push protrusion 151 to be described below may rectilinearly move along the protrusion moving hole 122a. In addition, a gearbox 155 may be provided below the dust bin guide surface 122 based on the gravitational direction and accommodate a gear or the like of a cover opening unit 150 to be described below. In this case, a guide space 122b, through which the push protrusion 151 may move, may be formed between the dust bin guide surface 122, the lower surface, and the upper surface of the gearbox 155. Further, the guide space 122b may communicate 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 define one flow path. With this configuration, when the dust collecting motor 191 operates in the state in which the dust bin 220 is coupled to the coupling part 120, the dust or the like, which remains in the dust bin 220 and remains on the dust bin guide surface 122, may be sucked through the flow path.

**[0148]** The coupling part 120 may include guide protrusions 123. The guide protrusions 123 may be disposed on the coupling surface 121. The guide protrusions 123 may protrude upward from the coupling surface 121. Two guide protrusions 123 may be disposed to be spaced apart from each other. A distance between the two guide protrusions 123, which are spaced apart from each other, may correspond to a width of the battery housing 230 of the cleaner 200. Therefore, it is possible to provide the convenience when coupling the cleaner 200 to the coupling surface 121.

**[0149]** The coupling part 120 may include coupling part sidewalls 124. The coupling part sidewalls 124 may mean wall surfaces disposed at two opposite sides of the coupling surface 121 and may be perpendicularly connected to the coupling surface 121. The coupling part sidewalls 124 may be connected to the first outer wall surface 112a. In addition, the coupling part sidewalls 124 may define surfaces connected to the dust bin guide surface 122. Therefore, the cleaner 200 may be stably accommodated.

**[0150]** The coupling part 120 may include a coupling sensor 125. The coupling sensor 125 may detect whether the cleaner 200 is coupled to the coupling part 120.

**[0151]** The coupling sensor 125 may include a contact sensor. For example, the coupling sensor 125 may include a micro-switch. In this case, the coupling sensor 125 may be disposed on the guide protrusion 123. Therefore, when the battery housing 230 or the battery 240 of the cleaner 200 is coupled between the pair of guide protrusions 123, the battery housing 230 or the battery 240 comes into contact with the coupling sensor 125, such that the coupling sensor 125 may detect that the cleaner 200 is coupled to the coupling part.

**[0152]** Meanwhile, the coupling sensor 125 may include a contactless sensor. For example, the coupling sensor 125 may include an infrared ray (IR) sensor. In this case, the coupling sensor 125 may be disposed on the coupling part sidewall 124. Therefore, when the dust bin 220 or the main body 210 of the cleaner 200 passes the coupling part sidewall 124 and then reaches the coupling surface 121, the coupling sensor 125 may detect the presence of the dust bin 220 or the main body 210.

**[0153]** In the state in which the cleaner 200 is coupled to the cleaner station 100, the coupling sensor 125 may face the dust bin 220 or the battery housing 230 of the cleaner 200.

**[0154]** The coupling sensor 125 may be a mean for determining whether the cleaner 200 is coupled and power is applied to the battery 240 of the cleaner 200.

**[0155]** The coupling part 120 may include the 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 suction part guide surface 126 may be formed in a shape corresponding to the shape of the suction part 212.

**[0156]** The coupling part 120 may further include a fixing member entrance hole 127. The fixing member entrance hole 127 may be formed in the form of a long hole along the coupling part sidewall 124 so that fixing members 131 may enter and exit the fixing member entrance hole 127.

**[0157]** With this configuration, when the user couples the cleaner 200 to the coupling part 120 of the cleaner station 100, the main body 210 of the cleaner 200 may be stably disposed on the coupling part 120 by the dust bin guide surface 122, the guide protrusions 123, and the suction part guide surface 126. Therefore, it is possible to provide convenience when coupling the dust bin 220 and the battery housing 230 of the cleaner 200 to the coupling surface 121.

**[0158]** Meanwhile, the cleaner station 100 may further include a charging part 128. The charging part 128 may be disposed on the coupling part 120. The charging part 128 may be electrically connected to the cleaner 200 coupled to the coupling part 120. The charging part 128 may supply power to the battery of the cleaner 200 coupled to the coupling part 120.

**[0159]** In addition, the cleaner station 100 may further include a lateral door (not illustrated). The lateral door may be disposed in the housing 110. The lateral door may selectively expose the dust collecting part 170 to the outside. Therefore, the user may easily remove the dust bag 172 from the cleaner station 100.

**[0160]** A fixing unit 130 according to the present disclosure will be described below with reference to FIG. 6.

**[0161]** The cleaner station 100 according to the present disclosure may include the fixing unit 130. The fixing unit 130 may be disposed on the coupling part sidewall 124. In addition, the fixing unit 130 may be disposed on a back surface to the coupling surface 121. The fixing unit 130 may fix the 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 cleaner 200 coupled to the coupling surface 121.

**[0162]** The fixing unit 130 may include fixing members 131 configured to fix the dust bin 220 and the battery housing 230 of the cleaner 200, and a fixing part motor 133 configured to operate the fixing members 131. In addition, the fixing unit 130 may further include fixing part links 135 configured to transmit power of the fixing part motor 133 to the fixing members 131.

**[0163]** The fixing member 131 may be disposed on the coupling part sidewall 124 and provided on the coupling part sidewall 124 so as to reciprocate in order to fix the

dust bin 220. Specifically, the fixing members 131 may be accommodated in the fixing member entrance hole 127.

**[0164]** The fixing members 131 may be disposed at two opposite sides of the coupling part 120, respectively. For example, a pair of two fixing members 131 may be symmetrically disposed with respect to the coupling surface 121.

**[0165]** The fixing part motor 133 may provide power for moving the fixing member 131.

**[0166]** The fixing part links 135 may convert a rotational force of the fixing part motor 133 into the reciprocations of the fixing members 131.

**[0167]** The stationary sealer 136 may be disposed on the dust bin guide surface 122 so as to seal the dust bin 220 when the cleaner 200 is coupled. With this configuration, when the dust bin 220 of the cleaner 200 is coupled, the cleaner 200 may press the stationary sealer 136 by its own weight, such that the dust bin 220 and the dust bin guide surface 122 may be sealed.

**[0168]** The stationary sealer 136 may be disposed on an imaginary extension line of the fixing member 131. With this configuration, when the fixing part motor 133 operates and the fixing members 131 press the dust bin 220, a circumference of the dust bin 220 at the same height may be sealed.

**[0169]** According to the embodiment, the stationary sealer 136 may be disposed on the dust bin guide surface 122 and formed in the form of a bent line corresponding to an arrangement of the cover opening unit 150 to be described below.

**[0170]** Therefore, when the main body 210 of the cleaner 200 is disposed on the coupling part 120, the fixing unit 130 may fix the main body 210 of the cleaner 200. Specifically, when the coupling sensor 125 detects that the main body 210 of the cleaner 200 is coupled to the coupling part 120 of the cleaner station 100, the fixing part motor 133 may move the fixing members 131 to fix the main body 210 of the cleaner 200.

**[0171]** Therefore, it is possible to improve the suction force of the cleaner by preventing the residual dust from remaining in the dust bin. Further, it is possible to remove an offensive odor caused by the residual dust by preventing the residual dust from remaining in the dust bin.

**[0172]** A door unit 140 according to the present disclosure will be described below with reference to FIGS. 7 and 8.

**[0173]** The cleaner station 100 according to the present disclosure may include the door unit 140. The door unit 140 may be configured to open or close the dust passage hole 121a.

**[0174]** The door unit 140 may include a door 141, a door motor 142, and a door arm 143.

**[0175]** The door 141 may be hingedly coupled to the coupling surface 121 and may open or close the dust passage hole 121a. The door 141 may include a door main body 141a.

**[0176]** The door main body 141a may be formed in a shape capable of blocking the dust passage hole 121a. For example, the door main body 141a may be formed in a shape similar to a circular plate shape.

**[0177]** Based on a state in which the door main body 141a blocks the dust passage hole 121a, the hinge part may be disposed at an upper side of the door main body 141a, and an arm coupling part 141b may be disposed at a lower side of the door main body 141a.

**[0178]** The door main body 141a may be formed in a shape capable of sealing the dust passage hole 121a. For example, an outer surface of the door main body 141a, which is exposed to the outside of the cleaner station 100, is formed to have a diameter corresponding to a diameter of the dust passage hole 121a, and an inner surface of the door main body 141a, which is disposed in the cleaner station 100, is formed to have a diameter greater than the diameter of the dust passage hole 121a. In addition, a level difference may be defined between the outer surface and the inner surface. Meanwhile, one or more reinforcing ribs may protrude from the inner surface in order to connect the hinge part and the arm coupling part 141b and reinforce a supporting force of the door main body 141a.

**[0179]** The hinge part may be a means by which the door 141 is hingedly coupled to the coupling surface 121. The hinge part may be disposed at an upper end of the door main body 141a and coupled to the coupling surface 121.

**[0180]** The arm coupling part 141b may be a means to which the door arm 143 is rotatably coupled. The arm coupling part 141b may be disposed at a lower side of the door main body 141a and rotatably coupled to the door main body 141a, and the door arm 143 may be rotatably coupled to the arm coupling part 141b.

**[0181]** With this configuration, when the door arm 143 pulls the door main body 141a in the state in which the door 141 closes the dust passage hole 121a, the door main body 141a is rotated about the hinge part toward the inside of the cleaner station 100, such that the dust passage hole 121a may be opened. Meanwhile, when the door arm 143 pushes the door main body 141a in the state in which the dust passage hole 121a is opened, the door main body 141a is rotated about the hinge part 141b toward the outside of the cleaner station 100, such that the dust passage hole 121a may be closed.

**[0182]** Meanwhile, the door 141 may be in contact with the discharge cover 215 in the state in which the cleaner 200 is coupled to the cleaner station 100 and the discharge cover 215 is separated from the dust bin main body 210. Further, when the door 141 rotates, the discharge cover 215 may rotate in conjunction with the door 141.

**[0183]** The door motor 142 may provide power for rotating the door 141.

**[0184]** Specifically, the door motor 142 may rotate the door arm 143 in a forward or reverse direction. In this case, the forward direction may mean a direction in which the door arm 143 pulls the door 141. Therefore, when

the door arm 143 is rotated in the forward direction, the dust passage hole 121a may be opened. In addition, the reverse direction may mean a direction in which the door arm 143 pushes the door 141. Therefore, when the door arm 143 is rotated in the reverse direction, at least a part of the dust passage hole 121a may be closed. The forward direction may be opposite to the reverse direction.

**[0185]** The door arm 143 may connect the door 141 and the door motor 142 and open or close the door 141 using the power generated from the door motor 142.

**[0186]** For example, the door arm 143 may include a first door arm 143a and the 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 a force transmitted from the door motor 142 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 open or close the dust passage hole 121a by pushing or pulling the door 141.

**[0187]** The door unit 140 may further include door opening/closing detecting parts 144. The door opening/closing detecting parts 144 may be provided in the housing 110 and may detect whether the door 141 is in an opened state.

**[0188]** For example, the door opening/closing detecting parts 144 may be disposed at both ends in a rotational region of the door arm 143, respectively. As another example, the door opening/closing detecting parts 144 may be disposed at both ends in a movement region of the door 141, respectively.

**[0189]** Therefore, when the door arm 143 is moved to a preset door opening position DP1 or when the door 141 is opened to a predetermined position, the door opening/closing detecting parts 144 may detect that the door is opened. In addition, when the door arm 143 is moved to a preset door closing position DP2 or when the door 141 is opened to a predetermined position, the door opening/closing detecting parts 144 may detect that the door is opened.

**[0190]** The door opening/closing detecting part 144 may include a contact sensor. For example, the door opening/closing detecting part 144 may include a microswitch.

**[0191]** Meanwhile, the door opening/closing detecting part 144 may also include a contactless sensor. For example, the door opening/closing detecting part 144 may include an infrared ray (IR) sensor.

**[0192]** With this configuration, the door unit 140 may selectively open or close at least a part of the coupling surface 121, thereby allowing the outside of the first outer wall surface 112a to communicate with the flow path part 180 and/or the dust collecting part 170.

**[0193]** The door unit 140 may be opened when the discharge cover 222 of the cleaner 200 is opened. In addition, when the door unit 140 is closed, the discharge cover 222 of the cleaner 200 may also be closed in conjunction with the door unit 140.

**[0194]** When the dust in the dust bin 220 of the cleaner 200 is removed, the door motor 142 may rotate the door 141, thereby coupling the discharge cover 222 to the dust bin main body 221. Specifically, the door motor 142 may rotate the door 141 to rotate the door 141 about the hinge part 141b, and the door 141 rotated about the hinge part 141b may push the discharge cover 222 toward the dust bin main body 221.

**[0195]** The cover opening unit 150 according to the present disclosure will be described below with reference to FIG. 9.

**[0196]** The cleaner station 100 according to the present disclosure may include the cover opening unit 150. The cover opening unit 150 may be disposed on the coupling part 120 and may open the discharge cover 222 of the cleaner 200.

**[0197]** The cover opening unit 150 may include the push protrusion 151, a cover opening motor 152, cover opening gears 153, a support plate 154, and the gearbox 155.

**[0198]** The push protrusion 151 may move to press the coupling lever 222c when the cleaner 200 is coupled.

**[0199]** The push protrusion 151 may be disposed on the dust bin guide surface 122. Specifically, the protrusion moving hole may be formed in the dust bin guide surface 122, and the push protrusion 151 may be exposed to the outside by passing through the protrusion moving hole.

**[0200]** When the cleaner 200 is coupled, the push protrusion 151 may be disposed at a position at which the push protrusion 151 may push the coupling lever 222c. That is, the coupling lever 222c may be disposed on the protrusion moving hole. In addition, the coupling lever 222c may be disposed in a movement region of the push protrusion 151.

**[0201]** The push protrusion 151 may rectilinearly reciprocate to press the coupling lever 222c. Specifically, the push protrusion 151 may be coupled to the gear box 155, such that the rectilinear movement of the push protrusion 151 may be guided. The push protrusion 151 may be coupled to the cover opening gears 153 and moved together with the cover opening gears 153 by the movements of the cover opening gears 153.

**[0202]** The cover opening motor 152 may provide power for moving the push protrusion 151. Specifically, the cover opening motor 152 may rotate a motor shaft (not illustrated) in a forward direction or a reverse direction. In this case, the forward direction may mean a direction in which the push protrusion 151 pushes the coupling lever 222c. In addition, the reverse direction may mean a direction in which the push protrusion 151, which has pushed the coupling lever 222c, returns back to an original position. The forward direction may be opposite to the reverse direction.

**[0203]** The cover opening gears 153 may be coupled to the cover opening motor 152 and may move the push protrusion 151 using the power from the cover opening motor 152. Specifically, the cover opening gears 153 may be accommodated in the gear box 155. A driving gear 153a of the cover opening gears 153 may be coupled to the motor shaft of the cover opening motor 152 and supplied with the power. A driven gear 153b of the cover opening gears 153 may be coupled to the push protrusion 151 to move the push protrusion 151. For example, the driven gear 153b may be provided in the form of a rack gear, engage with the driving gear 153a, and receive power from the driving gear 153a.

**[0204]** In this case, the discharge cover 222 may have the torsion spring 222d. The discharge cover 222 may be rotated by a predetermined angle or more and supported in the rotated position by an elastic force of the torsion spring 222d. Therefore, the discharge cover 222 may be opened, and the dust passage hole 121a and the inside of the dust bin 220 may communicate with each other.

**[0205]** The gear box 155 may be disposed in the housing 110 and disposed at the lower side of the coupling part 120 in the gravitational direction, and the cover opening gears 153 may be accommodated in the gearbox 155.

**[0206]** Cover opening detecting parts 155f may be disposed on the gear box 155. In this case, the cover opening detecting part 155f may include a contact sensor. For example, the cover opening detecting part 155f may include a micro-switch. Meanwhile, the cover opening detecting part 155f may also include a contactless sensor. For example, the cover opening detecting part 155f may include an infrared (IR) sensor.

**[0207]** The cover opening detecting part 155f may be disposed on at least one of inner and outer walls of the gear box 155. For example, the single cover opening detecting part 155f may be disposed on the inner surface of the gear box 155. In this case, the cover opening detecting part 155f may detect that the push protrusion 151 is positioned at the initial position.

**[0208]** Accordingly, according to the present disclosure, the cover opening unit 150 may open the dust bin 220 even though the user does not separately open the discharge cover 222 of the cleaner, and as a result, it is possible to improve convenience.

**[0209]** In addition, because the discharge cover 222 is opened in the state in which the cleaner 200 is coupled to the cleaner station 100, it is possible to prevent the dust from scattering.

**[0210]** Meanwhile, the dust collecting part 170 will be described below with reference to FIGS. 10 to 16.

**[0211]** The cleaner station 100 may include the dust collecting part 170. The dust collecting part 170 may be disposed in the housing 110. The dust collecting part 170 may be disposed at the lower side of the coupling part 120 based on the gravitational direction.

**[0212]** The dust collecting part 170 may capture the dust in the dust bin 220 of the cleaner 200. Specifically, when the dust collecting motor 191 operates in the state in which the cleaner 200 is coupled to the cleaner station 100 and the inside of the dust bin 220 communicates with the flow path part 180, the dust in the dust bin 220 may flow along the flow path part 180 and be captured in the dust collecting part 170.

**[0213]** The dust collecting part 170 may include a dust separating part 171, the dust bag 172, the bag support part 173, the dust bag cartridge 174, a prefilter 175, the joining device 176, and the bag compressing member 177.

**[0214]** The dust separating part 171 may separate dust from the air introduced from the dust bin 220.

**[0215]** The dust separating part 171 may communicate with the first flow path 181. The dust separating part 171 may separate the dust sucked through the first flow path 181. The space in the dust separating part 171 may communicate with a space in the bag support part 173.

**[0216]** For example, the dust separating part 171 may have one or more cyclone parts capable of separating dust by using a cyclone flow. Therefore, air and dust, which are introduced through the first flow path 181, spirally flow along an inner circumferential surface of the dust separating part 171. Therefore, the cyclone flow may be generated in an internal space of the dust separating part 171.

**[0217]** The dust separating part 171 communicates with the first flow path 181. The dust separating part 171 adopts a principle of a dust collector using a centrifugal force to separate the dust introduced into the housing 110 through the dust passage hole 121a.

**[0218]** The dust separating part 171 may further include a secondary cyclone part configured to separate again dust from the air discharged from the cyclone part. In this case, the secondary cyclone part may be positioned in the cyclone part to minimize a size of the dust separating part 171. The secondary cyclone part may include a plurality of cyclone bodies disposed in parallel. The air discharged from the cyclone part may be distributed to and pass through the plurality of cyclone bodies.

**[0219]** The dust bag 172 may be disposed in the housing 110. The dust bag 172 may be disposed below the dust separating part 171 based on the gravitational direction.

**[0220]** The dust bag 172 may be made of an impermeable material. For example, the dust bag 172 may include a roll vinyl film (not illustrated). With this configuration, the dust bag 172 is sealed or joined, which may prevent dust or offensive odor captured in the dust bag 172 from leaking to the outside from the dust bag 172.

**[0221]** The dust bag 172 may be mounted in the housing 110 by means of the dust bag cartridge 174. As necessary, the dust bag 172 may be replaced by means of the dust bag cartridge 174. That is, the dust collecting part 170 may be defined as a consumable component. A volume of the dust bag 172 may be increased by the suction force (negative pressure), which is generated when the dust collecting motor 191 operates, in the state

in which the dust bag 172 is mounted in the housing 110.

**[0222]** In this case, the dust bag 172 in the spread state may be accommodated in the bag support part 173. That is, the dust bag 172 may expand in the bag support part 173 when the dust collecting motor 191 operates. Further, the dust bag 172 in the spread state is supported by the bag support part 173, such that a shape of the dust bag 172 may be maintained.

**[0223]** The dust bag 172 may store the dust separated by the dust separating part 171. An upper region of the dust bag 172 may be cut and joined by the joining device 176. In the state in which the upper region of the dust bag 172 is cut and joined, the dust bag 172 may be separated from the bag support part 173.

**[0224]** With this configuration, the user need not separately tie a bag in which dust is captured, such that the user convenience may be improved.

**[0225]** The bag support part 173 may support the dust bag 172. In case that the dust bag 172 expands, the bag support part 173 may accommodate the dust bag 172 therein. The bag support part 173 may support an external shape of the expanded dust bag 172.

**[0226]** Specifically, the bag support part 173 may include a support part main body 173a and suction holes 173b.

**[0227]** The support part main body 173a may be separably coupled in the housing 110. For example, the support part main body 173a may be formed in a cylindrical shape, and wheels 173c may be provided at a lower side of the support part main body 173a. In this case, an outer peripheral surface of the support part main body 173a may be disposed to be spaced apart from a sidewall of the bag accommodation space 115. Therefore, a space may be defined between an outer peripheral surface of the support part main body 173a and the sidewall of the bag accommodation space 115. Further, a space may be defined between a lower surface of the support part main body 173a and a lower surface of the bag accommodation space 115. The space may provide a route along which a suction force of the dust collecting motor 191 is transmitted.

**[0228]** With this configuration, when the dust collecting motor 191 operates, the air, which is present in the bag accommodation space 115, may be sucked into the dust collecting motor 191 by the suction force of the dust collecting motor 191, and a negative pressure, which expands the dust bag 172, may be generated in the bag accommodation space 115.

**[0229]** The support part main body 173a may be formed to accommodate the dust bag 172 therein in case that the dust bag 172 expands. For example, the support part main body 173a may be formed in a cylindrical shape, an upper side of the support part main body 173a may be opened, and at least a part of the lower surface of the support part main body 173a may be closed. In this case, at least a part of the dust bag 172 may be disposed at an upper side of the support part main body 173a. Further, in case that the dust bag 172 expands, the dust bag 172 may expand downward and fill an internal space of the support part main body 173a.

**[0230]** The suction holes 173b may be provided as a plurality of suction holes 173b formed in the support part main body 173a. For example, the plurality of suction holes 173b may be formed along the outer peripheral surface of the support part main body 173a. Further, one or more suction holes 173b may be formed in the lower surface of the support part main body 173a. With this configuration, when the dust collecting motor 191 operates, the air in the support part main body 173a may flow to the outside of the support part main body 173a through the suction holes 173b. In addition, in the state in which the dust bag 173b is expanded in the support part main body 173a, the negative pressure may be applied to the dust bag 172 toward the outside of the support part main body 173a, and the dust bag 172 may expand to come into close contact with the inner peripheral surface and the lower surface of the support part main body 173a. That is, the dust bag 172 may expand along an internal shape of the bag support part 173.

**[0231]** In particular, when the plurality of suction holes 173b is formed while maintaining predetermined intervals, a uniform negative pressure is applied to the entire dust bag 172, such that the dust bag 172 may be uniformly expanded, and the expanded state may be maintained.

**[0232]** Meanwhile, the bag support part 173 may be provided in the housing 110 and configured to be withdrawn from the housing 110.

**[0233]** Specifically, the bag support part 173 may be provided in the bag accommodation space 115 formed in the housing 110. In this case, the bag support part 173 may have a structure for guiding the rectilinear movement of the bag support part 173. For example, as illustrated in FIG. 17, the plurality of wheels 173c may be provided on the bag support part 173. That is, the plurality of wheels 173c may be provided on the lower surface of the support part main body 173a. As another example, although not illustrated, a guide rail may be provided at a lateral side of the bag support part 173.

**[0234]** With this configuration, the user may withdraw the dust bag 172 to the outside of the housing 110 by pulling the bag support part 173 after opening a lateral door (not illustrated) of the cleaner station 100. Therefore, according to the present disclosure, the user may easily withdraw and discard the dust bag.

**[0235]** The dust bag cartridge 174 may be separably coupled to the housing 110 and supply the dust bag 172.

**[0236]** The dust bag cartridge 174 may be detachably coupled to the housing 110. Although not illustrated, a structure to which the dust bag cartridge 174 is coupled may be provided in the housing 110 (the bag accommodation space 115), and the user may insert the dust bag cartridge 174 into the housing 110. In addition, when the user pulls the dust bag cartridge 174 to the outside of the cleaner station 100 in the state in which 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 may easily mount or separate the dust bag cartridge 174 in or from the housing.

**[0237]** The dust bag 172 may be provided in the dust bag cartridge 174. For example, at least a part of the dust bag 172, which is provided in the form of a roll vinyl film, may be coupled to the dust bag cartridge 174. The dust bag 172 may be expanded in the direction toward the bag support part 173 by the operation of the dust collecting motor 191.

**[0238]** In addition, when the joining device 176 to be described below operates, the dust bag 172 may be joined, and a part of the dust bag 172 may be separated from the dust bag cartridge 174. With this configuration, the user need not separately tie a bag in which dust is captured, such that the user convenience may be improved.

**[0239]** The dust collecting part 170 may further include the prefilter 175. The prefilter 175 may be disposed on the second flow path 182 and separate the debris from the air flowing along the second flow path 182. For example, the prefilter 175 may be disposed at an inlet port side of the second flow path 182 and separate the dust contained in the air having passed through the dust separating part 171. With this configuration, it is possible to prevent the debris from being introduced into a dust collecting motor 191.

**[0240]** The dust collecting part 170 may further include the joining device 176. The joining device 176 may be disposed in the housing 110. The joining device 176 may be disposed in an upper region of the bag support part 173. The joining device 176 may cut and join an upper region of the dust bag 172 in which dust is captured. Specifically, the joining device 176 collects the upper region of the dust bag 172 to one point and then joins the upper region of the dust bag 172 by heating the upper region of the dust bag 172 by using a heating wire.

**[0241]** Specifically, the joining device 176 may be mounted at the upper side of the bag accommodation space 115 and mounted below the bag cartridge 174. That is, the joining device 176 may be disposed between the bag accommodation space 115 and the bag cartridge 174.

**[0242]** The joining device 176 may include a heating wire 1760, a movable joining member 1761, a stationary joining member 1762, and a joint drive part 1763.

**[0243]** The movable joining member 1761 may be configured to be movable toward the stationary joining member 1762 by receiving power from the joint drive part 1763. The joining device 176 may have a structure for guiding a rectilinear movement of the movable joining member 1761.

**[0244]** For example, although not illustrated, one or more wheels may be provided on the movable joining member 1761.

**[0245]** As another example, although not illustrated, a guide rail may be formed on a lateral surface of the movable joining member 1761. The movable joining member 1761 may be configured to be rectilinearly moved toward the stationary joining member 1762 by the joint drive part 1763.

**[0246]** The heating wire 1760 may be disposed on at least any one of the movable joining member 1761 and the stationary joining member 1762.

**[0247]** With this configuration, the dust captured in the dust bin 220 of the cleaner 200 may be collected in the dust bag 172 of the cleaner station 100, and the dust bag 172 may be automatically joined. Therefore, it is not necessary for the user to separately tie a bag in which the dust is captured, and as a result, it is possible to improve convenience for the user.

**[0248]** Meanwhile, although not illustrated, the dust collecting part 170 may include a dust amount sensor. The dust amount sensor may measure the amount of dust in the dust bag 172.

**[0249]** The cleaner station 100 may include the flow path part 180. The flow path part 180 may connect the cleaner 200, the dust collecting part 170, and the dust collecting motor 191.

**[0250]** The flow path part 180 may include the first flow path 181, the second flow path 182, and the bypass flow path 183.

**[0251]** The first flow path 181 may connect the dust bin 220 of the cleaner 200 and the dust collecting part 170. The first flow path 181 may be disposed at a rear side of the coupling surface 121. The first flow path 181 may mean a space between the dust bin 220 of the cleaner 200 and the dust collecting part 170. The first flow path 181 may be a space formed at a rear side of the dust passage hole 121a. The first flow path 181 may be a flow path directed downward from the dust passage hole 121a, and the dust and the air may flow through the first flow path 181.

**[0252]** For example, the first flow path 181 may include a first region 181a configured to communicate with the internal space of the dust bin 220 when the cleaner 200 is coupled to the cleaner station 100 and the dust passage hole 121a is opened, and a second region 181b configured to allow the first region 181a and the bag accommodation space 115 (or the internal space of the dust collecting part 170) to communicate with each other. In this case, a direction in which the first region 181a is formed may be disposed substantially in parallel with the axial direction (longitudinal direction) of the dust bin. In addition, a direction in which the second region 181b is formed may be disposed in parallel with the longitudinal axis C of the housing 110. In this case, the first region 181a may be formed to have a predetermined angle with respect to the second region 181b. With this configuration, it is possible to minimize a decrease in the suction force of the dust collecting motor 191 in the first flow path 181 and the second flow path 182.

**[0253]** Therefore, when the dust collecting motor 191 operates, the dust in the dust bin 220 of the cleaner 200 may flow to the dust collecting part 170 through the first flow path 181.

**[0254]** The second flow path 182 may connect the dust collecting part 170 and the dust suction module 190. Specifically, the second flow path 182 may be a flow path that connects the upper side of the dust collecting part 170 and the upper side of the dust suction module 190. For example, the second flow path 182 may include a third region 182a formed vertically upward from the upper side of the dust collecting part 170, a fourth region 182b connected to the third region 182a and formed horizontally, a fifth region 182c connected to the fourth region 182b and formed vertically downward, and a sixth region 182d formed horizontally from the fifth region 182c and merged with the bypass flow path 183.

**[0255]** With this configuration, it is possible to guide the air, which has passed through the dust collecting part 170, to the dust collecting motor 191 through the second flow path 182.

**[0256]** The bypass flow path 183 may connect the bag support part 173 and the dust collecting motor 191 by means of the flow path.

**[0257]** The bypass flow path 183 may allow the bag accommodation space 115 and the internal space of the dust suction module 190 to communicate with each other. For example, the bypass flow path 183 may be a flow path formed in the gravitational direction to connect the bag accommodation space 115 and the dust suction module 190. With this configuration, the bypass flow path 183 may guide the air, which is present in the bag accommodation space 115, to the dust collecting motor 191.

**[0258]** The second flow path 182 and the bypass flow path 183 may communicate with each other and be connected to the dust suction module 190. For example, the second flow path 182 may be connected to the bypass flow path 183, and the bypass flow path 183 may be connected to the dust suction module 190. 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. Therefore, the second flow path 182 and the bypass flow path 183 may be respectively connected to the dust collecting part 170 and the dust collecting motor 191 by means of the flow paths.

**[0259]** With this configuration, the operation of the dust collecting motor 191 may simultaneously maintain the shape of the dust bag and suck outside air.

**[0260]** The cleaner station 100 may include the dust suction module 190. The dust suction module 190 may include the dust collecting motor 191.

**[0261]** The dust collecting motor 191 may be disposed below the dust collecting part 170. The dust collecting motor 191 may generate a suction force in the flow path part 180. Therefore, the dust collecting motor 191 may provide a suction force capable of sucking the dust in the dust bin 220 of the cleaner 200.

**[0262]** The dust collecting motor 191 may generate the suction force by means of the rotation. For example, the dust collecting motor 191 may be formed in a shape similar to a cylindrical shape and generate a suction force while rotating about a rotation axis. In this case, a direction of the rotation axis of the dust collecting motor 191 may be disposed to be perpendicular to the ground surface.

**[0263]** An operating process of the cleaner station 100 according to the embodiment of the present disclosure will be described below with reference to FIGS. 10 to 16.

**[0264]** First, when the cleaner 200 is coupled to the cleaner station 100, the fixing part motor 133 may operate, and the fixing member 131 may move to fix the dust bin 220 of the cleaner 200.

**[0265]** Further, when the dust bin 220 of the cleaner 200 is fixed, the cover opening motor 152 may operate, the discharge cover 222 of the cleaner 200 may be opened, and the door motor 142 may operate, such that the door 141 may open the dust passage hole 121a. In this case, the inside of the dust bin 220, the first flow path 181, and the dust collecting part 170 may communicate with one another.

**[0266]** Next, when the dust collecting motor 191 operates, a negative pressure may be applied to the flow path part 180, and the air and dust in the dust bin 220 may flow toward the dust collecting motor 191.

**[0267]** Specifically, the air, which is introduced into the first flow path 181 from the inside of the dust bin 220, may pass through the first flow path 181, and then the dust may be separated by the dust separating part 171. Further, the air, from which the dust is separated, may flow toward the dust collecting motor 191 through the second flow path 182 and then be discharged to the outside.

**[0268]** Meanwhile, when the negative pressure is applied to the bypass flow path 183 as the dust collecting motor 191 operates, the dust bag 172 may expand toward the bag support part 173. Further, the dust separated from the air may be captured in the expanded dust bag 172 (see FIG. 14).

**[0269]** Next, when the dust collecting motor 191 is ended, the joining device 176 may operate. A process in which the joining device 176 joins the dust bag 172 will be specifically described below.

**[0270]** The dust bag 172 extends downward from the roll vinyl film (not illustrated) of the bag cartridge 174, passes through the joining device 176, and reaches the bag support part 173.

**[0271]** The movable joining member 1761 may move by receiving power from the joint drive part 1763. A movement direction of the movable joining member 1761 may be a direction parallel to the ground surface. The movement direction of the movable joining member 1761 may be a direction parallel to the bottom surface 111.

**[0272]** When the movable joining member 1761 moves toward the stationary joining member 1762, a part of the dust bag 172 may be closed at the position at which the joining device 176 is disposed (see FIG. 15).

**[0273]** The heating wire 1760 may join and seal the upper portion of the closed dust bag 172. The dust cap-

tured in the sealed dust bag 172 is not discharged to the outside.

**[0274]** Further, the sealed dust bag 172 may be separated downward and accommodated in the bag support part 173.

**[0275]** Meanwhile, as the dust bag 172 is separated, a new dust bag 172' may be created in the dust bag cartridge 174. For example, the new dust bag 172' may be created as the dust bag 172 is joined and separated from the roll vinyl film provided in the dust bag cartridge 174 (see FIG. 16).

**[0276]** Further, the bag support part 173 may move to the outside of the housing 110 of the cleaner station 100. For example, the plurality of wheels 173c may be provided on the lower surface of the bag support part 173. When the user opens the lateral door (not illustrated) of the housing 110 and pulls the bag support part 173, the bag support part 173 may be moved to the outside of the housing 110. In this state, the user may withdraw the sealed dust bag 172 and discard the dust bag 172.

**[0277]** With this configuration, it is possible to provide convenience in that the user may empty the dust bin only by performing a simple operation of withdrawing the dust bag, which is sealed in advance, from the cleaner station 100 and then discarding the dust bag.

**[0278]** Meanwhile, FIG. 17 is a block diagram for explaining a control configuration of the cleaner station according to the embodiment of the present disclosure.

**[0279]** The control configuration of the cleaner station 100 of the present disclosure will be described below with reference to FIG. 17.

**[0280]** The cleaner station 100 according to the embodiment of the present disclosure may further include a control unit 300 configured to control the coupling part 120, the fixing unit 130, the door unit 140, the cover opening unit 150, the dust collecting part 170, the flow path part 180, the joining device 176, a compression drive part 178, and the dust suction module 190.

**[0281]** The control unit 300 may include a printed circuit board and elements mounted on the printed circuit board.

**[0282]** When the coupling sensor 125 detects the coupling of the cleaner 200, the coupling sensor 125 may transmit a signal indicating that the cleaner 200 is coupled to the coupling part 120. In this case, the control unit 300 may receive the signal from the coupling sensor 125 and determine that the cleaner 200 is coupled to the coupling part 120.

**[0283]** In addition, when the charging part 128 supplies power to the battery 240 of the cleaner 200, the control unit 300 may determine that the cleaner 200 is coupled to the coupling part 120.

**[0284]** When the control unit 300 determines that the cleaner 200 is coupled to the coupling part 120, the control unit 300 may operate the fixing part motor 133 to fix the cleaner 200.

**[0285]** When the fixing members 131 or the fixing part links 135 are moved to a predetermined fixing point FP1, a fixing detecting part 137 may transmit a signal indicating that the cleaner 200 is fixed. The station control unit 300 may receive the signal, which indicates that the cleaner 200 is fixed, from the fixing detecting part 137, and determine that the cleaner 200 is fixed. When the control unit 300 determines that the cleaner 200 is fixed, the control unit 300 may stop the operation of the fixing part motor 133.

**[0286]** Meanwhile, when the operation of emptying the dust bin 220 is ended, the control unit 300 may rotate the fixing part motor 133 in the reverse direction to release the cleaner 200.

**[0287]** When the control unit 300 determines that the cleaner 200 is fixed to the coupling part 120, the control unit 300 may operate the door motor 142 to open the door 141 of the cleaner station 100.

**[0288]** When the door 141 or the door arm 143 reaches the predetermined opening position DP1, the door opening/closing detecting part 144 may transmit a signal indicating that the door 141 is opened. The control unit 300 may receive the signal, which indicates that the door 141 is opened, from the door opening/closing detecting part 137 and determine that the door 141 is opened. When the control unit 300 determines that the door 141 is opened, the control unit 300 may stop the operation of the door motor 142.

**[0289]** Meanwhile, when the operation of emptying the dust bin 220 is ended, the control unit 300 may rotate the door motor 142 in the reverse direction to close the door 141.

**[0290]** When the control unit 300 determines that the door 141 is opened, the control unit 300 may operate the cover opening motor 152 to open the discharge cover 222 of the cleaner 200.

**[0291]** When a guide frame 151e reaches the predetermined opening position CP1, the cover opening detecting part 155f may transmit a signal indicating that the discharge cover 222 is opened. The control unit 300 may receive the signal, which indicates that the discharge cover 222 is opened, from the cover opening detecting part 155f and determine that the discharge cover 222 is opened. When the control unit 300 determines that the discharge cover 222 is opened, the control unit 300 may stop the operation of the cover opening motor 152.

**[0292]** Meanwhile, in the present embodiment, the control unit 300 may operate the joining device 176 after the operation of the dust collecting motor 191 is ended. For example, the control unit 300 may operate the joining device 176 when a preset predetermined time elapses after the operation of the dust collecting motor 191 is ended. As another example, the control unit 300 may operate the joining device 176 when a predetermined time elapses after the dust collecting motor 191 operates a preset number of times. As still another example, the control unit 300 may operate the joining device 176 for each preset cycle. In case that the dust collecting motor 191 is operating, the control unit 300 may operate the joining device 176 when a predetermined time elapses. In addition, the control unit 300 may operate the joining

device 176 when the amount of dust measured by the dust amount sensor (not illustrated) exceeds a predetermined reference.

**[0293]** Specifically, the control unit 300 may close the dust bag 172 by moving the movable joining member 1761 toward the stationary joining member 1762 by operating the joint drive part 1763 and join the dust bag 172 by using the heating wire by operating the heating wire 1760.

**[0294]** With this configuration, it is possible to improve hygiene by sealing the dust bag 172 in a state in which the dust is settled in the dust bag 172 without floating in the cleaner station 100.

**[0295]** The control unit 300 may operate the dust collecting motor 191 to suck the dust in the dust bin 220.

**[0296]** Meanwhile, the control unit 300 may move the bag compressing member 177 by operating the compression drive part 178, thereby removing air from the dust bag 172, compressing the dust bag 172, and reducing a volume of the dust bag 172. A specific process of compressing the dust bag 172 by using the compression drive part 178 will be more specifically described below with reference to the drawings.

**[0297]** The control unit 300 may operate the display part 310 to display a dust bin emptied situation and a charged situation of the cleaner 200. For example, in the present embodiment, in case that the amount of dust measured by the dust amount sensor exceeds a predetermined reference value, the control unit 300 may display information, which indicates that the dust bag 172 is required to be replaced, on the display part 310.

**[0298]** Meanwhile, the cleaner station 100 according to the present disclosure may include the display part 310.

**[0299]** The display part 310 may be disposed on the housing 110, disposed on a separate display device, or disposed on a terminal such as a mobile phone.

**[0300]** The display part 310 may be configured to include at least any one of a display panel capable of outputting letters and/or figures and a speaker capable of outputting voice signals and sound. The user may easily ascertain a situation of a currently performed process, a residual time, and the like on the basis of information outputted through the display part.

**[0301]** Meanwhile, the cleaner station 100 according to the embodiment of the present disclosure may include a memory 330. The memory 330 may include various data for operating or driving the cleaner station 100.

**[0302]** Meanwhile, the cleaner station 100 according to the embodiment of the present disclosure may include an input part 340. The input part 340 generates key input data inputted by the user to control the operation of the cleaner station 100. To this end, the input part 340 may include a keypad, a dome switch, a touchpad (resistive touchpad/capacitive touchpad), and the like. In particular, in case that the touchpad defines a mutual layer structure together with the display part 310, the touchpad may be called a touch screen.

**[0303]** FIGS. 18 and 19 are views for explaining a two-axis movable joining device of the cleaner station according to the embodiment of the present disclosure.

**[0304]** A configuration of a two-axis movable joining device of the cleaner station according to the embodiment of the present disclosure will be described below with reference to FIGS. 18 and 19.

**[0305]** The joining device 176 may be mounted at the upper side of the bag accommodation space 115. Specifically, the joining device 176 may be mounted at the upper side of the bag accommodation space 115 and mounted below the bag cartridge 174. That is, the joining device 176 may be disposed between the bag accommodation space 115 and the bag cartridge 174.

**[0306]** The joining device 176 may include the heating wire 1760, the movable joining member 1761, the stationary joining member 1762, and the joint drive part 1763.

**[0307]** The movable joining member 1761 may include a first movable joining member 1761a and a second movable joining member 1761b. The joint drive part 1763 may include a first joint drive part 1763a and a second joint drive part 1763b. The first movable joining member 1761a may be moved in a first direction by the first joint drive part 1763a, and the second movable joining member 1761b may be moved in a second direction perpendicular to the first direction by the second joint drive part 1763b. Both the first and second directions may be parallel to the ground surface. Both the first and second directions may be parallel to the bottom surface 111.

**[0308]** The first movable joining member 1761a and the second movable joining member 1761b may rectilinearly move in a sliding manner. For example, as illustrated in FIGS. 18 and 19, rails may be formed on an upper portion of the joining device 176 to rectilinearly move the movable joining member 1761. The first movable joining member 1761a and the second movable joining member 1761b may rectilinearly move along the rails.

**[0309]** As another example, although not illustrated, a wheel may be provided on the movable joining member 1761 so that the movable joining member 1761 rectilinearly moves.

**[0310]** The first joint drive part 1763a and the second joint drive part 1763b may include motors (not illustrated) for sliding the first movable joining member 1761a and the second movable joining member 1761b.

**[0311]** A process in which the two-axis movable joining device of the cleaner station according to the embodiment of the present disclosure joins the dust bag 172 will be described below with reference to FIGS. 18 and 19.

**[0312]** The control unit 300 may operate the joining device 176 to join the dust bag 172.

**[0313]** Specifically, the control unit 300 may move the first movable joining member 1761a in the first direction by operating the first movable joining member 1761a. The control unit 300 may move the second movable joining member 1761b in the second direction perpendicular to the first direction by operating the second movable

joining member 1761b.

**[0314]** When the dust bag 172 is closed by the movements of the first and second movable joining members 1761a and 1761b, the control unit 300 may join the upper portion of the dust bag 172 by operating the heating wire 1760.

**[0315]** When the plurality of movable joining members 1761 is provided to close and join the dust bag 172 as described above, the dust bag 172 may be more effectively sealed and joined, and the effect of preventing dust from scattering may be improved, in comparison with the embodiment in which the single movable joining member 1761 is provided.

**[0316]** After the process of sealing and joining the dust bag 172 ends, the first movable joining member 1761a and second movable joining member 1762b may be moved away from the stationary joining member 1762 by the first joint drive part 1763a and the second joint drive part 1763b. That is, the movable joining member 1761 may return to the original position after the process of sealing and joining the dust bag 172 ends.

**[0317]** After the movable joining member 1761 returns to the original position, a new dust bag 172' may be disposed in the bag accommodation space 115.

**[0318]** FIGS. 20 to 27 are for explaining the joining device 176 and the bag compressing member 177 of the cleaner station according to the embodiments of the present disclosure.

**[0319]** The joining device 176 and the bag compressing member 177 of the cleaner station 100 according to the embodiment of the present disclosure will be described below with reference to FIGS. 20 to 23.

**[0320]** The bag compressing member 177 and the compression drive part 178 may be disposed in the bag accommodation space 115. In the present embodiment, the bag compressing member 177 may include a flow path closing member 177a. The flow path closing member 177a may be movably coupled to the bag accommodation space 115 and configured to open or close the bypass flow path 183.

**[0321]** The flow path closing member 177a may be disposed at the lower side of the bag accommodation space 115.

**[0322]** For example, the flow path closing member 177a may be rectilinearly movably coupled to the lower side of the bag accommodation space 115 in a sliding manner (see FIGS. 20 and 21). The bag compressing member 177 may have a rail or wheel that guides the rectilinear movement of the flow path closing member 177a.

**[0323]** As another example, the flow path closing member 177a may be hingedly coupled to the lower side of the bag accommodation space 115 and configured to be rotatable (see FIGS. 22 and 23). The bag compressing member 177 may have a hinge structure for rotating the flow path closing member 177a.

**[0324]** The compression drive part 178 is connected to the flow path closing member 177a and configured to move the flow path closing member 177a. The compression drive part 178 may include a flow path closing motor 178a for rectilinearly moving or rotating the flow path closing member 177a.

**[0325]** The flow path closing member 177a may be formed in a shape similar to a circular plate shape. A packing (not illustrated) made of silicone or the like may be disposed on an upper surface of the flow path closing member 177a to effectively close the bypass flow path 183.

**[0326]** Meanwhile, the joining device 176 may have the movable joining member 1761 and the stationary joining member 1762, and the movable joining member 1761 may move toward the stationary joining member 1762.

**[0327]** In case that the dust bag 172 needs to be emptied, the control unit 300 may control the joint drive part 1763 so that the movement of the movable joining member 1761 is stopped in a state in which the movable joining member 1761 is spaced apart from the stationary j oining member 1762 at a predetermined distance. Because the upper portion of the dust bag 172 is not in a fully closed state, an air flow path, through which air in the dust bag may be discharged, may be formed. In this case, the air flow path may be disposed at a position close to the dust separating part 171.

**[0328]** Specifically, the stationary joining member 1762 is disposed immediately below the dust separating part 171, and the movement of the movable joining member 1761 is stopped in the state in which the movable joining member 1761 is spaced apart from the stationary joining member 1762 at a predetermined distance, such that the air flow path disposed above the dust bag 172 may be disposed immediately below the dust separating part 171.

**[0329]** Next, the bypass flow path 183 may be closed as the flow path closing member 177a is rectilinearly moved or rotated by the flow path closing motor 178a. The control unit 300 may operate the dust collecting motor 191 after the bypass flow path 183 is closed.

**[0330]** When the dust collecting motor 191 operates, negative pressure is applied to the first flow path 181 and the second flow path 182. The air in the dust bag 172 may be discharged to the dust separating part 171 by the negative pressure formed in the second flow path 182.

**[0331]** Meanwhile, because the bypass flow path 183 is closed, negative pressure cannot be applied to the bypass flow path 183, and the dust bag 172 is not expanded.

**[0332]** Therefore, the dust collecting motor 191 operates in the state in which the bypass flow path 183 is closed by the flow path closing member 177a, such that the air in the dust bag 172 may be discharged, the dust bag 172 may be compressed, and the volume of the dust bag 172 may be minimized.

**[0333]** After the compression of the dust bag 172 ends, the control unit 300 may open the bypass flow path 183 again by rectilinearly moving or rotating the flow path

closing member 177a by using the flow path closing motor 178a.

**[0334]** The joining device 176 and the bag compressing member 177 of the cleaner station 100 according to another embodiment of the present disclosure will be described below with reference to FIGS. 24 to 27.

**[0335]** The bag compressing member 177 and the compression drive part 178 may be disposed in the bag accommodation space 115. In the present embodiment, the bag compressing member 177 may include a pressing member 177b configured to apply pressure to an outer surface of the dust bag 172. The pressing member 177b may be movably coupled to the inside of the bag support part 173 and configured to compress the dust bag 172. The pressing member 177b may be formed in a rectangular flat plate shape.

**[0336]** The pressing member 177b may be disposed in the bag support part 173.

**[0337]** For example, the pressing member 177b may be rectilinearly movably coupled to the bag support part 173 in a sliding manner (see FIGS. 24 and 25). The bag compressing member 177 may have a rail or wheel that guides the rectilinear movement of the pressing member 177b.

**[0338]** As another example, the pressing member 177b may be hingedly coupled to the inside of the bag support part 173 and configured to be rotatable (see FIGS. 26 and 27). The bag compressing member 177 may have a hinge structure for rotating the pressing member 177b.

**[0339]** The compression drive part 178 is connected to the flow path closing member 177a and configured to move the flow path closing member 177a. The compression drive part 178 may include a pressing motor 178b for rectilinearly moving or rotating the pressing member 177b.

**[0340]** As described above, the control unit 300 may control the joint drive part 1763 so that the movement of the movable joining member 1761 is stopped in the state in which the movable joining member 1761 is spaced apart from the stationary joining member 1762 at a predetermined distance, such that the air flow path is formed in the state in which the upper portion of the dust bag 172 is not fully closed. The air flow path formed in the dust bag 172 may be disposed immediately below the dust separating part 171.

**[0341]** Next, the pressing member 177b may rectilinearly move or rotate and apply pressure to the outer surface of the dust bag 172. The air in the dust bag 172 may be discharged by the pressure applied by the pressing member 177b.

**[0342]** The pressing member 177b, which is configured to be rectilinearly movable, may rectilinearly move from one side toward the other side of the inner wall of the bag support part 173. A direction of the rectilinear movement of the pressing member 177b may be parallel to a direction in which the movable joining member 1761 moves to the stationary joining member 1762.

**[0343]** From another point of view, the other side may be a lower side of the stationary joining member 1762. That is, the pressing member 177b may compress the dust bag 172 toward the lower side of the air flow path defined above the dust bag 172 by the stationary joining member 1762 and the movable joining member 1761, such that the dust bag 172 may move so that the air in the dust bag 172 may be appropriately discharged to the air flow path.

**[0344]** A lower end of the pressing member 177b, which is configured to be rotatable, is hingedly coupled to one side lower end of the inner wall of the bag support part 173, such that the pressing member 177b may be rotatably coupled.

**[0345]** Specifically, the pressing member 177b, which is configured to be rotatable, may be disposed to be parallel to one side of the inner wall of the bag support part 173 and perpendicular to a bottom of the bag support part 173.

**[0346]** The pressing motor 178b may rotate the pressing member 177b so that the pressing member 177b defines a predetermined angle with respect to one side of the inner wall of the bag support part 173. From another point of view, the pressing motor 178b may rotate the pressing member 177b so that the pressing member 177b defines an acute angle (the pressing member 177b gradually faces the bottom of the bag support part 173) in the state in which the pressing member 177b is perpendicular to the bottom of the bag support part 173.

**[0347]** The pressing member 177b compresses the dust bag 172 from above to below by the above-mentioned rotation, such that the air in the dust bag 172 may be discharged through the air flow path at the upper side.

**[0348]** After the compression of the dust bag 172 ends, the pressing motor 178b rectilinearly moves or rotates the pressing member 177b to the original position, and a new dust bag 172' extends downward from the roll vinyl film (not illustrated), such that the space through which the dust bag 172' is to be introduced into the bag support part 173 through the joining device 176 may be formed again.

**[0349]** After the dust bag 172 is compressed by the bag compressing member 177, the joining device 176 may close the upper end of the dust bag 172 by further moving the movable joining member 1761 toward the stationary joining member 1762 and then seal the dust bag 172 by joining the upper end of the dust bag 172 by the heating wire by operating the heating wire 1760.

**[0350]** With this configuration, the dust bag 172 may be sealed in a state in which the volume of the dust bag 172 is innovatively reduced. Therefore, the convenience and hygiene may be improved during the process in which the user takes the sealed dust bag 172 out of the bag support part 173 and discards the dust bag 172.

**[0351]** FIGS. 28 and 29 are flowcharts for explaining processes of compressing the dust bag 172 in the dust collecting part 170 of the cleaner station 100, reducing the volume of the dust bag 172, and joining and sealing

the dust bag 172 according to the embodiment of the present disclosure.

**[0352]** The processes of compressing the dust bag 172 in the dust collecting part 170 of the cleaner station 100, reducing the volume of the dust bag 172, and joining and sealing the dust bag 172 according to the embodiment of the present disclosure will be described below with reference to FIGS. 20 to 29.

**[0353]** The control unit 300 of the cleaner station 100 according to the present disclosure may capture the dust in the dust bin 220 into the dust bag 172 in the cleaner station 100 by operating the dust collecting motor 191 after the cleaner 200 is connected (S10).

**[0354]** When the user instructs the input part 340 to pack the dust bag 172 after the dust bag 172 is captured, the input part 340 may transmit a packing signal for packing the dust bag 172 to the control unit 300 (S20).

**[0355]** The control unit 300, which receives the packing signal, may tighten an inlet of the dust bag by operating the joint drive part 1763 (S30).

**[0356]** The joint drive part 1763 may include the first joint drive part 1763a and the second joint drive part 1763b. The first joint drive part 1763a may move the first movable joining member 1761a, and the second joint drive part 1763b may move the second movable joining member 1761b.

**[0357]** Specifically, the control unit 300 may move the first movable joining member 1761a in the first direction by operating the first joint drive part 1763a and move the second movable joining member 1761b in the second direction perpendicular to the first direction by operating the second joint drive part 1763b.

**[0358]** In this case, the movement directions of the first and second movable joining members 1761a and 1761b may be directed toward the stationary joining member 1762. The first and second movable joining members 1761a and 1761b are stopped in the state in which the first and second movable joining members 1761a and 1761b are spaced apart from the stationary joining member 1762 at predetermined distances, thereby tightening the inlet of the dust bag 172 by limiting the inlet of the dust bag 172 to a predetermined area.

**[0359]** After the inlet of the dust bag 172 is tightened, the control unit 300 may compress the dust bag by moving the bag compressing member 177 by operating the compression drive part 178 (S40).

**[0360]** The bag compressing member 177 may include the flow path closing member 177a or the pressing member 177b. The compression drive part 178 may include the flow path closing motor 178a capable of moving the flow path closing member 177a or the pressing motor 178b capable of moving the pressing member 177b.

**[0361]** For example, after the inlet of the dust bag 172 is tightened, the control unit 300 may close the bypass flow path 183, which is configured to connect the bag accommodation space 115 and the dust collecting motor 191, by moving the flow path closing member 177a by operating the flow path closing motor 178a (S41a).

**[0362]** Thereafter, the control unit 300 may operate the dust collecting motor 191 in the state in which the bypass flow path 183 is closed, thereby reducing the volume of the dust bag 172 by discharging the air in the dust bag 172 and compressing the dust bag 172 (S41b) (steps S41a and S41b are included in step S40).

**[0363]** As another example, after the inlet of the dust bag 172 is tightened, the control unit 300 may compress the outer surface of the dust bag 172 by moving the pressing member 177b by operating the pressing motor 178b, thereby reducing the volume of the dust bag 172 by discharging the air in the dust bag 172 and compressing the dust bag 172. The movement of the pressing member 177b may be the rectilinear movement or the rotation (S42) (step S42 is included in step S40).

**[0364]** After the control unit 300 compresses the dust bag 172, the control unit 300 may operate the joining device 176 and join and seal the dust bag 172 by using the heating wire (S50).

**[0365]** Specifically, the control unit 300 may maximally move the first movable joining member 1761a in the first direction (S51) and maximally move the second movable joining member 1761b in the second direction (S52) by operating the first joint drive part 1763a and the second joint drive part 1763b, thereby closing the upper portion of the dust bag 172. Thereafter, the control unit 300 may seal the dust bag 172 by joining the upper portion of the dust bag 172 by using the heating wire by operating the heating wire 1760.

**[0366]** As another example, even though the user's input for packing the dust bag 172 is not present (a bag packing signal receiving step (step S20) is excluded), the bag may be compressed and sealed by operating the compression drive part 178 and the joint drive part 1763 by the above-mentioned method when a preset predetermined time elapses after the operation of the dust collecting motor 191 ends.

**[0367]** As another example, when a predetermined time elapses after the dust collecting motor 191 operates a preset number of times, the control unit 300 may compress and seal the bag by operating the compression drive part 178 and the joint drive part 1763 by using the above-mentioned method.

**[0368]** As still another example, the control unit 300 may operate the compression drive part 178 and the joint drive part 1763 in a preset cycle. In case that the dust collecting motor 191 is operating, the control unit 300 may compress and seal the bag by operating the joint drive part 1763 after a predetermined time elapses.

**[0369]** In addition, in case that the amount of dust measured by the dust amount sensor (not illustrated) exceeds a predetermined reference, the control unit 300 may compress and seal the bag by using the above-mentioned method by operating the compression drive part 178 and the joint drive part 1763.

**[0370]** According to the above-mentioned other embodiments, even in case that the user forgets or does not care to empty the dust bag 172, the dust bag 172 may

be compressed and sealed at the appropriate timing, thereby improving hygiene and preventing dust from scattering.

**[0371]** While the present disclosure has been described with reference to the specific embodiments, the specific embodiments are only for specifically explaining the present disclosure, and the present disclosure is not limited to the specific embodiments. It is apparent that the present disclosure may be modified or altered by those skilled in the art without departing from the technical spirit of the present disclosure.

**[0372]** All the simple modifications or alterations to the present disclosure fall within the scope of the present disclosure, and the specific protection scope of the present disclosure will be defined by the appended claims.

## Claims

**1.** A cleaner station comprising:

a housing configured to define an external appearance and having a space formed therein;
a coupling part disposed in the housing and including a coupling surface to which at least a part of a cleaner is coupled;
a dust collecting part comprising a dust separating part accommodated in the housing, disposed at a lower side of the coupling part, and configured to separate dust from air introduced from a dust bin of the cleaner, a dust bag configured to store the dust separated by the dust separating part, a bag support part configured to support the dust bag, and a joining device configured to join the dust bag;
a bag accommodation space formed in the housing and configured to accommodate the bag support part;
a dust collecting motor accommodated in the housing, disposed at the lower side of the dust collecting part, and configured to generate a suction force for sucking dust in the dust bin; and
a flow path part comprising a first flow path configured to connect the dust bin of the cleaner and the dust collecting part, a second flow path configured to guide air, which has passed through the dust collecting part, to the dust collecting motor, and a bypass flow path configured to connect the bag support part and the dust collecting motor,
wherein the dust collecting part further comprises a bag compressing member movably coupled to the bag accommodation space and configured to discharge the air in the dust bag by compressing the dust bag.

**2.** The cleaner station of claim 1, wherein the bag compressing member comprises a flow path closing member hingedly coupled to the bag accommodation space, and wherein the flow path closing member is capable of opening or closing the bypass flow path by rotating.

**3.** The cleaner station of claim 1, wherein the bag compressing member comprises a flow path closing member coupled to the bag accommodation space in a sliding manner, and
wherein the flow path closing member is capable of opening or closing the bypass flow path by rectilinearly moving.

**4.** The cleaner station of claim 1, wherein the bag compressing member comprises a pressing member hingedly coupled to the inside of the bag support part, and
wherein the pressing member is capable of compressing an outer surface of the dust bag by rotating.

**5.** The cleaner station of claim 1, wherein the bag compressing member comprises a pressing member disposed in the bag support part, and
wherein the pressing member is capable of compressing an outer surface of the dust bag by rectilinearly moving.

**6.** The cleaner station of claim 1, wherein the joining device comprises:

a stationary joining member; and
a movable joining member configured to be movable toward the stationary joining member, and
wherein the dust collecting motor enables the movable joining member to operate in a state in which the movable joining member is spaced apart from the stationary joining member at a predetermined distance.

**7.** The cleaner station of claim 1, wherein the joining device comprises a heating wire capable of joining the dust bag by the heating wire.

**8.** The cleaner station of claim 7, wherein the joining device further comprises a stationary joining member; and

a movable joining member configured to close the dust bag by moving toward the stationary joining member, and
wherein the heating wire is disposed on at least any one of the stationary joining member and the movable joining member.

**9.** The cleaner station of claim 8, wherein the movable joining member comprises:

a first movable joining member configured to rectilinearly move toward the stationary joining member in a first direction; and
a second movable joining member configured to rectilinearly move toward the stationary joining member in a second direction perpendicular to the first direction.

**10.** The cleaner station of claim 1, wherein the dust collecting part further comprises a dust bag cartridge separably coupled to the housing and configured to supply the dust bag.

**11.** The cleaner station of claim 1, wherein the dust bag is supported by the bag support part and configured to be discharged from the bag accommodation space.

**12.** The cleaner station of claim 1, wherein the first flow path is connected to an upper side of the bag accommodation space, and the second flow path is connected to the upper side of the bag accommodation space.

**13.** The cleaner station of claim 12, wherein the bypass flow path is connected to a lower side of the bag accommodation space.

**14.** A method of controlling a cleaner station, which discharges air in a dust bag by compressing the dust bag, the method comprising:

a capturing step of capturing dust in a dust bin of a cleaner into a dust bag provided in the cleaner station by operating a dust collecting motor;
a tightening step of limiting an inlet of the dust bag to a predetermined area by moving a movable joining member after the capturing step;
a bag compressing step of compressing the dust bag by moving a bag compressing member after the tightening step; and
a packing step of closing an inlet of the dust bag by moving the movable joining member and joining and packing the inlet of the dust bag by using a heating wire after the bag compressing step.

**15.** The method of claim 14, wherein the bag compressing step further comprises:

a flow path closing step of closing a bypass flow path, which connects the dust collecting motor and a bag accommodation space for accommodating the dust bag, by moving the bag compressing member; and
an air sucking step of discharging air in the dust bag by operating the dust collecting motor after the flow path closing step.

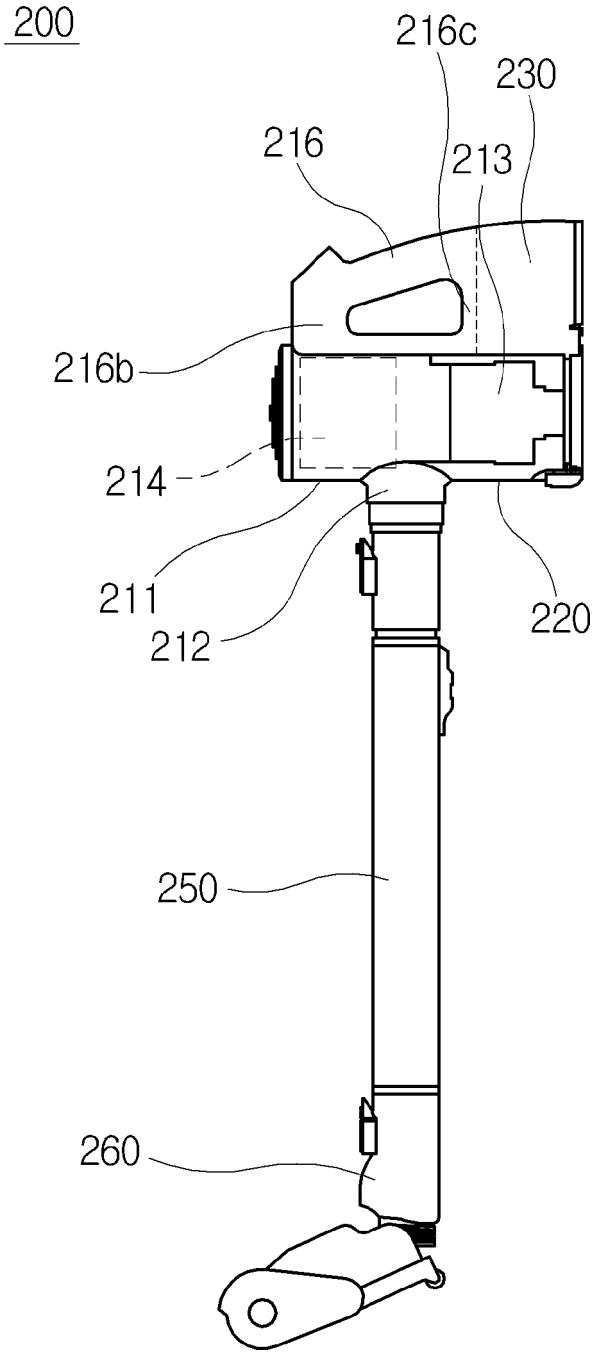
**16.** The method of claim 14, wherein the bag compressing step further comprises a pressing step of discharging air in the dust bag by compressing an outer surface of the dust bag by moving the bag compressing member.

**17.** The method of claim 14, wherein the tightening step further comprises:

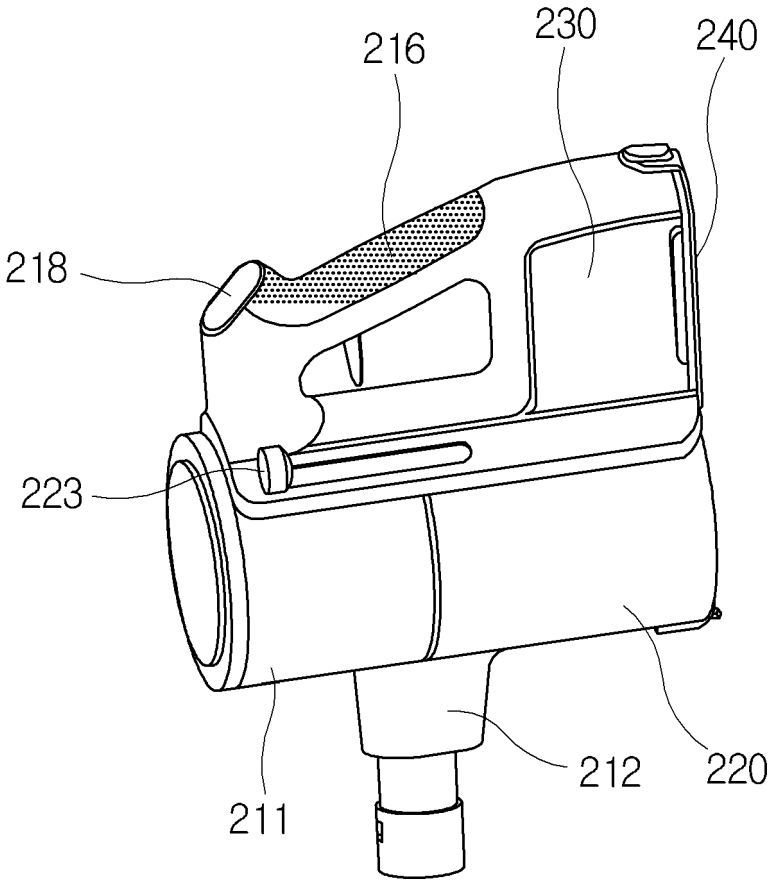
a first tightening step of moving a first movable joining member included in the movable joining member in a first direction; and
a second tightening step of moving a second movable joining member included in the movable joining member in a second direction perpendicular to the first direction, and
wherein the packing step further comprises:

a first packing step of moving the first movable joining member in the first direction; and
a second packing step of moving the second movable joining member in the second direction.

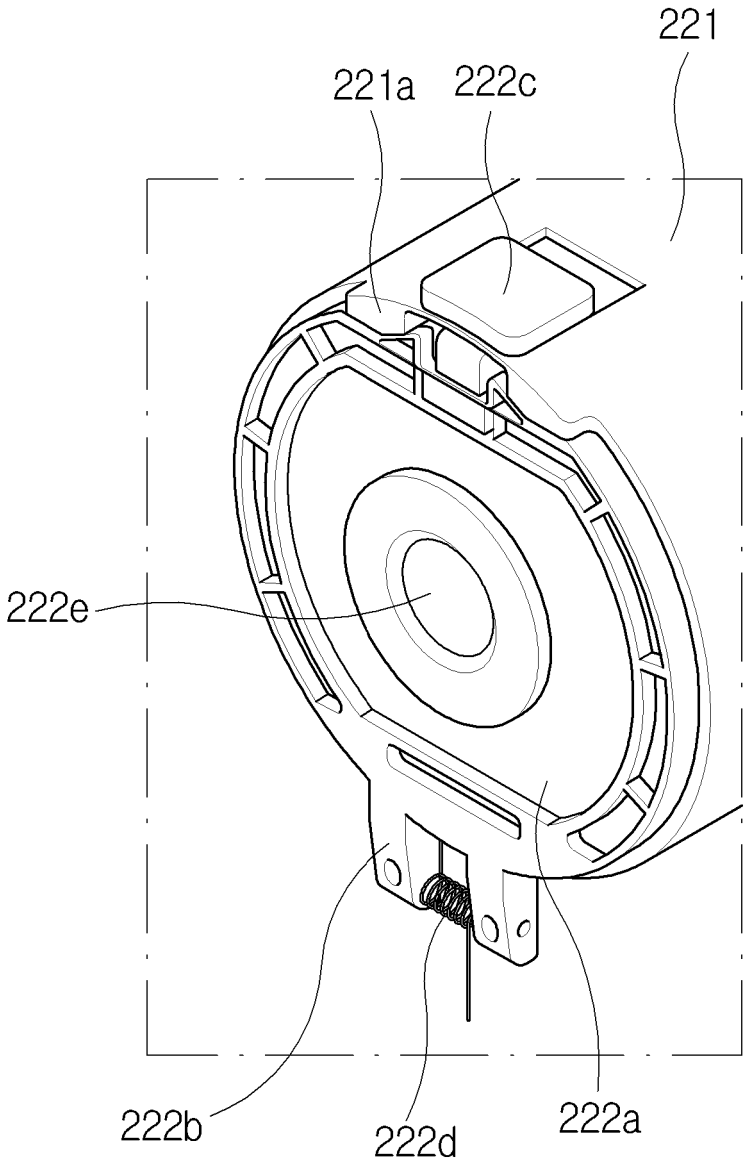
[FIG. 1]



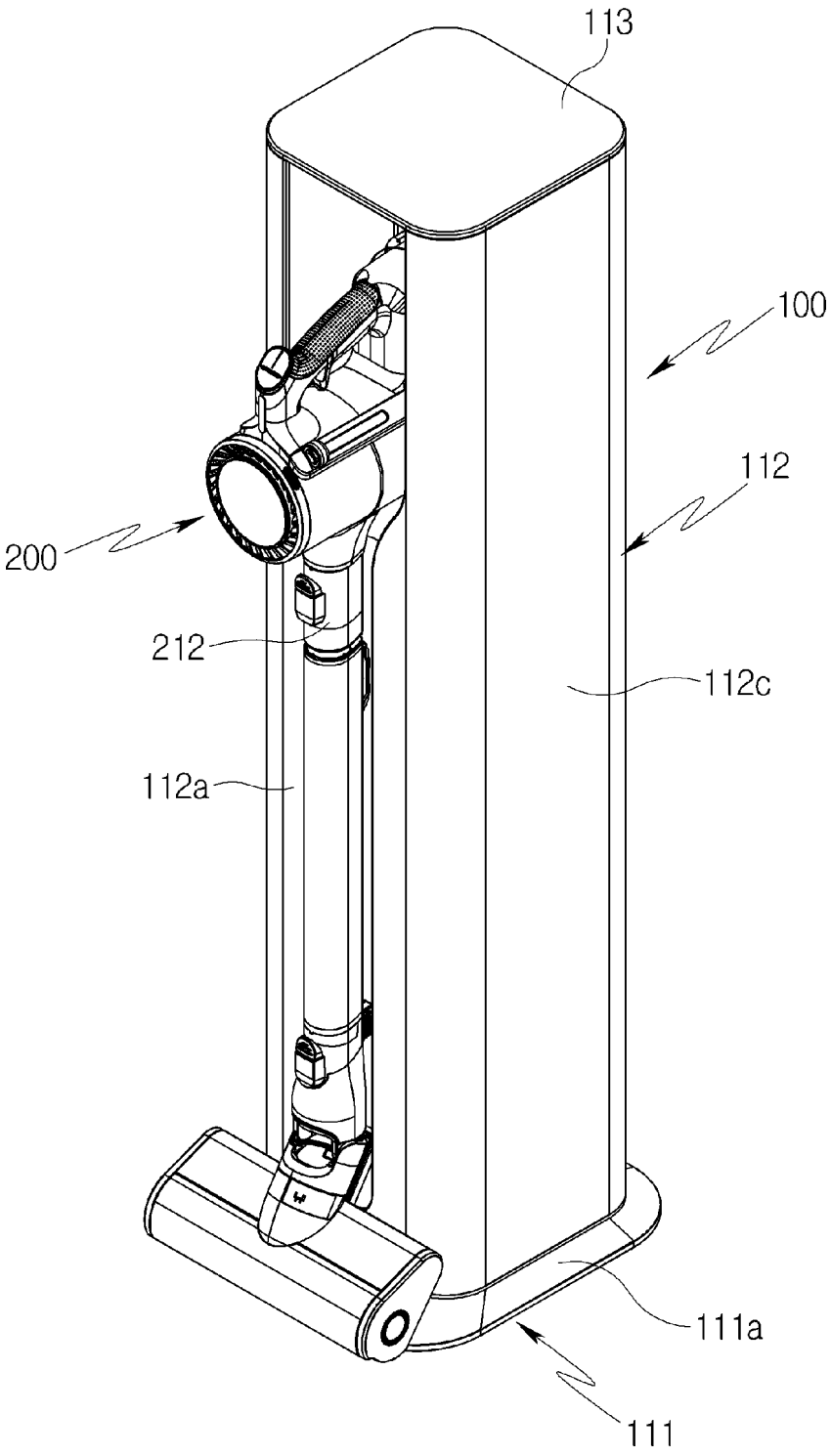
[FIG. 2]



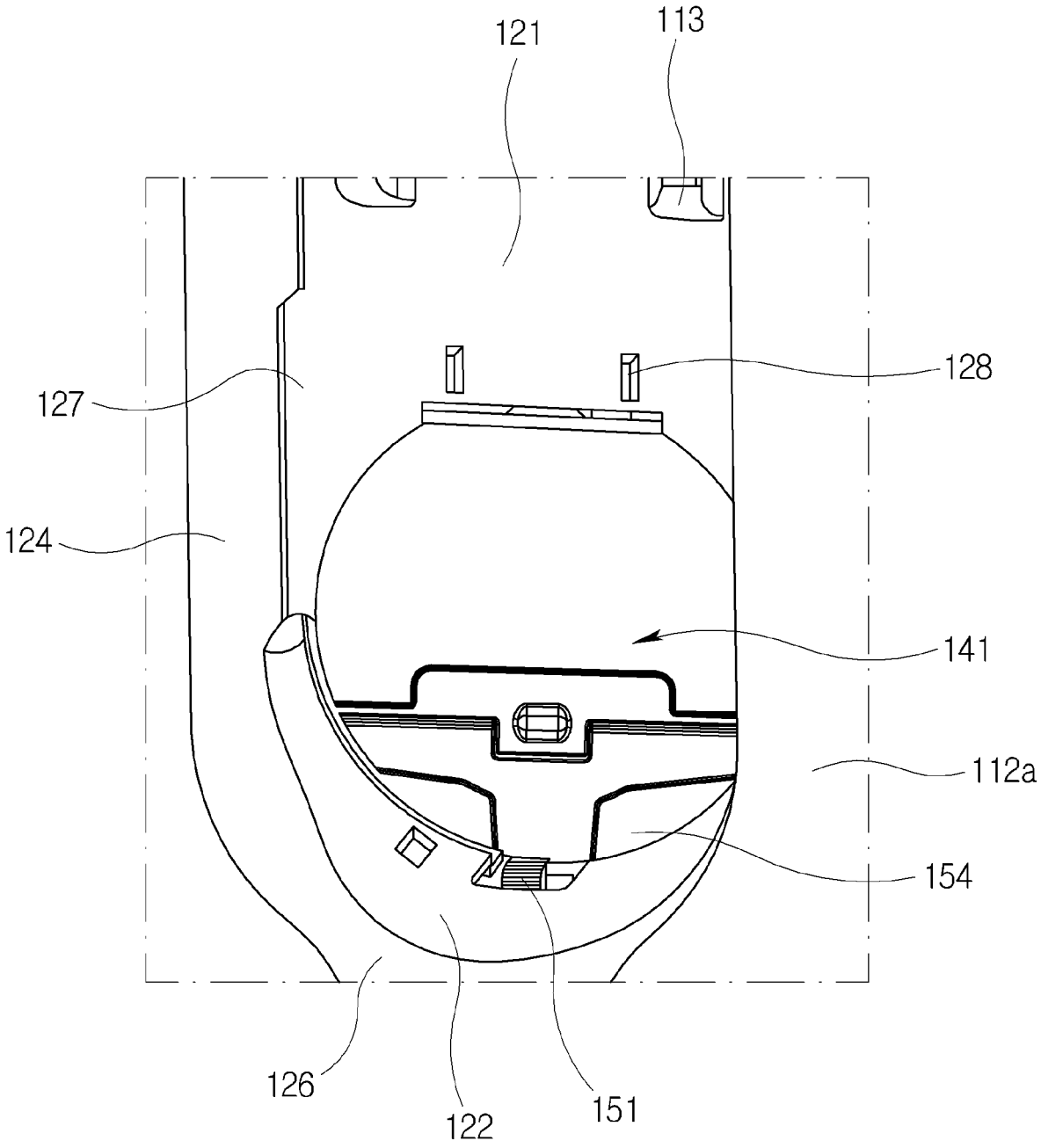
[FIG. 3]



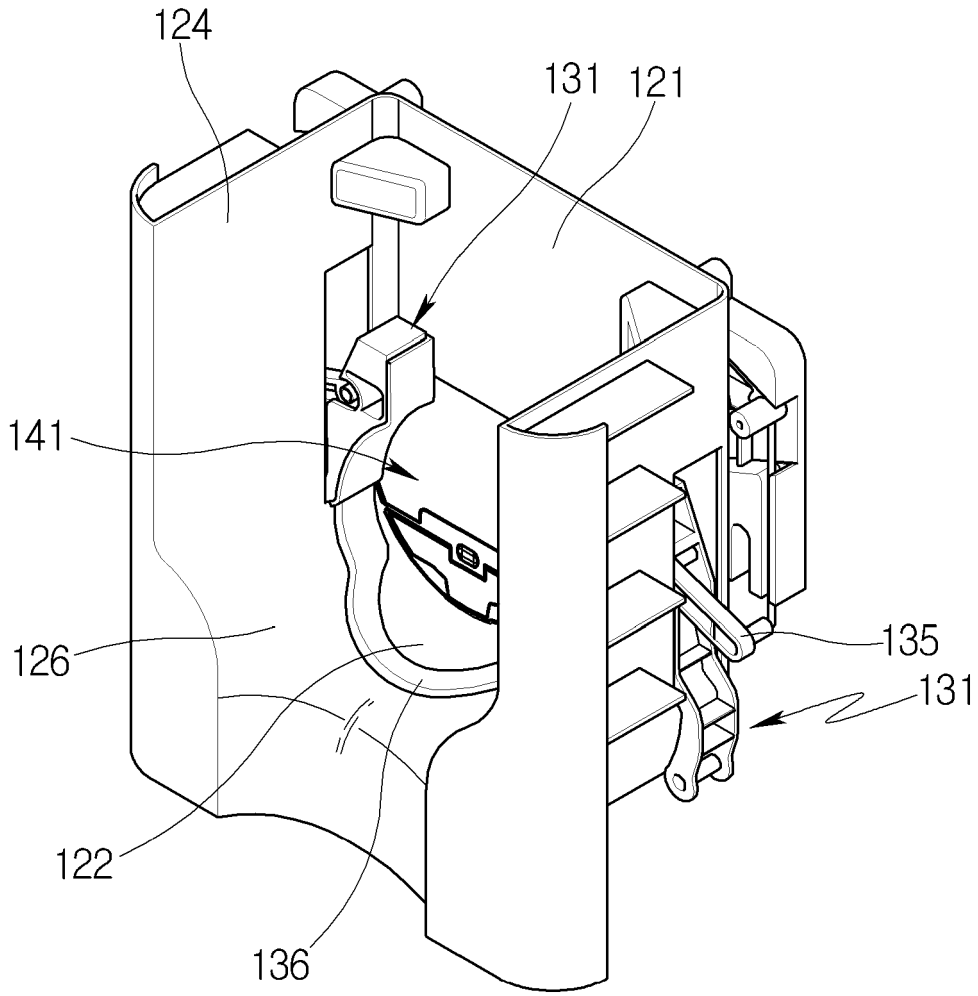
[FIG. 4]



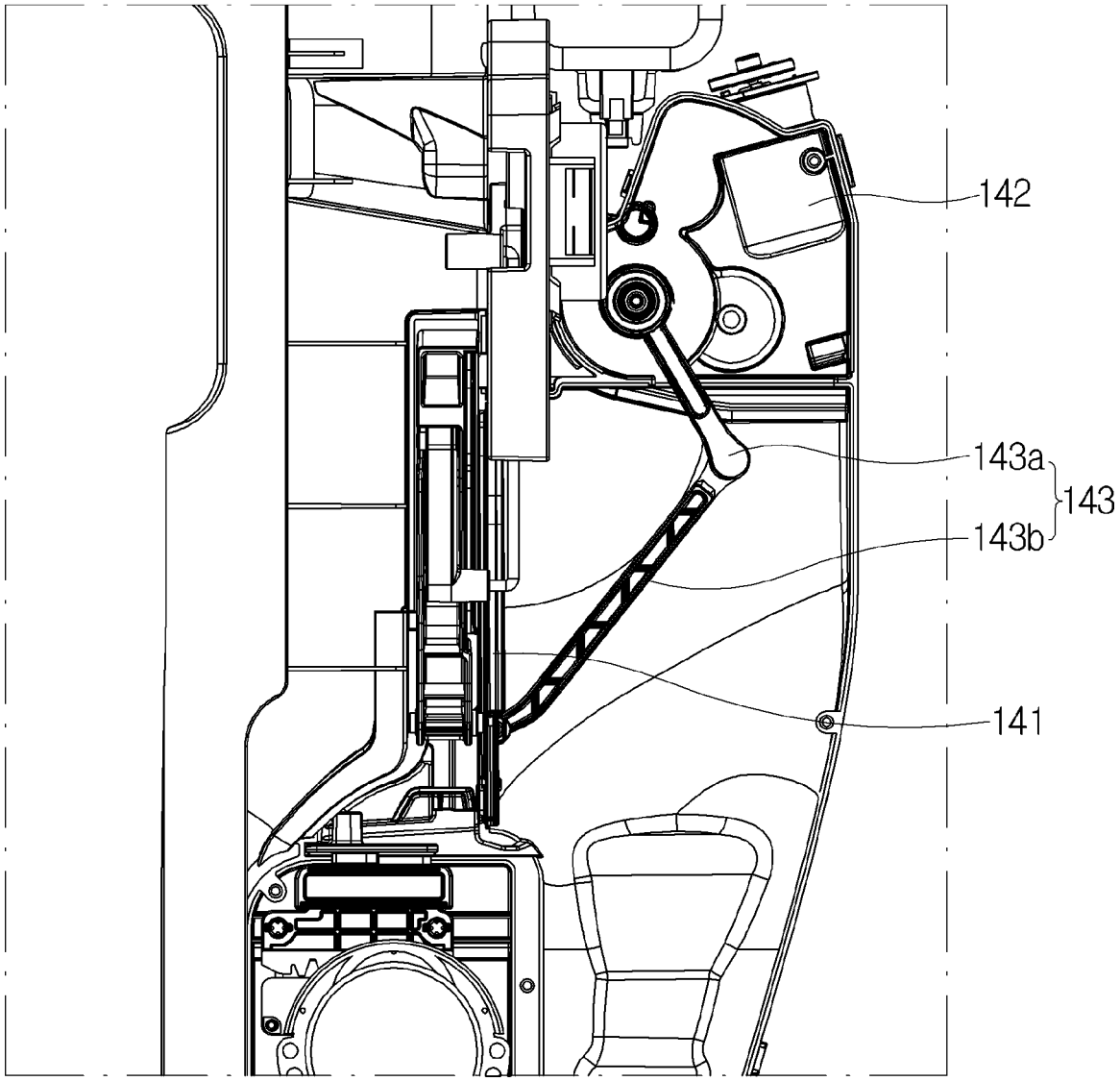
[FIG. 5]



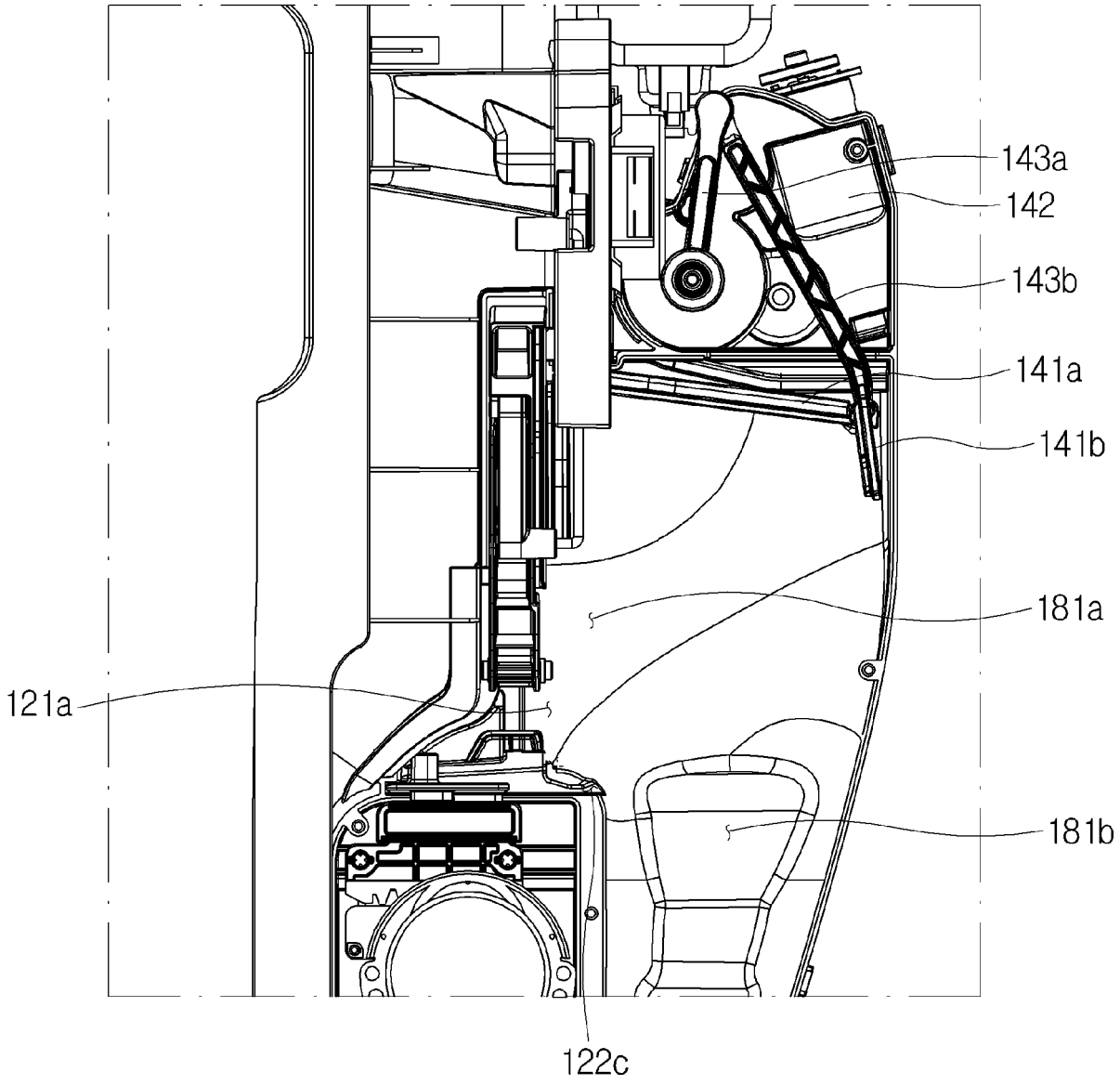
[FIG. 6]



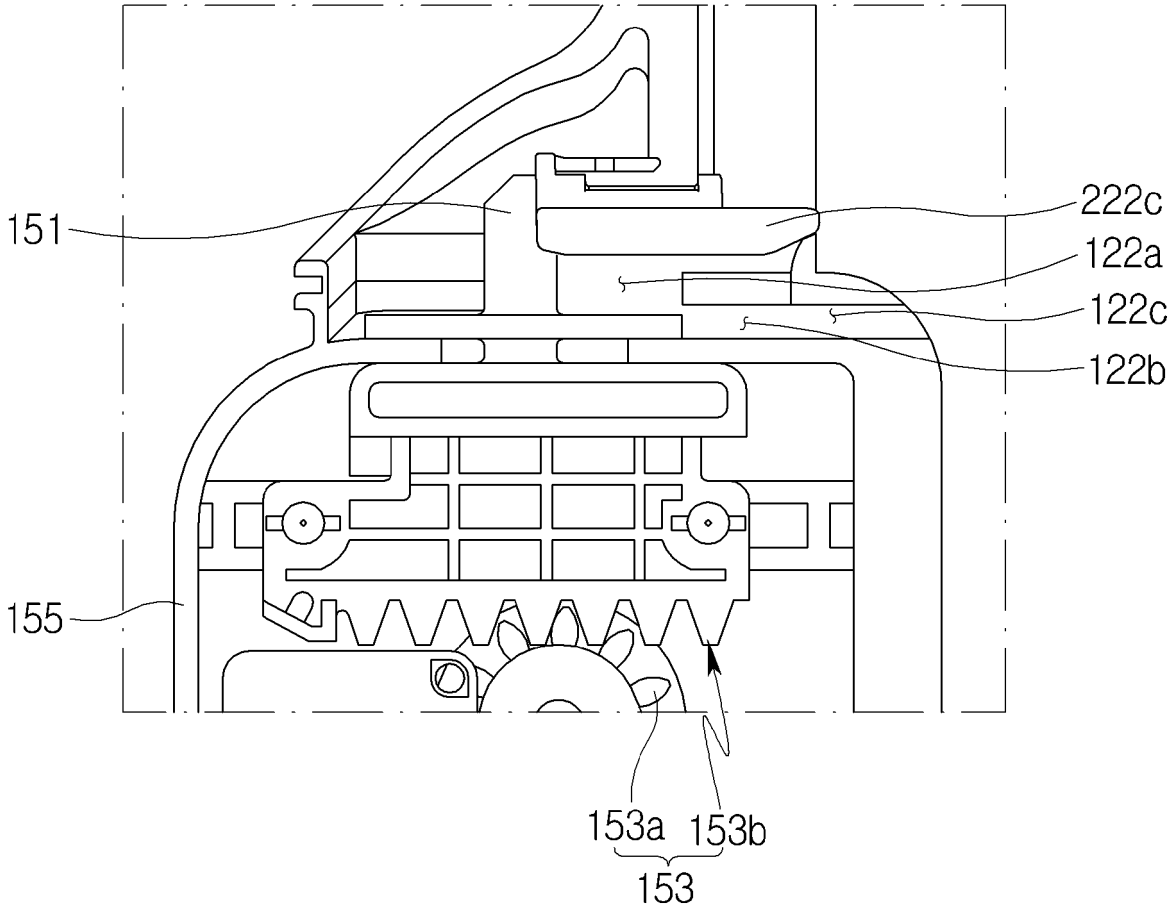
[FIG. 7]



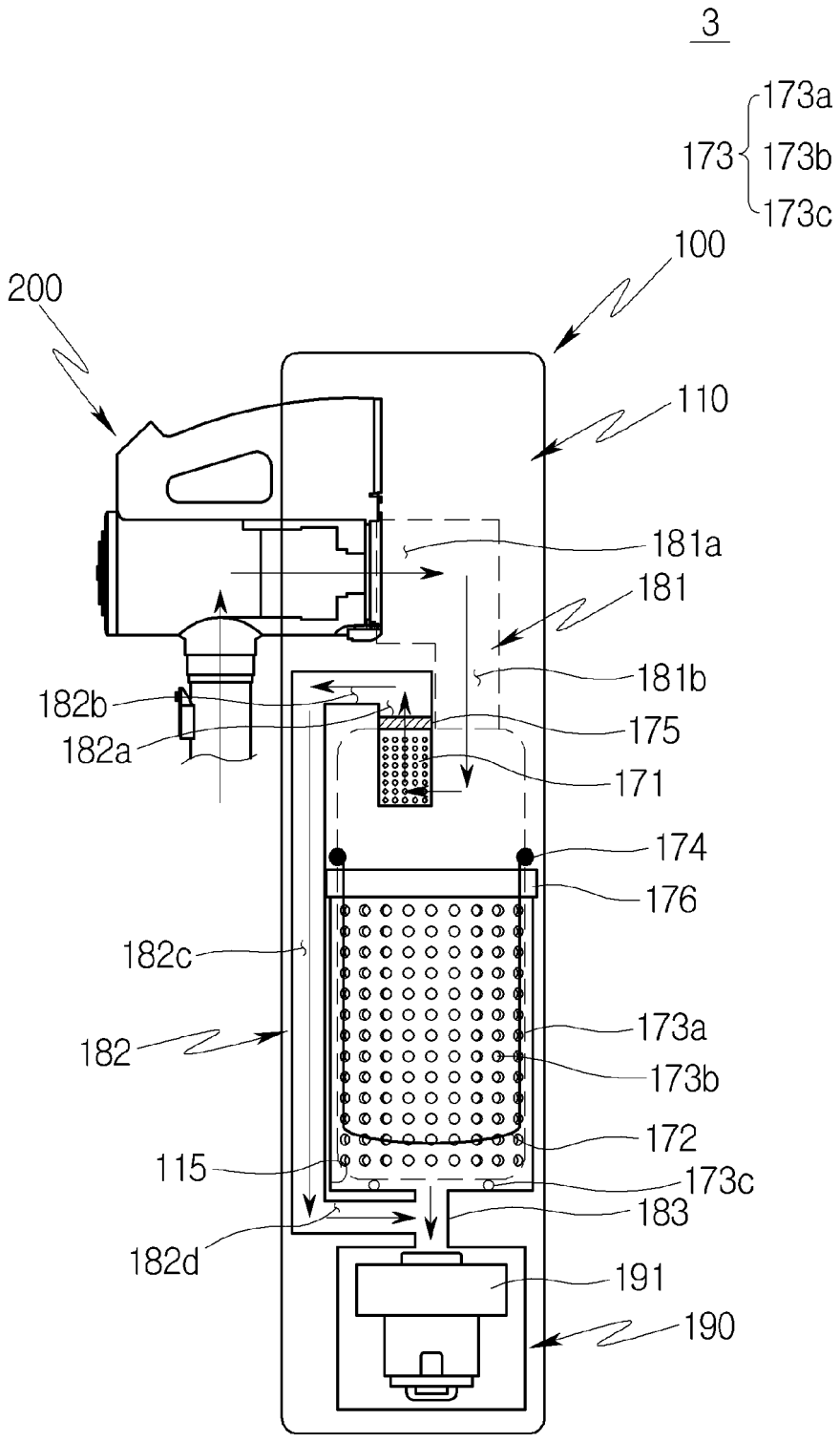
[FIG. 8]



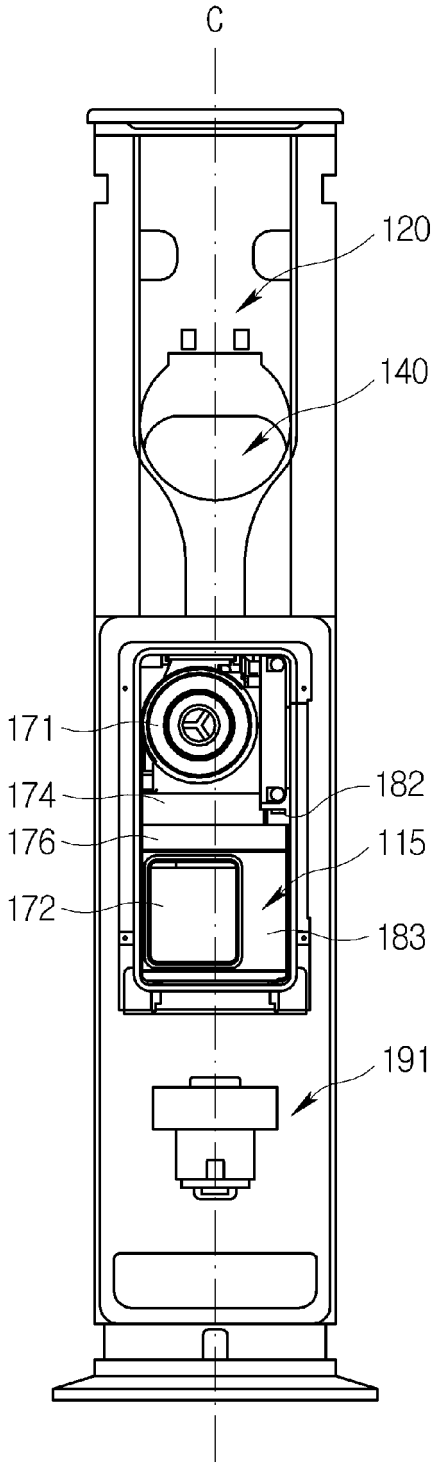
[FIG. 9]



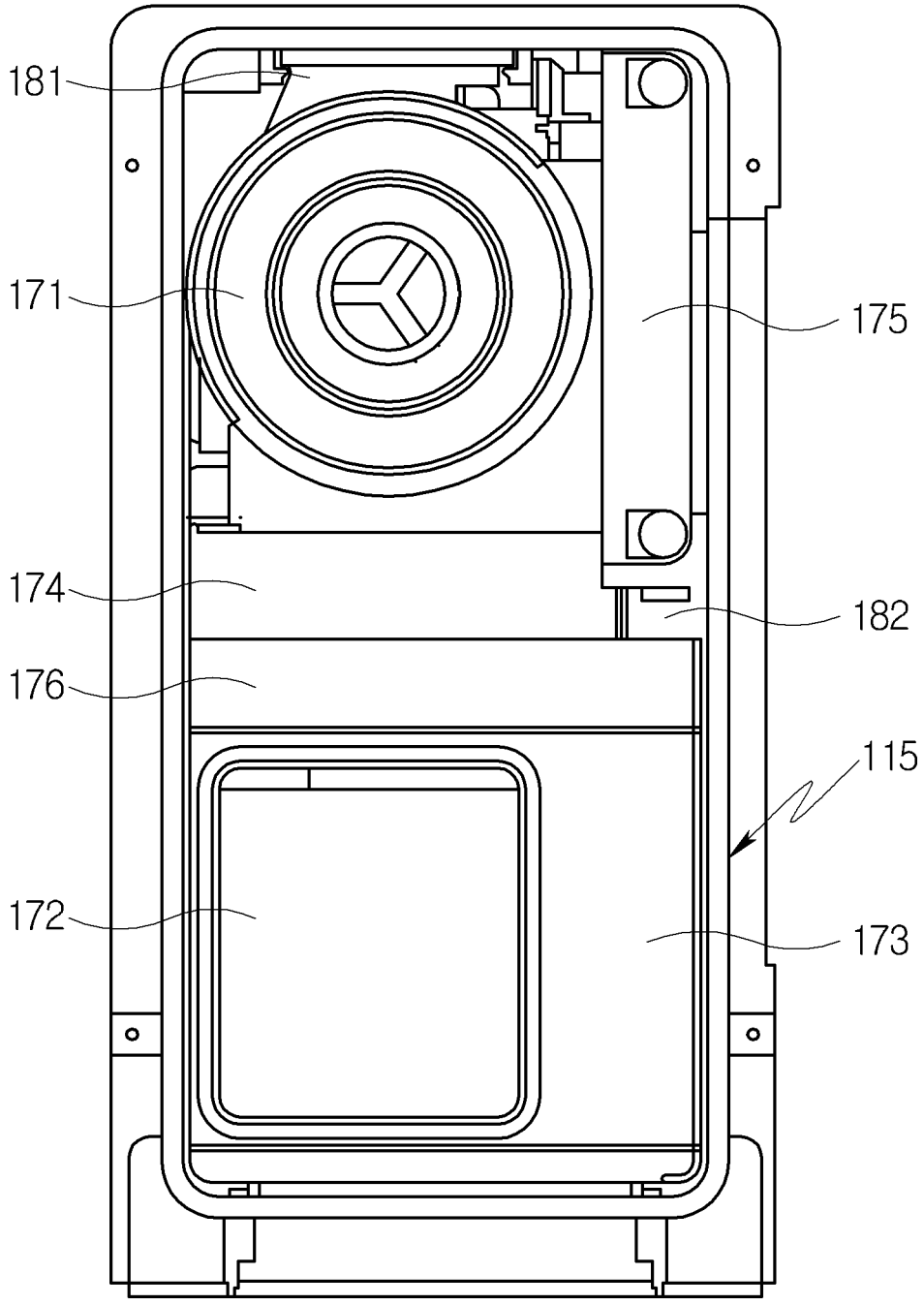
[FIG. 10]


3
173a
173
173b
173c
100
200
110
181a
181
181b
182b
175
182a
171
174
176
182c
182
173a
173b
172
115
173c
183
182d
191
190

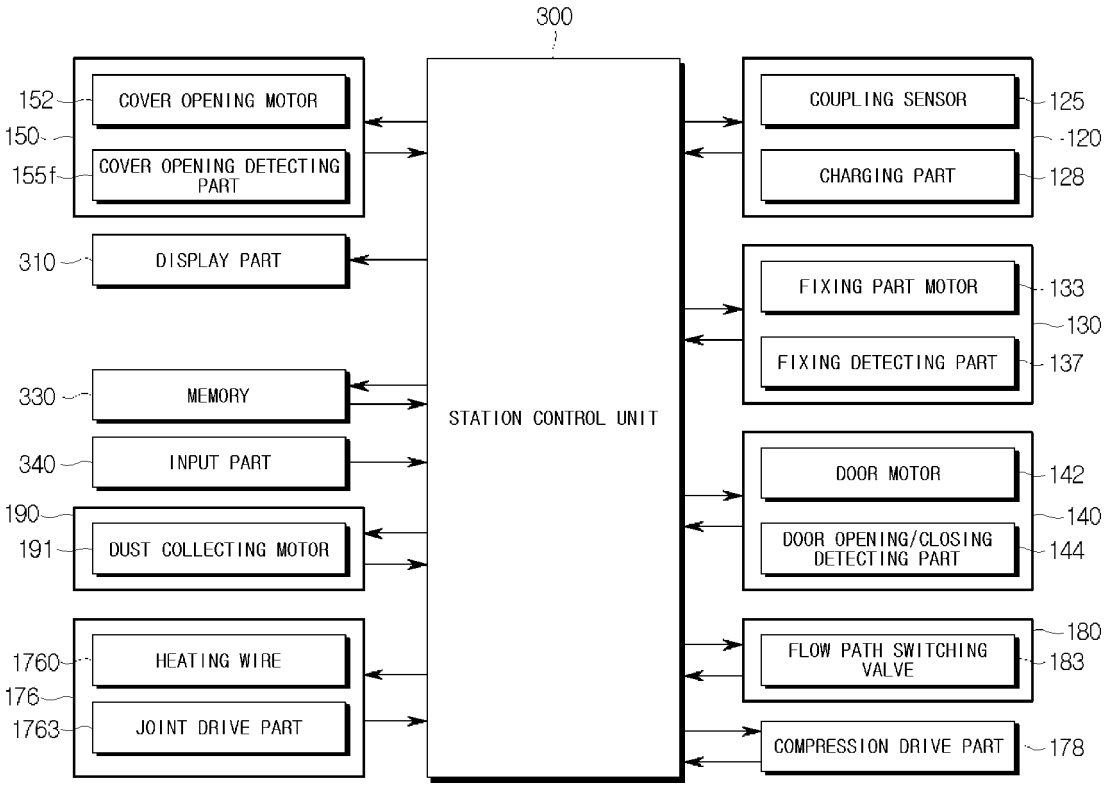
[FIG. 11]



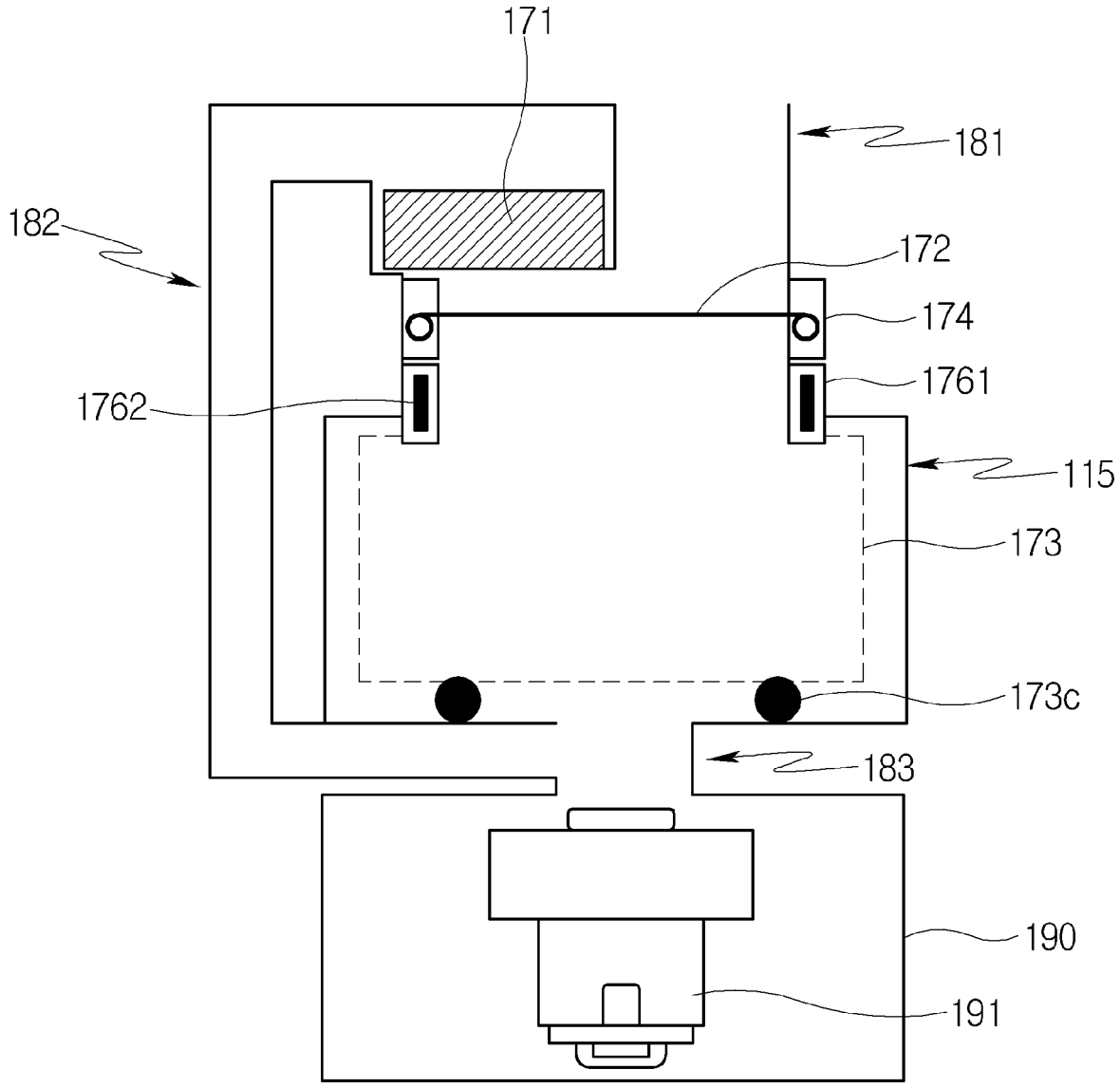
[FIG. 12]



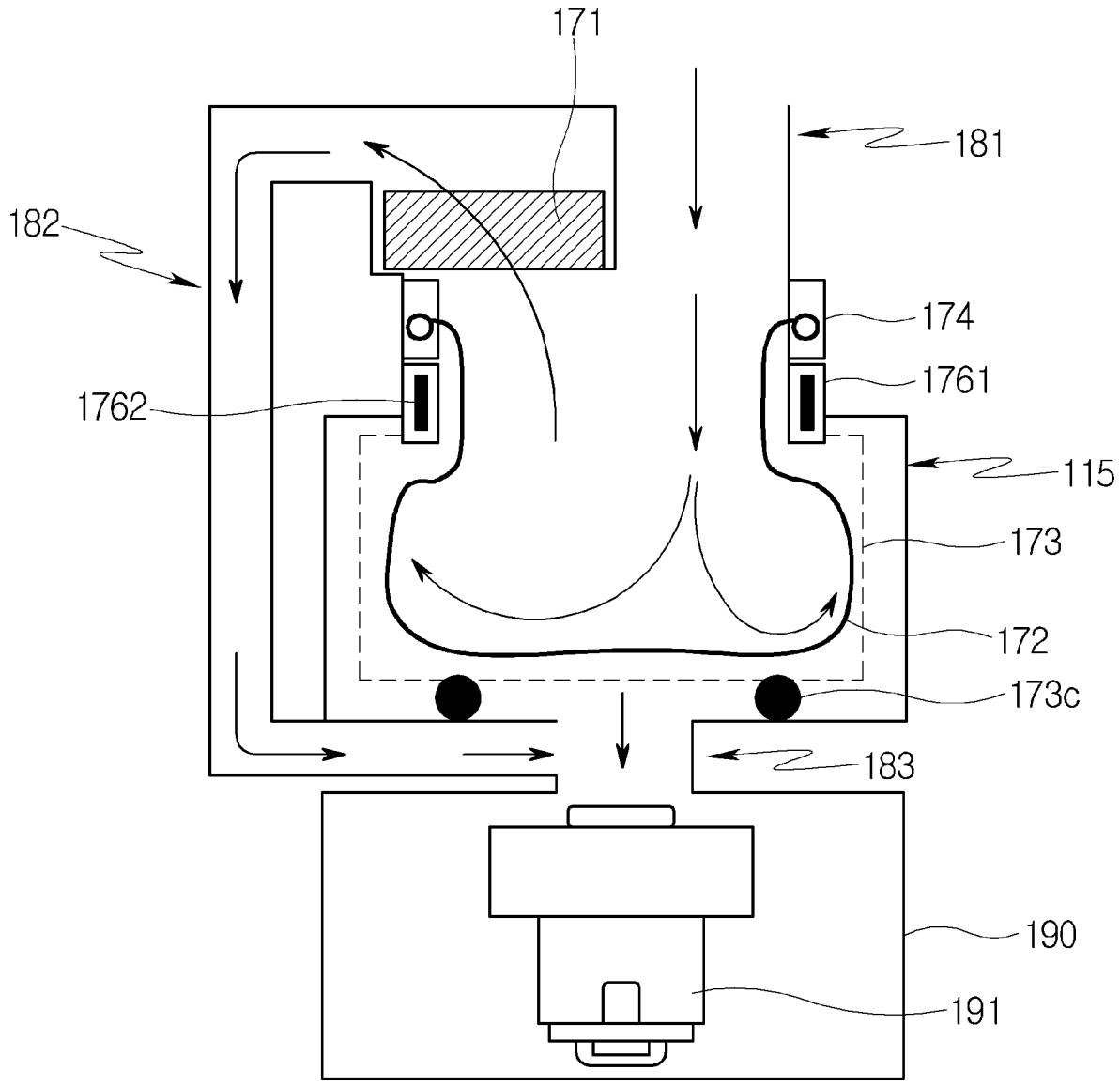
[FIG. 13]


300
152
COVER OPENING MOTOR
150
155f
COVER OPENING DETECTING PART
310
DISPLAY PART
330
MEMORY
340
INPUT PART
190
191
DUST COLLECTING MOTOR
1760
HEATING WIRE
176
1763
JOINT DRIVE PART
STATION CONTROL UNIT
COUPLING SENSOR
125
120
CHARGING PART
128
FIXING PART MOTOR
133
130
FIXING DETECTING PART
137
DOOR MOTOR
142
140
DOOR OPENING/CLOSING DETECTING PART
144
180
FLOW PATH SWITCHING VALVE
183
COMPRESSION DRIVE PART
178

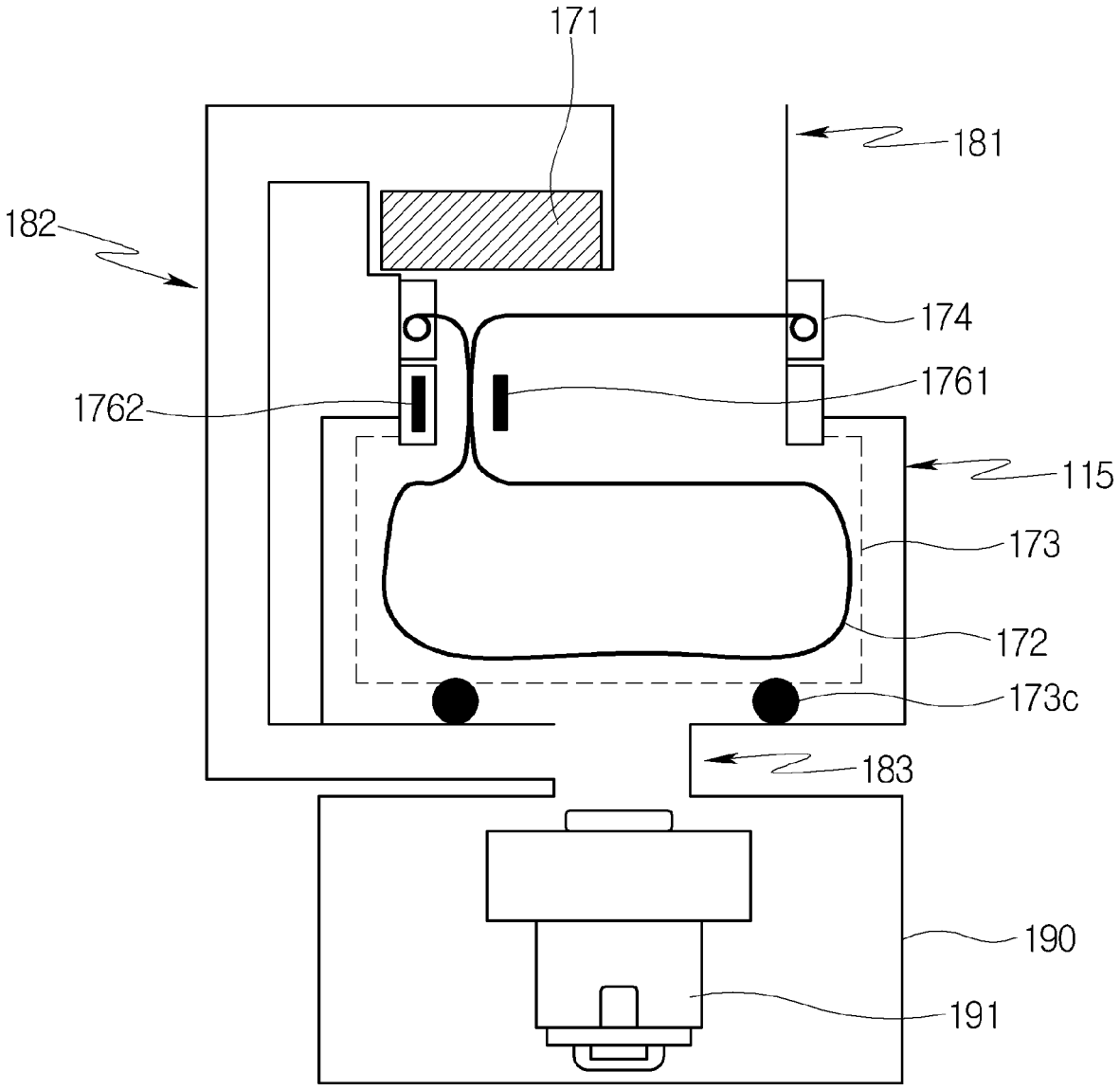
[FIG. 14]



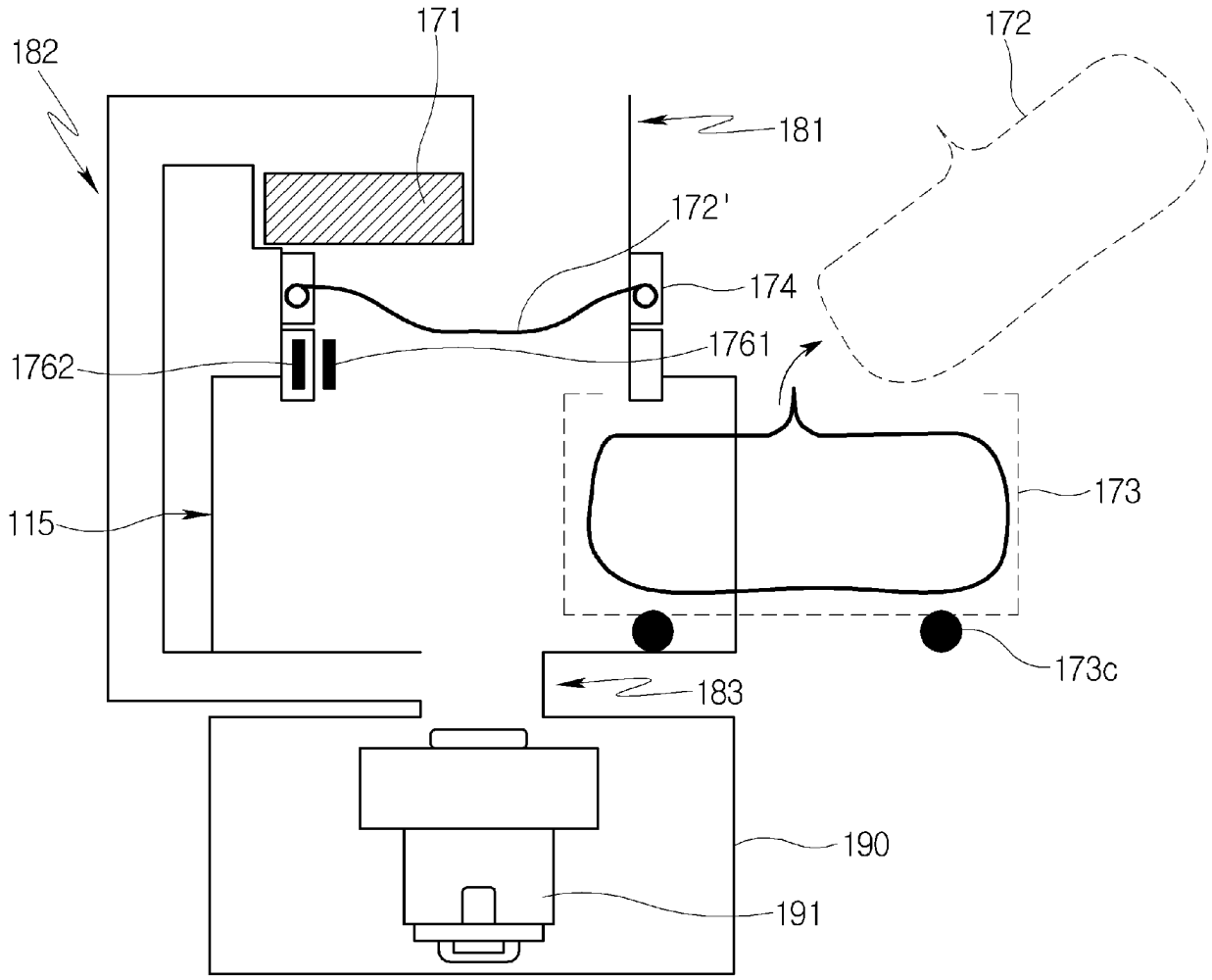
[FIG. 15]



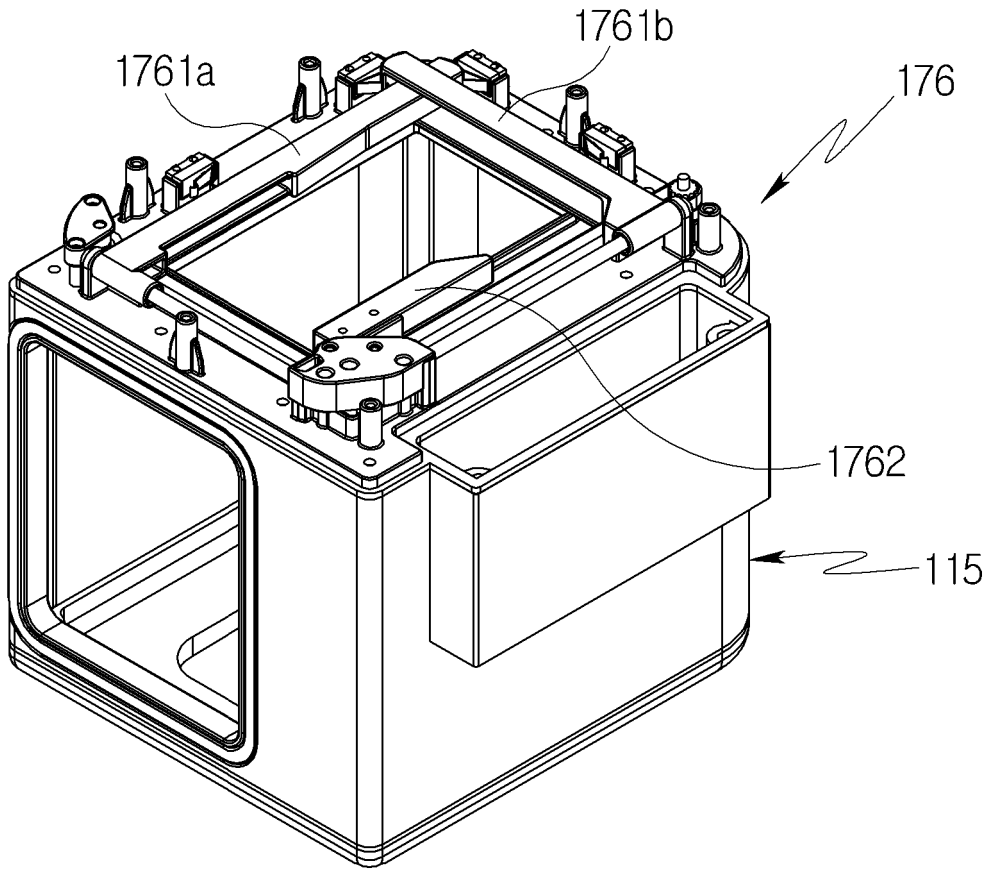
[FIG. 16]



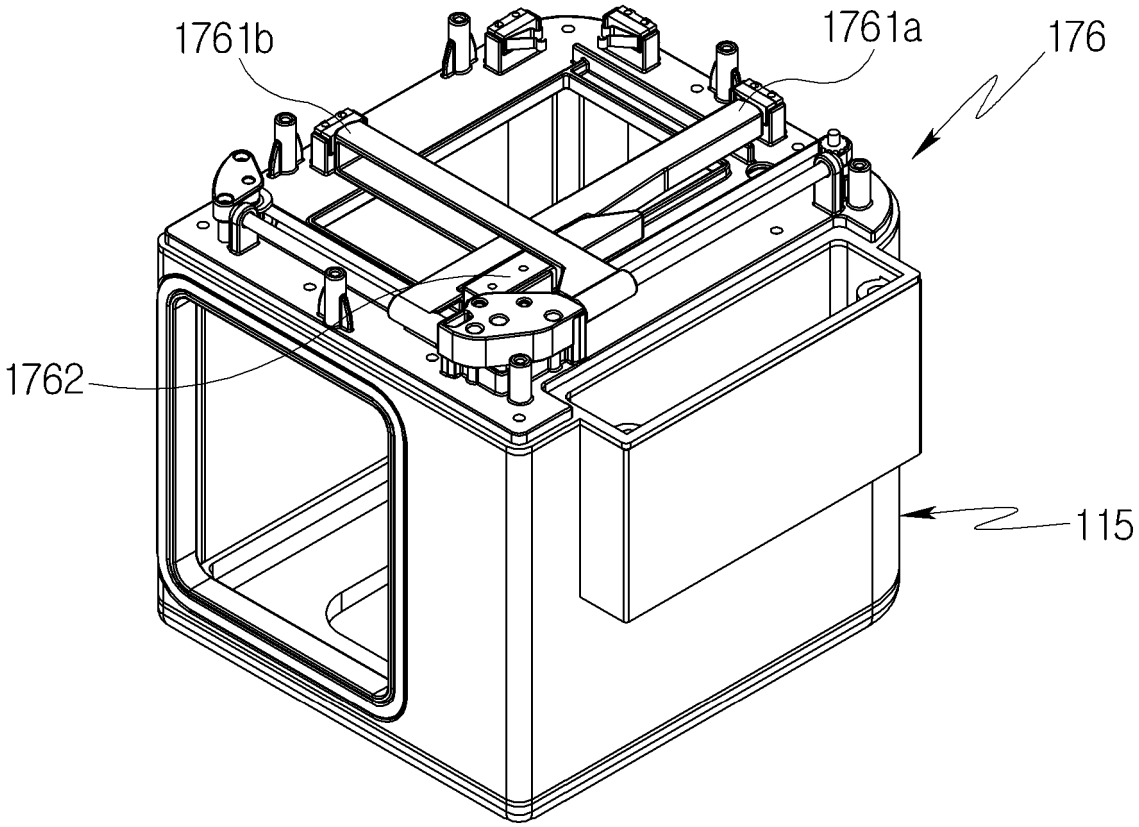
[FIG. 17]



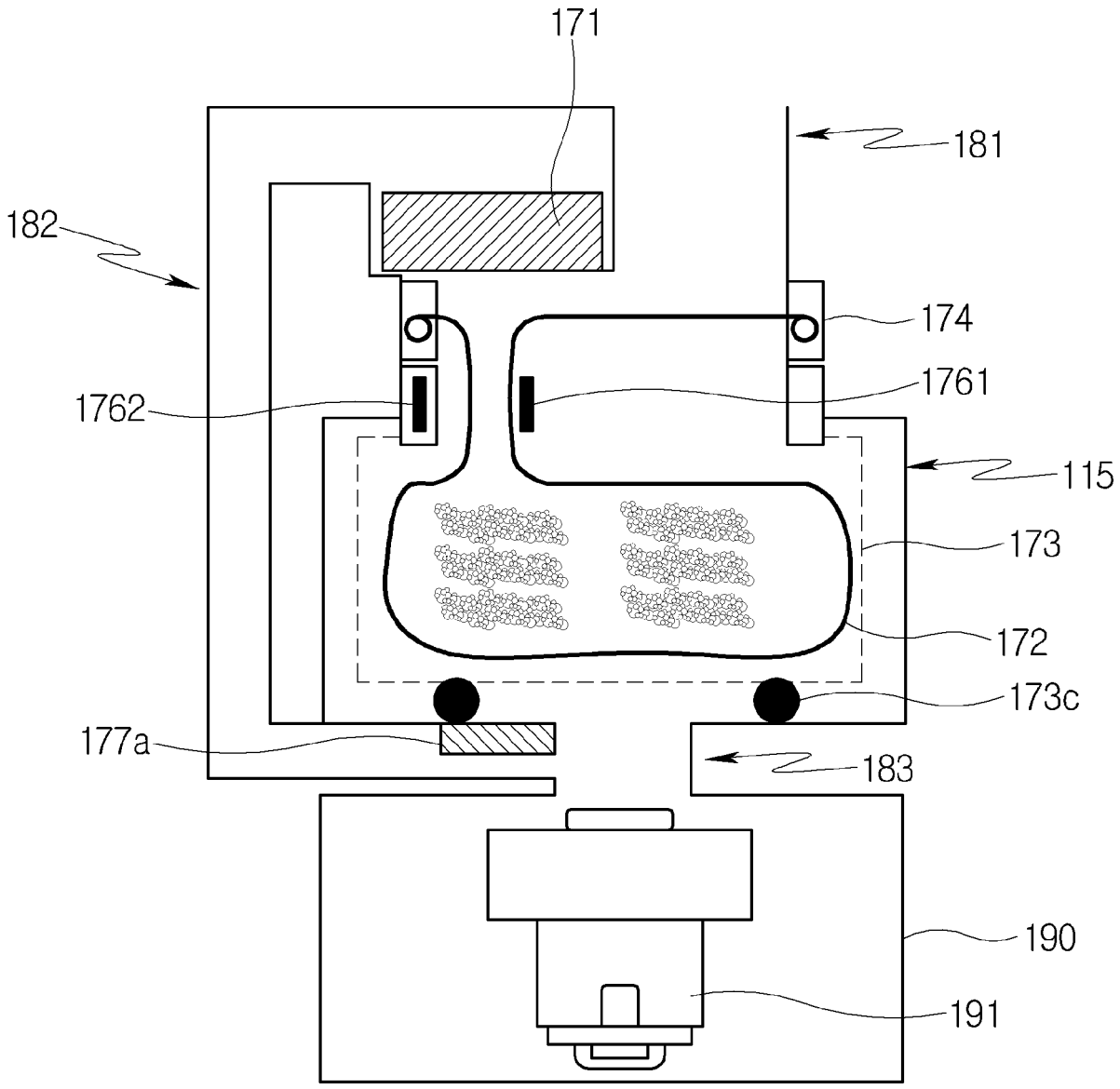
[FIG. 18]



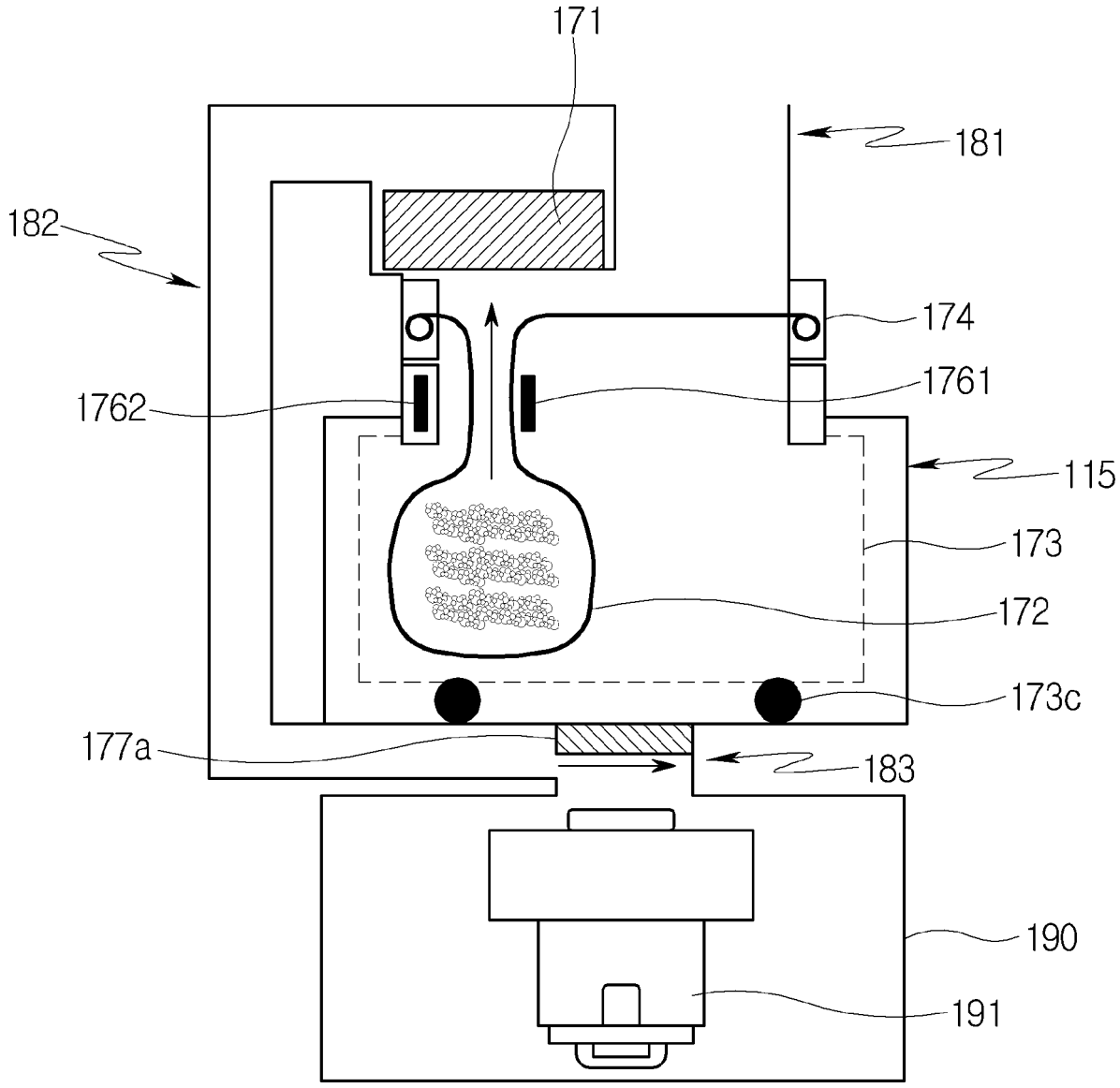
[FIG. 19]



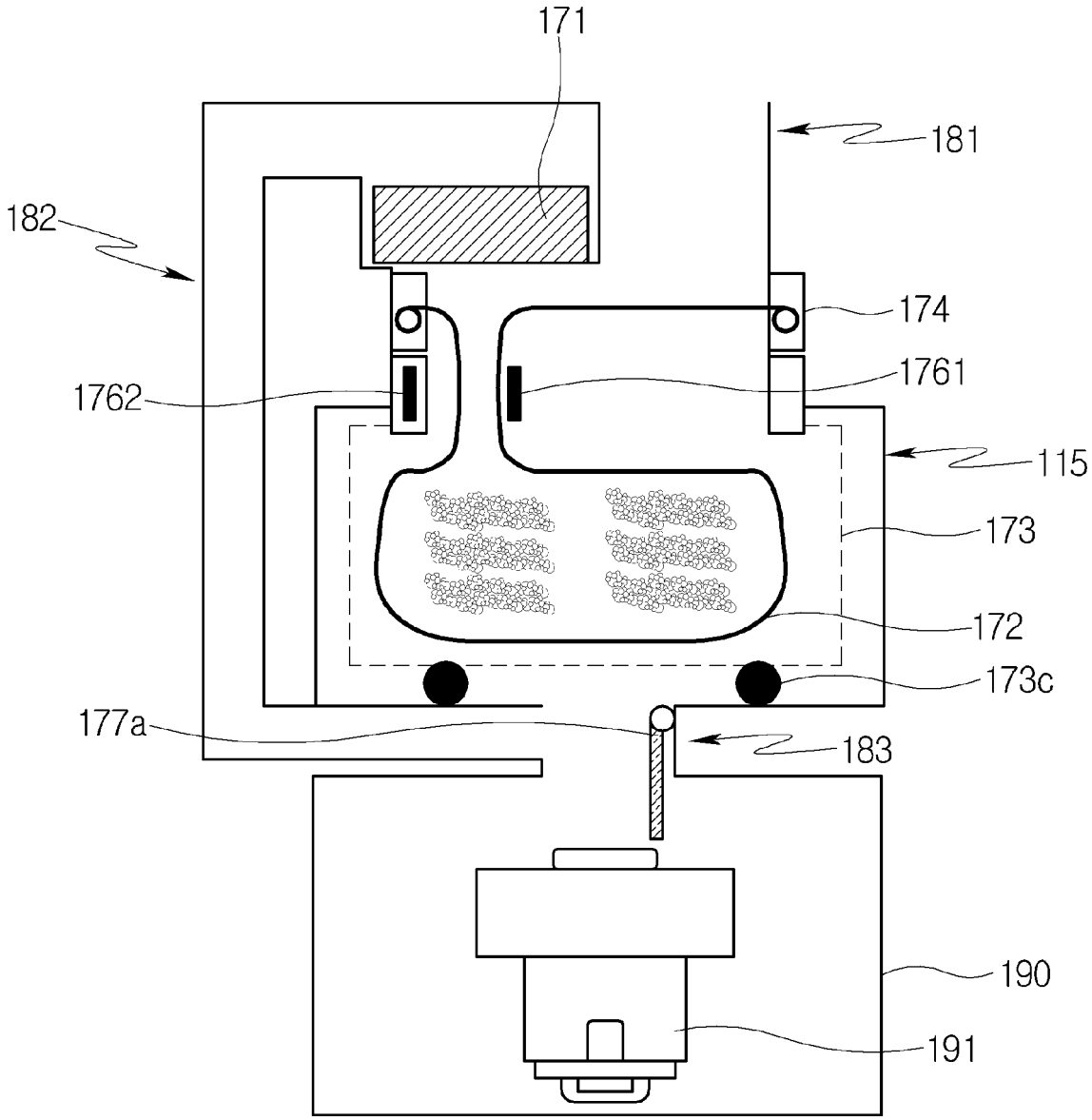
[FIG. 20]



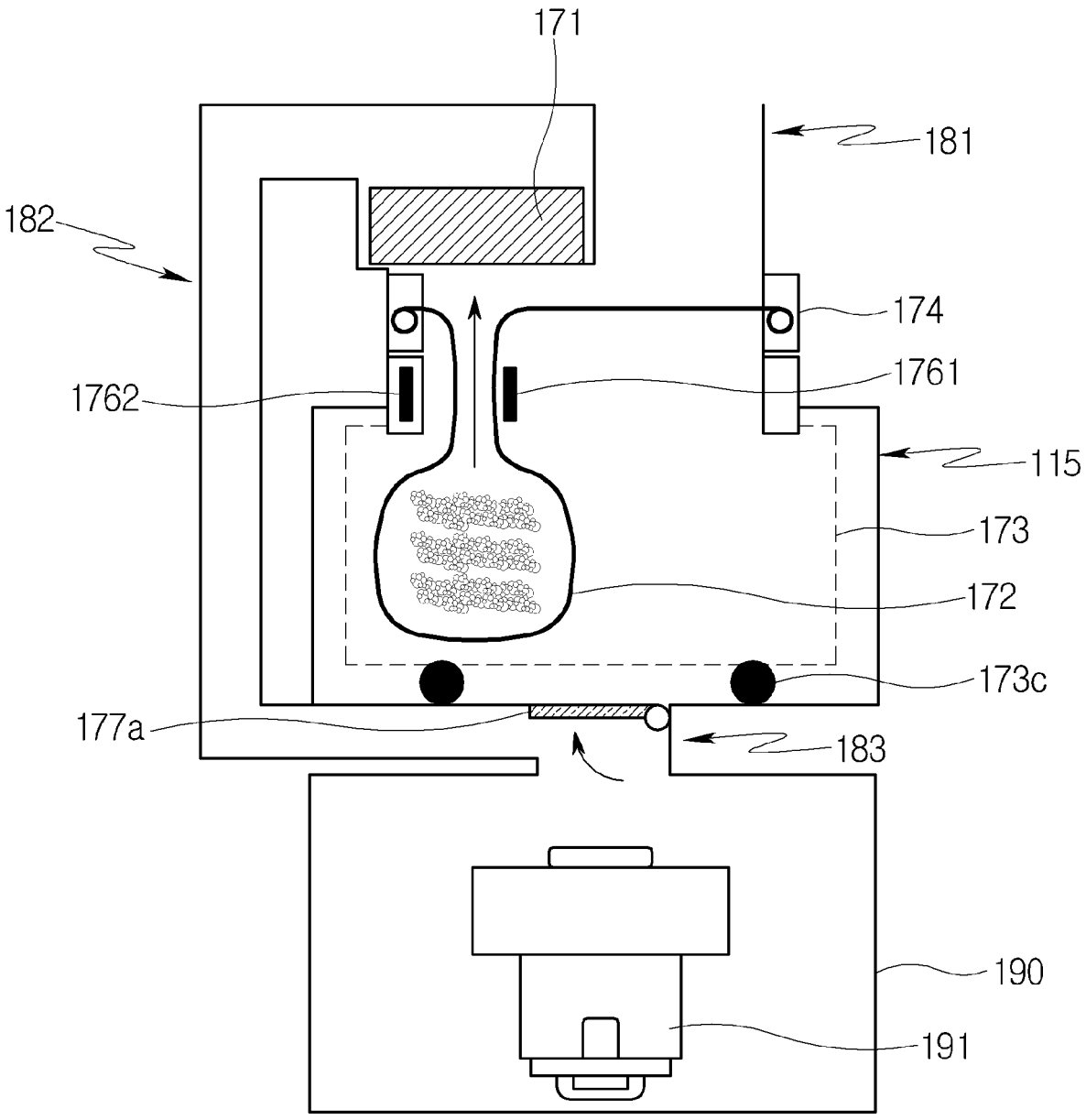
[FIG. 21]



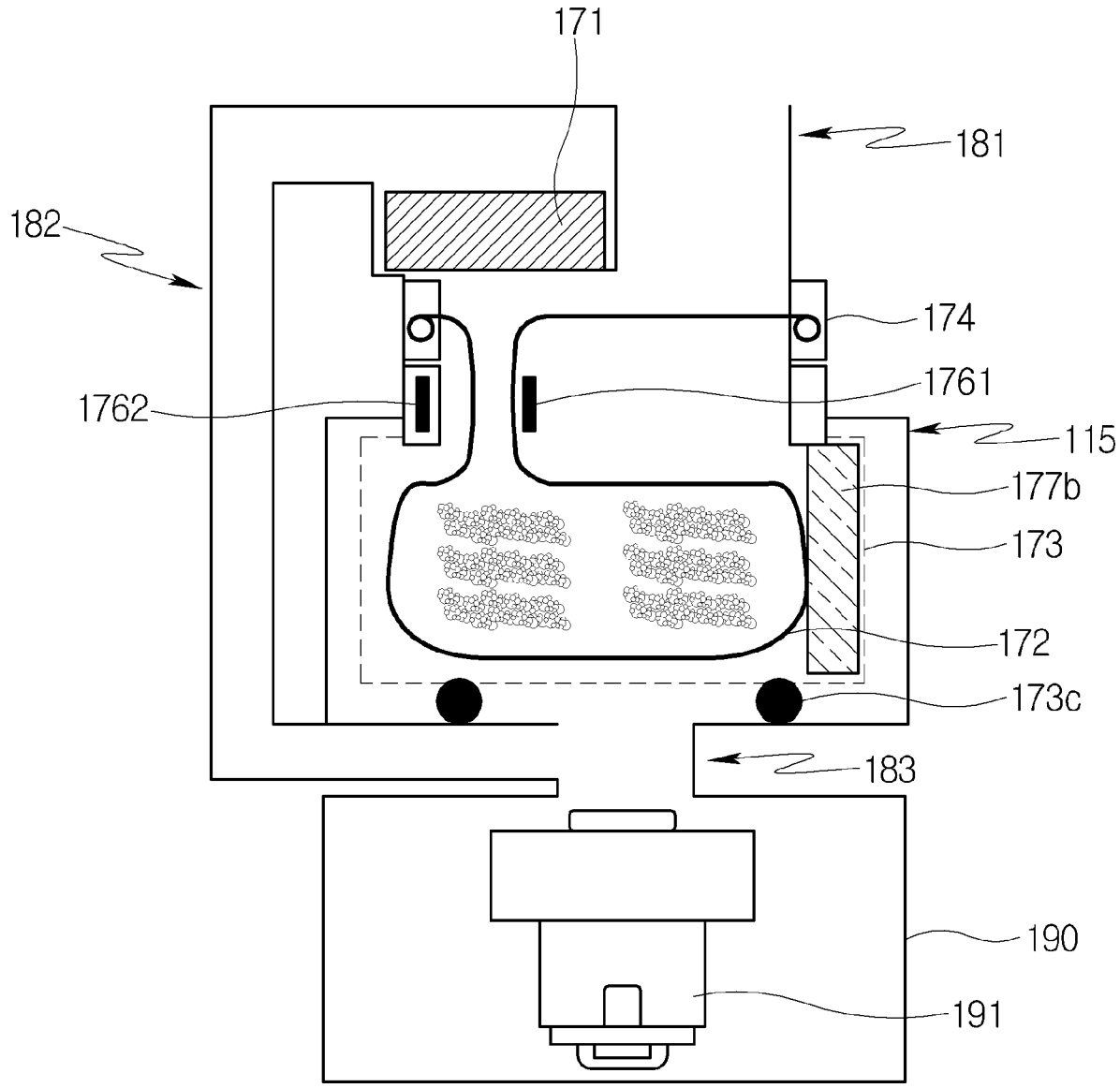
[FIG. 22]



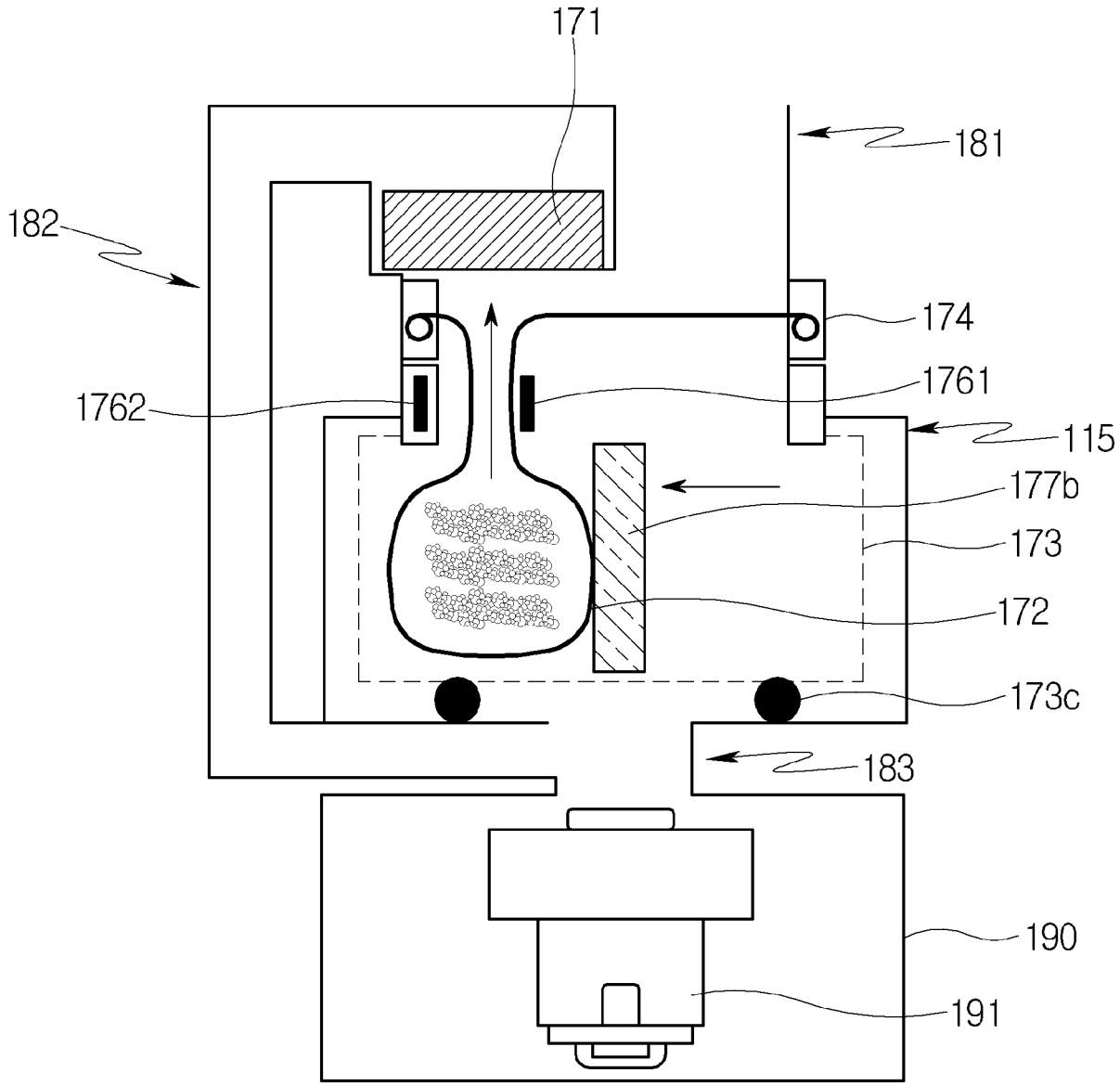
[FIG. 23]



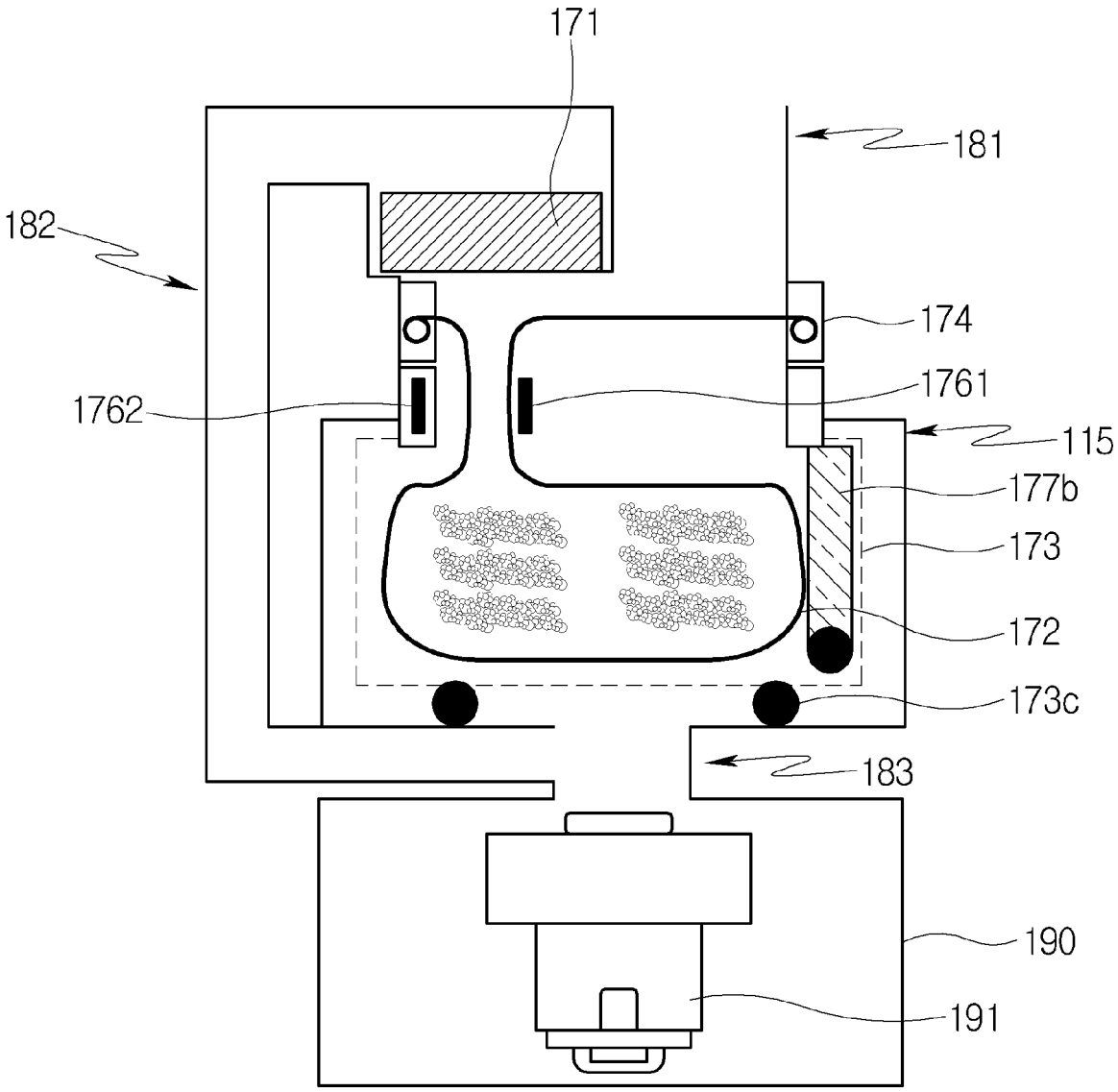
[FIG. 24]



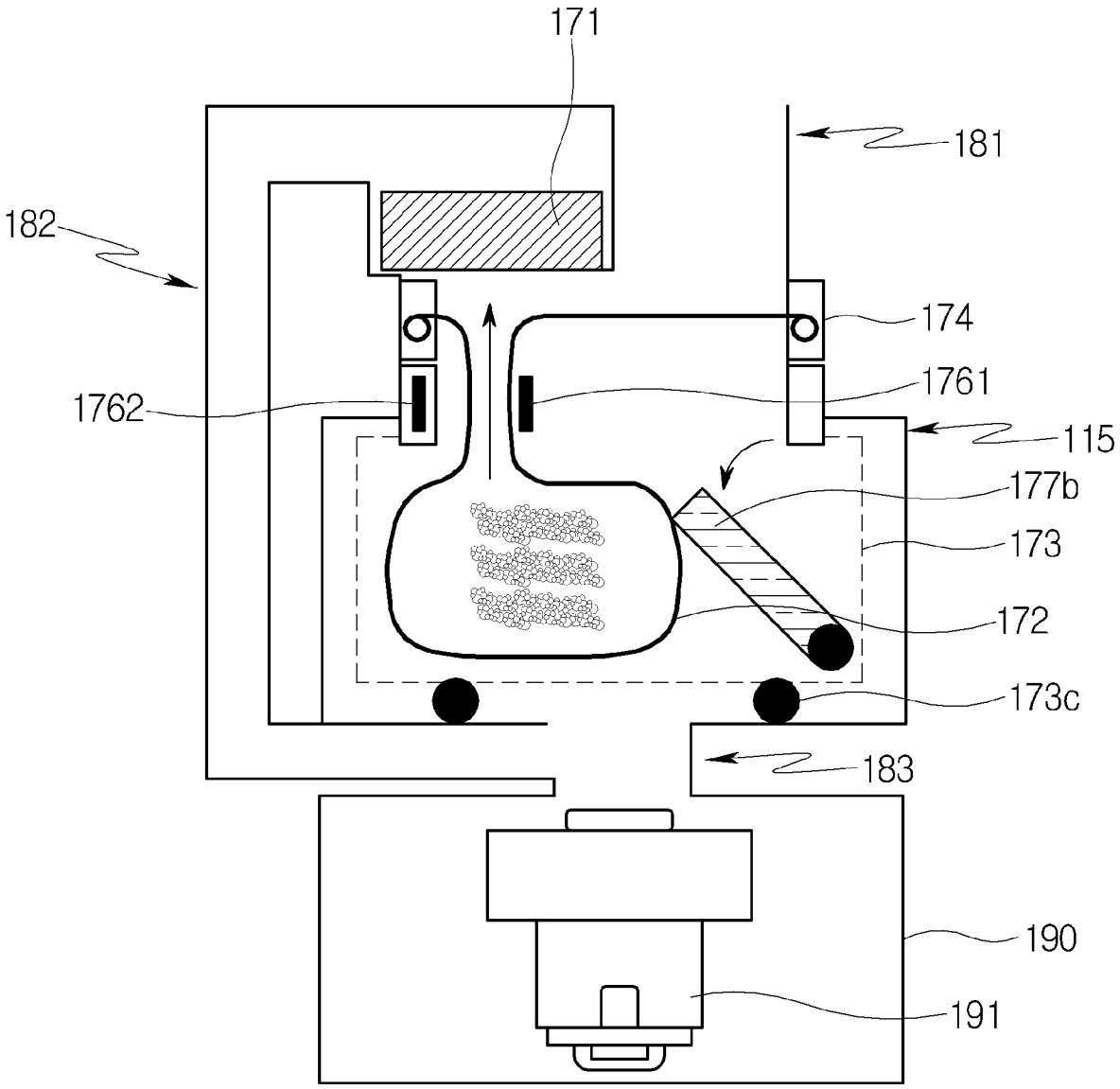
[FIG. 25]



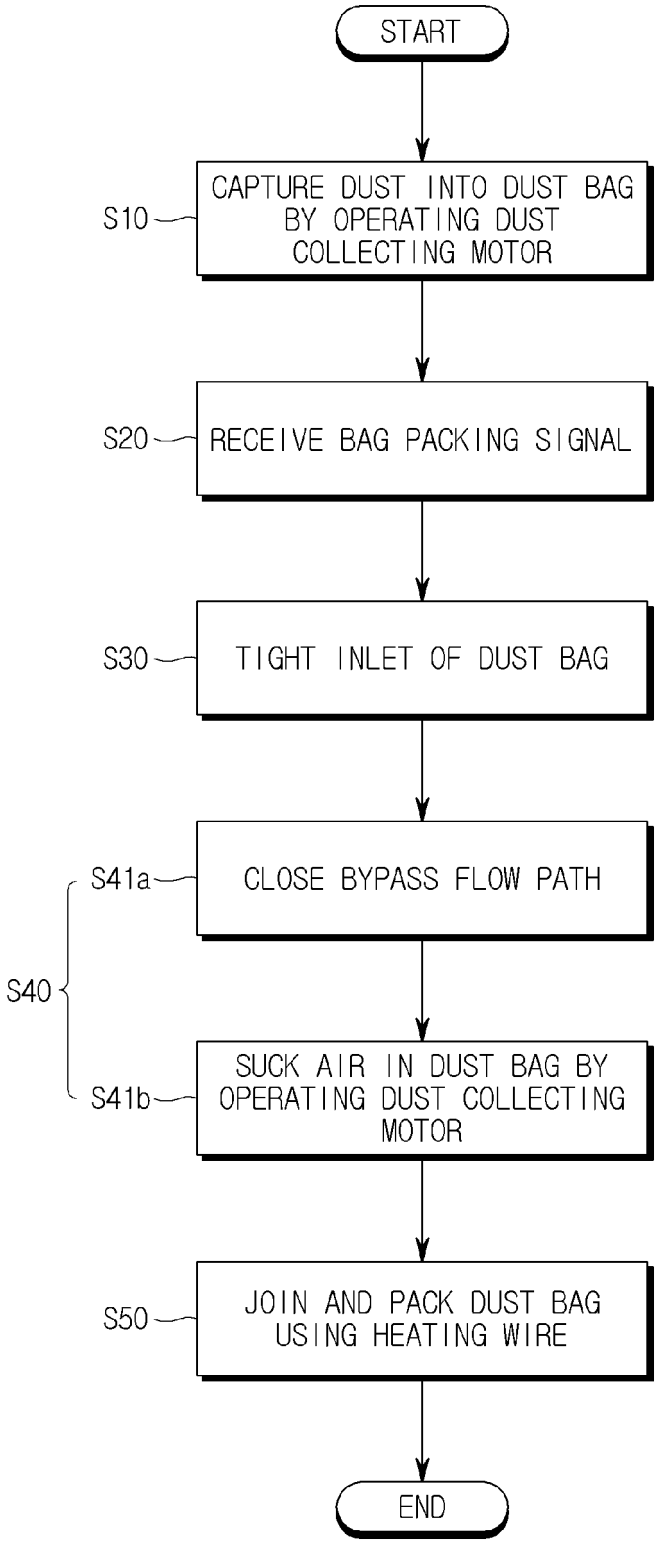
[FIG. 26]



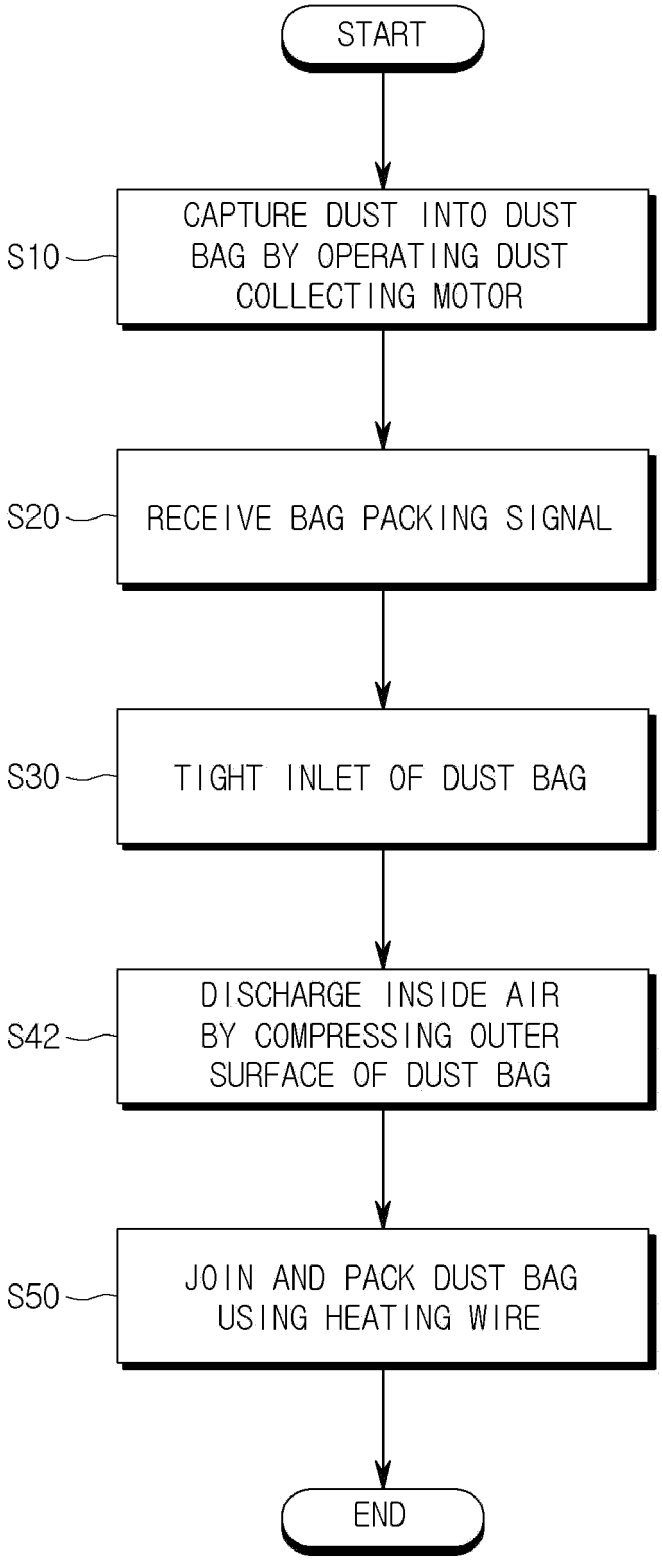
[FIG. 27]



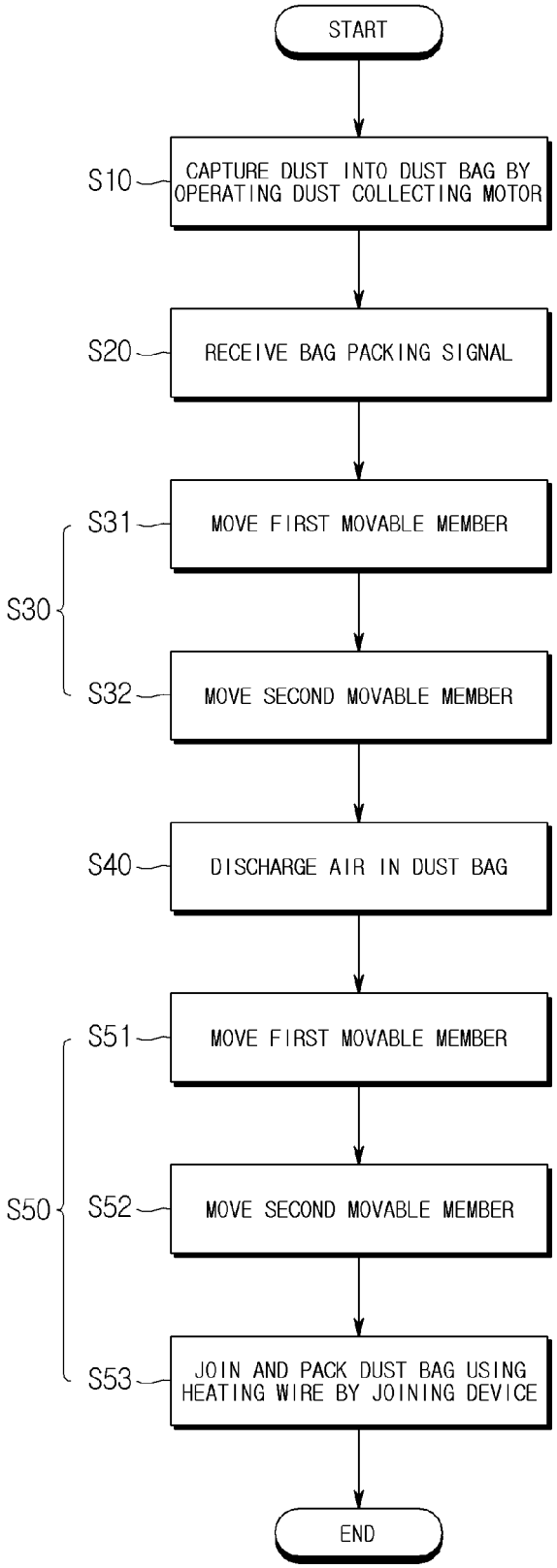
[FIG. 28A]


START
S10
CAPTURE DUST INTO DUST BAG BY OPERATING DUST COLLECTING MOTOR
S20
RECEIVE BAG PACKING SIGNAL
S30
TIGHT INLET OF DUST BAG
S40
S41a
CLOSE BYPASS FLOW PATH
S41b
SUCK AIR IN DUST BAG BY OPERATING DUST COLLECTING MOTOR
S50
JOIN AND PACK DUST BAG USING HEATING WIRE
END

[FIG. 28B]


START
S10
CAPTURE DUST INTO DUST BAG BY OPERATING DUST COLLECTING MOTOR
S20
RECEIVE BAG PACKING SIGNAL
S30
TIGHT INLET OF DUST BAG
S42
DISCHARGE INSIDE AIR BY COMPRESSING OUTER SURFACE OF DUST BAG
S50
JOIN AND PACK DUST BAG USING HEATING WIRE
END

[FIG. 29]


START
S10
CAPTURE DUST INTO DUST BAG BY OPERATING DUST COLLECTING MOTOR
S20
RECEIVE BAG PACKING SIGNAL
S30
S31
MOVE FIRST MOVABLE MEMBER
S32
MOVE SECOND MOVABLE MEMBER
S40
DISCHARGE AIR IN DUST BAG
S50
S51
MOVE FIRST MOVABLE MEMBER
S52
MOVE SECOND MOVABLE MEMBER
S53
JOIN AND PACK DUST BAG USING HEATING WIRE BY JOINING DEVICE
END

## INTERNATIONAL SEARCH REPORT

International application No.
**PCT/KR2023/001807**

**A. CLASSIFICATION OF SUBJECT MATTER**

**A47L 7/00**(2006.01)i; **A47L 9/28**(2006.01)i; **A47L 9/00**(2006.01)i; **A47L 9/16**(2006.01)i; **A47L 9/10**(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 7/00(2006.01); A47L 9/28(2006.01); B30B 9/30(2006.01); B65B 51/10(2006.01); B65F 1/06(2006.01); B65F 1/10(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), 먼지 봉투(dust bag), 카트리지(cartridge), 열선(hot wire), 히터(heater), 압축(compression), 압착(pressure), 밀봉(sealing), 조임(tighten), 접합(bonding), 바이패스(bypass)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

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

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"D" document cited by the applicant in the international application
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"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
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"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
"&" document member of the same patent family

| Date of the actual completion of the international search | Date of mailing of the international search report |
|---|---|
| **10 May 2023** | **11 May 2023** |

| Name and mailing address of the ISA/KR | Authorized officer |
|---|---|
| **Korean Intellectual Property Office**<br>**Government Complex-Daejeon Building 4, 189 Cheongsa-ro, Seo-gu, Daejeon 35208** | |
| Facsimile No. **+82-42-481-8578** | Telephone No. |

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**Information on patent family members**

International application No.
**PCT/KR2023/001807**

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**Information on patent family members**

International application No.
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