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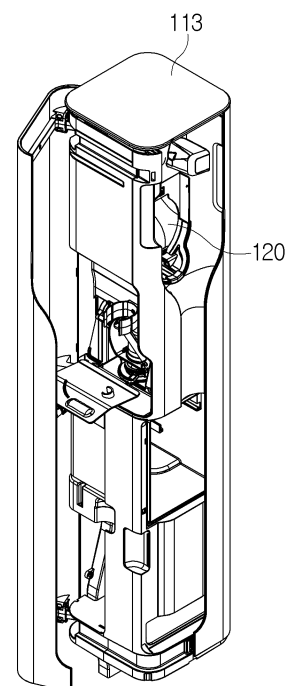
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(54) **VACUUM CLEANER STATION**

(57) The present disclosure relates to a cleaner station including a flow path switching module configured to selectively connect a dust collecting part to a first cleaner flow path or a second cleaner flow path, and a control unit disposed in a housing and configured to control at least any one of a dust collecting motor and the flow path switching module, in which before the dust collecting motor operates, the control unit operates the flow path switching module at least one or more times and couples a connection hose to a cleaner flow path connection portion to which the corresponding cleaner is coupled between first and second cleaner flow path connection portions, such that a user does not need to manually switch the cleaner flow path, the flow path may be automatically switched, and dust does not scatter during a process of switching the flow path.

[FIG. 3]



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Description

[Technical Field]

[0001] The present disclosure relates to a cleaner station, and more particularly, to a cleaner station to which a first cleaner and a second cleaner may be selectively or simultaneously coupled.

[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, because the handy cleaner, the stick cleaner, or the robot cleaner in the related art has a dust

bin with a small capacity for storing collected dust, which inconveniences the user because the user needs to empty the dust bin frequently.

[0010] In addition, because the dust scatters during the process of emptying the dust bin, there is a problem in that the scattering dust has a harmful effect on the user's health.

[0011] In addition, if residual dust is not removed from the dust bin, there is a problem in that a suction force of the cleaner deteriorates.

[0012] In addition, if the residual dust is not removed from the dust bin, there is a problem in that the residual dust causes an offensive odor.

[0013] Korean Patent Application Laid-Open No. 10-2021-0157905 is provided as Patent Document 1. Patent Document 1 relates to a cleaner station and a method of controlling the same.

[0014] Patent Document 1 discloses the cleaner station including a first flow path connected to a first cleaner, and a second flow path connected to a second cleaner. In addition, the cleaner station according to Patent Document 1 has a flow path switching valve. The flow path switching valve is disposed between a dust collecting part, the first flow path, and the second flow path and selectively opens or closes the first flow path and the second flow path connected to the dust collecting part.

[0015] However, Patent Document 1 conceptually discloses the flow path switching valve but does not disclose a specific structure of the flow path switching valve. In addition, the timing of when the flow path switching valve operates to open or close the cleaner flow path is not described.

[0016] Korean Patent Application Laid-Open No. 10-2021-0003543 is provided as Patent Document 2. Patent Document 2 relates to a robot cleaner station.

[0017] Patent Document 2 discloses the robot cleaner station in which a robot cleaner is seated, the robot cleaner station including a connection hose configured to communicate with a dust collecting device of the robot cleaner. In a first mode, the connection hose communicates with the dust collecting device of the robot cleaner, sucks dust collected in the robot cleaner, and captures the dust in a dust collecting part of the station. In a second mode, a lower end of the connection hose may be separated from the cleaner station. The connection hose may be coupled to another cleaning module, sucks dust present in another region other than the robot cleaner, and captures the dust in the dust collecting part of the station.

[0018] According to Patent Document 2, the cleaner station may selectively suck dust present at a position other than the robot cleaner. However, a user is inconvenienced because the user needs to open a cover of the cleaner station and manually separate the connection hose. Further, there is a problem in that dust scatters during the separation process. In addition, the user needs to manually manipulate the connection hose, and a configuration of the flow path switching valve is

not provided. Therefore, it is impossible to identify the timing of when the flow path switching valve operates to open or close the cleaner flow path even though Patent Document 2 is combined with Patent Document 1.

[Documents of Related Art]

[Patent Documents]

[0019]

(Patent Document 1) Patent Document 1: Korean Patent Application Laid-Open No. 10-2021-0157905
(Patent Document 2) Patent Document 2: Korean Patent Application Laid-Open No. 10-2021-0003543

[Disclosure]

[Technical Problem]

[0020] An object to be achieved by the present disclosure is to provide a cleaner station capable of solving the above-mentioned problem with the cleaner station in the related art. That is, the cleaner station in the related art is not provided with a specific configuration of a method of controlling the flow path switching valve. In contrast, another object to be achieved by the present disclosure is to provide a cleaner station having a flow path switching module capable of being connected to a cleaner flow path corresponding to a dust collecting part when a first cleaner or a second cleaner is coupled to the cleaner station.

[0021] Still another object to be achieved by the present disclosure is to provide a cleaner station capable of determining whether a connection hose of a flow path switching module is accurately coupled to a first cleaner connection flow path connection portion or a second cleaner connection flow path connection portion when the connection hose is coupled to the first cleaner connection flow path connection portion or the second cleaner connection flow path connection portion.

[0022] Yet another object to be achieved by the present disclosure is to provide a cleaner station capable of sequentially removing dust collected in a first cleaner or a second cleaner on the basis of imparted priority in case that a first cleaner and a second cleaner are simultaneously coupled to the cleaner station.

[0023] Technical problems of the present disclosure are not limited to the aforementioned technical problems, and other technical problems, which are not mentioned above, may be clearly understood by those skilled in the art from the following descriptions.

[Technical Solution]

[0024] In order to achieve the above-mentioned objects, a cleaner station according to the present disclosure includes: a housing configured to define an external shape and having a space therein, at least any one of a

first cleaner and a second cleaner being coupled to the housing; a first cleaner flow path disposed in the housing and connected to a dust bin of the first cleaner; a second cleaner flow path disposed in the housing and connected to a dust bin of the second cleaner; a dust collecting part disposed in the housing and configured to capture dust in the dust bin of the first cleaner or the second cleaner; a dust collecting motor disposed in the housing and configured to generate a suction force for sucking dust in the dust bin; a flow path switching module configured to selectively connect the dust collecting part to the first cleaner flow path or the second cleaner flow path; and a control unit disposed in the housing and configured to control at least any one of the dust collecting motor and the flow path switching module. The control unit may operate the flow path switching module at least one or more times before the dust collecting motor operates.

[0025] The cleaner station may include a charging part electrically connected to at least any one of the first cleaner and the second cleaner. In this case, the control unit may operate the flow path switching module when an electric current flows to the charging part.

[0026] The flow path switching module may include: a casing disposed in the housing and having a first cleaner flow path connection portion connected to the first cleaner flow path, and a second cleaner flow path connection portion connected to the second cleaner flow path; a connection hose disposed in the casing and having an inlet selectively coupled to any one of the first cleaner flow path connection portion and the second cleaner flow path connection portion; and a position sensor disposed in the casing and configured to detect a position of the connection hose and transmit a signal to the control unit. In this case, the control unit may stop an operation of the flow path switching module when the control unit receives the signal from the position sensor.

[0027] The position sensor may include: a first position sensor disposed at one side of the first cleaner flow path connection portion and configured to transmit a signal to the control unit when the inlet of the connection hose is coupled to the first cleaner flow path connection portion; and a second position sensor disposed at one side of the second cleaner flow path connection portion and configured to transmit a signal to the control unit when the inlet of the connection hose is coupled to the second cleaner flow path connection portion.

[0028] The control unit may couple the connection hose to a cleaner flow path connection portion to which the corresponding cleaner is coupled between the first and second cleaner flow path connection portions. In this case, the control unit may couple the connection hose to the first cleaner flow path connection portion when the first cleaner and the second cleaner are coupled to the housing before the dust collecting motor operates. Alternatively, the control unit may couple the connection hose to the second cleaner flow path connection portion when the second cleaner is coupled to the housing before the dust collecting motor operates and when the first cleaner

is coupled to the housing after the dust collecting motor operates.

[0029] The cleaner station may further include: a coupling part disposed in the housing so that the first cleaner is coupled to the coupling part; and a coupling sensor disposed in the coupling part and configured to transmit a signal to the control unit when the first cleaner approaches the coupling sensor. In this case, the control unit may operate the flow path switching module when the control unit receives the signal from the coupling sensor.

[0030] The cleaner station may further include: a fixing unit disposed in the housing and configured to fix the first cleaner to the housing when the first cleaner is coupled to the housing. In this case, the control unit may operate the flow path switching module before the fixing unit operates.

[0031] The cleaner station may further include: a cover opening unit disposed in the housing and configured to open a discharge cover of the dust bin of the first cleaner. In this case, the control unit may operate the flow path switching module before the cover opening unit operates.

[0032] The cleaner station may further include: a door unit disposed in the housing and configured to open or close the first cleaner flow path. In this case, the control unit may operate the flow path switching module before the door unit operates.

[0033] In order to achieve the above-mentioned objects, a method of controlling a cleaner station according to the present disclosure includes: a coupling checking step of checking whether at least any one of a first cleaner and a second cleaner is coupled to a housing; a flow path connecting step of selectively connecting a dust collecting part to a first cleaner flow path or a second cleaner flow path by operating a flow path switching module disposed between the dust collecting part configured to capture dust, the first cleaner flow path connected to a dust bin of the first cleaner, and the second cleaner flow path connected to a dust bin of the second cleaner; and a dust collecting step of collecting dust in the dust bin into the dust collecting part by operating a dust collecting motor disposed in the housing.

[0034] The coupling checking step may include determining that at least any one of the first cleaner and the second cleaner is coupled to the housing when an electric current flows to at least any one of the first cleaner and the second cleaner in the housing.

[0035] The flow path connecting step may include connecting the dust collecting part to the cleaner flow path to which the corresponding cleaner is coupled between the first and second cleaner flow paths. In this case, the flow path connecting step may include connecting the dust collecting part to the first cleaner flow path when the first cleaner and the second cleaner are coupled to the housing in the coupling checking step. Alternatively, the dust collecting part may be connected to the second cleaner flow path when the second cleaner is coupled to the housing in the coupling checking step and

the first cleaner is coupled to the housing after the dust collecting step is initiated.

[0036] Other detailed matters of the exemplary embodiment are included in the detailed description and the drawings.

[Advantageous Effects]

[0037] The cleaner station of the present disclosure has one or more of the following effects.

[0038] First, before the dust collecting motor operates, the control unit operates the flow path switching module at least one or more times and couples the connection hose to the cleaner flow path connection portion to which the corresponding cleaner is coupled between the first and second cleaner flow path connection portions. Therefore, the user does not need to manually switch the cleaner flow path, the flow path may be automatically switched, and dust does not scatter during the process of switching the flow path.

[0039] Second, the cleaner station includes the first position sensor configured to transmit a signal to the control unit when the connection hose is coupled to the first cleaner flow path connection portion, and the second position sensor configured to transmit a signal to the control unit when the connection hose is coupled to the second cleaner flow path connection portion. Therefore, it is possible to easily determine whether the connection hose is accurately coupled to the first cleaner connection flow path connection portion or the second cleaner connection flow path connection portion.

[0040] Third, in case that the first cleaner and the second cleaner are coupled to the housing before the dust collecting motor operates, the control unit may couple the connection hose to the first cleaner flow path connection portion, and the priority may be imparted to the first cleaner, which is manually manipulated, such that the convenience of the first cleaner may be improved.

[0041] The effects of the present disclosure are not limited to the aforementioned effects, and other effects, which are not mentioned above, will be clearly understood by those skilled in the art from the claims.

[Description of Drawings]

[0042]

FIG. 1 is a perspective view illustrating a cleaner system including a cleaner station and a cleaner according to the present disclosure.

FIG. 2 is a schematic view illustrating a configuration of the cleaner system according to the present disclosure.

FIG. 3 is a perspective view illustrating a flow path switching module of the cleaner station when a part of a cover is opened.

FIG. 4 is an enlarged view of the flow path switching

module in FIG. 3.

FIG. 5 is an exploded view of the flow path switching module according to the present disclosure.

FIG. 6 is an enlarged view of a portion of the cleaner station to which the flow path switching module is coupled.

FIG. 7 is an enlarged view of the flow path switching module in a state in which a first link is indicated by the hidden line in FIG. 6.

FIG. 8 is an enlarged view of the flow path switching module in a state in which a connection hose is indicated by the hidden line in FIG. 7.

FIG. 9 is a view illustrating a state in which the connection hose in FIG. 6 is moved by a predetermined distance toward a second cleaner flow path connection portion.

FIG. 10 is a view illustrating a state in which the connection hose in FIG. 9 is further moved by a predetermined distance toward the second cleaner flow path connection portion.

FIG. 11 is an enlarged view illustrating a portion of the cleaner station to which the flow path switching module is coupled, i.e., a view illustrating a state in which the connection hose is coupled to the second cleaner flow path connection portion.

FIGS. 12 and 13 are views illustrating a first trajectory and a second trajectory in the flow path switching module.

FIG. 14 is an enlarged view of a chamber in which the flow path switching module is installed when the flow path switching module is separated.

FIG. 15 is a perspective view of the flow path switching module according to the present disclosure.

FIGS. 16 to 18 are views illustrating a step of separating the flow path switching module from a housing. FIG. 19 is a view for explaining a coupling part of the cleaner station.

FIG. 20 is an exploded perspective view for explaining a fixing unit of the cleaner station.

FIG. 21 is a view for explaining a relationship between a first cleaner and a door unit in the cleaner station.

FIG. 22 is a view for explaining a relationship between the first cleaner and a cover opening unit in the cleaner station.

FIG. 23 is a schematic view briefly illustrating a charging part of the cleaner system.

FIG. 24 is a block diagram for explaining a control configuration of the cleaner station.

FIG. 25 is a flowchart for explaining a method of controlling the cleaner station according to a first embodiment.

FIG. 26 is a flowchart for explaining a method of controlling the cleaner station according to a second embodiment.

FIG. 27 is a flowchart for explaining a method of controlling the cleaner station according to the embodiment in FIG. 22.

FIG. 28 is a flowchart for explaining a method of controlling the cleaner station according to another embodiment in FIG. 22.

FIG. 29 is a view for explaining an operation of controlling a motor over time when the first cleaner is mounted in the method of controlling the cleaner station.

FIG. 30 is a view for explaining an operation of controlling the motor over time when a second cleaner is mounted in the method of controlling the cleaner station.

[Mode for Invention]

[0043] Hereinafter, exemplary embodiments of the present disclosure will be described in detail with reference to the accompanying drawings.

[0044] 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.

[0045] 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.

[0046] 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.

[0047] FIG. 1 is a perspective view illustrating a cleaner system 10 including a cleaner station 100, a first cleaner 200, and a second cleaner 300 according to an embodiment of the present disclosure, and FIG. 2 is a schematic view illustrating a configuration of the cleaner system 10 according to the embodiment of the present disclosure.

[0048] In addition, FIG. 3 is a perspective view illustrating a flow path switching module of the cleaner station when a part of a cover is opened, FIG. 4 is an enlarged view of the flow path switching module in FIG. 3, FIG. 5 is an exploded view of the flow path switching module according to the present disclosure, FIG. 6 is an enlarged view of a portion of the cleaner station to which the flow path switching module is coupled, FIG. 7 is an enlarged view of the flow path switching module in a state in which a first link is indicated by the hidden line in FIG. 6, FIG. 8 is an enlarged view of the flow path switching module in a

state in which a connection hose is indicated by the hidden line in FIG. 7, FIG. 9 is a view illustrating a state in which the connection hose in FIG. 6 is moved by a predetermined distance toward a second cleaner flow path connection portion, FIG. 10 is a view illustrating a state in which the connection hose in FIG. 9 is further moved by a predetermined distance toward the second cleaner flow path connection portion, FIG. 11 is an enlarged view illustrating a portion of the cleaner station to which the flow path switching module is coupled, i.e., a view illustrating a state in which the connection hose is coupled to the second cleaner flow path connection portion, FIGS. 12 and 13 are views illustrating a first trajectory and a second trajectory in the flow path switching module, FIG. 14 is an enlarged view of a chamber in which the flow path switching module is installed when the flow path switching module is separated, FIG. 15 is a perspective view of the flow path switching module according to the present disclosure, FIGS. 16 to 18 are views illustrating a step of separating the flow path switching module from a housing, FIG. 19 is a view for explaining a coupling part of the cleaner station, FIG. 20 is an exploded perspective view for explaining a fixing unit of the cleaner station, FIG. 21 is a view for explaining a relationship between a first cleaner and a door unit in the cleaner station, FIG. 22 is a view for explaining a relationship between the first cleaner and a cover opening unit in the cleaner station, FIG. 23 is a schematic view briefly illustrating a charging part of the cleaner system, FIG. 24 is a block diagram for explaining a control configuration of the cleaner station, FIG. 25 is a flowchart for explaining a method of controlling the cleaner station according to a first embodiment, FIG. 26 is a flowchart for explaining a method of controlling the cleaner station according to a second embodiment, FIG. 27 is a flowchart for explaining a method of controlling the cleaner station according to the embodiment in FIG. 22, FIG. 28 is a flowchart for explaining a method of controlling the cleaner station according to another embodiment in FIG. 22, FIG. 29 is a view for explaining an operation of controlling a motor over time when the first cleaner is mounted in the method of controlling the cleaner station, and FIG. 30 is a view for explaining an operation of controlling the motor over time when a second cleaner is mounted in the method of controlling the cleaner station.

[0049] With reference to FIGS. 1 and 2, the cleaner system 10 according to the embodiment of the present specification may include the cleaner station 100 and the cleaners 200 and 300. In this case, the cleaners 200 and 300 may include the first cleaner 200 and the second cleaner 300. Meanwhile, the present embodiment may be carried out without some of the above-mentioned components and does not exclude additional components.

[0050] The cleaner system 10 may include the cleaner station 100. The first cleaner 200 and the second cleaner 300 may be coupled to the cleaner station 100. The first cleaner 200 may be coupled to the lateral surface of the

cleaner station 100. Specifically, the main body of the first cleaner 200 may be coupled to the lateral surface of the cleaner station 100. The second cleaner 300 may be coupled to a lower portion of the cleaner station 100. The cleaner station 100 may remove dust from a dust bin 220 of the first cleaner 200. The cleaner station 100 may remove dust from the dust bin (not illustrated) of the second cleaner 300.

[0051] First, a structure of the first cleaner 200 will be described below with reference to FIGS. 1 and 2.

[0052] The first cleaner 200 may mean a cleaner configured to be manually operated by a user. For example, the first cleaner 200 may mean a handy cleaner or a stick cleaner.

[0053] The first cleaner 200 may be mounted on the cleaner station 100. The first cleaner 200 may be supported by the cleaner station 100. The first cleaner 200 may be coupled to the cleaner station 100.

[0054] The first 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.

[0055] The main body housing 211 may define an external appearance of the first 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.

[0056] 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.

[0057] Meanwhile, in the present embodiment, an imaginary line may be defined to penetrate the inside of the suction part 212 having a cylindrical shape. That is, an imaginary suction flow path through line A2 may be formed to penetrate the suction flow path in a longitudinal direction.

[0058] 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 a dust bin 220.

[0059] For example, the dust separating part 213 may have two or more cyclone parts capable of separating dust 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.

[0060] 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.

[0061] 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.

[0062] Meanwhile, in the present embodiment, an imaginary suction motor axis A1 may be formed by extending a rotation axis of the suction motor 214.

[0063] 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.

[0064] The air discharge cover 215 may have an air discharge port (not illustrated) for discharging the air introduced by the suction force of the suction motor 214.

[0065] 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.

[0066] Meanwhile, in the present embodiment, an imaginary handle axis A3 extending in a longitudinal direction of the handle 216 (an axial direction of a column) may be defined.

[0067] 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 an instruction to operate or stop the first cleaner 200 through the operating part 218.

[0068] The first 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.

[0069] 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).

[0070] 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.

[0071] The dust bin 220 may include the discharge cover 222. The discharge cover 222 may be disposed at a lower side of the dust bin 220.

[0072] 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 lower

side of the dust bin 220 that is opened downward.

[0073] The discharge cover 222 may be coupled to the dust bin main body 221 by a hook engagement. Meanwhile, the discharge cover 222 may be separated from the dust bin main body 221 by means of a coupling lever (not illustrated).

[0074] The dust bin 220 may include the dust bin compression lever (not illustrated). The dust bin compression lever (not illustrated) reduces a volume of dust by compressing the dust collected in the dust bin by moving the compression member. The dust bin compression lever (not illustrated) may be disposed outside the dust bin 220.

[0075] The compression member (not illustrated) may be disposed in the dust bin main body (not illustrated). The compression member may move in the internal space of the dust bin main body (not illustrated). Specifically, the compression member may move upward and downward in the dust bin main body (not illustrated). Therefore, the compression member may compress downward the dust in the dust bin main body (not illustrated). In addition, when the discharge cover (not illustrated) is separated from the dust bin main body (not illustrated) and thus the lower side of the dust bin 220 is opened, the compression member may move from an upper side of the dust bin 220 to the lower side of the dust bin 220, thereby removing debris such as residual dust in the dust bin 220.

[0076] The first cleaner 200 may include a battery housing 230. A battery 240 may be accommodated in the battery housing 230. The battery housing 230 may be disposed below the handle 216. For example, the battery housing 230 may have a hexahedral shape opened at a lower side thereof. A rear side of the battery housing 230 may be connected to the handle 216.

[0077] The battery housing 230 may include an accommodation portion opened downward. The battery 240 may be coupled or separated through the accommodation portion of the battery housing 230.

[0078] The first cleaner 200 may include the battery 240.

[0079] For example, the battery 240 may be separably coupled to the first 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. The above-mentioned configuration may improve portability of the first cleaner 200.

[0080] On the contrary, the battery 240 may be integrally provided in the battery housing 230. In this case, a lower surface of the battery 240 is not exposed to the outside.

[0081] The battery 240 may supply power to the suction motor 214 of the first cleaner 200.

[0082] The first 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.

[0083] 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.

[0084] The first 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 first cleaner 200 via the cleaning module 260 and the extension tube 250 by the suction force generated in the main body 210 of the first cleaner 200.

[0085] The dust in the dust bin 220 of the first 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.

[0086] The first cleaner 200 may be coupled to a lateral surface of a housing 110. Specifically, the main body 210 of the first cleaner 200 may be mounted on a 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 (see FIG. 2).

[0087] The dust removing system 10 may include the second cleaner 300. The second cleaner 300 may mean a robot cleaner. The second cleaner 300 may automatically clean a zone to be cleaned by sucking foreign substances such as dust from the floor while autonomously traveling in the zone to be cleaned. The second cleaner 300, that is, the robot cleaner may include a distance sensor configured to detect a distance from an obstacle such as furniture, office supplies, or walls installed in the zone to be cleaned, and left and right wheels for moving the robot cleaner. The second cleaner 300 may be coupled to the cleaner station. The dust in the second cleaner 300 may be captured into the dust collecting part 170 through a second flow path 182.

[0088] The cleaner station 100 of the present disclosure will be described below with reference to FIGS. 1 and 2.

[0089] The first cleaner 200 and the second cleaner 300 may be disposed on the cleaner station 100. The first cleaner 200 may be coupled to the lateral surface of the cleaner station 100. Specifically, the main body of the first cleaner 200 may be coupled to the lateral surface of the

cleaner station 100. The second cleaner 300 may be coupled to a lower portion of the cleaner station 100. The cleaner station 100 may remove dust from the dust bin 220 of the first cleaner 200. The cleaner station 100 may remove dust from the dust bin (not illustrated) of the second cleaner 300.

[0090] The cleaner station 100 may include the housing 110. The housing 110 defines an external shape of the cleaner station 100 and has a space therein, and at least one of or both the first cleaner 200 and the second cleaner 300 are coupled to the housing 110.

[0091] The housing 110 may define an external appearance of the cleaner station 100. 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.

[0092] At least one of or both the first cleaner 200 and the second cleaner 300 are coupled to the housing 110. For example, only the first cleaner 200 may be coupled to the housing 110, only the second cleaner 300 may be coupled to the housing 110, or both the first cleaner 200 and the second cleaner 300 may be coupled to the housing 110.

[0093] 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.

[0094] The housing 110 may include a bottom surface 111, an outer wall surface 112, and an upper surface 113.

[0095] 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.

[0096] 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 first cleaner 200 is coupled.

[0097] 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.

[0098] 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.

[0099] 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.

[0100] 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.

[0101] 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, a state of the first cleaner 200, and a state of the second cleaner 300. The display part may further display information such as a cleaning process situation, a map of the cleaning zone, and the like.

[0102] Meanwhile, according to the embodiment, 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 or 300 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.

[0103] With reference to FIG. 19, the cleaner station 100 may include the coupling part 120 to which the first cleaner 200 is coupled. Specifically, the coupling part 120 may be disposed in the outer wall surface 112, and the main body 210, the dust bin 220, and the battery housing 230 of the first cleaner 200 may be coupled to the coupling part 120. Specifically, the coupling part 120 may be disposed in a front surface of the outer wall surface 112.

[0104] The coupling part 120 may include a coupling surface 121. The coupling surface 121 may be disposed on the lateral 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 front surface of the cleaner station 100.

[0105] The coupling part 120 may include a dust bin guide surface 122. The dust bin guide surface 122 may be connected to the coupling surface 121.

[0106] 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.

[0107] 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 first cleaner 200. Therefore, it is possible to provide convenience when coupling the first cleaner 200 to the coupling surface 121.

[0108] The coupling part 120 may include sidewalls 124. The 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 sidewalls 124 may be connected to a first outer wall surface 112a. In addition, the sidewalls 124 may define surfaces connected to the dust bin guide surface 122. Therefore, the first cleaner 200 may be stably accommodated.

[0109] The coupling part 120 may include a coupling sensor 125. The coupling sensor 125 may detect whether the first cleaner 200 is coupled to the coupling part 120.

[0110] 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 first 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 first cleaner 200 is coupled to the cleaner station 100.

[0111] 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 sidewall 124. Therefore, when the dust bin 220 or the main body 210 of the first cleaner 200 passes the 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.

[0112] The coupling sensor 125 may be a mean for determining whether the first cleaner 200 is coupled and power is applied to the battery 240 of the first cleaner 200.

[0113] The coupling part 120 may include a suction part guide surface 126. The suction part guide surface 126 may be disposed on the first outer wall surface 112a. The suction part guide surface 126 may be connected to the dust bin guide surface 122. The suction part 212 may be coupled to the suction part guide surface 126. The suction part guide surface 126 may be formed in a shape corresponding to the shape of the suction part 212.

[0114] 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 sidewall 124 so that fixing members 131 may enter and exit the fixing member entrance hole 127.

[0115] The first cleaner 200 may be coupled to the coupling part 120.

[0116] The coupling part 120 may include the coupling sensor 125. The coupling sensor 125 may detect whether the first cleaner 200 is coupled to the coupling part 120. Specifically, when the first cleaner 200 approaches the coupling sensor 125, the first cleaner 200 transmits a

signal to a control unit 400.

[0117] 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 first 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 first cleaner 200 is coupled to the cleaner station 100.

[0118] Meanwhile, the coupling sensor 125 may include a contactless sensor. For example, the coupling sensor 125 may include an infrared ray (IR) sensor.

[0119] The coupling sensor 125 may face the dust bin 220 or the battery housing 230 of the first cleaner 200.

[0120] The coupling sensor 125 may be a mean for determining whether the first cleaner 200 is coupled and power is applied to the battery 240 of the first cleaner 200.

[0121] With reference to FIG. 20, the cleaner station 100 according to the present disclosure may include a fixing unit 130.

[0122] The fixing unit 130 is disposed in the housing 110. In addition, the fixing unit 130 may be disposed on a back surface of the coupling part 120. The fixing unit 130 may fix the first cleaner 200 coupled to the coupling part 120. Specifically, the fixing unit 130 may fix the dust bin 220 and the battery housing 230 of the first cleaner 200 coupled to the coupling part 120.

[0123] The fixing unit 130 may include fixing members 131 configured to fix the dust bin 220 and the battery housing 230 of the first cleaner 200, and a fixing drive part 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 drive part 133 to the fixing members 131.

[0124] The fixing members 131 may be disposed at one side of the coupling part 120 and configured to reciprocate in order to fix the dust bin 220.

[0125] The fixing members 131 may be respectively disposed at two opposite sides of the coupling part 120.

[0126] The fixing drive part 133 may provide power for moving the fixing members 131.

[0127] The fixing part links 135 may convert a rotational force of the fixing drive part 133 into the reciprocations of the fixing members 131.

[0128] A stationary sealer 136 may be disposed on the dust bin guide surface 122 so as to seal the dust bin 220 when the first 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.

[0129] Therefore, when the main body 210 of the first cleaner 200 is disposed on the coupling part 120, the fixing unit 130 may fix the main body 210 of the first cleaner 200. Specifically, when the coupling sensor 125 detects that the main body 210 of the first cleaner

200 is coupled to the coupling part 120 of the cleaner station 100, the fixing drive part 133 may move the fixing members 131 to fix the main body 210 of the first cleaner 200.

[0130] 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.

[0131] With reference to FIG. 21, the cleaner station 100 of the present disclosure may include a door unit 140. The door unit 140 may be configured to open or close a first flow path 181.

[0132] The door unit 140 may include a door 141, a door motor 142, and a door arm 143.

[0133] The door 141 may be hingedly coupled to one side of the coupling part 120 and open or close the first flow path 181.

[0134] The door motor 142 may provide power for rotating the door 141. Specifically, the door motor 142 may rotate the door arm 143 in a forward or reverse direction. When the door arm 143 is rotated in the forward direction, the first flow path 181 may be opened. On the contrary, when the door arm 143 is rotated in the reverse direction, at least a part of the first flow path 181 may be closed. The forward direction may be opposite to the reverse direction.

[0135] 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.

[0136] 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.

[0137] Therefore, when the door 141 is opened to a predetermined position, the door opening/closing detecting parts 144 may detect that the door is opened.

[0138] The door opening/closing detecting part 144 may include a contact sensor. For example, the door opening/closing detecting part 144 may include a micro-switch.

[0139] 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.

[0140] With this configuration, the door unit 140 may selectively open or close at least a part of the first cleaner flow path 181, thereby allowing the dust bin 220 of the first cleaner 200 and the dust collecting part 170 to communicate with each other.

[0141] The door unit 140 may be opened when the discharge cover 222 of the first cleaner 200 is opened. In addition, when the door unit 140 is closed, the discharge cover 222 of the first cleaner 200 may also be closed.

[0142] When the dust in the dust bin 220 of the first 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 a 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.

[0143] With reference to FIG. 22, the cleaner station 100 of 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 first cleaner 200.

[0144] 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 gear box 155.

[0145] The push protrusion 151 may move to press a coupling lever 222c when the first cleaner 200 is coupled. In case that the push protrusion moves the coupling lever, the discharge cover may be unfixed, the lower side of the dust bin 220 may be opened, and the dust bin 220 and the first cleaner flow path 181 may communicate with each other.

[0146] When the first 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.

[0147] The push protrusion 151 may rectilinearly reciprocate to press the coupling lever 222c.

[0148] 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.

[0149] 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.

[0150] 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 gear box 155.

[0151] 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.

[0152] 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 first cleaner, and as a result, it is possible to improve convenience.

[0153] In addition, since the discharge cover 222 is opened in the state in which the first cleaner 200 is coupled to the cleaner station 100, it is possible to prevent the dust from scattering.

[0154] 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.

[0155] For example, the dust collecting part 170 may mean a dust bag for collecting dust sucked from the inside of the dust bin 220 of the first cleaner 200 by the dust collecting motor 191.

[0156] The dust collecting part 170 may be separably coupled to the housing 110.

[0157] Therefore, the dust collecting part 170 may be separated from the housing 110 and discarded, a new dust collecting part 170 may be coupled to the housing 110. That is, the dust collecting part 170 may be defined as a consumable component.

[0158] When the suction force is generated by the dust collecting motor 191, a volume of the dust bag is increased, such that the dust may be accommodated in the dust bag. To this end, the dust bag may be made of a material that transmits air but does not transmit debris such as dust. For example, the dust bag may be made of a non-woven fabric material and have a hexahedral shape when the dust bag has an increased volume.

[0159] 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.

[0160] Meanwhile, the cleaner station 100 according to the embodiment of the present disclosure may further include a sterilization module (not illustrated).

[0161] At least one sterilization module (not illustrated) may be provided on a flow path part 180 or provided at the periphery of the dust collecting part 170.

[0162] The sterilization module (not illustrated) is configured to sterilize the dust captured in the dust collecting part 170.

[0163] The cleaner station 100 may include the flow path part 180. The flow path part 180 may connect the first cleaner 200 or the second cleaner 300 to the dust collecting part 170.

[0164] The flow path part 180 may include the first cleaner flow path 181, a second cleaner flow path 182, a dust collecting flow path 184, and a flow path switching module 183.

[0165] The first cleaner flow path 181 is disposed in the housing 110 and connected to the dust bin 220 of the first cleaner 200.

[0166] The first cleaner flow path 181 may connect the dust bin 220 of the first cleaner 200 and the dust collecting part 170. The first cleaner flow path 181 may be disposed rearward of the coupling part 120. The first cleaner flow path 181 may mean a space between the dust bin 220 of the first cleaner 200 and the dust collecting part 170.

[0167] The first cleaner flow path 181 may extend rearward from the coupling part 120, be bent, and then extend downward.

[0168] The dust in the dust bin 220 of the first cleaner 200 may move to the dust collecting part 170 through the first cleaner flow path 181.

[0169] The second cleaner flow path 182 is disposed in

the housing 110 and connected to the dust bin (not illustrated) of the second cleaner 300.

[0170] The second cleaner flow path 182 may connect the second cleaner 300 to the dust collecting part 170. The dust in the second cleaner 300 may move to the dust collecting part 170 through the second cleaner flow path 182.

[0171] An inlet of the dust collecting flow path 184 is selectively connected to any one of the first cleaner flow path 181 and the second cleaner flow path 182, and an outlet of the dust collecting flow path 184 is connected to the dust collecting part 170.

[0172] The inlet of the dust collecting flow path 184 is coupled to a dust collecting flow path connection portion 1831d of a casing 1831.

[0173] As illustrated in FIG. 6, in case that an inlet 1832a of a connection hose 1832 is coupled to a first cleaner flow path connection portion 1831b, the dust collecting flow path 184 may be connected to the first cleaner flow path 181, such that air may flow. Alternatively, as illustrated in FIG. 9, in case that the inlet 1832a of the connection hose 1832 is coupled to a second cleaner flow path connection portion 1831c, the dust collecting flow path 184 may be connected to the second cleaner flow path 182, such that air may flow.

[0174] The outlet of the dust collecting flow path 184 is coupled to an inlet of the dust collecting part 170 and communicates with an internal space of the dust collecting part 170.

[0175] The flow path switching module 183 is a constituent element configured to selectively connect the dust collecting flow path 184 to the first cleaner flow path 181 or the second cleaner flow path 182.

[0176] The flow path switching module 183 selectively connects the dust collecting part 170, which is disposed in the housing 110, to the first cleaner flow path 181 or the second cleaner flow path 182.

[0177] The flow path switching module 183 is disposed between the dust collecting part 170, the first cleaner flow path 181, and the second cleaner flow path 182.

[0178] The flow path switching module 183 may be disposed between the dust collecting part 170, the first cleaner flow path 181, and the second cleaner flow path 182. The flow path switching module 183 may selectively open or close the first cleaner flow path 181 and the second cleaner flow path 182 connected to the dust collecting part 170. Therefore, it is possible to prevent a decrease in suction force caused when the plurality of flow paths 181 and 182 is opened.

[0179] For example, in case that only the first cleaner 200 is coupled to the cleaner station 100, the flow path switching module 183 may connect the first cleaner flow path 181 and the dust collecting part 170 and disconnect the second cleaner flow path 182 and the dust collecting part 170.

[0180] The connection between the first cleaner flow path 181 and the dust collecting part 170 will be described below in another way. The connection hose 1832 is

coupled to the first cleaner flow path connection portion 1831b. The connection hose 1832 is connected to the first cleaner flow path 181. The first cleaner flow path 181 communicates with the dust collecting part 170.

[0181] The connection between the second cleaner flow path 182 and the dust collecting part 170 will be described below in another way. The connection hose 1832 is coupled to the second cleaner flow path connection portion 1831c. The connection hose 1832 is connected to the second cleaner flow path 182. The second cleaner flow path 182 communicates with the dust collecting part 170.

[0182] For example, in case that the first cleaner 200 is connected to the cleaner station 100, the flow path switching module 183 connects the first cleaner flow path 181 and the dust collecting part 170. Alternatively, in case that the second cleaner 300 is connected to the cleaner station 100, the flow path switching module 183 connects the second cleaner flow path 182 and the dust collecting part 170.

[0183] In case that both the first cleaner 200 and the second cleaner 300 are coupled to the cleaner station 100, the flow path switching module 183 may connect the first cleaner flow path 181 and the dust collecting part 170 and disconnect the second cleaner flow path 182 and the dust collecting part 170, thereby removing dust in the dust bin 220 of the first cleaner 200 first. Thereafter, the flow path switching module 183 may disconnect the first cleaner flow path 181 and the dust collecting part 170 and connect the second cleaner flow path 182 and the dust collecting part 170, thereby removing dust in the second cleaner 300. Therefore, it is possible to improve convenience in respect to the use of the first cleaner 200 manually manipulated by the user.

[0184] The cleaner station 100 may include the dust suction module 190. The dust suction module 190 may include the dust collecting motor 191, a first filter 192, and a second filter (not illustrated).

[0185] 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 first cleaner flow path 181 and the second cleaner flow path 182. Therefore, the dust collecting motor 191 may provide the suction force capable of sucking the dust in the dust bin 220 of the first cleaner 200 and the dust in the second cleaner 300.

[0186] 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.

[0187] The first filter 192 may be disposed between the dust collecting part 170 and the dust collecting motor 191. The first filter 192 may be a prefilter.

[0188] The second filter (not illustrated) may be disposed between the dust collecting motor 191 and the outer wall surface 112. The second filter (not illustrated) may be an HEPA filter.

[0189] Meanwhile, the cleaner station 100 may further

include a charging part 128.

[0190] The charging part 128 is a constituent element connected to the first cleaner 200 and/or the second cleaner 300 and configured to charge the first cleaner 200 and/or the second cleaner 300. The charging part 128 is electrically connected to at least any one of the first cleaner 200 and the second cleaner 300.

[0191] The charging part 128 may be a charging terminal. The charging part 128 may come into contact with a corresponding terminal disposed in the first cleaner 200 or the second cleaner 300 and be electrically connected to the corresponding terminal, such that an electric current may flow.

[0192] The charging part 128 may include a first charging part 1281 and a second charging part 1282.

[0193] The first charging part 1281 may be disposed in the coupling part 120. The charging part 128 may be electrically connected to the first cleaner 200 coupled to the coupling part 120. The charging part 128 may supply power to the battery of the first cleaner 200 coupled to the coupling part 120.

[0194] In addition, the charging part 128 may include a lower charging part (not illustrated) disposed in a lower region of the housing 110. The second charging part 1282 may be electrically connected to the second cleaner 300 coupled to the lower region of the housing 110. The second charging part 1282 may supply power to the battery of the second cleaner 300 coupled to the lower region of the housing 110.

[0195] 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 collecting part 170 from the cleaner station 100.

[0196] Hereinafter, a detailed structure of the flow path switching module 183 will be described with reference to FIGS. 4 to 12.

[0197] First, the directions are defined based on FIG. 6. FIG. 6 is a front view of the flow path switching module 183. A direction in which the second cleaner flow path 182 is positioned based on the casing 1831 is defined as a leftward direction. A direction in which a driving cam 1836 is positioned based on the casing 1831 is defined as a rightward direction. A direction in which the first cleaner flow path 181 is positioned based on the casing 1831 is defined as an upward direction. A direction in which the dust collecting part 170 is positioned based on the casing 1831 is defined as a downward direction. A direction in which a first link 1833 is positioned based on the casing 1831 is defined as a forward direction. A direction in which a second link 1834 is positioned based on the casing 1831 is defined as a rearward direction.

[0198] With reference to FIG. 4, the flow path switching module 183 is disposed in the housing 110.

[0199] With reference to FIG. 4, the flow path switching module 183 may be disposed inside a left cover of the housing 110. The flow path switching module 183 may be

exposed to the outside when the left cover of the housing 110 is opened. Alternatively, unlike the configuration illustrated in FIG. 4, the flow path switching module 183 may be disposed inside a right cover.

[0200] With reference to FIG. 4, the flow path switching module 183 may be disposed inside a flow path switching module cover 185. The flow path switching module 183 may be exposed to the outside when the flow path switching module cover 185 is opened.

[0201] The flow path switching module 183 includes the casing 1831, the connection hose 1832, the first link 1833, the second link 1834, a switching motor 1835, and the driving cam 1836.

[0202] The flow path switching module 183 includes the casing 1831. The casing 1831 is a constituent element configured to define an external shape and constitute a frame on which other constituent elements may be coupled or supported.

[0203] The casing 1831 is formed in a container shape having a space therein and has the first cleaner flow path connection portion 1831b connected to the first cleaner flow path 181, and the second cleaner flow path connection portion 1831c connected to the second cleaner flow path 182. In addition, the casing 1831 has the dust collecting flow path connection portion 1831d connected to the dust collecting flow path 184.

[0204] An arc may be formed on an inner peripheral surface of the casing 1831. The inner peripheral surface of the casing 1831 constitutes a part of an imaginary circle having a center as a central axis of the casing 1831. With reference to FIG. 6, a central axis 1831a of the casing is disposed in the forward/rearward direction.

[0205] The first cleaner flow path connection portion 1831b may protrude radially outward from the casing 1831. With reference to FIG. 6, the first cleaner flow path connection portion 1831b may protrude upward. A flange 1831ba may be formed at an end of the first cleaner flow path connection portion 1831b, and the flange 1831ba may be fixed by being inserted into a groove 181c formed in the first cleaner flow path 181.

[0206] The second cleaner flow path connection portion 1831c may protrude radially outward from the casing 1831. With reference to FIG. 6, the second cleaner flow path connection portion 1831c may protrude leftward. A flange 1831ca may be formed at an end of the first cleaner flow path connection portion 1831c, and the flange 1831ca may be fixed by being inserted into a groove 182a formed in the second cleaner flow path 182.

[0207] The dust collecting flow path connection portion 1831d may protrude radially outward from the casing 1831. With reference to FIG. 6, the dust collecting flow path connection portion 1831d may protrude downward. A flange 1831da may be formed at an end of the dust collecting flow path connection portion 1831d, and the flange 1831da may be fixed by being inserted into a groove 184a formed in the dust collecting flow path 184.

[0208] The casing 1831 may be separably coupled to the housing 110. The casing 1831 is inserted into the

housing from the left side toward the right side of the housing and fixed as the flanges formed on the first cleaner flow path connection portion 1831b, the second cleaner flow path connection portion 1831c, and the dust collecting flow path connection portion 1831d are inserted into the grooves of the first cleaner flow path 181, the second cleaner flow path 182, and the dust collecting flow path 184. Thereafter, the casing 1831 may be screw-coupled to the housing 110 by at least one or more screws.

[0209] The flow path switching module 183 includes the connection hose 1832. The connection hose 1832 is a constituent element configured to allow the dust collecting flow path 184 to selectively communicate with the first cleaner flow path 181 or the second cleaner flow path 182.

[0210] The inlet 1832a of the connection hose 1832 is selectively coupled to any one of the first cleaner flow path connection portion 1831b and the second cleaner flow path connection portion 1831c while moving along the inner peripheral surface of the casing 1831. An outlet 1832b of the connection hose is coupled to the dust collecting flow path connection portion 1831d.

[0211] The connection hose 1832 may be made of a material having flexibility. For example, the connection hose 1832 may be made of a rubber or resin material. Therefore, the connection hose 1832 may be deformed.

[0212] Alternatively, at least a part of the connection hose 1832 may crease. Therefore, the connection hose 1832 may be structurally deformed.

[0213] The inlet 1832a of the connection hose 1832 is selectively coupled to any one of the first cleaner flow path connection portion 1831b and the second cleaner flow path connection portion 1831c. As illustrated in FIG. 6, the connection hose 1832 may be coupled to the first cleaner flow path connection portion 1831b and allow the first cleaner flow path 181 and the dust collecting part 170 to communicate with each other. Alternatively, as illustrated in FIG. 9, the connection hose 1832 may be coupled to the second cleaner flow path connection portion 1831c and allow the second cleaner flow path 182 and the dust collecting part 170 to communicate with each other.

[0214] The inlet 1832a of the connection hose 1832 moves along the inner peripheral surface of the casing 1831. Specifically, the inlet 1832a of the connection hose 1832 moves along the inner peripheral surface of the casing 1831 in a state in which the inlet 1832a of the connection hose 1832 is spaced apart from the casing 1831 by a predetermined distance or more. Therefore, a sealer 1832c disposed in the inlet 1832a of the connection hose 1832 is not damaged while the connection hose 1832 moves along the inner peripheral surface of the casing 1831.

[0215] The outlet 1832b of the connection hose 1832 is coupled to the dust collecting flow path connection portion 1831d. The outlet 1832b of the connection hose 1832 is fixedly coupled to the dust collecting flow path connec-

tion portion 1831d and always communicates with the dust collecting part.

[0216] The flow path switching module 183 includes the first link 1833. The first link 1833 is a constituent element configured to move the connection hose 1832 by transmitting power of the motor to the connection hose 1832.

[0217] One side of the first link 1833 is rotatably coupled to the casing 1831, and the other side of the first link 1833 is coupled to the connection hose 1832.

[0218] The first link 1833 rotates about a rotary shaft 1833a disposed at one side. The first link 1833 is rotatably coupled to the casing 1831 by means of the rotary shaft 1833a of the first link 1833. With reference to FIG. 6, the first link 1833 is rotatably coupled to the casing 1831 at the right side of the connection hose 1832.

[0219] The rotary shaft 1833a of the first link is a rotation center about which the first link 1833 rotates. The rotary shaft 1833a of the first link may extend from the first link 1833 toward the casing 1831. The rotary shaft 1833a of the first link is rotatably coupled to the casing 1831.

[0220] The first link 1833 extends in one direction from the rotary shaft 1833a of the first link and has a connection portion 1833b disposed at an end thereof and connected to the connection hose 1832.

[0221] The connection portion 1833b of the first link is hingedly coupled to the inlet 1832a of the connection hose 1832. The first link 1833 is connected to the connection hose 1832 through the connection portion 1833b of the first link. Therefore, the connection hose 1832 may move when the first link 1833 rotates.

[0222] With reference to FIG. 6, the first link 1833 extends leftward from the rotary shaft 1833a. The connection portion 1833b of the first link is disposed at a left end of the first link 1833. The connection portion 1833b of the first link may be connected to a left end of the inlet 1832a of the connection hose 1832.

[0223] The first link 1833 includes a gear portion 1833c.

[0224] The first link 1833 may extend from the rotary shaft 1833a of the first link in a direction opposite to the connection portion 1833b, and the gear portion 1833c of the first link is disposed at the end of the first link 1833. With reference to FIG. 6, the first link 1833 may extend rightward from the rotary shaft 1833a of the first link, and the gear portion 1833c of the first link is disposed at a right end of the first link 1833.

[0225] Gear teeth are formed at an end of the gear portion 1833c of the first link. The gear portion 1833c of the first link is connected to a gear portion 1836c of the driving cam. Specifically, the gear portion 1833c of the first link engages with the gear portion 1836c of the driving cam.

[0226] The first link includes a partition wall 1833d.

[0227] The partition wall 1833d of the first link is a constituent element configured to prevent the separation of the flow path switching module 183 when the connection hose 1832 is positioned at a particular position.

Specifically, the separation of the flow path switching module 183 is prevented in case that the connection hose 1832 is coupled to the second cleaner flow path part 1831c or the connection hose 1832 is positioned between the first cleaner flow path part 1831b and the second cleaner flow path part 1831c in a state in which the connection hose 1832 is not coupled to the first cleaner flow path connection portion 1831b.

[0228] The partition wall 1833d of the first link is disposed on a rear surface of the gear portion 1833c of the first link and extends radially outward from the gear portion 1833c of the first link.

[0229] The partition wall 1833d of the first link is disposed on the rear surface of the gear portion 1833c of the first link. Therefore, the assembly including the casing 1831 and the first link 1833 is separated while moving toward the front side of the driving cam 1836. When the partition wall 1833d is caught by the gear portion 1836c of the driving cam, the assembly cannot be separated.

[0230] The partition wall 1833d of the first link is disposed on a part of the gear portion 1833c of the first link. The partition wall 1833d of the first link covers a part of the gear portion 1833c.

[0231] The partition wall 1833d of the first link is disposed so as not to overlap the gear portion 1836c of the driving cam when the flow path switching module 1833 is separated. With reference to FIG. 6, the partition wall 1833d is disposed rearward of the gear portion 1836c of the driving cam and overlaps the gear portion 1836c of the driving cam, such that the partition wall 1833d of the first link is caught by the gear portion 1836c of the driving cam, and the flow path switching module 183 cannot be separated. On the contrary, with reference to FIG. 9, the flow path switching module 183 may be easily separated because the partition wall 1833d of the first link is not disposed to overlap the gear portion 1836c of the driving cam.

[0232] When the connection hose 1832 is coupled to the first cleaner flow path connection portion 1831b, the partition wall 1833d of the first link and the driving cam 1836 are not disposed to overlap forward and rearward. When the connection hose 1832 is coupled to the second cleaner flow path connection portion 1831c, the partition wall 1833d of the first link and the driving cam 1836 are disposed to overlap forward and rearward. When the connection hose 1832 is disposed between the first cleaner flow path connection portion 1831b and the second cleaner flow path connection portion 1831c, the partition wall 1833d of the first link and the driving cam 1836 are disposed to overlap forward and rearward. Therefore, because the flow path switching module 183 may be separated only in the state in which the first cleaner flow path connection portion 1831b is closed, dust falling through the first flow path 181a does not scatter while the flow path switching module 183 is separated.

[0233] The flow path switching module 183 includes the second link 1834. The second link 1834 is a consti-

tuent element configured to move the connection hose 1832 together with the first link 1833.

[0234] One side of the second link 1834 is rotatably coupled to the casing 1831, and the other side of the second link 1834 is coupled to the connection hose 1832.

[0235] The second link 1834 rotates about a rotary shaft 1834a disposed at one side. One side of the second link 1834 is rotatably coupled to the casing 1831. The second link 1834 rotates about the rotary shaft 1834a disposed at one side. The rotary shaft 1834a of the second link may be disposed at an end of the second link 1834. With reference to FIG. 6, the second link 1834 is rotatably coupled to the casing 1831 at the rear side of the connection hose 1832.

[0236] The rotary shaft 1834a of the second link is a rotation center about which the second link 1834 rotates. The rotary shaft 1834a of the second link extends from the second link 1834 toward the casing 1831. The rotary shaft 1834a of the second link is rotatably coupled to the casing 1831.

[0237] The second link 1834 extends in one direction from the rotary shaft 1834a of the second link and has a connection portion 1834b disposed at an end thereof and connected to the connection hose 1832.

[0238] The connection portion 1834b of the second link is hingedly coupled to the inlet 1832a of the connection hose 1832. The second link 1834 is connected to the connection hose 1832 through the connection portion 1834b of the second link. Therefore, the connection hose 1832 may move when the second link 1834 rotates.

[0239] One side of the second link 1834 is coupled to the casing 1831, and the other side of the second link 1834 is coupled to the connection hose 1832. Specifically, one end of the second link 1834 is the rotary shaft 1834a and coupled to the casing 1831. The other end of the second link 1834 is the connection portion 1834b and hingedly coupled to the inlet 1832a of the connection hose 1832.

[0240] With reference to FIG. 6, the rotary shaft 1834a of the second link is disposed at a lower end of the second link 1834 and rotatably coupled to the casing 1831. The second link 1834 extends upward from the rotary shaft 1834a of the second link, and the connection portion 1834b of the second link is disposed at an upper end of the second link 1834. The connection portion 1834b of the second link may be connected to a right end of the inlet 1832a of the connection hose 1832.

[0241] With reference to FIGS. 12 and 13, the rotary shaft 1833a of the first link is disposed to be spaced apart from the rotary shaft 1834a of the second link. Therefore, the rotary shaft 1833a of the first link and the rotary shaft 1834a of the second link may serve as two focal points, and the connection hose 1832 may move along an elliptical trajectory. The elliptical trajectory of the connection hose 1832 is a trajectory through which a center point of the inlet 1832a of the connection hose passes, as indicated by the two-dot chain line in FIGS. 12 and 13. Therefore, the inlet 1832a of the connection hose 1832

may be spaced apart from the casing 1831 by a predetermined distance and move while the inlet 1832a of the connection hose 1832 moves.

[0242] When the connection hose 1832 is coupled to any one of the first cleaner flow path connection portion 1831b and the second cleaner flow path connection portion 1831c, the connection hose 1832 is tightly attached to the inner peripheral surface of the casing 1831. When the connection hose 1832 moves from any one of the first cleaner flow path connection portion 1831b and the second cleaner flow path connection portion 1831c toward the other of the first cleaner flow path connection portion 1831b and the second cleaner flow path connection portion 1831c, the connection hose 1832 is spaced apart from the inner peripheral surface of the casing 1831.

[0243] As illustrated in FIG. 6, the connection hose 1832 is tightly attached to the first cleaner flow path connection portion 1831b at a first position. As illustrated in FIGS. 7 and 8, the connection hose 1832 is spaced apart from the inner peripheral surface of the casing 1831 while the connection hose 1832 moves between the first cleaner flow path connection portion 1831b and the second cleaner flow path connection portion 1832c. As illustrated in FIG. 11, the connection hose 1832 is tightly attached to the second cleaner flow path connection portion 1831c at a second position.

[0244] Therefore, the sealer 1832c of the connection hose 1832 may not be damaged by friction or the like while the connection hose 1832 moves between the first cleaner flow path connection portion 1831b and the second cleaner flow path connection portion 1831c.

[0245] At least any one of the rotary shaft 1833a of the first link and the rotary shaft 1834a of the second link is disposed to be spaced apart from the central axis 1831a of the casing 1831.

[0246] With reference to FIG. 12, the rotary shaft 1833a of the first link is disposed at the right side of the central axis 1831a of the casing 1831, and the rotary shaft 1834a of the second link is disposed below the central axis 1831a of the casing 1831. With this arrangement, the trajectory, along which the connection portion 1833b of the first link moves, and the trajectory, along which the connection portion 1834b of the second link moves, are inconsistent with each other, and the inlet 1832a of the connection hose moves along the elliptical trajectory. Therefore, the inlet 1832a of the connection hose may be spaced apart from the inner peripheral surface of the casing 1831 by a predetermined distance or more while the connection hose moves.

[0247] A first trajectory C1, which is defined as a connection point between the first link 1833 and the connection hose 1832 moves, intersect, at least twice, an imaginary reference circle C0 that is a concentric circle with respect to the inner peripheral surface of the casing 1831. In this case, the connection point between the first link 1833 and the connection hose 1832 indicates the connection portion 1833b of the first link.

[0248] With reference to FIGS. 12 and 13, the first trajectory C1 and the reference circle C0 intersect at two points. With reference to FIG. 12, the connection portion 1833b of the first link is disposed at a right intersection point when the connection hose 1832 is connected to the first cleaner flow path 181, as illustrated in FIG. 6. In addition, with reference to FIG. 13, the connection portion 1833b of the first link is disposed at a left intersection point when the connection hose 1832 is connected to the second cleaner flow path 182, as illustrated in FIG. 11.

[0249] A second trajectory C2, which is defined as a connection point between the second link 1834 and the connection hose 1832 moves, intersect, at least twice, the imaginary reference circle C0 that is a concentric circle with respect to the inner peripheral surface of the casing 1831.

[0250] With reference to FIGS. 12 and 13, the second trajectory C2 and the reference circle C0 intersect at two points. With reference to FIG. 12, the connection portion of the second link is disposed at a right intersection point when the connection hose 1832 is connected to the first cleaner flow path 181, as illustrated in FIG. 6. In addition, with reference to FIG. 13, the connection portion 1834b of the second link is disposed at a left intersection point when the connection hose 1832 is connected to the second cleaner flow path 182, as illustrated in FIG. 11.

[0251] The flow path switching module 183 may be formed such that a radius of curvature of the inner peripheral surface of the casing 1831 is smaller than a radius of curvature that defines the trajectory of the inlet 1832a of the connection hose 1832. The trajectory along which the inlet 1832a of the connection hose 1832 moves may be formed in a shape similar to an elliptical shape, and a radius of curvature of the ellipse may be larger than the radius of curvature of the inner peripheral surface of the casing 1831. With reference to FIGS. 12 and 13, the inner peripheral surface of the casing 1831 may define a circle concentric with of the reference circle C0, and the radius of curvature of the inner peripheral surface of the casing 1831 may be referred to as R0. With reference to FIGS. 12 and 13, the trajectory of the inlet 1832a of the connection hose 1832 is an ellipse having focal points as the rotary shaft 1833a of the first link and the rotary shaft 1833b of the second link. The radius of curvature defined by the trajectory of the inlet 1832a of the connection hose 1832 is naturally larger than the radius of curvature of the inner peripheral surface of the casing 1831.

[0252] Because the radius of curvature of the ellipse is larger than the radius of curvature of the inner peripheral surface of the casing 1831, the inlet 1832a of the connection hose 1832 may be spaced apart inward from the inner peripheral surface of the casing 1831 when the connection hose 1832 moves along the inner peripheral surface of the casing 1831.

[0253] The flow path switching module 183 includes a plurality of links each having one side rotatably coupled to the casing 1831, and the other side coupled to the con-

nection hose 1832. The links may be the first link 1833 and the second link 1834.

[0254] At least any one of the plurality of links may be configured such that a radius of curvature of a trajectory along which an end connected to the casing 1831 moves may be larger than the radius of curvature of the inner peripheral surface of the casing 1831. With reference to FIGS. 12 and 13, a radius of curvature R2 of a second trajectory may be larger than the radius of curvature of the inner peripheral surface of the casing 1831, and a radius of curvature R1 of a first trajectory may be larger than the radius of curvature R2 of the second trajectory and the radius of curvature of the inner peripheral surface of the casing 1831.

[0255] Based on an imaginary line extending in the longitudinal direction of the connection hose 1832, the connection hose 1834 and the connection portion 1833b of the first link 1833 may be disposed opposite to the connection hose 1832 and the connection portion 1834b of the second link 1834.

[0256] With reference to FIG. 12 or 13, based on the imaginary line extending in the longitudinal direction of the connection hose 1832, the connection portion 1833b of the first link is disposed at the left side of the imaginary line, and the connection portion 1834c of the second link 1834 is disposed at the right side of the imaginary line.

[0257] With this arrangement, the inlet 1832a of the connection hose 1832 may move along the trajectory similar to the ellipse, and the sealer 1832c of the connection hose 1832 may be spaced apart from the inner peripheral surface of the casing 1831 and move. With reference to FIG. 12 or 13, the trajectory of the inlet 1832a of the connection hose 1832 is indicated by the two-dot chain line.

[0258] A length of the first link 1833 may be longer than a length of the second link 1834.

[0259] When the flow path switching module 183 is viewed from one side, the first link 1833 may intersect the second link 1834.

[0260] The length of the first link 1833 and the length of the second link 1834 are different from each other, and the first link 1833 and the second link 1834 are disposed to intersect each other, the inlet 1832a of the connection hose 1832 may be spaced apart from the inner peripheral surface of the casing 1831 while the connection hose 1832 moves between the first cleaner flow path connection portion 1831b and the second cleaner flow path connection portion 1831c.

[0261] The flow path switching module 183 includes the switching motor 1835 and the driving cam 1836.

[0262] The switching motor 1835 is disposed at one side of the casing 1831 and generates power for moving the connection hose 1832.

[0263] The switching motor 1835 may be a bidirectional motor that may rotate in two directions. That is, the switching motor 1835 may rotate clockwise or counterclockwise. For example, in case that the switching motor 1835 rotates clockwise from the state in FIG. 6

to the state in FIG. 9, the connection hose 1832 moves to the second cleaner flow path connection portion 1831c. On the contrary, in case that the switching motor 1835 rotates counterclockwise from the state in FIG. 9 to the state in FIG. 6, the connection hose 1832 moves to the first cleaner flow path connection portion 1831b.

[0264] The driving cam 1836 is coupled to the switching motor 1835 and transmits power to the first link 1833.

[0265] The driving cam 1836 is coupled to the switching motor 1835 and includes a sensing part 1836b protruding toward one side. The driving cam 1836 transmits power to the connection hose 1832.

[0266] The driving cam 1836 is coupled to a shaft of the switching motor 1835. Therefore, the driving cam 1836 rotates integrally with the shaft of the switching motor 1835.

[0267] The driving cam 1836 includes the gear portion 1836c.

[0268] The gear portion 1836c of the driving cam may protrude radially outward.

[0269] The gear portion 1836c of the driving cam is connected to the gear portion 1833c of the first link. The gear portion 1836c of the driving cam and the gear portion 1833c of the first link are gear-connected. Therefore, the first link 1833 rotates counterclockwise when the driving cam 1836 rotates clockwise, and the first link 1833 rotates clockwise when the driving cam 1836 rotates counterclockwise.

[0270] The flow path switching module 183 may include the sensing part 1836b and a third position sensor 1837c and determine a position of the connection hose 1832.

[0271] The sensing part 1836b is provided on the driving cam 1836 and protrudes toward one side.

[0272] The sensing part 1836b protrudes outward in the radial direction of the shaft of the switching motor 1835, and an end of the sensing part 1836b is tightly attached to a switch of a position sensor 1837.

[0273] The third position sensor 1837c is disposed at one side of the sensing part 1836b and turned on or off by the sensing part 1836b. The third position sensor 1837c detects the position of the connection hose 1832.

[0274] The third position sensor 1837c includes a micro-switch. The micro-switch is disposed at one side of the sensing part 1836b. Therefore, in case that the micro-switch is turned on by being pressed by the sensing part 1836b, the micro-switch generates a signal. On the contrary, in case that the micro-switch is not pressed by the sensing part 1836b, the micro-switch is turned off and does not generate a signal.

[0275] The signal may be transmitted to the control unit. The control unit may determine the position of the connection hose 1832 on the basis of the presence or absence of the signal and the signal transmission time.

[0276] The sensing part 1836b may include a plurality of surfaces.

[0277] With reference to FIG. 6, a first surface 1836ba presses and turns on the third position sensor 1837c. The

first surface 1836ba further protrudes radially outward than a second surface 1836bb or a fourth surface 1836bd to be described below, such that the first surface 1836ba pushes the micro-switch of the third position sensor 1837c to generate a signal.

[0278] With reference to FIG. 9, the second surface 1836bb turns off the third position sensor 1837c. The second surface 1836bb is adjacent to the first surface 1836ba. The second surface 1836bb less protrudes radially outward than the first surface 1836ba or a third surface 1836bc, the micro-switch of the third position sensor 1837c is not pushed, and no signal is generated.

[0279] With reference to FIG. 10, the third surface 1836bc presses and turns on the third position sensor 1837. The third surface 1836bc is disposed between the second surface 1836bb and the fourth surface 1836bd. Because the third surface 1836bc further protrudes radially outward than the second surface 1836bb or the fourth surface 1836bd, the third surface 1836bc pushes the micro-switch of the third position sensor 1837c to generate a signal.

[0280] With reference to FIG. 11, the fourth surface 1836bd turns off the third position sensor 1837c. The fourth surface 1836bd is adjacent to the third surface 1836bc. The fourth surface 1836bd less protrudes radially outward than the first surface 1836ba or the third surface 1836bc, the micro-switch of the third position sensor 1837c is not pushed, and no signal is generated.

[0281] The flow path switching module 183 may further include the position sensor 1837. The position sensor is a constituent element configured to detect the position of the connection hose. The position sensor detects the position of the connection hose and transmits a signal to the control unit.

[0282] The position sensor may include a first position sensor 1837a, a second position sensor 1837b, and the third position sensor 1837c.

[0283] When the inlet 1832a of the connection hose is coupled to the first cleaner flow path connection portion 1831b, the first position sensor 1837a transmits a signal to the control unit 400.

[0284] The first position sensor 1837a is disposed at one side of the first cleaner flow path connection portion 1831b. The first position sensor 1837a may be disposed on the inner peripheral surface of the casing 1831.

[0285] In case that the connection hose 1832 is coupled to the first cleaner flow path connection portion 1831b, the inlet 1832a of the connection hose or the second link 1834 may adjoin the first position sensor 1837a. In this case, the first position sensor 1837a may detect the inlet 1832a of the connection hose or the second link 1834 and transmit a signal to the control unit 400.

[0286] When the inlet 1832a of the connection hose is coupled to the second cleaner flow path connection portion 1831c, the second position sensor 1837b transmits a signal to the control unit 400.

[0287] The second position sensor 1837b may be dis-

posed at one side of the second cleaner flow path connection portion 1831c. The second position sensor 1837b may be disposed on the inner peripheral surface of the casing 1831.

[0288] In case that the connection hose 1832 is coupled to the second cleaner flow path connection portion 1831c, the inlet 1832a of the connection hose or the first link 1833 may adjoin the second position sensor 1837b. In this case, the second position sensor 1837b may detect the inlet 1832a of the connection hose or the first link 1833 and transmit a signal to the control unit 400.

[0289] The flow path switching module 183 according to the present disclosure may have a space provided in the casing 1831, and the first position sensor 1837a and the second position sensor 1837b may be disposed in the space. Therefore, the first position sensor 1837a and the second position sensor 1837b may accurately determine the position of the connection hose 1832 and easily determine whether the connection hose 1832 is accurately coupled to the first cleaner flow path connection portion 1831b or the second cleaner flow path connection portion 1831c.

[0290] The flow path switching module 183 may further include an elastic member 1838. The elastic member 1838 is a constituent element configured to assist in moving the inlet 1832a of the connection hose 1832.

[0291] One side of the elastic member 1838 is connected to the casing 1831, and the other side of the elastic member 1838 is connected to the second link 1834.

[0292] The elastic member 1838 may be a torsion spring.

[0293] With reference to FIG. 6, the elastic member 1838 is stretched when the connection hose 1832 is coupled to the first cleaner flow path connection portion 1831b. In addition, with reference to FIG. 11, the elastic member 1838 is compressed when the connection hose 1832 is coupled to the second cleaner flow path connection portion 1831c.

[0294] The elastic member 1838 assists the connection hose 1832 in moving from the second cleaner flow path connection portion 1831c to the first cleaner flow path connection portion 1831b. With reference to FIG. 6, the first link 1833 may easily guide the connection hose 1832 to the second cleaner flow path connection portion 1831c by pulling a left end of the connection hose 1832 leftward. Alternatively, with reference to FIG. 11, the first link 1833 guides the connection hose 1832 to the first cleaner flow path connection portion 1831b by pushing the left end of the connection hose 1832 rightward. In this process, there may occur a problem in that the right end of the connection hose 1832 is caught by the second cleaner flow path connection portion 1831c. In this case, the elastic member 1838 pulls the connection portion 1834b of the second link rightward, such that the right end of the connection hose 1832 is easily separated rightward from the second cleaner flow path connection portion 1831c.

[0295] The flow path switching module 183 may include a stop sensor 1839 and a stopper 1836d and

prevent the connection hose 1832 from moving beyond a limit position.

[0296] With reference to FIG. 6, the stopper 1836d is disposed at one side of the driving cam 1836. Specifically, the stopper 1836d may be disposed adjacent to one side of the first surface 1836ba of the sensing part 1836b.

[0297] The stopper 1839 protrudes radially.

[0298] The stop sensor 1839 may be disposed adjacent to the driving cam 1836.

[0299] The stop sensor 1839 may be an infrared sensor or a contact sensor. In case that the stopper 1836d is disposed to be close to the stop sensor 1839, the stop sensor 1839 may detect a position of the stopper 1836d and generates a signal. The generated signal is transmitted to the control unit 400.

[0300] In case that the control unit 400 receives the signal from the stop sensor 1839, the control unit 400 may determine that the connection hose 1832 is completely coupled to the first cleaner flow path connection portion 1831b, and control unit 400 may stop the operation of the switching motor 1835.

[0301] The flow path switching module 183 according to the present disclosure may be coupled to or separated from the housing 110. A chamber, in which the flow path switching module 183 may be disposed, is formed in the housing 110. The flow path switching module 183 is disposed in the chamber and connected to the first flow path 181, the second flow path 182, and the dust collecting flow path 184.

[0302] Because air and dust flow in the flow path switching module 183, the flow path switching module 183 may be contaminated by dust, or dust is trapped in the flow path switching module 183, which causes a risk of an erroneous operation. Therefore, the flow path switching module needs to be separated and cleaned. According to the present disclosure, the flow path switching module 183 may be easily coupled to or separated from the housing 110, such that the flow path switching module 183 may be easily separated and cleaned.

[0303] The flow path switching module 183 may be coupled to or separated from the housing 110 while sliding. With reference to the example in FIGS. 16 to 18, the flow path switching module 183 may be coupled to or separated from the housing 110 while moving forward or rearward.

[0304] The cleaner station includes the flow path switching module cover 185. The flow path switching module cover 185 is a constituent element configured to cover at least a part of the flow path switching module 183.

[0305] The flow path switching module cover 185 is disposed at one side of the flow path switching module 183 and coupled to the housing 110. Specifically, one side of the flow path switching module cover 185 is rotatably coupled to the housing 110.

[0306] With reference to FIGS. 3 and 16 to 18, when one side cover of the housing 110 is opened, the flow path switching module cover 185 is exposed. Thereafter,

when the flow path switching module cover 185 is rotated in one direction and opened, the flow path switching module 183 may be exposed, and the flow path switching module 183 may be separated.

[0307] The flow path switching module cover 185 prevents dust remaining in the flow path switching module 183 from scattering to the outside of the housing 110.

[0308] With reference to FIGS. 16 to 18, the flow path switching module cover 185 may include a rotary shaft 1851, a lower cover 1852, and an upper cover 1853.

[0309] The rotary shaft 1851 of the flow path switching module cover 185 may be disposed in the coupling part coupled to the housing 110. The rotary shaft 1851 of the flow path switching module cover is disposed at a lower end of the lower cover 1852. The flow path switching module cover 185 rotates as an upper end thereof moves relative to a lower end thereof.

[0310] The lower cover 1852 of the flow path switching module cover extends upward from the rotary shaft 1851 of the flow path switching module cover and includes an inclined surface.

[0311] The lower cover 1852 of the flow path switching module cover may have an inclined surface extending upward from the rotary shaft 1851 and directed toward the flow path switching module 183.

[0312] The upper cover 1853 of the flow path switching module cover includes a vertical surface extending upward from an upper end of the lower cover 1852 and perpendicular to the ground surface, and one side of the upper cover 1853 is separably fixed to the housing 110.

[0313] The upper cover 1853 of the flow path switching module may cover the opened front side of the casing 1831.

[0314] The flow path switching module cover 185 includes a cover coupling portion 1856. The cover coupling portion 1856 may be coupled to one side of the housing 110 by a hook engagement.

[0315] The cover coupling portion 1856 may be disposed at an upper end of one side of the upper cover 1853.

[0316] The flow path switching module cover 185 includes a cover handle 1857. The cover handle 1857 is gripped by the user.

[0317] The cover handle 1857 may be disposed at one side of the cover coupling portion 1856.

[0318] At least a part of the flow path switching module cover 185 is tightly attached to the first link 1833. Specifically, support members of the flow path switching module cover 185 are tightly attached to the first link 1833 and support the first link 1833 when the first link 1833 rotates.

[0319] The flow path switching module cover 185 includes a first link rotary shaft support member 1854. The first link rotary shaft support member 1854 supports the rotary shaft 1851 of the first link.

[0320] The first link rotary shaft support member 1854 protrudes toward the first link 1833, and an end of the first link rotary shaft support member 1854 supports the rotary

shaft 1851 of the first link.

[0321] The first link rotary shaft support member 1854 may be formed in a C-shape opened at one side thereof. The first link rotary shaft support member 1854 may extend in a circumferential direction of the rotary shaft 1851 of the first link.

[0322] The first link rotary shaft support member 1854 may extend along the gear portion 1833c of the first link.

[0323] The first link rotary shaft support member 1854 may be disposed on the lower cover 1852. The first link rotary shaft support member 1854 may be disposed below a first link connection portion support member 1855.

[0324] The flow path switching module cover 185 includes the first link connection portion support member 1855. The first link connection portion support member 1855 supports the connection portion 1833b of the first link.

[0325] The first link connection portion support member 1855 protrudes toward the first link 1833, and an end of the first link connection portion support member 1855 supports the connection portion 1833b of the first link.

[0326] The first link connection portion support member 1855 extends along the first trajectory C1 formed as the first link and the connection portion 1833b of the connection hose move. The first link connection portion support member 1855 may be disposed concentrically with the first trajectory C1. With reference to FIG. 4, the first link connection portion support member 1855 may be formed in an arc shape.

[0327] The connection hose 1832 and the first link 1833 may be coupled to the casing 1831 and constitute a single assembly, and the assembly may be integrally coupled to or separated from the housing 110. With reference to FIG. 12, the casing 1831, the connection hose 1832, the first link 1833, and the second link 1834 may constitute a single assembly. The assembly may be assembled before being coupled to the housing 110. The assembly may be considered as a single component, and the assembly may be coupled to or separated from the housing 110.

[0328] With reference to FIG. 4, the assembly may be coupled to the housing 110 as flanges are inserted into flange grooves while sliding. After the assembly is coupled to the housing 110, the assembly may be more securely fixed by a screw or the like.

[0329] The flow path switching module 183 is separably coupled to the housing 110. The flow path switching module 183 is separated when the flow path switching module 183 is connected to any one of the first cleaner flow path 181 and the second cleaner flow path 182. With reference to FIG. 6, the flow path switching module 183 is separated when the connection hose 1832 is connected to the first cleaner flow path 181. In contrast, with reference to FIG. 9, when the connection hose 1832 is connected to the second cleaner flow path 182, the partition wall 1833d is caught by the gear portion 1836c of the driving cam, and the flow path switching module 183

cannot be separated.

[0330] The control unit 400 may include a printed circuit board and elements mounted on the printed circuit board.

[0331] The control unit 400 controls the coupling part 120, the fixing unit 130, the door unit 140, the cover opening unit 150, a lever pulling unit 160, the dust collecting part 170, the flow path part 180, and the dust suction module 190.

[0332] With reference to FIG. 23, when the first charging part 1281 supplies power to the battery 240 of the first cleaner 200, the control unit 400 may determine that the first cleaner 200 is electrically coupled to the coupling part 120.

[0333] With reference to FIG. 23, when the second charging part 1282 supplies power to the battery (not illustrated) of the second cleaner 300, the control unit 400 may determine that the second cleaner 300 is electrically coupled to the housing 110.

[0334] Alternatively, when the coupling sensor 125 detects the coupling of the first cleaner 200, the coupling sensor 125 may transmit a signal indicating that the first cleaner 200 is coupled to the coupling part 120. In this case, the control unit 400 may receive the signal from the coupling sensor 125 and determine that the first cleaner 200 is physically coupled to the coupling part 120.

[0335] Therefore, when the control unit 400 determines that the first cleaner 200 is physically and electrically coupled to the coupling part 120, the control unit 400 may determine that the first cleaner 200 is coupled to the cleaner station 100.

[0336] Likewise, when the coupling sensor (not illustrated) disposed in the second cleaner 300 detects the coupling of the second cleaner 300, the control unit may determine that the second cleaner 300 is physically coupled to the housing 110.

[0337] When the control unit 400 determines that the first cleaner 200 is coupled to the coupling part 120, the control unit 400 may operate the fixing drive part 133 to fix the first cleaner 200.

[0338] Meanwhile, when the operation of emptying the dust bin 220 is ended, the control unit 400 may rotate the fixing drive part 133 in the reverse direction to release the first cleaner 200.

[0339] When the control unit 400 determines that the first cleaner 200 is fixed to the coupling part 120, the control unit 400 may operate the door motor 142 to open the door 141 of the cleaner station 100.

[0340] Meanwhile, when the operation of emptying the dust bin 220 is ended, the control unit 400 may rotate the door motor 142 in the reverse direction to close the door 141.

[0341] When the control unit 400 determines that the door 141 is opened, the control unit 400 may operate the cover opening motor 152 to open the discharge cover 222 of the first cleaner 200. As a result, the dust passage hole 121a may communicate with the inside of the dust bin 220. Therefore, the cleaner station 100 and the first cleaner 200 may be coupled to each other to enable a

flow of a fluid (coupling of the flow path).

[0342] When a guide frame 151e reaches the predetermined opening position, the cover opening detecting part 155f may transmit a signal indicating that the discharge cover 222 is opened. The control unit 400 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 400 determines that the discharge cover 222 is opened, the control unit 300 may stop the operation of the cover opening motor 152.

[0343] The control unit 400 may control the flow path switching module 183 of the flow path part 180. For example, the control unit 400 may selectively open or close the first cleaner flow path 181 and the second cleaner flow path 182.

[0344] The control unit 400 may operate the dust collecting motor 191 to suck the dust in the dust bin 220.

[0345] The control unit 400 may operate a display part 500 to display a dust bin emptied situation and a charged situation of the first cleaner 200 or the second cleaner 300.

[0346] Meanwhile, a method of controlling the cleaner station according to a first embodiment of the present disclosure will be described below with reference to FIG. 25.

[0347] A method of controlling a cleaner station includes a coupling checking step S10, a flow path connecting step S20, a dust bin fixing step S30, a door opening step S40, a cover opening step S50, a dust collecting step S70, a dust collection ending step S90, a door closing step S100, and a release step S120.

[0348] In the coupling checking step S10, whether at least any one of the first cleaner 200 and the second cleaner 300 is coupled to the housing 110 may be checked.

[0349] When an electric current flows to the charging part 128, the control unit 400 operates the flow path switching module 183.

[0350] In the coupling checking step S10 of the present disclosure, the control unit 400 may determine whether the first cleaner 200 or the second cleaner 300 is electrically coupled to the cleaner station 100 on the basis of whether the charging part 128 supplies power to the first cleaner 200 or the second cleaner 300.

[0351] For example, in case that the electric current flows to the first cleaner 200 through the first charging part 1281 and the first cleaner 200 is charged, the control unit 400 may determine that the first cleaner 200 is coupled to the housing 110. Likewise, in case that the electric current flows to the second cleaner 300 through the second charging part 1282 and the second cleaner 300 is charged, the control unit 400 may determine that the second cleaner 300 is coupled to the housing 110.

[0352] Alternatively, when the first cleaner 200 is coupled to the cleaner station 100, the coupling sensor 125 disposed in the coupling part 120 may come into contact with the first cleaner 200, and the coupling sensor

125 may transmit a signal indicating that the first cleaner 200 is coupled to the coupling part 120. Alternatively, the coupling sensor 125 of a non-contact sensor type may detect the presence of the dust bin 220, and the coupling sensor 125 may transmit a signal indicating that the first cleaner 200 is coupled to the coupling part 120. In case that the control unit 400 receives the signal from the coupling sensor 125, the control unit 400 operates the flow path switching module 183.

[0353] Therefore, in the coupling checking step S10, the control unit 400 may determine whether the first cleaner 200 is coupled on the basis of the flow of the electric current and the signal generated and received from the coupling sensor 125.

[0354] When the control unit 400 receives the signal from the coupling sensor 125, the control unit 400 may connect the dust collecting part 170 to the first cleaner flow path 181 regardless of the flow of the electric current to the first cleaner 200 or the second cleaner 300. Therefore, the priority may be imparted to the first cleaner 200.

[0355] In the flow path connecting step S20, in case that at least any one of the first cleaner 200 and the second cleaner 300 is coupled to the housing 110, the dust collecting part 170 is selectively connected to the first cleaner flow path 181 or the second cleaner flow path 182.

[0356] The control unit 400 operates the flow path switching module 183 at least one or more times before the dust collecting motor 191 operates.

[0357] For example, in case that the first cleaner 200 is coupled to the housing 110, the control unit 400 connects the dust collecting part 170 and the first cleaner flow path 181 by operating the flow path switching module 183. Alternatively, in case that the second cleaner 300 is coupled to housing, the control unit 400 connects the dust collecting part 170 and the second cleaner flow path 182 by operating the flow path switching module 183.

[0358] In case that the control unit 400 receives the signal from the position sensor 1837, the control unit 400 may stop the operation of the flow path switching module 183.

[0359] For example, in case that a signal is transmitted from the first position sensor 1837a to the control unit 400, the control unit 400 may determine that the connection hose 1832 is properly coupled to the first cleaner flow path connection portion 1831b, and the control unit 400 may stop the operation of the switching motor 1835. Likewise, in case that a signal is transmitted from the second position sensor 1837b to the control unit 400, the control unit 400 may determine that the connection hose 1832 is properly coupled to the second cleaner flow path connection portion 1831c, and the control unit 400 may stop the operation of the switching motor 1835.

[0360] With the first position sensor 1837a and the second position sensor 1837b, the control unit 400 may easily determine that the dust collecting part 170 is accurately coupled to the first cleaner flow path 181 or the second cleaner flow path 182.

[0361] A process in which the connection hose 1832 moves from the first cleaner flow path connection portion 1831b to the second cleaner flow path connection portion 1831c will be described. In case that the control unit 400 determines that the second cleaner 300 is coupled, the control unit 400 operates the switching motor 1835. When the switching motor 1835 operates, the first position sensor 1837a does not generate a signal any further. In case that the inlet 1832a of the connection hose is coupled to the second cleaner flow path connection portion 1831c, the second position sensor 1837b generates a signal. In case that the control unit 400 receives the signal from the second position sensor 1837b, the control unit 400 stops the operation of the switching motor 1835.

[0362] A process in which the connection hose 1832 moves from the second cleaner flow path connection portion 1831c to the first cleaner flow path connection portion 1831b will be described. In case that the control unit 400 determines that the first cleaner 200 is coupled, the control unit 400 operates the switching motor 1835. When the switching motor 1835 operates, the second position sensor 1837b does not generate a signal any further. In case that the inlet 1832a of the connection hose is coupled to the first cleaner flow path connection portion 1831b, the first position sensor 1837a generates a signal. In case that the control unit 400 receives the signal from the first position sensor 1837a, the control unit 400 stops the operation of the switching motor 1835.

[0363] The control unit 400 may sequentially receive the signals from the first position sensor 1837a and the second position sensor 1837b and easily determine whether the connection hose 1832 is properly coupled to the first cleaner flow path connection portion 1831b or the second cleaner flow path connection portion 1831c.

[0364] The control unit 400 couples the connection hose 1832 to the cleaner flow path connection portion 1831b or 1831c to which the cleaner 200 or 300 is coupled between the first and second cleaner flow path connection portions 1831b and 1831c.

[0365] For example, in case that the first cleaner 200 is coupled to the housing 110, the control unit 400 couples the inlet 1832a of the connection hose to the first cleaner flow path connection portion 1831b by operating the flow path switching module 183. Alternatively, in case that the second cleaner 300 is coupled to the housing 110, the control unit 400 couples the inlet 1832b of the connection hose to the second cleaner flow path connection portion 1831c by operating the flow path switching module 183.

[0366] According to the present disclosure, the user does not manually switch the cleaner flow paths 181 and 182, and the control unit 400 opens or closes the cleaner flow path 181 or 182 to which the cleaner 200 or 300 is connected before the dust collecting motor 191 operates. Therefore, it is possible to minimize a degree to which dust scatters while the flow path is switched, and the dust collected in the first cleaner 200 or the second cleaner 300 may be easily removed.

[0367] In case that the first cleaner 200 and the second

cleaner 300 are simultaneously connected to the cleaner station 100, the control unit 400 may connect the dust collecting part 170 sequentially to the first cleaner flow path 181 and the second cleaner flow path 182.

[0368] In case that the first cleaner 200 and the second cleaner 300 are coupled to the housing 110 before the dust collecting motor 191 operates, the control unit 400 couples the connection hose 1832 to the first cleaner flow path connection portion 1831b.

[0369] In case that both the first cleaner 200 and the second cleaner 300 are coupled to the housing 110, the flow path switching module 183 may connect the first cleaner flow path 181 and the dust collecting part 170 by coupling the connection hose 1832 to the first cleaner flow path connection portion 1831b. Thereafter, the control unit 400 may remove, first, the dust collected in the dust bin of the first cleaner 200 by operating the dust collecting motor 191. Thereafter, the control unit 400 may separate the connection hose 1832 from the first cleaner flow path connection portion 1831b and connect the second cleaner flow path 182 and the dust collecting part 170 by coupling the second cleaner flow path connection portion 1831c. Thereafter, the control unit 400 may remove the dust collected in the dust bin of the second cleaner 300 by operating the dust collecting motor 191.

[0370] Therefore, the priority is imparted to the first cleaner 200, which is manually manipulated by the user, other than the second cleaner 300 that operates automatically, such that the convenience related to the use of the first cleaner 200 may be improved.

[0371] With reference to FIG. 27, according to the embodiment, the control unit 400 may determine, first, whether the first cleaner 200 having the priority is coupled (S11). In this case, in case that the first cleaner 200 is coupled, the control unit 400 connects the dust collecting part 170 to the first cleaner flow path 181 (S21). In case that the first cleaner 200 is not coupled, the control unit 400 may determine whether the second cleaner 300 is coupled (S12). In this case, in case that the second cleaner 300 is coupled, the dust collecting part 170 is connected to the second cleaner flow path 182. In case that the second cleaner 300 is not coupled, the step ends. According to the present embodiment, the priority may be more assuredly imparted to the first cleaner 200, such that the dust bin of the first cleaner 200 may be more preferentially and quickly emptied.

[0372] With reference to FIG. 28, according to another embodiment, the control unit 400 may determine, first, whether the second cleaner 200, which does not have the priority, is coupled (S11'). In this case, as a default value, the dust collecting part 170 may be already connected to the first cleaner flow path 181. In case that the second cleaner 300 is not coupled, the flow path connecting step S20 is ended, and the next step is performed. In contrast, in case that the second cleaner 300 is coupled, whether the first cleaner 200 is coupled is determined (S12'). In case that the first cleaner 200 is coupled, the control unit 400 connects the dust collecting part 170 to the first

cleaner flow path 181 (S21). In case that the first cleaner 200 is not coupled, the control unit 400 connects the dust collecting part 170 to the second cleaner flow path 182. According to the present embodiment, except for the case in which the second cleaner 300 is coupled, the dust collecting part 170 is always connected to the first cleaner flow path 181. Therefore, it is possible to prevent the dust remaining in the first cleaner flow path 181 from falling and scattering.

[0373] In case that the second cleaner 300 is coupled to the housing 110 before the dust collecting motor 191 operates and the first cleaner 200 is coupled to the housing 110 after the dust collecting motor 191 operates, the control unit 400 couples the connection hose 1832 to the second cleaner flow path connection portion 1831c.

[0374] In case that only the second cleaner 300 is coupled to the housing 110, the flow path switching module 183 connects the second cleaner flow path 182 and the dust collecting part 170 by coupling the connection hose 1832 to the second cleaner flow path connection portion 1831c. Thereafter, the control unit 400 may remove, first, the dust collected in the dust bin of the second cleaner 300 by operating the dust collecting motor 191. In case that the first cleaner 200 is coupled to the housing while the dust in the second cleaner 300 is removed, the priority is not imparted to the first cleaner 200, the flow path switching module 183 is not operated, and the connection hose 1832 is kept coupled to the second cleaner flow path connection portion 1831c. After the dust bin of the second cleaner 300 is emptied, the control unit 400 separates the connection hose 1832 from the second cleaner flow path connection portion 1831c and connects the first cleaner flow path 181 and the dust collecting part 170 by coupling the first cleaner flow path connection portion 1831b. Thereafter, the control unit 400 removes the dust collected in the dust bin of the first cleaner 200 by operating the dust collecting motor 191.

[0375] Therefore, because the currently performed process of removing the dust in the second cleaner 300 is not stopped, it is possible to minimize a dust bin emptying time and prevent the dust from scattering during the process of switching the flow path.

[0376] In case that the second cleaner 300 is coupled to the housing before the dust collecting motor 191 operates and the first cleaner 200 is coupled to the housing after the dust collecting motor 191 operates, the control unit 400 couples the connection hose 1832 to the first cleaner flow path connection portion 1831b.

[0377] In case that only the first cleaner 200 is coupled to the housing 110, the flow path switching module 183 connects the first cleaner flow path 181 and the dust collecting part 170 by coupling the connection hose 1832 to the first cleaner flow path connection portion 1831b. Thereafter, the control unit 400 may remove, first, the dust collected in the dust bin of the first cleaner 200 by operating the dust collecting motor 191. In case that the second cleaner 300 is coupled to the housing while the

dust in the first cleaner 200 is removed, the connection hose 1832 is kept coupled to the first cleaner flow path connection portion 1831b because the priority is imparted to the first cleaner 200. After the dust bin of the first cleaner 200 is emptied, the control unit 400 separates the connection hose 1832 from the first cleaner flow path connection portion 1831b and connects the second cleaner flow path 182 and the dust collecting part 170 by coupling the second cleaner flow path connection portion 1831c. Thereafter, the control unit 400 removes the dust collected in the dust bin of the second cleaner 300 by operating the dust collecting motor 191.

[0378] The control unit 400 may operate the flow path switching module 183 before the fixing unit 130 operates. Specifically, the switching motor 1835 may operate before the fixing drive part 133 operates, and the first cleaner flow path 181 may be connected to the dust collecting part 170 before the first cleaner 200 is fixed to the housing 110.

[0379] The control unit 400 may operate the flow path switching module 183 before the door unit 140 operates. Specifically, the switching motor 1835 may operate before the door motor 142 operates, and the first cleaner flow path 181 may be connected to the dust collecting part 170 before the first cleaner flow path 181 for the first cleaner 200 is fully opened.

[0380] The control unit 400 may operate the flow path switching module 183 before the cover opening unit 150 operates. Specifically, the switching motor 1835 may operate before the cover opening motor 152 operates, and the first cleaner flow path 181 may be connected to the dust collecting part 170 before the discharge cover 222 of the first cleaner 200 is opened.

[0381] Before the fixing unit 130, the door unit 140, or the cover opening unit 150 operates, the flow path switching module 183 operates, and the dust collecting part 170 is connected to the first cleaner flow path 181. Therefore, it is possible to prevent dust from scattering during the process of coupling the first cleaner 200 to the housing 110 or opening the discharge cover 222.

[0382] In the dust bin fixing step S30, when the first cleaner 200 is coupled to the cleaner station 100, the fixing member 131 may hold and fix the dust bin 220.

[0383] Specifically, when the control unit 400 determines that the first cleaner 200 is coupled, the control unit 400 may operate the fixing drive part 133 in the forward direction so that the fixing member 131 fixes the dust bin 220.

[0384] When the control unit 400 determines that the first cleaner 200 is fixed, the control unit 400 may stop the operation of the fixing drive part 133.

[0385] In the door opening step S40, when the dust bin 220 is fixed, the door 141 may be opened.

[0386] When the control unit 400 determines that the door 141 is opened, the control unit 400 may stop the operation of the door motor 142.

[0387] In the cover opening step S50, when the door 141 is opened, the discharge cover 222 may be opened.

[0388] For example, after the door 141 is opened, the control unit 400 may open the discharge cover 222 by operating the cover opening motor 152 in the forward direction. That is, the discharge cover 222 may be separated from the dust bin main body 221.

[0389] As another example, the control unit 400 may operate the cover opening motor 152 first with a predetermined time interval before operating the door motor 142 in consideration of the time it takes to move the push protrusion 151 and press the coupling lever 222c. Even in this case, the discharge cover 222 is opened after the door 141 begins to be opened. With this configuration, it is possible to minimize the time it takes to open both the door 141 and the discharge cover 222.

[0390] When the control unit 400 determines that the discharge cover 222 is opened, the control unit 400 may stop the operation of the cover opening motor 152.

[0391] Specifically, in the dust collecting step S70, when the discharge cover 222 is opened, the dust collecting motor 191 may operate to collect the dust from the dust bin 220.

[0392] As another example, the control unit 400 may operate the dust collecting motor 191 when a preset time has elapsed after receiving the signal, which indicates that the first cleaner 200 is coupled to the cleaner station 100, from the coupling sensor 125.

[0393] In the dust collecting step S70, the dust collected in the first cleaner 200 or the second cleaner 300 may pass through the first cleaner flow path 181 or the second cleaner flow path 182 and be collected in the dust collecting part 170. Therefore, the user may remove the dust in the dust bin 220 without a separate manipulation, and as a result, it is possible to provide convenience for the user.

[0394] In the dust collection ending step S90, the operation of the dust collecting motor 191 may be ended when the dust collecting motor 191 operates for a predetermined time.

[0395] Specifically, the control unit 400 may be embedded with a timer (not illustrated), and the operation of the dust collecting motor 191 may be ended when the control unit 400 determines that a predetermined time has elapsed.

[0396] In this case, the operating time of the dust collecting motor 191 may be preset, or the user may input the operating time through an input part (not illustrated). Alternatively, the control unit 400 may automatically set the operating time by detecting the amount of dust in the dust bin 220 using a sensor or the like.

[0397] In the door closing step S100, the door 141 may be closed after the dust collection ending step S90.

[0398] Specifically, after the control unit 400 stops the operation of the dust collecting motor 191, the control unit 400 may operate the door motor 142 in the reverse direction to close at least a part of the dust passage hole 121a.

[0399] In this case, the discharge cover 222 supported by the door 141 may be rotated by the door 141 and

fastened to the dust bin main body 221, such that the lower side of the dust bin main body 221 may be closed.

[0400] In the release step S120, when the door 141 is closed, the fixing drive part 133 may be operated, such that the fixing member 131 may release the dust bin 220.

[0401] Specifically, the control unit 400 may operate the fixing drive part 133 in the reverse direction to release the dust bin 220.

[0402] A method of controlling a cleaner station according to a second embodiment of the present disclosure will be described with reference to FIG. 26.

[0403] The method of controlling the cleaner station according to the second embodiment additionally includes a step of compressing the dust bin of the cleaner S60, S80, and S110 in addition to the method of controlling the cleaner station according to the first embodiment. The step of compressing the dust bin is not an essential step but a selective step.

[0404] The control unit 400 may perform a dust bin compressing step S60 before the dust collecting step S70 is performed after the cover opening step S50.

[0405] In the dust bin compressing step S60, when the discharge cover 222 is opened, the inside of the dust bin 220 may be compressed.

[0406] In the dust bin compressing step S60, the dust in the dust bin 220 is compressed in advance before the dust collecting motor 191 operates, and as a result, there is an effect of preventing residual dust remaining in the dust bin 220 and improving efficiency in collecting the dust in the dust collecting motor 191.

[0407] The control unit 400 may perform an additional dust bin compressing step S80 before the dust collection ending step S90 is performed after the dust collecting step S70.

[0408] In the additional dust bin compressing step S80, the inside of the dust bin 220 may be compressed during the operation of the dust collecting motor 191.

[0409] In the additional dust bin compressing step S80, since the dust in the dust bin 220 is compressed during the operation of the dust collecting motor 191, there is an effect of removing the dust remaining even during the operation of the dust collecting motor 191.

[0410] The control unit 400 may perform the compression ending step S110 before the release step S120 is performed after the door closing step S100.

[0411] In the compression ending step S110, the lever pulling arm may be returned back to the original position after the door closing step S100.

[0412] 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.

[0413] 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.

[Description of Reference Numerals]

[0414]

10: Cleaner system
 100: Cleaner station
 110: Housing
 120: Coupling part
 130: Fixing unit
 140: Door unit
 150: Cover opening unit
 160: Lever pulling unit
 170: Dust collecting part
 180: Flow path part
 181: First cleaner flow path
 182: Second cleaner flow path
 183: Flow path switching module
 1831: Casing
 1832: Connection hose
 1833: First link
 1834: Second link
 1835: Switching motor
 1836: Driving cam
 1837: Position sensor
 1838: Elastic member
 1839: Stop sensor
 184: Dust collecting flow path
 185: Flow path switching module cover
 190: Dust suction module
 191: Dust collecting motor
 200: First cleaner
 300: Second cleaner
 400: Control unit

Claims

1. A cleaner station comprising:

a housing configured to define an external shape and having a space therein, at least any one of a first cleaner and a second cleaner being coupled to the housing;
 a first cleaner flow path disposed in the housing and connected to a dust bin of the first cleaner;
 a second cleaner flow path disposed in the housing and connected to a dust bin of the second cleaner;
 a dust collecting part disposed in the housing and configured to capture dust in the dust bin of the first cleaner or the second cleaner;
 a dust collecting motor disposed in the housing and configured to generate a suction force for sucking dust in the dust bin;
 a flow path switching module configured to se-

lectively connect the dust collecting part to the first cleaner flow path or the second cleaner flow path; and
 a control unit disposed in the housing and configured to control at least any one of the dust collecting motor and the flow path switching module, wherein the control unit operates the flow path switching module at least one or more times before the dust collecting motor operates.

2. The cleaner station of claim 1, comprising:

a charging part electrically connected to at least any one of the first cleaner and the second cleaner, wherein the control unit operates the flow path switching module when an electric current flows to the charging part.

3. The cleaner station of claim 2, wherein the flow path switching module comprises:

a casing disposed in the housing and having a first cleaner flow path connection portion connected to the first cleaner flow path, and a second cleaner flow path connection portion connected to the second cleaner flow path;
 a connection hose disposed in the casing and having an inlet selectively coupled to any one of the first cleaner flow path connection portion and the second cleaner flow path connection portion; and
 a position sensor disposed in the casing and configured to detect a position of the connection hose and transmit a signal to the control unit, and wherein the control unit stops an operation of the flow path switching module when the control unit receives the signal from the position sensor.

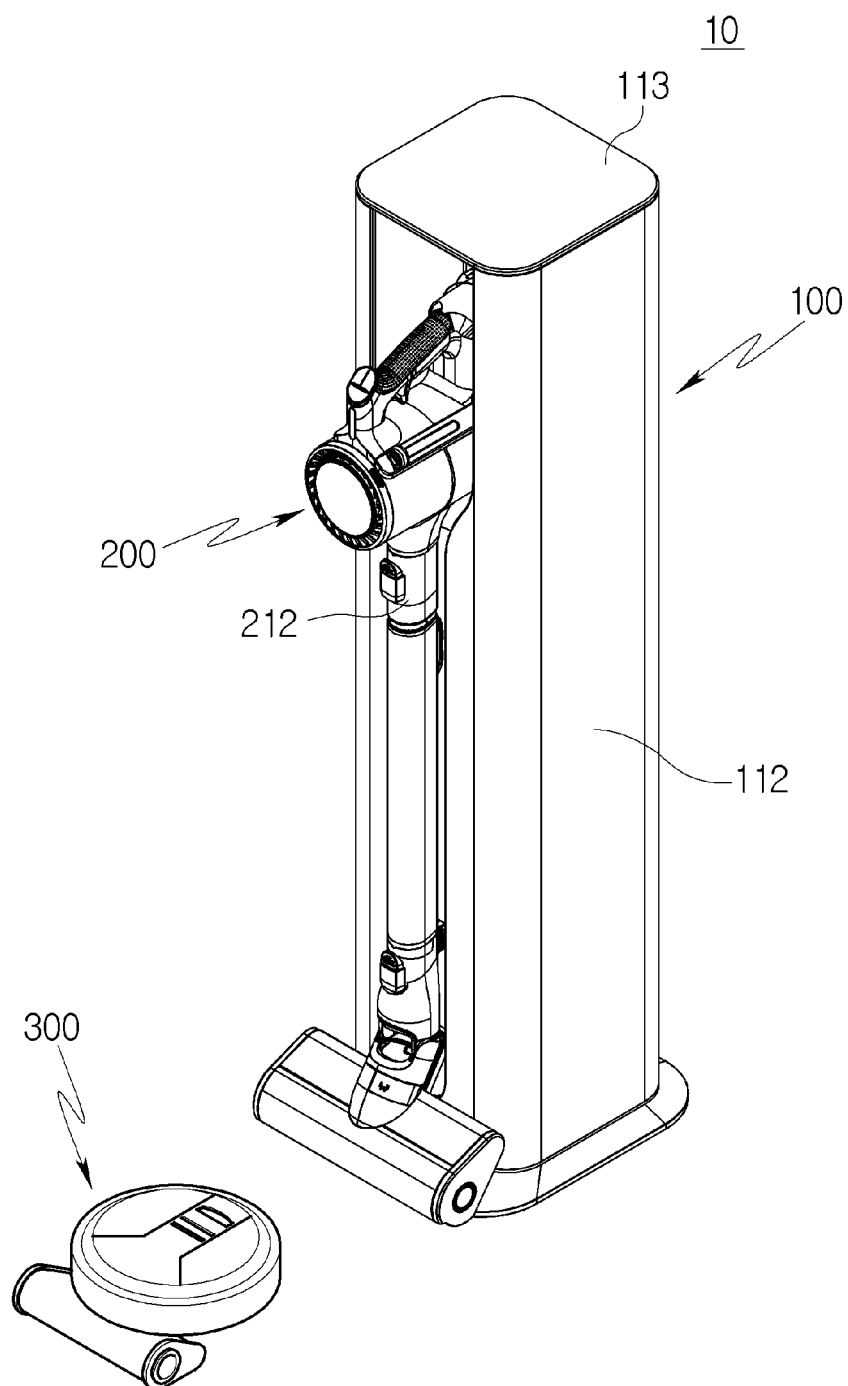
4. The cleaner station of claim 3, wherein the position sensor comprises:

a first position sensor disposed at one side of the first cleaner flow path connection portion and configured to transmit a signal to the control unit when the inlet of the connection hose is coupled to the first cleaner flow path connection portion; and
 a second position sensor disposed at one side of the second cleaner flow path connection portion and configured to transmit a signal to the control unit when the inlet of the connection hose is coupled to the second cleaner flow path connection portion.

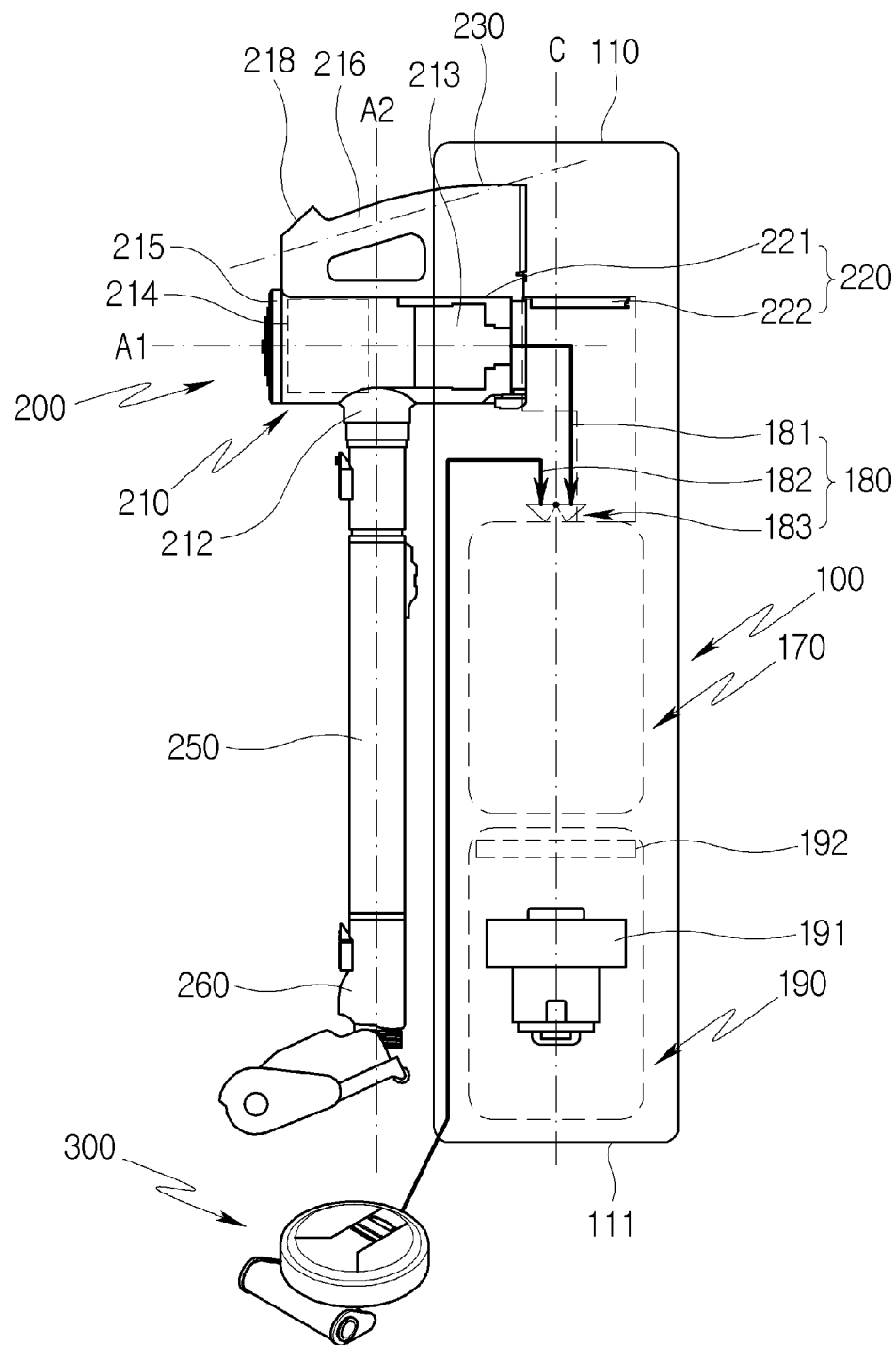
5. The cleaner station of claim 1, wherein the flow path switching module comprises:

- a casing disposed in the housing and having a first cleaner flow path connection portion connected to the first cleaner flow path, and a second cleaner flow path connection portion connected to the second cleaner flow path; and a connection hose disposed in the casing and having an inlet selectively coupled to any one of the first cleaner flow path connection portion and the second cleaner flow path connection portion, and wherein the control unit couples the connection hose to a cleaner flow path connection portion to which the corresponding cleaner is coupled between the first and second cleaner flow path connection portions.
6. The cleaner station of claim 5, wherein the control unit couples the connection hose to the first cleaner flow path connection portion when the first cleaner and the second cleaner are coupled to the housing before the dust collecting motor operates.
7. The cleaner station of claim 5, wherein the control unit couples the connection hose to the second cleaner flow path connection portion when the second cleaner is coupled to the housing before the dust collecting motor operates and when the first cleaner is coupled to the housing after the dust collecting motor operates.
8. The cleaner station of claim 1, further comprising:
- a coupling part disposed in the housing so that the first cleaner is coupled to the coupling part; and
- a coupling sensor disposed in the coupling part and configured to transmit a signal to the control unit when the first cleaner approaches the coupling sensor, wherein the control unit operates the flow path switching module when the control unit receives the signal from the coupling sensor.
9. The cleaner station of claim 1, further comprising:
- a fixing unit disposed in the housing and configured to fix the first cleaner to the housing when the first cleaner is coupled to the housing, wherein the control unit operates the flow path switching module before the fixing unit operates.
10. The cleaner station of claim 1, further comprising:
- a cover opening unit disposed in the housing and configured to open a discharge cover of the dust bin of the first cleaner, wherein the control unit operates the flow path switching module before the cover opening unit operates.
11. The cleaner station of claim 1, further comprising:
- a door unit disposed in the housing and configured to open or close the first cleaner flow path, wherein the control unit operates the flow path switching module before the door unit operates.
12. A method of controlling a cleaner station, the method comprising:
- a coupling checking step of checking whether at least any one of a first cleaner and a second cleaner is coupled to a housing;
- a flow path connecting step of selectively connecting a dust collecting part to a first cleaner flow path or a second cleaner flow path by operating a flow path switching module disposed between the dust collecting part configured to capture dust, the first cleaner flow path connected to a dust bin of the first cleaner, and the second cleaner flow path connected to a dust bin of the second cleaner; and
- a dust collecting step of collecting dust in the dust bin into the dust collecting part by operating a dust collecting motor disposed in the housing.
13. The method of claim 12, wherein the coupling checking step comprises determining that at least any one of the first cleaner and the second cleaner is coupled to the housing when an electric current flows to at least any one of the first cleaner and the second cleaner in the housing.
14. The method of claim 12, wherein the flow path connecting step comprises connecting the dust collecting part to the cleaner flow path to which the corresponding cleaner is coupled between the first and second cleaner flow paths.
15. The method of claim 14, wherein the flow path connecting step comprises connecting the dust collecting part to the first cleaner flow path when the first cleaner and the second cleaner are coupled to the housing in the coupling checking step.
16. The method of claim 14, wherein the dust collecting part is connected to the second cleaner flow path when the second cleaner is coupled to the housing in the coupling checking step and the first cleaner is coupled to the housing after the dust collecting step is initiated.

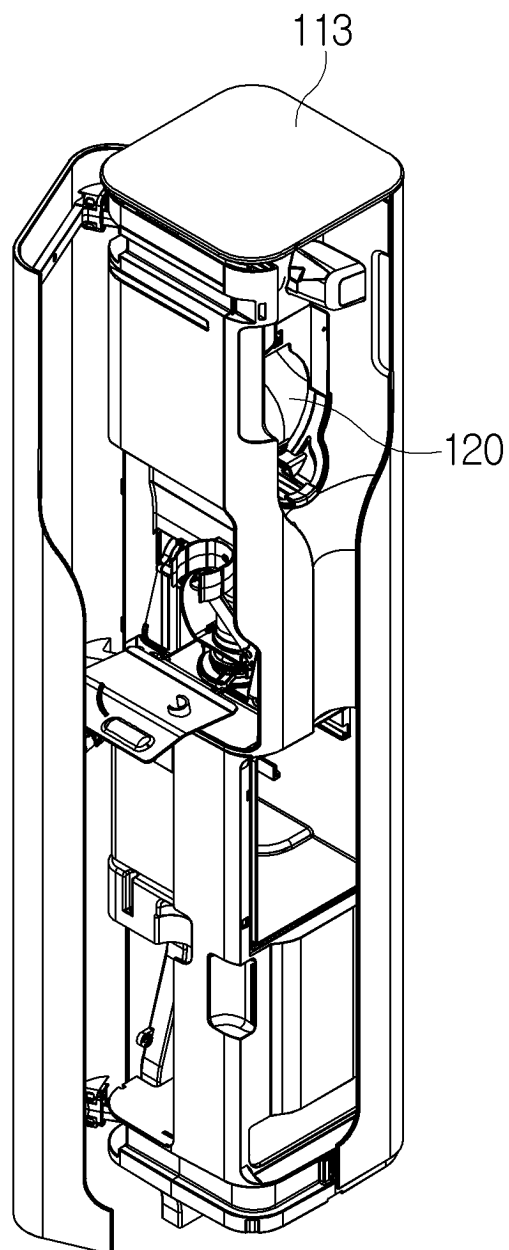
[FIG. 1]



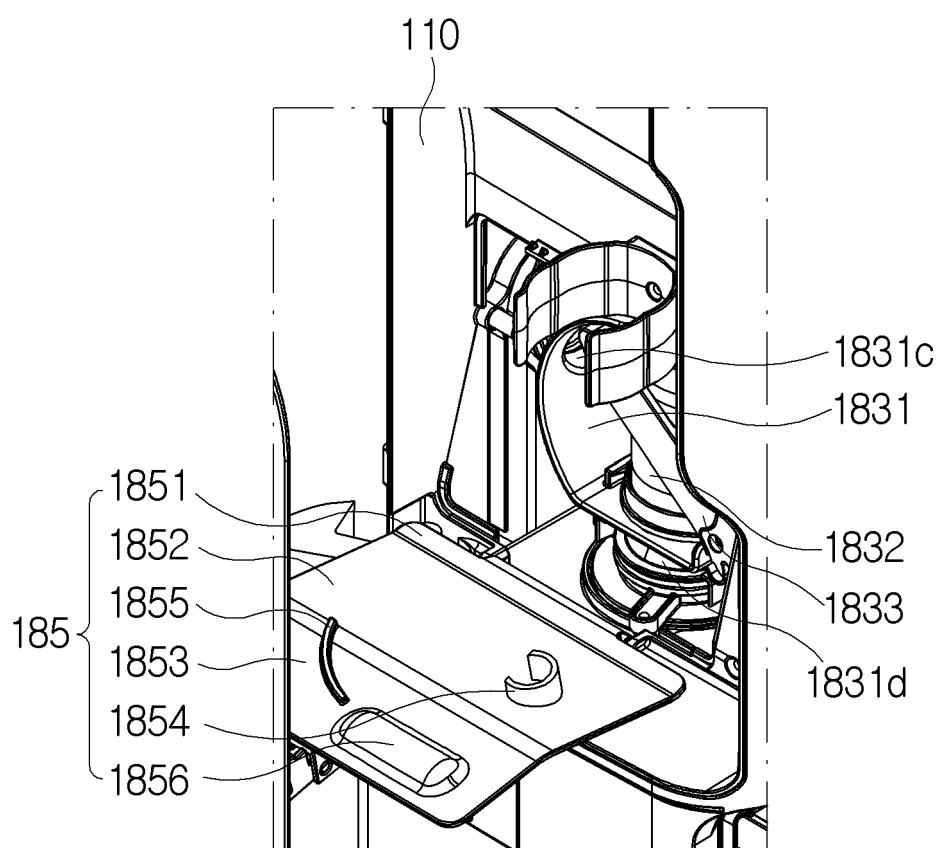
[FIG. 2]



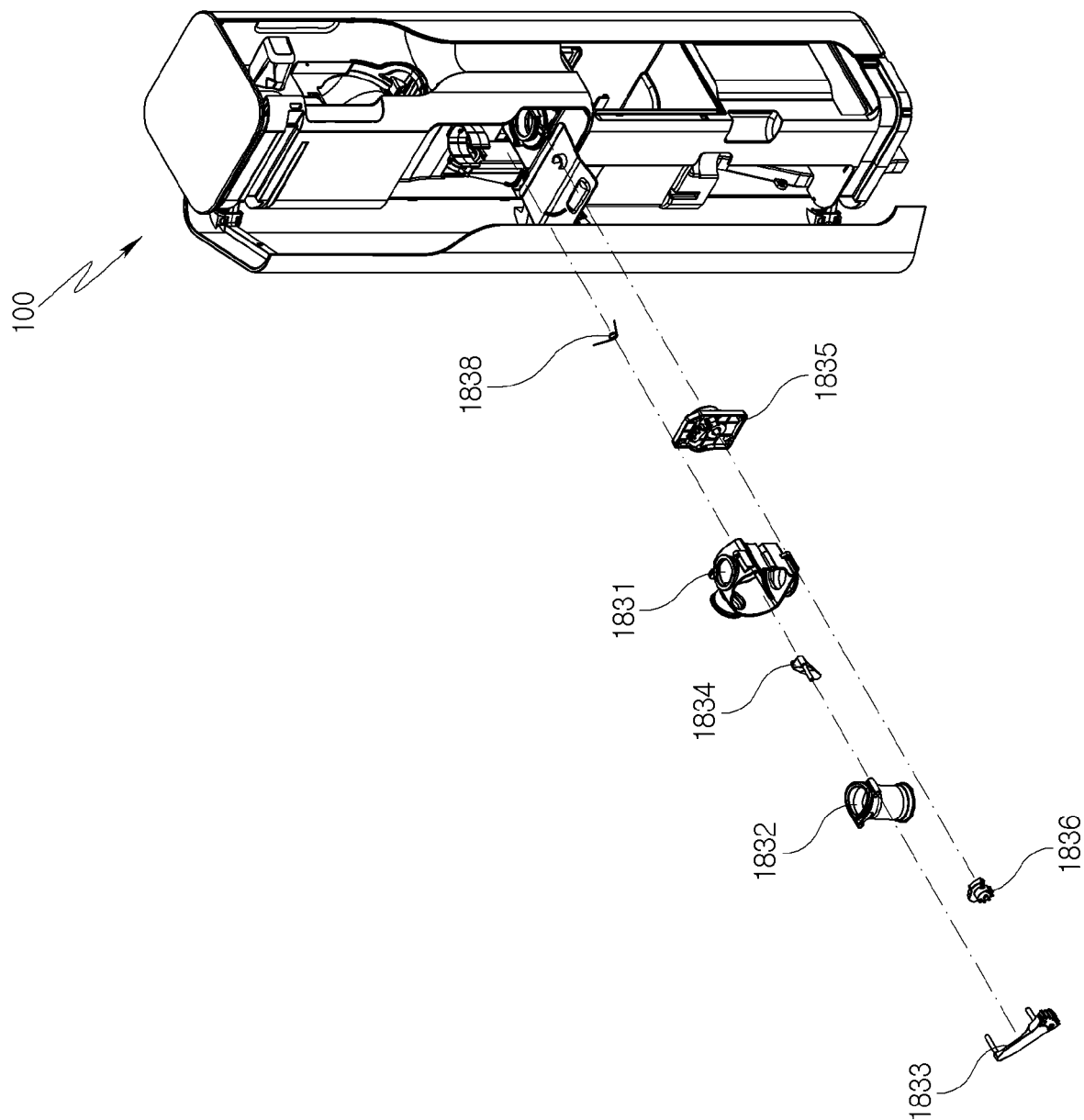
[FIG. 3]



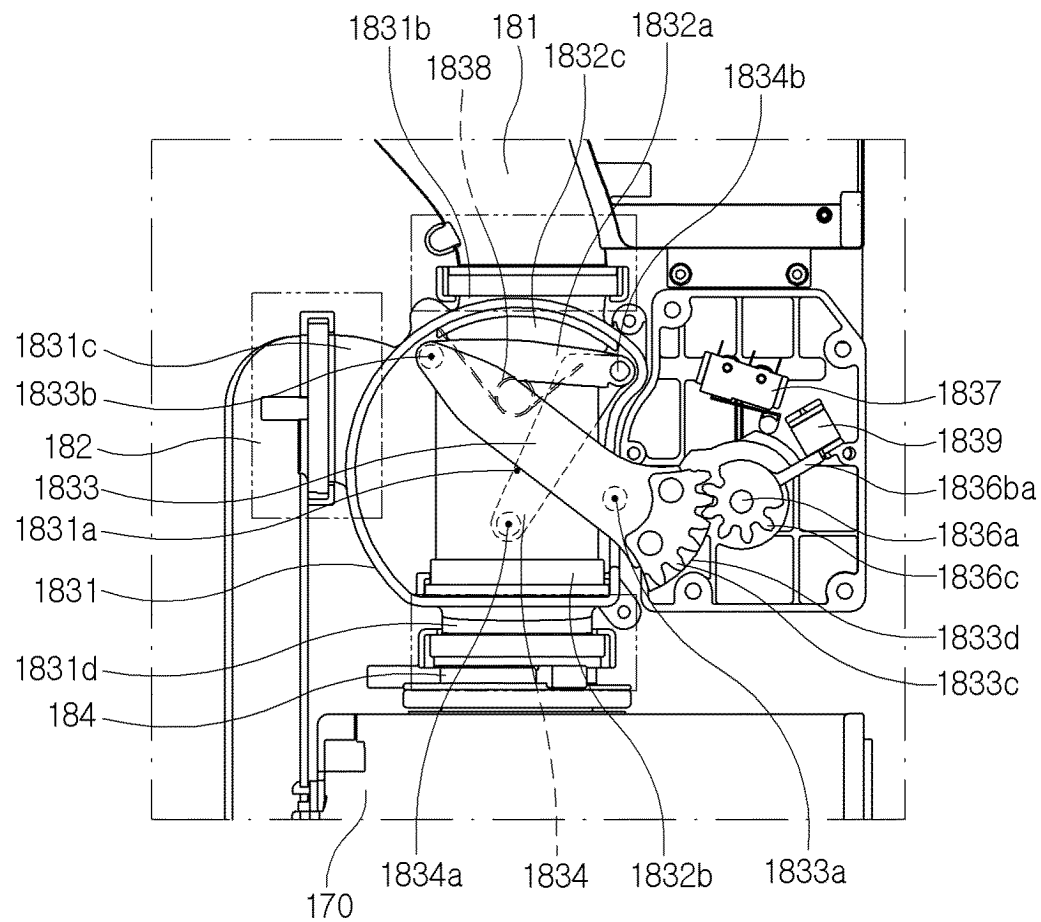
[FIG. 4]



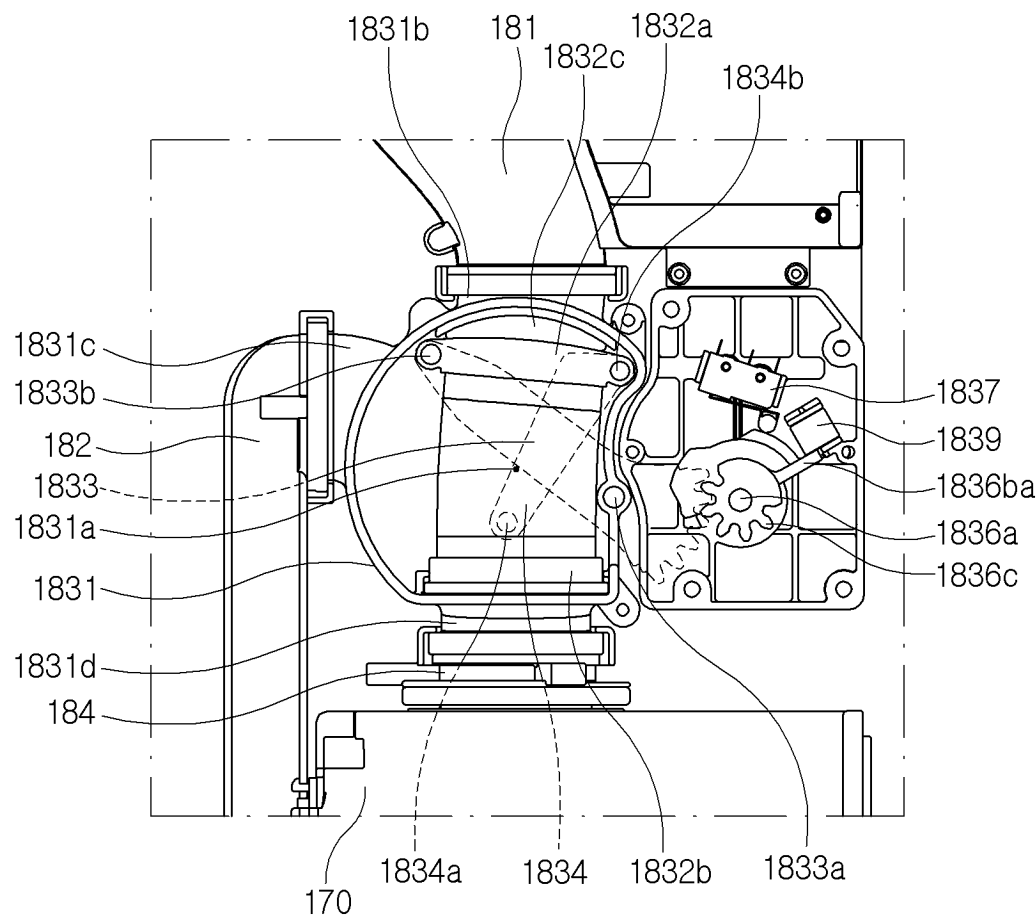
[FIG. 5]



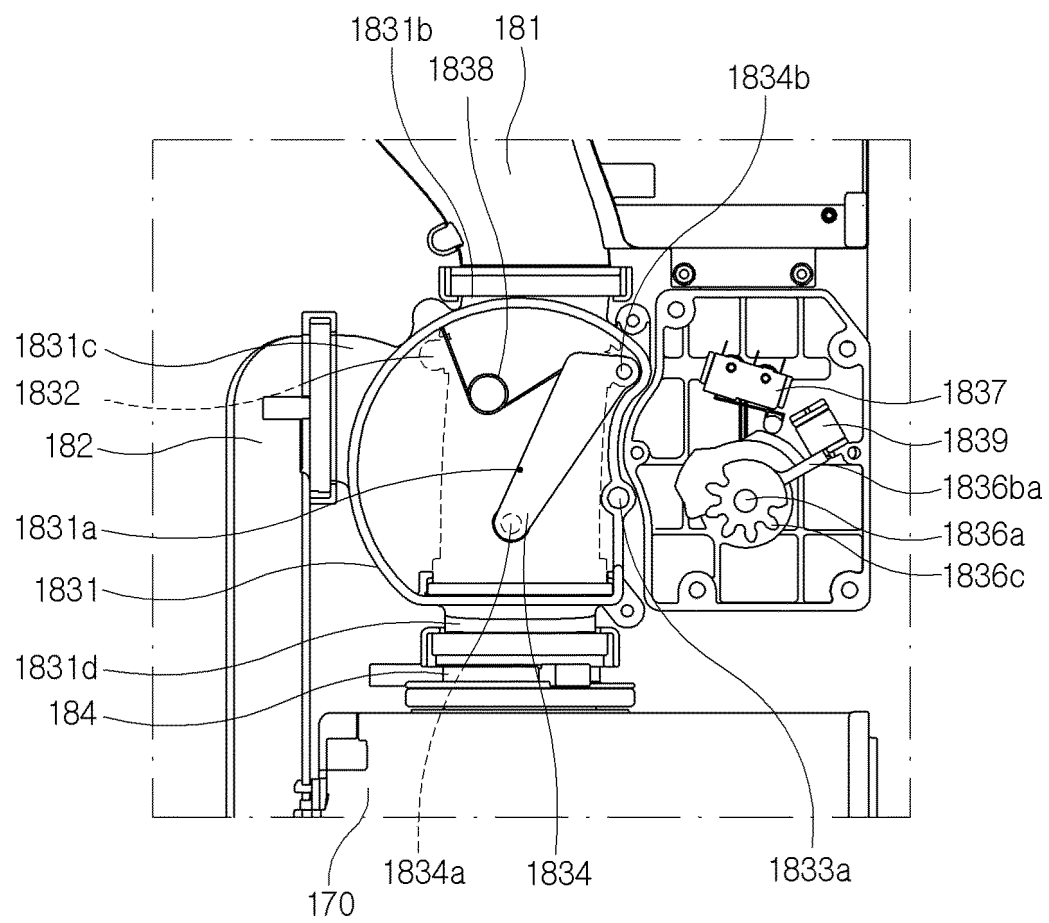
[FIG. 6]



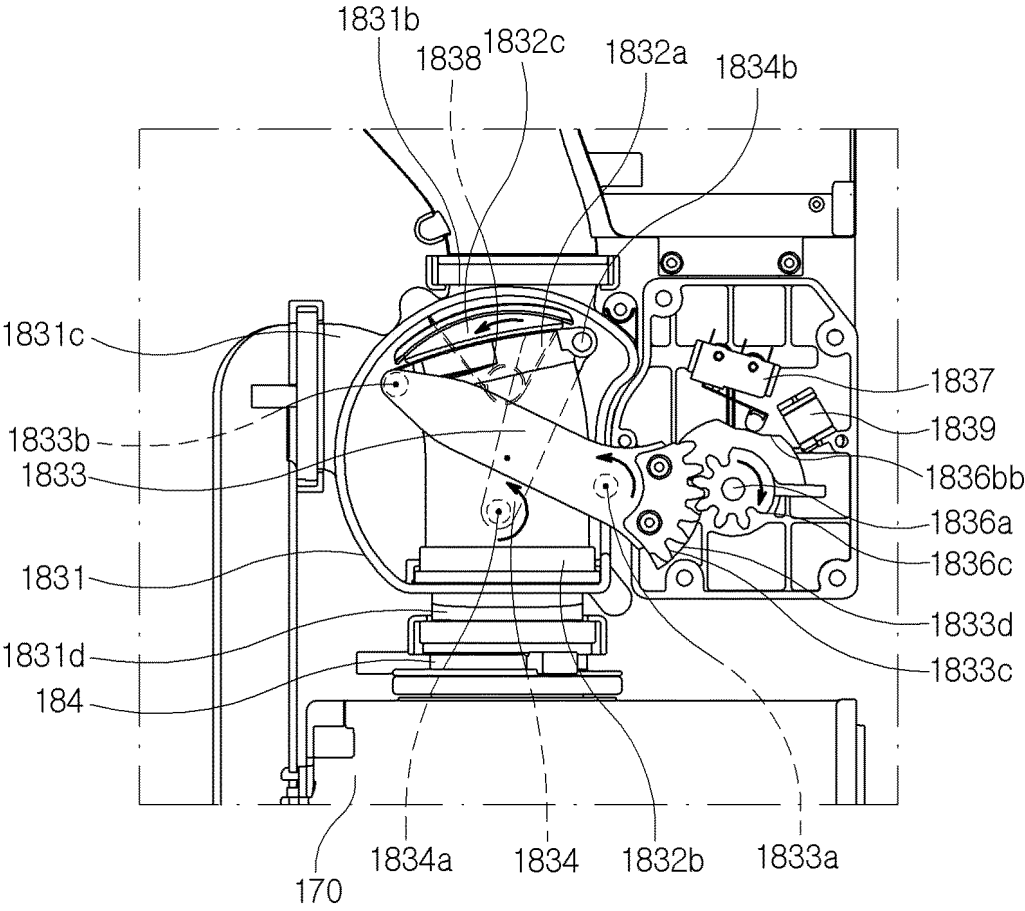
[FIG. 7]



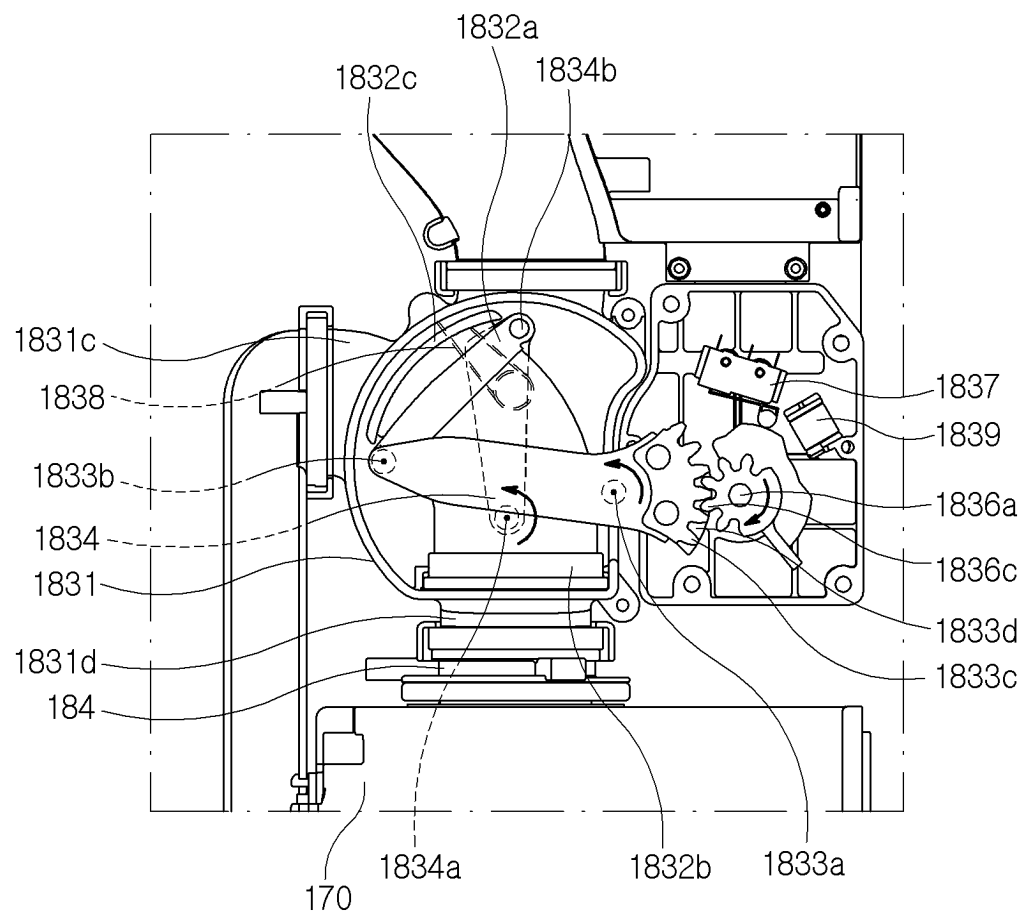
[FIG. 8]



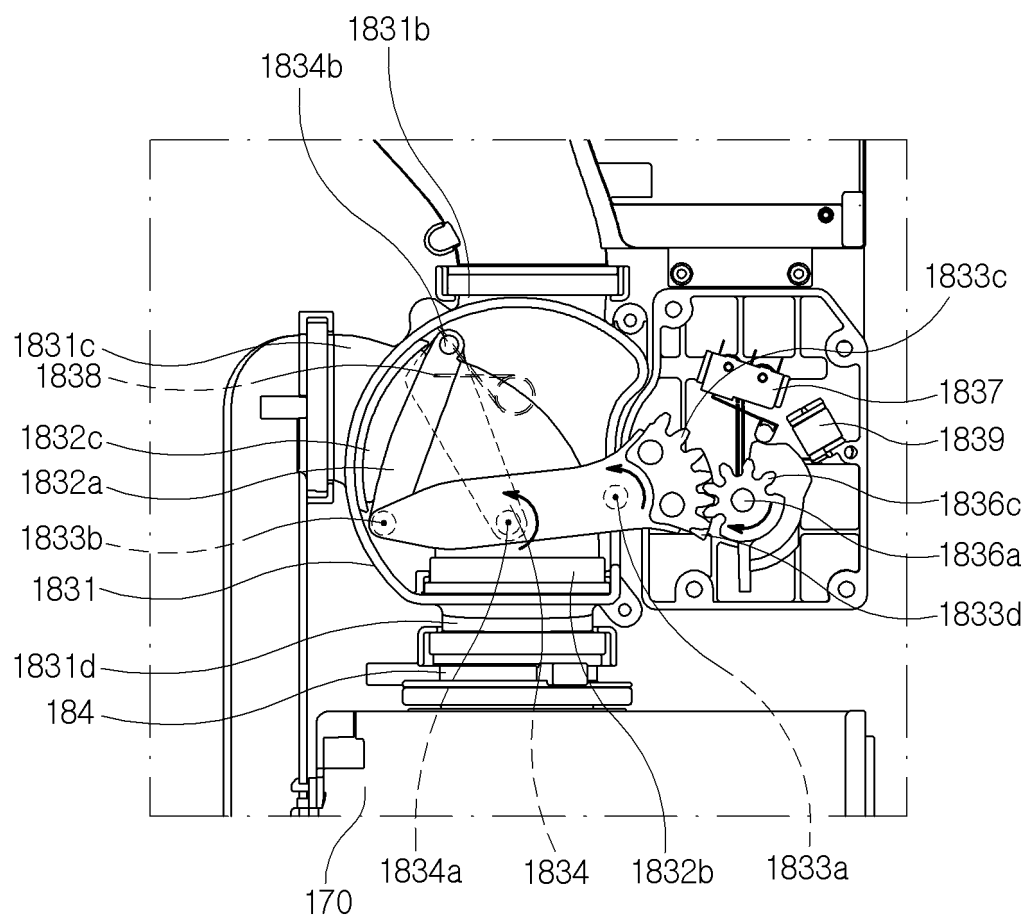
[FIG. 9]



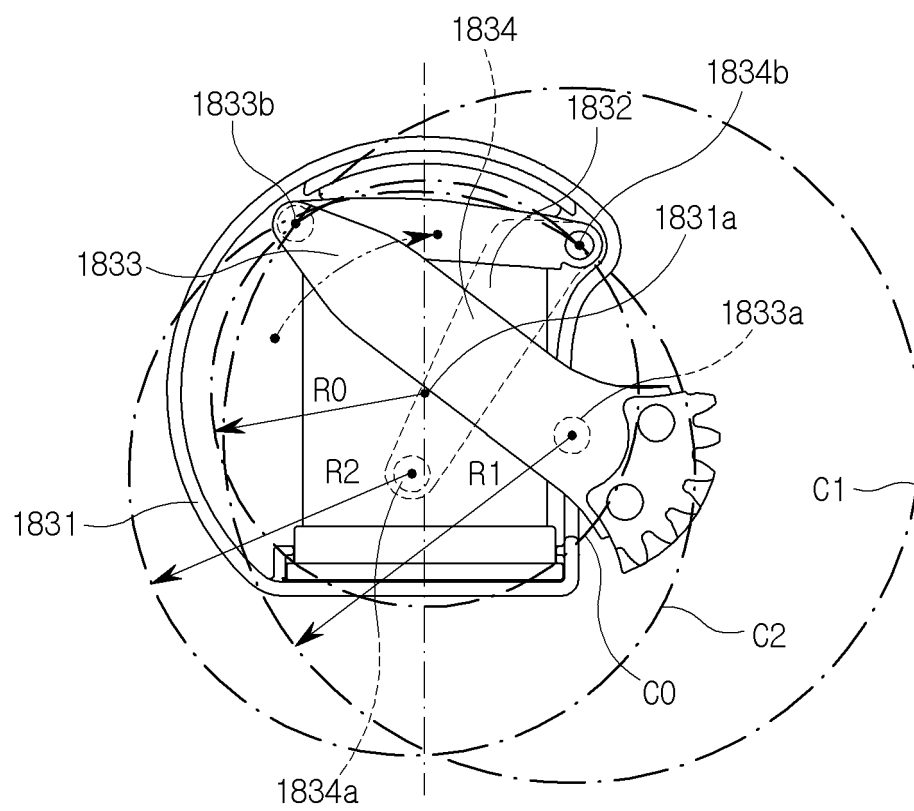
[FIG. 10]



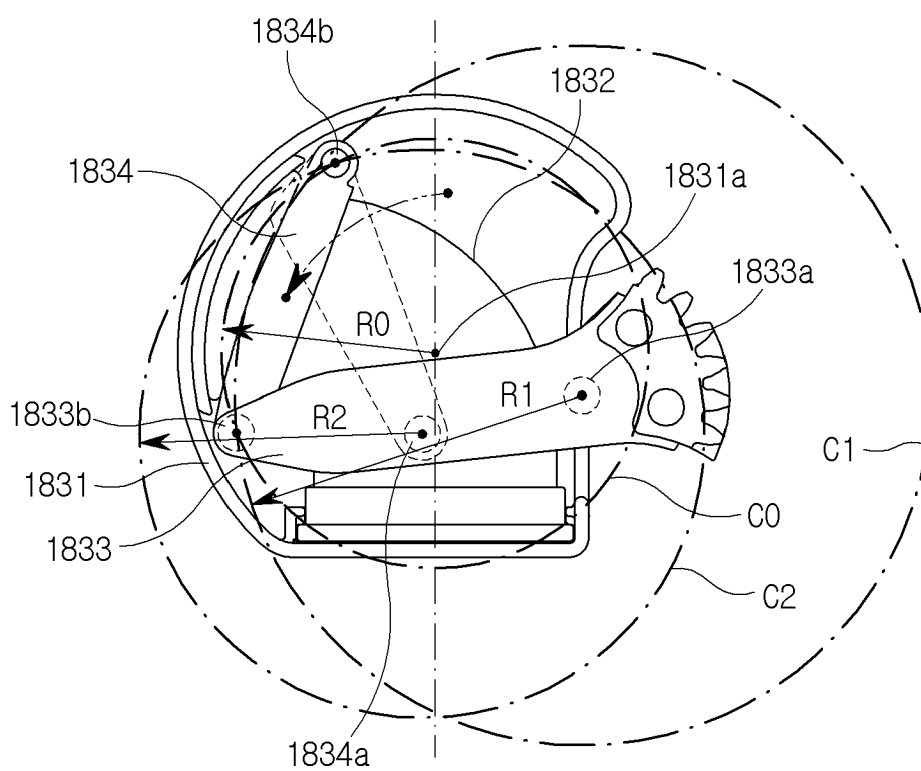
[FIG. 11]



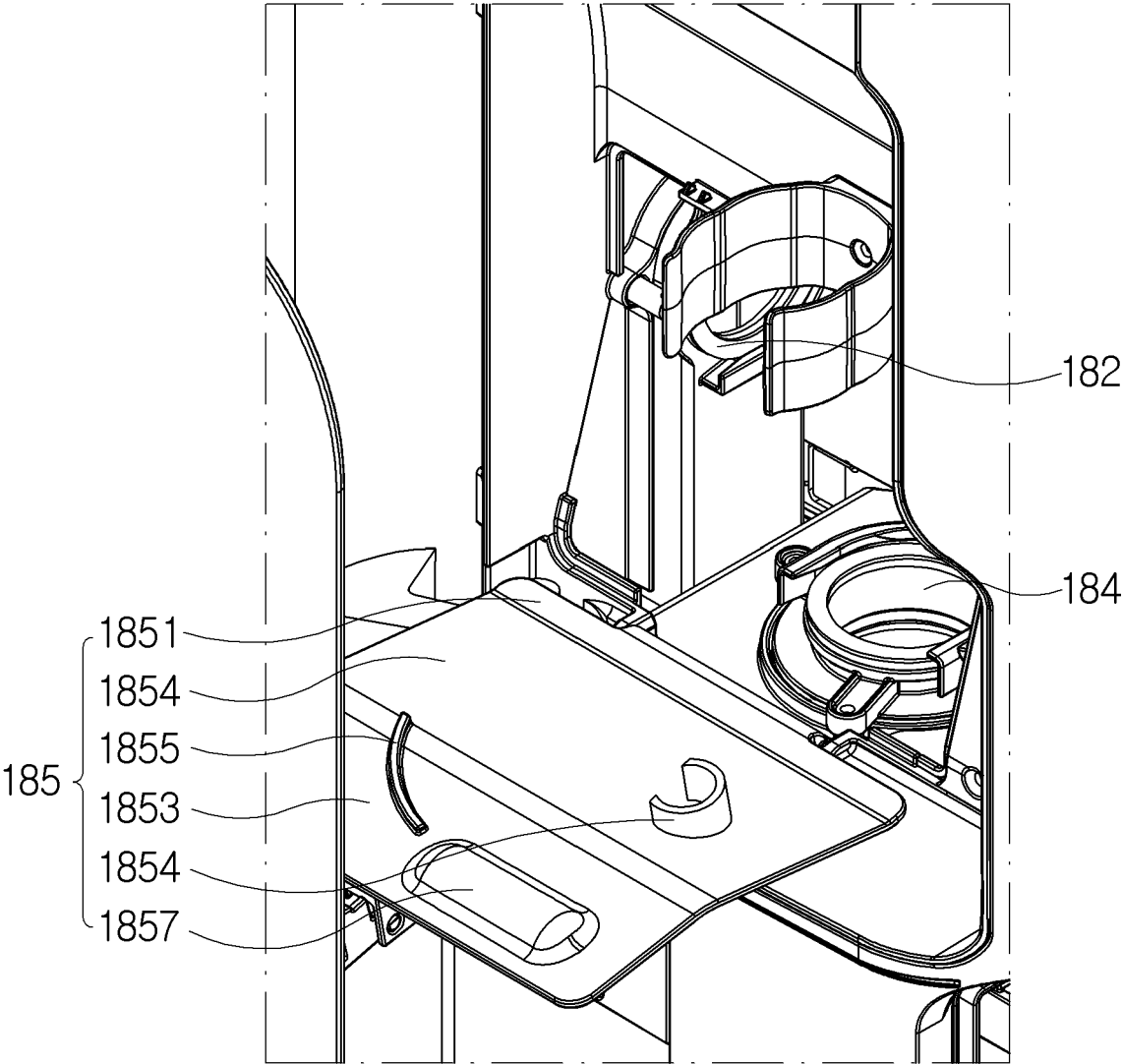
[FIG. 12]



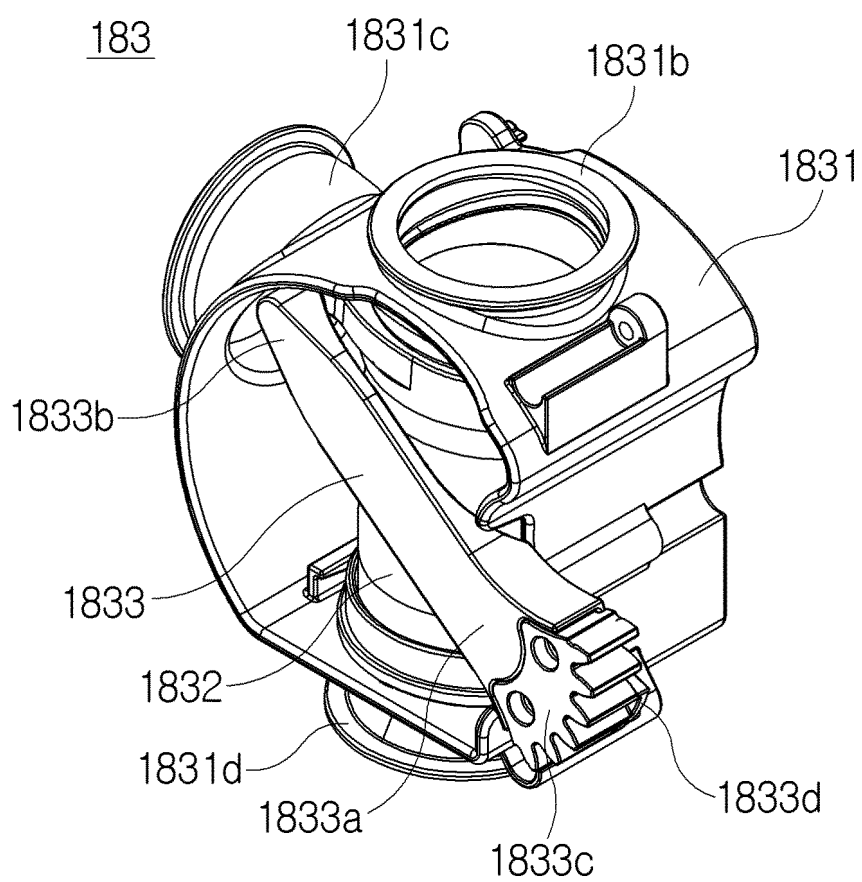
[FIG. 13]



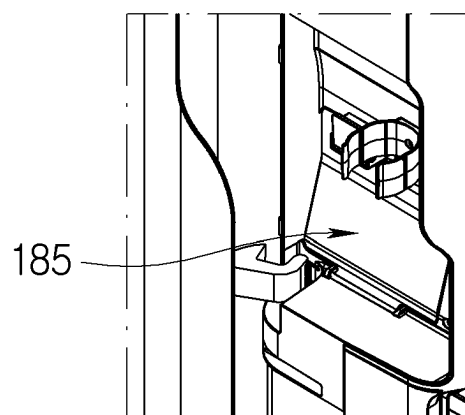
[FIG. 14]



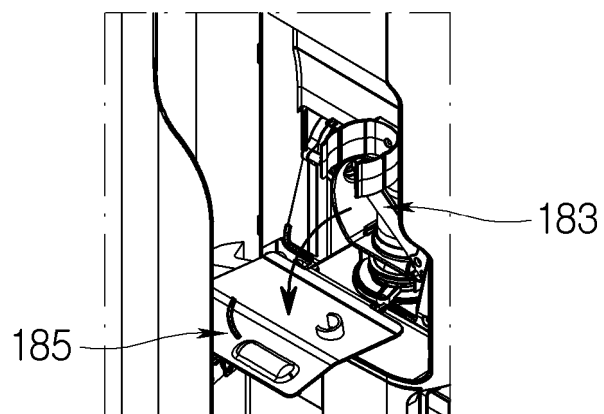
[FIG. 15]



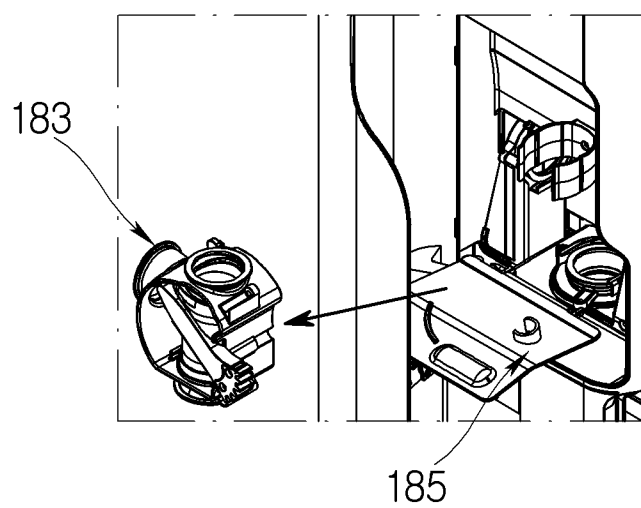
[FIG. 16]



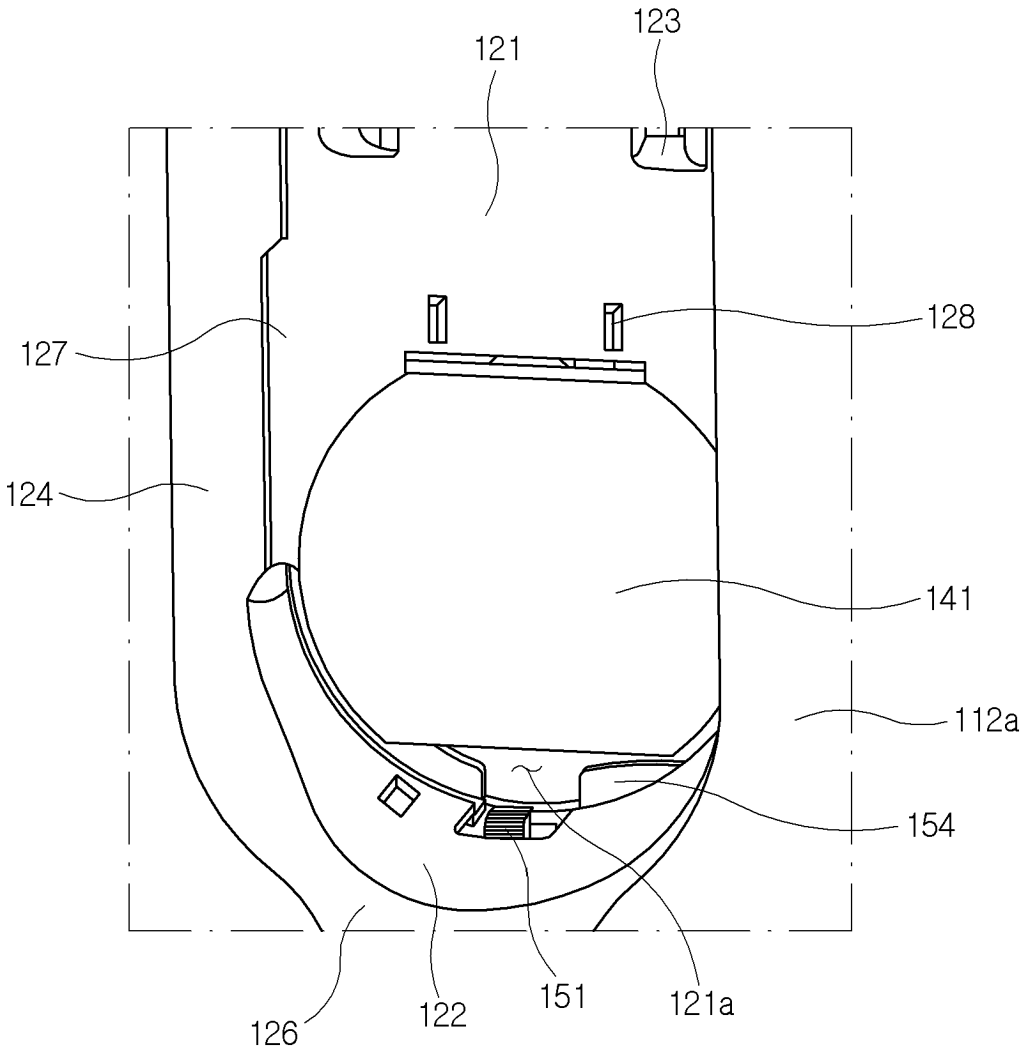
[FIG. 17]



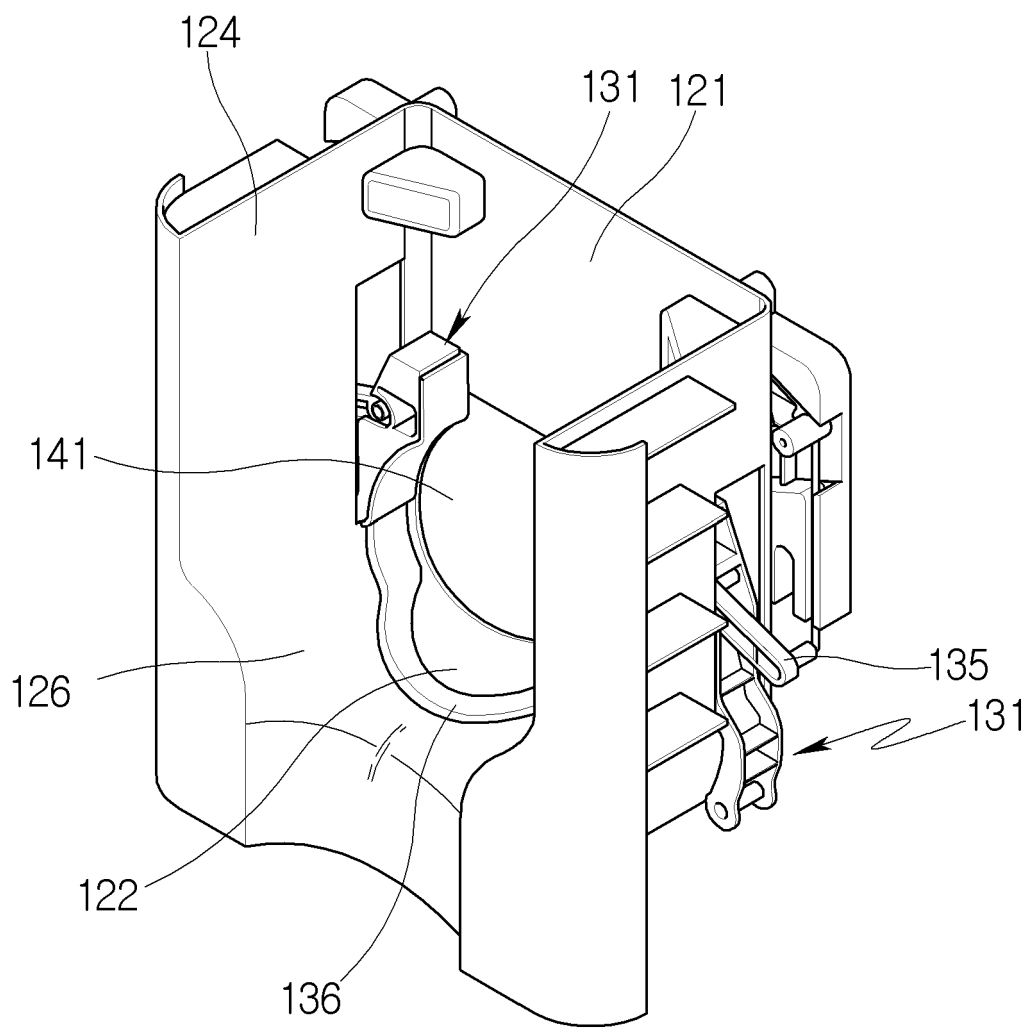
[FIG. 18]



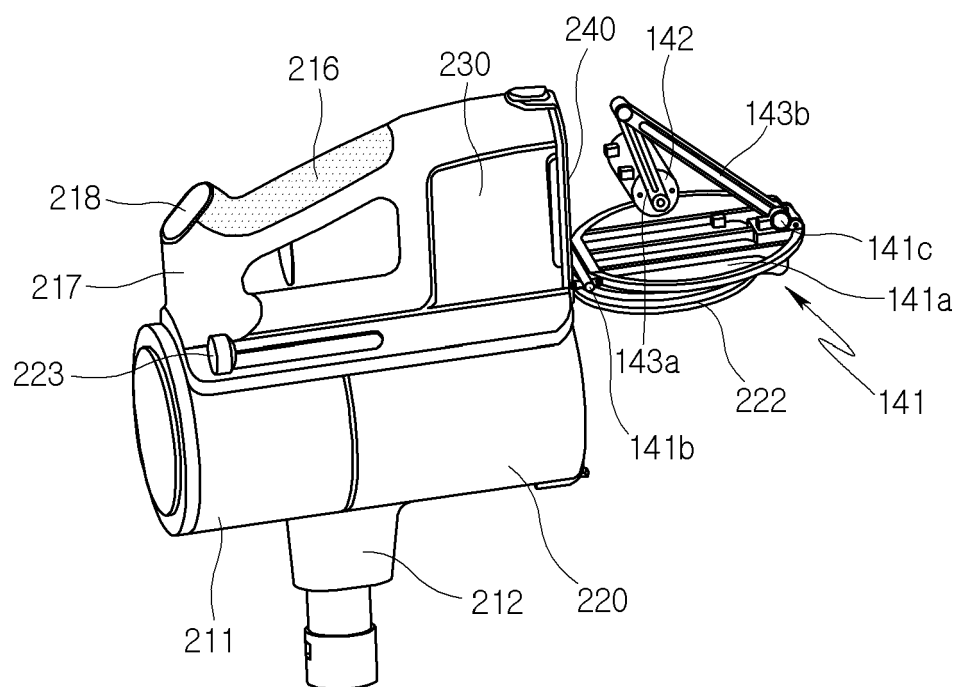
[FIG. 19]



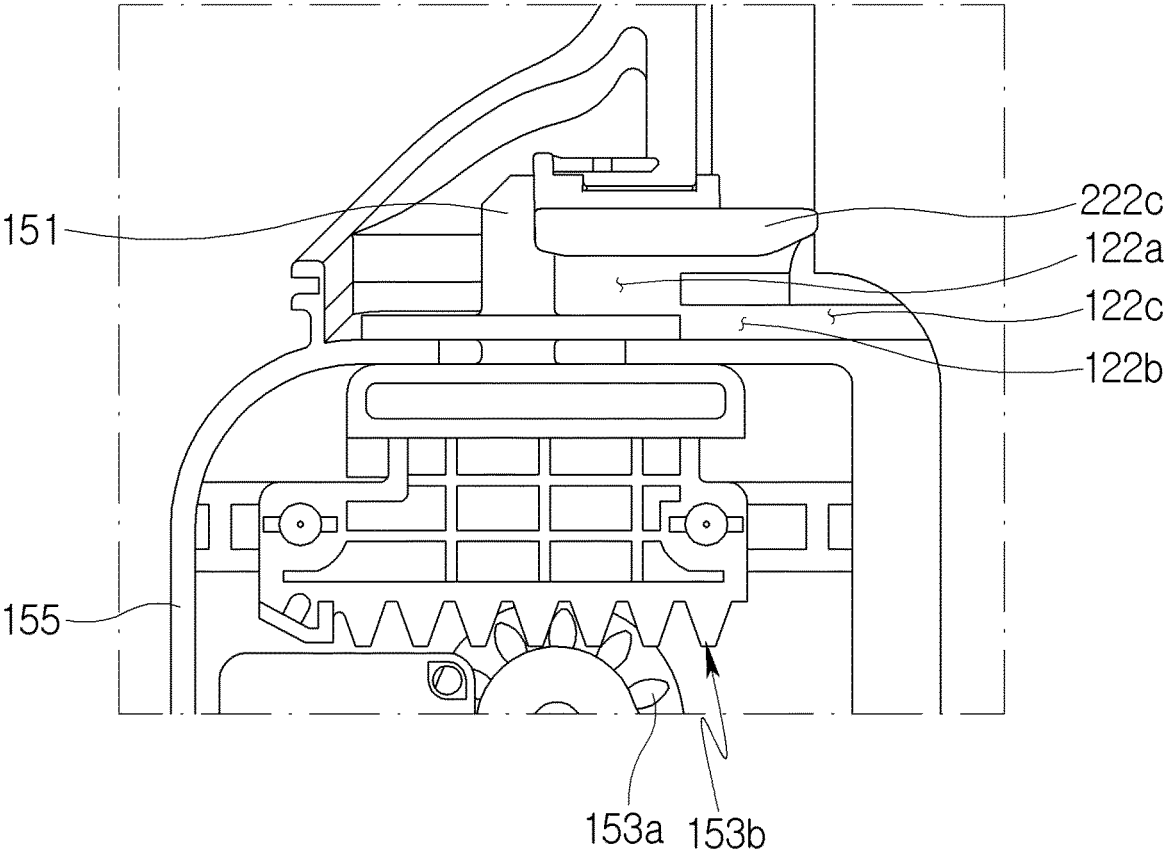
[FIG. 20]



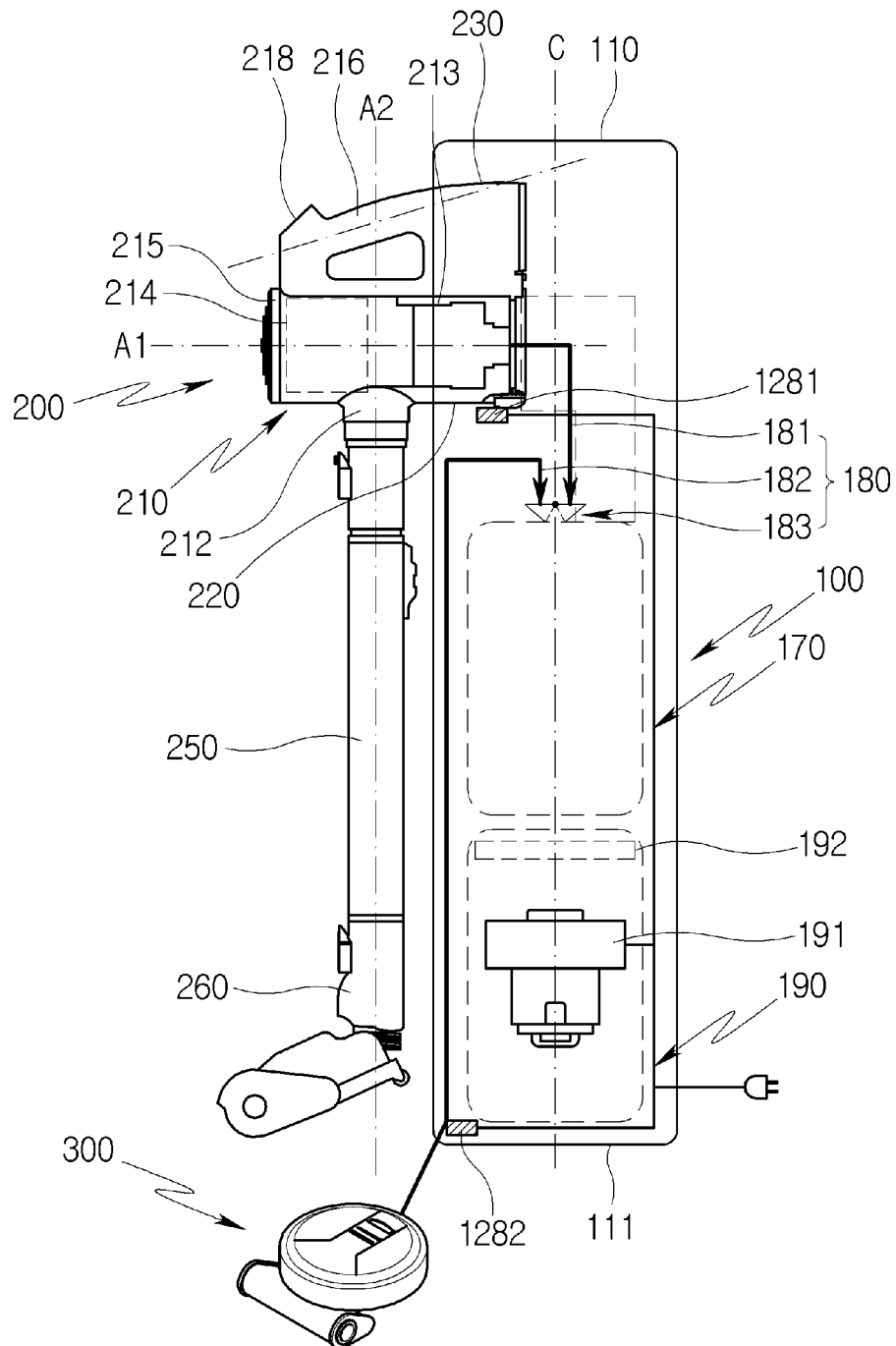
[FIG. 21]



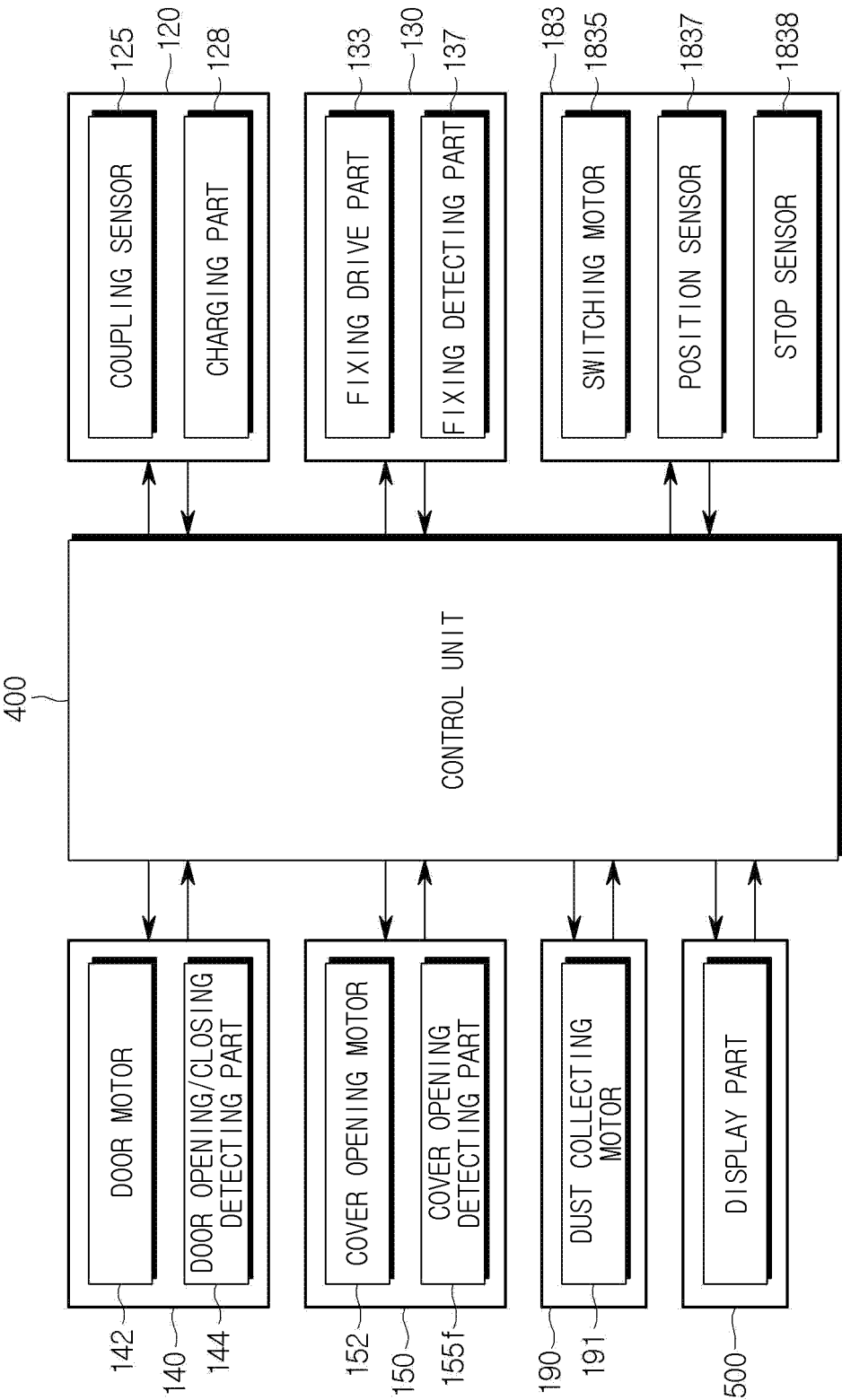
[FIG. 22]



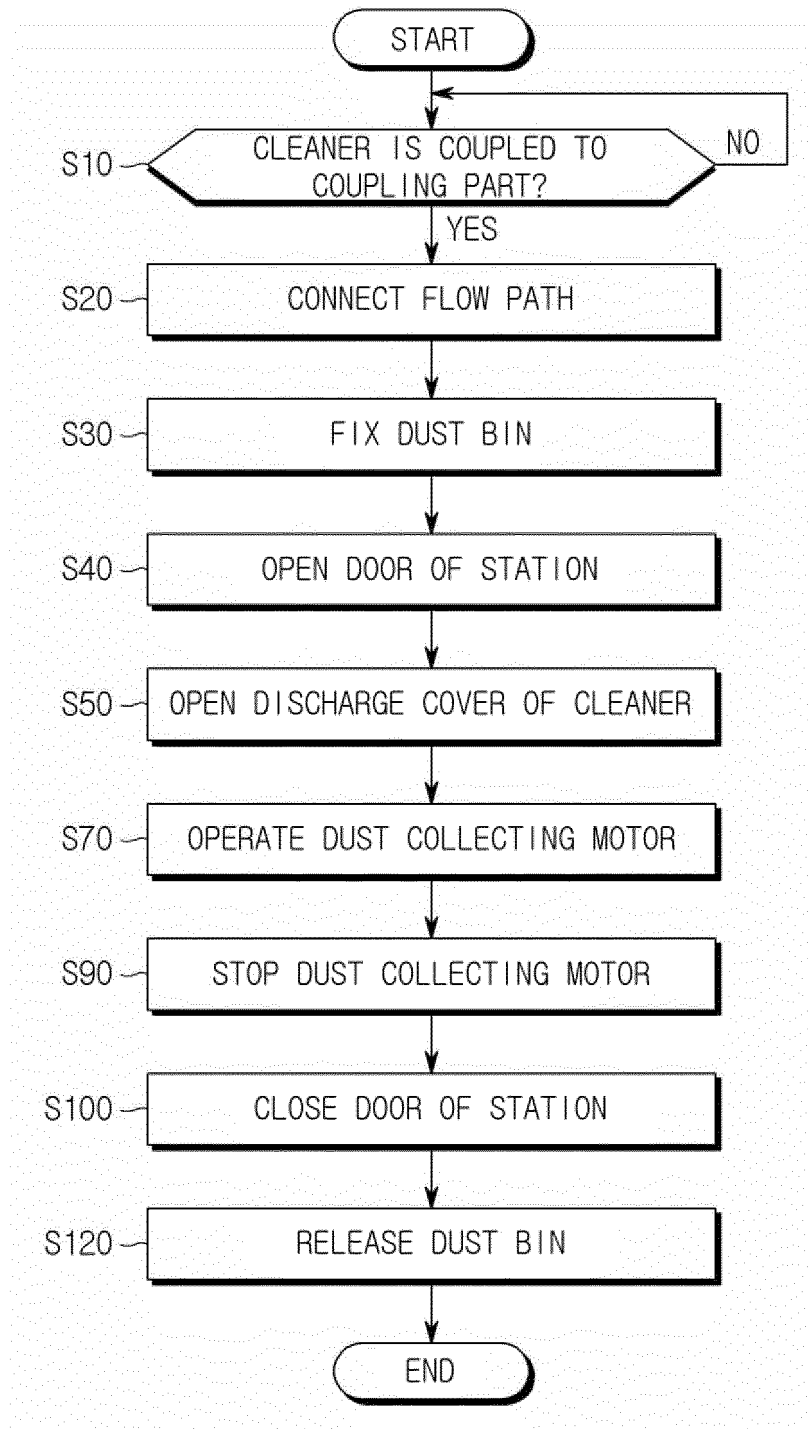
[FIG. 23]



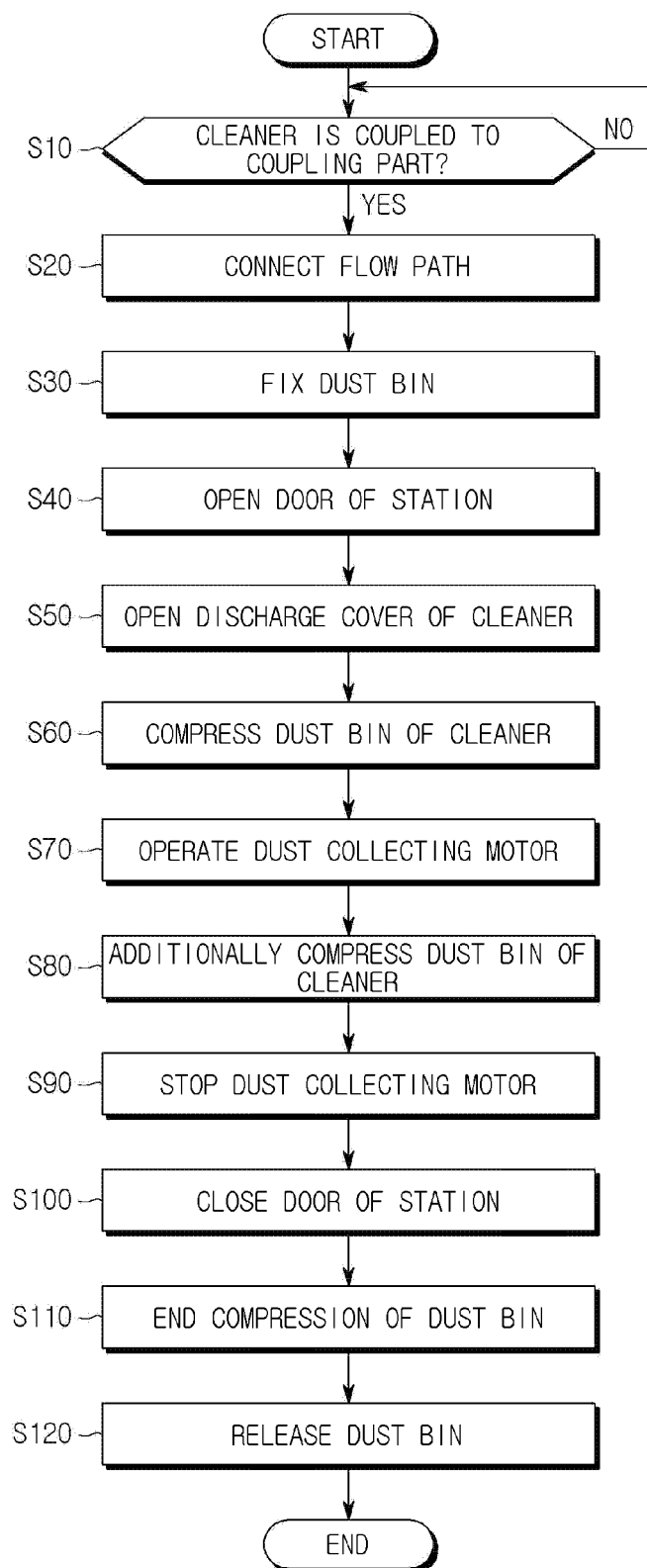
[FIG. 24]



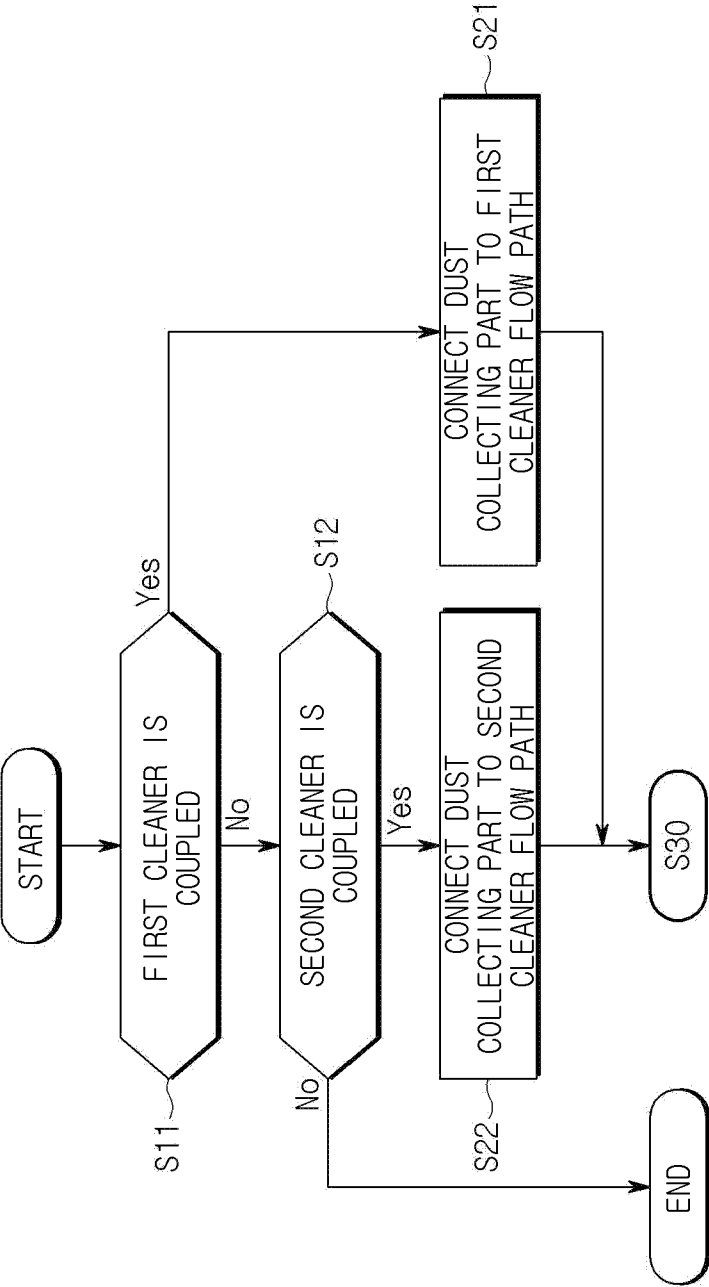
[FIG. 25]



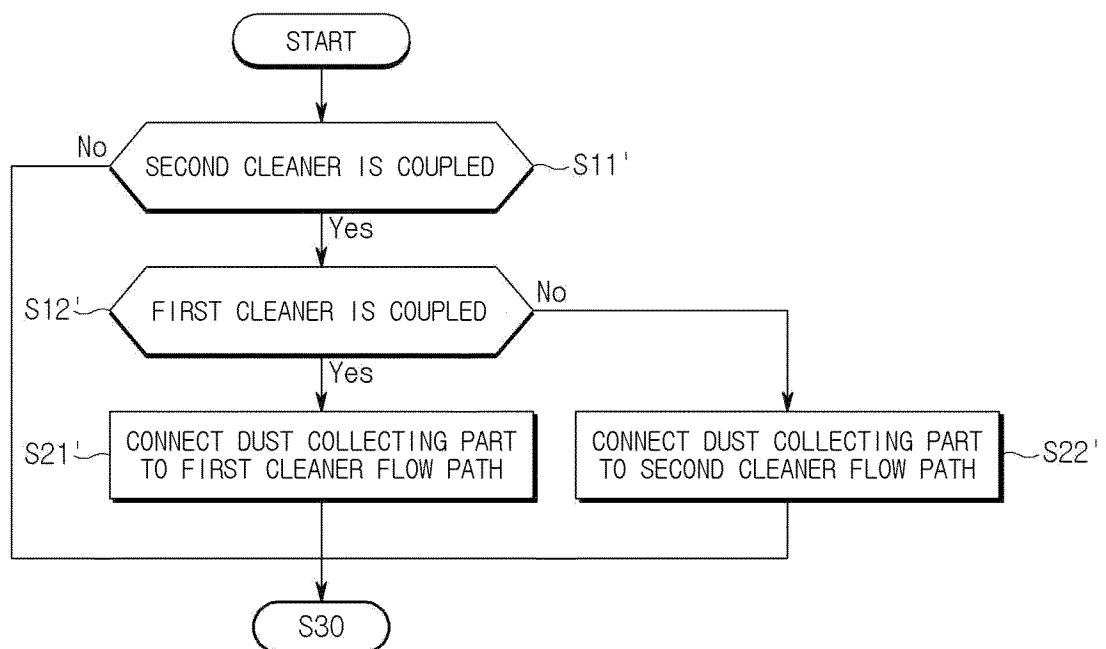
[FIG. 26]



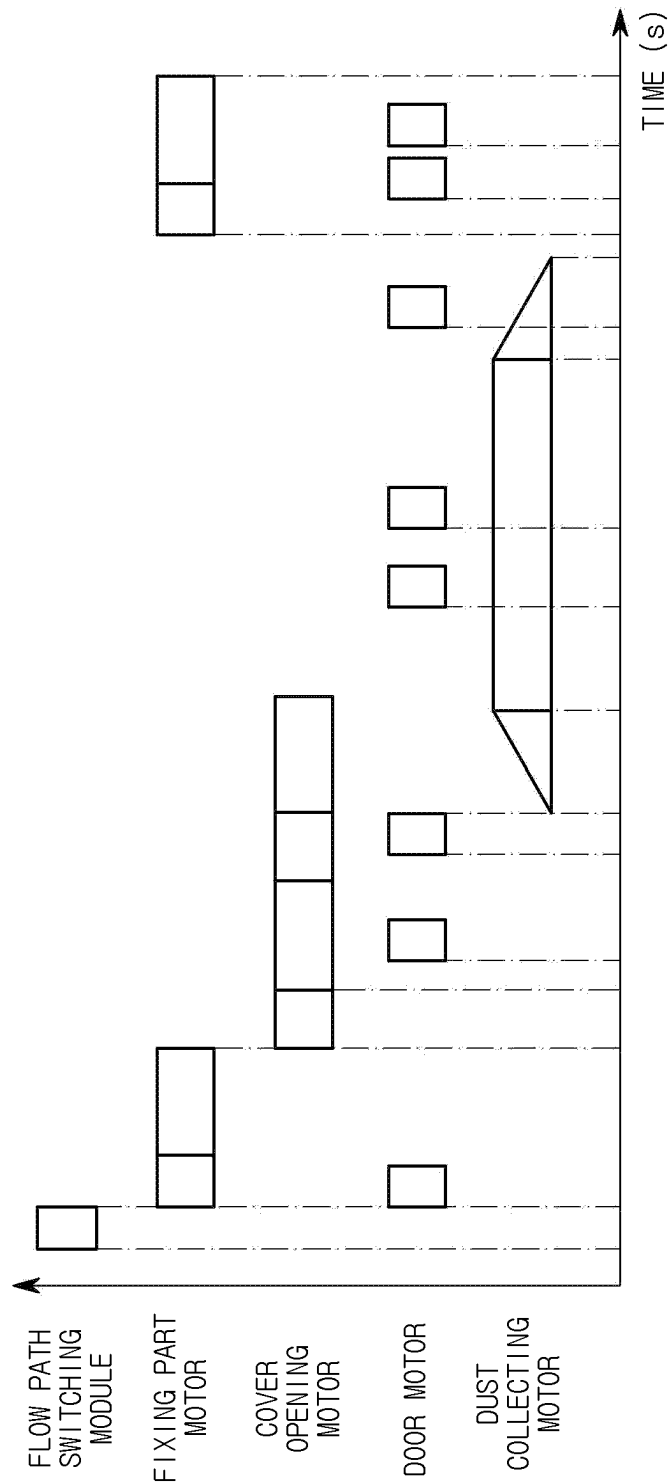
[FIG. 27]



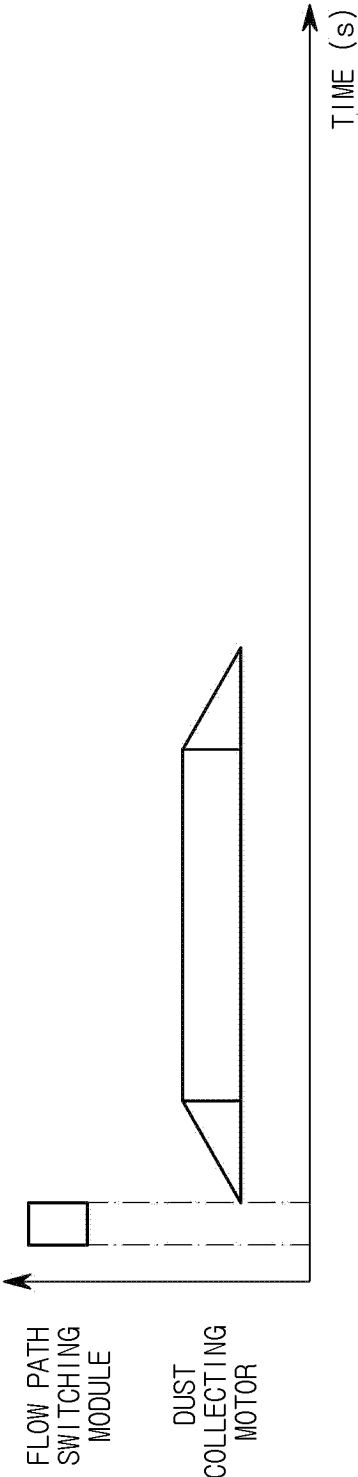
[FIG. 28]



[FIG. 29]



[FIG. 30]



INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2023/002531

A. CLASSIFICATION OF SUBJECT MATTER

A47L 9/28(2006.01)i; A47L 9/00(2006.01)i; A47L 7/00(2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A47L 9/28(2006.01); A47L 5/24(2006.01); A47L 5/28(2006.01); A47L 9/00(2006.01); F16K 11/02(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), 유로(flow path), 전환(diversion), 충전(charge), 위치센서(position sensor), 연결호스(connecting hose), 도어(door)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KR 10-2021-0130655 A (LG ELECTRONICS INC.) 01 November 2021 (2021-11-01) See paragraphs [0058]-[0095], [0128]-[0136] and [0174], claims 1-3 and figures 1-11.	1-2,8,12-16
Y		3-7,9-11
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Y	KR 10-2021-0157905 A (LG ELECTRONICS INC.) 29 December 2021 (2021-12-29) See paragraphs [0201], [0266] and [0289] and figures 5-13.	9-11
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A	JP 2016-116850 A (VORWERK & CO. INTERHOLDING GMBH) 30 June 2016 (2016-06-30) See paragraph [0013] and figures 8 and 11.	1-16

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 ☒ See patent family annex.

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Date of the actual completion of the international search

07 June 2023

Date of mailing of the international search report

08 June 2023

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

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- KR 1020210003543 [0016] [0019]