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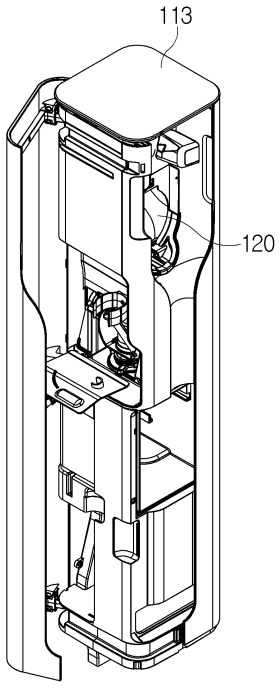
(54) VACUUM CLEANER STATION

(57) The present disclosure relates to a cleaner station, and a flow path switching module according to the present disclosure includes a casing, a connection hose having an inlet configured to move along an inner peripheral surface of the casing, the connection hose being coupled selectively to any one of a first cleaner flow path connection portion and a second cleaner flow path connection portion, a switching motor disposed at one side of the casing and configured to generate power, a sensing part coupled to the switching motor and protruding toward one side, a driving cam configured to transmit power to the connection hose, and a position sensor disposed at one side of the sensing part and including a switch configured to be turned on or off by the sensing part, the position sensor being configured to detect a position of the connection hose, such that even though a user does not manually reassemble the connection hose, the first link and the second link moves the connection hose and couples the connection hose to the first cleaner flow path connection portion or the second cleaner flow path connection portion, and whether the connection hose is coupled to the first cleaner connection flow path or the second cleaner connection flow path may be easily determined.

[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.

[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.

[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, in the case of a cleaner station in the related art, a user needs to open a cover and manually separate a connection hose to use the connection hose for other purposes. Another object to be achieved by the present disclosure is to provide a cleaner station having a flow path switching module capable of allowing a connection hose to selectively communicate with a first cleaner or a second cleaner without requiring a user to manually reassemble the connection hose when the first cleaner and the second cleaner are selectively or simultaneously 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 is accurately coupled to a first cleaner connection flow path or a second cleaner connection flow path by means of a simple constituent element.

[0022] Yet another object to be achieved by the present disclosure is to provide a cleaner station capable of preventing damage to a sealer caused by friction with another constituent element when a connection hose of a flow path switching module moves between a first cleaner connection flow path connection portion and a second cleaner connection flow path connection portion.

[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; and a flow path switching module configured to connect a dust collecting part, which is disposed in the housing, selectively to the first cleaner flow path or the second cleaner flow path. In this case, the flow path switching module may include: a casing 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 having an inlet configured to move along an inner peripheral surface of the casing, the connection hose being selectively coupled to any one of the first cleaner flow path connection portion and the second cleaner flow path connection portion; a switching motor disposed at one side of the casing and configured to generate power; a driving cam coupled to the switching motor and including a sensing part protruding toward one side, the driving cam being configured to transmit the power to the connection hose; and a position sensor disposed at one side of the sensing part and including a switch configured to be turned on or off by the sensing part, the position sensor being configured to detect a position of the connection hose.

[0025] The sensing part may protrude outward in a radial direction of a shaft of the switching motor and have an end tightly attached to the switch of the position sensor.

[0026] The sensing part may include: a first surface protruding radially outward and having an outer end configured to press the switch of the position sensor and turn on the position sensor; and a second surface disposed at one side of the first surface and less protruding radially outward than the first surface, the second surface being configured to turn off the position sensor.

[0027] The sensing part may include: a first surface protruding radially outward and extending in a circumferential direction by less than a predetermined length, the first surface being configured to turn on the position sensor; and a third surface disposed at one side of the first surface and protruding radially outward, the third surface extending in the circumferential direction by more than the predetermined length and configured to turn on the position sensor. In this case, the sensing part may include a second surface disposed between the first surface and the third surface and less protruding radially outward than the first surface, the second surface being configured to turn off the position sensor. In this case, the second surface may extend in the circumferential direction by more than the predetermined length.

[0028] The flow path switching module may include a first link having one side rotatably coupled to the casing, and the other side coupled to the connection hose, and the driving cam may include a gear portion connected to the first link and configured to transmit power to the first link.

[0029] A connection portion between the first link and the casing may be disposed opposite to a connection portion between the first link and the connection hose based on an imaginary line extending in a longitudinal

direction of the connection hose.

[0030] The driving cam may include a stopper disposed at one side of the sensing part, protruding radially, and configured to prevent the driving cam from rotating at a limited angle or more.

[0031] 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 flow path switching module configured to connect a dust collecting part, which is disposed in the housing, selectively to the first cleaner flow path or the second cleaner flow path; and a control unit configured to control the flow path switching module. The flow path switching module may include: a connection hose selectively connected to any one of the first cleaner flow path and the second cleaner flow path; and a position sensor including a switch configured to be turned on or off, the position sensor being configured to transmit a first signal to the control unit when the switch is turned on, and transmit a second signal to the control unit when the switch is turned off. The control unit may determine a position of the connection hose on the basis of a length of the signal received from the position sensor.

[0032] The control unit may determine that the connection hose is connected to the first cleaner flow path connection portion when the control unit receives the first signal from the position sensor continuously for a predetermined time or more, and the control unit may determine that the connection hose is connected to the second flow path when the control unit receives the second signal from the position sensor continuously for the predetermined time or more.

[0033] The control unit may determine that the connection hose is connected to any one of the first cleaner flow path and the second cleaner flow path when the control unit receives any one of the first signal and the second signal multiple times.

[0034] The control unit may determine that the connection hose is connected to any one of the first cleaner flow path and the second cleaner flow path when a receiving time of the first signal and a receiving time of the second signal are equal to each other before a final signal is received.

[0035] The flow path switching module may include: a casing in which the connection hose is disposed; a first link having one side rotatably coupled to the casing, and the other side coupled to an inlet of the connection hose; a switching motor disposed at one side of the casing and configured to generate power; and a driving cam coupled to the switching motor and configured to transmit the power to the first link. In this case, the flow path switching module may include: a stopper configured to prevent the driving cam from rotating at a limited angle or more; and a stop sensor configured to detect a position of the stopper and transmit a signal to the control unit when the position of the stopper is detected, and the control unit may determine that the connection hose is connected to any one of the first cleaner flow path and the second cleaner flow path when the control unit simultaneously receives a signal from the position sensor and receives a signal from the stop sensor.

[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, one side of the flow path switching module is rotatably coupled to the casing, the other side of the flow path switching module is coupled to the connection hose, and the rotary shaft of the first link is disposed to be spaced apart from the rotary shaft of the second link. Therefore, even though the user does not manually reassemble the connection hose, the first link and the second link may move the connection hose and couple the connection hose to the first cleaner flow path connection portion or the second cleaner flow path connection portion.

[0039] Second, the single position sensor having a micro-switch is disposed, and the position sensor is turned on or off by the sensing part disposed on the driving cam, such that it is possible to easily determine whether the connection hose is coupled to the first cleaner connection flow path or the second cleaner connection flow path.

[0040] Third, on the basis of the length of the signal received from the position sensor, the control unit may easily determine whether the connection hose is tightly attached and coupled to the first cleaner connection flow path connection portion or the second cleaner flow path connection portion.

[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 enlarged views illustrating a flange and a flange groove in FIG. 6.
FIG. 19 is a view illustrating signals generated by a position sensor while the connection hose moves from the first cleaner flow path connection portion to the second cleaner flow path connection portion.
FIG. 20 is a view illustrating signals generated by the position sensor while the connection hose moves from the second cleaner flow path connection portion to the first cleaner flow path connection portion.
FIGS. 21 to 23 are views illustrating a step of separating the flow path switching module from a housing.

[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 enlarged views illustrating a flange and a flange groove in FIG. 6, FIG. 19 is a view illustrating signals generated by a position sensor while the connection hose moves from the first cleaner flow path connection portion to the sec-

ond cleaner flow path connection portion, FIG. 20 is a view illustrating signals generated by the position sensor while the connection hose moves from the second cleaner flow path connection portion to the first cleaner flow path connection portion, FIGS. 21 to 23 are views illustrating a step of separating the flow path switching module from a housing.

[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 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.

[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 and a discharge cover 222.

[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 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.

[0075] 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.

[0076] The first cleaner 200 may include the battery 240.

[0077] 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.

[0078] 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.

[0079] The battery 240 may supply power to the suction motor 214 of the first cleaner 200.

[0080] 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.

[0081] 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.

[0082] 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.

[0083] 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.

[0084] 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).

[0085] 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 cleaner flow path 182.

[0086] The cleaner station 100 of the present disclosure will be described below with reference to FIGS. 1 and 2.

[0087] 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.

[0088] 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.

[0089] 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.

[0090] 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.

[0091] 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.

[0092] The housing 110 may include a bottom surface 111, an outer wall surface 112, and an upper surface 113.

[0093] 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.

[0094] 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.

[0095] 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.

[0096] 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.

[0097] 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.

[0098] 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.

[0099] A display part may be disposed on the upper surface 113. For example, the display part 410 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 410 may further display information such as a cleaning process situation, a map of the cleaning zone, and the like.

[0100] Meanwhile, according to the embodiment, the upper surface 113 may be separable from the outer wall surface. 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, and a terminal (not illustrated) capable of charging the separated battery may be provided in the internal space.

[0101] 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, 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.

[0102] The first cleaner 200 may be coupled to the coupling part 120.

[0103] The cleaner station 100 according to the present disclosure may include the fixing unit (not illustrated). The fixing unit (not illustrated) is disposed in the housing 110. In addition, the fixing unit (not illustrated) may be disposed on a back surface of the coupling part (not illustrated). The fixing unit (not illustrated) may fix the first cleaner 200 coupled to the coupling part 120. Specifically, the fixing unit (not illustrated) may fix the dust bin 220 and the battery housing 230 of the first cleaner 200 coupled to the coupling part 120.

[0104] The cleaner station 100 according to the present disclosure may include a door unit (not illustrated). The door unit (not illustrated) may be configured to open or close a first cleaner flow path 181.

[0105] The cleaner station 100 according to the present disclosure may include a cover opening unit (not illustrated). The cover opening unit (not illustrated) may be disposed on the coupling part (not illustrated) and may open the discharge cover (not illustrated) of the first cleaner 200.

[0106] 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.

[0107] 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.

[0108] The dust collecting part 170 may be separably coupled to the housing 110.

[0109] 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.

[0110] 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.

[0111] 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.

[0112] Meanwhile, the cleaner station 100 according to the embodiment of the present disclosure may further include a sterilization module (not illustrated).

[0113] 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.

[0114] The sterilization module (not illustrated) is configured to sterilize the dust captured in the dust collecting part 170.

[0115] 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.

[0116] 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.

[0117] The first cleaner flow path 181 is disposed in the housing 110 and connected to the dust bin 220 of the first cleaner 200.

[0118] 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.

[0119] The first cleaner flow path 181 may extend rearward from the coupling part 120, be bent, and then extend downward.

[0120] 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.

[0121] 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.

[0122] 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.

[0123] 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.

[0124] The inlet of the dust collecting flow path 184 is coupled to a dust collecting flow path connection portion 1831d of a casing 1831.

[0125] 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.

[0126] 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.

[0127] 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.

[0128] 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.

[0129] 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.

[0130] 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.

[0131] 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.

[0132] 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.

[0133] 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.

[0134] 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).

[0135] 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.

[0136] 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.

[0137] 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.

[0138] 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.

[0139] Meanwhile, the cleaner station 100 may further include a charging part (not illustrated). The charging part (not illustrated) may be electrically connected to the first cleaner 200 or the second cleaner 300. The charging part (not illustrated) may supply power to a battery of the first cleaner 200 or a battery of the second cleaner 300.

[0140] 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.

[0141] Hereinafter, a detailed structure of the flow path switching module 183 will be described with reference to FIGS. 3 to 12.

[0142] 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.

[0143] With reference to FIG. 3, the flow path switching module 183 is disposed in the housing 110.

[0144] With reference to FIG. 3, 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. 3, the flow path switching module 183 may be disposed inside a right cover.

[0145] 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.

[0146] 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.

[0147] 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.

[0148] 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.

[0149] 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.

[0150] 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.

[0151] 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 1832ca may be formed at an end of the first cleaner flow path connection portion 1831c, and the flange 1832ca may be fixed by being inserted into a groove 182a formed in the second cleaner flow path 182.

[0152] 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.

[0153] The casing 1831 may be separably coupled to the housing 110. The casing 1831 is inserted into the housing 110 from the rear side while moving rearward, and the flanges 1831ba, 1831ca, and 1831da, which are 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 fixedly inserted into the grooves 181c, 182a, and 184a 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.

[0154] 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.

[0155] 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.

[0156] 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 while moving.

[0157] Alternatively, at least a part of the connection hose 1832 may crease. Therefore, the connection hose 1832 may be structurally deformed.

[0158] 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.

[0159] 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.

[0160] 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 connection portion 1831d and always communicates with the dust collecting part 170.

[0161] 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.

[0162] 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.

[0163] 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.

[0164] 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 extends from the first link 1833 toward the casing 1831. The rotary shaft 1833a of the first link is rotatably coupled to the casing 1831.

[0165] 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.

[0166] 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.

[0167] 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.

[0168] The first link 1833 includes a gear portion 1833c.

[0169] 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.

[0170] 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.

[0171] The first link includes a partition wall 1833d.

[0172] 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.

[0173] 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.

[0174] 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.

[0175] 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.

[0176] 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.

[0177] Specifically, 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 coupled or separated.

[0178] The flow path switching module 183 includes the second link 1834. The second link 1834 is a constituent element configured to move the connection hose 1832 together with the first link 1833.

[0179] 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.

[0180] 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.

[0181] 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.

[0182] 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.

[0183] 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.

[0184] 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.

[0185] 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.

[0186] 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.

[0187] 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.

[0188] 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. 9 and 10, 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.

[0189] 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.

[0190] 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.

[0191] 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.

[0192] 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.

[0193] 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. 5. 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.

[0194] 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.

[0195] 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 1834b 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.

[0196] 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.

[0197] 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.

[0198] 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 connection hose 1832. The links may be the first link 1833 and the second link 1834.

[0199] 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.

[0200] 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.

[0201] With reference to FIG. 12 and 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.

[0202] 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 and 13, the trajectory of the inlet 1832a of the connection hose 1832 is indicated by the two-dot chain line.

[0203] A length of the first link 1833 may be longer than a length of the second link 1834.

[0204] When the flow path switching module 183 is viewed from one side, the first link 1833 may intersect the second link 1834.

[0205] 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.

[0206] The flow path switching module 183 includes the switching motor 1835 and the driving cam 1836.

[0207] The switching motor 1835 is disposed at one side of the casing 1831 and generates power for moving the connection hose 1832.

[0208] 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.

[0209] The driving cam 1836 is coupled to the switching motor 1835 and transmits power to the first link 1833.

[0210] 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.

[0211] 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.

[0212] The driving cam 1836 includes the gear portion 1836c.

[0213] The gear portion 1836c of the driving cam may protrude radially outward.

[0214] 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.

[0215] The flow path switching module 183 may include the sensing part 1836b and a position sensor 1837 and determine a position of the connection hose 1832.

[0216] The sensing part 1836b is provided on the driving cam 1836 and protrudes toward one side.

[0217] 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.

[0218] The position sensor 1837 is disposed at one side of the sensing part 1836b and turned on or off by the sensing part 1836b. The position sensor 1837 detects the position of the connection hose 1832.

[0219] The position sensor 1837 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.

[0220] 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.

[0221] The sensing part 1836b may include a plurality of surfaces.

[0222] With reference to FIG. 6, a first surface 1836ba presses and turns on the position sensor 1837. 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 position sensor 1837 to generate a signal.

[0223] With reference to FIG. 9, the second surface 1836bb turns off the position sensor 1837. 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 position sensor 1837 is not pushed, and no signal is generated.

[0224] With reference to FIG. 10, the third surface 1836bc presses and turns on the 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 position sensor 1837 to generate a signal.

[0225] With reference to FIG. 11, the fourth surface 1836bd turns off the position sensor 1837. 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 position sensor 1837 is not pushed, and no signal is generated.

[0226] The first surface 1836ba protrudes radially outward, and an outer end of the first surface 1836ba presses the switch of the position sensor 1837 and turns on the position sensor 1837. The second surface 1836bb is disposed at one side of the first surface 1836ba. The second surface 1836bb less protrudes radially outward than the first surface 1836ba and turns off the position sensor 1837.

[0227] Specifically, the second surface 1836bb and the fourth surface 1836bd less protrude radially outward than the first surface 1836ba or the third surface 1836bc. Therefore, in case that the first surface 1836ba or the third surface 1836bc comes into contact with the switch of the position sensor 1837, the first surface 1836ba or the third surface 1836bc presses the switch of the position sensor 1837 and turns on the position sensor 1837, and the position sensor 1837 transmits a first signal to a control unit 400. On the contrary, in case that the second surface 1836bb or the fourth surface 1836bd comes into contact with the switch of the position sensor 1837, the switch of the position sensor 1837 is not pressed, such that the position sensor 1837 is turned off. The position sensor 1837 transmits a second signal, which is different from the first signal, to the control unit 400 or does not transmit a signal to the control unit 400.

[0228] A radially protruding length of the first surface 1836ba may be equal to a radially protruding length of the third surface 1836bc. Likewise, a radially protruding length of the second surface 1836bb may be equal to a radially protruding length of the fourth surface 1836bd.

[0229] The first surface 1836ba protrudes radially outward and extends in a circumferential direction by less than a predetermined length, such that the first surface 1836ba turns on the position sensor 1837. The third surface 1836bc is disposed at one side of the first surface 1836ba and protrudes radially outward. The third surface 1836bc extends in the circumferential direction by more than a predetermined length and turns on the position sensor 1837.

[0230] Specifically, a circumferential length of the first surface 1836ba and a circumferential length of the fourth surface 1836bd are shorter than a predetermined length, and a circumferential length of the second surface 1836bb and a circumferential length of the third surface 1836bc are longer than the predetermined length.

[0231] For example, with reference to FIG. 19, when the driving cam 1836 rotates, the first surface 1836ba comes into contact with the position sensor 1837 for time $\Delta T1$, the second surface 1836bb comes into contact with the position sensor 1837 for time $\Delta T2$, the third surface 1836bc comes into contact with the position sensor 1837 for time $\Delta T3$, and the fourth surface 1836bd comes into contact with the position sensor 1837 for time $\Delta T4$. In this case, $\Delta T1$ and $\Delta T3$ are less than a predetermined time, and $\Delta T2$ and $\Delta T4$ exceed the predetermined time.

[0232] The circumferential length of the second surface 1836bb may be equal to the circumferential length of the third surface 1836bc. That is, $\Delta T2$ and $\Delta T3$ may be equal to each other.

[0233] The second surface 1836bb is disposed between the first surface 1836ba and the third surface 1836bc and less protrudes radially outward than the first surface 1836ba, such that the second surface 1836bb turns off the position sensor 1837. The second surface 1836bb extends in the circumferential direction by more than the predetermined length. With this arrangement, the position sensor 1837 may generate a signal corresponding to a square wave. The control unit 400 may determine the position of the connection hose 1832 based on an intensity of a signal and a length of a signal.

[0234] With reference to FIGS. 12 and 13, based on the imaginary line extending in the longitudinal direction of the connection hose 1832, the rotary shaft 1833a, which is the connection portion between the first link 1833 and the casing 1831, is disposed opposite to the connection portion 1833b between the first link 1833 and the connection hose 1832. In this case, the rotary shaft 1833a of the first link may be disposed at the right side of the

connection hose 1832. A length from the rotary shaft 1833a of the first link to the connection portion 1833b of the first link may be longer than a length from the rotary shaft 1833a of the first link to the end of the gear portion 1833c of the first link. Therefore, when the first link 1833 rotates, the displacement of the connection portion 1833b of the first link may be maximized, such that the movement range of the connection hose 1832 may be increased.

[0235] 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.

[0236] 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.

[0237] The elastic member 1838 may be a torsion spring.

[0238] 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.

[0239] 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.

[0240] 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.

[0241] 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.

[0242] The stopper 1839 protrudes radially.

[0243] The stop sensor 1839 may be disposed adjacent to the driving cam 1836.

[0244] 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.

[0245] 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.

[0246] The flow path switching module 183 according to the present disclosure may be separably coupled to 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 cleaner flow path 181, the second cleaner flow path 182, and the dust collecting flow path 184.

[0247] 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.

[0248] 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. 21 to 23, the flow path switching module 183 may be coupled to or separated from the housing 110 while moving forward or rearward.

[0249] With reference to FIGS. 16 to 18, the flow path switching module 183 includes the flanges 1831ba, 1831ca, and 1831da. The first cleaner flow path 181, the second cleaner flow path 182, the dust collecting flow path 184 include the flange grooves 181c, 182a, and 184a. When the flanges 1831ba, 1831ca, and 1831da are inserted into the flange grooves 181c, 182a, and 184a, the flow path switching module 183 is coupled to the housing 110.

[0250] The first cleaner flow path connection portion 1831b includes the flange 1831ba. The flange 1831ba may be formed at an end of the first cleaner flow path connection portion 1831b. The flange 1831ba extends radially outward from the end of the first cleaner flow path connection portion 1831b. The flange 1831ba is inserted into the flange groove 181c formed at an end of the first cleaner flow path 181.

[0251] The flange groove 181c is formed at the end of the first cleaner flow path 181. Specifically, the flange groove 181c is formed at a lower end of the first flow path 181a. The flange groove 181c is recessed outward in the inner peripheral surface of the first cleaner flow path 181. The flange groove 181c may be formed in a C-shape opened at a front side thereof. Therefore, the flange 1831ba of the first cleaner flow path connection portion may be inserted into the flange groove 181c of the first

cleaner flow path while moving rearward from the front side.

[0252] The second cleaner flow path connection portion 1831c includes the flange 1831ca. The flange 1831ca may be formed at an end of the second cleaner flow path connection portion 1831c. The flange 1831ca extends radially outward from the end of the second cleaner flow path connection portion 1831c. The flange 1831ca is inserted into the flange groove 182a formed at an end of the second cleaner flow path 182.

[0253] The flange groove 182a is formed at the end of the second cleaner flow path 182. The flange groove 182a is recessed outward in the inner peripheral surface of the second cleaner flow path 182. The flange groove 182a may be formed in a C-shape opened at a front side thereof. Therefore, the flange 1831ca of the second cleaner flow path connection portion may be inserted into the flange groove 182a of the second cleaner flow path while moving rearward from the front side.

[0254] The dust collecting flow path connection portion 1831d includes the flange 1831da. The flange 1831da is formed at an end of the dust collecting flow path connection portion 1831d. The flange 1831da extends radially outward from the end of the dust collecting flow path connection portion 1831d. The flange 1831da is inserted into the flange groove 184a formed at an end of the dust collecting flow path 184.

[0255] The flange groove 184a is formed at the end of the dust collecting flow path 184. The flange groove 184a is recessed outward in the inner peripheral surface of the dust collecting flow path 184. The flange groove 184a may be formed in a C-shape opened at a front side thereof. Therefore, the flange 1831da of the dust collecting flow path connection portion may be inserted into the flange groove 184a of the dust collecting flow path while moving rearward from the front side.

[0256] 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.

[0257] 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.

[0258] With reference to FIGS. 3, 4, and 21 to 23, 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.

[0259] 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.

[0260] With reference to FIG. 14, the flow path switching module cover 185 may include a rotary shaft 1851, a lower cover 1852, and an upper cover 1853.

[0261] 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.

[0262] 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.

[0263] 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.

[0264] 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.

[0265] The upper cover 1853 of the flow path switching module may cover the opened front side of the casing 1831.

[0266] 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.

[0267] The cover coupling portion 1856 may be disposed at an upper end of one side of the upper cover 1853.

[0268] The flow path switching module cover 185 includes a cover handle 1857. The cover handle 1857 is gripped by the user.

[0269] The cover handle 1857 may be disposed at one side of the cover coupling portion 1856.

[0270] 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.

[0271] 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.

[0272] 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.

[0273] 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.

[0274] The first link rotary shaft support member 1854 may extend along the gear portion 1833c of the first link.

[0275] 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.

[0276] 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.

[0277] 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.

[0278] 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.

[0279] 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.

[0280] With reference to FIGS. 3 and 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.

[0281] 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.

[0282] The control unit 400 may include a printed circuit board and elements mounted on the printed circuit board.

[0283] The control unit 400 may determine the position of the connection hose 1832 on the basis of a length of the signal received from the position sensor 1837. Specifically, the control unit 400 may determine whether the connection hose 1832 is accurately coupled to any one of the first cleaner flow path connection portion 1831b and the second cleaner flow path connection portion 1832c. When the control unit 400 determines that the connection hose 1832 is accurately coupled, the control unit 400 operates the dust collecting motor 191. When the control unit 400 determines that the connection hose 1832 is not accurately coupled, the control unit 400 may stop the operation of the dust collecting motor 191.

[0284] When the control unit 400 receives the first signal from the position sensor 1837 continuously for a predetermined time or more, the control unit 400 may determine that the connection hose 1832 is connected to the first cleaner flow path 181. When the control unit 400 receives the second signal from the position sensor 1837 continuously for a predetermined time or more, the control unit 400 may determine that the connection hose 1832 is coupled to the second cleaner flow path 182.

[0285] In this case, an intensity of the second signal may be lower than an intensity of the first signal, and the intensity of the second signal may be 0.

[0286] With reference to FIG. 6, when the first surface 1836ba comes into contact with the position sensor 1837, the position sensor 1837 transmits the first signal to the control unit 400. When the control unit 400 receives the first signal continuously for a predetermined time or more, the control unit 400 may determine that the connection hose 1832 is coupled to the first cleaner flow path connection portion 1831b.

[0287] On the contrary, with reference to FIG. 11, when the fourth surface 1836bd comes into contact with the position sensor 1837, the position sensor 1837 generates the second signal. When the control unit 400 receives the second signal continuously for a predetermined time or more, the control unit 400 may determine that the connection hose 1832 is coupled to the second cleaner flow path connection portion 1831c. In this case, the intensity of the second signal may be 0. In this case, when the control unit 400 does not receive a signal continuously for a predetermined time or more, the control unit 400 may determine that the connection hose 1832 is coupled to the second cleaner flow path connection portion 1831c.

[0288] In case that the control unit 400 receives any one of the first signal and the second signal multiple times, the control unit 400 may determine that the connection hose is coupled to any one of the first cleaner flow path connection portion 1831b and the second cleaner flow path connection portion 1831c.

[0289] FIG. 19 is a view illustrating signals generated from the position sensor 1837 while the connection hose 1832 moves from the first cleaner flow path connection portion 1831b to the second cleaner flow path connection portion 1832c. The process is performed in the order of FIG. 6, FIG. 9, FIG. 10, and FIG. 11. In this case, the control unit 400 receives the first signal twice from the position sensor 1837 when the position sensor 1837 comes into contact with the first surface 1836ba and the third surface 1836bc before the connection hose 1832 is coupled to the second cleaner flow path connec-

tion portion 1831c, such that the control unit 400 may determine that the connection hose 1832 is coupled to the second cleaner flow path connection portion 1831c.

[0290] FIG. 20 is a view illustrating signals generated from the position sensor 1837 while the connection hose 1832 moves from the second cleaner flow path connection portion 1831c to the first cleaner flow path connection portion 1831b. The process is performed in the order of FIG. 11, FIG. 10, FIG. 9, and FIG. 6. In this case, the control unit 400 receives the signal twice from the position sensor 1837 when the position sensor 1837 comes into contact with the fourth surface 1836bd and the second surface 1836bb before the connection hose 1832 is coupled to the first cleaner flow path connection portion 1831b, such that the control unit 400 may determine that the connection hose 1832 is coupled to the first cleaner flow path connection portion 1831b.

[0291] In case that a first signal receiving time and a second signal receiving time are equal to each other before the control unit 400 receives a final signal, the control unit 400 may determine that 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.

[0292] With reference to FIG. 19, when the connection hose 1832 is coupled to the second cleaner flow path connection portion 1831c, the second signal is generated as the final signal. In case that a first signal receiving time ($\Delta T3$) and a second signal receiving time ($\Delta T2$) are equal to each other before the control unit 400 receives the second signal, the control unit 400 may determine that the connection hose 1832 is coupled to the second cleaner flow path connection portion 1831c.

[0293] With reference to FIG. 20, when the connection hose 1832 is coupled to the first cleaner flow path connection portion 1831b, the first signal is generated as the final signal. In case that the second signal receiving time ($\Delta T2$) and the third signal receiving time ($\Delta T3$) are equal to each other before the control unit 400 receives the first signal, the control unit 400 may determine that the connection hose 1832 is coupled to the first cleaner flow path connection portion 1831b.

[0294] When the control unit 400 simultaneously receives the signals from the position sensor 1837 and the stop sensor 1839, the control unit 400 may determine that 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.

[0295] With reference to FIGS. 6 and 20, at a final position, the connection hose 1832 is coupled to the first cleaner flow path connection portion 1831b, and the position sensor 1837 transmits the first signal to the control unit 400. In addition, the stop sensor 1839 detects that the stopper 1836d approaches the stop sensor 1839, and the stop sensor 1839 transmits a signal to the control unit 400. The control unit 400 simultaneously receives the first signal from the position sensor 1837 and receives the signal from the stop sensor 1839, and the control unit 400 may determine that the connection hose 1832 is coupled to the first cleaner flow path connection portion 1831b.

[0296] According to the present disclosure, the slight driving cam 1836 and the single micro-switch 1837 (position sensor) may be used to easily determine the position of the connection hose 1832 and whether the connection hose 1832 is coupled.

[0297] 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.

[0298] 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]

[0299]

10: Cleaner system
100: Cleaner station
110: Housing
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
200: First cleaner
210: Main body
220: Dust bin
230: Battery housing
240: Battery
250: Extension tube
260: Cleaning module
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; and
   a flow path switching module configured to connect a dust collecting part, which is disposed in the housing, selectively to the first cleaner flow path or the second cleaner flow path,
   wherein the flow path switching module comprises:

      a casing 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 having an inlet configured to move along an inner peripheral surface of the casing, the connection hose being selectively coupled to any one of the first cleaner flow path connection portion and the second cleaner flow path connection portion;
      a switching motor disposed at one side of the casing and configured to generate power;
      a driving cam coupled to the switching motor and comprising a sensing part protruding toward one side, the driving cam being configured to transmit the power to the connection hose; and
      a position sensor disposed at one side of the sensing part and comprising a switch configured to be turned on or off by the sensing part, the position sensor being configured to detect a position of the connection hose.

2. The cleaner station of claim 1, wherein the sensing part protrudes outward in a radial direction of a shaft of the switching motor and has an end tightly attached to the switch of the position sensor.

3. The cleaner station of claim 1, wherein the sensing part comprises:

   a first surface protruding radially outward and having an outer end configured to press the switch of the position sensor and turn on the position sensor; and
   a second surface disposed at one side of the first surface and less protruding radially outward than the first surface, the second surface being configured to turn off the position sensor.

4. The cleaner station of claim 1, wherein the sensing part comprises:

   a first surface protruding radially outward and extending in a circumferential direction by less than a predetermined length, the first surface being configured to turn on the position sensor; and
   a third surface disposed at one side of the first surface and protruding radially outward, the third surface extending in the circumferential direction by more than the predetermined length and configured to turn on the position sensor.

5. The cleaner station of claim 4, wherein the sensing part comprises a second surface disposed between the first surface and the third surface and less protruding radially outward than the first surface, the second surface being configured to turn off the position sensor.

6. The cleaner station of claim 5, wherein the second surface extends in the circumferential direction by more than the predetermined length.

7. The cleaner station of claim 1, wherein the flow path switching module comprises a first link having one side rotatably coupled to the casing, and the other side coupled to the connection hose, and
   wherein the driving cam comprises a gear portion connected to the first link and configured to transmit power to the first link.

8. The cleaner station of claim 7, wherein a connection portion between the first link and the casing is disposed opposite to a connection portion between the first link and the connection hose based on an imaginary line extending in a longitudinal direction of the connection hose.

9. The cleaner station of claim 1, wherein the driving cam comprises a stopper disposed at one side of the sensing part, protruding radially, and configured to prevent the driving cam from rotating at a limited angle or more.

10. 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 flow path switching module configured to connect a dust collecting part, which is disposed in the housing, selectively to the first cleaner flow path or the second cleaner flow path; and
a control unit configured to control the flow path switching module,
wherein the flow path switching module comprises:

a connection hose selectively connected to any one of the first cleaner flow path and the second cleaner flow path; and
a position sensor comprising a switch configured to be turned on or off, the position sensor being configured to transmit a first signal to the control unit when the switch is turned on, and transmit a second signal to the control unit when the switch is turned off, and
wherein the control unit determines a position of the connection hose on the basis of a length of the signal received from the position sensor.

11. The cleaner station of claim 10, wherein the control unit determines that the connection hose is connected to the first cleaner flow path when the control unit receives the first signal from the position sensor continuously for a predetermined time or more, and wherein the control unit determines that the connection hose is connected to the second flow path when the control unit receives the second signal from the position sensor continuously for the predetermined time or more.

12. The cleaner station of claim 10, wherein the control unit determines that the connection hose is connected to any one of the first cleaner flow path and the second cleaner flow path when the control unit receives any one of the first signal and the second signal multiple times.

13. The cleaner station of claim 10, wherein the control unit determines that the connection hose is connected to any one of the first cleaner flow path and the second cleaner flow path when a receiving time of the first signal and a receiving time of the second signal are equal to each other before a final signal is received.

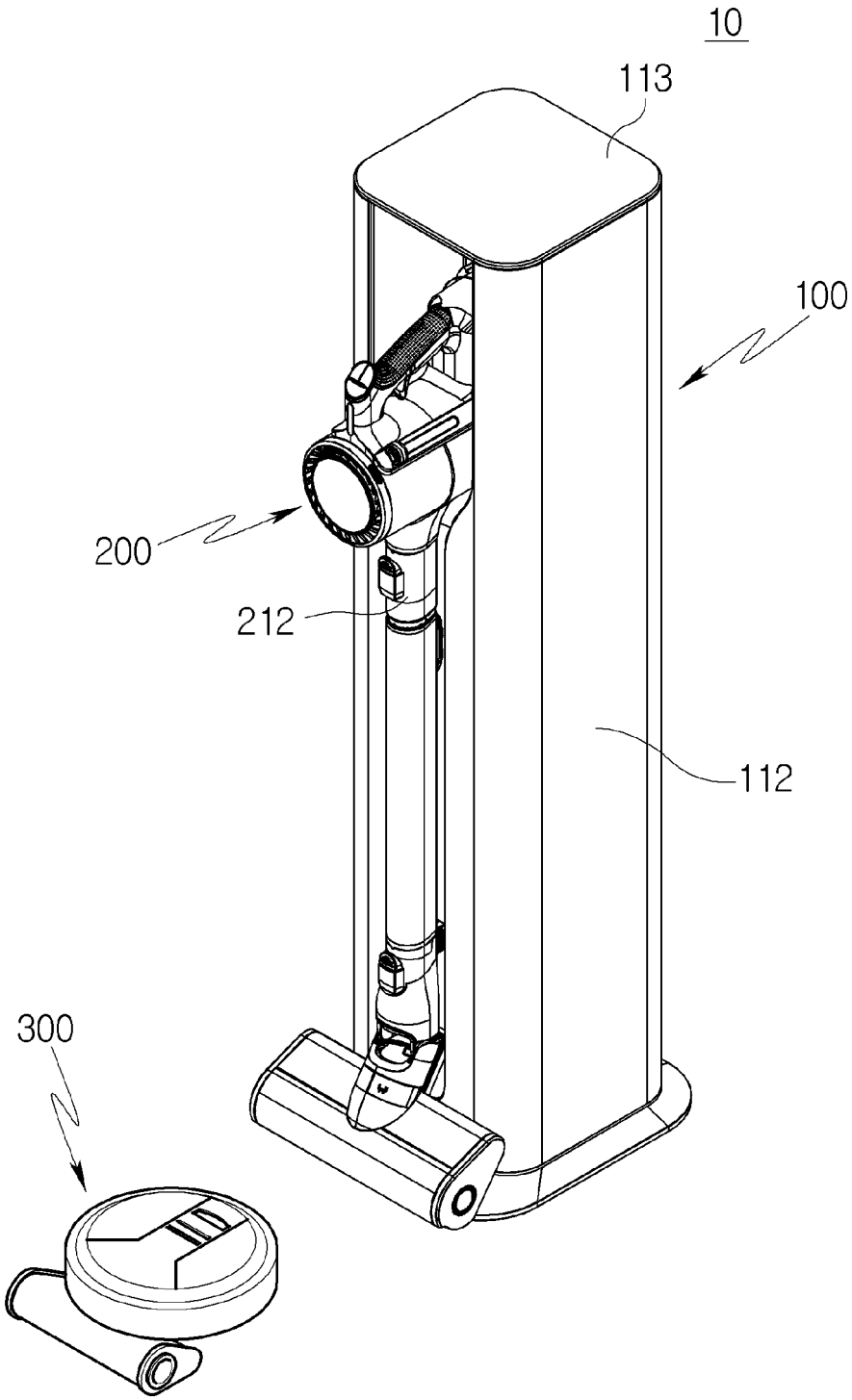
14. The cleaner station of claim 10, wherein the flow path switching module comprises:

a casing in which the connection hose is disposed;
a first link having one side rotatably coupled to the casing, and the other side coupled to an inlet of the connection hose;
a switching motor disposed at one side of the casing and configured to generate power; and
a driving cam coupled to the switching motor and configured to transmit the power to the first link.

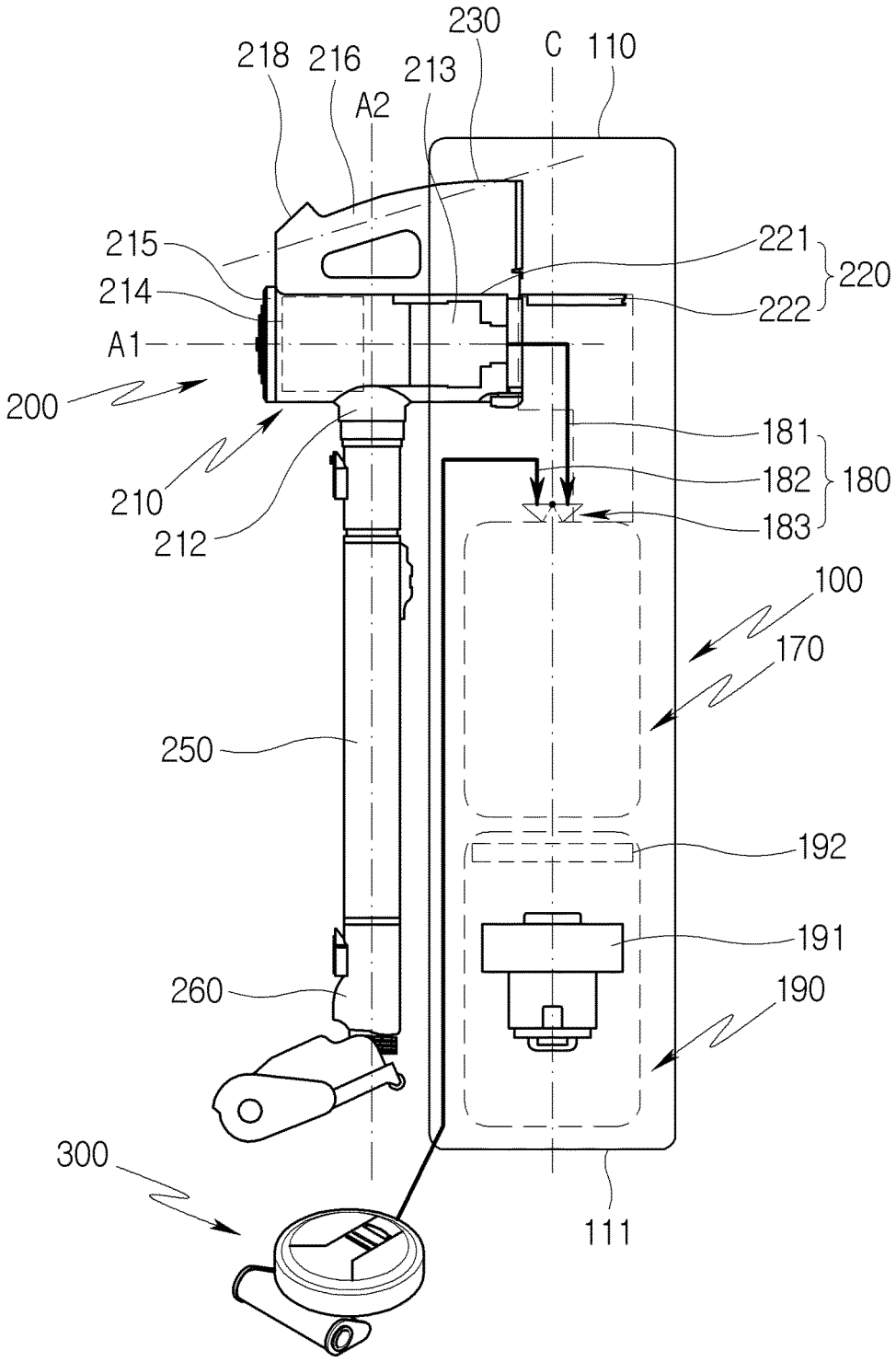
15. The cleaner station of claim 14, wherein the flow path switching module comprises:

a stopper configured to prevent the driving cam from rotating at a limited angle or more; and
a stop sensor configured to detect a position of the stopper and transmit a signal to the control unit when the position of the stopper is detected, and
wherein the control unit determines that the connection hose is connected to any one of the first cleaner flow path and the second cleaner flow path when the control unit simultaneously receives a signal from the position sensor and receives a signal from the stop sensor.

[FIG. 1]



[FIG. 2]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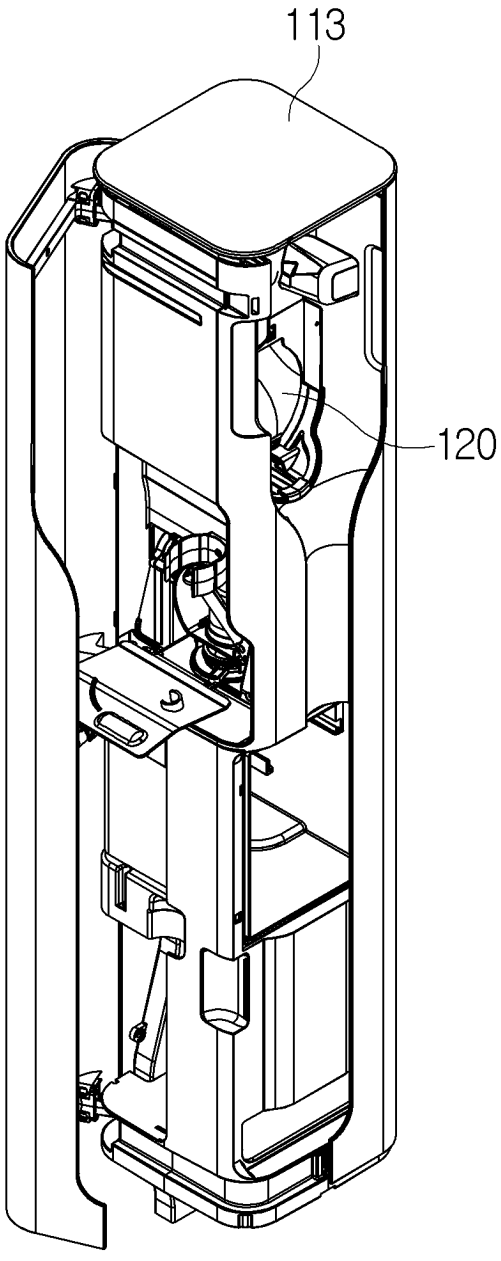
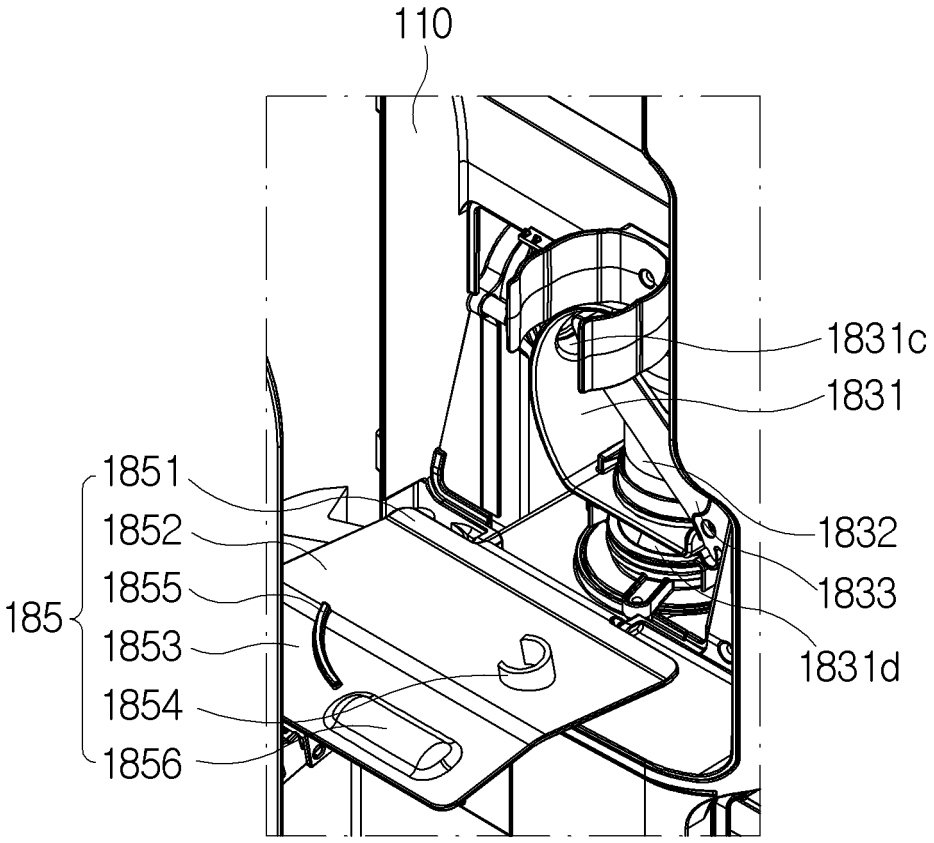
[FIG. 3]



[FIG. 4]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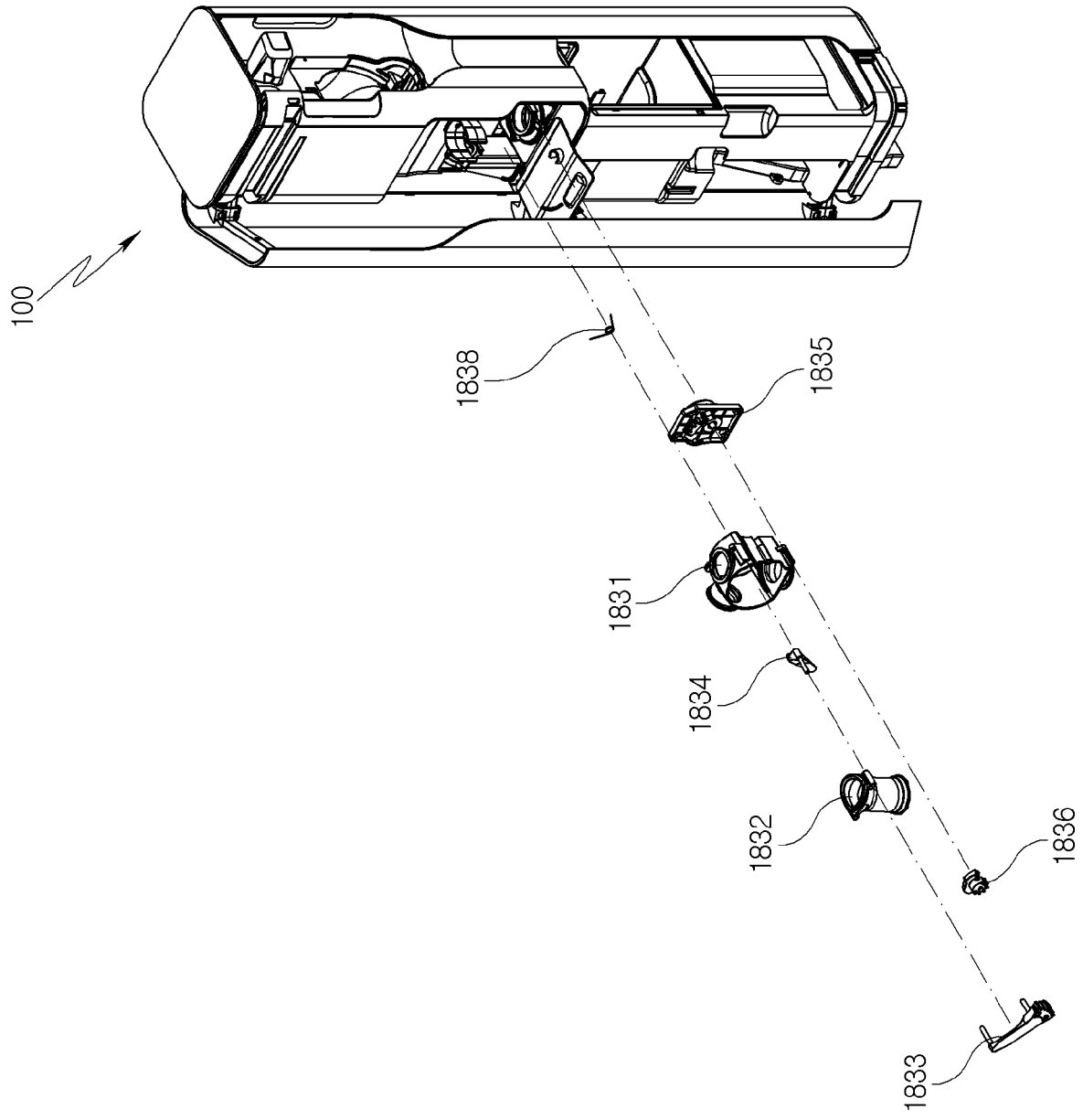
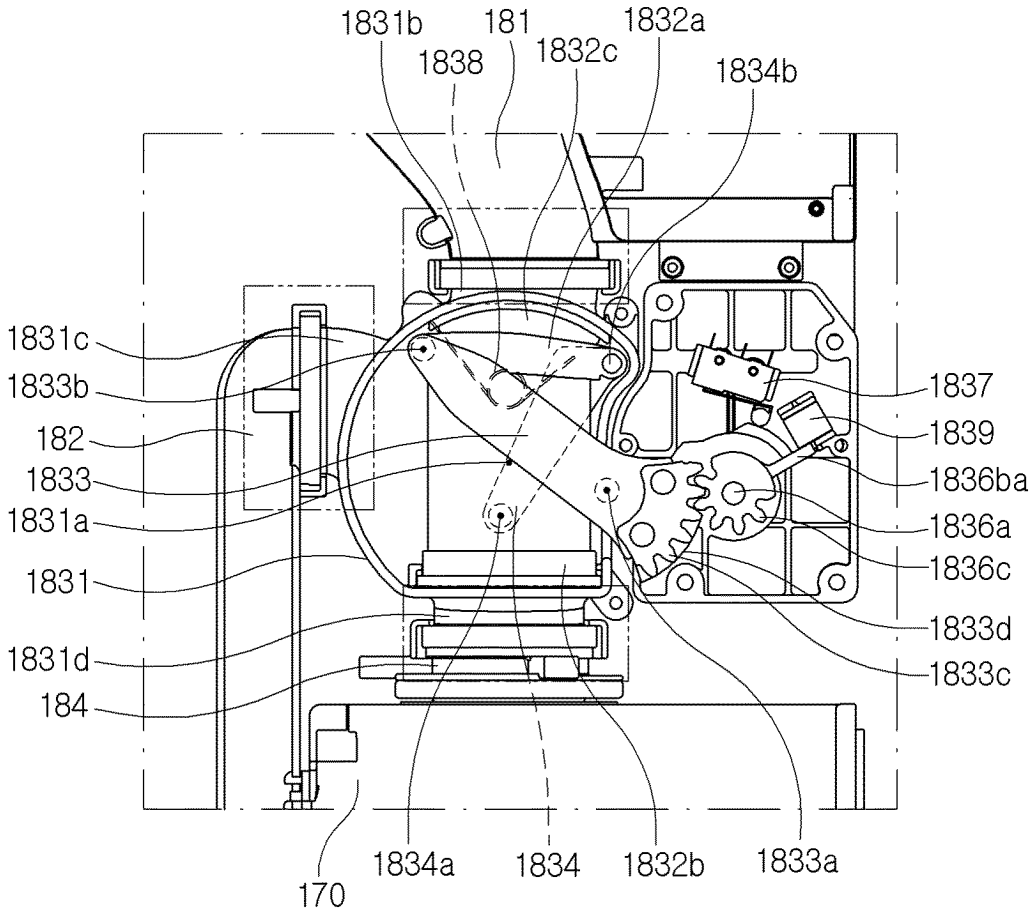
[FIG. 5]



[FIG. 6]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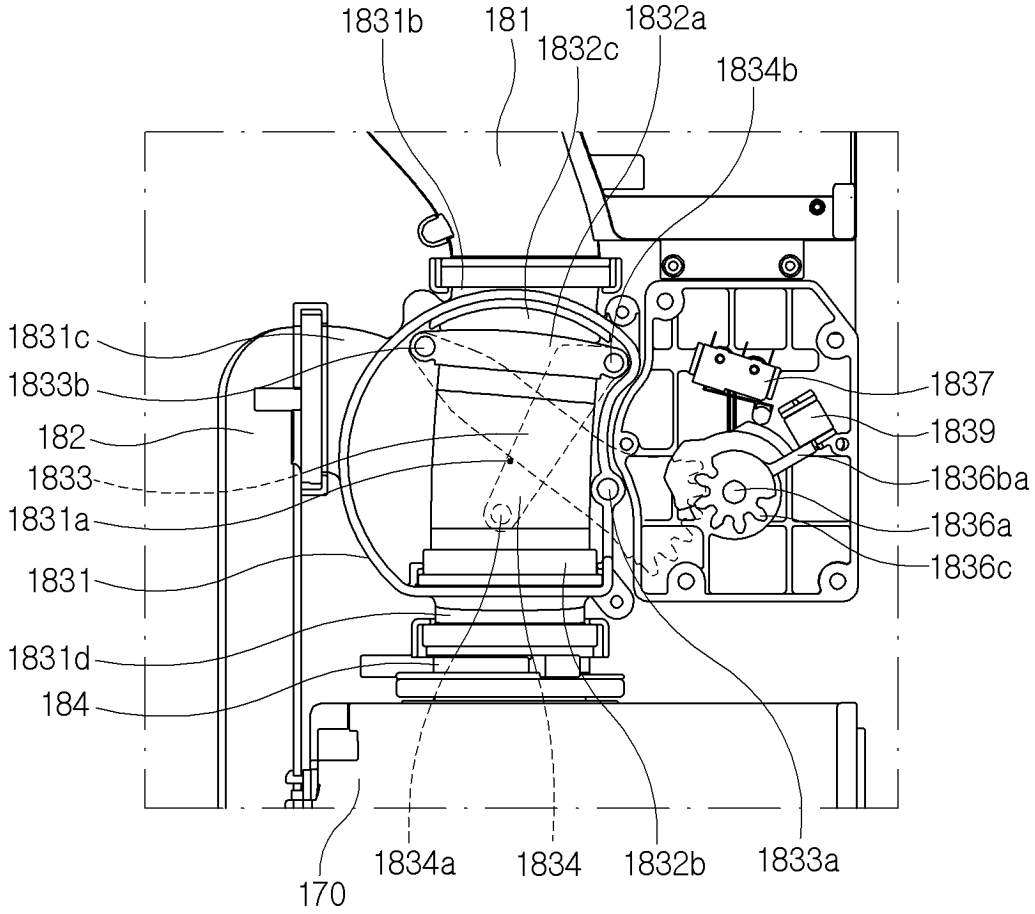
[FIG. 7]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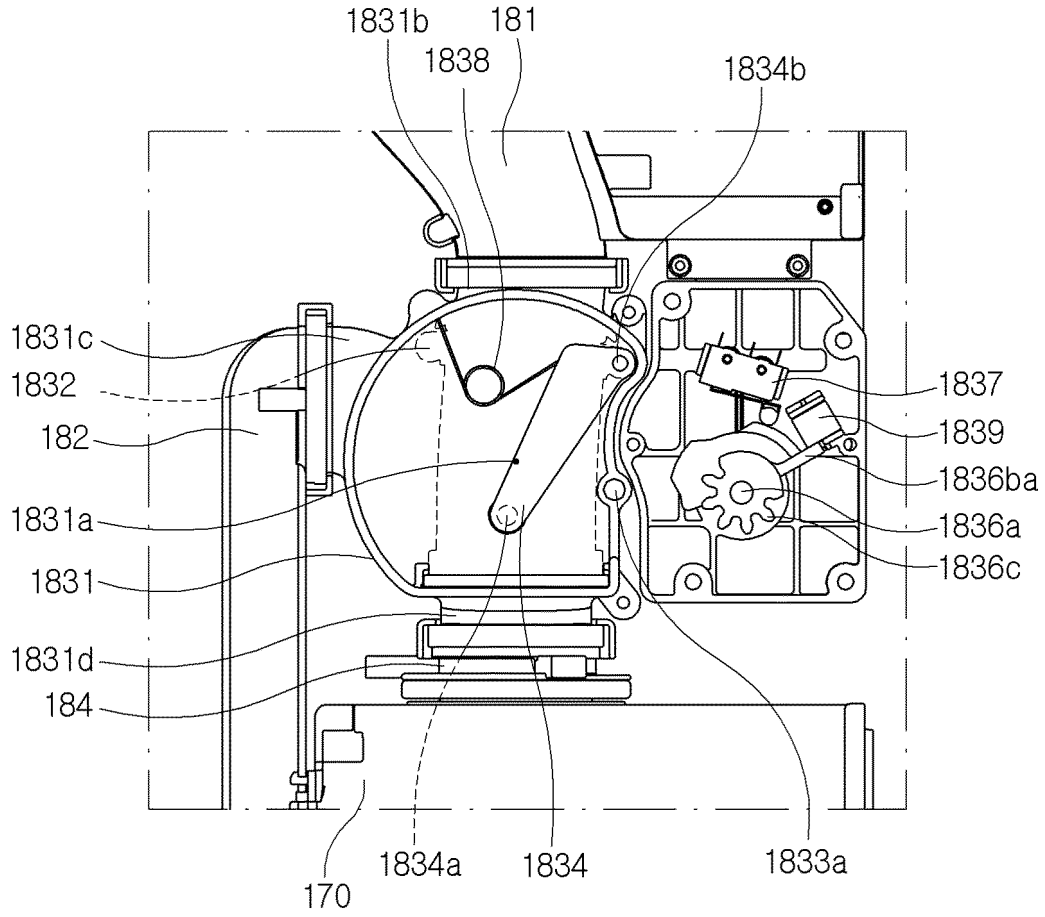
[FIG. 8]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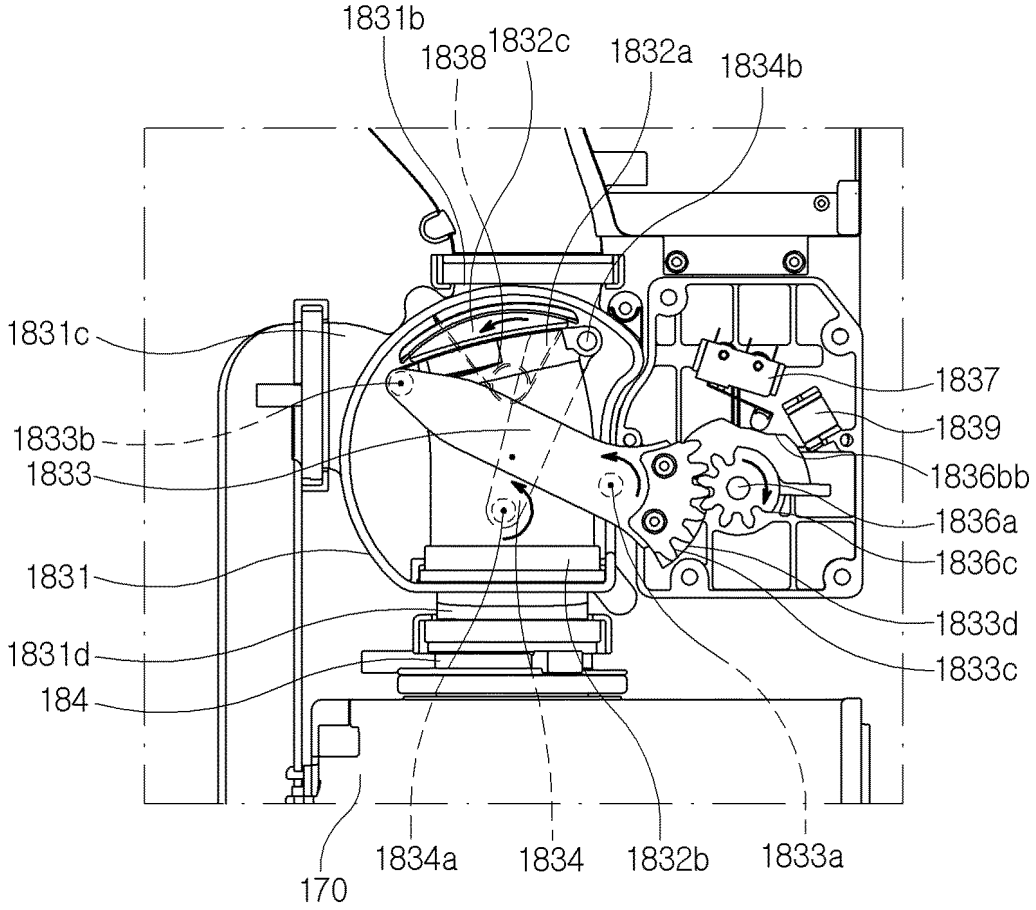
[FIG. 9]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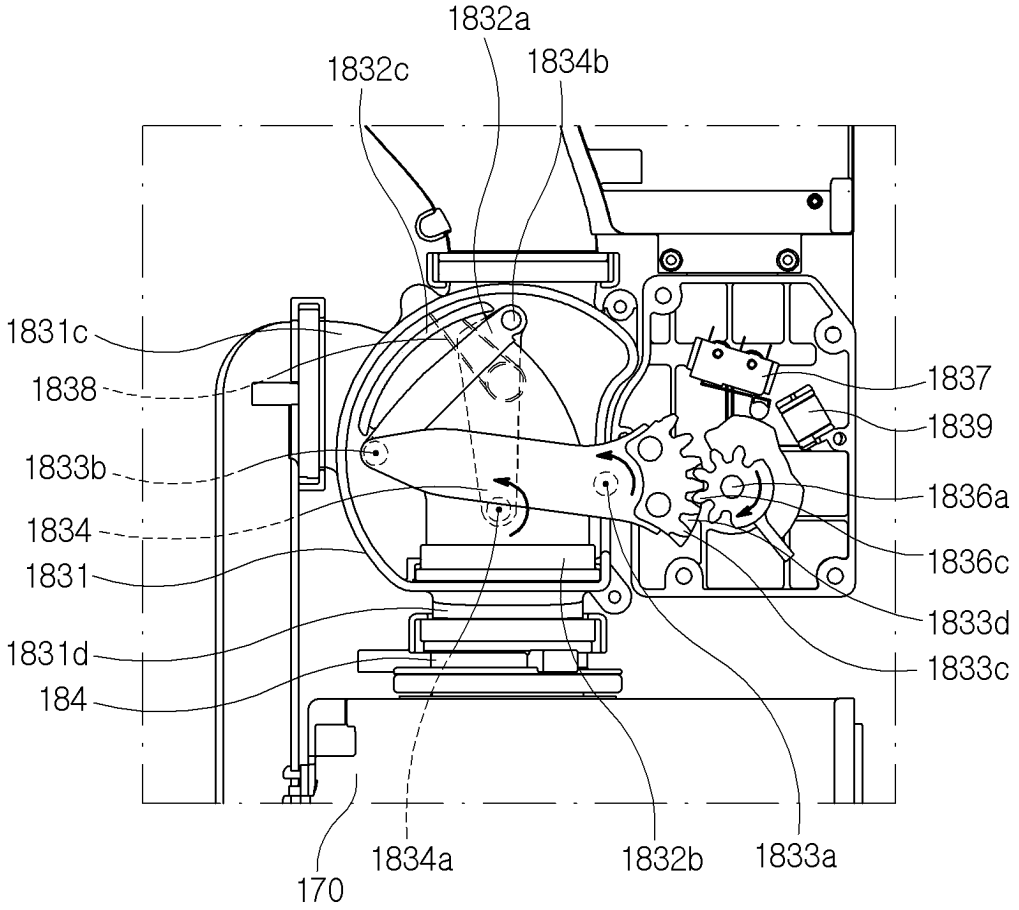
[FIG. 10]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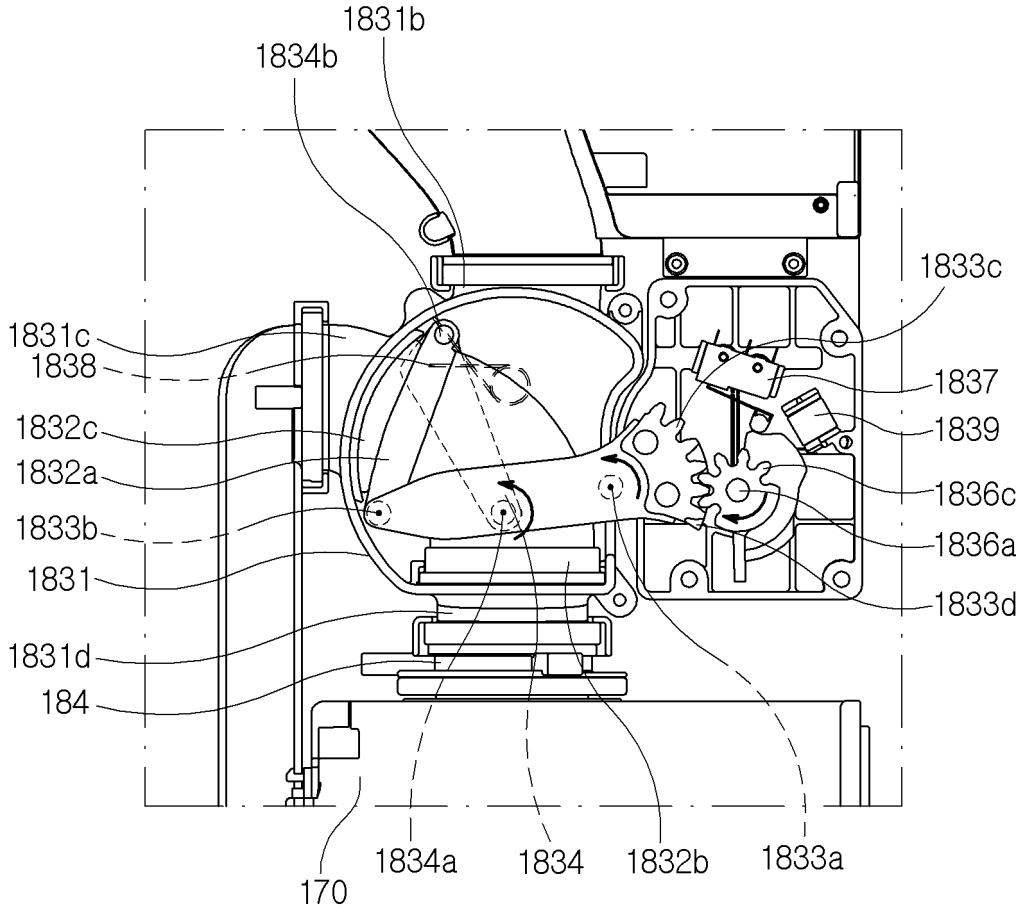
[FIG. 11]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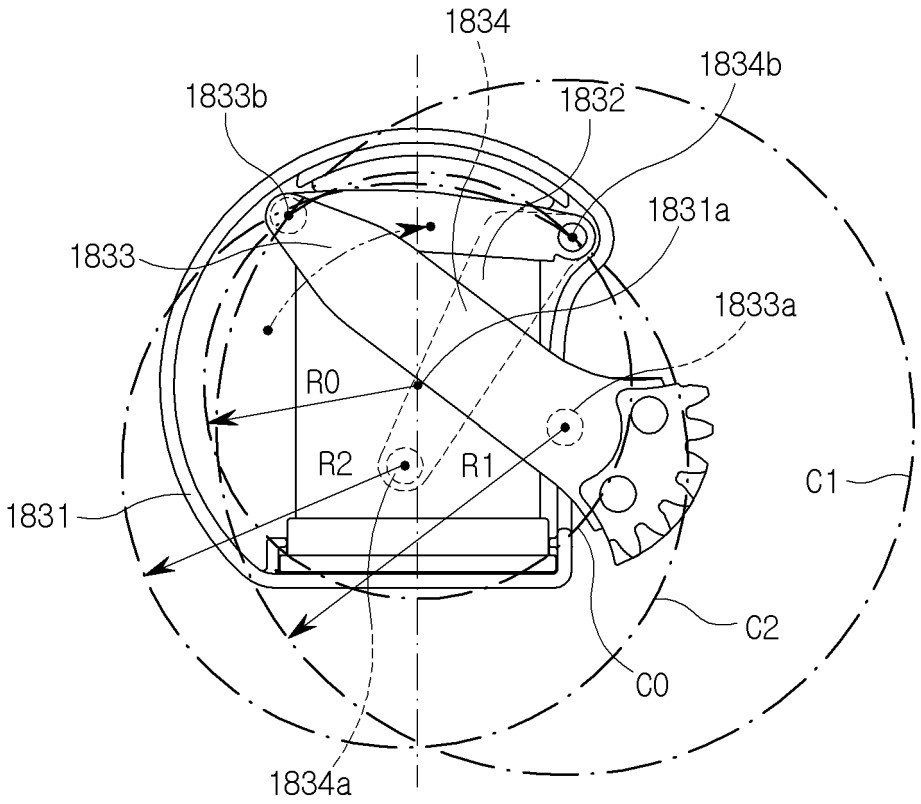
[FIG. 12]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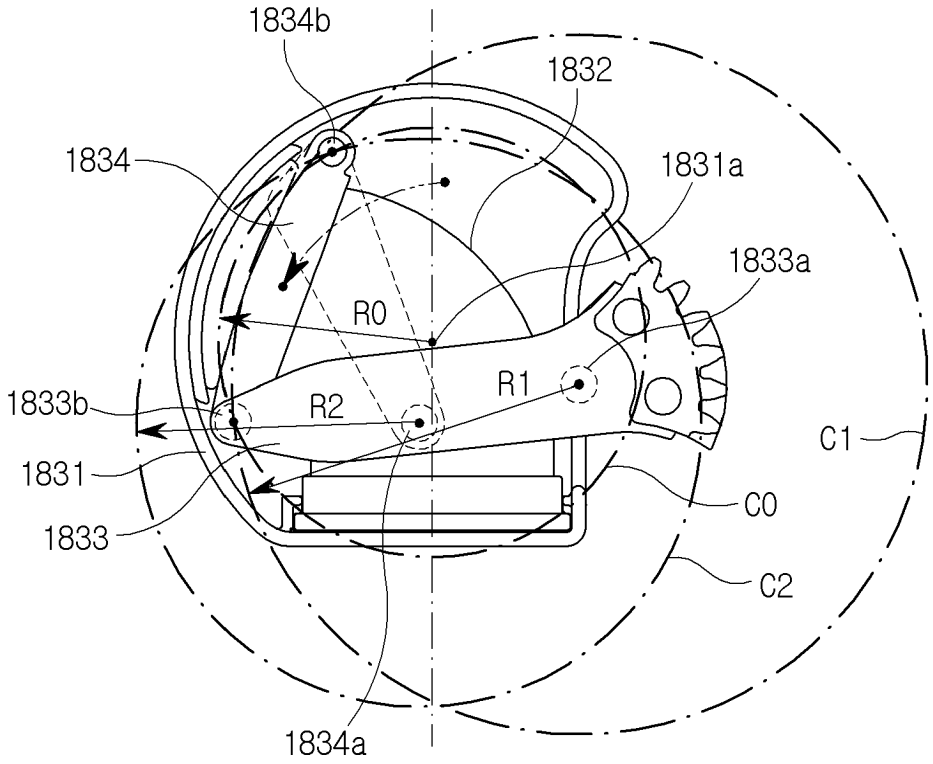
[FIG. 13]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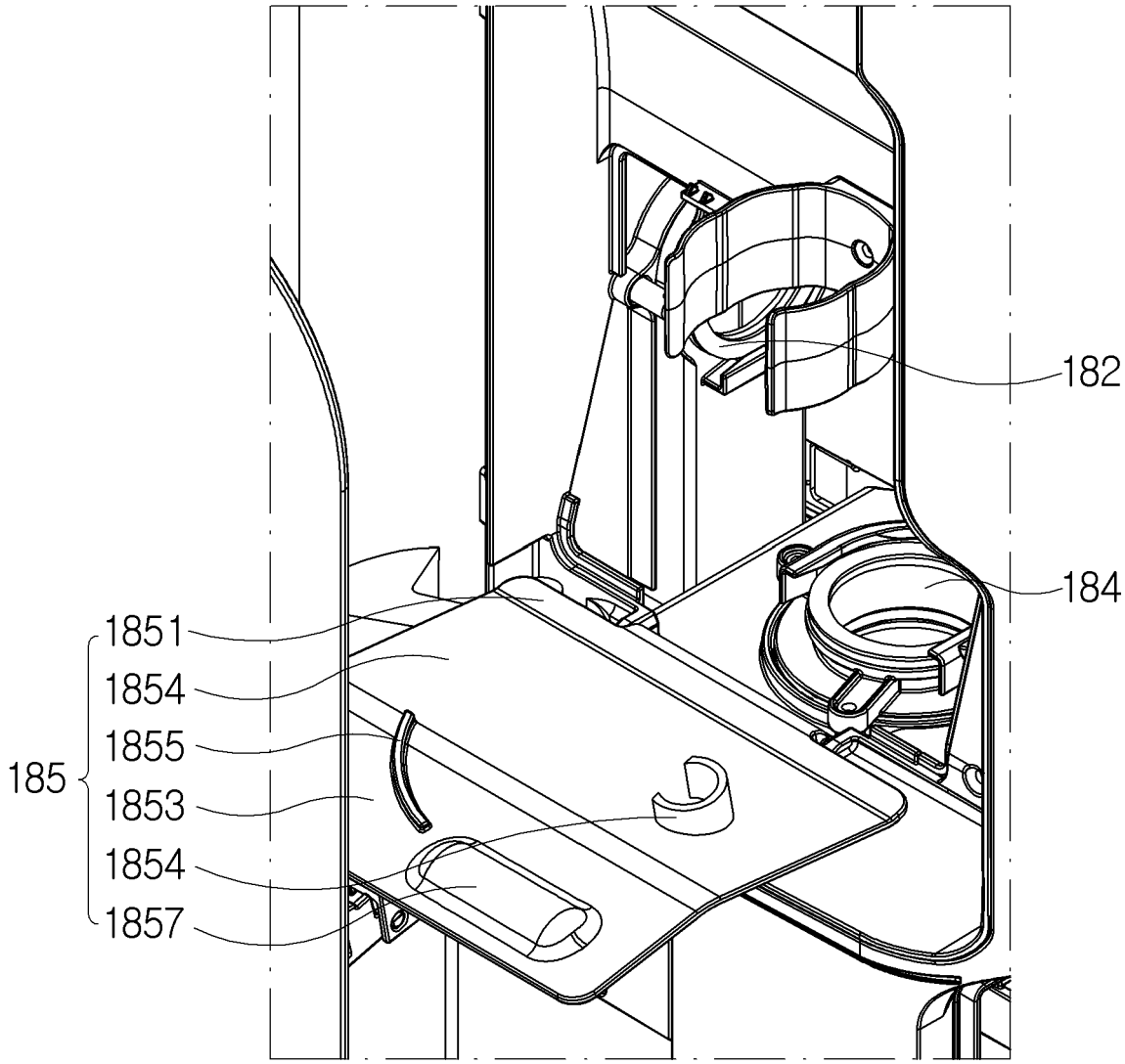
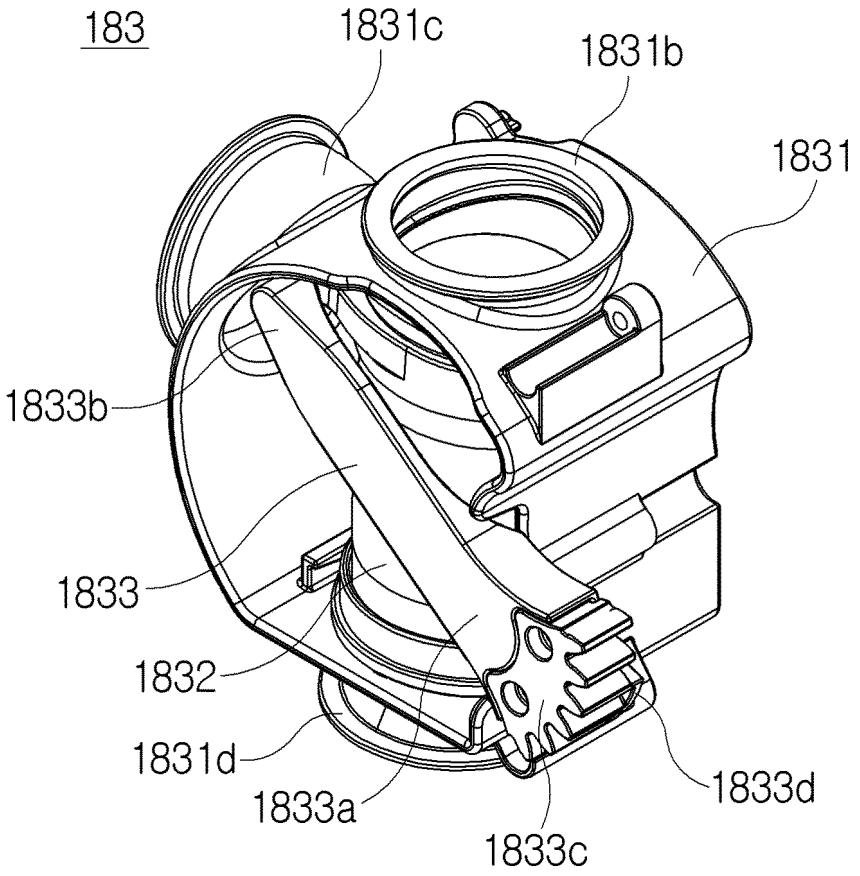
[FIG. 14]



[FIG. 15]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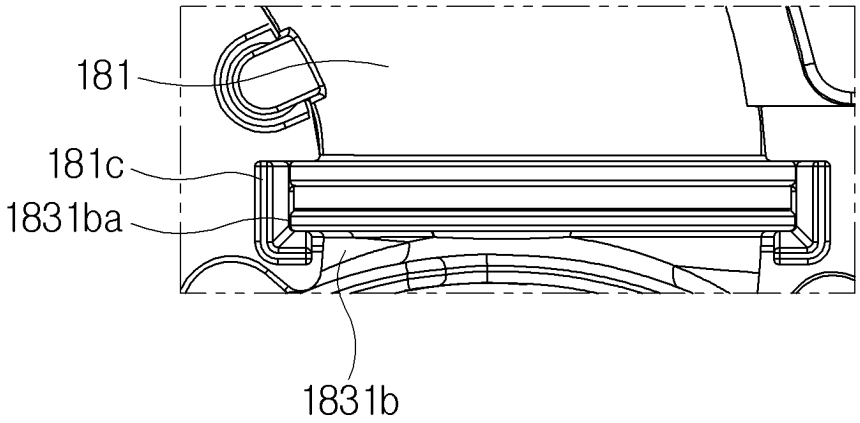
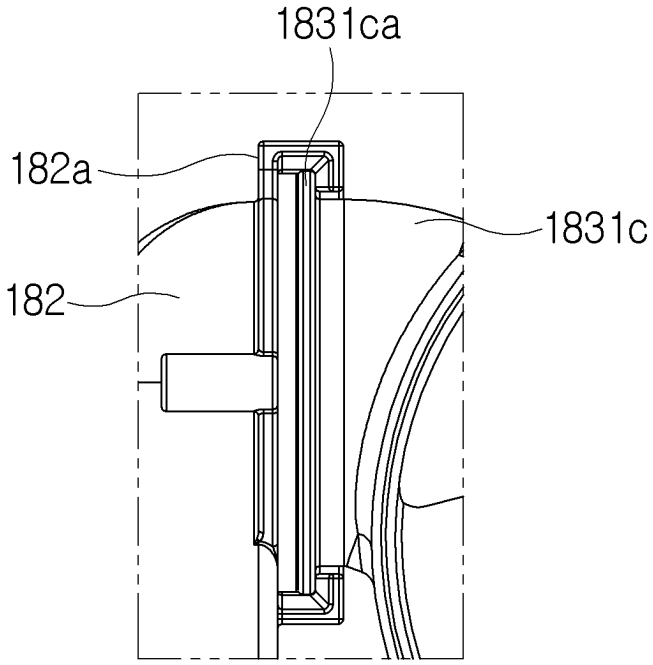
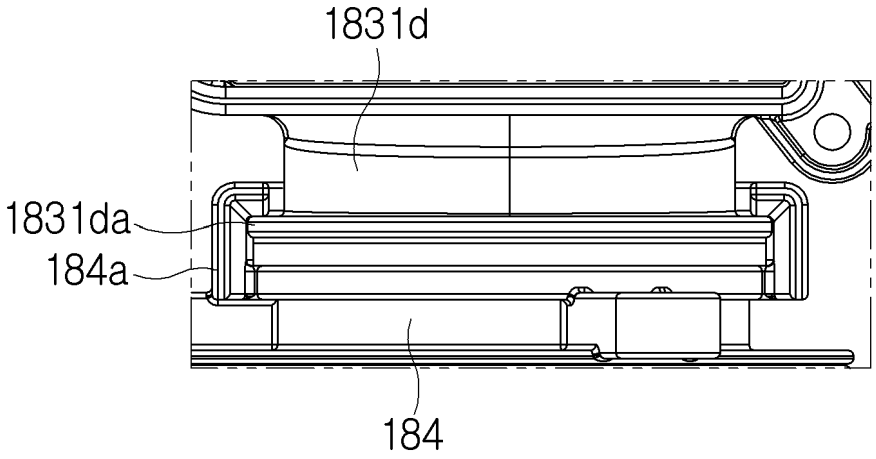
[FIG. 16]



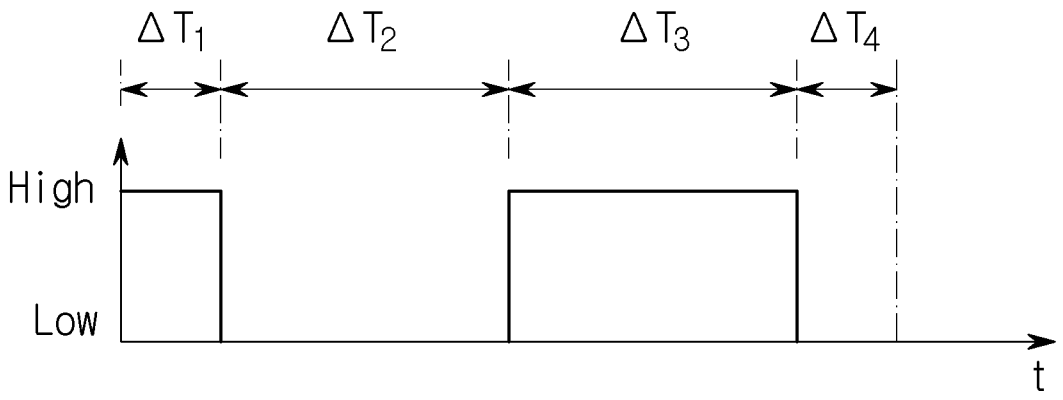
[FIG. 17]



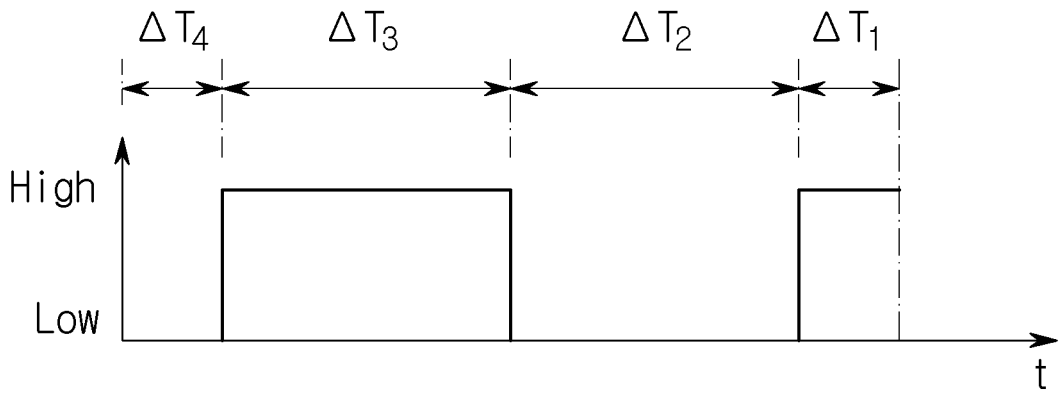
[FIG. 18]



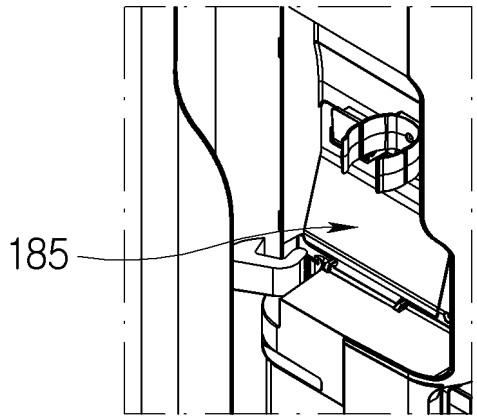
[FIG. 19]



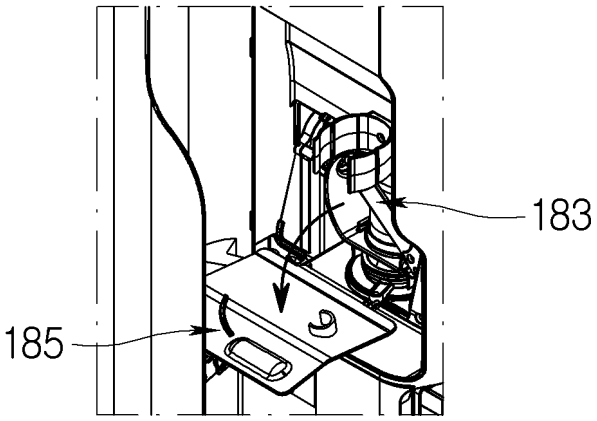
[FIG. 20]



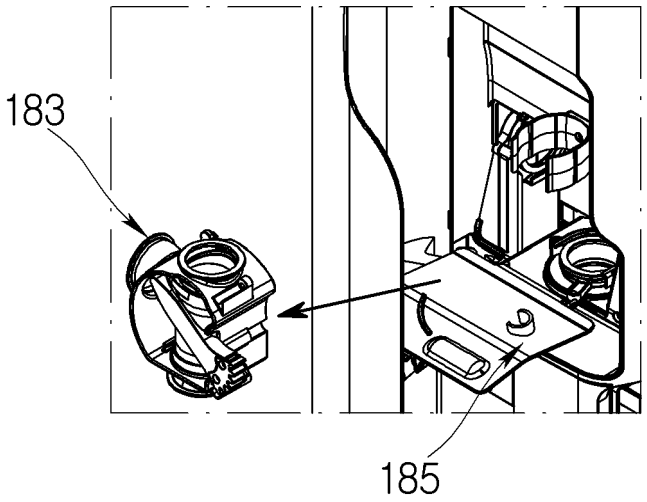
[FIG. 21]



[FIG. 22]



[FIG. 23]



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2023/002538

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 5/28(2006.01); A47L 9/00(2006.01); F16K 11/00(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), 연결호스(connecting hose), 위치센서(position sensor), 링크(link), 캠(cam), 기어(gear), 스토퍼(stopper), 스톱센서(stop sensor)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	KR 10-2021-0130655 A (LG ELECTRONICS INC.) 01 November 2021 (2021-11-01) See paragraphs [0058]-[0081], [0095] and [0119]-[0129], claims 1-3 and figures 1-12.	1-2,9-14
A		3-8,15
Y	KR 10-2010-0111603 A (SAMSUNG GWANGJU ELECTRONICS CO., LTD.) 15 October 2010 (2010-10-15) See paragraphs [0033]-[0041] and figures 1-2 and 4-5.	1-2,9-14
A	KR 10-2021-0157905 A (LG ELECTRONICS INC.) 29 December 2021 (2021-12-29) See paragraphs [0201], [0266] and [0289] and figures 5-13.	1-15
A	KR 20-0274160 Y1 (ALCO. CORP.) 06 May 2002 (2002-05-06) See claim 1 and figure 3.	1-15
A	JP 2016-116850 A (VORWERK & CO. INTERHOLDING GMBH) 30 June 2016 (2016-06-30) See claim 1 and figure 1.	1-15

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

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"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
13 June 2023	**13 June 2023**
Name and mailing address of the ISA/KR **Korean Intellectual Property Office** **Government Complex-Daejeon Building 4, 189 Cheongsa-ro, Seo-gu, Daejeon 35208** Facsimile No. **+82-42-481-8578**	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (July 2022)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/KR2023/002538

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		TW 201633985 A	01 October 2016
		TW I685324 B	21 February 2020

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

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- KR 1020210157905 **[0013] [0019]**
- KR 1020210003543 **[0016] [0019]**