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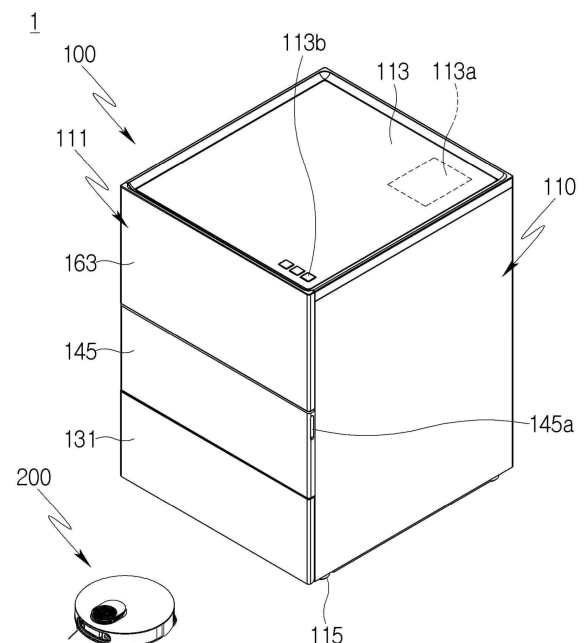
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(54) **ROBOT CLEANER STATION**

(57) The present disclosure relates to a robot cleaner station (100) including a housing (110), a base (121) disposed in the housing and configured such that a robot cleaner (200) is seated on the base, a dust collection motor (153) disposed above the base and configured to provide a flow force for collecting dust from an interior of a dust bin of the robot cleaner, a drawer (160) configured to be withdrawable from the housing in a first direction, a wastewater container coupled to be separable from the drawer in a second direction different from the first direction and configured to store a liquid discharged from the base, and a washing water container (171) coupled to be separable from the drawer in the second direction and configured to store a liquid to be discharged to the base, in which an upper surface of the housing may be used like a shelf, and the drawer and an accommodation part may be provided on a front surface of the housing and accommodate an item like a drawer cabinet.

FIG. 1



Description

CROSS-REFERENCE TO RELATED APPLICATION

[0001] The present application claims priority to Korean Patent Application No. 10-2025-0036167, filed on March 20, 2025, the entire contents of which are incorporated herein for all purposes by this reference.

BACKGROUND OF THE DISCLOSURE

Field of the Disclosure

[0002] The present disclosure relates to a robot cleaner station, and more particularly, to a robot cleaner station configured such that the robot cleaner station may collect dust from a dust bin of a robot cleaner and wash and dry a rag of the robot cleaner when the robot cleaner is coupled to the robot cleaner station, and the robot cleaner station may be configured in the form of a drawer cabinet to accommodate an item and provide an aesthetic appearance.

Description of the Related Art

[0003] Recently, with the advancement of industrial technologies, robot cleaners, which clean zones required to be cleaned while autonomously traveling without user operations, have been developed.

[0004] The robot cleaner may be equipped with a sensor capable of recognizing a space to be cleaned, an agitator capable of cleaning and sweeping a floor surface, and a rag or the like capable of wiping the floor surface. The robot cleaner may travel while sucking dust from the floor surface in the space recognized by the sensor and wiping the floor surface with the rag or the like.

[0005] Among the robot cleaners, there are a dry robot cleaner capable of sucking and removing debris scattered on the floor surface, and a wet robot cleaner capable of wiping the floor surface with the rag containing moisture in order to effectively remove debris attached to the floor surface. The dry robot cleaner is equipped with a dust bin and sucks debris on the floor surface by using a suction force of a suction motor. The wet robot cleaner is equipped with a water container and is configured such that water accommodated in the water container is supplied to the rag and the rag containing moisture wipes the floor surface to effectively remove debris attached to the floor surface. In addition, there is also a robot cleaner having a shape equipped with both the agitator and the rag.

[0006] A charging stand for the robot cleaner refers to a device in which the robot cleaner, which has completed a cleaning process, is docked. The charging stand is configured to charge a battery provided in the robot cleaner by supplying electric power to the battery. The charging stand is equipped with a power supply module therein. The charging stand is equipped with a charging terminal

connected to the power supply module, and the robot cleaner is equipped with a corresponding terminal. In case that the charging terminal and the corresponding terminal come into contact with each other, electric power is supplied to the battery, and the battery is charged.

[0007] Meanwhile, in case that the charging stand for the robot cleaner is disposed in a building, the charging stand occupies a predetermined range of an indoor space. In this case, spatial efficiency of the interior may deteriorate. In addition, there may be a risk that the robot cleaner may collide with a user or pet while the user or pet is moving, which causes injury or damage to both the user or pet and the robot cleaner.

[0008] In addition, in the case of a station to which a dust collection function of the robot cleaner is added, there is a limitation in that a volume occupied by the station increases, which may degrade the aesthetics of the interior.

[0009] In this regard, U.S. Patent Application Publication No. US2023-0030775A discloses a robot cleaner station in which a drawer type water container is disposed.

[0010] In the robot cleaner station, a seating part for a robot cleaner is disposed at a lowermost layer, a dust collection motor is disposed above the seating part, and a water container is disposed above the dust collection motor.

[0011] However, because the robot cleaner seated on the seating part of the robot cleaner station is exposed to the outside, there is a limitation in that an aesthetic interior appearance is degraded.

[0012] In addition, because the water container disposed at an uppermost side is configured to be withdrawn directly from a housing, a user may experience inconvenience in that the user needs to bend at the waist and pull the water container. In case that the water container is withdrawn, the user may also experience inconvenience in that the user needs to support, with the hand, the water container, which is about to be dropped downward by a load of the water container, and lift the water container.

[0013] In addition, because a dust bag and a dust collection motor are disposed in a leftward/rightward direction, there is a limitation in that it is impossible to provide a space capable of accommodating other items excluding the dust bag.

[0014] Meanwhile, Chinese Patent Application Laid-Open No. CN116889354A discloses a robot cleaner station in which a wastewater container is withdrawn in a drawer-type manner.

[0015] In the robot cleaner station, the wastewater container, a dust bag, and a storage part may be disposed in a drawer.

[0016] However, because the robot cleaner station is a direct-water-type robot cleaner station in which a direct water supply pipe needs to be connected, there is a limitation in that an installable position is restricted.

[0017] In addition, because the drawer and the waste-

water container are disposed at a low position, a user experiences inconvenience in that the user needs to bend at the waist, pull the drawer, and then lift the wastewater container.

[0018] In addition, because the storage part is opened in the same direction as the wastewater container and the dust bag, wastewater or dust may fall into the storage part during a process of separating the wastewater container and the dust bag, which causes a limitation in that an accommodated item may be contaminated.

SUMMARY OF THE DISCLOSURE

[0019] The present disclosure is proposed to solve these problems with the robot cleaner station in the related art and aims to provide a robot cleaner station capable of accommodating an item.

[0020] The present disclosure also aims to provide a robot cleaner station capable of providing an aesthetic interior appearance.

[0021] The present disclosure also aims to provide a robot cleaner station capable of being configured such that an accommodated item is not visible from the outside.

[0022] The present disclosure also aims to provide a robot cleaner station capable of providing a space capable of variously accommodating an accommodated item in accordance with a size of the accommodated item.

[0023] The present disclosure also aims to provide a robot cleaner station capable of allowing a user to withdraw a drawer and lift an accommodated liquid container without bending at the waist.

[0024] The present disclosure also aims to provide a robot cleaner station in which a weight balance is adjusted to prevent a plurality of liquid containers from overturning even though the plurality of liquid containers are simultaneously withdrawn.

[0025] The present disclosure also aims to provide a robot cleaner station capable of automatically collecting dust from an interior of a dust bin of a robot cleaner when the robot cleaner is coupled.

[0026] The present disclosure also aims to provide a robot cleaner station capable of automatically washing a rag of a robot cleaner when the robot cleaner is coupled.

[0027] The present disclosure also aims to provide a robot cleaner station capable of automatically drying a rag of a robot cleaner after washing the rag.

[0028] The present disclosure also aims to provide a robot cleaner station capable of preventing a situation in which wastewater or dust is introduced into an accommodation part and contaminates an accommodated item during a process of separating a wastewater container or a dust bag.

[0029] The present disclosure also aims to provide a robot cleaner station capable of preventing a situation in which a liquid, which is stored in a liquid container or remains in a hose, is dropped and contaminates an interior of a housing during a process of withdrawing a

drawer in which the liquid container is accommodated.

[0030] The present disclosure also aims to provide a robot cleaner station capable of preventing a situation in which a hose connected to a drawer is detached during a process of moving the drawer, and a liquid is spilled into a housing.

[0031] In order to achieve the above-mentioned objects, a robot cleaner station according to the present disclosure includes: a housing; a base disposed in the housing and configured such that a robot cleaner is seated on the base; a dust bag coupled in the housing in a withdrawable manner, disposed above the base, and configured to collect dust from a dust bin of the robot cleaner; a drawer provided in the housing in a withdrawable manner and disposed to be higher than the dust bag; and a washing water container separably coupled to the drawer and configured to store a liquid to be discharged to the base.

[0032] In this case, in a state in which the drawer is withdrawn from the housing, the washing water container may be separated from the drawer in a direction intersecting a withdrawal direction of the drawer.

[0033] Specifically, the washing water container may be separated in an upward/downward direction.

[0034] In addition, the drawer may be withdrawn toward a front side at which the robot cleaner enters an interior of the housing.

[0035] Meanwhile, the robot cleaner station according to the present disclosure may further include a wastewater container separably coupled to the drawer and configured to store the liquid discharged from the base.

[0036] In addition, the robot cleaner station according to the present disclosure may further include: a door provided on the housing and configured to open or close an inlet/outlet through which the robot cleaner enters or exits.

[0037] In this case, the door may be disposed at a side of the housing based on a direction in which the drawer is withdrawn.

[0038] In addition, in a state in which the door is opened, a lower end of the door may be disposed below a lower end of the housing.

[0039] In addition, in the state in which the door is opened, the door may be disposed to be inclined with respect to a ground surface.

[0040] Meanwhile, the robot cleaner station according to the present disclosure may further include: a plurality of legs provided at a lower side of the housing and configured to support the housing.

[0041] Meanwhile, the dust bag may be withdrawn in a direction in which the drawer is withdrawn.

[0042] In addition, the dust bag may be withdrawn in a direction intersecting a direction in which the washing water container is separated.

[0043] Meanwhile, the robot cleaner station according to the present disclosure may further include a detergent container coupled in the housing in a withdrawable manner and disposed between the base and the drawer.

[0044] In this case, the detergent container may be withdrawn in a direction intersecting the direction in which the washing water container is separated.

[0045] Meanwhile, the housing includes a front surface from which the drawer is withdrawn, and an accommodation part cover configured to open or close an accommodation part, in which the dust bag is accommodated, may be provided on the front surface.

[0046] In this case, the accommodation part cover may include a hinge part coupled to the housing, and a shaft of the hinge part may be disposed in the direction in which the washing water container is separated from the drawer.

[0047] Meanwhile, the housing may include a rear surface formed with an air discharge outlet through which air in the housing is discharged.

[0048] In addition, the housing may include an upper surface configured to cover an upper side of the drawer, and a charging part configured to charge an electronic device may be provided on the upper surface.

[0049] Meanwhile, a maximum withdrawal distance of the drawer may be equal to or lower than one-half of a length of the housing in a forward/rearward direction.

[0050] In addition, the maximum withdrawal distance of the drawer may be longer than a length of the washing water container in the forward/rearward direction.

[0051] Meanwhile, the drawer may include a drawer main body configured to accommodate the washing water container; and a rail coupled to the drawer main body and configured to guide the withdrawal of the drawer main body.

[0052] Meanwhile, the robot cleaner station according to the present disclosure may further include an accommodation box disposed between the base and the drawer and formed to accommodate an item.

[0053] In addition, the robot cleaner station according to the present disclosure includes: a housing formed with an inlet/outlet through which a robot cleaner enters or exits; a door configured to open or close a front side of the housing at which the inlet/outlet is disposed; a base disposed in the housing and configured such that the robot cleaner is seated on the base; a dust collection motor disposed above the base and configured to provide a flow force for collecting dust from an interior of a dust bin of the robot cleaner; a dust bag coupled to be withdrawable from the housing and configured to collect dust from the dust bin; and a drawer configured to be withdrawable from the housing and disposed above the dust bag.

[0054] In this case, the dust bag may be disposed forward of the dust collection motor.

[0055] In addition, the drawer may be withdrawn in a direction opposite to a direction in which the dust collection motor is disposed.

[0056] The robot cleaner station according to the present disclosure may further include a wastewater container separably coupled to the drawer and configured to store the liquid discharged from the base; and a washing

water container separably coupled to the drawer and configured to store the liquid discharged from the base, in which the wastewater container and the washing water container are symmetrically disposed in the drawer.

[0057] Meanwhile, the robot cleaner station according to the present disclosure may further include a dust collection flow path part configured to connect an internal space of the dust bin and an internal space of the dust bag, in which at least a part of the dust collection flow path part may be disposed between the wastewater container and the washing water container.

[0058] Meanwhile, the drawer may be formed with a plurality of ports configured to communicate with an interior of the wastewater container or an interior of the washing water container and configured such that the liquid passes through the plurality of ports.

[0059] In this case, the plurality of ports may be disposed above a lower surface of the drawer.

[0060] Meanwhile, the robot cleaner station according to the present disclosure may further include at least one flow path part coupled to the drawer, configured to move together with the drawer, and formed with a flow path in which the liquid flows.

[0061] In addition, the robot cleaner station according to the present disclosure may further include a hose guide part configured to guide deformation of the flow path part.

[0062] In addition, the robot cleaner station according to the present disclosure may further include a sterilization module disposed between the drawer and the dust bag and configured to emit light toward the dust bag.

[0063] Meanwhile, an inclined surface configured to guide a flow of the liquid may be formed on a lower surface of the drawer.

[0064] Meanwhile, the robot cleaner station according to the present disclosure may further include a dust bag housing in which the dust bag is coupled in a withdrawable manner, the dust bag housing being disposed forward of the dust collection motor.

[0065] Meanwhile, the washing water container or the wastewater container may be disposed forward of the dust collection motor.

[0066] Meanwhile, the robot cleaner station according to the present disclosure may further include an accommodation part disposed between the base and the drawer and configured to provide an accommodation space, in which the accommodation part may be disposed forward of the dust collection motor.

[0067] Meanwhile, the robot cleaner station according to the present disclosure may further include a heater disposed in the housing and configured to heat washing water for washing a rag of the robot cleaner, in which the heater may be disposed rearward of the dust collection motor.

[0068] Meanwhile, the robot cleaner station according to the present disclosure may further include: a washing plate configured to come into contact with a rag of the robot cleaner in a state in which the robot cleaner is

seated on the seating part; and a washing tub configured to store the liquid having passed through the washing plate, in which the washing tub may be disposed rearward of the dust collection motor.

[0069] Meanwhile, a maximum withdrawal distance of the drawer may be shorter than a distance from a front end of the housing to a front end of the dust collection motor.

[0070] In addition, the robot cleaner station according to the present disclosure includes a housing, a base disposed in the housing and configured such that a robot cleaner is seated on the base, a dust collection motor disposed above the base and configured to provide a flow force for collecting dust from an interior of a dust bin of the robot cleaner, a drawer configured to be withdrawable from the housing in a first direction, a wastewater container coupled to be separable from the drawer in a second direction different from the first direction and configured to store a liquid discharged from the base, and a washing water container coupled to be separable from the drawer in the second direction and configured to store a liquid to be discharged to the base.

[0071] In this case, the robot cleaner station according to the present disclosure may further include a door provided on the housing and configured to open or close an inlet/outlet through which the robot cleaner enters or exits, in which the door may be inclined in a third direction different from the first direction and the second direction in a state in which the door is opened.

[0072] In this case, the first direction and the second direction may intersect each other.

[0073] In addition, the third direction may intersect the first direction.

[0074] In addition, the first direction, the second direction, and the third direction may intersect one another on the same plane.

[0075] In this case, the robot cleaner station according to the present disclosure may further include a dust bag coupled to be withdrawable from the housing in the first direction and configured to collect dust from the dust bin.

[0076] In addition, the robot cleaner station according to the present disclosure may further include an accommodation part drawer coupled to be withdrawable from the housing in the first direction and configured to store a detergent.

[0077] In addition, the robot cleaner station according to the present disclosure may further include an accommodation box formed in the housing and configured to accommodate an item in the first direction.

[0078] In this case, the first direction may be an axial direction of a shaft of the dust collection motor.

[0079] In addition, the second direction may be a vertical direction.

[0080] In addition, the third direction may be an inclination direction of the base.

[0081] According to the robot cleaner station according to the present disclosure described above, the upper surface of the housing may be used like a shelf, and

the drawer and the accommodation part may be provided on the front surface of the housing, thereby accommodating an item, like a drawer cabinet.

[0082] In addition, the robot cleaner is not exposed to the outside in case that the robot cleaner enters the interior of the housing, thereby providing an aesthetic appearance similar to indoor furniture.

[0083] In addition, because the cover is provided at the front side of the accommodation space, such that the accommodated item accommodated in the accommodation space may be visible after the cover is pulled and separated from the housing.

[0084] In addition, the liquid container may be accommodated in the drawer, or the accommodation boxes having various sizes may accommodate various items.

[0085] In addition, the handle of the drawer and the handle of the liquid container are disposed in consideration of a height and an arm length of an adult, such that the user may withdraw the drawer and lift the liquid container without bending at the waist.

[0086] In addition, the dust collection motor may be disposed rearward of the plurality of liquid containers, and the weight balance is adjusted so that the plurality of liquid containers do not overturn even though the drawer is withdrawn, thereby preventing the drawer from overturning.

[0087] In addition, the item may be mounted by utilizing the widely ensured upper surface of the housing.

[0088] In addition, because dust in the dust bin of the robot cleaner is automatically collected when the robot cleaner is coupled, the user only needs to withdraw the dust bag at regular intervals, thereby reducing user effort.

[0089] In addition, the rag of the robot cleaner may be automatically washed when the robot cleaner is coupled, thereby reducing the inconvenience of having to separate the rag and separately wash the rag.

[0090] In addition, the detergent may be supplied as necessary, thereby improving the effect of washing the rag.

[0091] In addition, the rag may be automatically dried by supplying hot air to the rag after the rag of the robot cleaner is washed, thereby preventing the occurrence of offensive odor caused by a wet rag.

[0092] In addition, the door of the robot cleaner station is closed when the robot cleaner enters the robot cleaner station, thereby preventing the dust from scattering to the outside while the dust is collected from the dust bin.

[0093] In addition, it is possible to prevent wastewater from leaking to the outside in case that the rag of the robot cleaner is washed.

[0094] In addition, the drawer provided with the wastewater container may be disposed at a different height from the accommodation part, thereby preventing a situation in which the wastewater is introduced into the accommodation part and contaminates the accommodated item.

[0095] In addition, the hose may move together with the drawer in the state in which the hose is connected to

the drawer in which the liquid container is accommodated, thereby preventing the liquid from leaking from the portion where the hose and the liquid container are connected.

[0096] In addition, the hose may be supported in a shape in the hose is bent multiple times, thereby preventing the hose from sagging downward or arbitrarily separated even though the drawer moves.

BRIEF DESCRIPTION OF THE DRAWINGS

[0097]

FIG. 1 is a perspective view for explaining a cleaner system according to an embodiment of the present disclosure.

FIG. 2 is a front view for explaining a robot cleaner station according to the embodiment of the present disclosure.

FIG. 3 is a rear view of FIG. 2.

FIG. 4 is a cross-sectional view of FIG. 2.

FIG. 5 is a perspective view for explaining a robot cleaner according to the embodiment of the present disclosure.

FIG. 6 is a side view of FIG. 5.

FIG. 7 is a bottom plan view of FIG. 5.

FIG. 8 is a rear view of FIG. 5.

FIG. 9 is a perspective view for explaining a state in which a door is open in the robot cleaner station according to the embodiment of the present disclosure.

FIG. 10 is a cross-sectional view for explaining a seating part and a door part in the robot cleaner station according to the embodiment of the present disclosure.

FIG. 11 is a front view of FIG. 9.

FIG. 12 is a view when FIG. 10 is viewed at another angle.

FIG. 13 is a perspective view illustrating a state in which an accommodation part cover is removed from the robot cleaner station according to the embodiment of the present disclosure.

FIG. 14 is a front view of FIG. 13.

FIG. 15 is a perspective view for explaining a state in which a dust bag and an accommodation part drawer are withdrawn from the robot cleaner station according to the embodiment of the present disclosure.

FIG. 16 is a view for explaining an internal structure of the robot cleaner station according to the embodiment of the present disclosure.

FIG. 17 is a top plan view for explaining an internal structure of the robot cleaner station according to the embodiment of the present disclosure when viewed from above the accommodation part.

FIG. 18 is a perspective view for explaining a state in which the drawer is withdrawn from the robot cleaner station according to the embodiment of the present disclosure.

FIG. 19 is a top plan view of FIG. 18.

FIG. 20 is a cross-sectional view of FIG. 18.

FIG. 21 is a perspective view for explaining a direction in which a liquid container is separated after the drawer is withdrawn from the robot cleaner station according to the embodiment of the present disclosure.

FIGS. 22 to 24 are views for explaining a process of separating the liquid container after the drawer is withdrawn from the robot cleaner station according to the embodiment of the present disclosure.

FIGS. 25 and 26 are perspective views for explaining the liquid container coupled to the drawer in the robot cleaner station according to the embodiment of the present disclosure.

FIG. 27 is a rear view of FIG. 22.

FIG. 28 is a top plan view of FIG. 22.

FIG. 29 is a top plan view for explaining the drawer in a state in which the liquid container is separated from the robot cleaner station according to the embodiment of the present disclosure.

FIG. 30 is a cross-sectional view for explaining an arrangement of a hose before the drawer is withdrawn from the robot cleaner station according to the embodiment of the present disclosure.

FIG. 31 is a cross-sectional view for explaining an arrangement of the hose after the drawer is withdrawn from the robot cleaner station according to the embodiment of the present disclosure.

FIG. 32 is a cross-sectional view for explaining a drain flow path part in the robot cleaner station according to the embodiment of the present disclosure.

FIG. 33 is a perspective view for explaining a hose guide part in the robot cleaner station according to the embodiment of the present disclosure.

DETAILED DESCRIPTION OF THE DISCLOSURE

[0098] Hereinafter, exemplary embodiments of the present disclosure will be described in detail with reference to the accompanying drawings.

[0099] 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 technical scope of the present disclosure.

[0100] In the description of the present disclosure, the terms such as "first" and "second" may be used to describe various constituent elements, but the constituent elements may not be limited by the terms. These terms are used only to distinguish one constituent element from another constituent element. For example, a first component may be named a second component, and simi-

larly, the second component may also be named the first component, without departing from the scope of the present disclosure.

[0101] The term "and/or" may include any and all combinations of a plurality of the related and listed items.

[0102] When one constituent element is described as being "coupled" or "connected" to another constituent element, it should be understood that one constituent element can be coupled or connected directly to another constituent element, and an intervening constituent element can also be present between the constituent elements. When one constituent element is described as being "coupled directly to" or "connected directly to" another constituent element, it should be understood that no intervening constituent element is present between the constituent elements.

[0103] 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.

[0104] The terms "comprises," "comprising," "includes," "including," "containing," "has," "having" or other variations thereof are inclusive and therefore specify the presence of stated features, integers, steps, operations, elements, components, and/or combinations thereof, but do not preclude the presence or addition of one or more other features, integers, steps, operations, elements, components, and/or combinations thereof.

[0105] 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.

[0106] Further, the following embodiments are provided to more completely explain the present disclosure to those skilled in the art, and shapes and sizes of elements illustrated in the drawings may be exaggerated for a more apparent description.

[0107] FIG. 1 is a view for explaining a cleaner system according to an embodiment of the present disclosure.

[0108] With reference to FIG. 1, a cleaner system 1 according to an embodiment of the present disclosure includes a robot cleaner station 100 and a robot cleaner 200.

[0109] The robot cleaner 200 may be seated in the robot cleaner station 100. Specifically, the robot cleaner 200 may enter a front side of the robot cleaner station 100, and the robot cleaner 200 may be accommodated in the robot cleaner station 100.

[0110] When the robot cleaner 200 enters the interior of the robot cleaner station 100, the robot cleaner 200 may be seated on a base 121 of the robot cleaner station 100.

In this case, the robot cleaner 200 and the robot cleaner station 100 may be docked in an electrical and flow path manner. Specifically, a dust bin 220 of the robot cleaner 200 may be connected, in a flow path manner, to a dust collection part 150 of the robot cleaner station 100. In addition, a water container 230 of the robot cleaner 200 may be connected to a water supply nozzle 123c of the robot cleaner station 100. In addition, a charging terminal 280 of the robot cleaner 200 may be electrically connected to an electric power supply terminal 123b of the robot cleaner station 100.

[0111] Therefore, the robot cleaner station 100 may remove dust from the dust bin 220 of the robot cleaner 200. The robot cleaner station 100 may wash rags 242 of the robot cleaner 200. The robot cleaner station 100 may dry the rags 242 of the robot cleaner 200. The robot cleaner station 100 may supply electric power to the robot cleaner 200.

[0112] FIGS. 2 to 5 is a view for explaining the robot cleaner according to the embodiment of the present disclosure.

[0113] A structure of the robot cleaner 200 will be described below with reference to FIGS. 2 to 5.

[0114] The robot cleaner 200 may automatically clean a zone to be cleaned by sucking debris such as dust from a floor while autonomously traveling in the zone to be cleaned.

[0115] The robot cleaner 200 according to the embodiment of the present disclosure is configured to be placed on a floor and clean the floor while moving on a floor surface. Therefore, hereinafter, an upward/downward direction is defined based on a state in which the robot cleaner 200 is placed on the floor.

[0116] Further, based on a pair of wheels 260, a side at which an auxiliary wheel 270 to be described below is defined as a front side, and a side at which the rotary cleaning part 240 to be described below is disposed is defined as a rear side.

[0117] Among the portions described in the embodiment of the present disclosure, a 'lowermost portion' may be a portion positioned at a lowest position or a portion closest to the floor when the robot cleaner 200 according to the embodiment of the present disclosure is placed on the floor and used.

[0118] The robot cleaner 200 according to the embodiment of the present disclosure includes a body 210, the dust bin 220, the water container 230, the rotary cleaning part 240, an agitator 250, the wheels 260, the auxiliary wheel 270, and the charging terminal 280.

[0119] The body 210 may define an overall external shape of the robot cleaner 200. Components constituting the robot cleaner 200 may be coupled to the body 210, and some of the components constituting the robot cleaner 200 may be accommodated in the body 210.

[0120] Specifically, the components of the robot cleaner 200 may be provided in a space in the body 210. For example, a battery and at least one motor may be accommodated in the space in the body 210.

[0121] In the embodiment of the present disclosure, the body 210 has a shape in which a width (or diameter) in a horizontal direction is larger than a height in an upward/downward direction. The body 210 may provide an advantageous structure that assists the robot cleaner 200 in having a stable structure and allows the robot cleaner 200 to avoid an obstacle while moving traveling.

[0122] The body 210 may have various shapes such as a circular shape, an elliptical shape, or a quadrangular shape when viewed from above or below.

[0123] The body 210 may be divided into a lower body and an upper body, and the lower body and the upper body may be coupled to define the space in the body 210.

[0124] The lower body may be coupled to the upper body to define the space capable of accommodating therein the battery, at least one sensor, and at least one motor.

[0125] A suction part 211 into which air is introduced may be formed in the lower body, and a hole configured to accommodate the pair of wheels 260 may be formed in the lower body.

[0126] The suction part 211 may be a passageway into which dust on the floor surface is introduced. Further, the suction part 211 may communicate with a suction flow path (not illustrated) formed in the body 210, and the suction flow path may communicate with an internal space of the dust bin 220.

[0127] Meanwhile, the lower body may be further provided with an air discharge flow path. One side of the air discharge flow path may communicate with the internal space of the dust bin 220, and the other side of the air discharge flow path may communicate with an air discharge outlet. In this case, a filter may be disposed in the air discharge outlet.

[0128] With this configuration, the air introduced through the suction part 211 may flow into the dust bin 220 through the suction flow path and be discharged to the air discharge outlet through the air discharge flow path.

[0129] The agitator 250 to be described below may be rotatably accommodated in the suction part 211. With this configuration, dust present around the suction part 211 may be guided into the suction part 211 by a rotation of the agitator 250, thereby improving efficiency in sucking dust.

[0130] The upper body may define an external appearance of an upper side of the robot cleaner 200. Although not illustrated, a display may be provided on the upper body.

[0131] The robot cleaner 200 of the present disclosure may include a bumper. The bumper is coupled along a rim of the body 210 and configured to move relative to the body 210.

[0132] The bumper may be coupled along a part of the rim of the body 210 or coupled along the entire rim of the body 210. At least one elastic member (not illustrated) may be provided between the bumper and the body 210. With this configuration, when the bumper comes into

contact with an obstacle or the like and relatively moves toward a center of the body 210, the bumper may be returned to an original position by a restoring force of the elastic member (not illustrated), and the elastic member (not illustrated) may absorb or disperse impact applied to the bumper to prevent and reduce the transmission of the impact to the body 210.

[0133] The dust bin 220 may be provided to suck outside dust and air and store dust.

[0134] The dust bin 220 may store dust that passes through the suction flow path and is introduced. The dust bin 220 may have a dust inlet port configured to communicate with the suction flow path, the internal space capable of storing dust, and an air discharge port through which air may be discharged.

[0135] The dust bin 220 may be provided in the body 210. In this case, the dust bin 220 may be fixedly coupled to the body 210. Of course, according to the embodiment, the dust bin 220 may be separably provided.

[0136] Meanwhile, in the present disclosure, a dust discharge flow path may be formed in the dust bin 220. The dust discharge flow path may allow the internal space of the dust bin 220 and an external space of the robot cleaner 200 to communicate with each other. With this configuration, in case that the robot cleaner station 100 collects dust, the dust in the dust bin 220 may be removed.

[0137] Meanwhile, a dust discharge port 221, which communicates with the dust discharge flow path, may be formed in the dust bin 220 according to the embodiment of the present disclosure. For example, the dust discharge port 221 may be formed at one side of a rear side of an outer surface (or outer peripheral surface) of the body 210. In another example, the dust discharge port 221 may be formed in an outer surface of the dust bin 220.

[0138] In addition, the robot cleaner 200 according to the embodiment of the present disclosure may have a dust bin door 222 configured to selectively open or close the dust discharge port 221. Specifically, the dust bin door 222 may be coupled to the body 210 and disposed at a position at which the dust bin door 222 may block the dust discharge port 221. For example, the dust bin door 222 may be made of rubber or resin and configured to be flipped, and one side of the dust bin door 222 may be fixedly coupled to the body 210.

[0139] With this configuration, when a dust collection motor 153 of the robot cleaner station 100 to be described below operates, the dust bin door 222 is elastically deformed by driving power of the dust collection motor 153, and the dust discharge port 221 is opened, such that the dust in the dust bin 220 may be collected by the dust collection part 150 of the robot cleaner station 100.

[0140] The water container 230 may be provided in the form of a container having an internal space to store therein a liquid such as water. The water container 230 may be disposed in the body 210 and fixedly coupled to the body 210 or detachably coupled to the body 210.

[0141] The water container 230 include a supply part

231 and a nozzle (not illustrated). The supply part 231 may be configured to supply a liquid such as water from the outside. For example, the supply part 231 may have an injection port formed at the other side of the rear side of the outer surface (or outer peripheral surface) of the body 210, and the supply part 231 may be connected to a storage space in the water container 230 through a water supply hose.

[0142] In this case, with a relationship with the dust discharge port 221, the supply part 231 may be disposed at a side opposite to the robot cleaner 200 in a leftward/rightward direction. For example, in case that the dust discharge port 221 is disposed at a rear left side of the body 210, the supply part 231 may be disposed at a rear right side of the body 210.

[0143] With the above-mentioned configuration, in the state in which the robot cleaner 200 is coupled to the robot cleaner station 100, the robot cleaner station 100 may perform both the dust collection and the water injection.

[0144] Meanwhile, the nozzle (not illustrated) is provided in the form of a tube or pipe and connected to the water container 230 so that the liquid in the water container 230 may flow through the interior of the nozzle. The nozzle (not illustrated) may be disposed such that one side thereof is connected to the water container 230, and the other end thereof is positioned above a pair of rotary plates 241 or positioned on each of the pair of rotary plates 241. Therefore, the liquid in the water container 230 may be supplied to the pair of rags 242.

[0145] That is, the nozzle (not illustrated) may be provided in a shape in which two tube portions are diverged from a single tube portion. In this case, an end of one diverged tube portion may be positioned above the left rag, and an end of the other diverged tube portion may be positioned above the right rag.

[0146] Meanwhile, although not illustrated, the water container 230 is equipped with a pump, and the pump may allow the water in the water container 230 to flow to the nozzle (not illustrated). Therefore, when the pump of the water container 230 operates, the liquid stored in the water container 230 may be discharged to the rotary cleaning part 240 through the nozzle (not illustrated).

[0147] The rotary cleaning part 240 includes the rotary plates 241 and the rags 242.

[0148] The rotary plates 241 may be provided as a pair of rotary plates 241 including a left rotary plate and a right rotary plate, and the rags 242 may be provided as a pair of rags 242 including a left rag and a right rag.

[0149] The rotary plate 241 may be rotatably disposed on a bottom surface of the body 210, and the rag 242 may be coupled to a lower side of the rotary plate 241.

[0150] The rotary plate 241 has a predetermined area and is provided in the form of a flat plate, a flat frame, or the like. The rotary plate 241 is laid approximately horizontally. Therefore, the rotary plate 241 has a shape in which a width (or diameter) thereof in the horizontal direction is sufficiently larger than a height thereof in the upward/downward direction. The rotary plate 241

coupled to the body 210 may be parallel to the floor surface or inclined with respect to the floor surface. The rotary plate 241 may have a circular plate-like shape, the bottom surface of the rotary plate 241 may have an approximately circular shape, and the rotary plate 241 may have a rotationally symmetrical shape as a whole.

[0151] The pair of rotary plates 241 may be vertically symmetric.

[0152] The rag 242 may be coupled to the lower side of the rotary plate 241 so as to face the bottom surface.

[0153] The rag 242 is configured such that a bottom surface of the rag 242 facing the floor has a predetermined area. The rag 242 has a flat shape. The rag 242 is configured such that a width (or diameter) thereof in the horizontal direction is sufficiently larger than a height thereof in the upward/downward direction. When the rag 242 is coupled to the body 210, the bottom surface of the rag 242 may be parallel to the floor or inclined with respect to the floor.

[0154] The bottom surface of the rag 242 may have an approximately circular shape, and the rag 242 may have a rotationally symmetrical shape as a whole. In addition, the rag 242 may be attached to or detached from the bottom surface of the rotary plate 241. The rag 242 may be coupled to the rotary plate 241 and rotate together with the rotary plate 241.

[0155] Meanwhile, although not illustrated, the rotary cleaning part 240 may be equipped with a drive part configured to apply a rotational force to the rotary plate 241. For example, the drive part may be provided with a motor and at least one gear. Therefore, when the drive part operates, the rotary plates 241 and the rags 242 may rotate to wipe and clean the floor surface.

[0156] The agitator 250 may have a plurality of brushes configured to be rotatable and guide outside dust and air into the dust bin 220. In this case, the agitator 250 may be provided with at least one gear.

[0157] Meanwhile, the agitator 250 according to the present embodiment may be equipped with a separate agitator motor (not illustrated) to receive rotational power. According to the embodiment, the agitator 250 may also receive rotational power from a driving motor or receive rotational power from the drive part of the rotary cleaning part 240.

[0158] The wheels 260 may be provided on the bottom surface of the body 210 and connected to the drive part (not illustrated). In this case, the drive part (not illustrated) may be coupled to the body 210.

[0159] The wheels 260 may be provided on the body 210 and roll on the floor.

[0160] The wheels 260 may include a first driving wheel and a second driving wheel. In this case, the first driving wheel may be identical to the second driving wheel, or the first driving wheel and the second driving wheel may be symmetric. For example, in case that the first driving wheel is positioned at the left side of the robot cleaner 200, the second driving wheel may be positioned at the right side of the robot cleaner 200. In this case, the first

driving wheel and the second driving wheel may be symmetric vertically.

[0161] The drive part (not illustrated) may include driving motors and gears. In this case, the driving motors may be accommodated in the body 210 and provide power to the wheels 260. The driving motors may include a first driving motor and a second driving motor.

[0162] The driving motor may be configured as an electric motor. The plurality of gears engage with one another and rotate. The plurality of gears connect the driving motors and the wheels 260 and transmit rotational power of the driving motors to the wheels 260. Therefore, the wheels 260 may rotate when rotary shafts of the driving motors rotate.

[0163] With this configuration, when the driving motors operate, the wheels 260 may rotate, and the body 210 may travel on the floor surface at a predetermined traveling speed.

[0164] The auxiliary wheel 270 may be provided on a lower surface of the body 210 and roll on the floor surface (cleaning target surface). The auxiliary wheel 270, together with the pair of wheels 260, may support the body 210 on the floor surface. With this configuration, the auxiliary wheel 270 may guide a motion of the robot cleaner 200 while minimizing friction between the robot cleaner 200 and the floor surface.

[0165] The suction motor (not illustrated) may generate a suction force capable of sucking outside dust and air through the suction part 211. For example, the suction motor (not illustrated) may be an electric motor. By the suction force generated by the suction motor (not illustrated), outside dust and air may be introduced into the suction part 211 and reach the dust bin 220 after passing through the suction flow path.

[0166] Although not illustrated, the battery is coupled to the body 210 and configured to supply electric power to other components constituting the robot cleaner 200. The battery may supply electric power to at least one motor provided in the robot cleaner 200. For example, the battery may supply electric power to the motors provided in the rotary cleaning part 240, the agitator 250, the wheel 260, and the suction motor (not illustrated).

[0167] In addition, the battery may supply electric power to a sensor part (not illustrated) and a controller (not illustrated).

[0168] The battery may be charged with external electric power. To this end, the charging terminal 280 for charging the battery may be provided at one side of the body 210. For example, the charging terminal 280 may be disposed at a rear side of the outer surface of the body 210. The charging terminal 280 may be supplied with electric power by coming into contact with the electric power supply terminal 123b of the robot cleaner station 100 when the robot cleaner 200 is coupled to the robot cleaner station 100.

[0169] The robot cleaner station 100 of the present disclosure will be described with reference to FIGS. 1 to 4 and 9 to 17.

[0170] The robot cleaner 200 may be accommodated in the robot cleaner station 100. The robot cleaner 200 may be seated on a seating part 120 of the robot cleaner station 100.

[0171] The robot cleaner station 100 may include a housing 110.

[0172] The housing 110 may define an external appearance of the robot cleaner station 100. For example, the housing 110 may be formed in a shape similar to a hexahedral shape.

[0173] The housing 110 may be formed with a space in which the seating part 120, an accommodation part 140, the dust collection part 150, a drawer 160, a rag washing part 170, and a rag drying part 180 may be accommodated.

[0174] The housing 110 may include a front surface 111. The front surface 111 may be disposed at a front side of the robot cleaner station 100.

[0175] In this case, the front side may refer to a direction in which a door 131 is provided based on the interior of the robot cleaner station 100. That is, the front side may refer to a direction in which an inlet/outlet 111a is formed.

[0176] In addition, the rear side may refer to a direction opposite to the front side based on the interior of the robot cleaner station 100.

[0177] In addition, the left side may be referred to as a leftward side and the right side may be referred to as a rightward side when the front side is viewed from the interior of the robot cleaner station 100.

[0178] The front surface 111 may be provided in the form a quadrangular surface, as a whole.

[0179] The front surface 111 may be formed with the inlet/outlet 111a through which the robot cleaner 200 enters or exits. The drawer 160 may be withdrawn from the front surface 111. In this case, the drawer 160 may be withdrawn in a first direction D1. In addition, one or more liquid containers 171 and 179 may be accommodated in the drawer 160. In this case, the liquid containers 171 and 179 may be separably accommodated in the drawer 160 in a second direction D2 different from the first direction D1.

[0180] An accommodation part cover 145 and a drawer cover 163 may be provided on the front surface 111. A space capable of accommodating items may be formed in the front surface 111.

[0181] Therefore, the front surface 111 may have an external appearance similar in shape to a drawer cabinet.

[0182] In addition, the robot cleaner 200 may pass through the front surface 111 and enter the interior of the seating part 120. Therefore, according to the present disclosure, it is possible to provide an aesthetic appearance similar to that of indoor furniture without exposing the robot cleaner 200 to the outside.

[0183] The housing 110 may include a rear surface 112. The rear surface 112 may be disposed at a rear side of the robot cleaner station 100. The rear surface 112 may be disposed at a side opposite to the front surface 111 based on the dust collection motor 153. The rear surface

112 may be formed in a shape corresponding to a shape of the front surface 111. For example, the rear surface 112 may be provided in the form a quadrangular surface. An air discharge port 182e may be formed in the rear surface 112. In addition, a rear door 112a may be provided on the rear surface 112. A user or operator may open the rear door 112a to approach the interior of the robot cleaner station 100 and perform installation and/or repair.

[0184] The housing 110 may include an upper surface 113. The upper surface 113 may cover an upper side of the drawer 160. For example, the upper surface 113 may be provided in the form a quadrangular surface. In this case, the upper surface 113 may be formed in a shape in which a rim portion protrudes by a predetermined height. That is, the inside of the upper surface 113 may be formed in a concave shape. An item may be mounted on an upper side of the upper surface 113. Specifically, a charging part 113a configured to charge an electronic device may be provided on the upper surface 113. Therefore, when the electronic device is mounted on the upper surface 113, the electronic device may be charged.

[0185] The housing 110 may include a lower surface 114. The lower surface 114 may be disposed to face the ground surface. The lower surface 114 may be disposed below the base 121 and support the base 121. A plurality of legs 115 may be provided below the lower surface 114.

[0186] The legs 115 may support the lower side of the housing 110. The legs 115 may come into contact with the ground surface and support the housing 110. Therefore, the lower surface 114 may be spaced apart from the ground surface (the floor of the kitchen) by a predetermined height.

[0187] The robot cleaner 200 and the robot cleaner station 100 may be connected through the seating part 120 in a physical, electrical, and/or flow path manner.

[0188] The seating part 120 may be disposed in the housing 110.

[0189] An inlet/outlet 127 into which the robot cleaner 200 is introduced may be formed at a front side of the seating part 120. The inlet/outlet 127 may refer to a space formed in the front surface of the robot cleaner station 100.

[0190] The inlet/outlet 127 may be sized to allow the robot cleaner 200 to pass therethrough. That is, a height of the inlet/outlet 127 is larger than a height of the robot cleaner 200. In this case, the inlet/outlet 127 may refer to a space formed upward in the vertical direction from a front end of the base 121 to be described below. Alternatively, the inlet/outlet 127 may refer to a space formed in a door frame 132 to be described below so that the robot cleaner 200 passes through the space.

[0191] In this case, the inlet/outlet 127 may be opened or closed by the door 131.

[0192] The seating part 120 may include an accommodation space S, the base 121, a docking wall 123, and inner walls 124.

[0193] The robot cleaner 200 may be accommodated in the accommodation space S of the seating part 120.

For example, the accommodation space S may refer to a space surrounded by the base 121, the docking wall 123, and the inner walls 124. In another example, the accommodation space S may refer to a space surrounded by the base 121, a washing plate 122, the docking wall 123, and the inner walls 124. In still another example, the accommodation space S may refer to a space in which the robot cleaner 200 is positioned in a state in which the robot cleaner 200 is coupled to the electric power supply terminal 123b or a space in which the robot cleaner 200 is positioned in a state in which the dust bin 220 of the robot cleaner 200 communicates with a dust passage hole 123a.

[0194] The base 121 may be configured to support the robot cleaner 200 in case that the robot cleaner 200 enters the robot cleaner station 100. The wheel 260 of the robot cleaner 200 may come into contact with an upper surface of the base 121. In addition, the auxiliary wheel 270 of the robot cleaner 200 may come into contact with the upper surface of the base 121.

[0195] The base 121 may include a base main body 121a, an inclined portion 121b, wheel coupling portions 121c, an agitator accommodation portion 121d, and a washing tub 128.

[0196] The base main body 121a may define an overall external shape of the base 121. The inclined portion 121b, the wheel coupling portions 121c, the agitator accommodation portion 121d, and the washing tub 128 may be disposed on the base main body 121a.

[0197] The inclined portion 121b may be disposed in an inlet of the base main body 121a on which the robot cleaner 200 climbs.

[0198] The inclined portion 121b may be inclined upward and forward in the direction in which the robot cleaner 200 enters. More specifically, a front end of the inclined portion 121b may be connected to the lower surface 114 without a height difference and inclined upward and rearward. That is, the inclined portion 121b may be formed to be gradually raised when the robot cleaner 200 enters. In this case, an inclination direction of the inclined portion 121b may be defined as a third direction D3.

[0199] The wheel 260 of the robot cleaner 200, which is raised along the inclined portion 121b, may be seated on the wheel coupling portion 121c. When the wheel 260 of the robot cleaner 200 is seated on the wheel coupling portion 121c, the robot cleaner 200 and the robot cleaner station 100 may be physically coupled. The surface of the wheel coupling portion 121c may be formed to correspond to the surface of the wheel 260 so that the robot cleaner 200 may be stably stopped.

[0200] The wheel coupling portions 121c may be disposed at stop positions of the left and right wheels 260 of the robot cleaner 200 so that the robot cleaner 200 is stopped at an exact position. In this case, the stop position of the wheel 260 refers to a position determined so that the robot cleaner 200 is stopped to be coupled to the electric power supply terminal 123b and/or a position

determined so that the dust bin 220 of the robot cleaner 200 is stopped to communicate with the dust passage hole 123a.

[0201] The docking wall 123 is a component in which the dust passage hole 123a, the electric power supply terminal 123b, and the water supply nozzle 123c of the robot cleaner station 100 are disposed. The docking wall 123 may spatially distinguish the accommodation space S from components of the robot cleaner station 100. The docking wall 123 may extend in the vertical direction from a rear side of the base 121. The docking wall 123 may be formed to correspond to a shape of the robot cleaner 200. For example, in case that the body 210 of the robot cleaner 200 has a cylindrical shape, the docking wall 123 may be formed in a circular arc shape having a predetermined radius. With this configuration, it is possible to increase an area that may surround an outer periphery of the robot cleaner 200 and face the outer surface of the robot cleaner 200. In addition, the robot cleaner 200 may be stably supported.

[0202] The seating part 120 may be formed with the dust passage hole 123a through which air existing outside the housing 110 may be introduced into the housing 110. Specifically, the dust passage hole 123a may be formed in the docking wall 123 so that outside air may be introduced into the housing 110.

[0203] The dust passage hole 123a may communicate with the dust bin 220 of the robot cleaner 200. The dust passage hole 123a may communicate with the dust discharge port 221 of the dust bin 220 of the robot cleaner 200. The dust passage hole 123a may be formed in the form of a hole corresponding to the shape of the dust bin 220 so that the dust in the dust bin 220 may be introduced into the dust collecting part 150.

[0204] The dust passage hole 123a may be formed to communicate with a dust collection flow path part 152.

[0205] The robot cleaner station 100 may include an electric power supply module configured to supply electric power to the robot cleaner 200. The electric power supply module may include an electric power supply module housing and the electric power supply terminal 123b, and a circuit board and an element for supplying electric power may be mounted in the electric power supply module housing. Further, the electric power supply terminal 123b may be disposed forward in the electric power supply module housing and disposed on the docking wall 123 so as to be exposed.

[0206] The electric power supply terminal 123b may supply electric power to the robot cleaner 200 coupled to the seating part 120. The electric power supply terminal 123b may come into contact with and be electrically connected to the charging terminal of the robot cleaner 200. The electric power supply terminal 123b may be disposed on the seating part 120. Specifically, the electric power supply terminal 123b may be disposed on the docking wall 123. The electric power supply terminal 123b may be electrically connected to the robot cleaner 200 coupled to the docking wall 123. The electric power

supply terminal 123b may supply electric power to the battery of the robot cleaner 200 coupled to the docking wall 123.

[0207] The robot cleaner station 100 may further include the water supply nozzle 123c.

[0208] The water supply nozzle 123c may be connected to the supply part 231 of the water container 230 of the robot cleaner 200. Specifically, the water supply nozzle 123c may be connected to the injection port of the water container 230. The water supply nozzle 123c may supply water, which is supplied from a washing water container 171, to a storage space in the water container 230 of the robot cleaner 200.

[0209] The inner wall 124 may be formed on an inner surface of the housing 110 based on the leftward/rightward direction. The inner walls 124 may be provided as a pair of inner walls 124 disposed at the left and right sides of the base 121. The inner walls 124 may be connected to two opposite ends of the docking wall 123.

[0210] The washing plate 122 may be configured to wash the rag of the robot cleaner 200, and the washing plate 122 may be seated in the washing tub 128 of the base 121. In addition, the washing plate 122 may come into contact with the rag 242 in the state in which the robot cleaner 200 is seated.

[0211] The washing plate 122 may be a plate inclined downward toward a central portion thereof as a whole.

[0212] Specifically, the washing plate 122 includes a flow guide surface formed as a curved surface. Further, one or more passing holes 122b through which the fluid may pass may be formed in the flow guide surface. In addition, washing protrusions 122a may protrude from the flow guide surface.

[0213] In this case, the washing protrusions 122a may be provided as a pair of washing protrusions 122a symmetrically formed on the flow guide surface. Specifically, the pair of washing protrusions 122a may be disposed vertically below the pair of rags 242 of the robot cleaner 200 and disposed to face the pair of rags 242. The pair of washing protrusions 122a may be disposed to at least partially come into contact with the pair of rags 242.

[0214] Further, the passing holes 122b may be provided as a plurality of passing holes 122b formed in the flow guide surface and formed between the pair of washing protrusions 122a. For example, the plurality of passing holes 122b may be formed while including positions on the flow guide surface that have the lowest heights from the ground surface (the floor of the kitchen), and the plurality of passing holes 122b may be formed between the pair of washing protrusions 122a. Therefore, the fluid discharged between the pair of washing protrusions 122a may flow while being guided to the passing holes 122b.

[0215] Meanwhile, a height of the flow guide surface from the floor of the kitchen may increase toward the rear side from the position at which the passing holes 122b is formed. That is, the height of the flow guide surface from the floor of the kitchen may increase as the distance from an outside air discharge part 181c to be described below

decreases.

[0216] With this configuration, the washing water and/or air may flow along the flow guide surface and enter a space formed between the washing plate 122 and the washing tub 128 through the passing holes 122b.

[0217] When the washing water is supplied to the washing plate 122 and the rag 242 rotates, the rag 242 may be washed by friction with the washing protrusions 122a provided in a stationary state.

[0218] The washing tub 128 is a component in which the washing plate 122 is seated. The washing tub 128 may be disposed rearward of the base main body 121a. Alternatively, the washing tub 128 may be disposed rearward of the dust collection motor 153. The washing tub 128 may be disposed below the washing plate 122 and detachably coupled to the washing plate 122. The washing tub 128 may be formed to correspond to the washing plate 122 so as to be fitted with the washing plate 122. The liquid passing through the washing plate 122 may be introduced into the washing tub 128.

[0219] The washing tub 128 may include a washing tub base surface along which the fluid having passed through the washing plate 122 flows, and a washing tub wall extending and protruding in the vertical direction from an outer periphery of a washing tub base surface. In this case, a height of the washing tub base surface from the ground surface (the floor of the kitchen) may decrease toward the rear side of the robot cleaner station 100. Therefore, the fluid having passed through the washing plate 122 may be collected at the rear side of the washing tub 128 and discharged to the outside through a wastewater suction part 176 to be described below.

[0220] A door part 130 may be provided to cover a part of a lower side of the front end of the housing 110.

[0221] The door part 130 includes the door 131. The door 131 may define a front external appearance of the robot cleaner station 100 in a state in which the inlet/outlet 127 is closed. For example, the door 131 may be formed in a shape similar to a rectangular flat plate-like shape. A length of the door 131 in the leftward/rightward direction may be equal to or longer than a length of the housing 110 in the leftward/rightward direction. With this configuration, it is possible to provide a neat external appearance of the robot cleaner station 100.

[0222] The door frame 132 may be disposed at the front lower side of the housing 110. The door 131 may be openably and closably coupled to the door frame 132. In addition, the inlet/outlet 127 through which the robot cleaner 200 may enter or exit may be formed in the door frame 132.

[0223] The door frame 132 may define a front external appearance of the robot cleaner station 100 in the state in which the door 131 is open.

[0224] A rotary shaft 131a of the door 131 may be disposed at the lower end of the door frame 132. When the inlet/outlet 127 is open, the door 131 may be disposed in parallel with the floor surface or inclined downward and forward, such that an end thereof may come into contact

with the ground surface. For example, the door 131 may be inclined in the third direction D3 in a state in which the door 131 is opened. In this case, the third direction D3 may be a direction different from the first direction D1 and the second direction D2. In this case, the third direction D3 may intersect the first direction D1. In addition, the third direction D3 may intersect the second direction D2. That is, the first direction D1, the second direction D2, and the third direction D3 may intersect one another on the same plane. In this case, the plane may be the plane formed in the direction perpendicular to the ground surface.

[0225] The door 131 may be provided with a hinge part and be rotatably connected to the door frame 132. The hinge part may be provided as a plurality of hinge parts disposed along the rotary shaft 131a and spaced apart from one another at different intervals.

[0226] In addition, auxiliary entry paths 131b may be provided on a surface of the door 131 that faces the housing 110 when the inlet/outlet 127 is closed. The auxiliary entry paths 131b may be provided to allow the robot cleaner 200 to stably travel to the seating part 120 or the inlet/outlet 127, and the auxiliary entry paths 131b may be provided to be inclined upward and rearward.

[0227] Specifically, the auxiliary entry paths 131b may be formed in the shape of grooves to allow the robot cleaner 200 to stably travel inclinedly. The auxiliary entry paths 131b may be configured such that the grooves formed in the leftward/rightward direction are disposed to be spaced apart from one another at equal intervals in a forward/rearward direction. The auxiliary entry path 131b may be formed such that a width thereof decreases rearward in the leftward/rightward direction. Therefore, the wheel 260 of the robot cleaner 200 may be guided to the exact position while the leftward and rightward movements of the wheel 260 are restricted as the wheel 260 travels toward the seating part 120 or the inlet/outlet 127.

[0228] The auxiliary entry paths 131b guide the wheel 260 to wheel guide portions 121ba disposed on the seating part 120. The auxiliary entry paths 131b may be provided as a pair of auxiliary entry paths 131b respectively disposed at positions connected to the pair of wheel guide portions 121ba.

[0229] An entry sensor 135 may be installed on the door frame 132 and recognize the approach of the robot cleaner 200. The entry sensor 135 may be disposed at the front side of the housing 110 to recognize the approach of the robot cleaner 200. For example, the entry sensor 135 may be an IR sensor.

[0230] The entry sensor 135 may be installed at an upper side of the front surface of the door frame 132. Therefore, it is possible to maximize a detection range. In addition, the entry sensor 135 may be installed at a central portion of the inlet/outlet 127 based on the leftward/rightward direction. Therefore, an entry direction of the robot cleaner 200 may be guided in accordance with communication with the robot cleaner 200.

[0231] The door 131 may be rotated by a door driving part 134. For example, the door driving part 134 may include a door drive motor and a driving link part.

[0232] The door drive motor may be disposed in the housing 110 and disposed in an upper space of the door frame 132. Specifically, the door drive motor may be disposed on an accommodation part body 141. For example, the door drive motor may be disposed above a driving link part.

[0233] Therefore, the spatial utilization and accessibility are improved, thereby providing convenience to the user.

[0234] The driving link part is configured to connect the door drive motor and the door 131 and transmit power. The driving link part may include at least one link and rotate the door 131 by transmitting driving power of the door drive motor to the door 131.

[0235] The robot cleaner station 100 of the present disclosure includes the accommodation part 140. The accommodation part 140 may provide at least one accommodation space.

[0236] The accommodation part 140 may be disposed between the seating part 120 and the drawer 160 based on the upward/downward direction of the robot cleaner station 100. Specifically, the accommodation part 140 may be disposed above the seating part 120. In addition, the accommodation part 140 may be disposed below the drawer 160. Therefore, the drawer 160, which is provided with a wastewater container 179, and the accommodation part 140 are disposed at different heights, which may prevent a situation in which wastewater in the wastewater container 179 is introduced into the accommodation part 140 and contaminates an accommodated item.

[0237] The accommodation part 140 includes the accommodation part body 141. The accommodation part body 141 may provide a space in which an item may be accommodated. Specifically, the accommodation part body 141 may be disposed at the front side of the housing 110. In this case, the accommodation part body 141 may be disposed above the inlet/outlet 127. The accommodation part body 141 and the seating part 120 may be separated based on a seating part cover 125 as a boundary.

[0238] Specifically, a space in which a dust bag 151 may be accommodated may be formed in the accommodation part body 141. A space in which an accommodation part drawer 143 may be accommodated may be formed in the accommodation part body 141. A space in which items, such as consumable components of the robot cleaner station 100 or the robot cleaner 200, may be accommodated may be formed in the accommodation part body 141.

[0239] The accommodation part body 141 may be covered by the accommodation part cover 145. Specifically, the accommodation space formed in the accommodation part body 141 may be exposed to the outside when the accommodation part cover 145 is separated. Therefore, in a state in which the accommodation part

cover 145 is separated or open, the accommodation part body 141 may be disposed forward of the robot cleaner station 100, formed in a plate-like shape in the vertical direction, and exposed while having a plurality of holes.

[0240] In contrast, when the accommodation part cover 145 is closed, the accommodation space may be closed without being visible from the outside. Therefore, according to the present disclosure, it is possible to provide an aesthetic appearance similar to that of indoor furniture without exposing items accommodated in the robot cleaner 100 to the outside.

[0241] A dust bag housing 142 may be formed with a space in which a filter (not illustrated) and the dust bag 151 may be accommodated.

[0242] The dust bag 151 may be coupled to an interior of the dust bag housing 142 in a withdrawable manner. In this case, the dust bag 151 may be withdrawn in the first direction D1. For example, the dust bag housing 142 may be formed in the shape of a rectangular tube opened at a front side thereof, and a rear internal space may communicate with the dust collection flow path part 152 and a dust collection motor housing 154.

[0243] Dust in the dust bin 220 may be introduced into the dust bag housing 142.

[0244] An upper side of the dust bag housing 142 may be connected to the dust collection flow path part 152, and a rear side of the dust bag housing 142 may be connected to the dust collection motor housing 154. Specifically, an inlet port may be formed in an upper surface of the dust bag housing 142, and a discharge port may be formed in a rear surface of the dust bag housing 142.

[0245] Therefore, an internal space of the dust bag housing 142 may communicate with a dust collection flow path formed in the dust collection flow path part 152 and communicate with an internal space of the dust collection motor housing 154. In addition, when the dust bag 151 is coupled to the dust bag housing 142, the dust bag 151 may be disposed in the dust bag housing 142 and communicate with the dust collection flow path part 152.

[0246] Therefore, when the dust collection motor 153 operates, the dust in the dust bin 220 may flow along the dust collection flow path and be introduced into the dust bag housing 142, and the dust may pass through the dust bag 151 and be discharged to the dust collection motor housing 154.

[0247] The accommodation part drawer 143 may be configured to be withdrawable from the accommodation part body 141. The accommodation part drawer 143 may be withdrawn forward from the accommodation part body 141. In this case, a withdrawal direction of the accommodation part drawer 143 may be identical to a withdrawal direction of the drawer 160. That is, the accommodation part drawer 143 may be withdrawn in the first direction D1. Further, the accommodation part drawer 143 may be withdrawn in a direction intersecting the direction (second direction) in which the washing water

container 171 and the wastewater container 179 are separated from the drawer 160.

[0248] The accommodation part drawer 143 may be disposed at one side of the dust bag housing 142 based on the leftward/rightward direction.

[0249] The accommodation part drawer 143 includes a drawer body 143a, a handle 143b, and a cap 143c.

[0250] An accommodation space may be formed in the accommodation part drawer 143. Specifically, the accommodation part drawer body 143a may be formed in the shape of a box opened at an upper side thereof. For example, the accommodation part drawer 143 may be a detergent container. The accommodation part drawer body 143a may provide a space that may store a liquid containing a detergent.

[0251] The handle 143b may be provided forward of the accommodation part drawer body 143a. The handle 143b may be configured to be gripped by the user. For example, the handle 143b may be recessed rearward from a front surface of the accommodation part drawer body 143a.

[0252] With this configuration, when the user grips the handle 143b and pulls the handle 143b forward, the accommodation part drawer body 143a may be pulled forward together with the handle 143b and withdrawn. Therefore, according to the present disclosure, the user may easily pull the accommodation part drawer 143 forward and then supply the detergent.

[0253] Meanwhile, the accommodation part drawer 143 may be provided with an injection port through which a liquid may be injected, and the cap 143c that may block the injection port. The injection port may be formed in an upper surface of the accommodation part drawer 143. Meanwhile, the cap 143c may be formed in a shape corresponding to a shape of the cap 143c so as to seal the injection port. For example, in case that the injection port is a circular hole, the cap 143c may include a coupling portion formed to have a diameter, which is equal to a diameter of the injection port, and inserted into the injection port to block the injection port.

[0254] An accommodation box 144 may be formed to accommodate an item. The accommodation box 144 may be recessed rearward from the accommodation part body 141. For example, the accommodation box 144 may be recessed in the form of a quadrangular groove.

[0255] The accommodation box 144 may be opened in the horizontal direction. Specifically, the accommodation box 144 may be formed in a shape opened at a front side thereof. In contrast, because an inlet port of the dust bag 151 is opened upward, it is possible to prevent dust from being introduced into the accommodation box 144 even though a trace amount of dust scatters during a process in which the dust bag 151 is withdrawn.

[0256] The accommodation box 144 may be disposed at the other side of the dust bag housing 142 based on the leftward/rightward direction. The accommodation box 144 may be disposed at a side opposite to the accommodation part drawer 143 based on the dust bag housing

142.

[0257] One or more accommodation boxes 144 may be formed. For example, the accommodation boxes 144 may include a first accommodation box 144a and a second accommodation box 144b. In this case, the first accommodation box 144a and the second accommodation box 144b may be formed to be different in height and width. Therefore, the first accommodation box 144a and the second accommodation box 144b may accommodate different items. For example, the first accommodation box 144a may accommodate a non-used dust bag 151, and the second accommodation box 144b may accommodate a non-used or dried rag 242.

[0258] The accommodation part cover 145 may cover the accommodation part body 141. The accommodation part cover 145 may cover a front side of the accommodation part body 141. For example, the accommodation part cover 145 may be formed in a quadrangular plate-like shape.

[0259] For example, the accommodation part cover 145 may be detachably coupled to the accommodation part body 141. The accommodation part cover 145 may be provided with a magnet and detachably coupled to the accommodation part body 141. Therefore, the user may separate the accommodation part cover 145 from the accommodation part body 141 and expose the accommodation part body 141 to the outside.

[0260] In another example, the accommodation part cover 145 may be hingedly coupled to the accommodation part body 141. Specifically, the accommodation part cover 145 may be provided with a hinge part 145a, and the hinge part 145a may be provided at an end of the accommodation part body 141 based on the leftward/rightward direction. In this case, a rotary shaft of the hinge part 145a may be disposed in the vertical direction. With this configuration, even though the accommodation part cover 145 is opened, it is possible to prevent a situation in which the accommodation part cover 145 sags downward and blocks the inlet/outlet 127 or interferes with the opening operation of the door 131.

[0261] The accommodation part 140 may be provided with a drawer housing 146. The drawer housing 146 may accommodate the accommodation part drawer body 143a.

[0262] The drawer housing 146 may guide a movement of the accommodation part drawer body 143a. For example, the drawer housing 146 may be formed in the shape of a box opened at a front side thereof. In this case, a width of the drawer housing 146 may be larger than a diameter of the accommodation part drawer body 143a.

[0263] With this configuration, in case that the user couples the accommodation part drawer 143 to the housing 110, the accommodation part drawer 143 may be coupled at an exact position, and the washing water may be prevented from leaking out.

[0264] The dust collection part 150 may collect dust from the dust bin 220 of the robot cleaner 200. The dust collecting part 150 may be disposed in the housing 110.

The dust collection part 150 may be disposed above the base 121.

[0265] The dust collection part 150 may include a filter (not illustrated), the dust bag 151, the dust collection flow path part 152, the dust collection motor 153, a motor housing 154, and an air discharge flow path part 155.

[0266] The filter (not illustrated) may be provided in the dust bag housing 142.

[0267] Meanwhile, the filter (not illustrated) may be disposed to be lower than the inlet port of the dust bag housing 142. The filter (not illustrated) may be disposed forward of the discharge port of the dust bag housing 142.

[0268] The dust bag 151 may refer to a dust collection bag configured to collect dust sucked from the interior of the dust bin 220 of the robot cleaner 200 by the dust collection motor 153.

[0269] The dust bag 151 may be detachably coupled to the dust bag housing 142. The dust bag 151 may be configured to be withdrawable from the dust bag housing 142. Therefore, the dust bag 151 may be separated from the dust bag housing 142 and discarded, and a new dust bag 151 may be coupled to the dust bag housing 142. That is, the dust bag 151 may be defined as a consumable component.

[0270] The inlet port of the dust bag 151 may be disposed to communicate with the inlet port of the dust bag housing 142. Therefore, when the dust collection motor 153 operates, air and dust in the dust bin 220 may be introduced into the dust bag 151 and captured.

[0271] Specifically, the dust bag 151 may include a bag 151a and a dust bag plate 151b. When a suction force is generated by the dust collection motor 153, a volume of the bag 151a is increased, such that the dust may be accommodated in the bag 151a. To this end, the bag 151a may be made of a material that transmits air but does not transmit debris such as dust. For example, the bag 151a may be made of a non-woven fabric material and have a hexahedral shape corresponding to a shape of the dust bag housing 142 when the bag 151a has an increased volume.

[0272] The dust bag plate 151b may be disposed at one side of the bag 151a. The dust bag plate 151b may be formed with an inlet port into which air may be introduced. Therefore, when the dust collection motor 153 operates in a state in which the dust bag 151 is coupled to the dust bag housing 142, the air and dust having passed through the dust collection flow path part 152 may pass through the dust bag plate 151b and be introduced into the bag 151a. In addition, according to the embodiment, the dust bag plate 151b may be provided with a window through which light including ultraviolet rays may be transmitted.

[0273] Therefore, when a sterilization module (not illustrated) disposed in the dust bag housing 142 emits light in the state in which the dust bag 151 is coupled to the dust bag housing 142, the light may pass through the window and sterilize the interior of the bag 151a. In this case, the sterilization module may be disposed between the drawer 160 and the dust bag 151.

[0274] The dust bag plate 151b may be detachably coupled to the dust bag housing 142. The dust bag plate 151b may be configured to be withdrawn or retracted along a guide portion provided in the dust bag housing 142. Therefore, the dust bag 151 may be coupled to an exact position in the dust bag housing 142. When the dust bag 151 is coupled to the dust bag housing 142, the dust collection part 150 may further include a dust collection module.

[0275] The dust collection module may provide a suction gas flow to the dust collection flow path part 152.

[0276] Specifically, the dust collection part 150 may further include the dust collection motor 153 and the dust collection motor housing 154.

[0277] The dust collection motor 153 may generate a suction force in the dust collection flow path part 152. That is, the dust collection motor 153 may provide a suction force that sucks the dust in the dust bin 220 into the dust bag 151 disposed in the dust bag housing 142.

[0278] The accommodation part 140 may be disposed forward of the dust collection motor 153. Specifically, the dust collection motor 153 may be disposed rearward of the dust bag housing 142. That is, the dust bag housing 142 may be disposed forward of the dust collection motor 153. Therefore, the dust bag 151 may be disposed forward of the dust collection motor 153.

[0279] The dust collection motor 153 may generate the suction force by means of the rotation. For example, although not illustrated, the dust collection motor 153 may include a rotor and a stator that perform a relative rotation by receiving electric power, and the dust collection motor 153 may include an impeller configured to be rotated about a rotary shaft by the rotation of the rotor. Therefore, the suction force may be generated by the rotation of the impeller.

[0280] One side of the dust collection motor 153 may be connected to the dust bag housing 142, and the other side of the dust collection motor 153 may be connected to the air discharge flow path part 155. In case that the dust collection motor 153 operates, the air flowing through the dust collection flow path part 152 may be introduced into the dust collection motor housing 154. In addition, the air introduced into the dust collection motor housing 154 may pass through the dust collection motor 153 and then be discharged to the outside of the dust collection motor housing 154.

[0281] Meanwhile, in the present embodiment, a motor shaft 153a of the dust collection motor 153 may be disposed in the horizontal direction. Therefore, the first direction D1 may refer to an axial direction of the shaft 153a of the dust collection motor.

[0282] The dust collection motor 153 may be accommodated in the dust collection motor housing 154. The dust collection motor housing 154 may be disposed rearward of the dust bag housing 142. The dust collection motor housing 154 may be disposed rearward of an upper end of the dust collection flow path part 152. The dust collection motor housing 154 may be disposed

below the upper end of the dust collection flow path part 152. In contrast, the dust collection motor housing 154 may be disposed forward of a lower end of the dust collection flow path part 152. The dust collection motor housing 154 may be disposed above the lower end of the dust collection flow path part 152.

[0283] Meanwhile, the dust collection part 150 may further include the dust collection flow path part 152. One longitudinal end of the dust collection flow path part 152 may be connected to the dust bag housing 142, and the other longitudinal end of the dust collection flow path part 152 may be connected to the docking wall 123. The dust collection flow path part 152 may refer to a flow path through which the air sucked through the dust passage hole 123a flows to the dust collection motor 153 via the dust bag 151.

[0284] Specifically, the dust collection flow path part 152 may allow the dust bin 220 and the internal space of the dust bag housing 142 to communicate with each other when the robot cleaner 200 is docked in the robot cleaner station 100 and the dust passage hole 123a and the dust bin 220 of the robot cleaner 200 communicate with each other.

[0285] The dust collection flow path part 152 may connect the dust bin 220 of the robot cleaner 200 and the internal space of the dust bag housing 142. The dust collection flow path part 152 may connect the dust passage hole 123a and the internal space of the dust bag housing 142.

[0286] The dust collection flow path part 152 may be connected to a rear surface of the docking wall 123. In this case, the dust passage hole 123a may be formed in the docking wall 123, and the dust collection flow path may be formed in the dust collection flow path part 152 and communicate with the dust passage hole 123a. Therefore, when the dust collection motor 153 operates, the air and dust in the dust bin 220 may pass through the dust passage hole 123a and flow through the dust collection flow path.

[0287] Meanwhile, the dust collection flow path part 152 may be disposed to be inclined. Specifically, at least a part of the dust collection flow path part 152 may be disposed to be inclined in the leftward/rightward direction. In addition, at least a part of the dust collection flow path part 152 may be disposed to be inclined in the forward/rearward direction.

[0288] The dust collection flow path part 152 may be disposed in a shape extending rearward from the dust passage hole 123a and bent upward and forward. In this case, the dust collection flow path part 152 may be disposed to be inclined from one side based on the leftward/rightward direction at which the dust passage hole 123a is formed toward a central portion of the housing 110 based on the leftward/rightward direction.

[0289] Meanwhile, the dust collection flow path part 152 is connected to the upper surface of the dust bag housing 142. That is, one longitudinal end of the dust collection flow path part 152 is connected to the upper

surface of the dust bag housing 142. In this case, a part of an upper side of the dust collection flow path part 152 may be disposed to be inclined upward and then bent downward, and connected to the dust bag housing 142. Therefore, the upper end of the dust collection flow path part 152 may be disposed to be higher than the upper surface of the dust bag housing 142 based on the ground surface (floor).

[0290] In addition, the lower end of the dust collection flow path part 152 may be disposed below the dust bag 151.

[0291] Therefore, at least a part of the dust collection flow path part 152 may be disposed at a vertically upper side of the robot cleaner 200 in the state in which the robot cleaner 200 is seated on the base 121. In this case, a rear end of the dust bag housing 142 may be disposed at the vertically upper side of the robot cleaner 200.

[0292] In addition, a part of the upper side of the dust collection flow path part 152 may be disposed at the central portion of the robot cleaner station 100 based on the leftward/rightward direction. In this case, at least a part of the dust collection flow path part 152 may be disposed between the washing water container 171 and the wastewater container 179. Specifically, the upper end of the dust collection flow path part 152 may be disposed between the washing water container 171 and the wastewater container 179.

[0293] Therefore, the washing water container 171 and the wastewater container 179 may be disposed at the left and right sides above the dust collection flow path part 152, and the dust collection flow path part 152 may be disposed between the washing water container 171 and the wastewater container 179.

[0294] With this configuration, it is possible to minimize a volume occupied by the dust collection flow path part 152 in the leftward/rightward direction in the robot cleaner station 100. In addition, it is possible to maximally expand a volume of the dust bag 151 that may expand in a limited space.

[0295] It is possible to maximize the volume of the dust bag 151 while simultaneously reducing a width in the leftward/rightward direction.

[0296] The dust collection motor housing 154 may provide a space in which the dust collection motor 153 is accommodated. For example, the dust collection motor housing 154 may be formed in the shape of a cylindrical or quadrangular container.

[0297] The dust collection motor housing 154 may be disposed rearward of the dust bag housing 142. The internal space of the dust collection motor housing 154 may communicate with the internal space of the dust bag housing 142. Specifically, the dust collection motor housing 154 may be formed with an air inlet port. An air inlet port of the dust collection motor housing 154 may communicate with an air discharge port of the dust bag housing 142.

[0298] In addition, the dust collection motor housing 154 may be formed with an air discharge port. The air

discharge port of the dust collection motor housing 154 may communicate with the flow path formed in the air discharge flow path part 155.

[0299] The air discharge flow path part 155 may discharge the air discharged from the dust collection motor 153. An inlet port of the air discharge flow path part 155 may communicate with the internal space of the dust collection motor housing 154. In addition, a discharge port of the air discharge flow path part 155 may be formed in the rear surface 112 of the housing 110. Therefore, the air discharge flow path part 155 may discharge the air, which has passed through the dust collection motor 153, to the outside of the robot cleaner station 100.

[0300] Meanwhile, FIGS. 18 to 29 illustrate the drawer 160 of the robot cleaner station 100 according to the embodiment of the present disclosure.

[0301] The drawer 160 according to the embodiment of the present disclosure will be described below with reference to FIGS. 18 to 29.

[0302] The robot cleaner station 100 according to the embodiment of the present disclosure includes the drawer 160. The drawer 160 may be disposed in the housing 110 and configured to be withdrawable from the housing 110.

[0303] The drawer 160 may be withdrawn from the housing 110. The drawer 160 may be withdrawn from the housing 110 in the first direction D1. Specifically, the drawer 160 may be withdrawn forward from the housing 110. The drawer 160 may be withdrawn in the direction in which the door 131 is disposed. That is, the drawer 160 may be withdrawn in a direction opposite to the direction in which the dust collection motor 153 is disposed.

[0304] Meanwhile, one or more liquid containers 171 and 179 may be accommodated in the drawer 160. Specifically, the washing water container 171 and the wastewater container 179 may be accommodated in the drawer 160. The washing water container 171 and the wastewater container 179 may be accommodated so as to be separable from the drawer 160. In this case, the washing water container 171 and the wastewater container 179 may be separated from the drawer 160 in the second direction D2. The second direction D2 may be a direction intersecting the first direction D1. For example, the second direction D2 may be the vertical direction.

[0305] Therefore, even in a state in which the washing water container 171 and/or the wastewater container 179 are fully filled with the liquid, the drawer 160 may support the washing water container 171 and/or the wastewater container 179. The user may separate or couple the washing water container 171 and/or the wastewater container 179 from or to the drawer 160 by simply lifting or placing down the washing water container 171 and/or the wastewater container 179.

[0306] Meanwhile, a position at which the user may couple or separate the washing water container 171 and/or the wastewater container 179 to or from the drawer 160 without bending at the waist will be described below with reference to FIGS. 22 to 24.

[0307] In order for the user to separate or couple the liquid container 171 or 179 from or to the drawer 160 without bending at the waist, the user needs to couple or separate the liquid container 171 or 179 to or from the drawer 160 only by adding a simple operation of moving the liquid container 171 or 179 horizontally or moving the wrist or the forearm.

[0308] Therefore, a lowest height at which the user may attach or detach the liquid container 171 or 179 to or from the drawer 160 without bending at the waist may refer to a height from the ground surface to a lower end of the palm based on a state in which the user stands with his/her arm lowered downward. This height may be a height at which the user may pull the handle of the drawer 160 without bending at the waist, i.e., a height at which the user may grip the handle of the liquid container 171 or 179 without bending at the waist.

[0309] For example, the height of the upper end of the drawer may be 50 cm or more from the ground surface.

[0310] Specifically, a height from the ground surface to a fingertip may be calculated as a value obtained by subtracting a upper arm length, a forearm length, and a hand length from an outer shoulder height.

[0311] In this case, the lowest height at which the user may grip the handle of the liquid container 171 or 179 without bending at the waist is about 50 cm which is obtained by using the dimensions of the bodies of the women over 60 years old who have the lowest average height among the adults (based on the standards of the Korean Agency for Technology and Standards).

[0312] Therefore, a shortest distance from the ground surface of the upper end of the drawer 160 may be 50 cm or more.

[0313] Meanwhile, in the case in which the user may couple the liquid container 171 or 179 to the drawer 160 only using his/her forearm or wrist without rotating his/her upper arm, the user does not put a relatively large effort. As a result, it is possible to provide convenience for the user.

[0314] Therefore, a maximum height at which the user may conveniently couple the liquid container 171 or 179 to the drawer 160 may refer to a height from the ground surface to the elbow (the lower end of the upper arm) based on the state in which the user stands with his/her arm lowered downward. In this case, in case that a height of the elbow is equal to or less than a height obtained by adding the height of the liquid container 171 or 179 to the height of the upper end of the drawer 160, the user may separate or couple the liquid container 171 or 179 from or to the drawer 160 only by raising the forearm.

[0315] For example, a sum of the heights of the liquid container 171 or 179 and the upper end of the drawer 160 may be 108 cm or less from the ground surface.

[0316] Specifically, the height from the ground surface to the elbow may be a value (A-B) obtained by subtracting the height A of the outer portion of the shoulder by the length B of the upper arm.

[0317] In this case, the height from the ground surface

to the elbow is about 107.6 cm which is obtained by using the dimension of the body of the man in his 30s who has the largest height from the ground surface to the elbow among the adults. In consideration of a diameter or the like of the handle of the liquid container 171 or 179, the sum of the heights of the liquid container 171 or 179 and the upper end of the drawer 160 may be at most 108 cm or less.

[0318] With this configuration, the user may conveniently and comfortably attach or detach the liquid container 171 or 179 to or from the drawer 160 without bending the waist.

[0319] Meanwhile, the drawer 160 may be disposed at the upper side of the interior of the housing 110. The drawer 160 may be disposed below the upper surface 113 of the housing 110. Therefore, the drawer 160 may be disposed below the charging part 113a.

[0320] As described above, in case that the heights of the drawer 160 and the liquid container 171 or 179 are ensured, a space in which an item may be accommodated may be ensured between the drawer 160 and the base 121 on which the robot cleaner 200 is seated. Therefore, the accommodation part 140 may be disposed below the drawer 160. Specifically, the drawer 160 may be disposed above the dust bag 151. In addition, the drawer 160 may be disposed above the accommodation part drawer 143. In addition, the drawer 160 may be disposed above an accommodation box 144.

[0321] The drawer 160 may include a drawer body 161, rails 162, and the drawer cover 163.

[0322] The liquid containers 171 and 179 may be accommodated in the drawer body 161. Specifically, the drawer body 161 may be provided with a liquid container accommodation portion. A space capable of accommodating the washing water container 171 and the wastewater container 179 may be provided in the liquid container accommodation portion. The liquid container accommodation portion may have a shape obtained by recessing the interior of the drawer body 161. In this case, the liquid container accommodation portion may be formed such that a width in the leftward/rightward direction is larger than a width in the forward/rearward direction. Therefore, the washing water container 171 and the wastewater container 179 may be disposed in the leftward/rightward direction in the liquid container accommodation portion. With this configuration, it is possible to minimize a distance by which the drawer 160 is withdrawn forward to separate the washing water container 171 and the wastewater container 179.

[0323] Meanwhile, the liquid container accommodation portion may be formed with a plurality of ports configured to communicate with the interiors of the liquid containers 171 and 179. Fresh water in the washing water container 171 may be discharged to a washing water flow path part 173 through the ports, or wastewater discharged from the wastewater suction part 176 may be introduced into the wastewater container 179 through the ports.

[0324] Specifically, the drawer body 161 may be formed with a washing water supply port 161a. One side of the washing water supply port 161a may be connected to the washing water flow path part 173, and the other side of the washing water supply port 161a may be connected to a washing water supply port 171d of the washing water container 171. Therefore, when a washing water pump (not illustrated) operates, the washing water may pass through the washing water supply port 161a.

[0325] In addition, the drawer body 161 may be formed with a negative pressure forming port 161b. One side of the negative pressure forming port 161b may be connected to a wastewater pumping flow path part 178, and the other side of the negative pressure forming port 161b may be connected to a negative pressure forming port 179d of the wastewater container 179. Therefore, when a wastewater pump operates, the air may pass through the negative pressure forming port 179d.

[0326] In addition, the drawer body 161 may be formed with a wastewater inlet port 161c. One side of the wastewater inlet port 161c may be connected to a wastewater flow path part 177, and the other side of the wastewater inlet port 161c may be connected to a wastewater inlet port 179f of the wastewater container 179. Therefore, when the wastewater pump operates, the wastewater may pass through the wastewater inlet port 179f.

[0327] Meanwhile, the port may be disposed gravitationally above a lower surface of the liquid container accommodation portion. Therefore, it is possible to prevent a situation in which fresh water is discharged to the washing water flow path part 173 by gravity or wastewater flows reversely regardless of the operation of the pump.

[0328] Meanwhile, a dust collection flow path guide portion 161d may be formed on a lower surface of the drawer body 161. For example, the dust collection flow path guide portion 161d may be recessed upward from the lower surface of the drawer body 161. The dust collection flow path guide portion 161d may guide a position of the dust collection flow path part 152. The dust collection flow path guide portion 161d may accommodate at least a part of the dust collection flow path part 152.

[0329] With this configuration, it is possible to prevent interference between the drawer 160 and the dust collection flow path part 152 when the drawer 160 reciprocates.

[0330] In addition, it is possible to maximally utilize capacities of the dust bag 151, the washing water container 171, and the wastewater container 179.

[0331] Meanwhile, a leakage water discharge port 161e may be formed in the lower surface of the drawer body 161. A drain flow path part 172 may be connected to the leakage water discharge port 161e. Therefore, the liquid flowing outward from the liquid containers 171 and 179 may be discharged to the washing tub 128 through the leakage water discharge port 161e. Therefore, it is possible to prevent a situation in which the liquid flowing outward from the liquid containers 171 and 179 contam-

inates the interior of the robot cleaner station 100.

[0332] Meanwhile, an inclined surface 161f may be formed on the lower surface of the drawer body 161. The inclined surface 161f may be formed to be inclined downward toward the water leakage discharge port 161e. Therefore, the liquid flowing outward from the liquid containers 171 and 179 may be guided by the inclined surface 161f and discharged to the water leakage discharge port 161e.

[0333] Meanwhile, the rail 162 may be provided on the drawer body 161 and guide the withdrawal of the drawer body 161. Specifically, the rails 162 may be provided as a pair of rails 162 provided on side surfaces of the drawer body 161 based on the leftward/rightward direction. The rail 162 may be coupled to a rail (not illustrated) formed on an inner surface of the housing 110, and the rail 162 may guide the forward/rearward movement of the drawer body 161.

[0334] The drawer cover 163 may define a front external appearance of the drawer body 161. The drawer cover 163 may define the front surface of the housing 110. The drawer cover 163 may be disposed above the accommodation part cover 145.

[0335] The drawer cover 163 may be formed to have a width larger than a maximum diameter of the drawer body 161. In addition, the drawer cover 163 may be formed to have a height larger than a maximum height of the drawer body 161. Therefore, in the state in which the drawer 160 is retracted into the housing 110, the drawer cover 163 may cover the front side of the drawer body 161 and prevent the interior of the drawer body 161 from being exposed.

[0336] Meanwhile, the drawer cover 163 may be formed with a grip portion 163a. The grip portion 163a may be configured to be gripped by the user. For example, the grip portion 163a may be recessed from an upper end of a rear surface of the drawer cover 163. That is, a recessed portion, into which the user's hand may be inserted, formed at an upper end of a rear surface of the drawer cover 163.

[0337] Therefore, the user may insert his/her hand into the grip portion 163a and then pull the drawer 160 to withdraw the drawer 160.

[0338] Meanwhile, the washing water container 171 and the wastewater container 179, which are relatively heavy in weight, may be accommodated in the drawer 160 in the robot cleaner station 100. Therefore, as withdrawal distances of the washing water container 171 and the wastewater container 179 increase, an overall center of gravity of the robot cleaner station 100 may move to the outside of the robot cleaner station 100, and the robot cleaner station 100 may fall down.

[0339] In order to solve this problem, in the present disclosure, the dust collection motor 153, which is relatively heavy in weight, may be disposed rearward of the washing water container 171 and the wastewater container 179.

[0340] In this case, a maximum withdrawal distance of

the drawer 160 may be shorter than a distance from a front end of the housing 110 to a front end of the dust collection motor 153. Therefore, an overall gravity center may be maintained in the housing 110.

[0341] Therefore, according to the present disclosure, it is possible to prevent the robot cleaner station 100 from falling down even though the drawer 160 is withdrawn.

[0342] Meanwhile, the rag washing part 170 of the robot cleaner station 100 according to the embodiment of the present disclosure will be described below.

[0343] The robot cleaner station 100 according to the embodiment of the present disclosure may include the rag washing part 170. The rag washing part 170 may supply the washing water to the rag 242 of the robot cleaner 200 seated on the seating part 120, wash the rag 242, and drain the wastewater after the rag 242 is washed.

[0344] The rag washing part 170 may include a washing water supply part configured to mix fresh water with a liquid including a detergent and discharge the mixture to an upper side of the washing plate 122. The washing water supply part may include the washing water container 171, the washing water flow path part 173, a branch flow path 174, and washing water nozzles 175.

[0345] The washing water container 171 may be separably coupled to the drawer 160 and store the liquid to be discharged to the washing plate 122 provided on the base 121. For example, the washing water container 171 may store fresh water.

[0346] Specifically, the washing water container 171 may include a washing water container body 171a, a washing water container cover 171b, and a washing water container handle 171c.

[0347] The washing water container body 171a may provide a space in which washing water (fresh water) may be stored. For example, the washing water container body 171a may be formed in the shape of a box opened at an upper side thereof.

[0348] In this case, a part of a lower surface of the washing water container body 171a may be formed in a shape recessed upward. For example, a part of a rear end of the lower surface of the washing water container body 171a may be recessed upward based on the state in which the washing water container 171 is coupled to the drawer 160. That is, a part of the rear end may be formed to have a stepped portion based on the interior of the washing water container body 171a. The washing water supply port 171d may be disposed at a portion where the stepped portion is formed. Therefore, it is possible to prevent an overflow of the liquid even though the washing water container 171 sways during a process in which the user transports the washing water container 171. In addition, it is possible to prevent a situation in which the liquid in the washing water container 171 leaks due to gravity in the state in which the washing water container 171 is coupled to the drawer 160.

[0349] In addition, two opposite ends of the lower surface of the washing water container body 171a based on

the leftward/rightward direction may be recessed upward based on the state in which the washing water container 171 is coupled to the drawer 160. In this case, one side of the recessed portion may be a position that faces the dust collection flow path part 152.

[0350] Therefore, a space, in which the dust collection flow path part 152 is to be disposed, may be provided at one side based on the leftward/rightward direction, and a space, in which the rail 162 is to be disposed, may be provided at the other side based on the leftward/rightward direction.

[0351] The washing water container cover 171b may be detachably coupled to the washing water container body 171a. The washing water container cover 171b may be coupled to the washing water container body 171a and cover an upper side of the washing water container body 171a. For example, a sealer may be disposed along a periphery of a lower end of the washing water container cover 171b. In addition, the washing water container cover 171b may be provided with a hook detachably coupled to the washing water container body 171a. Therefore, when the washing water container cover 171b is coupled to the washing water container body 171a, it is possible to prevent an overflow of the washing water during the process of withdrawing or transporting the washing water container 171.

[0352] The washing water container handle 171c may be provided on the washing water container body 171a or the washing water container cover 171b and configured to be gripped by the user. For example, the washing water container handle 171c may be a frame having two opposite longitudinal sides rotatably coupled to the washing water container body 171a or the washing water container cover 171b. Therefore, when the user grips and lifts the washing water container handle 171c, the washing water container body 171a and/or the washing water container cover 171b may be lifted. Therefore, the user may easily transport the washing water container 171.

[0353] Meanwhile, the washing water container 171 may supply the washing water (fresh water) to the washing plate 122 in the state in which the washing water container 171 is seated in the drawer 160. Specifically, the washing water container 171 may include the washing water supply port 171d and a guide frame 171e.

[0354] The washing water stored in the washing water container body 171a may be discharged through the washing water supply port 171d. The washing water supply port 171d may communicate with the washing water supply port 161a provided in the drawer 160. In addition, although not illustrated, a hose or pipe (hereinafter, referred to as a "washing water container flow path part") may be connected to the washing water supply port 171d.

[0355] One end of the washing water container flow path part may be disposed to be in contact with the lower surface of the washing water container body 171a or spaced apart from the lower surface of the washing water container body 171a at a predetermined distance, and

the other end of the washing water container flow path part may be connected to the washing water supply port 171d. Therefore, when the washing water pump (not illustrated) operates, the water stored on the lower surface of the washing water container body 171a may flow along the washing water container flow path part and pass through the washing water supply port 171d.

[0356] The washing water container flow path part may be mounted on the guide frame 171e. The washing water container flow path part may be mounted on the guide frame 171e, and the guide frame 171e may support the washing water container flow path part connected to the washing water supply port 171d. Therefore, the position of the washing water container flow path part may be stably maintained even though the washing water container 171 sways during the process of transporting the washing water container 171.

[0357] Meanwhile, according to the embodiment, the washing water container 171 may be provided with a floater (not illustrated), and the drawer 160 may be provided with a Hall sensor. The Hall sensor may be disposed adjacent to the lower surface of the washing water container body 171a. The Hall sensor may detect a position of the floater provided with a magnet. Therefore, in case that a water level of the washing water stored in the washing water container 171 is lowered to a preset height or lower, the floater (not illustrated) may also be lowered, and the Hall sensor may detect the floater. Therefore, the controller (not illustrated) may detect that the amount of washing water stored in the washing water container 171 is smaller than a preset reference amount, and the controller (not illustrated) may notify the user of the detection result.

[0358] With reference to FIG. 32, the drain flow path part 172 may discharge the liquid leaking from the liquid containers 171 and 179. The drain flow path part 172 may be disposed below the liquid containers 171 and 179. The drain flow path part 172 may discharge the liquid introduced into the drawer 160.

[0359] The drain flow path part 172 may be formed with a flow path in which the liquid may flow. For example, the drain flow path part 172 may be a hose. One longitudinal side of the drain flow path part 172 may be connected to the water leakage discharge port 161e provided in the drawer body 161, and the other longitudinal side of the drain flow path part 172 may be connected to the washing tub 128. In this case, one longitudinal side of the drain flow path part 172 may be disposed gravitationally above the other longitudinal side. Specifically, the drain flow path part 172 may be disposed to be inclined downward and rearward from the drawer 160, bent, and then inclined downward and forward. Therefore, the drain flow path part 172 may be continuously inclined downward from the drawer 160 to the washing tub 128. Therefore, the drain flow path part 172 of the present disclosure may allow the liquid, which is introduced from the drawer 160, to continuously flow downward without being stopped.

[0360] Therefore, according to the present disclosure,

it is possible to prevent the liquid from remaining in the drain flow path part 172, thereby improving the hygiene of the robot cleaner station 100.

[0361] Meanwhile, the drain flow path part 172 may be coupled to the drawer 160 and withdrawn together with the drawer 160. In this case, upper ends of the one or more flow path parts 173 and 177 coupled to the drawer 160 may be disposed to be higher than the drain flow path part 172. Therefore, in case that the water leaks from positions at which the flow path parts 173 and 177 and the drawer 160 are connected, the water may be collected on the lower surface of the drawer 160 by gravity and discharged to the drain flow path part 172.

[0362] Meanwhile, an upper end of the drain flow path part 172 may be disposed above an upper end of the dust bag 151, and a lower end of the drain flow path part 172 may be disposed below a lower end of the dust bag 151. Therefore, a sufficient length of the drain flow path part 172 may be ensured. The drain flow path part 172 may be kept inclined downward even though the drain flow path part 172 is withdrawn together with the drawer 160.

[0363] Therefore, according to the present disclosure, the liquid, which leaks from the liquid containers 171 and 179 or is introduced into the drawer 160 in the state in which the drawer 160 is withdrawn, may be collected in the water leakage discharge port 161e, and the liquid may flow along the drain flow path part 172 and be introduced into the washing tub 128. In addition, the washing tub 128 may be emptied as the liquid introduced into the washing tub 128 is consequently introduced into the wastewater container 179.

[0364] The washing water flow path part 173 may supply the washing water, which is stored in the washing water container 171, to the branch flow path 174 or the robot cleaner 200. The washing water flow path part 173 may include a washing water inlet pipe 173a, the washing water pump (not illustrated), a washing water supply pipe 173c, a heater 173d, and a heated water supply pipe 173e.

[0365] The washing water inlet pipe 173a may be connected to the washing water container 171 and allow the washing water to flow therethrough. One side of the washing water inlet pipe 173a may be connected to the washing water container 171 through the drawer 160, and the other side of the washing water inlet pipe 173a may be connected to the washing water pump (not illustrated). For example, the washing water inlet pipe 173a may be a hose.

[0366] The washing water pump (not illustrated) may be connected to the washing water inlet pipe 173a and provide a flow force for allowing the washing water to flow.

[0367] Although not illustrated, the washing water pump (not illustrated) may be connected to a first washing water valve. The first washing water valve may be supplied with the washing water from the washing water pump (not illustrated) and supply the washing water selectively to the washing water supply pipe 173c or the heater 173d.

[0368] The washing water supply pipe 173c may supply the washing water to the branch flow path 174.

[0369] In contrast, the washing water having passed through the first washing water valve may be introduced into a second washing water valve (not illustrated) and supplied to the water supply nozzle 123c or the heater 173d. The washing water introduced into the water supply nozzle 123c may be supplied to the water container 230 of the robot cleaner 200. In contrast, the washing water introduced into the heater 173d may be heated by the heater 173d. In this case, the heater 173d may be disposed rearward of the dust collection motor 153. The washing water heated by the heater 173d may be introduced into the heated water supply pipe 173e and supplied to the branch flow path 174.

[0370] Therefore, the robot cleaner station 100 may supply non-heated washing water through the washing water supply pipe 173c or supply heated washing water through the heated water supply pipe 173e.

[0371] The branch flow path 174 may supply the washing water, in which purified water and the detergent are mixed, may be supplied to the pair of washing water nozzles 175.

[0372] The branch flow path 174 may be provided in a shape having two tube portions diverged from a single tube portion. In this case, an end of one diverged tube portion may be connected to any one of the pair of washing water nozzles 175, and an end of the other diverged tube portion may be connected to the remaining one of the pair of washing water nozzles 175.

[0373] The pair of washing water nozzle 175 may be disposed to be spaced apart from each other. In this case, the pair of washing water nozzles 175 may be disposed at positions that are symmetric to each other.

[0374] Further, the branch flow path 174 may be connected to the washing water nozzle 175, the washing water may be introduced into the washing water nozzle 175, and the washing water may be discharged to the washing plate 122. The washing water nozzle 175 may discharge the washing water to the upper surface of the washing plate 122 through the washing water discharge port. The washing water discharge port may be opened in a direction in which the washing water discharge port faces an upper surface of the rag 242 seated on the washing plate 122. More specifically, the washing water discharge port formed in the washing water nozzle 175 may discharge the washing water toward a washing protrusion portion 122a of the washing plate 122.

[0375] After the rag 242 is washed, the washing water discharged to the upper surface of the washing plate 122 may flow downward along the inclination of the washing plate 122 and be discharged to the passing holes 122b. The washing water having passed through the passing holes 122b accumulates in the washing tub 128. In addition, the washing water accumulating in the washing tub 128 may be introduced into the wastewater flow path part 177 through the wastewater suction part 176 and introduced into the wastewater container 179 through the

wastewater flow path part 177. That is, the liquid having passed through the washing plate 122 may flow along the washing tub 128 and be discharged through the wastewater suction part 176.

[0376] Meanwhile, one end of the wastewater flow path part 177 may be connected to the wastewater suction part 176, and the other end of the wastewater flow path part 177 may be connected to the wastewater container 179 through the drawer 160. The wastewater flow path part 177 may guide the wastewater, which is sucked by the wastewater suction part 176, to the wastewater container 179. For example, the wastewater flow path part 177 may be a hose.

[0377] The wastewater container 179 may be connected to the wastewater pumping flow path part 178 through the drawer 160. The wastewater pumping flow path part 178 may be connected to the wastewater pump (not illustrated) and provide a flow force for introducing the wastewater into the wastewater container 179. For example, the wastewater pumping flow path part 178 may be a hose.

[0378] The wastewater container 179 may provide a space that stores the washing water that has been used to wash the rag 242.

[0379] The wastewater container 179 may be separably coupled to the drawer 160 and store the liquid discharged from the washing tub 128. For example, the wastewater container 179 may store wastewater.

[0380] Specifically, the wastewater container 179 may include a wastewater container body 179a, a wastewater container cover 179b, and a wastewater container handle 179c.

[0381] The wastewater container body 179a may provide a space in which the wastewater may be stored. For example, the wastewater container body 179a may be formed in the shape of a box opened at an upper side thereof.

[0382] In this case, a part of a lower surface of the wastewater container body 179a may be formed in a shape recessed upward. For example, a part of a rear end of the lower surface of the wastewater container body 179a may be recessed upward based on the state in which the wastewater container 179 is coupled to the drawer 160. That is, a part of the rear end may be formed to have a stepped portion based on the interior of the wastewater container body 179a. The wastewater inlet port 179f may be disposed at a portion where the stepped portion is formed. Therefore, it is possible to prevent an overflow of the liquid even though the wastewater container 179 sways during a process in which the user transports the wastewater container 179. In addition, it is possible to prevent a situation in which the liquid in the wastewater container 179 leaks due to gravity in the state in which the wastewater container 179 is coupled to the drawer 160.

[0383] In addition, two opposite ends of the lower surface of the wastewater container body 179a based on the leftward/rightward direction may be recessed upward

based on the state in which the wastewater container 179 is coupled to the drawer 160. Therefore, a space, in which the dust collection flow path part 152 is to be disposed, may be provided at one side based on the leftward/rightward direction, and a space, in which the rail 162 is to be disposed, may be provided at the other side based on the leftward/rightward direction.

[0384] The wastewater container cover 179b may be detachably coupled to the wastewater container body 179a. The wastewater container cover 179b may be coupled to the wastewater container body 179a and cover an upper side of the wastewater container body 179a. For example, a sealer may be disposed along a periphery of a lower end of the wastewater container cover 179b. In addition, the wastewater container cover 179b may be provided with a hook detachably coupled to the wastewater container body 179a. Therefore, when the wastewater container cover 179b is coupled to the wastewater container body 179a, it is possible to prevent an overflow of the wastewater during the process of withdrawing or transporting the wastewater container 179.

[0385] The wastewater container handle 179c may be provided on the wastewater container body 179a or the wastewater container cover 179b and configured to be gripped by the user. For example, the wastewater container handle 179c may be a frame having two opposite longitudinal sides rotatably coupled to the wastewater container body 179a or the wastewater container cover 179b. Therefore, when the user grips and lifts the wastewater container handle 179c, the wastewater container body 179a and/or the wastewater container cover 179b may be lifted. Therefore, the user may easily transport the wastewater container 179.

[0386] Meanwhile, the wastewater may be introduced into the wastewater container 179 from the washing tub 128 in the state in which the wastewater container 179 is seated on the drawer 160. Specifically, the wastewater container 179 may include the negative pressure forming port 179d, a floater 179e, and the wastewater inlet port 179f.

[0387] The wastewater inlet port 179f may communicate with the wastewater inlet port 161c provided in the drawer 160. Therefore, the wastewater having passed through the wastewater flow path part 177 may pass through the wastewater inlet port 179f and be stored in the wastewater container body 179a.

[0388] Meanwhile, a suction force may be applied to the negative pressure forming port 179d from the wastewater pump (not illustrated). The negative pressure forming port 179d may communicate with the negative pressure forming port 161b provided in the drawer 160. Therefore, when the wastewater pump (not illustrated) operates, the air in the wastewater container 179 may pass through the negative pressure forming port 179d and be sucked into the wastewater pump (not illustrated). Therefore, negative pressure may be applied to the wastewater container 179 through the wastewater pump-

ing flow path part 178.

[0389] Meanwhile, the floater 179e may move upward or downward in the wastewater container 179 due to the buoyancy of the liquid. The floater 179e may move upward or downward depending on a water level of the wastewater in the wastewater container body 179a. In this case, the floater 179e may be connected to a lever. The floater 179e may close the negative pressure forming port 179d when the floater 179e moves upward, and the floater 179e may open the negative pressure forming port 179d when the floater 179e moves downward. Therefore, in case that the amount of wastewater reaches a preset reference amount, the negative pressure forming port 179d may be blocked, thereby preventing the wastewater from being sucked any further.

[0390] In addition, according to the embodiment, the floater 179e may be provided with a magnet, and the drawer 160 may be provided with a Hall sensor. The Hall sensor may be provided on the drawer body 161 and disposed at a preset height. The Hall sensor may detect a position of the floater provided with the magnet. Therefore, in case that a water level of the wastewater stored in the wastewater container 179 is raised to a preset height or higher, the floater (not illustrated) may also be raised, and the Hall sensor may detect the floater. Therefore, the controller (not illustrated) may detect that the amount of wastewater stored in the wastewater container 179 is larger than a preset reference amount, and the controller (not illustrated) may notify the user of the detection result.

[0391] The robot cleaner station 100 according to the embodiment of the present disclosure may include the rag drying part 180. In this case, the rag drying part 180 may dry the rag 242 of the robot cleaner 200, which has been washed by the rag washing part 170, or the rag 242 that is wet after a water cleaning process.

[0392] The rag drying part 180 may include an outside air supply module 181 and an air discharge part 182.

[0393] The outside air supply module 181 may heat air existing outside the housing 110 and supply the heated air to the accommodation space S. The outside air supply module 181 may include an outside air supply flow path 181a, the outside air discharge part 181c, a heater 181d, and a blower fan 181e.

[0394] The outside air supply module 181 is formed with the outside air supply flow path 181a. The outside air supply flow path 181a may allow air existing outside the seating part 120 to flow to the outside air discharge part 181c.

[0395] The outside air supply flow path 181a may connect an external space of the seating part 120 and the accommodation space. One side of the outside air supply flow path 181a may communicate with the external space of the seating part 120, and the other side of the outside air supply flow path 181a may communicate with the accommodation space S through the outside air discharge part 181c. The blower fan 181e and the heater 181d may be sequentially disposed on the outside air supply flow path 181a.

[0396] At least a part of the outside air discharge part 181c may be disposed above the washing plate 122. The outside air discharge part 181c may be disposed in a direction in which the outside air discharge part 181c faces the washing plate 122. The outside air discharge part 181c may be provided as a pair of outside air discharge parts 181c opened downward.

[0397] The outside air discharge part 181c may discharge the air having passed through the outside air supply flow path 181a. The outside air discharge part 181c may be disposed forward of the heater 181d. The outside air discharge part 181c may discharge the air, which is heated by the heater 181d, to the accommodation space S.

[0398] With this configuration, the pair of outside air discharge parts 181c may dry the rags 242 disposed to be vertically symmetric and disposed at the lower side of the robot cleaner 200. In addition, it is possible to prevent a situation in which heat is concentratedly applied to a specific region. Therefore, it is possible to improve efficiency in drying the rag 242.

[0399] The blower fan 181e may be disposed in the outside air supply flow path 181a and blow the air toward the accommodation space S. The blower fan 181e may provide a flow force to the air in the outside air supply flow path 181a.

[0400] The blower fan 181e may allow the air to flow to the outside air discharge part 181c.

[0401] The heater 181d may be disposed in the outside air supply flow path 181a and heat the air flowing through the outside air supply flow path 181a. The heater 181d may heat the air discharged through the outside air discharge part 181c.

[0402] The heater 181d may include a heater housing and a heating element. In this case, the heater housing may be disposed in the outside air supply flow path 181a, and a space capable of accommodating the heating element may be provided in the heater housing. In addition, the heating element may heat air to be introduced into the heater housing. Therefore, the air heated by the heating element may be discharged to the accommodation space S through the outside air discharge part 181c and dry the wet rag 242.

[0403] The air heated by hot air discharged from the outside air supply module 181 may be discharged through the air discharge part 182.

[0404] At least a part of the air discharge part 182 may be disposed above the accommodation space S.

[0405] The air heated by hot air discharged from the outside air supply module 181 may supply heat to the rag 242 of the robot cleaner 200. Therefore, moisture, which is absorbed by the rag 242 and remains in the rag 242, may be vaporized by absorbing heat from the air. The vaporized moisture may flow in the accommodation space S. Therefore, the air in the accommodation space S may include the vaporized moisture, and a humidity in the accommodation space S may be increased (hereinafter, the air including the vaporized moisture in the

accommodation space S may be referred to as "wet vapor").

[0406] The air discharge part 182 may discharge the air, which exists in the accommodation space S, to the outside. Specifically, at least a part of the air discharge part 182 may be disposed on the seating part cover 125, and the seating part cover 125 may cover an upper side of the accommodation space S.

[0407] The air discharge part 182 may include an air suction port (not illustrated) and an air discharge fan 182c.

[0408] The air suction port may communicate with the accommodation space S. The air suction port may be disposed at the upper side of the accommodation space S. The wet vapor in the accommodation space S may be discharged through the air suction port. The air in the accommodation space S may be sucked through the air suction port.

[0409] The air suction port may be disposed to be higher than the robot cleaner 200 from the ground surface in the state in which the robot cleaner 200 is seated on the seating part 120. Therefore, it is possible to improve efficiency in sucking vapor that is raised by convection while the rag is being dried.

[0410] For example, the air suction port may be formed in the seating part cover 125. In this case, an air discharge fan housing may be coupled to the seating part cover 125 and define a flow path through which the air is discharged. Therefore, the wet vapor introduced into the air suction port may be discharged through the flow path.

[0411] The air suction port may be formed in the shape of a hole in the seating part cover 125. The air suction port may be provided in the form of a circular hole. The air discharge fan housing may be coupled directly to the corresponding hole portion of the air suction port. Therefore, the air introduced through the air suction port may immediately flow to the air discharge fan housing. The air sucked through the air suction port may be introduced into the air discharge fan 182c. A distance from an air discharge port 171c to the air suction port may be longer than a distance from the air discharge port 171c to the rag 242. This is intended to prevent a situation in which the heated air discharged from the air discharge port 171c is sucked directly into the air suction port without being sufficiently supplied to the rag 242, which causes waste of energy.

[0412] In addition, the air suction port may be disposed to be closer to the door 131 than the air discharge port 171c. Because the air suction port is disposed at a front upper side of the accommodation space S, a range of a space in which hot air discharged from the air discharge port 171c flows is increased, thereby improving efficiency in drying the rag 242. Therefore, the hot air discharged through the outside air discharge part 181c may dry the rag 242 of the robot cleaner 200 while flowing forward, and then the hot air may be discharged to the air suction port.

[0413] One side of the air discharge fan housing may

be connected to an air suction port 182a, and the other side of the air discharge fan housing may be connected to the air discharge port 182e. The air discharge fan 182c may be disposed in the air discharge fan housing. A flow path may be formed in the air discharge fan housing and communicate with the air suction port 182a.

[0414] The air discharge fan 182c may allow the air, which exists in the accommodation space S, to flow to the air suction port. The air discharge fan 182c may generate an airflow in order to suck the wet vapor, which exists in the accommodation space S, into the air suction port and then discharge the wet vapor to the outside through an air discharge fan housing 182b.

[0415] The air discharge fan 182c may be disposed below the dust collection motor 153. In addition, the air discharge fan 182c may be disposed above the base 121. Therefore, it is possible to effectively discharge the wet vapor that is raised from the base 121 by convection.

[0416] The air discharge fan 182c may include a shaft, a fan motor, and an impeller. When the impeller is rotated by an operation of the fan motor, the air in the accommodation space S or the housing 110 may be introduced into the air discharge fan housing, pass through the interior of the air discharge fan housing, and be discharged to the air discharge port 182e.

[0417] Meanwhile, in the present embodiment, the air discharge fan 182c may be configured as a centrifugal fan. An air discharge direction of the air discharge fan 182c may be perpendicular to a rotary shaft. The air suction direction of the air discharge fan 182c may be perpendicular to an air discharge direction. When the air discharge fan 182c operates, the air in the accommodation space S may be introduced into the air suction port.

[0418] In this case, the air discharge port 182e may be disposed in a rear surface of the housing 110. That is, the air discharge port 182e may be formed at a side opposite to the side at which the dust bag 151 is withdrawn. The air discharge port 182e may be formed in a shape opened toward a rear side of the housing 110. The air discharged from the air discharge port 182e may be diffused into the outside air.

[0419] The air discharge port 182e may be disposed above the base 121. In addition, the air discharge port 182e may be disposed below the drawer 160. Therefore, it is possible to minimize a length of the flow path through which the air is discharged from the air discharge fan 182c.

[0420] Meanwhile, in the present embodiment, the air discharge port 182e may be configured such that the air discharged from the dust collection motor 153 and the air discharged from the air discharge fan are discharged together. That is, the air discharge port 182e may communicate with the dust collection motor housing 154, and the air discharged from the dust collection motor 153 may flow through the air discharge port 182e. Therefore, the air having passed through the dust collection motor housing 154 and the air having passed through the air discharge fan housing may be merged and then dis-

charged to the air discharge port 182e.

[0421] In this case, a filter (not illustrated) may be disposed in the air discharge port 182e. The filter may filter out debris from the air discharged from the dust collection motor 153 and the air discharge fan 182c. With this configuration, the air discharge outlets may be integrated into a single air discharge outlet, and the number of filters to be used may be reduced. Therefore, it is possible to easily manage the filter.

[0422] Meanwhile, with reference to FIGS. 30 and 31, the robot cleaner station 100 according to the embodiment of the present disclosure includes the flow path parts 172, 173a, 177, and 178 each having one longitudinal end coupled to the drawer 160, configured to be withdrawn together with the drawer 160, and formed with the flow path in which the fluid flows. The flow path parts 172, 173a, 177, and 178 may each be formed with the flow path in which the fluid (liquid or gas) flows. For example, the flow path parts 172, 173a, 177, and 178 may each be a hose. The flow path parts 172, 173a, 177, and 178 may include the drain flow path part 172, the washing water inlet pipe 173a, the wastewater flow path part 177, and the wastewater pumping flow path part 178.

[0423] In the case of a robot cleaner station in the related art, a drawer-type water container is used, and a drawer and a hose or a connector are separated when the drawer is withdrawn. In this case, a problem occurs in which water leaks from a connection portion between the drawer and the hose, and an interior of a station is contaminated.

[0424] In order to solve the problem, in the present disclosure, the flow path parts 172, 173a, 177, and 178 are coupled to the drawer 160 and configured to be withdrawn together with the drawer 160.

[0425] Therefore, it is possible to prevent the occurrence of water leakage even though the drawer 160 is withdrawn.

[0426] In addition, even though the liquid containers 171 and 179 are separated from the drawer 160, the liquid may be discharged through the drain flow path part 172 and the inclined surface provided on the lower surface of the drawer.

[0427] Meanwhile, a sufficient length needs to be ensured so that the hose is connected to the drawer and moves together with the drawer, as described above. In this case, as the length of the hose increases, a part of the hose may sag downward due to gravity. In this case, the connection portion between the hose and the drawer may be separated, and a flow rate of the fluid flowing through the hose may be decreased.

[0428] In order to solve the problem, in the present disclosure, the flow path parts 172, 173a, 177, and 178 may each be disposed in a shape bent two or more times.

[0429] Specifically, the flow path parts 172, 173a, 177, and 178 may each include a drawer coupling portion 195a coupled to the drawer, a first connection portion 195b connected to the drawer coupling portion and disposed in the forward/rearward direction, a first bending

portion 195c connected to the first connection portion and disposed in a bent shape, a second connection portion 195d connected to the first bending portion 195c and disposed in the forward/rearward direction, a second bending portion 195e connected to the second connection portion 195d and disposed in a bent shape, a third connection portion 195f connected to the second bending portion and disposed in the forward/rearward direction, a third bending portion 195g connected to the third connection portion and disposed in a bent shape, and a fourth connection portion 195h connected to the third bending portion and disposed in the upward/downward direction.

[0430] In this case, the flow path parts 172, 173a, 177, and 178 may be made of a material that may be deformed in accordance with the movement of the drawer 160.

[0431] Therefore, when the drawer 160 is withdrawn, the first connection portion 195b moves along the drawer 160, such that a length of the first connection portion 195b may increase, and a length of the second connection portion 195d may decrease. In contrast, a length of the third connection portion 195f may be maintained when the drawer 160 is withdrawn.

[0432] Meanwhile, when the drawer 160, which has been withdrawn, is retracted again, the first connection portion 195b moves along the drawer 160, such that the length of the first connection portion 195b may decrease, and the length of the second connection portion 195d may increase.

[0433] Therefore, even though the drawer 160 moves, the flow path parts 172, 173a, 177, and 178 may be stably supported without sagging downward.

[0434] Meanwhile, the robot cleaner station 100 according to the embodiment of the present disclosure may further include a hose guide part 190. The hose guide part 190 may guide the deformation of the one or more flow path parts 172, 173a, 177, and 178 connected to the drawer 160.

[0435] The hose guide part 190 may include guide plates 191, hose support plates 192, and hose support rings 193. The guide plates 191 may be provided as a pair of guide plates 191 formed in the vertical direction, disposed in the forward/rearward direction, and disposed to face each other. In this case, the flow path parts 172, 173a, 177, and 178 may be disposed between the pair of guide plates 191.

[0436] In addition, the pair of guide plates may be connected through the hose support plate 192. The hose support plate 192 may be in contact with and support the flow path parts 172, 173a, 177, and 178, thereby preventing a situation in which the flow path parts 172, 173a, 177, and 178 sag downward due to gravity.

[0437] In addition, the hose support rings 193 may be disposed to protrude upward from the hose support plates 192, such that the flow path parts 172, 173a, 177, and 178 may be supported by being caught by the hose support rings 193. The flow path parts 172, 173a, 177, and 178 may be bent upward or bent upward

and rearward from points at which the flow path parts 172, 173a, 177, and 178 are in contact with the hose support rings 193.

[0438] Therefore, specific positions of the flow path parts 172, 173a, 177, and 178 may be fixed by the hose support plates 192 and the hose support rings 193, and the flow path parts 172, 173a, 177, and 178 may be stably supported even though the flow path parts 172, 173a, 177, and 178 are deformed in accordance with the forward/rearward movement of the drawer 160.

[0439] Meanwhile, the hose guide part 190 may be provided as a plurality of hose guide parts 190. For example, in the present embodiment, four hose guide parts 190 may be provided and guide the deformation of the drain flow path part 172, the washing water inlet pipe 173a, the wastewater flow path part 177, and the wastewater pumping flow path part 178.

[0440] With this configuration, the hose connected to the drawer 160 may be maintained in a constant shape while moving together with the drawer 160 even though the drawer 160 moves in the forward/rearward direction, thereby preventing a situation in which the hose sags due to gravity, which causes water leakage or damage to the hose.

[0441] 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 present disclosure.

[0442] 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

[0443]

1: Cleaner system
 100: Robot cleaner station
 110: Housing
 115: Leg
 121: Base
 131: Door
 140: Accommodation part
 142: Dust bag housing
 143: Accommodation part drawer
 144: Accommodation box
 145: Accommodation part cover
 150: Dust collection part
 151: Dust bag
 152: Dust collection flow path part
 153: Dust collection motor
 160: Drawer
 161d: Dust collection flow path guide portion

162: Rail
 170: Rag washing part
 171: Washing water container
 172: Drain flow path part
 173a: Washing water inlet pipe
 177: Wastewater flow path part
 178: Wastewater pumping flow path part
 179: Wastewater container
 180: Rag drying part
 190: Hose guide part
 191: Guide plate
 192: Hose support plate
 193: Hose support ring
 200: Robot cleaner

Claims

1. A robot cleaner station (100) comprising:

a housing (110);
 a base (121) disposed in the housing (110) and configured such that a robot cleaner (200) is seated on the base (121);
 a dust bag (151) coupled in the housing (110) in a withdrawable manner, disposed above the base (121), and configured to collect dust from a dust bin of the robot cleaner (200) ;
 a drawer (160) provided in the housing (110) in a withdrawable manner and disposed to be higher than the dust bag (151); and
 a washing water container (171) separably coupled to the drawer (160) and configured to store a liquid to be discharged to the base (121).

2. The robot cleaner station (100) of claim 1, wherein the drawer (160) is withdrawn toward a front side at which the robot cleaner (200) enters an interior of the housing (110).

3. The robot cleaner station (100) of claim 1 or 2, further comprising:

a door (131) provided on the housing (110) and configured to open or close an inlet/outlet through which the robot cleaner (200) enters or exits,
 wherein the door (131) is disposed at a side of the housing (110) based on a direction in which the drawer (160) is withdrawn.

4. The robot cleaner station (100) any one of the preceding claims, further comprising:
 a plurality of legs (115) provided at a lower side of the housing (110) and configured to support the housing (110).

5. The robot cleaner station (100) of any one of the

preceding claims, further comprising:

a door (131) provided on the housing (110) and configured to open or close an inlet/outlet through which the robot cleaner (200) enters or exits, wherein the door (131) is disposed to be inclined with respect to a ground surface in a state in which the door (131) is opened.

6. The robot cleaner station (100) of any one of the preceding claims, wherein the housing (110) comprises an upper surface configured to cover an upper side of the drawer (160), and wherein a charging part configured to charge an electronic device is provided on the upper surface.

7. The robot cleaner station (100) of any one of the preceding claims, wherein a maximum withdrawal distance of the drawer (160) is equal to or lower than one-half of a length of the housing (110) in a forward/rearward direction.

8. The robot cleaner station (100) of any one of the preceding claims, further comprising:

a dust collection motor (153) disposed above the base (121) and configured to provide a flow force for collecting dust from an interior of the dust bin of the robot cleaner (200), wherein the dust bag (151) is disposed forward of the dust collection motor (153).

9. The robot cleaner station (100) of claim 8, wherein the drawer (160) preferably is withdrawn in a direction opposite to a direction in which the dust collection motor (153) is disposed.

10. The robot cleaner station (100) of any one of the preceding claims, further comprising: at least one flow path part (173, 172, 177) coupled to the drawer (160), configured to move together with the drawer (160), and formed with a flow path in which the liquid flows.

11. The robot cleaner station (100) of claim 10, further comprising: a hose guide part (190) configured to guide deformation of the flow path part (173, 172, 177).

12. The robot cleaner station (100) of any one of the preceding claims, further comprising: a sterilization module disposed between the drawer (160) and the dust bag (151) and configured to emit light toward the dust bag (151).

13. The robot cleaner station (100) of claim 8, further comprising:

a dust bag housing (142) to which the dust bag (151) is coupled in a withdrawable manner, the dust bag housing (142) being disposed forward of the dust collection motor (153).

14. The robot cleaner station (100) of claim 8, further comprising:

an accommodation part (140) disposed between the base (121) and the drawer (160) and configured to provide an accommodation space, wherein the accommodation part (140) is disposed forward of the dust collection motor (153).

15. The robot cleaner station (100) of claim 8, further comprising:

a heater disposed in the housing (110) and configured to heat washing water for washing a rag of the robot cleaner (200), wherein the heater is disposed rearward of the dust collection motor (153).

16. The robot cleaner station (100) of claim 8, further comprising:

a washing plate configured to come into contact with a rag of the robot cleaner (200) in a state in which the robot cleaner (200) is seated on the base (121); and a washing tub configured to store the liquid having passed through the washing plate, wherein the washing tub is disposed rearward of the dust collection motor (153).

17. The robot cleaner station (100) of any one of the preceding claims, wherein the drawer (160) is configured to be withdrawable from the housing (110) in a first direction, and wherein the washing water container (171) is coupled to be separable from the drawer (160) in a second direction different from the first direction.

18. The robot cleaner station (100) of claim 17, further comprising:

a wastewater container (179) coupled to be separable from the drawer (160) in the second direction and configured to store the liquid discharged from the base (121).

19. The robot cleaner station (100) of any one of the preceding claims, further comprising:

a door (131) provided on the housing (110) and configured to open or close an inlet/outlet through which the robot cleaner (200) enters or exits,

wherein the door (131) is inclined in a third direction different from the first direction and the second direction in a state in which the door (131) is opened.

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- 20.** The robot cleaner station (100) of any one of the preceding claims, wherein the dust bag (151) is coupled to be withdrawable from the housing (110) in a first direction.

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FIG. 1

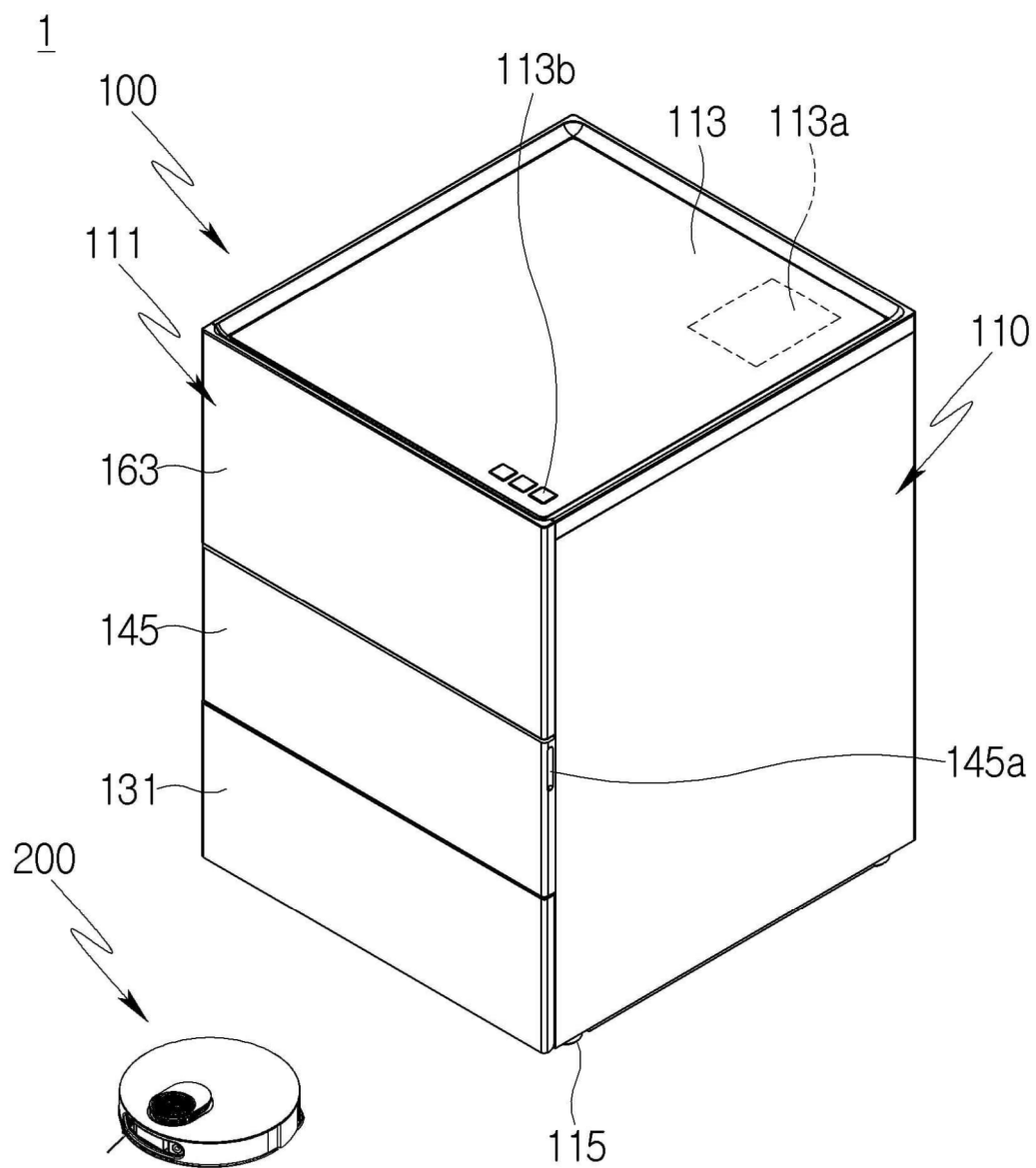


FIG. 2

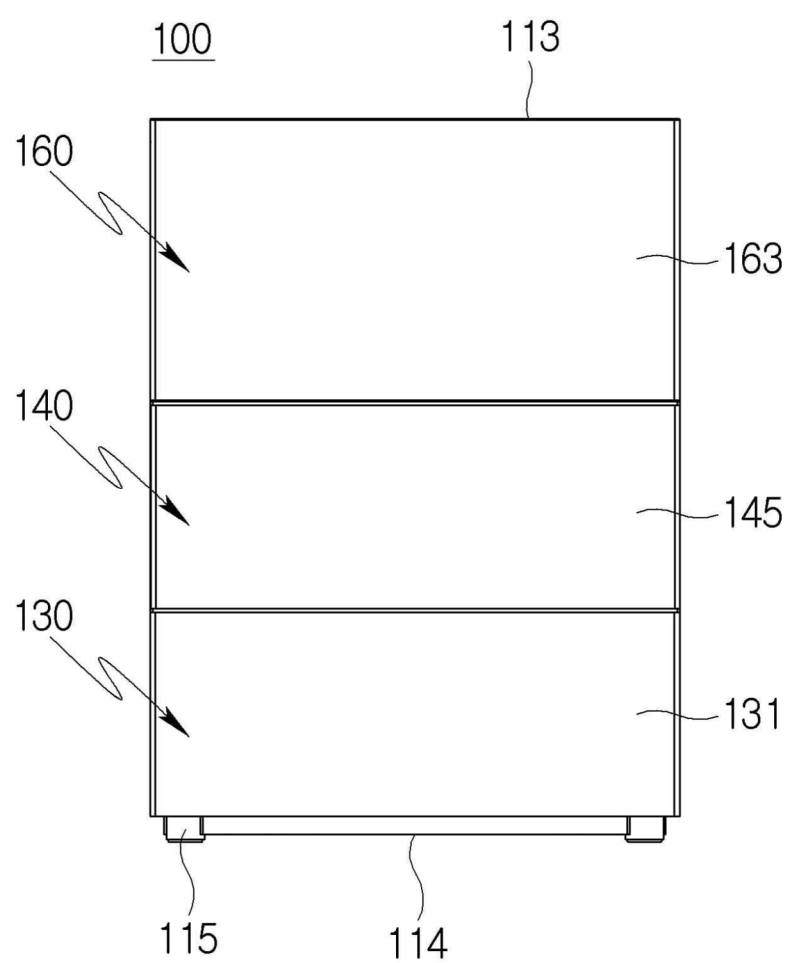


FIG. 3

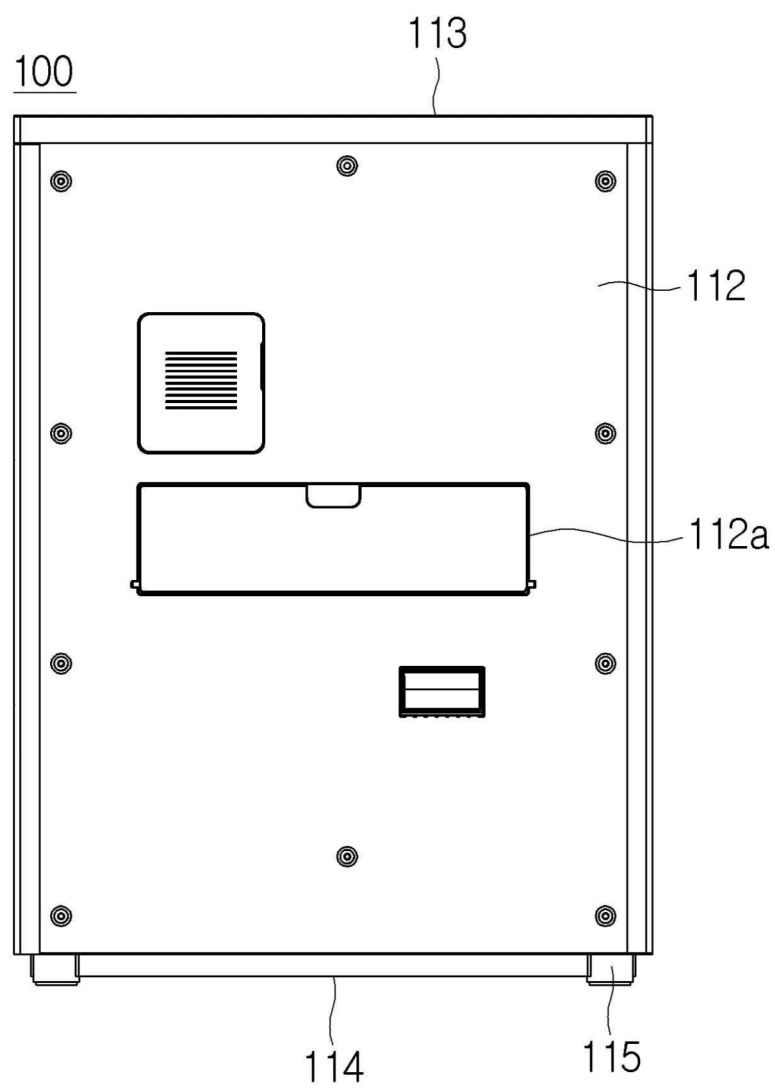


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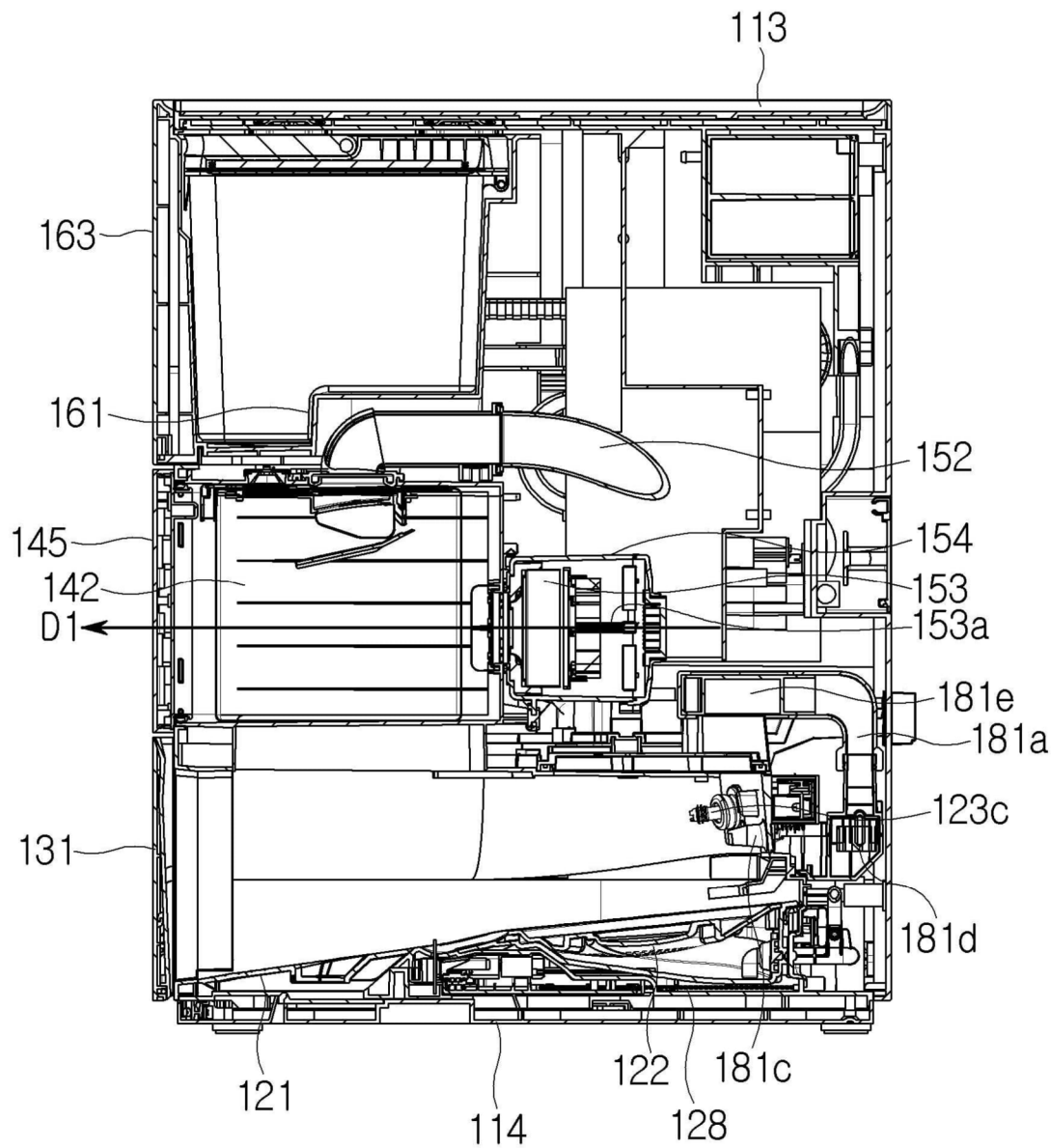


FIG. 5

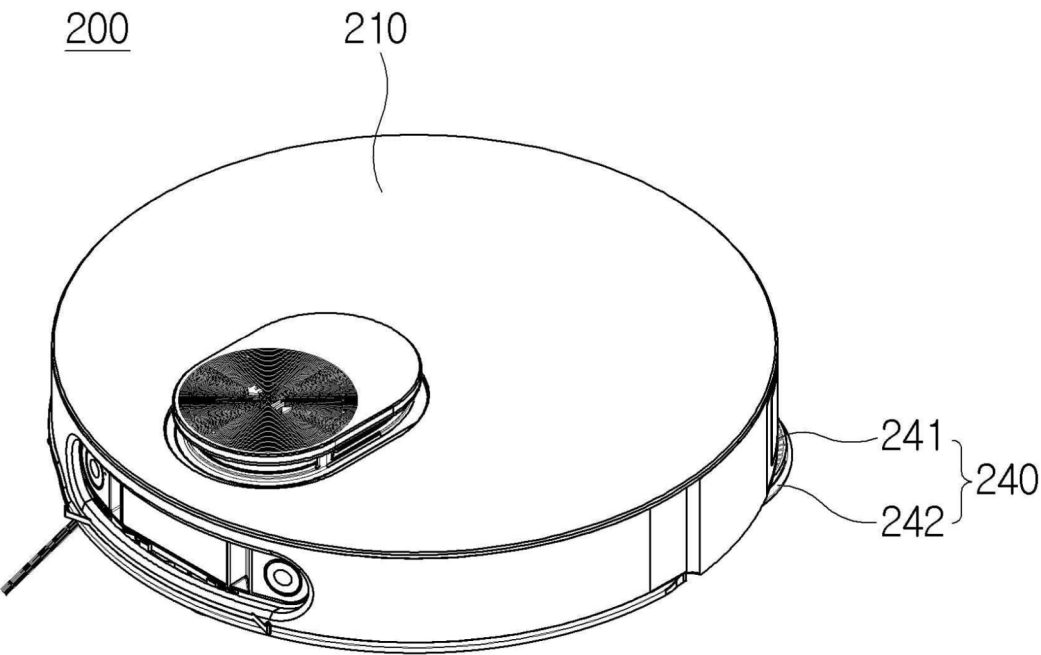


FIG. 6

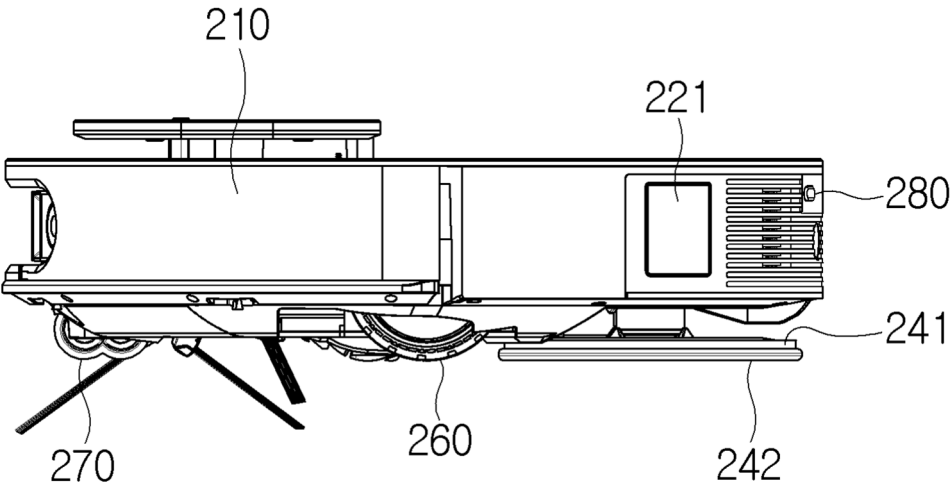


FIG. 7

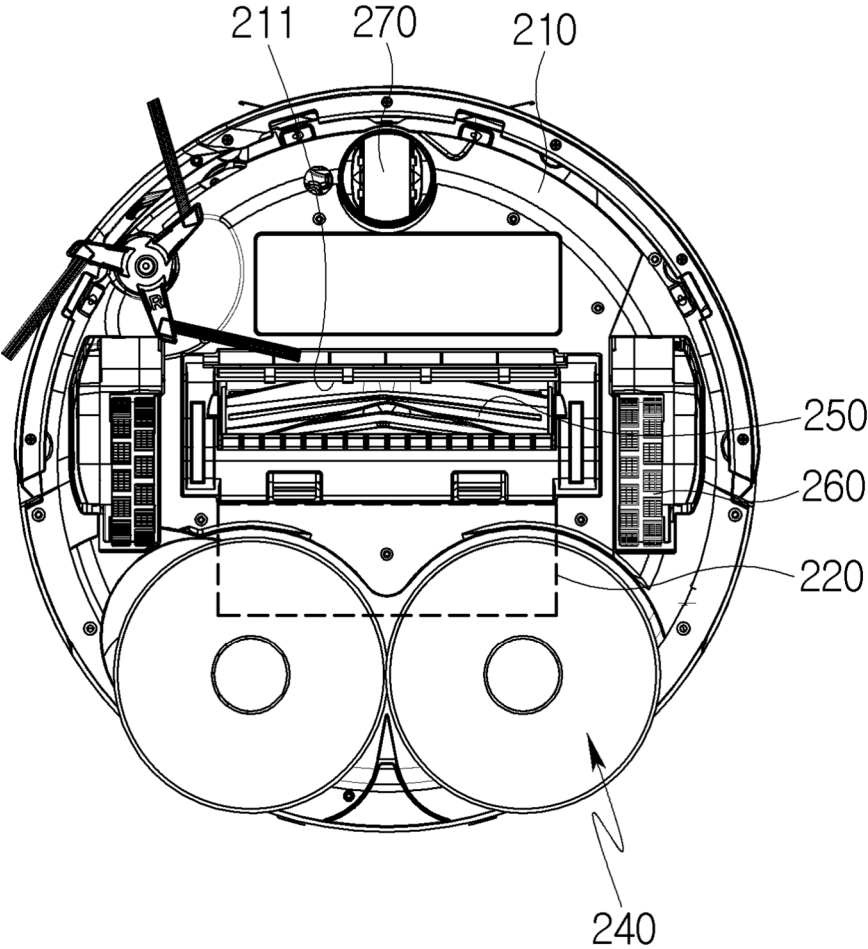


FIG. 8

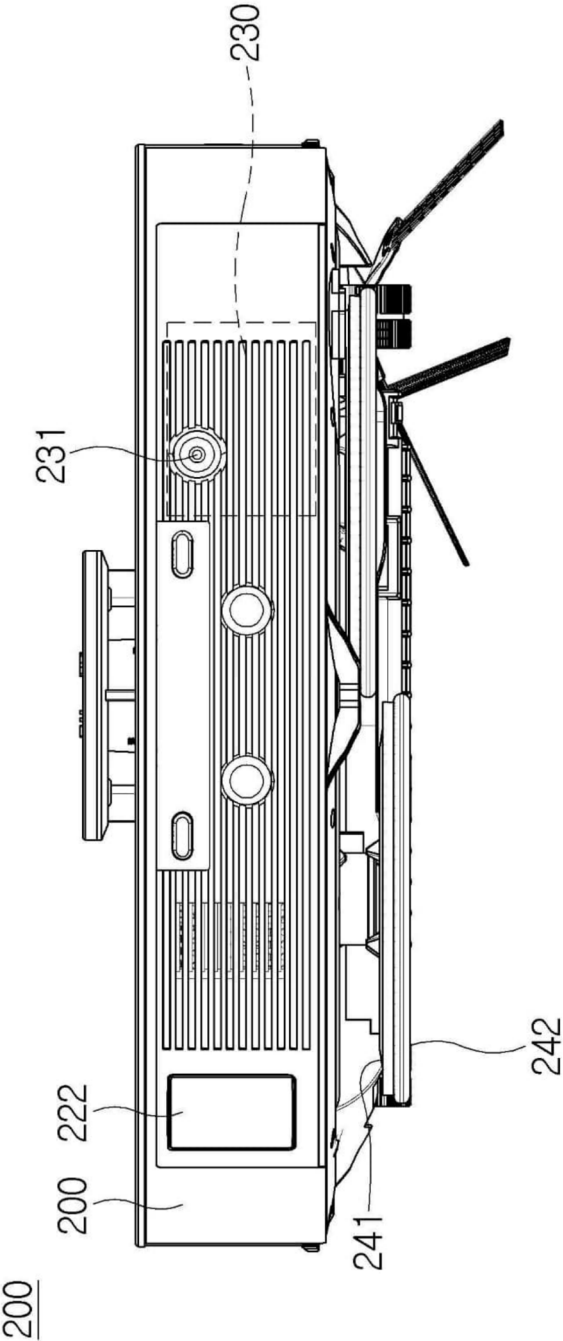


FIG. 9

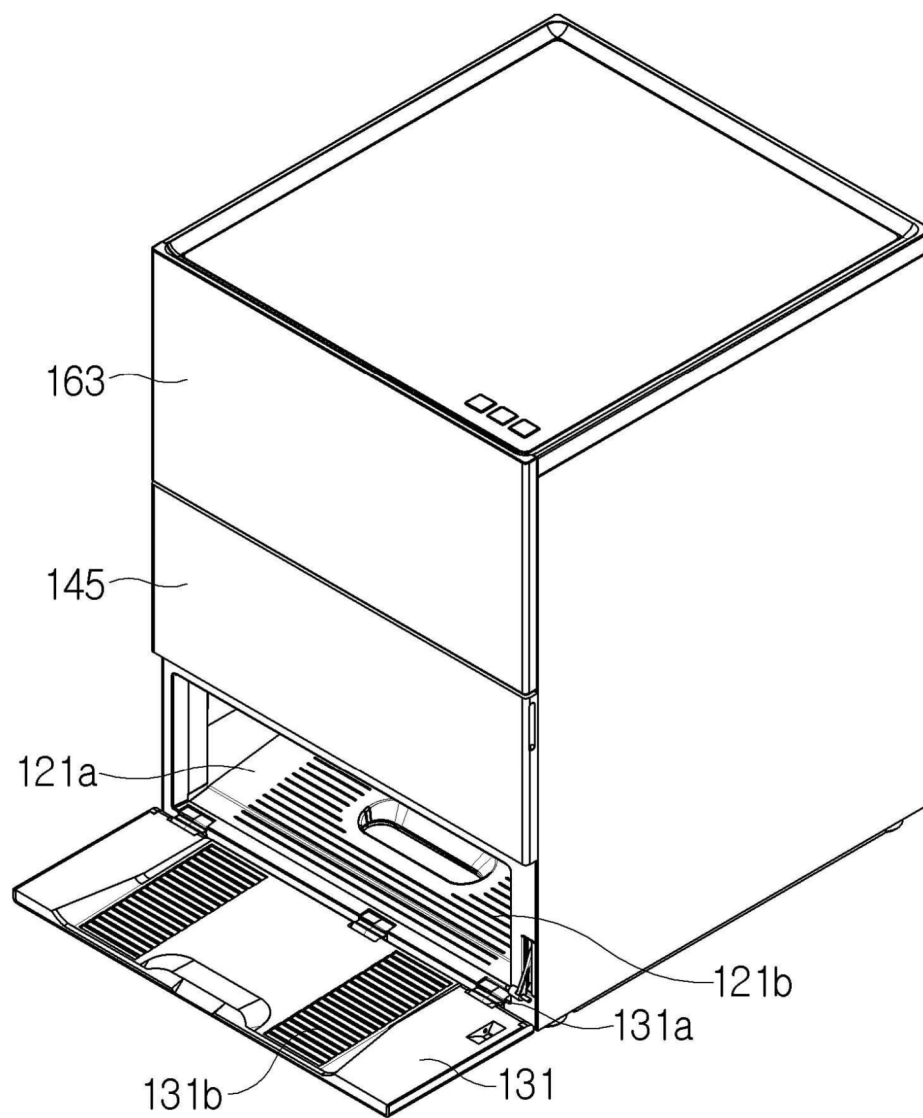


FIG. 10

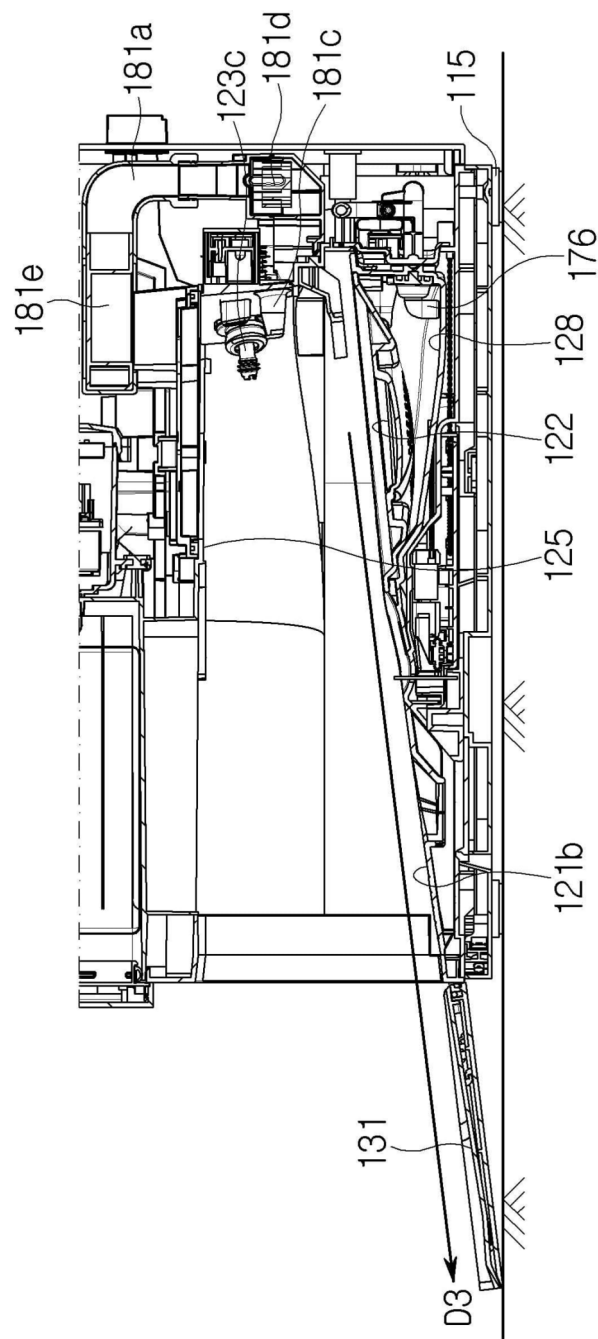


FIG. 11

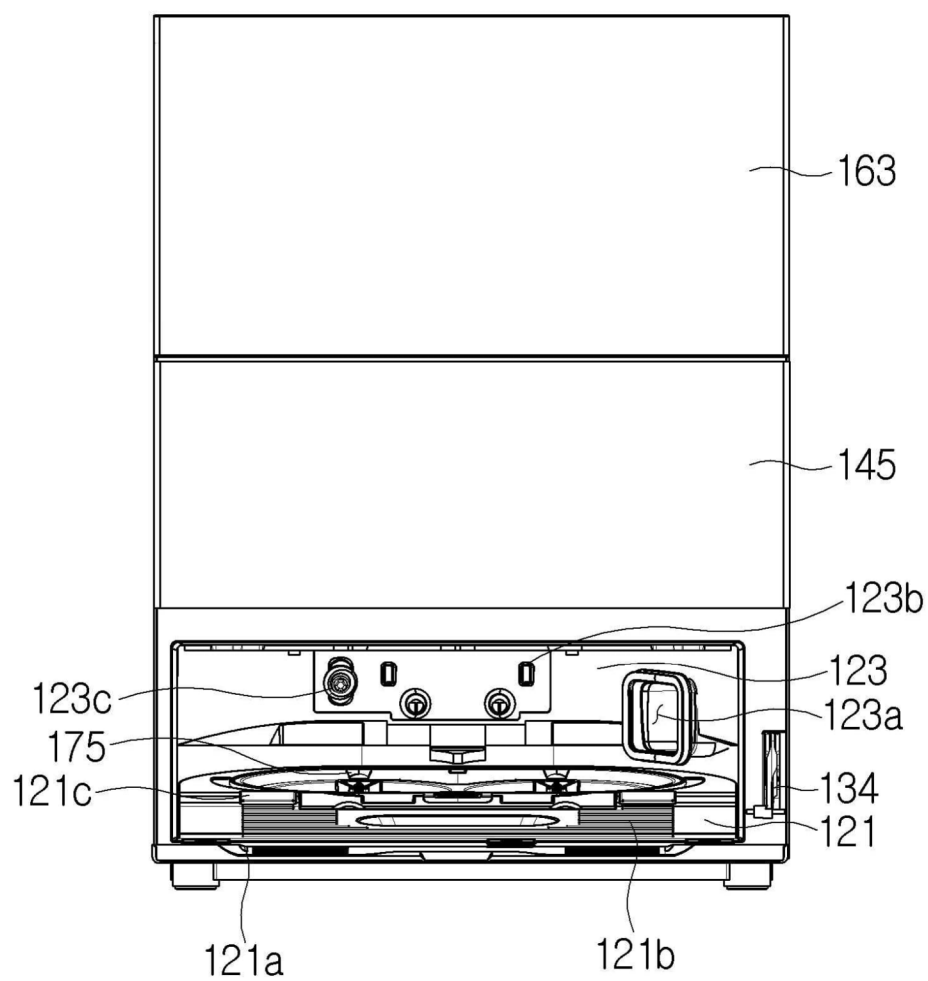


FIG. 12

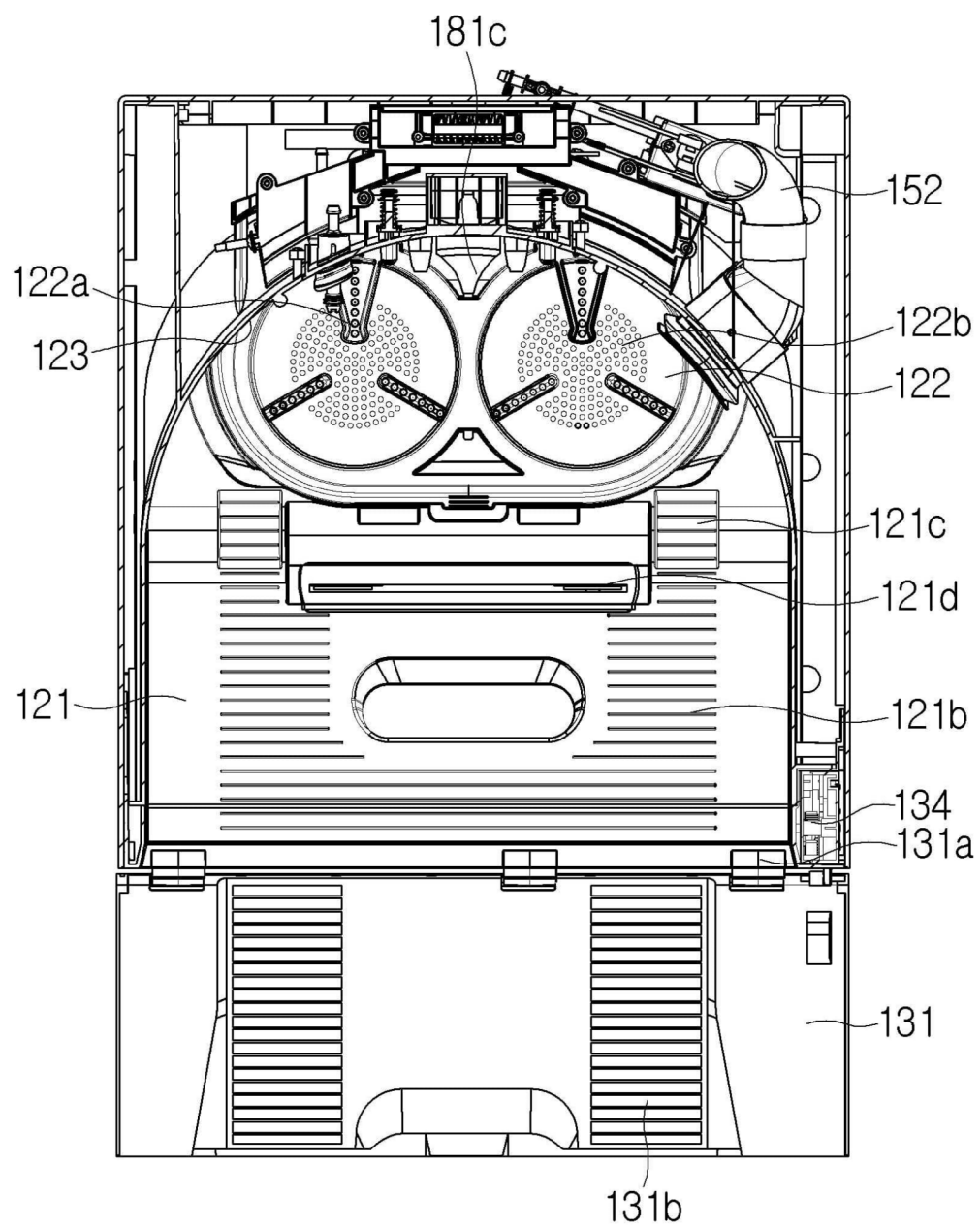


FIG. 13

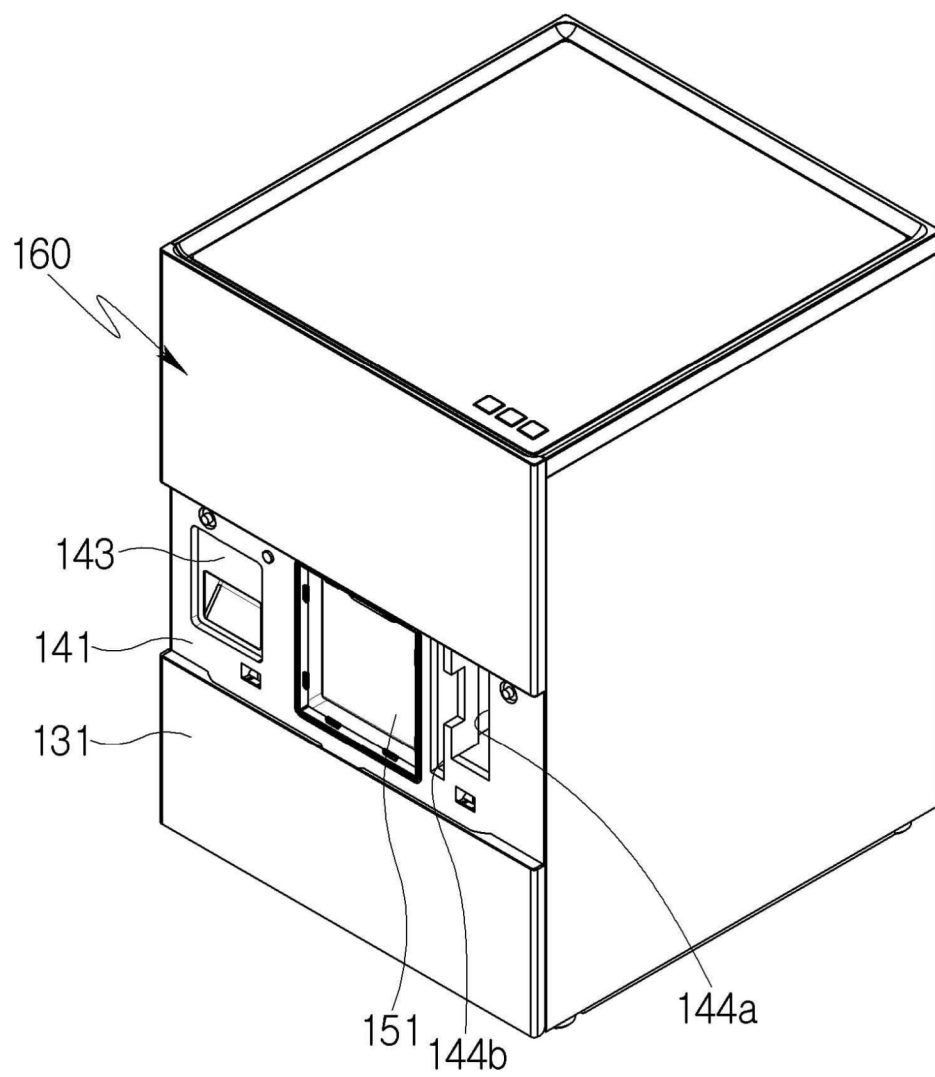


FIG. 14

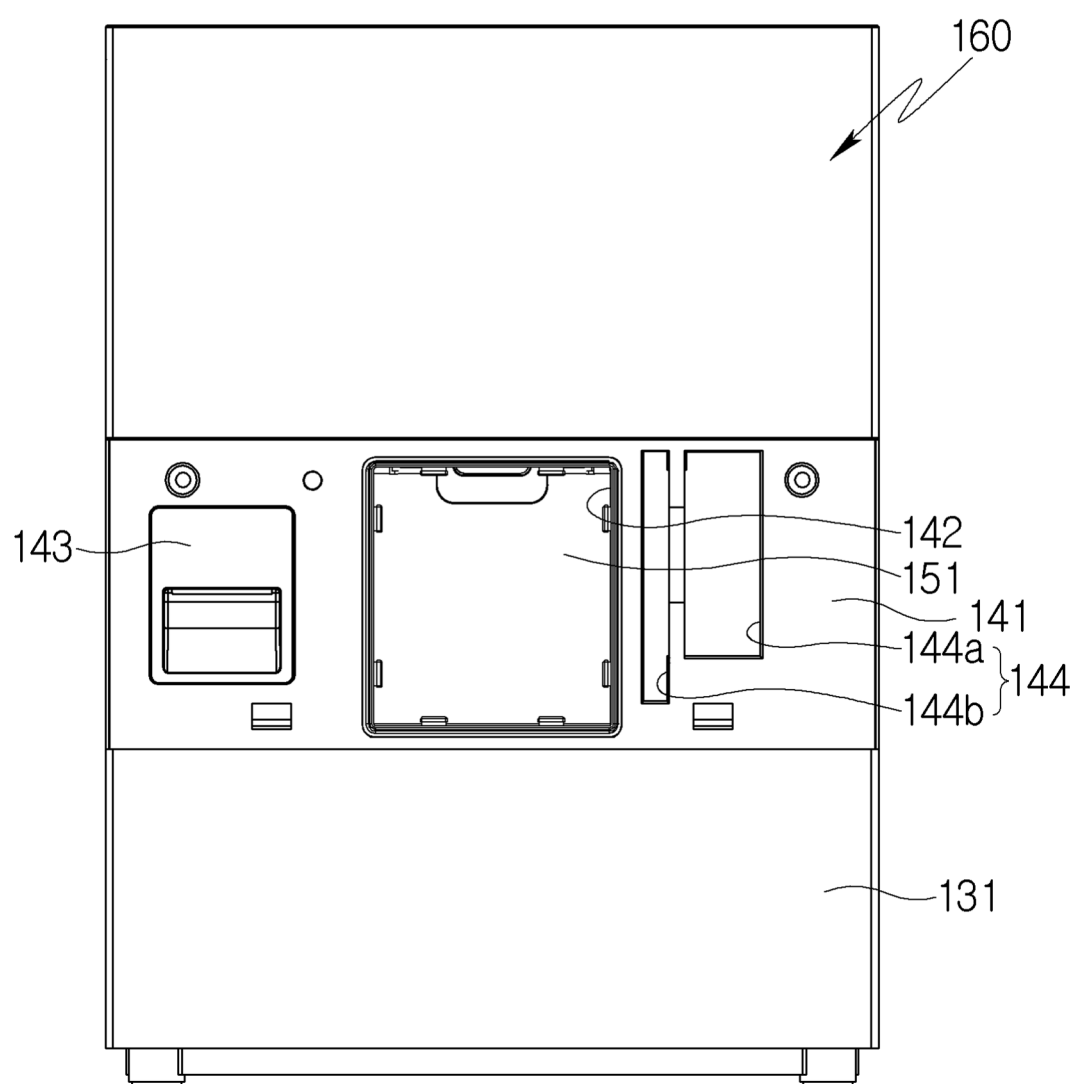


FIG. 15

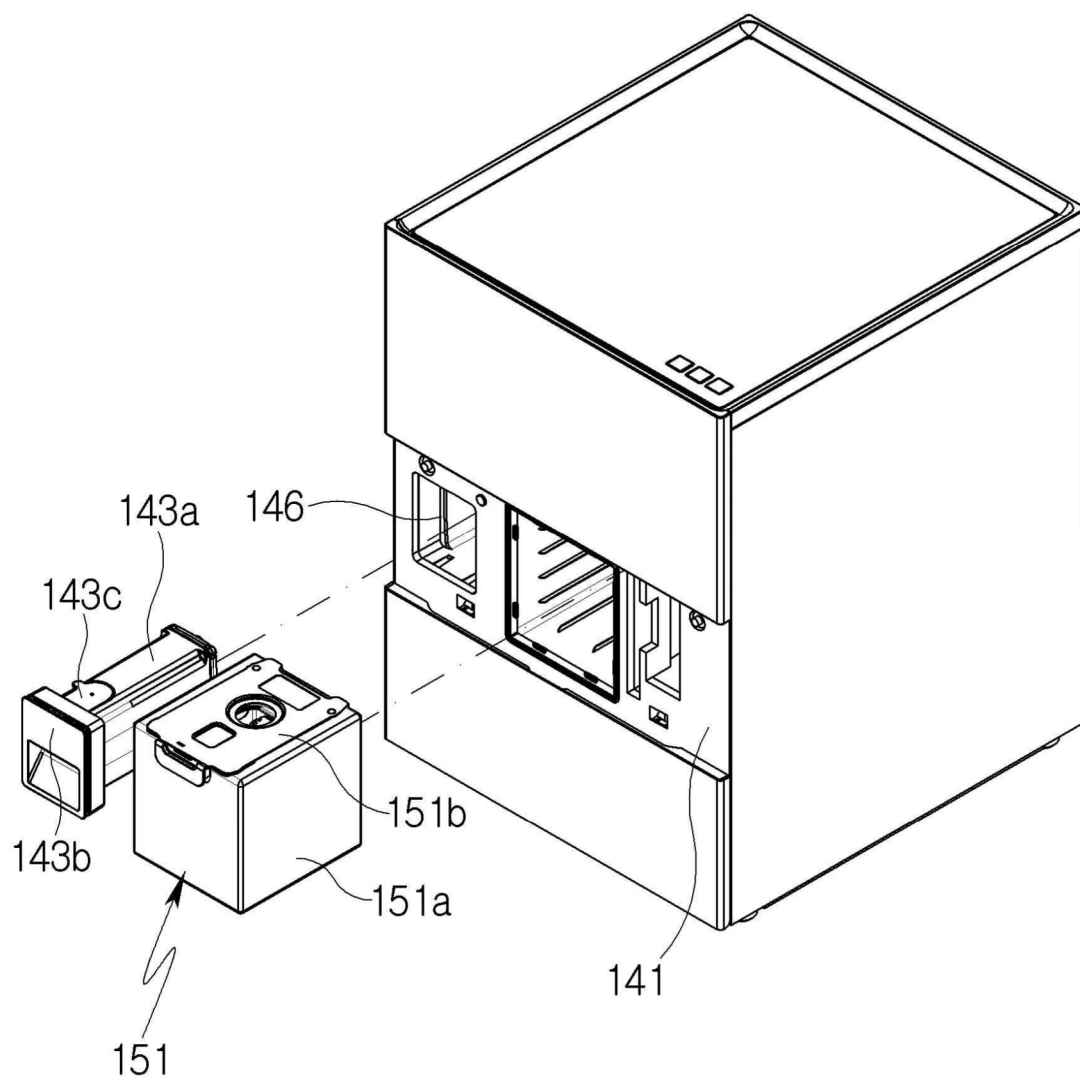


FIG. 16

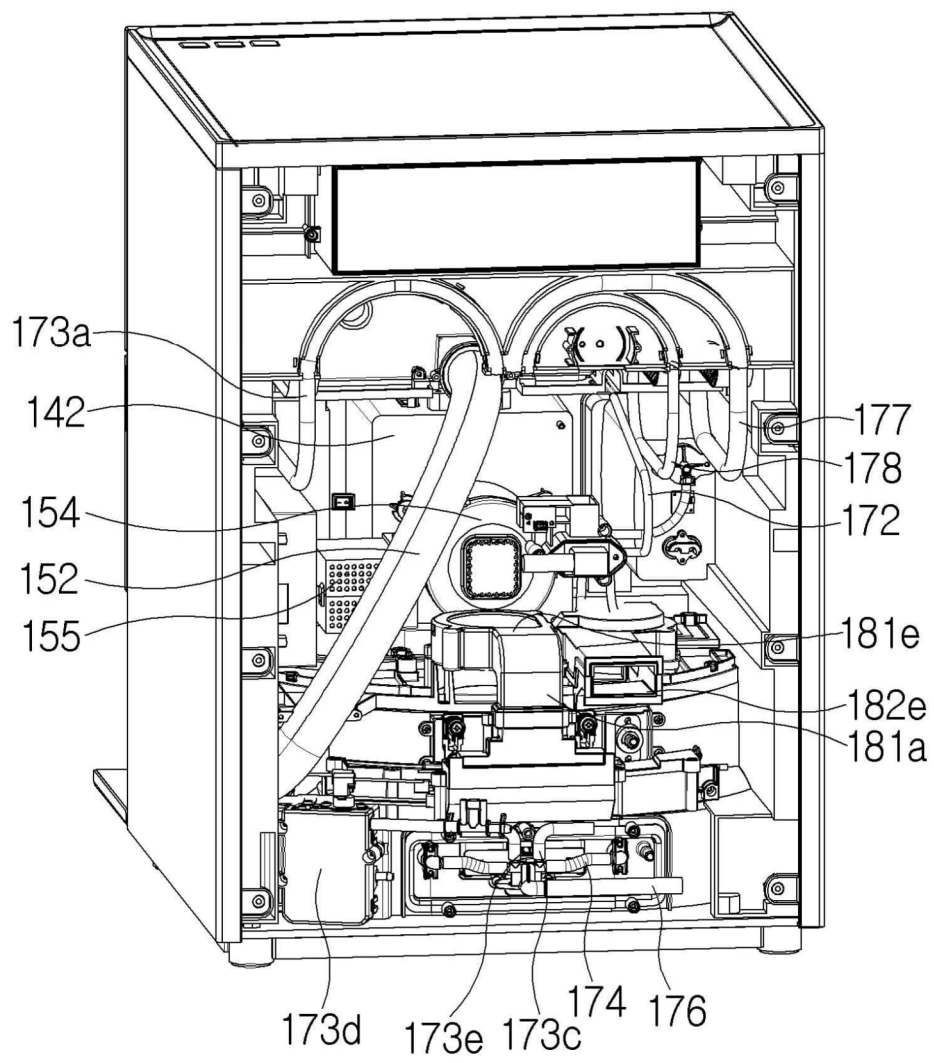


FIG. 17

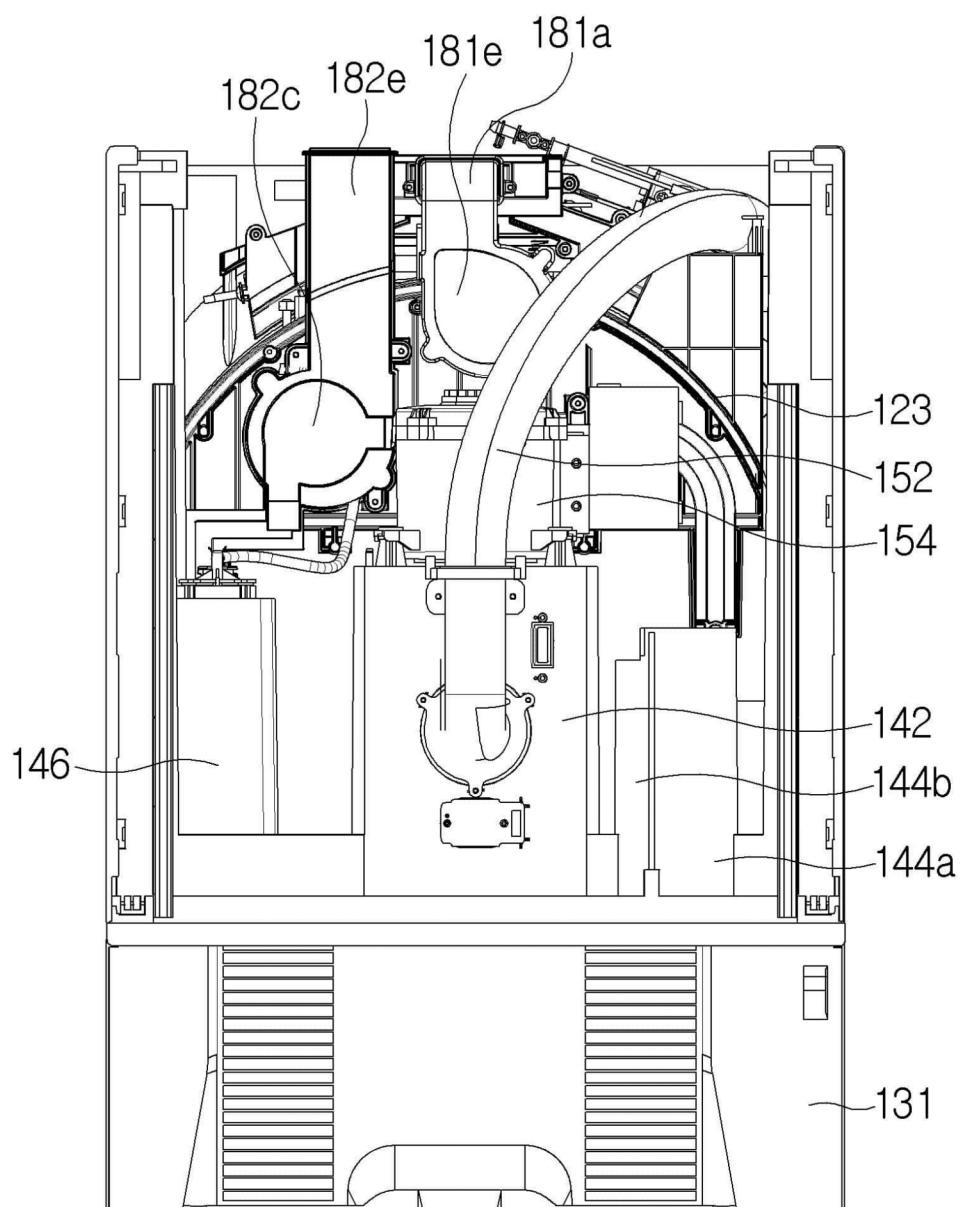


FIG. 18

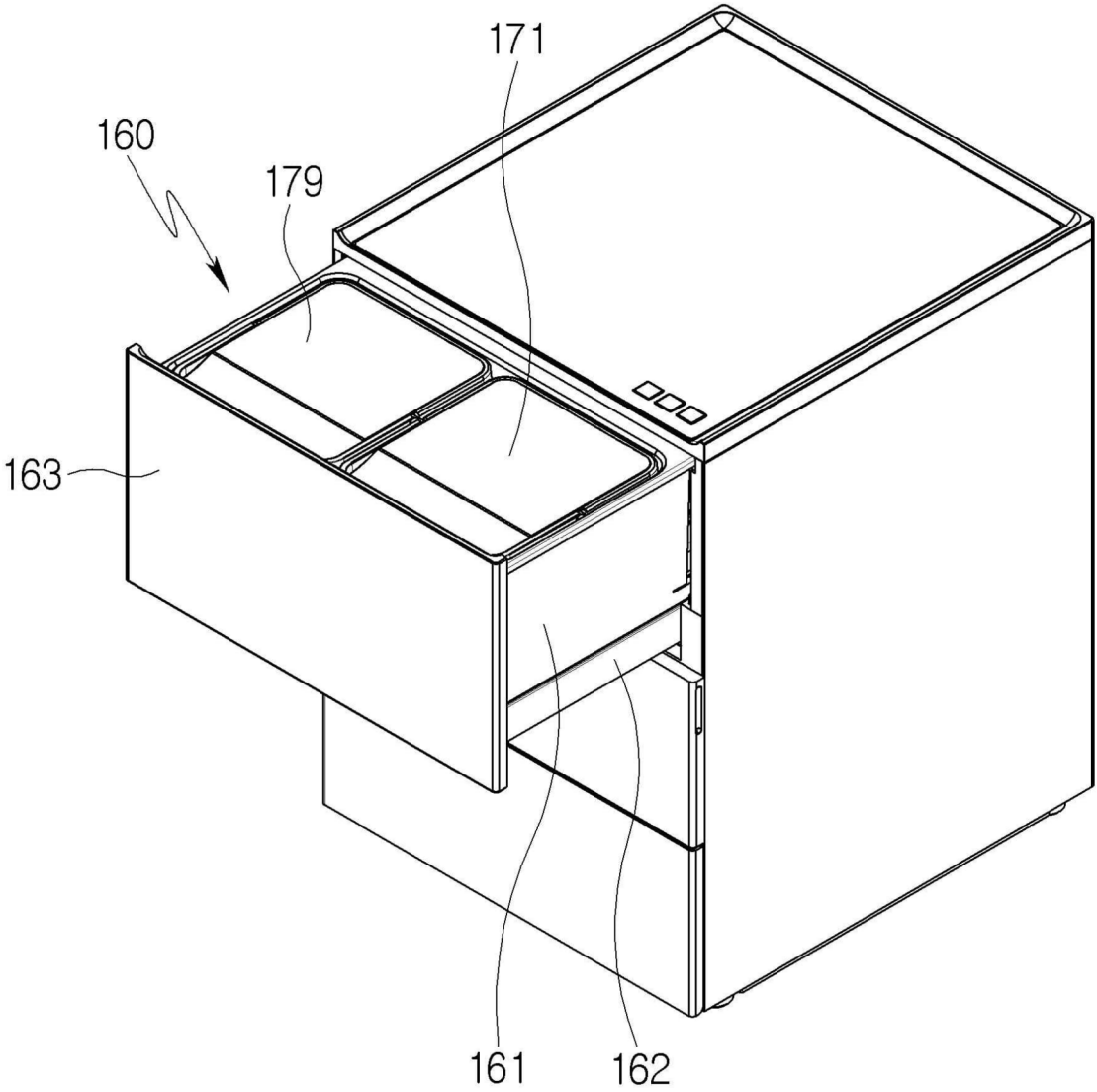


FIG. 19

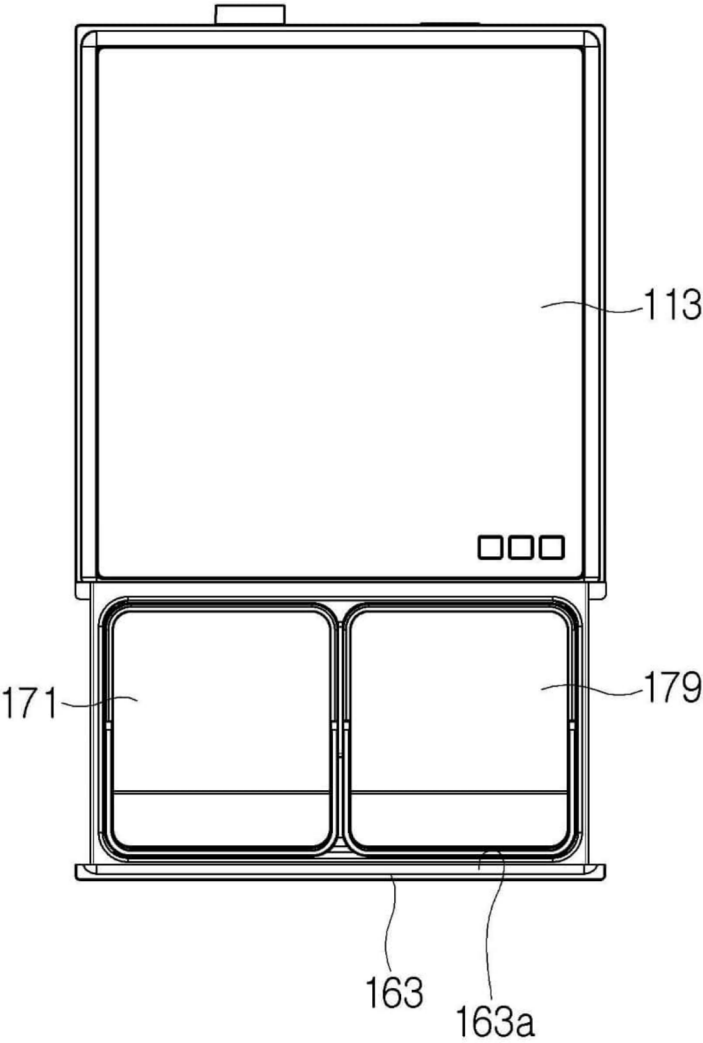


FIG. 20

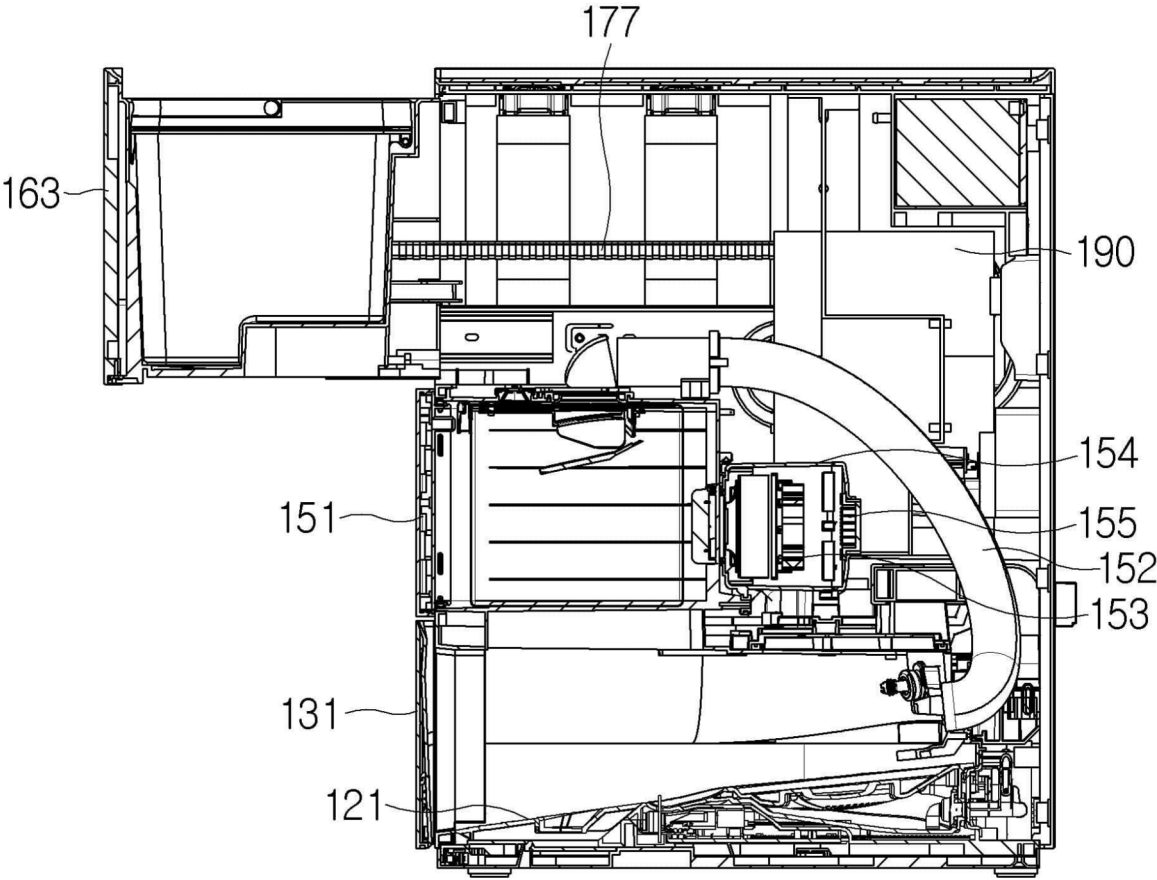


FIG. 21

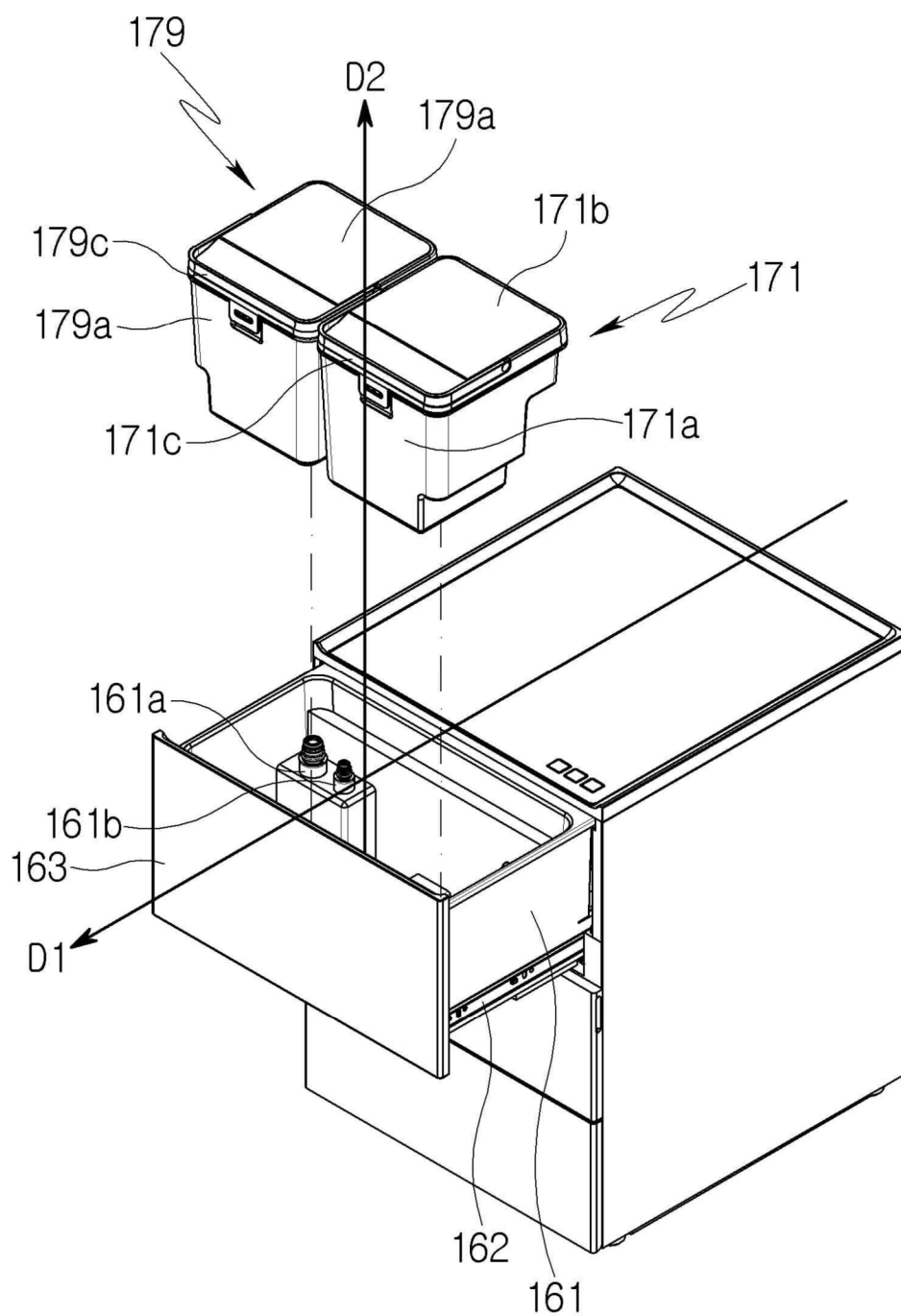


FIG. 22

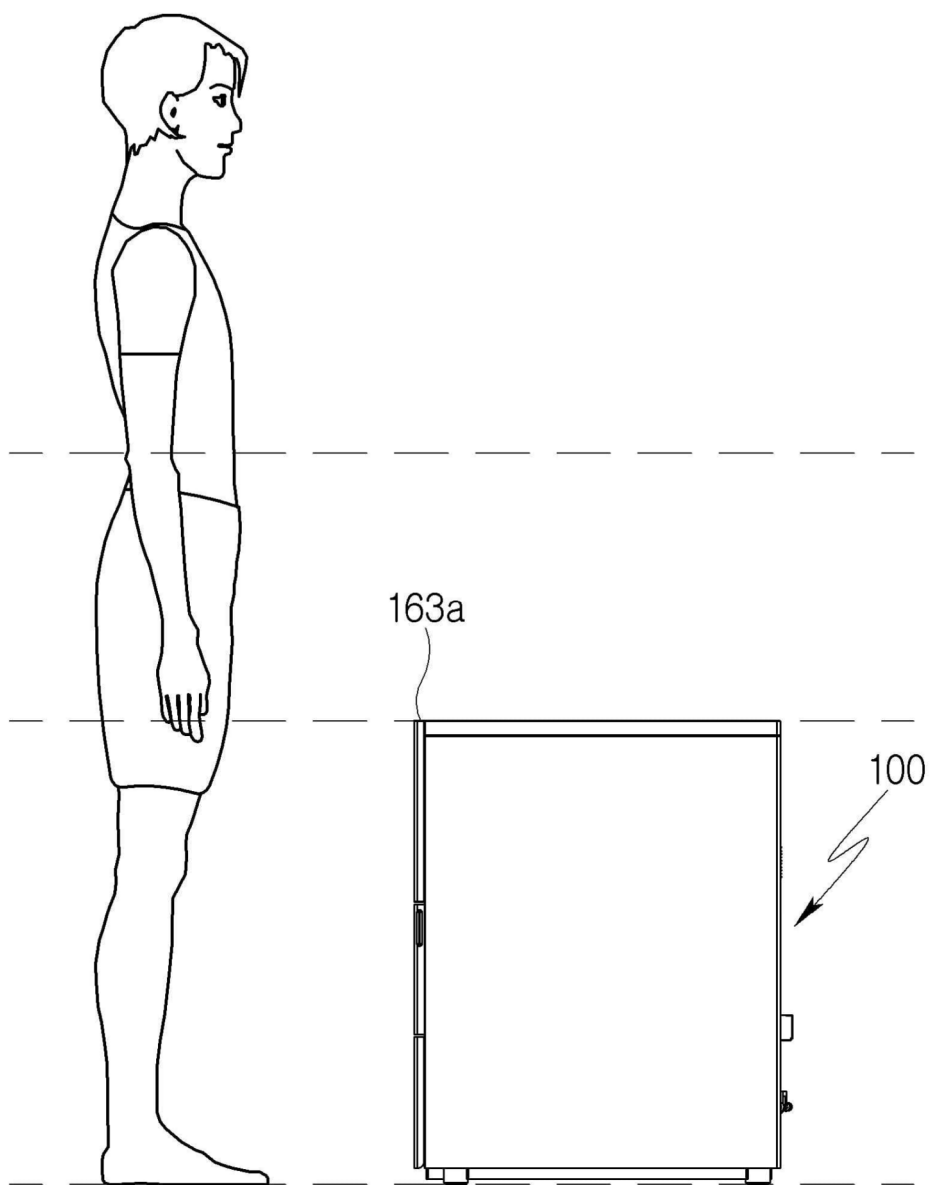


FIG. 23

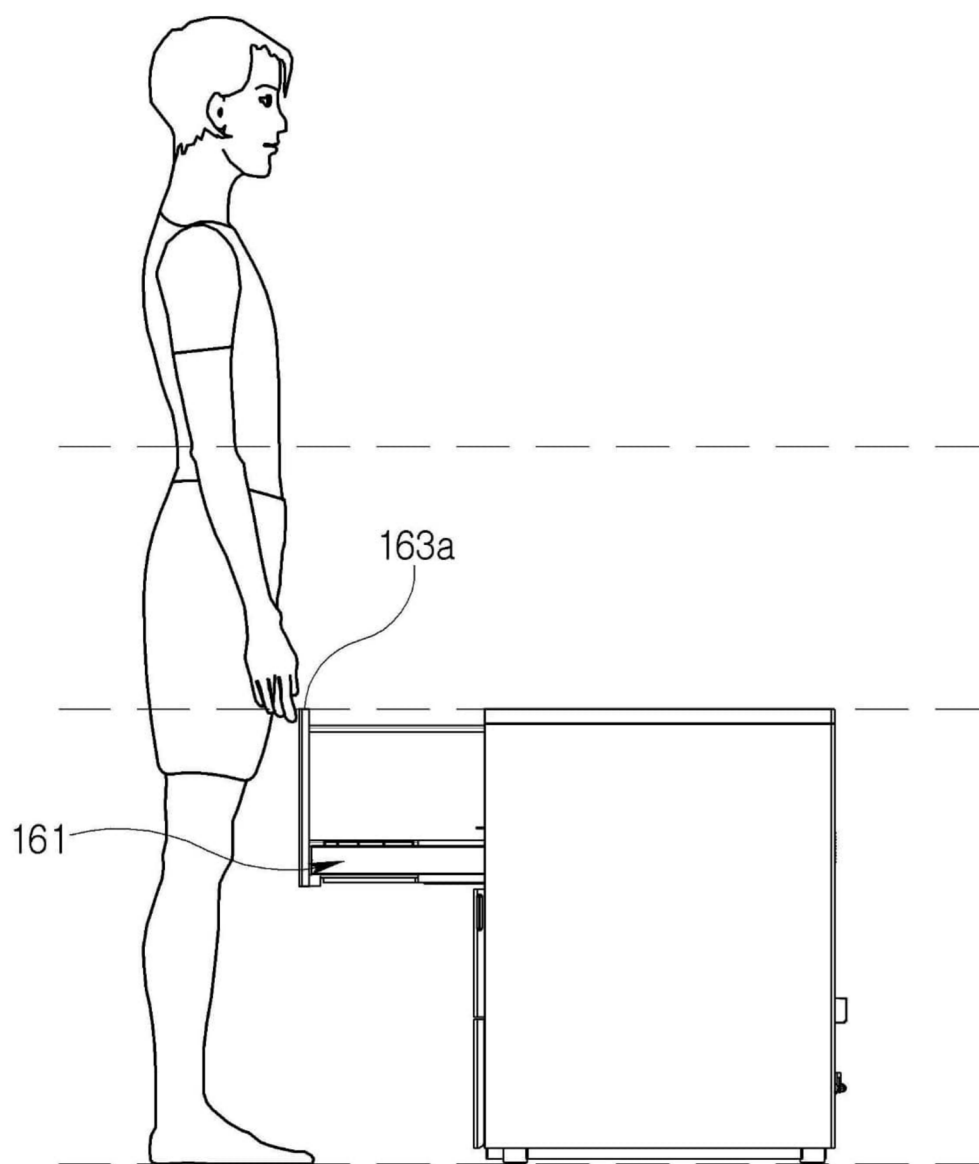


FIG. 24

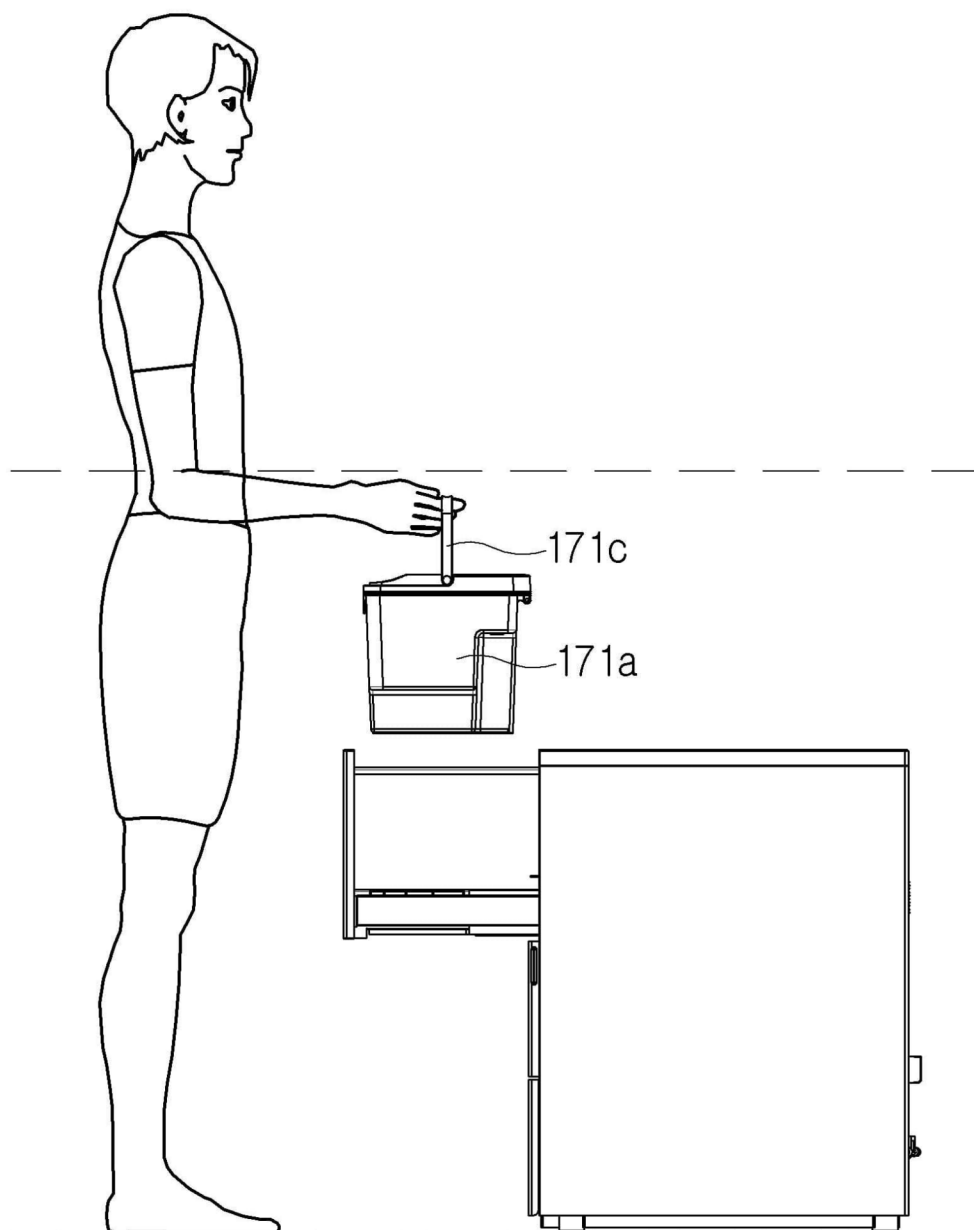


FIG. 25

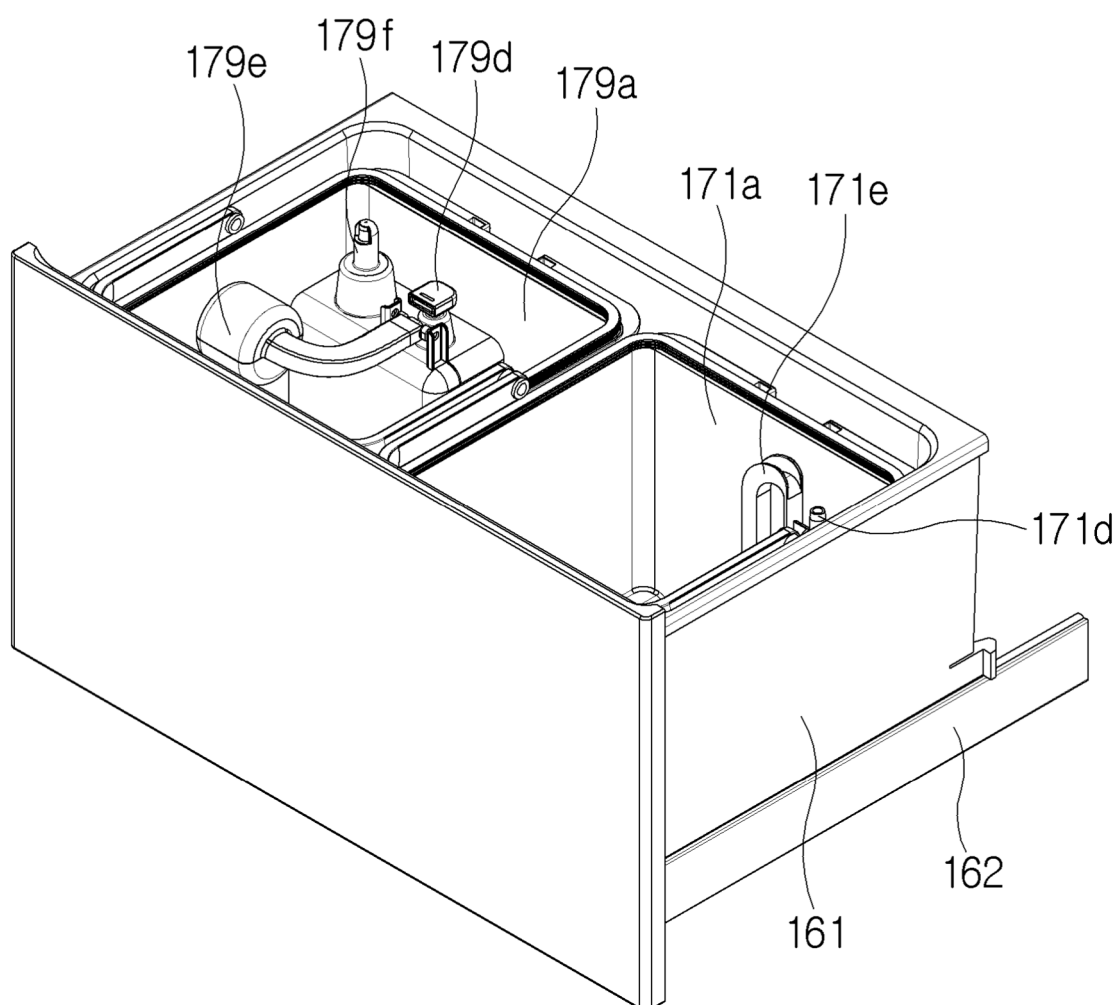


FIG. 26

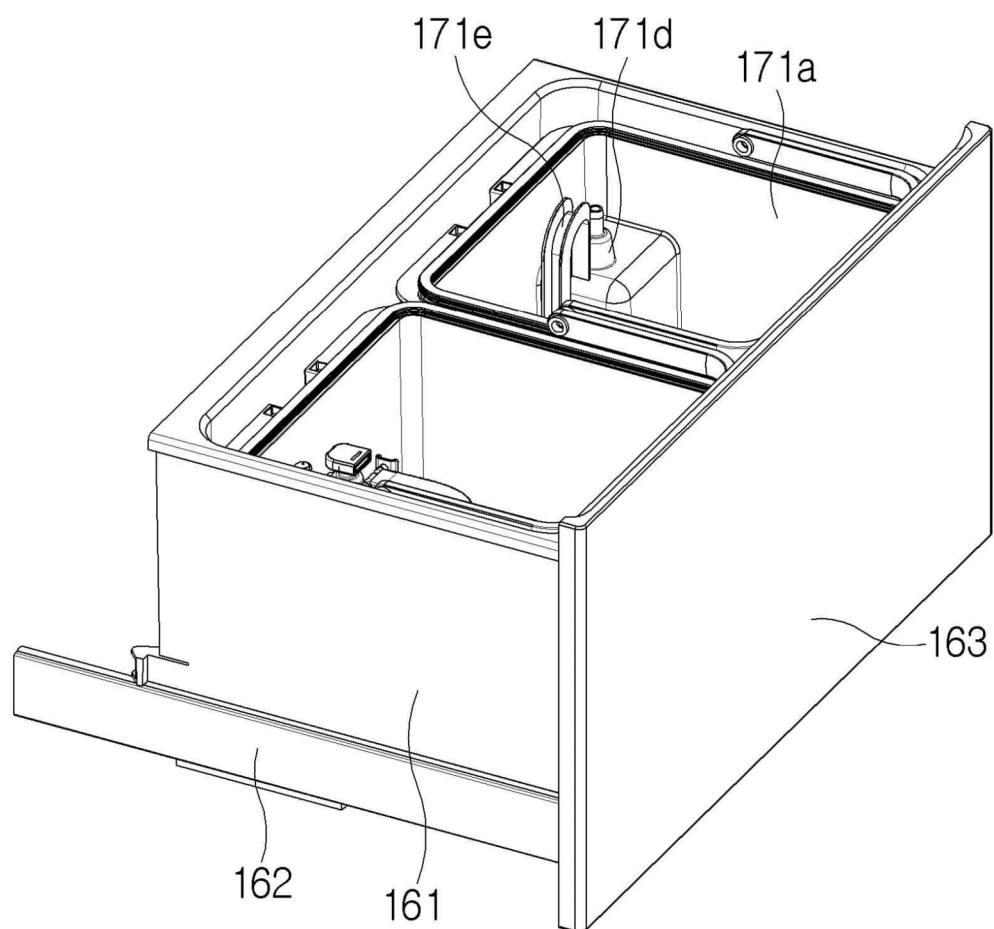


FIG. 27

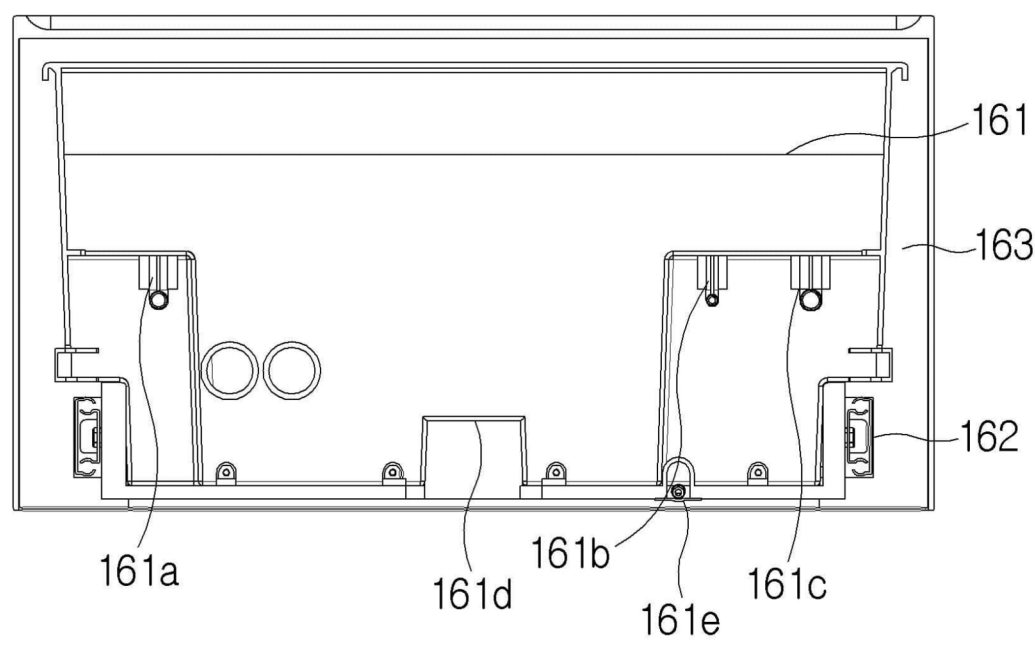


FIG. 28

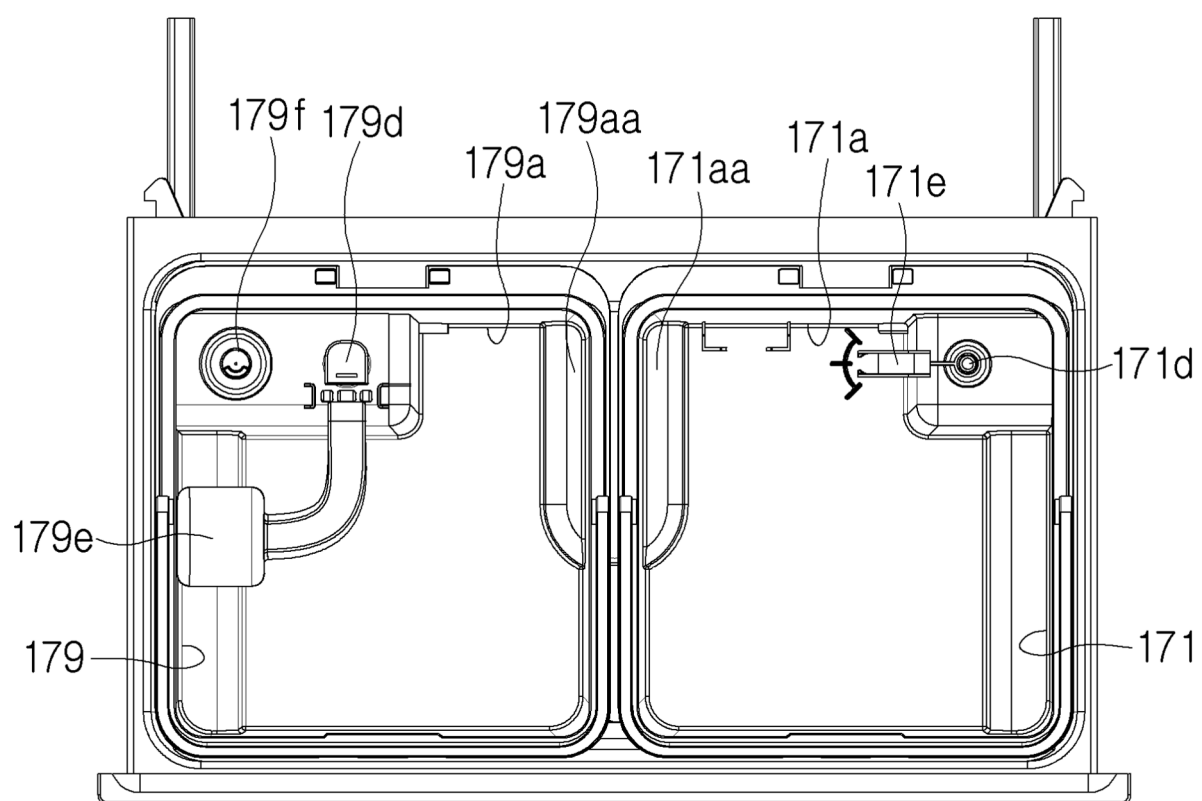


FIG. 29

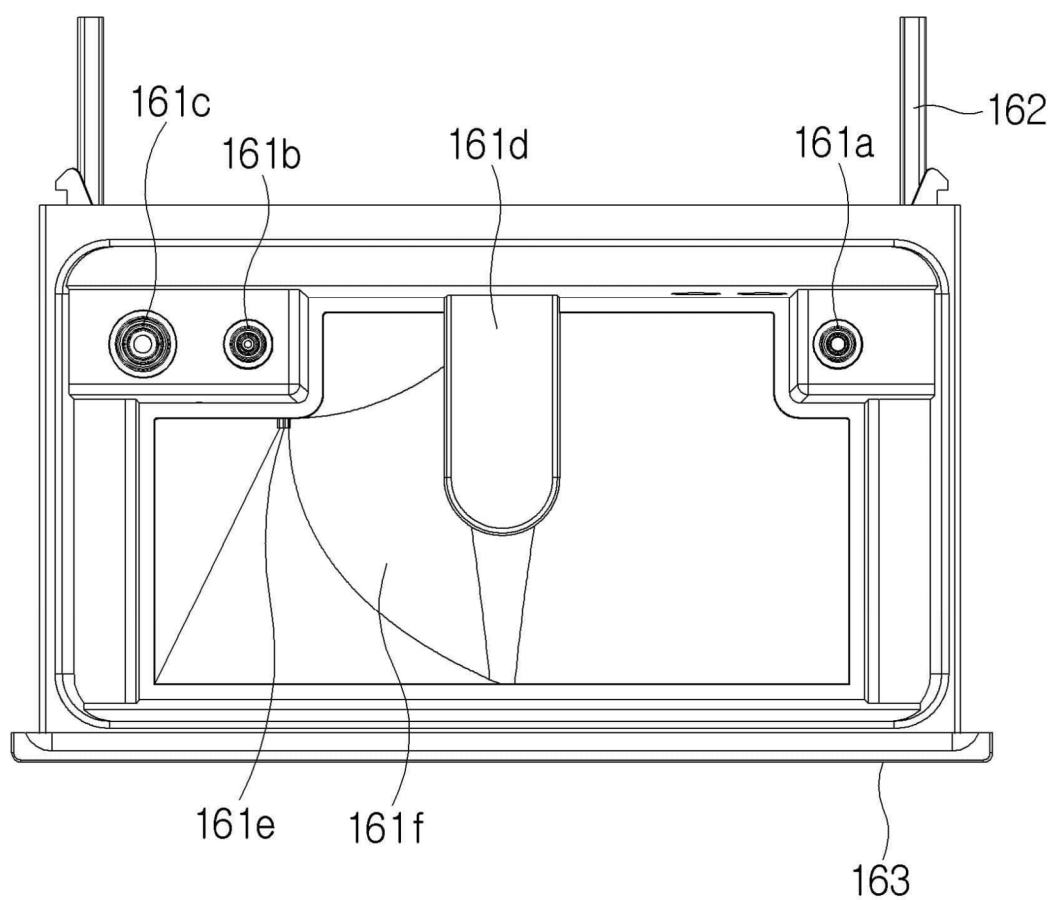


FIG. 30

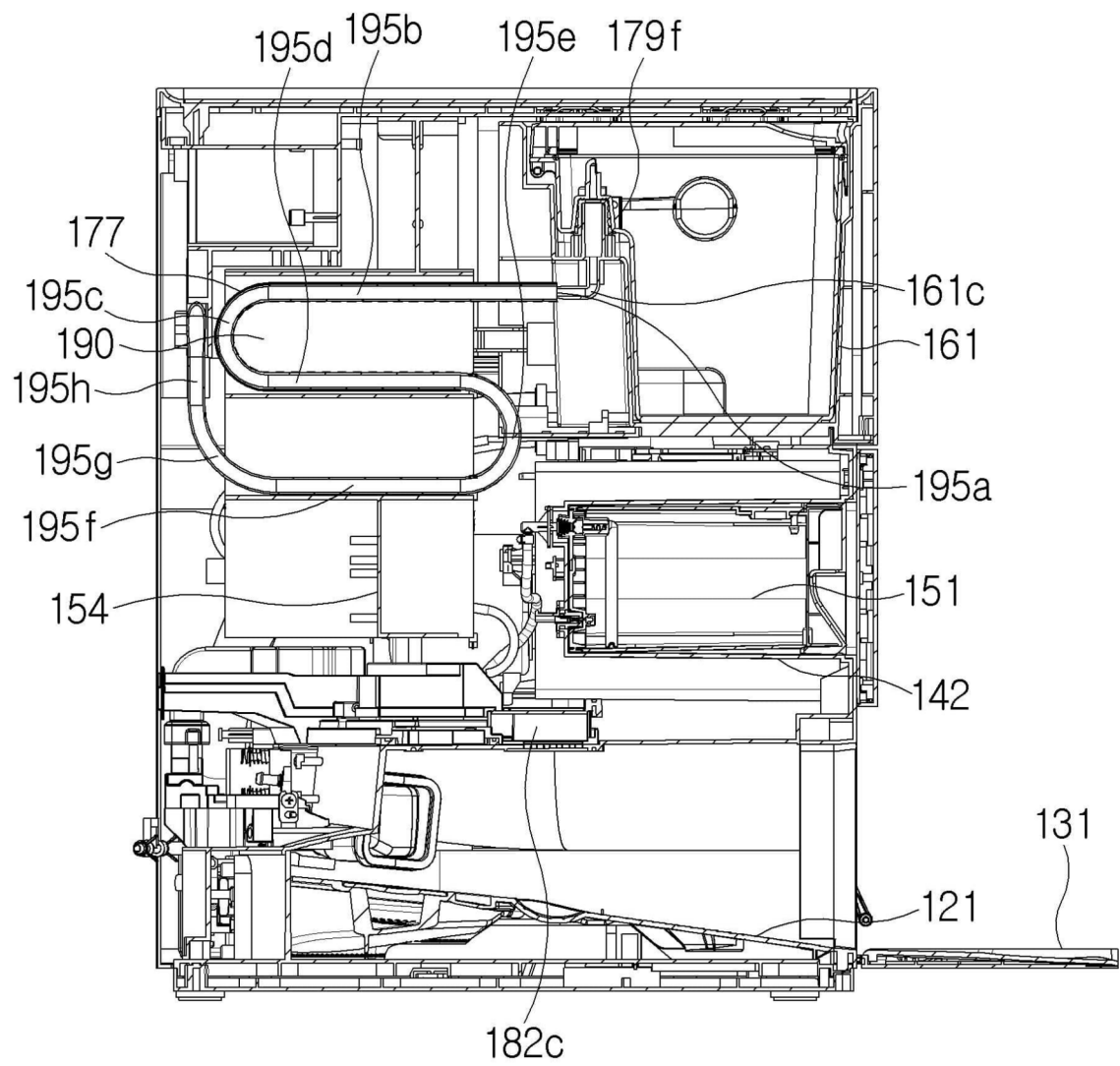


FIG. 31

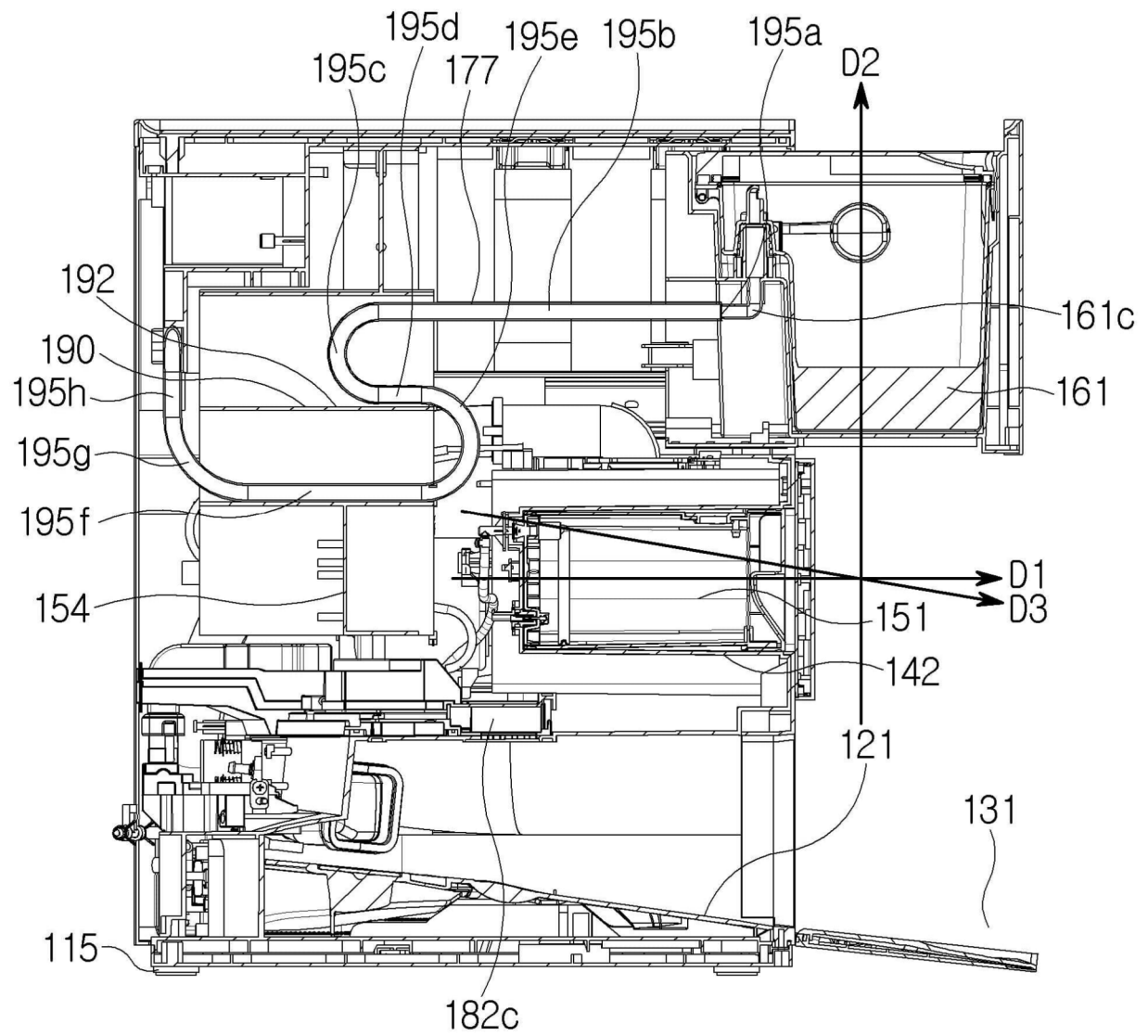


FIG. 32

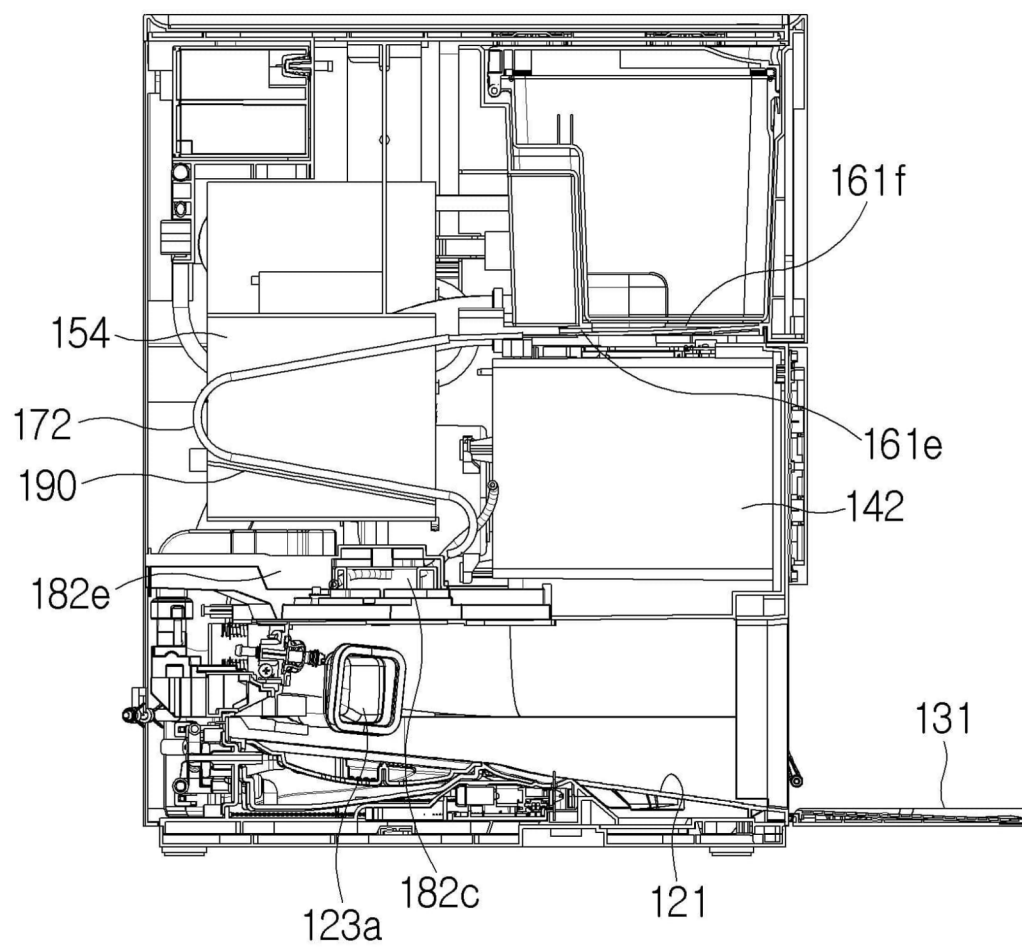
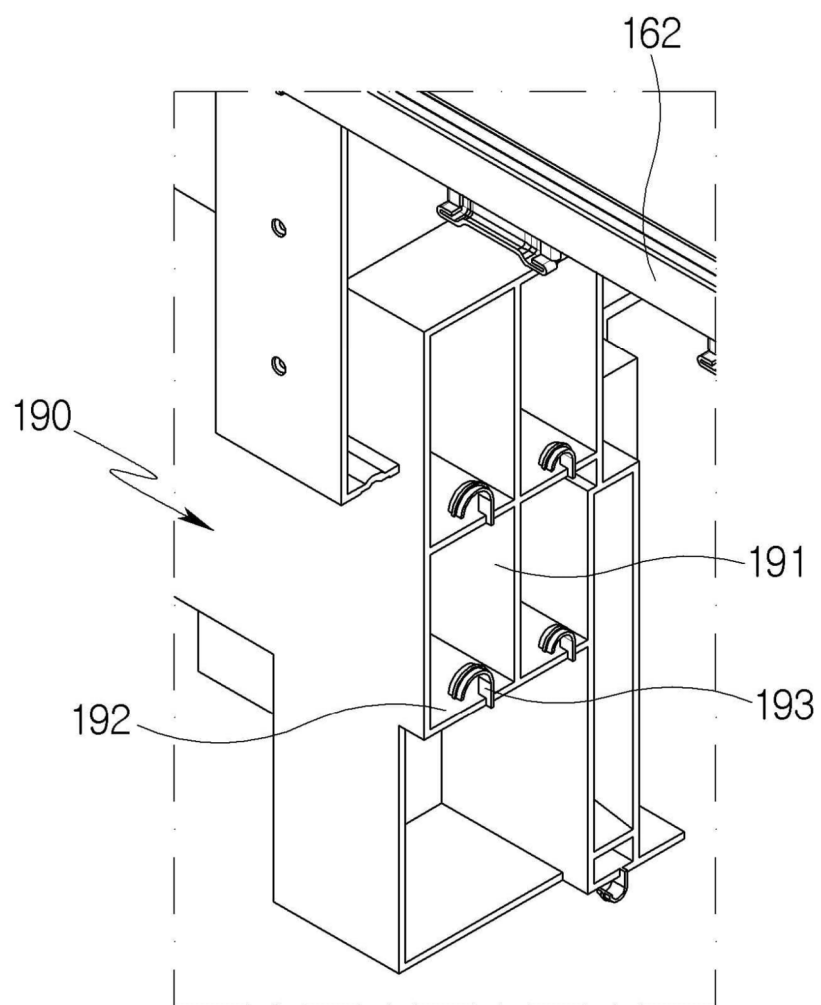


FIG. 33





EUROPEAN SEARCH REPORT

Application Number

EP 26 16 5389

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A	US 2022/287527 A1 (HONG INSUN [US] ET AL) 15 September 2022 (2022-09-15) * paragraph [0090] - paragraph [0099] * -----	1-20	
			TECHNICAL FIELDS SEARCHED (IPC)
			A47L
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
Munich		12 August 2026	Jezierski, Krzysztof
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			
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