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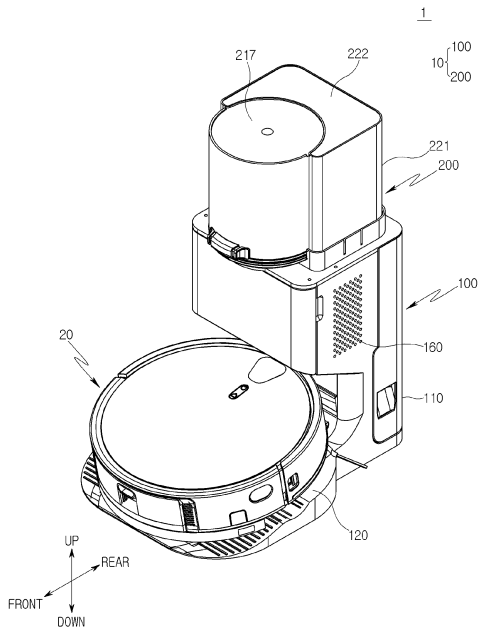
(54) CLEANER STATION

(57) The present invention relates to a cleaner station coupled to a cleaner in order to collect dust inside a cleaner dust container. One embodiment of the present invention relates to a cleaner station, which includes, as a foreign material storage member, a member of a bin type rather than a bag type, is economical and can increase user convenience since the foreign material storage member does not require periodic replacement, and has a simple structure since a dust separator such as a cyclone is not included, and thus user convenience is provided such that a user can easily carry out maintenance and repair such as washing of a dust collection container.

[FIG. 1]



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Description

[Technical Field]

[0001] The present disclosure relates to a cleaner station configured to be coupled to a cleaner to capture dust in a dust bin of the cleaner.

[Background Art]

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

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

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

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

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

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

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

[0009] However, because the stick cleaner or the robot cleaner in the related art has a dust bin with a small capacity for storing collected dust, which inconveniences the user because the user needs to empty the dust bin frequently.

[0010] Korean Patent Application Laid-Open No. 2020-0074001 discloses a cleaning apparatus including a vacuum cleaner and a docking station.

[0011] The patent document discloses the cleaning apparatus including the vacuum cleaner including the dust collecting container for collecting foreign substances, and the docking station connected to the dust collecting container and configured to remove the foreign substances collected in the dust collecting container. The docking station includes the suction device configured to suck foreign substances in the dust collecting container.

[0012] In addition, the patent document includes the capturing part disposed in the docking station and configured to capture foreign substances.

[0013] However, the capturing part in the embodiment of the patent document is configured as a dust bag, which inconveniences the user because the user needs to periodically replace the dust bag. In addition, because of the nature of the material of the dust bag, there may occur a problem in that dust scatters during the process of separating the dust bag from the docking station to replace the dust bag.

[0014] U.S. Patent No. 10595692 discloses an embodiment of a discharge station configured to be docked with a robot cleaner and including a bin-type canister and a dust separator.

[0015] In the embodiment disclosed in the patent document, the dust separator has a conical shape to use a centrifugation principle and is included in the canister. Another embodiment disclosed in the patent document is configured such that dust separated by a multi-stage separation device disposed above the canister is collected in the canister.

[0016] However, the discharge station including the dust separator disclosed in the patent document may make it difficult for a user to understand the complicated structure of the dust separator. As a result, it is difficult for the user to intuitively approach a method of maintaining the dust separator, and the discharge station may not be hygienically managed.

[0017] In addition, there is a problem in that in the embodiment in which the dust separator is included in the canister, a capacity to collect dust in the canister decreases in accordance with a volume of the dust separator.

[0018] The patent document also discloses an embodiment in which the dust separator is not included. The embodiment, in which the dust separator is not included, is configured such that a filter wall is included in the canister, the filter wall has an annular ring shape, and air containing dust sucked into the canister passes through the filter wall and then is discharged.

[0019] However, in the embodiment including only the filter wall without including the dust separator as described above, there is a problem in that a large amount of non-separated dust is inevitably introduced into the filter wall instantaneously, which decreases a lifespan of

the filter wall and a replacement cycle.

[0020] Therefore, there is a need to develop a cleaner station including a debris storage member, which is not required to be periodically replaced and does not cause a problem of dust scattering, and having a simple structure that makes it easy for the user to wash and maintain the debris storage member.

[0021] In addition, even though the debris storage member is not required to be periodically replaced, the user needs to manually eliminate the dust captured in the debris storage member. Therefore, there is a need to develop a cleaner station having a structure capable of prolonging a dust removal cycle time even though the debris storage member having the same capacity is included.

[Disclosure]

[Technical Problem]

[0022] An object of the present disclosure is to provide a cleaner station including a debris storage member that is not required to be replaced.

[0023] Another object of the present disclosure is to provide a cleaner station including a dust collecting container that improves a dust storage capacity and efficiency to ensure a prolonged dust removal cycle time.

[0024] Still another object of the present disclosure is to provide a cleaner station including a debris storage member (hereinafter, referred to as a 'dust collecting container') having a simple structure and provided to be easy to wash and maintain.

[0025] Yet another object of the present disclosure is to improve convenience for a user by providing a cleaner station configured such that dust does not scatter during a process of removing the dust from a dust collecting container.

[Technical Solution]

[0026] In order to achieve the above-mentioned objects, an embodiment of the present disclosure provides a cleaner station including: a housing to which a cleaner is coupled so that dust in a dust bin of the cleaner is captured; a suction flow path disposed in the housing and having one side configured to communicate with the dust bin of the cleaner; a dust collecting motor disposed in the housing and configured to provide a suction force directed from the inside toward the outside of the dust bin through the suction flow path; a cylindrical dust collecting container including an inlet port configured to communicate with the suction flow path at the other side of the suction flow path so that air is introduced into the inlet port, and a discharge port through which the air is discharged, the dust collecting container being configured to provide an accommodation space for the captured dust; a discharge air moving part connected to the discharge port and configured to provide a space in which the air discharged from the dust collecting container is introduced and flows; a rotary unit disposed in the dust collecting container and configured to collect the dust in the dust collecting container while rotating about a longitudinal axis of the dust collecting container along an inner peripheral surface of the dust collecting container; and a compression plate disposed in the dust collecting container and disposed in a state of being fixed to one side in the dust collecting container, in which the rotary unit rotates in a direction toward the compression plate and compresses the dust between the rotary unit and the compression plate.

[0027] In this case, the discharge port may have a predetermined area and be formed on a wall surface disposed in a radial direction of the dust collecting container among wall surfaces of the dust collecting container that define the accommodation space.

[0028] In addition, the inlet port may have a predetermined area and be formed in a wall surface disposed in a radial direction of the dust collecting container among wall surfaces of the dust collecting container that define the accommodation space.

[0029] In addition, according to the embodiment of the present disclosure, the cleaner station may further include: a mesh net disposed in the discharge port to filter out the dust from the air discharged from the dust collecting container.

[0030] Meanwhile, the discharge air moving part may include: a dust collecting motor connection part configured to communicate with the dust collecting motor so that the air discharged from the dust collecting container moves toward the dust collecting motor; and a prefilter disposed on the dust collecting motor connection part to filter out the dust from the air discharged from the dust collecting container.

[0031] In addition, the discharge air moving part may include a suction flow path connection part disposed so that one end thereof is connected to the suction flow path, and the other end thereof is connected to the inlet port.

[0032] Meanwhile, the housing may include a major axis extending in an upward/downward direction, the dust collecting container may be disposed outside and above the housing, and the longitudinal axis of the dust collecting container may be disposed in parallel with the major axis extending in the upward/downward direction of the housing.

[0033] Meanwhile, the rotary unit may include: a rotary shaft provided in the dust collecting container and disposed in the longitudinal direction of the dust collecting container; and a rotary plate coupled to the rotary shaft so as to rotate together with the rotary shaft and disposed in a space between the rotary shaft and an inner radial peripheral surface of the dust collecting container.

[0034] In this case, the rotary shaft may rotate in a first direction and then rotate in a second direction opposite to the first direction after the dust between the rotary plate and the compression plate is compressed.

[0035] In addition, the rotary unit may further include

a scrubber coupled to the rotary plate and provided to be in contact with an inner peripheral surface of the dust collecting container.

[0036] In this case, a height from a lower end surface in the dust collecting container to a lower end of the scrubber may be smaller than a height from the lower end surface to a lower end of the discharge port, and a height from the lower end surface to an upper end of the scrubber may be larger than a height from the lower end surface to an upper end of the discharge port.

[0037] In addition, according to the embodiment of the present disclosure, the cleaner station may further include: a dust compression motor connected to the rotary shaft and configured to operate to provide rotational power to the rotary shaft.

[0038] In this case, the dust compression motor may be disposed outside the dust collecting container and configured to be separable from the dust collecting container.

[0039] In order to achieve the above-mentioned objects, another embodiment of the present disclosure provides a cleaner station, which sucks and collects dust in a dust bin of a cleaner, the cleaner station including: a cylindrical dust collecting container including an inlet port into which air is introduced, and a discharge port through which the air is discharged, the cylindrical dust collecting container being configured to provide an accommodation space for captured dust; a dust collecting motor disposed below the dust collecting container and configured to provide a suction force in the dust bin so that the dust is introduced into the dust collecting container through the inlet port; a scrubber disposed in the dust collecting container and configured to rotate about a longitudinal axis of the dust collecting container, the scrubber being configured to rotate in a state in which the scrubber is in contact with an inner peripheral surface of the dust collecting container; and a mesh net disposed in the discharge port to filter out the dust from the air discharged from the dust collecting container, in which the mesh net is disposed in a partial region of a wall surface that is in contact with the rotating scrubber among wall surfaces of the dust collecting container that define the accommodation space.

[0040] In this case, the discharge port may have a predetermined area and be formed on a wall surface disposed in a radial direction of the dust collecting container among wall surfaces of the dust collecting container that define the accommodation space.

[0041] In addition, according to the embodiment of the present disclosure, the cleaner station may further include: a rotary shaft provided in the dust collecting container and disposed in a longitudinal direction of the dust collecting container; and a rotary plate having one end coupled to the rotary shaft and the other end coupled to the scrubber, the rotary plate being configured to rotate together with the rotary shaft.

[0042] In addition, according to the embodiment of the present disclosure, the cleaner station may include a compression plate disposed in the dust collecting container and disposed in a state of being fixed to one side in the dust collecting container, in which the rotary plate rotates in a direction toward the compression plate and compresses dust between the rotary plate and the compression plate.

[Advantageous Effects]

[0043] According to the present disclosure, the cleaner station includes a bin-type member, instead of a bag-type member, as a debris storage member. Therefore, it is not necessary to periodically change the debris storage members, which may improve the economic feasibility and convenience for the user.

[0044] In addition, according to the present disclosure, the dust separator, such as the cyclone, is not included, and the structure is simplified, which may provide convenience so that the user may easily wash and maintain the dust collecting container.

[0045] In addition, according to the present disclosure, the scrubber capable of scrubbing the dust attached to the mesh net is provided, which may prevent the mesh net from being clogged even when a large amount of dust, which does not pass through the dust separator, is introduced into the mesh net.

[0046] In addition, according to the present disclosure, the components for separating dust, such as the cyclone, are not disposed in the dust collecting container, such that the space capable of storing dust in the dust collecting container may be increased, and thus the cycle for removing the dust in the dust collecting container by the user may be prolonged, thereby improving the convenience for the user.

[0047] In addition, according to the present disclosure, the dust captured in the dust collecting container may be stored by being compressed by the rotary unit provided in the dust collecting container, such that the efficiency in storing the dust in the dust collecting container may be improved, thereby improving the convenience for the user.

[0048] In addition, according to the present disclosure, the dust captured in the dust collecting container may be stored by being compressed by the rotary unit provided in the dust collecting container, such that the dust does not scatter during the process of removing the dust from the dust collecting container.

[Description of Drawings]

[0049]

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

FIG. 2 is a bottom plan view of a cleaner configured to be coupled to the cleaner station in FIG. 1.

FIG. 3 is a front view of the cleaner system including

the cleaner station according to the embodiment of the present disclosure.

FIG. 4 is a side view illustrating an arrangement structure of a suction flow path.

FIG. 5 is a cross-sectional side view illustrating a connection structure between the suction flow path and the cleaner.

FIG. 6 is a perspective view illustrating a coupling part of the cleaner station in FIG. 1 to which the cleaner is coupled.

FIG. 7 is a perspective view illustrating a dust collecting container and a discharge air moving part when viewed from the top side.

FIG. 8 is a view illustrating a cross-section of a cover assembly part configured to open or close a dust collecting container cover.

FIG. 9 is a view illustrating the cover assembly part in FIG. 8 when viewed from the front side.

FIG. 10 is a view illustrating the cover assembly part in FIG. 8 from which a button cover is excluded.

FIG. 11 is a view illustrating a state in which the dust collecting container cover is opened.

FIG. 12 is a view illustrating the dust collecting container and the discharge air moving part when viewed from the top side.

FIG. 13 is a cross-sectional view taken along line A-A in FIG. 12.

FIG. 14 is a cross-sectional view taken along line B-B in FIG. 12.

FIG. 15 is a cross-sectional view taken along line C-C in FIG. 12.

FIG. 16 is a perspective view illustrating the dust collecting container and the discharge air moving part when viewed from the bottom side in a state in which the dust collecting container cover is excluded.

FIG. 17 is a conceptual view for explaining a positional relationship between a mesh net and a rotary plate in the dust collecting container.

FIG. 18 is a perspective view illustrating a rotary unit and a dust compression motor.

FIG. 19 is a perspective view illustrating a state in which the rotary unit is separated from the dust compression motor.

FIG. 20 is a bottom plan view illustrating the dust collecting container and the discharge air moving part.

FIGS. 21 to 23 are views for explaining a process of compressing dust by rotating the rotary unit.

FIG. 24 is a cross-sectional side view of the cleaner station illustrated together with a discharge direction of air discharged from the dust collecting container.

[Mode for Invention]

[0050] Hereinafter, exemplary embodiments of the present disclosure will be described in detail with reference to the accompanying drawings.

[0051] The present disclosure may be variously modified and may have various embodiments, and particular embodiments illustrated in the drawings will be specifically described below. The description of the embodiments is not intended to limit the present disclosure to the particular embodiments, but it should be interpreted that the present disclosure is to cover all modifications, equivalents and alternatives falling within the spirit and technical scope of the present disclosure.

[0052] 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.

[0053] 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.

[0054] FIG. 1 is a perspective view of a cleaner system including a cleaner station according to an embodiment of the present disclosure, FIG. 2 is a bottom plan view of a cleaner configured to be coupled to the cleaner station in FIG. 1, FIG. 3 is a front view of the cleaner system including the cleaner station according to the embodiment of the present disclosure, FIG. 4 is a side view illustrating an arrangement structure of a suction flow path, and FIG. 5 is a cross-sectional side view illustrating a connection structure between the suction flow path and the cleaner.

[0055] With reference to FIGS. 1 to 5, a cleaner system 1 according to an embodiment of the present disclosure may include a cleaner station 10 and a cleaner 20. Meanwhile, the present embodiment may be carried out without some of the above-mentioned components and does not exclude additional components.

[0056] The cleaner station 10 refers to a device configured to operate to suck and remove dust in a dust bin 21 of the cleaner 20. The cleaner 20 may be coupled to the cleaner station 10 to perform the dust suction operation. In this case, the cleaner 20 configured to be coupled to the cleaner station 10 may be a robot cleaner that performs a cleaning operation while autonomously traveling.

[0057] Prior to the description of a structure of the cleaner station 10, a structure of the cleaner 20 will be described first with reference to FIG. 2.

[0058] The cleaner 20 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. The cleaner 20 may include a distance sensor configured to detect a distance from an obstacle such as furniture, office supplies, or walls installed in the zone to be cleaned, and left and right wheels for moving the cleaner.

The cleaner 20 may be coupled to the cleaner station 10. The dust sucked into the dust bin 21 of the cleaner 20 may be collected in the cleaner station 10 through a suction hole 121 to be described below.

[0059] The cleaner 20 may include a dust discharge hole 22. In this case, the dust discharge hole 22 may be disposed in a bottom surface of the dust bin 21 of the cleaner 20. Therefore, the dust bin 21 of the cleaner 20 may communicate with a suction flow path 140 to be described below. For example, the dust discharge hole 22 may be provided in the form of a quadrangular hole. However, in the embodiment of the present disclosure, the shape of the dust discharge hole 22 is not limited.

[0060] The cleaner 20 may include a discharge cover 23. In this case, the discharge cover 23 may be formed in a shape corresponding to the dust discharge hole 22 and configured to close the dust discharge hole 22. To this end, the discharge cover 23 may be disposed in the dust discharge hole 22. In addition, one side of the discharge cover 23 may be defined as a fixed end fixed to the dust discharge hole 22, and the other side of the discharge cover 23 may be defined as a free end. With this configuration, when a suction force is generated toward the dust bin 21 of the cleaner 20, the free end may move downward (a direction toward the suction hole 121 of a coupling part 120) in a state in which the fixed end is fixed, such that the dust discharge hole 22 may be opened. When the suction force, which is applied toward the dust bin 21 of the cleaner 20, is eliminated, the free end of the discharge cover 23 may move upward and close the dust discharge hole 22 again. As described above, in accordance with the movement direction of the free end, the discharge cover 23 may allow the dust bin 21 of the cleaner 20 to communicate with a suction tube 126 or close the dust bin 21 and the suction tube 126.

[0061] The cleaner 20 may include corresponding terminals 24 used to charge a battery when the cleaner 20 is coupled to the cleaner station 10. The corresponding terminals 24 may be disposed at positions at which the corresponding terminals 24 may be connected to charging terminals of the cleaner station 10 in the state in which the cleaner 20 is coupled to the cleaner station 10. For example, the corresponding terminals 24 may be provided as a pair of corresponding terminals 24 disposed on a bottom surface of the cleaner 20. When the corresponding terminals 24 and the charging terminals are electrically connected, power is supplied from the cleaner station 10 to the cleaner 20, such that the cleaner 20 may be charged.

[0062] Hereinafter, the structure of the cleaner station 10 will be described with reference to FIGS. 1 and 3 to 5.

[0063] The cleaner station 10 may include a station main body 100 and a dust separation module 200.

[0064] The directions, which will be described throughout the specification, will be defined prior to the description of the specific configuration of the cleaner station 10. When a direction in which the cleaner 20 moves to be coupled to the cleaner station 10 is defined as a forward/rearward direction, one side at which the cleaner 20 is coupled to the cleaner station 10 may be defined as a front side. Further, the opposite side to the front side is defined as a rear side. In addition, a direction parallel to a major axis A1 of the station main body 120 may be defined as an upward/downward direction.

[0065] The station main body 100 is configured to be coupled to the cleaner 20 and suck the dust in the dust bin 21 of the cleaner 20 into the inside of the station main body 100. The station main body 100 may have the major axis A1 disposed to extend in the upward/downward direction.

[0066] The station main body 100 may include a housing 110 having an internal space surrounded by a plurality of outer walls. Various types of components may be accommodated in the space and protected from external impact. For example, the components may be a dust collecting motor 140 configured to generate a suction force in the dust bin 21 of the cleaner 20, a power source module configured to charge the cleaner 20, and a control circuit configured to control an overall operation of the cleaner station 10. The cleaner 20 may be coupled to the housing 110 so that the dust in the dust bin 21 of the cleaner 20 may be captured.

[0067] The plurality of outer walls of the housing 110 may define an external shape of the station main body 100. Therefore, the housing 110 may have the major axis A1 extending in the upward/downward direction. The major axis A1 of the housing 110 may be defined coaxially with the major axis A1 of the station main body 100. The housing 110 may have an external shape similar to a quadrangular column. More specifically, the housing 110 may have a shape similar to a quadrangular column as a whole, and a part of the housing 110, to which the cleaner 20 is coupled, may have a shape bent rearward. However, the external shape of the housing 110 may be variously changed within a range of functions of the housing 110 that may be coupled to the cleaner 20, define a space in the cleaner station 100, and accommodate and protect the above-mentioned components.

[0068] Meanwhile, the plurality of outer walls may include a front surface wall 110a disposed at the front side, a rear surface wall 110b disposed to face the front surface wall 110a and be directed rearward, and lateral surface walls 110c and 110d disposed between the front surface wall 110a and the rear surface wall 110b. The coupling part 120, to which the cleaner 20 is coupled, may be provided on the front surface wall 110a. The front surface wall 110a may be provided to have a shape bent rearward to correspond to the shape in which the cleaner 20 is coupled. The rear surface wall 110b may be provided in the form of a flat surface in contrast to the front surface wall 110a. Therefore, in an indoor space in which the cleaner station 10 is placed, the rear surface wall 110b may be disposed adjacent to a wall of the indoor space, which may improve spatial utilization efficiency of the indoor space. In addition, a power line for supplying power to the cleaner station 10 may be extended from the rear

surface wall 110b. The lateral surface walls 110c and 110d may be respectively provided at the left and right sides to connect the front surface wall 110a and the rear surface wall 110b. In this case, at least one edge, which connects the front surface wall 110a and the lateral surface walls 110c and 110d or connects the rear surface wall 110b and the lateral surface walls 110c and 110d, may be provided to have a predetermined radius of curvature.

[0069] A partial region of the housing 110 may be configured to open or close the internal space of the housing 110 and the outside of the housing 110. For example, a housing opening cover (not illustrated) configured to be openable and closable may be provided in a partial region of the front surface wall 110a. The housing opening cover may be disposed to open or close an adjacent region in which a HEPA filter 150 to be described below is disposed.

[0070] The station main body 100 may further include the coupling part 120 to which the cleaner 20 is coupled. The cleaner 20 may climb an upper surface of the coupling part 120 and be coupled to the cleaner station 100. The coupling part 120 may be disposed on one of the outer walls that constitute the housing 110. For example, as in the embodiment in FIG. 1, the coupling part 120 may be disposed on the front surface wall 110a. A structure of the coupling part 120 will be described below with reference to FIG. 6.

[0071] The station main body 100 may further include the suction flow path 130.

[0072] With reference to FIGS. 3 to 5, the suction flow path 130 may be disposed in the internal space of the housing 110. The suction flow path 130 may be coupled to the coupling part 120 and provided in the form of a hollow tube to suck the dust in the dust bin 21 of the cleaner 20. That is, the air containing the dust discharged from the dust bin 21 of the cleaner 20 may flow in the suction flow path 130. One end of the suction flow path 130 is coupled to a suction hole 123 of the coupling part 120. Therefore, when the cleaner 20 is coupled to the cleaner station 10, the dust bin 21 of the cleaner 20 may communicate with the suction flow path 130 through the suction hole 123. The other end of the suction flow path 130 may be connected to the dust separation module 200, such that the air flowing through the suction flow path 130 may be introduced into the dust separation module 200, and the dust may be separated by the dust separation module 200.

[0073] The suction flow path 130 may include a first suction flow path 130a and a second suction flow path 130b. A longitudinal axis A3 of the first suction flow path 130a may be disposed in parallel with the major axis A1 of the station main body 100. One end of the second suction flow path 130b may be connected to the first suction flow path 130a. In addition, the second suction flow path 130b may be disposed at a lower side of the coupling part 120 and extend in the forward/rearward direction. From another point of view, the first suction flow path 130a may be configured to extend in a vertical direction, and the second suction flow path 130b may be configured to extend in a horizontal direction. The first suction flow path 130a may be disposed in parallel with the longitudinal axis of the dust collecting motor 140. The longitudinal axis A3 of the first suction flow path 130a and the longitudinal axis of the dust collecting motor 140 may be disposed to be spaced apart from each other at a predetermined distance.

[0074] The other end of the second suction flow path 130b may be connected to the suction hole 123. Therefore, when the cleaner 20 is coupled to the coupling part 132, the other end of the second suction flow path 130b may communicate with the dust bin 21 of the cleaner 20.

[0075] The station main body 100 may further include the dust collecting motor 140.

[0076] The dust collecting motor 140 may be disposed in the internal space of the housing 110. The dust collecting motor 140 may provide a suction force in a direction from the inside to the outside of the dust bin 21 so that the dust in the dust bin 21 of the cleaner 20 moves through the suction flow path 130. More specifically, when the dust collecting motor 140 operates, a flow of air is generated in a direction from the upper side toward the lower side of the station main body 100, such that a suction force directed from the dust separation module 200, which will be described below, toward the dust collecting motor 140 may be generated. In the suction flow path 130, the suction force may be applied in the direction in which the suction force sucks the dust in the dust bin 21.

[0077] The station main body 100 may further include the HEPA filter 150.

[0078] With reference to FIG. 5, the HEPA filter 150 may be accommodated in the housing 110. The HEPA filter 150 may be disposed at an appropriate position at which the HEPA filter 150 may finally filter the air, which has passed through the dust collecting motor 150, before the air is discharged to the outside of the housing 110. In the possible embodiment, the HEPA filter 150 may be disposed below the dust collecting motor 140. Alternatively, in the possible embodiment, the HEPA filter 150 may be disposed forward of the dust collecting motor 140. Alternatively, in the possible embodiment, the HEPA filter 150 may be disposed rearward of the dust collecting motor 140.

[0079] The station main body 100 may further include a controller (not illustrated).

[0080] The controller may be accommodated in the internal space of the housing 110. The controller may determine whether the cleaner 20 is coupled to the cleaner station 10, and the controller may control the overall subsequent suction operation. In this case, the controller may include any type of device capable of processing data, such as a processor. Here, the 'processor' may refer to a data processing device embedded in hardware and having, for example, a circuit physically structured to perform a function represented by codes or instructions included in a program. Examples of the data

processing device embedded in hardware may include processing devices such as a microprocessor, a central processing unit (CPU), a processor core, a multiprocessor, an application-specific integrated circuit (ASIC), or a field programmable gate array (FPGA), but the scope of the present disclosure is not limited thereto.

[0081] The station main body 100 may further include the power source module (not illustrated).

[0082] The power source module may be accommodated in the internal space of the housing 110 and convert alternating current power, which is supplied from the outside of the housing 110, into direct current power. When the cleaner 20 is coupled to the coupling part 120, the power source module may supply electric power to the cleaner 20 to charge the battery of the cleaner 20.

[0083] The housing 110 of the station main body 100 may have an air discharge part 160 (see FIG. 1). The air discharge part 160 may include a plurality of holes formed through the inside and outside of the housing 110 so that the air having passed through the HEPA filter 150 is discharged to the outside of the housing 110. In the possible embodiment, the air discharge part 160 may be formed in the front surface wall 110a. Alternatively, in the possible embodiment, the air discharge part 160 may be formed in the rear surface wall 110b. Alternatively, in the possible embodiment, the air discharge part 160 may be formed in the lateral surface walls 110c and 110d.

[0084] FIG. 6 is a perspective view illustrating the coupling part of the cleaner station in FIG. 1 to which the cleaner is coupled.

[0085] With reference to FIG. 6, the coupling part 120 may include a coupling surface 120a. The coupling surface 120a may mean a surface formed by bending the front surface wall 110a of the housing 110, i.e., a surface directed upward. In addition, the coupling surface 120a may mean a surface facing the bottom surface of the cleaner 20 based on the state in which the cleaner 20 is coupled. The cleaner 20 may approach the coupling part 120 from a location disposed forward of the coupling part 120 and be seated on the coupling surface 120a while climbing the coupling part 120. A shape of the coupling surface 120a may correspond to a shape of the bottom surface of the cleaner 20. For example, the coupling surface 120a may have a rectangular shape. However, in the possible embodiment, the shape of the coupling surface 120a may be different from the shape of the bottom surface of the cleaner 20.

[0086] The coupling part 120 may include rolling portions 121 over which the left and right wheels of the cleaner 20 pass when the cleaner 20 climbs the coupling part 120 so as to be coupled to the coupling part 120. The rolling portions 121 may be disposed to be respectively adjacent to left and right ends of the coupling part 120 based on the state in which the coupling part 120 is viewed from the front side. In order to guide the movements of the left and right wheels of the cleaner 20, an interval between the left and right rolling portions 121 may correspond to an interval between the left and right wheels of the cleaner 20. In addition, the rolling portions 121 may have shapes recessed downward from the coupling surface 120a of the coupling part 120 so that the left and right wheels of the cleaner 20 do not deviate from movement routes when the left and right wheels of the cleaner 20 move. That is, the rolling portion 121 may be defined as a region concavely depressed downward with respect to the coupling surface 120a adjacent to the rolling portion 121.

[0087] In addition, the rolling portions 121 may have wheel seating portions 122 configured to support the left and right wheels of the cleaner 20 so that the cleaner 20 does not move in the state in which the cleaner 20 is completely coupled to the coupling part 120. The wheel seating portions 122 may be defined as concave regions depressed to have curved surfaces to surround and support the left and right wheels of the cleaner 20 on the rolling portions 121.

[0088] A plurality of protrusions may be provided at predetermined intervals on an upper surface of the rolling portion 121 and protrude upward. The plurality of protrusions may define concave-convex portions on the rolling portion 121 to prevent the left and right wheels from slipping.

[0089] The coupling part 120 may include the suction hole 123 provided to correspond to the position at which the dust bin 21 of the cleaner 20 is disposed based on the state in which the cleaner 20 is coupled to the coupling part 110. The suction flow path 130 and the dust bin 21 may communicate with each other through the suction hole 123. The suction hole 123 may be provided in a protruding portion 124 protruding upward from the coupling surface 120a. The protruding portion 124 may protrude by a height that may compensate for a position difference between the dust discharge hole 22 of the cleaner 20 and the coupling surface 120a when the wheels of the cleaner 20 are seated on the wheel seating portions 122. Because the suction hole 123 is provided in the protruding portion 124, it is possible to prevent the suction force from decreasing when the dust bin 21 communicates with the suction flow path 130.

[0090] In this case, a caster guide portion 125 may be formed on the protruding portion 124 and have a height equal to the height of the coupling surface 120a in order to guide a movement of a caster. From another point of view, the protruding portions 124 may be respectively formed at the left and right sides and spaced apart from each other at a predetermined interval in order to maintain left and right balances of the cleaner 20, and one region of the coupling surface 120a between the protruding portions 124, which are spaced apart from each other, may be defined as the caster guide portion 125.

[0091] The suction hole 123 may be disposed to correspond to the position at which the dust discharge hole 22 of the cleaner 20 is disposed when the cleaner 20 is coupled to the coupling part 120. The suction hole 123 may be formed in a shape corresponding to the dust discharge hole 22 of the cleaner 20. For example, the suc-

tion hole 123 may be provided in the form of a quadrangular hole.

[0092] Meanwhile, the second suction flow path 130b may be accommodated in the internal space of the housing 110 disposed below the coupling part 120, and an end of the second suction flow path 130b may be connected to the suction hole 123 (see FIG. 5). That is, when the discharge cover 23 of the cleaner 20 opens the dust discharge hole 22, the second suction flow path 130b and the inside of the dust bin 21 may communicate with each other through the suction hole 123.

[0093] The coupling part 120 may include a charging part 126 electrically connected to the cleaner 20 and configured to supply electric power to charge the cleaner 20. The charging part 126 may include charging terminals 126a and 126b respectively provided at left and right sides, one for each side, based on the state in which the coupling part 120 is viewed from the front side. When the cleaner 20 is coupled to the coupling part 110, the corresponding terminals 24 of the cleaner 20 are electrically connected to the charging terminals 126a and 126b, and the power source module provided in the housing 110 supplies electric power to the cleaner 20, such that the cleaner 20 may be charged. An interval between the left and right charging terminals 126a and 126b may be substantially equal to an interval between the corresponding terminals 24 of the cleaner 20.

[0094] Hereinafter, an exemplary embodiment of the dust separation module 200 included in the cleaner station 10 of the present disclosure will be described.

[0095] FIG. 7 is a perspective view illustrating a dust collecting container and a discharge air moving part when viewed from the top side. In FIG. 7, a dust collecting container blocking plate 217 and a housing blocking plate 222 are excluded in order to explain internal structures of a dust collecting container 211 and a discharge air moving part.

[0096] With reference to FIGS. 4 and 7, the dust separation module 200 may include a dust capturing part 210 and a discharge air moving part 220.

[0097] The dust capturing part 210 may include the dust collecting container 211.

[0098] The dust collecting container 211 may be disposed above the station main body 100 and configured to capture dust flowing together with air. The dust collecting container 211 may be disposed outside and above the housing 110.

[0099] The dust collecting container 211 may include a dust collecting container body 2111 and a dust collecting container cover 2112.

[0100] The dust collecting container body 2111 may provide an accommodation space that stores the captured dust. The dust collecting container body 2111 may have a cylindrical shape. A longitudinal axis A2 of the dust collecting container body 2111 may be disposed in parallel with the major axis A1 of the housing. In addition, the longitudinal axis A2 of the dust collecting container body 2111 may be disposed in parallel with a major axis A3 of the second suction flow path 130b (see FIG. 3).

[0101] A lower side of the dust collecting container body 2111 may be coupled to the dust collecting container cover 2112 and configured to be selectively openable and closable. An upper side of the dust collecting container body 2111 may be closed by the dust collecting container blocking plate 217 (see FIG. 1). The dust collecting container blocking plate 217 may simultaneously constitute an upper surface of the dust collecting container body 2111 and an upper surface of the cleaner station 100. The dust collecting container blocking plate 217 may be integrated with the dust collecting container body 2111. The dust collecting container body 2111 may be made of a transparent material so that the interior of the dust collecting container body 2111 is visible. Therefore, a user may recognize a degree to which dust is captured, and the user may easily determine whether to remove the dust captured in the dust collecting container 211. The dust collecting container body 2111 may be made of a washable material. For example, the dust collecting container body 2111 may be made of a plastic material.

[0102] In case that a dust storage member provided in the cleaner station 100 is a bag-type dust bag, the user needs to periodically change the dust bags. In this case, in case that the dust bag has a small capacity, there is a problem in that the user needs to frequently change the dust bags, which degrades the convenience for the user. In contrast, in case that the dust bag has a large capacity, there may occur a problem in that the user needs to wait until the dust bag is fully filled with dust, and a replacement cycle increases, which may cause the proliferation of bacteria inside the dust bag.

[0103] In contrast, as in the embodiment of the present disclosure, in case that the bin-type dust collecting container 211 is provided as the dust storage member, the dust collecting container 211 may be used semi-permanently without being required to be replaced, such that the dust collecting container 211 is economical. Further, because the dust collecting container 211 is washable, the dust may be removed, and the dust collecting container 211 may be washed at any desired time, such that the cleaner station 10 may be more hygienically managed.

[0104] Meanwhile, the dust collecting container body 2111 may have an inlet port 2111a into which the air is introduced.

[0105] The inlet port 2111a communicates with the suction flow path 130 at the other side of the suction flow path 130 (the side opposite to one side at which the suction flow path 130 is connected to the dust bin 21 of the cleaner 20), such that the air may be introduced. More specifically, the inlet port 2111a may be provided in the form of a hole formed through the dust collecting container body 2111 to allow the suction flow path 130 and the inside of the dust collecting container body 2111 to communicate with each other.

[0106] The inlet port 2111a may have a predetermined

area and be formed on a wall surface disposed in a radial direction of the dust collecting container 211 among the wall surfaces of the dust collecting container 211 that define the accommodation space. More specifically, in the embodiment in which the dust collecting container body 2111 has a cylindrical shape, the dust collecting container 211 may have the accommodation space defined by a dust collecting container upper wall defined by the dust collecting container blocking plate 217, a cylindrical dust collecting container sidewall disposed in the radial direction based on a longitudinal axis of the dust collecting container body 2111, and a dust collecting container lower wall defined by the dust collecting container cover 2112 to be described below. In this case, the inlet port 2111a may be formed in a wall surface of the dust collecting container sidewall. That is, the air sucked from the dust bin 21 of the cleaner 20 may be introduced into a lateral side of the dust collecting container 211. With the arrangement configured such that the air is introduced into the lateral side of the dust collecting container 211 as described above, the overall height of the cleaner station 10 may be decreased, and the utilization of the indoor space may be improved.

[0107] The dust collecting container body 2111 may have a discharge port 2111b from which the air is discharged.

[0108] The discharge port 2111b may be provided in the form of a hole formed through the dust collecting container body 2111 to allow the inside of the dust collecting container body 2111 and the discharge air moving part 220, which will be described below, to communicate with each other.

[0109] The discharge port 2111b may have a predetermined area and be formed on a wall surface disposed in the radial direction of the dust collecting container 211 among the wall surfaces of the dust collecting container 211 that define the accommodation space. That is, like the inlet port 2111a, the discharge port 2111b may be formed in the wall surface of the dust collecting container sidewall. The discharge port 2111b and the inlet port 2111a may be disposed in the dust collecting container sidewall and spaced apart from each other at a predetermined distance.

[0110] Hereinafter, the dust collecting container cover 2112 will be described.

[0111] FIG. 8 is a view illustrating a cross-section of a cover assembly part configured to open or close the dust collecting container cover, FIG. 9 is a view illustrating the cover assembly part in FIG. 8 when viewed from the front side, FIG. 10 is a view illustrating the cover assembly part in FIG. 8 from which a button cover is excluded, and FIG. 11 is a view illustrating a state in which the dust collecting container cover is opened.

[0112] The dust collecting container cover 2112 may include a cover main body 2112a and a hinge portion 2112b. The cover main body 2112a may be formed to cover a lower side of the dust collecting container body 2111. The cover main body 2112a may rotate downward relative to the hinge portion 2112b. The hinge portion 2112b may be disposed adjacent to the discharge air moving part 220 to be described below. When the dust collecting container cover 2112 is coupled to a coupling protrusion 2111c of the dust collecting container body 2111 by means of a coupling hook 2112c, the dust collecting container cover 2112 may close the lower side of the dust collecting container body 2111.

[0113] Meanwhile, the dust collecting container 211 may further include a cover assembly part 2113. The dust collecting container cover 2112 may be separated from the dust collecting container by means of the cover assembly part 2113. More specifically, the dust collecting container cover 2112 may be rotated by the cover assembly part 2113 to open or close one longitudinal end of the dust collecting container 211. The cover assembly part 2113 may be disposed opposite to the hinge portion 2112b. The cover assembly part 2113 may be disposed on an outer surface of the dust collecting container body 2111 and disposed adjacent to a lower end of the dust collecting container body 2111.

[0114] The cover assembly part 2113 may include buttons 2113a to which an external force is applied, hook pressing protrusions 2113b connected to the buttons 2113a and configured to move, when the external force is applied to the buttons 2113a, to elastically deform the coupling hook 2112c connected to the dust collecting container cover 2112, and a button cover 2113c provided to cover at least a part of the coupling hook 2112c.

[0115] More specifically, the buttons 2113a may be respectively provided at the left and right sides. When an external force is simultaneously applied to the left and right buttons 2113a in a direction (arrow direction in FIG. 10) toward the coupling hook 2112c, the hook pressing protrusions 2113b connected to the buttons 2113a may move toward the coupling hook 2112c to apply pressure to the coupling hook 2112c. The coupling hook 2112c may be elastically deformed by the hook pressing protrusions 2113b in a direction in which the coupling hook 2112c is decoupled from the coupling protrusion 2111c. When the dust collecting container cover 2112 and the dust collecting container body 2111 are decoupled, the dust collecting container cover 2112 rotates downward about the hinge portion 2112b and opens the dust collecting container body 2111. This configuration may easily remove dust stored in the dust collecting container 211.

[0116] Meanwhile, the dust capturing part 210 may further include a mesh net 212 disposed in the discharge port 2111b of the dust collecting container 211 to filter out the dust from the air discharged from the dust collecting container 211.

[0117] With reference to FIG. 7, the mesh net 212 may be formed to have the same shape and area as the discharge port 2111b. The mesh net 212 may be disposed to block the discharge port 2111b. That is, the mesh net 212 may be disposed to define a part of an external shape of the dust collecting container body 2111. The mesh net

212 may be a member having a plurality of holes and made of, but not limited to, a metallic material. The mesh net 212 may prevent large dust particles from passing through the dust collecting container body 2111, such that the dust may be captured in the dust collecting container 211. The mesh net 212, together with the discharge port 2111b, may be disposed on the sidewall wall surface of the dust collecting container 211. That is, discharge air discharged from the dust collecting container body 2111 may be discharged from the lateral side of the dust collecting container 211. With the arrangement configured such that the discharge air is discharged from the lateral side of the dust collecting container 211 as described above, the overall height of the cleaner station 10 may be decreased, and the utilization of the indoor space may be improved.

[0118] Hereinafter, a structure for compressing dust captured in the dust collecting container 211 will be described with reference to FIGS. 12 to 17.

[0119] FIG. 12 is a view illustrating the dust collecting container and the discharge air moving part when viewed from the top side, FIG. 13 is a cross-sectional view taken along line A-A in FIG. 12, FIG. 14 is a cross-sectional view taken along line B-B in FIG. 12, FIG. 15 is a cross-sectional view taken along line C-C in FIG. 12, and FIG. 16 is a perspective view illustrating the dust collecting container and the discharge air moving part when viewed from the bottom side in a state in which the dust collecting container cover is excluded.

[0120] The dust capturing part 210 may further include a rotary unit 213.

[0121] With reference to FIGS. 12 to 16, the rotary unit 213 may be disposed in the dust collecting container 211 and configured to rotate about the longitudinal axis of the dust collecting container 211 along an inner peripheral surface of the dust collecting container 211 to collect the dust in the dust collecting container 211. More specifically, the rotary unit 213 may include a rotary shaft 2133 and a rotary plate 2131.

[0122] The rotary shaft 2133 may be disposed in the longitudinal direction of the dust collecting container 211 and rotate by receiving power from the outside of the dust collecting container 211. The rotary shaft 2133 may be coaxial with the longitudinal axis of the dust collecting container 211. A lower end of the rotary shaft 2133 may be connected to the dust collecting container cover 2112 so as to receive power from the outside. The rotary shaft 2133 may extend to be adjacent to the upper end of the dust collecting container 211. For example, the rotary shaft 2133 may be coupled to an inner surface of the dust collecting container upper wall.

[0123] The rotary plate 2131 may be coupled to the rotary shaft 2133 so as to rotate together with the rotary shaft 2133 and disposed in a space between the rotary shaft 2133 and an inner radial peripheral surface of the dust collecting container 211. More specifically, the rotary plate 2131 may be formed such that one end of the rotary plate 2131 is connected to the rotary shaft 2133, and the other end of the rotary plate 2131 extends outward in the radial direction of the dust collecting container body 2111, i.e., extends from a center of the dust collecting container 211 toward the dust collecting container sidewall. For example, the rotary plate 2131 may be provided in the form of a quadrangular flat plate. A length of the rotary plate 2131 in the upward/downward direction may be similar to a length of the dust collecting container body 2111. When the rotary plate 2131 rotates together with the rotary shaft 2133, one large surface of the rotary plate 2131 comes into contact with one large surface of a compression plate 214 to be described below, such that the dust collected between the rotary plate 2131 and the compression plate 214 may be compressed.

[0124] The dust capturing part 210 may further include the compression plate 214.

[0125] With reference to FIGS. 12 to 16, the compression plate 214 may be disposed in a state of being fixed to one side in the dust collecting container 211 to compress the dust collected by the rotation of the rotary unit 213. More specifically, one end of the compression plate 214 may be connected to the inner surface of the dust collecting container sidewall, and the other end of the compression plate 214 may extend outward in the radial direction of the dust collecting container 211. The compression plate 214 may be formed in a shape substantially identical to the shape of the rotary plate 2131. For example, the compression plate 214 may be provided in the form of a quadrangular flat plate.

[0126] The rotary unit 213 may rotate in the direction toward the compression plate 214 and compress the dust collected between the rotary unit 213 and the compression plate 214. More specifically, when the rotary shaft 2133 rotates, the rotary plate 2131 and the compression plate 214 become gradually close to each other, such that one large surface of the rotary plate 2131 and one large surface of the compression plate 214 meet together to compress the dust collected between one large surface of the rotary plate 2131 and one large surface of the compression plate 214.

[0127] Meanwhile, the rotary shaft 2133 may rotate in a first direction and then rotate in a second direction opposite to the first direction after the dust between the rotary plate 2131 and the compression plate 214 is compressed. The rotation direction of the rotary shaft 2133 may be controlled by a dust compression motor 215 to be described below.

[0128] This configuration may compress and store the dust captured in the dust collecting container 211. Therefore, the capacity capable of collecting the dust is increased compared to an actual capacity of the dust collecting container 211, and the efficiency in storing dust in the dust collecting container 211 is improved, such that the convenience for the user may be improved. In addition, because the dust is compressed in the dust collecting container 211, the dust does not scatter during the process of removing the dust from the dust collecting container 211. In addition, because the direction of the

rotary shaft 2133 may switch between the first direction and the second direction, the dust may be compressed in the two directions of the compression plate 214, thereby maximizing the dust storing efficiency of the dust collecting container 211.

[0129] Meanwhile, the rotary unit 213 may further include a scrubber 2132.

[0130] With reference back to FIG. 7, the scrubber 2132 may be configured to rotate together with the rotary shaft 2133 in a state in which the scrubber 2132 is in contact with an inner peripheral surface of the dust collecting container 211. The scrubber 2132 may be coupled to a side of the rotary plate 2131 opposite to the side at which the rotary shaft 2133 is disposed. In this case, one side of the scrubber 2132 may be disposed to be in contact with the inner peripheral surface of the dust collecting container 211. That is, the scrubber 2132 may be disposed so that one side edge of the scrubber 2132 is in contact with the inner surface of the dust collecting container sidewall. Therefore, the scrubber 2132 may scrub the inner surface of the dust collecting container sidewall when the scrubber 2132 rotates together with the rotary plate 2131. The scrubber 2132 may be made of a material with flexibility. For example, the scrubber 2132 may be made of a rubber material.

[0131] Meanwhile, the mesh net 214 may be disposed in a partial region of the wall surface being contact with the scrubber 2132. In the embodiment in which the scrubber 2132 is disposed in the radial direction of the dust collecting container body 2111, the mesh net 214 may be disposed on the dust collecting container sidewall. That is, the discharge port 2111b, from which the air is discharged from the dust collecting container body 2111, may be disposed in the dust collecting container sidewall. With this configuration, the scrubber 2132 may scrub and remove the dust attached to the mesh net 214.

[0132] In case that the cleaner station is not equipped with a dust separator such as a cyclone, the structure may be simplified, which may provide the convenience for the user so that the user may easily wash the dust collecting container. However, a problem may occur in that a large amount of dust, which does not pass through the dust separator, is attached to the mesh net, and the mesh net is clogged. In the embodiment of the present disclosure, the scrubber 2132 capable of scrubbing the dust attached to the mesh net 214 may be provided, thereby preventing a situation in which the mesh net 214 is clogged.

[0133] FIG. 17 is a conceptual view for explaining a positional relationship between the mesh net and the rotary plate in the dust collecting container.

[0134] With reference to FIG. 17, a length of the scrubber 2132 in the upward/downward direction may be longer than a length of the discharge port 2111b in the upward/downward direction. In addition, the scrubber 2132 may be disposed so that the scrubber 2132 passes an entire region of the discharge port 2111b when the scrubber 2132 rotates.

[0135] More specifically, a height H1 from a lower end surface in the dust collecting container body 2111 to a lower end of the scrubber 2132 may be smaller than a height H3 from the lower end surface in the dust collecting container body 2111 to a lower end of the discharge port 2111b. A height H2 from the lower end surface of the dust collecting container body 2111 to an upper end of the scrubber 2132 may be larger than a height H4 from the lower end surface of the dust collecting container body 2111 to an upper end of the discharge port 2111b.

[0136] With this configuration, the scrubber 2132 may remove the dust attached to the mesh net 212 while passing and scrubbing the overall area of the mesh net 212 disposed in the discharge port 2111b.

[0137] Hereinafter, the dust compression motor 215 configured to provide power for rotating the rotary unit 213 will be described.

[0138] FIG. 18 is a perspective view illustrating the rotary unit and the dust compression motor, and FIG. 19 is a perspective view illustrating a state in which the rotary unit is separated from the dust compression motor.

[0139] With reference back to FIGS. 18 and 19, the dust capturing part 210 may further include the dust compression motor 215.

[0140] The dust compression motor 215 may provide power for rotating the rotary shaft 2133. The dust compression motor 215 may be disposed outside the dust collecting container 211 and connected to the rotary shaft 2133 by means of the dust collecting container cover 2112. For example, as in the embodiment of the present disclosure illustrated in FIG. 18, the dust compression motor 215 may be connected to the rotary shaft 2133 by means of a dust compression gear part 216. The dust compression gear part 216 may include a first gear 2161 and a second gear 2162. The first gear 2161 and the second gear 2162 may each be provided in the form of a circular gear. The first gear 2161 may be connected to a shaft of the dust compression motor 215. The second gear 2162 may engage with the first gear 2161. The second gear 2162 may be connected to the rotary shaft 2133.

[0141] However, the connection between the dust compression motor 215 and the rotary shaft 2133 is not limited to the connection in this embodiment. In the possible embodiment, the dust compression motor 215 may be connected directly to the rotary shaft 2133 by means of a dust compression motor shaft provided to penetrate the cover main body 2112a of the dust collecting container cover 2112.

[0142] A sensor may be disposed at one side of the dust compression motor 215 and detect a rotation degree of the rotary shaft 2133 in order to control and stop the rotary shaft 2133. The sensor may be a micro-switch.

[0143] The dust compression motor 215 may be controlled by the controller. As described above, the rotation direction of the rotary shaft 2133 may switch between the first direction and the second direction, and this may be performed by changing the rotation direction of the dust compression motor 215. For example, when the dust

compression motor 215 rotates in a forward direction, the rotary shaft 2133 may rotate in the first direction. When the dust compression motor 215 rotates in a reverse direction, the rotary shaft 2133 may rotate in the second direction.

[0144] The dust compression motor 215 and the dust collecting container 211 may be provided separably. FIG. 20 is a bottom plan view illustrating the dust collecting container and the discharge air moving part.

[0145] With reference to FIG. 19 together with FIG. 20, the second gear 2162 may include a rotary shaft connection part 2162a. The rotary shaft connection part 2162a may be coupled by being fitted into a coupling groove 2112d of the dust collecting container cover 2112. A shape of an end of the rotary shaft connection part 2162a may be identical to a shape of the coupling groove 2112d. Therefore, when the rotary shaft connection part 2162a is fitted into the coupling groove 2112d, the rotary shaft 2133 and the second gear 2162 may be coupled. Therefore, when the second gear 2162 rotates, the rotary shaft 2133 may also rotate.

[0146] FIGS. 21 to 23 are views for explaining a process of compressing dust by rotating the rotary unit 213.

[0147] With reference to FIGS. 21 to 23, the rotary plate 2131 may rotate in the first direction to compress the dust between the rotary plate 2131 and the compression plate 214 and then stop. The rotary plate 2131 may switch the rotation direction to the second direction, rotate to compress the dust between the rotary plate 2131 and the compression plate 214, and then stop. As described above, the operation of rotating and stopping the rotary plate 2131 may be controlled as the controller controls the dust compression motor 215. With this configuration, the dust may be stored in the compressed state in the vicinity of the compression plate 214. Even when the dust collecting container cover 2112 is opened to remove the stored dust, the dust may be clearly removed without scattering.

[0148] Hereinafter, the discharge air moving part 220 will be described with reference back to FIGS. 7 and 12 to 16.

[0149] As described above, the dust separation module 200 may include the discharge air moving part 220.

[0150] The discharge air moving part 220 may be connected to the discharge port 2111b and provide a space in which the air discharged from the dust collecting container 211 is introduced and flows. More specifically, the discharge air moving part 220 may include a discharge air moving part housing 221, a suction flow path connection part 223, and a dust collecting motor connection part 224.

[0151] The discharge air moving part 220 may be disposed above the station main body 100 (see FIG. 1). The discharge air moving part 220 may be disposed rearward of the dust collecting container 211. That is, the dust capturing part 210 and the discharge air moving part 220 may be provided above the station main body 100 and disposed in parallel with each other in the forward/rearward direction. In the possible embodiment, the dust capturing part 210 and the discharge air moving part 220 may also be disposed in parallel with each other in the leftward/rightward direction. With this arrangement, the overall height of the cleaner station 10 may be decreased, and the utilization of the indoor space may be improved.

[0152] Meanwhile, the cover assembly part 2113 for opening the dust collecting container cover 2112 may be disposed to be directed forward, and the discharge air moving part 220 may be disposed at one side at which the cover assembly part 2113 is not positioned. For example, the discharge air moving part 220 may be disposed at one side at which the hinge portion 2111b of the dust collecting container 211 is positioned. With this arrangement, the operation of the user applying an external force to the cover assembly part 2113 to open the dust collecting container cover 2112 is not hindered.

[0153] The discharge air moving part housing 221 may define a space into which the air discharged through the discharge port 2111b is introduced. A part of an external shape of the discharge air moving part housing 221 may be provided to surround the dust collecting container 211, and the remaining part of the external shape of the discharge air moving part housing 221 may be provided to have a shape corresponding to the shape of the housing 110 of the station main body 100. More specifically, the discharge air moving part housing 221 may include a first surface 221a provided to surround an outer peripheral surface of the dust collecting container sidewall, and a second surface 221b configured to define an external shape of a rear surface of the cleaner station 100 together with the rear surface wall 110b of the housing 110. In addition, the discharge air moving part housing 221 may further include third and fourth surfaces 221c and 221d configured to connect the first and second surfaces 221a and 221b and define an external shape of a lateral surface of the cleaner station 100 together with the lateral surface walls 110c and 110d of the housing 110.

[0154] In the possible embodiment, the first surface 221a may have a shape integrated with a partial region of the dust collecting container sidewall. That is, the first surface 221a may simultaneously constitute one surface of the discharge air moving part housing 221 and the dust collecting container sidewall. In this case, the inlet port 2111a and the discharge port 2111b may be formed in the first surface 221a.

[0155] A lower side of the discharge air moving part housing 221 may communicate with the dust collecting motor 140 (see FIG. 16). An upper side of the discharge air moving part housing 221 may be opened. The discharge air moving part housing 221 may be coupled to the housing blocking plate 222. In this case, a partial region of the upper side of the discharge air moving part housing 221 may be closed by the housing blocking plate 222. The housing blocking plate 222 may simultaneously define the upper surface of the discharge air moving part housing 221 and constitute the upper surface of the cleaner station 100.

[0156] The suction flow path connection part 223 may be provided in the form of a hollow cylindrical tube and disposed in the discharge air moving part housing 221. One end of the suction flow path connection part 223 may be connected to the suction flow path 130, and the other end of the suction flow path connection part 223 may be connected to the inlet port 2111a. More specifically, with reference to FIGS. 7 and 13, one end of the suction flow path connection part 223 may be coupled to an upper end of the first suction flow path 130a, and the other end of the suction flow path connection part 223 may be connected to the inlet port 2111a. That is, the suction flow path 130 and the dust collecting container 211 may communicate with each other through the suction flow path connection part 223, and the dust sucked from the dust bin 21 of the cleaner 20 may pass through the suction flow path 130 and the suction flow path connection part 223 and be introduced into the dust collecting container 211.

[0157] The dust collecting motor connection part 224 may be disposed in the discharge air moving part housing 221. The dust collecting motor connection part 224 may allow the dust collecting motor 140 and the discharge air moving part housing 221 to communicate with each other so that the air discharged from the dust collecting container 211 moves toward the dust collecting motor 140. More specifically, with reference to FIGS. 7 and 16, the dust collecting motor connection part 224 may be provided in the form of a hollow tube, and both the upper and lower ends of the dust collecting motor connection part 224 may be opened. For example, a cross-section of the dust collecting motor connection part 224, which is taken in the longitudinal direction, may have an elliptical shape.

[0158] The discharge air moving part 220 may further include a prefilter 225.

[0159] The prefilter 225 may be disposed on the dust collecting motor connection part 224 to filter out the dust, once more, from the air discharged from the discharge air moving part 220. More specifically, with reference to FIGS. 7 and 16, a cross-sectional shape of the prefilter 225 may be identical to a shape of a cross-section of the dust collecting motor connection part 224 taken in the longitudinal direction. The prefilter 225 may be disposed on the dust collecting motor connection part 224 to block a flow of the discharge air directed toward the dust collecting motor 140. Therefore, the dust particles with fine sizes may be filtered out from the discharge air. In the possible embodiment, the prefilter 225 may be disposed to block the opened upper side of the dust collecting motor connection part 224 so that the discharge air may pass through the prefilter 225. Alternatively, in the possible embodiment, the prefilter 225 may be disposed to be fixed by being inserted into the dust collecting motor connection part 224. In this case, the dust collecting motor connection part 224 may simultaneously serve as a passageway, which allows the discharge air moving part housing 221 and the dust collecting motor 140 to communicate with each other, and serve as a frame for fixing the prefilter 225. The prefilter 225 may be made of a flexible material that is washable with water. The prefilter 225 may be typically made of a non-woven fabric material, but the present disclosure is not limited thereto.

[0160] With reference back to FIGS. 4, 7, and 24, a process in which the dust discharged from the dust bin 21 of the cleaner 20 is captured in the dust collecting container 211 will be described.

[0161] The air, which contains the dust and is discharged from the dust bin 21 by the suction force of the dust collecting motor 140, may pass through the second suction flow path 130b, the first suction flow path 130a, and the suction flow path connection tube 223 and be introduced into the dust collecting container 211 through the inlet port 2111a. The air introduced into the dust collecting container 211 is discharged from the dust collecting container 211 through the discharge port 2111b. In this case, the large dust particles may be separated from the air by the mesh net 212 disposed in the discharge port 2111b. The separated dust may be captured in the dust collecting container 211. The discharge air discharged through the discharge port 2111b is introduced into the discharge air inlet port housing 221, passes through the prefilter 225, passes through the dust collecting motor 140 and the HEPA filter 150, and is discharged to the outside of the housing 110.

[0162] As described above, according to the present disclosure, the cleaner station includes a bin-type member, instead of a bag-type member, as a debris storage member. Therefore, it is not necessary to periodically change the debris storage members, which may improve the economic feasibility and convenience for the user.

[0163] In addition, according to the present disclosure, the dust separator, such as the cyclone, is not included, and the structure is simplified, which may provide convenience so that the user may easily wash and maintain the dust collecting container.

[0164] In addition, according to the present disclosure, the scrubber capable of scrubbing the dust attached to the mesh net is provided, which may prevent the mesh net from being clogged even when a large amount of dust, which does not pass through the dust separator, is introduced into the mesh net.

[0165] In addition, according to the present disclosure, the components for separating dust, such as the cyclone, are not disposed in the dust collecting container, such that the space capable of storing dust in the dust collecting container may be increased, and thus the cycle for removing the dust in the dust collecting container by the user may be prolonged, thereby improving the convenience for the user.

[0166] In addition, according to the present disclosure, the dust captured in the dust collecting container may be stored by being compressed by the rotary unit provided in the dust collecting container, such that the efficiency in storing the dust in the dust collecting container may be improved, thereby improving the convenience for the

user.

[0167] In addition, according to the present disclosure, the dust captured in the dust collecting container may be stored by being compressed by the rotary unit provided in the dust collecting container, such that the dust does not scatter during the process of removing the dust from the dust collecting container.

[0168] While the present disclosure has been described with reference to the specific embodiments, the specific embodiments are only for specifically explaining the present disclosure, and the present disclosure is not limited to the specific embodiments. It is apparent that the present disclosure may be modified or altered by those skilled in the art without departing from the technical spirit of the present disclosure.

[0169] All the simple modifications or alterations to the present disclosure fall within the scope of the present disclosure, and the specific protection scope of the present disclosure will be defined by the appended claims.

Claims

1. A cleaner station comprising:

a housing to which a cleaner is coupled so that dust in a dust bin of the cleaner is captured;
a suction flow path disposed in the housing and having one side configured to communicate with the dust bin of the cleaner;
a dust collecting motor disposed in the housing and configured to provide a suction force directed from the inside toward the outside of the dust bin through the suction flow path;
a cylindrical dust collecting container including an inlet port configured to communicate with the suction flow path at the other side of the suction flow path so that air is introduced into the inlet port, and a discharge port through which the air is discharged, the dust collecting container being configured to provide an accommodation space for the captured dust;
a discharge air moving part connected to the discharge port and configured to provide a space in which the air discharged from the dust collecting container is introduced and flows;
a rotary unit disposed in the dust collecting container and configured to collect the dust in the dust collecting container while rotating about a longitudinal axis of the dust collecting container along an inner peripheral surface of the dust collecting container; and
a compression plate disposed in the dust collecting container and disposed in a state of being fixed to one side in the dust collecting container, wherein the rotary unit rotates in a direction toward the compression plate and compresses the dust between the rotary unit and the compression plate.

2. The cleaner station of claim 1, wherein the discharge port has a predetermined area and is formed on a wall surface disposed in a radial direction of the dust collecting container among wall surfaces of the dust collecting container that define the accommodation space.

3. The cleaner station of claim 1, wherein the inlet port has a predetermined area and is formed in a wall surface disposed in a radial direction of the dust collecting container among wall surfaces of the dust collecting container that define the accommodation space.

4. The cleaner station of claim 1, further comprising:
a mesh net disposed in the discharge port to filter out the dust from the air discharged from the dust collecting container.

5. The cleaner station of claim 1, wherein the discharge air moving part comprises:

a dust collecting motor connection part configured to communicate with the dust collecting motor so that the air discharged from the dust collecting container moves toward the dust collecting motor; and
a prefilter disposed on the dust collecting motor connection part to filter out the dust from the air discharged from the dust collecting container.

6. The cleaner station of claim 1, wherein the discharge air moving part comprises a suction flow path connection part disposed so that one end thereof is connected to the suction flow path, and the other end thereof is connected to the inlet port.

7. The cleaner station of claim 1, wherein the housing comprises a major axis extending in an upward/downward direction, the dust collecting container is disposed outside and above the housing, and the longitudinal axis of the dust collecting container is disposed in parallel with the major axis.

8. The cleaner station of claim 1, wherein the rotary unit comprises:

a rotary shaft provided in the dust collecting container and disposed in the longitudinal direction of the dust collecting container; and
a rotary plate coupled to the rotary shaft so as to rotate together with the rotary shaft and disposed in a space between the rotary shaft and an inner radial peripheral surface of the dust collecting container.

9. The cleaner station of claim 8, wherein the rotary shaft rotates in a first direction and then rotates in a second direction opposite to the first direction after the dust between the rotary plate and the compression plate is compressed.

10. The cleaner station of claim 8, wherein the rotary unit further comprises a scrubber coupled to the rotary plate and provided to be in contact with an inner peripheral surface of the dust collecting container.

11. The cleaner station of claim 10, wherein a height from a lower end surface in the dust collecting container to a lower end of the scrubber is smaller than a height from the lower end surface to a lower end of the discharge port, and a height from the lower end surface to an upper end of the scrubber is larger than a height from the lower end surface to an upper end of the discharge port.

12. The cleaner station of claim 8, further comprising:
a dust compression motor connected to the rotary shaft and configured to operate to provide rotational power to the rotary shaft.

13. The cleaner station of claim 12, wherein the dust compression motor is disposed outside the dust collecting container and configured to be separable from the dust collecting container.

14. A cleaner station, which sucks and collects dust in a dust bin of a cleaner, the cleaner station comprising:

a cylindrical dust collecting container including an inlet port into which air is introduced, and a discharge port through which the air is discharged, the cylindrical dust collecting container being configured to provide an accommodation space for captured dust;
a dust collecting motor disposed below the dust collecting container and configured to provide a suction force in the dust bin so that the dust is introduced into the dust collecting container through the inlet port;
a scrubber disposed in the dust collecting container and configured to rotate about a longitudinal axis of the dust collecting container, the scrubber being configured to rotate in a state in which the scrubber is in contact with an inner peripheral surface of the dust collecting container; and
a mesh net disposed in the discharge port to filter out the dust from the air discharged from the dust collecting container,
wherein the mesh net is disposed in a partial region of a wall surface that is in contact with the rotating scrubber among wall surfaces of the dust collecting container that define the accommodation space.

15. The cleaner station of claim 14, wherein the discharge port has a predetermined area and is formed on a wall surface disposed in a radial direction of the dust collecting container among wall surfaces of the dust collecting container that define the accommodation space.

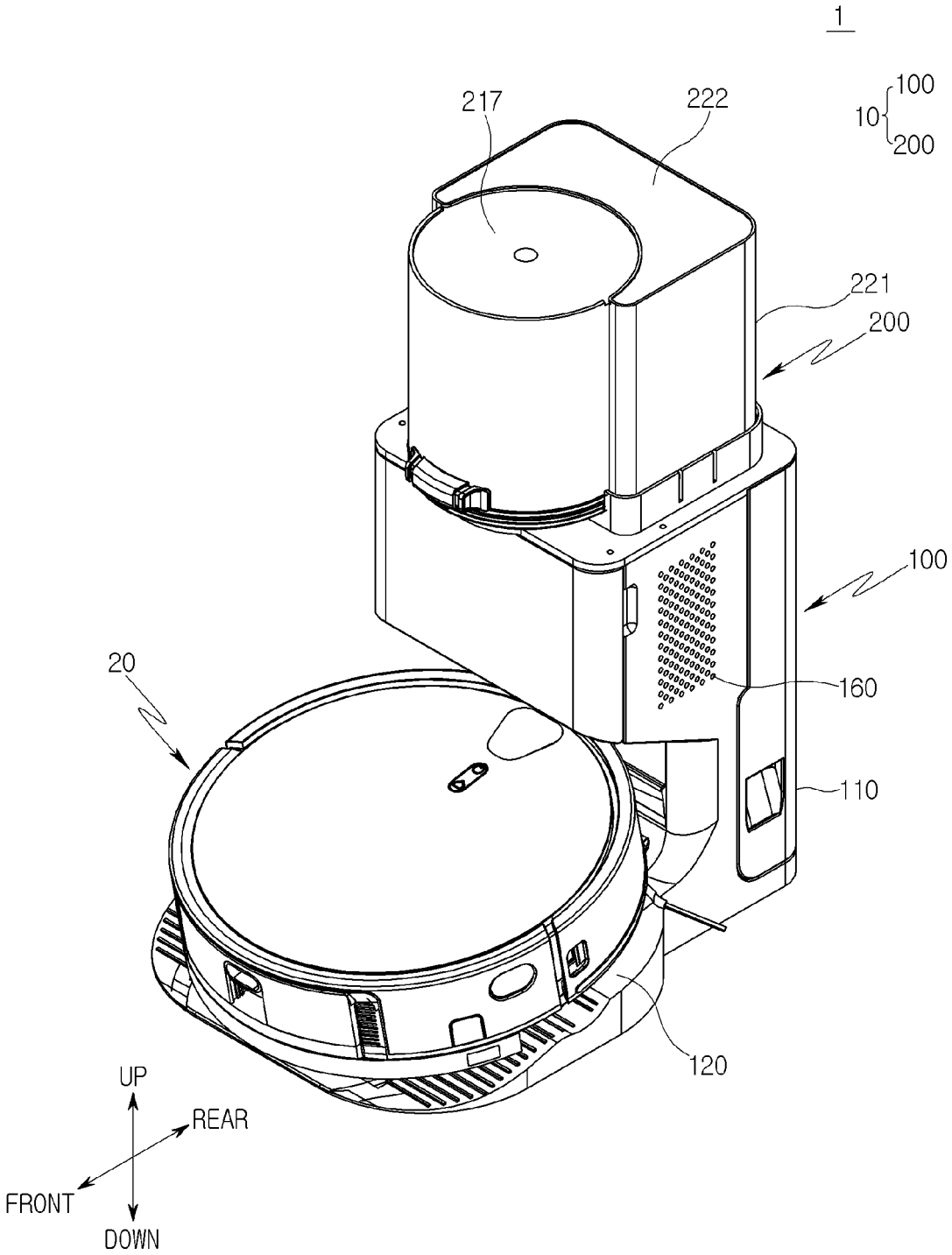
16. The cleaner station of claim 14, further comprising:

a rotary shaft provided in the dust collecting container and disposed in a longitudinal direction of the dust collecting container; and
a rotary plate having one end coupled to the rotary shaft and the other end coupled to the scrubber, the rotary plate being configured to rotate together with the rotary shaft.

17. The cleaner station of claim 16, comprising:

a compression plate disposed in the dust collecting container and disposed in a state of being fixed to one side in the dust collecting container,
wherein the rotary plate rotates in a direction toward the compression plate and compresses dust between the rotary plate and the compression plate.

[FIG. 1]


1
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222
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200
221
200
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110
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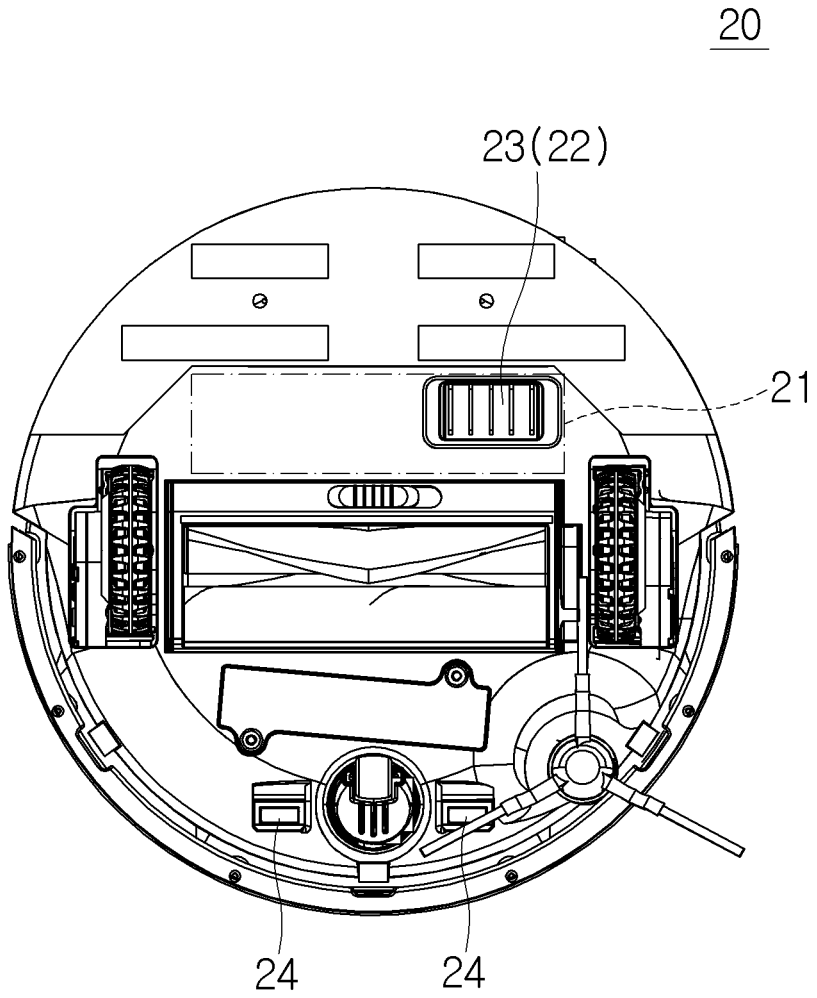
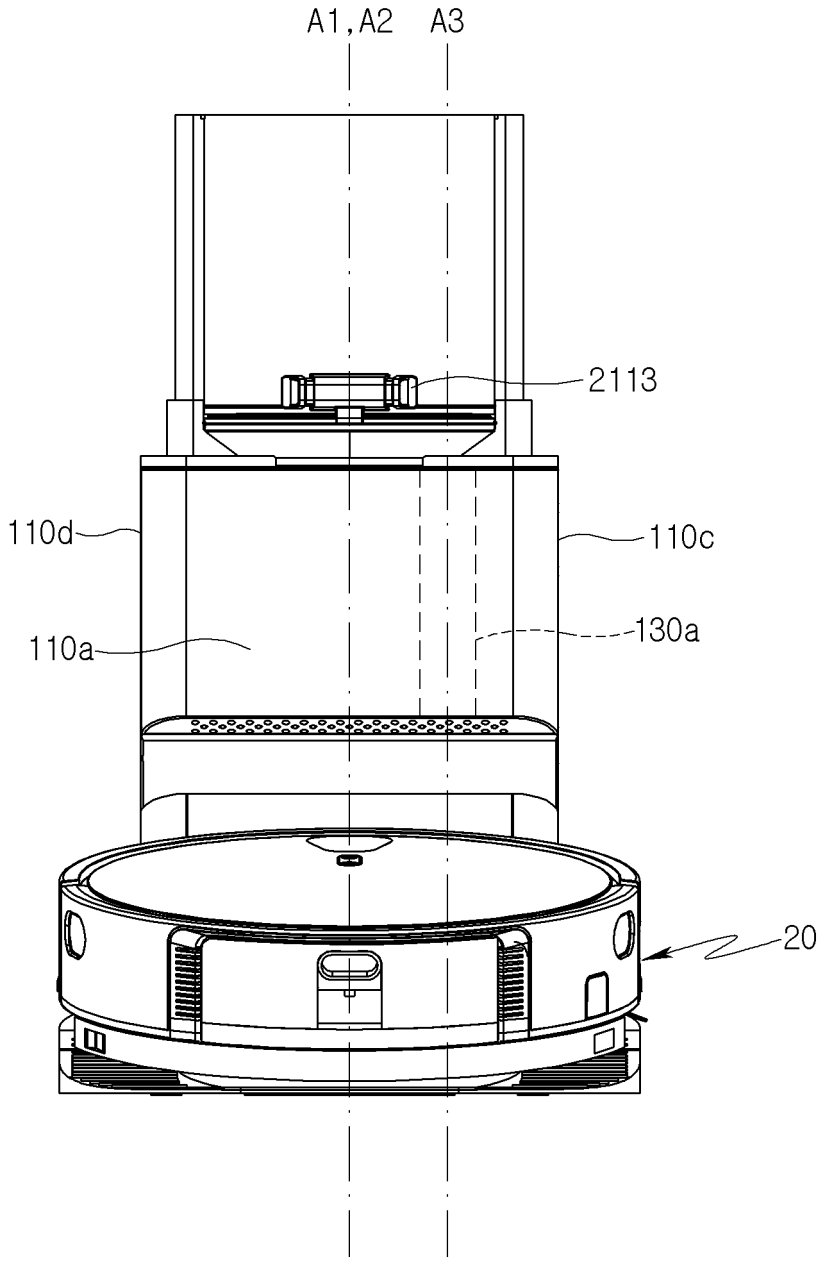
UP
REAR
FRONT
DOWN

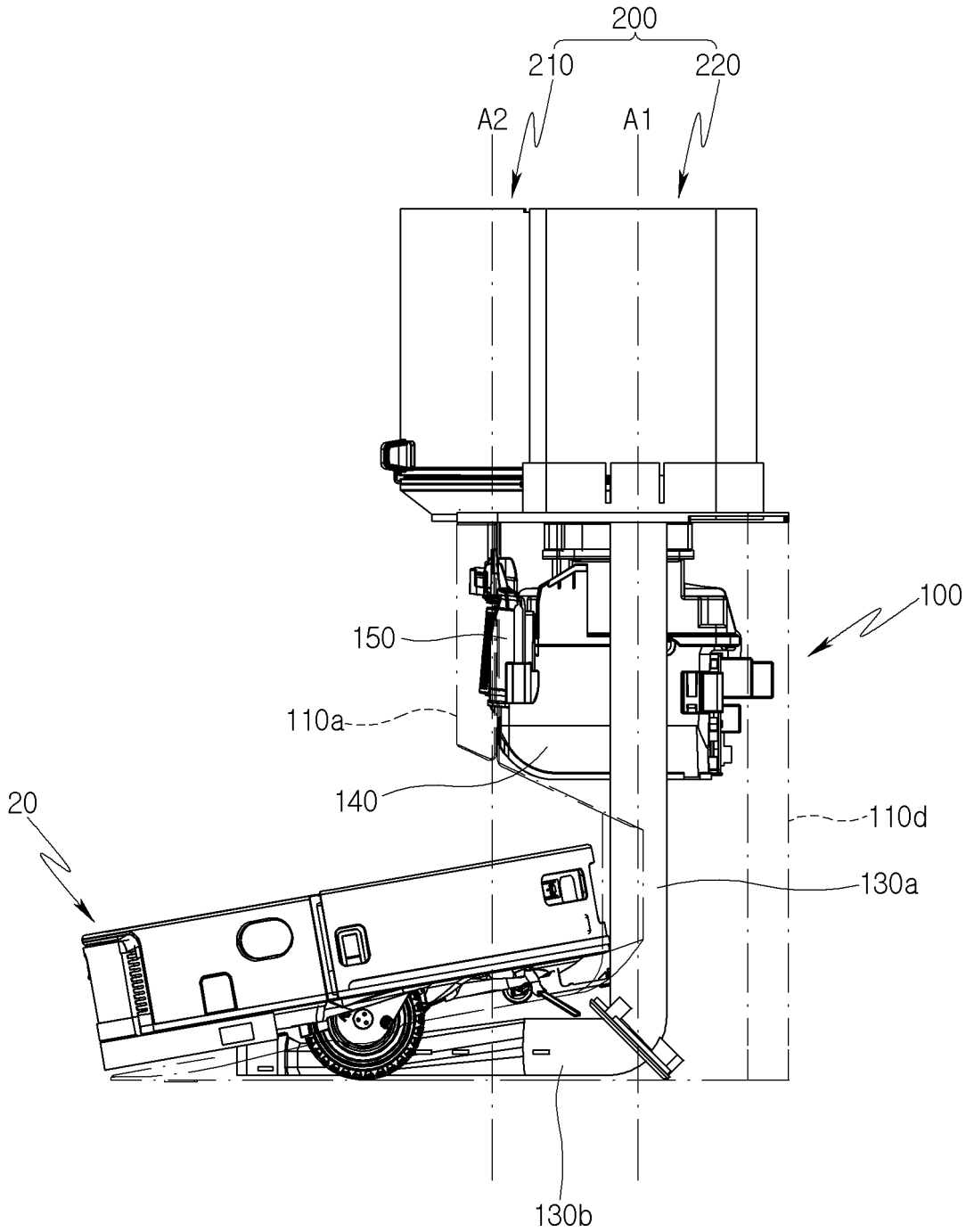
[FIG. 2]



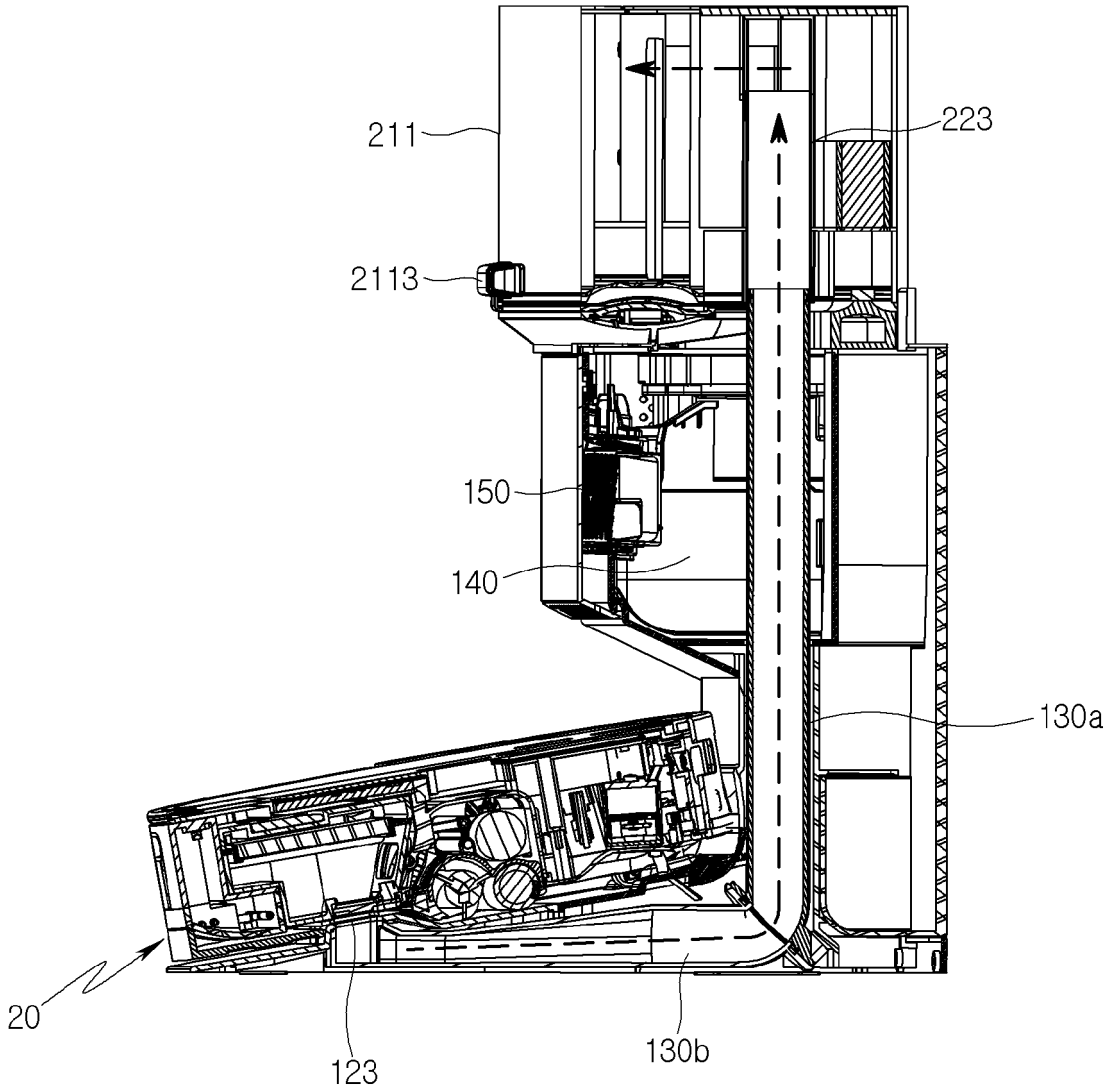
[FIG. 3]



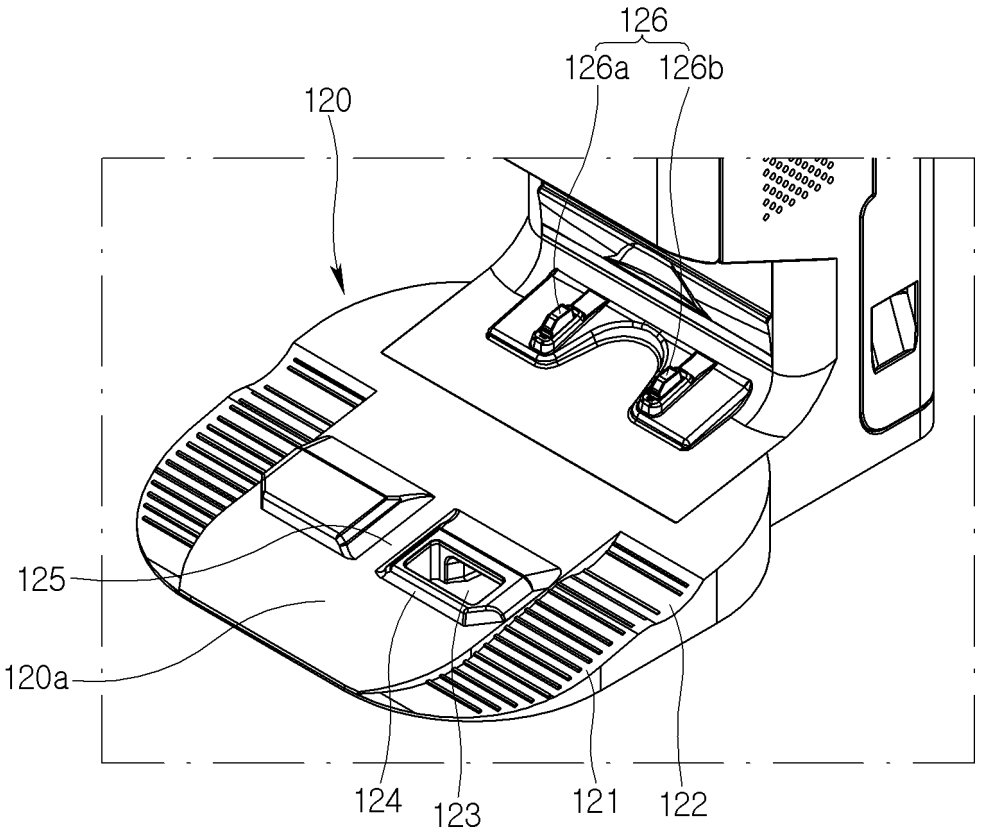
[FIG. 4]



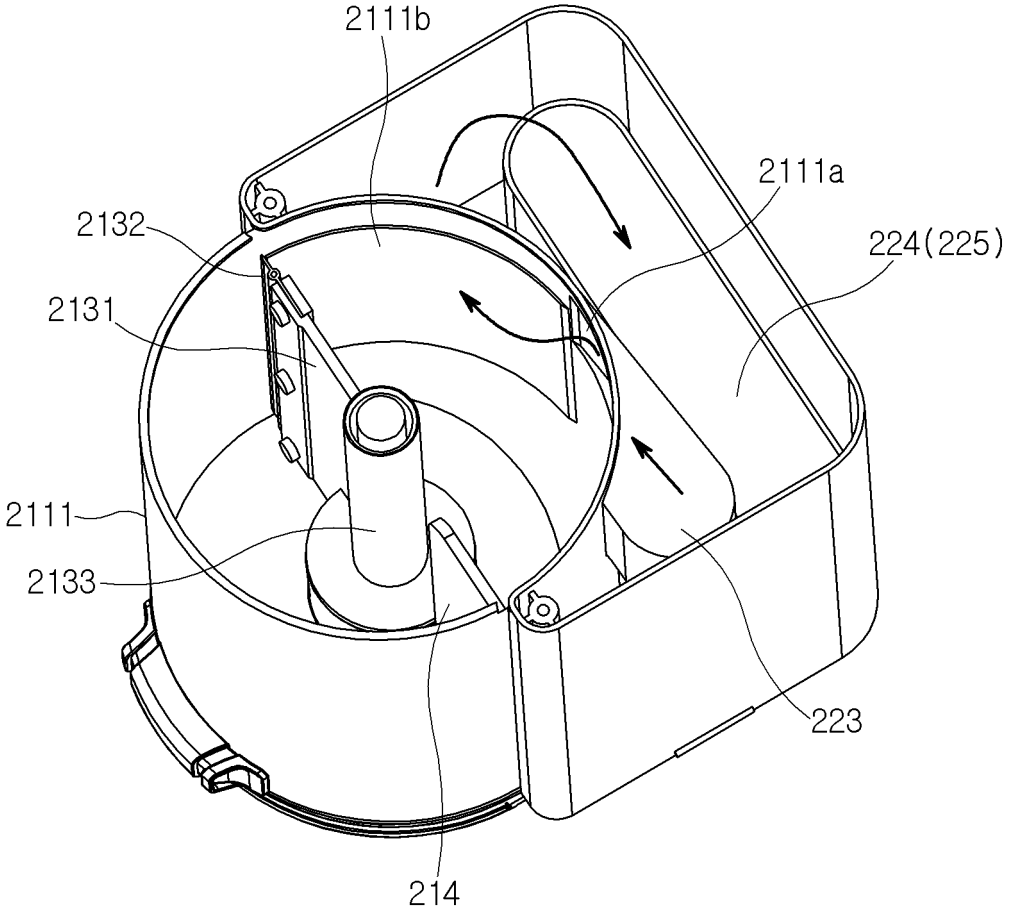
[FIG. 5]



[FIG. 6]



[FIG. 7]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2111
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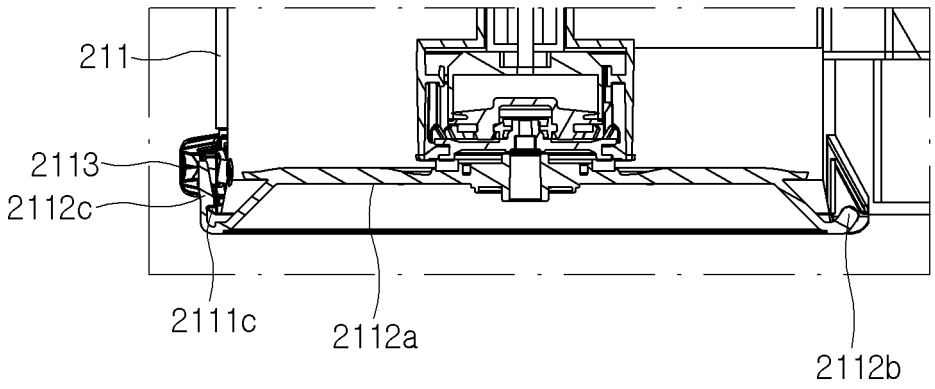
[FIG. 8]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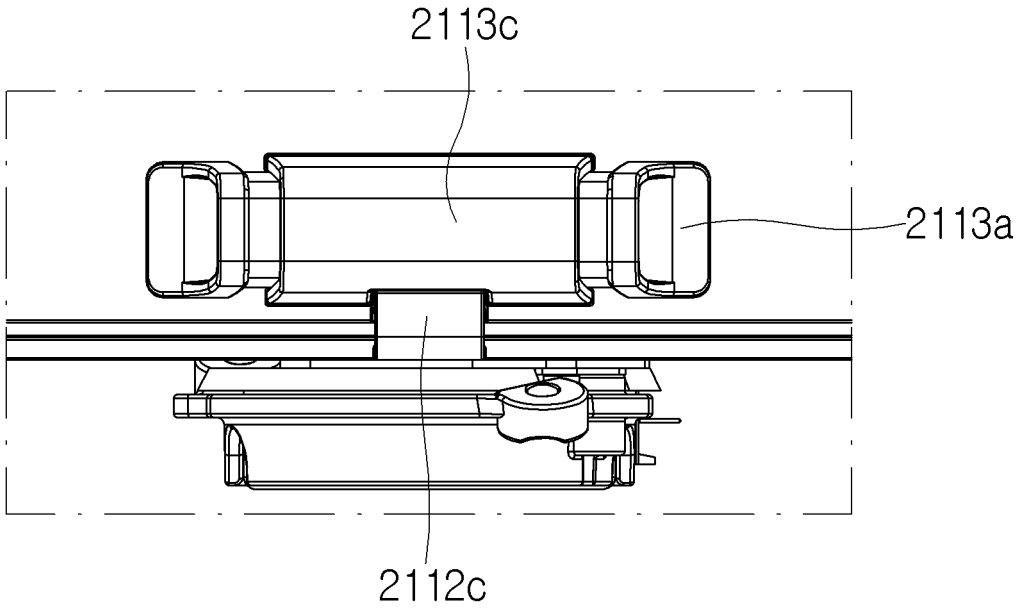
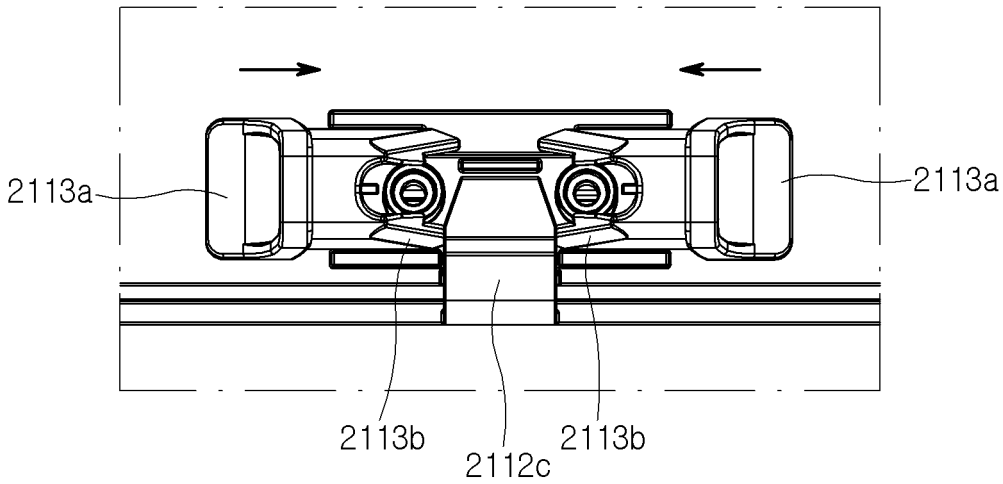
2112b

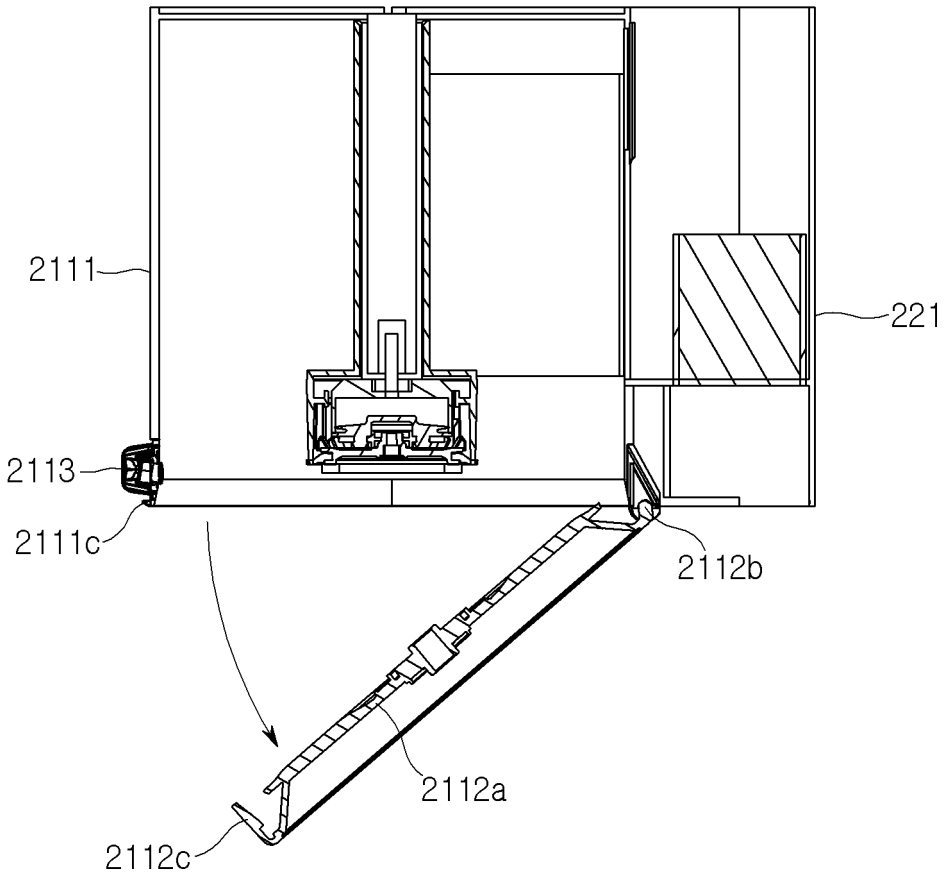
[FIG. 9]



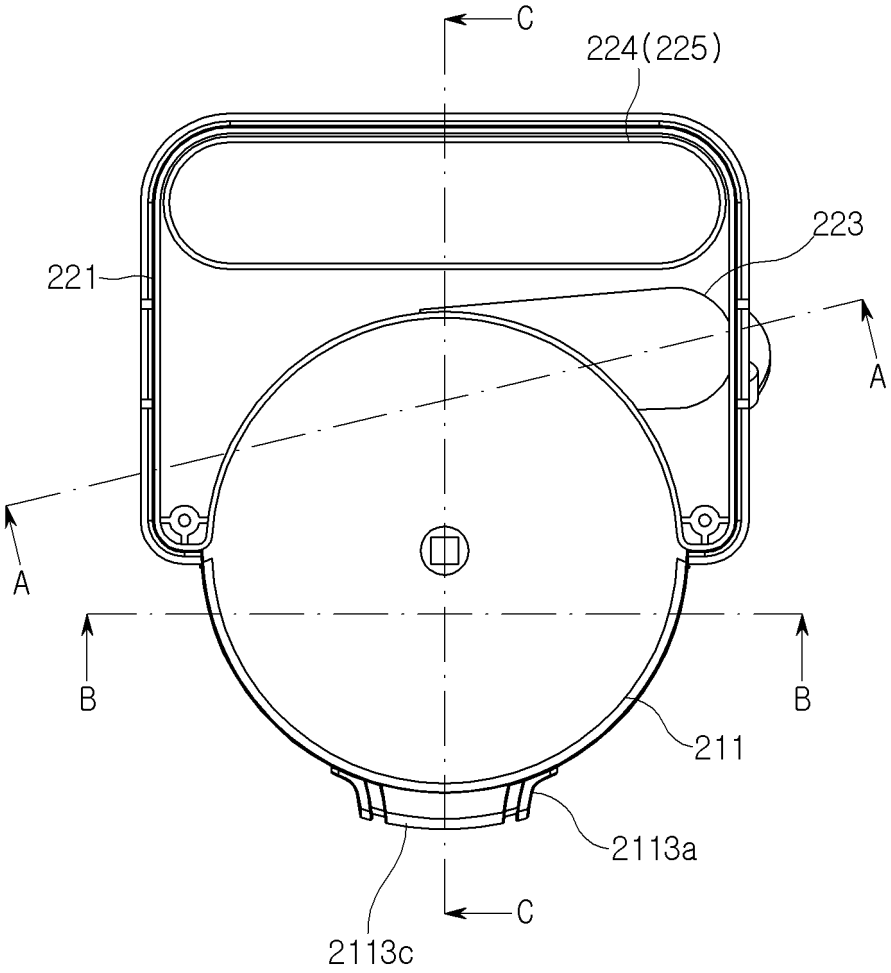
[FIG. 10]



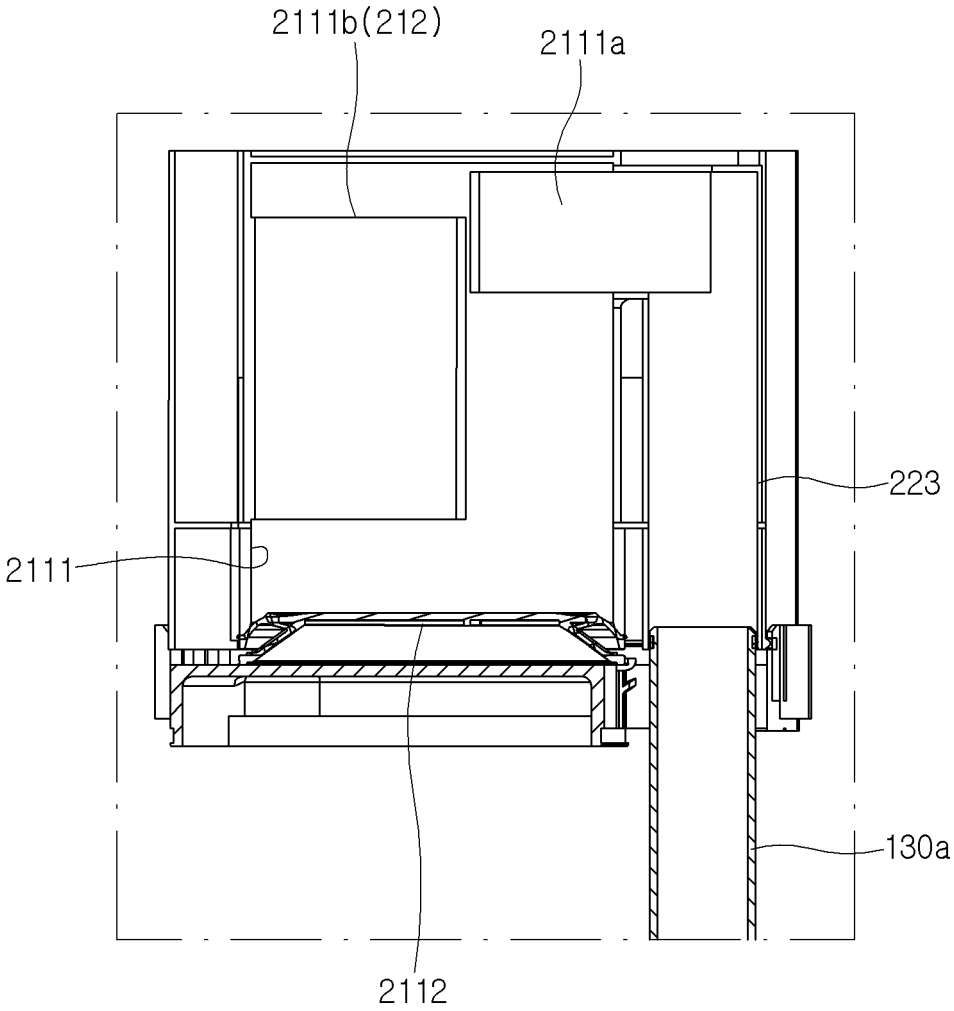
[FIG. 11]



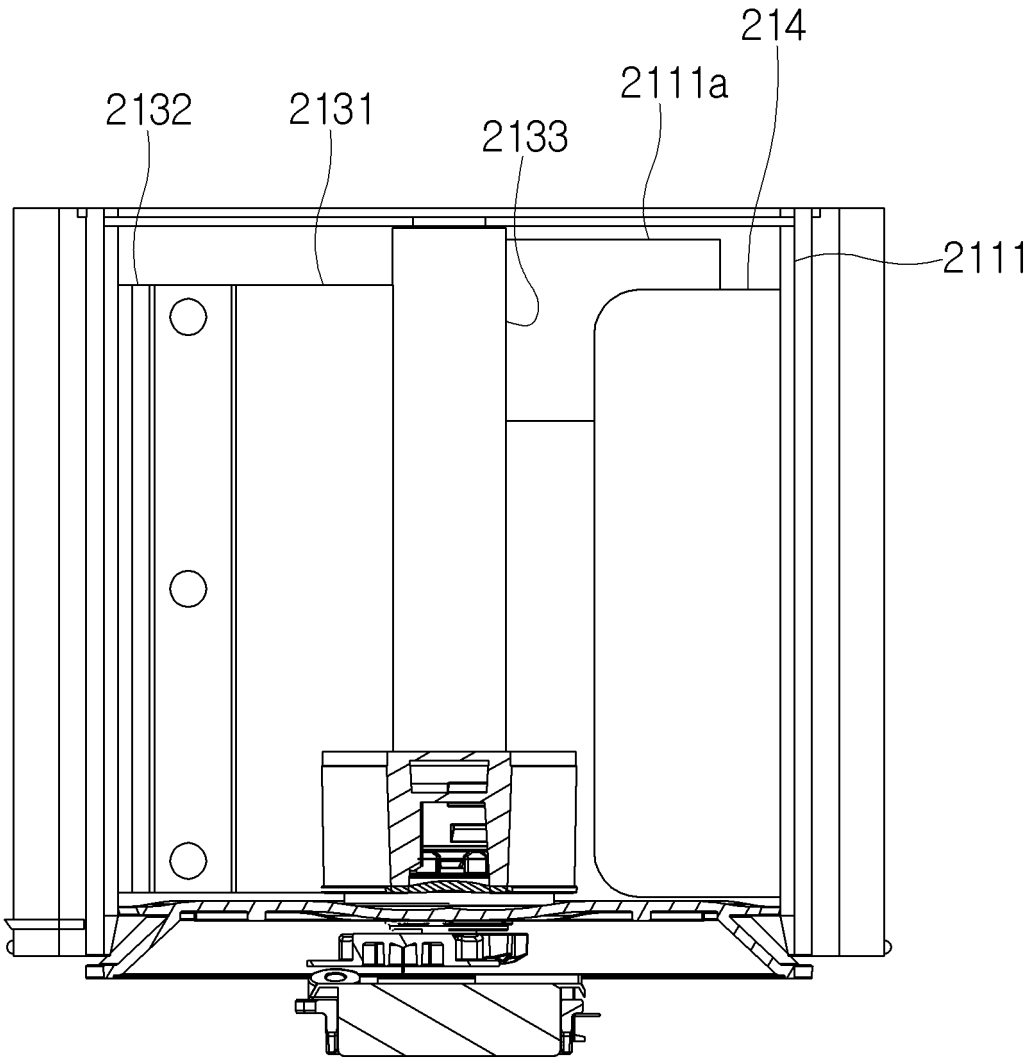
[FIG. 12]



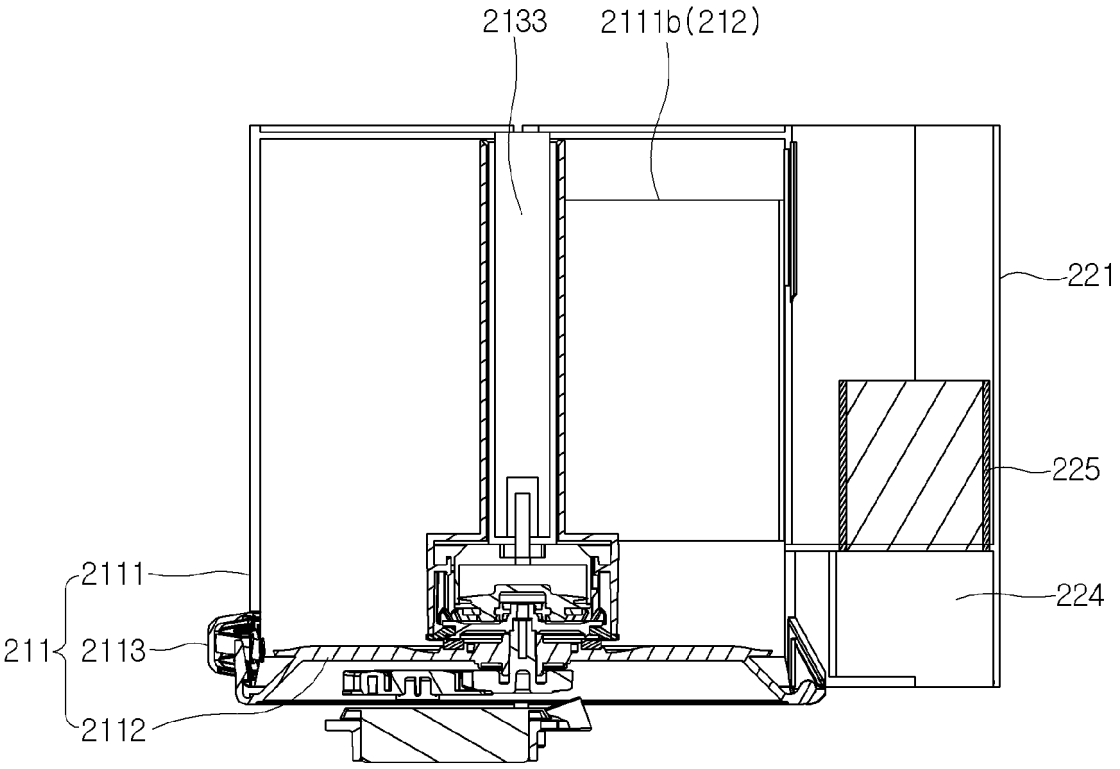
[FIG. 13]



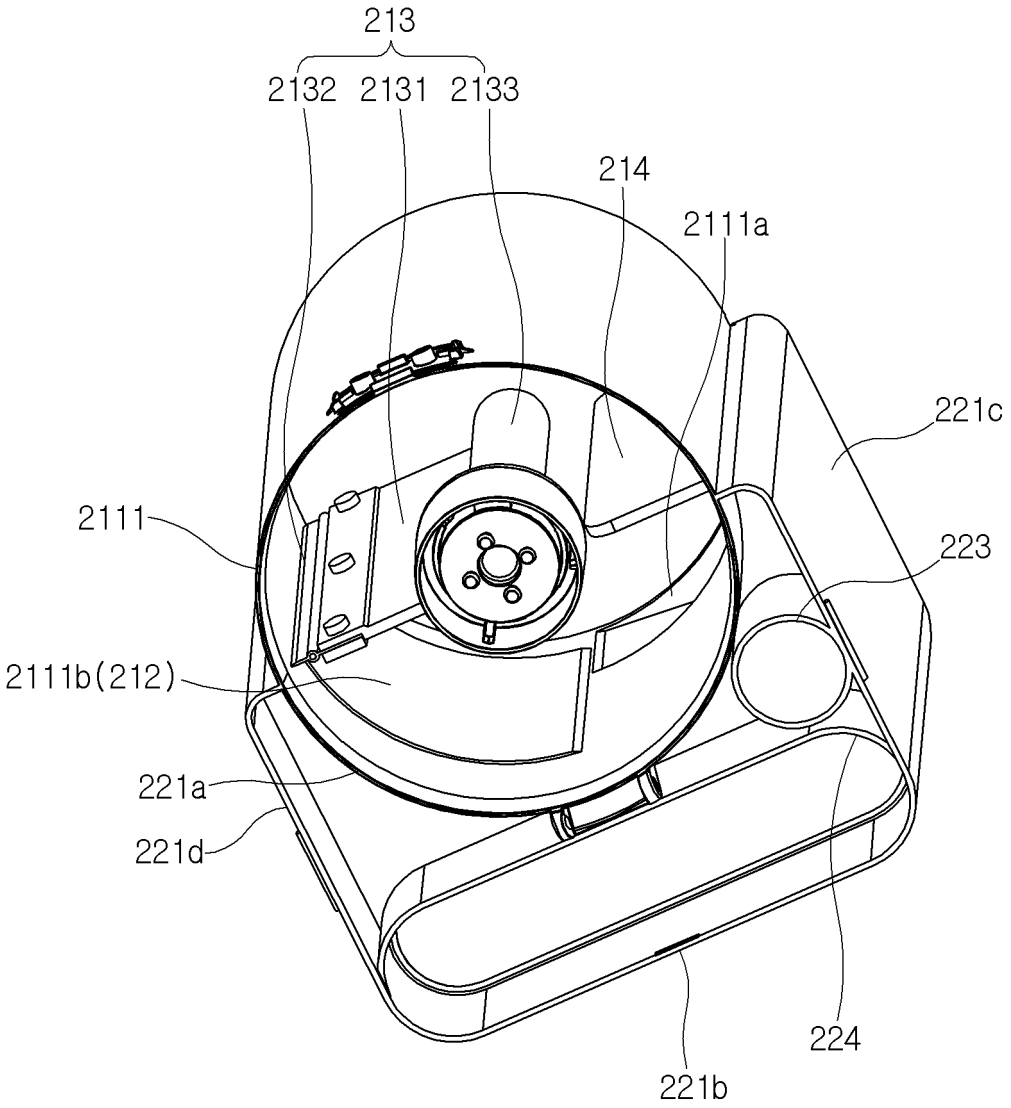
[FIG. 14]



[FIG. 15]



[FIG. 16]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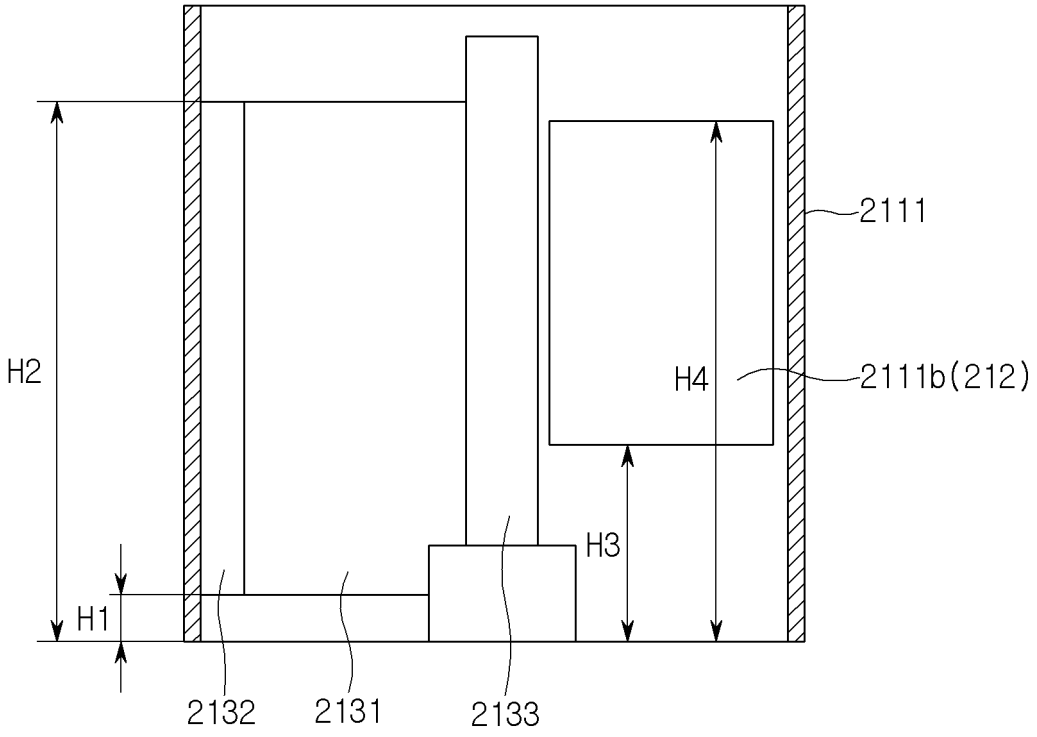
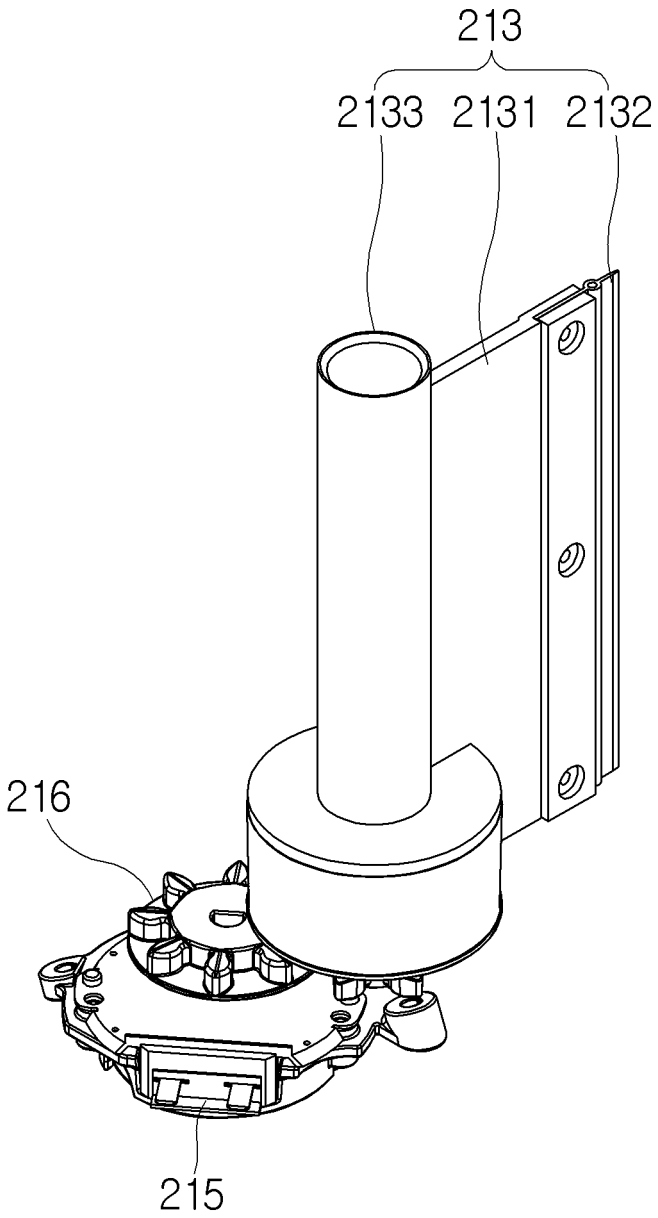
221a
221d
224
221b

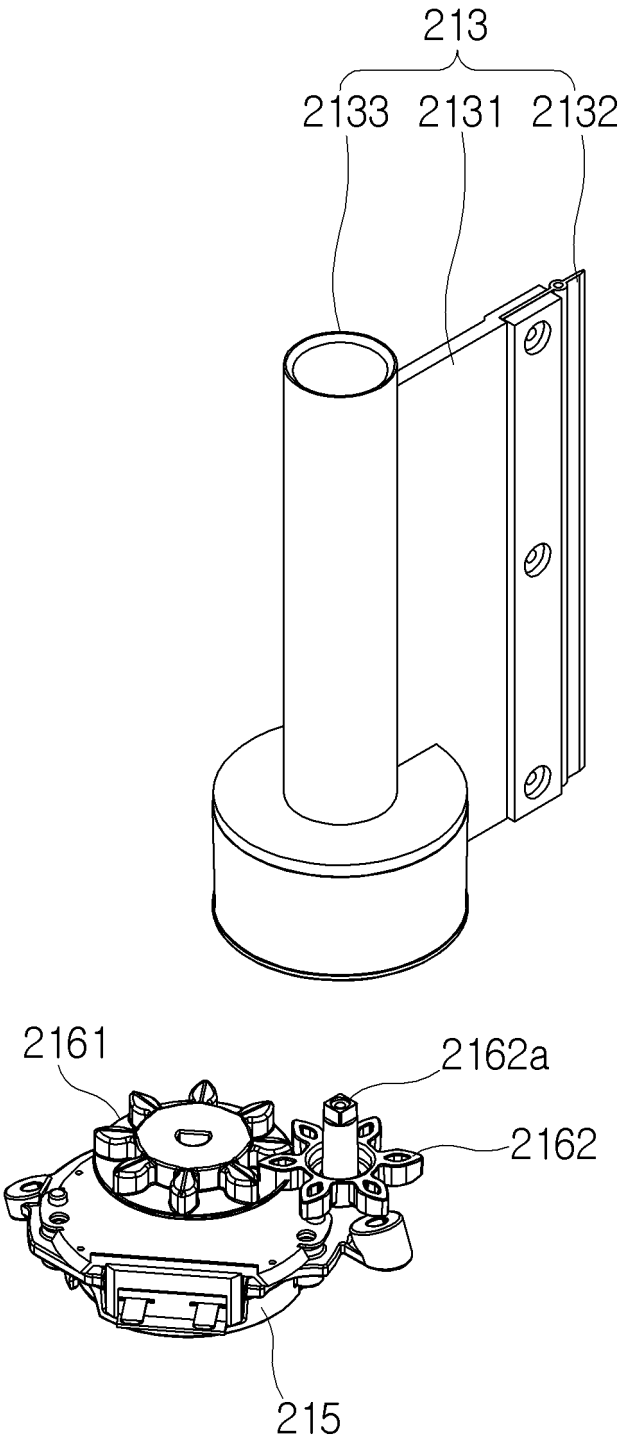
[FIG. 17]



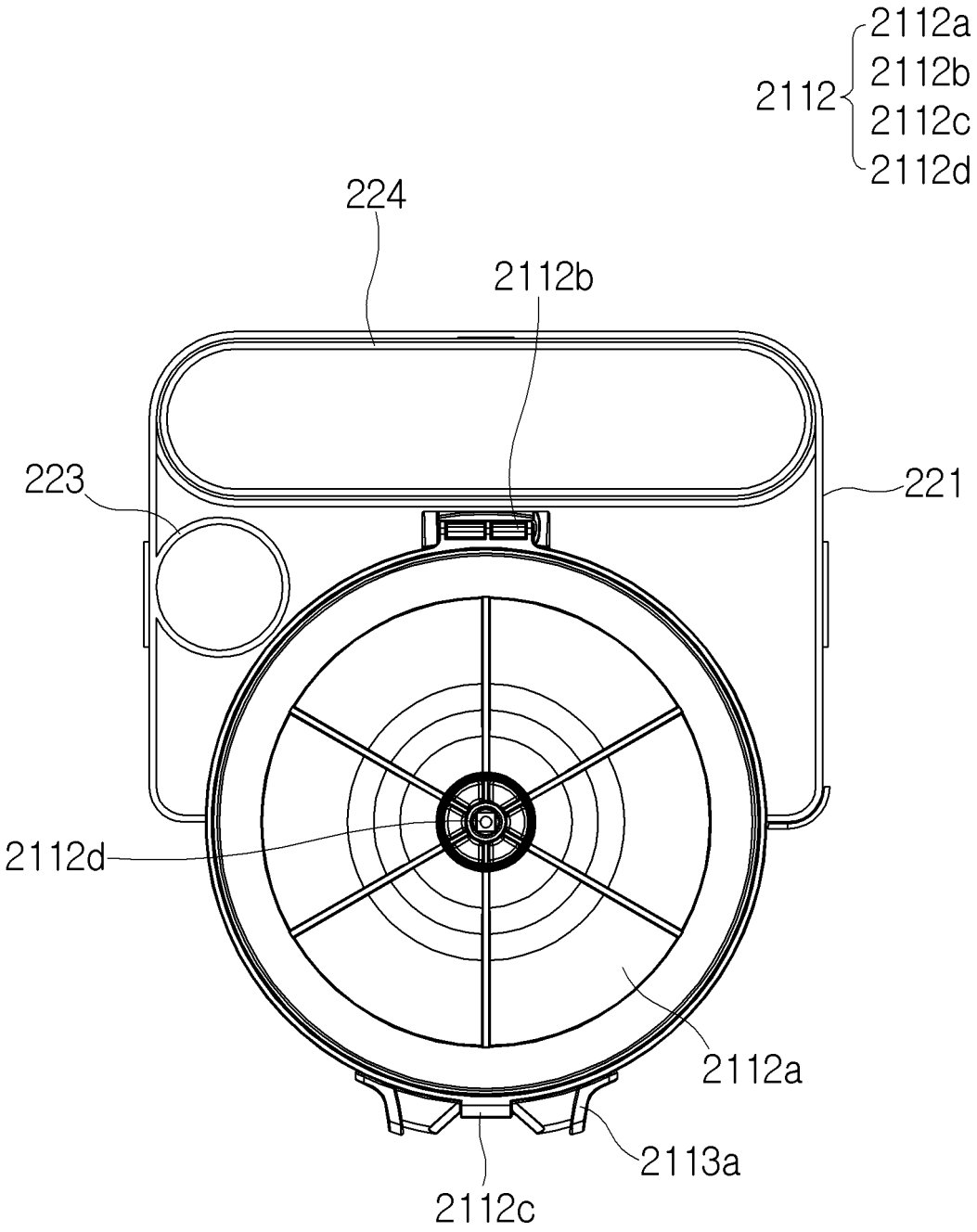
[FIG. 18]



[FIG. 19]



[FIG. 20]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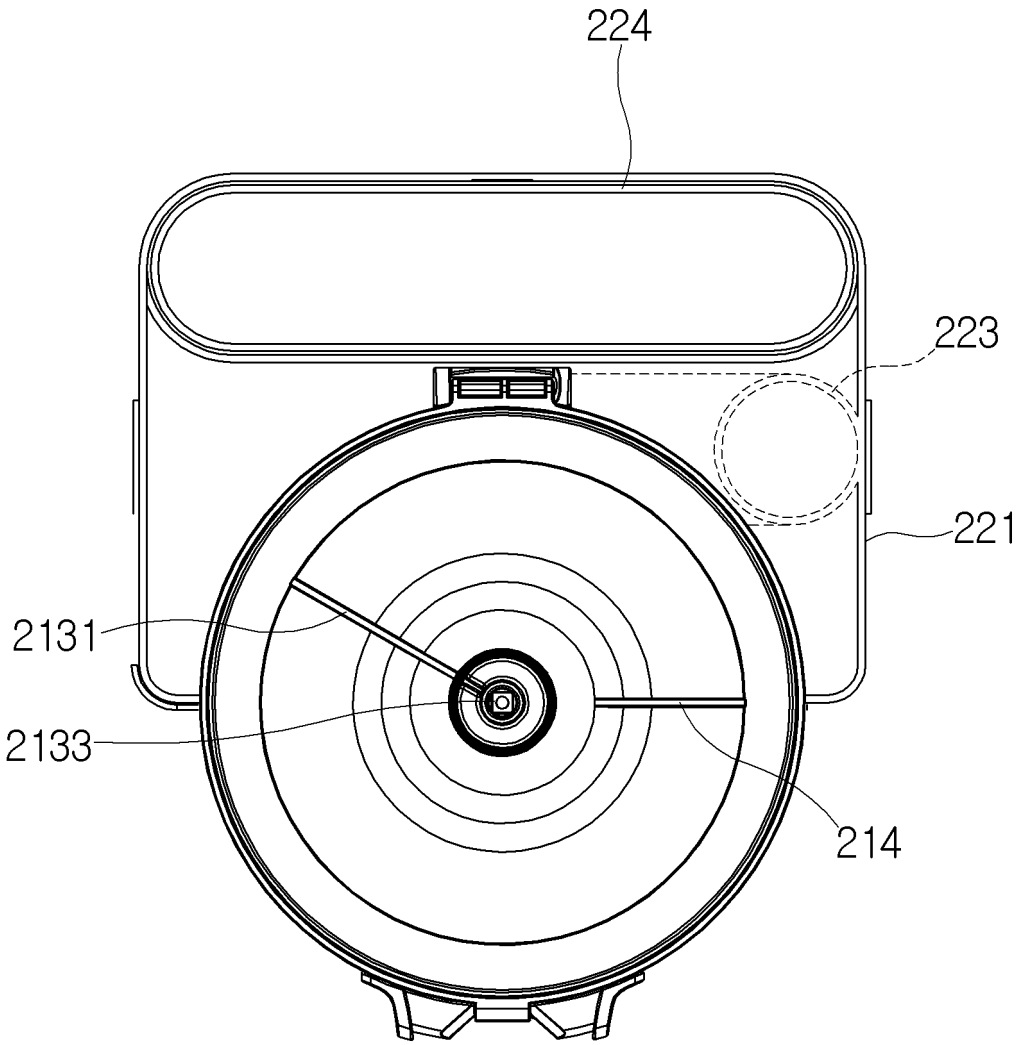
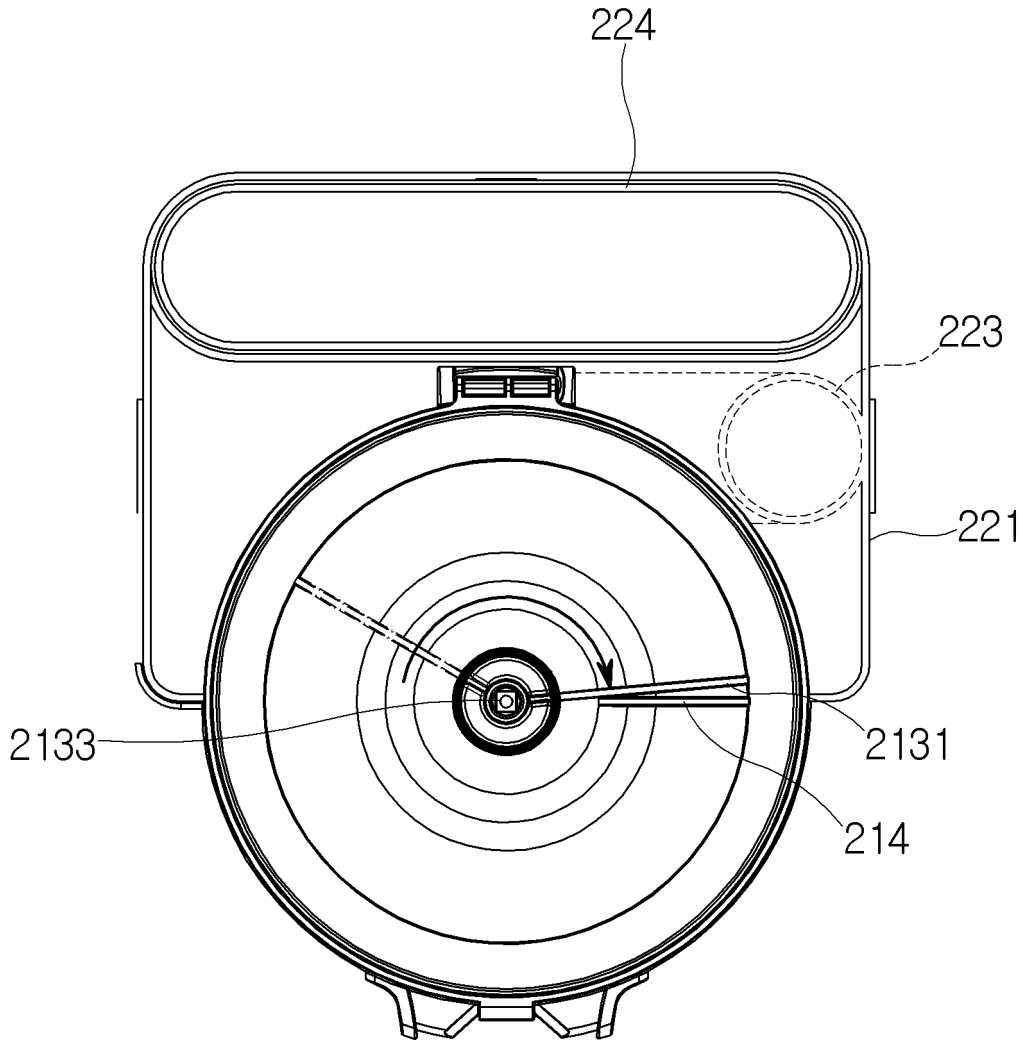
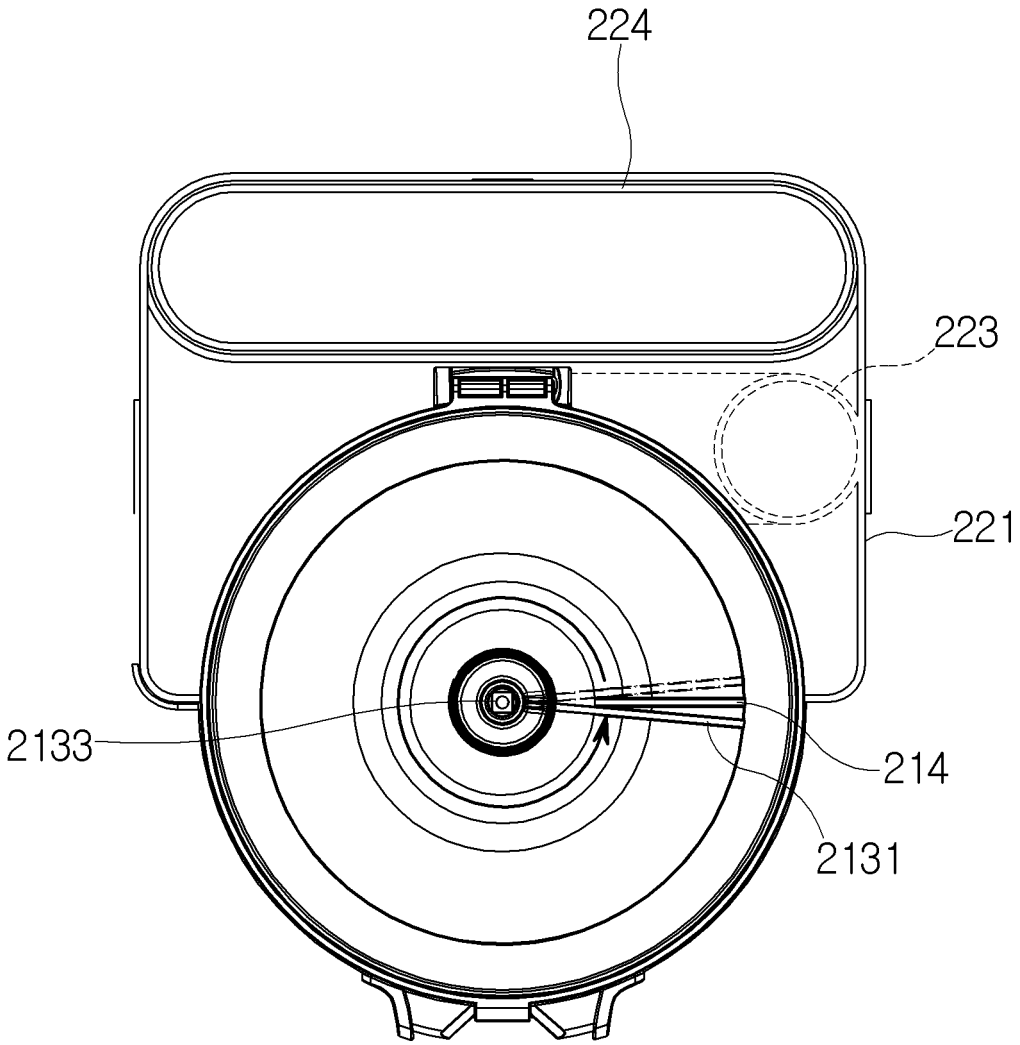
[FIG. 21]



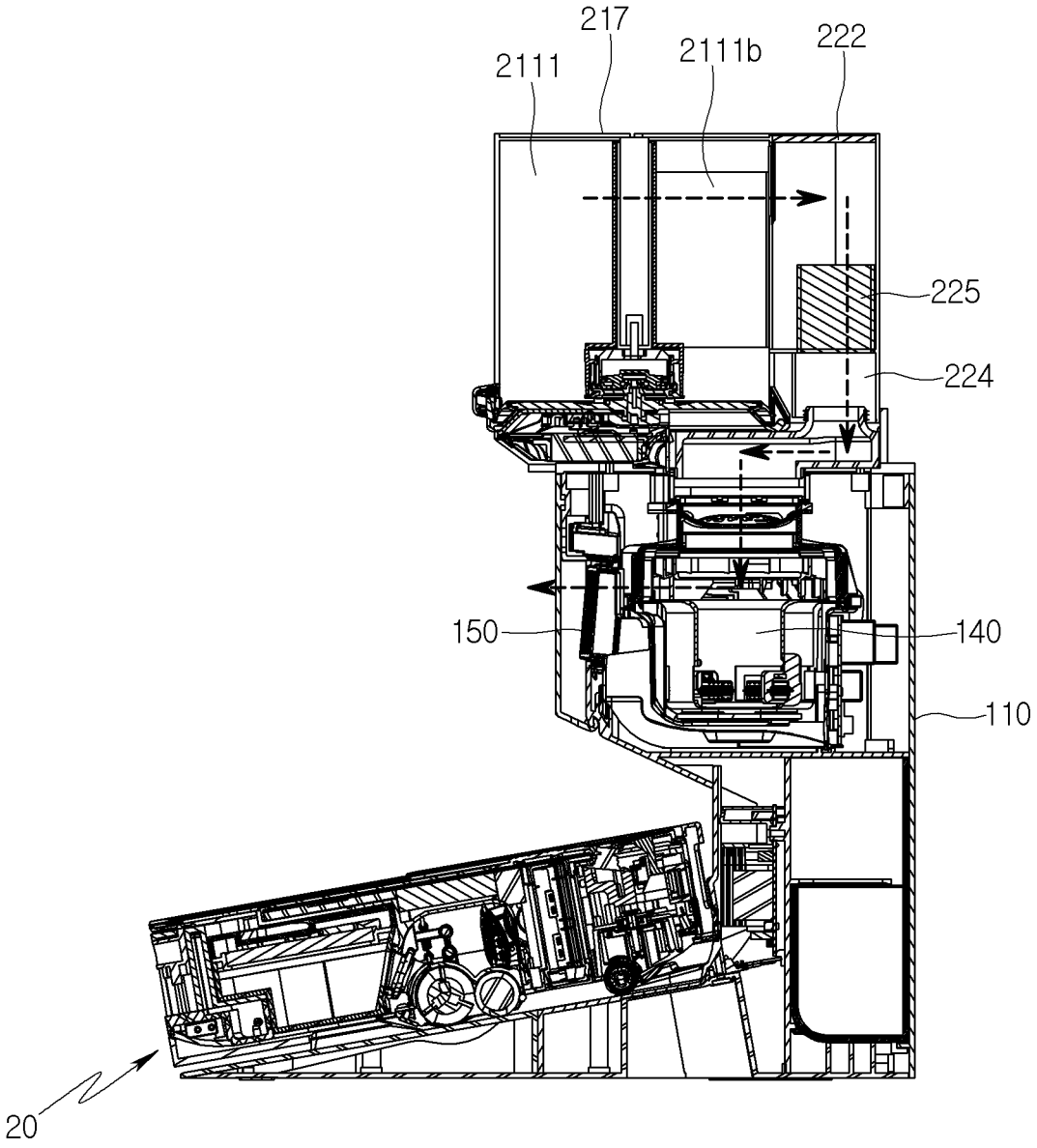
[FIG. 22]



[FIG. 23]



[FIG. 24]



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Patent documents cited in the description

- KR 20200074001 **[0010]**
- US 10595692 B **[0014]**