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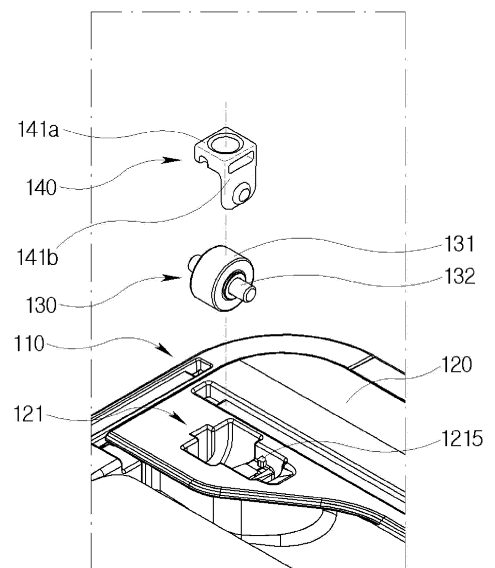
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(54) **VACUUM CLEANER**

(57) The present disclosure relates to a cleaner including a cleaner head including a roller configured to assist the cleaner in traveling on a cleaning surface, and a roller cover configured to prevent the roller from being withdrawn from the cleaner and configured to be easily separated, such that a user may easily replace the roller capable of being disposed on a lower surface of the cleaner head and easily remove foreign substances accumulated on the roller, thereby maintaining traveling performance of the roller, preventing damage to components, and reducing maintenance costs and time required for the roller.

[FIG. 2]



EP 4 491 077 A1

Description**[Technical Field]**

[0001] The present disclosure relates to a cleaner configured to perform a cleaning operation while traveling on a cleaning surface, and more particularly, to a cleaner having a structure in which a roller configured to assist the cleaner in traveling on a cleaning surface during a cleaning operation may be separated.

[Background Art]

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

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

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

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

[0006] The handy cleaner (hand vacuum cleaner) has maximized portability and is light in weight. However, because the handy cleaner has a short length, there may be a limitation to a cleaning surface. 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] Methods of cleaning floors are broadly classified into a dry-cleaning method and a wet-cleaning method. The dry-cleaning method refers to a method of wiping up or sucking dust, and a vacuum cleaner in the related art uses the dry-cleaning method. The wet-cleaning method refers to a method of performing a cleaning

operation by wiping up the dust with a wet mop rag. As another wet-cleaning method, there is a method of sterilizing and cleaning a floor by producing and spraying high-temperature steam.

[0009] In general, a roller may be disposed on a lower surface of the cleaner and assist the traveling of the cleaner while coming into direct contact with the cleaning surface. However, the component, such as the roller, may be contaminated and abraded as the cleaner is used consistently, and foreign substances, such as hairs, may be tangled around the component, which degrades traveling performance or causes noise. In this case, the entire configuration including the corresponding component needs to be disassembled, separated, and replaced.

[0010] In addition, in case that the cleaner is continuously used in the state in which the traveling performance of the roller is degraded by foreign substances such as hairs, an excessive load is applied to the roller, which causes a concern that the roller is damaged.

[0011] In addition, a skilled technician is sometimes required to separate and replace the roller, which inconveniences a cleaner user and incurs labor costs.

[0012] Therefore, there is a need for a cleaner head including a structure that allows the roller, which assists the cleaner in traveling on the cleaning surface, to be easily replaced.

[Disclosure]**[Technical Problem]**

[0013] The present invention has been made in an effort to solve the above-mentioned problem in the related art, and an object of the present invention is to provide a cleaner having a structure capable of allowing a roller, which may be disposed on a lower surface of a cleaner head, to be easily replaced, easily removing foreign substances accumulated on the roller, maintaining traveling performance of the roller, preventing damage to a component, simplifying maintenance of the cleaner, and reducing costs and time.

[0014] Technical problems of the present disclosure are not limited to the aforementioned technical problems, and other technical problems, which are not mentioned above, may be clearly understood by those skilled in the art from the following descriptions.

[Technical Solution]

[0015] In order to achieve the above-mentioned object, a cleaner head according to an embodiment of the present disclosure includes: a housing configured to define an external appearance and having a space therein; a cleaning member disposed in the space in the housing and configured to clean a cleaning surface; a lower cover configured to cover a lower side of the housing and having a lower surface in which a roller accommodation

portion is recessed; a roller separably coupled in the roller accommodation portion, rotatably provided, and configured to roll on the cleaning surface; and a roller cover having a flat plate shape separably coupled to the roller accommodation portion and the roller and configured to prevent the roller from being withdrawn.

[0016] In this case, the roller accommodation portion may include a cover groove recessed vertically, the roller cover may include: a cover main body disposed in parallel with the lower cover; and a cover coupling portion disposed perpendicularly to the cover main body, and the cover coupling portion may be disposed at one end of the cover main body and vertically inserted into the cover groove.

[0017] In addition, the roller accommodation portion may include a hook groove horizontally recessed in an inner wall of the cover groove, the cover coupling portion may include a cover hook protruding horizontally, and the cover hook may be separably coupled to the hook groove and disposed at a position that faces the hook groove.

[0018] In addition, the roller may include: a roller main body having a cylindrical shape; and a roller shaft disposed to penetrate a rotation center of the roller main body, and the lower cover may include: a roller groove having an inner wall recessed to define a curved surface in the roller accommodation portion so that a part of the roller main body is inserted into the roller groove; one or more roller shaft grooves each having an inner wall recessed to define a curved surface in the roller accommodation portion so that a part of the roller shaft is inserted into the roller shaft groove; and a cover support protruding vertically in the roller accommodation portion and configured to support the cover main body.

[0019] Further, the roller cover may further include: a shaft support groove having an inner wall vertically recessed to define a curved surface at a lower side of the cover main body so that a part of the roller shaft is vertically inserted into the shaft support groove; and a cover support groove recessed vertically at the lower side of the cover main body so that the cover support is vertically inserted into the cover support groove.

[0020] In addition, the roller shaft and the cover support may block a horizontal movement of the cover main body, and a direction in which the roller shaft blocks the horizontal movement of the cover main body and a direction in which the cover support blocks the horizontal movement of the cover main body may be orthogonal to each other.

[0021] Further, the roller accommodation portion may further include a separation assisting groove recessed at a side opposite, in a horizontal direction, to a position at which the roller is disposed based on the cover coupling portion, at least a part of the cover coupling portion may be exposed to an internal space of the separation assisting groove, and the cover hook may be moved horizontally and separated from the hook groove when an external force is applied in the horizontal direction to a part of the exposed cover coupling portion.

[0022] Further, a first cover groove may be recessed in a part of the cover coupling portion exposed toward the separation assisting groove.

[0023] In this case, the separation assisting groove may have an inclined surface formed such that a depth thereof increases as the distance from the cover coupling portion decreases.

[0024] Meanwhile, a second cover groove may be recessed in a lower surface of the cover main body.

[0025] Meanwhile, the structure according to the present disclosure may also be applied to a robot cleaner.

[0026] A robot cleaner according to the present disclosure may include: a housing configured to define an external appearance and having a space; a cleaning member disposed in the space in the housing and configured to clean a cleaning surface; a lower cover configured to cover a lower side of the housing and having a lower surface in which a roller accommodation portion is recessed; a roller separably coupled in the roller accommodation portion, rotatably provided, and configured to roll on the cleaning surface; and a roller drive motor separably connected to the roller and configured to transmit a rotational force to the roller to rotate the roller; a roller cover having a flat plate shape, separably coupled to the roller accommodation portion and the roller, and configured to prevent the roller from being withdrawn; and a controller configured to control the cleaning member and the roller drive motor to control cleaning and traveling operations.

[0027] Other detailed matters of the exemplary embodiment are included in the detailed description and the drawings.

[Advantageous Effects]

[0028] The cleaner of the present disclosure has one or more of the following effects.

[0029] The cleaner head according to the present disclosure includes the roller configured to assist the cleaner head in traveling on the cleaning surface, and the roller cover configured to prevent the roller from being withdrawn from the cleaner and configured to be easily separated. Therefore, the user may easily replace the roller capable of being disposed on the lower surface of the cleaner head and easily remove foreign substances accumulated on the roller, thereby maintaining the traveling performance of the roller, preventing damage to the components, and reducing maintenance costs and time required for the cleaner.

[0030] The effects of the present disclosure are not limited to the aforementioned effects, and other effects, which are not mentioned above, will be clearly understood by those skilled in the art from the claims.

[Description of Drawings]

[0031]

FIG. 1 is a perspective view of a cleaner head according to an embodiment of the present disclosure. FIG. 2 is an exploded view of the cleaner head according to the embodiment of the present disclosure.

FIG. 3 is a perspective view of a roller cover of the cleaner head according to the embodiment of the present disclosure.

FIGS. 4 to 6 are views illustrating the roller cover of the cleaner head according to the embodiment of the present disclosure when viewed at various angles.

FIG. 7 is a view illustrating the cleaner head according to the embodiment of the present disclosure when viewed from below.

FIG. 8 is a view for explaining a roller accommodation portion formed in the cleaner head according to the embodiment of the present disclosure.

FIG. 9 is a cross-sectional view of the roller accommodation portion formed in the cleaner head according to the embodiment of the present disclosure.

FIG. 10 is a cross-sectional view illustrating a state in which a roller and the roller cover are coupled to the cleaner head according to the embodiment of the present disclosure.

FIG. 11 is a view for explaining a state in which the roller and the roller cover are applied to a robot cleaner according to another embodiment of the present disclosure.

FIG. 12 is a view for explaining a state in which the roller and the roller cover are applied to a wet cleaner according to still another embodiment of the present disclosure.

[Mode for Invention]

[0032] Advantages and features of the present disclosure and methods of achieving the advantages and features will be clear with reference to embodiments described in detail below together with the accompanying drawings. However, the present disclosure is not limited to the embodiments disclosed herein but will be implemented in various forms. The embodiments of the present disclosure are provided so that the present disclosure is completely disclosed, and a person with ordinary skill in the art can fully understand the scope of the present disclosure. The present disclosure will be defined only by the scope of the appended claims. Throughout the specification, the same reference numerals denote the same constituent elements.

[0033] Hereinafter, a cleaner head according to the present disclosure will be described with reference to the drawings.

[0034] In the embodiment of the present disclosure, a cleaner may refer to a cleaning device that a user manually manipulates. For example, the cleaner may be a vacuum cleaner. The cleaner may perform a dry cleaning operation and/or wet cleaning operation. The cleaner may refer to a canister cleaner, an upright cleaner, a

handy cleaner, or a stick cleaner.

[0035] In the embodiment of the present disclosure, the cleaner may refer to a cleaning device that automatically performs a cleaning operation. For example, the cleaner may refer to a robot cleaner that is a vacuum cleaner capable of performing a dry cleaning operation and/or a wet cleaning operation.

[0036] The cleaner may include a main body (not illustrated) and a cleaner head 1. The main body (not illustrated) is a constituent element that has a suction motor provided therein and provides a suction force to the cleaner head 1. The cleaner head 1 is a constituent element configured to clean a cleaning surface by using a cleaning member 150.

[0037] The main body may be connected to an extension tube A. The main body may be connected to the cleaner head 1 through the extension tube A. The main body may generate the suction force by means of the suction motor and provide the suction force to the cleaner head 1 through the extension tube A. Outside dust may be introduced into the main body through the cleaner head 1 and the extension tube A.

[0038] The main body may define an external shape, have a space therein, and accommodate main constituent elements. A dust bin, a dust separating part, the suction motor, a filter, a handle, an operating part, and a main battery may be provided in the main body.

[0039] The dust bin is a constituent element configured to store dust. The dust bin may communicate with the dust separating part and store dust separated by the dust separating part.

[0040] The dust separating part communicates with the extension tube A. The dust separating part may separate dust, which is sucked into the dust separating part through the extension tube A, from air.

[0041] The dust separating part may communicate with the dust bin. More specifically, the dust separating part may be disposed in the dust bin. Therefore, the dust separated by the dust separating part is collected in the dust bin, and the air is discharged to the outside of the dust separating part.

[0042] The dust separating part may be a cyclone part capable of separating dust using a cyclone flow.

[0043] The suction motor is a constituent element configured to generate a suction force for sucking air. The suction motor is accommodated in the main body. The suction motor generates the suction force by means of a rotation.

[0044] The filter is a constituent element configured to filter out foreign substances contained in the flowing air. The filter may include a prefilter or a HEPA filter.

[0045] The prefilter is a filter disposed at the most upstream side among the filters. The prefilter is formed in a mesh shape and primarily filters out physically large dust. The prefilter is a constituent element that physically filters out dust larger than intervals between the meshes, thereby improving lifespans of the other filters.

[0046] The HEPA filter refers to a high-efficiency parti-

culate air filter that is a constituent element that filters out fine dust. In general, the HEPA filter filters out fine dust by means of an electrostatic force. The HEPA filter is disposed at a downstream side of the prefilter.

[0047] A main body handle may be gripped by the user. The main body handle may be formed in a shape similar to a cylindrical shape. Alternatively, the main body handle may be formed in a curved cylindrical shape.

[0048] The operating part is a constituent element that receives instructions from the user. The operating part may include a plurality of buttons. When the user pushes the corresponding button, the operating part performs an instruction corresponding to the button. For example, the operating part may have an operation button and a stop button.

[0049] A main battery may be disposed in the main body. The main battery is a constituent element that stores electrical energy and supplies electric power to the constituent elements of the cleaner including the suction motor.

[0050] The main battery may be separably coupled to the cleaner.

[0051] The main battery may supply electric power to the cleaner head 1. Alternatively, the cleaner head 1 may be supplied with electric power from a sub-battery.

[0052] The extension tube A is a constituent element configured to guide the air, which is sucked into the cleaner head 1, to the main body.

[0053] One end of the extension tube A communicates with the cleaner head 1, and the other end of the extension tube A communicates with the main body. Specifically, a rear end of the extension tube A is connected to the main body, and a front end of the extension tube A is connected to the cleaner head 1.

[0054] The extension tube A is formed in a long cylindrical shape.

[0055] A rolling axis is defined in a longitudinal direction of the extension tube A. The rolling axis is an imaginary line extending in a forward/rearward direction. The cleaner head 1 may perform a rolling motion about the rolling axis.

[0056] Prior to the description, the directions are defined as follows to assist in understanding the present disclosure.

[0057] When the cleaner performs the cleaning operation, a direction toward the cleaning surface may be referred to as a downward direction, and a direction opposite to the downward direction may be referred to as an upward direction.

[0058] A direction toward the cleaning member 150 from a center of the cleaner head 1 may be referred to as a forward direction, and a direction toward the extension tube A from the center of the cleaner head 1 may be referred to as a rearward direction.

[0059] Leftward and rightward may be defined based on a state directed toward the front side from the center of the cleaner head 1.

[0060] A direction identical to the longitudinal direction

of the cleaner head 1 and/or the cleaning member 150 may be referred to as a horizontal direction.

[0061] From another point of view, a direction, which is parallel to the cleaning surface when the cleaner performs the cleaning operation, may be referred to as the horizontal direction.

[0062] A direction perpendicular to a plane defined by flat plates of the cleaner head 1 and/or a lower cover 120 may be referred to as a vertical direction.

[0063] From another point of view, a direction, which is perpendicular to the cleaning surface when the cleaner performs the cleaning operation, may be referred to as the vertical direction.

[0064] From another point of view, a direction, which is identical to the gravity when the cleaner performs the cleaning operation, may be referred to as the vertical direction.

[0065] FIGS. 1 to 10 are views for explaining an embodiment according to the present disclosure in which the cleaner head is applied to a vacuum cleaner that the user manually manipulates.

[0066] The cleaner head 1 illustrated in FIGS. 1 to 10 may be configured to be applied to the vacuum cleaner and perform a dry cleaning operation.

[0067] The following description of the present disclosure with reference to the vacuum cleaner illustrated in FIGS. 1 to 10 is provided for illustrative purposes only. As described above, the present disclosure may also be applied to a wet cleaner or a robot cleaner (see FIGS. 11 and 12).

[0068] FIG. 1 is a perspective view of the cleaner head 1 including a roller 130 and a roller cover 140 according to the embodiment of the present disclosure. FIG. 2 is an exploded view illustrating the roller 130 and the roller cover 140 of the cleaner head 1 in FIG. 1.

[0069] The cleaner head 1 is a constituent element configured to clean the cleaning surface by sucking outside air or generating steam.

[0070] The cleaner head 1 is connected to the main body. With reference to FIG. 1, the cleaner head 1 may be connected to the extension tube A. The cleaner head 1 may be connected indirectly to the main body through the extension tube A.

[0071] The cleaner head 1 may include a housing 110.

[0072] The housing 110 is a constituent element that defines an external shape of the cleaner head 1 and defines a space for accommodating other constituent elements.

[0073] The housing 110 is connected to the main body. With reference to FIG. 1, the housing 110 may be connected to the front end of the extension tube A, the rear end of the extension tube A may be connected to the main body, such that the housing 110 may be connected indirectly to the main body through the extension tube A. Alternatively, the housing 110 may be connected directly to the main body.

[0074] The term 'connection' described above may be interpreted in various ways. For example, an air flow path

extending from the housing 110 to the main body may be formed, such that dust-containing air may flow to the main body through the housing 110. In this case, the housing 110 may be electrically connected to the main body, and the main body may supply electric power to the housing 110.

[0075] A suction port may be disposed in a lower surface of the housing 110. The suction port is a constituent element that performs the dry cleaning operation by sucking dust present on the floor by receiving the suction force from the main body.

[0076] The cleaner head 1 may include the lower cover 120.

[0077] The lower cover 120 is a constituent element that defines a part of the lower surface of the cleaner head 1 and protects components in the cleaner head 1.

[0078] The lower cover 120 may be separably coupled to the housing 110 while covering a lower side of the housing 110.

[0079] The lower cover 120 may include a flat plate shape to cover the lower surface of the housing 110.

[0080] The lower cover 120 closes a partial area of the lower surface of the housing 110. The partial area of the lower surface of the housing 110 may be opened so that the constituent elements for performing the cleaning operation are exposed to the outside.

[0081] A space, in which the cleaning member 150 and a flow path, into which air is to be sucked, may be disposed may be formed at one side of the lower cover 120.

[0082] For example, the cleaning member 150 may be formed at a front side of the housing 110, and the lower cover 120 may be disposed rearward of the cleaning member 150 and spaced apart from the cleaning member 150 at a predetermined distance.

[0083] When the lower cover 120 and the cleaning member 150 are disposed to be spaced apart from each other at a predetermined distance, the air flow path, in which the dust-containing air sucked from the cleaning surface flows, may be formed between the lower cover 120 and the cleaning member 150.

[0084] From another point of view, the lower cover 120 may be provided in the form of a flat plate that closes the lower surface of the cleaner head 1, except for an area of the lower surface of the cleaner head 1 occupied by the cleaning member 150 and the air flow path.

[0085] The lower cover 120 may be spaced apart from the cleaning member 150 at a predetermined distance. A part of the flat plate, which defines the lower cover 120, may protrude toward the cleaning member 150.

[0086] For example, two opposite sides of the flat plate, which defines the lower cover 120, may protrude toward the cleaning member 150. With the protruding area of the flat plate, the lower cover 120 may be more stably coupled to a larger area of the housing 110.

[0087] In addition, various constituent elements, such as the roller 130 and the roller cover 140, required for the cleaner head 1 may be disposed in the protruding area of

the flat plate.

[0088] From another point of view, the lower cover 120 may be formed to protect the constituent elements in the cleaner head 1 by closing a position at which the components, such as the cleaning member 150 or the air flow path, required to perform the cleaning operation are not provided.

[0089] One example, which may define the shape of the lower cover 120 of the cleaner head 1, has been described above. However, the shape is not limited to the above-mentioned example. The lower cover 120 may be formed in various shapes and configured to protect a lower surface of a head of a typical cleaner.

[0090] The roller 130 is a constituent element separably coupled to the lower cover 120, rotatably provided, and configured to roll on the cleaning surface.

[0091] The roller 130 is a constituent element that enables the cleaner to travel softly on the cleaning surface while maintaining an appropriate distance from the cleaning surface when the cleaner performs the cleaning operation while traveling on the cleaning surface.

[0092] The roller 130 may include a roller main body 131 similar in shape to a typical wheel, and a roller shaft 132 configured to penetrate a rotation center of the roller main body 131.

[0093] The roller 130 may rotate about the roller shaft 132.

[0094] The roller 130 may be provided as a plurality of rollers 130. The roller 130 serves as a typical wheel to reduce friction between the cleaner head 1 and the cleaning surface and allow the cleaner head 1 to travel on the cleaning surface while performing the cleaning operation.

[0095] A roller accommodation portion 121 may be recessed in the lower surface of the lower cover 120 and have a space therein so that the roller 130 may be inserted into the roller accommodation portion 121.

[0096] The roller accommodation portion 121 may be recessed upward in the lower surface of the lower cover 120.

[0097] The roller accommodation portion 121 may be provided as a plurality of roller accommodation portions 121 corresponding in number to the rollers 130.

[0098] The roller accommodation portion 121 may have a space therein and accommodate the roller 130.

[0099] One or more cover supports 1215 may protrude from the roller accommodation portion 121 to support the roller cover 140 and suppress a horizontal movement of the roller cover 140.

[0100] A detailed shape of the inside of the roller accommodation portion 121 will be described below with reference to the description described with reference to FIGS. 7 to 10.

[0101] The roller cover 140 is a constituent element separably coupled to the roller accommodation portion 121 and the roller 130 and configured to suppress the movement of the roller 130 so that the roller 130 is not separated from the lower cover 120.

[0102] The roller cover 140 may be provided as a plurality of roller covers 140 corresponding in number to the rollers 130.

[0103] The roller cover 140 may be provided in the form of a flat plate. As an example, the roller cover 140 may be provided in the form of a flat plate bent at 90 degrees.

[0104] In this case, the flat plate of the roller cover 140, which is disposed in parallel with the lower cover 120, may be referred to as a cover main body 141a, and the flat plate of the roller cover 140, which is disposed perpendicularly to the lower cover 120, may be referred to as a cover coupling portion 141b.

[0105] A specific shape of the roller cover 140 will be described below more specifically with reference to the description described with reference to FIGS. 3 to 7.

[0106] As the cleaner head 1 of the cleaner performs the cleaning operation, the roller 130 disposed in the roller accommodation portion 121 of the lower cover 120 may be contaminated and abraded, the traveling performance may deteriorate, and noise may occur.

[0107] For example, when the cleaner head 1 performs the cleaning operation, foreign substances, such as hairs and dust, present on the cleaning surface may be tangled around the constituent elements, such as the roller shaft 132, as the cleaner head 1 travels on the cleaning surface.

[0108] Because the roller 130 consistently rotates when the cleaner head 1 performs the cleaning operation, the foreign substances tangled around the roller shaft 132 are consistently wound around the roller shaft 132 and strongly coupled, such that the foreign substances may not be easily removed.

[0109] When the foreign substances wound around the roller shaft 132 accumulate, the roller 130 may have difficulty in rotating. Therefore, the traveling performance of the cleaner head 1 may be severely degraded, which may inconvenience the user because the user needs to use a great effort to perform the cleaning operation.

[0110] Further, when the user forcibly rotates the roller 130 consistently in a state in which the roller 130 cannot rotate because the foreign substances wound around the roller shaft 132 accumulate, there is a concern that the roller 130 is severely abraded or damaged by a frictional force with the cleaning surface.

[0111] Because the roller 130 in the related art is not independently separated from the cleaner head 1, a complicated replacement process needs to be performed, or the cleaner head needs to be replaced, which requires an excessively large amount of costs and time to solve the problem.

[0112] According to the present disclosure, the cleaner user may separate the roller 130 singly from the cleaner head 1 and remove foreign substances or couple a new roller 130, thereby solving the problem in which foreign substances accumulate in the roller 130.

[0113] A specific embodiment in which the roller 130 is separably coupled to the cleaner head 1 will be described below more specifically with reference to the other draw-

ings.

[0114] FIG. 3 is a perspective view of the roller cover 140 of the cleaner head 1 according to the embodiment of the present disclosure. FIGS. 4 to 6 are views illustrating the roller cover 140 of the cleaner head 1 according to the embodiment of the present disclosure when viewed at various angles.

[0115] A shape of the roller cover 140 according to the embodiment of the present disclosure will be described below with reference to FIGS. 3 to 6.

[0116] As described above, the roller cover 140 may include the cover main body 141a disposed in parallel with the lower cover 120, and the cover coupling portion 141b disposed perpendicularly to the lower cover 120.

[0117] The cover coupling portion 141b may be disposed at one end of the cover main body 141a.

[0118] The cover coupling portion 141b is a constituent element vertically inserted into a cover groove 1213 to be described below so that the roller cover 140 may be securely fixed to the lower cover 120.

[0119] A cover hook 142 may protrude from the cover coupling portion 141b. A direction in which the cover hook 142 protrudes may be the horizontal direction based on the state in which the roller cover 140 is coupled to the lower cover 120.

[0120] A first cover groove 144 may be recessed in the cover coupling portion 141b. A direction in which the first cover groove 144 is recessed may be the horizontal direction identical to the direction in which the cover hook 142 protrudes.

[0121] The first cover groove 144 will be described below with reference to the description of a separation assisting groove 1216.

[0122] The cover main body 141a is a constituent element configured to block the movement of the roller 130 so that the roller 130 is not withdrawn from the lower cover 120.

[0123] A cover support groove 143, into which the cover support 1215 is vertically inserted, may be recessed at a lower side of the cover main body 141a.

[0124] An inner surface of the cover support groove 143 may be disposed to be spaced apart from the cover support 1215 at a predetermined distance.

[0125] A second cover groove 145 may be recessed in a surface of the cover main body 141a that faces the cleaning surface when the cleaner head 1 travels on the cleaning surface.

[0126] A shaft support groove 146, into which a part of the roller shaft 132 is vertically inserted, may be recessed at a lower side of the cover main body 141a.

[0127] The inside of the shaft support groove 146 may be formed in a curved shape so that the shaft support groove 146 is disposed to be spaced apart from the roller shaft 132 at a predetermined distance.

[0128] In this case, a direction in which the cover support groove 143 is recessed may be orthogonal to the direction in which the shaft support groove 146 is recessed.

[0129] FIG. 7 is a view illustrating the cleaner head 1 according to the embodiment of the present disclosure when viewed from below. FIG. 8 is a view for explaining the roller accommodation portion 121 formed in the cleaner head 1 according to the embodiment of the present disclosure. FIG. 9 is a cross-sectional view of the roller accommodation portion 121 formed in the cleaner head 1 according to the embodiment of the present disclosure. FIG. 10 is a cross-sectional view illustrating a state in which the roller 130 and the roller cover 140 are coupled to the cleaner head 1 according to the embodiment of the present disclosure.

[0130] The roller accommodation portion 121 may have a roller groove 1211 for accommodating the roller main body 131. Specifically, an inner wall of the roller groove 1211 may be formed in a curved shape and spaced apart from an outer peripheral surface of the roller main body 131 at a predetermined distance.

[0131] The roller 130 may be disposed so that a rotation axis of the roller 130 is parallel to the longitudinal direction of the cleaner head 1 to assist the cleaner head 1 in moving forward or rearward. With this arrangement, the roller shaft 132 may also be disposed in parallel with the longitudinal direction of the cleaner head 1.

[0132] The roller groove 1211 may be formed to accommodate the roller 130 disposed so that the rotation axis is perpendicular to the longitudinal direction of the cleaner head 1.

[0133] The roller accommodation portion 121 may have a roller shaft groove 1212 for accommodating the roller shaft 132.

[0134] An inner wall of the roller shaft groove 1212 may have a curved surface and be spaced apart from an outer peripheral surface of the roller shaft 132 at a predetermined distance.

[0135] Because the roller shaft 132 penetrates the roller 130 and protrudes from two opposite surfaces of the roller 130, the two roller shaft grooves 1212 may be formed in inner surfaces of the roller groove 1211 that face each other.

[0136] That is, the two roller shaft grooves 1212 may be formed to correspond to the positions at which the roller shaft 132 penetrating the roller 130 protrudes.

[0137] The roller shaft groove 1212 may serve to support the roller shaft 132 and fix the roller shaft 132 so that the roller shaft 132 is not withdrawn to the outside.

[0138] The roller accommodation portion 121 may have the cover groove 1213 to which the roller cover 140 may be coupled.

[0139] Among the constituent elements of the roller cover 140, the cover coupling portion 141b may be vertically inserted into the cover groove 1213.

[0140] The cover groove 1213 may include an inner wall spaced apart from the cover coupling portion 141b at a predetermined distance when the cover coupling portion 141b having a flat plate shape is vertically inserted into the cover groove 1213.

[0141] The roller accommodation portion 121 may

have a hook groove 1214 recessed so that the cover hook 142 may be separably coupled to the hook groove 1214.

[0142] The hook groove 1214 may be formed in at least a part of the inner wall of the cover groove 1213. Specifically, the hook groove 1214 may be recessed in the inner wall corresponding to the position at which the cover hook 142 is disposed in the state in which the cover coupling portion 141b is inserted into the cover groove 1213.

[0143] The cover hook 142 may be fixed by being caught by the hook groove 1214. When at least a part of the cover hook 142 is caught by the hook groove 1214, a vertical movement of the roller cover 140 is blocked.

[0144] The user may stably couple the roller cover 140 to the lower cover 120 by manipulating the roller cover 140 and allowing the cover hook 142 to be caught by the hook groove 1214.

[0145] The cover support 1215 may protrude from the roller accommodation portion 121 to support the cover main body 141a.

[0146] The cover support 1215 may be formed in the roller accommodation portion 121 and protrude between the roller groove 1211 and the cover groove 1213.

[0147] The cover support 1215 may be inserted into the cover support groove 143 formed in the cover main body 141a and support the cover main body 141a.

[0148] The horizontal movement of the lower cover 120 may be blocked in the state in which the cover support 1215 is coupled to the cover main body 141a.

[0149] The cover support 1215 may be provided as a plurality of cover supports 1215 protruding in the roller accommodation portion 121.

[0150] The roller cover 140 may be coupled after the roller 130 is inserted into the roller accommodation portion 121.

[0151] Specifically, the roller main body 131 may be inserted into the roller groove 1211, the roller shaft 132 may be inserted into the roller shaft groove 1212, and then the cover coupling portion 141b may be inserted into the cover groove 1213.

[0152] The cover support 1215 may be inserted into the cover support groove 143 of the roller cover 140, and the roller shaft 132 may be coupled to the shaft support groove 146.

[0153] Because at least a part of the roller shaft 132 is coupled to the roller shaft groove 1212, the remaining part of the roller shaft 132, which is not coupled to the roller shaft groove 1212, may be coupled to the shaft support groove 146.

[0154] That is, the roller shaft 132 may penetrate the roller main body 131 and protrude in two directions. The roller shaft 132 may be simultaneously supported by the roller shaft groove 1212 and the shaft support groove 146 and protected so as not to be withdrawn to the outside of the lower cover 120.

[0155] Meanwhile, when the roller shaft 132 is coupled to the shaft support groove 146, the horizontal movement of the roller cover 140 may be blocked. That is, the roller

shaft 132 may serve as a rotation axis of the roller 130 and also serve to block the horizontal movement of the roller cover 140.

[0156] From another point of view, the shaft support groove 146 may serve to protect the roller shaft 132 so that the roller shaft 132 is not withdrawn to the outside of the lower cover 120, and the shaft support groove 146 may also serve to allow the roller shaft 132 to block the horizontal movement of the roller cover 140.

[0157] As described above, the cover support 1215 may also be coupled to the cover support groove 143 and block the horizontal movement of the roller cover 140.

[0158] In this case, a direction in which the roller shaft 132 blocks the horizontal movement of the roller cover 140 may be orthogonal to a direction in which the cover support 1215 blocks the horizontal movement of the roller cover 140.

[0159] For example, in case that the direction in which the shaft support groove 146 is recessed and the direction in which the cover support groove 143 is recessed are orthogonal to each other, the direction in which the roller shaft 132 blocks the horizontal movement of the roller cover 140 and the direction in which the cover support 1215 blocks the horizontal movement of the roller cover 140 may be orthogonal to each other.

[0160] From another point of view, in case that the longitudinal direction of the roller shaft 132 and the direction in which the cover support groove 143 is recessed are orthogonal to each other, the direction in which the roller shaft 132 blocks the horizontal movement of the roller cover 140 and the direction in which the cover support 1215 blocks the horizontal movement of the roller cover 140 may be orthogonal to each other.

[0161] With this configuration, the horizontal movement of the roller cover 140 is blocked in all the horizontal directions, such that the roller cover 140 may be more securely fixed to the lower cover 120.

[0162] As a result, when the cover hook 142 of the cover coupling portion 141b is fastened to the hook groove 1214, the vertical movement of the cover coupling portion 141b is blocked, and the vertical movement of the cover main body 141a coupled to the cover coupling portion 141b is also blocked, such that the vertical movement of the entire roller cover 140 is blocked.

[0163] With this configuration, the movement of the roller cover 140 in the horizontal direction is blocked, and the vertical movement of the roller cover 140 is also blocked, such that the movements in all the movements in the three-dimensional directions may be blocked, and the roller cover 140 may be securely fixed to the lower cover 120.

[0164] When the roller cover 140 is securely fixed to the lower cover 120, the cover main body 141a may be disposed to close at least a part of the roller 130.

[0165] Specifically, the roller cover 140 may be disposed such that the roller main body 131 is opened, and the roller rolls on the cleaning surface. The roller shaft 132 may be disposed to close at least a part thereof, such

that the roller 130 may not be withdrawn.

[0166] Meanwhile, the separation assisting groove 1216 may be formed in the roller accommodation portion 121.

5 **[0167]** The position of the separation assisting groove 1216 may be defined in the state in which the roller cover 140 is separably coupled in the roller accommodation portion 121, as described above.

10 **[0168]** The separation assisting groove 1216 may be recessed at a side opposite, in the horizontal direction, to the position at which the roller 130 is disposed based on the cover coupling portion 141b.

15 **[0169]** When the separation assisting groove 1216 is formed, at least a part of the cover coupling portion 141b is exposed toward the separation assisting groove 1216.

20 **[0170]** A direction in which the cover coupling portion 141b is exposed may be identical to the direction in which the cover hook 142 protrudes from the cover coupling portion 141b.

25 **[0171]** In this case, the direction in which the separation assisting groove 1216 is disposed based on the cover coupling portion 141b may also be identical to the direction in which the cover hook 142 protrudes from the cover coupling portion 141b.

30 **[0172]** In this case, when an external force is applied in the horizontal direction to a surface of the cover coupling portion 141b exposed toward the separation assisting groove 1216, the cover coupling portion 141b may move a predetermined distance in the horizontal direction, and the cover hook 142 may also move in the horizontal direction and be separated from the hook groove 1214.

35 **[0173]** The user may insert a finger or the like into the separation assisting groove 1216 and separate the cover hook 142 from the hook groove 1214 by pressing, in the horizontal direction, the surface of the cover coupling portion 141b exposed toward the separation assisting groove 1216, such that the roller cover 140 may be separated from the cover groove 1213, and then the roller 130 may be separated from the roller accommodation portion 121.

40 **[0174]** The wound foreign substances such as hairs may be removed from the separated roller 130, such that the traveling performance, which has been degraded by foreign substances, may be restored, and the roller 130 may be replaced with a new roller 130.

45 **[0175]** The user may greatly reduce the time and costs that have been required in the related art to restore the traveling performance.

50 **[0176]** Meanwhile, the separation assisting groove 1216 may include an inclined surface formed such that a depth thereof increases as the distance from the cover coupling portion 141b decreases.

55 **[0177]** In case that the user inserts a finger, a tool, or the like to separate the roller cover 140, the inclined surface may serve to guide the finger, the tool, or the like so that the finger, the tool, or the like is inserted into the cover coupling portion 141b.

[0178] Meanwhile, the first cover groove 144 may be

recessed in one surface of the cover coupling portion 141b exposed toward the separation assisting groove 1216.

[0179] For example, the first cover groove 144 may be formed in a rectangular shape having a long cross-section so that a flat-head screwdriver or the like may be inserted into the first cover groove 144. However, the shape of the cross-section is not necessarily limited thereto.

[0180] The user may more easily separate the roller cover 140 by inserting a tool such as a flat-head screwdriver into the first cover groove 144 and pressing the first cover groove 144.

[0181] Meanwhile, the second cover groove 145 may be recessed in a lower surface of the cover coupling portion 141b toward the cleaning surface.

[0182] For example, the second cover groove 145 may have a circular cross-section so that the user's finger or the like may be inserted into the second cover groove 145. However, the shape of the cross-section is not necessarily limited thereto.

[0183] When the user inserts the finger, the tool, or the like into the second cover groove 145 and applies a force in the horizontal direction, the cover hook 142 may be separated from the hook groove 1214, and the roller cover 140 may be separated from the lower cover 120.

[0184] Specifically, in order to separate the roller cover 140 from the lower cover 120, the user may insert the finger, the tool, or the like into the second cover groove 145 and apply a force in a direction opposite to the horizontal direction in which the cover hook 142 protrudes.

[0185] The user may easily separate the roller cover 140 from the lower cover 120 by selectively or complexly applying the method of inserting the tool such as the flat-head screwdriver into the first cover groove 144 and pressing the first cover groove 144 or the method of inserting the finger or the like into the second cover groove and pressing the second cover groove.

[0186] According to the structure of the cleaner head 1 of the present disclosure, the roller 130 and the roller cover 140 may be very securely fixed to the lower cover 120, and the roller 130 and the roller cover 140 may be very easily separated when the user is intended to separate the roller 130 and the roller cover 140.

[0187] FIG. 11 is a view for explaining a state in which the roller and the roller cover are applied to a robot cleaner according to another embodiment of the present disclosure.

[0188] The coupling structure of the cleaner head 1 according to the present disclosure may also be applied to the robot cleaner equipped with an autonomous driving function.

[0189] With reference to FIG. 11, in a robot cleaner 2, a housing 210 configured to define an external appearance of the robot cleaner 2 and having a space therein, a lower cover 220 configured to cover a lower side of the housing 210 and protect internal configuration elements, and a

cleaning member 250 configured to clean the cleaning surface are disposed.

[0190] The robot cleaner 2 may be a cleaner capable of autonomously traveling and further include a roller drive motor (not illustrated) separably connected to rollers 230 and configured to transmit a rotational force to the rollers 230 to rotate the rollers 230, and a controller (not illustrated) configured to control the cleaning member 250 and the roller drive motor to control the cleaning and traveling operations.

[0191] The roller 230 and roller cover 240 according to the present disclosure are disposed on the lower cover 220 of the robot cleaner 2, such that the user may easily replace the roller 230 and remove foreign substances, thereby maintaining the traveling performance of the robot cleaner 2.

[0192] The controller may control whether to rotate the roller drive motor and/or a rotational speed and control an operation of the cleaning member 250.

[0193] Because the detailed structures of the roller 230 and roller cover 240 and the method of coupling the roller 230 and roller cover 240 are identical or similar to those described with reference to FIGS. 1 to 10, the detailed description thereof will be omitted to avoid a repeated description.

[0194] FIG. 12 is a view for explaining a state in which the roller and the roller cover are applied to a wet cleaner according to still another embodiment of the present disclosure.

[0195] A wet cleaner 3 is a cleaning device having a rotatable rag or the like and configured to perform a wet cleaning operation.

[0196] With reference to FIG. 12, in a wet cleaner 3, a housing 310 configured to define an external appearance of the wet cleaner 3 and having a space therein, a lower cover 320 configured to cover a lower side of the housing 310 and protect internal configuration elements, and a cleaning member 350 configured to clean the cleaning surface are disposed.

[0197] The roller 330 and roller cover 340 according to the present disclosure are disposed on the lower cover 320 of the wet cleaner 3, such that the user may easily replace the roller 330 and remove foreign substances, thereby maintaining the traveling performance of the wet cleaner 3.

[0198] Because the detailed structures of the roller 230 and roller cover 240 and the method of coupling the roller 230 and roller cover 240 are identical or similar to those described with reference to FIGS. 1 to 10, the detailed description thereof will be omitted to avoid a repeated description.

[0199] While the exemplary embodiments of the present disclosure have been illustrated and described above, the application scope of the present disclosure is not limited to the above-mentioned cleaners, and the present disclosure may, of course, be applied to all the commercially available cleaners.

[0200] The present disclosure is not limited to the

specific exemplary embodiments, and various modifications can of course be made by those skilled in the art to which the present disclosure pertains without departing from the subject matter of the present disclosure as claimed in the claims. Further, the modifications should not be appreciated individually from the technical spirit or prospect of the present disclosure.

Claims

1. A cleaner head comprising:

a housing configured to define an external appearance and having a space therein;
 a cleaning member disposed in the space in the housing and configured to clean a cleaning surface;
 a lower cover configured to cover a lower side of the housing and having a lower surface in which a roller accommodation portion is recessed;
 a roller separably coupled in the roller accommodation portion, rotatably provided, and configured to roll on the cleaning surface; and
 a roller cover having a flat plate shape separably coupled to the roller accommodation portion and the roller and configured to prevent the roller from being withdrawn.

2. The cleaner head of claim 1, wherein the roller accommodation portion comprises a cover groove recessed vertically, wherein the roller cover comprises:

a cover main body disposed in parallel with the lower cover; and
 a cover coupling portion disposed perpendicularly to the cover main body, and wherein the cover coupling portion is disposed at one end of the cover main body and vertically inserted into the cover groove.

3. The cleaner head of claim 2, wherein the roller accommodation portion comprises a hook groove horizontally recessed in an inner wall of the cover groove,

wherein the cover coupling portion comprises a cover hook protruding horizontally, and wherein the cover hook is separably coupled to the hook groove and disposed at a position that faces the hook groove.

4. The cleaner head of claim 2, wherein the roller comprises:

a roller main body having a cylindrical shape; and

a roller shaft disposed to penetrate a rotation center of the roller main body, and wherein the roller accommodation portion comprises:

a roller groove having an inner wall recessed to define a curved surface so that at least a part of the roller main body is inserted into the roller groove;
 one or more roller shaft grooves each having an inner wall recessed to define a curved surface so that at least a part of the roller shaft is inserted into the roller shaft groove; and
 a cover support protruding vertically and configured to support the cover main body.

5. The cleaner head of claim 4, wherein the cover main body further comprises:

a shaft support groove having an inner wall vertically recessed to define a curved surface so that at least a part of the roller shaft is vertically inserted into the shaft support groove; and
 a cover support groove into which the cover support is vertically inserted.

6. The cleaner head of claim 5, wherein the roller shaft and the cover support are coupled to the cover main body and block a horizontal movement of the cover main body, and wherein a direction in which the roller shaft blocks the horizontal movement of the cover main body and a direction in which the cover support blocks the horizontal movement of the cover main body are orthogonal to each other.

7. The cleaner head of claim 3, wherein the roller accommodation portion further comprises a separation assisting groove recessed at a side opposite, in a horizontal direction, to a position at which the roller is disposed based on the cover coupling portion,

wherein at least a part of the cover coupling portion is exposed to an internal space of the separation assisting groove, and wherein the cover hook is moved horizontally and separated from the hook groove when an external force is applied in the horizontal direction to a part of the exposed cover coupling portion.

8. The cleaner head of claim 7, wherein a first cover groove is recessed in a part of the cover coupling portion exposed toward the separation assisting groove.

9. The cleaner head of claim 7, wherein the separation

assisting groove has an inclined surface formed such that a depth thereof increases as the distance from the cover coupling portion decreases.

10. The cleaner head of claim 7, wherein a second cover groove is recessed in a lower surface of the cover main body. 5

11. A robot cleaner comprising: 10

a housing configured to define an external appearance and having a space;

a cleaning member disposed in the space in the housing and configured to clean a cleaning surface; 15

a lower cover configured to cover a lower side of the housing and having a lower surface in which a roller accommodation portion is recessed;

a roller separably coupled in the roller accommodation portion, rotatably provided, and configured to roll on the cleaning surface; 20

a roller drive motor separably connected to the roller and configured to transmit a rotational force to the roller; and

a roller cover having a flat plate shape, separably coupled to the roller accommodation portion and the roller, and configured to prevent the roller from being withdrawn. 25

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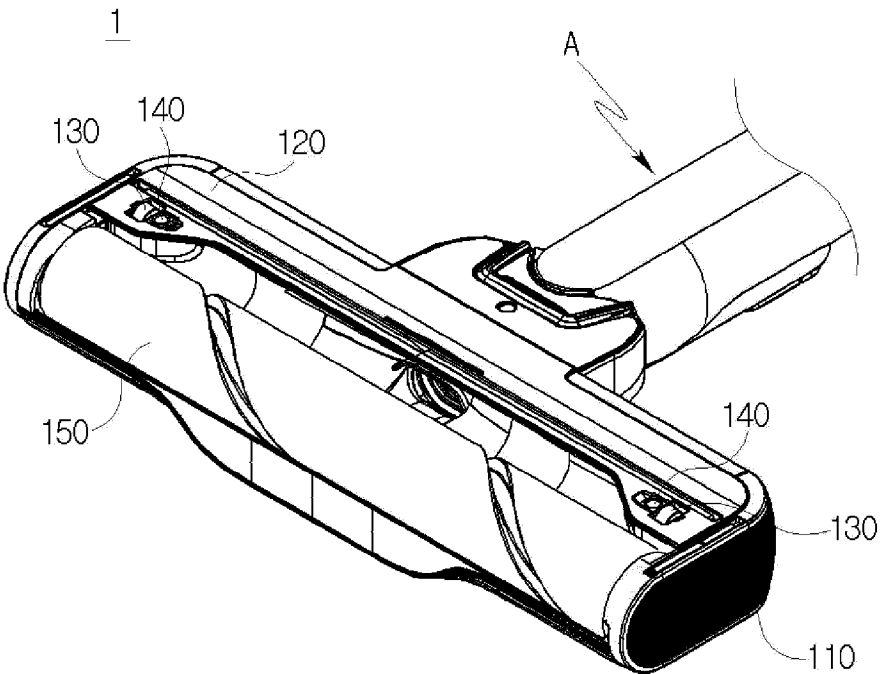
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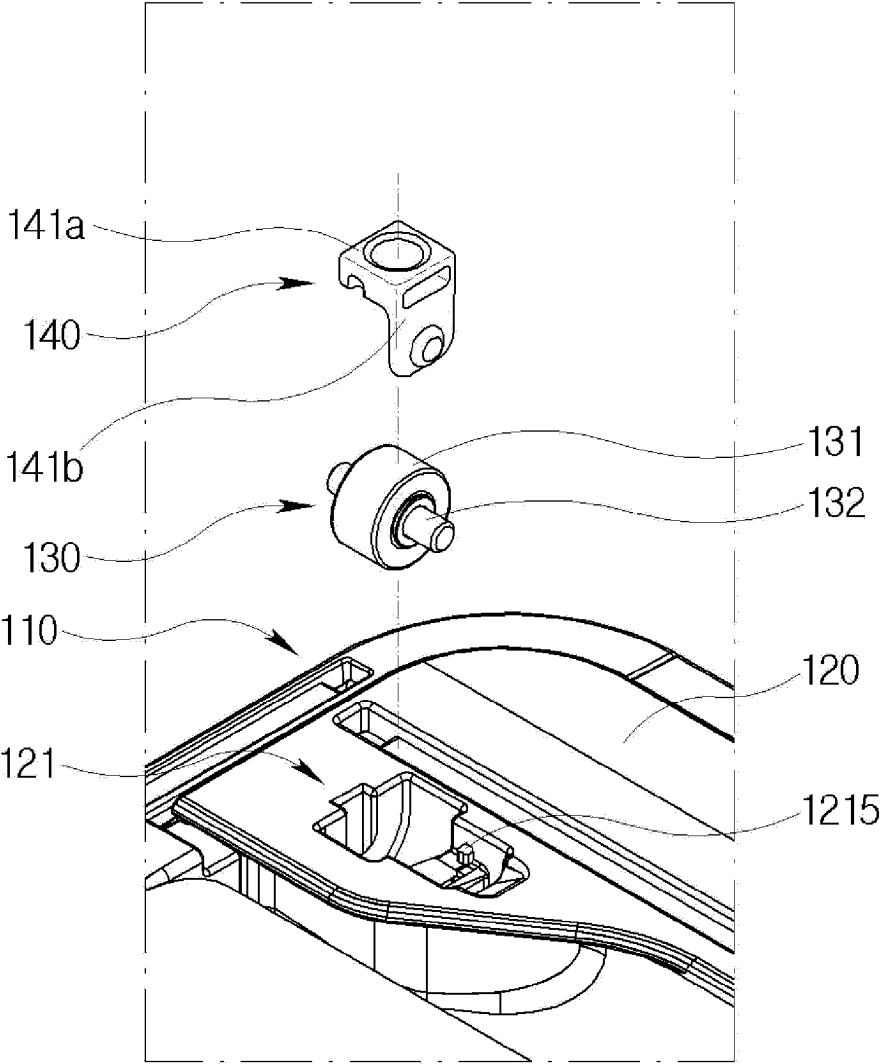
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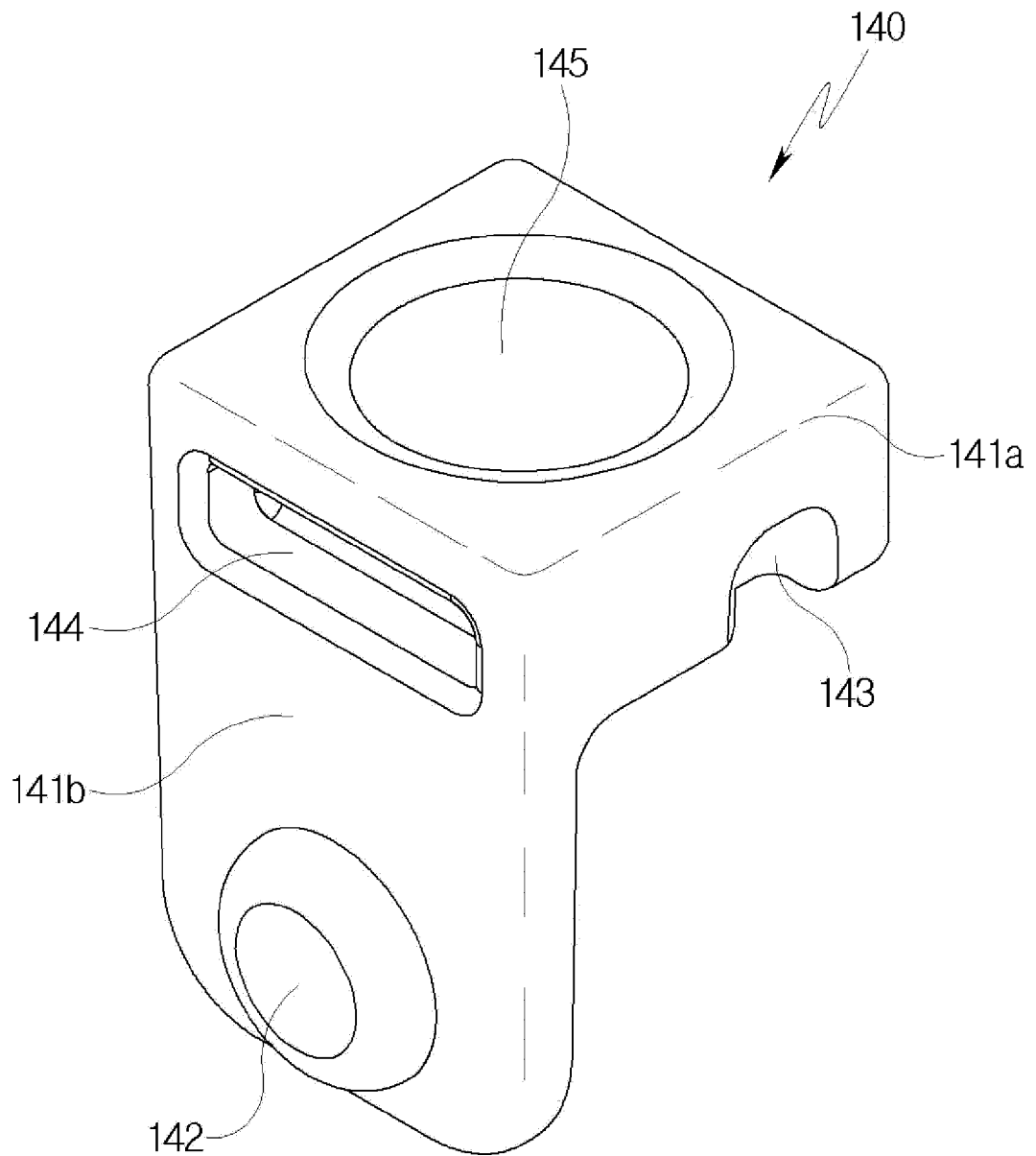
[FIG. 1]



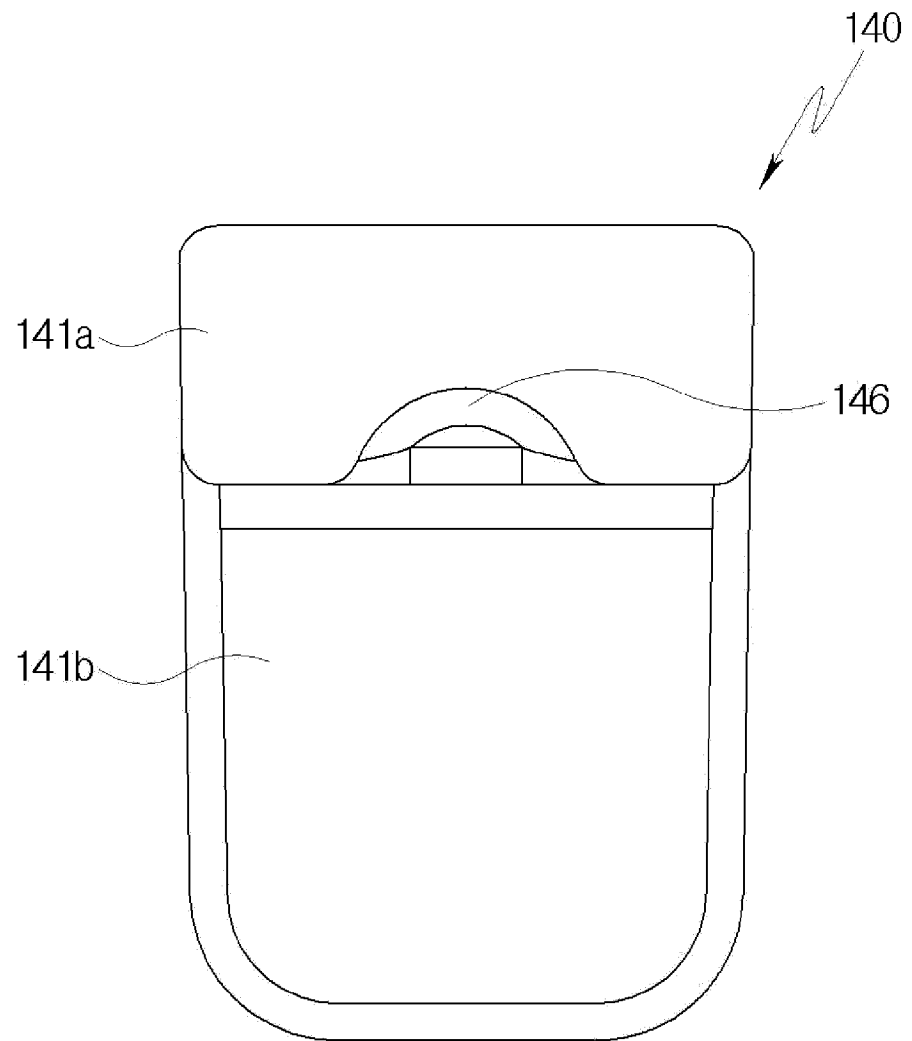
[FIG. 2]



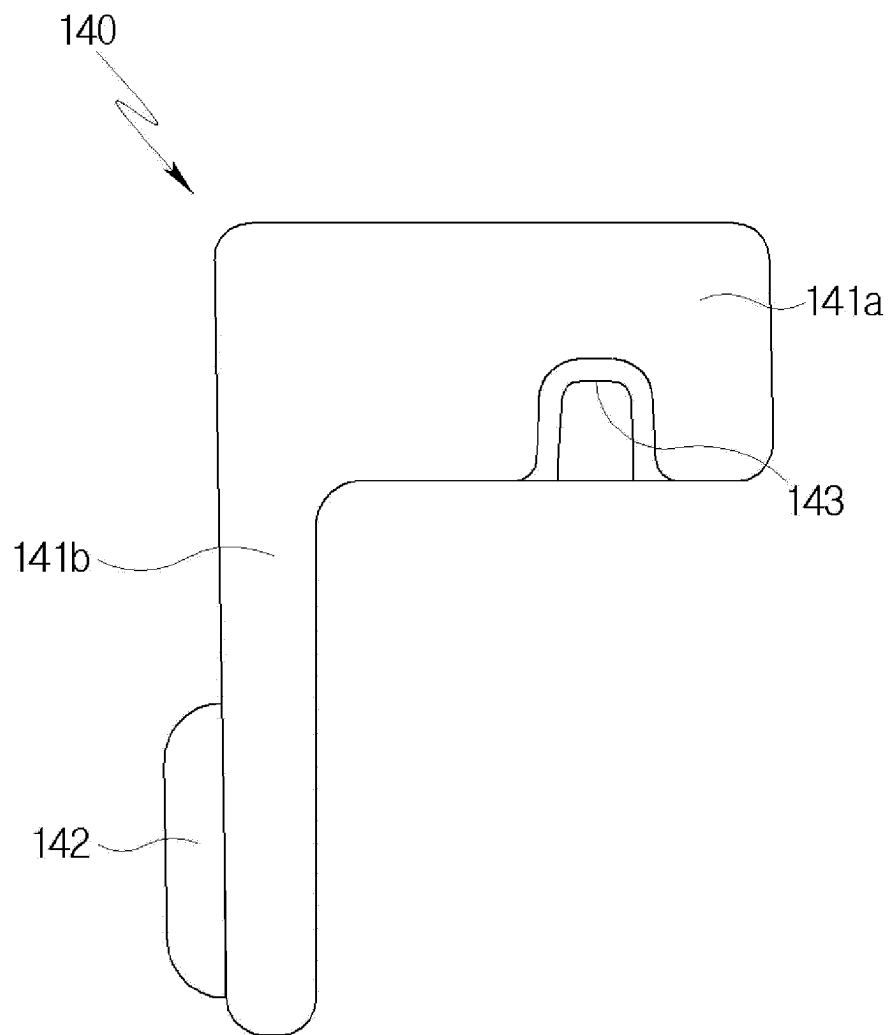
[FIG. 3]



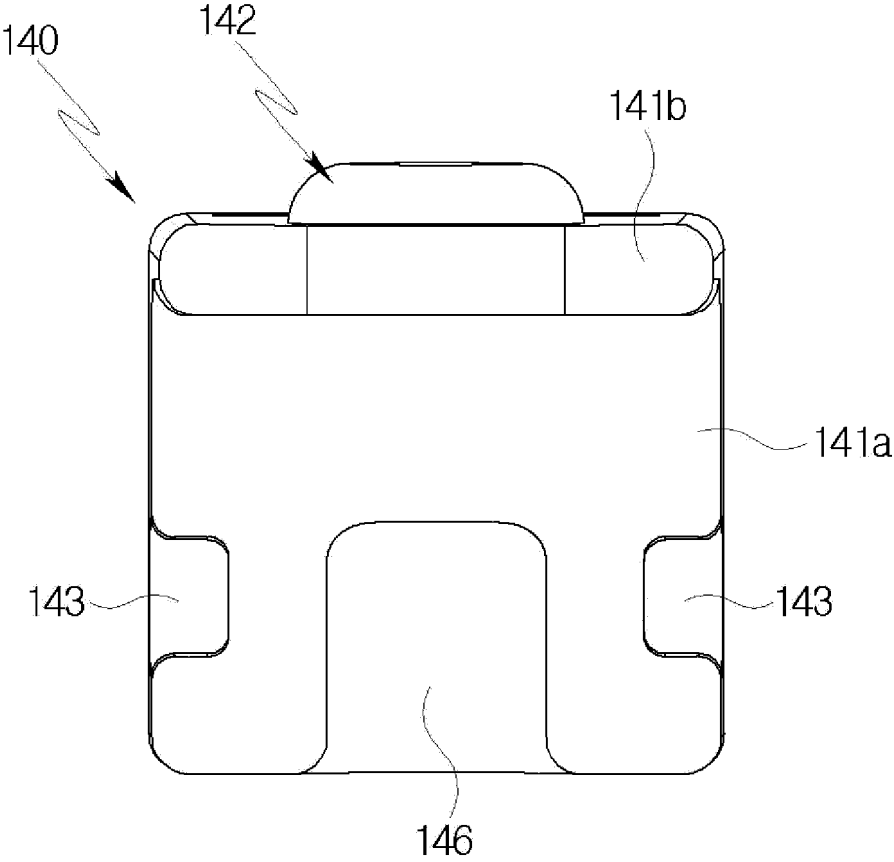
[FIG. 4]



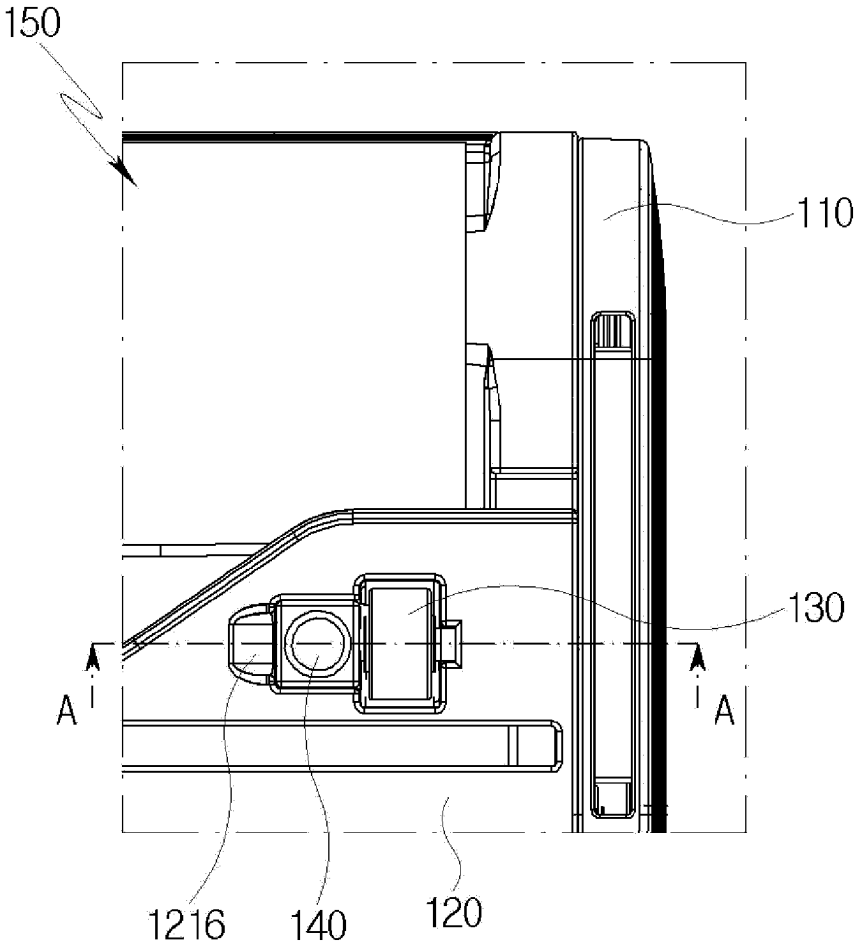
[FIG. 5]



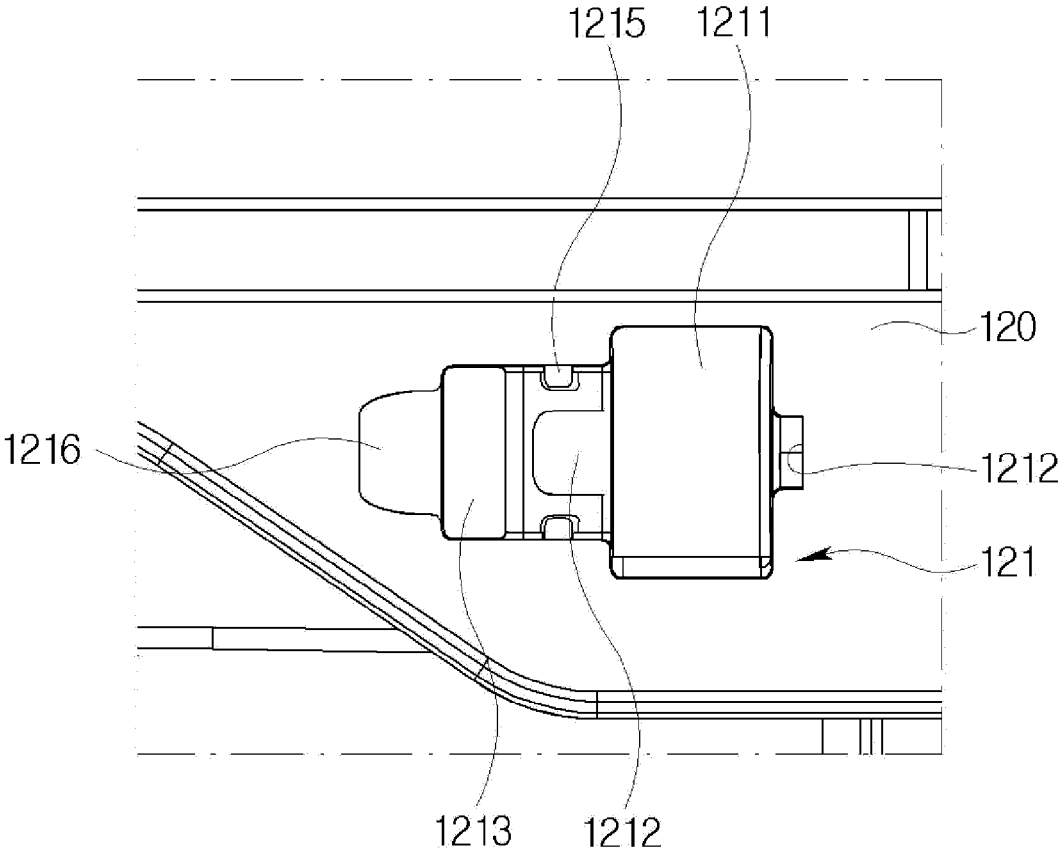
[FIG. 6]



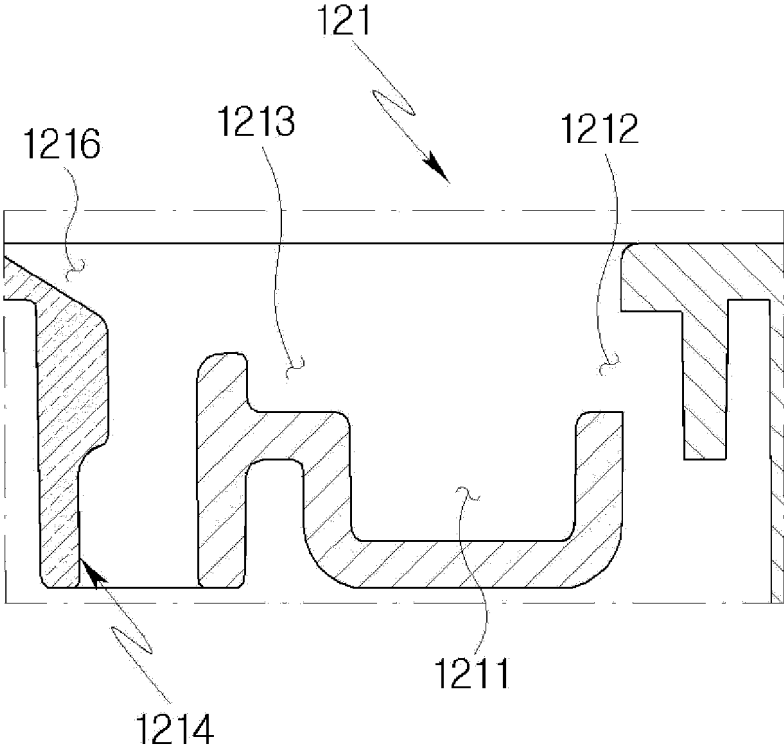
[FIG. 7]



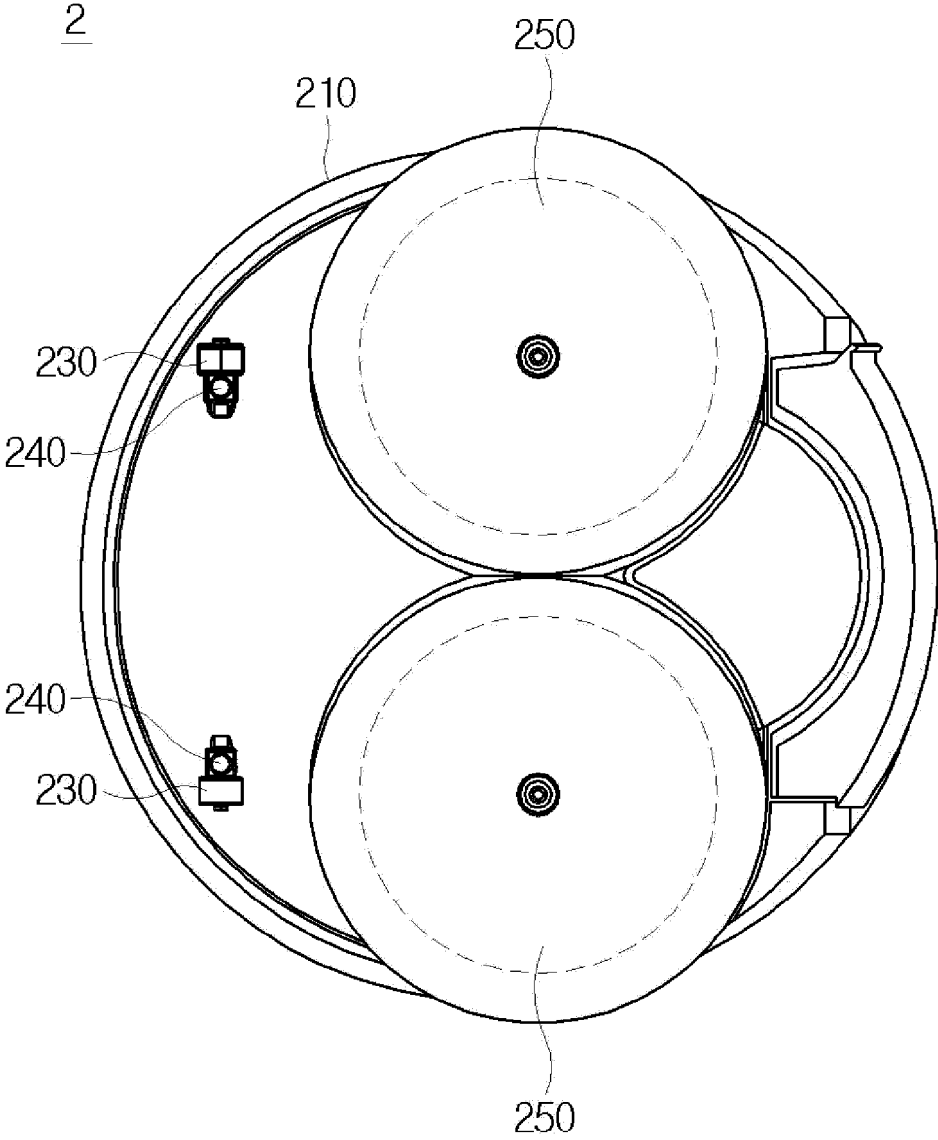
[FIG. 8]



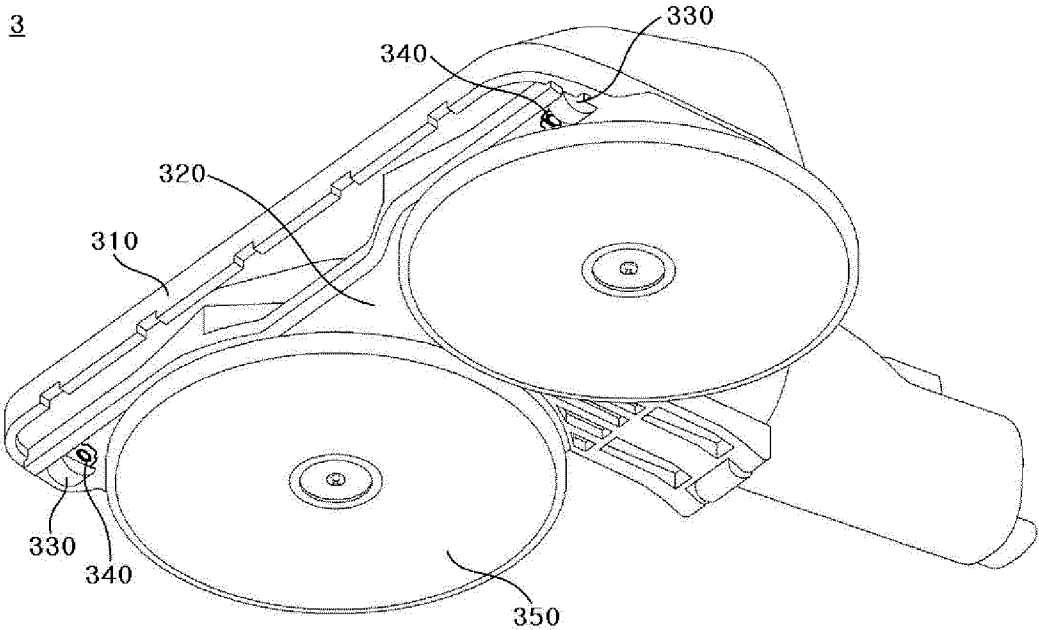
[FIG. 9]



[FIG. 11]



[FIG. 12]



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2023/002852

| <p>A. CLASSIFICATION OF SUBJECT MATTER A47L 9/00(2006.01)i; A47L 11/40(2006.01)i; A47L 5/26(2006.01)i</p> <p>According to International Patent Classification (IPC) or to both national classification and IPC</p> | | | | | | | | | | | | | | | | | | | | |
|---|---|---|-----------|--|-----------------------|---|---|----------|---|--|-----|---|--|-----|---|--|---|---|---|---|
| <p>B. FIELDS SEARCHED</p> <p>Minimum documentation searched (classification system followed by classification symbols) A47L 9/00(2006.01); A47L 9/02(2006.01); A47L 9/04(2006.01)</p> <p>Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Korean utility models and applications for utility models: IPC as above Japanese utility models and applications for utility models: IPC as above</p> <p>Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) eKOMPASS (KIPO internal) & keywords: 청소기(cleaner), 롤러(roller), 커버(cover), 축(shaft) 및 지지(support)</p> | | | | | | | | | | | | | | | | | | | | |
| <p>C. DOCUMENTS CONSIDERED TO BE RELEVANT</p> <table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>X</td> <td>US 2014-0013539 A1 (SHENZHEN SILVER STAR INTELLIGENT TECHNOLOGY CO., LTD.) 16 January 2014 (2014-01-16) See paragraphs [0031]-[0049] and figures 3-14.</td> <td>1-4,7-11</td> </tr> <tr> <td>Y</td> <td></td> <td>5,6</td> </tr> <tr> <td>Y</td> <td>KR 20-1998-0013974 U (DAEWOO ELECTRONICS CO., LTD.) 05 June 1998 (1998-06-05) See paragraphs [0011] and [0013]-[0014] and figures 3-5c.</td> <td>5,6</td> </tr> <tr> <td>X</td> <td>KR 10-2017-0025595 A (JOO, Yo Han) 08 March 2017 (2017-03-08) See paragraphs [0004]-[0009] and figures 1-3.</td> <td>1</td> </tr> <tr> <td>X</td> <td>KR 10-2005-0110153 A (DAEWOO ELECTRONICS CORPORATION) 23 November 2005 (2005-11-23) See paragraphs [0003] and [0016]-[0017] and figures 2-3.</td> <td>1</td> </tr> </tbody> </table> | | | Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. | X | US 2014-0013539 A1 (SHENZHEN SILVER STAR INTELLIGENT TECHNOLOGY CO., LTD.) 16 January 2014 (2014-01-16) See paragraphs [0031]-[0049] and figures 3-14. | 1-4,7-11 | Y | | 5,6 | Y | KR 20-1998-0013974 U (DAEWOO ELECTRONICS CO., LTD.) 05 June 1998 (1998-06-05) See paragraphs [0011] and [0013]-[0014] and figures 3-5c. | 5,6 | X | KR 10-2017-0025595 A (JOO, Yo Han) 08 March 2017 (2017-03-08) See paragraphs [0004]-[0009] and figures 1-3. | 1 | X | KR 10-2005-0110153 A (DAEWOO ELECTRONICS CORPORATION) 23 November 2005 (2005-11-23) See paragraphs [0003] and [0016]-[0017] and figures 2-3. | 1 |
| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. | | | | | | | | | | | | | | | | | | |
| X | US 2014-0013539 A1 (SHENZHEN SILVER STAR INTELLIGENT TECHNOLOGY CO., LTD.) 16 January 2014 (2014-01-16) See paragraphs [0031]-[0049] and figures 3-14. | 1-4,7-11 | | | | | | | | | | | | | | | | | | |
| Y | | 5,6 | | | | | | | | | | | | | | | | | | |
| Y | KR 20-1998-0013974 U (DAEWOO ELECTRONICS CO., LTD.) 05 June 1998 (1998-06-05) See paragraphs [0011] and [0013]-[0014] and figures 3-5c. | 5,6 | | | | | | | | | | | | | | | | | | |
| X | KR 10-2017-0025595 A (JOO, Yo Han) 08 March 2017 (2017-03-08) See paragraphs [0004]-[0009] and figures 1-3. | 1 | | | | | | | | | | | | | | | | | | |
| X | KR 10-2005-0110153 A (DAEWOO ELECTRONICS CORPORATION) 23 November 2005 (2005-11-23) See paragraphs [0003] and [0016]-[0017] and figures 2-3. | 1 | | | | | | | | | | | | | | | | | | |
| <p><input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.</p> | | | | | | | | | | | | | | | | | | | | |
| <p>* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "D" document cited by the applicant in the international application "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family</p> | | | | | | | | | | | | | | | | | | | | |
| <p>Date of the actual completion of the international search 12 June 2023</p> | | <p>Date of mailing of the international search report 19 June 2023</p> | | | | | | | | | | | | | | | | | | |
| <p>Name and mailing address of the ISA/KR Korean Intellectual Property Office Government Complex-Daejeon Building 4, 189 Cheongsaro, Seo-gu, Daejeon 35208 Facsimile No. +82-42-481-8578</p> | | <p>Authorized officer</p> <p>Telephone No.</p> | | | | | | | | | | | | | | | | | | |

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2023/002852

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| C. DOCUMENTS CONSIDERED TO BE RELEVANT | | |
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