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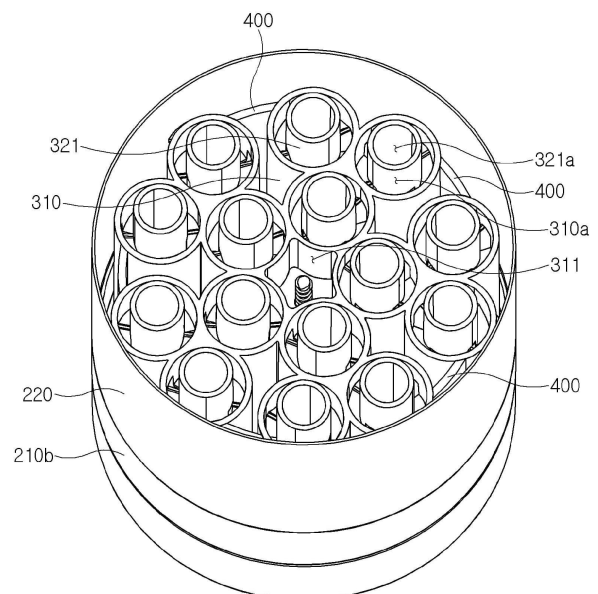
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(54) **CLEANER**

(57) The present disclosure relates to a cleaner, comprising: a suction part configured to guide air to an inside of a dustbin; a first cyclone part configured to separate dust from the air sucked through the suction part; a filter part configured to filter dust from the air discharged from the first cyclone part; a second cyclone part configured to separate dust from the air discharged from the filter part; and a guide part configured to guide the air passing through the filter part to be introduced into the second cyclone part.

[Fig. 9]



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Description

[Technical Field]

[0001] The present disclosure relates to a cleaner.

[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 dustbin 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 dustbin and a cleaner main body are integrally provided to improve convenience of use.

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

[0006] The handy cleaner (hand vacuum cleaner) has maximized portability and is light in weight. However, because the handy cleaner has a short length, there may be a limitation to a cleaning region when the user cleans the cleaning region while being seated in the 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 this regard, a cleaner is disclosed in Korean Patent Publication No. 10-2097439, which is a prior art document.

[0009] In the case of the prior art document, it includes a first cyclone part configured to separate dust from the air introduced from a suction part, and a mesh portion configured to filter dust from the air discharged

from the first cyclone part.

[0010] At this time, since the cleaner of the prior art document has a structure in which the user uses it while tilting it in a state of gripping a handle, it has a structure in which a lot of dust is accumulated at a lower side of an inside of a dustbin due to gravity and re-scattering of dust generated when a suction motor is driven.

[0011] Therefore, when the suction motor is driven in such a state and a suction airflow is generated, holes of the mesh portion close to the lower side of the inside of the dustbin may be clogged, so there is a problem that a suction force of the cleaner is degraded.

[0012] In addition, when the suction motor is driven in a state where most of the holes of the mesh portion are clogged and the dust accumulated inside the mesh portion is scattered, dust is accumulated on various parts disposed downstream of the suction airflow with respect to the mesh portion, so there is also a problem that a maintenance period of the cleaner is shortened.

[Disclosure]

[Technical Problem]

[0013] The present disclosure has been made in an effort to solve the above-mentioned problems of the conventional cleaner, and an object of the present disclosure is to provide a cleaner capable of minimizing clogging of holes of a mesh filter when air discharged from a first cyclone part passes through the mesh filter by maximizing an airflow at an upper portion of the mesh filter where dust is barely accumulated and minimizing an airflow at a lower portion of the mesh filter where a lot of dust is accumulated.

[0014] In addition, an object of the present disclosure is to provide a cleaner capable of preventing a suction force from being degraded by minimizing clogging of the holes of the mesh filter.

[0015] In addition, an object of the present disclosure is to provide a cleaner capable of minimizing accumulation of dust on various parts of the cleaner including a second cyclone part, a pre-filter, and a HEPA filter as well as the mesh filter by reducing scattering of the dust accumulated at the lower portion of the dustbin and inside the mesh filter when driving a suction motor.

[0016] In addition, an object of the present disclosure is to provide a cleaner capable of taking a longer maintenance period of various parts including the mesh filter, the second cyclone part, the pre-filter, and the HEPA filter by minimizing the accumulation of dust on the various parts.

[Technical Solution]

[0017] In order to achieve the above-mentioned objects, a cleaner according to the present disclosure may include: a suction part configured to guide air to

an inside of a dustbin; a suction device configured to generate a suction airflow so that air is sucked into the suction part; a first cyclone part configured to separate dust from the air sucked through the suction part; a filter part configured to filter dust from the air discharged from the first cyclone part; and a guide part configured to guide the air passing through the filter part to flow toward the suction device.

[0018] In order to achieve the above-mentioned objects, a cleaner according to the present disclosure may include: a suction part configured to guide air to an inside of a dustbin; a first cyclone part configured to separate dust from the air sucked through the suction part; a filter part configured to filter dust from the air discharged from the first cyclone part; a second cyclone part configured to separate dust from the air discharged from the filter part; and a guide part configured to guide the air passing through the filter part to be introduced into the second cyclone part.

[0019] The second cyclone part may include a plurality of cyclone bodies into which the air discharged from the first cyclone part is introduced, and the guide part may be disposed between the plurality of cyclone bodies.

[0020] The guide part may be disposed between the filter part and the second cyclone part.

[0021] The guide part may surround the second cyclone part in a state of being spaced apart from the second cyclone part.

[0022] A diameter of the guide part may be smaller than a diameter of the filter part.

[0023] The second cyclone part may include a cyclone body having an inlet formed therein, into which the air discharged from the first cyclone part is introduced, and a maximum height of the guide part may be equal to or lower than a height of the inlet.

[0024] The second cyclone part may include: a cyclone body into which the air discharged from the first cyclone part is introduced; and a support member configured to support the cyclone body, and the guide part may contact the support member.

[0025] In addition, the cleaner according to the present disclosure may further include a virtual dustbin central axis extending along a longitudinal direction of the dustbin, and a distance from the dustbin central axis to the guide part may be smaller than a distance from the dustbin central axis to the filter part.

[0026] The second cyclone part may include a plurality of cyclone bodies into which the air discharged from the first cyclone part is introduced, and at least a portion of the suction part may be disposed between the plurality of cyclone bodies.

[Advantageous Effects]

[0027] As described above, according to the cleaner according to the present disclosure, it is possible to prevent the holes of the mesh filter from being clogged

when the air discharged from the first cyclone part passes through the mesh filter by maximizing the airflow at the upper portion of the mesh filter where dust is barely accumulated and minimizing the airflow at the lower portion of the mesh filter where a lot of dust is accumulated.

[0028] In addition, according to the present disclosure, there is an effect of preventing the suction force of the cleaner from being degraded by minimizing the clogging of the holes of the mesh filter.

[0029] In addition, according to the present disclosure, since the accumulation of dust on the mesh filter, the second cyclone part, the pre-filter, and the HEPA filter can be minimized by reducing the scattering of dust accumulated at the lower portion of the dustbin when the suction motor is driven, there is an effect that the maintenance period of various parts of the cleaner including the second cyclone part, the pre-filter, and the HEPA filter as well as the mesh filter can be made longer.

[Description of Drawings]

[0030]

Fig. 1 is a schematic view for explaining a cleaner according to an embodiment of the present disclosure.

Fig. 2 is a perspective view of the cleaner according to the embodiment of the present disclosure.

Fig. 3 is a view for explaining a lower surface of a dustbin of the cleaner according to the embodiment of the present disclosure.

Fig. 4 is an exploded view of the cleaner according to the embodiment of the present disclosure.

Fig. 5 is a cross-sectional view for explaining a detailed configuration of the cleaner according to the embodiment of the present disclosure.

Fig. 6 is a cross-sectional perspective view of a cleaner according to a first embodiment of the present disclosure.

Fig. 7 is a view for explaining an area A shown in Fig. 6 in detail.

Fig. 8 and Fig. 9 are views for explaining a guide part according to the first embodiment of the present disclosure.

Fig. 10 is a cross-sectional perspective view of a cleaner according to a second embodiment of the present disclosure.

Fig. 11 is a view for explaining an area B shown in Fig. 10 in detail.

Fig. 12 is a view for explaining a guide part of the cleaner according to the second embodiment of the present disclosure.

Fig. 13 is a cross-sectional view of a cleaner according to a third embodiment of the present disclosure.

Fig. 14 is a view for explaining a guide part of the

cleaner according to the third embodiment of the present disclosure.

[Mode for Invention]

[0031] Hereinafter, preferred embodiments of the present disclosure will be described in detail with reference to the accompanying drawings.

[0032] 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.

[0033] 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.

[0034] 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.

[0035] Fig. 1 is a schematic view for explaining a cleaner according to an embodiment of the present disclosure, Fig. 2 is a perspective view of the cleaner according to the embodiment of the present disclosure, Fig. 3 is a view for explaining a lower surface of a dustbin of the cleaner according to the embodiment of the present disclosure, Fig. 4 is an exploded view of the cleaner according to the embodiment of the present disclosure, and Fig. 5 is a cross-sectional view for explaining a detailed configuration of the cleaner according to the embodiment of the present disclosure.

[0036] First, referring to Figs. 1 to 5, the structure of a cleaner 100 will be described as below.

[0037] The cleaner 100 may refer to a cleaner manually operated by a user. For example, the cleaner 100 may refer to a handy cleaner or a stick cleaner.

[0038] Meanwhile, in an embodiment of the present disclosure, directions of the cleaner 100 may be defined based on when a bottom surface (lower surface) of a battery housing 130 is placed on a ground surface.

[0039] In this case, a forward direction may mean a direction in which a suction part 112 is disposed based on a suction device 114, and a rearward direction may mean a direction in which a handle 116 is disposed based on the suction device 114. Further, based on a state in which the suction part 112 is viewed from the

suction device 114, a rightward direction may refer to a direction in which a component is disposed at the right, and a leftward direction may refer to a direction in which a component is disposed at the left. In addition, in an embodiment of the present disclosure, upper and lower sides may be defined along a direction perpendicular to the ground surface based on when the bottom surface (lower surface) of the battery housing 130 is placed on the ground surface.

[0040] The cleaner 100 may include a main body 110. The main body 110 may include a main body housing 111, the suction part 112, a first cyclone part 113, the suction device 114, an air discharge cover 115, the handle 116, and an operating part 117.

[0041] The main body housing 111 may define an external appearance of the cleaner 100. The main body housing 111 may provide a space capable of accommodating the suction device 114 and a filter (not shown) therein. The main body housing 111 may be configured in a shape similar to a cylinder.

[0042] The suction part 112 may protrude outward from the main body housing 111. For example, the suction part 112 may be formed in a cylindrical shape with an opened inside. The suction part 112 may be coupled to an extension tube 150. The suction part 112 may provide a flow path through which air containing dust may flow. The suction part 112 may be coupled to the main body 110 such that an approximately central portion thereof is located at a boundary between a dustbin 120 and the main body housing 111.

[0043] Meanwhile, in the present embodiment, a virtual line penetrating the inside of the suction part 112 configured in a cylindrical shape may be formed. At this time, the virtual line may mean a longitudinal axis of a suction flow path.

[0044] The cleaner 100 according to an embodiment of the present disclosure may include at least one or more cyclone parts capable of separating dust through a cyclonic flow. For example, the cleaner 100 may include the first cyclone part 113 and a second cyclone part 300.

[0045] The first cyclone part 113 is a configuration applying a principle of a dust collector using a centrifugal force to separate dust sucked into the inside of the main body 110 through the suction part 112. That is, the first cyclone part 113 means a space where a cyclonic flow turning along an inner circumferential surface of the dustbin 120 is generated, and the first cyclone part 113 may mean some region of the space inside the dustbin 120.

[0046] The first cyclone part 113 may be communicated with the suction part 112. The first cyclone part 113 may separate dust sucked into the inside through the suction part 112. A space inside the first cyclone part 113 may be communicated with a space inside the dustbin 120.

[0047] The cyclonic flow generated in the first cyclone part 113 may be caused by a suction force of the

suction device 114.

[0048] The cyclonic flow generated in the first cyclone part 113 may be formed between an inner surface of the dustbin 120 and an outer surface of a case 210 to be described below. That is, the cyclonic flow may be formed inside the first cyclone part 113.

[0049] The space inside the first cyclone part 113 may be communicated with the suction part 112. Air and dust sucked through the suction part 112 flow along the inner circumferential surface of the first cyclone part 113, and through this, a cyclonic flow may be generated in the internal space of the first cyclone part 113.

[0050] For example, the cyclonic flow generated in the first cyclone part 113 may be formed to surround in a circular shape along an inner circumference of the dustbin 120. Air sucked through the suction part 112 flows in a circular shape along the inner circumferential surface of the dustbin 120 based on a central axis a1 of the dustbin 120, and through this, a cyclonic flow may be generated in the internal space of the first cyclone part 113.

[0051] Specifically, when an axis a2 of the cyclone flow generated in the first cyclone part 113 is disposed perpendicular to a lower side in a gravity direction, air sucked through the suction part 112 may flow in a circular shape along the inner circumferential surface of the dustbin 120 based on the central axis a1 of the dustbin 120. Alternatively, when the axis a2 of the cyclone flow generated in the first cyclone part 113 is disposed parallel to the ground surface, air sucked through the suction part 112 may flow in a circular shape along the inner circumferential surface of the dustbin 120 based on the central axis a1 of the dustbin 120.

[0052] As another example, the cyclonic flow generated in the first cyclone part 113 may be formed in a spiral shape along the inner circumference of the dustbin 120. That is, air sucked through the suction part 112 spirally flows along the inner circumference of the dustbin 120, and through this, a cyclonic flow may be generated in the internal space of the first cyclone part 113.

[0053] Specifically, when the axis a2 of the cyclone flow generated in the first cyclone part 113 is disposed to be inclined with respect to the ground surface, air sucked through the suction part 112 may flow in a spiral shape along the inner circumference of the dustbin 120.

[0054] The cleaner 100 according to an embodiment of the present disclosure may include the second cyclone part 300 configured to separate dust from the air discharged from the first cyclone part 113 again. That is, the second cyclone part 300 may filter small dust that the first cyclone part 113 and a filter part 200 failed to filter from the air passing through the first cyclone part 113 and the filter part 200.

[0055] At this time, the second cyclone part 300 may be located inside the first cyclone part 113 to minimize

the size of the cleaner 100. The second cyclone part 300 may be disposed below the suction device 114. Specifically, the second cyclone part 300 may be disposed inside the filter part 200. That is, the first cyclone part 113 and the second cyclone part 300 may be disposed inside the dustbin 120 with the filter part 200 interposed therebetween.

[0056] The second cyclone part 300 may include a plurality of cyclone bodies 310 disposed in parallel. Therefore, air discharged from the first cyclone part 113 may pass through the filter part 200 and be divided to pass through the plurality of cyclone bodies 310. That is, a cyclonic flow generated in the second cyclone part 113 may be formed inside the cyclone bodies 310.

[0057] Meanwhile, it is also possible for the second cyclone part 300 to include a single cyclone body 310, and in this case as well, the axis a2 of the cyclone flow generated in the second cyclone part 300 may extend in the upward and downward directions.

[0058] In addition, the axis a2 of the cyclone flow generated in the first cyclone part 200 may also extend in the upward and downward directions. Therefore, the axis a2 of the cyclone flow generated in the first cyclone part 113 and the axis a2 of the cyclone flow generated in the second cyclone part 300 may form a coaxial line or be formed parallel to each other in the upward and downward directions.

[0059] A storage member 211 configured to store the dust separated by the second cyclone part 300 may be disposed inside the dustbin 120. The storage member 211 may be connected to a lower side of the case 210, and may contact an upper surface of a discharge cover 122. In addition, a lower side of the storage member 211 may be opened.

[0060] The storage member 211 may partition the space inside the dustbin 120 into a first dust storage part 211a in which dust separated by the first cyclone part 113 is stored, and a second dust storage part 211b in which dust separated by the second cyclone part 300 is stored.

[0061] Therefore, a space between the storage member 211 and the dustbin 120 may be defined as the first dust storage part 211a, and a lower internal space of the storage member 211 may be defined as the second dust storage part 211b.

[0062] The discharge cover 122 may open and close the first dust storage part and the second dust storage part together. That is, the first dust storage part and the second dust storage part may be exposed to the outside together.

[0063] The suction device 114 may generate a suction airflow for sucking air. The suction device 114 may be accommodated in the main body housing 111.

[0064] The suction device 114 may mean a suction motor. That is, the suction device 114 may generate a suction force through rotation. As an example, the suction device 114 may be provided similarly to a cylindri-

cal shape.

[0065] At this time, a cyclonic flow may occur due to the suction force of the suction device 114.

[0066] Specifically, when operating the suction device 114, air sucked through the suction part 112 by the suction force of the suction device 114 may generate a cyclonic flow in the first cyclone part 113 and/or the second cyclone part 300.

[0067] Meanwhile, in the present embodiment, a virtual rotational axis a3 of the suction device extending the rotational axis of the suction device 114 may be formed.

[0068] The suction device 114 may be located inside the main body housing 111. In addition, at least a portion of the suction device 114 may be located above the second cyclone part 300. Therefore, the suction device 114 may be located above the dustbin 120.

[0069] The suction device 114 may be connected to an outlet of the second cyclone part 300.

[0070] The axis a2 of the cyclone flow of the first cyclone part 113 may penetrate the suction device 114.

[0071] In an embodiment of the present disclosure, if the suction device 114 is located above the second cyclone part 300, air discharged from the second cyclone part 300 may immediately flow toward the suction device 114, so a flow path between the second cyclone part 300 and the suction device 114 may be minimized.

[0072] The air discharge cover 115 may be disposed at one side of the main body housing 111 in an axial direction. A filter for filtering air may be accommodated in the air discharge cover 115. As an example, a HEPA filter may be accommodated in the air discharge cover 115.

[0073] An air discharge opening configured to discharge air sucked by the suction force of the suction device 114 may be formed in the air discharge cover 115.

[0074] A flow guide may be disposed in the air discharge cover 115. The flow guide may guide the flow of air discharged through the air discharge opening.

[0075] The handle 116 may be gripped by the user. As an example, the handle 116 may be formed similarly to a cylindrical shape. Alternatively, the handle 116 may be formed in a curved cylindrical shape. The handle 116 may be disposed at a predetermined angle with the main body housing 111 or the suction device 114 or the first cyclone part 113.

[0076] The handle 116 may include a grip portion formed in a column shape so that the user can grip it, a first extension portion connected to one end in a longitudinal direction (axial direction) of the grip portion and extending toward the suction device 114, and a second extension portion connected to the other end in the longitudinal direction (axial direction) of the grip portion and extending toward the dustbin 120.

[0077] Meanwhile, in the present embodiment, a virtual grip portion penetration line extending along the longitudinal direction (axial direction of the column) of

the grip portion and penetrating the grip portion may be formed.

[0078] As an example, the grip portion penetration line may be a virtual line formed inside the cylindrical handle 116, and may be a virtual line formed parallel to at least a portion of an outer surface (outer circumferential surface) of the grip portion.

[0079] An upper surface of the handle 116 may form a part of an external appearance of an upper surface of the cleaner 100. Through this, when the user grips the handle 116, it is possible to prevent one component of the cleaner 100 from contacting the user's arm.

[0080] The first extension portion may extend from the grip portion toward the main body housing 111 or the suction device 114. At least a portion of the first extension portion may extend in a horizontal direction.

[0081] The second extension portion may extend from the grip portion toward the dustbin 120. At least a portion of the second extension portion may extend in the horizontal direction.

[0082] The operating part 117 may be disposed on the main body housing 111. The operating part 117 may be disposed on an outer surface of the main body housing 111. The operating part 117 may be composed of a plurality of buttons, and when the user presses a corresponding button, a command corresponding thereto may be performed. The user may input a command to operate or stop the cleaner 100 through the operating part 117.

[0083] The cleaner 100 may include the dustbin 120. The dustbin 120 may be communicated with the suction part 112. The first cyclone part 113 may be located inside the dustbin 120. The dustbin 120 may store dust separated by the first cyclone part 113.

[0084] The dustbin 120 may include a dustbin main body 121, the discharge cover 122, a dustbin compression lever (not shown), and a compressor (not shown).

[0085] The dustbin main body 121 may provide a space capable of storing dust separated by the first cyclone part 113. As an example, the dustbin main body 121 may be formed similarly to a cylindrical shape.

[0086] Meanwhile, in the present embodiment, a virtual dustbin central axis a1 penetrating the inside (internal space) of the dustbin main body 121 and extending along a longitudinal direction (meaning an axial direction in the cylindrical dustbin main body 121) of the dustbin main body 121 may be formed.

[0087] A part of a lower surface (bottom surface) of the dustbin main body 121 may be opened. In addition, a lower surface extension portion (not shown) may be formed on the lower surface (bottom surface) of the dustbin main body 121. The lower surface extension portion may be formed to block a part of the lower surface of the dustbin main body 121.

[0088] The dustbin 120 may include the discharge cover 122. The discharge cover 122 may be disposed on the lower surface of the dustbin 120.

[0089] The discharge cover 122 may be provided to open and close one end in the longitudinal direction of the dustbin main body 121. Specifically, the discharge cover 122 may selectively open and close the lower portion of the dustbin 120 which is opened downward.

[0090] The discharge cover 122 may include a cover main body and a hinge part. The cover main body may be formed to block a part of the lower surface of the dustbin main body 121. The cover main body may rotate downward based on the hinge part. The hinge part may be disposed adjacent to the battery housing 130. A torsion spring may be provided in the hinge part. Therefore, when the discharge cover 122 is separated from the dustbin main body 121, the cover main body may be supported in a state of rotating by a predetermined angle or more about the hinge part from the dustbin main body 121 by an elastic force of the torsion spring.

[0091] The discharge cover 122 may be coupled to the dustbin 120 through a hook coupling. Meanwhile, the discharge cover 122 may be separated from the dustbin 120 through a coupling lever 122c. The coupling lever 122c may be disposed at a front of the dustbin 120. Specifically, the coupling lever 122c may be disposed on an outer surface of a front side of the dustbin 120. When an external force is applied, the coupling lever 122c may elastically deform a hook extending from the cover main body to release the hook coupling between the cover main body and the dustbin main body 121.

[0092] When the discharge cover 122 is closed, the lower surface of the dustbin 120 may be blocked (sealed) by the discharge cover 122 and the lower surface extension portion.

[0093] The dustbin 120 may include a dustbin compression lever. The dustbin compression lever may be disposed outside the dustbin 120. The dustbin compression lever may be disposed to move up and down outside the dustbin 120. The dustbin compression lever may be connected to a compressor (not shown). When the dustbin compression lever moves downward by an external force, the compressor (not shown) may also move downward. Through this, convenience for the user can be provided. The compressor (not shown) and the dustbin compression lever may return to their original positions by an elastic member (not shown). Specifically, when an external force applied to the dustbin compression lever is removed, the elastic member may move the dustbin compression lever and the compressor (not shown) upward.

[0094] The compressor (not shown) may be disposed inside the dustbin main body 121. The compressor may move in the internal space of the dustbin main body 121. Specifically, the compressor may move up and down in the dustbin main body 121. Through this, the compressor may compress dust in the dustbin main body 121 downward. In addition, when the discharge cover 122 is separated from the dustbin main body

121 and the lower portion of the dustbin 120 is opened, the compressor moves from an upper portion of the dustbin 120 to a lower portion to remove foreign substances such as residual dust in the dustbin 120. Through this, it is possible to improve a suction force of the cleaner by preventing residual dust from remaining in the dustbin 120. In addition, it is possible to remove an odor caused by residues by preventing residual dust from remaining in the dustbin 120.

[0095] The cleaner 100 may include the battery housing 130. The battery 140 may be accommodated in the battery housing 130. The battery housing 130 may be disposed at a lower side of the handle 116. As an example, the battery housing 130 may be a hexahedral shape having an open lower side. An upper surface of the battery housing 130 may be connected to the handle 116.

[0096] The battery housing 130 may include an accommodating portion opened downward. The battery 140 may be attached and detached through the accommodating portion of the battery housing 130.

[0097] A battery terminal exposed to the outside may be provided in the battery housing 130.

[0098] When the battery terminal of the battery housing 130 and an external charging terminal (not shown) are coupled, power may be supplied to the battery 140 through the battery terminal. The battery terminals may be spaced apart left and right on the lower surface of the battery housing 130.

[0099] The cleaner 100 may include the battery 140.

[0100] For example, the battery 140 may be detachably coupled to the cleaner 100. The battery 140 may be detachably coupled to the battery housing 130. As an example, the battery 140 may be inserted into the inside of the battery housing 130 from a lower side of the battery housing 130. With this configuration, portability of the cleaner 100 may be improved.

[0101] Alternatively, the battery 140 may be integrally provided inside the battery housing 130. In this case, a lower surface of the battery 140 is not exposed to the outside.

[0102] The battery 140 stores electrical energy, and may supply power to each component including the suction device 114 of the cleaner 100. The battery 140 may be disposed at a lower portion of the handle 116. The battery 140 may be disposed at a lower side of the dustbin 120. That is, the suction device 114 and the battery 140 may be disposed so as not to overlap in the front-rear direction, and their heights may also be arranged differently. Based on the handle 116, the heavy suction device 114 is disposed above the handle 116, and the light battery 140 is disposed below the handle 116, so the weight may be evenly distributed throughout the cleaner 100. Through this, when the user holds the handle 116 and cleans, it is possible to prevent strain on the user's wrist.

[0103] Depending on the embodiment, when the battery 140 is coupled to the battery housing 130, the low-

er surface of the battery 140 may be exposed to the outside. When the cleaner 100 is put down on the floor, the battery 140 may be placed on the floor, so the battery 140 may be immediately separated from the battery housing 130. In addition, since the lower surface of the battery 140 is exposed to the outside and directly contacts the external air of the battery 140, a cooling performance of the battery 140 may be improved.

[0104] Meanwhile, when the battery 140 is integrally fixed to the battery housing 130, a structure for attaching and detaching the battery 140 and the battery housing 130 can be reduced, so the overall size of the cleaner 100 can be reduced, and weight reduction is possible.

[0105] The cleaner 100 may include the extension tube 150. The extension tube 150 may be communicated with the cleaning module. The extension tube 150 may be communicated with the main body 110. The extension tube 150 may be communicated with the suction part 112 of the main body 110. The extension tube 150 may be formed in a long cylindrical shape.

[0106] The main body 110 may be connected to the extension tube 150. The main body 110 may be connected to the cleaning module through the extension tube 150. The main body 110 may generate a suction force through the suction device 114, and provide the suction force to the cleaning module through the extension tube 150. External dust may flow into the main body 110 through the cleaning module and the extension tube 150.

[0107] The cleaner 100 may include the cleaning module 160. The cleaning module 160 may be communicated with the extension tube 150. Therefore, external air may flow into the main body 110 of the cleaner 100 through the cleaning module 160 and the extension tube 150 by a suction force generated in the main body 110 of the cleaner 100.

[0108] The cleaner according to an embodiment of the present disclosure may include the filter part 200.

[0109] The filter part 200 may filter the air discharged from the first cyclone part 113. The filter part 200 may guide air from which dust is separated while passing through the first cyclone part 113 to the second cyclone part 300.

[0110] The filter part 200 may include the case 210 and the mesh filter 220.

[0111] The case 210 may be disposed inside the dustbin 120. The case 210 may be disposed inside the first cyclone part 113.

[0112] A space may be formed inside the case 210. The second cyclone part 300 may be disposed inside the case 210.

[0113] The case 210 may be formed in a cylindrical shape, although not limited thereto.

[0114] A central axis a4 of the case 210 may extend in the up and down directions. The central axis a4 of the case 210 may extend along a longitudinal direction

of the case 210.

[0115] The case 210 may consist of the upper case 210a and the lower case 210b. The upper case 210a may be coupled to an upper edge of the mesh filter 220, and the lower case 210b may be coupled to a lower edge of the mesh filter 220.

[0116] As an example, the central axis a4 of the case 210 may form a coaxial line with the axis a2 of the cyclone flow generated in the first cyclone part 113. As another example, the central axis a4 of the case 210 may be formed parallel to the axis a2 of the cyclone flow generated in the first cyclone part 113. As another example, the central axis a4 of the case 210 may form a coaxial line with the rotational axis a3 of the suction device 114.

[0117] The mesh filter 220 may filter dust from air discharged from the first cyclone part 113.

[0118] The mesh filter 220 may have a plurality of holes having a predetermined diameter. Therefore, large foreign substances included in air discharged from the first cyclone part 113 can be filtered by the mesh filter 220.

[0119] The mesh filter 220 may be disposed in the case 210. The mesh filter 220 may mean a part of the case 210. Alternatively, the mesh filter 220 may be disposed between the cases 210. For example, the case 210 may consist of the upper case 210a and the lower case 210b, an upper edge of the mesh filter 220 may be coupled to the upper case 210a, and a lower edge of the mesh filter 220 may be coupled to the lower case 210b.

[0120] Air passing through the mesh filter 220 may flow into the second cyclone part 300 disposed inside the case 210.

[0121] At this time, an outer side and/or outside of the case 210 may mean a direction facing the first cyclone part 113 based on the case 210, and an inner side and/or inside of the case 210 may mean a direction facing the second cyclone part 300 based on the case 210.

[0122] The cleaner according to an embodiment of the present disclosure may include the second cyclone part 300.

[0123] At least a portion of the second cyclone part 300 may be disposed inside the first cyclone part 113, and may separate dust from air discharged from the first cyclone part 113. After dust is separated from air by the first cyclone part 113, the air discharged from the first cyclone part 113 may flow into the second cyclone part 300 along the flow path.

[0124] The second cyclone part 300 may consist of an assembly of axial flow cyclones formed to separate dust from air flowing in an axial direction. The assembly of axial flow cyclones may include the cyclone body 310 and a dust separation unit 320.

[0125] The second cyclone part 300 may include the cyclone body 310, the dust separation unit 320, and the guide vane 330.

[0126] The cyclone body 310 is a configuration applying the principle of a dust collector using a centrifugal force to separate dust from air passing through the filter part 200. Specifically, the cyclone body 310 may separate dust from air passing through the mesh filter 220 using a cyclonic flow. Since a space through which air can flow may be formed inside the cyclone body 310, air passing through the mesh filter 220 may flow into the inside of the cyclone body 310.

[0127] The cyclone body 310 may be disposed inside the case 210. Specifically, at least a portion of the cyclone body 310 may be disposed inside the case 210, and air passing through the mesh filter 220 may flow into the inside of the cyclone body 310.

[0128] A plurality of cyclone bodies 310 may be provided. An inlet 310a forming an outer wall around a hollow portion may be formed in each cyclone body 310. The outer walls around the hollow portion formed by the cyclone bodies 310 may correspond to the outer walls of each axial flow cyclone. Air discharged from the first cyclone part 113 may flow into the inside of the cyclone body 310 through the inlet 310a. Air rotating along an inner circumferential surface of the cyclone body 310 may form a cyclonic flow.

[0129] Dust heavier than air may rotate while drawing a rotational radius larger than air within the swirl flow. Since dust rotates inside the cyclone body 310, a maximum rotational radius of the dust can be defined by the cyclone body 310.

[0130] A lower portion of the cyclone body 310 may have an inclined shape so as to become narrower as it goes downward. The reason why the lower portion of the cyclone body 310 has a shape that becomes narrower as it goes downward is to induce a drop of dust separated from air and to prevent dust from being discharged to a vortex finder 321 along with the air.

[0131] The lower portion of the cyclone body 310 may be supported by a support member 212. The support member 212 may be disposed to surround an outer circumferential surface of each cyclone body 310. A plurality of through holes may be formed in the support member 212 at positions facing the cyclone bodies 310, and the lower portion of the cyclone body 310 may be inserted into each of the through holes. Since the lower portion of the cyclone body 310 has an inclined shape so as to become narrower as it goes downward, the cyclone body 310 may be supported by the support member 212 at a position where sizes of an outer circumferential surface of the cyclone body 310 and a through hole are the same.

[0132] The support member 212 may partition an inner space of the filter part 200 into a space in which air before passing through the cyclone body 310 flows, and a space in which air passing through the cyclone body 310 flows. At this time, the space in which air passing through the cyclone body 310 flows may be a first dust storage part 230a.

[0133] A fixing groove (not shown) may be provided

in the support member 212. The fixing groove may be disposed along an outer circumferential surface of the support member 212, and the fixing groove is coupled to a fixing protrusion (not shown) disposed on an inner circumferential surface of the case 210 to set a coupling position and prevent arbitrary relative rotation. Since arbitrary relative rotation may occur between the dust separation unit 320 and the case 210, arbitrary relative rotation must be prevented for normal operation of the second cyclone part 300.

[0134] The fixing protrusion of the case 210 is configured to be insertable into the fixing groove, and may be formed on any one of the support member 212 and the case 210. The fixing groove of the support member 212 is configured to accommodate the fixing protrusion of the case 210, and may be formed on the other of the support member 212 and the case 210. In addition, a plurality of fixing grooves of the support member 212 and a plurality of fixing protrusions of the case 210 may be provided.

[0135] An outlet may be formed at a lower portion of the cyclone body 310. That is, dust separated from air inside the cyclone body 310 may be discharged from the cyclone body 310 through the outlet. In addition, the lower portion of the cyclone body 310 may be communicated with an internal space of the storage member 211. Therefore, dust rotating along the swirl flow inside the cyclone body 310 may fall and be stored in the storage member 211. Dust stored in the storage member 211 may be communicated with an external space when the discharge cover 122 is opened.

[0136] An upper portion of the cyclone body 310 may be formed to accommodate the vortex finder 321. The upper portion of the cyclone body 310 may be formed to have a constant inner diameter. The upper portion and the lower portion of the cyclone body 310 may be distinguished based on a position where an inner diameter narrows.

[0137] An outer circumferential surface of each cyclone body 310 is connected to be in contact with the surrounding cyclone bodies 310, so that the plurality of cyclone bodies 310 may form one member. A cross section of each cyclone body 310 preferably has a circular shape as shown in the drawings. If the cross section of the cyclone body 310 is formed in a circular shape, even if the outer circumferential surfaces of adjacent cyclone bodies 310 are in close contact with each other, flow paths of air and dust can be formed therebetween. If the flow paths of air and dust are formed between the cyclone bodies 310, there is an advantage that a separate flow path structure does not need to be installed.

[0138] It is not excluded that the cross section of each cyclone body 310 is formed in a polygonal shape. However, even if the cross section of each cyclone body 310 is formed in a polygonal shape, it is preferable to be made of a polygon capable of forming flow paths of air and dust.

[0139] The dust separation unit 320 may be disposed above the cyclone body 310 to form an assembly of axial flow cyclones together with the cyclone body 310. The cyclone body 310 may form a part of the assembly, and the dust separation unit 320 may form the remaining part of the assembly. That is, an assembly of axial flow cyclones may be formed by the plurality of cyclone bodies 310 and one member.

[0140] The dust separation unit 320 may include the vortex finder 321, a band member 322, an edge member 323, and a fixing member 324. Since the dust separation unit may be a single integral member, the vortex finder 321, the band member 322, the edge member 323, and the fixing member 324 may refer to each part of the dust separation unit 320.

[0141] The vortex finder 321 is a configuration for discharging air passing through a cyclonic flow from the inside of the cyclone body 310. A flow path through which air can flow may be formed inside the vortex finder 321. A plurality of vortex finders 321 may be provided, and at least a portion of each vortex finder 321 may be disposed inside each cyclone body 310. An outer circumferential surface of each vortex finder 321 may be spaced apart from an inner circumferential surface of each cyclone body 310. Each vortex finder 321 has an inlet forming an outer wall around a hollow portion, and air passing through the cyclone body 310 may be discharged to the inlet of each vortex finder 321. In addition, air introduced into the inlet of the vortex finder 321 flows upward and can be discharged to an outlet 321a of the vortex finder 321.

[0142] A lower portion of the vortex finder 321 may have a higher height compared to the band member 322. However, an upper portion of the vortex finder 321 may have the same height as the band member 322. In the drawing, it can be seen that a lower end of the vortex finder 321 protrudes downward from the dust separation unit 320, but it can be seen that an upper end does not.

[0143] A cross section of each vortex finder 321 preferably has a circular ring shape. It is not excluded that the cross section of each vortex finder 321 is formed in a polygonal shape. However, even if the cross section of each vortex finder 321 is formed in a polygonal shape, it is preferable to be made of a polygon capable of forming flow paths of air and dust.

[0144] The band member 322 may be formed to surround the outer circumferential surface of the vortex finder 321. At this time, the band member 322 may be named differently as needed. For example, names such as a ring portion, a ring part, an edge portion, a circumference portion, a circle portion, a support portion, a connection portion, an outer portion, a cyclone boundary portion, and an outer wall portion may be considered, and other names are also possible. The band member 322 may be seated on the case 210, and may have a shape corresponding to an upper portion of the case 210. The upper portion of the case 210

may be formed in a circular shape, and the band member 322 may also be formed in a circular shape surrounding the vortex finder 321. However, it is not excluded that the upper portion of the case 210 and the band member 322 are formed in a polygonal shape.

[0145] The band member 322 may form a guide flow path guiding air discharged from the first cyclone part 113 to the inside of the cyclone body 310. Here, the guide flow path may mean a space between the band member 322 and the inlet 310a. That is, air discharged from the first cyclone part 113 and passing through the mesh filter 220 may pass through the guide flow path and flow into the inside of the cyclone body 310 through the inlet 310a.

[0146] Meanwhile, an assembly of axial flow cyclones of the cleaner according to the present invention may be formed by the flow of air passing through the cyclone body 310 and the vortex finder 321.

[0147] A positioning step (not shown) of the dust separation unit 320 is fitted into a step (not shown) of the case 210 so that a coupling position can be set and arbitrary relative rotation can be prevented. Since arbitrary relative rotation may occur between the dust separation unit 320 and the case 210, arbitrary relative rotation must be prevented for normal operation of the second cyclone part 300.

[0148] A fixing member 324 fixing the support member 212 to the band member 322 may be provided in the band member 322. The fixing member 324 may be disposed on a lower surface of the band member 322. The fixing member 324 may extend downward from a center of the lower surface of the band member 322.

[0149] The fixing member 324 may be fitted into an insertion groove 311. The insertion groove 311 may be formed by the cyclone bodies 310 located in a center among the plurality of cyclone bodies 310. That is, since an outer circumferential surface of the cyclone bodies 310 located in the center among the plurality of cyclone bodies 310 is connected to contact surrounding cyclone bodies 310, the insertion groove 311 is surrounded by outer circumferential surfaces of the cyclone bodies 310 located in the center.

[0150] The insertion groove 311 may be formed corresponding to the fixing member 324. In a state in which the fixing member 324 is fitted into the insertion groove 311, the plurality of cyclone bodies 310 may be disposed radially around the fixing member 324. The fixing member 324 fitted into the insertion groove 311 is fitted into a fixing protrusion formed on an upper surface of the support member 212 to set a coupling position, and arbitrary relative rotation between the dust separation unit 320 and the cyclone body 310 can be prevented.

[0151] The edge member 323 may be formed to surround the band member 322 to form an edge of the dust separation unit 320. The edge member 323 may surround the band member 322 on the outside of the band member 322. Meanwhile, the edge member 323

may form a fixing step together with the band member 322. That is, since some of side surfaces of the band member 322 and a lower surface of the edge member 323 form the fixing step, the case 210 may be fitted into the fixing step.

[0152] Since the vortex finder 321 and the band member 322 are connected to each other, and the band member 322 is connected to the edge member 323, the dust separation unit 320 may be formed as a single integral member.

[0153] The guide vane 330 is a configuration guiding air discharged from the first cyclone part 113 to the inside of the cyclone body 310. The guide vane 330 may form a flow path through which air introduced through the inlet can flow into the inside of the cyclone body 310. Therefore, that is, air flowing along the flow path formed by the guide vane 330 may form a swirl flow between the vortex finder 321 and the cyclone body 310.

[0154] At least a portion of the guide vane 330 is disposed between the cyclone body 310 and the vortex finder 321 to be connected to each cyclone body 310 and each vortex finder 321. One side of the guide vane 330 may be connected to an outer surface of the vortex finder 321 along a spiral direction, and the other side of the guide vane 330 may be connected to an inner surface of the cyclone body 310 along a spiral direction.

및 먼지는 선회 흐름을 형성할 수 있다.

[0155] A plurality of guide vanes 330 may be provided for each cyclone body 310 and each vortex finder 321, and the guide vane 330 may extend along a spiral direction to generate a swirl flow. As the guide vane 330 extends in a spiral direction, air and dust introduced into the inlet of the cyclone body 310 can form a swirl flow.

[0156] Hereinafter, the flow of air flowing through the flow path of the cleaner according to an embodiment of the present disclosure will be described.

[0157] First, when the suction device 114 is operated, external air may be introduced into the inside of the dustbin 120 through the suction part 112.

[0158] Air from which dust is separated by the first cyclone part 113 inside the dustbin 120 may pass through the mesh filter 220 formed in the case 210 and flow into a flow path between the cyclone body 310 and the case 210. At this time, a flow path between the cyclone body 310 and the case 210 may be formed between an outer circumferential surface of the cyclone body 310 and an inner circumferential surface of the case 210.

[0159] Air passing through the mesh filter 220 may pass through the flow path between the cyclone body 310 and the case 210, and then flow into the inside of the cyclone body 310 through the inlet of the cyclone body 310.

[0160] Air flowing into the inside of the cyclone body 310 forms a swirl flow, falls, and then flows upward to

pass through the vortex finder 321. Dust of air passing through the vortex finder 321 can be filtered by a pre-filter disposed above the second cyclone part 300. Air in which dust is filtered from the pre-filter may flow toward the suction device 114 disposed downstream of the suction airflow. Air passing through the suction device 114 may pass through a HEPA filter and then be discharged to the outside via an air discharge opening of the air discharge cover 115.

[0161] Fig. 6 is a cross-sectional perspective view of a cleaner according to a first embodiment of the present disclosure, Fig. 7 is a view for explaining an area A shown in Fig. 6 in detail, and Figs. 8 and 9 are views for explaining a guide part according to the first embodiment of the present disclosure.

[0162] Hereinafter, a guide part of the cleaner according to the first embodiment of the present disclosure will be described with reference to Figs. 6 to 9.

[0163] Meanwhile, in first to third embodiments of the present disclosure, a direction of the cleaner 100 may be defined based on the second cyclone part 300. At this time, an upper side is a direction in which the suction device 114 is disposed based on the second cyclone part 300, and a lower side may mean a direction in which the discharge cover 122 of the dustbin 120 is disposed based on the second cyclone part 300.

[0164] A guide part 400 according to the first embodiment of the present disclosure may guide air passing through the filter part 200 so as to be introduced into the second cyclone part 300. At this time, if the cleaner 100 does not include the second cyclone part 300, the guide part 400 may guide air passing through the filter part 200 to flow upward toward the suction device 114.

[0165] The guide part 400 may reduce a space in which air passing through the mesh filter 220 can flow inside the mesh filter 220. Therefore, air passing through the mesh filter 220 may flow upward along the guide part 400 and be introduced into the cyclone body 310.

[0166] The guide part 400 may be disposed between the plurality of cyclone bodies 310. That is, the guide part 400 may be composed of a plurality of members. Through this, the guide part 400 may block air passing through the mesh filter 220 from flowing between the plurality of cyclone bodies 310.

[0167] The guide part 400 may be formed in a plate shape having a predetermined curvature. In addition, both end portions of the guide part 400 may be formed to correspond to outer circumferential surfaces of the cyclone body 310. Therefore, the guide part 400 can be fitted between two cyclone bodies 310.

[0168] The guide part 400 may guide air passing through the mesh filter 220 to the inlet 310a of the cyclone body 310. The guide part 400 may be disposed in a lower space inside the mesh filter 220. Through this, the guide part 400 prevents air passing through the mesh filter 220 from flowing an outer lower portion of the cyclone body 310 to increase a flow amount of

air introduced into the inlet 310a of the cyclone body 310.

[0169] A distance from the dustbin central axis a1 to the guide part 400 may be smaller than a distance from the dustbin central axis a1 to the filter part 200. A distance from the dustbin central axis a1 to the guide part 400 may be smaller than a distance from the dustbin central axis a1 to the mesh filter 220.

[0170] The guide part 400 may be disposed between outermost cyclone bodies 310 among the plurality of cyclone bodies 310. Therefore, the guide part 400 may block air passing through the mesh filter 220 from flowing into a center portion of the filter part 200.

[0171] A maximum height of the guide part 400 may be equal to or lower than a height of the inlet 310a. An upper end portion of the guide part 400 may have the same or lower height as the inlet 310a, and a lower end portion of the guide part 400 may contact the support member 340.

[0172] The guide part 400 may extend upward from the support member 340. The guide part 400 may contact the support member 340 or be connected to the support member 340.

[0173] Air passing through the mesh filter 220 may flow into a space formed by the cyclone body 310, the guide part 400, and the support member 340. In addition, air flowing into the cyclone body 310, the guide part 400, and the support member 340 may flow upward through an open upper side and be introduced into the inlet 310a of the cyclone body 310.

[0174] Since the cleaner 100 of the present disclosure includes the guide part 400 disposed inside the mesh filter 220 and having a predetermined height, air discharged from the first cyclone part 113 can flow more into an upper portion of the mesh filter 220.

[0175] In addition, since dust stored in the dustbin 120 accumulates more at a lower portion than an upper portion of the dustbin 120, if more suction air flow is delivered to an upper portion than a lower portion of the mesh filter 220, a phenomenon in which holes of the mesh filter 220 are clogged due to dust in air discharged from the first cyclone part 113 can be reduced.

[0176] Fig. 10 is a cross-sectional perspective view of a cleaner according to a second embodiment of the present disclosure, Fig. 11 is a view for explaining an area B shown in Fig. 10 in detail, and Fig. 12 is a view for explaining a guide part of the cleaner according to the second embodiment of the present disclosure.

[0177] Hereinafter, a guide part of the cleaner according to the second embodiment of the present disclosure will be described with reference to Figs. 10 to 12.

[0178] In order to avoid a redundant description, except for what is specifically mentioned in the second embodiment of the present disclosure, other configurations may cite the content of the cleaner according to the first embodiment of the present disclosure.

[0179] Unlike the guide part 400 according to the first

embodiment composed of a plurality of members, a guide part 1400 according to the second embodiment of the present disclosure has a difference in that it consists of one member.

[0180] In addition, the guide part 1400 may be disposed between the filter part 200 and the second cyclone part 300. Specifically, the guide part 1400 may surround the second cyclone part 300 in a state of being spaced apart from the second cyclone part 300. That is, the guide part 1400 may be a ring-shaped member surrounding the plurality of cyclone bodies 310.

[0181] In addition, since the guide part 1400 is disposed between the mesh filter 220 and the plurality of cyclone bodies 310, a diameter of the guide part 1400 may be smaller than a diameter of the filter part 200.

[0182] Fig. 13 is a cross-sectional view of a cleaner according to a third embodiment of the present disclosure, and Fig. 14 is a view for explaining a guide part of the cleaner according to the third embodiment of the present disclosure.

[0183] In order to avoid a redundant description, except for what is specifically mentioned in the third embodiment of the present disclosure, other configurations may cite the content of the cleaner according to the first embodiment of the present disclosure.

[0184] The cleaner according to the third embodiment of the present disclosure has a difference from the cleaner according to the first embodiment in that a position and structure of a suction part 2112 and an extension tube 2150 are different from a suction part 112 and an extension tube 150 of the cleaner according to the first embodiment.

[0185] Specifically, while the extension tube 150 according to the first embodiment of the present disclosure is disposed to intersect the dustbin central axis a1 vertically, the extension tube 2150 according to the third embodiment may be disposed to coincide with or be parallel to the dustbin central axis a1.

[0186] Therefore, at least a portion of the suction part 2112 may be disposed between the plurality of cyclone bodies 310. In addition, at least a portion of the extension tube 2150 may also be disposed between the plurality of cyclone bodies 310.

[0187] Although the present disclosure has been described in detail through specific embodiments above, this is for describing the present disclosure in detail, and the present disclosure is not limited thereto, and it is obvious that modifications or improvements can be made by a person having ordinary skill in the art within the technical spirit of the present disclosure.

[0188] All simple modifications or changes of the present disclosure fall within the scope of the present disclosure, and the specific protection scope of the present disclosure will be clarified by the appended claims.

Claims**1.** A cleaner comprising:

a suction part configured to guide air to an inside of a dustbin; 5
 a suction device configured to generate a suction airflow so that air is sucked into the suction part;
 a first cyclone part configured to separate dust from the air sucked through the suction part; 10
 a filter part configured to filter dust from the air discharged from the first cyclone part; and
 a guide part configured to guide the air passing through the filter part to flow toward the suction device. 15

2. A cleaner, comprising:

a suction part configured to guide air to an inside of a dustbin; 20
 a first cyclone part configured to separate dust from the air sucked through the suction part;
 a filter part configured to filter dust from the air discharged from the first cyclone part; 25
 a second cyclone part configured to separate dust from the air discharged from the filter part; and
 a guide part configured to guide the air passing through the filter part to be introduced into the second cyclone part. 30

3. The cleaner of claim 2, wherein the second cyclone part comprises a plurality of cyclone bodies into which the air discharged from the first cyclone part is introduced, and 35
 the guide part is disposed between the plurality of cyclone bodies.

4. The cleaner of claim 2, wherein the guide part is disposed between the filter part and the second cyclone part. 40

5. The cleaner of claim 2, wherein the guide part surrounds the second cyclone part in a state of being spaced apart from the second cyclone part. 45

6. The cleaner of claim 5, wherein a diameter of the guide part is smaller than a diameter of the filter part. 50

7. The cleaner of claim 2, wherein the second cyclone part comprises a cyclone body having an inlet formed therein, into which the air discharged from the first cyclone part is introduced, and 55
 a maximum height of the guide part is equal to or lower than a height of the inlet.

8. The cleaner of claim 2, wherein the second cyclone part comprises:

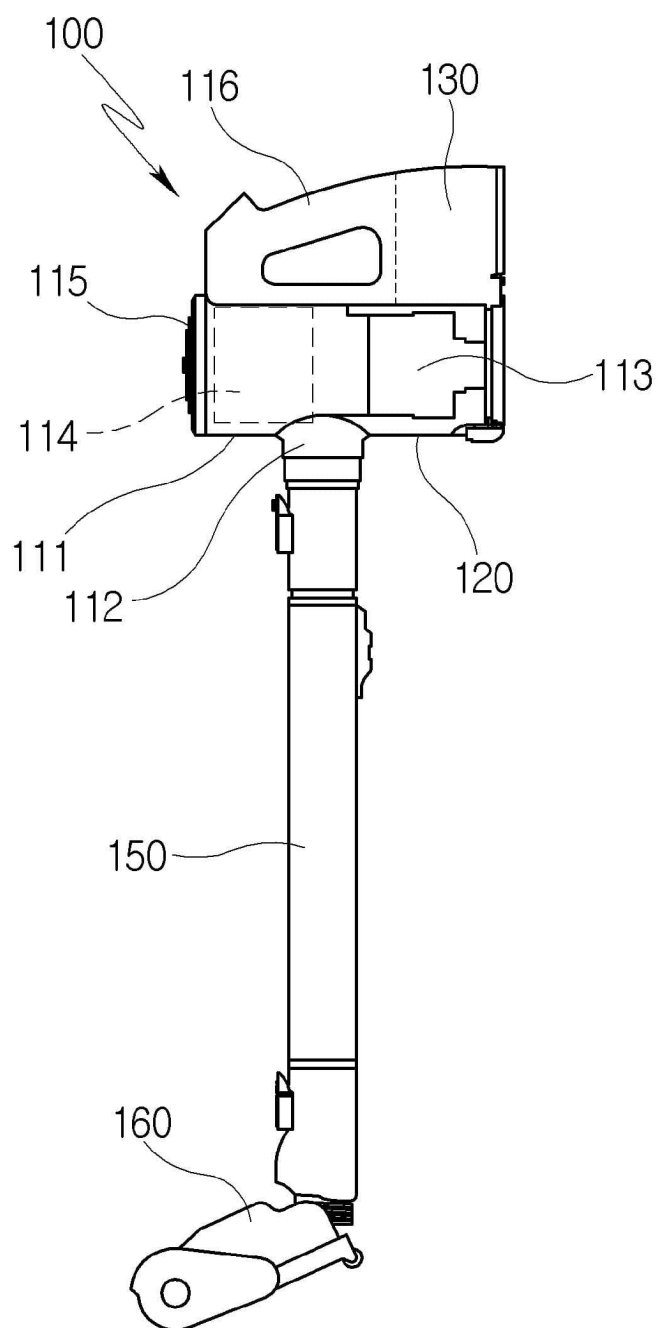
a cyclone body into which the air discharged from the first cyclone part is introduced; and
 a support member configured to support the cyclone body,
 and the guide part contacts the support member.

9. The cleaner of claim 2, further comprising:

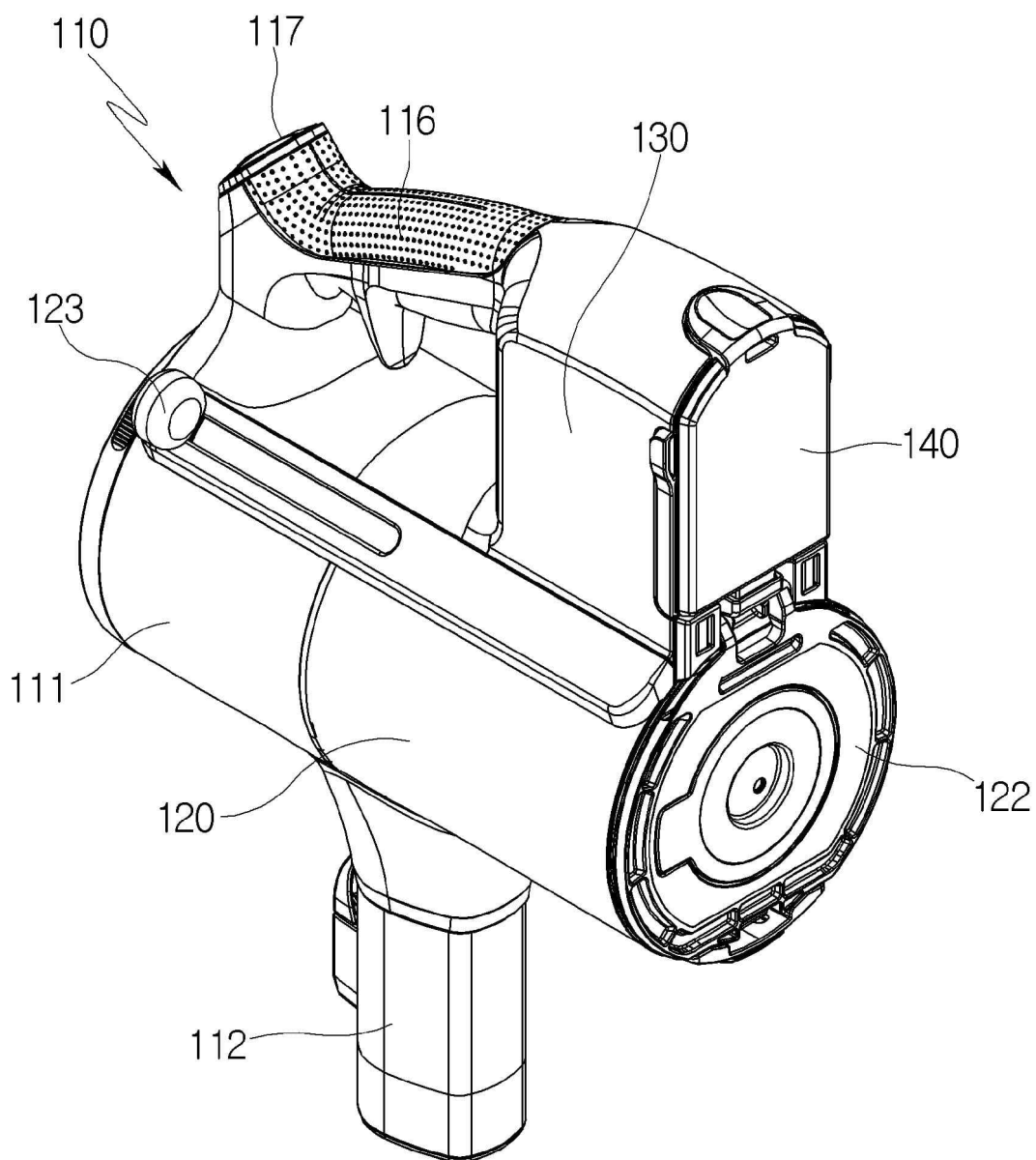
a virtual dustbin central axis extending along a longitudinal direction of the dustbin,
 wherein a distance from the dustbin central axis to the guide part is smaller than a distance from the dustbin central axis to the filter part.

10. The cleaner of claim 2, wherein the second cyclone part comprises a plurality of cyclone bodies into which the air discharged from the first cyclone part is introduced, and
 at least a portion of the suction part is disposed between the plurality of cyclone bodies.

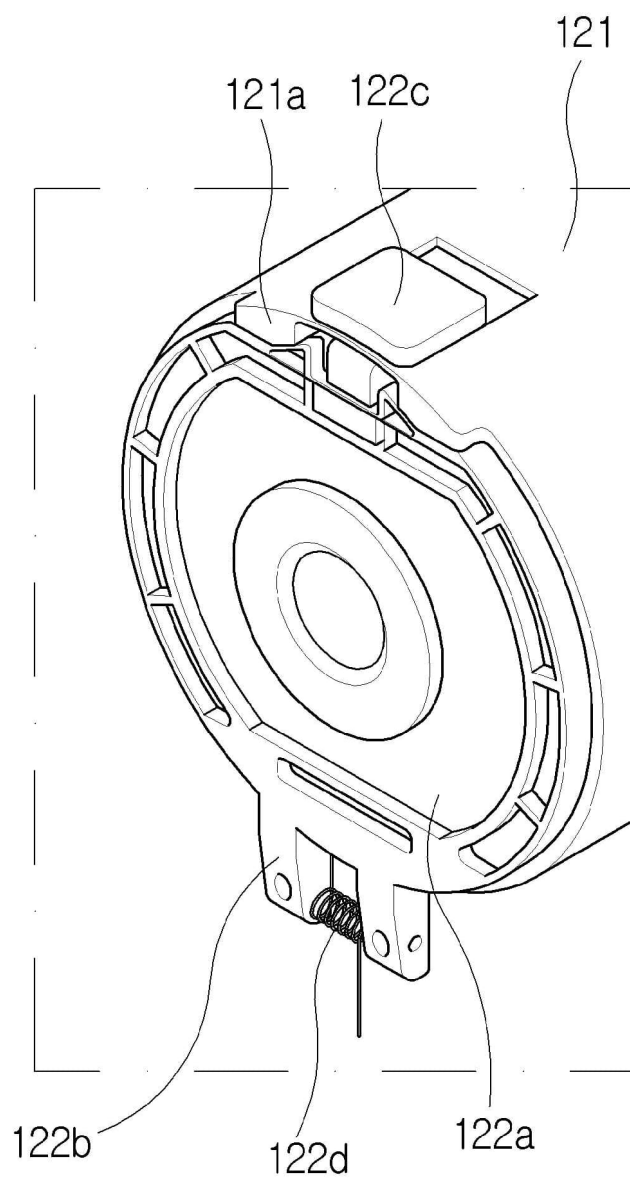
[Fig. 1]



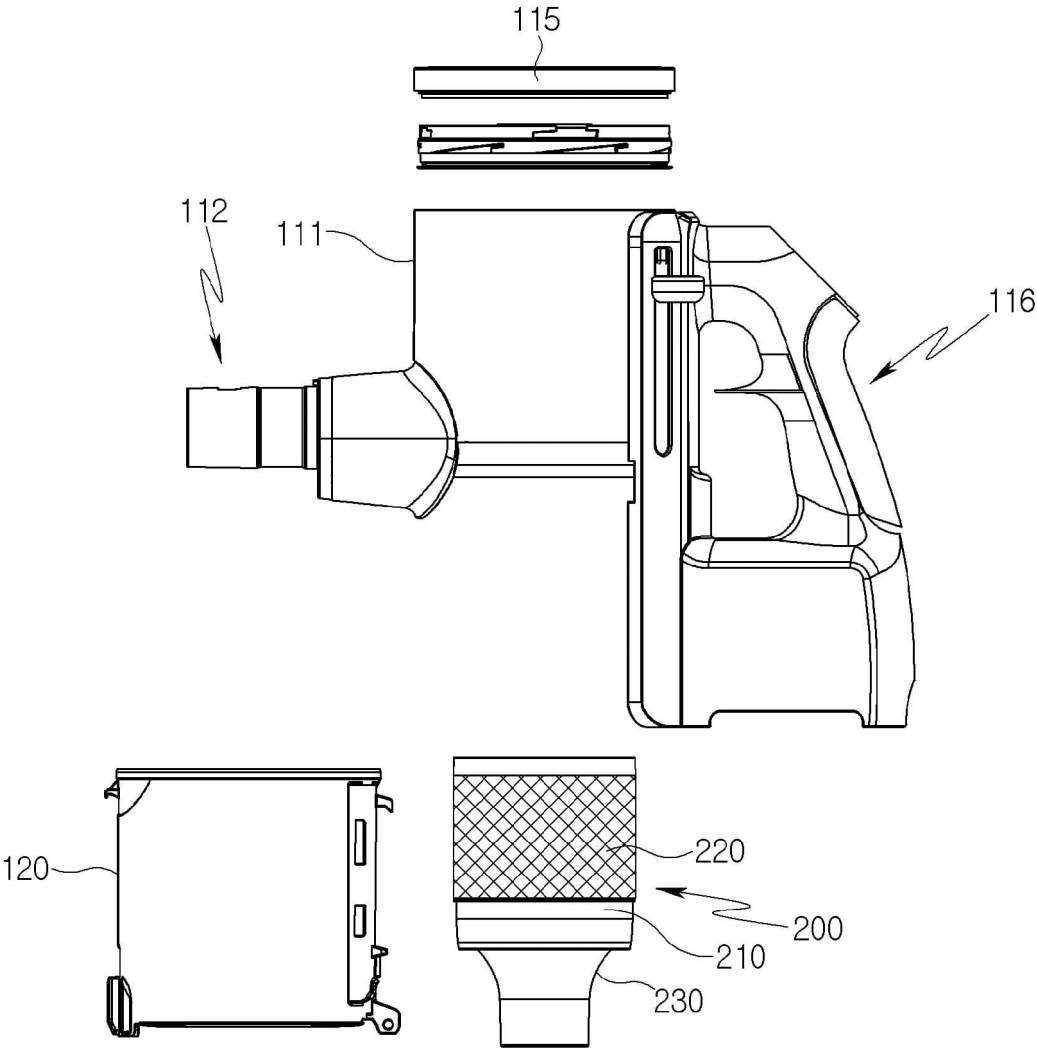
[Fig. 2]



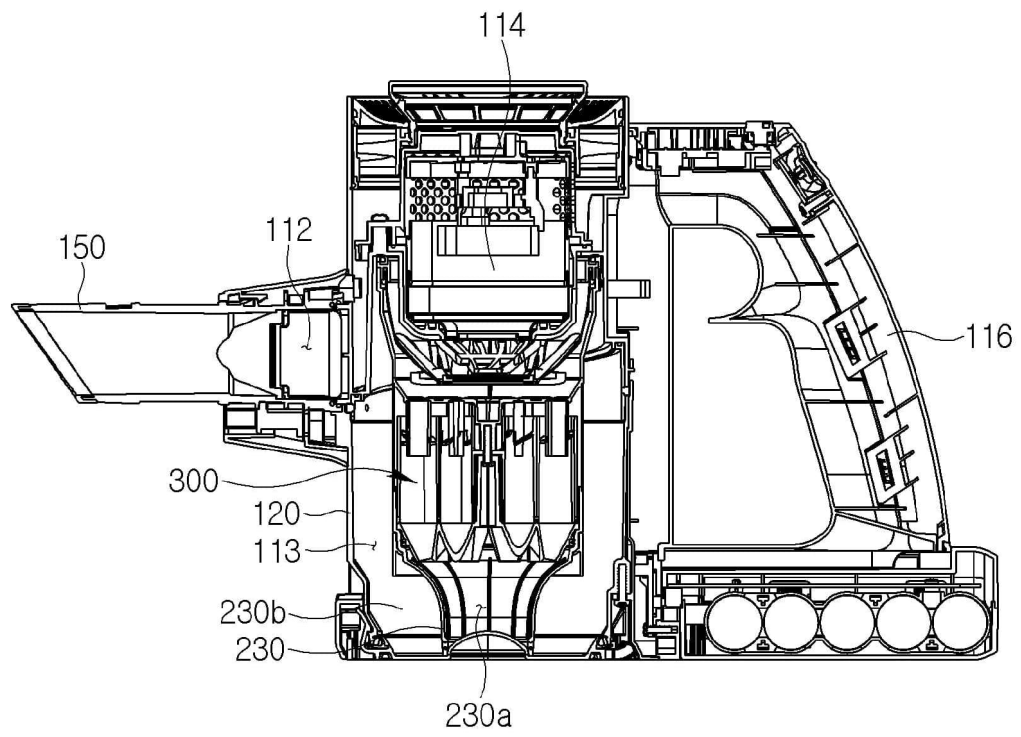
[Fig. 3]



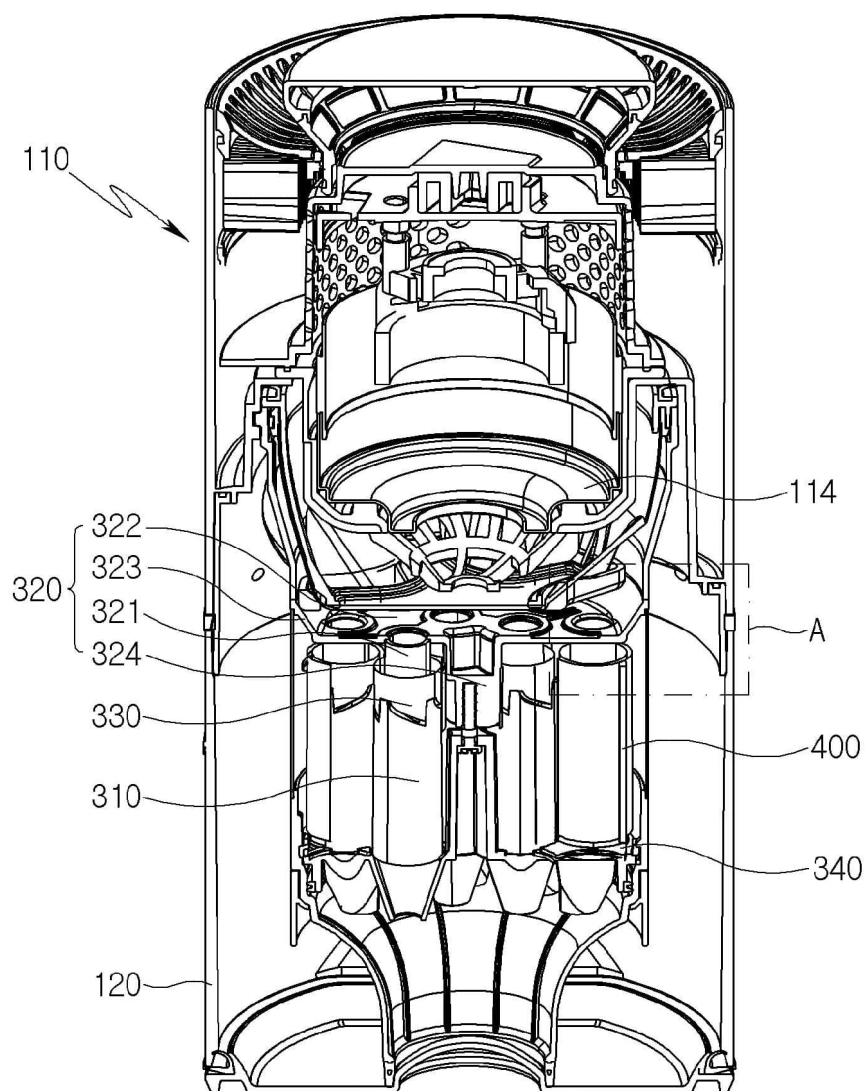
[Fig. 4]



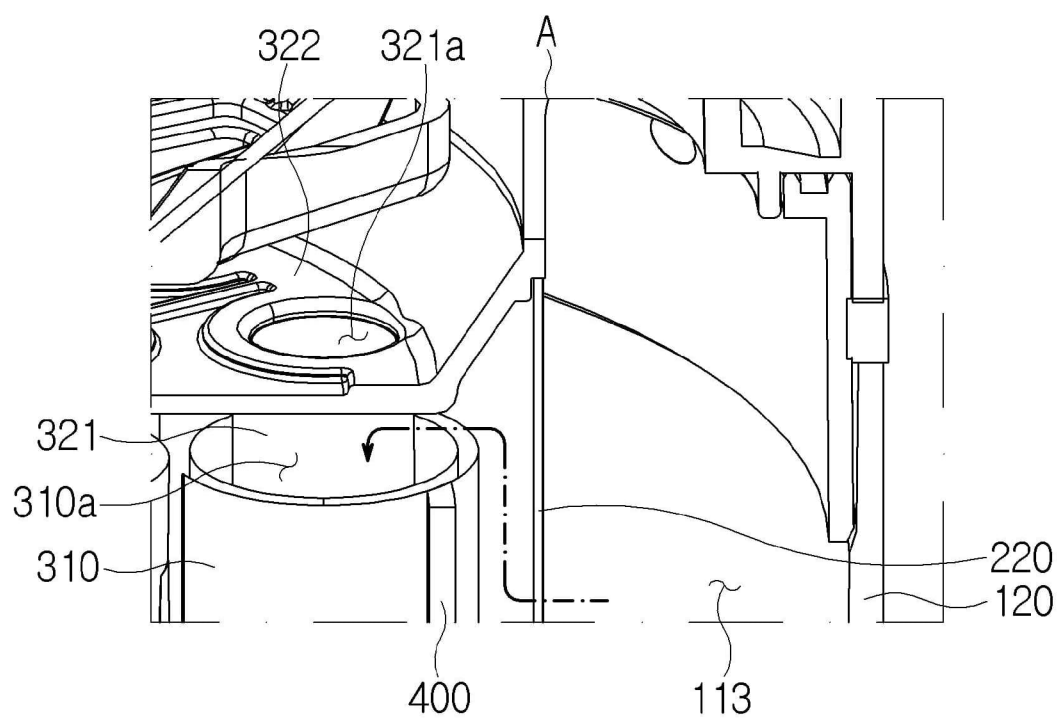
[Fig. 5]



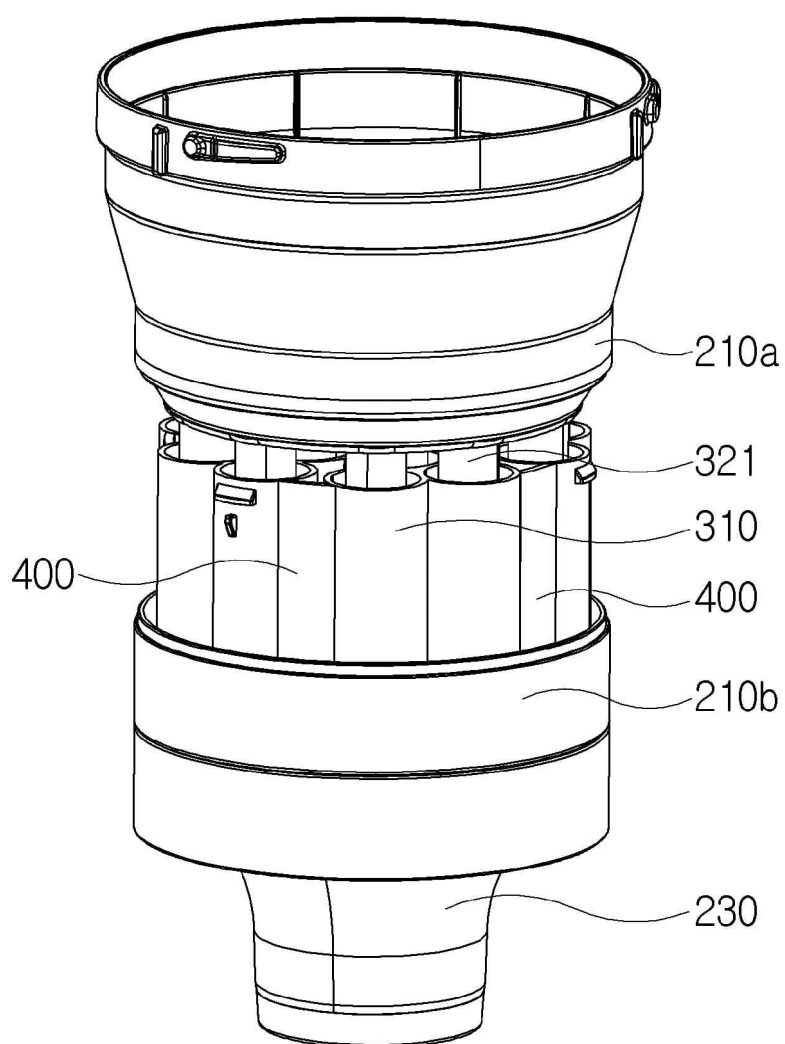
[Fig. 6]



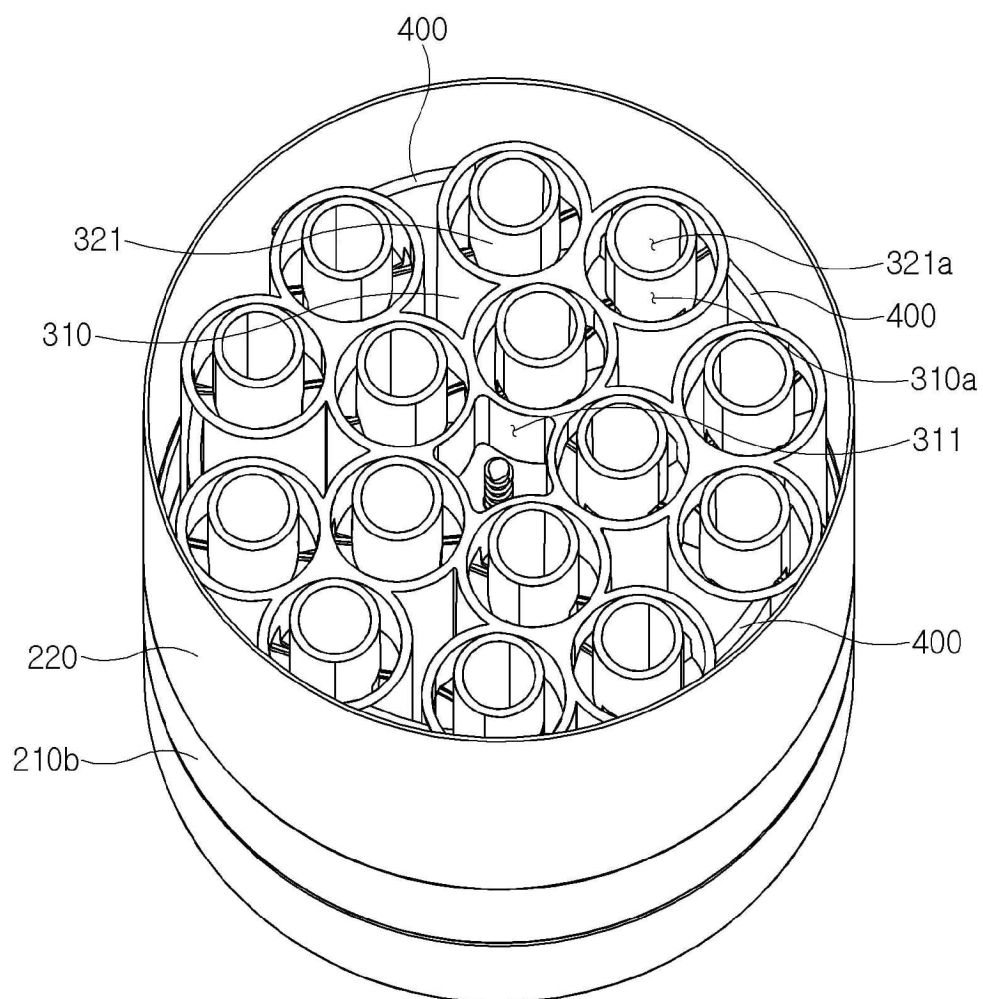
[Fig. 7]



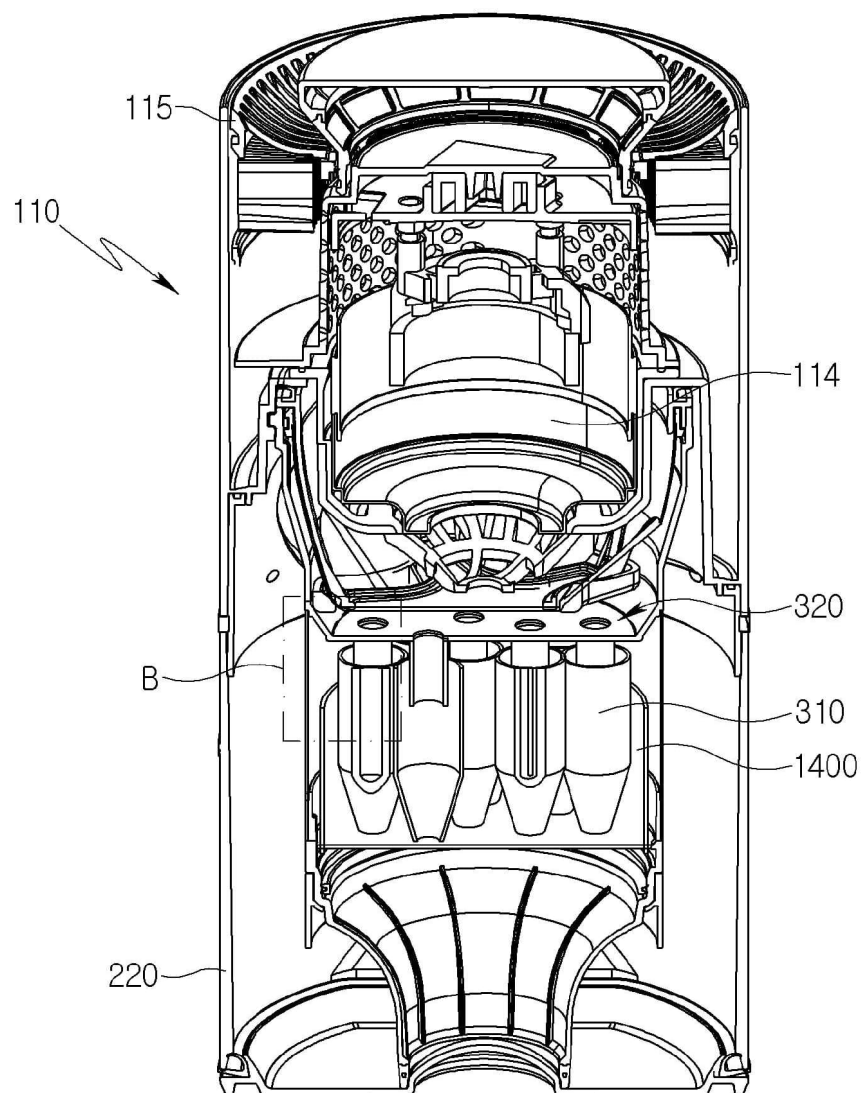
[Fig. 8]



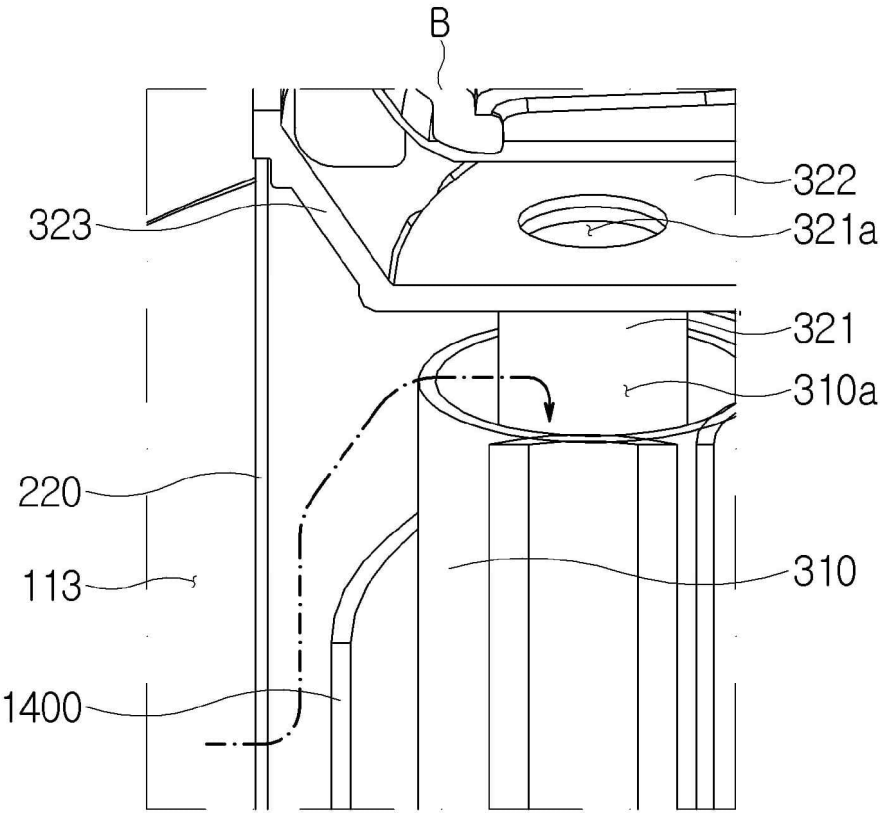
[Fig. 9]



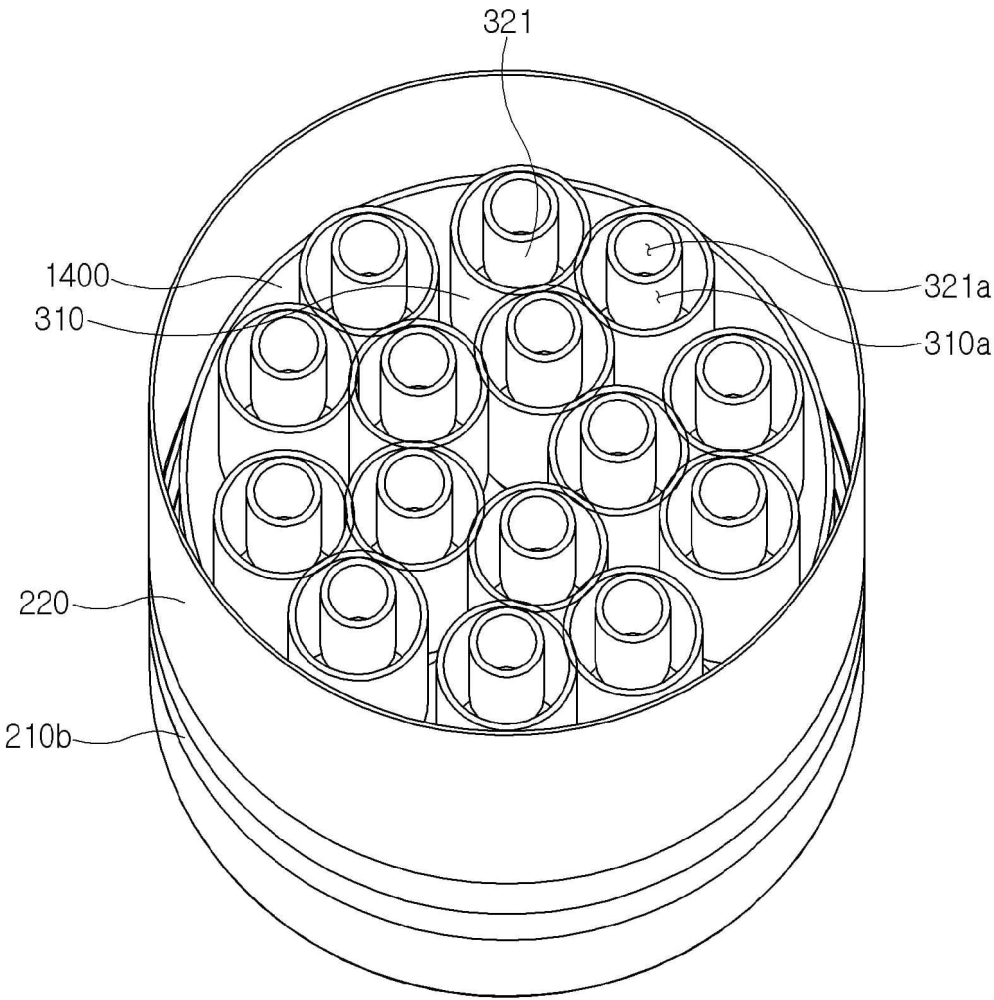
[Fig. 10]



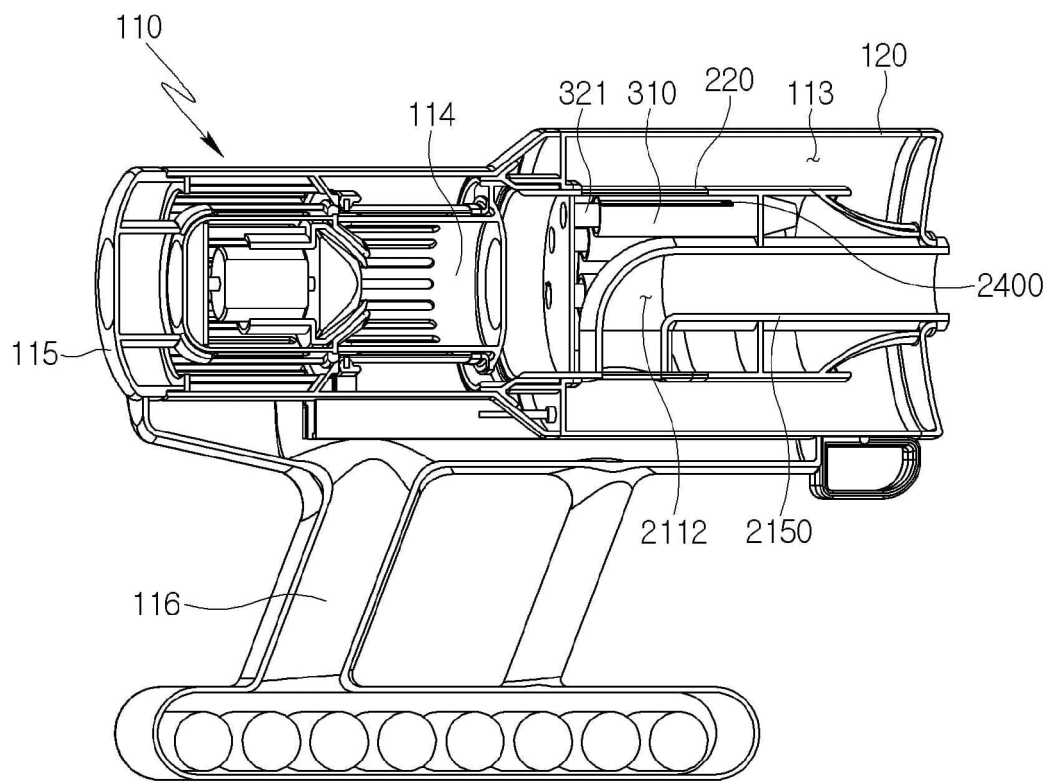
[Fig. 11]



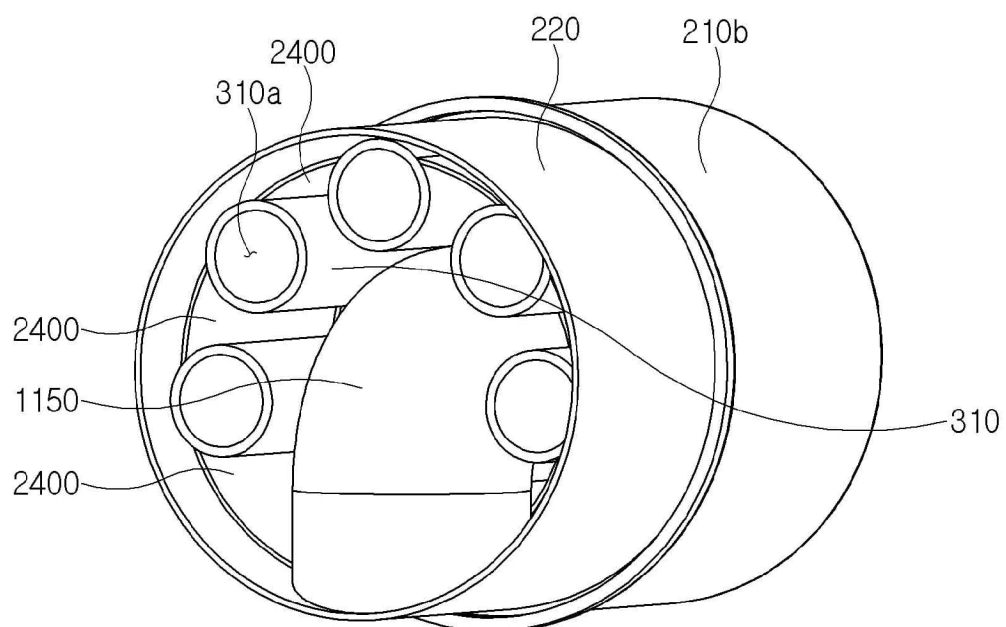
[Fig. 12]



[Fig. 13]



[Fig. 14]



INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2024/003859

A. CLASSIFICATION OF SUBJECT MATTER

A47L 9/16(2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A47L 9/16(2006.01); A47L 9/12(2006.01); B01D 50/00(2006.01)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models: IPC as above

Japanese utility models and applications for utility models: IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS (KIPO internal) & keywords: 청소기(vacuum cleaner), 흡입(intake), 싸이클론(cyclone), 가이드(guide), 필터(filter), 지지부채(supporter), 분리부(separator)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2016-0143498 A1 (JIANGSU MIDEA CLEANING APPLIANCES CO., LTD. et al.) 26 May 2016 (2016-05-26) See paragraphs [0071]-[0104] and figures 2-7.	1-10
Y	KR 10-2429246 B1 (LG ELECTRONICS INC.) 05 August 2022 (2022-08-05) See paragraphs [0081], [0131]-[0167] and [0216] and figures 9-13.	1-10
Y	KR 10-2015-0109045 A (SAMSUNG ELECTRONICS CO., LTD.) 01 October 2015 (2015-10-01) See paragraphs [0059] and [0081] and figures 4-5.	8
A	CN 111345731 A (BEIJING ROBOROCK TECHNOLOGY CO., LTD.) 30 June 2020 (2020-06-30) See claims 1-9 and figures 1, 4 and 7-8.	1-10
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☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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“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

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Date of the actual completion of the international search

19 November 2024

Date of mailing of the international search report

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EP 4 825 293 A1

INTERNATIONAL SEARCH REPORT Information on patent family members

International application No.

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