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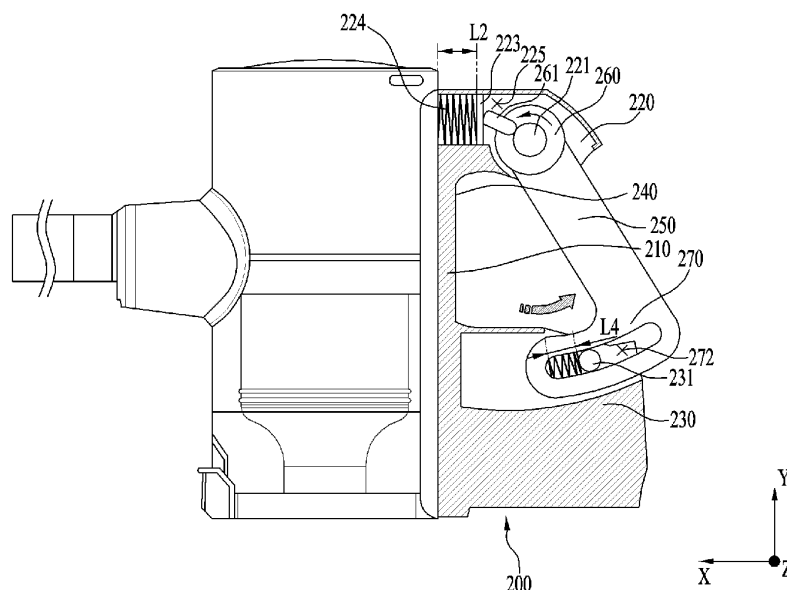
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(54) **CLEANER**

(57) Disclosed is a cleaner including a main body including a motor, a stick extending from the main body, wherein an inlet hole for sucking fluid by the motor is defined at an end of the stick located forward of the main body, and a handle disposed on the main body and gripped by a user, wherein the handle includes a hinge

coupling portion disposed on the main body and having a hinge shaft extending along a lateral direction of the main body, and a grip portion including a hinge portion pivotally coupled to the hinge shaft, wherein the grip portion extends from the hinge portion to be gripped by the user.

FIG. 3



Description

BACKGROUND

Field

[0001] The present disclosure relates to a cleaner, and to a cleaner that sucks dust using a motor and the like and collects the dust.

Discussion of the Related Art

[0002] A cleaner is an appliance that performs cleaning by sucking or wiping dust or a foreign substance in a region to be cleaned. Such a cleaner may be a manual cleaner for a user to perform the cleaning while directly moving the cleaner. The manual cleaners may be classified into canister-type cleaners, upright-type cleaners, handy cleaners, and the like based on a shape of the cleaner.

[0003] A cleaner is disclosed in Korean Patent Application Publication No. KR 10-2017-0079181 A1, which is a related document. The corresponding cleaner includes a main body including a motor, and the like, and a dust sucking portion extending from the main body. The dust sucking portion includes a handle that may be gripped by the user.

[0004] When the user uses the cleaner, a user's arm is moved forward and rearward to move a position of the dust sucking portion in a front and rear direction. In this case, an angle formed by a length direction of the dust sucking portion and the user's arm may change.

[0005] However, the corresponding cleaner is remained in a fixed state with respect to the dust sucking portion. Thus, the user must bend a wrist joint when the angle formed by the user's arm changes, which may cause discomfort in use and the wrist joint.

[0006] Therefore, in the cleaner that is used by the user by gripping the handle thereof, it is an important task in the present technical field to implement a structure that facilitates a movement of the cleaner or the handle, improves convenience of use, and is stable, simultaneously.

SUMMARY

[0007] Embodiments of the present disclosure aim to provide a cleaner that may increase a cleaning efficiency and effectively improve ease of use.

[0008] In addition, embodiments of the present disclosure aim to provide a cleaner that is structurally stable and is able to improve usability and convenience for the user.

[0009] Purposes of the present disclosure are not limited to the above-mentioned purpose. Other purposes and advantages of the present disclosure as not mentioned above may be understood from following descriptions and more clearly understood from embodiments of

the present disclosure. Further, it will be readily appreciated that the purposes and advantages of the present disclosure may be realized by features and combinations thereof as disclosed in the claims.

5 [0010] The object is solved by the features of the independent claims. Preferred embodiments are given in the dependent claims.

[0011] A cleaner according to an embodiment of the present disclosure may improve usability through an improved structure of a handle. During a cleaning operation using the cleaner, a fixed handle structure may cause discomfort to a musculoskeletal system such as a wrist, a shoulder, and the like by a changed position.

10 [0012] The cleaner according to an embodiment of the present disclosure may have a structure in which the handle structure varies corresponding to the cleaning operation. The variable structure may be used in a form fixed by a fixing mechanism. An embodiment of the present disclosure may identify by a rapid entire body assessment (REBA) analysis that the discomfort of the musculoskeletal system is improved by the improved structure of the present disclosure.

20 [0013] The cleaner according to an embodiment of the present disclosure may be rechargeable, and/or may use a stick-type hose. In one example, a risk of injury to the user's musculoskeletal system resulted from use of the cleaner using the stick-type hose may be increased.

25 [0014] An embodiment of the present disclosure may be a stick-type cleaner. A cleaner body and a battery, which is a power supply, may be integrated. A load on the wrist, the shoulder, and the like may increase in the stick-type cleaner compared to a canister-type cleaner that places the cleaner body and the power supply on a floor and drags the cleaner body and power supply using a wheel structure.

30 [0015] For example, the floor, which is a surface to be cleaned, and a stick-type nozzle are always in contact with each other during the cleaning operation. The cleaner body located at the handle is connected to a stick or a pipe through the nozzle to form a flow path.

35 [0016] The stick that may be constituted by the nozzle and the pipe changes a slope of the pipe such that the contact between the nozzle and the floor is maintained in pushing and pulling operations of the cleaner. In one example, in a cleaner in which the handle is fixed to have a specific angle, a radial deviation may occur based on a change in an angle of the pipe during the cleaning operation, and repeated bending of the wrist may cause tendonitis, fracture, and the like.

40 [0017] An embodiment of the present disclosure aims to reduce the discomfort or the risk of injury to the user's musculoskeletal system by providing the improved handle. In order to improve discomfort caused by the radial deflection, an embodiment of the present disclosure may prevent the bending of the wrist as the handle pivots around a hinge portion or a pivot.

45 [0018] In addition, a proper return operation of the handle may be implemented in the cleaning operation by

applying a spring or a friction damper. The spring or damper structure may be applied in a form of a torsion spring to the pivot.

[0019] The variable or pivoting structure of the handle may have a lock-unlock structure to restrict pivoting based on a use environment. A pivoting knob, a push button, a slide-type, or the like may be applied as the lock structure.

[0020] In one aspect of the present disclosure, a cleaner includes a main body including a motor, a stick extending from the main body, wherein an inlet hole for sucking fluid by the motor is defined at an end of the stick located forward of the main body, and a handle disposed on the main body and gripped by a user.

[0021] In addition, the handle includes a hinge coupling portion disposed on the main body and having a hinge shaft extending along a lateral direction of the main body, and a grip portion including a hinge portion pivotally coupled to the hinge shaft, wherein the grip portion extends from the hinge portion to be gripped by the user.

[0022] In one implementation, the handle may be disposed on a rear face of the main body, the hinge portion may be located at an upper end of the grip portion, and a lower end of the grip portion may be pivoted around the upper end thereof.

[0023] In one implementation, the hinge portion may be inserted into the hinge coupling portion and pivotably coupled to the hinge shaft.

[0024] In one implementation, the hinge coupling portion may include a first elastic portion whose amount of deformation increases as an amount of pivoting of the hinge portion increases, wherein the first elastic portion exerts a restoring force resulted from the deformation to the hinge portion.

[0025] In one implementation, the hinge portion may include a pressing protrusion protruding in a direction away from the hinge shaft, pivoting together with the hinge portion, and pressing the first elastic portion, and an amount or protrusion of the pressing protrusion toward the first elastic portion may change in response to the pivoting of the hinge portion.

[0026] In one implementation, the hinge coupling portion may include an elastic portion space extending in the direction away from the hinge shaft, and the first elastic portion may include a first spring disposed in the elastic portion space, extending parallel to the elastic portion space, and having a variable length as being pressed by the pressing protrusion.

[0027] In one implementation, the first elastic portion may further include a pressing plate coupled to an end of the first spring, wherein the pressing plate moves along the elastic portion space as one face thereof facing the hinge portion is pressed by the pressing protrusion.

[0028] In one implementation, the first elastic portion may include a second spring wound around the hinge shaft, wherein an amount of deformation of the second spring increases as an amount of pivoting of the grip portion increases.

[0029] In one implementation, the hinge coupling portion may further include a first coupling protrusion fixedly disposed inside the hinge coupling portion, wherein one end of the second spring is coupled and fixed to the first coupling protrusion, and the hinge portion may include a second coupling protrusion pivoted together with the hinge portion, wherein an opposite end of the second spring is coupled to the second coupling protrusion.

[0030] In one implementation, the handle may further include a sliding coupling portion disposed on the main body and including a sliding protrusion slidably coupled to the grip portion, the grip portion may further include a sliding portion, wherein the sliding protrusion is slidably inserted into and coupled to the sliding portion, and the sliding protrusion may be slid in the sliding portion as the grip portion is pivoted around the hinge portion.

[0031] In one implementation, the handle may be located on a rear face of the main body, the hinge portion may be located at an upper end of the grip portion, and the sliding portion may be located at a lower end of the grip portion.

[0032] In one implementation, the handle may further include a base disposed on the rear face of the main body, the base may have the hinge coupling portion at an upper portion thereof, and have the sliding coupling portion at a lower portion thereof, and an indented portion indented forward such that fingers of the user are able to be positioned thereon may be formed between the hinge coupling portion and the sliding coupling portion.

[0033] In one implementation, the sliding protrusion may be fixedly disposed inside the sliding coupling portion, and the sliding portion may be inserted into the sliding coupling portion, so that the sliding protrusion is slidably coupled to the sliding portion.

[0034] In one implementation, the sliding portion may have a sliding space defined therein, wherein the sliding protrusion is inserted into the sliding space and slides, and a pivoting range of the grip portion may be restricted around the hinge portion as a moving range of the sliding protrusion is restricted by an inner face of the sliding space.

[0035] In one implementation, the sliding portion may include a second elastic portion positioned between the sliding protrusion and the inner face of the sliding space in the sliding space, and elastically deformed by the sliding protrusion.

[0036] Effects of the present disclosure are as follows but are limited thereto.

[0037] Embodiments of the present disclosure may provide the cleaner that may increase the cleaning efficiency and effectively improve the ease of use.

[0038] In addition, embodiments of the present disclosure may provide the cleaner that is structurally stable and is able to improve the usability.

BRIEF DESCRIPTION OF DRAWINGS

[0039]

FIG. 1 is a view showing a cleaner according to an embodiment of the present disclosure;

FIG. 2 is a view showing an interior of a handle of a cleaner according to an embodiment of the present disclosure;

FIG. 3 is a view showing a state in which a handle is pivoted in a cleaner in FIG. 2;

FIG. 4 is a view showing an interior of a handle in a cleaner according to another embodiment of the present disclosure;

FIG. 5 is a view showing a state in which a handle is pivoted in a cleaner in FIG. 4;

FIG. 6 is a view showing a state that a cleaner according to an embodiment of the present disclosure is gripped by a user; and

FIG. 7 is a view showing a state in which a handle is pivoted in a cleaner in FIG. 6.

DETAILED DESCRIPTIONS

[0040] For simplicity and clarity of illustration, elements in the figures are not necessarily drawn to scale. The same reference numbers in different figures denote the same or similar elements, and as such perform similar functionality. Furthermore, in the following detailed description of the present disclosure, numerous specific details are set forth in order to provide a thorough understanding of the present disclosure. However, it will be understood that the present disclosure may be practiced without these specific details. In other instances, well-known methods, procedures, components, and circuits have not been described in detail so as not to unnecessarily obscure aspects of the present disclosure.

[0041] Examples of various embodiments are illustrated and described further below. It will be understood that the description herein is not intended to limit the present disclosure to the specific embodiments as described. On the contrary, it is intended to cover alternatives, modifications, and equivalents as may be included within the spirit and scope of the present disclosure as defined by the appended claims.

[0042] The terminology used herein is for the purpose of describing particular embodiments only and is not intended to be limiting of the present disclosure. As used herein, the singular forms "a" and "an" are intended to include the plural forms as well, unless the context clearly indicates otherwise. It will be further understood that the terms "comprises", "comprising", "includes", and "including" when used in this specification, specify the presence of the stated features, integers, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, integers, operations, elements, components, and/or portions thereof. As used herein, the term "and/or" includes any and all combinations of one or greater of the associated listed items. Expression such as "at least one of" when preceding a list of elements may modify the entire list of elements and may not modify the individual elements of the list.

[0043] It will be understood that, although the terms "first", "second", "third", and so on may be used herein to describe various elements, components, regions, layers and/or sections, these elements, components, regions, layers and/or sections should not be limited by these terms. These terms are used to distinguish one element, component, region, layer or section from another element, component, region, layer or section. Thus, a first element, component, region, layer or section described below could be termed a second element, component, region, layer or section, without departing from the spirit and scope of the present disclosure.

[0044] In addition, it will also be understood that when a first element or layer is referred to as being present "on" or "beneath" a second element or layer, the first element may be disposed directly on or beneath the second element or may be disposed indirectly on or beneath the second element with a third element or layer being disposed between the first and second elements or layers. It will be understood that when an element or layer is referred to as being "connected to", or "coupled to" another element or layer, it may be directly on, connected to, or coupled to the other element or layer, or one or more intervening elements or layers may be present. In addition, it will also be understood that when an element or layer is referred to as being "between" two elements or layers, it may be the only element or layer between the two elements or layers, or one or more intervening elements or layers may be present.

[0045] Unless otherwise defined, all terms including technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this inventive concept belongs. It will be further understood that terms, such as those defined in commonly used dictionaries, should be interpreted as having a meaning that is consistent with their meaning in the context of the relevant art and will not be interpreted in an idealized or overly formal sense unless expressly so defined herein.

[0046] FIG. 1 is a view showing a cleaner according to an embodiment of the present disclosure, and FIG. 2 is a view showing an interior of a handle 200 of a cleaner shown in FIG. 1.

[0047] Referring to FIGS. 1 and 2, a cleaner according to an embodiment of the present disclosure includes a main body 100 including a motor 110, a stick 120 extending from the main body 100 to have an end in front of the main body 100, wherein an inlet hole 125 through which fluid is sucked by the motor 110 is defined at the end of the stick 120, and a handle 200 disposed on the main body 100 and gripped by a user.

[0048] The handle 200 includes a hinge coupling portion disposed on the main body 100 and having a hinge shaft 221 extending in a lateral direction Z of the main body 100, and a grip portion 250 whose length direction is toward the ground 10, wherein the grip portion 250 is gripped by the user and includes a hinge portion 260 rotatably coupled to the hinge shaft 221.

[0049] Specifically, the main body 100 may include the motor 110, and may suck external air using the motor 110. FIG. 1 schematically shows the motor 110 embedded in the main body 100.

[0050] An opening may be defined in one face of the main body 100, and the stick 120 to be described later may be coupled to the opening. When the motor 110 is driven, an external foreign substance is sucked through the stick 120. Then, the foreign substance is filtered from air by passing through a filter or the like inside the main body 100.

[0051] The foreign substance filtered by the filter may be separated from air flow by its own weight or the like and collected in a collection space defined inside the main body 100. In addition, the air from which the foreign substance is filtered may be discharged to the outside through an outlet defined in a top face or the like of the main body 100.

[0052] In addition, the cleaner according to an embodiment of the present disclosure may be a rechargeable cleaner in which a battery is embedded, and the battery may be disposed inside the main body 100. The battery may be detachable from the main body 100 or may be maintained in a fixed state.

[0053] The main body 100 may have various shapes. Although FIG. 1 shows the main body 100 having a substantially cylindrical shape according to an embodiment of the present disclosure, the main body 100 may have a cross-section of a polygonal shape, and may have various shapes, such as a shape bent in a length direction, a streamlined shape, or the like, as necessary.

[0054] In one example, the stick 120 extends from the main body 100 and the end thereof is located forward of the main body 100. The inlet hole 125 through which the fluid is sucked by the motor 110 may be defined at the end of the stick 120.

[0055] The stick 120 may include a stick or a pipe having a length, and a hollow of the stick may be connected or coupled to the opening defined at on one side of the main body 100. The stick of the hollow shape may have the inlet hole 125 defined at a front end thereof, and air introduced through the inlet hole 125 may flow to the main body 100 through the hollow of the stick.

[0056] The stick 120 is schematically illustrated in FIG. 1, and a length direction of the stick 120 is indicated in FIGS. 6 and 7. The length direction of the stick 120 may be substantially perpendicular to an up and down direction Y of the main body 100. That is, the stick 120 may have a shape extending forwardly of the main body along a front and rear direction X of the main body 100.

[0057] However, the present disclosure may not be necessarily limited thereto, and an angle formed between the length direction of the stick 120 and the up and down direction Y of the main body 100 may be variously set.

[0058] In one example, the handle 200 may be disposed on the main body 100 and may be gripped by the user. That is, an embodiment of the present disclosure may be a handy cleaner in which the handle 200 is dis-

posed on the main body 100, so that the user directly grips the main body 100 to move the main body 100, but the present disclosure may not be limited thereto.

[0059] The handle 200 is disposed on the main body 100. FIG. 1 shows the handle 200 disposed on a rear face of the main body 100 according to an embodiment of the present disclosure.

[0060] The handle 200 may have a length, and may have a shape that is easy for the user to grip by hand. For example, the handle 200 may include a finger groove in which user's fingers may be positioned.

[0061] In one example, the handle 200 includes the hinge coupling portion and the grip portion 250, and the grip portion 250 includes the hinge portion 260 coupled to the hinge coupling portion.

[0062] The hinge coupling portion may be disposed on the main body 100. For example, as shown in FIG. 1, the hinge coupling portion may be coupled to the rear face of the main body 100 and rearwardly protrude from the main body 100, so that the hinge portion 260 may be easily coupled thereto.

[0063] The hinge shaft 221 may be formed in the hinge coupling portion. The hinge shaft 221 corresponds to a rotate shaft around which the grip portion 250 is rotated. The hinge shaft 221 may be formed integrally with or separately from the hinge coupling portion, or may be formed integrally with the hinge portion 260. The hinge shaft 221 extends along the lateral direction Z of the main body 100.

[0064] The grip portion 250 may have a length and may be gripped by the user, and may include the hinge portion 260 rotatably coupled to the hinge shaft 221 disposed in the hinge coupling portion.

[0065] The hinge portion 260 may be coupled to the hinge coupling portion to be rotatable around the hinge shaft 221. Accordingly, the grip portion 250 may be rotated around the hinge shaft 221 extending in the lateral direction Z of the main body 100.

[0066] FIG. 2 shows the interior of the handle 200. Specifically, FIG. 2 illustrates the grip portion 250 rotatably coupled to the hinge shaft 221 of the hinge coupling portion through the hinge portion 260.

[0067] In one example, FIG. 3 shows a state in which the handle 200 shown in FIG. 2 is rotated around the hinge shaft 221. In the present disclosure, a state in which the grip portion 250 is located close to the main body 100 as shown in FIG. 2 is defined as an original state, and a state in which the grip portion 250 is rotated to be away from the main body 100 as shown in FIG. 3 from the state in FIG. 2 is defined as a rotated state.

[0068] Referring to FIG. 3, the rotated state of the grip portion 250 of the cleaner shown in FIG. 2 is shown according to an embodiment of the present disclosure. Referring to FIG. 3, the grip portion 250 is rotated around the hinge shaft 221 extending in the lateral direction Z of the main body 100, so that an end of the grip portion 250 is moved in the front and rear directions X.

[0069] When the user uses the cleaner while gripping

the handle 200, an angle formed by a length direction K2 of the stick 120 and a length direction K1 of a user's arm may change as the cleaner moves forward and rearward. Such change in the angle causes a wrist joint rotation.

[0070] Such usage environment of the cleaner is shown in FIGS. 6 and 7. FIG. 6 shows a state in which the user grips the handle 200 and uses the cleaner, and FIG. 7 shows a state in which the cleaner is moved forward from the state in FIG. 6.

[0071] Referring to FIG. 7 with reference to FIG. 6, when the user moves the cleaner forward, a deviation occurs in the angle between the length direction K2 of the stick 120 and the length direction K1 of the arm. An embodiment of the present disclosure allows the wrist joint of the user to maintain a certain angle even when the angle deviation occurs resulted from the rotating of the handle 200, that is, the grip portion 250.

[0072] Specifically, when the user moves the cleaner forward, the length direction K2 may be changed such that the stick 120 becomes closer to the ground 10. In this case, the deviation occurs in the angle formed by the length direction K1 of the arm and the length direction K2 of the stick.

[0073] In this connection, because a length direction K3 of the grip portion 250 before the rotating changes together with the length direction K2 of the stick 120, eventually, an angle formed by the length direction K3 of the grip portion 250 and the length direction K1 of the arm in a situation before the cleaner moves forward changes differently in a situation after the cleaner moves forward. Accordingly, when the grip portion 250 is fixed, the user adjusts the wrist joint based on the change in the length direction K2 of the stick 120 and the change in the length direction K3 of the grip portion 250.

[0074] In one example, in an embodiment of the present disclosure, the length direction of the grip portion 250 may be adjusted. That is, when the length direction K2 of the stick 120 changes as shown in FIG. 7 from FIG. 6 in the use situation of the cleaner, the grip portion 250 may be rotated such that the angle formed by the length direction thereof and the length direction K1 of the arm is constant.

[0075] That is, as shown in FIGS. 6 and 7, the length direction K3 of the grip portion 250 before the rotating and a length direction K4 of the grip portion 250 after the rotating have an angle change M. An angle formed by the length direction K4 of the grip portion and the length direction K1 of the arm after the rotating may always be maintained constant.

[0076] Accordingly, in an embodiment of the present disclosure, the hinge shaft 221 extends in the lateral direction Z of the main body 100. The rotating of the grip portion 250, which is rotated around the hinge shaft 221 extending in the lateral direction, may replace the rotating of the wrist joint, and ameliorate inconvenience in use.

[0077] Depending on a scheme for using the cleaner, the grip portion 250 may be in the original state in the situation in which the cleaner is moved forward, and the

grip portion 250 may be in the rotated state in the situation in which the cleaner is moved rearward. Even in this case, the grip portion 250 rotates around the hinge shaft 221 in the lateral direction Z, thereby replacing the wrist joint rotation.

[0078] The grip portion 250 may have various shapes, and may have various shapes to facilitate the user's grip, for example, the shape having the finger groove to allow the user's fingers to be seated on an outer face of the grip portion 250.

[0079] The hinge portion 260 may be formed at one end, an opposite end, or a central side of the grip portion 250. In this case, rotating directions of the grip portion 250, which is rotated around the hinge shaft 221 extending in the lateral direction Z may be implemented to be the same.

[0080] However, the state in which the length direction of the grip portion 250 is toward the ground 10, and the hinge portion 260 is formed at an upper end of the grip portion 250, so that the hinge portion 260 is coupled to the hinge coupling portion, according to an embodiment of the present disclosure is shown in FIG. 1 and the like.

[0081] A coupling shape of the hinge portion 260 and the hinge coupling portion may also be various. For example, the hinge portion 260 may be coupled to the hinge coupling portion to be exposed outward of the hinge coupling portion, or may be inserted into a space inside the hinge coupling portion and coupled to the hinge coupling portion as shown in FIG. 2 and the like.

[0082] In one example, as shown in FIGS. 1 to 3, in an embodiment of the present disclosure, the handle 200 may be located on the rear face of the main body 100, the hinge portion 260 may be located at the upper end of the grip portion 250, and a lower end of the grip portion 250 may be rotated around the upper end of the grip portion 250.

[0083] In an embodiment of the present disclosure, the handle 200 may be disposed on the rear face of the main body 100 to be easily gripped by the user. Furthermore, rotating in which the upper end and the lower end are moved in the front and rear direction X may be easily performed without structural interference.

[0084] In addition, the hinge portion 260 is formed at the upper end of the grip portion 250, so that the hinge coupling portion may be positioned on a top of a user's hand. In this case, it is advantageous that a load of the main body 100 may be supported as the hinge coupling portion is supported by the top of the user's hand as well as by a gripping force of the user exerted on the grip portion 250.

[0085] Furthermore, as the hinge portion 260 is formed at the upper end of the grip portion 250, a movement range of the lower end that is moved by the rotating of the grip portion 250 may be increased, and the angular deviation of the grip portion 250 based on the cleaner usage situation may be effectively absorbed.

[0086] In one example, in an embodiment of the present disclosure, the hinge portion 260 may be inserted

into the hinge coupling portion and rotatably coupled to the hinge shaft 221.

[0087] FIGS. 2 and 3 illustrate the hinge portion 260 inserted into the inner space of the hinge coupling portion according to an embodiment of the present disclosure. A shape of the inner space of the hinge coupling portion may correspond to the hinge portion 260, and the hinge portion 260 may be rotated around the hinge shaft 221 inside the hinge coupling portion.

[0088] As the hinge portion 260 is coupled to the inside of the hinge coupling portion, coupling stability of the hinge portion 260 and the hinge coupling portion may be improved, and components such as the hinge shaft 221 and the like may not be exposed to the outside, so that it is effective for maintenance and an external appearance of the cleaner may be improved.

[0089] In one example, in an embodiment of the present disclosure, the hinge coupling portion may include a first elastic portion 222 that is elastically deformed in proportion to an amount of rotating of the hinge portion 260 and provides a restoring force to the hinge portion 260.

[0090] FIGS. 2 and 3 illustrate the first elastic portion 222 according to an embodiment of the present disclosure. The first elastic portion 222 is disposed in the hinge coupling portion, and the elastic deformation of being compressed or extended by the rotating of the hinge portion 260 of the first elastic portion 222 is performed.

[0091] An amount of deformation of the first elastic portion 222 may have a proportional relationship with the amount of rotating of the hinge portion 260. For example, the amount of elastic deformation of the first elastic portion 222 in the original state of the grip portion 250 as shown in FIG. 2 may correspond to 0. In the rotated state of the grip portion 250 as shown in FIG. 3, that is, in a state in which the grip portion 250 is maximally rotated by design, the amount of elastic deformation of the first elastic portion 222 may correspond to a maximum value.

[0092] The amount of rotating of the grip portion 250 or the hinge portion 260 may be understood as an angle formed by the length direction of the grip portion 250 and the length direction of the rotated grip portion 250 when the lower end of the grip portion 250 is located maximally close to the main body 100 as shown in FIG. 2. This may be understood as an angle M formed by the length direction K3 of the grip portion 250 before the rotating and the length direction K4 of the grip portion 250 after the rotating in FIG. 7.

[0093] The first elastic portion 222 may include an elastic body that is compressed or extended, the elastic body may be a first spring 224 or a second spring 226 to be described later, and an amount of deformation of the first spring 224 or the second spring 226 may be understood as the amount of deformation of the first elastic portion 222.

[0094] The deformation of the first elastic portion 222 may be made by a structural change resulted from the rotating of the hinge portion 260. For example, as shown

in FIG. 2, an amount of protrusion of a pressing protrusion 261 of the hinge portion 260 toward the first elastic portion 222 may gradually increase as the hinge portion 260 rotates, and the amount of deformation of the first elastic portion 222 may increase as the amount of protrusion of the pressing protrusion 261 increases.

[0095] Alternatively, as shown in FIGS. 4 and 5, the first elastic portion 222 may include a torsion spring. The torsion spring may be fastened to a second coupling protrusion 262 of the hinge portion 260, and an amount of winding may be increased as the hinge portion 260 pivots.

[0096] As described above, a scheme or a structure in which the amount of deformation of the first elastic portion 222 is increased corresponding to or proportional to the amount of rotating of the hinge portion 260 may be variously determined.

[0097] In one example, the first elastic portion 222 is deformed by the rotating of the hinge portion 260, and provides the restoring force against the deformation to the hinge portion 260. The restoring force may be a rotating force in a direction opposite to a reference rotating direction in which the hinge portion 260 of FIG. 2 pivots to be in the state of FIG. 3.

[0098] For example, as the amount of pivoting of the hinge portion 260 increases in the normal pivoting direction, the deformation amount of the first elastic portion 222 increases. Accordingly, the restoring force of the first elastic portion 222 is also increased. Further, the restoring force may be exerted to the hinge portion 260 to generate the pivoting force that causes the hinge portion 260 to pivot in the pivoting direction opposite to the normal pivoting direction.

[0099] An embodiment of the present disclosure may induce rotating of the grip portion 250 to be in the original state thereof by the first elastic portion 222 disposed in the hinge coupling portion. For example, when the cleaner is moved forward as shown in FIG. 7 from a cleaner position as shown in FIG. 6, the grip portion 250 may be rotated in the normal rotating direction. In addition, when the cleaner returns to an original position thereof, the grip portion 250 may be induced to return to the original state before the rotating by the restoring force of the first elastic portion 222.

[0100] Accordingly, even when the user does not make any effort to pivot the grip portion 250 of the handle 200 to be in the original state thereof, because the grip portion 250 is rotated in an opposite manner to be in the original state thereof by restoration of the first elastic portion 222, convenience of use may be improved.

[0101] In one example, in an embodiment of the present disclosure, the hinge portion 260 includes the pressing protrusion 261 protruding in a direction away from the hinge shaft 221, rotating together with the hinge portion 260, and pressing the first elastic portion 222. The amount of protrusion of the pressing protrusion 261 toward the first elastic portion 222 may change based on the rotating of the hinge portion 260.

[0102] The pressing protrusion 261 is disposed on the hinge portion 260 and protrude outwardly of an outer circumferential face of the hinge portion 260. A protruding direction of the pressing protrusion 261 may be a radial direction centered on the hinge shaft 221. The pressing protrusion 261 may be rotated together with the hinge portion 260.

[0103] The pressing protrusion 261 may be integrally molded with the hinge portion 260, or manufactured separately from the hinge portion 260 and coupled to the hinge portion 260. An end of the pressing protrusion 261 may be rotated in a circumferential direction centered on the hinge shaft 221 by the rotating of the hinge portion 260.

[0104] The first elastic portion 222 may be elastically deformed by such pressing protrusion 261. The first elastic portion 222 may be located at one side of a circumference of the hinge portion 260, and may face the hinge portion 260.

[0105] The pressing protrusion 261 is means for pressing the first elastic portion 222. A pressing level of the first elastic portion 222 embedded in the hinge coupling portion may be changed differently based on the length direction of the pressing protrusion 261 rotated together with the hinge portion 260.

[0106] FIGS. 2 and 3 show the first elastic portion 222 pressed by the pressing protrusion 261. The pressing protrusion 261 in FIG. 3 is in a state of being more rotated than the state shown in FIG. 2, so that the amount of protrusion toward the first elastic portion 222 thereof is increased.

[0107] That is, as the end of the pressing protrusion 261 approaches the first elastic portion 222 by the rotating of the hinge portion 260, the amount of protrusion of the pressing protrusion 261 toward the first elastic portion 222 may increase. Further, as the amount of protrusion or a protruding length of the pressing protrusion 261 increases, the amount of elastic deformation of the first elastic portion 222 may increase.

[0108] As above, an embodiment of the present disclosure disposes the pressing protrusion 261 on the hinge portion 260, so that the amount of elastic deformation of the first elastic portion 222 increases as the amount of rotating of the hinge portion 260 increases.

[0109] In addition, the first elastic portion 222 pushes the pressing protrusion 261 with the restoring force against the deformation to allow the hinge portion 260 to pivot in a direction in which the amount of protrusion or the protruding length of the pressing protrusion 261 is reduced.

[0110] Referring to FIG. 3, when the amount of pivot of the hinge portion 260 increases and the amount of protrusion of the pressing protrusion 261 toward the first elastic portion 222 increases accordingly, the amount of deformation of the first elastic portion 222 may increase and the restoring force, that is, an elastic force, of the first elastic portion 222 may also increase.

[0111] The elastic force of the first elastic portion 222

is increased by normal rotating of the pressing protrusion 261, that is, rotating for the grip portion 250 to be in the rotated state from the original state, and the elastic force induces reverse rotating of the pressing protrusion 261, that is, rotating for the grip portion 250 to be in the original state again from the rotated state.

[0112] Accordingly, an embodiment of the present disclosure forms a pivot structure of the grip portion 250 and includes the first elastic portion 222 and the pressing protrusion 261, so that the convenience of use is improved through the rotating of the grip portion 250, and at the same time, it becomes easy to restore the grip portion 250 in the rotated state to the original state using the elastic force of the first elastic portion 222.

[0113] In one example, in an embodiment of the present disclosure, the hinge coupling portion has an elastic portion space 225 defined therein extending toward the hinge shaft 221, wherein the first elastic portion 222 is disposed in the elastic portion space 225. The first elastic portion 222 may include the first spring 224 disposed in the elastic portion space 225, extending toward the hinge portion 260, and elastically deformed to change a length thereof by the pressing protrusion 261.

[0114] The elastic portion space 225 may be defined inside the hinge coupling portion. The elastic portion space 225 extends toward the hinge shaft 221. That is, the elastic portion space 225 may have a length in the radial direction centered on the hinge shaft 221.

[0115] The first elastic portion 222 may be disposed in the elastic portion space 225. In addition, the first elastic portion 222 may include the first spring 224, and the first spring 224 may be disposed to extend in the elastic portion space 225 toward the hinge portion 260.

[0116] That is, the first spring 224 may have a length in a direction away from the hinge shaft 221, for example, in the radial direction centered on the hinge shaft 221, like the elastic portion space 225. FIGS. 2 and 3, the first spring 224 disposed in the elastic portion space 225 is shown. The first spring 224 may be of various types, for example, a coil spring having a length as shown in FIGS. 2 and 3.

[0117] The first spring 224, which is disposed in the elastic portion space 225 such that an end thereof faces the hinge portion 260, may be deformed to shorten the length thereof as the amount of protrusion of the pressing protrusion 261 increases. That is, the first spring 224 is compressed by the pressing protrusion 261. As the amount of rotating of the hinge portion 260 increases, the amount of protrusion of the pressing protrusion 261 increases, so that an amount of compression of the first spring 224 may increase. When the amount of compression of the first spring 224 is increased, the length of the first spring 224 may be reduced.

[0118] Referring to FIG.2, the first spring 224 has a length L1 in the original state of the grip portion 250. The first spring 224 may be deformed to have a length L2 reduced than the length L1 in the rotated state in which the grip portion 250 is rotated as shown in FIG.3 from

the state in FIG.2.

[0119] That is, the first spring 224 is pressed and compressed by a rotating force of the pressing protrusion 261, and exert the restoring force to the pressing protrusion 261, thereby exerting the rotating force such that the pressing protrusion 261 is rotated to be in the original state thereof.

[0120] In one example, the first spring 224 may be an extensible coil spring that is extended by the rotating of the pressing protrusion 261. For example, when a movable end of the first spring 224 is coupled to the pressing protrusion 261 and the pressing protrusion 261 pivots from the original state, the first spring 224 may move away from the end of the pressing protrusion 261. Accordingly, the length of the first spring 224 may increase as the pressing protrusion 261 is rotated.

[0121] However, for convenience of description, the first spring 224 of the first elastic portion 222 as shown in FIGS.2 and 3 will be described based on a form in which the first spring 224 of the first elastic portion 222 is compressed such that the length thereof is reduced by the pressing protrusion 261.

[0122] In one example, in an embodiment of the present disclosure, the first elastic portion 222 may further include a pressing plate 223 coupled to the movable end of the first spring 224 and moving through the elastic portion space 225 as one face thereof facing the hinge portion 260 is pressed by the pressing protrusion 261.

[0123] The pressing plate 223 may have one face facing the hinge portion 260 and the other surface facing the movable end of the first spring 224. The pressing plate 223 may be disposed to be movable along the elastic portion space 225, and be coupled to or in close contact with the movable end of the first spring 224.

[0124] Because one face of the pressing plate 223 faces the hinge portion 260, the pressing protrusion 261 may be in contact with the pressing plate 223 and may push the pressing plate 223 as the amount of rotating increases. The pressing plate 223 may be pushed by the pressing protrusion 261 and may compress the first spring 224.

[0125] An embodiment of the present disclosure has the pressing plate 223 between the first spring 224 and the pressing protrusion 261, so that a pressing force by the pressing protrusion 261 may be uniformly and stably transmitted to the first spring 224.

[0126] In one example, another embodiment of the first elastic portion 222 according to the present disclosure is shown in FIGS. 4 and 5. Referring to FIGS. 4 and 5, in another embodiment of the present disclosure, the first elastic portion 222 may include a second spring 226 wound around the hinge shaft 221 and having an amount of deformation that increases as the amount of rotating of the grip portion 250 increases.

[0127] The amount of elastic deformation of the second spring 226 may increase by the rotating of the hinge portion 260 and the second spring 226 may have a shape wound around the hinge shaft 221. That is, the second

spring 226 is elastically deformed such that an amount of winding thereof is increased by the rotating of the hinge portion 260, and exerts a restoring force to the hinge portion 260, thereby exerting the rotating force for allowing the hinge portion 260 to be rotatable to be in the original state from the rotated state. Such second spring 226 may be the torsion spring wound around the hinge shaft 221.

[0128] In another embodiment of the present disclosure, the first elastic portion 222 may include the second spring 226 wound around the hinge shaft 221, and the second spring 226 in the form of being wound around the hinge shaft 221 may be effective for deformation and restoration by a rotating object.

[0129] In one example, in another embodiment of the present disclosure, the hinge coupling portion may further include a first coupling protrusion 227 fixed inside the hinge coupling portion and coupled to one end of the second spring 226. In addition, the hinge portion 260 may include the second coupling protrusion 262 which is rotated together with the hinge portion 260 and to which an opposite end of the second spring 226 is coupled.

[0130] The first coupling protrusion 227 may protrude from an inner face of the hinge coupling portion. For example, the first coupling protrusion 227 may have a length in a width direction Z like the hinge shaft 221 extending in the lateral direction or the width direction Z of the main body 100.

[0131] The first coupling protrusion 227 may be integrally molded on the inner face of the hinge coupling portion, or separately manufactured from the inner face and coupled to the inner face of the hinge coupling portion. A shape of the first coupling protrusion 227 may be various, and the first coupling protrusion 227 may be formed such that a position thereof in the hinge coupling portion is fixed.

[0132] The second spring 226 having the form wound around the hinge shaft 221 may have one end and the opposite end. As one end is coupled to the first coupling protrusion 227 having the fixed position, a position of one end may be fixed even when the hinge portion 260 pivots together with the first coupling protrusion 227.

[0133] The second coupling protrusion 262 may be formed on the hinge portion 260. The second coupling protrusion 262 may be integrally molded with the hinge portion 260, or manufactured separately from the hinge portion 260 and coupled to the hinge portion 260. The second coupling protrusion 262 may protrude from one plane or from an outer circumferential face of the hinge portion 260.

[0134] The second coupling protrusion 262 may be rotated together with the hinge portion 260. In addition, the opposite end of the second spring 226 may be coupled to the second coupling protrusion 262 and rotated together with the hinge portion 260. Accordingly, when the hinge portion 260 is rotated, the opposite end of the second spring 226 is rotated while one end of the second spring 226 has the fixed position, so that the amount of elastic

deformation of the second spring 226 may be increased as the rotating of the hinge portion 260 increases.

[0135] In one example, the amount of deformation of the second spring 226 may correspond to a distance between the first coupling protrusion 227 and the second coupling protrusion 262 in the circumferential direction of the hinge shaft 221. In FIG. 4, a distance L5 between the first coupling protrusion 227 and the second coupling protrusion 262 in the original state in which the grip portion 250 is not rotated is indicated. In addition, in FIG. 5, a distance L6 between the first coupling protrusion 227 and the second coupling protrusion 262 in the rotated state of the grip portion 250.

[0136] That is, in an embodiment of the present disclosure as shown in FIGS. 4 and 5, the distance between the first coupling protrusion 227 and the second coupling protrusion 262 may be reduced from L5 to L6 as the grip portion 250 pivots, and a difference in the length between L5 and L6 may correspond to the amount of deformation of the second spring 226. In one example, the second spring 226 may be wound to extend in the rotating direction in which the state of the grip portion 250 is changed from the original state to the rotated state.

[0137] In one example, FIGS. 2 to 5 illustrate a sliding coupling portion 230 and a sliding portion 270 according to an embodiment of the present disclosure.

[0138] When referring to FIGS. 2 to 5, in an embodiment of the present disclosure, the handle 200 further includes the sliding coupling portion 230 disposed on the main body 100 and including a sliding protrusion 231 slidably coupled to the grip portion 250, and the grip portion 250 further includes the sliding portion 270 into which the sliding protrusion 231 is slidably inserted and coupled. A position of the sliding protrusion 231 may be fixed, and may be slid in the sliding portion 270 as the grip portion 250 is rotated.

[0139] The handle 200 may include the sliding coupling portion 230 together with the hinge coupling portion. The sliding coupling portion 230 may be positioned spaced apart from the hinge coupling portion, may be coupled to the sliding portion 270 of the grip portion 250.

[0140] The grip portion 250 may include the sliding portion 270, and the sliding portion 270 may be spaced apart from the hinge portion 260. The sliding portion 270 may be rotated about the hinge portion 260, and the sliding protrusion 231 may slide in the sliding portion 270.

[0141] Specifically, the sliding coupling portion 230 is disposed on the main body 100, and may include the sliding protrusion 231. The sliding protrusion 231 may be disposed in the sliding coupling portion 230, and may be slid in the sliding portion 270 that is coupled to the sliding coupling portion 230 and rotated around the hinge portion 260.

[0142] A position of the sliding coupling portion 230 may be variously determined as necessary. FIGS. 2 to 5 illustrate a state in which the hinge coupling portion is disposed at an upper end and the sliding coupling portion 230 is disposed at a lower end of a portion disposed on

the rear face of the main body 100 according to an embodiment of the present disclosure.

[0143] A protruding direction of the sliding protrusion 231 may be various. For example, the protruding direction of the sliding protrusion 231 may be the lateral direction Z of the main body 100 like the hinge shaft 221, or may be the up and down direction Y of the main body 100 like the length direction of the grip portion 250. However, when considering a moving direction of the sliding portion 270, the protruding direction of the sliding protrusion 231 may be different from the rotating direction of the grip portion 250, for example, the front and rear direction X of the main body 100.

[0144] A shape, a protruding length, or the like of the sliding protrusion 231 may be various, and the sliding protrusion 231 protruding from the sliding coupling portion 230 may be slidably inserted into the sliding portion 270 of the grip portion 250.

[0145] In one example, the sliding portion 270 may be formed in the grip portion 250, and may be distinguished from the hinge portion 260. The sliding portion 270 may be coupled to the sliding coupling portion 230 through the sliding protrusion 231.

[0146] A shape or a position of the sliding portion 270 may be various. FIGS. 2 to 5 illustrate that the sliding coupling portion 230 is disposed at a lower side of the main body 100, and the sliding portion 270 is disposed at the lower end of the grip portion 250 to be coupled to the sliding coupling portion 230, according to an embodiment of the present disclosure.

[0147] A groove or a hole through which the sliding protrusion 231 slides may be defined in the sliding portion 270. The sliding protrusion 231 may perform a relative sliding motion along the sliding groove or the sliding hole by the rotating of the grip portion 250.

[0148] That is, based on the main body 100, the sliding protrusion 231 is disposed in the sliding coupling portion 230 and has the fixed position, and the sliding portion 270 is moved as the grip portion 250 pivots around the hinge portion 260. As a result, the sliding protrusion 231 may slide inside the groove or the hole of the sliding portion 270 by the movement of the sliding portion 270.

[0149] Because the sliding groove or the sliding hole is a region where the relative sliding of the sliding protrusion 231 by the rotating motion of the grip portion 250 is performed, the sliding groove or the sliding hole may extend in the rotating direction of the grip portion 250.

[0150] In addition, at least a portion of the sliding portion 270 in the grip portion 250 may have a shape extending along the rotating direction of the grip portion 250. Accordingly, the groove or the hole of the sliding portion 270 may extend in a direction parallel to the extending direction of the sliding portion 270.

[0151] According to an embodiment of the present disclosure, the lower end of the grip portion 250 is moved rearward so as to be away from the main body 100 to be in the rotated state from the original state of being located at the minimum distance from the main body 100. Ac-

cordingly, FIGS. 2 to 5 illustrate that the sliding portion 270 extends along a pivot radius toward a front side of the grip portion 250, and the sliding hole extends toward the front side of the grip portion 250 together.

[0152] In one example, a coupling structure of the sliding coupling portion 230 and the sliding portion 270 may be various. For example, as shown in FIGS. 2 to 5, the sliding coupling portion 230 may have a space defined therein into which the sliding portion 270 is inserted, and the sliding portion 270 may be inserted into the sliding coupling portion 230 to form a coupling relationship with the sliding coupling portion 230.

[0153] In this connection, the sliding protrusion 231 may protrude from an inner face of the sliding coupling portion 230 and be inserted into the sliding hole of the sliding portion 270. The sliding hole may penetrate the sliding portion 270 in the lateral direction Z of the main body 100, and the protruding direction of the sliding protrusion 231 may be the lateral direction Z.

[0154] An embodiment of the present disclosure includes the hinge portion 260 to enable the rotating of the grip portion 250 and at the same time, includes the sliding portion 270 in which the sliding protrusion 231 slides in response to the rotating of the grip portion 250, thereby stabilizing the rotating structure of the grip portion 250 and, when necessary, restricting a pivot radius of the grip portion 250.

[0155] In addition, the sliding portion 270 may provide a restoring force for the grip portion 250 to return to the original state thereof from the rotated state, and may adjust a rotating speed of the grip portion 250 by adjusting a frictional force between the sliding protrusion 231 and an inner face of the sliding hole.

[0156] In one example, in an embodiment of the present disclosure, the handle 200 may be located on the rear face of the main body 100, the hinge portion 260 may be located at the upper end of the grip portion 250, and the sliding portion 270 may be located at the lower end of the grip portion 250.

[0157] As the hinge portion 260 is located at the upper end and the sliding portion 270 is located at the lower end of the grip portion 250 as shown in FIGS. 2 to 5, the pivot radius centered on the hinge portion 260 may be increased, and a structure in which the rotating motion may be stably performed that is coupled to the sliding coupling portion 230 at the lower end farthest from the hinge portion 260 may be implemented.

[0158] In one example, the handle 200 may further include a base disposed on the rear face of the main body 100, the hinge coupling portion may be formed at an upper portion of the base and the sliding coupling portion 230 may be formed at a lower portion of the base, and an indented portion 240 that is forwardly indented such that the user's fingers may be positioned thereon may be formed between the hinge coupling portion and the sliding coupling portion 230.

[0159] The base may be a component to which the grip portion 250 is coupled. The base may be formed inte-

grally with the main body 100 on the rear face of the main body 100, or may be separately manufactured and coupled to the main body 100. The hinge coupling portion may be formed at the upper portion of the base, which is disposed on the main body 100, and the sliding coupling portion 230 is formed at the lower portion of the base to form a coupling structure between the base and the grip portion 250. That is, the grip portion 250 may have a coupling relationship with the main body 100 via the base.

[0160] The indented portion 240 may be formed between the hinge coupling portion and the sliding coupling portion 230 of the base. The indented portion 240 may be indented to be away from the grip portion 250. FIGS. 2 to 5 illustrate the indented portion 240 that is indented toward the front side of the main body 100 to be away from the grip portion 250 according to an embodiment of the present disclosure.

[0161] As the indented portion 240 is formed, a space in which the fingers may be positioned while the user grips the grip portion 250 may be defined, and convenience of grip of the user may be improved.

[0162] Further, in an embodiment of the present disclosure, the handle 200 may be disposed on the main body 100 through the coupling structure between the base and the grip portion 250, so that it is advantageous in design convenience and manufacturing.

[0163] In one example, in an embodiment of the present disclosure, the sliding protrusion 231 may be fixedly disposed inside the sliding coupling portion 230, and the sliding portion 270 may be inserted into the sliding coupling portion 230 and be coupled to the sliding coupling portion 230 such that the sliding protrusion 231 is slidable.

[0164] As described above, a scheme for coupling the sliding protrusion 231 and the sliding coupling portion 230 with each other may be various. In FIGS. 2 to 5, a space may be defined inside the sliding coupling portion 230 according to an embodiment of the present disclosure, and the sliding protrusion 231 may be fixedly disposed on an inner face of the space. The sliding portion 270 may be inserted into the sliding coupling portion 230, so that the sliding protrusion 231 may be slidably inserted into and coupled to the sliding portion 270.

[0165] In one example, in an embodiment of the present disclosure, the sliding portion 270 may have a sliding space 272 extending in the front and rear direction X and into which the sliding protrusion 231 is inserted, and a sliding range of the sliding protrusion 231 may be restricted by an inner face of the sliding space 272.

[0166] The sliding portion 270 may have the sliding hole or the sliding groove into which the sliding protrusion 231 is inserted, and the space defined by the sliding hole or the sliding groove may become the sliding space 272 of the sliding protrusion 231.

[0167] The sliding protrusion 231 slides in the sliding space 272. The sliding range of the sliding protrusion 231 may correspond to an extended length of the sliding

groove or the sliding hole. That is, the sliding protrusion 231 may slide in the sliding space 272 by the extended length of the sliding space 272, and accordingly, a rotating range of the grip portion 250 may be restricted to correspond to the extended length of the sliding space 272.

[0168] Specifically, in the rotating process of the grip portion 250, the sliding protrusion 231 slides toward one of both ends of the sliding groove or the sliding hole along the extending direction of the sliding space 272 or the rotating direction of the grip portion 250. A movement of the sliding protrusion 231 is restricted by inner faces of the both ends of the sliding groove or the sliding hole, which in turn leads to the restriction of the rotating range of the grip portion 250.

[0169] Therefore, an embodiment of the present disclosure may not only effectively improve the stability of the rotating structure by forming the sliding portion 270 of the grip portion 250, but also determine the sliding range of the sliding protrusion 231 and the rotating range of the grip portion 250 by design through the sliding space 272 of the sliding portion 270.

[0170] In one example, in an embodiment of the present disclosure, the sliding portion 270 may include a second elastic portion 273 positioned between the sliding protrusion 231 and the inner face of the sliding space 272 in the sliding space 272 and elastically deformed by the sliding protrusion 231.

[0171] The second elastic portion 273 may be located in the sliding space 272. The second elastic portion 273 may be elastically deformed by the sliding of the sliding protrusion 231 at the position between the inner face of the sliding groove or the sliding hole constituting the sliding space 272 and the sliding protrusion 231.

[0172] The second elastic portion 273 may be a coil spring extending in a direction in parallel with the length direction of the sliding space 272, may be compressed or extended by the sliding of the sliding protrusion 231, and may exert a restoring force against the compression or extension deformation to the sliding protrusion 231.

[0173] The restoring force exerted to the sliding protrusion 231 may be understood to be the same as that exerted on the inner face of the sliding space, and accordingly, a rotating force in an opposite direction may be exerted to the grip portion 250 rotated in one direction.

[0174] Referring to FIGS. 2 to 5, in an embodiment of the present disclosure, the second elastic portion 273 may be disposed between a front end of the sliding space 272 and the sliding protrusion 231. As the grip portion 250 of the original state shown in FIG. 2 or 4 is rotated as shown in FIG. 3 or 5, the sliding protrusion 231 moves toward a front side of the sliding space 272, so that the second elastic portion 273 is compressed. The compressed second elastic portion 273 exerts an elastic force to the sliding protrusion 231 and the inner face of the front side of the sliding space 272. Accordingly, the grip portion 250 may have the rotating force to return to the original state thereof.

[0175] FIGS. 2 and 4 illustrate the second elastic portion 273 before the deformation having the length L3, and FIGS. 3 and 5 illustrate the second elastic portion 273 after the deformation whose length is reduced from L3 to L4 by the rotating of the grip portion 250.

[0176] An embodiment of the present disclosure may be advantageous because the second elastic portion 273 may allow the rotating and the restoration of the grip portion 250 to be efficiently implemented, and exert the rotating force in the opposite direction of the grip portion 250 together with the first elastic portion 222 described above.

[0177] Although the present disclosure has been illustrated and described in connection with a specific embodiment, it will be apparent to those of ordinary skill in the art that the present disclosure may be variously improved and changed without departing from the technical idea of the present disclosure provided by the following claims.

Claims

1. A cleaner comprising:

a main body (100) including a motor (110);
a stick (120) extending from the main body (100), wherein an inlet hole (125) for sucking fluid is defined at an end of the stick (120) located forward of the main body (100); and
a handle (200) disposed on the main body (100), the handle is provided for being gripped by a user, wherein the handle (200) includes:

a hinge coupling portion disposed on the main body (100) and having a hinge shaft (221) extending along a lateral direction (Z) of the main body (100); and
a grip portion (250) including a hinge portion (260) rotatably coupled to the hinge shaft (221), wherein the grip portion (250) extends from the hinge portion (260) to be gripped by the user.

2. The cleaner of claim 1, wherein the handle (200) is disposed on a rear side of the main body (100), wherein the hinge portion (260) is located at an upper end portion of the grip portion (250), wherein a lower end portion of the grip portion (250) is rotated around the upper end portion.

3. The cleaner of claim 1 or 2, wherein the hinge portion (260) is inserted into the hinge coupling portion and rotatably coupled to the hinge shaft (221).

4. The cleaner of any one of the preceding claims, wherein the hinge coupling portion includes a first elastic portion (222) whose amount of deformation

increases as an amount of rotating of the hinge portion (260) increases, wherein the first elastic portion (222) exerts a restoring force to the hinge portion (260), the restoring force resulted from the deformation.

5. The cleaner of claim 4, wherein the hinge portion (260) includes a pressing protrusion (261) protruding in a direction away from the hinge shaft (221), rotating together with the hinge portion (260), and pressing the first elastic portion (222), wherein a length of the protrusion of the pressing protrusion (261) toward the first elastic portion (222) changes in response to the rotating of the hinge portion (260).
6. The cleaner of claim 4 or 5, wherein the hinge coupling portion includes an elastic portion space (225) extending in the direction away from the hinge shaft (221), wherein the first elastic portion (222) includes a first spring (224) disposed in the elastic portion space (225), extending parallel to the elastic portion space (225), and having a variable length for being pressed by the pressing protrusion (261).
7. The cleaner of claim 6, wherein the first elastic portion (222) further includes a pressing plate (223) coupled to an end of the first spring (224), wherein the pressing plate (223) moves along the elastic portion space (225) when one surface thereof facing the hinge portion (260) is pressed by the pressing protrusion (261).
8. The cleaner of claim 4, 5, 6 or 7, wherein the first elastic portion (222) includes a second spring (226) wound around the hinge shaft (221), wherein an amount of deformation of the second spring (226) increases when an amount of rotating of the grip portion (250) increases.
9. The cleaner of claim 8, wherein the hinge coupling portion further includes a first coupling protrusion (227) fixedly disposed inside the hinge coupling portion, wherein one end of the second spring (226) is coupled and fixed to the first coupling protrusion (227), wherein the hinge portion (260) includes a second coupling protrusion (262) rotated together with the hinge portion (260), wherein an opposite end of the second spring (226) is coupled to the second coupling protrusion (262).
10. The cleaner of any one of the preceding claims, wherein the handle (200) further includes a sliding coupling portion (230) disposed on the main body (200) and including a sliding protrusion (231) slidably coupled to the grip portion (250), wherein the grip portion (250) further includes a sliding portion (270), wherein the sliding protrusion (231) is slidably inserted into and coupled to the sliding portion (270), and

wherein the sliding protrusion (231) is sliding in the sliding portion (270) when the grip portion (250) is rotated around the hinge portion (260).

11. The cleaner of claim 10, wherein the handle (200) is located on a rear side of the main body (100), wherein the hinge portion (260) is located at an upper end portion of the grip portion (250), wherein the sliding portion (270) is located at a lower end portion of the grip portion (250).
12. The cleaner of claim 10 or 11, wherein the handle (200) further includes a base disposed on the rear side of the main body (100), wherein the base has the hinge coupling portion at an upper portion thereof, and has the sliding coupling portion (230) at a lower portion thereof, wherein an indented portion indented forward such that fingers of the user are able to be positioned thereon is formed between the hinge coupling portion and the sliding coupling portion (230).
13. The cleaner of claim 10, 11 or 12, wherein the sliding protrusion (231) is fixedly disposed inside the sliding coupling portion (230), wherein the sliding portion (270) is inserted into the sliding coupling portion (230), so that the sliding protrusion (231) is slidably coupled to the sliding portion (270).
14. The cleaner of any one of the claims 10, 11, 12 or 13, wherein the sliding portion (270) has a sliding space (272) defined therein, wherein the sliding protrusion (231) is inserted into the sliding space (272) and slides, wherein a rotating range of the grip portion (250) is restricted around the hinge portion (260) as a moving range of the sliding protrusion (231) is restricted by an inner face of the sliding space (272).
15. The cleaner of any one of the claims 10, 11, 12, 13 or 14, wherein the sliding portion (270) includes a second elastic portion (273) positioned between the sliding protrusion (231) and the inner face of the sliding space (272) in the sliding space (272), and elastically deformed by the sliding protrusion (231).

FIG. 1

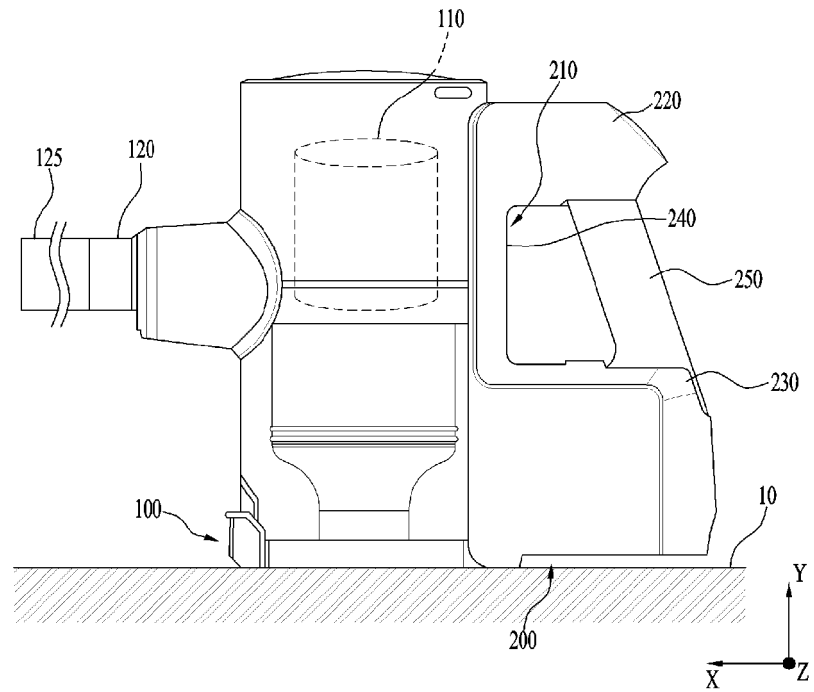


FIG. 2

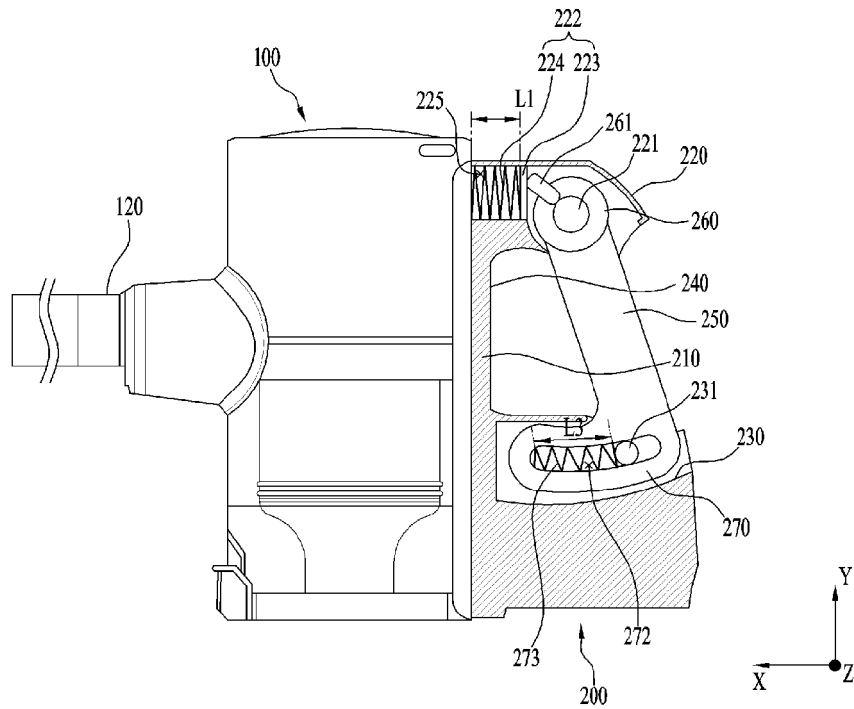


FIG. 3

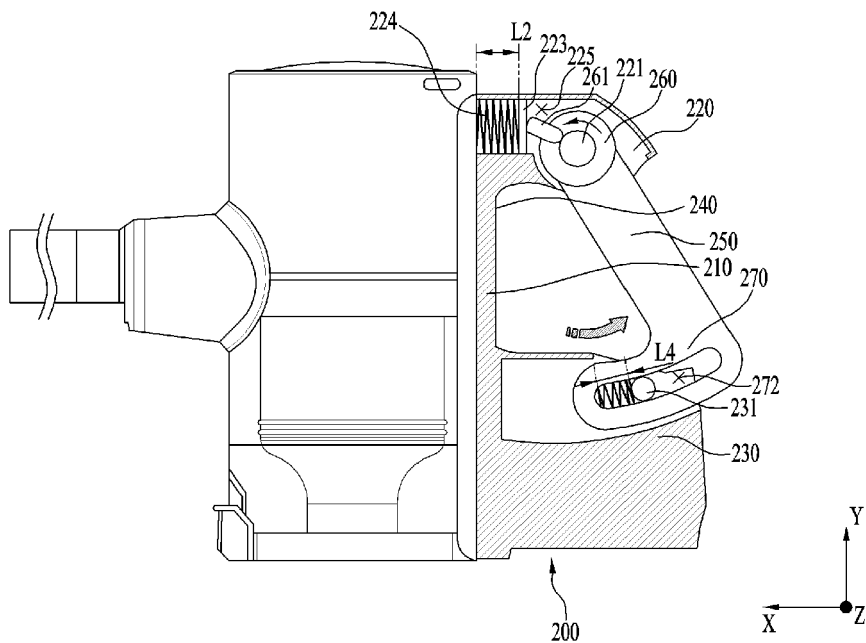


FIG. 4

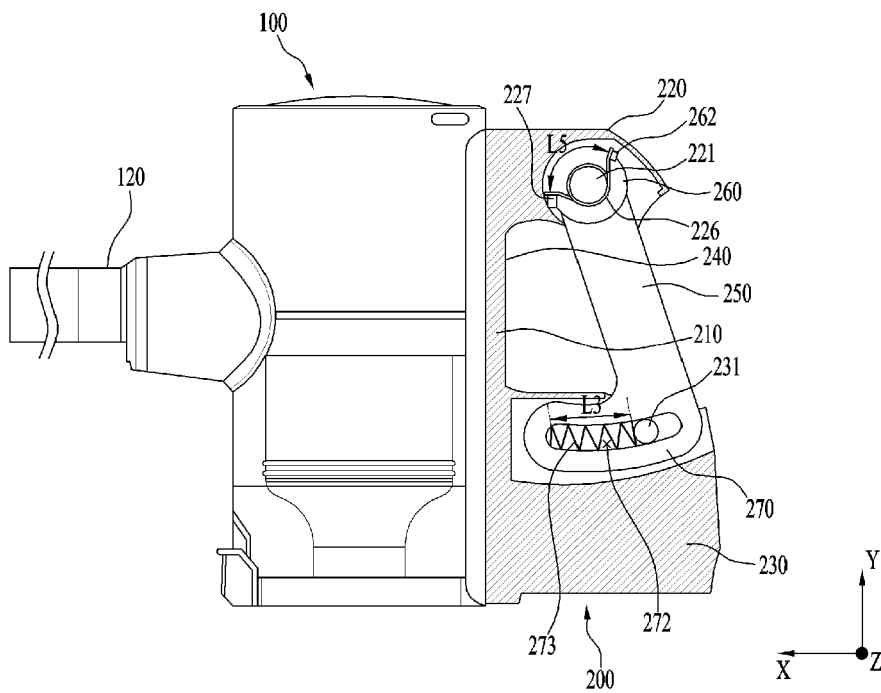


FIG. 5

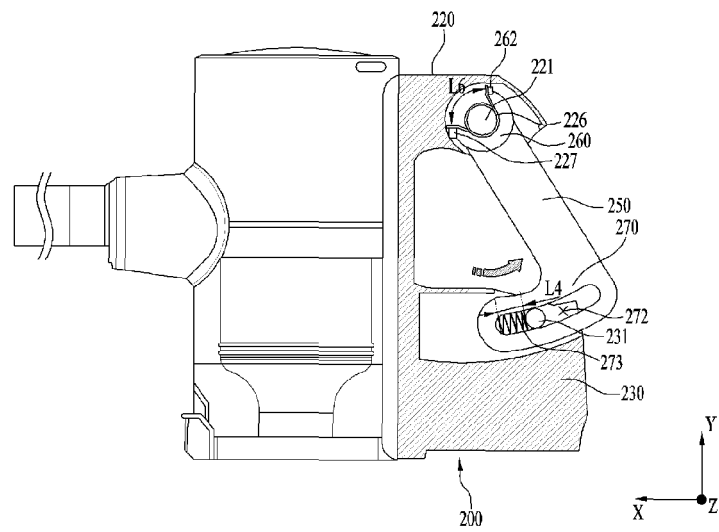


FIG. 6

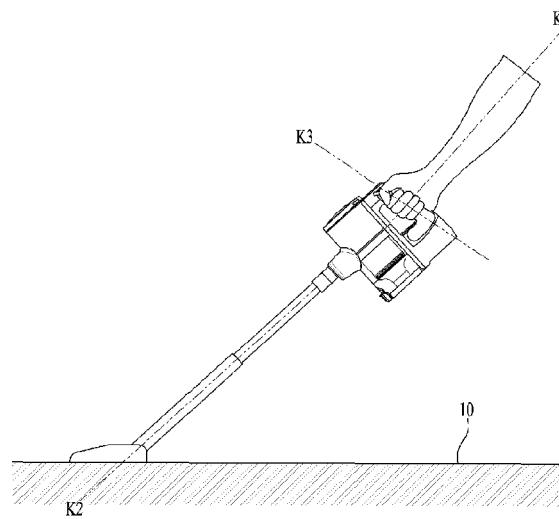
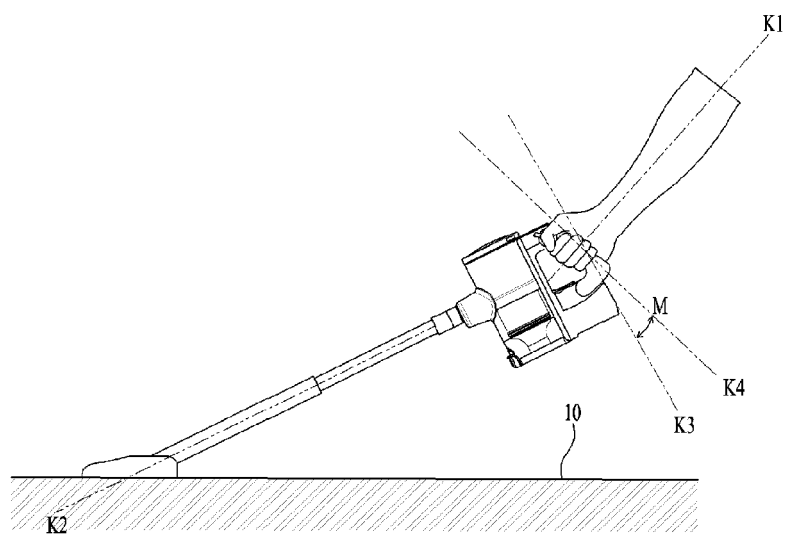


FIG. 7





EUROPEAN SEARCH REPORT

 Application Number
 EP 20 21 7439

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	CN 107 397 508 A (SUZHOU BALUOKE IND PRODUCTS DESIGN CO LTD) 28 November 2017 (2017-11-28)	1-3	INV. A47L5/24 A47L9/32
A	* paragraphs [0010] - [0015]; figures * -----	4-15	
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