UPRIGHT VACUUM CLEANER HAVING SUCTION PATH DIVERTING VALVE

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ABSTRACT

An upright vacuum cleaner is provided that includes a cleaner body having a suction motor, a dust-collecting unit, and a body frame where the suction motor and the dust-collecting unit are disposed, a suction inlet body which is hinged to a lower end of the body frame, a hose which has one side fluidly communicating with the body frame and the other side fluidly communicating with an extension pipe through a manipulation handle, and a suction path diverting valve which is disposed on the body frame and has a valve member elastically arranged on a suction path. As the extension pipe is inserted into or withdrawn from a socket on the body frame, the valve member selectively diverts the suction path to a first suction path flowing from the suction inlet body to the dust-collecting unit or a second suction path flowing from the extension pipe to the dust-collecting unit.
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CROSS-REFERENCE TO RELATED APPLICATIONS


BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] Methods and apparatuses consistent with the present disclosure relate to a cleaner, and more particularly, to an upright vacuum cleaner which is capable of selecting a suction path from a suction inlet body or from an extension pipe connected to a cleaner body to draw in dust from a cleaning surface using a suction force generated by a driven motor of the cleaner body.

[0004] 2. Description of the Related Art

[0005] In general, vacuum cleaners can be largely divided into two main types, namely an upright type vacuum cleaner and a canister type vacuum cleaner. The upright type vacuum cleaner has a suction inlet body directly connected to a cleaner body without passing through an extra hose or an extension pipe, and can improve a cleaning efficiency using a self-weight of the vacuum cleaner in particularly when cleaning a carpet.

[0006] The canister type vacuum cleaner differs from the upright type vacuum cleaner in that a suction inlet body fluidly communicates with a cleaner body through a hose or an extension pipe. Due to this structure, the canister type vacuum cleaner provides an unrestricted freedom of manipulating the suction inlet body compared to the upright type vacuum cleaner. Accordingly, the canister type vacuum cleaner can easily clean hard-to-clean areas such as floors, stairs, and narrow areas that the upright type vacuum cleaner cannot easily reach.

[0007] U.S. Pat. No. 4,377,882 and EP1464257 disclose an upright vacuum cleaner which comprises a hose and an extension pipe in a cleaner body and employs a suction path diverting structure to guide dust and air drawn in from a cleaning surface to a dust-collecting unit through the extension pipe in canister cleaning mode, thereby acting as both an upright type vacuum cleaner and a canister type vacuum cleaner.

[0008] However, there is a continuing need for suction path diverting structures that have an improved design over such prior art devices.

SUMMARY OF THE INVENTION

[0009] The present disclosure provides an upright vacuum cleaner, which diverts a suction path by operating a path diverting valve located on the suction path.

[0010] According to an aspect of the present disclosure, there is provided an upright vacuum cleaner, including a cleaner body which comprises a suction motor, a dust-collecting unit, and a body frame where the suction motor and the dust-collecting unit are disposed, a suction inlet body which is langed to a lower end of the body frame, a hose which has one side fluidly communicating with the body frame and the other side fluidly communicating with an extension pipe through a manipulation handle, and a suction path diverting valve which is disposed on a backside of the body frame and has a valve member elastically arranged on a suction path. As the extension pipe is inserted into or withdrawn from a socket disposed on a backside of the body frame in a lengthwise direction, the valve member selectively diverts the suction path to a first suction path flowing from the suction inlet body to the dust-collecting unit or a second suction path flowing from the extension pipe to the dust-collecting unit.

[0011] The suction path diverting valve may include a first suction duct which has one side fluidly communicating with the suction inlet body and the other side fluidly communicating with the dust-collecting unit, the first suction duct being disposed on a backside of the body frame parallel with the socket, and a second suction duct which has one side fluidly communicating with the hose and the other side fluidly communicating with the first suction duct. The valve member slides in the first suction duct, thereby opening and closing the second suction duct, and may have a push portion extending from one side of the valve member and pressed by the extension pipe and released from a pressure by the extension pipe.

[0012] The valve member may be formed in a cylindrical shape and may have a communication hole formed on a circumference surface thereof to fluidly communicate with the second suction duct. The second suction duct may be arranged in a perpendicular relation with respect to the first suction duct, and a return spring may be disposed on the second suction duct to elastically support the push portion.

[0013] Accordingly, the push portion is released from the pressure by the extension pipe and upwardly and elastically supported by the return spring, the valve member fluidly communicates with the second suction duct, and as the push portion is pressed by the extension pipe, the valve member fluidly communicates with the first suction duct.

[0014] The suction path diverting valve may include a first suction duct which has one side fluidly communicating with the suction inlet body and is disposed on a backside of the body frame parallel with the socket, a connection duct which has one side fluidly communicating with the other side of the first suction duct coaxially with the first suction duct and the other side fluidly communicating with the suction inlet body, and has a path diverting chamber defined therein, and a second suction duct which has one side fluidly communicating with the hose and the other side fluidly communicating with the connection duct in a perpendicular relation to the connection duct. The valve member is pivotally disposed in the path diverting chamber, thereby selectively allowing the first suction duct to fluidly communicate with the second suction duct or the suction inlet body.

[0015] The suction path diverting valve may include an operating member which is elastically disposed on an external side of the second suction duct and is pressed by the extension pipe and released from a pressure by the extension pipe, and a link which has one side fixed to a rotary shaft of the valve member to pivot the valve member in a normal direction or a reverse direction in cooperation with the operating member.

[0016] The link may have the other side slidably connected with the operating member such that the link is inclined as the operating member moves up and down, and a return spring may be disposed on the second suction duct to elastically support the operating member.

[0017] Accordingly, as the operating member is released from the pressure by the extension pipe and upwardly and elastically supported by the return spring, the valve member
turns in a normal direction through the link, thereby allowing the first and the second suction ducts to fluidly communicate with each other, and as the operating member is pressed by the extension pipe and thus turns the link in a reverse direction, the valve member allows the suction inlet body to fluidly communicate with the first suction duct.

The suction path diverting valve may include a first suction duct which has one side fluidly communicating with the suction inlet body, a second suction duct which has one side fluidly communicating with the hose, a valve housing which has a lower end fluidly communicating with the other side of each of the first and the second suction ducts and is fixedly disposed on a backside surface of the body frame, and a guide duct which has one side fluidly communicating with an upper side of the valve housing and the other side fluidly communicating with the dust-collecting unit. The valve member may be pivotally disposed in the valve housing, and may have a first communication hole selectively communicating with the first and the second suction ducts, and a second communication hole to guide dust and air passing through the first communication hole toward the guide duct.

The valve member may elastically pivot in the valve housing by a torsion spring. The valve member may be formed in an arc shape and is disposed in the valve housing formed in a cylindrical shape, and the first and the second communication holes may penetrate through different side surfaces of the valve member.

The suction path diverting valve may include a push portion which is disposed above the valve housing and is pressed by the extension pipe and released from a pressure by the extension pipe, and a push rod which extends from a lower end of the push portion and has a terminal end penetrating through the valve housing and contacting with the valve member such that the push rod presses one side of the valve member with the pressure applied to the push portion.

As the push portion is released from the pressure by the extension pipe, the valve member is pivoted in a normal direction by the torsion spring, thereby allowing the first communication hole to fluidly communicate with the second suction duct, and as the push portion is pressed by the extension pipe, the valve member is pivoted in a reverse direction, thereby allowing the first communication hole to fluidly communicate with the first suction duct.

FIG. 5 is a perspective view schematically illustrating a suction path diverting valve of and upright vacuum cleaner according to a second exemplary embodiment of the present disclosure;

FIGS. 6 and 7 are views illustrating a part of the suction path diverting valve of FIG. 5;

FIGS. 8 and 9 are schematic cross section views illustrating a first suction path P3 defined by the suction path diverting valve of the upright vacuum cleaner according to the second exemplary embodiment of the present disclosure;

FIGS. 10 and 11 are schematic cross section views illustrating a second suction path P4 defined by the suction path diverting valve of the upright vacuum cleaner according to the second exemplary embodiment of the present disclosure;

FIG. 12 is a perspective view schematically illustrating a suction path diverting valve of an upright vacuum cleaner according to a third exemplary embodiment of the present disclosure; and

FIGS. 13 and 14 are schematic cross section views illustrating a first suction path P5 and a second suction path P6, respectively, defined by the suction path diverting valve of the upright vacuum cleaner according to the third exemplary embodiment of the present disclosure.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

Certain exemplary embodiments of the present disclosure will be described in greater detail with reference to the accompanying drawings.

In the following description, the same drawing reference numerals are used for the same elements even in different drawings. The matter defined in the description, such as detailed construction and elements, are provided to assist in a comprehensive understanding of the disclosure. Thus, it is apparent that the exemplary embodiments of the present disclosure can be carried out without this specifically defined matter. Also, well-known functions or constructions are not described in detail since they would obscure the disclosure with unnecessary detail.

Hereinafter, a suction path diverting valve of an upright vacuum cleaner according to a first exemplary embodiment of the present disclosure will now be described in detail with reference to the drawings.

Referring to FIGS. 1 and 2, an upright vacuum cleaner according to a first exemplary embodiment of the present disclosure comprises a cleaner body 10, a suction inlet body 20, a hose 30, a manipulation handle 40, an extension pipe 50, and a suction path diverting valve 100.

The cleaner body 10 comprises a body frame 11, a suction motor 13, and a dust-collecting unit 14. The suction inlet body 20 is hinged on a lower end of the body frame 11 and the suction motor 13 is disposed in a motor casing 12. The dust-collecting unit 14, which comprises a dust receptacle 15 and a dust separator 17, is disposed above the suction motor 13. The body frame 11 has a socket 11a disposed on a backside of the body frame 11 in a lengthwise direction, and the extension pipe 50 is inserted into the socket 11a. The socket 11a has a lower end fixed to an outer circumference of a second suction duct 120 (see FIG. 2), which will be described below.

The suction motor 13 is disposed in the motor casing 12 disposed under the body frame 11, and the motor casing 12 fluidly communicates with the dust separator 17 such that air
The dust separator 17 separates dust from air drawn in by a suction force of the suction motor 13, and the dust is collected in the dust receptacle 15 disposed under the dust separator 17. The dust separator 17 may adopt a cyclone structure that separates dust from air using the centrifugal force. However, this should not be considered as limiting and a dust-bag (not shown) may be employed to collect dust instead of the cyclone structure.

The suction inlet body 20 has a suction inlet (not shown) disposed on a bottom surface thereof to draw dust in and air from a cleaning surface to a first suction duct 110 (see FIG. 2), and has a pair of traveling wheels 21a and 21b disposed at opposite rear sides of the suction inlet body 20 to easily travel on the cleaning surface.

The hose 30 is flexible in its length, and has one end fluidly communicating with one end of the manipulation handle 40 and the other end fluidly communicating with a suction port 121 disposed at a backside of the body frame 11. The manipulation handle 40 has a holding portion 41 held by a user and is located between the hose 30 and the extension pipe 50 to allow them to fluidly communicate with each other.

The extension pipe 50 has a predetermined length, and when in use, the extension pipe 50 is withdrawn from the socket 11a, and an extra accessory nozzle (not shown) is attached to a free end 51 (see FIG. 4) of the extension pipe 50 such that the vacuum cleaner acts as a canister vacuum cleaner using the extension pipe 50. On the other hand, when not in use, the extension pipe 50 is inserted into the socket 11a and is fixed to the body frame 11 and simultaneously, a suction path is diverted such that the vacuum cleaner acts as an upright vacuum cleaner drawing in dust and air through the suction inlet body 20. That is, a push portion 143 (see FIG. 3) is pressed or released from a pressure as the extension pipe 50 is inserted into or withdrawn from the socket 11a, and according to the operation of the push portion 143, a suction path for the dust and the air is diverted to a first suction path P1 or a second suction path P2.

The extension pipe 50 may have a telescopic structure so that it is able to adjust its length when the vacuum cleaner acts as a canister vacuum cleaner. Also, the extension pipe 50 may be designed to be higher than the body frame 11 when it is inserted into the socket 11a so that a user can easily push and pull the suction inlet body 20 in an upright cleaning mode.

Referring to FIGS. 2 to 4, a suction path diverting valve 100 according to the first exemplary embodiment of the present disclosure will now be described. The suction path diverting valve 100 comprises a first suction duct 110, a second suction duct 120, and a valve member 140.

The first suction duct 110 is disposed on a backside of the body frame 11 parallel with the socket 11a, and is fixed at a lower portion by a pipe fixing portion 12b. The first suction duct 110 has a lower end fluidly communicating with the suction inlet body 20 and an upper end fluidly communicating the dust separator 17.

The second suction duct 120 has the suction port 121 formed at one side thereof to connect with the hose 30, and the other side of the second suction duct 120 fluidly communicates with a middle portion of the first suction duct 110 in a substantially perpendicular relation with respect to the first suction duct 110. Also, the second suction duct 120 has a supporting protrusion 123 extending from an upper and outer circumference of the second suction duct 120 to a predetermined height and upwardly inserted into the socket 11a. A return spring 144 is disposed around the supporting protrusion 123 to elastically support the push portion 143.

The valve member 140 is formed in a pipe shape and is slidably inserted into the first suction duct 110. The valve member 140 is connected to the push portion 143 through an extension portion 141 formed on an outer circumference of the valve member 140. The push portion 143 is formed to allow the supporting protrusion 123 to penetrate thereafter and, accordingly, the push portion 143 slides along the supporting protrusion 123 when being pressed by the free end 51 of the extension pipe 50 and is elastically supported on the return spring 144. Also, the valve member 140 has a communication hole 145 formed at one side thereof to fluidly communicate with the second suction duct 120 when the push portion 143 is released from a pressure by the extension pipe 50.

As described above, the valve member 140 is designed to ensure the first or the second suction path P1 or P2 (see FIGS. 3 and 4) as the extension pipe 50 is inserted into or withdrawn from the socket 11a.

Hereinafter, a process of diverting the suction path to the first and the second suction paths P1 and P2 using the suction path diverting valve 100 of the upright vacuum cleaner according to the first exemplary embodiment of the present disclosure will now be described with reference to FIGS. 3 and 4.

As shown in FIG. 3, in order to draw in dust and air from a cleaning surface through the suction inlet body 20, the extension pipe 50 is inserted into the socket 11a. In this case, the push portion 143 is pressed down by the free end 51 of the extension pipe 50 so that the push portion 143 moves down along the supporting protrusion 123 and is elastically supported on the return spring 144.

Accordingly, the valve member 140 slides down along the first suction duct 110 and thus the communication hole 145 is located under the second suction duct 120 such that the second suction duct 120 is closed by a part of the valve member 140 and the first suction path P1 is ensured.

If the suction motor 13 is driven in this state, dust and air are drawn in the suction inlet body 20 through a suction inlet (not shown) of the suction inlet body 20 contacting with the cleaning surface, and flow into the dust separator 17 through the first suction duct 110. Then, the dust is separated from the air in the dust separator 17 by the centrifugal force and collected in the dust receptacle 15 due to its self-weight, and the air separated from the air is discharged to the outside through a discharge outlet (not shown) of the dust separator 17 fluidly communicating with the suction motor 13 and then through the suction motor 13.

On the other hand, in order to perform a canister cleaning operation using the extension pipe 50, the extension pipe 50 is withdrawn from the socket 11a as shown in FIG. 4. Then, the push portion 143 is released from the pressure by the extension pipe 50 and moves up due to an elastic force by the return spring 144, and accordingly, the valve member 140 moves up.

As the valve member 140 moves up, the communication hole 145 returns to the upper position where it fluidly communicates with the second suction duct 120 such that the suction path is diverted from the first suction path P1 to the second suction path P2.
In this state, if an appropriate accessory nozzle (not shown) is mounted on the free end 51 of the extension pipe 50 withdrawn from the socket 11a and the suction motor 13 is driven, dust and air flow into the second suction duct 120 after passing through the accessory nozzle, the extension pipe 50, the manipulation handle 40, and the hose 30 in sequence.

The dust and air drawn into the second suction duct 120 flows into the dust separator 17 through the first communication hole 145 and then along the first suction duct 110. The dust is separated from the air by the centrifugal force in the dust separator 17 and collected in the dust receptacle 15 due to the self-weight, and the air separated from the dust is discharged to the outside through the discharge outlet (not shown) of the dust separator 17 fluidly communicating with the suction motor 13 and then through the suction motor 13.

As described above, according to the first exemplary embodiment of the present disclosure, the suction path can be diverted simply by moving up and down the valve member 140 slidably disposed in the first suction duct 110, not by closing and opening an extra space.

Hereinafter, an upright vacuum cleaner according to a second exemplary embodiment of the present disclosure will now be described with reference to FIGS. 5 and 6. The upright vacuum cleaner of the second exemplary embodiment has a similar structure to that of the first exemplary embodiment except for a suction path diverting valve 200. Therefore, the parts that make up the first exemplary embodiment will not be described and only the suction path diverting valve 200 will be described in detail.

As shown in FIG. 5, the suction path diverting valve 200 comprises a first suction duct 210, a connection duct 220, a path diverting chamber 230 (see FIG. 6), a second suction duct 240, and a valve member 259 (see FIG. 6).

The first suction duct 210 is disposed on a backside of the body frame 11 parallel with the socket 11a, and has an upper end fluidly communicating with the dust separator 17 (see FIG. 1) and a lower end fluidly communicating with the connection duct 220.

The connection duct 220 has the path diverting chamber 230 defined therein, and has one side fluidly communicating with the second suction duct 240 and a connection port 221 disposed at a lower end of the connection duct 220 to fluidly communicate with the suction inlet body 20 (see FIG. 1).

As shown in FIG. 6, the path diverting chamber 230 has a holding depression 231 formed on an inner circumference thereof opposite the second suction duct 240 to receive a leading end of a valve member 259. The valve member 259 is pivotably disposed in the path diverting chamber 230 with a predetermined pivoting angle. The valve member 259 comprises a flap of a plate shape.

The second suction duct 240 has one end fluidly communicating with the hose 30 (see FIG. 1) and the other end fluidly communicating with the connection duct 220 in a substantially perpendicular relation with respect to the connection duct 220. The second suction duct 240 has a guide protrusion 243 formed on an upper portion thereof and inserted into the socket 11a, and a supporting member 241 is disposed around the guide protrusion 243 and is elastically supported by a return spring 245.

Referring to FIGS. 6 and 7, an operating member 251 and a link 255 are disposed on the outside of the second suction duct 240 to pivot the valve member 259. The operating member 251 is engaged with the supporting member 241 and elastically slides up and down along the guide protrusion 243 as it is pressed by the extension pipe 50 and released from pressure by the extension pipe 50. Also, the operating member 251 has an insertion portion 252 downwardly extending from a lower end thereof, and a sliding protrusion 253 is formed on at least one side surface of the insertion portion 252.

The link 255 has a cutaway portion 265 of a predetermined length formed in one side thereof to allow the insertion portion 252 to be inserted thereto, and also has a slit 257 formed on a side surface thereof to slidably engage with the sliding protrusion 253. Also, the other side of the link 255 is fixedly connected to a rotary shaft 258 integrally formed with the valve member 259.

Accordingly, the link 255 pivots to a predetermined angle as the operating member 251 moves up and down, thereby pivoting the rotary shaft 258 and accordingly pivoting the valve member 259. In this case, the valve member 259 closes or opens a communication hole 223 (see FIG. 9) of the second suction duct 240 such that the suction path is diverted into a first suction path P3 (see FIGS. 8 and 9) or a second suction path P4 (see FIGS. 10 and 11).

Hereinafter, a process of diverting the suction path of the upright vacuum cleaner according to the second exemplary embodiment of the present disclosure will now be described with reference to FIGS. 8 to 11 in sequence. FIGS. 8 and 9 illustrate the first suction path P3 as a result of diverting the suction path, but FIG. 8 omits the operating member 251 and the link 255 for the clarity of understanding. Also, FIGS. 10 and 11 illustrate the second suction path P4 as a result of diverting the suction path, but FIG. 10 omits the operating member 251 and the link 255 for the clarity of understanding.

Referring to FIGS. 8 and 9, in order to draw in dust and air from a cleaning surface through the suction inlet body 20 (see FIG. 1), the extension pipe 50 is inserted into the socket 11a. Then, the operating member 251 is pressed down by the extension pipe 50 and accordingly the sliding protrusion 253 moves down.

Accordingly, as the sliding protrusion 253 slides along the slit 257 of the link 255, the link 255 is downwardly pivoted on the rotary shaft 258. Due to this pivotal movement of the link 255, the rotary shaft 258 turns in the same direction as that of the link 255, thereby moving the valve member 259 toward the communication hole 223.

As a result, the communication hole 223 is closed by the valve member 259 such that the first suction path P3 flowing from the suction inlet body 20 to the connection duct 220 and the first suction duct 210 is ensured.

In this state, if the suction motor 13 is driven, dust and air are drawn in through the suction inlet (not shown) of the suction inlet body 20 contacting the cleaning surface and flows into the dust separator 17 through the first suction path P3, as shown in FIGS. 8 and 9. After that, the dust is separated from the air by the centrifugal force in the dust separator 17 and collected in the dust receptacle 15 due to the self-weight, and the air separated from the dust is discharged to the outside through the discharge outlet of the dust separator 17 fluidly communicating with the suction motor 13 and then through the suction motor 13.

On the other hand, in order to perform a canister cleaning operation using the extension pipe 50, the extension pipe 50 is withdrawn from the socket 11a as shown in FIGS. 10 and 11. Accordingly, the operating member 251 is released.
from a pressure exerted by the extension pipe 50 and thus moves up by an elastic force of the return spring 245. [0072] In this case, the sliding protrusion 253 slides up along the slit 257 together with the operating member 251, and accordingly, the link 255 is upwardly pivoted on the rotary shaft 258. Due to this pivotal movement of the link 255, the rotary shaft 258 turns in the same direction as that of the link 255, thereby pivoting the valve member 259. [0073] The valve member 259 pivots until the leading end of the valve member 259 is received on the holding depression 231, thereby blocking a path from the suction inlet body 20 in the path diverting chamber 230 and completely opening the communication hole 223 at the same time. Accordingly, the second suction path P4 flowing from the second suction duct 240 to the connection duct 220 and the first suction duct 210 is ensured. [0074] In this state, if an appropriate accessory nozzle (not shown) is mounted on the free end of the extension pipe 50 withdrawn from the socket 11 and then the suction motor 13 is driven, dust and air drawn into the second suction duct 240 flow into the dust separator 17 through the second suction path P4. [0075] The dust is separated from the air by the centrifugal force in the dust separator 17 and collected in the dust receptacle 15 due to the self-weight, and the air separated from the dust is discharged to the outside through the discharge outlet (not shown) of the dust separator 17 fluidly communicating with the suction motor 13 and then through the suction motor 13. [0076] Hereinafter, an upright vacuum cleaner according to a third exemplary embodiment of the present disclosure will now be described with reference to FIGS. 12 to 14. The upright vacuum cleaner of the third exemplary embodiment of the present disclosure has a similar structure to those of the vacuum cleaners of the first and the second exemplary embodiments, but a suction path diverting valve 300 differs from those of the first and the second exemplary embodiments. Therefore, the same elements as those of the first and the second exemplary embodiments will not be described and only the suction path diverting valve 300 will be described in detail. [0077] Referring to FIG. 12, the suction path diverting valve 300 according to the third exemplary embodiment of the present disclosure is fixedly disposed on a backside of the body frame 11 (see FIG. 1). The suction path diverting valve 300 comprises a first suction duct 310, a second suction duct 320, a valve housing 330, a valve member 340, and a guide duct 350. [0078] The first suction duct 310 has one end fluidly communicating with the suction inlet body 20 and the other end fluidly communicating with one side of a lower end of the valve housing 330. The second suction duct 320 has one end fluidly communicating with the hose 30 and the other end fluidly communicating with the other side of the lower end of the valve housing 330. Also, a connection port 321 is disposed at an area where the second suction duct 320 is connected to the hose 30 to facilitate the connection with and disconnection from the hose 30. [0079] The valve housing 330 is fixedly disposed on a rear surface of the body frame 11 and is formed in a substantially cylindrical shape. The valve housing 330 has a space 331 defined therein to allow a valve member 340 to pivot to a predetermined angle in the space 331. The space 331 has a rotary shaft 333 disposed on a center thereof and the valve member 340 is hinged on the rotary shaft 333. A partition 335 is disposed in the upper portion of the space 331 in a vertical direction and a stopper 337 extends from an end of the partition 335 to restrict the rotation of the valve member 340. Also, the valve housing 330 has a guide pipe 339 disposed on an upper side thereof and leading inwardly in a vertical direction. [0080] The valve member 340 is formed in a substantially arc shape and has a first penetrating hole 341 selectively communicating with the first and the second suction ducts 310 and 320. Also, the valve member 340 has a second penetrating hole 343 to guide the dust and air passing through the first penetrating hole 341 to the guide duct 350. Also, the valve member 340 is elastically supported by a torsion spring 345 disposed between a rotary hole 344 and the rotary shaft 333, and if the valve member 340 is released from a pressure by the extension pipe 50, the valve member 340 is pivoted such that the first penetrating hole 341 fluidly communicates with the second suction duct 320. [0081] Also, a push portion 361 is disposed above the valve housing 330 to be pressed by the free end 51 of the extension pipe 50. A push rod 363 extends from a lower end of the push portion 361 to transmit a pressure exerted to the push portion 361 to the valve member 340. A terminal end of the push rod 363 presses a protrusion 347 formed on a surface of the valve member 340 when the push rod 363 presses the valve member 340. Accordingly, the terminal end of the push rod 363 is prevented from slipping on a pressure surface 340a which is inclined as the valve member 300 turns, and thus the valve member 300 turns without losing the pressure. [0082] Hereinafter, a process of diverting the suction path of the upright vacuum cleaner according to the third exemplary embodiment of the present disclosure will now be described with reference to FIGS. 13 and 14. FIG. 13 illustrates a first suction path P5 as a result of diverting the suction path and FIG. 14 illustrates a second suction path P6 as a result of diverting the suction path. [0083] Referring to FIG. 13, in order to draw in dust and air from a cleaning surface through the suction inlet body 20, the extension pipe 50 is inserted into the socket 11a. In this case, the push portion 361 is pressed by the free end 51 of the extension pipe 50 and accordingly the push rod 363 moves down to a predetermined distance, thereby pressing the pressure surface 340a of the valve member 340. [0084] Then, the valve member 340 elastically supported by the torsion spring 345 pivots in a counter clockwise direction and the first penetrating hole 341 is displaced from a position where it fluidly communicates with the second suction duct 320 to a position where it fluidly communicates with the first suction duct 310. Accordingly, the first suction path P5 flowing from the suction inlet body 20 to the guide duct 350 through the first suction duct 310 and the first and the second penetrating holes 341 and 343 is ensured. [0085] In this state, if the suction motor 13 is driven, dust and air are drawn in through the suction inlet (not shown) of the suction inlet body 20 contacting with a cleaning surface and flow into the dust separator 17 through the first suction path P5 as shown in FIG. 13. After that, the dust is separated from the air by the centrifugal force in the dust separator 17 and collected in the dust receptacle 15 due to the self-weight, and the air separated from the dust is discharged to the outside through the discharge outlet (not shown) of the dust separator 17 fluidly communicating with the suction motor 13 and then through the suction motor 13.
Referring to FIG. 14, if the extension pipe 50 is withdrawn from the socket 11a in order to perform a canister cleaning operation using the extension pipe 50, the push portion 361 is released from a pressure by the extension pipe 50 and accordingly the push rod 363 moves up along with the push portion 361 by an elastic force of the return spring 245.

Accordingly, the valve member 340 turns on the rotary shaft 346 in a clockwise direction, thereby closing the first suction duct 310 and displacing the first penetrating hole 341 to fluidly communicate with the second suction duct 320. Accordingly, the second suction path P6 flowing from the extension pipe 50 to the guide duct 350 through the second suction duct 320 and the first and the second penetrating holes 341 and 343 is ensured.

In this state, if the suction motor 13 is driven after an appropriate accessory nozzle (not shown) is mounted on the free end 51 of the extension pipe 50 withdrawn from the socket 11a, dust and air are drawn into the second suction duct 320 through the accessory nozzle, the extension pipe 50, the manipulation handle 40, and the hose 30 in sequence. The dust and the air drawn into the second suction duct 320 flows into the dust separator 17 through the second suction path P6.

The dust is separated from the air by the centrifugal force in the dust separator 17 and collected in the dust receptacle 15 due to the self weight, and the air separated from the dust is discharged to the outside through the discharge outlet (not shown) of the dust separator 17 fluidly communicating with the suction motor 13 and then through the suction motor 13.

According to the first through the third exemplary embodiments of the present disclosure as described above, the suction path diverting valves 100, 200, 300 can be operated and thus can divert the suction path simply by inserting or withdrawing the extension pipe 50 into or from the socket 11a.

The foregoing exemplary embodiments and advantages are merely exemplary and are not to be construed as limiting the present disclosure. The present teaching can be readily applied to other types of apparatuses. Also, the description of the exemplary embodiments of the present disclosure is intended to be illustrative, and not to limit the scope of the claims, and many alternatives, modifications, and variations will be apparent to those skilled in the art.

What is claimed is:

1. An upright vacuum cleaner, comprising:
   a cleaner body which comprises a suction motor, a dust-collecting unit, and a body frame where the suction motor and the dust-collecting unit are disposed;
   a suction inlet body which is hinged to a lower end of the body frame;
   a hose which has one side fluidly communicating with the body frame and the other side fluidly communicating with an extension pipe through a manipulation handle; and
   a suction path diverting valve which is disposed on a backside of the body frame and has a valve member elastically arranged in a suction path,
   wherein, as the extension pipe is inserted into or withdrawn from a socket disposed on a backside of the body frame in a lengthwise direction, the valve member selectively diverts the suction path to a first suction path flowing from the suction inlet body to the dust-collecting unit or a second suction path flowing from the extension pipe to the dust-collecting unit.

2. The upright vacuum cleaner as claimed in claim 1, wherein the suction path diverting valve comprises:
   a first suction duct which has one side fluidly communicating with the suction inlet body and the other side fluidly communicating with the dust-collecting unit, the first suction duct being disposed on a backside of the body frame parallel with the socket; and
   a second suction duct which has one side fluidly communicating with the hose and the other side fluidly communicating with the first suction duct,
   wherein the valve member slides in the first suction duct, thereby opening and closing the second suction duct, and has a push portion extending from one side of the valve member so that the push portion is pressed by the extension pipe when the extension pipe is inserted into the socket and released from a pressure of the extension pipe when the extension pipe is withdrawn from the socket.

3. The upright vacuum cleaner as claimed in claim 2, wherein the valve member is formed in a cylindrical shape and has a communication hole formed on a circumference surface thereof to fluidly communicate with the second suction duct.

4. The upright vacuum cleaner as claimed in claim 2, wherein the second suction duct is arranged in a perpendicular relation with respect to the first suction duct, and a return spring is disposed on the second suction duct to elastically support the push portion.

5. The upright vacuum cleaner as claimed in claim 4, wherein, as the push portion is released from the pressure by the extension pipe and upwardly and elastically supported by the return spring, the valve member fluidly communicates with the second suction duct, and as the push portion is pressed by the extension pipe, the valve member fluidly communicates with the first suction duct.

6. The upright vacuum cleaner as claimed in claim 1, wherein the suction path diverting valve comprises:
   a first suction duct which has one side fluidly communicating with the suction inlet body and is disposed on a backside of the body frame parallel with the socket;
   a connection duct which has one side fluidly communicating with the other side of the first suction duct coaxially with the first suction duct and the other side fluidly communicating with the suction inlet body, and has a path diverting chamber defined therein; and
   a second suction duct which has one side fluidly communicating with the hose and the other side fluidly communicating with the connection duct in a perpendicular relation to the connection duct,
   wherein the valve member is pivotally disposed in the path diverting chamber, thereby selectively allowing the first suction duct to fluidly communicate with the second suction duct or the suction inlet body.

7. The upright vacuum cleaner as claimed in claim 6, wherein the valve member is formed in a plate shape.

8. The upright vacuum cleaner as claimed in claim 6, wherein the suction path diverting valve comprises:
   an operating member which is elastically disposed on an external side of the second suction duct and is pressed by the extension pipe and released from a pressure by the extension pipe; and
a link which has one side fixed to a rotary shaft of the valve member to pivot the valve member in a normal direction or a reverse direction in cooperation with the operating member.

9. The upright vacuum cleaner as claimed in claim 8, wherein the link has a second side slidably connected with the operating member such that the link is inclined as the operating member moves up and down.

10. The upright vacuum cleaner as claimed in claim 8, further comprising a return spring disposed on the second suction duct to elastically support the operating member.

11. The upright vacuum cleaner as claimed in claim 10, wherein, as the operating member is released from the pressure by the extension pipe and upwardly and elastically supported by the return spring, the valve member turns in a normal direction through the link, thereby allowing the first and the second suction ducts to fluidly communicate with each other, and as the operating member is pressed by the extension pipe and thus turns the link in a reverse direction, the valve member allows the suction inlet body to fluidly communicate with the first suction duct.

12. The upright vacuum cleaner as claimed in claim 1, wherein the suction path diverging valve comprises:
   a first suction duct which has one side fluidly communicating with the suction inlet body;
   a second suction duct which has one side fluidly communicating with the hose;
   a valve housing which has a lower end fluidly communicating with the other side of each of the first and the second suction ducts and is fixedly disposed on a backsides surface of the body frame; and
   a guide duct which has one side fluidly communicating with an upper side of the valve housing and the other side fluidly communicating with the dust-collecting unit,

wherein the valve member is pivotably disposed in the valve housing, and has a first communication hole selectively communicating with the first and the second suction ducts, and a second communication hole to guide dust and air passing through the first communication hole toward the guide duct.

13. The upright vacuum cleaner as claimed in claim 12, wherein the valve member elastically pivots in the valve housing by a torsion spring.

14. The upright vacuum cleaner as claimed in claim 12, wherein the valve member is formed in an arc shape and is disposed in the valve housing formed in a cylindrical shape, and the first and the second communication holes penetrate through different side surfaces of the valve member.

15. The upright vacuum cleaner as claimed in claim 12, wherein the suction path diverging valve comprises:
   a push portion which is disposed above the valve housing and is pressed by the extension pipe and released from a pressure by the extension pipe; and
   a push rod which extends from a lower end of the push portion and has a terminal end penetrating through the valve housing and contacting with the valve member such that the push rod presses one side of the valve member with the pressure applied to the push portion.

16. The upright vacuum cleaner as claimed in claim 15, wherein, as the push portion is released from the pressure by the extension pipe, the valve member is pivoted in a normal direction by the torsion spring, thereby allowing the first communication hole to fluidly communicate with the second suction duct, and as the push portion is pressed by the extension pipe, the valve member is pivoted in a reverse direction, thereby allowing the first communication hole to fluidly communicate with the first suction duct.

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