

Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of Korean Patent Application No. 2004-100541, filed on December 2, 2004, in the Korean Intellectual Property Office, the disclosure of which is incorporated herein by reference in its entirety.

BACKGROUND OF THE INVENTION

Field of the Invention

[0002] The present invention relates to a vacuum cleaner, and more particularly, to a suction hose assembly that draws in air laden with dust and/or foreign substance in a room, and a vacuum cleaner having the same.

Description of the Related Art

[0003] In general, a vacuum cleaner produces a vacuum by using a motor, and draws in air laden with dust and/or foreign substance by the vacuum to remove the dust and/or foreign substance from air.

[0004] FIG. 1 is a view schematically illustrating a conventional vacuum cleaner 20.

[0005] As shown in FIG. 1, the vacuum cleaner 20 comprises a cleaner body 1 and a suction hose assembly 17.

[0006] The cleaner body 1 has wheels 7 rotatably fixed at both sides thereof, and an inlet 2 formed at a front side thereof. The suction hose assembly 17, which draws in air with dust and/or foreign substance in a room, is connected with the inlet 2.

[0007] The suction hose assembly 17 is provided with a flexible hose 3, an operation handle 4, a multistage extended tube 5, and a brush unit 6. The flexible hose 3 is connected to the inlet 2 at one end thereof, and to one end of the operation handle 4 at the other end thereof. At the other end of the operation handle 4, one end of the multistage extended tube 5 is connected and at the other end of the multistage extended tube 5, the brush unit 6 is connected.

[0008] As shown in FIG. 2, the flexible hose 3 is coupled with the operation handle 4 by a connector 8. The connector 8 comprises a hose fixing tube 10 and a fixing cap 14. The hose fixing tube 10 has a double tube structure that an inner tube 11 is inserted by a certain depth into the flexible hose 3 and that an outer tube 12 encloses the inner tube 11 and the flexible hose 3. An inner circumferential surface of the flexible hose 3 is bonded with an outer circumferential surface of the inner tube 11 by an adhesive 13. At an inner circumferential surface of the outer tube 12, a securing protrusion 12a for securing the flexible hose 3 is formed. The fixing cap 14, which is assembled with the one end of the operation handle 4 to prevent the hose fixing tube 10 from being escaped from the operation handle 4, has a projection 14a at one end

thereof. The projection 14a is inserted and locked up in a groove 15 formed at the inside of the one end of the operation handle 4.

[0009] Operation of the conventional vacuum cleaner 1 constructed above is as follows.

[0010] When a motor (not shown) in the cleaner body 1 is driven to rotate a fan (not shown) and thereby to produce an inhalation force, air laden with dust and/or foreign substance is drawn in by the brush unit 6, and is then flowed into the cleaner body 1 via the multistage extended tube 5, the operation handle 4, the flexible hose 3 and the inlet 2.

[0011] After that, air flowed into the cleaner body 1 is filtered through a dust filter such as a dust-collecting bag. Then, air having the dust and/or foreign substance removed therefrom is discharged to outside via an outlet (not shown) formed at a rear side of the cleaner body 1.

[0012] In the conventional vacuum cleaner 20 constructed as above, however, since the flexible hose 3 of the suction hose assembly 17 is connected to the operation handle 4 to be unmovable by the connector 8, when user moves the suction hose assembly 17 here and there, gripping the operation handle 4, the flexible hose 3 and the operation handle 4 are moved or rotated as one body.

[0013] As a result, it becomes not only to be difficult for user to manage the suction hose assembly 17, but also the flexible hose 3 may be twisted or wrenched. If the flexible hose 3 is excessively twisted beyond a limit of angle, in order to prevent the flexible hose 3 from being damaged, user has to conduct a troublesome operation that rotates the whole of the suction hose assembly 17 and thereby untwists the twisted suction hose assembly 17.

[0014] Also, if the twisting of the suction hose assembly 17 is repeated, the suction hose assembly 17 may be torn or broken thereby to replace it with a new one.

SUMMARY OF THE INVENTION

[0015] The present invention has been developed in order to solve the above problems in the related art. Accordingly, an aspect of the present invention is to provide a suction hose assembly having a structure in which a flexible hose is rotatably connected with respect to an operation handle, thereby easily managing and using the operation handle, and a vacuum cleaner having the same.

[0016] The above aspect is achieved by providing a suction hose assembly comprising: a flexible hose connected to an inlet of a cleaner body; an operation handle having a first cylinder through which air is flowed; and a rotating connector having one end connected to the flexible hose to communicate with the flexible hose, and the other end rotatably supported on an outer circumferential surface of the first cylinder and communicating with the first cylinder.

[0017] The rotating connector may comprises a first penetrated tube connected to the flexible hose, and a

second penetrated tube connected at a predetermined angle with the first penetrated tube, and having a diameter slightly larger than that of the first cylinder to be rotatably supported on the outer circumferential surface of the first cylinder.

[0018] The suction hose assembly may further comprise a sealing part sealing up between the second penetrated tube and the first cylinder.

[0019] The sealing part may be composed of a plurality of sealing protrusions circumferentially formed on the outer circumferential surface of the first cylinder, and at least one protrusion receiving groove formed at an inner circumferential surface of the second penetrated tube to be engaged with at least one of the plurality of sealing protrusions.

[0020] The suction hose assembly may also comprise a rotation restrictor restricting a range, which the second penetrated tube rotates about the first cylinder.

[0021] The rotation restrictor may be composed of a rotation restricting groove formed at a circumferentially predetermined angle at the outer circumferential surface of the first cylinder, and a rotation restricting projection installed with respect to the rotating connector to be slidable along the rotation restricting groove. It is preferred that the rotation restricting projection is formed at a fixing cover fixed to the rotating connector, and is engaged with the rotation restricting groove through a guide hole circumferentially formed corresponding to the rotation restricting groove at second penetrated tube.

[0022] According to an embodiment of the present invention, a vacuum cleaner is provided that includes: a cleaner body having an inlet through which dust and/or foreign substance is drawn in; and a suction hose assembly drawing in the dust and/or foreign substance and guiding the dust and/or foreign substance into the inlet. The suction hose assembly comprises: a flexible hose connected to the inlet of the cleaner body; an operation handle having a first cylinder through which air is flowed; and a rotating connector having one end connected to the flexible hose to communicate with the flexible hose, and the other end rotatably supported on an outer circumferential surface of the first cylinder and communicating with the first cylinder.

[0023] The rotating connector may comprise a first penetrated tube connected to the flexible hose, and a second penetrated tube connected at a predetermined angle with the first penetrated tube, and having a diameter slightly larger than that of the first cylinder to be rotatably supported on the outer circumferential surface of the first cylinder.

[0024] The suction hose assembly may further comprise a sealing part sealing up between the second penetrated tube and the first cylinder.

[0025] The suction hose assembly may also comprise a rotation restrictor restricting a range, which the second penetrated tube rotates about the first cylinder.

BRIEF DESCRIPTION OF THE DRAWING FIGURES

[0026] The above aspects and other advantages of the present invention will be more apparent by describing an embodiment of the present invention with reference to the accompanying drawing figures, in which:

[0027] FIG. 1 is a perspective view showing a conventional vacuum cleaner;

[0028] FIG. 2 is a partial cross-section view showing a connector connecting a flexible hose with an operation handle of the vacuum cleaner showed in FIG. 1;

[0029] FIG. 3 is a perspective view of a vacuum cleaner having a suction hose assembly according to an embodiment of the present invention;

[0030] FIG. 4 is a partial side elevation view showing the suction hose assembly of the vacuum cleaner shown in FIG. 3;

[0031] FIG. 5 is a partial cross-section view showing a connection between an operation handle and a rotating connector of the suction hose assembly of the vacuum cleaner shown in FIG. 4;

[0032] FIG. 6 is a partial exploded side elevation view showing the suction hose assembly of the vacuum cleaner shown in FIG. 4; and

[0033] FIGS. 7A through 7C are partial top plan views showing operation of the suction hose assembly of the vacuum cleaner shown in FIG. 4.

[0034] In the drawing figures, it should be understood that like reference numerals refer to like features and structures.

DETAILED DESCRIPTION OF AN EXEMPLARY EMBODIMENT

[0035] Hereinafter, a suction hose assembly according to an embodiment of the present invention and a vacuum cleaner having the same will now be described in greater detail with reference to the accompanying drawing figures.

[0036] FIG. 3 is a view schematically showing a vacuum cleaner 100 having a suction hose assembly according to an embodiment of the present invention.

[0037] The vacuum cleaner 100 comprises a cleaner body 101 and a suction hose assembly 117.

[0038] The cleaner body 101 has wheels 107 rotatably fixed at both sides thereof, and an inlet 102 formed at a front side thereof. The inlet 102 draws in air laden with dust and/or foreign substance in a room. In the cleaner body 101, there are installed a dust collector (not shown) such as a dust-collecting bag for storing the dust and/or foreign substance drawn in through the inlet 102, and a driving part (not shown) such as a motor for providing an inhalation force of drawing in air laden with the dust and/or foreign substance in the room.

[0039] The suction hose assembly 117, which draws in air with the dust and/or foreign substance in the room and guides to the inlet 102, is connected with the inlet 102.

[0040] The suction hose assembly 117 is provided with

a flexible hose 103, an operation handle 104, a rotating connector 110, a multistage extended tube 113, and a brush unit 114.

[0041] The flexible hose 103 is connected to the inlet 102 of the cleaner body 101 at a first end thereof, and to a first penetrated tube 111 of the rotating connector 110 which will be explained later, at a second end thereof.

[0042] As shown in FIGS. 4 and 6, the operation handle 104, which allows user to grip the suction hose assembly 117 and to control operation of the vacuum cleaner, is provided with a handle part 105 and a first cylinder 106. The handle part 105 has an operation panel 109 in which operation/stop buttons (not shown) is formed. The first cylinder 106 is formed of a cylindrical shape, which is integrally formed with the handle part 105. On an upper side of first end of the first cylinder 106, which is apart from the handle part 105, an elastic protrusion 141 is formed. The elastic protrusion 141 is locked up in a fixing groove (not shown) of the multistage extended tube 113 when the first cylinder 106 is inserted into the multistage extended tube 113. At a lower side of second end of the first cylinder 106, which is adjacent to the handle part 105, a first air communicating opening 108 is formed. The first air communicating opening 108 allows air laden with the dust and/or foreign substance to flow from the multistage extended tube 113 to a first penetrated tube 111 of the rotating connector 110 through the first cylinder 106.

[0043] The rotating connector 110, which connects the flexible hose 103 rotatably to the first cylinder 106 of the operation handle 104, is provided with first and second penetrated tubes 111 and 112.

[0044] The first penetrated tube 111 is connected to the second end of the flexible hose 103 by a connector (not shown). Since construction of the connector is the same as that of the connector 8 explained with reference to FIG.2, or other connector known in the art, detailed descriptions thereof are omitted.

[0045] The second penetrated tube 112, which has a diameter slightly larger than that of the first cylinder 106, is rotatably supported on an outer circumferential surface of the first cylinder 106 of the operation handle 104.

[0046] The first and second penetrated 111 and 112 constitutes a T-shaped joint tube, which are integrally connected at a predetermined angle with each other.

[0047] The first end of the first cylinder 106, which is apart from the handle part 105, is inserted in a one end of the multistage extended tube 113, and is locked therein by the fixing groove and the elastic protrusion 141. The other end of the multistage extended tube 113 is connected to the brush unit 114. Since construction of the brush unit 114 is the same as that of the brush unit for drawing in air laden with the dust and/or foreign substance in the room known in the art, detailed descriptions thereof are omitted.

[0048] As shown in FIGS. 5 and 6, the suction hose assembly 117 further comprises a sealing part 121 for positioning the position of the second penetrated tube

112 and sealing up between the second penetrated tube 112 and the first cylinder 106 when the second penetrated tube 112 of the rotating connector 110 is assembled with the first cylinder 106 of the operation handle 104.

[0049] The sealing part 121 is composed of sealing protrusions 122a and 122b, and a protrusion receiving groove 123. Each of the sealing protrusions 122a and 122b has a semi-circular shape in section, which is circumferentially formed on an outer circumferential surface of the first cylinder 106. The protrusion receiving groove 123 is circumferentially formed at an inner circumferential surface of the second penetrated tube 112, and is engaged with one of the sealing protrusions 122a and 122b, i.e., the sealing protrusion 122b.

[0050] Accordingly, when the first cylinder 106 is inserted into the second penetrated tube 112, the sealing protrusions 122a and 122b is positioned between the second penetrated tube 112 and the first cylinder 106 thereby to seal up therebetween. Also, the sealing protrusion 122b is engaged with the protrusion receiving groove 123, so that the second penetrated tube 112 is positioned in position on the outer circumferential surface of the first cylinder 106 and at the same time is lightly locked up not to be axially movable, but to be circumferentially rotatable about the first cylinder 106.

[0051] Here, the sealing protrusions 122a and 122b and the protrusion receiving groove 123 are illustrated and explained as formed at the outer circumferential surface of the first cylinder 106 and the inner circumferential surface of the second penetrated tube 112, respectively, but they can be formed by contrary.

[0052] Also, if the second penetrated tube 112 is rotated beyond an angle of 360 ° about the first cylinder 106, the flexible hose 103 connected with the second penetrated tube 112 may be twisted or wrenched. To prevent this, as shown in FIGS.5 and 6, the suction hose assembly 117 further comprises a rotation restrictor 127 for restricting rotation of the second penetrated tube 112 about the first cylinder 106 within a range of predetermined angle, for example about 90 °.

[0053] The rotation restrictor 127 comprises a rotation restricting groove 132 and a rotation restricting projection 128. The rotation restricting groove 132 is formed at a circumferentially predetermined angle, for example about 90°, along the sealing protrusion 122b at the outer circumferential surface of the first cylinder 106, so that the second penetrated tube 112 can be rotated by the circumferentially predetermined angle about the first cylinder 106.

[0054] The rotation restricting projection 128 is formed at a front end of fixing cover 115 to be slidable along the rotation restricting groove 132. However, since the fixing cover 115 is fixed to a fixing boss 147 formed at the outer circumferential surface of the second penetrated tube 112 between the first and second penetrated tubes 111 and 112, by a screw 135, the rotation restricting projection 128 is inserted in the rotation restricting groove 132 through a guide hole 129 formed at a lower side of the

second penetrated tube 112. The guide hole 129 is formed at a circumferentially predetermined angle, for example about 90°, corresponding to the rotation restricting groove 132 to allow the rotation restricting projection 128 to be guidable along the rotation restricting groove 132.

[0055] Accordingly, when the first cylinder 106 is inserted into the second penetrated tube 112 and the second penetrated tube 112 is rotated on the outer circumferential surface of the first cylinder 106, the second penetrated tube 112 is guided only by the angle of 90° by the rotation restricting groove 132 and the rotation restricting projection 128, although it can be rotated beyond an angle of 360° by the sealing protrusions 122a and 122b and the protrusion receiving groove 123 of the sealing part 121. As a result, as shown in FIGS. 7A through 7C, the second penetrated tube 112 can be rotated right and left at an angle of about 45° about the first cylinder 106. Also, since the rotation restricting projection 128 is circumferentially guided along the rotation restricting groove 132, the second penetrated tube 112 having the fixing cover 115 at which the rotation restricting projection 128 is formed cannot be escaped from the first cylinder 106, but locked up to the first cylinder 106.

[0056] Hereinafter, operation of assembling the suction hose assembly 117 of the vacuum cleaner 100 as described above will now be described with reference to FIGS. 3 through 7C.

[0057] First, the rotating connector 110 connected to the flexible hose 103 by connecting means such as the conventional connector 8 explained with reference to FIG. 2 is prepared.

[0058] Then, the first cylinder 106 of the operation handle 104 is inserted into the second penetrated tube 112 of the rotating connector 110. When the first cylinder 106 is completely inserted into the second penetrated tube 112, the sealing protrusions 122a and 122b formed on the outer circumferential surface of the first cylinder 106 are positioned between the second penetrated tube 112 and the first cylinder 106 to seal up therebetween. Also, one of the sealing protrusions 122a and 122b, i.e., the sealing protrusions 122b is engaged with the protrusion receiving groove 123. Therefore, the second penetrated tube 112 is positioned in position on the outer circumferential surface of the first cylinder 106 and at the same time is lightly locked up thereon not to axially be movable, but to be circumferentially rotatable about the first cylinder 106.

[0059] After that, the rotation restricting projection 128 of the fixing cover 115 is inserted into the rotation restricting groove 132 through the guide hole 129 of the second penetrated tube 112. Then, the fixing cover 115 is fixed to the fixing boss 147 by the screw 135. The fixing boss 147 is formed on the outer circumferential surface of the second penetrated tube 112 between the first and second penetrated tubes 111 and 112. Accordingly, as shown in FIGS. 7A through 7C, when the second penetrated tube 112 is rotated on the outer circumferential surface of the

first cylinder 106, the second penetrated tube 112 is guided only by an angle of 90° by the rotation restricting groove 132 and the rotation restricting projection 128, and thereby is rotated right and left at an angle of about 45° about the first cylinder 106. Therefore, when user moves the suction hose assembly 117 here and there, gripping the operation handle 104, there is no need to move the flexible hose 3 and the operation handle 4 as one body. Accordingly, it becomes not only to be easy for user to manage the suction hose assembly 117, but also the flexible hose 103 is not twisted or wrenched. Also, even though the flexible hose 103 is excessively twisted beyond a limit of angle, user can untwist the twisted flexible hose 103 by rotating only the flexible hose 103 or the operation handle 104 without moving the whole of the suction hose assembly 117.

[0060] Thereafter, when the first end of the first cylinder 106, which is apart from the handle part 105, is inserted into the multistage extended tube 113 having the brush unit 114 assembled thereto, the elastic protrusion 141 is inserted and locked up in the fixing groove of the multistage extended tube 113. As a result, the first cylinder 106 is fixed to the multistage extended tube 113, and the operation of assembling the suction hose assembly 117 is completed.

[0061] Operation of the vacuum cleaner 100 having the suction hose assembly 117 constructed as above is the same as that of the conventional vacuum cleaner 20 explained with reference to FIGS. 1 and 2, except that the flexible hose 103 is rotated about the operation handle 104 by the rotating connector 110 when user moves the suction hose assembly 117 here and there gripping the operation handle in cleaning, and thus detailed description thereof are omitted.

[0062] As apparent from the foregoing description, the suction hose assembly according to the present invention and the vacuum cleaner having the same have a structure that the flexible hose is rotatably connected with respect to the operation handle, thereby easily managing and using the operation handle, and preventing the flexible hose from being twisted or wrenched. Also, even though the flexible hose is excessively twisted beyond a limit of angle, user can easily untwist the twisted hose by rotating only the flexible hose or the operation handle without moving the whole of the suction hose assembly.

[0063] The foregoing embodiment and advantages are merely exemplary and are not to be construed as limiting the present invention. The description of the present invention is intended to be illustrative, and not to limit the scope of the claims. Many alternatives, modifications, and variations will be apparent to those skilled in the art. In the claims, means-plus-function clauses are intended to cover the structures described herein as performing the recited function and not only structural equivalents but also equivalent structures.

Claims**1.** A suction hose assembly comprising:

a flexible hose (103) connected to an inlet of a cleaner body (101) ;
 an operation handle (104) having a first cylinder (106) through which air is flowed; and
 a rotating connector (110) having one end connected to the flexible hose to communicate with the flexible hose, and the other end rotatably supported on an outer circumferential surface of the first cylinder and communicating with the first cylinder.

2. The assembly as claimed in claim 1, wherein the rotating connector (110) comprises:

a first penetrated tube (111) connected to the flexible hose (103) ; and
 a second penetrated tube (112) connected at a predetermined angle with the first penetrated tube, and having a diameter slightly larger than that of the first cylinder (106) to be rotatably supported on the outer circumferential surface of the first cylinder.

3. The assembly as claimed in claim 2, further comprising a sealing part (121) sealing up between the second penetrated tube (112) and the first cylinder (106).**4.** The assembly as claimed in claim 3, wherein the sealing part (121) comprises:

a plurality of sealing protrusions (122a, 122b) circumferentially formed on the outer circumferential surface of the first cylinder (106) ; and
 at least one protrusion receiving groove (123) formed at an inner circumferential surface of the second penetrated tube to be engaged with at least one of the plurality of sealing protrusions.

5. The assembly as claimed in claim 2, further comprising a rotation restrictor (127) restricting a range, which the second penetrated tube (112) rotates about the first cylinder (106).**6.** The assembly as claimed in claim 5, wherein the rotation restrictor comprises:

a rotation restricting groove (132) formed at a circumferentially predetermined angle at the outer circumferential surface of the first cylinder; and
 a rotation restricting projection (128) installed with respect to the rotating connector to be slidable along the rotation restricting groove.

7. The assembly as claimed in claim 6, wherein the rotation restricting projection (128) is formed at a fixing cover (115) fixed to the rotating connector, and is engaged with the rotation restricting groove (132) through a guide hole (129) circumferentially formed corresponding to the rotation restricting groove at second penetrated tube.**8.** A vacuum cleaner comprising:

a cleaner body (101) having an inlet (102) through which dust and/or foreign substance is drawn in; and
 a suction hose assembly (117) drawing in the dust and/or foreign substance and guiding the dust and/or foreign substance into the inlet; and wherein the suction hose assembly comprises a flexible hose (103) connected to the inlet of the cleaner body, an operation handle (104) having a first cylinder (106) through which air is flowed, and a rotating connector (110) having one end connected to the flexible hose to communicate with the flexible hose, and the other end rotatably supported on an outer circumferential surface of the first cylinder and communicating with the first cylinder.

9. The vacuum cleaner as claimed in claim 8, wherein the rotating connector comprises:

a first penetrated tube (111) connected to the flexible hose; and
 a second penetrated tube (112) connected at a predetermined angle with the first penetrated tube, and having a diameter slightly larger than that of the first cylinder (106) to be rotatably supported on the outer circumferential surface of the first cylinder.

10. The vacuum cleaner as claimed in claim 9, further comprising a sealing part (121) sealing up between the second penetrated tube and the first cylinder.**11.** The vacuum cleaner as claimed in claim 9, further comprising a rotation restrictor (127) restricting a range, which the second penetrated tube (112) rotates about the first cylinder (106).

FIG. 1

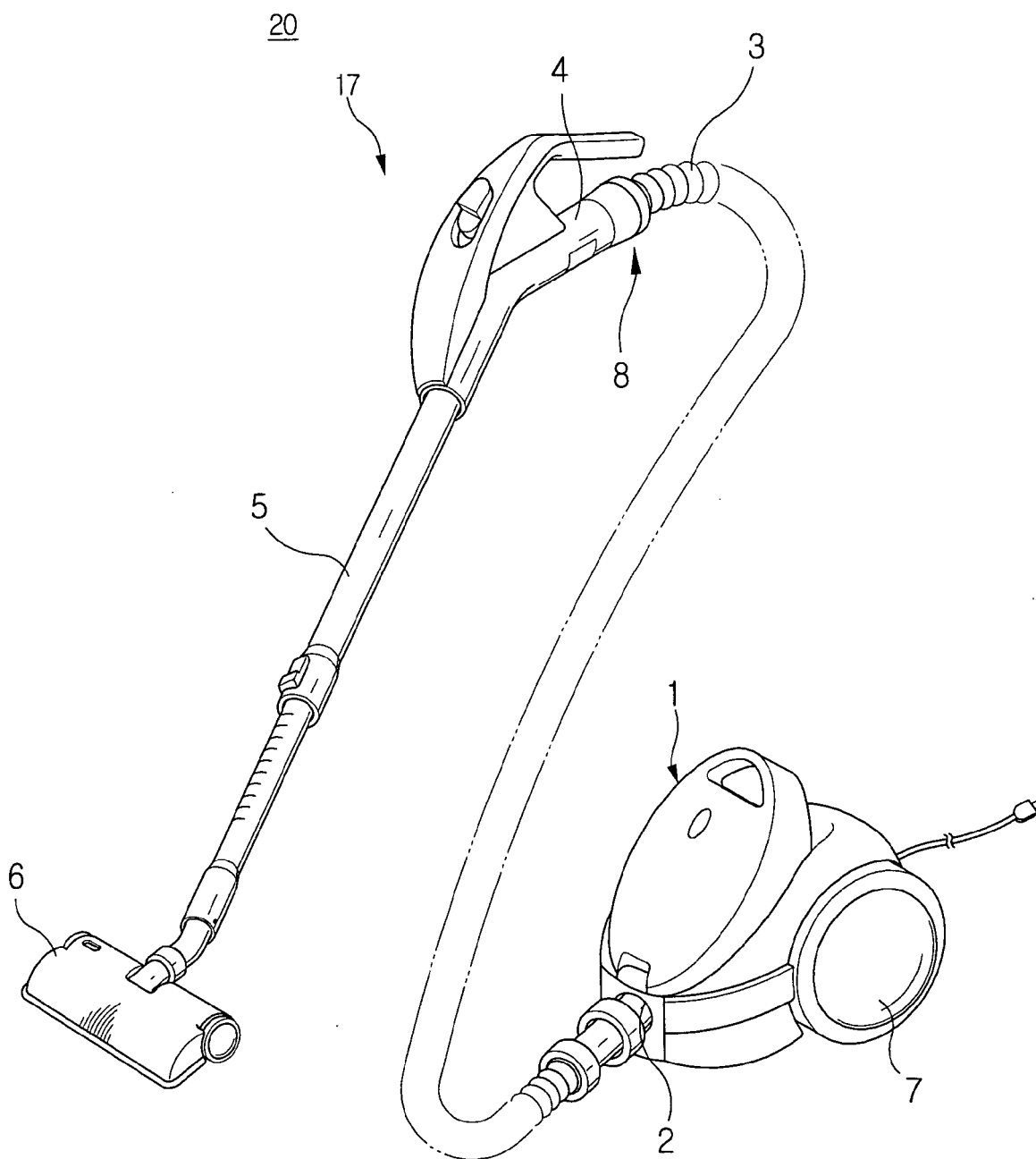


FIG. 2

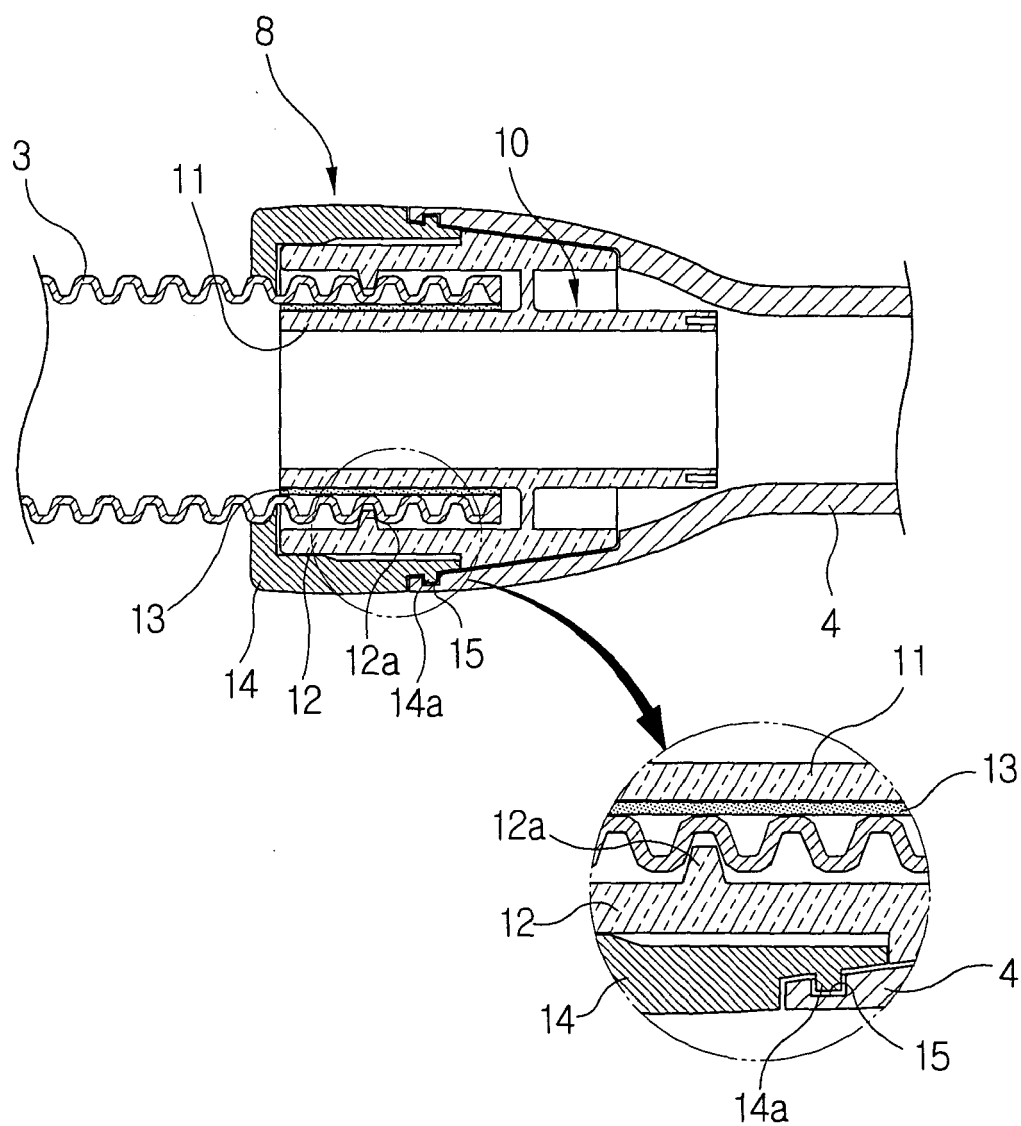


FIG. 3

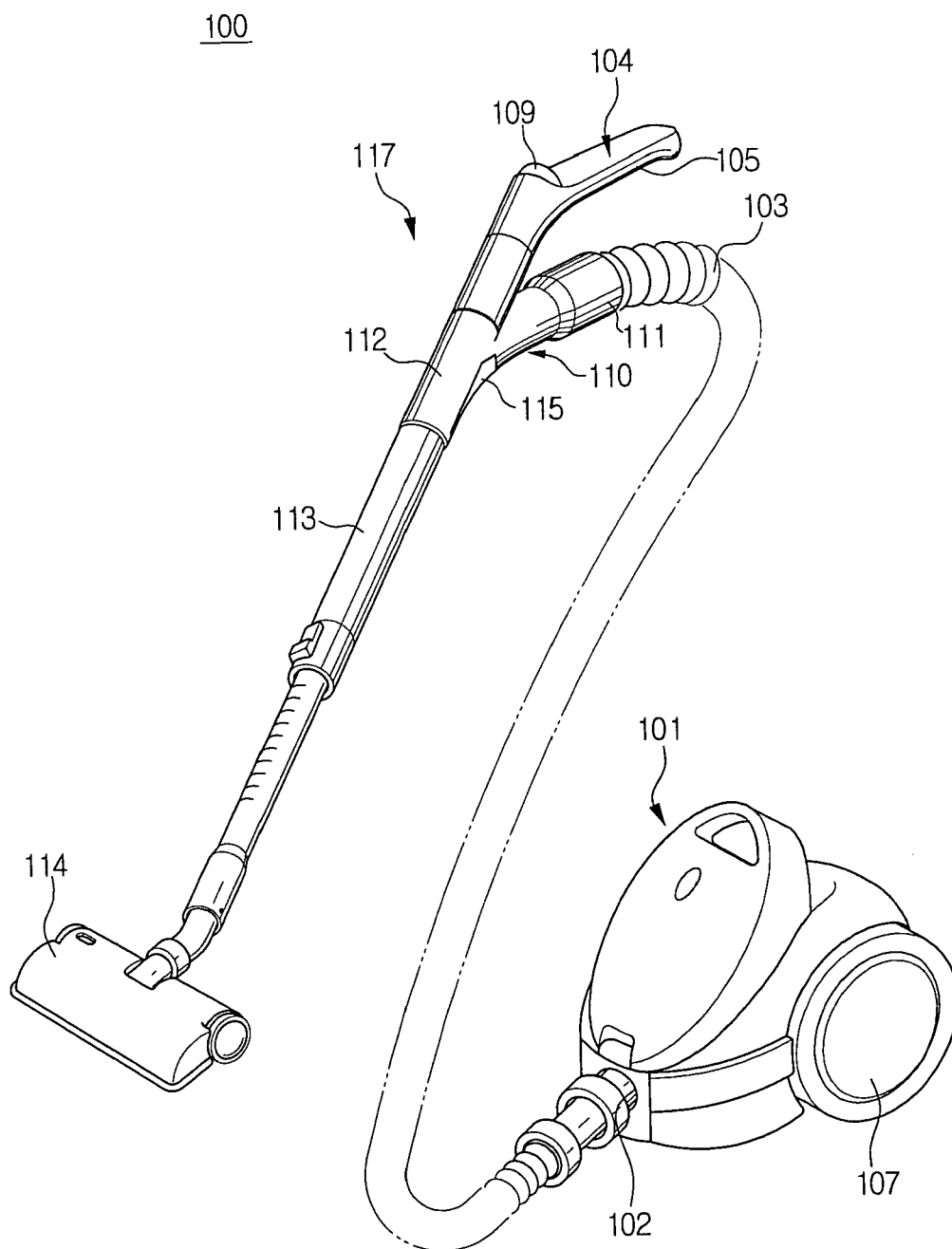


FIG. 4

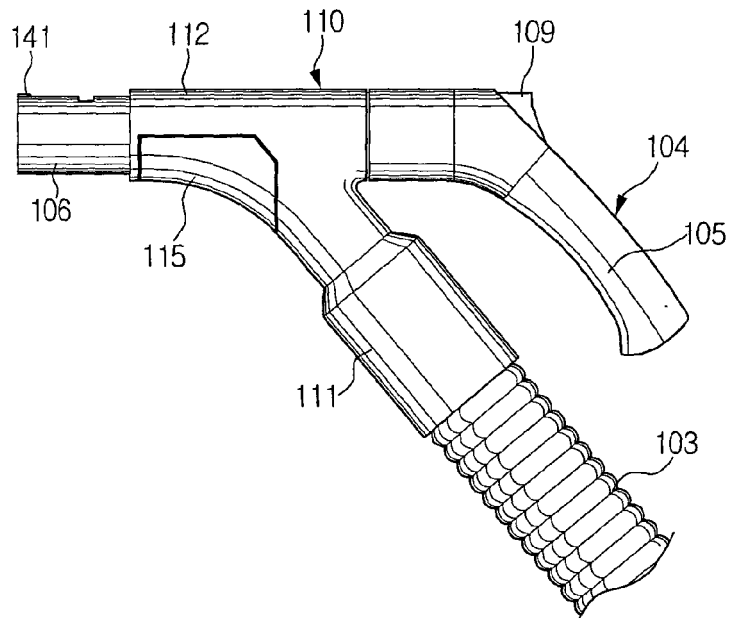


FIG. 5

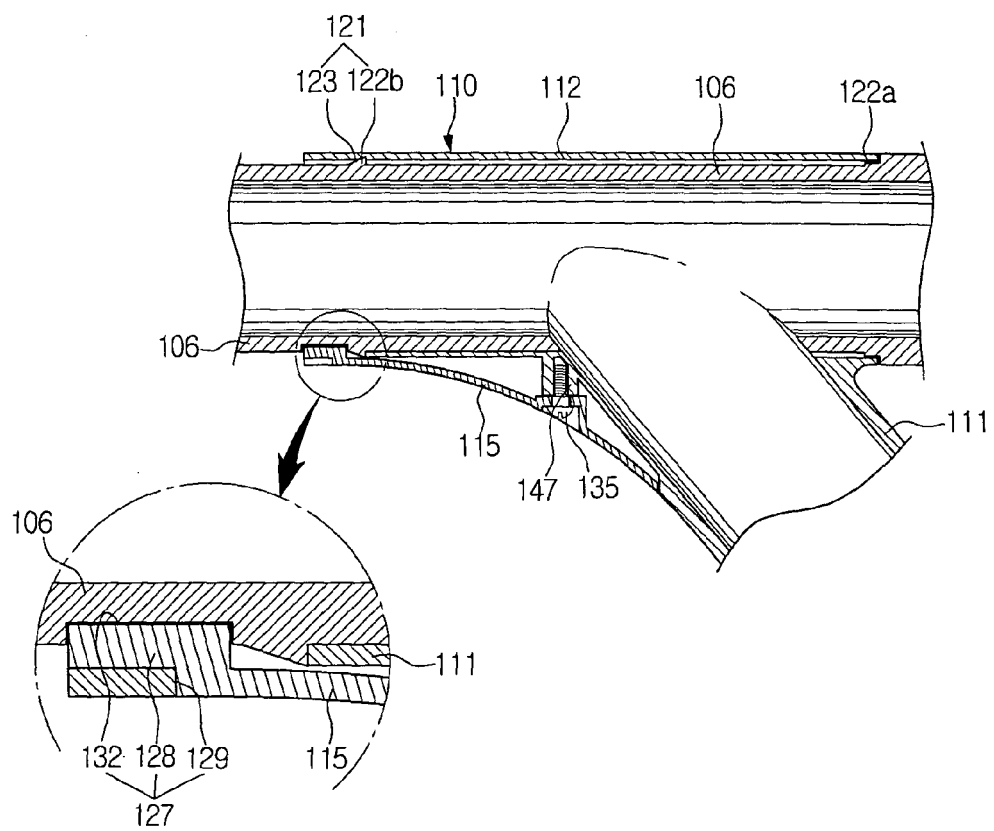


FIG. 6

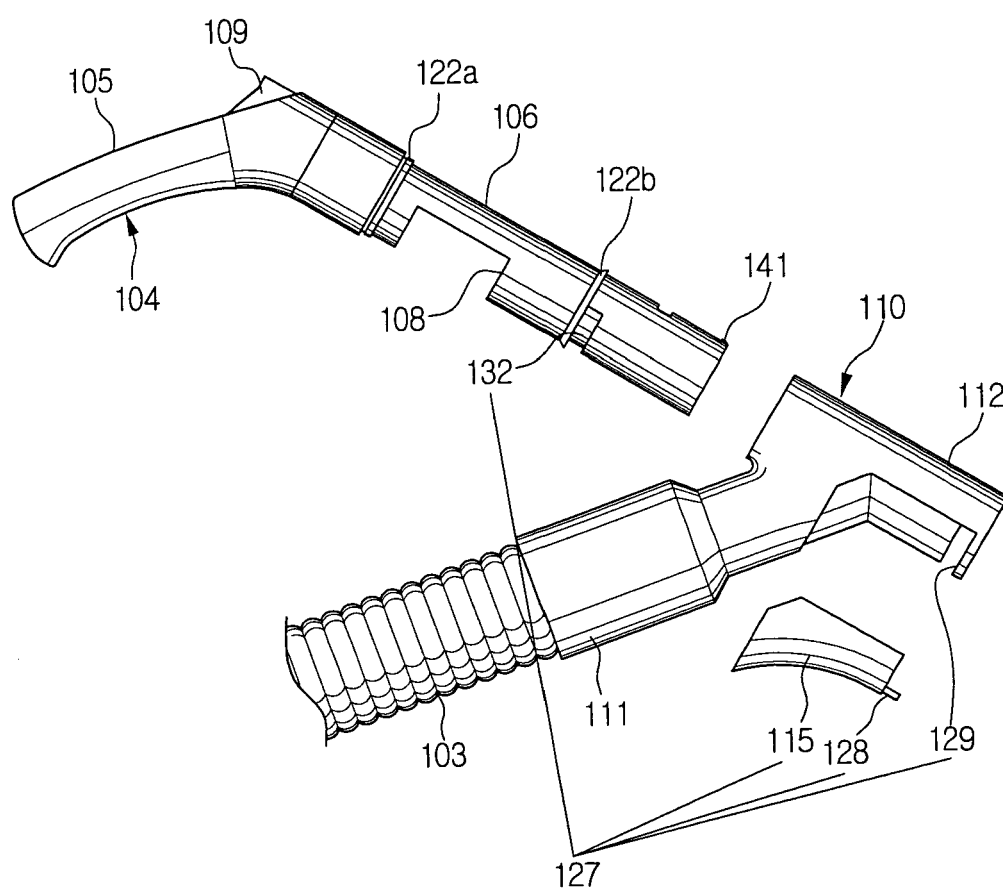


FIG. 7A

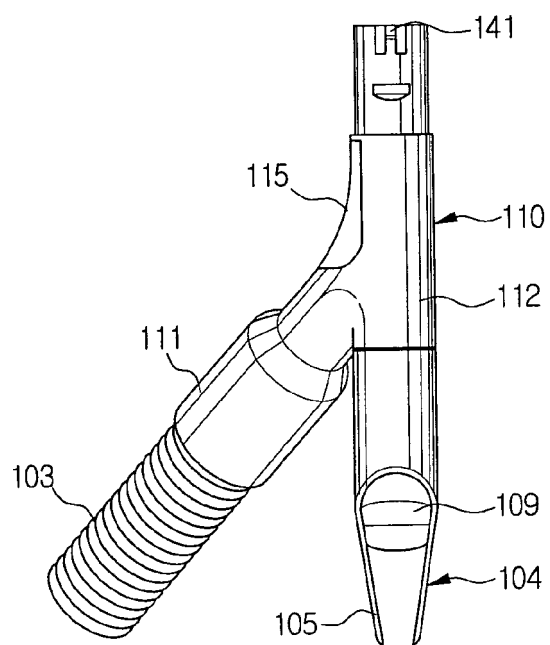


FIG. 7B

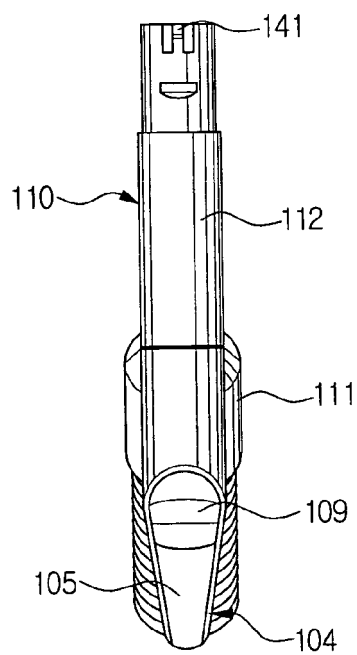
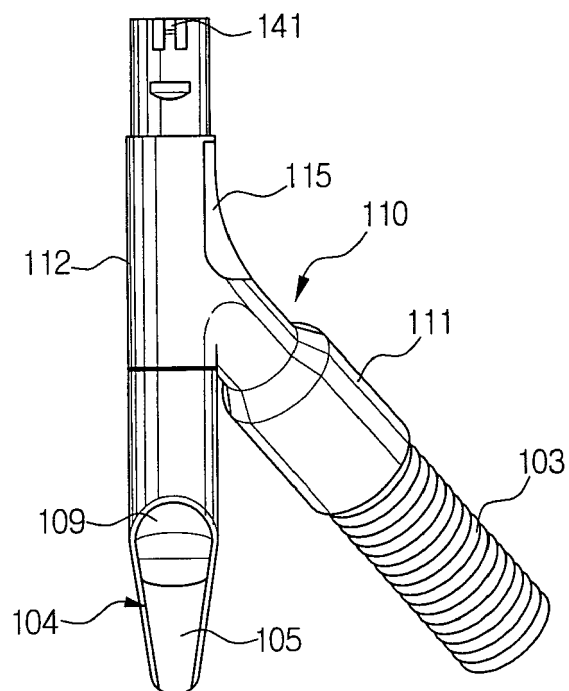


FIG. 7C





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 05 35 6109

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 10 March 2006	Examiner CONTRERAS APARICIO
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (F04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 05 35 6109

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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10-03-2006

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