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(54) **CLEANING DEVICE**

(57) The present invention provides a cleaning device, with a sealing member provided in a region of connection of a body part and a dust collection component of the cleaning device, a cross section of an elastic force application portion of the sealing member being formed in an arc shape, thereby enabling a good sealing effect while also facilitating installation and removal of the dust collection component; moreover, the sealing member has a two-layer elastic wall structure and is therefore not likely to deform even with long-term use. The present invention additionally provides an alignment structure between the dust collection component and a device body, further avoiding problems such as rocking and shifting during installation of the dust collection component; improves a sealing structure between a handle and the device body, facilitating installation and removal of the handle; improves an installation connection structure of a cleaning fluid storage tank and the device body, facilitating installation and removal of the cleaning fluid storage tank; and improves the structure of a motor mounting bracket, avoiding excessive rocking of the motor during use, and thus being able to effectively extend the motor service life.

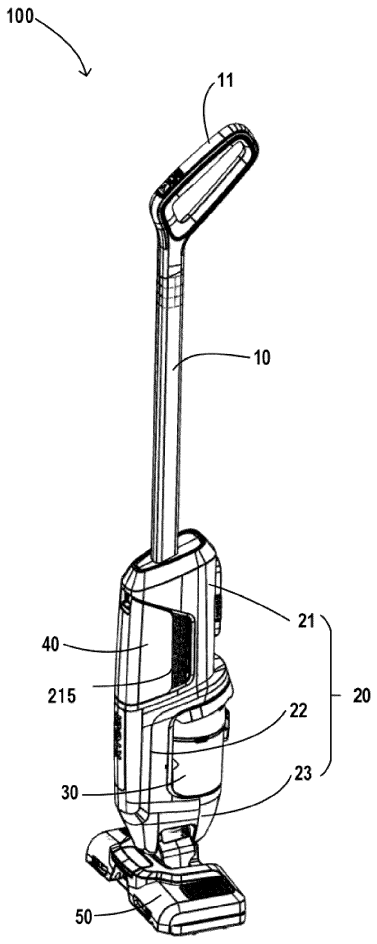

Fig. 1

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Description

Technical Field

[0001] The present invention relates to the field of household appliances, in particular to a cleaning device, such as a vacuum cleaner, a mopping apparatus or a floor sweeper.

Background Art

[0002] Cleaning devices are generally fitted with a dust bin for collecting dust and other dirt. A fluid communication duct is generally provided between the dust bin and a body of the device, the duct allowing air or dust and other dirt to pass through. A sealing member may be provided at the position of connection between the dust bin and the device body to prevent outward leakage of gases or dust. Existing sealing members are quite complex in structure, and usually need to be fitted to both the device body and the dust bin by insertion, in order to ensure sealing quality, but such a configuration makes removal of the dust bin from the device body inconvenient. Sealing members which are structurally simple can be envisaged, but structurally simple sealing members are likely to result in a poor sealing effect, fatigue damage after a long period of use, and so on.

[0003] Furthermore, existing cleaning devices have room for improvement in other respects, for example: there are few alignment feature structures between the dust bin and the device body, so deviation from the correct installation position is likely to occur in the process of installing the dust bin; a sealing structure between a handle and the device body is overly complex, making removal of the handle from the device difficult; a connection structure for fitting a cleaning fluid tank, used for holding cleaning fluid, to the device is difficult to operate; a mounting bracket for a vibrating component motor has too simple a structure, so the motor is easily damaged in use and has a short service life; and a suction cleaning part of the cleaning device contains complex ducts and electric wires, so components for accommodating or carrying these ducts and electric wires usually need to be additionally provided, which increases the overall volume of the structure as well as the manufacturing cost.

[0004] Thus, it is necessary to provide a cleaning device to at least partially solve the abovementioned problems.

Summary of the Invention

[0005] The present invention provides a cleaning device, with a sealing member provided in a region of connection of a body part and a dust collection component of the cleaning device, a cross section of an elastic force application portion of the sealing member being formed in an arc shape, thereby enabling a good sealing effect while also facilitating installation and removal of the dust collection component; moreover, the sealing member has a two-layer elastic wall structure and is therefore not likely to deform even with long-term use.

[0006] The cleaning device of the present invention also provides preferred configurations in other respects; for example, the present invention additionally provides an alignment structure between the dust collection component and a device body, further avoiding problems such as rocking and shifting during installation of the dust collection component; improves a sealing structure between a handle and the device body, facilitating installation and removal of the handle; improves an installation connection structure of a cleaning fluid storage tank and the device body, facilitating installation and removal of the cleaning fluid storage tank; improves the structure of a motor mounting bracket, avoiding excessive rocking of the motor during use, and thus being able to effectively extend the motor service life; and integrates part of a wall face of a cleaning apparatus with a part for accommodating and carrying electric wires, ducts and other structures, thus saving space and reducing manufacturing costs.

[0007] According to one aspect of the present invention, a cleaning device is provided, comprising:

a body, the body having a body top portion, a body bottom portion, and a body side portion connected between the body top portion and the body bottom portion, with a first gas channel port formed on a bottom wall of the body top portion;

a cleaning apparatus, connected to the bottom of the body;

a dust collection means, removably installed between the body top portion and the body bottom portion, with a second gas channel port formed on a top wall of the dust collection means, the second gas channel port being aligned with the first gas channel port;

a sealing member, installed between the body top portion and the dust collection means to realize sealing at a position of communication between the first gas channel port and the second gas channel port, the sealing member comprising an inside wall, an outside wall with the same axis as the inside wall, and a connecting wall that transitions smoothly from the bottom of the inside wall to the bottom of the outside wall, the connecting wall abutting the top wall of the dust collection means around the second gas channel port.

[0008] In an embodiment, the sealing member comprises a mounting portion fixed to the body top portion, the mounting portion being connected to a top end of the outside wall, and a top end of the inside wall being a free end.

[0009] In an embodiment, the inside wall and the outside wall are formed in a shape, such as an annular shape, fitting the shape of the second gas channel port,

and in particular, an axial dimension of the inside wall is substantially equal to an axial dimension of the outside wall.

[0010] In an embodiment, in a cross section through the axis, a sectional profile of the connecting wall forms a substantially arc-shaped portion, such as a semicircle, a 1/4 circle or a teardrop shape, and preferably, the top wall is at a certain angle to a longitudinal direction of the cleaning device.

[0011] In an embodiment, the dust collection means has an inlet in communication with the cleaning apparatus, a filtration component positioned between the inlet and the second gas channel port is further provided in the dust collection means, and a gas suction apparatus is provided in the body top portion, the gas suction apparatus being used to suck gas from the dust collection means into the body top portion via the second gas channel port and the first gas channel port.

[0012] In an embodiment, a first positioning feature structure is provided on the dust collection means at a position of connection to the body side portion, and the body side portion has a second positioning feature structure corresponding to the first positioning feature structure, wherein the first positioning feature structure and the second positioning feature structure are positioned so that in the process of installing the dust collection means, the first positioning feature structure and the second positioning feature structure begin to engage with each other when the top wall of the dust collection means comes close to the sealing member.

[0013] In an embodiment, the first positioning feature structure is a rib that is positioned on the dust collection means near the bottom and projects in a first horizontal direction towards the body side portion, and the second positioning feature structure is a rib receiving slot of depth 3 mm;

in particular, the rib comprises two ribs arranged side by side in a second horizontal direction perpendicular to the first horizontal direction, and the rib receiving slot is one slot running through in the second horizontal direction.

[0014] In an embodiment, a positioning slot extending in a first horizontal direction is provided at the bottom of the dust collection means, and a positioning protrusion corresponding to the positioning slot is provided on a top surface of the body bottom portion; and/or

a positioning block protruding towards a bottom side is provided on the dust collection means at a position close to the bottom and remote from the body side portion, a receiving recess corresponding to the positioning block is provided on the body bottom portion, and preferably, an outer surface of the positioning block is flush with an outer surface of the body bottom portion when the dust collection means is mounted on the body.

[0015] In an embodiment, the cleaning device comprises an elongated handle detachably mounted on the body top portion, wherein a second sealing member is mounted at a handle receiving port of the body top portion, the second sealing member having a sealing portion abutting an outer periphery of the handle, and in a cross section through a centre line of the handle, a sectional profile of the sealing portion is formed in a circular arc shape, in particular a semicircle, a 1/4 circle, or a teardrop shape.

[0016] In an embodiment, the sealing portion comprises a top wall, a bottom wall, and a transitional portion which smoothly connects radial inner ends of the top wall and the bottom wall, a radial outer end of the top wall being fixed to the body top portion, and a radial outer end of the bottom wall being free.

[0017] In an embodiment, the body top portion contains a first support member and a second support member located at the bottom of the first support member, the second sealing member being located in an accommodating space jointly defined by the first support member and the second support member, and preferably, the handle has a locking pin projecting radially from an outer wall thereof, and the first support member is provided with a locking pin hole corresponding to the locking pin, the locking pin hole being spaced apart from the accommodating space.

[0018] In an embodiment, a cleaning fluid storage means is fitted to the body top portion, and a locking bolt and a button fixedly connected to the locking bolt are provided at the top of the cleaning fluid storage means, the locking bolt being constructed to be movable, under the driving action of the button, between a locked position in which the locking bolt extends into the body top portion and an unlocked position in which the locking bolt is disengaged from the body top portion;

[0019] in particular, an elastic member is provided between the locking bolt and a body of the cleaning fluid storage means, and when the locking bolt is in the unlocked position, the elastic member stores force, and has a biasing force that biases the locking bolt towards the locked position;

in particular, the locking bolt and the button are a one-piece member.

[0020] In an embodiment, the cleaning fluid storage means has a bottom cover assembly, with a retainer provided at the bottom of the bottom cover assembly, the retainer having a top opening to partially install and accommodate the bottom cover assembly; a cleaning fluid discharge tube extending towards a bottom side is provided at the bottom of the retainer, and the retainer has two opposite wing parts projecting horizontally, the wing parts being received in corresponding accommodating parts in the body top portion, such that the retainer is pivotable.

[0021] In an embodiment, the wing parts are hollow round tube structures; more preferably, the two wing parts are coaxial but have different diameters, and more preferably, a bottom surface of the wing part with the larger diameter of the two wing parts is flush with a bottom surface of a body of the retainer;

[0022] in particular, a one-way valve is provided on the bottom cover assembly, and the retainer has an installa-

tion post projecting towards a top side, the installation post being inserted into the bottom of a valve core of the one-way valve; preferably, a sealing ring is provided between the retainer and the bottom cover assembly, and the installation post is dimensioned so that sealing can be maintained at the sealing ring in the process of the installation post and the one-way valve interacting with each other during installation and removal of the cleaning fluid storage means.

[0023] In an embodiment, a motor and a motor mounting bracket are provided in the cleaning apparatus, wherein the motor mounting bracket comprises a mounting base and a circumferential portion which is annular and projects from the mounting base towards a top side, the circumferential portion surrounding the motor and being adapted in shape to the motor; preferably, the circumferential portion covers a region of the motor that exceeds 1/2 of an axial dimension thereof, and more preferably, the circumferential portion covers a region equivalent to 1/2 - 3/4 of the motor in the axial direction thereof.

[0024] In an embodiment, a connecting component constructed to allow the cleaning apparatus to pivot relative to the body is provided between the cleaning apparatus and the body, and the cleaning apparatus comprises a mounting bracket for receiving the connecting component, a part of the mounting bracket forming part of an outer surface of the cleaning apparatus, and the mounting bracket further comprising an extension portion in the cleaning apparatus, the extension portion being constructed to cover or carry an electric wire or duct in the cleaning apparatus, and the mounting bracket being an integrally formed member;
in particular, there are two said extension portions, the two extension portions extending from a body of the mounting bracket in two partially opposite directions.

Brief Description of the Drawings

[0025] To better understand the above and other objectives, features, advantages and functions of the present invention, reference may be made to the preferred embodiments shown in the drawings. In the drawings, identical or similar reference signs denote identical or similar components. It should be understood by a person skilled in the art that the drawings are intended to schematically illustrate preferred embodiments of the present invention, without imposing any limitations on the scope of the present invention, and that the various components in the drawings are not drawn to scale.

Figs. 1 and 2 are schematic drawings of a cleaning device according to some preferred embodiments of the present invention, viewed from two angles.
Fig. 3 is a partial section taken along line A-A in Fig. 2.
Fig. 4 is a partial enlarged drawing of part B in Fig. 3.
Fig. 5 is a schematic drawing of a body at the position of a sealing member, viewed from below.
Figs. 6 - 7B are 3D schematic drawings of a dust collection means on its own, viewed from three angles.
Fig. 8 is a 3D schematic drawing of a receiving slot part of a body.
Fig. 9 is a partial enlarged drawing of part C in Fig. 3.
Fig. 10 is a partial enlarged drawing of part D in Fig. 3.
Fig. 11 is a partial enlarged drawing of part E in Fig. 3.
Fig. 12 is a 3D drawing of the retainer in Fig. 11.
Fig. 13 is another sectional drawing of the part shown in Fig. 11.
Fig. 14 is a 3D drawing of a motor part in the cleaning apparatus of the cleaning device in Fig. 1.
Fig. 15 is a 3D drawing of the junction between a body and the cleaning apparatus of the cleaning device in Fig. 1.
Fig. 16 is a schematic drawing of some of the internal structure of the cleaning apparatus in Fig. 15.

Key to reference signs:

[0026]

100	cleaning device
10	handle
101	locking pin
11	gripping portion
20	body
21	body top portion
211	suction apparatus
212	locking tongue receiving slot
213	second support member
214	sealing portion of second sealing member
2141	top wall of second sealing member
2142	bottom wall of second sealing member
2143	transitional portion of second sealing member
215	device exhaust hole
216	second sealing member
217	first support member
22	body side portion
221	second engagement feature structure
222	locking bolt receiving slot
223	accommodating part
23	body bottom portion
231	positioning protrusion
232	receiving recess
233	separating wall
24	dust suction duct
241	inlet of dust suction duct
242	outlet of dust suction duct
25	sealing member
251	mounting portion of sealing member
2521	outside wall
2522	inside wall
2523	connecting wall
26	gas outlet
30	dust collection means

31	dirt inlet
32	primary filtration component
33	gas outlet
34	top wall
341	locking tongue
351	first engagement feature structure
352	positioning slot
353	positioning block
36	secondary filtration component
40	cleaning fluid storage means
41	locking bolt
42	button
43	elastic member
44	fluid inlet valve
45	bottom cover assembly
46	one-way valve
47	retainer
471	installation post
472	cleaning fluid discharge tube
473, 474	wing parts
475	filtration core
50	cleaning apparatus
51	bottom cover
52	motor
53	motor mounting bracket
531	mounting base
532	circumferential portion
54	mounting bracket
541	part of mounting bracket
542	extension portion
60	connecting component

Detailed Description of Embodiments

[0027] A cleaning device according to the present invention is described in detail below with reference to the drawings. The embodiments set out below are merely preferred embodiments according to the present invention. A person skilled in the art could think of other ways of implementing the present invention on the basis of the preferred embodiments, and such other ways shall likewise fall within the scope of the present invention.

[0028] The present invention provides a cleaning device, such as a vacuum cleaner, which in particular may be a vacuum cleaner with a mopping function. It should first be explained that directional and positional terms in the present invention should be understood as meaning relative directions and positions, and should be interpreted with reference to the normal orientation of the cleaning device in a state of use (e.g. Fig. 1).

[0029] Figs. 1 - 16 show a cleaning device 100 according to some preferred embodiments of the present invention. First referring to Figs. 1 and 2, the cleaning device 100 comprises a body 20, a handle 10 mounted at the top of the body 20, and a cleaning apparatus 50 mounted at the bottom of the body 20. A gripping portion 11 is formed at the top of the handle 10. The cleaning apparatus 50 is configured to directly contact a surface to be cleaned and is formed as a plate-like structure, which extends substantially along a horizontal plane when viewed from the angles shown in Figs. 1 and 2, and which is pivotable relative to the body 20 in a position of use. The body 20 has a body top portion 21, a body bottom portion 23, and a body side portion 22 connected between the body top portion 21 and the body bottom portion 23. The cleaning device 100 further comprises a cleaning fluid storage means 40 mounted on the body top portion 21, and a dust collection means 30 mounted between the body top portion 21 and the body bottom portion 23. The dust collection means 30, the cleaning fluid storage means 40 and the body 20 together form a substantially tubular structure.

[0030] The dust collection means 30 has two fluid channels respectively in communication with the body 20: a dirt inlet 31 formed on a side wall of the dust collection means 30, and a gas outlet 33 formed on a top wall 34 of the dust collection means 30. Referring to Fig. 3, an inlet 241 of a dust suction duct 24 of the cleaning device 100 is formed on the cleaning apparatus 50, specifically arranged near the bottom of the cleaning device 100; an outlet 242 of the dust suction duct 24 (see Fig. 8) is formed at an approximately central position on the body side portion 22 of the body 20, and in communication with the dirt inlet 31 of the dust collection means 30. A suction apparatus 211, such as a fan, is provided in the body top portion 21 of the body 20; the suction apparatus 211 sucks gas from the dust collection means 30 into the body top portion 31 through the gas outlet 33. A filtration means positioned between the dirt inlet 31 and the gas outlet 33 is provided in the dust collection means 30, the filtration means further comprising a primary filtration component 32 mainly used for filtering large particles and a secondary filtration component 36 mainly used for filtering small particles. It will be understood that under the sucking action of the suction apparatus 211, dirt from the surface to be cleaned enters the dust collection means 30 together with air via the dust suction duct 24, then clean air resulting from two stages of filtration in the dust collection means 30 enters the body top portion 31 through the gas outlet 33, and is finally discharged from a device exhaust hole 215 (see Fig. 1).

[0031] Fig. 4 shows the structure of a sealing member 25 at a position of connection between the gas outlet 33 of the dust collection means 30 and a gas inlet 26 of the body top portion 31, the sealing member 25 for example being a sealing ring. The sealing member 25 as a whole is made of a soft elastic material such as silicone rubber, and has a mounting portion 251 for mounting the sealing member 25 and a sealing portion serving a sealing function. The mounting portion 251 is snap-fitted to the body top portion 21; the sealing portion comprises an annular inside wall 2522, an annular outside wall 2521, and a connecting wall 2523 connected at the bottom of the inside wall 2522 and the outside wall 2521. A top end of the outside wall 2521 is connected to the mounting

portion 251, and a top end of the inside wall 2522 is a free end. The connecting wall 2523 is constructed to transition smoothly from a bottom end of the inside wall 2522 to a bottom end of the outside wall 2521; that is to say, there is no edge in a region of connection of the inside wall 2522 and the outside wall 2521. In the sectional drawing shown in Fig. 4, the sectional profile of the connecting wall 2523 is formed to be substantially semicircular. In other embodiments which are not shown, the sectional profile of the connecting wall 2523 may be formed in a teardrop shape, meaning that a radial dimension is largest near a bottommost part thereof and slightly smaller at a position slightly nearer the top. In another embodiment which is not shown, the sectional profile of the connecting wall 2523 may be formed in another arc shape, e.g. a 1/4 circle.

[0032] In some embodiments which are not shown, the sealing member may not be a sealing ring. The sealing member may be a non-annular member, having an outside wall, an inside wall and an arc-shaped connecting wall, similar to the sealing member described above.

[0033] In particular, the annular inside wall 2522 and the annular outside wall 2521 are both circular ring structures around an axis X1, and an axial dimension of the inside wall 2522 is substantially equal to an axial dimension of the outside wall 2521. In another embodiment which is not shown, the sealing member 25 has a shape adapted to the shape of the gas outlet 33 overall; for example, the inside wall and outside wall may be constructed in an oval or square shape, etc. if the gas outlet 33 is oval or square, and an axis of the inside and outside walls may be a straight line through the centre point of a projected profile thereof.

[0034] The connecting wall 2523 of the sealing member 25 is configured to abut and be pressed tightly against the top wall 34 of the dust collection means 30 around the gas outlet 33. Figs. 5 and 6 show views of the dust collection means 30 and the body 20 respectively after they have been separated. The sealing member 25 is pre-installed on the body top portion 21 of the body 20; when the dust collection means 30 is installed on the body 20, the sealing member 25 and the top wall 34 of the dust collection means 30 come into contact and are pressed tightly against each other, and there is no need for a snap-fitting or other connection relationship between the dust collection means 30 and the sealing member 25.

[0035] Such a configuration of the sealing member 25 can achieve a good sealing effect while also facilitating installation and removal of the dust collection means 30. Moreover, the sealing member 25 is not likely to deform even with long-term use, due to having a two-layer elastic wall structure.

[0036] In the embodiment described above, the gas inlet 26 on the body top portion 21 forms a "first gas channel port", and the gas outlet 33 of the dust collection means 30 forms a "second gas channel port". In another embodiment which is not shown, the first gas channel port and second gas channel port may be other channel ports; for example, the first gas channel port and second gas channel port may be the outlet of the dust suction duct and the dirt inlet of the dust collection means. That is to say, the sealing member in the embodiment described above could also be used at other positions where gas channel ports are joined.

[0037] Continuing to refer to Figs. 5 and 6, a locking tongue 341 is provided on the top wall 34 of the dust collection means 30, and a locking tongue receiving slot 212 is formed on a bottom wall of the body top portion 21. Referring to Figs. 6-8, the dust collection means 30 and the body 20 have a variety of alignment feature structures, to facilitate accurate positioning of the dust collection means 30 in the process of installing the dust collection means 30, and avoid rocking or shifting of the dust collection means 30. For example, a first positioning feature structure 351 is provided on the dust collection means 30 at a position of connection to the body side portion 22, and the body side portion 22 has a second positioning feature structure 221 corresponding to the first positioning feature structure 351. The first positioning feature structure 351 is a rib that is positioned on the dust collection means 30 near the bottom and projects in a first horizontal direction H1 towards a side wall; the second positioning feature structure 221 is the side wall. Preferably, there are two ribs, arranged side by side in a second horizontal direction H2 perpendicular to the first horizontal direction H1.

[0038] It will be understood that in the process of installing the dust collection means 30, when the top wall 34 of the dust collection means 30 initially contacts the sealing member 25, the sealing member 25 is compressed elastically and applies a certain elastic force to the dust collection means 30, possibly causing the dust collection means 30 to rock and thus be positioned inaccurately, but by having the first positioning feature structure 351 and the second positioning feature structure 221 begin to engage with each other at or before this time, rocking and shifting of the dust collection means 30 due to the sealing member 25 contacting the dust collection means 30 can be avoided. Thus, the first positioning feature structure 351 and the second positioning feature structure 221 may be positioned such that: in the process of installing the dust collection means 30, the first positioning feature structure 351 and the second positioning feature structure 221 begin to engage with each other when the top of the dust collection means 30 comes close to the sealing member 25.

[0039] In some embodiments, there may be other positioning feature structures between the dust collection means 30 and the body 20. For example, a positioning slot 352 extending in the first horizontal direction H1 is provided at the bottom of the dust collection means 30, and a positioning protrusion 231 corresponding to the positioning slot 352 is provided on a top surface of the body bottom portion 23; a positioning block 353 protruding towards a bottom side is provided on the dust collec-

tion means 30 at a position close to the bottom and remote from the body side portion 22, and a receiving recess 232 corresponding to the positioning block is provided on the body bottom portion 23, the positioning protrusion 231 and the receiving recess 232 being separated by a separating wall 233. Preferably, when the dust collection means 30 is installed on the body 20, an outer surface of the positioning block 353 and an outer surface of the body bottom portion 23 are flush with each other.

[0040] When installing the dust collection means 30, the positioning block 353 and the receiving recess 232 engage with each other first, and the dust collection means 30 pivots around the positioning block 353, such that the positioning slot 352 of the dust collection means 30 engages with the positioning protrusion 231, and the separating wall is thus positioned between the positioning block 353 and the positioning slot 352. When the top wall 34 of the dust collection means 30 is about to come into contact with the sealing member 25, the rib and the side wall (i.e. the first positioning feature structure 351 and the second positioning feature structure 221) begin to engage with each other. As shown in Fig. 7, in an embodiment, the top wall 34 is at a certain angle to a vertical direction (i.e. a direction perpendicular to the plane defined by direction H1 and direction H2); this angle is for example an acute angle, and the vertical direction is parallel to a longitudinal direction of the cleaning device. When the dust collection means 30 rotates into a locked position, the top wall 34 abuts the sealing member 25, thereby forming a sealed engagement.

[0041] It should be explained that terms such as "first positioning feature structure" and "second positioning feature structure" mentioned in the present invention are merely used to distinguish between components. In fact, the components may be named in different ways. For example, the positioning block 353 may be called a first positioning part, while the receiving recess 232 is a first positioning counterpart corresponding to the first positioning part; and the part with reference numeral 351 may be called a second positioning part, while the part with reference numeral 221 is a second positioning counterpart corresponding to the second positioning part.

[0042] Referring to Fig. 9 below, in some embodiments, a sealing structure between the handle 10 and the body 20 has a similar structure to the sealing member 25. For convenience of description, the sealing structure between the handle 10 and the body 20 is called a second sealing member 216. The handle 10 is an elongated structure detachably mounted on the body top portion 21; the second sealing member 216 is mounted at a handle receiving port of the body top portion 21, and the second sealing member 216 has a sealing portion 214 abutting an outer periphery of the handle 10. In a cross section through the centre line of the handle 10, the sectional profile of the sealing portion 214 is formed in a circular arc shape, e.g. a semicircle, a 1/4 circle, or a teardrop shape. Further, the sealing portion comprises a top wall 2141, a bottom wall 2142, and a transitional portion 2143 which smoothly connects radial inner ends of the top wall 2141 and the bottom wall 2142. A radial outer end of the top wall 2141 is fixed to a mounting portion of the second sealing member 216, and a radial outer end of the bottom wall 2142 is free.

[0043] The second sealing member 216 has the same advantages as the sealing member 25. For example, the configuration of a second sealing ring can achieve a good sealing effect while also facilitating mounting and removal of the handle 10. Moreover, the second sealing member 216 is not likely to deform even with long-term use, due to having a two-layer elastic wall structure.

[0044] In another embodiment which is not shown, the second sealing member may have a non-annular shape; the non-annular second sealing member may still have a top wall, a bottom wall, and a transitional portion in a circular arc shape, as in the second sealing member described above.

[0045] Preferably, the body top portion contains a first support member 217 and a second support member 213 located at the bottom of the first support member. The second sealing member 214 is located in an accommodating space jointly defined by the first support member 217 and the second support member 213, and the mounting portion of the second sealing member 216 may be snap-fitted to the first support member 217 and/or the second support member 213. More preferably, the handle has a locking pin 101 projecting radially from an outer wall thereof, and the first support member 217 is provided with a locking pin hole corresponding to the locking pin 101, the locking pin hole being spaced apart from the accommodating space, to prevent the locking pin 101 from interfering with the second sealing member 214.

[0046] In some preferred embodiments, there are also certain preferred configurations for an installation connection structure for the cleaning fluid storage means 40; these preferred configurations are shown in Figs. 10 - 13.

[0047] First referring to Fig. 10, a locking bolt 41 and a button 42 fixedly connected to the locking bolt 41 are provided at the top of the cleaning fluid storage means 40, the locking bolt 41 being constructed to be movable, under the driving action of the button 42, between a locked position in which the locking bolt extends into a locking bolt receiving slot 222 of the body top portion 21 and an unlocked position in which the locking bolt is disengaged from the body top portion 21. In particular, an elastic member 43 is provided between the locking bolt 41 and a body 20 of the cleaning fluid storage means 40; when the locking bolt 41 is in the unlocked position, the elastic member 43 stores force, and has a biasing force that biases the locking bolt 41 towards the locked position. The locking bolt 41 and the button 42 may be integrally formed. The cleaning fluid storage means 40 is also provided with a one-way valve 44 near the top thereof, to enable the cleaning fluid storage means 40 to be replenished with air when the cleaning fluid is

discharged.

[0048] Turning to Fig. 11, the cleaning fluid storage means 40 has a bottom cover assembly 45, with a retainer 47 provided at the bottom of the bottom cover assembly 45, the retainer 47 having a top opening to partially install and accommodate the bottom cover assembly 45. A one-way valve 46 is provided on the bottom cover assembly 45, and the retainer 47 has an installation post 471 projecting towards a top side, the installation post 471 being inserted into the bottom of a valve core of the one-way valve 46. A filtration core 475 is further provided in the retainer 47. Preferably, a sealing ring is provided between the retainer 47 and the bottom cover assembly 45, and the installation post 471 is dimensioned so that sealing can be maintained at the sealing ring in the process of the installation post 471 and the one-way valve 46 interacting with each other during installation and removal of the cleaning fluid storage means 40.

[0049] The 3D structure of the retainer 47 is shown in Fig. 12. As can be seen, a cleaning fluid discharge tube 472 extending towards a bottom side is provided at the bottom of the retainer 47, and the retainer 47 has two opposite wing parts 473, 474 projecting horizontally. The two wing parts 473, 474 are hollow tubular structures, the two tubular structures having a common axis D1. Fig. 13 shows another sectional drawing of the components shown in Fig. 11. This cross section is jointly defined by an axis X2 of the installation post and the axis D1 of the tubular structures formed by the wing parts 473, 474, and the two wing parts 473, 474 are shown in the sectional drawing.

[0050] Now turning to Fig. 13, it can be seen that the wing parts 473, 474 are received in corresponding accommodating parts 223 in the body top portion 21. Since the wing parts 473, 474 are tube structures and the accommodating parts 223 are cylindrical receiving cavities, the retainer 47 is rotatable as a whole through a certain angle about direction D1 (see Fig. 12), and this facilitates installation and removal of the cleaning fluid storage means 40. It will be understood that the pivoting and rocking of the retainer 47 used for receiving the cleaning fluid storage means 40 can provide an optimal engagement angle, facilitating alignment of the cleaning fluid storage means 40. Preferably, the pair of wing parts 473, 474 have different diameters, and a bottom surface of the wing part 473 with the larger diameter is flush with a bottom surface of a body of the retainer 47.

[0051] In some embodiments, a motor 52 for providing vibration for the cleaning apparatus 50 is installed in the cleaning apparatus 50. Referring to Fig. 14, in some embodiments, a motor mounting bracket 53 may also have an improved structure. Fig. 14 shows the motor mounting bracket 53 on a bottom cover 51 of the cleaning apparatus 50, the motor mounting bracket comprising a mounting base 531 and a circumferential portion 532 which is annular and projects from the mounting base 531 towards a top side, the circumferential portion 532 surrounding the motor 52 and being adapted in shape to the motor 52. Preferably, the circumferential portion 532 covers a region of the motor 52 that exceeds 1/2 of an axial dimension thereof, and more preferably, the circumferential portion 532 covers a region equivalent to 1/2 - 3/4 of the motor 52 in the axial direction thereof. Such a configuration can avoid excessive rocking of the motor 52 during use, so can effectively extend the service life of the motor 52.

[0052] Now referring to Fig. 15, a connecting component 60 constructed to allow the cleaning apparatus 50 to pivot relative to the body 20 is provided between the cleaning apparatus 50 and the body 20, and the cleaning apparatus 50 comprises a mounting bracket 54 for receiving the connecting component 60, the mounting bracket 54 being a one-piece member. A part 541 of the mounting bracket 54 forms part of an outer surface of the cleaning apparatus 50. Fig. 16 shows the structure of the cleaning apparatus 50 after removal of a top wall 34 and other components thereof; as can be seen, the mounting bracket 54 further comprises extension portions 542 in the cleaning apparatus 50, the extension portions 542 being constructed to cover or carry electric wires or ducts in the cleaning apparatus 50. There are two extension portions 542, the two extension portions 542 extending from a body of the mounting bracket 54 in partially opposite directions. Compared with a conventional solution requiring an additional covering or carrying member to cover or carry electric wire or ducts, embodiments of the present invention integrate part of a wall face of the cleaning apparatus 50 with a part for accommodating and carrying electric wires, ducts and other structures, thus saving space and reducing manufacturing costs.

[0053] It can be seen from the discussion of the embodiments above that sealing in the region of connection of the dust collection component and the body part of the present invention can achieve a good sealing effect while also facilitating installation and removal of the dust collection component; moreover, the sealing member has a two-layer elastic wall structure and is therefore not likely to deform even with long-term use. The present invention additionally provides an alignment structure between the dust collection component and the device body, further avoiding problems such as rocking and shifting during installation of the dust collection component; improves the sealing structure between the handle and the device body, facilitating installation and removal of the handle; improves the installation connection structure of the cleaning fluid storage tank and the device body, facilitating installation and removal of the cleaning fluid storage tank; improves the structure of the motor mounting bracket, avoiding excessive rocking of the motor during use, and thus being able to effectively extend the motor service life; and integrates part of a wall face of the cleaning apparatus with a part for accommodating and carrying electric wires, ducts and other structures, thus saving space and reducing manufacturing costs.

[0054] Through the above content, those skilled in the art will easily recognize that alternatives to the structures disclosed in the present invention may be used as feasible alternative embodiments, and embodiments disclosed in the present invention may be combined to produce new embodiments, which likewise fall within the scope of the attached claims.

Claims

1. Cleaning device (100), **characterized in that** the cleaning device comprises:

   a body (20), the body having a body top portion (21), a body bottom portion (23), and a body side portion (22) connected between the body top portion and the body bottom portion, with a first gas channel port (26) formed on a bottom wall of the body top portion (21);
   a cleaning apparatus (50), connected to the bottom of the body (20);
   a dust collection means (30), removably installed between the body top portion (21) and the body bottom portion (23), with a second gas channel port (33) formed on a top wall (34) of the dust collection means (30), the second gas channel port (33) being aligned with the first gas channel port (26);
   a sealing member (25), installed between the body top portion (21) and the dust collection means (30) to realize sealing at a position of communication between the first gas channel port (26) and the second gas channel port (33), the sealing member comprising an inside wall (2522), an outside wall (2521) with the same axis as the inside wall, and a connecting wall (2523) that transitions smoothly from the bottom of the inside wall to the bottom of the outside wall, the connecting wall (2523) abutting the top wall (34) of the dust collection means (30) around the second gas channel port (33).

2. Cleaning device according to Claim 1, **characterized in that** the sealing member (25) comprises a mounting portion (251) fixed to the body top portion (21), the mounting portion (251) being connected to a top end of the outside wall (2521), and a top end of the inside wall (2522) being a free end.

3. Cleaning device according to Claim 1 or 2, **characterized in that** the inside wall (2522) and the outside wall (2521) are formed in a shape, such as an annular shape, fitting the shape of the second gas channel port, and in particular, an axial dimension of the inside wall is substantially equal to an axial dimension of the outside wall.

4. Cleaning device according to Claim 3, **characterized in that** in a cross section through the axis (X1), a sectional profile of the connecting wall (2523) forms a substantially arc-shaped portion, such as a semicircle, a 1/4 circle or a teardrop shape, and preferably, the top wall (34) is at a certain angle to a longitudinal direction of the cleaning device.

5. Cleaning device according to any one of Claims 1-4, **characterized in that** the dust collection means (30) has an inlet (31) in communication with the cleaning apparatus (50), a filtration component (32, 36) positioned between the inlet (31) and the second gas channel port (33) is further provided in the dust collection means (30), and a gas suction apparatus is provided in the body top portion (21), the gas suction apparatus being used to suck gas from the dust collection means (30) into the body top portion via the second gas channel port (33) and the first gas channel port (26).

6. Cleaning device according to Claim 2, **characterized in that** a first positioning feature structure (351) is provided on the dust collection means (30) at a position of connection to the body side portion (22), and the body side portion (22) has a second positioning feature structure (221) corresponding to the first positioning feature structure (351), wherein the first positioning feature structure and the second positioning feature structure are positioned so that in the process of installing the dust collection means, the first positioning feature structure and the second positioning feature structure begin to engage with each other when the top wall (34) of the dust collection means comes close to the sealing member (25).

7. Cleaning device according to Claim 6, **characterized in that** the first positioning feature structure (351) is a rib that is positioned on the dust collection means (30) near the bottom and projects in a first horizontal direction (H1) towards the body side portion (22), and the second positioning feature structure (221) is a rib receiving slot of depth 3 mm;
   in particular, the rib comprises two ribs arranged side by side in a second horizontal direction (H2) perpendicular to the first horizontal direction, and the rib receiving slot (221) is one slot running through in the second horizontal direction.

8. Cleaning device according to any one of Claims 1 - 7, **characterized in that** a positioning slot (352) extending in a first horizontal direction (H1) is provided at the bottom of the dust collection means (30), and a positioning protrusion (231) corresponding to the positioning slot is provided on a top surface of the body bottom portion (23); and/or
   a positioning block (353) protruding towards a bottom side is provided on the dust collection means

(30) at a position close to the bottom and remote from the body side portion, a receiving recess (232) corresponding to the positioning block (353) is provided on the body bottom portion (23), and preferably, an outer surface of the positioning block (353) is flush with an outer surface of the body bottom portion (23) when the dust collection means (30) is mounted on the body.

9. Cleaning device according to any one of Claims 1 - 8, **characterized in that** the cleaning device (100) comprises an elongated handle (10) detachably mounted on the body top portion, wherein a second sealing member (216) is mounted at a handle receiving port of the body top portion, the second sealing member (216) having a sealing portion (214) abutting an outer periphery of the handle (10), and in a cross section through a centre line of the handle, a sectional profile of the sealing portion (214) is formed in a circular arc shape, in particular a semicircle, a 1/4 circle, or a teardrop shape;
preferably, the sealing portion (214) comprises a top wall (2141), a bottom wall (2142), and a transitional portion (2143) which smoothly connects radial inner ends of the top wall and the bottom wall, a radial outer end of the top wall (2141) being fixed to the body top portion, and a radial outer end of the bottom wall (2142) being free.

10. Cleaning device according to Claim 9, **characterized in that** the body top portion contains a first support member (217) and a second support member (213) located at the bottom of the first support member, the second sealing member (214) being located in an accommodating space jointly defined by the first support member (217) and the second support member (213), and preferably, the handle has a locking pin (101) projecting radially from an outer wall thereof, and the first support member (217) is provided with a locking pin hole corresponding to the locking pin (101), the locking pin hole being spaced apart from the accommodating space.

11. Cleaning device according to any one of Claims 1 - 10, **characterized in that** a cleaning fluid storage means (40) is fitted to the body top portion (21), and a locking bolt (41) and a button (42) fixedly connected to the locking bolt are provided at the top of the cleaning fluid storage means, the locking bolt (41) being constructed to be movable, under the driving action of the button (42), between a locked position in which the locking bolt extends into the body top portion and an unlocked position in which the locking bolt is disengaged from the body top portion;

in particular, an elastic member (43) is provided between the locking bolt (41) and a body of the cleaning fluid storage means (40), and when the locking bolt (41) is in the unlocked position, the elastic member (43) stores force, and has a biasing force that biases the locking bolt towards the locked position;
in particular, the locking bolt (41) and the button (42) are a one-piece member.

12. Cleaning device according to Claim 11, **characterized in that** the cleaning fluid storage means (40) has a bottom cover assembly (45), with a retainer (46) provided at the bottom of the bottom cover assembly, the retainer (46) having a top opening to partially install and accommodate the bottom cover assembly (45); a cleaning fluid discharge tube (472) extending towards a bottom side is provided at the bottom of the retainer (46), and the retainer (47) has two opposite wing parts (473, 474) projecting horizontally, the wing parts being received in corresponding accommodating parts (223) in the body top portion, such that the retainer (47) is pivotable.

13. Cleaning device according to Claim 12, **characterized in that** the wing parts (473, 474) are hollow round tube structures; more preferably, the two wing parts are coaxial but have different diameters, and more preferably, a bottom surface of the wing part (473) with the larger diameter of the two wing parts is flush with a bottom surface of a body of the retainer (47);
in particular, a one-way valve (46) is provided on the bottom cover assembly (45), and the retainer has an installation post (471) projecting towards a top side, the installation post being inserted into the bottom of a valve core of the one-way valve; preferably, a sealing ring is provided between the retainer (47) and the bottom cover assembly (45), and the installation post (471) is dimensioned so that sealing can be maintained at the sealing ring in the process of the installation post (471) and the one-way valve (46) interacting with each other during installation and removal of the cleaning fluid storage means (40).

14. Cleaning device according to any one of Claims 1 - 13, **characterized in that** a motor (52) and a motor mounting bracket (53) are provided in the cleaning apparatus (50), wherein the motor mounting bracket (53) comprises a mounting base (531) and a circumferential portion (532) which is annular and projects from the mounting base towards a top side, the circumferential portion (532) surrounding the motor (52) and being adapted in shape to the motor (52); preferably, the circumferential portion (532) covers a region of the motor (52) that exceeds 1/2 of an axial dimension thereof, and more preferably, the circumferential portion (532) covers a region equivalent to 1/2 - 3/4 of the motor (52) in the axial direction thereof.

15. Cleaning device according to any one of Claims 1 - 14, **characterized in that** a connecting component (60) constructed to allow the cleaning apparatus to pivot relative to the body is provided between the cleaning apparatus (50) and the body (20), and the cleaning apparatus (50) comprises a mounting bracket (54) for receiving the connecting component (60), a part (541) of the mounting bracket forming part of an outer surface of the cleaning apparatus, and the mounting bracket further comprising an extension portion (542) in the cleaning apparatus, the extension portion being constructed to cover or carry an electric wire or duct in the cleaning apparatus, and the mounting bracket being an integrally formed member;
in particular, there are two said extension portions (542), the two extension portions extending from a body of the mounting bracket in two partially opposite directions.

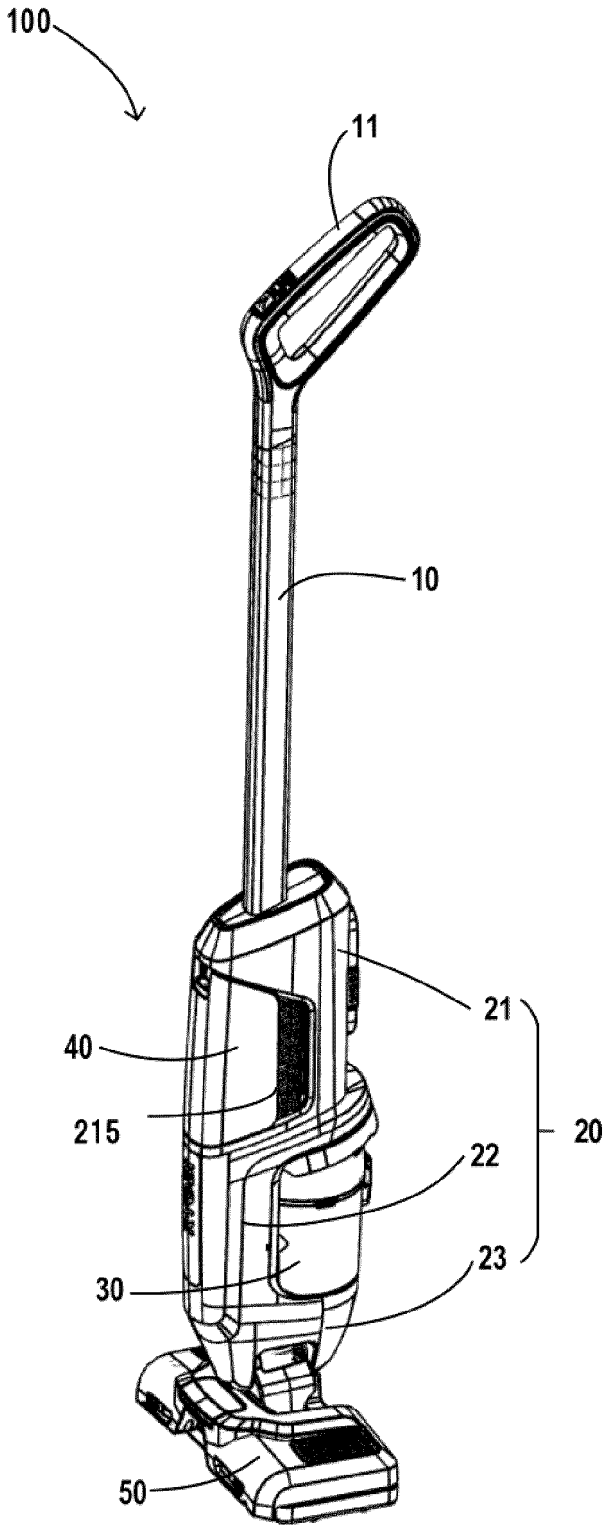


Fig. 1

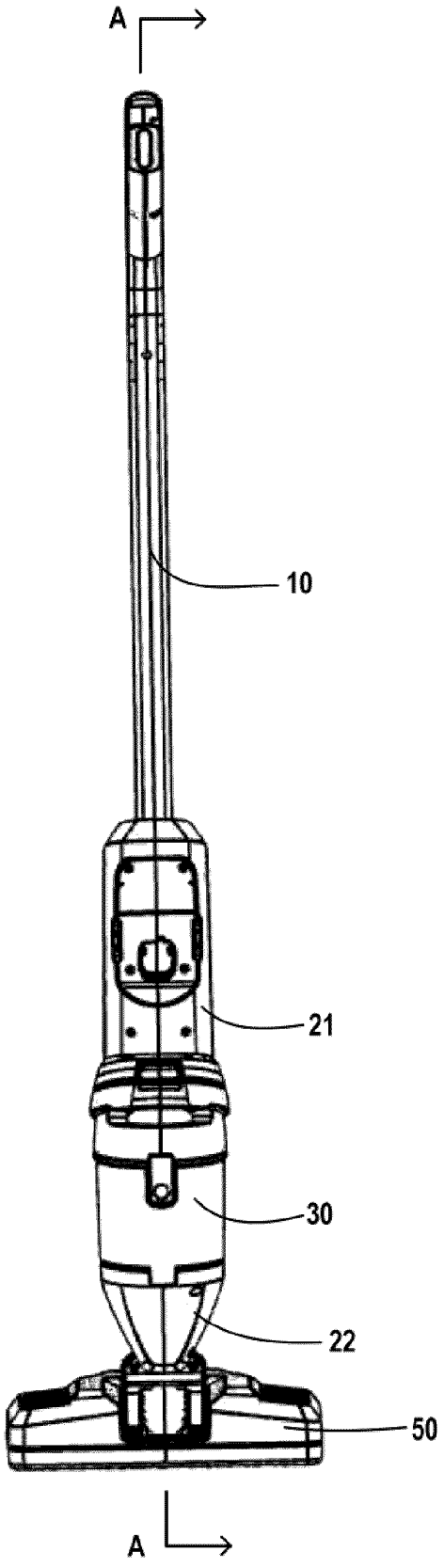
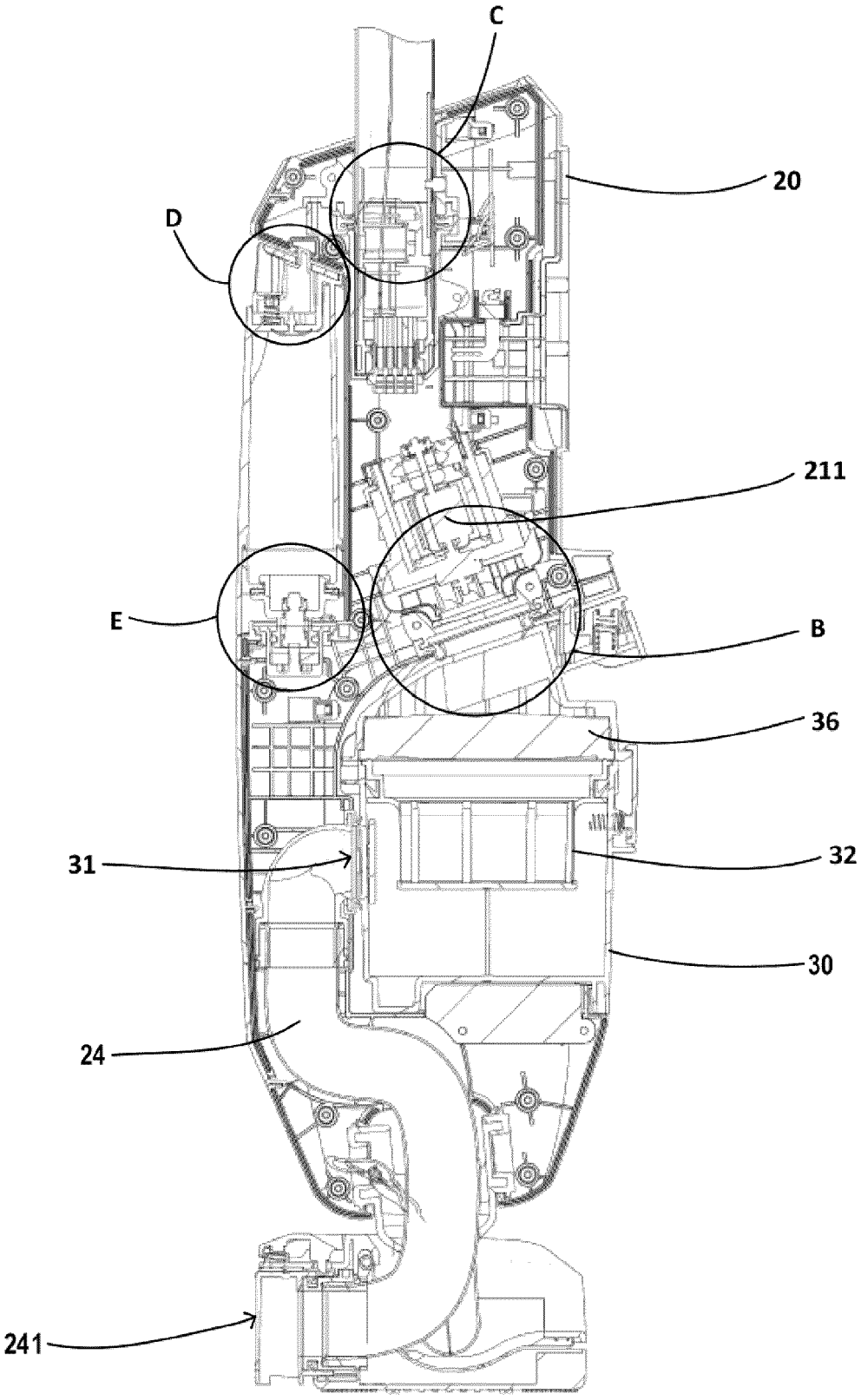


Fig. 2



A-A

Fig. 3

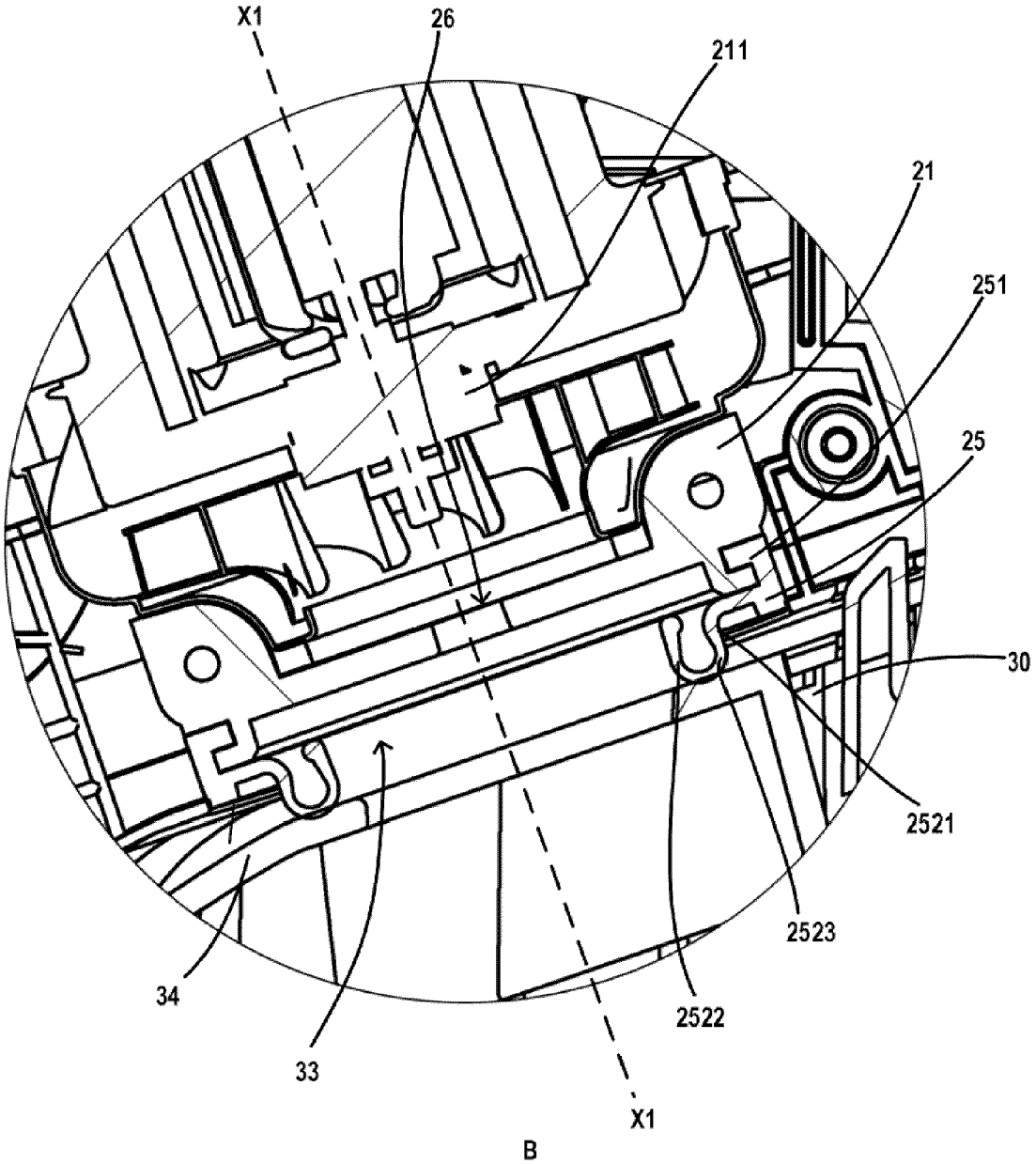


Fig. 4

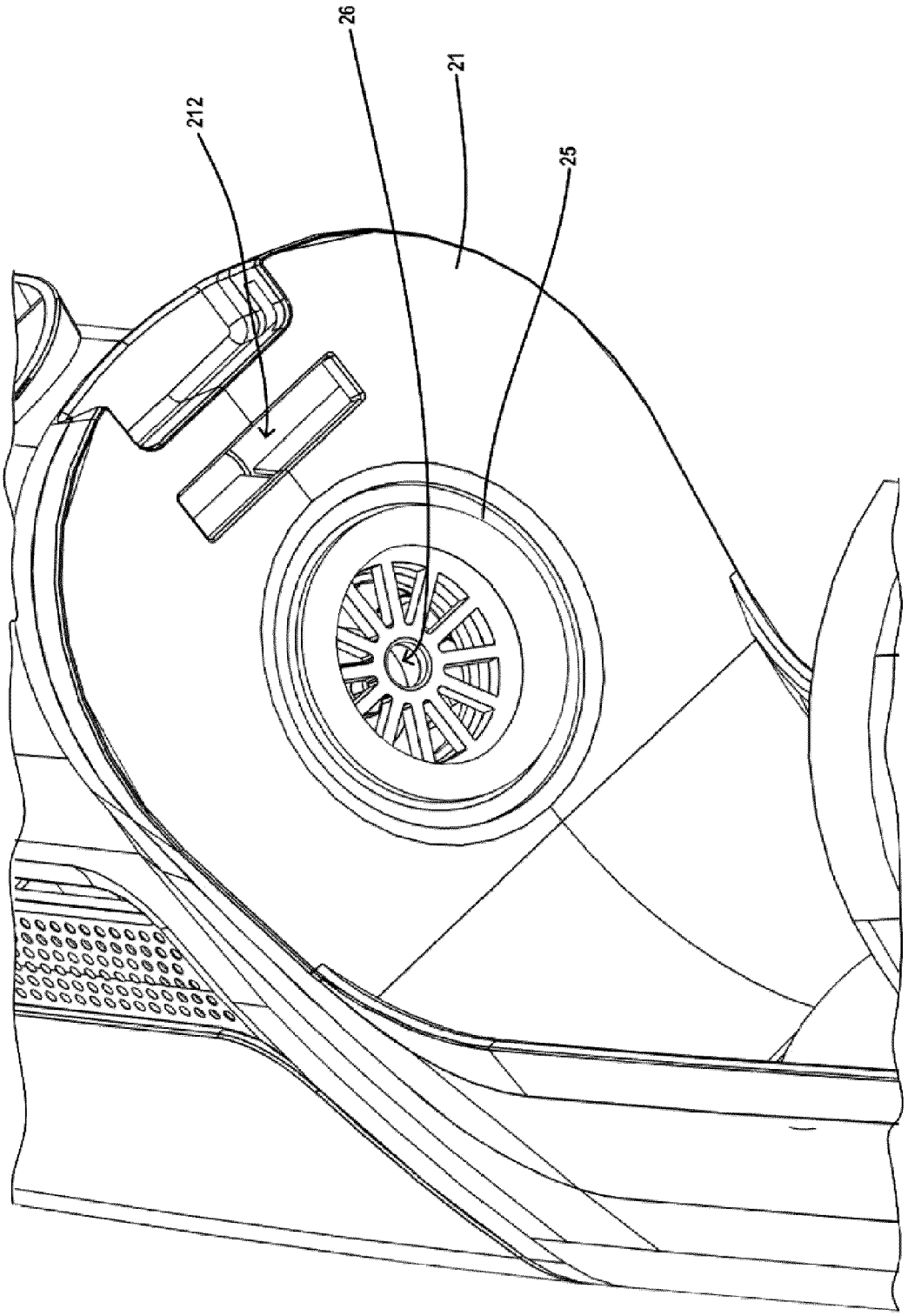


Fig. 5

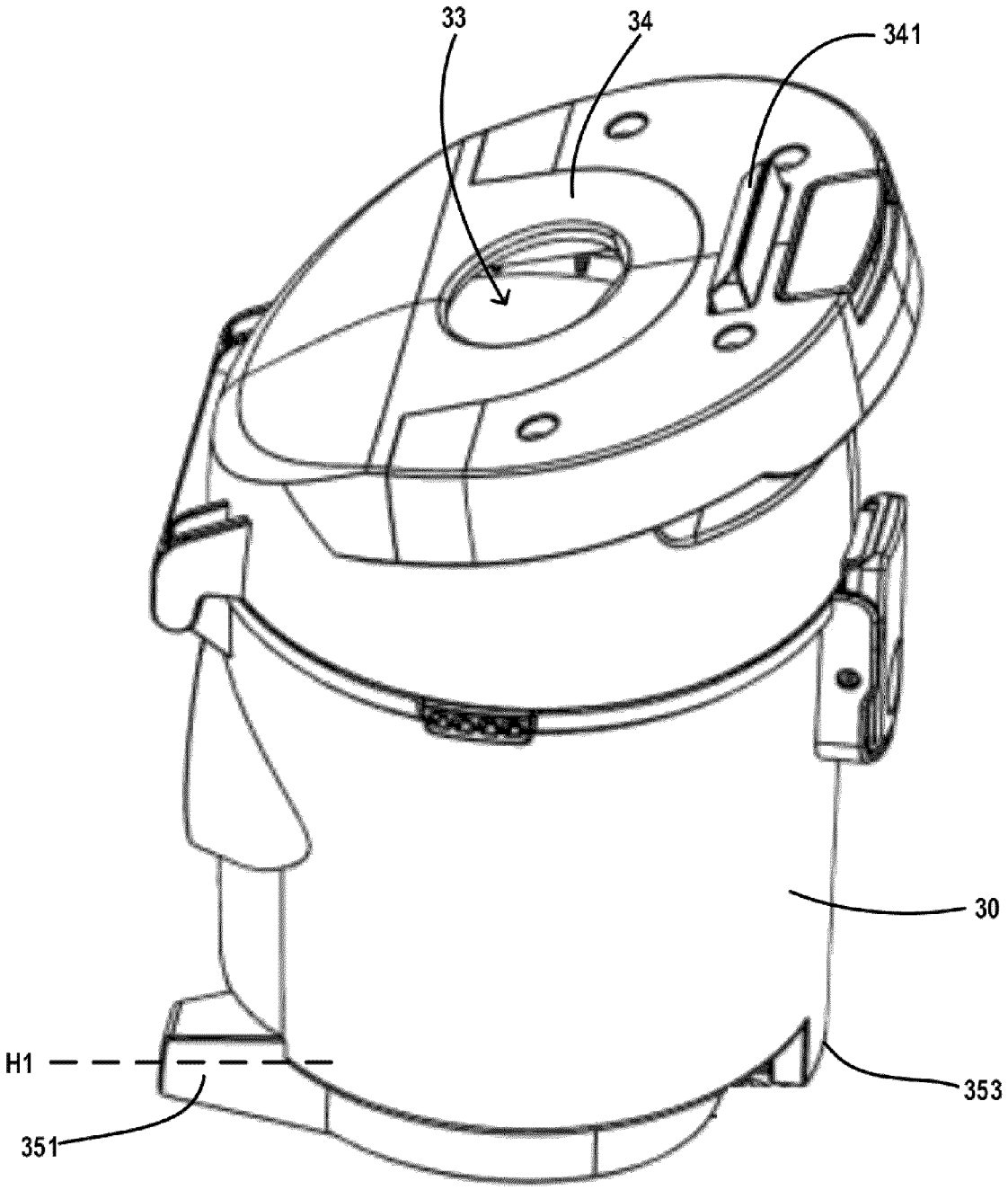


Fig. 6

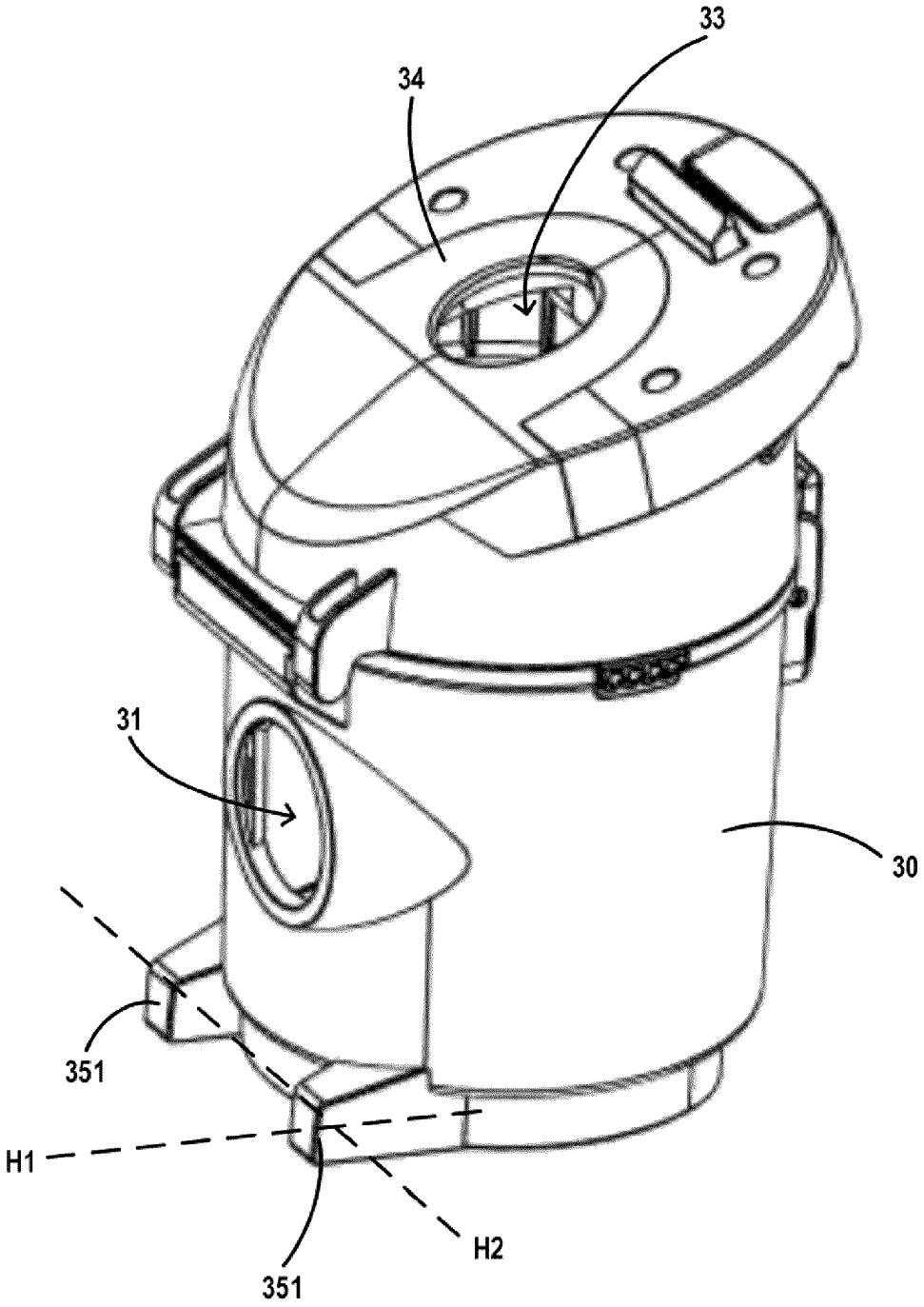


Fig. 7A

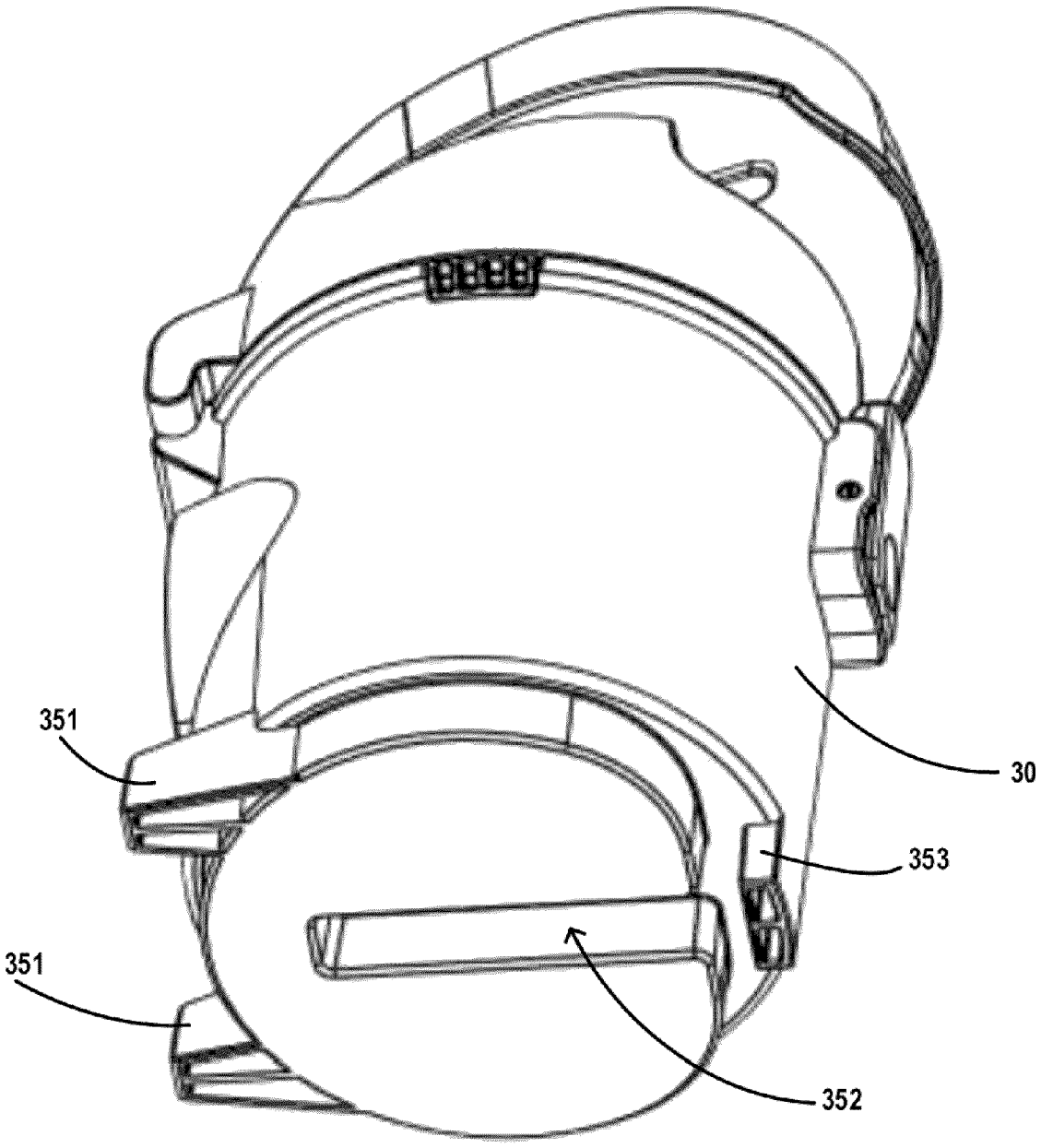


Fig. 7B

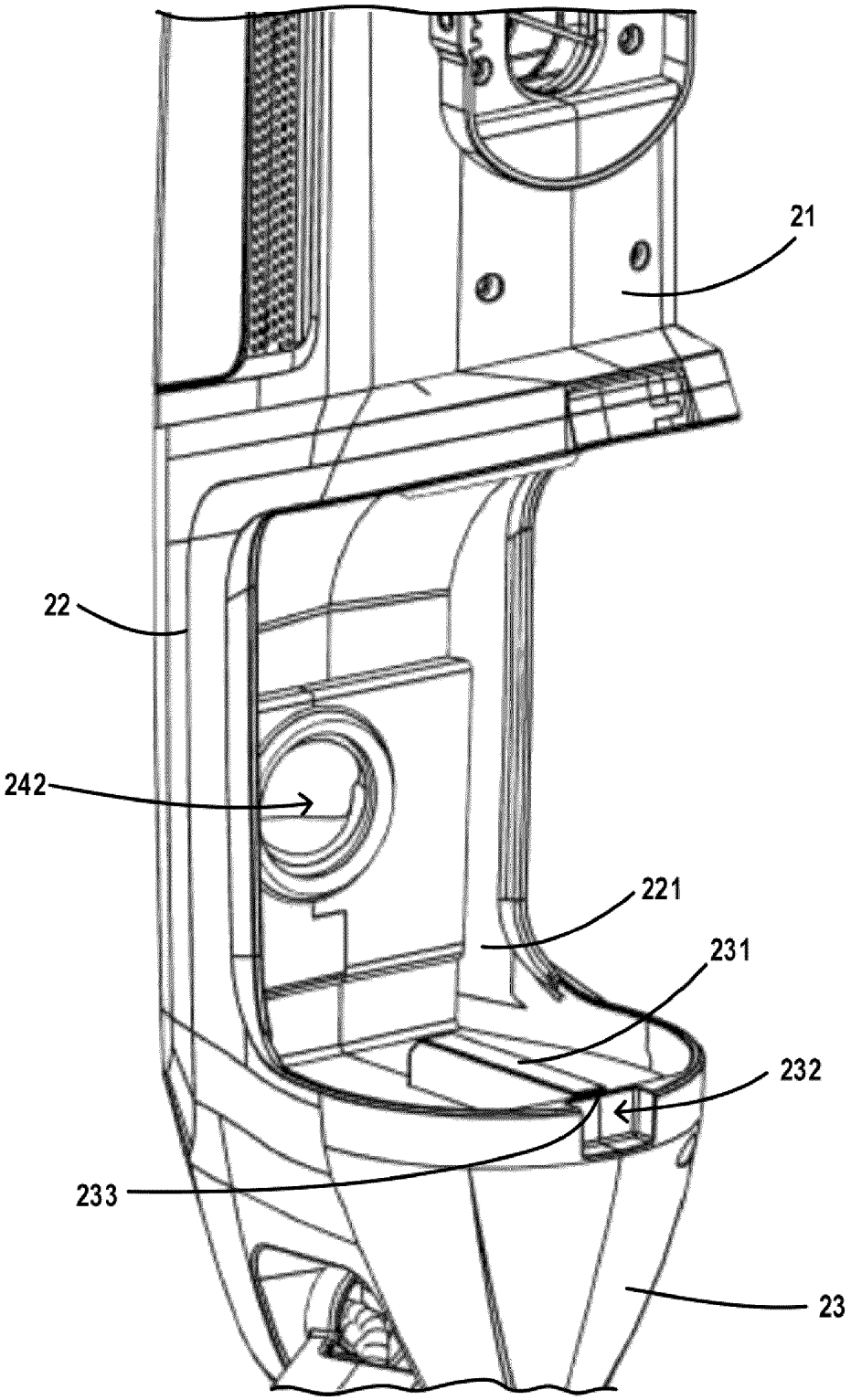
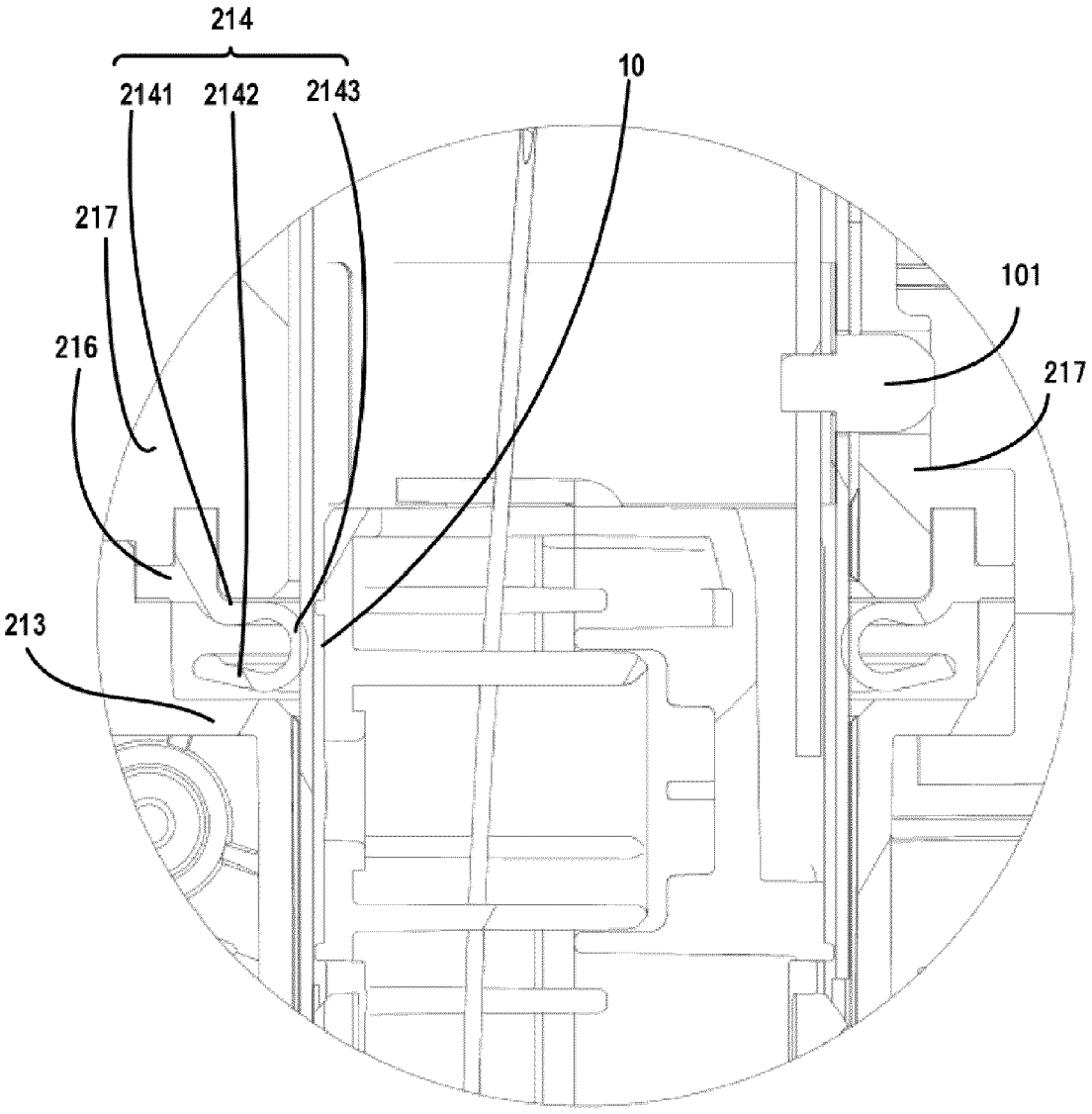


Fig. 8



C

Fig. 9

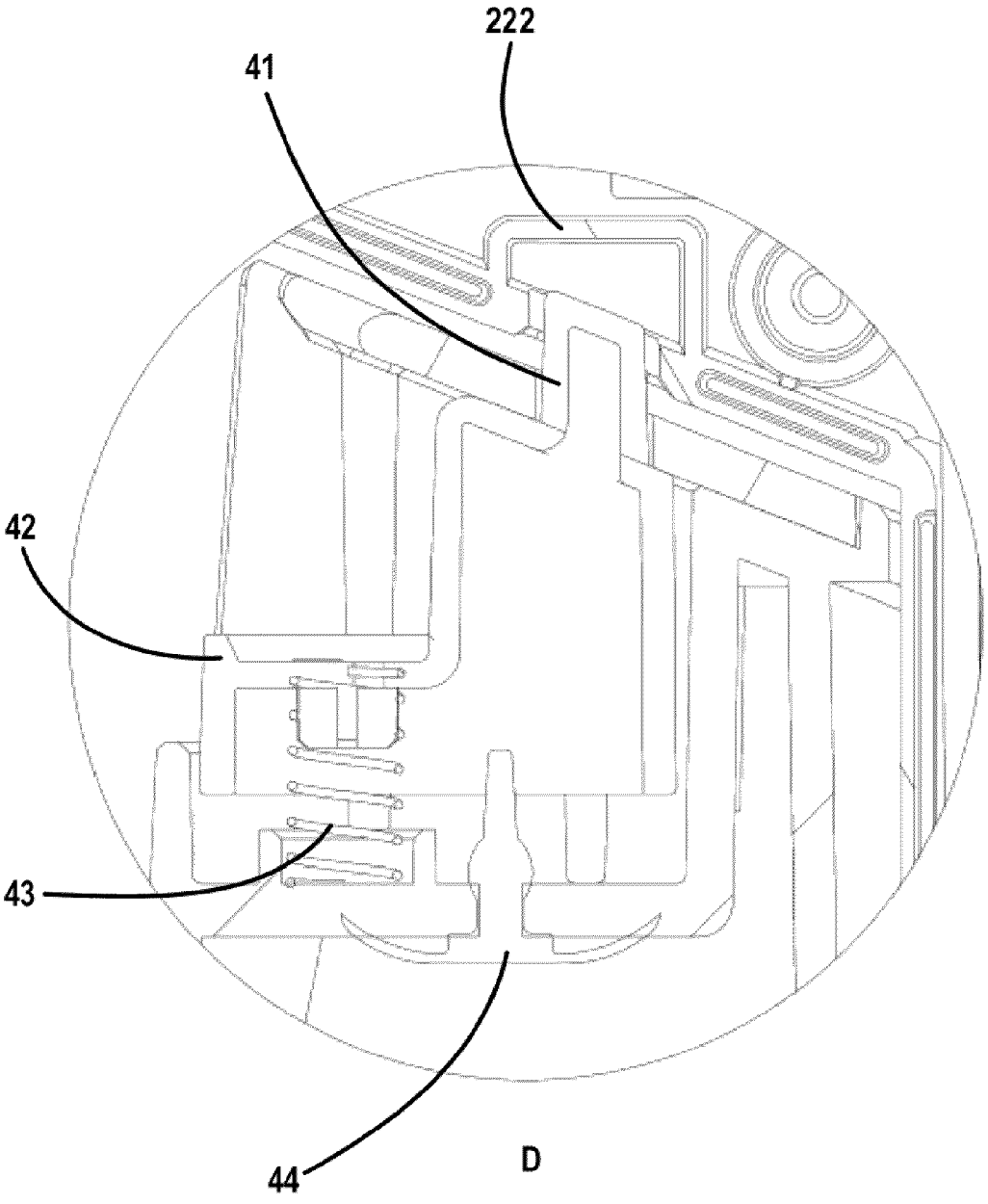


Fig. 10

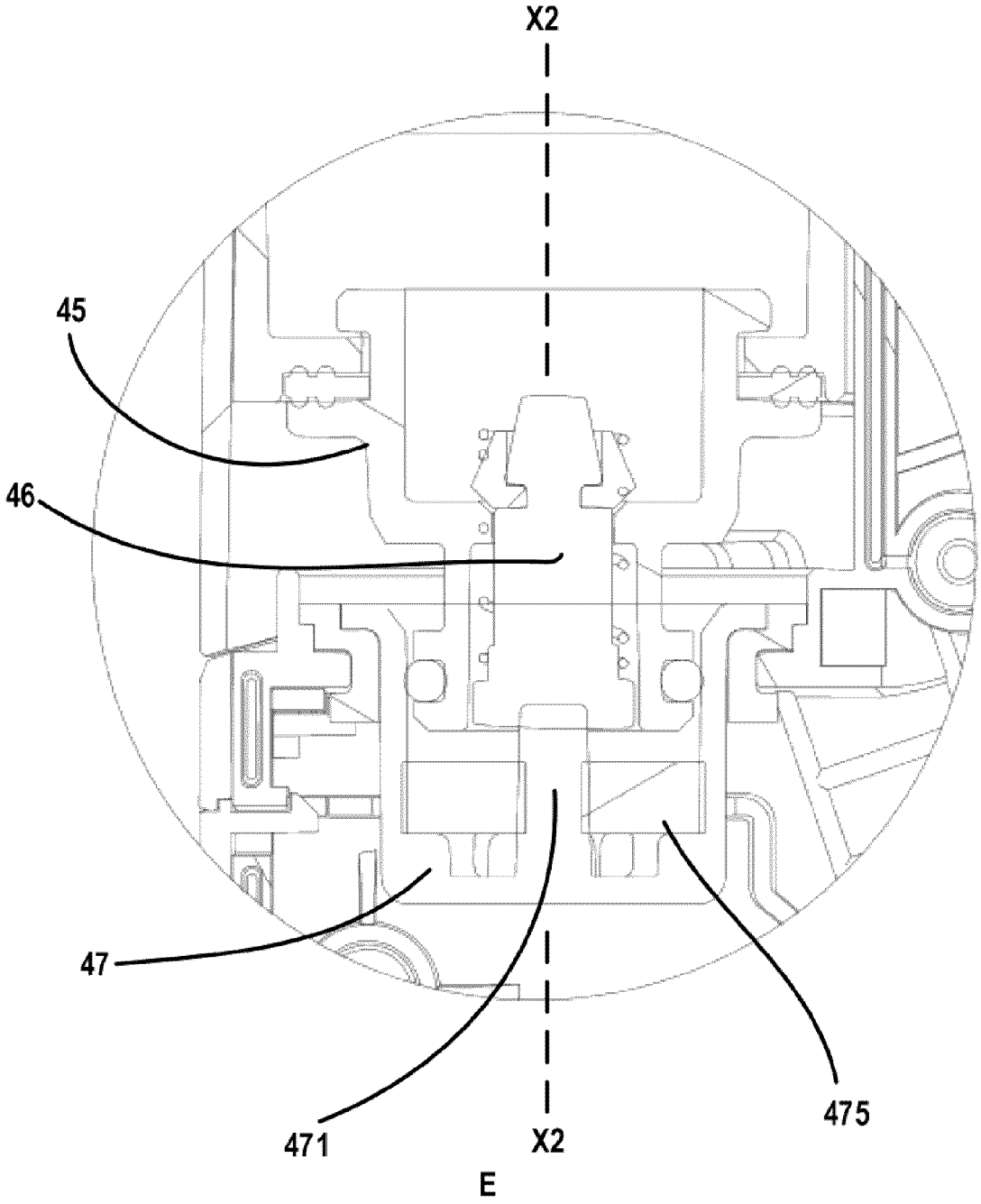


Fig. 11

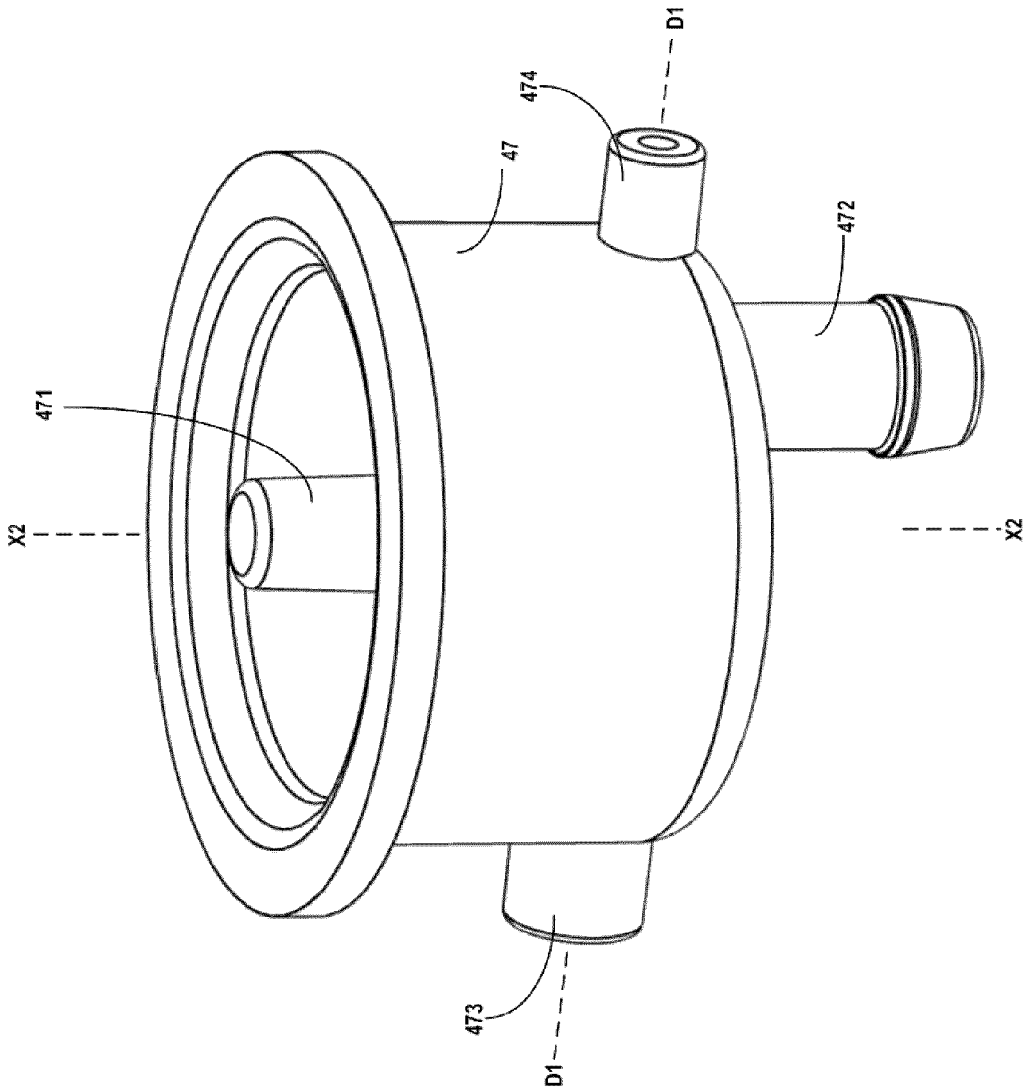


Fig. 12

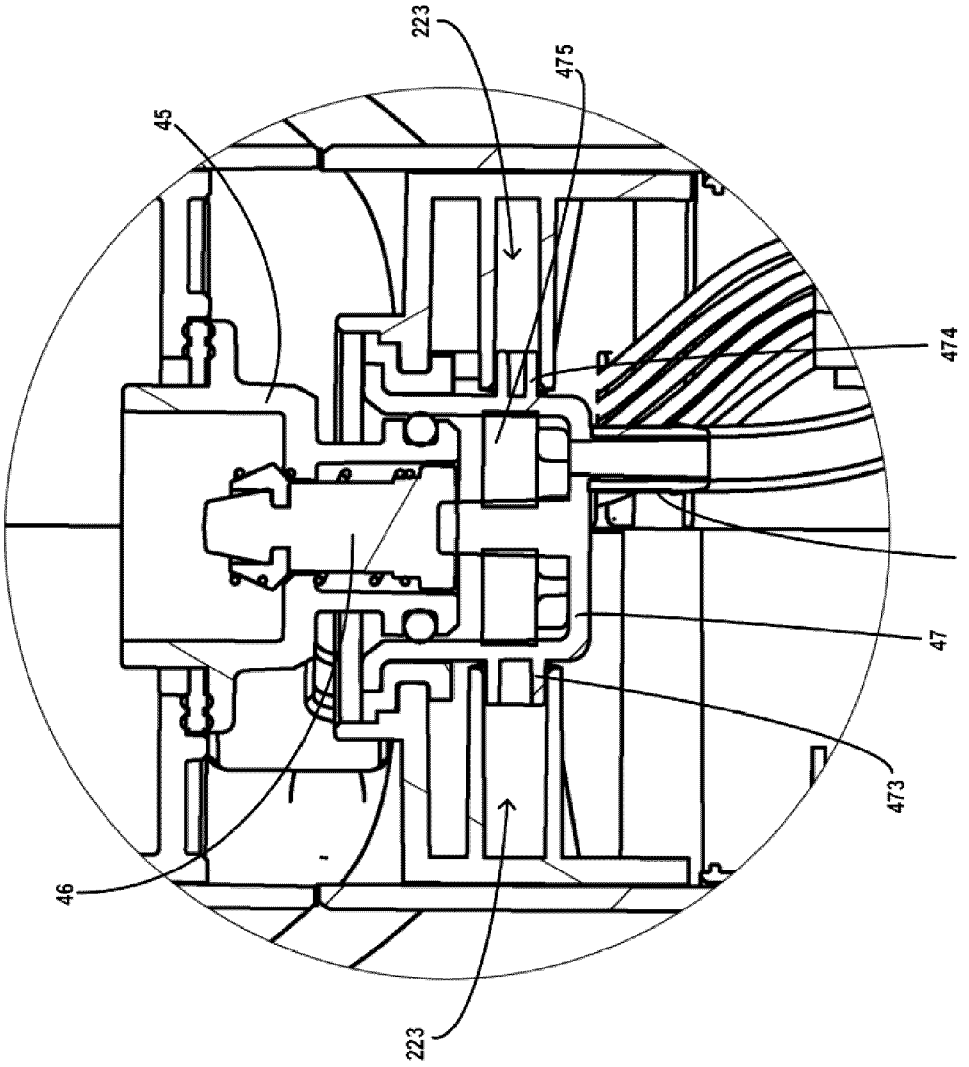


Fig. 13

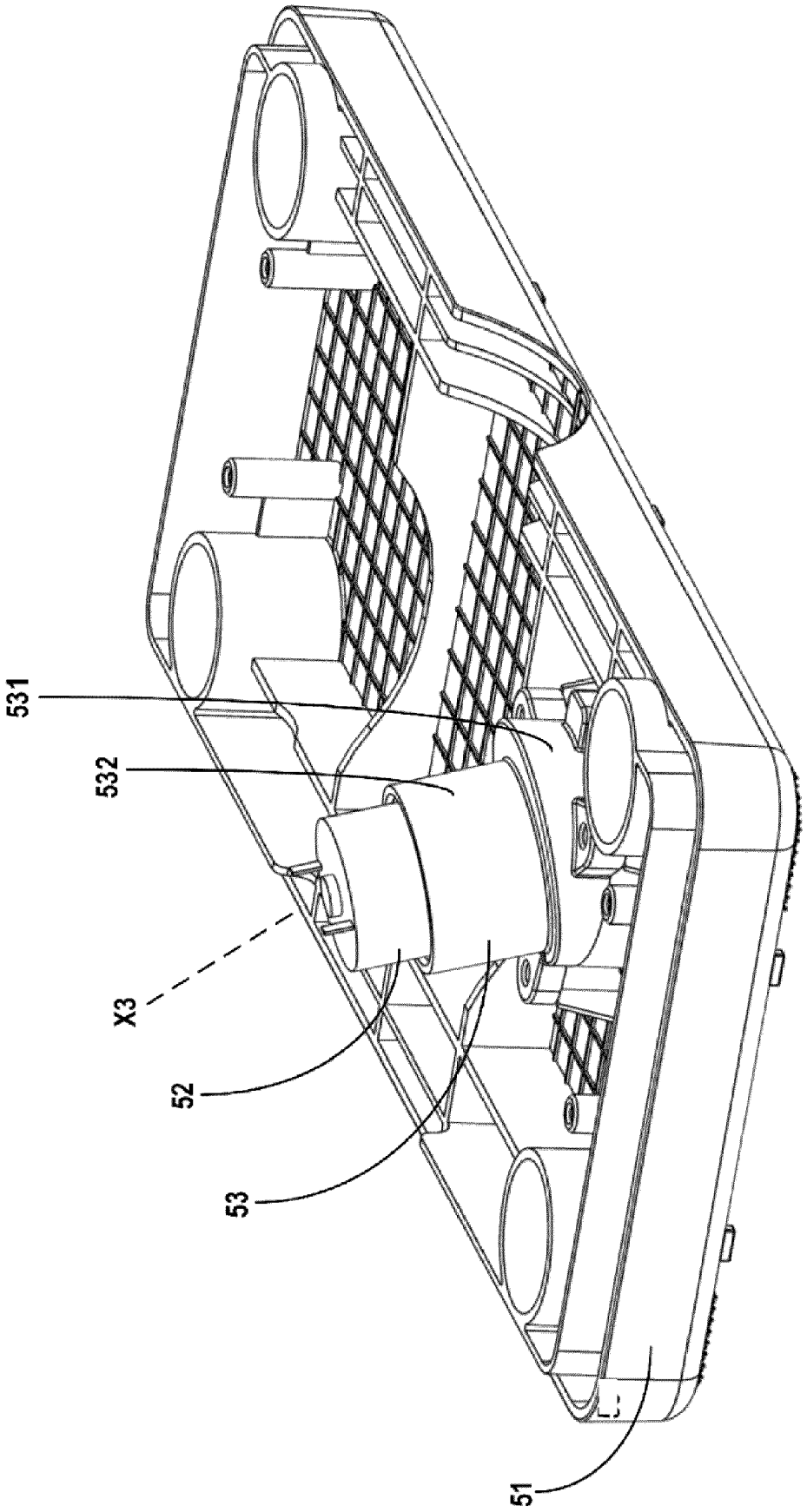


Fig. 14

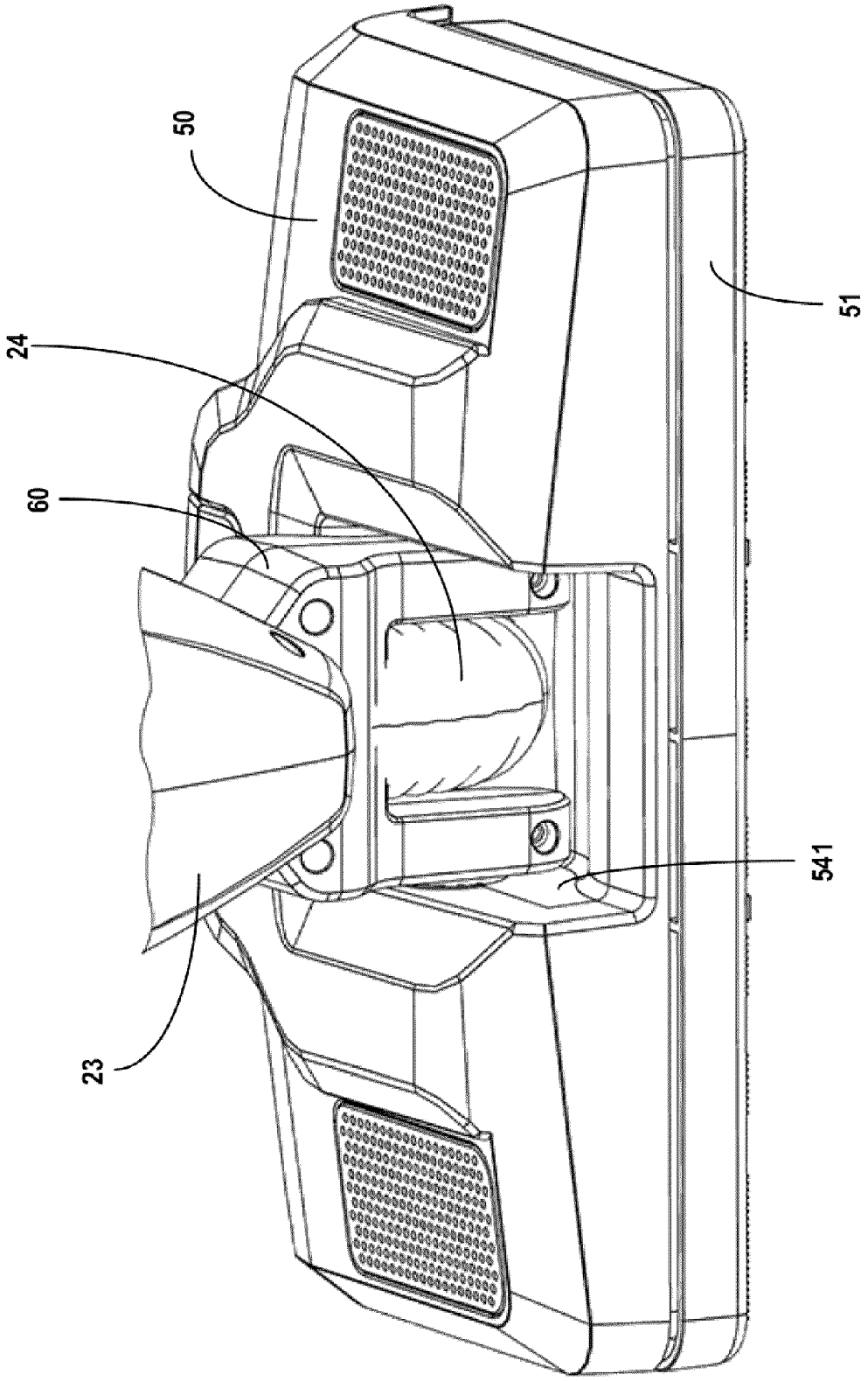


Fig. 15

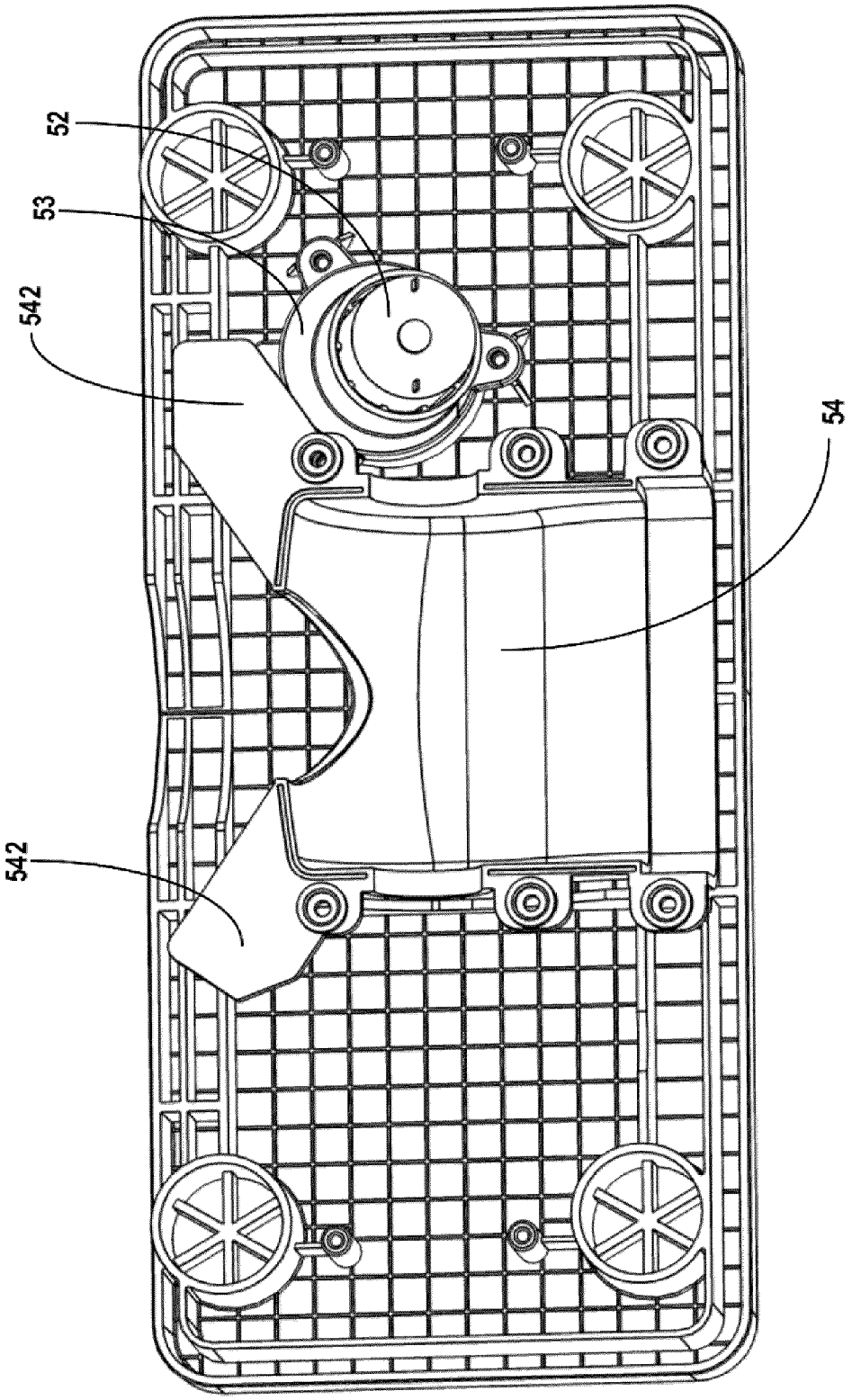


Fig. 16

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EUROPEAN SEARCH REPORT

Application Number
EP 24 19 1376

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	AU 2020 100 009 A4 (BISSELL INC [US]) 13 February 2020 (2020-02-13) * paragraph [0031] - paragraph [0084]; figures 2,11-14 *	1-15	INV. A47L11/20 A47L11/40
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A	CN 108 903 783 A (JIANGSU MIDEA CLEAN ELECTRIC APPLIANCE CO LTD; MIDEA GROUP CO LTD) 30 November 2018 (2018-11-30) * figures 1-4,28,43,44 *	1-15	

TECHNICAL FIELDS SEARCHED (IPC)

A47L

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	18 December 2024	Masset, Markus

CATEGORY OF CITED DOCUMENTS

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18-12-2024

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