



(11) **EP 1 997 411 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
03.12.2008 Bulletin 2008/49

(51) Int Cl.:
A47L 5/38 (2006.01) **A47L 9/00 (2006.01)**
A47L 9/16 (2006.01)

(21) Application number: **08157202.6**

(22) Date of filing: **29.05.2008**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT RO SE SI SK TR
Designated Extension States:
AL BA MK RS

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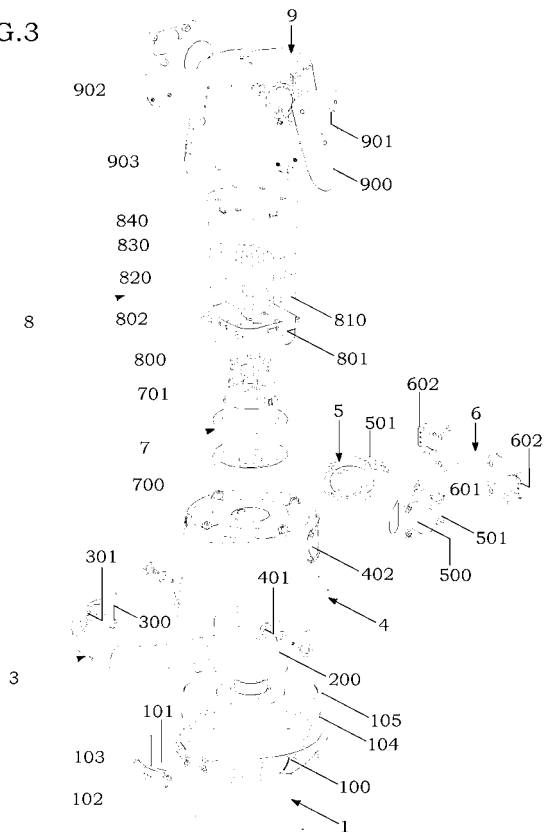
(30) Priority: **01.06.2007 IT RA20070042**

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(54) **Control unit for centralized vacuum cleaner systems**

(57) The control unit for centralized vacuum cleaner systems, of the type comprising a central body or stage (4), which is provided with an input duct (500) of the suctioned air, and is closed on the top by a head stage (9), bearing an output duct (901) of the filtered air, and is equipped on the bottom with a container (1) for collecting the dust, is characterized in that it comprises rapid hooking and releasing means (3, 102) of the said container (1) to the central stage (4), allowing the container (1) to be easily removed and inserted through simple frontal movement by a single operator, manually and without making use of tools; means (700, 701, 8) for reducing the noise level of the control unit; means (5, 900, 902) which allow to choose directly on the way on which side to arrange the input of the suctioned air and the output of the filtered air, independently one from each other, thus making the control unit fitted to the conditions of any system to serve; means (5, 6) for fixing the control unit to the wall by simple frontal push, which allow the control unit to be positioned in small places or even in a built-in box, since it does not require any lateral and vertical movements; means (404) for protecting the filter (200) from any possible dangerous objects dragged with the suctioned air; means for the self-cleaning of the filter (200).

FIG.3



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Description

[0001] For many years, centralized vacuum cleaner systems have been preferred, whereas possible, to traditional vacuum cleaners, that is those noisy household appliances which, dragged along the house, put again into circulation the air, which is suctioned and not thoroughly filtered.

[0002] It is known that such centralized vacuum cleaner systems use a control unit, connected to the suction intakes, which are suitably distributed over the building to serve, by means of a plastic canalization, chased or in view. By temporarily connecting to the said intakes suitable accessories, which are similar to those used with the traditional vacuum cleaners, the dust and rubbish are conveyed, through the said canalization, into the suitable container connected to the control unit, which is provided with a filtering device to separate the air from whatever is dragged therewith.

[0003] The said control unit, being particularly large, is generally arranged in a service room, or outside in a sheltered location, also because of the noise, that, even though is moderate, proves to be anyway annoying inside a dwelling-house.

[0004] The aim of the present invention is to provide a control unit for vacuum cleaner systems, which is more practical than the control units currently used, in terms of reduction of overall dimensions, of simplicity and reversibility of the installation, and of comfort of use. A further aim of the invention is to effectively reduce the noise, without using bulky and anaesthetic silencer means, arranged outside the control unit.

[0005] The innovative characteristics of the said control unit are described below, and are illustrated by way of non-limiting example in five drawings, wherein:

- FIG. 1 is a side view of the control unit according to the invention;
- FIG. 2 is a sectional vertical view, designated with the reference XX in FIG. 1;
- FIG. 3 is an axonometric exploded view of the control unit according to FIG. 1 and FIG. 2;
- FIG 4 and 5 are respectively a front view and a lateral view of the control unit, during the operative phase of removing the dust container, after unlocking the hooking means of the said container to the superposed central stage;
- FIG. 6 and 7, and FIG. 8 and 9 are front view and vertical sectional view of the two reciprocally hookable elements, as illustrated in FIG. 10, designed to maintain the dust container in a closed position.
- FIG. 11, 12 and 13 are respectively a lateral view and two vertical sectional views of the control unit, provided with the self-cleaning unit of the filter.

[0006] It is clear from the accompanying drawings, especially from FIG. 1, 2, and 3, that the control unit according to the invention comprises a central body or stage

4, provided with an input duct 500 of the suctioned air. The stage 4 is closed on the upper side by a sort of lid or head stage 9, which bears an output duct 901 of the filtered air and a control panel 903, which serves as user interface. The stage 4 is provided on the lower side with a container 1, for collecting the dust, which is equipped with a sort of funnel 104, designed for fastening a suitable bag to collect the dust. The funnel 104 is rimmed by a washer 105, pressed between the container 1 below, and the superposed central stage 4.

[0007] The said container 1 is provided with a rapid hooking and releasing means to the central stage 4, in order to be easily removed and inserted through simple frontal movements by a single operator, manually and without making use of tools. To this aim, as can be seen in FIG. 4 and 5, a shackle 3, nearly semicircular-shaped, is hinged on its seats 301, externally of the central stage 4 on the respective seats 401, so that by pushing a release button 102 (FIG. 6, 7, 8, 9, and 10), steadily arranged on the dust container 1 in a suitable frontal seat 101 and clasping from below with a hooked portion 103 a suitable protrusion 302 of the shackle 3, the release of the said protrusion 302 allows the container 1 to remain hung under the shackle 3. The shackle 3 is arranged tilted, by turning upon the pivots 301 and 401, by means of a couple of cylindrical protrusions 300, which engage respective notches 100, suitably realized on the outer surface of the container 1. Thus hung, the container 1 can be seized with both hands and easily removed to replace the dust bag, that is, besides, provided with a suitable tensioning means.

[0008] The control unit according to the invention allows to limit the noise, thanks to the fact that the motor unit -fan wheel 7 is not tighten with screw means to the central stage 4, as in the usual control units, but it is simply locked, being interposed between a couple of vibration-proof rubber gaskets 700 and 701. The gasket 701, that is the upper one, shaped to be locked by matching suitable notches of the motor 7, is reversible, in order to fit two sizes of the motor. The size of the motor, being definitely small, give the control unit a compact design and small overall dimensions.

[0009] Yet the achievement of a low noise level is assured, especially thanks to a silencer 8 which is arranged, inside the head stage 9, by means of a plurality of notches, realized on its base, matching respective protrusions realized on the gasket 701. The air coming from the motor 7 below is forced to pass inside the silencer 8, which is labyrinth-shaped and completely covered with sound absorbent material, for example foam polyurethane. The air goes through a convoluted course inside the silencer, then it comes out directly into the output duct 901. The silencer is characterized in that its input and output ducts do not directly face each other, in order to perform the aimed reduction of the noise intensity.

[0010] In the illustrated embodiment, the said silencer 8 comprises a container 800, preferably made of ABS and realized by injection moulding, which is closed by a

lid 840 and it bears, stuck on its inside, a base 810, a sort of labyrinth-shaped duct 820 and a closing element made of sound absorbent material. Two openings 801, 802 are realized on opposite lateral sides of the container 800, and are suitable to be arranged respectively by the input and the output of the air.

[0011] A further feature of the claimed control unit is that it can fit different conditions of the system to serve, being preset so that it allows to choose under way the side from which the suctioned air enters and the side from which the filtered air exits, independently one from each other.

[0012] In particular, the input of the suctioned air takes place, at the central stage 4, through a duct 500, which protrudes from an end of an element 5, which is fixed by screw means to the said central stage in correspondence with two suitable openings 402 (fig. 12), arranged symmetrically with respect to the vertical median plane of the central unit. The element 5 is perfectly reversible, because it allows to obtain the input of the air from each openings 402, by simply arranging it with its duct 500 matching the chosen opening.

[0013] Concerning the output of the filtered air, the head stage 9 can be adapted to allow the exit from one or from the other side, by inverting the position of two lateral bulkheads 900 and 902, one of them (900) being provided with the output duct 901, to be arranged by the output 802 of the silencer 8, suitably rotated for this purpose when it is fixed inside the head stage 9.

[0014] The control unit is fixed to the wall, by pre-assembling a suitable support 6 onto the wall, and then applying the control unit to the support by way of a simple frontal push, and by the fastening of suitable protrusions 501, projecting from the element 5 from the opposite side with respect to the side to be fixed to the central stage 4. The protrusions 501 are fastened into respective holds 601 realized on the support 6, and they can be released simply by pushing two lateral tabs 602.

[0015] Advantageously, the said frontal fastening system allows positioning the control unit in a small place, or even in a built-in box, because it does not require any lateral or vertical movements, to mount or to remove the control unit.

[0016] The air filter 200 inside the control unit can be easily installed and removed since it is supported by a ring 201, screwed on the lower end of the central portion 403 of the central stage 4. The filter 400 is protected by a coaxial cylindrical shield 404, which extends toward the bottom in order to intercept any possible dangerous objects dragged with the suctioned air.

[0017] The invention also provides that the control unit can be equipped with a self-cleaning unit of the filter 200 (fig. 11, 12, 13). The self-cleaning unit comprises a compressor 210, which fills a storage tank 211 with compressed air until a known electric valve commands the opening of a fast discharging valve 213, when a prearranged pressure level is reached, measured by a manostat 212. The opening of the valve 213 determines the

immediate inflow of a stream of air inside the filter 200 through a nozzle 214. The stream of air has opposite direction with respect to the filtering direction, so that it causes the removal of the particles retained inside the filter. The said self-cleaning unit, which operates with a rate that can be set as required, is arranged between the vibration-proof gasket 700 of the motor 7 and the filter 200 below, and it is protected externally by a case 2. The case 2 is realized so that it can be interposed between the central stage 4 and the head stage 9, in order to maintain the small overall dimensions of the control units, and it has a central duct 20 for the necessary passing of the suctioned air.

[0018] It is obvious that, being fixed the general characteristics illustrated and described herewith, the central unit according to the invention can be susceptible of modifications or variations, anyway comprised in the scope of the patent.

Claims

- Control unit for centralized vacuum cleaner systems, of the type comprising a central body or stage (4), which is provided with an input duct (500) of the suctioned air, and is closed on the top by a head stage (9), bearing an output duct (901) of the filtered air, and is equipped on the bottom with a container (1) for collecting the dust, **characterized in that** it comprises: rapid hooking and releasing means (3, 102) of the said container (1) to the central stage (4), allowing the container (1) to be easily removed and inserted through simple frontal movements by a single operator, manually and without making use of tools; means (700, 701, 8) for reducing the noise level of the control unit; means (5, 900, 902) which allow to choose directly on the way on which side to arrange the input of the suctioned air and the output of the filtered air, independently one from each other, thus making the control unit fitted to the conditions of any system to serve; means (5, 6) for fixing the control unit to the wall by simple frontal push, which allow the control unit to be positioned in small places or even in a built-in box, since it does not require any lateral and vertical movements; means (404) for protecting the filter (200) from any possible dangerous objects dragged with the suctioned air; means (2, 20, 210, 211, 212, 213, 214) for the self-cleaning of the filter (200).
- Control unit according to claim 1, **characterized in that** the said rapid hooking and releasing means (3, 102) of the said container (1) to the central stage (4) comprise a shackle (3), hinged on its seats (301), externally of the central stage (4) on respective seats (401), and a release button (102), steadily arranged on the dust container (1) in a suitable frontal seat (101).

3. Control unit according to claim 2, **characterized in that** the said release button (102) clasps from below with a hooked portion (103) a suitable protrusion (302) of the shackle (3), so that by pushing the said button (102) the release of the said protrusion (302) makes the shackle (3) turn upon the pivots (301, 401), thus arranging itself tilted.
4. Control unit according to claim 3, **characterized in that** the said container (1) remains hung under the shackle (3), which is tilted, by means of a couple of cylindrical protrusions (300), which project from the shackle (3) to engage respective notches (100), suitably realized on the outer surface of the container (1).
5. Control unit according to claim 1, **characterized in that** the motor unit -fan wheel (7) is integral to the central stage (4) below, since it is interposed between a couple of vibration-proof rubber gaskets (700, 701), in order to reduce the noise level of the control unit.
6. Control unit according to claim 5, **characterized in that** the said vibration-proof gasket (701), i.e. the one arranged above the motor unit -fan wheel (7), is shaped with suitable notches, in order to be locked matching respective protrusions of the motor (7), and it is reversible, to fit two sizes of the motor.
7. Control unit according to claims 1, 5 and 6, **characterized in that** a silencer (8) lays, inside the head stage (9), on the vibration-proof gasket (701) in order to force the air coming from the motor (7) below to pass through the silencer, which is labyrinth-shaped and completely covered with sound absorbent material, up to the exit which is located directly into the output duct (901).
8. Control unit according to claim 7, **characterized in that** the said silencer (8) comprises an outer container (800) having two openings (801, 802), realized on opposite lateral sides of the container (800) in order to be arranged respectively by the input and the output of the air, which do not directly face each other, in order to perform the aimed reduction of the noise intensity.
9. Control unit according to claims 7 and 8, **characterized in that** the said container (800) has its base prearranged with suitable notches, which match respective protrusions of the vibration-proof gasket (701) below.
10. Control unit according to claim 1, **characterized in that** the input of the suctioned air takes place, by the central stage (4), through a duct (500) protruding from an end of an element (5), which is fixed by screw means to the said central stage in correspondence with two suitable openings (402), arranged symmetrically with respect to the vertical median plane of the central unit, and which is perfectly reversible because it allows to obtain the input of the air from each openings (402), by simply arranging it with its duct (500) matching the chosen opening.
11. Control unit according to claim 1, **characterized in that**, concerning the output of the filtered air, the head stage (9) can be adapted to allow the exit from one or from the other side, by inverting the position of two lateral bulkheads (900, 902), one of them (900) being provided with the output duct (901), to be arranged by the output (802) of the silencer (8), suitably rotated for this purpose when it is fixed inside the head stage (9).
12. Control unit according to claim 1, **characterized in that** the control unit is fixed to the wall, by pre-assembling a suitable support (6) onto the wall, and then applying the control unit to the support (6) by way of a simple frontal push, and by the fastening of suitable protrusions (501), projecting from the element (5) from the opposite side with respect to the side to be fixed to the central stage (4), into respective holds (601) realized on the support (6), and from which they can be released simply by pushing two lateral tabs (602).
13. Control unit according to claim 1, **characterized in that** the air filter (200) inside the control unit, which can be easily installed and removed since it is supported by a ring (201), screwed on the lower end of the central portion (403) of the central stage (4), is protected by a coaxial cylindrical shield (404), which extends toward the bottom in order to intercept any possible dangerous objects dragged with the suctioned air.
14. Control unit according to claim 1, **characterized in that** the self-cleaning unit of the filter (200) comprises a compressor (210), which fills a storage tank (211) with compressed air until a known electric valve commands the opening of a fast discharging valve (213), when a prearranged pressure level is reached, measured by a manostat (212), in order to determine the immediate inflow of a stream of air inside the filter (200) through a nozzle (214), the said stream of air having opposite direction with respect to the filtering direction, so that it causes the removal of the particles retained inside the filter.
15. Control unit according to claim 14, **characterized in that** the self-cleaning unit of the filter (200), which operates with a rate that can be set as required, is arranged between the vibration-proof gasket (700) of the motor (7) and the filter (200) below, and it is protected externally by a case (2), which is realized

so that it can be interposed between the central stage (4) and the head stage (9), in order to maintain the small overall dimensions of the control unit, and has a central duct (20) for the necessary passing of the suctioned air.

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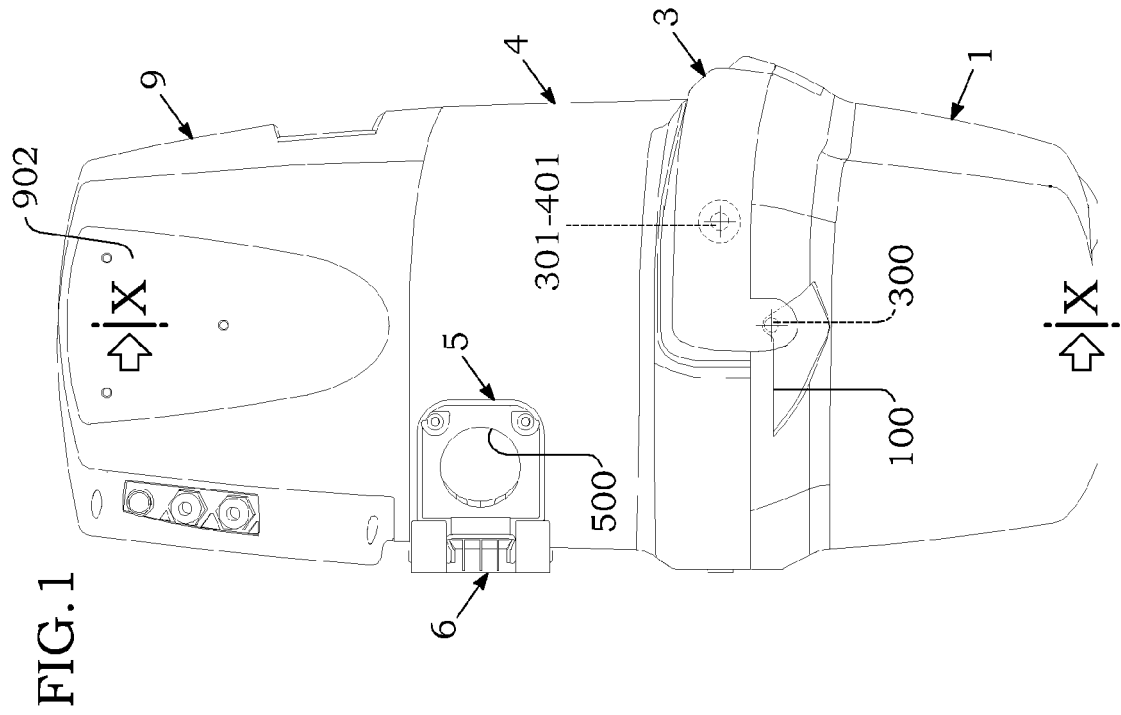
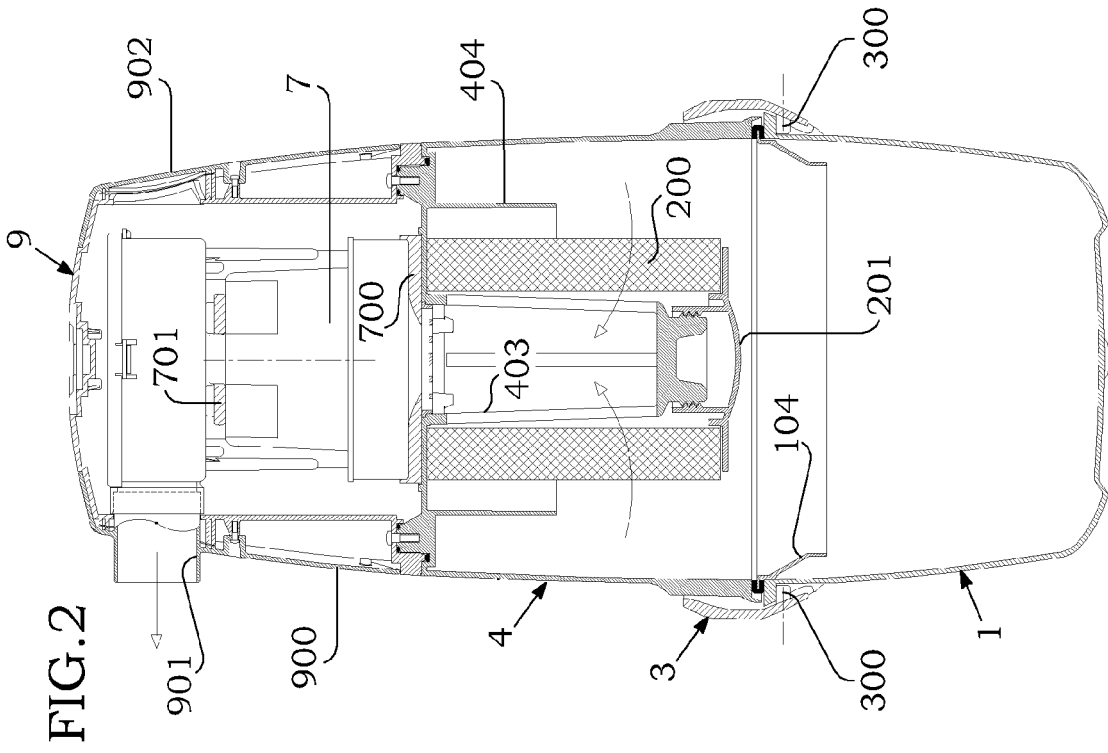
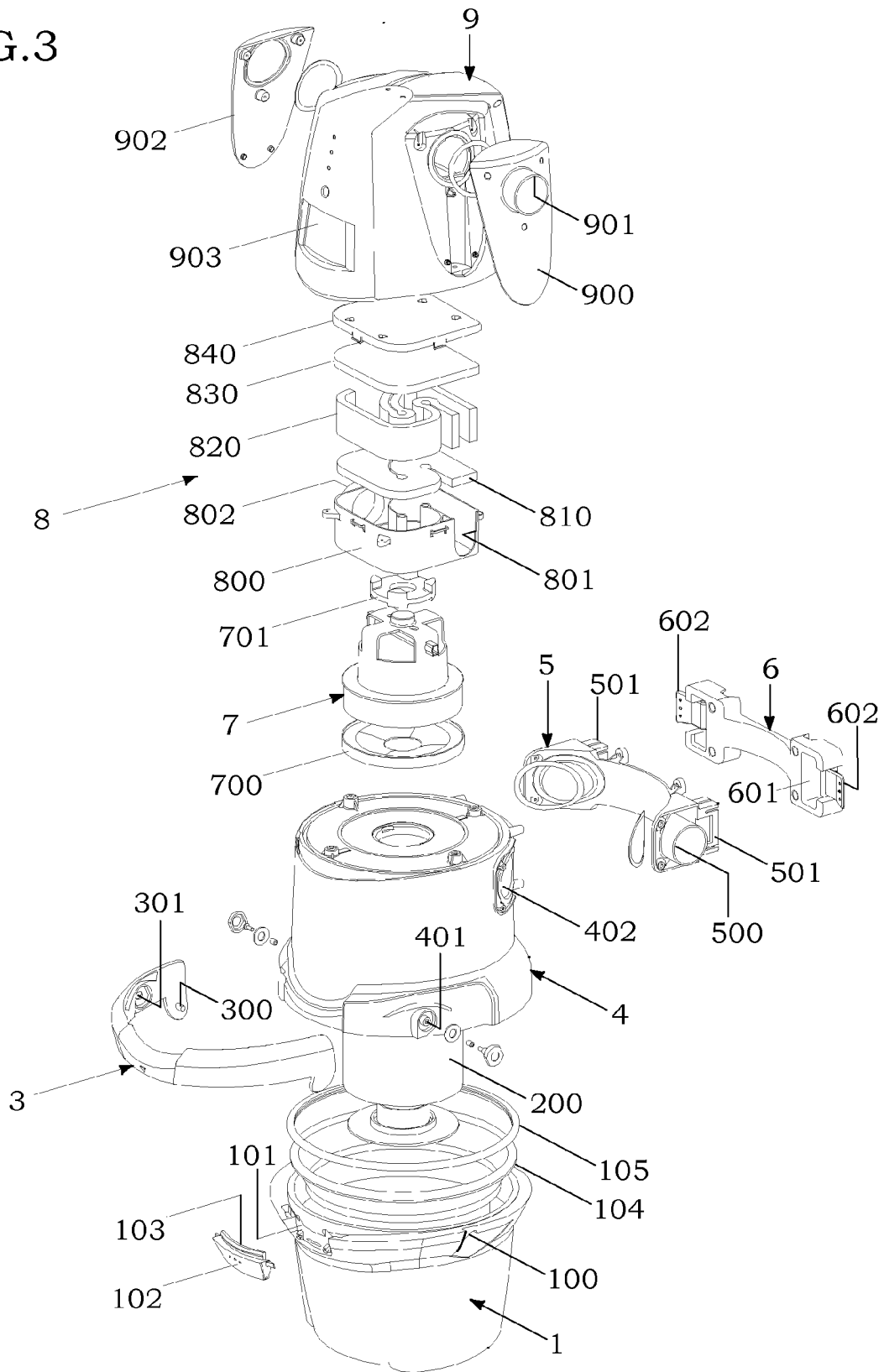


FIG.3



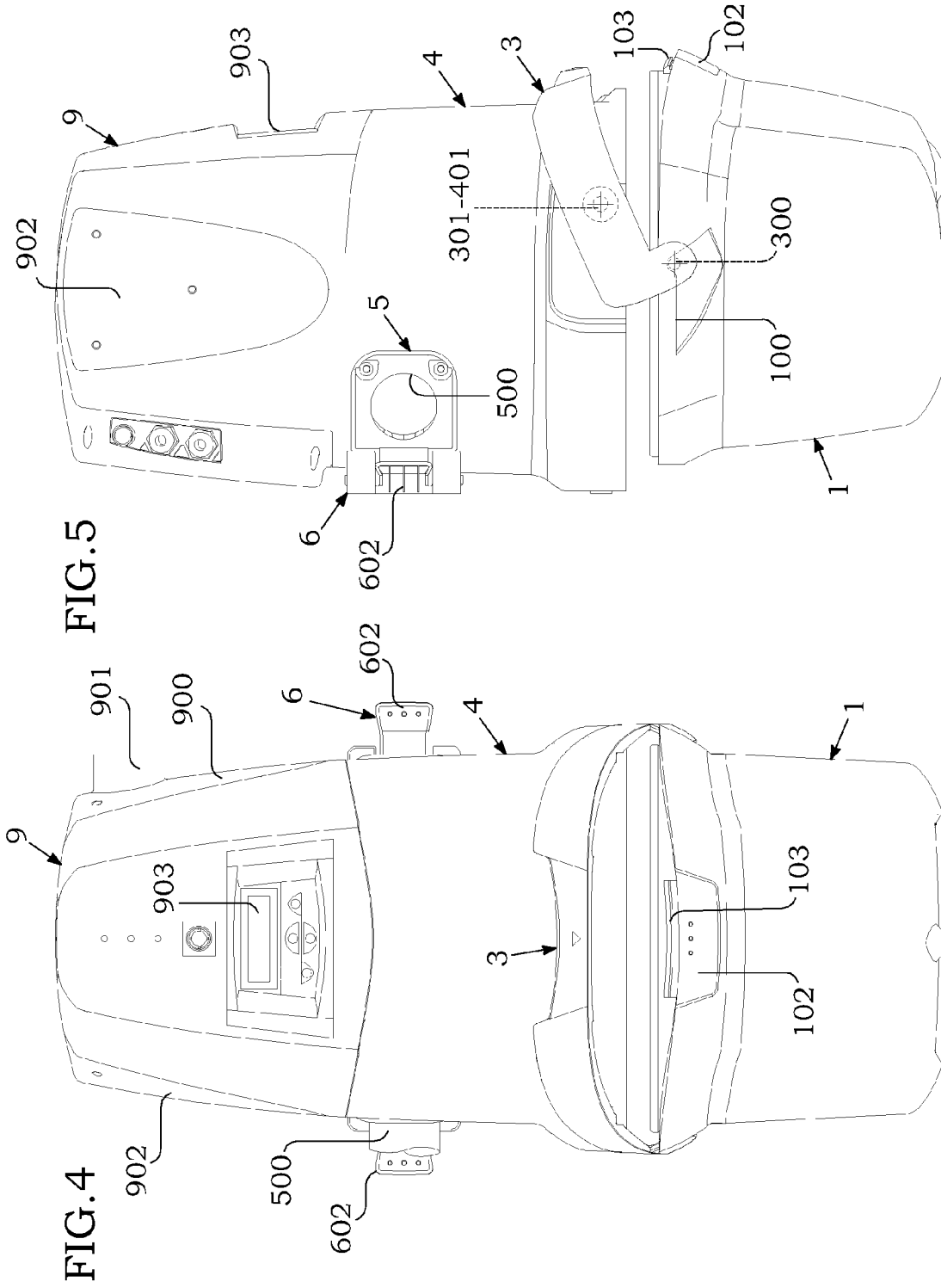


FIG. 6

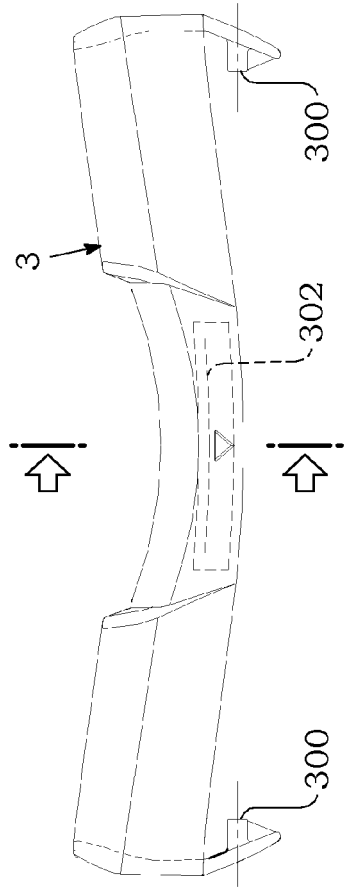


FIG. 7

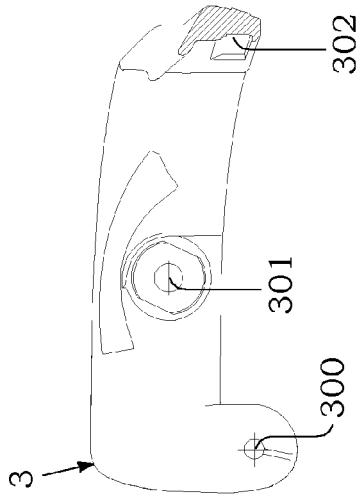


FIG. 8

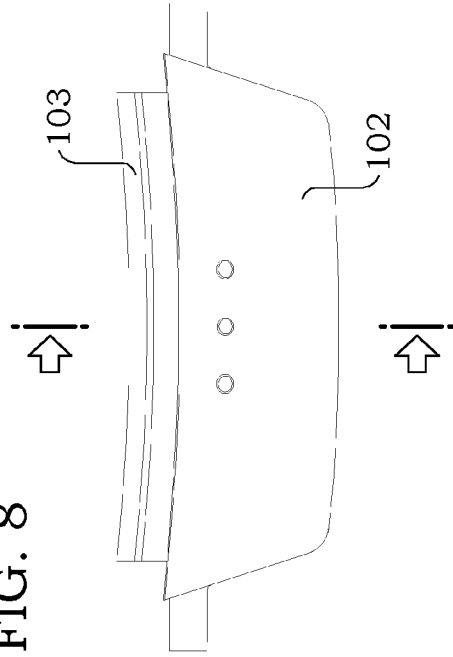


FIG. 9

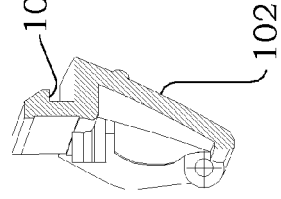


FIG. 10

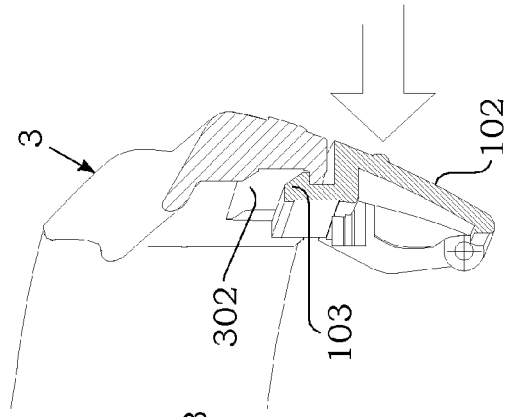


FIG. 13

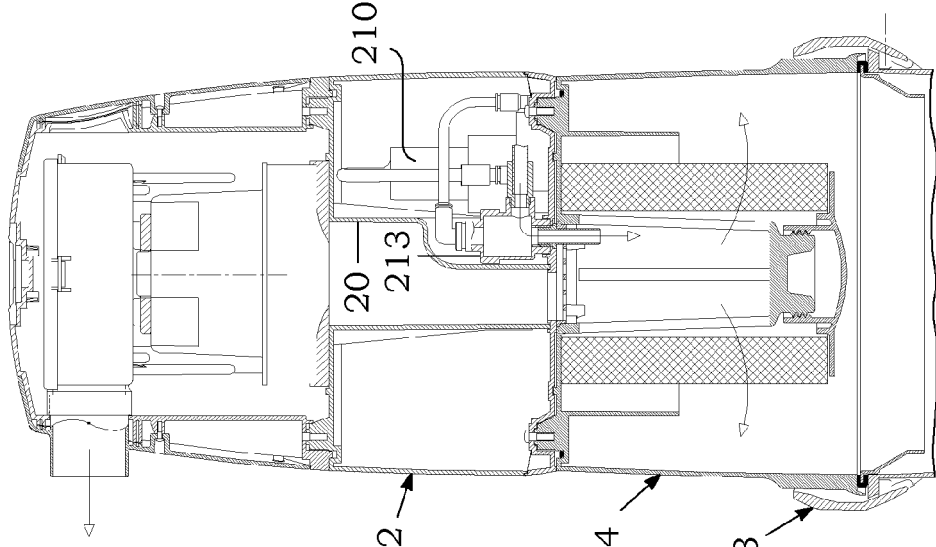


FIG. 11

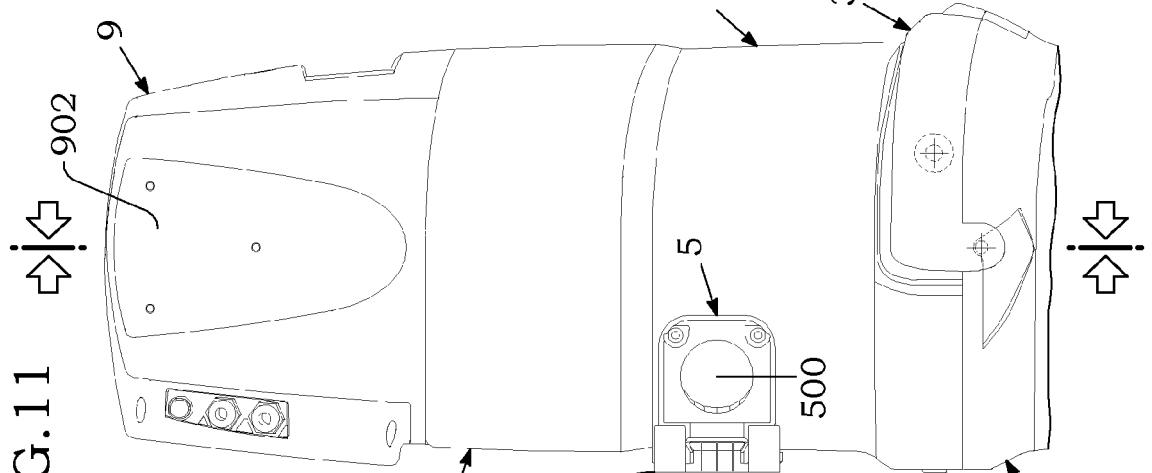


FIG. 12

