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(54) **DRAINAGE CONTROL DEVICE AND CLEANING ROBOT**

(57) The present invention provides a drainage control device and a cleaning robot, the drainage control device includes a water tank body and a middle cover sealingly disposed on an upper portion of the water tank body; wherein the middle cover is provided with a water inlet, an air inlet, and a steering engine assembly engaged with the air inlet and configured to adjust an opening size of the air inlet to control an air intake amount, the water inlet is mounted with a sealing cover, and a lower portion of the water tank body is provided with at least one water outlet. The present invention precisely controls the air intake amount through the steering gear assembly and the air inlet, and can accurately control the water output under the action of the atmospheric pressure, which is very suitable for the occasion where the displacement needs precise control.

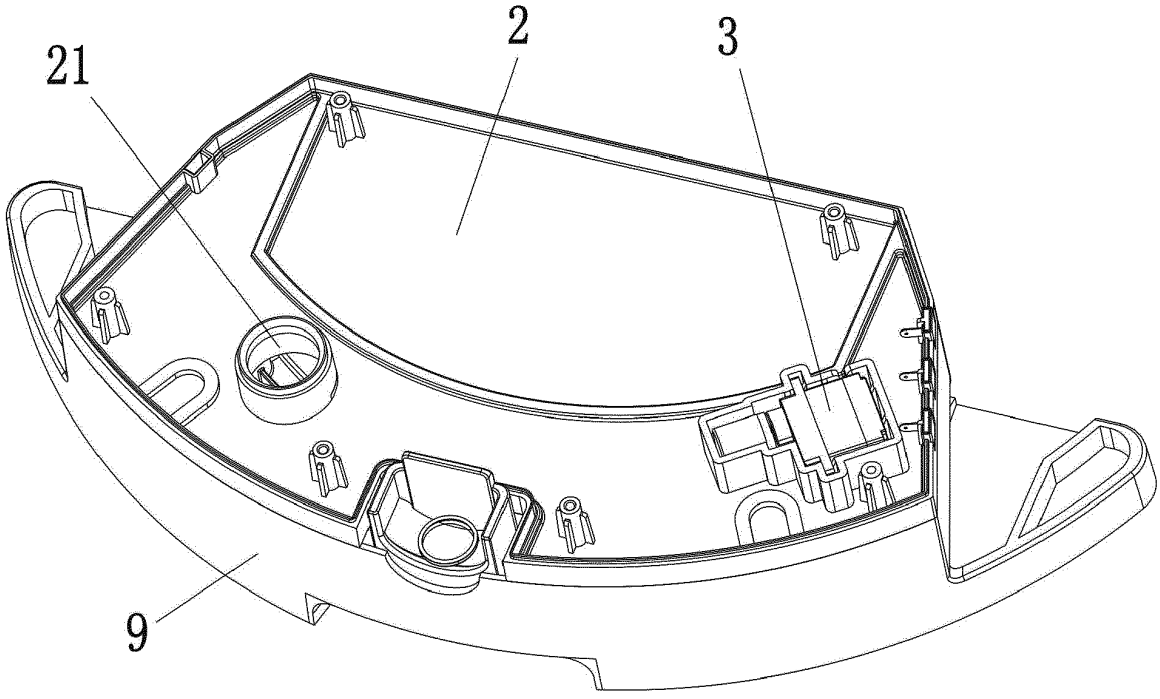

FIG. 1

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Description

FIELD OF THE INVENTION

[0001] The invention relates to the field of cleaning robot technology, in particular to a drainage control device and a cleaning robot.

BACKGROUND OF THE INVENTION

[0002] The cleaning robot has a drainage device, and it is necessary to control the displacement when cleaning. The current drainage device is basically controlled by a water pump or a solenoid valve, but the water pump or the solenoid valve cannot achieve accurate water intake or drainage. Because the ground cleaning effect is not ideal due to the inability to accurately control the water, the existing drainage device cannot be used for the precise control of the displacement.

[0003] Therefore, the prior art has yet to be improved and developed.

SUMMARY OF THE INVENTION

[0004] In view of the above deficiencies of the prior art, it is an object of the present invention to provide a drainage control device and a cleaning robot, which overcomes the problem that the existing drainage device cannot accurately control the water output, and truly realizes the effect of simulating the real person switch faucet.

[0005] The present invention provides a drainage control device, including a water tank body and a middle cover sealingly disposed on an upper portion of the water tank body;

[0006] wherein the middle cover is provided with a water inlet, an air inlet, and a steering engine assembly engaged with the air inlet and configured to adjust an opening size of the air inlet to control an air intake amount,

[0007] the water inlet is mounted with a sealing cover, and a lower portion of the water tank body is provided with at least one water outlet.

[0008] In an embodiment of the invention, the steering engine assembly includes a steering gear and an air inlet sealer arranged on an output shaft of the steering gear, the air inlet sealer cooperates with the air inlet to block or open the air inlet.

[0009] In an embodiment of the invention, the steering engine assembly further includes a connector mounted on the output shaft of the steering gear, and the air inlet sealer being mounted on the connector.

[0010] In an embodiment of the invention, the air inlet sealer includes a cylindrical seal body and a flat portion arranged on the cylindrical seal body.

[0011] In an embodiment of the invention, the air inlet sealer is a soft rubber.

[0012] In an embodiment of the invention, the drainage control device further includes an upper cover arranged at an upper portion of the middle cover, and the sealing cover is arranged on the upper cover.

[0013] In an embodiment of the invention, the middle cover is disposed with a mounting groove, and the steering engine assembly is arranged in the mounting groove.

[0014] In an embodiment of the invention, the drainage control device comprises one or more water outlets. The water outlets are evenly distributed at the lower portion of the water tank body. Preferably, the drainage control device comprises six water outlets.

[0015] In an embodiment of the invention, the sealing cover is a soft rubber.

[0016] The present invention also provides a cleaning robot including a drainage control device. Wherein the drainage control device includes: a water tank body and a middle cover sealingly disposed on an upper portion of the water tank body; wherein the middle cover is provided with a water inlet, an air inlet, and a steering engine assembly engaged with the air inlet, and the steering engine assembly is configured for adjusting an opening size of the air inlet to control an air intake amount, a sealing cover is mounted on the water inlet, and at least one water outlet is arranged at a lower portion of the water tank body.

[0017] In an embodiment of the invention, the steering engine assembly includes a steering gear and an air inlet sealer arranged on an output shaft of the steering gear, the air inlet sealer cooperates with the air inlet to block or open the air inlet.

[0018] In an embodiment of the invention, the steering engine assembly further includes a connector mounted on the output shaft of the steering gear, and the air inlet sealer being mounted on the connector.

[0019] In an embodiment of the invention, the air inlet sealer includes a cylindrical seal body and a flat portion arranged on the cylindrical seal body.

[0020] In an embodiment of the invention, the air inlet sealer is a soft rubber.

[0021] In an embodiment of the invention, the drainage control device further includes an upper cover arranged at an upper portion of the middle cover, and the sealing cover is arranged on the upper cover.

[0022] In an embodiment of the invention, the middle cover is disposed with a mounting groove, and the steering engine assembly is arranged in the mounting groove.

[0023] In an embodiment of the invention, an amount of the at least one water outlet is six, and the six water outlets are evenly distributed at the lower portion of the water tank body.

[0024] In an embodiment of the invention, the sealing cover is a soft rubber.

[0025] The invention has the beneficial effects that: by providing a sealed water tank structure, the water outlet is arranged in the lower portion of the water tank body, the air inlet is arranged in the middle cover, and the air intake amount is precisely controlled by the steering engine assembly and the air inlet. Under the action of atmospheric pressure, the water volume can be precisely controlled, which is very suitable for occasions where the

displacement needs precise control.

BRIEF DESCRIPTION OF THE DRAWINGS

[0026]

FIG. 1 is a partial structural schematic view of the drainage control device of the present invention.
FIG. 2 is a partially exploded perspective view of the drainage control device of the present invention.
FIG. 3 is a partial schematic structural view of the drainage control device of the present invention.
FIG. 4 is a schematic structural view of the drainage control device of the present invention.
FIG. 5 is a schematic view showing the structure of the drainage control device of the present invention from another angle.
FIG. 6 is a schematic exploded view of the drainage control device of the present invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0027] The present invention provides a drainage control device and a cleaning robot. The present invention will be further described in detail below with reference to the accompanying drawings and embodiments. It is understood that the specific embodiments described herein are merely illustrative of the invention and are not intended to limit the invention.

[0028] Referring to FIG. 1 to FIG. 6 together, the drainage control device of the preferred embodiment of the present invention includes: a water tank body 9 and a middle cover 2 sealingly disposed on an upper portion of the water tank body 9. The middle cover 2 is provided with a water inlet 21, an air inlet 22, and a steering engine assembly 3 matched with the air inlet 22, the steering engine assembly 3 is configured to adjust the opening size to control the air intake amount, a sealing cover 4 is mounted on the water inlet 21, and a least one water outlet 91 is arranged in a lower portion of the water tank body 9.

[0029] In this embodiment, the water tank body 9 is sealingly connected with the middle cover 2, the sealing cover 4 is sealingly connected with the water inlet 21, and the steering engine assembly 3 blocks the air inlet 22, thereby forming a sealed water tank overall structure. Based on the atmospheric pressure principle, water in the tank body 9 cannot be oozing out from the water outlet 91 at this time. When the steering engine assembly 3 accurately opens the air inlet 22 to a specific size, correspondingly controlling a specific air intake amount, and controlling the water outlet 91 to flow out a specific volume of water, thereby achieving an effect of accurately controlling the amount of water discharged.

[0030] The drainage control device of the present invention provides a sealed water tank structure, and the water outlet is arranged in the lower portion of the water tank body, and the air inlet is arranged in the middle cover, and the air intake amount is precisely controlled by the steering engine assembly and the air inlet. Under the action of atmospheric pressure, the water volume can be precisely controlled, which is very suitable for occasions where the displacement needs precise control.

[0031] Further, referring to FIG. 1 to FIG. 6 together, in this embodiment, the steering engine assembly 3 includes a steering engine 31 and an air inlet sealer 32 mounted on the output shaft of the steering engine for cooperation with the air inlet 22 for closing or opening the air inlet 22. The steering engine 31 has an accurate rotation angle and can achieve a precise rotation of 0.2°, so that the opening size can be precisely controlled. The steering engine 31 is mainly composed of a motor, a reduction gear, a control circuit, etc., and is itself a prior art. This embodiment is preferably a high-precision digital steering engine or a high-precision analog steering engine. Specifically, the steering engine assembly 3 further includes a connector 33 mounted on the output shaft of the steering engine, and the air inlet sealer 32 is mounted on the connector 33. The air inlet sealer 32 can take a variety of different forms, for example a sump-like ball valve structure can be employed. In the present embodiment, the air inlet sealer 32 preferably includes a cylindrical seal body 321 and a flat portion 322 disposed on the cylindrical seal body 321. The air inlet sealer 32 is preferably a soft rubber, which is advantageous for achieving a sealing effect of the air inlet 22.

[0032] Further, referring to FIG. 1 to FIG. 6 together, in this embodiment, the drainage control device further includes an upper cover 1 disposed in an upper portion of the middle cover 2, the sealing cover 4 being disposed on the upper cover 1. A mounting groove 23 is disposed in the middle cover 2, and the steering engine assembly 3 is disposed in the mounting groove 23. There are a plurality of the water outlet 91 (e.g., six) which are evenly disposed at the lower portion of the tank body 9. Preferably, the sealing cover 4 is a soft rubber, which is beneficial to achieve the sealing effect of the water inlet 21.

[0033] Further, the embodiment further provides a cleaning robot, wherein the cleaning robot includes the above-mentioned drainage control device. Based on the drainage control device, the cleaning robot of the embodiment can accurately control the water output and facilitate high quality cleaning.

[0034] It is to be understood that the application of the present invention is not limited to the above-described examples, and those skilled in the art can make modifications and changes in accordance with the above description, all of which are within the scope of the appended claims.

Claims

1. A drainage control device, comprising:

a water tank body and a middle cover sealingly disposed on an upper portion of the water tank body;
wherein the middle cover is provided with a water inlet, an air inlet, and a steering engine assembly engaged with the air inlet and configured to adjust an opening size of the air inlet to control an air intake amount,
the water inlet is mounted with a sealing cover, and a lower portion of the water tank body is provided with at least one water outlet.

2. The drainage control device according to claim 1, wherein the steering engine assembly comprises a steering gear and an air inlet sealer arranged on an output shaft of the steering gear, the air inlet sealer cooperates with the air inlet to block or open the air inlet.

3. The drainage control device according to claim 2, wherein the steering engine assembly further comprises a connector mounted on the output shaft of the steering gear, and the air inlet sealer being mounted on the connector.

4. The drainage control device according to claim 3, wherein the air inlet sealer comprises a cylindrical seal body and a flat portion arranged on the cylindrical seal body.

5. The drainage control device according to claim 2, wherein the air inlet sealer is a soft rubber.

6. The drainage control device according to claim 1, wherein the drainage control device further comprises an upper cover arranged at an upper portion of the middle cover, and the sealing cover is arranged on the upper cover.

7. The drainage control device according to claim 1, wherein the middle cover is disposed with a mounting groove, and the steering engine assembly is arranged in the mounting groove.

8. The drainage control device according to claim 1, wherein the drainage control device comprises one or more water outlets.

9. The drainage control device according to claim 8, wherein the water outlets are evenly distributed at the lower portion of the water tank body.

10. The drainage control device according to claim 8, wherein the drainage control device comprises six water outlets.

11. The drainage control device according to claim 1, wherein the sealing cover is a soft rubber.

12. A cleaning robot, comprising a drainage control device according to any one of claims 1-11.

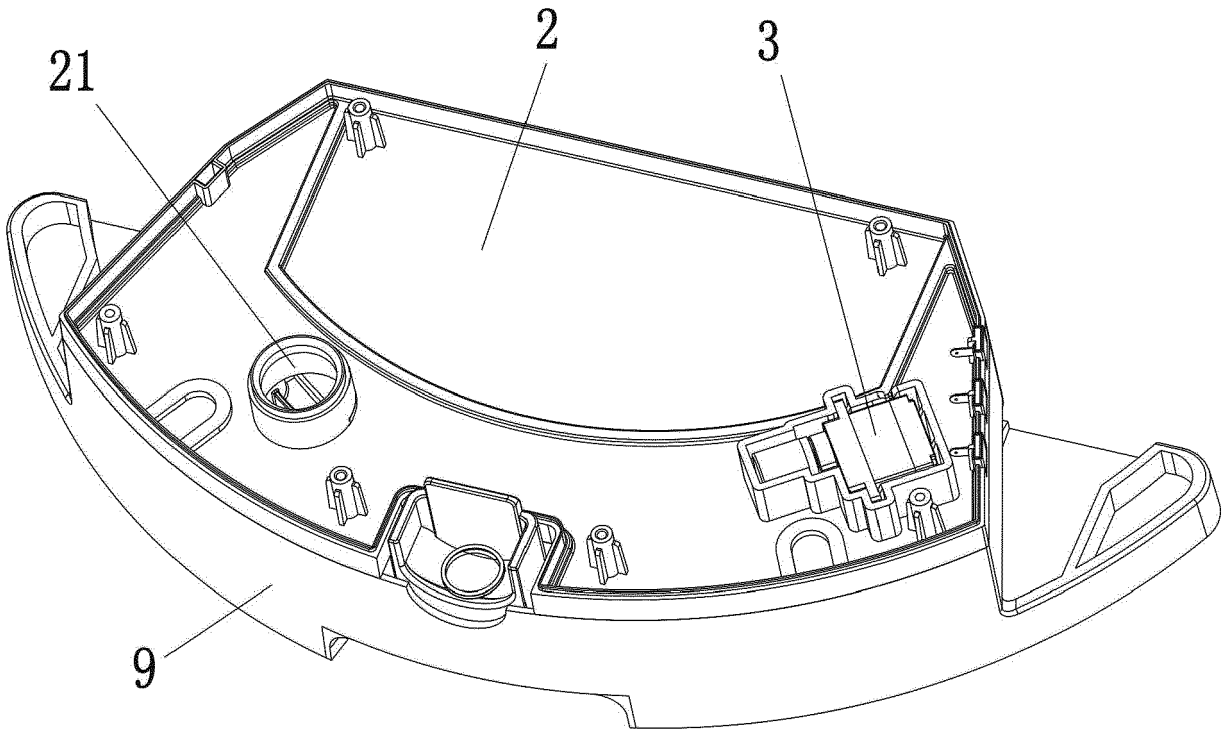

FIG. 1

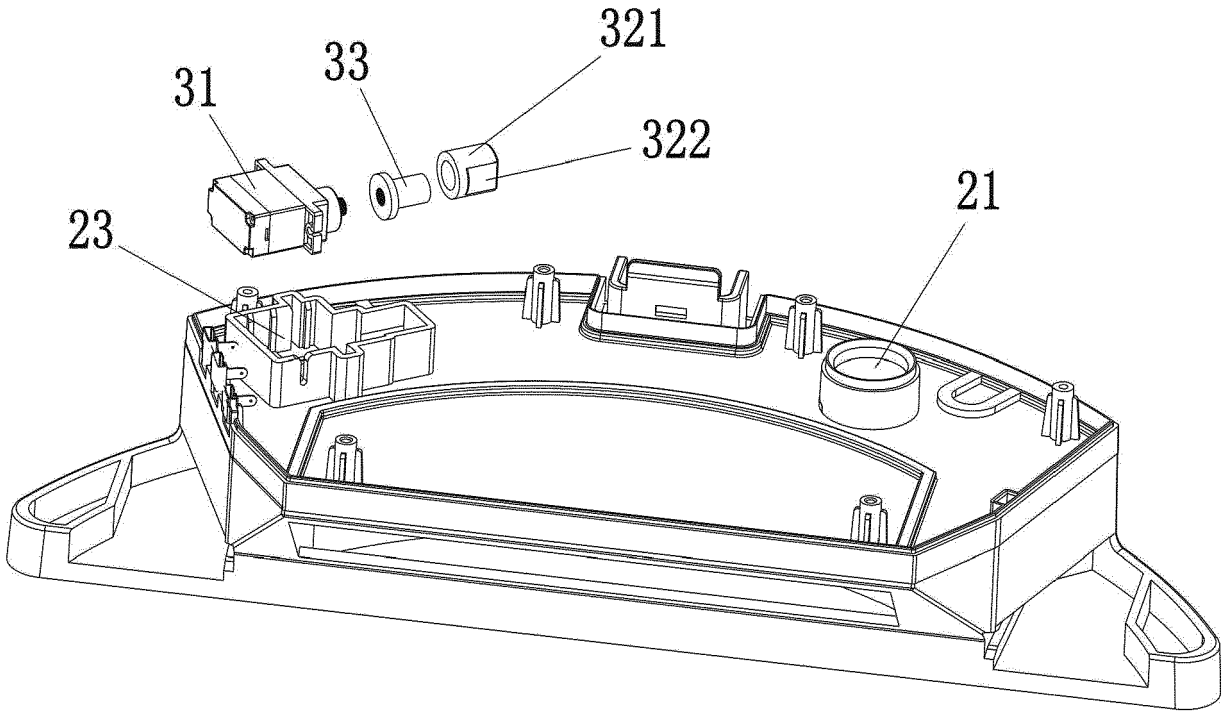

FIG. 2

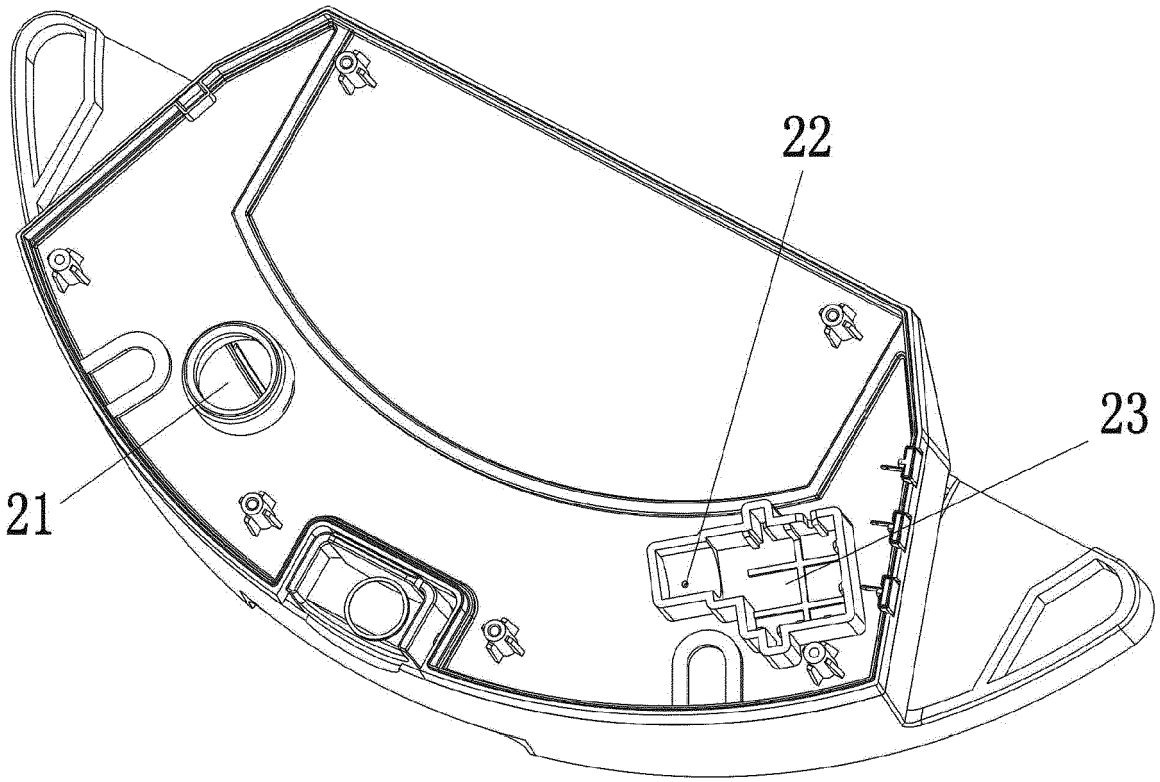

FIG. 3

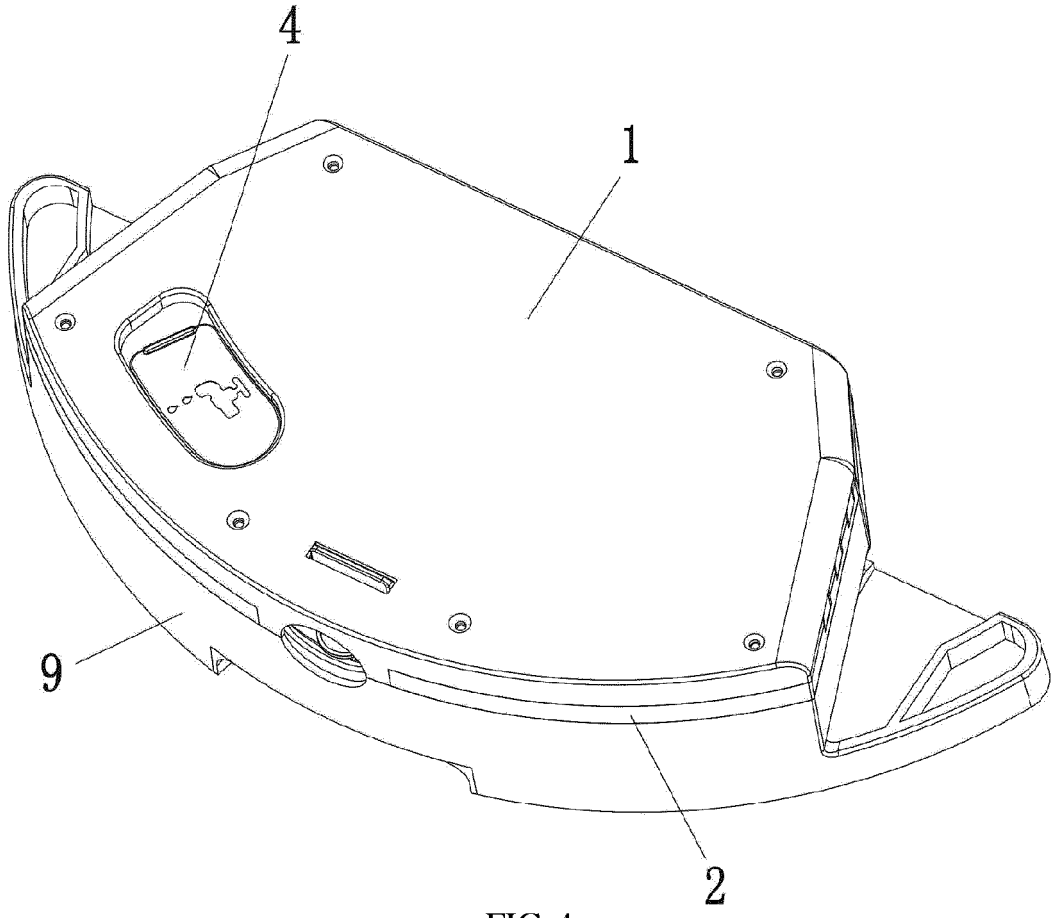

FIG. 4

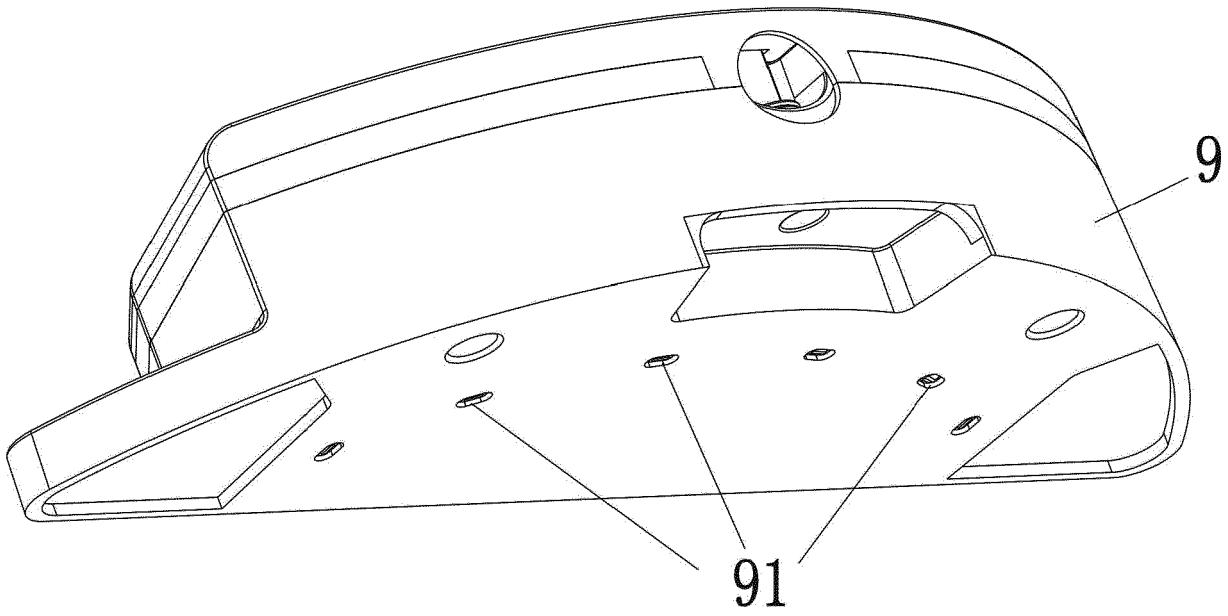

FIG. 5

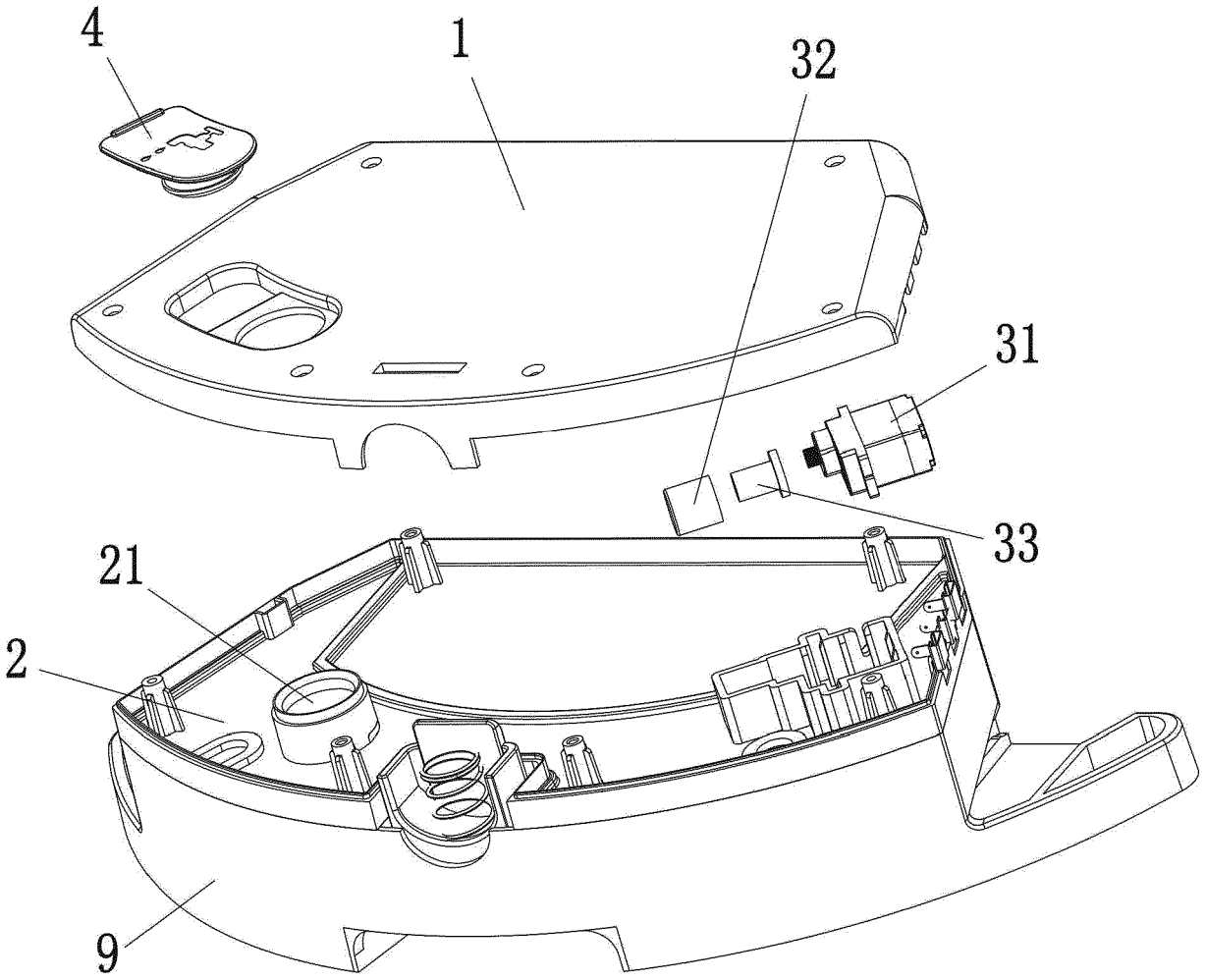

FIG. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 19 18 6354

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X A	CN 109 259 673 A (GUANGDONG LESHENG SMART TECH CO LTD) 25 January 2019 (2019-01-25) * paragraph [0047] - paragraph [0055]; figures 5-7 *	1-3, 8-10,12 4-7,11	INV. A47L11/40
X A	CN 109 106 290 A (SHENZHEN WATER WORLD CO LTD) 1 January 2019 (2019-01-01) * paragraph [0045] - paragraph [0050]; figure 3 *	1-3, 8-10,12 4-7,11	

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	24 January 2020	Blumenberg, Claus

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 19 18 6354

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
CN 109259673 A	25-01-2019	NONE	
CN 109106290 A	01-01-2019	NONE	

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82