



(11)

EP 4 520 242 A1

(12)

EUROPEAN PATENT APPLICATION
published in accordance with Art. 153(4) EPC

(43) Date of publication:
12.03.2025 Bulletin 2025/11

(21) Application number: **22894457.5**

(22) Date of filing: **23.09.2022**

(51) International Patent Classification (IPC):
A47L 11/30^(2006.01) A47L 11/29^(2006.01)
A47L 11/40^(2006.01)

(52) Cooperative Patent Classification (CPC):
A47L 11/30; A47L 7/0019; A47L 7/0038;
A47L 9/009; A47L 9/1409; A47L 9/1463;
A47L 9/22; A47L 11/24; A47L 11/29; A47L 11/40;
A47L 11/4016; A47L 11/4025; A47L 11/4027;
A47L 11/4072; A47L 11/4083

(86) International application number:
PCT/CN2022/121120

(87) International publication number:
WO 2023/087919 (25.05.2023 Gazette 2023/21)

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

(30) Priority: **17.11.2021 CN 202111365286**
17.11.2021 CN 202122822726 U
17.11.2021 CN 202111365285
17.11.2021 CN 202122822600 U
17.11.2021 CN 202111365272
17.11.2021 CN 202122824860 U
17.11.2021 CN 202111365281
17.11.2021 CN 202111365290
17.11.2021 CN 202122822729 U
17.11.2021 CN 202111363992
17.11.2021 CN 202122858778 U

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(54) **SELF-MOVING CLEANING ROBOT, CLEANING SYSTEM, CONTROL METHOD, AND CLEANING METHOD**

(57) This disclosure relates to a self-moving cleaning robot, cleaning system, control method, and cleaning method. The self-moving cleaning robot comprises a body and a water tank mounted on the body. The water tank includes: a tank body, which forms an air duct in the inner cavity of the tank body; a fan accommodation cavity extending from the bottom of the tank body toward the top of the tank body is provided in the inner cavity of the tank body; the opening end of the fan accommodation cavity faces downwards of the tank body; an air inlet is provided on the side wall of the tank body, and an air outlet is provided at the top of the fan accommodation cavity; the

air duct is formed in the inner cavity of the tank body, comprising a second channel formed by the enclosing side walls of the fan accommodation cavity and corresponding portions of the side wall of the tank body, and a first channel located in the inner cavity of the tank body between the air inlet and the fan accommodation cavity. The self-moving robot of this application can suction sewage generated during cleaning work into the tank body, and separate the sewage and airflow in the inner cavity of the tank body, with sewage remaining in the inner cavity of the tank body and airflow being discharged from the tank body.

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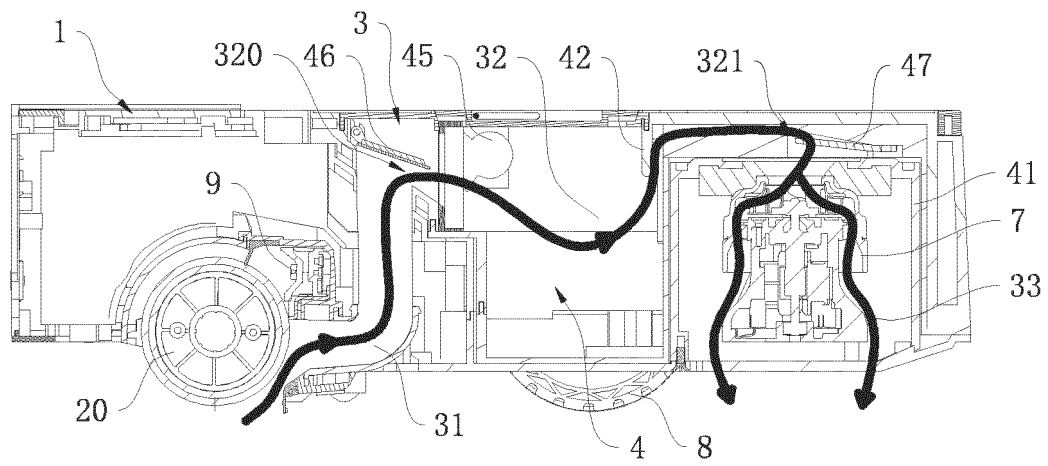


FIG. 1

Description

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation application of International Patent Application No. PCT/CN2022/121120, filed on September 23, 2022, which is based on and claims priority to and benefits of Chinese patent applications submitted to the China National Intellectual Property Administration on November 17, 2021, with application number 202111365286.X, titled "Water Tank and Self-moving Cleaning Robot," application number 202122822726.1, titled "Water Tank and Self-moving Cleaning Robot," application number 202111365285.5, titled "Self-moving Cleaning Robot and Cleaning System," application number 202122822600.4, titled "Self-moving Cleaning Robot and Cleaning System," application number 202111365272.8, titled "Roller assembly and Self-moving Cleaning Robot," application number 202122824860.5, titled "Roller assembly and Self-moving Cleaning Robot," application number 202111365281.7, titled "Self-moving Floor Washing Robot and Control Method," application number 202111365290.6, titled "Cleaning System, Base Station, and Cleaning Method," application number 202122822729.5, titled "Cleaning System and Base Station," application number 202111363992.0, titled "Water Tank and Cleaning Equipment," and application number 202122858778.4, titled "Water Tank and Cleaning Equipment." All of the above-referenced applications are incorporated herein by reference.

TECHNICAL FIELD

[0002] This disclosure relates to the field of robotics, particularly focusing on a self-moving cleaning robot. Additionally, it relates to a cleaning system comprising the aforementioned self-moving cleaning robot, along with control methods and cleaning methods.

BACKGROUND

[0003] The self-moving floor cleaning robot is an intelligent household appliance capable of autonomously performing cleaning tasks such as sweeping, vacuuming, and mopping within a room, relying on a certain level of artificial intelligence.

[0004] However, existing self-moving floor cleaning robots have a low water stain recovery rate when mopping. After cleaning, residual water stains may remain on the floor, which continue to attract dust, causing secondary pollution and reducing cleaning efficiency. Moreover, people may also slip due to the water stains on the floor.

SUMMARY

[0005] The present disclosure provides a self-moving

cleaning robot, a cleaning system, a control method, and a cleaning method.

[0006] According to a first aspect of the present disclosure, a self-moving cleaning robot is provided, comprising a body and a water tank mounted on the body. The water tank comprises:

a box body, having an air duct in a cavity of the box body; a fan chamber in the cavity of the box body extending from the bottom of the box body towards the top of the box body; an opening end of the fan chamber facing downwards of the box body; an air inlet on a side wall of the box body, and an air outlet on the top of the fan chamber;
an air duct formed in the cavity of the box body and, comprising a second channel enclosed by a surrounding side wall of the fan chamber and a corresponding side wall of the box body and a first channel located in the cavity of the box body from the air inlet to the fan chamber.

[0007] According to a second aspect of the present disclosure, a water tank is provided, comprising:

a box body, having an air duct in the cavity of the box body; a fan chamber in the cavity of the box body extending from the bottom of the box body towards the top of the box body; an opening end of the fan chamber facing downwards of the box body; an air inlet on a side wall of the box body, and an air outlet on the top of the fan chamber;
an air duct formed in the cavity of the box body and, comprising a second channel enclosed by a surrounding side wall of the fan chamber and a corresponding side wall of the box body and a first channel located in the cavity of the box body from the air inlet to the fan chamber.

[0008] According to a third aspect of the present disclosure, a self-moving cleaning robot is provided, comprising a body and a water tank assembly disposed in the body. The water tank assembly comprises:

a clean water tank; a sewage tank with an air inlet; a fan chamber, wherein the opening of the fan chamber faces the bottom of the water tank assembly, and the fan assembly is inserted into the fan chamber from the opening. The top of the fan chamber is provided with an air outlet communicating with the sewage tank.

[0009] A second channel is provided between the clean water tank and the fan chamber to allow the airflow entering the sewage tank from the air inlet to be discharged through the air outlet via the second channel.

[0010] One beneficial effect of the present disclosure is that, during the operation of the self-moving robot, negative pressure is generated in the air duct, which can suck the sewage generated during the cleaning work from the air inlet into the tank body. The first channel space of the tank body is relatively open, allowing sew-

age and airflow to be adequately separated in the first channel. The sewage remains in the inner cavity of the tank body, while the airflow uniformly flows towards the air outlet through the second channel inside the tank body and is discharged, preventing the situation where the sewage is carried away by excessively fast local airflow.

[0011] According to a fourth aspect of the present disclosure, a self-moving cleaning robot is provided, comprising a body and, mounted on the body:

- a cleaning device constructed for cleaning a working surface;
- a first air duct, with its inlet adjacent to the cleaning device, and constructed to extract sewage from the working surface cleaned by the cleaning device;
- a sewage tank constructed to contain sewage after cleaning the working surface, with a second air duct provided in the sewage tank;
- a fan assembly with a third air duct;
- wherein the first air duct and the third air duct are respectively connected to the second air duct; water vapor extracted by the first air duct enters the second air duct of the sewage tank, with liquid dropping into the sewage tank, while gas is discharged through the third air duct of the fan assembly.

[0012] According to a fifth aspect of the present disclosure, a cleaning system is provided, comprising a self-moving cleaning robot and a base station. The base station includes a base station body with a housing cavity, and a drying system is installed inside the base station body.

[0013] The housing cavity of the base station body is constructed to accommodate the self-moving cleaning robot. The inlet of the first air duct of the self-moving cleaning robot is configured to draw in the wind drying airflow emitted by the drying system, drying the cleaning device.

[0014] One beneficial effect of this disclosure is that the first air duct, located at the rear of the cleaning device, can suction away sewage from behind the cleaning device. The sewage suctioned by the air duct can be separated from gas in the second air duct of the sewage tank, avoiding entry into the third air duct and affecting the fan assembly. This ensures efficient utilization of energy by the fan assembly, thereby improving work efficiency.

[0015] According to a sixth aspect of the present disclosure, a self-moving cleaning robot is provided, comprising a body with a mounting cavity and a roller assembly mounted in the mounting cavity. The roller assembly comprises:

- a roller bracket with a roller cavity;
- a roller rotatably connected in the roller cavity of the roller bracket; at least one end of the roller is equipped with a pressure block, which is rotatably connected to the roller and constructed to move axially along the roller under the action of an elastic

device to seal against the side wall of the roller cavity.

[0016] According to a seventh aspect of the present disclosure, a roller assembly is provided, comprising:

- a roller bracket with a roller cavity;
- a roller rotatably connected in the roller cavity of the roller bracket; at least one end of the roller is equipped with a pressure block, which is rotatably connected to the roller and constructed to move axially along the roller under the action of an elastic device to seal against the side wall of the roller cavity.

[0017] One beneficial effect of this disclosure is that, in the roller assembly of the self-moving cleaning robot, the pressure block at one end of the roller can be sealed against the end face of the roller bracket, and under the action of the elastic device, the pressure block can be moved axially along the side wall of the roller cavity of the roller bracket to ensure the sealing performance between them, facilitating the assembly and disassembly of the roller.

[0018] According to an eighth aspect of the present application, a self-moving floor scrubbing robot is provided, comprising:

- a body, the body having an mounting cavity;
- a roller, the roller rotatably connected in the mounting cavity;
- a squeegee, the squeegee connected to the body and constructed to contact the roller to remove liquid from the roller;
- wherein the roller and the squeegee are constructed to undergo relative movement when encountering obstacles, causing the roller to separate from the squeegee.

[0019] According to a ninth aspect of the present application, a control method for the robot is also provided, wherein the robot employs the self-moving floor scrubbing robot; further comprising an identification device and a control unit, comprising the following steps:

- the control unit receives a detection signal of front obstacles obtained by the identification device, and sends a control signal to a driving mechanism;
- the driving mechanism receives the control signal and drives the roller to undergo relative movement with the squeegee to separate the roller from the squeegee.

[0020] An advantageous effect of this disclosure is that the squeegee scrapes away sewage from the roller while the roller cleans the working surface, thus enhancing the cleaning ability of the roller. When encountering obstacles, the roller and the squeegee undergo relative movement, causing the squeegee to stop scraping water to prevent sewage from remaining on the floor.

[0021] According to a tenth aspect of the present disclosure, a cleaning system is provided, comprising:

a cleaning device, the cleaning device comprising a cleaning unit, an air duct system, and a sewage tank; the cleaning unit is constructed for cleaning the working surface; the sewage tank is constructed for containing sewage after cleaning the working surface; the air duct system is constructed for extracting sewage from the cleaning unit after cleaning the working surface to the sewage tank; a base station, the base station comprising a base body with a housing cavity, wherein a drying system is installed inside the base body; wherein the housing cavity of the base body is constructed for accommodating the cleaning device, and the air duct system of the cleaning device is configured to draw in dry air sent out by the drying system to dry the cleaning device.

[0022] According to an eleventh aspect of the present disclosure, a cleaning method is provided, implemented by a cleaning system, comprising:

the cleaning device entering the housing cavity of the base station to clean the cleaning unit;
the cleaning device extracting the cleaned sewage to its sewage tank through its air duct system;
the drying system of the base station delivering dry airflow to the cleaning device;
the cleaning device extracting the dry airflow through its air duct system to dry the cleaning device.

[0023] According to a twelfth aspect of the present disclosure, a base station is provided, comprising:

a base station having a housing cavity, wherein the housing cavity of the base station is constructed to accommodate the cleaning device;
a drying system, wherein the drying system forms an air outlet in the housing cavity of the base station, and the air outlet is configured to blow dry airflow towards the cleaning unit of the cleaning device located in the housing cavity.

[0024] An advantageous effect of the present disclosure is that after the cleaning device enters the housing cavity of the base station, the air duct system can extract dry airflow sent out by the base station's drying system, drying the cleaning unit and the residual water stains inside the cleaning device, preventing bacteria growth and odor.

[0025] According to a thirteenth aspect of the present disclosure, a water tank is provided, comprising a body and a water tank mounted on the body, wherein the water tank comprises:

a body having an cavity;

an air duct, wherein the air duct is located in the cavity of the body, and air inlets and air outlets are formed at different positions of the body;

a water blocking part, wherein the water blocking part is located on the inner wall of the body adjacent to the air outlet, and is constructed to block the raised water level.

[0026] According to a fourteenth aspect of the present disclosure, a water tank is provided, comprising a body and a water tank mounted on the body, wherein the water tank comprises:

a body having an cavity;
a duct, wherein the air duct is located in the cavity of the body, and air inlets and air outlets are formed at different positions of the body;
a water blocking part, wherein the water blocking part is located on the inner wall of the body adjacent to the air outlet, and is constructed to block the raised water level.

[0027] An advantageous effect of the present disclosure is that the airflow in the air duct affects the liquid water level in the cavity of the water tank, causing the liquid to be pushed towards the air outlet. The water baffle inside the water tank, located adjacent to the air outlet on the inner wall of the body, can block the raised water level, preventing liquid from being drawn out of the water tank from the air outlet. Additionally, the water baffle has through-holes, allowing airflow in the air duct to flow towards the air outlet.

BRIEF DESCRIPTION OF THE DRAWINGS

[0028] The appended figures, incorporated within the manual and forming a part thereof, illustrate embodiments disclosed herein and are used in conjunction with their descriptions to elucidate the principles disclosed herein.

FIG. 1 is a sectional view of a self-moving cleaning robot provided in an embodiment of the present disclosure.

FIG. 2 is a sectional view of a roller provided in an embodiment of the present disclosure.

FIG. 3 is a sectional view of a pressure block of the roller provided in an embodiment of the present disclosure.

FIG. 4 is an exploded view of one end of the roller provided in an embodiment of the present disclosure.

FIG. 5 is an exploded view of the body, roller, and roller cover plate provided in an embodiment of the present disclosure.

FIG. 6 is a schematic diagram of the structure of an anti-rotation groove provided in an embodiment of the present disclosure.

FIG. 7 is a sectional view of the roller bracket and roller cover plate provided in an embodiment of the present disclosure.

FIG. 8 is a sectional view of the front part of the body provided in an embodiment of the present disclosure.

FIG. 9 is a schematic diagram of the structure of a water supply device provided in an embodiment of the present disclosure.

FIG. 10 is an internal structural schematic diagram of the water supply device provided in an embodiment of the present disclosure.

FIG. 11 is an exploded view of the body and roller assembly provided in an embodiment of the present disclosure.

FIG. 12 is a schematic diagram of the hinge shaft and support base provided in an embodiment of the present disclosure.

FIG. 13 is a longitudinal sectional view of the middle position of the sewage tank provided in an embodiment of the present disclosure.

FIG. 14 is a schematic diagram of the battery and heat dissipation module provided in an embodiment of the present disclosure.

FIG. 15 is an exploded view of the battery and driving wheel provided in an embodiment of the present disclosure.

FIG. 16 is an exploded view of the sewage tank provided in an embodiment of the present disclosure.

FIG. 17 is a cross-sectional view of the sewage tank provided in an embodiment of the present disclosure.

FIG. 18 is a cross-sectional view of the inlet and outlet part of the sewage tank provided in an embodiment of the present disclosure.

FIG. 19 is an exploded view of the dust collection device provided in an embodiment of the present disclosure.

FIG. 20 is a schematic diagram of the first position of the anti-misplacement mechanism provided in an embodiment of the present disclosure.

FIG. 21 is a structural schematic diagram of the anti-misplacement mechanism provided in an embodiment of the present disclosure.

FIG. 22 is a structural schematic diagram of the dust collection device and anti-misplacement mechanism provided in an embodiment of the present disclosure.

FIG. 23 is an exploded view of the sewage tank and body provided in an embodiment of the present disclosure.

FIG. 24 is a top view of the lower shell of the sewage tank provided in an embodiment of the present disclosure.

FIG. 25 is a horizontal sectional view of the water tank provided in an embodiment of the present disclosure.

FIG. 26 is a vertical sectional view of the water tank provided in an embodiment of the present disclosure.

FIG. 27 is a top view of the self-moving cleaning robot provided in an embodiment of the present disclosure.

FIG. 28 is a flowchart of the robot control method provided in an embodiment of the present disclosure.

FIG. 29 is an overall structural schematic diagram of the cleaning system in an embodiment of the present disclosure.

FIG. 30 is a structural schematic diagram of the base station of the cleaning system in an embodiment of the present disclosure.

FIG. 31 is a structural schematic diagram of the drying system of the cleaning system in an embodiment of the present disclosure.

FIG. 32 is a partial structural schematic diagram of the base station of the cleaning system in an embodiment of the present disclosure.

FIG. 33 is a sectional view of the base station of the cleaning system in an embodiment of the present disclosure.

FIG. 34 is a schematic diagram of the working principle of the cleaning system in an embodiment of the present disclosure.

FIG. 35 is a flowchart of the cleaning method in the present disclosure.

[0029] Below is the translation of the component names and FIG. references from FIG. 1 to FIG. 35:

body 1, floating part 11-A, fixed part 11-B, mounting cavity 101, clean water interface 102, waterless detection sensor 103, limiting slot 1011, hinge shaft 120, universal wheel 13, cliff sensor 14, tank groove 15, battery 16, battery mounting bracket 160, connecting line 161, lifting part 17, support base 18, shaft pressure cover 19, roller assembly 2, roller 20, assembly groove 200, drive assembly 21, rotating part 210, pressure block 22, anti-rotation portion 221, elastic device 23, base component 24, roller shaft end cover 241, first screw socket 2410, guide rod 2411, fixed seat 242, second screw socket 2420, roller end cover 243, flange 2431, anti-rotation structure 2432, rotating shaft 25, bearing 26, positioning structure 27, roller bracket 28, anti-rotation groove 280, avoidance space 281, locking slot 282, limit buckle 283, side wall 284, roller cover plate 29, slider 291, locking member 292, coupling portion 2920, first air duct 31, first air outlet 310, second air duct 32, second air inlet 320, second air outlet 321, second channel 322, first channel 323, third air duct 33, sewage tank 4, upper shell 401, third sidewall 4010, fourth sidewall 4011, middle shell 402, first sidewall 4020, second sidewall 4021, lower shell 403, sidewall 4030, bottom wall 4031, fan chamber 41, enclosed sidewall 410, top wall 411, wind-blocking mechanism 42, drain outlet 43, sewage suction pipe 430, coupling head 4301, first gate valve 431, cover plate 44,

anti-misplacement mechanism 45, cam 451, protrusion 4511, torsion spring 452, compressed part 453, first valve 46, first sealing rubber 460, second valve 47, second sealing rubber 470, water baffle 48, water level detection device 49, storage groove 490, first detection probe 491, second detection probe 492, clean water tank 5, clean water supply port 501, inlet 51, second active valve 511, heat dissipation module 52, delivery pipeline 53, clean water suction pipe 530, clean water tank check valve 531, elastic valve rod 532, pump 54, dust collection device 6, fixed bracket 61, filter mesh 62, pressure part 63, fan assembly 7, driving wheel 8, drive motor 80, driving wheel mounting base 81, auxiliary cleaning component 9, water supply device 90, total water inlet 901, water supply channel 902, nozzle 91, uniform water strip 92, squeegee 93, sealing edge 94, cleaning device A, base station B, base station body 121, housing cavity 1211, groove 1212, expanding structure 1213, guide wheel 1214, positioning groove 1215, drying system 122, air outlet 1221, drying duct 1222, base station fan 1223, heating device 1224, waterway component 123, sewage bucket 124, clean water bucket 125.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0030] Now the various exemplary embodiments of the present disclosure will be described in detail with reference to the drawings. It should be noted that unless otherwise specifically stated, the relative arrangement, numerical expressions, and values of the components and steps described in these embodiments do not limit the scope of the present disclosure.

[0031] The description of at least one exemplary embodiment below is merely illustrative and does not serve as a limitation on the present disclosure and its applications or uses.

[0032] Techniques, methods, and devices known to those skilled in the art in related fields may not be discussed in detail, but in appropriate cases, such techniques, methods, and devices should be considered as part of the specification.

[0033] In all examples shown and discussed here, any specific values should be interpreted as merely exemplary and not as limiting. Therefore, other examples of exemplary embodiments may have different values.

[0034] It should be noted that similar numerals and letters in the drawings below represent similar items, so once an item is defined in one drawing, it does not need to be further discussed in subsequent drawings.

[0035] Cleaning equipment includes floor cleaning machine, vacuum cleaners, and floor-sweeping robots, which play an efficient cleaning role in various places such as municipal sanitation, manufacturing workshops, and indoor environments, reducing the labor cost of cleaning, improving work efficiency, and are indispensable equipment in modern society.

[0036] Currently, some cleaning equipment is equipped with water tanks, air ducts, and fans. During

the cleaning process, the fan provides negative pressure to suction sewage in a cleaning area into a water tank. Cleaning equipment has a large variation in speed during startup, collision, and obstacle avoidance, causing fluctuations in the sewage in the water tank. The water level near the fan may be raised due to changes in speed, causing sewage to be sucked into the fan through the air duct and discharged by the fan into the cleaning area, resulting in ineffective cleaning.

[0037] Self-moving floor cleaning robots are a type of cleaning equipment that can automatically complete cleaning, vacuuming, mopping, and other cleaning tasks in a room with certain artificial intelligence. Existing self-moving floor cleaning robots clean the floor using a roller, with an air inlet at the rear of the roller to suction away water stains. After using for a period of time, the roller needs to be removed for cleaning. However, the existing self-moving cleaning robot's roller is inconvenient to disassemble and install with the body, and there is a problem of poor sealing, resulting in significant loss of suction power at the rear air inlet, making it easy for water stains to remain on the floor. The water stains will continue to adhere to dust, causing secondary pollution, reducing cleaning efficiency, and causing people to slip on the floor due to water stains when walking.

[0038] The present disclosure provides a self-moving cleaning robot, comprising a body capable of walking on a working surface with the assistance of a control unit. A cleaning device is arranged on the body, and the cleaning device is configured to clean the working surface. The self-moving cleaning robot can be a floor-sweeping robot, and the working surface to be cleaned can be the floor.

[0039] The body also includes an air duct, a sewage tank, and a fan assembly. Among them, the air duct includes a first air duct, the entrance of which is adjacent to the cleaning device and is configured to extract sewage from the working surface after cleaning by the cleaning device. The sewage tank is configured to contain the sewage from the working surface after cleaning. The sewage tank is provided with a second air duct, and the fan assembly has a third air duct. The first air duct and the third air duct are respectively connected to the second air duct; the fan assembly is able to provide negative pressure to the three air ducts, and the water vapor extracted by the first air duct enters the second air duct of the sewage tank, where the liquid drops into the sewage tank, and the gas is discharged through the suction passage of the fan assembly.

[0040] The first air duct is relatively narrow, so the airflow speed in the first air duct is higher, which can suction away the sewage after cleaning the working surface. The second air duct in the sewage tank is relatively wide. After the water vapor in the first air duct enters the second air duct, the flow rate decreases, the air pressure decreases, and the heavier sewage is separated from the gas and remains in the sewage tank, while the separated gas is sucked into the third air duct.

[0041] For ease of subsequent description, the exemplary embodiment of the present disclosure takes the direction of movement of the body as the forward direction. The cleaning device is arranged near the front of the body, and the fan assembly is arranged near the rear of the body. The first air duct is set behind the cleaning device, and the sewage tank is set between the first air duct and the fan assembly, so that the first air duct, the second air duct, and the third air duct have a longer path, which is conducive to the sufficient separation of water vapor in the second air duct of the sewage tank.

[0042] The air outlet of the fan assembly faces the working surface, blowing the working surface cleaned by the cleaning device to accelerate the evaporation of residual water stains. The heat generated by the fan assembly itself can heat the airflow, accelerating the evaporation of water stains on the working surface, fully utilizing the energy of the fan assembly.

[0043] The body also includes a clean water tank for storing clean water, cleaning agents, and other cleaning liquids. The clean water tank is configured to supply the cleaning liquid to the cleaning device to enhance the decontamination ability of the cleaning device and improve the efficiency of the self-moving cleaning robot.

[0044] FIGS. 1 to 27 show specific embodiments of the self-moving cleaning robot of the present disclosure, including the body 1, which is provided with a cleaning device, air ducts, sewage tank 4, clean water tank 5, and fan assembly 7. Among them, the air duct includes the first air duct 31 set on the body 1, the second air duct 32 set in the sewage tank 4 and connected to the first air duct 31, and the third air duct 33 set in the fan assembly 7 and connected to the second air duct 32.

[0045] As shown in FIG 1, the cleaning device is arranged at the front of the body 1, and the entrance of the first air duct 31 is set behind the cleaning device and faces the working surface. When the body 1 walks along the working surface, the entrance of the first air duct 31, the cleaning device, and the working surface form a relatively enclosed space, and the fan assembly 7 rotates to create negative pressure, thereby forming an airflow in the air duct flowing from the cleaning device towards the outlet of the fan assembly 7, allowing the first air duct 31 to suction away the sewage after cleaning the working surface by the cleaning device. The air duct not only can suction away sewage but also solid particles on the working surface. When the sewage contains mixed solid particles, the first air duct 31 can suction away both sewage and solid particles simultaneously.

[0046] The bottom of the body 1 is also provided with driving wheels 8 for walking, and the driving wheels 8 are set behind the cleaning device. The cleaning device can clean dirt, water stains, etc., on the working surface in front of the driving wheels 8 during walking to prevent dust and water stains from affecting the friction between the driving wheels 8 and the working surface, thereby protecting the driving wheels 8 and improving the mobility of the body 1.

Cleaning device

[0047] The cleaning device may include a mop, brush, roller brush, roller, etc., capable of wiping or sweeping the working surface while the body 1 is walking. In one embodiment of the present disclosure, the cleaning device includes a roller 20, and a mounting cavity is provided on the body 1. The roller 20 is rotatably connected in the mounting cavity of the body 1 and can roll against the working surface. The surface of the roller 20 can be provided with a cleaning layer, which can be a sponge, cotton cloth, velvet, etc. During rolling, the cleaning layer can wipe the working surface and adhere to dust and other stains on the working surface. The roller 20 can be designed as a hollow structure to reduce weight.

[0048] The roller 20 can achieve rolling in different ways. In some embodiments, the roller 20 can rotate by relying on the friction between the body 1 and the working surface during walking; in other embodiments, the roller 20 can rotate by the driving action of a driving mechanism.

[0049] In a specific embodiment of the present disclosure, as shown in FIG 2, a drive assembly 21 is provided on the body 1, and the drive assembly 21 is connected to the roller 20 to drive the rotation of the roller 20. The drive assembly 21 includes a motor and a transmission mechanism. The output end of the motor is connected to one end of the roller 20 through the transmission mechanism to drive the rotation of the roller 20.

[0050] For the convenience of cleaning and replacement of the roller 20, one end of the roller 20 can be set to detachably connect with the drive assembly 21, and the other end can be set to detachably rotate with the body 1. Furthermore, in order to reduce the wind loss at the entrance of the first air duct 31, the two end portions of the roller 20 and the corresponding positions of the body 1 are sealed.

[0051] In one embodiment of the present disclosure, the roller 20 is installed on the body 1 in the form of a roller assembly 2. Referring to FIGS. 5 and 11, the roller assembly 2 includes a roller bracket 28, a roller 20 mounted on the roller bracket 28, and a roller cover plate 29 that restricts the roller 20 on the roller bracket 28.

[0052] Referring to FIG. 11, a mounting cavity 101 is provided at a corresponding position on the body 1, and the shape of the mounting cavity 101 matches the shape of the roller assembly 2. This allows the roller assembly 2 to be installed in the mounting cavity 101 of the body 1, and allows the roller 20 to extend out of the lower end surface of the body 1 for fitting with the working surface. The roller 20 can clean the working surface by rotating.

[0053] Still referring to FIGS. 5 and 11, the roller bracket 28 can have a frame-shaped or slot-shaped structure, with a roller cavity provided on the roller bracket 28. The roller 20 is rotatably connected in the roller cavity, and the roller cover plate 29 is frame-shaped, mounted on the open end of the roller bracket 28, and restricts the roller 20 in the roller cavity of the roller bracket 28, with part of

the roller 20 extending out from the frame of the roller cover plate 29 for contact with the working surface. The drive assembly 21 can be directly or indirectly connected to the rotating part 210 set inside the roller bracket 28 through a transmission mechanism. One end of the roller 20 is provided with an assembly groove 200 for assembly with the rotating part 210 to drive the rotation of the roller 20. The rotating part 210 can be provided with flanges and/or groove structures to cooperate with corresponding flanges and/or groove structures in the assembly groove 200. Alternatively, the roller bracket 28 is provided with a yielding structure, such as an avoidance groove, at one end for cooperation with the transmission mechanism. For example, the avoidance groove, etc., rotating part 210 is rotationally connected to the main body and is connected to the transmission mechanism. When installing the roller bracket 28, the yielding structure at the corresponding position of the roller bracket 28 can directly pass through the rotating part 210, thereby installing the roller bracket 28 in the mounting cavity 101 of the body 1. This is not specifically described here.

[0054] The other end of the roller 20 can be sealed connected to the end face of the roller bracket 28 by means of pressure blocks 22. Specifically, one end of the roller 20 is provided with pressure blocks 22, which are preloaded at one end of the roller 20 through elastic devices 23. The outer end face of the pressure block 22 abuts against the corresponding end face of the roller cavity on the roller bracket 28, and under the action of the elastic device 23, the outer end face of the pressure block 22 forms a contact seal with the end face of the roller cavity.

[0055] The roller 20 is also rotatably connected to the roller bracket 28 through the pressure block 22. The pressure block 22 can be rotatably connected to the roller bracket 28 or the roller 20.

[0056] Referring to FIGS. 2-4, the roller 20 also includes a base component 24 and a rotating shaft 25 supported inside the roller 20. The base component 24 is relatively fixed to the roller 20, and the axial direction of the base component 24 is consistent with the axial direction of the roller 20. The rotating shaft 25 is configured to move along the axial direction of the base component 24. The rotating shaft 25 is rotationally connected to the pressure block 22, and under the action of the elastic device 23, the rotating shaft 25 applies outward pressure to the pressure block 22, driving the pressure block 22 to tightly adhere to the inner wall of the roller cavity, achieving sealing between them. The base component 24 can be made of self-lubricating material to reduce friction between the rotating shaft 25 and the base component 24, thus extending the service life.

[0057] The base component 24 includes roller end covers 243 for supporting inside the roller 20 and fixed seats 242 fixed on the roller end covers 243. The rotating shaft 25 passes through the fixed seat 242 and is configured to move along the axial direction of the roller 20.

[0058] Specifically, the fixed seat 242 extends axially

relative to the roller 20, and a guiding channel is provided inside the fixed seat 242. The rotating shaft 25 is arranged in the guiding channel of the fixed seat 242. When the rotating shaft 25 is subjected to external force, it can move along the extension direction of the fixed seat 242, thereby improving the stability of the rotating shaft 25.

[0059] The base component 24 also includes roller shaft end covers 241 connected to the fixed seat 242 or the roller end covers 243, and the elastic device 23 is arranged between the rotating shaft 25 and the roller shaft end covers 241. When the roller 20 is installed in the mounting cavity of the body 1, the elastic device 23 preloads the pressure block 22 against the end face of the mounting cavity through the rotating shaft 25. The roller shaft end covers 241 can be designed in a "concave" structure, and the elastic device 23 is arranged inside the roller shaft end covers 241.

[0060] The roller shaft end covers 241, fixed seats 242, and roller end covers 243 of the base component 24 can be connected from the inside to the outside of the roller 20. These components can be integrally processed or set as separate connection structures. The connection methods of the separate connection structure include but are not limited to threaded connection, screw connection, adhesive bonding, and insertion connection.

[0061] In the disclosed embodiment, the roller shaft end covers 241, fixed seats 242, and roller end covers 243 of the base component 24 adopt a modular connection structure to facilitate the installation of the elastic device 23 and the rotating shaft 25. Positioning structures 27 are provided between the roller shaft end covers 241 and the fixed seats 242, and between the fixed seats 242 and the roller end covers 243, allowing for convenient positioning during installation. Additionally, the roller shaft end covers 241, fixed seats 242, and roller end covers 243 can be further secured by screws to enhance connection stability. Screw holes or screw sockets can be provided on the roller shaft end covers 241, fixed seats 242, and roller end covers 243 for screw insertion.

[0062] In a specific embodiment, as shown in FIG. 4, the roller shaft end covers 241 are provided with first screw sockets 2410 on opposite sides, the fixed seats 242 are provided with second screw sockets 2420 on opposite sides, and threaded holes can be provided on the roller end covers. The threaded holes, first screw sockets 2410, and second screw sockets 2420 are coaxially aligned. Screws pass through the threaded holes, first screw sockets 2410, and second screw sockets 2420 to securely connect the roller shaft end covers 241, fixed seats 242, and roller end covers 243 together.

[0063] The fixed seats 242 can be manufactured separately using self-lubricating materials, while the roller shaft end covers 241 and roller end covers 243 can be made from other common materials to save costs.

[0064] The elastic device 23 can be selected from compression springs, elastic plates, elastic blocks, etc. In the disclosed embodiment, a compression spring is used for the elastic device 23. The compression spring

can be connected to the roller shaft end covers 241 and the rotating shaft 25 using a plug-in mating connection method.

[0065] Guide structures compatible with the compression spring can be provided on the roller shaft end covers 241 and/or the rotating shaft 25, such as guide rods, guide sleeves, etc., to guide the compression spring and improve its installation stability.

[0066] In one embodiment, guide rods 2411 are set on the roller shaft end covers 241, and the guide rods 2411 are inserted into the compression springs to fix and guide the compression springs; slots are opened on the rotating shaft 25, and one end of the compression spring is inserted into the slot.

[0067] One end of the rotating shaft 25 connected to the elastic device 23 can extend into the roller shaft end cover 241 and be set as a limiting end, which can abut against the end face of the fixed seat 242 to restrict the position of the rotating shaft 25 and prevent it from detaching from the fixed seat 242. The radial size of the roller shaft end cover 241 is sufficient to accommodate the limiting end of the rotating shaft 25. Under external force, the rotating shaft 25 can move axially into the roller shaft end cover 241.

[0068] The roller end cover 243 can be close to the end face of the roller 20 and be shaped to match the "concave" structure of the pressure block 22. The roller end cover 243 is provided with a cavity to accommodate the pressure block 22, and a limiting structure is formed between the outer circumference of the pressure block 22 and the inner wall of the cavity of the roller end cover 243 to prevent the pressure block 22 from escaping from the cavity of the roller end cover 243. The pressure block 22 can move axially along the axis of the roller, and one end of the rotating shaft 25 passes through the roller end cover 243 to rotatably connect with the pressure block 22. Under the driving force of the elastic device 23, the pressure block 22 partially extends from the roller end cover 243 and mates with the corresponding position of the roller bracket 28.

[0069] The edge of the roller end cover 243 is provided with a flange 2431 that engages with the edge of the roller 20 to limit the position of the roller end cover 243. The anti-rotation structures 2432 can be set between the outer side of the roller end cover 243 and the inner side of the roller 20 to prevent relative rotation. The anti-rotation structures 2432 include complementary grooves and protrusions, with one of the grooves or protrusions set on the outer side of the roller end cover 243 and the other set on the inner side of the roller 20, preventing the roller end cover 243 from rotating relative to the roller 20.

[0070] To ensure smooth rotation of the rotating shaft 25 relative to the pressure block 22, a bearing 26 can be set between the rotating shaft 25 and the pressure block 22. Specifically, an installation groove is set on the side of the pressure block 22 facing the rotating shaft 25, and one end of the rotating shaft 25 is inserted into the installation groove. The bearing 26 is set in the installa-

tion groove, with its outer ring fixedly connected to the pressure block 22 and its inner ring fixedly connected to the rotating shaft 25. One end of the rotating shaft 25 connected to the pressure block 22 can be machined with a shoulder, and the bearing 26 fits onto the shoulder.

[0071] The outer end face of the pressure block 22 can be provided with grooves and/or protrusions for external connection, which mate with corresponding grooves or protrusions set on the end face of the roller bracket. The grooves and/or protrusions should be offset from the center position of the pressure block 22 or set to a non-circular shape.

[0072] In a specific embodiment disclosed herein, as shown in FIGS. 4-6, the outer side of the pressure block 22 is equipped with an outwardly extending anti-rotation portion 221, and the inner wall of the roller cavity is provided with an anti-rotation groove 280 that mates with the anti-rotation portion 221, the anti-rotation groove 280 can be configured to match the shape of the anti-rotation portion 221. When the roller 20 is inserted into the roller cavity, the anti-rotation portion 221 fits into the anti-rotation groove 280, preventing the pressure block 22 from rotating with the roller 20.

[0073] In a specific embodiment disclosed herein, the anti-rotation portion 221 and the anti-rotation groove 280 can have shapes known to those skilled in the art, such as trapezoidal, rectangular, triangular, polygonal, etc. By mating the anti-rotation portion 221 with the anti-rotation groove 280, not only can the roller 20 be supported on the roller bracket 28, but also the rotation of the anti-rotation portion 221 relative to the roller bracket 28 can be prevented.

[0074] To facilitate the installation and removal of the roller 20, the anti-rotation groove 280 extends to the end face of the roller bracket 28. During assembly, one end of the roller 20 can be first inserted into the rotating part at the corresponding end of the roller bracket 28, and the anti-rotation portion 221 on the pressure block 22 can be directly inserted into the anti-rotation groove 280 on the other end. Of course, to ensure the seal between the end face of the roller 20 and the end face of the roller bracket 28, when inserting the anti-rotation portion 221, it is necessary to move it a predetermined distance towards the roller 20 direction, so that the elastic device 23 is preloaded. After inserting it into the anti-rotation groove 280, under the action of the elastic device 23, the anti-rotation portion 221 is pressed against the side wall of the anti-rotation groove 280. Finally, the anti-rotation portion 221 is constrained in the anti-rotation groove 280 by the roller cover plate 29 to prevent it from coming out of the anti-rotation groove 280.

[0075] The anti-rotation groove 280 can be set on the roller bracket 28 and correspond to the anti-rotation portion 221 of the pressure block 22, extending radially from the end of the roller bracket 28. The roller cover plate 29 can seal the anti-rotation groove 280 and constrain the anti-rotation portion 221 within it. The roller cover plate 29 can be configured as a frame structure. The roller 20 can

partially extend from the center of the roller cover plate 29 to fit the ground for cleaning work.

[0076] In one embodiment disclosed herein, as shown in FIG. 6, a side wall 284 is arranged in the roller cavity of the roller bracket 28. The outer side end face of the pressure block 22 can fit together with the end face of the side wall 284, and under the action of the elastic device 23, the outer side end face of the pressure block 22 can maintain contact with the end face of the side wall 284, thereby improving the end face sealing between the roller 20 and the roller bracket 28. The sealed position of the end face constitutes a part of the entrance of the first air duct, thereby enhancing the suction capability of the entrance of the first air duct.

[0077] The upper end of the side wall 284 (the opening end of the roller cavity) is provided with an avoidance groove, through which the anti-rotation portion 221 on the pressure block 22 can pass to match with the anti-rotation groove 280 at the end position of the roller bracket 28. The anti-rotation groove 280 can be set, for example, at the avoidance groove position of the side wall 284, which is not further elaborated here.

[0078] The roller cover plate 29 can be connected to the body 1 or the roller bracket 28. The roller cover plate 29 is detachably connected, with specific connection methods including but not limited to screw fixation, insertion, and snap connection.

[0079] In a specific embodiment, the roller cover plate 29 can be detachably connected to the roller bracket 28. As shown in FIGS. 5 and 7, a slider 291 is arranged on the roller cover plate 29. The slider 291 is configured to slide fit on the outer side of the roller cover plate 29, and a locking member 292 is further provided on the rear or back of the roller cover plate 29. The locking member 292 cooperates with the slider 291, allowing users to move the locking member 292 located at the rear or back of the roller cover plate 29 by manipulating the slider 291 on the outer side of the roller cover plate 29.

[0080] In a specific embodiment disclosed herein, the slider 291 can be guided to fit into the corresponding guide groove set on the roller cover plate 29, and is preloaded to the first position by the elastic device. When the slider 291 is moved to the second position, it needs to overcome the elastic force of the elastic device; upon release, the slider 291 moves from the second position to the first position under the restoring force of the elastic device. The locking member 292 can cooperate with the slider 291 through a groove or other known means in the art, enabling the locking member 292 to move synchronously with the slider 291. A coupling portion 2920 can be provided on the locking member 292, for example, at the end position of the locking member 292 or at any other suitable position.

[0081] After the roller cover plate 29 is assembled on the roller bracket 28, the locking member 292 is located in the avoidance space 281 of the roller bracket 28, allowing users to move the locking member 292 within the avoidance space 281 of the roller bracket 28 by manipulating

the slider 291. Corresponding positions on the roller bracket 28 are provided with locking slot 282 for cooperating with the coupling portions 2920 of the locking member 292, such that when the slider 291 moves from the second position to the first position, the coupling portions 2920 of the locking member 292 can move into alignment with the locking slot 282 of the roller bracket 28 to securely engage the roller cover plate 29 with the roller bracket 28. Furthermore, under the action of the elastic device, the coupling portions 2920 can be maintained in engagement with the locking slot 282.

[0082] When it is necessary to remove the roller cover plate 29, the slider 291 is driven to move from the second position to the first position, causing the coupling portions 2920 of the locking member 292 to disengage from the locking slot 282 of the roller bracket 28. Then, the roller cover plate 29 can be removed from the roller bracket 28, allowing access to the corresponding components for replacement or maintenance, such as replacing or maintaining the roller 20. Multiple coupling portions 2920 can be provided on the locking member 292, spaced apart along the extension direction of the roller cover plate 29; correspondingly, multiple locking slot 282 can be provided on the roller bracket 28, thus ensuring multiple locking structures along the extension direction of the roller bracket 28 and the roller cover plate 29, ensuring the stability of the connection between the two.

[0083] When installing the roller 20, the pressure block 22 is moved a certain distance towards the inside of the roller 20, so that the elastic device 23 generates a preloading force on the pressure block 22. Then, the roller 20 is inserted into the roller bracket 28, and the pressure block 22 of the roller is pressed against the corresponding end face of the roller bracket 28 under the action of the elastic device 23, thus achieving sealing. After the roller 20 is installed, the roller cover plate 29 is mounted on the roller bracket 28, and the slider 291 of the roller cover plate 29 is engaged with the corresponding guide groove of the roller bracket 28. Then, the slider 291 is pushed from the first position to the second position, causing the locking member 292 on the roller cover plate 29 to move, and the coupling portion 2920 of the locking member 292 is brought into alignment with the locking slot 282 on the roller bracket 28, thereby securely engaging the roller cover plate 29 with the roller bracket 28, and the roller 20 is confined between the roller bracket 28 and the roller cover plate 29.

[0084] When disassembling the roller 20, the slider 291 is driven to move from the second position to the first position, causing the coupling portion 2920 of the locking member 292 to disengage from the locking slot 282 of the roller bracket 28. Then, the roller cover plate 29 is removed, followed by the removal of the roller 20 from the roller bracket 28.

[0085] An auxiliary cleaning component 9 is also provided on the body 1, as shown in FIGS. 1 and 8. The auxiliary cleaning component 9 is positioned near the roller 20 and assists in the cleaning work of the roller 20,

thereby improving the cleaning efficiency of the roller 20.

[0086] The auxiliary cleaning component 9 includes a nozzle 91, which is oriented towards the roller 20 and is configured to spray water onto the surface of the roller 20.

[0087] Specifically, the nozzle 91 can be positioned behind the cleaning device and above the entrance of the first air duct 31. The nozzle 91 can be singular or multiple, and when multiple, they can be arranged along the axial direction of the roller 20. The nozzle 91 can be a misting nozzle, which sprays the cleaning liquid more uniformly and conserves the consumption rate of the cleaning liquid.

[0088] In one embodiment, as shown in FIGS. 9-10, the nozzles 91 are equipped with multiple units, and these multiple units are integrated and set on the water supply device 90. The water supply device 90 can be a plate-like structure parallel to the roller 20. Additionally, the water supply device 90 is equipped with a main water inlet 901 and multiple water supply channels 902. The main water inlet 901 is connected to the clean water tank 5, and the multiple nozzles 91 are connected to the main water inlet 901 through the water supply channels 902. The clean water from the clean water tank 5 is supplied to the nozzles 91 via the main water inlet 901 and the water supply channels 902. Multiple water supply channels 902 can be set up to correspond to each nozzle 91 individually or arranged in a branching manner.

[0089] To ensure uniform spraying of cleaning fluid by multiple nozzles 91 onto the cleaning device, the multiple nozzles 91 are evenly distributed along the length of the water supply device 90. Additionally, the lengths and widths of multiple water supply channels 902 are identical to ensure equal water pressure and flow rate for each nozzle 91. For example, in the embodiments illustrated in FIGS. 9-10, there are eight nozzles evenly distributed on the water supply device 90. The main water inlet 901 is located at the middle position of the water supply device 90, and the water supply channels 902 extend from the position of the main water inlet 901 to both sides. Through branching, the distance from the main water inlet 901 to each nozzle 91 is the same, thereby ensuring equal water pressure and flow rate for each nozzle 91.

[0090] The water supply channels 902 of the water supply device 90 can be in the form of pipelines or grooves. Groove-shaped water supply channels 902 can be sealed and fit onto the surface of the body 1, forming a closed channel. The connection between the water supply device 90 and the body 1 includes but is not limited to welding, bonding, or screw fixation.

[0091] As shown in FIG. 8, the auxiliary cleaning component 9 further includes a water leveling bar 92. The water leveling bar 92 is designed to closely adhere to the surface of the roller 20 and spreads the cleaning liquid evenly across the surface of the roller 20 as it rotates. The water leveling bar 92 extends axially along both ends of the roller 20. Referring to the perspective view shown in FIG. 5, as the roller 20 rotates counterclockwise, the water leveling bar 92 is positioned in front of the nozzles

91. During the rotation of the roller 20, the water leveling bar 92 spreads the cleaning liquid evenly across the surface of the roller 20, thereby improving the cleaning effect of the roller 20.

[0092] The auxiliary cleaning component 9 also includes a squeegee 93, which is constructed to be in contact with the surface of the roller 20. The squeegee 93 is positioned at the rear of the roller 20, above the entrance of the first air duct 31, and below the nozzle 91. During the rotation of the roller 20, the squeegee 93 scrapes off stains and water stains adhered to the roller 20. The dirt and water stains scraped off by the squeegee 93 can fall into the entrance of the first air duct 31 below, and be sucked away by the first air duct 31. The ends of the squeegee 93 extend along the axial direction of the roller 20 and tightly fit with the surface of the roller 20, improving the sealing performance at the entrance of the first air duct 31 and reducing air loss.

[0093] As a result, after the roller 20 completes the cleaning operation, it rotates to the position of the squeegee 93. The squeegee 93 then scrapes off the sewage from the surface of the roller 20 and sucks it away through the entrance of the first air duct 31. Here, the squeegee 93 participates in enclosing the upper area of the entrance of the first air duct 31. Referring to Figure 8, the squeegee 93 is located at the rear end of the roller 20 and at the upper end position of the entrance of the first air duct 31. When the squeegee 93 contacts the roller 20, a sealed area is formed between the squeegee 93, the roller 20, the working surface, and the lower area of the entrance of the first air duct 31, ensuring the suction capacity of the entrance of the first air duct 31.

[0094] During the rotation of the roller 20, the nozzle 91 sprays cleaning fluid onto the surface of the roller 20. The portion of the roller 20 sprayed with cleaning fluid rotates to the uniform water strip 92, which evenly spreads the cleaning fluid. It then rotates to the lower working surface for wiping. After wiping the working surface of the roller 20, it rotates to the squeegee 93 for cleaning. The dirt and water stains scraped off by the squeegee 93 can be sucked away by the first air duct 31.

[0095] The uniform water strip 92 and the squeegee 93 of the auxiliary cleaning component 9 have certain elasticity and can resiliently abut against the surface of the roller 20. After long-term friction with the roller 20, they can still fit the surface of the roller 20. The uniform water strip 92 and the squeegee 93 can be made of elastic materials such as rubber or plastic. The uniform water strip 92 and the squeegee 93 can be detachably connected to the body 1, and the connection method can be snap-in, adhesive, screw fixation, etc. When the uniform water strip 92 and the squeegee 93 are worn out after long-term use, they can be removed and replaced with new ones.

[0096] The bottom edge of the lower area of the entrance of the first air duct 31 can be provided with a sealing edge 94. When the body 1 travels along the working surface, the sealing edge 94 fits with the working

surface, further improving the sealing of the entrance of the first air duct 31. The sealing edge 94 can be made of elastic materials, which can resiliently abut against the working surface. After wear, it can still fit the working surface. The sealing edge 94 can be detachably connected to the edge of the first air duct 31 by snap-in, adhesive, screw fixation, etc. When severely worn, it can be replaced.

[0097] The bottom of the roller 20 fits with the working surface, the squeegee 93 above the entrance of the first air duct 31 fits with the roller 20, and the sealing edge 94 at the bottom edge of the entrance of the first air duct 31 fits with the working surface, forming a closed structure, reducing the air loss in the air duct, thereby improving work efficiency.

[0098] After the surface of the roller 20 wears out over time and cannot fit tightly with the working surface, causing significant air loss in the air duct, the entrance of the first air duct 31 cannot suck away the sewage scraped off by the squeegee 93.

[0099] To solve the above problems, in one embodiment, as shown in Figure 8, the body 1 can be configured to include a floating part 11-A and a fixed part 11-B. The floating part 11-A is hinged to the fixed part 11-B via a hinge shaft, allowing the floating part 11-A to rotate up and down relative to the fixed part 11-B about the hinge shaft. The mounting cavity and the roller 20 are set on the floating part 11-A. The roller 20 is configured to remain in contact with the working surface under its own gravity and the gravity of the floating part 11-A.

[0100] In another embodiment disclosed herein, the roller assembly 2 is floatably mounted on the body 1. As shown in FIGS. 11-12, the roller bracket 28 is equipped with hinge shafts 120, and the roller bracket 28 is hinged to the body 1 via the hinge shafts 120, allowing the roller bracket 28 to move up and down within the mounting cavity 101 of the body 1.

[0101] Referring to FIGS. 11 and 12, grooves can be opened at the bottom of the body 1 in the edge of the mounting cavity 101, and support bases 18, which cooperate with the hinge shafts 120, are set in the grooves. The support bases 18 are equipped with arc surfaces that adapt to the hinge shafts 120, allowing the hinge shafts 120 to rotate relative to the support bases 18. Specifically, the support bases 18 may include two arc surfaces, each of which matches one end of the hinge shafts 120. Multiple hinge shafts 120 can be set on the roller bracket 28 at intervals along its extension, and correspondingly, multiple support bases 18 can be set on the body 1, each corresponding to one hinge shaft 120.

[0102] The body 1 is also equipped with shaft pressure covers 19, which are placed over the support bases 18 in the grooves, limiting the hinge shafts 120 within the grooves and ensuring their coordination with the support bases 18. The shaft pressure covers 19 are detachably connected to the body 1, and the connection method can be screw fixing, plug-in, riveting, etc.

[0103] With this structure, the roller assembly 2 includ-

ing the roller bracket 28 and the roller 20 mounted on it, as well as the roller cover plant 29, can rotate relative to the body 1 as a whole. This ensures that under the influence of its own gravity, the roller 20 of the roller assembly 2 is always in contact with and coordinated with the working surface, thereby improving the cleaning effect.

[0104] In one embodiment disclosed herein, to limit the rotation angle of the roller assembly 2, limit buckles 283 are set on the roller bracket 28, and limiting slots 1011 that cooperate with the limit buckles 283 are set on the body 1. Referring to FIG. 11, the limiting slots 1011 are set on the side of the mounting cavity 101 of the body 1 opposite to the support base 18; correspondingly, the limit buckles 283 are set on the side of the roller bracket 28 opposite to the hinge shafts 120. During assembly, the limit buckles 283 on one side of the roller bracket 28 are first inserted into the limiting slots 1011, then the hinge shafts 120 on the other side are installed into the support bases 18, and finally, the hinge shafts 120 are limited on the support bases 18 of the body 1 by the shaft pressure covers 19. One side of the roller bracket 28 is limited by the limit buckles 283, and the other side is limited by the coordination of the hinge shafts and support bases and the shaft pressure covers 19. This restricts the movement range of the roller assembly 2 within a certain range.

[0105] Of course, the limit buckles 283 can also be set on the body 1, and the limiting slots 1011 can be set on the roller bracket 28, achieving the same function. This is not further elaborated here.

[0106] Driving wheels 8 used to support the body 1 are set at the bottom of the body 1, with two driving wheels 8 distributed on opposite sides of the body 1. The body 1 is also equipped with universal wheels 13, which are located near the roller 20 and can support the body 1 together with the driving wheels 8 on the ground to keep the body 1 stable.

[0107] In another embodiment of the present disclosure, as shown in FIG. 11, the head of the body 1 is structured as a rectangle, and an obstacle detection plate is set on the outer side of the front end of the body 1 for detecting obstacles. The roller 20 is positioned at the bottom of the front end of the body 1. At least two universal wheels 13 can be set, positioned on the body 1 between the roller 20 and the driving wheels 8, and respectively placed near both ends of the roller 20. With the support of the two universal wheels 13 and two driving wheels 8, the body 1 can be stably supported on the working surface.

[0108] During the movement of the body 1, the roller 20 remains in contact with the working surface, preventing the roller 20 from leaving the working surface due to surface wear or unevenness, thereby ensuring the formation of a sealed space between the entrance of the first air duct 31 and the working surface support.

Water Tank Assembly

[0109] The water tank or water tank assembly of the

self-moving cleaning robot includes a sewage tank 4, a clean water tank 5, a second air duct in the water tank. Specifically, as shown in FIG. 13, the sewage tank 4 has a second air inlet 320 and a second air outlet 321. The second air inlet 320 and the second air outlet 321 are set at different positions within the water tank. Referring to FIG. 13, the second air inlet 320 and the second air outlet 321 are located on opposite sides of the water tank, allowing the airflow and liquid entering the water tank through the second air inlet 320 to flow a certain distance along the extension direction of the water tank. During the flow process, the liquid gradually drops to the bottom of the water tank under its own gravity, while the gas exits the water tank through the second air outlet 321, achieving gas-liquid separation.

[0110] The second air duct 32 is located between the second air inlet 320 and the second air outlet 321. The second air inlet 320 is connected to the first air duct 31, while the second air outlet 321 is connected to the third air duct 33 of the fan assembly 7. Both the second air inlet 320 and the second air outlet 321 are positioned at relatively high positions within the sewage tank 4. When the gas carrying liquid enters the spacious interior of the water tank through the second air inlet 320, the airflow velocity decreases, reducing the ability of the gas to carry liquid, thus allowing the liquid to separate from the gas and accumulate in the sewage tank 4. Meanwhile, the gas can exit through the second air outlet 321. Additionally, the second air inlet 320 is positioned at a high level, allowing the airflow to flow upward within the tank. Under the influence of gravity, the liquid also separates from the gas and remains in the sewage tank 4.

[0111] It should be noted that the water level inside the sewage tank 4 should not exceed the lowest point of the second air inlet 320 and the second air outlet 321 to prevent overflow. Additionally, a safety distance should be maintained between the water level line inside the sewage tank 4 and the second air outlet 321 to prevent sewage from being drawn into the fan assembly 7 due to the proximity of the second air outlet 321 to the airflow. To maintain the minimum flow of air in the second air duct inside the sewage tank 4 and ensure the separation of sewage after entering the sewage tank 4, the maximum water level inside the sewage tank 4 should be set, and the water level should be controlled not to exceed the maximum value. Therefore, a water level detection device can be installed on the sewage tank 4 to detect the water level, and the water level detection device can send the detection signal to the control unit of the self-moving cleaning robot.

[0112] The control unit can be connected to an alarm device. When the water level detection device detects that the water level inside the sewage tank 4 is close to or reaches the maximum value, the control unit controls the alarm device to emit an alarm signal to remind the user. The alarm signal can be a warning light, alarm sound, etc. Furthermore, the control unit can also control the fan assembly 7 to shut down to prevent sewage from entering

and damaging the fan assembly 7.

[0113] Additionally, based on the electrical signals detected by the water level detection device, the control unit can control the self-moving cleaning robot to return to the base station and extract the sewage from the sewage tank of the self-moving cleaning robot into the base station.

[0114] The water tank can be positioned on the body 1 behind the cleaning device. Referring to FIG. 16, a tank groove 15 is set above the body 1, extending from the position adjacent to the cleaning device to the rear side of the body 1, and the water tank can be detachably installed in the tank groove 15. After the self-moving cleaning robot works for a period of time, dust or other dirt may accumulate in the gap between the sewage tank 4 and the body 1. The user can remove the water tank as a whole for cleaning. The water tank and the tank groove 15 can be fastened together through a quick release structure, including but not limited to buckles, slots, etc., as known to those skilled in the art.

[0115] Referring to FIGS. 14-15, batteries 16 can be installed on both sides of the tank groove 15 to supply power to the body 1. Specifically, battery mounting brackets 160 are respectively set on both sides of the tank groove 15, and two batteries 16 are installed on the battery mounting brackets 160. The two batteries 16 can be connected in series. For example, the two batteries 16 on both sides can be connected in series with each other via a connecting line 161, which can pass through the gap between the cleaning device and the water tank or be routed to any other position on the body 1 that meets the wiring requirements, without limitation.

[0116] In another embodiment disclosed herein, the two driving wheels 8 can also be installed on the body 1 at positions on both sides of the water tank slot 15. Specifically, driving wheel mounting bases 81 are respectively arranged on both sides of the body 1 at positions corresponding to the water tank slot 15. The open ends of the driving wheel mounting bases 81 face downwards towards the body 1. The two battery mounting brackets 160 can be respectively installed above the two driving wheel mounting bases. The two driving wheels 8 are respectively installed inside the driving wheel mounting bases 81, and the body 1 is supported and driven to move by the two driving wheels 8. Referring to FIG. 15, driving motors 80 are also provided within the driving wheel mounting bases 81, and the driving motors 80 are transmissionally connected to the corresponding driving wheels 8 to drive the driving wheels 8 to rotate. Of course, the driving motors 80 and the driving wheels 8 can also be integrally installed in the driving wheel mounting bases 81 in a modular form.

[0117] The sewage tank 4 and the clean water tank 5 disclosed herein can be integrally processed and formed, or they can be assembled from multiple parts. In one embodiment, the sewage tank 4 is configured as a split structure, as shown in FIG. 16, comprising sequentially connected upper shell 401, middle shell 402, and lower

shell 403. Wherein, the upper shell 401 forms the top surface of the sewage tank 4, the lower shell 403 forms the bottom surface of the sewage tank 4, and the middle shell 402 is configured as a ring-shaped structure or a U-shaped hollow structure, and constitutes a portion of the side wall of the sewage tank 4. The connection between them includes but is not limited to bonding, welding, screw fixation, etc., and sealing structures are provided at the joints to prevent sewage leakage. The edge of the upper shell 401 extends downwards and connects with the middle shell 402, and the second air inlet 320 is opened on the front side of the upper shell 401.

[0118] In one embodiment, the sewage tank 4 can be configured to surround the fan assembly 7, and the rear region of the second air duct 32 is evenly surrounded around the intake of the fan assembly 7 so that the intake of the fan assembly 7 can uniformly intake air from all directions, avoiding the occurrence of localized high air-flow speeds, which may lead to the airflow inside the sewage tank 4 moving too quickly and thus preventing sufficient separation of water and air.

[0119] Specifically, a fan chamber 41 can be provided on the lower shell 403, with the open end of the fan chamber 41 facing the bottom of the lower shell 403. The fan chamber 41 extends through the hollow structure of the middle shell 402 towards the upper shell 401, and the second air outlet 321 is set at the top of the fan chamber 41, communicating with the fan chamber 41. There is a gap between the top of the fan chamber 41 and the upper shell 401, where the second air outlet 321 serves as the inlet of the third air duct 33. The fan assembly 7 is installed in the fan chamber 41, with the bottom of the fan chamber 41 open, allowing the fan assembly 7 to be loaded from the bottom of the fan chamber 41. When the fan assembly 7 operates, the airflow sucked from the air duct system can be discharged downward from the bottom of the fan chamber 41. The fan chamber 41 and the lower shell 403 can be integrally formed, for example, by injection molding; or they can be fixedly connected by welding, bonding, hot melting, and other methods, without limitation.

[0120] Referring to FIG. 16, the fan chamber 41 is located on one side of the sewage tank 4 away from the second air inlet 320, and the annular side wall of the fan chamber 41 and the corresponding side wall of the sewage tank 4 together form the second air duct 322, which is part of the second air duct 32. The region from the second air inlet 320 to the fan chamber 41 in the interior cavity of the sewage tank 4 constitutes the first channel 323 of the second air duct 32.

[0121] In one embodiment of the present disclosure, the second air duct 322 can be a circular passage surrounding the fan chamber 41 in the circumferential direction, or it can be arc-shaped along part of the side wall of the fan chamber 41. The shape and direction of extension of the second air duct 322 are related to the shape of the fan chamber 41. For example, when the circumferential side wall of the fan chamber 41 is rectangular, the second

air duct 322 surrounds or partially surrounds the rectangular side wall. Referring to FIG. 25, the second air duct 322 is divided into two sections, each located on opposite sides of the fan chamber 41 and respectively communicating with the first channel 323.

[0122] During operation, the airflow carrying liquid first enters the first channel 323 of the second air duct 32 from the second air inlet 320. While flowing in the first channel 323, the liquid drops to the bottom of the sewage tank 4 for storage due to the lower airflow velocity. The airflow enters the second air duct 322 from the first channel 323 and flows uniformly upward through the second air duct 322, ultimately flowing out from the second air outlet 321 located at the top of the fan chamber 41. Additionally, as the airflow rises in the second air duct 322, its ability to carry liquid decreases, causing the liquid to fall under its own gravity to the bottom of the sewage tank 4 for storage, further improving the efficiency of air-liquid separation.

[0123] The configuration of the second air duct 322 allows the airflow to flow uniformly towards the second air outlet 321 from all directions, thereby avoiding issues such as the airflow carrying some liquid flowing into the fan assembly 7 due to excessively high local airflow velocity at the second air outlet 321. The second air duct 322 is formed by the partial side walls of the lower shell 403, the middle shell 402, the upper shell 401, and the side wall of the fan chamber 41.

[0124] In one embodiment of the present disclosure, a water tank assembly is provided, comprising the above-mentioned clean water tank 5, sewage tank 4, and fan chamber 41.

[0125] The fan chamber 41 is used to install the fan assembly 7, with its opening facing the bottom of the water tank assembly, allowing the fan assembly to be inserted into the chamber from the opening. The sewage tank 4 has an air inlet, and the top of the fan chamber 41 is provided with an air outlet connected to the sewage tank 4. Specifically, the air inlet can be the second air inlet 320, and the air outlet can be the second air outlet 321. A second air duct 322 is provided between the clean water tank 5 and the fan chamber 41, allowing the airflow entering the sewage tank from the air inlet to be discharged from the air outlet through the second air duct 322.

[0126] In one embodiment of the present disclosure, to enhance the air-liquid separation capability of the second air duct 32, a wind-blocking mechanism 42 is also provided in the sewage tank 4, as shown in FIGS. 13 and 26, with the bottom of the wind-blocking mechanism 42 lower than the top of the fan chamber 41. This blocks the direct flow of water vapor from the first channel 323 out of the second air outlet 321. The water vapor needs to bypass the bottom of the wind-blocking mechanism 42, with a portion entering the second air duct 322 and the rest moving upward to enter the second air outlet 321 at the top of the fan chamber 41.

[0127] Specifically, the wind-blocking mechanism 42

can be located at the top of the sewage tank 4, and can be positioned at any location between the second air inlet 320 and the fan chamber 41. The airflow entering from the second air inlet 320 is hindered by the wind-blocking mechanism 42, requiring it to bypass the bottom of the wind-blocking mechanism 42 before flowing to the top of the fan chamber 41 and out of the second air outlet 321. The wind-blocking mechanism 42 elongates the flow path of the airflow in the second air duct 32 and changes the direction of airflow, facilitating the full separation of sewage in the sewage tank 4 from the gas.

[0128] Preferably, the wind-blocking mechanism 42 can be positioned near the second air outlet 321 or adjacent to the fan chamber 41, with its bottom extending downward below the top of the fan chamber 41 and above the highest water level in the sewage tank 4. A gap is formed between the wind-blocking mechanism 42 and the side wall of the fan chamber 41 to allow airflow to pass through. As the airflow in the sewage tank 4 bypasses the bottom of the wind-blocking mechanism 42 and flows upward through the gap between the wind-blocking mechanism 42 and the side wall of the fan chamber 41, the ability of the airflow to carry water vapor decreases, allowing for more effective separation of water vapor from the gas.

[0129] The wind-blocking mechanism 42 can be in the form of a plate, strip, or other structures, and is fixedly connected in a vertical position at the top of the sewage tank 4. The connection between the wind-blocking mechanism 42 and the sewage tank 4 includes but is not limited to integral molding, adhesion, or insertion.

[0130] The clean water tank 5 and sewage tank 4 can be independently installed on the body 1, or installed together to increase the integration of the body 1. The clean water tank 5 and sewage tank 4 can be integrally molded or assembled from multiple parts, without limitation in the present disclosure. The clean water tank 5 can be positioned on one side of the sewage tank 4 or partially surrounding the sewage tank 4, with the above position of the clean water tank being only exemplary, with no limitation in the present disclosure.

[0131] In one embodiment of the present disclosure, as shown in FIGS. 16-17, the edge position of the middle shell 402 of the sewage tank 4 is set with a semi-open groove facing the upper shell 401. The bottom of the upper shell 401 is also provided with a corresponding groove, and the grooves at the bottom of the upper shell 401 and the middle shell 402 are fastened together to form a sealed clean water tank 5. The clean water tank 5 can be constructed in a ring shape based on the shape of the middle shell 402, such as setting it around the edge position of the sewage tank. Of course, the clean water tank 5 can also be arranged in a C-shaped or U-shaped manner. For example, in the embodiments shown in FIGS. 13 and 16, since the second air inlet 320 needs to be set at the front end position of the upper shell 401, the clean water tank 5 is arranged around three sides of the sewage tank, approximating a U-shaped or C-shaped

structure.

[0132] Referring specifically to FIGS. 16-17, the middle shell 402 is hollowed out in the middle, with outer first sidewall 4020 and inner second sidewall 4021 positioned at its edge. The first sidewall 4020 and the second sidewall 4021 are parallel and spaced apart, forming an open-ended groove with the bottom of the middle shell 402. Based on a similar structure, the edge position of the upper shell 401 is provided with outer third sidewall 4010 and inner fourth sidewall 4011, which form an open-ended groove with the top of the upper shell 401. During assembly, the third sidewall 4010 of the upper shell 401 is joined to the first sidewall 4020 of the middle shell 402, and the fourth sidewall 4011 of the upper shell 401 is joined to the second sidewall 4021 of the middle shell 402, thus allowing the grooves of the upper shell 401 and the middle shell 402 to together form a sealed clean water tank 5.

[0133] The clean water tank 5 can be in a ring-shaped structure or a C-shaped or U-shaped structure. For example, in the structure shown in FIGS. 16-17, both the middle shell 402 and the upper shell 401 are in a rectangular structure, and the clean water tank 5 extends to the three sidewalls of the middle shell 402 and the upper shell 401, due to the second air inlet 320 being set on the front end sidewall of the upper shell 401.

[0134] The clean water tank 5 is connected to a delivery pipeline, on which a pump 54 is installed, and a nozzle 91 of the auxiliary cleaning component 9 is installed at the end. The delivery pipeline can extract water or cleaning fluid from the clean water tank 5 through the pump 54 and deliver it to the nozzle 91, which then sprays the cleaning fluid or water onto the cleaning device.

[0135] In a specific embodiment, as shown in FIGS. 14 and 18, a clean water supply port 501 can be provided on the clean water tank 5, and a clean water interface 102 can be set on the body 1 to dock with the clean water supply port 501. After the water tank is assembled on the body 1, the clean water interface 102 on the body 1 can be docked with the clean water supply port 501 on the water tank to connect the clean water tank 5.

[0136] The clean water interface 102 is connected to the delivery pipeline 53 to deliver water or cleaning fluid from the clean water tank to the position of the nozzle 91 through the delivery pipeline 53. A clean water tank check valve 531, which is in communication with the clean water supply port 501, can be set inside the clean water tank 5. The clean water tank check valve 531 has an elastic valve rod 532 for opening and closing the clean water tank check valve 531, which closes the clean water tank check valve 531 when not subjected to external force. An opening structure, which cooperates with the elastic valve rod 532, is provided on the body 1. When the clean water tank 5 is installed on the body 1, the delivery pipeline 53 is connected to the clean water tank check valve 531, and the opening structure can lift the elastic valve rod 532 to open the clean water tank check valve 531. After the clean water tank 5 is removed from the body 1, the

delivery pipeline 53 is disconnected from the clean water tank check valve 531, the elastic valve rod 532 returns to its original position, and the clean water tank check valve 531 is closed to prevent leakage of the cleaning fluid from the clean water tank 5.

[0137] As shown in FIG. 18, a clean water suction pipe 530 can be set inside the clean water tank 5, with one end of the clean water suction pipe 530 connected to the clean water tank check valve 531 and the other end extending to the bottom of the clean water tank 5. The clean water suction pipe 530 can communicate with the delivery pipeline 53 through the clean water tank check valve 531 to draw the cleaning fluid from the bottom of the clean water tank 5. Depending on the position of the clean water tank check valve 531 or other structural requirements, the clean water suction pipe 530 can be straight or bent.

[0138] A waterless detection sensor 103 can also be set on the body 1, which can be used to detect whether there is water passing through the delivery pipeline 53 to detect abnormalities. When an anomaly occurs, the waterless detection sensor 103 can send a detection signal to the control unit, and the control unit can issue an alarm based on this detection signal.

[0139] Continuing to refer to FIG. 14, the waterless detection sensor 103 and the pump 54 on the body 1 can be set below the sewage tank 4 on the body 1. The first air outlet 310 is set on the body 1 between the waterless detection sensor 103 and the pump 54, and is used to communicate with the second air inlet 320.

[0140] Continuing to refer to FIG. 17, the lower shell 403 includes a bottom wall 4031 and a side wall 4030. The side wall 4030 of the lower shell 403 is connected to the lower part of the first side wall 4020 of the middle shell 402, so that the inner walls of the upper shell 401, the middle shell 402, and the lower shell 403 together enclose the sewage tank 4. That is, the side wall 4030 and the bottom wall 4031 of the lower shell 403, the bottom and the second side wall 4021 of the middle shell 402, and the fourth side wall 4011 and the top of the upper shell 401 collectively enclose the sewage tank 4.

[0141] The fan chamber 41 can be integrally formed with the lower shell 403, extending from the bottom wall 4031 of the lower shell 403 to the direction of the upper shell 401 to form a lower open-ended fan chamber 41. The fan chamber 41 can also be seen as an upwardly extending protrusion formed on the bottom wall 4031 of the lower shell 403. In this structure, the sewage tank 4 is enclosed by the inner walls of the lower shell 403 (including the side wall 4030 and the bottom wall 4031), the enclosed sidewall 410 and the top wall 411 of the fan chamber 41, the second side wall 4021 of the middle shell 402, and the fourth side wall 4011 and its top of the upper shell 401. Among them, the enclosed sidewall 410 of the fan chamber 41 is parallel to and spaced apart from the second side wall 4021 of the middle shell 402 and the fourth side wall 4011 of the upper shell 401, enclosing the second air duct 322 of the second air duct 32.

[0142] Since the fan chamber 41 is set on one side of the sewage tank 4 away from the second air inlet 320, the region from the second air inlet 320 to the fan chamber 41 in the sewage tank 4 forms the first channel 323 of the second air duct. That is, the second air duct can be divided into two parts, one part is the first channel 323 adjacent to the second air inlet 320, and the other part is the second air duct 322 adjacent to the second air outlet 321. This allows the airflow entering the first channel 323 through the second air inlet 320 to eventually flow through the second air duct 322 around the fan chamber 41 and flow out from the second air outlet 321 at the top of the fan chamber 41.

[0143] In another embodiment disclosed herein, the sewage tank 4 and the clean water tank 5 can also be an integral structure. That is, the sewage tank 4 and the clean water tank 5 can be regarded as a single unitary tank. The first side wall 4020, the third side wall 4010, and the side wall 4030 together form the side walls of the tank, the bottom wall 4031 of the lower shell 403 forms the bottom wall of the tank, and the top wall of the upper shell 401 forms the top wall of the tank. The top wall, side walls, and bottom wall of the tank enclose the inner cavity of the tank.

[0144] The fourth side wall 4011 of the upper shell 401, the second side wall 4021, and the bottom wall together form the spacing between the clean water tank 5 and the sewage tank 4, and this spacing divides the inner cavity of the tank into the clean water tank 5 and the sewage tank 4.

[0145] In one embodiment disclosed herein, the spacing along with part of the tank's side walls and part of the top wall encloses the clean water tank 5, while the remaining portion of the tank's inner cavity constitutes the sewage tank 4. Of course, it can also be such that the spacing along with part of the tank's side walls and part of the bottom wall 4031 encloses the clean water tank 5, while the remaining portion of the tank's inner cavity constitutes the sewage tank 4.

[0146] The bottom wall 4031 of the tank has an upward protrusion away from the position of the second air inlet 320, forming a lower open-ended fan chamber 41. There is a gap between the top wall 411 of the fan chamber 41 and the top of the tank, and the second air outlet 321 is set on the top wall 411 of the fan chamber 41. The enclosed sidewall 410 of the fan chamber 41 restricts the shape of the sewage tank 4, and the enclosed sidewall 410 together with the spacing forms the aforementioned second air duct 322, with the area from the side of the second air inlet 320 in the sewage tank 4 to the position of the fan chamber 41 constituting the first channel 323 of the second air duct 32.

[0147] As shown in FIGS 16-17, a drain outlet 43 is provided on the sewage tank 4, through which sewage from the sewage tank 4 can be discharged. An inlet 51 is provided on the clean water tank 5, through which water or cleaning fluid can be supplied to the clean water tank 5. The drain outlet 43 and the inlet 51 can both be set on the

upper shell 401. When the autonomous mobile robot returns to the base station, the drain outlet 43 and the inlet 51 can be connected to corresponding drainpipes and water supply pipes set on the base station, supplying cleaning fluid to the clean water tank 5 and draining sewage from the sewage tank 4.

[0148] A sewage suction pipe 430 can be set inside the sewage tank 4, with its upper end corresponding to the drain outlet 43 and its lower end extending to the bottom of the sewage tank, capable of drawing sewage from the bottom of the sewage tank. After the autonomous mobile robot returns to the base station, the base station's drainpipe extends into and connects with the sewage suction pipe 430 through the drain outlet 43, extracting sewage from the sewage tank 4. Depending on the position of the drain outlet 43 or other structural requirements, the sewage suction pipe 430 can be straight or bent. The upper end of the sewage suction pipe 430 can be equipped with a coupling head 4301 for connecting to the drainpipe. The coupling head 4301 can be made of a material with certain elasticity, such as rubber or plastic, to ensure a sealed connection between the coupling head 4301 and the sewage suction pipe 430, improving drainage efficiency.

[0149] In one embodiment disclosed herein, as shown in FIG. 18, a first gate valve 431 can be installed inside the drain outlet 43 of the sewage tank 4. When the drainage pipe is inserted into the drain outlet 43 to connect with the sewage suction pipe 430, the first gate valve 431 can be pushed to open, thereby establishing a passage between the drainage pipe and the sewage tank 4. When the drainage pipe disconnects from the sewage tank, the first gate valve 431 automatically resets to close the sewage suction pipe, preventing sewage leakage during movement. The structure of the first gate valve 431 can be selected from those known to those skilled in the art, and is not further described here.

[0150] Correspondingly, a corresponding structure for docking with the base station water inlet pipe can also be set at the position of the inlet 51 of the clean water tank 5, such as a second active valve 511. When the water inlet pipe docks with the second active valve 511, the second active valve 511 can be pushed to open, establishing a passage between the water inlet pipe and the clean water tank 5, allowing replenishment of water to the clean water tank 5 via the base station. After the water inlet pipe disconnects, the second active valve 511 resets to close the inlet 51 of the clean water tank 5, preventing leakage of water or cleaning fluid from the clean water tank 5. The second active valve 511 can be selected with the same structure as the first gate valve 431, or other structures known to those skilled in the art, and are not further described here.

[0151] The cleaning fluid in the clean water tank 5 can also be used for cooling the heating elements on the body 1. The heating elements include at least the chip of the control unit, which has heating resistors, diodes, and other components. When the temperature of the heating

elements is too high, it affects the efficiency of the chip. Specifically, as shown in FIG. 14, the clean water tank 5 can be connected to the heat dissipation module 52 via a pipeline to supply the heat dissipation module 52 with lower-temperature cleaning fluid. The heat dissipation module 52 is set together with the heating elements and provides water cooling to them. The heat dissipation module 52 can be a heat exchanger that fully contacts the surface of the heating elements, dissipating the heat generated by the heating elements. The cleaning fluid passing through the heat dissipation module 52 can reduce the temperature of the chip, eliminating the need for a separate heat dissipation device and increasing the integration of the body 1. The heating elements can be positioned near the clean water tank 5 or the cleaning device to reduce the length of the water pipes. Additionally, as the temperature of the cleaning fluid increases after passing through the heat dissipation module 52, it can accelerate the dissolution of stains on the working surface when transported to the cleaning device, thereby improving cleaning efficiency.

[0152] In one embodiment, the pipeline connecting the heat dissipation module 52 can be the delivery pipeline 53 that supplies cleaning fluid from the clean water tank 5 to the cleaning device. The pump 54 simultaneously supplies cleaning fluid to both the cleaning device and the heating unit via the delivery pipeline 53, which can save costs and increase the integration of the body 1.

[0153] In another embodiment, the heat dissipation module 52 can be connected to the clean water tank 5 via a circulation pipeline, where a pump is also installed on the circulation pipeline. This pump pumps the cleaning fluid from the clean water tank 5 to the heat dissipation module 52 through the circulation pipeline, providing water cooling to the heating elements, and then returns it to the clean water tank 5 through the circulation pipeline. In this embodiment, the heat dissipation module 52 of the circulation pipeline and the nozzle 91 of the delivery pipeline 53 can work relatively independently without interfering with each other.

[0154] A dust collection device 6 can be installed inside the sewage tank 4, which is designed to filter particles in the air entering the second air duct 32. As shown in FIG. 19, a housing for installing the dust collection device 6 is provided inside the sewage tank 4, along with a cover plate 44 mounted at the opening of the housing. Opening the cover plate 44 allows the dust collection device 6 to be removed for cleaning. The dust collection device can be a dust collection box, a filter mesh bag, or any other device capable of filtering solid dirt.

[0155] The dust collection device 6 is equipped with an inlet and an outlet, as well as a filter mesh structure for filtering solid dirt. The inlet of the dust collection device 6 is connected to the second air inlet 320, while the outlet is connected to the interior of the sewage tank 4. The airflow carrying liquid first enters the dust collection device 6 through the second air inlet 320, where solid dirt in the airflow is intercepted by the filter mesh structure inside

the dust collection device 6, allowing the gas and sewage to enter the sewage tank 4 through the filter mesh structure 62. The dust collection device 6 can be of any shape and structure as long as it can effectively filter solid dirt.

[0156] In one embodiment, the dust collection device 6 is installed at the top of the sewage tank 4 and near the second air inlet 320. The dust collection device 6 comprises a fixed bracket 61 and a filter mesh 62 mounted on the bracket. The fixed bracket 61 is detachably connected inside the sewage tank 4, and the inlet of the dust collection device 6 is set on the fixed bracket 61, with the filter mesh 62 serving as the outlet of the dust collection device 6.

[0157] Since the dust collection device 6 needs to be frequently disassembled for cleaning, in order to prevent users from forgetting to install the dust collection device 6, an anti-misplacement mechanism 45 can be set in the housing of the sewage tank 4. As shown in FIGS. 19-21, the anti-misplacement mechanism 45 has a first position and a second position. After the dust collection device 6 is disassembled, the anti-misplacement mechanism 45 moves to the first position above the installation surface of the cover plate 44, obstructing the installation of the cover plate 44. When installing the dust collection device 6, the dust collection device 6 pushes the anti-misplacement mechanism 45 to rotate to the second position below the installation surface of the cover plate 44, allowing the cover plate 44 to be installed.

[0158] Specifically, the anti-misplacement mechanism 45 includes a cam 451 rotatably connected to the sewage tank 4 and a torsion spring 452 that biases the cam 451 to the first position. The torsion spring 452 can be mounted on the shaft of the cam 451 through the bracket. The cam 451 has a protrusion 4511 protruding from its base circle, which is higher than the installation surface of the cover plate 44 when in the first position. The end of the protrusion 4511 can be flat or curved, preventing the cam 451 from rotating when the cover plate 44 is installed.

[0159] The anti-misplacement mechanism 45 also includes a compressed part 453 connected to the cam 451, with the axis of the cam 451 being eccentrically arranged relative to the compressed part 453. The dust collection device 6 is provided with a pressure part 63 corresponding to the compressed part 453; the pressure part 63 is designed to cooperate with the compressed part 453 to rotate the cam 451 from the first position to the second position. The pressure part 63 can be set at the bottom of the fixed bracket 61.

[0160] During installation, the dust collection device 6 is vertically inserted into the housing, and the pressure part 63 can press down the compressed part 453 of the anti-misplacement mechanism 45, thereby driving the cam 451 to rotate from the first position to the second position, allowing the protrusion 4511 of the cam 451 to avoid the installation surface of the cover plate 44. After the dust collection device 6 is removed, the cam 451 resets to the first position under the driving of the torsion spring 452, and the protrusion 4511 rotates to the instal-

lation position of the cover plate 44, preventing the cover plate 44 from being installed, thereby preventing users from forgetting to install the dust collection device 6.

[0161] In a specific embodiment, the pressure part 63 of the fixed bracket 61 can be set as a downward-extending rib plate, and the compressed part 453 of the anti-misplacement mechanism 45 can be inclinedly arranged. When in the first position, one end of the compressed part 453 near the fixed bracket 61 is raised upward, thereby increasing the rotation angle of the cam 451. The protrusion 4511 of the cam 451 can be set as a curved structure to avoid damaging the cover plate 44. Additionally, a groove for avoiding interference with the cam 451 should be left on one side of the fixed bracket 61 where the pressure part 63 is located to prevent interference when the fixed bracket 61 is inserted into the sewage tank 4.

[0162] The anti-misplacement mechanism 45 can be set with two and placed on the opposite sides of the dust collection device 6. Both sides of the fixed bracket 61 are correspondingly equipped with pressure parts 63. When installing the dust collection device 6, the pressure parts 63 on both sides of the fixed bracket 61 simultaneously press the compressed parts 453 of the anti-misplacement mechanisms 45 on both sides, thereby driving the protrusions 4511 of the cams 451 to avoid the installation position of the cover plate 44.

[0163] After disassembling the sewage tank 4, to prevent sewage overflow, gates can be installed at the second air inlet 320 and the second air outlet 321. The gates can close the inlet and outlet of the second air duct after disassembling the sewage tank 4 to prevent leakage.

[0164] As shown in FIG. 13, a first valve 46 is installed at the second air inlet 320. One end of the first valve 46 is elastically connected to the sewage tank 4, and the other end is a free end. The first valve 46 is preloaded at the position of the second air inlet 320 to close the second air inlet 320.

[0165] The first valve 46 can be made of a material with its own elasticity, such as rubber, metal sheets, etc., to close the second air inlet 320 through its own elastic force. It can also be elastically connected to the sewage tank 4 by installing components such as torsion springs or flaps and close the first valve 46 with the elastic force of the torsion springs or flaps. The first valve 46 can be opened under external force. The second air inlet 320 faces downwards and corresponds to the end set up of the first air duct 31. The first valve 46 is set on the inner side of the second air inlet 320 and can be horizontally or obliquely set up, and its free end can be rotated inward to open the inlet.

[0166] A lifting part 17 is installed on the body 1. As shown in FIG. 16, the lifting part 17 is designed to lift the first valve 46 to open the second air inlet 320 when the sewage tank 4 is inserted into the body 1, connecting the first air duct 31 and the second air duct 32. Specifically, the lifting part 17 can be set inside the end of the first air duct 31. When the sewage tank 4 is inserted into the body

1, the lifting part 17 can overcome the elastic force of the first valve 46 to push the first valve 46 upward. When disassembling the sewage tank 4, the first valve 46 leaves the lifting part 17 and, under the elastic force, closes the second air inlet 320 to prevent sewage leakage.

[0167] The lifting part 17 can be set as a plate or pillar structure, and its connection with the body 1 includes but is not limited to integral molding, adhesive bonding, screw fixation, etc. At least two lifting parts 17 can be installed, spaced apart and with equal heights to simultaneously lift the first valve 46. The part of the lifting part 17 used to lift the end of the first valve 46 can be set as a curved structure to avoid excessive pressure concentration on the first valve 46.

[0168] To improve the sealing effect, a first sealing rubber 460 can be wrapped around the connection between the second air inlet 320 and the first air duct 31. As described in FIG. 23, the first sealing rubber 460 can be set on the edge of the second air inlet 320 or the outlet edge of the first air duct 31. The connection method can be adhesive bonding, snap fitting, etc. The first sealing rubber 460 has a certain elasticity to seal the connection gap between the second air inlet 320 and the first air duct 31, reducing wind power loss.

[0169] In one embodiment, a ring of grooves is opened on the outer edge of the second air inlet 320. The first sealing rubber 460 is annular in structure, with one side embedded in the groove and the other side set as an expansion. After the sewage tank 4 is inserted into the body 1, the first sealing rubber 460 resiliently abuts against the opening edge of the first air duct 31, thereby sealing the gap between the second air inlet 320 and the first air duct 31.

[0170] A second valve 47 is installed at the second air outlet 321. As shown in FIGS. 13, 17, and 24, the second valve 47 is designed to close the outlet under elastic force and open the outlet under negative pressure generated by the fan assembly 7, thereby connecting the second air duct 32 and the third air duct 33.

[0171] Specifically, one end of the second valve 47 is elastically connected to the sewage tank 4 or the fan chamber 41, and the other end is a free end. The second valve 47 can be made of a material with its own elasticity, such as rubber, metal sheets, etc., or can generate elasticity through the installation of components such as torsion springs or flaps. The second air outlet 321 faces downwards, and the second valve 47 is set on the outer side of the second air outlet 321. The negative pressure generated when the fan assembly 7 is operating can overcome the elastic force of the second valve 47, causing it to move downward and open the second air outlet 321. After the fan assembly 7 is closed, the second valve 47 closes the second air outlet 321 under elastic force to prevent sewage leakage. The second air outlet 321 is set at the top of the fan chamber 41, which has a relatively thin top structure. The second air outlet 321 can be raised upward to provide sufficient space for move-

ment when the second valve 47 is opened. Alternatively, the top wall of the fan chamber 41 can be sloped, allowing the second valve 47 to be inclined and positioned at the location of the second air outlet 321 inside the fan chamber 41.

[0172] To improve the sealing effect, a second sealing rubber 470 can be wrapped around the connection between the second air outlet 321 and the air inlet of the fan assembly 7. The second sealing rubber 470 can be set on the edge of the second air outlet 321, such as inside the fan chamber 41 at the position of the second air outlet, or on the fan assembly 7. The second sealing rubber 470 has a certain elasticity to seal the gap between the second air outlet 321 and the air inlet of the fan assembly 7, reducing wind power loss.

Water Tank Baffle Structure

[0173] The water tank provided herein can be used not only for storing liquid but also for storing sewage. Of course, depending on the application scenario, the water tank may only include a clean water tank or only include a sewage tank. The water tank can be applied to cleaning equipment, such as floor scrubbers, floor sweeping robots, etc., for storing liquids such as clean water, sewage, cleaning agents, etc.; it can also be applied to industrial liquid-containing systems, such as soda water separators, etc. Those skilled in the art can apply the water tank to suitable equipment as needed.

[0174] The water tank includes a tank body with an inner cavity in which a duct is provided, and air inlets and air outlets are formed at different positions of the tank body, respectively. As shown in FIG. 25, the water tank includes the aforementioned sewage tank 4 and clean water tank 5. Wherein, the inner cavity of the tank body can be the inner cavity of the sewage tank 4, the air duct in the inner cavity can be the second air duct 32, and the air inlet and air outlet are respectively the second air inlet 320 and the second air outlet 321.

[0175] After the water level in the sewage tank 4 rises to a certain level, under the negative pressure of the second air duct 32, the liquid is pushed up to the outlet of the second air duct 32. In addition, when the water tank is used in equipment such as floor sweeping robots, if the equipment moves or changes speed, the liquid in the sewage tank 4 will sway. When the direction of movement of the equipment is opposite to the direction of airflow in the second air duct 32, the liquid is pushed up to the outlet of the second air duct 321 due to inertia. When the liquid level at the outlet 321 of the second air duct is too high, the liquid is prone to be drawn out from the second air outlet 321. In addition, a water level detection device is usually installed in the water tank, such as a water level detection device used to detect full water levels. When the water level is pushed up, the water level detection device is also easily triggered, causing the water level detection device to emit an incorrect full water signal.

[0176] To address this, a water blocking part can be set

inside the sewage tank 4, as shown in FIGS. 25-26, and the water blocking part can be a water baffle 48 structure. Setting the water baffle 48 on the inner wall of the tank body near the outlet 321 of the second air duct can block the raised water level and prevent liquid from being drawn out of the water tank from the outlet 321 of the second air duct. Moreover, the water baffle 48 is provided with through-holes, through which airflow in the second air duct 32 can flow towards the second air outlet 321, avoiding the influence of the water baffle 48 on the flow of airflow. Multiple through-holes can be set on the water baffle 48 and evenly distributed to reduce obstruction to airflow.

[0177] As the water level in the sewage tank 4 rises, the space in the second air duct 32 gradually narrows. A preset water level line should be set inside the sewage tank 4, which can be a scale line expressing full water in the sewage tank 4. A safe distance should be left between the preset water level line and the second air outlet 321 to prevent the water level from being too close to the second air outlet 321. In one embodiment, the water baffle 48 can be set at the position of the preset water level line in the sewage tank 4.

[0178] Due to the relatively narrow second air duct 322 of the second air duct 32, and it is close to the second air outlet 321, the liquid in the second air duct 322 is pushed up under negative pressure. In one embodiment, the water baffle 48 can be set in the second air duct 322 to block the liquid in the second air duct 322 from being pushed up.

[0179] The water baffle 48 is horizontally set and can be shaped to match the second air duct 322. The outer side of the water baffle 48 is connected to the inner wall of the sewage tank 4, and the inner side is connected to the enclosed sidewall 410 of the fan chamber 41, and the connection methods include but are not limited to welding, snap connection, bonding, integral injection molding, and screw connection.

[0180] In one embodiment disclosed herein, the water baffle part is constructed to float on the water surface, such as being constructed to float on the sewage in sewage tank 4. As the water level in sewage tank 4 gradually rises, the water baffle part also rises accordingly. The water baffle part can match the shape of the second air duct 322, especially limiting the water baffle part to be confined within the second air duct 322, allowing it to only rise with the increase of sewage in the vertical direction.

[0181] In one embodiment disclosed herein, the water baffle part can be made of a material that can float on the liquid surface, such as foam material or plastic material that can float in sewage.

[0182] In one embodiment disclosed herein, the water baffle part can be made of flexible material. When the sewage in sewage tank 4 is pushed up, the water baffle part can have a certain deformation ability along with the rise of the water surface. However, the flexible water baffle part can still suppress the extent of water surface

elevation, and to some extent, can also prevent the water surface from being pushed up.

Water Level Detection Device

[0183] In some embodiments disclosed herein, as shown in FIGS. 25-26, a water level detection device 49 is also installed inside sewage tank 4, which is used to detect the water level inside the tank. When the water level detection device 49 detects that the water level reaches the preset water level line, the second air duct 32 can be closed or the negative pressure provided to the second air duct 32 can be stopped to prevent the liquid in sewage tank 4 from being carried out from the second channel outlet 321 by the airflow in the second air duct 32.

[0184] The water level detection device 49 disclosed herein can be capacitive or other structures that detect water level through electrical conductivity. Those skilled in the art can choose as needed.

[0185] In one embodiment disclosed herein, the water level detection device 49 includes a first detection probe 491 and a second detection probe 492, both of which are conductors. The water level detection device 49 is configured to be triggered when the first detection probe 491 and the second detection probe 492 conduct through the liquid, emitting a detection signal.

[0186] The first detection probe 491 and the second detection probe 492 can be arranged adjacent to each other or spaced apart in the cavity of the tank, for example, they can be set at the second air inlet 320 or the second air outlet 321, or in the middle of the tank cavity. Due to the airflow in the second air duct 32, there is a certain fluctuation of the liquid in the direction of extension of the second air duct 32, and the liquid is pushed up towards the second channel outlet 321, causing the water level at the second channel outlet 321 to be higher than that at the second channel inlet 320. To improve the accuracy of the measurement results, in a preferred embodiment, the first detection probe 491 and the second detection probe 492 can be respectively set close to the middle position in the direction of extension of the second air duct 32. Furthermore, the first detection probe 491 and the second detection probe 492 can be respectively set on the opposite sides in the direction of extension of the second air duct 32, which can increase the distance between the two probes and improve the accuracy of the detection results.

[0187] In one embodiment, the first detection probe 491 and the second detection probe 492 can be located between the water baffle 48 and the second air inlet 320. The bottom ends of the first detection probe 491 and the second detection probe 492 are set at the position of the preset water level line. Specifically, the first detection probe 491 and the second detection probe 492 can be connected to the top of the tank and extend downward.

[0188] In one embodiment, a storage groove 490 deviating from the air duct is provided on the side wall of the tank, the storage groove 490 can be set on the side wall

extending from the second air inlet to the second air outlet of the sewage tank, and adjacent to the communication area between the second air duct 322 and the first channel 323. The first detection probe 491 and/or the second detection probe 492 are set in the storage groove 490. The storage groove 490 can be set as a groove-shaped structure or a tube-shaped structure, and extends along the height direction of the side wall of the tank, the storage groove 490 communicates with the second air duct 32, and the liquid in the tank can enter the storage groove 490.

[0189] In a specific embodiment, only one storage groove 490 is provided, and one of the first detection probe 491 and the second detection probe 492 is set in the storage groove 490, or both the first detection probe 491 and the second detection probe 492 are set in the storage groove 490. In another specific embodiment, two storage grooves 490 are provided, with one of the first detection probe 491 set in one storage groove 490, and the other in the other storage groove 490.

[0190] In detail, with the extension direction of the second channel as the X-axis direction, and the lateral direction perpendicular to the X-axis as the Y-axis direction, the storage groove 490 extends in a direction deviating from the second channel along the Y-axis direction. The storage groove 490 can be cylindrical in shape with a C-shaped cross-section. Since the storage groove 490 deviates from the second air duct 32, the water level in the storage groove 490 is less affected by the airflow, and it is not easily pushed up. Therefore, the detection accuracy of the first detection probe 491 and/or the second detection probe 492 inside is higher.

[0191] Since the triggering of the water level signal requires both probes to contact the liquid, one probe can be set in the storage groove 490. Of course, for those skilled in the art, both probes can also be set in the storage groove deviating from the air duct. For example, a storage groove is set on each side of the inner wall of the tank, and the first detection probe 491 and the second detection probe 492 are respectively set in their own storage groove.

[0192] The liquid stored in the tank cavity is sewage generated by cleaning equipment during cleaning work, with solid impurities mixed in the sewage. In some embodiments, at least one of the first detection probe 491 and the second detection probe 492 has a gap between it and the side wall of the tank. The inner wall of the tank is in a wet state. If the liquid in the tank is mixed with solid impurities, the solid impurities may get stuck between the first detection probe 491 and the second detection probe 492 and the inner wall of the tank. At least one of the first detection probe 491 and the second detection probe 492 has a gap between it and the side wall of the tank, which can prevent at least one probe from being stuck with solid impurities between the probe and the inner wall of the tank, thereby preventing the first detection probe 491 and the second detection probe 492 from conducting due to solid impurities.

[0193] The bottom ends of the first detection probe 491 and the second detection probe 492 can be flush with the preset water level line, or one can be flush with the preset water level line while the other is lower than the preset water level line. Since both the first detection probe 491 and the second detection probe 492 conduct when they simultaneously contact the liquid in the tank, the triggering position of the first detection probe 491 and the second detection probe 492 depends on the higher bottom end. The liquid level in the tank is pushed up towards the second channel outlet under the action of airflow in the passage. In some embodiments, one bottom end of the first detection probe 491 and the second detection probe 492 is not higher than the preset water level line, and the other bottom end is higher than the preset water level line. In this case, one probe ensures contact with the liquid, while the other probe's bottom end is higher than the preset water level line, thereby eliminating the problem of triggering the preset water level due to the rise in water level. Only when the water level in the tank truly reaches the preset water level, the raised water level can trigger the probes under the action of airflow or movement, thereby triggering the alert signal for the preset water level.

[0194] The fan assembly can stop working based on the detection signal of the water level detection device of the tank, preventing the sewage level from exceeding the preset water level line and entering the fan assembly.

Floating and Anti-Waterlogging Structure

[0195] Embodiments disclosed herein provide a self-moving floor washing robot, comprising the body 1, roller 20, and squeegee 93 of the self-moving cleaning robot as described in the above embodiments. The body 1 has a mounting cavity, and the roller 20 is rotatably connected in the mounting cavity. The squeegee 93 is connected to the body 1 and is constructed to contact the roller 20 to scrape off the liquid from the roller 20. The liquid scraped off by the squeegee 93 is the sewage after cleaning the working surface. The specific structure of the self-moving floor washing robot can be seen in the self-moving cleaning robot of the above embodiments, and the similarities are not repeated here.

[0196] The difference between this embodiment of the self-moving floor washing robot and that of the first embodiment lies mainly in: the roller 20 and the squeegee 93 are constructed such that when encountering obstacles, there is relative movement between the roller 20 and the squeegee 93 to detach them.

[0197] This is because obstacles such as steps, thresholds, etc., may appear on the working surface, such as household floors. When the robot crosses these obstacles, the roller 20 may hang or be lifted, the entrance of the first air duct 31 cannot form a closed space, resulting in greater airflow loss, and the water streaks scraped off by the squeegee 93 from the roller 20 cannot be sucked away by the first air duct 31, thus falling on the

working surface.

[0198] When encountering obstacles, the airflow at the entrance of the first air duct 31 is insufficient, causing relative movement between the roller 20 and the squeegee 93 to detach, which can avoid the water streaks scraped off by the squeegee 93 from the roller 20, thereby preventing sewage from remaining on the working surface.

[0199] In one embodiment, the roller 20 can be set to move relative to the body 1, and the squeegee 93 is set to be relatively fixed to the body 1. When encountering obstacles, the roller 20 moves away from the squeegee 93. For example, as described in embodiment 1, the roller assembly 2 is rotatably connected to the body 1. When encountering obstacles, the roller assembly 2 is configured to move away from the squeegee 93 to prevent the squeegee 93 from scraping sewage off the roller 20. In another embodiment, the roller 20 is set to be fixed relative to the body 1, and the squeegee 93 is set to be able to move relative to the body 1. When encountering obstacles, the squeegee 93 moves away from the roller 20.

[0200] The movement of the roller 20 or the squeegee 93 can be achieved through a driving mechanism. Those skilled in the art can set up a driving mechanism based on existing technology, such as motors, drive shafts, gear assemblies, connecting rods, etc. The movement can be rotation, oscillation, linear motion, etc. There are no specific limitations on the driving mechanism in this embodiment.

[0201] In one embodiment provided herein, as shown in FIG. 8, the body 1 can be configured to include a floating part 11-A and a fixed part 11-B, with the floating part 11-A hinged to the fixed part 11-B via a hinge axis. The floating part 11-A is capable of rotating up and down relative to the fixed part 11-B about the hinge axis. The mounting cavity and the roller 20 are set on the floating part 11-A, while the squeegee 93 is set on the fixed part 11-B; the roller 20 is configured to maintain contact with the working surface under its own weight and the gravity of the floating part 11-A. The floating part 11-A is configured to rotate relative to the fixed part 11-B when encountering obstacles, causing the roller 20 to move away from the squeegee 93.

[0202] The rotation of the floating part 11-A can be achieved in different ways in the following embodiments.

[0203] In one embodiment, the floating part 11-A is configured to rotate relative to the fixed part 11-B under the obstructive force of obstacles. For example, when the obstacle is a threshold, the roller 20 is lifted upward when passing over the threshold, thereby driving the floating part 11-A to rotate upward relative to the fixed part 11-B.

[0204] In another embodiment, a driving mechanism is provided between the floating part 11-A and the fixed part 11-B. The driving mechanism is configured to drive the floating part 11-A to rotate relative to the fixed part 11-B.

[0205] In another embodiment, an elastic preloading device is provided between the floating part 11-A and the

fixed part 11-B, and the floating part 11-A is constructed to be preloaded on the working surface by the elastic preloading device.

[0206] In one embodiment, the squeegee 93 can be movably connected to the body 1 and includes a driving mechanism configured to drive the squeegee 93 to move away from the roller 20. Specifically, the squeegee 93 is movably connected to the body 1 through a gear and rack engagement structure. The squeegee 93 is connected to the rack, and the driving mechanism drives the gear to rotate, which in turn drives the rack to move, thereby moving the squeegee 93.

[0207] In this embodiment, when the body 1 encounters obstacles, the rotation speed of the roller 20 can also be reduced. After the rotation speed of the roller 20 is reduced, it can avoid the squeegee 93 from scraping off the sewage on the roller 20, thereby preventing sewage residue on the working surface.

[0208] The body 1 further includes an identification device, which is configured to identify obstacles ahead. The driving mechanism responds to the signal of the identification device recognizing the obstacles ahead by driving the squeegee 93 away from the roller 20. The identification device can be a camera or radar device.

[0209] The self-moving floor washing robot also includes a control unit, which can accept signals emitted by the identification device and send control signals to the driving mechanism on the body 1 to control its actions.

[0210] The identification device can send detection signals of obstacles ahead to the control unit. After receiving the detection signal, the control unit sends a control signal to the driving mechanism. Upon receiving the control signal, the driving mechanism drives relative movement between the roller 20 and the squeegee 93 to separate them.

[0211] In one embodiment, after the control unit receives the detection signal of obstacles ahead from the identification device, it sends a control signal to the driving mechanism. Upon receiving the control signal, the driving mechanism drives relative movement between the roller 20 and the squeegee 93 to separate them, thereby avoiding scraping off sewage. In this case, the driving mechanism can move the floating part 11-A to separate from the squeegee 93 or move the squeegee 93 to separate from the roller 20.

[0212] In one embodiment, after the control unit receives the detection signal of obstacles ahead from the identification device, it controls the rotation speed of the roller 20 to decrease. Specifically, the control unit can control the speed of the roller 20 to be reduced to 0-150 rpm, avoiding the squeegee 93 from scraping off the sewage on the roller 20.

[0213] In one embodiment disclosed herein, as shown in FIG. 27, there is also a cliff sensor 14 set up. The cliff sensor 14 can be set up in two, each set up at the bottom of the body 1 and located at the front end position of the roller 20. The cliff sensor 14 can be used to detect

whether there is a gap ahead. For example, when moving to a step position, the cliff sensor 14 can promptly detect the presence of a gap ahead. At this time, the robot should be controlled to stop, or move backward to avoid falling off the step.

[0214] This disclosure also provides a control method for a robot, which is the aforementioned self-moving floor washing robot, comprising an identification device and a control unit. The control method includes the following steps:

S1000, the control unit receives a detection signal of front obstacles obtained by the identification device, and sends a control signal to a driving mechanism;

[0215] As the body 1 travels on the working surface, obstacles are encountered ahead, which can be thresholds, steps, etc. The identification device can obtain obstacle detection signals and send them to the control unit; based on the obstacle detection signals sent by the identification device, the control unit sends control signals to the driving mechanism.

[0216] In step S1000, after the control unit receives the detection signal of obstacles ahead obtained by the identification device, it can control the speed of the roller to decrease to 0-150 rpm. With the roller rotating at a slower speed, less sewage is scraped off by the squeegee, or it may not be able to scrape off the sewage. At this time, the driving mechanism controlled by the control unit is the drive assembly connected to the roller.

[0217] S2000, the driving mechanism receives the control signal and drives the roller to undergo relative movement with the squeegee to separate the roller from the squeegee.

[0218] The driving mechanism can drive the floating part 11-A of the body 1 to rotate relative to the fixed part 11-B, thereby separating the roller 20 on the floating part 11-A from the squeegee 93 on the fixed part 11-B. Alternatively, the driving mechanism can directly drive the squeegee 93 to move, causing it to move away from the roller 20.

[0219] In step S2000, the driving mechanism drives the floating part to move away from the squeegee; or, the driving mechanism drives the squeegee to move away from the roller.

[0220] This disclosure also provides a cleaning system, comprising a cleaning device and a base station. The cleaning device is equipped with a cleaning apparatus constructed to clean the working surface. During the cleaning process, the cleaning device generates sewage. The cleaning device is capable of extracting the sewage after cleaning the working surface to prevent sewage residue on the working surface. The cleaning device can be a currently available cleaning function-equipped self-moving robot or a handheld device, such as a handheld cleaning machine, the self-moving cleaning robot described in the above embodiments, or other household or commercial cleaning devices equipped with wet mopping functions, such as vacuum cleaners.

[0221] The cleaning device also includes an air duct

system and a sewage tank. The sewage tank is constructed to contain the sewage after cleaning the working surface. The air duct system communicates with the sewage tank and is constructed to extract the sewage from the cleaning apparatus to the sewage tank after cleaning the working surface. After extracting the sewage, water stains will remain inside the cleaning device, which are difficult to clean directly. If not dried in time, bacteria will grow inside the cleaning device, causing odor.

[0222] The base station can integrate functions such as charging, dust collection, drainage, water replenishment, and drying, and can charge the self-moving robot, remove dirt and sewage, replenish cleaning fluid, and dry it. When the water level detection device detects that the water level in the sewage tank 4 reaches the highest value, the control unit can control the body 1 to return to the base station and discharge the sewage in the sewage tank 4 into the base station.

[0223] The base station includes a base station body, which has a housing cavity for accommodating the cleaning device. The base station body also has a drying duct, which can blow dry airflow into the housing cavity. After the cleaning device pauses or finishes cleaning, it enters the housing cavity of the base station and undergoes drying with the dry airflow. The air duct system of the cleaning device is configured to extract the dry airflow sent out by the drying system, which can dry the water stains remaining inside the cleaning device.

[0224] The housing cavity of the base station can be set at the top, middle, or bottom of the base station body, adapted to the corresponding cleaning device. For example, in one embodiment disclosed herein, the cleaning device is a handheld vacuum cleaner, and the housing cavity can be set at the top of the base station body to facilitate the user to take or put the handheld vacuum cleaner from the top of the base station body. In another embodiment disclosed herein, the cleaning device is the aforementioned self-moving cleaning robot, which can walk on the ground independently to clean the floor. The housing cavity can be set at the bottom of the base station body so that the self-moving robot can enter the housing cavity from the ground or walk through a slope to reach the housing cavity located at a certain height.

[0225] FIG. 29 is a schematic diagram of the overall structure of the cleaning system in an embodiment. In the embodiment shown in FIG. 29, the cleaning device A of the cleaning system is the self-moving cleaning robot described above in the embodiment. The housing cavity 1211 is set at the bottom of the base station body 121, and the opening of the housing cavity 1211 is set on the side or front of the base station body 121. The cleaning device A can enter the housing cavity 1211 of the base station through the opening.

[0226] The bottom of the housing cavity 1211 shown in FIGS. 29-30 is not flush with the ground; it is at a certain height from the ground. In this case, a ramp can be set at the opening position of the housing cavity 1211. The ramp

extends from the opening position of the housing cavity 1211 to the ground, allowing the cleaning device A to drive into the housing cavity 1211 along the ramp from the ground, or leave the housing cavity 1211 along the ramp.

[0227] FIGS. 30-31 are schematic diagrams of the structure of the base station of the cleaning system in an embodiment. A drying system 122 forms an air outlet 1221 in the housing cavity 1211 of the base station B. The drying system blows dry airflow into the housing cavity 1211 through the air outlet 1221. The air outlet is configured to blow the dry airflow towards the cleaning device A's cleaning apparatus located in the housing cavity 1211, drying the cleaning apparatus. When the air duct system of the cleaning device A is open, the dry airflow blown out of the air outlet is sucked into the air duct system, allowing the air duct system and internal components such as the sewage tank of the cleaning device A to dry.

[0228] In detail, the direction of the air outlet should be close to and facing the cleaning device. There can be multiple air outlets distributed around the cleaning device to improve the stable drying efficiency of the cleaning device. The cleaning device can include but is not limited to a cloth, a roller, a cleaning brush, a scraper, etc., and other conventional cleaning devices fall within the scope of the present disclosure. In the embodiment shown in FIG. 30, there are three air outlets 1221, which can be arranged along the transverse direction (the extension direction of the cleaning device) and spaced apart, corresponding to the position of the cleaning device.

[0229] In one embodiment, as shown in FIG. 30, a groove 1212 is set at the bottom of the housing cavity 1211 of base station B. The groove 1212 is used to cooperate with the cleaning device, A. After the cleaning device A enters the housing cavity 1211, at least part of the cleaning device can be positioned in the groove 1212 to limit the movement of the cleaning device. The air outlet 1221 can be set on the side wall of the groove 1212, directly facing the cleaning device, and blowing dry airflow towards the cleaning device. Alternatively, it can be set on the side wall of the housing cavity 1211 to ensure that when the cleaning device A enters the base station B, the air outlet 1221 of the base station B can directly face the cleaning device A's cleaning apparatus.

[0230] Because the groove 1212 is set at the bottom of the housing cavity 1211, when the cleaning device A enters the base station's housing cavity 1211, the cleaning apparatus can cooperate with the groove 1212 to position the cleaning device A, preventing the cleaning device A from shaking or slipping out of the base station B's housing cavity 1211.

[0231] In some embodiments disclosed herein, as shown in FIG. 31, the drying system 122 includes a drying duct 1222, a base station fan 1223, and a heating device 1224. The drying duct 1222 is connected to the air outlet 1221, and the base station fan 1223 is configured to create negative pressure in the drying duct, causing airflow to flow towards the air outlet 1221. The heating

device 1224 can be set in the drying duct 1222 to provide heat to the airflow in the drying duct 1222. The airflow in the drying duct 1222 is heated by the heating device 1224 to form dry airflow, which is then blown out through the air outlet 1221 to dry the cleaning device.

[0232] The drying duct 1222 can be a pipeline or a duct formed by an opening in the base station body 121. The air outlet 1221 and the base station fan 1223 are respectively set at both ends of the drying duct 1222. Additionally, the drying duct 1222 can have multiple branches to form multiple air outlets in the housing cavity 1211. Alternatively, the air outlet 1221 can have a single channel, and multiple channels of the drying duct 1222 can be connected to the same air outlet 1221. The structural settings of the drying duct 1222 and the air outlet 1221 are merely examples and do not limit the disclosure herein. Those skilled in the art can make adjustments to the actual structural settings or assemblies as needed.

[0233] The base station fan 1223 can include but is not limited to an axial fan or a centrifugal fan, and it can be fixedly mounted on the base station body 121. The heating device 1224 includes but is not limited to electric heating wires, heating plates, heat exchange tubes, etc. The airflow flowing through the drying duct 1222 is heated by the heating device 1224, forming dry airflow directed towards the air outlet. The temperature of the dry airflow can be related to the power and airflow rate of the heating device 1224. Additionally, the heating device 1224 can be singular or plural, but this is not specifically mentioned here.

[0234] Referring to FIGS. 31-32, with the opening direction of the housing cavity 1211 of the base station B as the front side, the drying system 122 can be set on the back side of the base station body 121. The end of the drying duct 1222 extends from the back side of the base station body 121 to the housing cavity 1211, connecting with the air outlet 1221 in the housing cavity 1211, or forming the aforementioned air outlet 1221 in the housing cavity 1211.

[0235] The cleaning device A disclosed herein can also be equipped with a clean water tank, which is used to store clean water, detergents, and other cleaning liquids. During the cleaning process of the cleaning device A, the clean water tank can supply the cleaning liquid to the cleaning apparatus, thereby improving the cleaning efficiency of the cleaning apparatus. After the cleaning apparatus wipes the floor, the cleaning liquid becomes sewage. The air duct system of the cleaning device A is located near the cleaning device A and can suction the sewage into the sewage tank of the cleaning device A.

[0236] In some embodiments, as shown in FIG. 32, a waterway component 123 is installed on the base station B. Through the waterway component 123, the sewage from the sewage tank of the cleaning device A can be extracted into the base station B, and clean liquid can be supplied to the clean water tank of the cleaning device A. When the cleaning device A enters the housing cavity 1211 of the base station B, the waterway component 123

of the base station B can extract the sewage from the sewage tank through the drainage port of the cleaning device A and replenish the clean liquid to its clean water tank through the inlet.

[0237] In a specific embodiment, as shown in FIG. 33, the base station B can be equipped with a sewage bucket 124 and a clean water bucket 125, both of which are connected to the waterway component 123. Additionally, a power device is installed in the base station B, which can be a pump or a motor capable of providing negative pressure. By providing negative pressure to the waterway component 123, the power device can extract the sewage from the sewage tank and pump clean liquid into the clean water tank.

[0238] For example, in a specific embodiment disclosed herein, a vacuum negative pressure port can be set on the sewage bucket 124. This vacuum negative pressure port is connected to the waterway component 123 through a pipeline. When the waterway component 123 is connected to the sewage tank of the cleaning device A, the motor can create negative pressure at the vacuum negative pressure port in the sewage bucket 124, extracting the sewage stored in the sewage tank of the cleaning device A into the sewage bucket 124.

[0239] To enable the cleaning device A to smoothly enter the housing cavity 1211 of the base station B, in some embodiments, as shown in FIGS. 29-30, the opening end of the housing cavity 1211 has an expanding structure 1213. The left and right sides of the opening end of the housing cavity 1211 are inclined outward, for example, with an inclination angle greater than 5°, which guides the cleaning device A, allowing it to smoothly enter the housing cavity 1211.

[0240] In other embodiments, guide wheels 1214 can be installed on the inner walls relative to both sides of the housing cavity 1211. The axis of rotation of the guide wheels 1214 is perpendicular to the direction of movement when the cleaning device A enters the housing cavity 1211. When the cleaning device A enters the housing cavity 1211, the side walls roll in conjunction with the guide wheels 1214. The guide wheels 1214 can guide the cleaning device A and reduce the friction resistance between them.

[0241] Furthermore, positioning structures can be installed inside the housing cavity 1211 to limit the position of the cleaning device A. The positioning structures can partially match the cleaning device A, such as the corners of the cleaning device A, the universal wheels, or driving wheels used for movement, etc. The positioning structures include but are not limited to grooves, steps, protrusions, etc.

[0242] In one embodiment, as shown in the embodiment of FIG. 30, the positioning structure is a positioning groove 1215, which can be set up in two corresponding to the number of driving wheels of the cleaning device A. The positioning grooves 1215 can be opened at the bottom of the housing cavity 1211. When the cleaning device A enters the housing cavity 1211, its bottom driv-

ing wheels can match the positioning grooves 1215 to position the cleaning device A, so that the waterway component 123 can accurately align with the drainage port and inlet of the cleaning device A.

[0243] The overall shape of the cleaning device A can be circular, rectangular, triangular, etc., without limitation herein. When entering the housing cavity 1211, the cleaning device A can enter by advancing or retreating.

[0244] In a specific embodiment disclosed herein, as shown in FIG. 29, with the forward direction of the cleaning device A as a reference, the overall shape of the cleaning device A is D-shaped, including a rectangular structure at the front end and a curved surface structure at the rear end. The cleaning device A enters the housing cavity 1211 of the base station B in a forward manner, with its rectangular structure entering the cavity first, unlike the traditional method where the curved surface enters the cavity first by retreating. The expanding structure and the guide wheels 1214 installed on the sidewall are advantageous for the cleaning device A to enter the cavity with its rectangular structure first in a forward manner.

[0245] Usually, the front end of a self-moving cleaning robot is equipped with a bumper sensor structure. When the self-moving cleaning robot collides with an obstacle, the bumper sensor is triggered, thereby controlling the self-moving cleaning robot to retreat to avoid the obstacle ahead. After the self-moving cleaning robot enters the station in a forward manner, it needs to close or shield the signal of the bumper sensor.

[0246] For example, in one embodiment disclosed herein, the charging contacts of the self-moving cleaning robot are set on the bumper structure. When the self-moving cleaning robot returns to the station for charging, the charging contacts on the bumper structure need to dock with the corresponding charging contacts on the base station. At this time, the signal of the bumper sensor should be turned off to avoid mis-operations such as the self-moving cleaning robot retreating.

[0247] As described above, when the cleaning device A enters the housing cavity of the base station B, the cleaning device A can be charged, the stored sewage can be pumped out, the water tank can be filled with water, and the cleaning device A's cleaning apparatus can be cleaned.

[0248] To this end, the present disclosure also provides a cleaning method implemented by the above-mentioned cleaning system, as shown in FIGS. 34-35, comprising the following steps:

Step S1000: The cleaning device enters the housing cavity of the base station to clean the cleaning apparatus.

[0249] When the cleaning device finishes its work and enters the housing cavity of the base station, corresponding operations can be performed as needed. For example, when the cleaning device is severely low on battery, priority can be given to charging the cleaning device before proceeding with the cleaning work.

[0250] In one embodiment disclosed herein, before

cleaning the cleaning apparatus, it is preferable to extract the sewage from the cleaning device's sewage tank to the base station's sewage bucket based on the current situation, and replenish the cleaning device's water tank with water from the base station's water bucket.

[0251] For example, when there is a lot of sewage in the cleaning device's sewage tank, reaching the designed full water level, the sewage should be first pumped out through the drain pipe set on the base station. When there is not much water in the cleaning device's water tank, water should also be first replenished into the cleaning device's water tank through the filling pipe set on the base station.

[0252] Alternatively, regardless of the current state of the cleaning device's water tank or sewage tank, the sewage in the sewage tank is extracted and the water tank is replenished before the cleaning device enters the base station for cleaning. This is conducive to subsequent cleaning of the cleaning apparatus.

[0253] When the cleaning mode is activated, water is supplied to the cleaning apparatus's cleaning apparatus, and the cleaning apparatus is opened to clean the cleaning apparatus. Water can be supplied to the cleaning apparatus through the cleaning device's own water tank to clean the cleaning apparatus. Alternatively, water can be supplied to the cleaning apparatus through the base station's water bucket to clean the cleaning apparatus. Alternatively, both can supply water to the cleaning apparatus simultaneously, and the cleaning apparatus can complete its own cleaning work during its own rotation.

[0254] In one embodiment disclosed herein, during the cleaning process, the main fan of the cleaning device is not turned on, that is, the airflow system of the cleaning device does not operate, so that the water supplied to the cleaning apparatus will fall into the groove of the base station, allowing some cleaning apparatuses to be immersed in the water in the groove.

[0255] For example, when the cleaning device is the self-moving cleaning robot disclosed herein, during the rotation of the cleaning apparatus, the water on the cleaning apparatus can be scraped off by the scraper plate, and the scraped-off water will fall into the groove coordinated with the cleaning apparatus. When a certain amount of water is deposited in the groove, the cleaning apparatus will be immersed in the water. As the cleaning apparatus continues to rotate, it can be cleaned by the water in the groove.

[0256] Step S2000: The cleaning device extracts the cleaned sewage to its sewage tank through its airflow system.

[0257] After the cleaning apparatus finishes cleaning, the main fan of the cleaning device is turned on, and the cleaned sewage is extracted to the sewage tank for storage through the cleaning device's airflow system. When the cleaning device enters the base station, a seal is formed between the soft rubber at the inlet end of its airflow system and the bottom of the base station's housing cavity, allowing the cleaning apparatus and

the water in the groove to be sucked into the sewage tank through the airflow system.

[0258] When the cleaning device is the self-moving cleaning robot disclosed herein, the water scraped off by the scraper plate of the cleaning apparatus can be directly sucked into the sewage tank by the airflow system. After scraping off the water, the cleaning apparatus can absorb the water in the groove, continue to scrape off the water absorbed on the cleaning apparatus with the scraper plate, and be sucked into the sewage tank by the airflow system, so that the cleaning apparatus and the water in the groove can be completely sucked into the sewage tank.

[0259] In one embodiment disclosed herein, steps S1000 and S2000 can be repeated multiple times to repeatedly clean the cleaning apparatus. The specific number of cleaning times can be set according to actual needs, for example, steps S1000 and S2000 can be performed twice.

[0260] Step S3000: The base station's drying system delivers dry airflow to the cleaning apparatus; the cleaning device extracts dry airflow through its airflow system to dry the cleaning device.

[0261] By opening the base station's drying system, the base station's fan blows heated dry airflow through the drying duct to the cleaning apparatus for drying. Additionally, at this time, the main fan of the cleaning device is turned on, and the dry airflow blown out by the drying duct can be sucked in through its airflow system to dry the cleaning device's airflow system.

[0262] Before the base station fan starts working or just starts working, the main fan of the cleaning device operates at the first power level, for example, it can work at full power for 1-3 minutes, which can suck out the moisture contained in the solid waste in the dust collection device, achieving further separation of solid waste and moisture. After completing this step, the main fan of the cleaning device can operate at the second power level, for example, it can enter the low-power mode to gradually dry the entire duct by sucking in the dry airflow blown out by the base station.

[0263] In one embodiment disclosed herein, before step S3000, there is also a step of extracting the sewage from the cleaning device's sewage tank to the base station's sewage bucket. This allows the sewage tank to be dried as well, avoiding the generation of bacteria and odors in the sewage tank.

[0264] When the cleaning device is the self-moving cleaning robot disclosed herein, the dry airflow sucked in by the first air inlet can flow through the first air duct, sewage tank, and third air duct to dry the entire duct system.

[0265] After the above cleaning and drying are completed, the cleaning device can enter the charging mode for charging by the base station.

Scenario 1

[0266] The control system of the self-moving floor washing robot starts operating after receiving work instructions, walking on the ground through the driving wheels, and rolling the roller to clean dust, water stains, etc. on the floor. The nozzle sprays the cleaning solution from the clean water tank onto the top of the roller, and the water distribution bar evenly spreads the cleaning solution on the roller, improving the cleaning effect of the roller. After the roller wipes the floor, it rotates to the scraper plate. The water stains and dirt on the surface of the roller are scraped off by the scraper plate and fall into the entrance of the first air duct. The edge of the entrance of the first air duct, the roller, the scraper plate, and the ground form a closed space, and the fan assembly creates a negative pressure in the air duct, thereby directly sucking the water stains and dirt scraped off by the scraper plate into the sewage tank through the entrance of the first air duct. The sewage does not fall on the ground, let alone accumulate on the working surface, greatly improving the cleaning and dirt suction effect.

[0267] Solid particles sucked into the air duct are filtered through the dust collection device and retained in the dust collection device. The gases and liquids sucked into the air duct are separated in the sewage tank. Among them, the liquid remains at the bottom of the sewage tank, and the gas enters the second channel of the second air duct, flowing uniformly towards the outlet of the second air duct from all directions in the second channel, avoiding the situation where the local airflow is too fast and causes the airflow to suck out the liquid in the sewage tank. The airflow from the outlet of the second air duct enters the third air duct, and the fan assembly blows the gas in the third air duct from the bottom of the machine body to the ground, thereby accelerating the evaporation of residual water stains on the ground.

Scenario 2

[0268] The roller assembly of the self-moving robot is installed in the mounting cavity at the bottom of the machine body, and the roller of the roller assembly can be detachably mounted on the roller bracket.

[0269] When installing the roller, insert the roller into the roller bracket, and then restrict the roller on the roller bracket with the roller cover plate. When installing the roller cover plate, first push the slider from the first position to the second position, and then assemble the roller cover plate on the roller bracket. After releasing the slider, the slider returns from the second position to the first position under the action of the elastic device. The slider drives the locking member on the roller cover plate to move, so that the engaging portion of the locking member can match with the locking groove on the roller bracket, thereby locking the roller cover plate to the roller bracket, and the roller is restricted between the roller bracket and the roller cover plate.

[0270] When disassembling the roller, push the slider from the first position to the second position to disengage the engaging portion of the locking member from the locking groove of the roller bracket, and then remove the roller cover plate so that the roller on the roller bracket can be taken out.

Scenario 3

[0271] The self-moving robot walks on the ground, and the roller rotates and rubs against the ground to perform cleaning work. The scraper plate can scrape off the dirt and sewage on the roller. After using for a period of time, the surface of the roller shows wear and tear. The roller assembly is connected to the body through a pivot axis, allowing the roller assembly to maintain contact with the ground under the action of gravity. That is, the roller assembly is floatingly arranged and can rotate relative to the body up and down.

[0272] During the long working process of the self-moving robot, when the roller wears out or when the ground becomes uneven, the roller can always be in contact with the ground and roll under the action of gravity, thereby avoiding gaps between the roller and the ground. This ensures a seal between the entrance of the first air duct and the ground, preventing air loss in the air duct, which would otherwise prevent the first air duct from sucking away the sewage not scraped off by the scraper plate. Additionally, maintaining contact between the roller and the ground can improve the cleaning effect of the roller on the ground. Even if the roller is worn out, it can still maintain its cleaning ability on the ground.

Scenario 4

[0273] When the sewage tank is installed on the body, the outlet of the first air duct on the body docks with the entrance of the second air duct on the sewage tank. The lifting part on the body can push open the first gate at the entrance of the second air duct, so that the first air duct and the second air duct are connected. The entrance of the third air duct on the body docks with the outlet of the second air duct on the sewage tank. When the fan assembly on the body is turned on, a negative pressure is formed in the third air duct, and the second gate at the outlet of the second air duct can be opened under the negative pressure, allowing the second air duct and the third air duct to be connected, thereby connecting the first air duct, the second air duct, and the third air duct to each other, and airflow is formed in the air duct. After the sewage tank is removed from the body, the first gate and the second gate can automatically close to prevent the liquid inside from overflowing through the entrance or exit of the second air duct.

Scenario 5

[0274] The dust collection device in the sewage tank

needs to be cleaned regularly. When disassembling, first open the cover plate on the top of the sewage tank, then remove the dust collection device inside the containment chamber, clean the garbage inside the dust collection device, or replace a new dust collection device. After removing the dust collection device, the anti-error mechanism in the containment chamber, under the action of the torsion spring, rotates its cam from the second position to the first position, occupying the installation position of the cover plate. At this time, the cover plate cannot be installed. This prevents users from forgetting to install the dust collection device and directly installing the cover plate, which would result in solid particles in the second air duct not being collected, or even the robot working without the cover plate installed, causing the second air duct to fail to seal, greatly reducing the suction effect of the air duct.

[0275] Only when the dust collection device is installed, the pressure part of the dust collection device can drive the pressed part of the anti-error mechanism to move, causing the cam to rotate from the first position to the second position, making room for installing the cover plate. At this time, the cover plate can be installed in the corresponding position, ensuring the collection of solid particles in the air duct and the sealing of the second air duct.

Scenario 6

[0276] When the self-moving robot is working, it walks forward on the ground, cleans the ground with the cleaning device, and the fan of the self-moving robot provides negative pressure to the air duct. The sewage generated after cleaning the ground is sucked into the first air duct by the airflow, then enters the cavity inside the water tank through the entrance of the second air duct. The sewage and airflow are separated inside the water tank, with the sewage remaining in the cavity of the water tank and the airflow being discharged from the exit of the second air duct. Under the action of the airflow, the sewage tends to be pushed up toward the exit of the second air duct. In addition, the entrance of the second air duct is near the front end of the water tank, and the exit of the second air duct is near the rear end of the water tank. Under conditions such as startup and acceleration, the sewage will also tend to be pushed up toward the exit of the second air duct due to inertia, causing the sewage to be easily sucked into the exit of the second air duct by the airflow or causing the water level detection device to be mistakenly triggered.

[0277] The baffle in the water tank can prevent the sewage from being pushed up. The airflow in the second air duct can flow to the exit of the second air duct through the throughhole of the baffle, thereby avoiding the sewage around the second air duct from being sucked into the exit of the second air duct by the airflow, and also preventing the water level detection device from being mistakenly triggered.

Scenario 7

[0278] The water tank is used to store sewage generated by the cleaning device. The cavity inside the water tank sucks in liquid-carrying sewage through the entrance of the second air duct. Sewage and airflow separate inside the water tank, with sewage remaining in the cavity of the water tank and airflow discharged from the exit of the second air duct. The sewage is stored in the cavity of the water tank, and the water level detection device set in the cavity of the water tank can detect the water level height. When the sewage level reaches the preset water level line, the first detection probe and the second detection probe of the water level detection device can be conductive through the sewage, thereby generating a detection signal. The fan assembly stops working based on the detection signal to prevent the water level of the sewage from being too high and being sucked into the fan assembly.

[0279] In the first detection probe and the second detection probe, the bottom of one detection probe is higher than the preset water level line, and the other end is lower than or equal to the preset water level line. In this way, only when the water level in the sewage tank reaches the preset water level line, under the action of the robot walking or the air duct, the raised water level can touch the detection probe whose bottom is higher than the preset water level line, thereby causing both detection probes to emit a signal indicating that the water is full.

Scenario 8

[0280] During the cleaning process of the self-moving floor washing robot on the ground, the recognition device at the front of the body detects obstacles on the ground. When obstacles are detected on the ground, the recognition device sends a detection signal to the control system. Based on the control signal, the control system can control the scraper plate to move away from the roller, stopping the scraping of sewage from the roller to prevent water stains and dirt from remaining on the ground at the entrance of the first air duct when the roller crosses obstacles.

[0281] In another application scenario, when obstacles are detected on the ground, the control system can control the roller to reduce speed based on the control signal, greatly reducing the amount of sewage scraped from the roller by the scraper plate. This also prevents water stains and dirt from remaining on the ground.

Scenario 9

[0282] When the cleaning device completes its cleaning work and enters the chamber of the base station, the drainage pipe and water inlet pipe on the base station respectively dock with the drainage outlet and water inlet of the cleaning device to extract the sewage from the cleaning device's sewage tank to the base station's

sewage bucket for processing, and replenish the water tank of the cleaning device with water through the base station's clean water bucket.

[0283] Subsequently, the cleaning device's water tank and/or the base station's clean water bucket can supply water to the cleaning device's cleaning device for cleaning. After cleaning, the main fan of the cleaning device is turned on to extract the sewage from the cleaning into the sewage tank, and then extract the sewage from the sewage tank into the base station's sewage bucket for storage again.

[0284] The base station fan is turned on to blow dry airflow from the base station's air drying duct to the cleaning device's cleaning device, and the cleaning device's duct system inhales the blown dry airflow to dry the air duct system and sewage tank of the cleaning device.

[0285] The above describes various embodiments of the present disclosure. The foregoing description is illustrative and not exhaustive, and is not limited to the disclosed embodiments. Many modifications and variations are apparent to those skilled in the art without departing from the scope and spirit of the described embodiments. The choice of terms used herein is intended to best explain the principles, practical applications, or technological improvements in the market of the disclosed embodiments, or to enable other ordinary skilled artisans in this technical field to understand the disclosed embodiments. The scope of the present disclosure is defined by the appended claims.

Claims

1. A self-moving cleaning robot, comprising a body and a water tank arranged inside the body, wherein the water tank comprises:

a box body, an air duct in a cavity of the box body; a fan chamber provided in the cavity of the box body and extending from the bottom of the box body to the top of the box body; an opening of the fan chamber facing downward; an air inlet provided on the box body, and an air outlet provided at the top of the fan chamber; an air duct, comprising a second channel formed by an enclosing side wall of the fan chamber and a corresponding side wall portion of the box body, and a first channel extending from the air inlet to the fan chamber in the cavity of the box body.

2. The self-moving cleaning robot according to claim 1, wherein the air inlet and the fan chamber are located on opposite sides of the box body.

3. The self-moving cleaning robot according to claim 1, wherein the cavity of the box body is divided into separated clean water tank and sewage tank; the air

duct and the fan chamber are located in the sewage tank.

4. The self-moving cleaning robot according to claim 3, wherein a separating portion is provided in the cavity of the box body, the separating portion extends along an extending direction of at least a portion of a side wall of the box body, and divides the cavity of the box body into the sewage tank and the clean water tank.

5. The self-moving cleaning robot according to claim 3, wherein the box body comprises sequentially engaged upper shell, middle shell, and lower shell; wherein the middle shell is a hollow structure, and grooves are provided at edge positions of the middle shell and/or the upper shell, the grooves of the middle shell and the upper shell form the clean water tank; the upper shell, middle shell, and lower shell enclose the sewage tank.

6. The self-moving cleaning robot according to claim 5, wherein the fan chamber passes through the middle shell, and a gap is formed between the top of the fan chamber and the upper shell; the fan chamber, upper shell, middle shell, and lower shell enclose the sewage tank.

7. The self-moving cleaning robot according to claim 6, wherein an inlet connected to the clean water tank and a drain connected to the sewage tank are provided at the top of the upper shell.

8. The self-moving cleaning robot according to claim 1, wherein a wind-blocking mechanism is provided inside the water tank; the bottom of the wind-blocking mechanism is lower than the top of the fan chamber; the wind-blocking mechanism is configured to make airflow in the air duct bypass from the bottom of the fan chamber.

9. The self-moving cleaning robot according to claim 8, wherein the wind-blocking mechanism is provided at a position where the first channel communicates with the second channel, and extends downward from the top of the box body.

10. The self-moving cleaning robot according to claim 1, wherein the cavity of the water tank is provided with a dust collection device docked with the air inlet, and the dust collection device is constructed to filter foreign matter from water vapor entering from the air inlet.

11. The self-moving cleaning robot according to claim 10, wherein the cavity of the water tank is provided with a chamber for installing the dust collection device, and a cover plate is mounted at an opening position of the chamber, and a detent mechanism is

provided in the chamber; the detent mechanism has a first position and a second position; when the dust collection device is removed, the detent mechanism moves to the first position higher than a mounting surface of the cover plate; when installing the dust collection device, the dust collection device pushes the detent mechanism to rotate to the second position lower than the mounting surface of the cover plate.

12. The self-moving cleaning robot according to claim 11, wherein the detent mechanism comprises a cam rotatably connected to the box body, and a torsion spring that biases the cam to the first position; the detent mechanism further comprises a pressed portion connected to the cam, and the dust collection device is provided with a pressing portion corresponding to the pressed portion; the pressing portion is constructed to cooperate with the pressed portion to rotate the cam from the first position to the second position.

13. The self-moving cleaning robot according to claim 1, wherein a first gate preloaded at the air inlet position is provided on the box body; a lifting portion is provided on the body, the lifting portion is configured to lift the first gate when the water tank is loaded into the body to open the air inlet.

14. The self-moving cleaning robot according to claim 1, wherein a second gate is provided at the air outlet; the second gate is configured to close the air outlet under elastic force, and move to open the air outlet under a negative pressure of the air duct.

15. A water tank, comprising:

a box body, having an air duct in a cavity of the box body; a fan chamber provided in the cavity of the box body and extending from the bottom of the box body towards the top of the box body; an opening end of the fan chamber facing downwards of the box body; an air inlet provided on a side wall of the box body, and an air outlet provided at the top of the fan chamber; an air duct in the cavity of the box body, comprising a second channel enclosed by a surrounding side wall of the fan chamber and a corresponding side wall of the box body, and a first channel located in the cavity of the box body from the air inlet to the fan chamber.

16. A self-moving cleaning robot, comprising a body and a water tank assembly disposed in the body, wherein the water tank assembly comprises:

a clean water tank;
a sewage tank with an air inlet;

a fan chamber, wherein an opening of the fan chamber faces the bottom of the water tank assembly, and a fan assembly is inserted into the fan chamber from the opening.

the top of the fan chamber having an air outlet communicating with the sewage tank.

a second channel provided between the clean water tank and the fan chamber to allow airflow entering the sewage tank from the air inlet to be discharged through the air outlet via the second channel.

17. A self-moving cleaning robot, comprising a body and mounted thereon:

a cleaning device constructed for cleaning a working surface;

a first air duct, with its inlet adjacent to the cleaning device, and constructed to extract sewage from the working surface cleaned by the cleaning device;

a sewage tank constructed to contain sewage after cleaning the working surface, with a second air duct provided in the sewage tank;

a fan assembly with a third air duct;

wherein: the first air duct and the third air duct are respectively connected to the second air duct; water vapor extracted by the first air duct enters the second air duct of the sewage tank, with liquid dropping into the sewage tank, while gas is discharged through the third air duct of the fan assembly.

18. The self-moving cleaning robot according to claim 17, wherein the cleaning device is arranged near the front of the body, and the fan assembly is arranged near the rear of the body.

19. The self-moving cleaning robot according to claim 18, further comprising driving wheels provided on the body, the driving wheels being located behind the cleaning device.

20. The self-moving cleaning robot according to claim 19, wherein the bottom of the body is equipped with two swivel casters, the swivel casters being positioned on the body between the cleaning device and the driving wheels, and distributed on opposite sides of the body.

21. The self-moving cleaning robot according to claim 17, further comprising a clean water tank provided on the body, the clean water tank being configured to supply cleaning liquid to the cleaning device.

22. The self-moving cleaning robot according to claim 17, wherein the sewage tank is equipped with a dust collection device configured to filter particles from

the water vapor entering the second air duct.

- 23.** The self-moving cleaning robot according to claim 22, wherein:

the sewage tank is provided with a receptacle for installing the dust collection device, and a cover plate mounted at an opening of the receptacle, wherein an anti-misplacement mechanism is provided inside the receptacle; the anti-misplacement mechanism has first and second positions;

when the dust collection device is removed, the anti-misplacement mechanism moves to the first position above the mounting surface of the cover plate;

when installing the dust collection device, the dust collection device pushes the anti-misplacement mechanism to rotate to the second position below the mounting surface of the cover plate.

- 24.** The self-moving cleaning robot according to claim 23, wherein:

the anti-misplacement mechanism comprises a cam rotatably connected to the sewage tank and a torsion spring preloaded on the cam at the first position;

the anti-misplacement mechanism further comprises a compression part connected to the cam, and the dust collection device is provided with a pressure part corresponding to the compression part; the pressure part is configured to cooperate with the compression part to rotate the cam from the first position to the second position.

- 25.** The self-moving cleaning robot according to claim 17, wherein:

a first gate preloaded at a second air inlet is provided on the sewage tank;

a lifting part is provided on the body, the lifting part is configured to lift the first gate to open the second air inlet when the sewage tank is loaded into the body, thereby connecting the first air duct and the second air duct.

- 26.** The self-moving cleaning robot according to claim 17, wherein the sewage tank comprises sequentially engaged upper shell, middle shell, and lower shell; wherein the middle shell is a hollow structure, and the edge thereof is provided with a groove, the groove of the middle shell and the upper shell together form a clean water tank; the upper shell, middle shell, and lower shell together form the sewage tank.

- 27.** The self-moving cleaning robot according to claim

26, wherein the edge of the upper shell is provided with another groove, the groove of the upper shell is docked with the groove of the middle shell, collectively forming the clean water tank.

- 28.** The self-moving cleaning robot according to claim 26, wherein an opening end of a fan accommodation chamber is provided on the lower shell at the bottom, the fan accommodation chamber passes through the middle shell and extends toward the upper shell; the top of the fan accommodation chamber is provided with a second air outlet for communication with the third air duct, and the fan accommodation chamber, upper shell, middle shell, and lower shell together enclose a second channel of the second air duct in the sewage tank.

- 29.** The self-moving cleaning robot according to claim 28, wherein the lower shell, fan accommodation chamber, middle shell, and upper shell together form the sewage tank.

- 30.** The self-moving cleaning robot according to claim 28, wherein a wind deflector is provided in the sewage tank; the bottom of the wind deflector is lower than the top of the fan accommodation chamber; the water vapor entering the second channel passes around the bottom of the wind deflector and rises upward into the second air outlet at the top of the fan accommodation chamber.

- 31.** The self-moving cleaning robot according to claim 28, wherein the second air outlet is provided with a second gate, the second gate is constructed to close the second air outlet under elastic force, and to open the second air outlet under a negative pressure generated by the fan assembly, thereby connecting the second air duct and the third air duct.

- 32.** The self-moving cleaning robot according to claim 17, wherein the cleaning device is a roller assembly connected to the body.

- 33.** The self-moving cleaning robot according to claim 32, wherein the roller assembly comprises a roller bracket and a roller mounted on the roller bracket, wherein the roller bracket is rotatably connected to the body via a hinge shaft; the roller bracket is configured to maintain contact between the roller and the working surface under its own gravity.

- 34.** The self-moving cleaning robot according to claim 33, wherein the roller bracket is further provided with an extended limit buckle, and a corresponding limit slot for cooperating with the limit buckle is provided on the body; the limit slot is configured to limit the rotation angle of the roller bracket relative to the body.

35. The self-moving cleaning robot according to claim 33, wherein a nozzle is provided on the body, and the nozzle is configured to spray water onto the roller.
36. The self-moving cleaning robot according to claim 35, wherein a scraper plate is provided on the body, and the scraper plate is configured to cooperate with the roller.
37. The self-moving cleaning robot according to claim 36, wherein the scraper plate is provided above the first air inlet on the body, and the scraper plate is involved in enclosing an upper portion of the first air inlet together with the roller and the working surface.
38. The self-moving cleaning robot according to claim 37, wherein one end of the roller is provided with a pressure block, and the pressure block is preloaded at the end position of the roller and contacts with the corresponding position on the body.
39. The self-moving cleaning robot according to claim 38, wherein the lower portion of the first air inlet is configured to extend toward the working surface and is enclosed with the scraper plate, roller, and working surface to form a sealed area.
40. The self-moving cleaning robot according to claim 36, wherein the roller and the scraper plate are configured to undergo relative movement when encountering an obstacle, causing the roller to separate from the scraper plate.
41. A cleaning system, comprising a self-moving cleaning robot according to any one of claims 17 to 40, and a base station comprising a base station body with a housing cavity, wherein a drying system is provided inside the base station body;
Wherein the housing cavity of the base station body is configured to accommodate the self-moving cleaning robot, wherein the first air inlet of the self-moving cleaning robot is configured to suction drying airflow emitted by the drying system to dry the cleaning device.
42. A self-moving cleaning robot, comprising a body with an mounting cavity is provided on the body, and a roller assembly installed in the mounting cavity, wherein the roller assembly comprises:
- a roller bracket having a roller cavity;
 - a roller rotatably connected in the roller cavity of the roller bracket; wherein at least one end of the roller is provided with a pressure block, the pressure block is connected to the roller for rotation and is configured to move axially along the roller to abut and seal against a side wall of the roller cavity under an action of an elastic device.
43. The self-moving cleaning robot according to claim 42, further comprising a base component, a rotating shaft supported inside the roller, wherein the rotating shaft is configured to move axially along the base component, and the rotating shaft is rotatably connected to the pressure block via a bearing.
44. The self-moving cleaning robot according to claim 43, wherein the base component comprises roller end covers for supporting inside the roller, and fixed seats fixed on the roller end covers, wherein the rotating shaft passes through the fixed seat and is configured to move axially along the roller.
45. The self-moving cleaning robot according to claim 44, wherein the base component further comprises roller shaft end covers connected to the fixed seat or the roller end cover, wherein the elastic device is provided between the rotating shaft and the roller shaft end cover, and the rotating shaft is configured to move outward along the axial direction of the roller under the action of the elastic device.
46. The self-moving cleaning robot according to claim 44, wherein the roller end cover is provided with a chamber for accommodating the pressure block, and a limiting structure is provided between an outer circumference of the pressure block and an inner wall of the chamber to prevent the pressure block from falling out.
47. The self-moving cleaning robot according to claim 42, wherein a rotating part controlled by a drive assembly is provided at the other end of the roller cavity, and an assembly groove for receiving and cooperating with the rotating part is provided at the other end of the roller.
48. The self-moving cleaning robot according to claim 42, wherein an outer side end face of the pressure block is provided with external grooves and/or protrusions.
49. The self-moving cleaning robot according to claim 42, wherein an outer side end face of the pressure block is provided with outwardly extending anti-rotation portions; anti-rotation grooves complementary to the anti-rotation portions are provided on an inner wall of the roller cavity.
50. The self-moving cleaning robot according to claim 42, further comprising a frame-shaped roller cover, wherein the roller cover is configured to confine the roller within the roller cavity of the roller bracket, and the roller protrudes from inside the frame of the roller cover.

51. The self-moving cleaning robot according to claim 42, wherein the roller bracket is rotatably connected to the body via a hinge shaft, and is configured to maintain contact between the roller and a working surface under its own gravity. 5
52. The self-moving cleaning robot according to claim 51, wherein the hinge shaft is provided on one side of the roller bracket, and a support base for supporting the hinge shaft is provided on the body; wherein self-moving cleaning robot further comprises a shaft cover configured to restrict the hinge shaft within the support base. 10
53. The self-moving cleaning robot according to claim 52, wherein: 15
- the other side of the roller bracket is provided with a limit buckle, and a corresponding position on the body is provided with a limit slot; or the other side of the roller bracket is provided with a limit slot, and a corresponding position on the body is provided with a limit buckle; 20
- the limit buckle extends into the limit slot, and the limit slot is configured to limit the rotation angle of the roller bracket relative to the body. 25
54. The self-moving cleaning robot according to claim 42, further comprising a scraper plate provided on the body, wherein the scraper plate is in contact and cooperation with the roller; the lower portion of the body is configured to extend towards a working surface and form a sealed area with the scraper plate, roller, and working surface, constituting a first air inlet. 30
55. The self-moving cleaning robot according to claim 54, wherein the lower portion of the body is provided with sealing edges configured to contact the working surface. 35
56. A roller assembly, comprising: 40
- a roller bracket with a roller cavity; 45
- a roller rotatably connected in the roller cavity of the roller bracket; wherein at least one end of the roller is equipped with a pressure block, which is rotatably connected to the roller and constructed to move axially along the roller under an action of an elastic device to seal against a side wall of the roller cavity. 50
57. A self-moving floor scrubbing robot, comprising: 55
- a body with a mounting cavity;
- a roller rotatably connected in the mounting cavity of the body;
- a scraper plate connected to the body and configured to contact the roller to scrape liquid off the roller; 60
- wherein the roller and scraper plate are configured such that when encountering obstacles, relative movement occurs between the roller and the scraper plate, causing the roller to detach from the scraper plate.
58. The self-moving floor scrubbing robot according to claim 57, wherein: 65
- the body comprises a floating part and a fixed part hinged together, the mounting cavity and the roller are arranged on the floating part, and the scraper plate is arranged on the fixed part; the roller is configured to maintain contact with a working surface under its own gravity and that of the floating part; 70
- the floating part is configured to rotate relative to the fixed part when encountering obstacles, causing the roller to move away from the scraper plate.
59. The self-moving floor scrubbing robot according to claim 58, wherein the floating part is configured to rotate relative to the fixed part under an obstructive force of obstacles. 75
60. The self-moving floor scrubbing robot according to claim 58, further comprising a driving mechanism provided between the floating part and the fixed part, the driving mechanism being configured to drive the floating part to rotate relative to the fixed part. 80
61. The self-moving floor scrubbing robot according to claim 58, wherein an elastic device is provided between the floating part and the fixed part, and the floating part is constructed to be preloaded on the working surface by the elastic device. 85
62. The self-moving floor scrubbing robot according to claim 57, further comprising a roller bracket with a roller cavity, wherein the roller is rotatably connected to the roller bracket; the roller bracket is pivotally connected to the mounting cavity of the body via a hinge shaft, and the roller bracket is configured to maintain contact between the roller and a working surface under its own gravity; and is constructed to move in a direction away from the scraper plate when encountering obstacles. 90
63. The self-moving floor scrubbing robot according to claim 57, wherein the scraper plate is movably connected to the body, further comprising a driving mechanism configured to drive the scraper plate to move away from the roller. 95
64. The self-moving floor scrubbing robot according to

claim 63, wherein the scraper plate is movably connected to the body via a gear and rack engagement structure.

- 65.** The self-moving floor scrubbing robot according to claim 63, further comprising an identification device configured to identify obstacles ahead; wherein the driving mechanism responds to a signal indicating the identification of obstacles ahead by the identification device to drive the scraper plate away from the roller. 5 10
- 66.** The self-moving floor scrubbing robot according to claim 65, wherein the identification device can be a camera or radar. 15
- 67.** The self-moving floor scrubbing robot according to claim 57, wherein the roller is configured to reduce its speed to 0-150 rpm when encountering obstacles.
- 68.** The self-moving floor scrubbing robot according to any one of claims 57 to 67, further comprising an air duct and a sewage tank, wherein the air duct is configured to extract the sewage scraped off the roller to the sewage tank. 20 25
- 69.** A control method for a robot, the robot employing the self-moving floor scrubbing robot according to any one of claims 57 to 68 and further comprising an identification device and a control unit, the method comprising the following steps: 30
- S1000, the control unit receiving a detection signal of front obstacles obtained by the identification device, and sending a control signal to a driving mechanism; 35
- S2000, the driving mechanism receiving the control signal and driving the roller to undergo relative movement with a squeegee to separate the roller from the squeegee. 40
- 70.** The control method according to claim 69, wherein in step S2000, the driving mechanism drives a floating part to move away from the scraper plate. 45
- 71.** The control method according to claim 69, wherein in step S2000, the driving mechanism drives the scraper plate to move away from the roller.
- 72.** The control method according to claim 69, wherein in step S1000, after the control unit receives the detection signal of front obstacles obtained by the identification device, the speed of the roller is controlled to 0-150 rpm. 50 55
- 73.** A cleaning system, comprising:

cleaning equipment, wherein the cleaning

equipment comprises a cleaning device, a duct system, and a sewage tank; the cleaning device is configured to clean a working surface; the sewage tank is configured to contain sewage after cleaning the working surface; and an air duct system is configured to extract sewage from the cleaning device to the sewage tank after cleaning the working surface; a base station, wherein the base station comprises a base station body with a housing cavity, and a drying system is arranged inside the base station body; wherein the housing cavity of the base station body is configured to accommodate the cleaning equipment, and the air duct system of the cleaning equipment is configured to suction dried airflow sent out by the drying system to dry the cleaning equipment.

- 74.** The cleaning system according to claim 73, wherein the drying system forms an air outlet in the housing cavity of the base station, and the air outlet is configured to blow the dried airflow towards the cleaning device in the housing cavity. 25
- 75.** The cleaning system according to claim 74, wherein the bottom of the housing cavity of the base station is provided with grooves for cooperating with at least a portion of the cleaning device. 30
- 76.** The cleaning system according to claim 74, wherein a base station fan is provided on the base station body, and the drying system includes a wind drying duct and a base station fan, and the base station fan is configured to create negative pressure in the wind drying duct; wherein the cleaning system further comprises a heating device, wherein airflow in the drying system is configured to be blown out from the air outlet after being heated by the heating device. 35 40
- 77.** The cleaning system according to claim 73, wherein an open end of the housing cavity has an expanded structure.
- 78.** The cleaning system according to claim 73, wherein guide wheels are provided on inner walls on opposite sides of the housing cavity for rolling cooperation with the side walls of the cleaning equipment. 45
- 79.** The cleaning system according to claim 77 or 78, wherein, with a forward direction of the cleaning device as a reference, the cleaning device as a whole is D-shaped, comprising a rectangular structure at the front end and a curved surface structure at the rear end; the cleaning device enters the housing cavity of the base station in a forward manner. 50 55
- 80.** The cleaning system according to claim 73, wherein

the cleaning equipment is a self-moving robot or a handheld device.

- 81.** A cleaning method, implemented by any one of the cleaning systems according to claims 73 to 80, comprising:

the cleaning device entering the housing cavity of the base station to clean a cleaning unit;
the cleaning device extracting the cleaned sewage to its sewage tank through its air duct system;
the drying system of the base station delivering dry airflow to the cleaning device;
the cleaning device extracting the dry airflow through its air duct system to dry the cleaning device.

- 82.** The cleaning method according to claim 81, wherein, in the step of cleaning the cleaning device, a clean water tank in the cleaning equipment supplies water to the cleaning device for cleaning; and/or the clean water tank of the base station supplies water to the cleaning device for cleaning.

- 83.** The cleaning method according to claim 82, wherein the cleaning device is a roller rotatably connected to the body, and in the step of cleaning the roller, water is supplied to the roller, and the roller is rotated for cleaning.

- 84.** The cleaning method according to claim 83, wherein, during a cleaning process of the roller, the air duct system of the cleaning equipment does not operate, and the water adsorbed by the roller during rotation is scraped by a squeegee to a groove of the base station, so that at least a portion of the cleaning device is immersed in the water in the groove for cleaning.

- 85.** The cleaning method according to claim 84, wherein, in the step of extracting sewage to the sewage tank, the air duct system of the cleaning equipment is opened, and the sewage scraped off by the squeegee during the rotation of the roller is extracted to its sewage tank.

- 86.** The cleaning method according to claim 85, wherein the sewage in the groove is adsorbed during the rotation of the roller, and the air duct system of the cleaning equipment extracts the sewage scraped off by the squeegee during the rotation of the roller to its sewage tank.

- 87.** The cleaning method according to claim 81, wherein, before the step of drying the cleaning equipment, further comprising the step of extracting sewage from the sewage tank of the cleaning equipment to

the sewage tank of the base station.

- 88.** The cleaning method according to claim 81, wherein, before drying the cleaning equipment, the steps of cleaning the cleaning device and extracting sewage back to the sewage tank are performed at least twice.

- 89.** The cleaning method according to claim 81, wherein, before drying the cleaning equipment, the main fan of the cleaning equipment operates at a first power to extract moisture contained in solid waste in a dust collection box; during the step of drying the cleaning equipment, the main fan of the cleaning equipment operates at a second power; wherein, the first power is greater than the second power.

- 90.** The cleaning method according to claim 81, wherein the air duct system of the cleaning equipment includes a second air duct located in the sewage tank, a first air duct communicating with the sewage tank and the cleaning device, and a third air duct communicating with the sewage tank and a fan assembly; the air duct system dries the first air duct, the sewage tank, and the third air duct by extracting the dry airflow delivered by the drying system.

- 91.** A base station, comprising:

the base station has a housing cavity, which is constructed to accommodate a cleaning device; a drying system, wherein the drying system forms an air outlet in the housing cavity of the base station, and the air outlet is configured to blow dry airflow towards the cleaning device located in the housing cavity.

- 92.** A cleaning equipment, comprising a body and a water tank set on the body, wherein the water tank comprises:

a body having an cavity;
an air duct, wherein the air duct is located in the cavity of the body, and air inlets and air outlets are formed at different positions of the body;
a water blocking part, wherein the water blocking part is located on an inner wall of the body adjacent to the air outlet, and is constructed to block a raised water level.

- 93.** The cleaning equipment according to claim 92, wherein the bottom of a box body is provided with a downwardly open fan housing cavity, and the fan housing cavity extends from the bottom of the box body to the top of the box body, and the air outlet is provided at the top of the fan housing cavity; an enclosing side wall of the fan housing cavity and a portion of the side wall of the box body enclose a second channel in the air duct.

94. The cleaning equipment according to claim 93, wherein the shape of the water blocking part matches the shape of the second channel, and the water blocking part is provided in the second channel between the fan housing cavity and the box body.

95. The cleaning equipment according to claim 94, wherein the water blocking part is a water baffle, and the water baffle is provided with through holes for airflow to pass through.

96. The cleaning equipment according to claim 95, wherein the water baffle is connected to the enclosing side wall of the fan housing cavity and the corresponding side wall of the box body.

97. The cleaning equipment according to claim 95, wherein the water baffle is provided at a position not higher than a preset water level line in the box body.

98. The cleaning equipment according to claim 94, wherein the water blocking part is constructed to float on a liquid surface inside the box body.

99. The cleaning equipment according to claim 98, wherein the water blocking part is made of flexible material.

100.

The cleaning equipment according to claim 92, wherein a water level detection device is also provided in a box body, and the water level detection device includes first and second detection probes, and is configured to be triggered when the first and second detection probes are conductive to liquid.

101.

The cleaning equipment according to claim 100, wherein the first and second detection probes are respectively spaced apart in an extending direction of the air ducts on opposite sides.

102.

The cleaning equipment according to claim 101, wherein the air inlet and the air outlet are respectively provided at opposite ends of the box body, and a first channel is formed inside the box body from the air inlet to a fan housing cavity.

103.

The cleaning equipment according to claim 101, wherein a receiving groove deviating from the extending direction of the air ducts is provided on a side wall of the box body at a position where the first channel and the second channel are communicated, and the receiving groove extends along a height direction of the side wall of the box body; the first detection probe and/or the second detection

probe are arranged in the receiving groove.

104.

The cleaning equipment according to claim 100, wherein the bottom end of one of the first detection probe and the second detection probe is not higher than a preset water level line, and the bottom end of the other is higher than the preset water level line.

105.

The cleaning equipment according to claim 100, wherein at least one of the first detection probe and the second detection probe has a gap with a side wall of the box body.

106.

The cleaning equipment according to any one of claims 92 to 105, wherein the water tank is a sewage tank.

107.

A water tank, comprising:

a body having an cavity;

an air duct, wherein the air duct is located in the cavity of the body, and air inlets and air outlets are formed at different positions of the body;

a water blocking part, wherein the water blocking part is located on an inner wall of the body adjacent to the air outlet, and is constructed to block a raised water level.

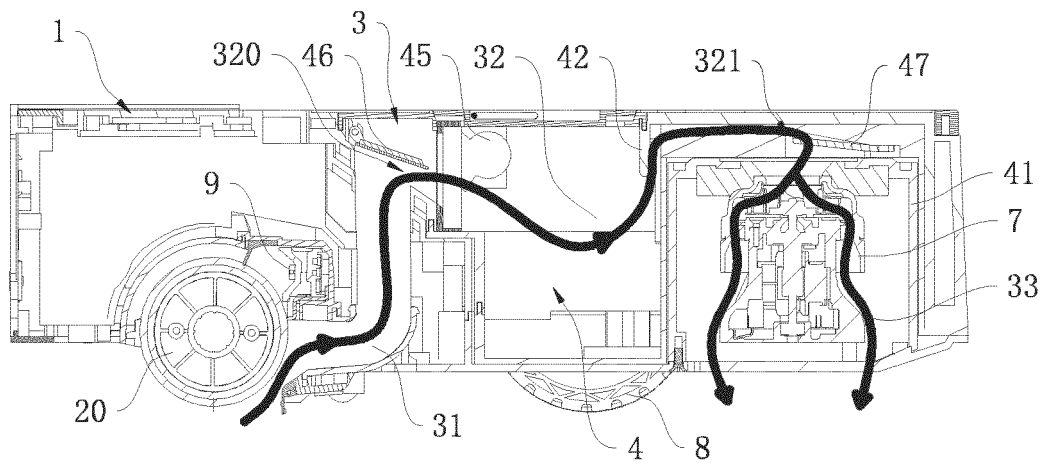


FIG. 1

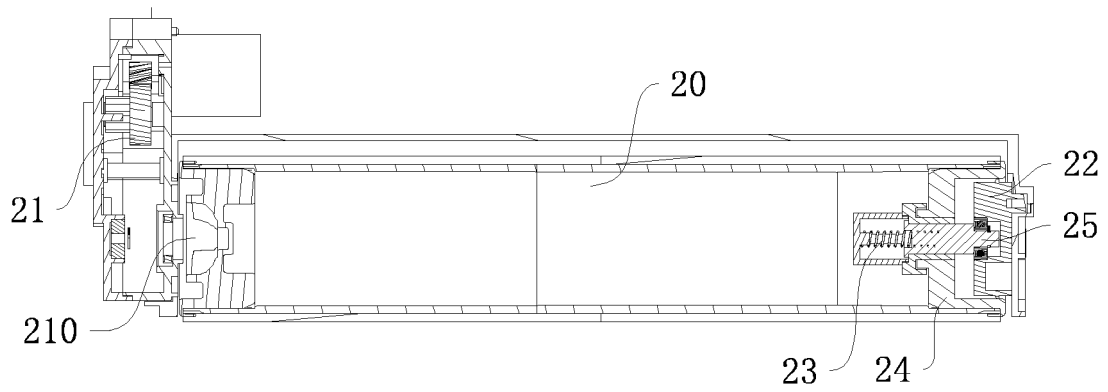


FIG. 2

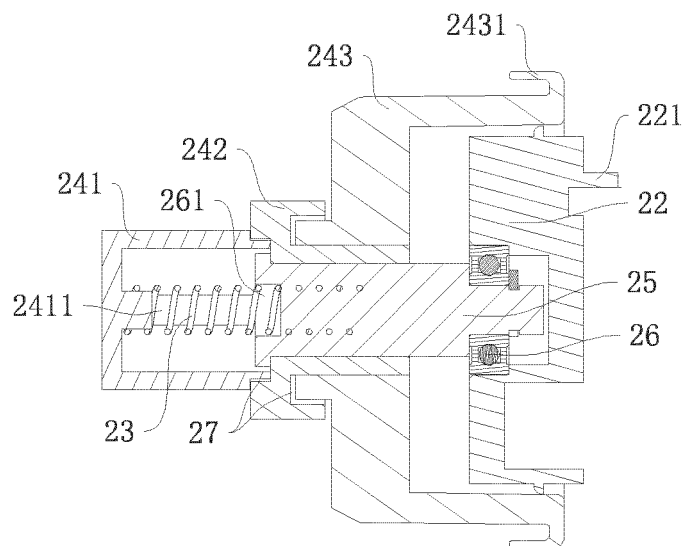


FIG. 3

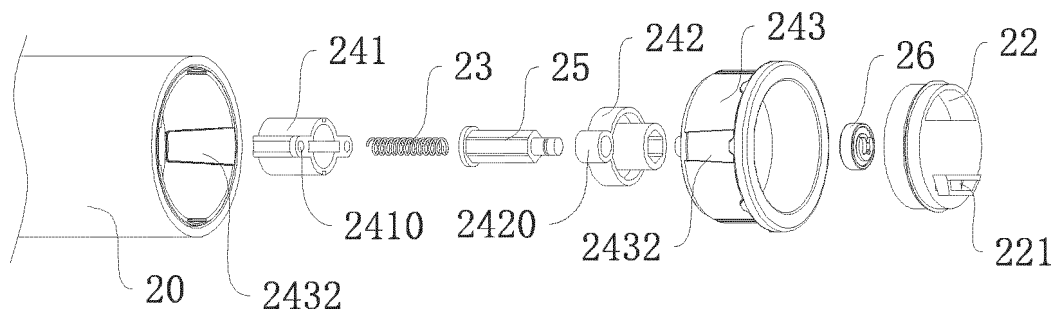


FIG. 4

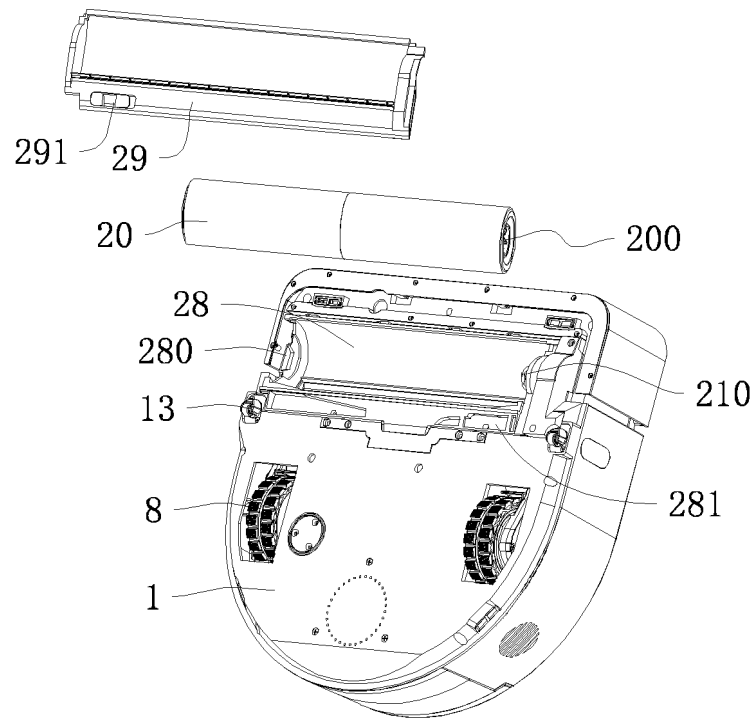


FIG. 5

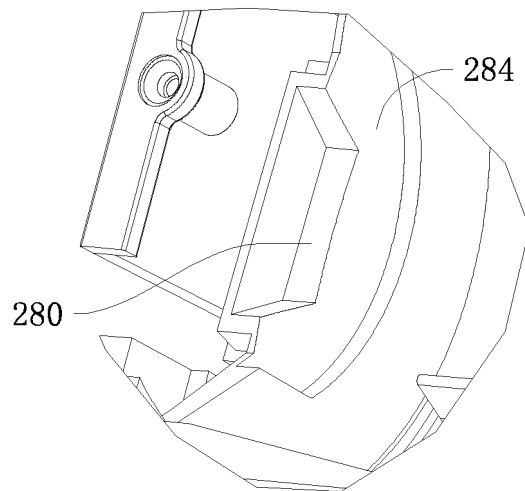


FIG. 6

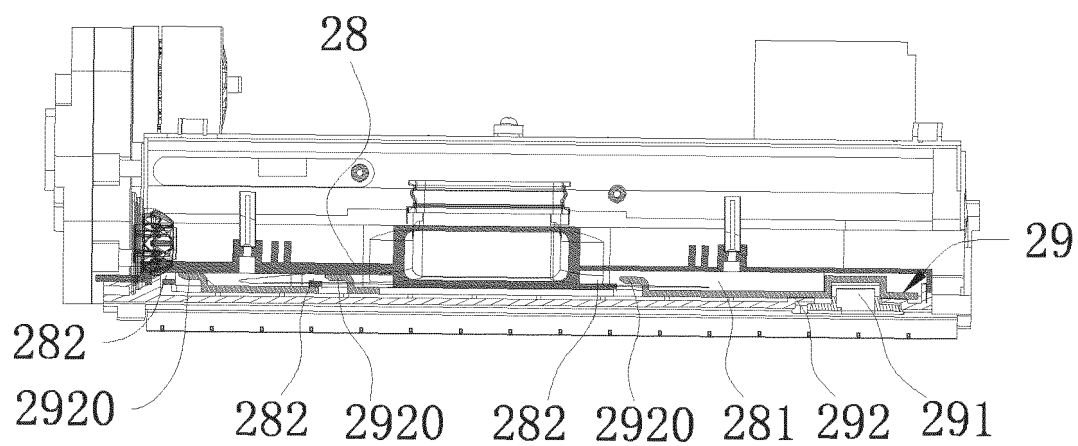


FIG. 7

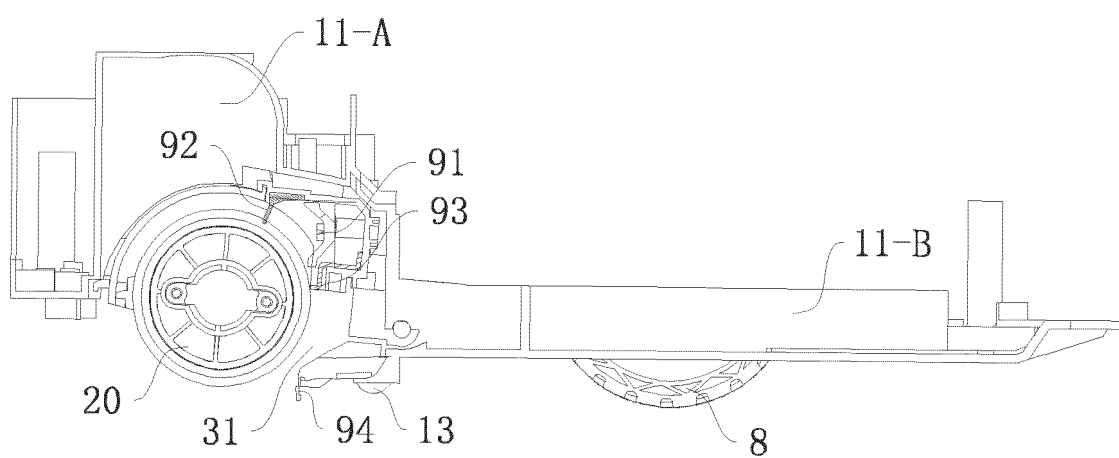


FIG. 8

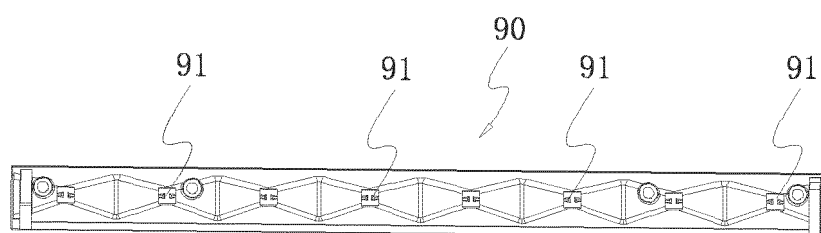


FIG. 9

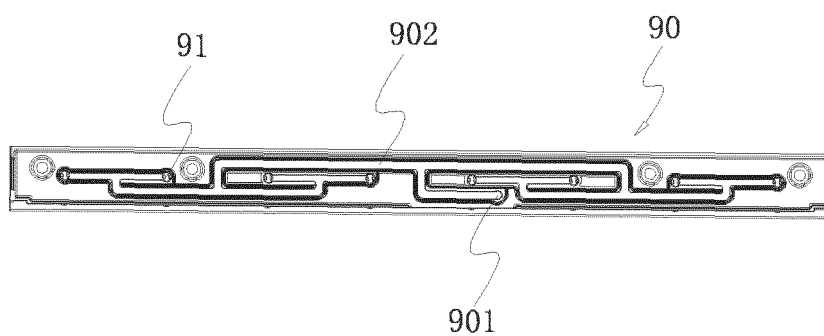


FIG. 10

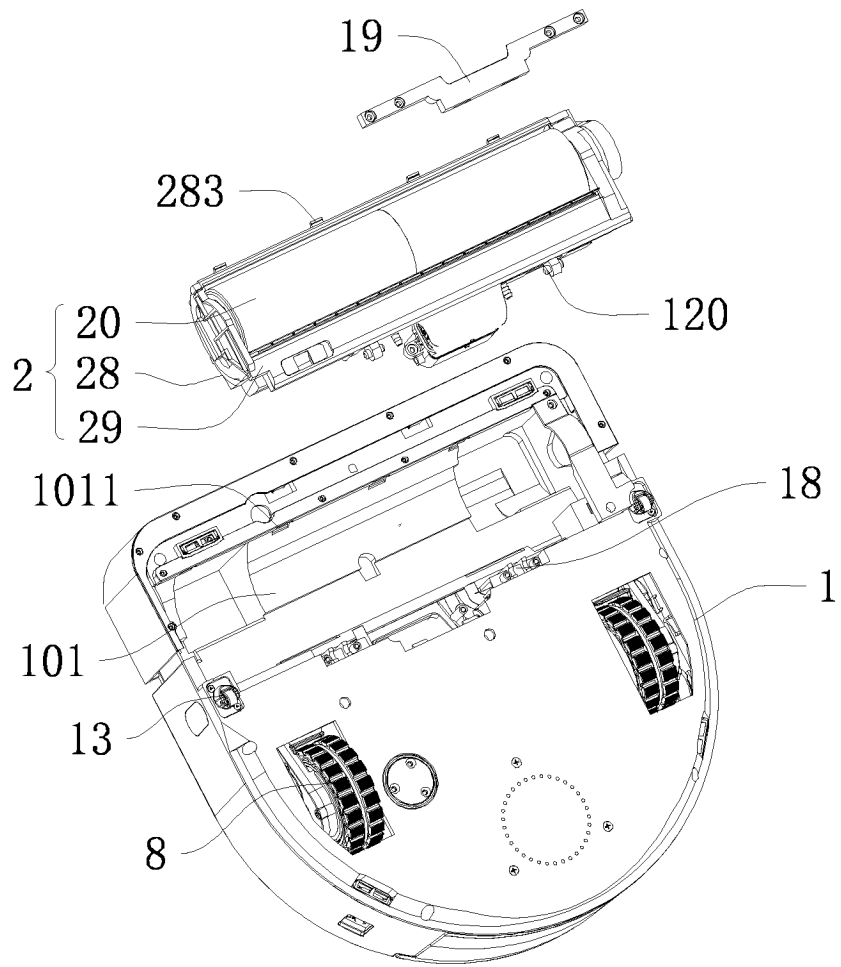


FIG. 11

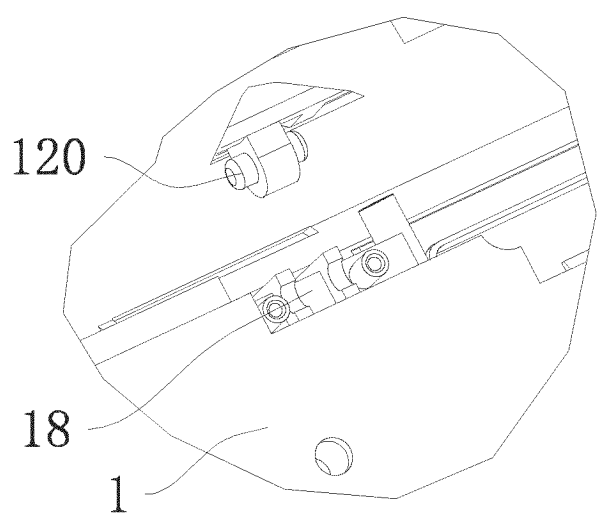


FIG. 12

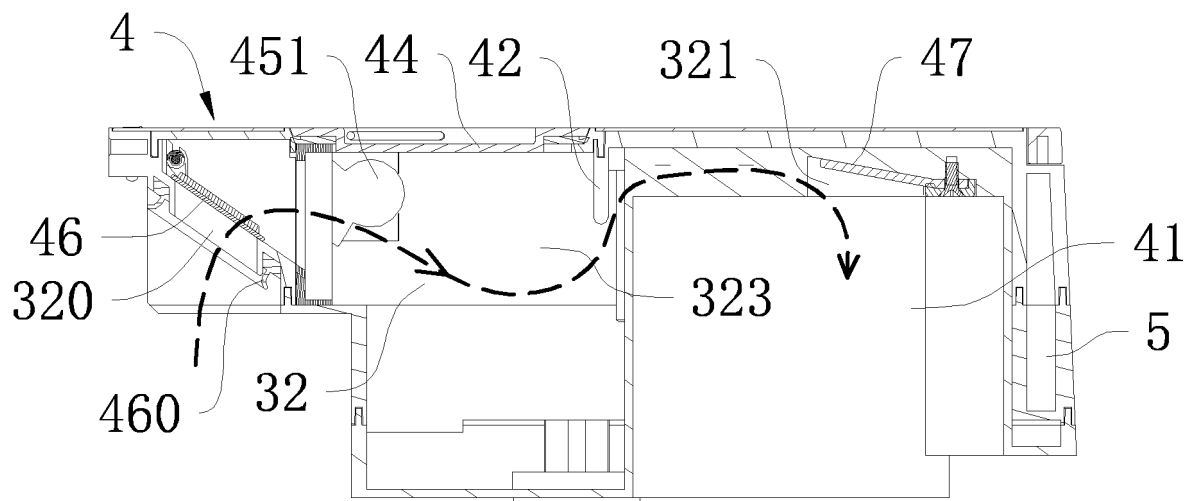


FIG. 13

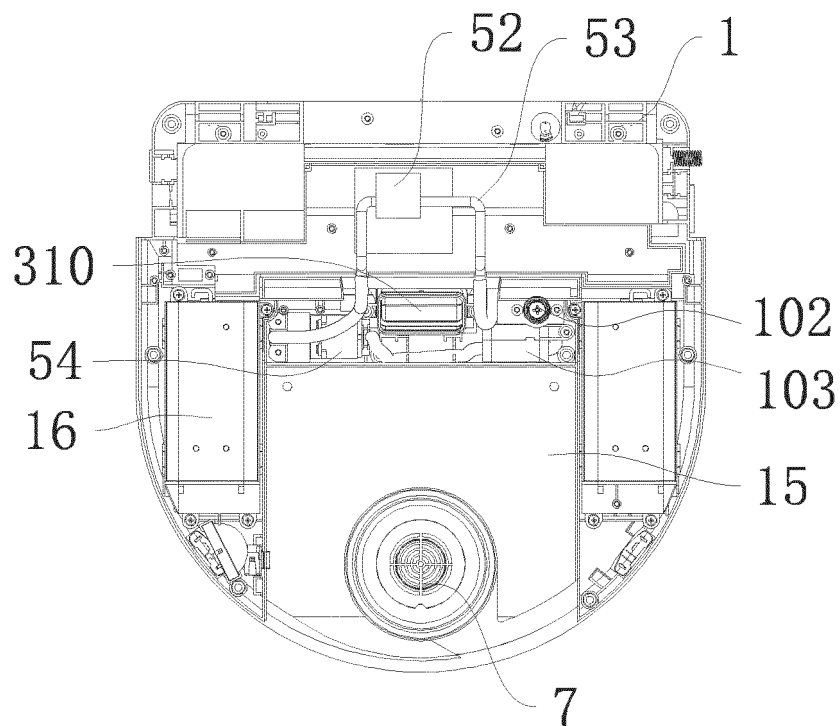


FIG. 14

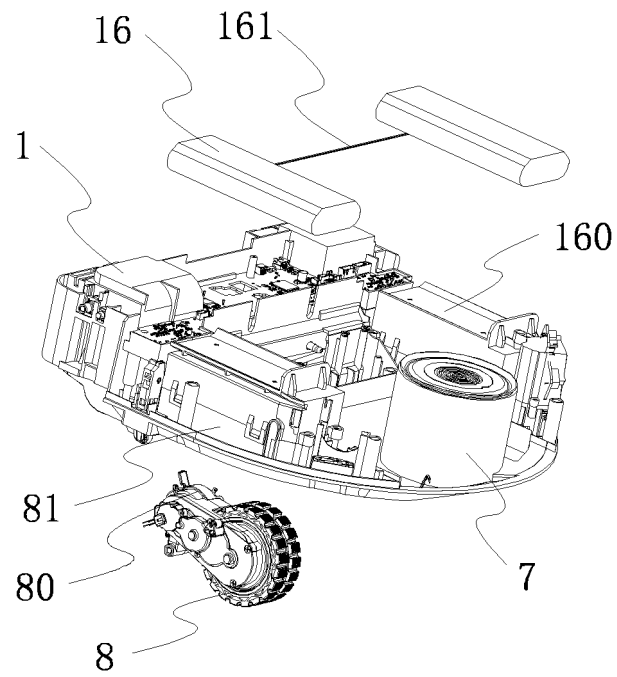


FIG. 15

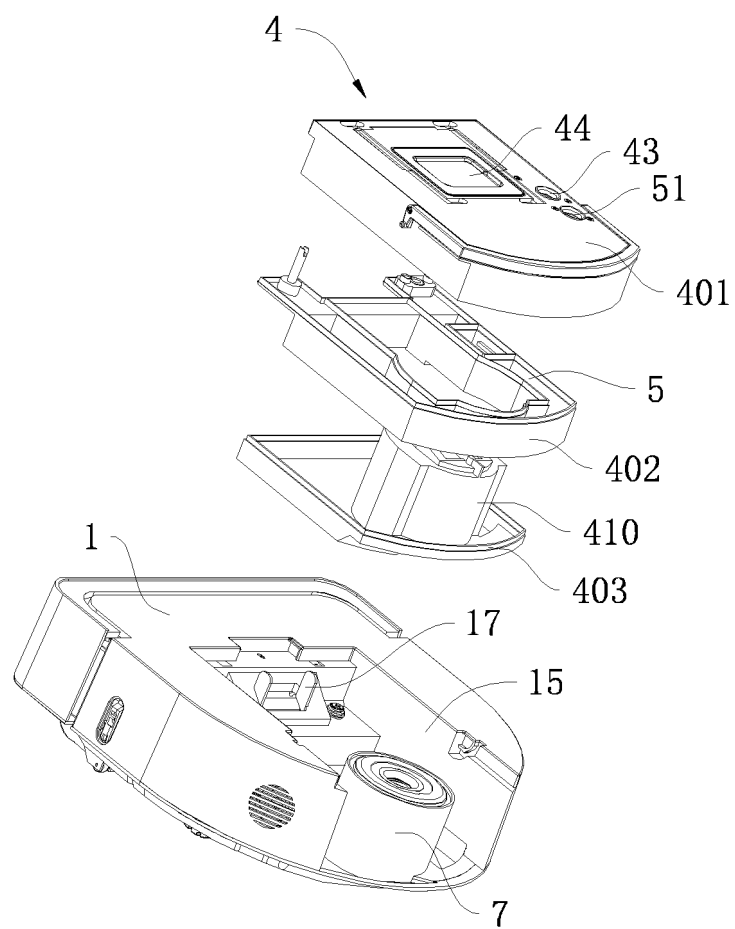


FIG. 16

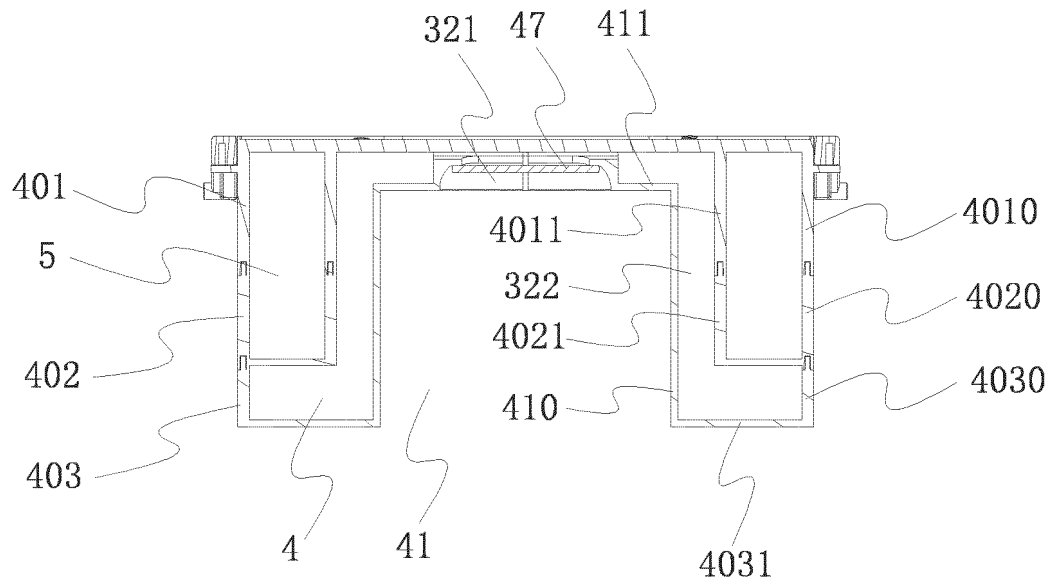


FIG. 17

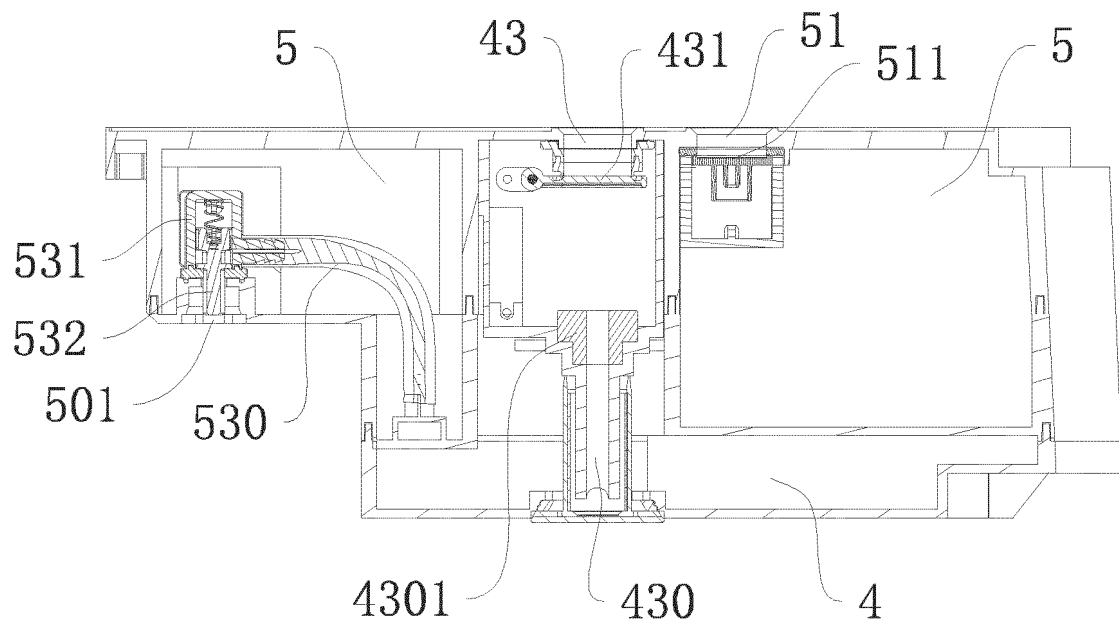


FIG. 18

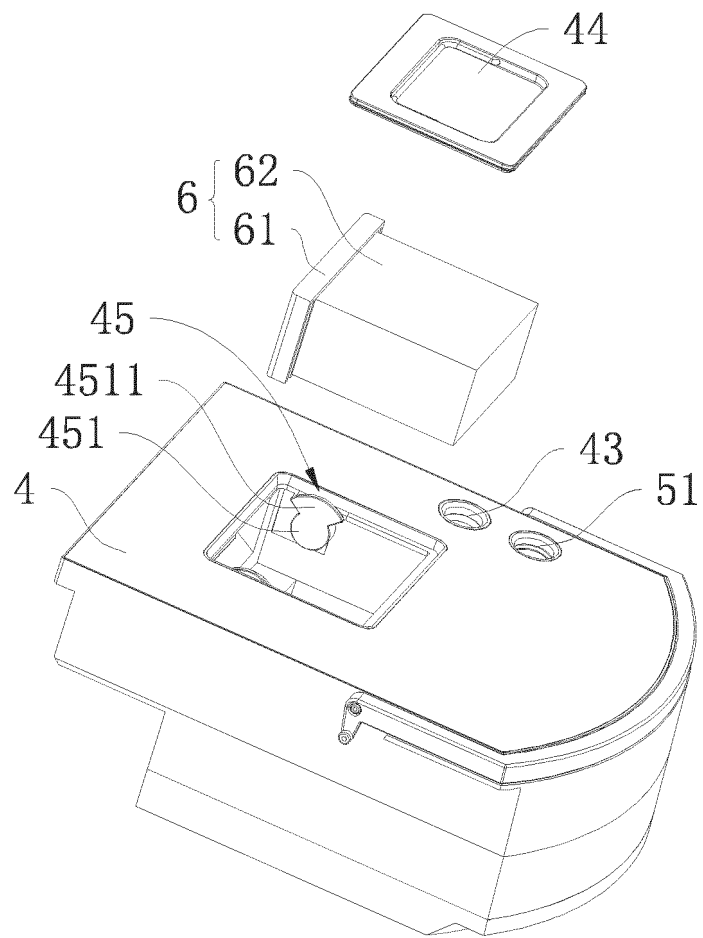


FIG. 19

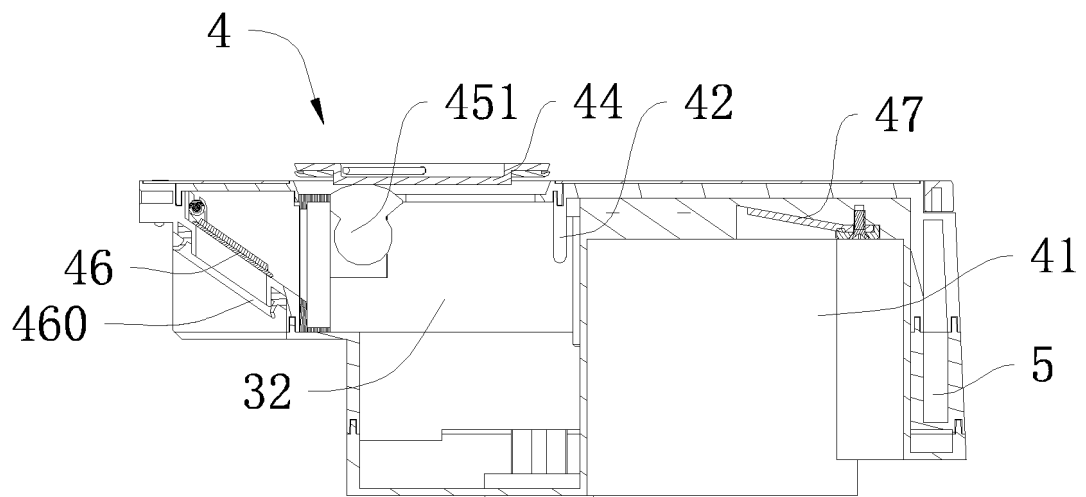


FIG. 20

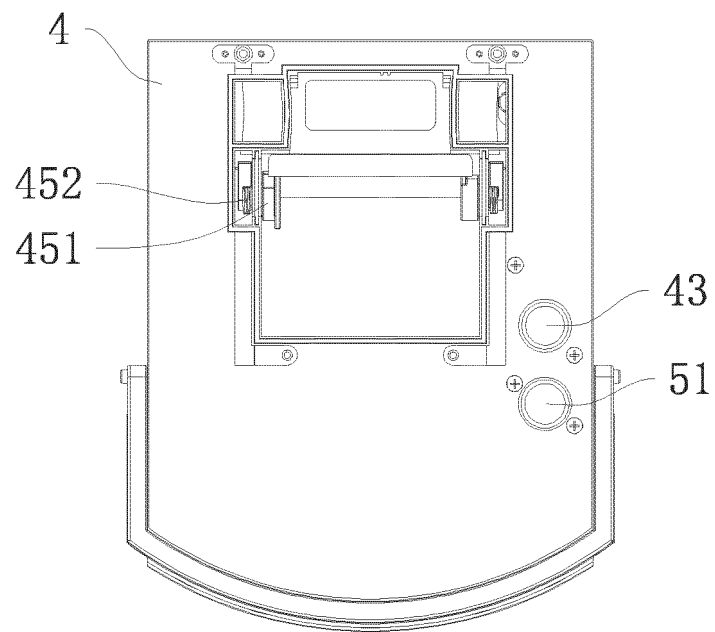


FIG. 21

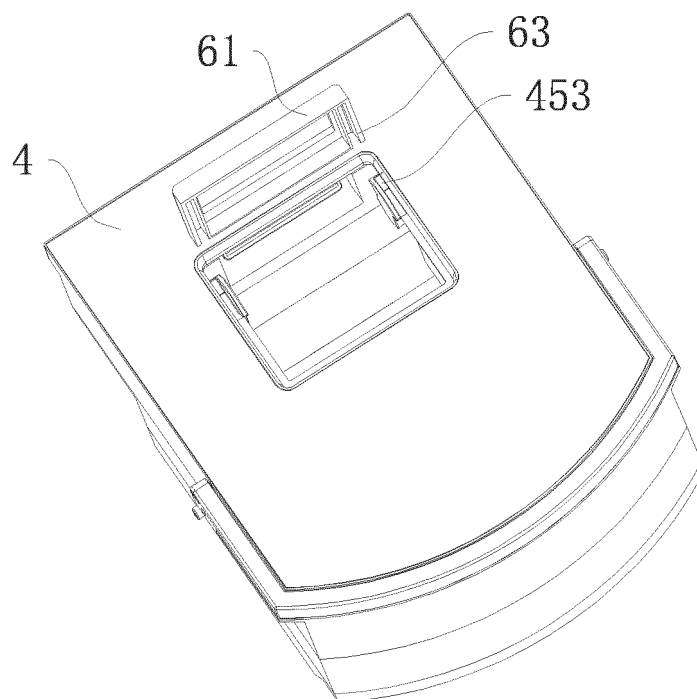


FIG. 22

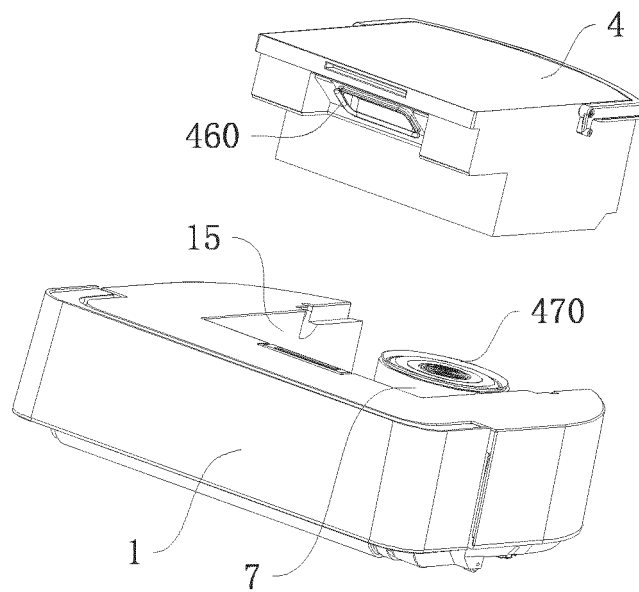


FIG. 23

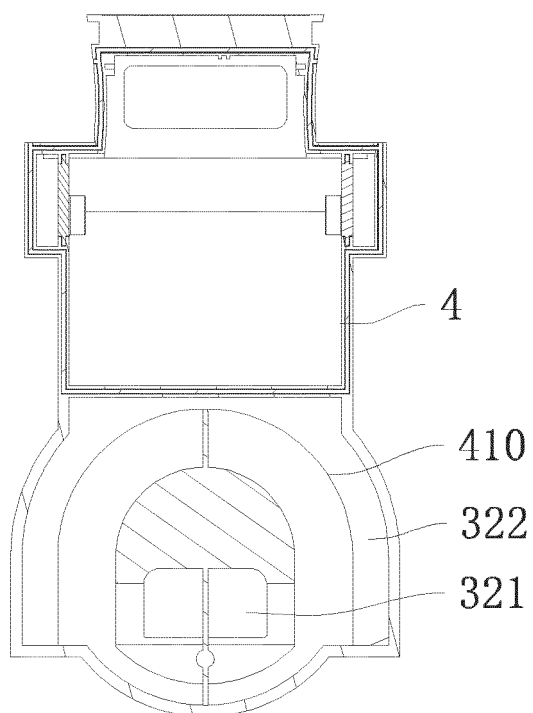


FIG. 24

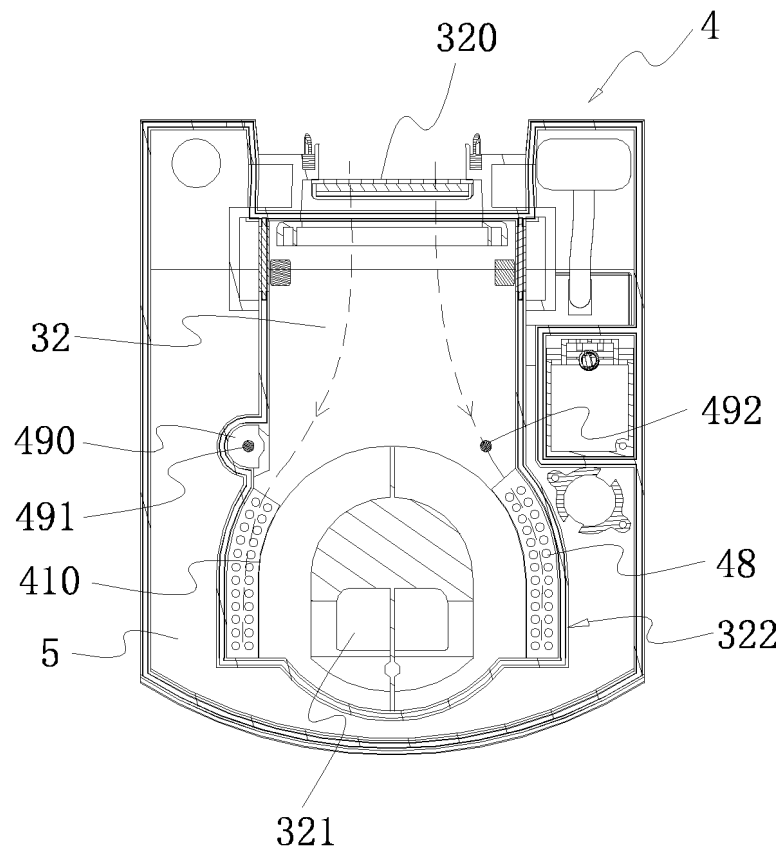


FIG. 25

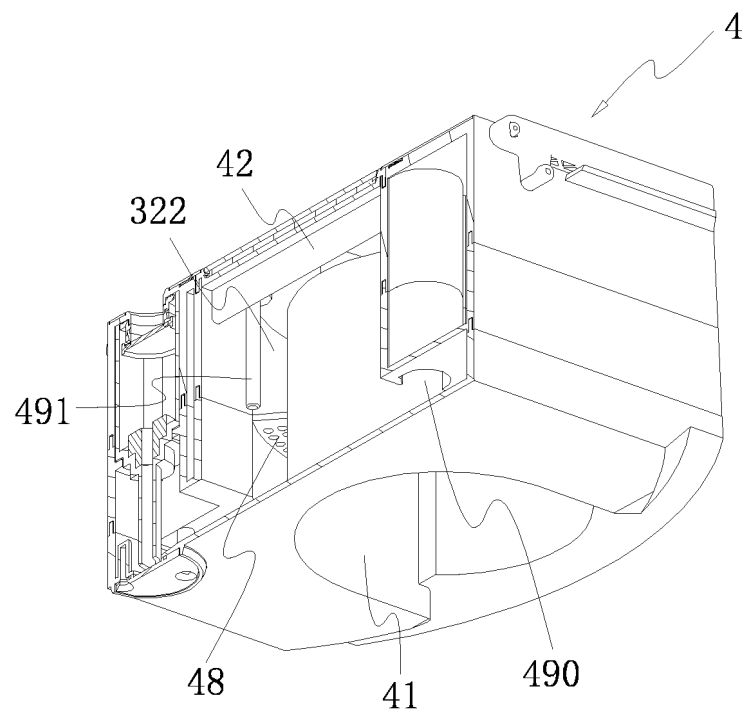


FIG. 26

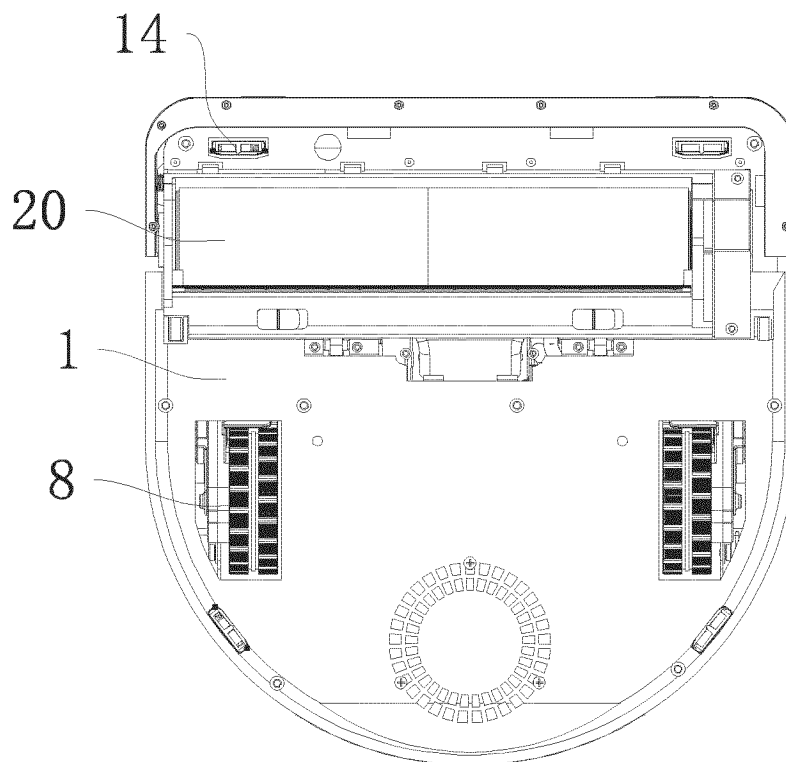


FIG. 27

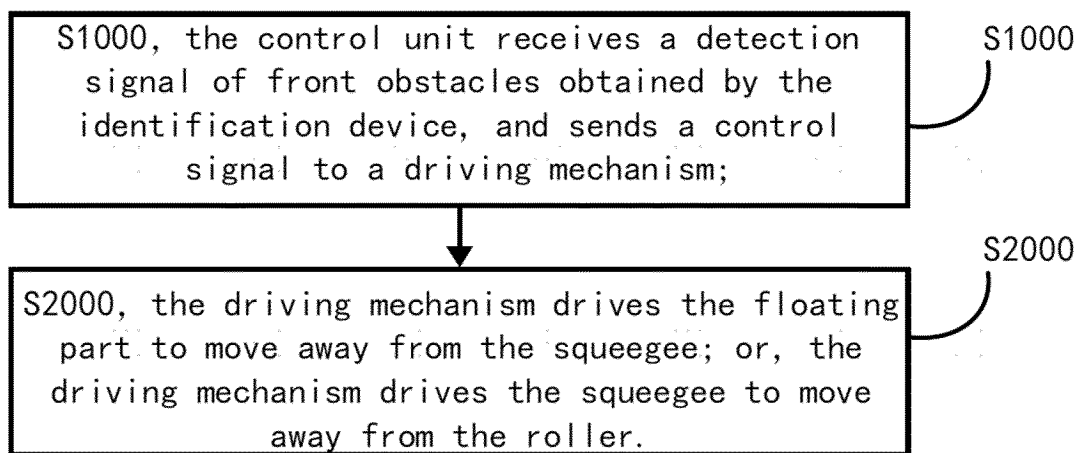


FIG. 28

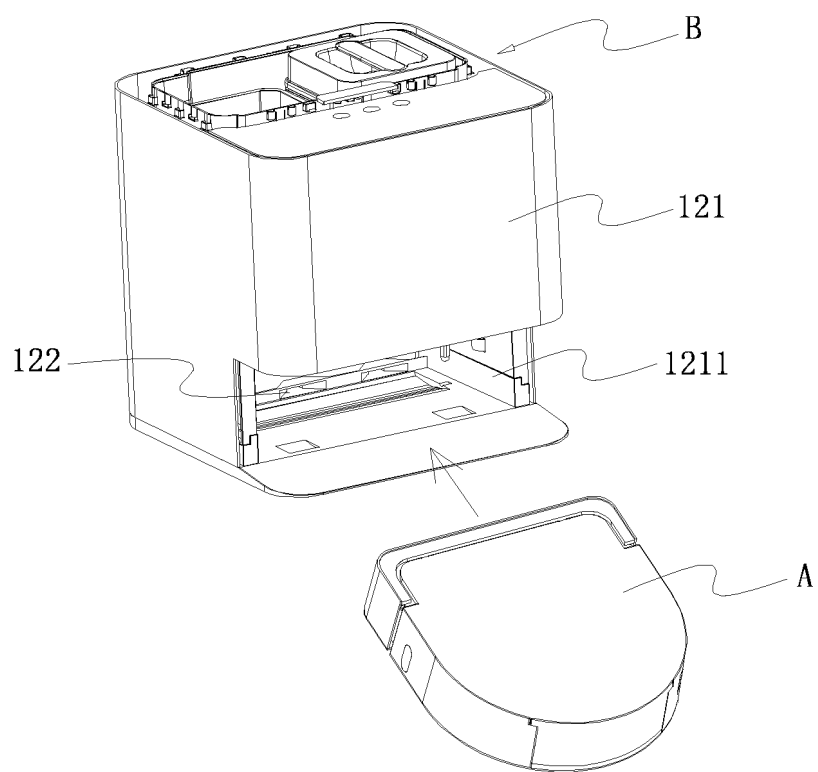


FIG. 29

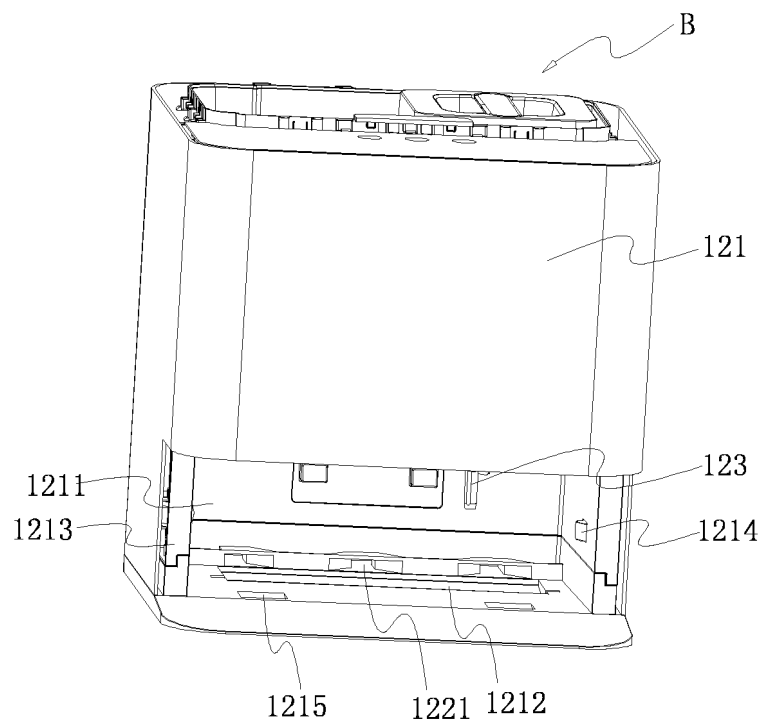


FIG. 30

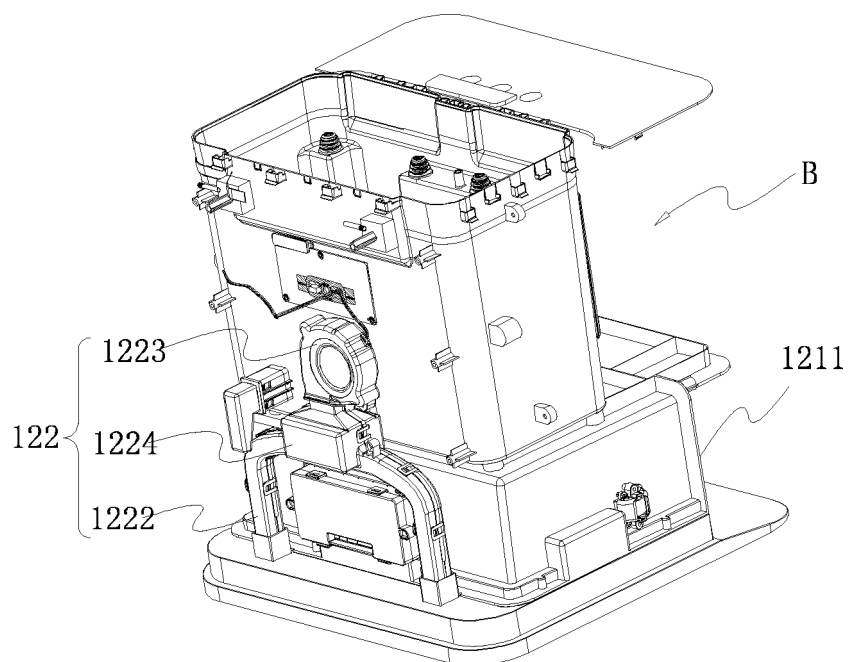


FIG. 31

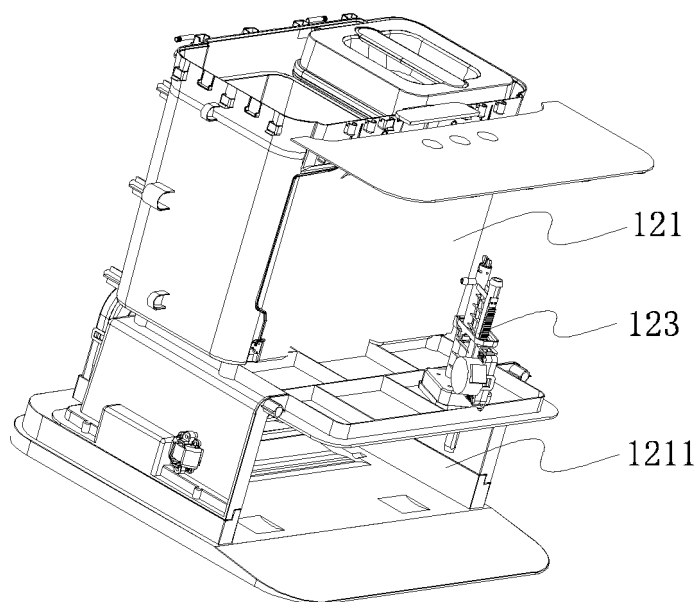


FIG. 32

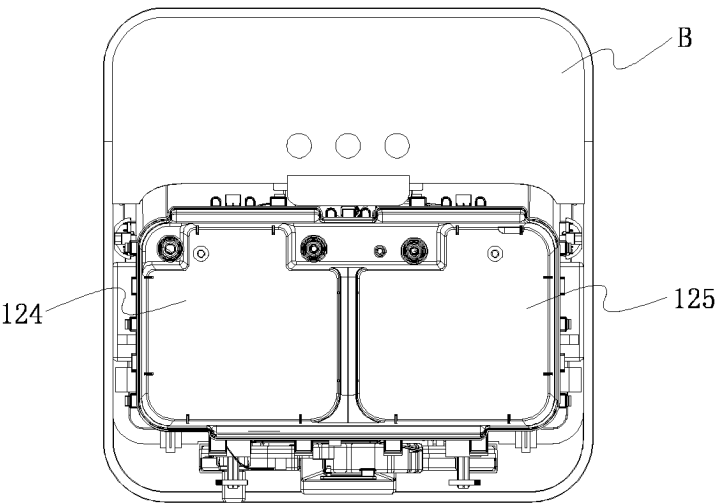


FIG. 33

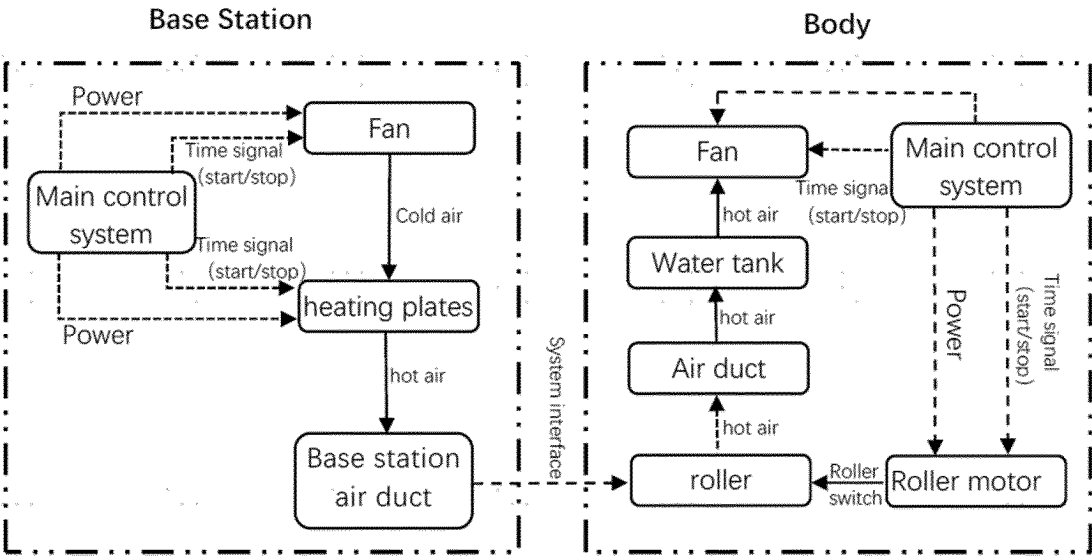


FIG. 34

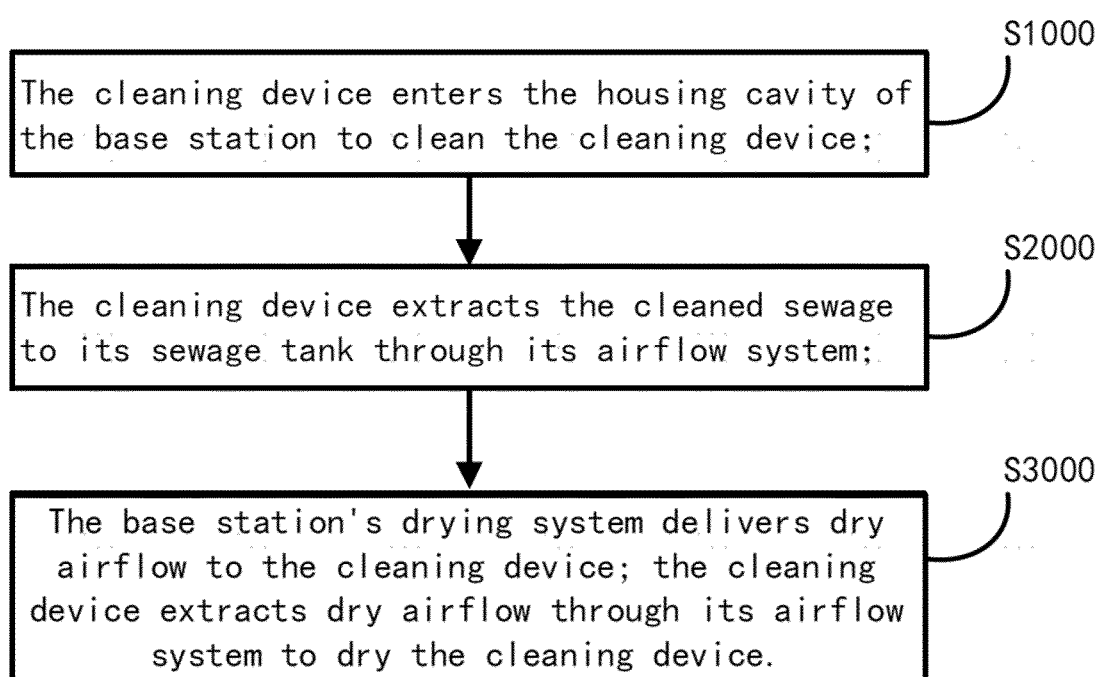


FIG. 35

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2022/121120

A. CLASSIFICATION OF SUBJECT MATTER

A47L 11/30(2006.01)i; A47L 11/29(2006.01)i; A47L 11/40(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A47L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNTXT; ENTXTC; ENTXT; VCN; VEN: 扫地机, 洗地机, 机器人, 清洁机, 水箱, 风道, 风路, 气流, 气道, 通道, 通路, 风机, 电机, 风扇, 抽吸, 负压, 侧壁, 滚刷, clean+, robot+, wash+, sweep+, box, tank, water, liquid, way, channel, path, air, wind, airflow, airway, fan, motor, aspirat+, extract, suct+, negative pressure, side, brush+, roll+, scrubber

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 110897561 A (SHENZHEN SILVER STAR INTELLIGENT TECHNOLOGY CO., LTD.) 24 March 2020 (2020-03-24) description, paragraphs 75-231, and figures 1-14b	1-16
X	CN 112137522 A (SHENZHEN JIEAO INTELLIGENT TECHNOLOGY CO., LTD.) 29 December 2020 (2020-12-29) description, paragraphs 43-99, and figures 1-4	1-16
X	CN 112120613 A (SHENZHEN JIEAO INTELLIGENT TECHNOLOGY CO., LTD.) 25 December 2020 (2020-12-25) description, paragraphs 38-94, and figures 1-4	1-16
A	CN 208625596 U (SHENZHEN ZHIYI SCIENCE & TECHNOLOGY CO., LTD.) 22 March 2019 (2019-03-22) entire document	1-16
A	EP 3524120 A2 (HIZERO TECHNOLOGIES CO., LTD.) 14 August 2019 (2019-08-14) entire document	1-16
A	JP 2008529752 A (IROBOT CORP.) 07 August 2008 (2008-08-07) entire document	1-16

☒ Further documents are listed in the continuation of Box C.
 ☒ See patent family annex.

* Special categories of cited documents:

“A” document defining the general state of the art which is not considered to be of particular relevance

“E” earlier application or patent but published on or after the international filing date

“L” document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

“O” document referring to an oral disclosure, use, exhibition or other means

“P” document published prior to the international filing date but later than the priority date claimed

“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

“&” document member of the same patent family

Date of the actual completion of the international search

06 December 2022

Date of mailing of the international search report

19 December 2022

Name and mailing address of the ISA/CN

China National Intellectual Property Administration (ISA/
CN)
No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing
100088, China

Facsimile No. (86-10)62019451

Authorized officer

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2022/121120

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 112190200 A (SHENZHEN HUAXIN INFORMATION TECHNOLOGY CO., LTD.) 08 January 2021 (2021-01-08) entire document	1-16
A	CN 113598665 A (UNOI (SHENZHEN) TECHNOLOGY CO., LTD.) 05 November 2021 (2021-11-05) entire document	1-16
PX	CN 216535175 U (SHENZHEN SILVER STAR INTELLIGENT TECHNOLOGY CO., LTD.) 17 May 2022 (2022-05-17) description, paragraphs 23-55, and figures 1-7	1-16
PX	CN 216876228 U (ECOVACS ROBOT CO., LTD.) 05 July 2022 (2022-07-05) description, paragraphs 79-347, and figures 1-35	1-16
PX	CN 216876229 U (ECOVACS ROBOT CO., LTD.) 05 July 2022 (2022-07-05) description, paragraphs 66-334, and figures 1-35	1-16
PX	CN 216535172 U (ECOVACS ROBOT CO., LTD.) 17 May 2022 (2022-05-17) description, paragraphs 64-332, and figures 1-35	1-16
PX	CN 216535171 U (ECOVACS ROBOT CO., LTD.) 17 May 2022 (2022-05-17) description, paragraphs 58-326, and figures 1-35	1-16
PX	CN 216535170 U (ECOVACS ROBOT CO., LTD.) 17 May 2022 (2022-05-17) description, paragraphs 73-341, and figures 1-35	1-16

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2022/121120

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

- [1] (1) Independent claim 1 sets forth a self-moving cleaning robot; independent claim 15 sets forth a water tank corresponding to the robot; and independent claim 16 sets forth a self-moving cleaning robot.
 - [2] (2) Independent claim 17 sets forth a self-moving cleaning robot; and claim 41 sets forth a cleaning system relating to claim 17.
 - [3] (3) Independent claim 42 sets forth a self-moving cleaning robot; and independent claim 56 sets forth a roller assembly.
 - [4] (4) Independent claim 57 sets forth a self-moving floor washing robot; and independent claim 69 sets forth a control method for the self-moving floor washing robot of claim 57.
 - [5] (5) Independent claim 73 sets forth a cleaning system; independent claim 81 sets forth a cleaning method implemented in claim 73; and claim 91 sets forth a base station.
 - [6] (6) Independent claim 92 sets forth a cleaning device; and independent claim 107 sets forth a water tank.
 - [7] The same technical features among claims 1, 17, and 92 are a machine body, a water tank, and an air channel, and the described features are not special technical features that make a contribution over the prior art. Therefore, claims 1, 17, and 92 lack unity.
 - [8] The same technical features between claims 42 and 57 are a machine body, an installation cavity, and a roller, and the described features are not special technical features that make a contribution over the prior art. Therefore, claims 42 and 57 lack unity.
 - [9] The same technical feature among claims 1, 17 and 92, and 42 and 57, is a machine body, which is common general knowledge in the art. Therefore, claims 1, 17 and 92, and 42 and 57, lack unity.
 - [10] Claims 1, 17, 42, 57, 92, and 73 do not share a same technical feature. Therefore, claims 1, 17, 42, 57, 92, and 73 do not share a special technical feature, and thus lack unity.
1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
 2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
 3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
 4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: **1-16**

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

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