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(54) **CLEANING TANK STRUCTURE, BASE STATION, AND CLEANING DEVICE**

(57) The present application relates to a cleaning tank structure, a base station and a cleaning device. The cleaning tank structure includes a cleaning tank, a water outlet opening, a filter element, and a protruding strip. The water outlet opening communicates with the cleaning tank. The filter element is accommodated in the water outlet opening. The protruding strip is located within the cleaning tank. The cleaning tank structure is configured such that: under a condition that a mopping cloth is placed on the protruding strip, the protruding strip scrapingly cleans the mopping cloth when relative movement occurs between the protruding strip and the mopping cloth, at least part of an inner surface of the

cleaning tank directly contacts the mopping cloth; and when the relative movement occurs between the cleaning tank and the mopping cloth, the mopping cloth applies a cleaning force to the inner surface of the cleaning tank to achieve self-cleaning of the cleaning tank. Therefore, during the process of cleaning the mopping cloth, the mopping cloth can clean the inner surface of the cleaning tank, thereby avoiding or reducing debris remaining on the inner surface of the cleaning tank, and further avoiding or reducing the probability of the generation of an unpleasant odor in the cleaning tank structure.

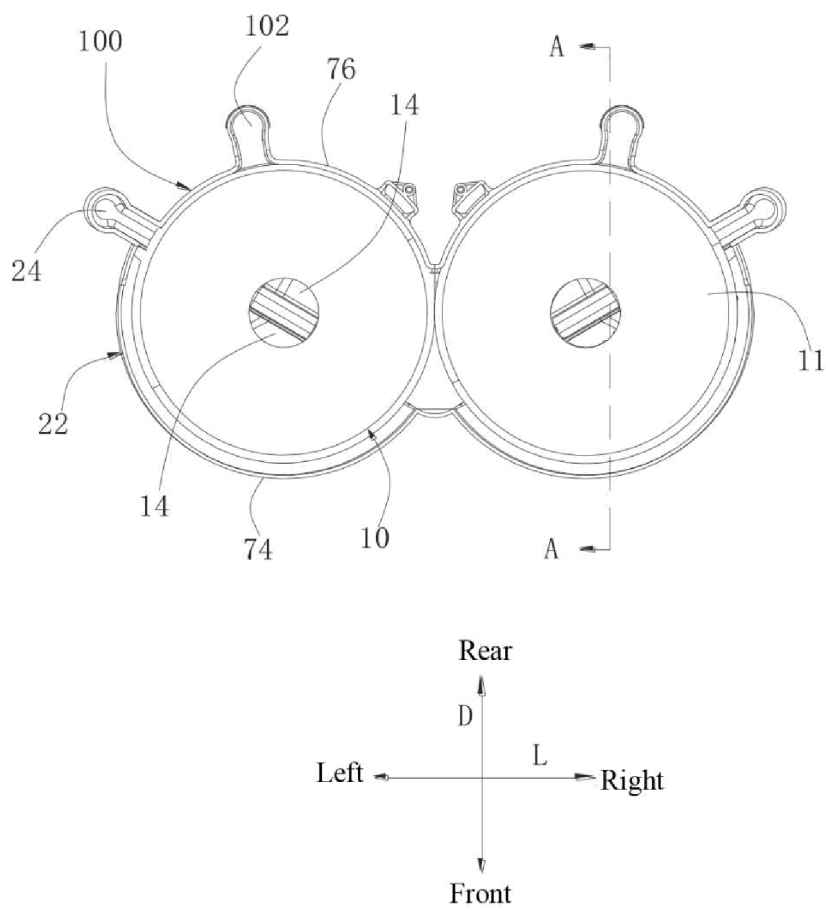


FIG. 1

Description

[0001] The present application claims priority to: Chinese Patent Application No. 2024101716648, with an invention title of "CLEANING TANK STRUCTURE, BASE STATION AND CLEANING DEVICE" and filed on February 05, 2024 to the China National Intellectual Property Administration, Chinese Patent Application No. 2023117391482, with an invention title of "CLEANING TANK STRUCTURE, BASE STATION AND CLEANING DEVICE" and filed on December 15, 2023 to the China National Intellectual Property Administration, Chinese Patent Application No. 2023234386508, with a utility model title of "CLEANING TANK STRUCTURE, BASE STATION AND CLEANING DEVICE" and filed on December 15, 2023 to the China National Intellectual Property Administration, Chinese Patent Application No. 2024101716648, with an invention title of "CLEANING TANK STRUCTURE, BASE STATION AND CLEANING DEVICE" and filed on February 05, 2024 to the China National Intellectual Property Administration, Chinese Patent Application No. 2024205412331, with a utility model title of "BASE STATION AND CLEANING DEVICE" and filed on March 15, 2024 to the China National Intellectual Property Administration, Chinese Patent Application No. 2024202833837, with a utility model title of "CLEANING TANK STRUCTURE AND CLEANING DEVICE" and filed on February 05, 2024 to the China National Intellectual Property Administration, Chinese Patent Application No. 2024204912316, with a utility model title of "CLEANING TANK STRUCTURE AND CLEANING DEVICE" and filed on March 13, 2024 to the China National Intellectual Property Administration, Chinese Patent Application No. 2024102990090, with an invention title of "CLEANING TANK STRUCTURE, CLEANING DEVICE AND CONTROL METHOD OF CLEANING DEVICE" and filed on March 14, 2024 to the China National Intellectual Property Administration, Chinese Patent Application No. 2024205214699, with a utility model title of "CLEANING TANK STRUCTURE AND CLEANING DEVICE" and filed on March 15, 2024 to the China National Intellectual Property Administration, Chinese Patent Application No. 2024205230687, with a utility model title of "CLEANING TANK STRUCTURE AND CLEANING DEVICE" and filed on March 15, 2024 to the China National Intellectual Property Administration, Chinese Patent Application No. 2024104090778, with an invention title of "CLEANING DEVICE" and filed on April 03, 2024 to the China National Intellectual Property Administration, Chinese Patent Application No. 2024111928652, with an invention title of "CLEANING TANK STRUCTURE AND CLEANING DEVICE" and filed on August 27, 2024 to the China National Intellectual Property Administration, Chinese Patent Application No. 2024221732371, with a utility model title of "CLEANING TANK STRUCTURE AND CLEANING DEVICE" and filed on September 04, 2024 to the China National Intellectual Property Administration. The above applications are incorporated herein by reference in their entireties.

TECHNICAL FIELD

[0002] The present application relates to the technical field of cleaning devices, and in particular, to a cleaning tank structure, a base station and a cleaning device.

BACKGROUND

[0003] In related technologies, a robotic vacuum cleaner is usually used in conjunction with a base station. The robotic vacuum cleaner can return to the base station for operations such as mopping cloth cleaning and charging. After long-term use of the base station, debris falling from the mopping cloth remains in the water tank of the base station, resulting in the generation of an unpleasant odor in the water tank.

SUMMARY

[0004] Embodiments of the present application provide a cleaning tank structure, a base station, and a cleaning device to address at least one of the above-mentioned technical problems.

[0005] A cleaning tank structure according to an embodiment of the present application includes:

- a cleaning tank;
- a water outlet opening, where the water outlet opening communicates with the cleaning tank;
- a filter element, where the filter element is accommodated in the water outlet opening;
- a protruding strip, where the protruding strip is located within the cleaning tank;
- the cleaning tank structure is configured such that:
 - under a condition that a mopping cloth is placed on the protruding strip, the protruding strip scrapingly cleans the mopping cloth when relative movement occurs between the protruding strip and the mopping cloth, at least part of an inner surface of the cleaning tank directly contacts the mopping cloth; and when relative movement occurs between the cleaning tank and the mopping cloth, the mopping cloth applies a cleaning force to the inner surface

of the cleaning tank to achieve self-cleaning of the cleaning tank.

[0006] In the above cleaning tank structure, under the condition that the mopping cloth is placed on the protruding strip, at least part of the inner surface of the cleaning tank directly contacts the mopping cloth. Therefore, when relative movement occurs between the cleaning tank and the mopping cloth during the process of cleaning the mopping cloth, the mopping cloth applies the cleaning force to the inner surface of the cleaning tank to achieve self-cleaning of the cleaning tank, causing the mopping cloth to clean the inner surface of the cleaning tank, thereby avoiding or reducing debris remaining on the inner surface of the cleaning tank, and further avoiding or reducing the probability of the generation of an unpleasant odor in the cleaning tank structure.

[0007] In some embodiments, the inner surface of the cleaning tank includes a bottom surface, the bottom surface includes at least one of a contact area and a non-contact area, and the cleaning tank structure is configured such that:

the contact area directly contacts the mopping cloth, so that the mopping cloth applies a cleaning force to the contact area;

under a condition that the mopping cloth is placed on the protruding strip, a vertical distance between the non-contact area and a plane where the mopping cloth is located ranges from (0, 3] mm.

[0008] In some embodiments, the cleaning tank structure further includes a water inlet opening, the bottom surface of the cleaning tank connects the water inlet opening with the water outlet opening, the bottom surface of the cleaning tank slopes from the water inlet opening toward the water outlet opening, the bottom surface of the cleaning tank is a conical shape, and the non-contact area includes at least part of a circular area, the circular area is a circular area formed with a center of the bottom surface of the cleaning tank as a circular center and a preset radius.

[0009] In some embodiments, the protruding strip divides the bottom surface of the cleaning tank into a first bottom surface area and a second bottom surface area;

the non-contact area includes one or a combination of a first non-contact area and a second non-contact area, the first non-contact area is a part of a first circular area, the first circular area is a circular area formed with a center of the first bottom surface area as a circular center and a first preset radius;

the second non-contact area is a part of a second circular area, the second circular area is a circular area formed with a center of the second bottom surface area as a circular center and a second preset radius.

[0010] In some embodiments, when the mopping cloth rotates relative to the cleaning tank, the mopping cloth applies a cleaning force to the inner surface of the cleaning tank to achieve self-cleaning of the cleaning tank; and/or,

the cleaning tank structure includes a base, and the cleaning tank is provided within the base; and/or, a compression amount between the mopping cloth and the bottom surface of the cleaning tank ranges from [0, T) mm, where T is a thickness of the mopping cloth; and/or,

the cleaning tank structure is configured such that under a condition that the mopping cloth is placed within the cleaning tank, a horizontal distance between an edge of the mopping cloth and a side wall of the cleaning tank ranges from (0, 8] mm.

[0011] In some embodiments, the cleaning tank structure is configured such that under a condition that the mopping cloth is placed within the cleaning tank, a compression amount between the edge of the mopping cloth and the side wall of the cleaning tank ranges from (0, 10] mm.

[0012] In some embodiments, the cleaning tank structure includes a retaining strip, the retaining strip encloses to form the cleaning tank; and/or,

the cleaning tank structure includes a water inlet opening, where a plurality of protruding strips are provided in the cleaning tank, the plurality of protruding strips and the bottom surface of the cleaning tank enclose to form a water delivery channel, the water delivery channel communicates the water inlet opening with the water outlet opening; or,

the cleaning tank structure includes a first retaining strip and a bottom plate, the first retaining strip and the bottom plate together enclose to form at least part of the cleaning tank, the at least part of the first retaining strip is movably connected to the bottom plate, the cleaning tank has an inlet-outlet, the at least part of the first retaining strip is able to move between a first position and a second position; under a condition of being in the first position, the at least part of the first retaining strip closes the inlet-outlet; under a condition of being in the second position, the at least part of the first retaining strip opens the inlet-outlet.

[0013] In some embodiments, among two of the protruding strips enclosing to form the water delivery channel, at least one of the protruding strips is provided with a first notch, the first notch communicates the water delivery channel with the cleaning tank, and/or;

among two of the protruding strips enclosing the water delivery channel, at least one of the protruding strips is provided with a through opening at an end of the at least one of the protruding strips near the water outlet opening, the through opening communicates the water delivery channel with the cleaning tank.

[0014] In some embodiments, the protruding strip is disposed to incline toward the water delivery channel.

[0015] In some embodiments, the water delivery channel includes a first section channel and a second section channel, the first section channel and the second section channel are sequentially connected along a direction from the water inlet opening to the water outlet opening; and relative to the water inlet opening, a depth of the second section channel is greater than or equal to a depth of the first section channel.

[0016] In some embodiments, along the direction from the water inlet opening to the water outlet opening, the depth of the first section channel gradually increases, and the depth of the second section channel gradually increases.

[0017] In some embodiments, the first section channel includes a first end and a second end, the second section channel includes a third end and a fourth end, the first end communicates with the water inlet opening, the second end communicates with the third end, and the fourth end communicates with the water outlet opening;

a depth H1 of the first end ranges from [1, 5] mm, depths H2 of the second end and the third end range from [2, 8] mm, a depth H3 of the fourth end ranges from [5, 15] mm, and $H1 \leq H2 \leq H3$.

[0018] In some embodiments, along the direction from the water inlet opening to the water outlet opening, an inclination angle of a bottom surface of the first section channel relative to a horizontal plane is less than an inclination angle of a bottom surface of the second section channel relative to the horizontal plane.

[0019] In some embodiments, the cleaning tank structure includes a drain pipe, the drain pipe communicates with the cleaning tank via the water outlet opening; and/or,

the cleaning tank includes a first side wall and a second side wall, the cleaning tank structure is provided with a water inlet opening and a station entry opening, the water inlet opening communicates with the cleaning tank, the first side wall and the second side wall are respectively connected to two opposite edges of the water inlet opening; and the first side wall is closer to the station entry opening than the second side wall;

a diameter of a circle where the first side wall is located is larger than a diameter of a circle where the second side wall is located, and a width of the first side wall along the horizontal direction is larger than a width of the second side wall along the horizontal direction.

[0020] In some embodiments, the cleaning tank structure includes a first retaining strip and a second retaining strip, the first retaining strip and the second retaining strip enclose to form the cleaning tank, the first side wall is a side wall of the first retaining strip facing the cleaning tank, the second side wall is a side wall of the second retaining strip facing the cleaning tank, and a height of the second retaining strip is greater than a height of the first retaining strip; and/or, a connecting portion between the second side wall and an edge of the water inlet opening is closer to a center of the cleaning tank than a connecting portion between the first side wall and the edge of the water inlet opening; and along a rotation direction of the mopping cloth, the connecting portion between the second side wall and the edge of the water inlet opening is located behind the connecting portion between the first side wall and the edge of the water inlet opening.

[0021] In some embodiments, the cleaning tank structure includes a first retaining strip, the first retaining strip encloses to form a part of the cleaning tank, the cleaning tank structure is provided with a water inlet opening and a station entry opening, the water inlet opening communicates with the cleaning tank, the first retaining strip includes a first portion and a second portion, the first portion connects the edge of the water inlet opening with the second portion, the second portion is disposed near the station entry opening; and relative to the bottom surface of the cleaning tank, a height of the second portion is less than a height of the first portion.

[0022] In some embodiments, the cleaning tank structure includes a second retaining strip, the second retaining strip encloses to form the other part of the cleaning tank, the first portion and the second retaining strip are respectively connected to two opposite edges of the water inlet opening; and relative to the bottom surface of the cleaning tank, a height of the second retaining strip is not less than the height of the first portion; the second retaining strip is provided with a detection opening, the cleaning tank structure includes a water level detection apparatus, the water level detection apparatus communicates with the cleaning tank via the detection opening, and/or;

the cleaning tank structure includes a third retaining strip, the third retaining strip connects the first retaining strip with the second retaining strip, the third retaining strip encloses to form the water inlet opening, and/or; the cleaning tank structure is provided with an air inlet, the second retaining strip is provided with a second notch, and the air inlet communicates with the cleaning tank through the second notch.

[0023] In some embodiments, the bottom surface of the cleaning tank includes a helical surface, the helical surface includes a starting end and a terminating end arranged along a helical direction of the helical surface, and the protruding strip is connected to the starting end;

5 the cleaning tank structure includes a drain structure, the drain structure is connected to the terminating end; the cleaning tank structure is configured such that: under a condition that the mopping cloth is placed on the protruding strip, the helical surface contacts the mopping cloth, and the helical direction of the helical surface is consistent with a movement direction of the mopping cloth.

10 **[0024]** In some embodiments, a plurality of protruding strips are provided within the cleaning tank, the plurality of protruding strips and the bottom surface of the cleaning tank enclose to form a water delivery channel, the cleaning tank structure includes a protruding member, the protruding member is disposed to protrude from the bottom surface of the cleaning tank, the protruding member includes a blocking surface facing the water delivery channel, and the blocking surface is spaced apart from and opposite to an opening of the water delivery channel.

15 **[0025]** In some embodiments, the cleaning tank structure includes a nano-layer, the nano-layer is provided on at least one of the bottom surface of the cleaning tank and a circumferential side surface of the cleaning tank, and/or;

the cleaning tank structure includes a base, a top surface of the base is formed with a first recess, the first recess constitutes the cleaning tank, and/or;

20 the top surface of the base is formed with a second recess, the second recess constitutes a water inlet opening, and the water inlet opening communicates with the cleaning tank.

[0026] In some embodiments, the protruding strip includes a first side surface, the first side surface faces a side wall of the cleaning tank and connects to the bottom surface of the cleaning tank, a minimum distance of the first side surface along a top of the protruding strip to the bottom surface of the cleaning tank is greater than or equal to 2 mm; and/or,

the filter element is detachably disposed within the water outlet opening.

[0027] In some embodiments, the cleaning tank structure further includes a water outlet opening and a spray head, the cleaning tank communicates with the water outlet opening, the spray head is disposed above the cleaning tank, and the spray head is configured to spray water toward the cleaning tank and/or the water outlet opening; and/or, the cleaning tank structure further includes a water inlet opening, and a top of the protruding strip includes a first segment, a second segment, and a third segment sequentially connected along a direction from the water inlet opening to the water outlet opening; and relative to the bottom surface of the cleaning tank, a height of the first segment is greater than a height of the third segment.

35 **[0028]** In some embodiments, the protruding strip is rotatably located within the cleaning tank;

where, the cleaning tank structure is configured such that: under a condition that the mopping cloth does not rotate, the protruding strip rotates, causing the relative movement to occur between the protruding strip and the mopping cloth for cleaning the mopping cloth; and/or

40 the cleaning tank structure is configured such that: under a condition that the mopping cloth rotates, a rotation direction of the protruding strip is the same as a rotation direction of the mopping cloth, and a rotation speed of the protruding strip is different from a rotation speed of the mopping cloth, causing the relative movement to occur between the protruding strip and the mopping cloth for cleaning the mopping cloth and cleaning the bottom surface of the cleaning tank; and/or

45 the cleaning tank structure is configured such that: under a condition that the mopping cloth rotates, a rotation direction of the protruding strip is opposite to a rotation direction of the mopping cloth, causing the relative movement to occur between the protruding strip and the mopping cloth for cleaning the mopping cloth and cleaning the bottom surface of the cleaning tank; and/or

50 the cleaning tank structure is configured such that: under a condition that the mopping cloth rotates, the protruding strip does not rotate, causing the relative movement to occur between the protruding strip and the mopping cloth for cleaning the mopping cloth and cleaning the bottom surface of the cleaning tank.

[0029] In some embodiments, the cleaning tank structure includes a cleaning member, the cleaning member includes a scraping portion and a combing portion, and the scraping portion and the combing portion are disposed to protrude from the bottom surface of the cleaning tank;

the cleaning tank structure is configured such that: under a condition that the mopping cloth is placed within the cleaning tank, the mopping cloth directly contacts the scraping portion and the combing portion, causing the combing portion to comb the mopping cloth and causing the scraping portion to scrapingly clean the mopping cloth.

[0030] In some embodiments, the protruding strip is disposed to protrude from the bottom surface of the cleaning tank, the protruding strip includes a first segment and a second segment; and relative to the bottom surface of the cleaning tank, a height of the second segment is greater than a height of the first segment; the cleaning tank structure is configured such that: under a condition that the mopping cloth is placed within the cleaning tank, the mopping cloth contacts the first segment, the second segment, and the contact area.

[0031] A cleaning tank structure according to an embodiment of the present application includes a cleaning tank, a water inlet opening, and a water outlet opening, where a plurality of protruding strips are provided in the cleaning tank, the plurality of protruding strips and the bottom surface of the cleaning tank enclose to form a water delivery channel, the water delivery channel communicates the water inlet opening with the water outlet opening;

the water delivery channel includes a first section channel and a second section channel, the first section channel and the second section channel are sequentially connected along a direction from the water inlet opening to the water outlet opening; and relative to the water inlet opening, a depth of the second section channel is greater than or equal to a depth of the first section channel;

the first section channel includes a first end and a second end, the second section channel includes a third end and a fourth end, the first end communicates with the water inlet opening, the second end communicates with the third end, and the fourth end communicates with the water outlet opening;

a depth H1 of the first end ranges from [1, 5] mm, depths H2 of the second end and the third end range from [2, 8] mm, a depth H3 of the fourth end ranges from [5, 15] mm, and $H1 \leq H2 \leq H3$.

[0032] A base station according to an embodiment of the present application includes the cleaning tank structure according to any one of the above embodiments.

[0033] A cleaning device according to an embodiment of the present application includes the base station according to the above embodiment.

[0034] In the above base station and cleaning device, under the condition that the mopping cloth is placed on the protruding strip, at least part of the inner surface of the cleaning tank directly contacts the mopping cloth. Therefore, when relative movement occurs between the cleaning tank and the mopping cloth during the process of cleaning the mopping cloth, the mopping cloth applies the cleaning force to the inner surface of the cleaning tank to achieve self-cleaning of the cleaning tank, causing the mopping cloth to clean the inner surface of the cleaning tank, thereby avoiding or reducing debris remaining on the inner surface of the cleaning tank, and further avoiding or reducing the probability of the generation of an unpleasant odor in the cleaning tank structure.

[0035] Additional aspects and advantages of the present application will be partially set forth in the following description, and will partially become apparent from the following description, or may be learned by practice of the present application.

[0036] It should be understood that the foregoing general description and the following detailed description are merely exemplary and explanatory, which are not intended to limit the present application.

BRIEF DESCRIPTION OF DRAWINGS

[0037] The accompanying drawings herein, which are incorporated in and constitute a part of this specification, illustrate embodiments consistent with the present application and together with the specification serve to explain the principles of the present application.

[0038] In order to illustrate technical solutions of embodiments of the present invention or technical solutions in related art more clearly, the drawings that need to be used in the description of the embodiments or the related art will be briefly introduced in the following. Obviously, for those of ordinary skill in the art, other drawings may be obtained according to these drawings without any creative effort.

FIG. 1 is a schematic structural diagram of a mopping cloth placed in a cleaning tank structure according to an embodiment of the present application;

FIG. 1a is a first schematic structural diagram of a cleaning tank structure according to an embodiment of the present application;

FIG. 2 is a cross-sectional view along line A-A in FIG. 1;

FIG. 3 is a schematic structural diagram of a mopping cloth according to an embodiment of the present application;

FIG. 4 is a second schematic structural diagram of a cleaning tank structure according to an embodiment of the present application;

FIG. 5 is an enlarged view of portion B in FIG. 4;

FIG. 6 is a third schematic structural diagram of a cleaning tank structure according to an embodiment of the

present application;

FIG. 7 is a fourth schematic structural diagram of a cleaning tank structure according to an embodiment of the present application;

FIG. 8 is a fifth schematic structural diagram of a cleaning tank structure according to an embodiment of the present application;

FIG. 9 is a sixth schematic structural diagram of a cleaning tank structure according to an embodiment of the present application;

FIG. 10 is a seventh schematic structural diagram of a cleaning tank structure according to an embodiment of the present application;

FIG. 11 is an eighth schematic structural diagram of a cleaning tank structure according to an embodiment of the present application;

FIG. 12 is a cross-sectional view along line C-C in FIG. 11;

FIG. 13 is a cross-sectional view along line M-M in FIG. 11;

FIG. 14 is a ninth schematic structural diagram of a cleaning tank structure according to an embodiment of the present application;

FIG. 15 is a cross-sectional view along line I-I in FIG. 14;

FIG. 16 is an enlarged view of portion J in FIG. 15;

FIG. 17 and FIG. 18 are schematic structural diagrams of a filter element according to an embodiment of the present application;

FIG. 19 is a tenth schematic structural diagram of a cleaning tank structure according to an embodiment of the present application;

FIG. 20 is an eleventh schematic structural diagram of a cleaning tank structure according to an embodiment of the present application;

FIG. 21 is a partial schematic structural diagram of a bottom surface of a water delivery channel according to an embodiment of the present application;

FIG. 22 is a schematic structural diagram of a bottom surface of a cleaning tank according to an embodiment of the present application;

FIG. 23 is a first partial cross-sectional schematic view of a bottom surface of the cleaning tank according to an embodiment of the present application;

FIG. 24 is a second partial cross-sectional schematic view of a bottom surface of the cleaning tank according to an embodiment of the present application;

FIG. 25 is a third partial cross-sectional schematic view of a bottom surface of the cleaning tank according to an embodiment of the present application;

FIG. 26 is a fourth partial cross-sectional schematic view of a bottom surface of the cleaning tank according to an embodiment of the present application;

FIG. 27 is a fifth partial cross-sectional schematic view of a bottom surface of the cleaning tank according to an embodiment of the present application;

FIG. 28 is a twelfth schematic structural diagram of a cleaning tank structure according to an embodiment of the present application;

FIG. 29 is a schematic structural diagram of a helical surface according to an embodiment of the present application;

FIG. 30 is a thirteenth schematic structural diagram of a cleaning tank structure according to an embodiment of the present application;

FIG. 31 is a fourteenth schematic structural diagram of a cleaning tank structure according to an embodiment of the present application;

FIG. 32 is a schematic structural diagram of a base station according to an embodiment of the present application;

FIG. 33 is a schematic diagram showing a relationship between a vertical compression amount between a mopping cloth and a bottom surface of a cleaning tank and cleaning effect according to an embodiment of the present application;

FIG. 34 and FIG. 35 are schematic diagrams showing a relationship between a horizontal compression amount between a mopping cloth and a bottom surface of a cleaning tank and cleaning effect according to an embodiment of the present application;

FIG. 36 is a schematic structural diagram of a cleaning tank structure provided with a spray head according to an embodiment of the present application;

FIG. 37 is a schematic structural diagram of a protruding strip according to an embodiment of the present application;

FIG. 38 is another schematic three-dimensional structural diagram of a cleaning tank structure according to an embodiment of the present application;

FIG. 39 is yet another schematic three-dimensional structural diagram of a cleaning tank structure according to an embodiment of the present application;

FIG. 40 is a schematic diagram of connection of a protruding strip and a drive member according to an embodiment of the present application;

FIG. 41 is a schematic exploded structural diagram of a cleaning tank structure provided with a movable filter element according to an embodiment of the present application;

FIG. 42 is a top view of a cleaning tank structure provided with a combing portion according to an embodiment of the present application;

FIG. 43 is a schematic structural diagram of a protruding strip provided in a cleaning tank structure according to an embodiment of the present application.

Reference signs:

[0039] 100, cleaning tank structure; 1001, bottom plate; 10 cleaning tank; 101, bottom surface; 101a, first bottom surface area; 101b, second bottom surface area; 102, inlet-outlet; 11, mopping cloth; 12, pile; 13, base plate; 14, protruding strip; 141, first segment; 142, second segment; 143, third segment; 15, drive member; 151, drive shaft; 152, motor; 16, contact area; 17, first side surface; 18, non-contact area; 181, first non-contact area; 182, second non-contact area; 19, second side surface; 20, base; 22, retaining strip; 23, combing portion; 24, water inlet opening; 25, spray head; 26, water outlet opening; 28, water delivery channel; 30, front tank; 32, first through opening; 34, rear tank; 36, first notch; 38, through opening; 40, first section channel; 42, second section channel; 44, connecting section channel; 46, first end; 48, second end; 50, third end; 52, fourth end; 54, filter element; 541, filtering portion; 542, flow channel portion; 56, filtering chamber; 58, filtering opening; 60, handle; 62, drain pipe; 64, recess; 66, protrusion portion; 68, communication opening; 70, accommodating cavity; 72, water pipe joint; 73, first side wall; 74, first retaining strip; 75, second side wall; 76, second retaining strip; 78, station entry opening; 80, second connecting portion; 82, first connecting portion; 88, first portion; 90, second portion; 92, detection opening; 94, water level detection apparatus; 96, third retaining strip; 98, second notch; 102, air inlet; 104, helical surface; 106, starting end; 108, terminating end; 110, drain structure; 112, drain channel; 1120, mounting opening; 1121, filtering section; 1122, flow channel section; 114, inclined surface; 116, protruding member; 118, blocking surface; 120, guiding surface; 122, housing; 124, accommodating space; 126, climbing plate; 128, top surface; 130, first recess; 132, second recess; 200, base station.

DESCRIPTION OF EMBODIMENTS

[0040] In order to make the objectives, technical solutions, and advantages of the embodiments of the present application clearer, the following will provide a clear and comprehensive description of the technical solutions in the embodiments of the present application. Obviously, the described embodiments are a part of the embodiments of the present invention, not all of them. Based on the embodiments of the present application, all other embodiments obtained by those of ordinary skill in the art without any creative effort are within the protection scope of the present application.

[0041] Referring to FIG. 1 to FIG.6, a cleaning tank structure 100 according to an embodiment of the present application includes a cleaning tank 10, a water outlet opening 26, a filter element 54, and a protruding strip 14. The water outlet opening 26 communicates with the cleaning tank 10, and the filter element 54 is accommodated in the water outlet opening 26 to filter debris. The protruding strip 14 is located within the cleaning tank 10. The cleaning tank structure 100 is configured such that: under a condition that a mopping cloth 11 is placed on the protruding strip 14, the protruding strip 14 scrapingly cleans the mopping cloth 11 when relative movement occurs between the protruding strip 14 and the mopping cloth 11, at least part of an inner surface of the cleaning tank 10 directly contacts the mopping cloth 11; and when relative movement occurs between the cleaning tank 10 and the mopping cloth 11, the mopping cloth 11 applies a cleaning force to the inner surface of the cleaning tank 10 to achieve self-cleaning of the cleaning tank 10. The relative movement between the protruding strip 14 and the mopping cloth 11 may be that the protruding strip 14 rotates relative to the mopping cloth 11 while the mopping cloth 11 is stationary, or that the mopping cloth 11 rotates relative to the protruding strip 14 while the protruding strip 14 is stationary. It may also be that both the protruding strip 14 and the mopping cloth 11 are rotatable, and their rotation directions may be opposite, thereby improving cleaning efficiency. The relative movement between the cleaning tank 10 and the mopping cloth 11 may be that the cleaning tank 10 rotates relative to the mopping cloth 11 while the mopping cloth 11 is stationary, or that the mopping cloth 11 rotates relative to the cleaning tank 10 while the cleaning tank 10 is stationary. It may also be that both the cleaning tank 10 and the mopping cloth 11 are rotatable, and their rotation directions may be opposite, thereby improving cleaning efficiency. The inner surface of the cleaning tank 10 includes a bottom surface 101 of the cleaning tank 10 and an inner peripheral surface (i.e., a side wall of the cleaning tank 10) surrounding an outer

periphery edge of the bottom surface 101.

[0042] The cleaning force may be a contact force and/or compression force applied when the mopping cloth 11 directly contacts the inner surface of the cleaning tank 10 when the relative movement occurs between the cleaning tank and the mopping cloth. The cleaning force may also be a force applied to the inner surface of the cleaning tank 10 during the flow of a liquid (such as clean water, a mixed liquid of clean water and a cleaning solution) agitated by the mopping cloth 11, or a cleaning force bore by the inner surface of the cleaning tank 10 when the mopping cloth drives the water flow (such as the water flow driven by the rotating mopping cloth) to spin onto the inner surface of the cleaning tank 10. This achieves self-cleaning of the cleaning tank 10 while cleaning the mopping cloth 11, thereby avoiding or reducing the probability of the generation of an unpleasant odor in the cleaning tank structure 100.

[0043] In the above cleaning tank structure 100, under the condition that the mopping cloth 11 is placed on the protruding strip 14, at least part of the inner surface of the cleaning tank 10 directly contacts the mopping cloth 11. Therefore, during the process of the protruding strip 14 cleaning the mopping cloth 11, when relative movement occurs between the cleaning tank 10 and the mopping cloth 11, the mopping cloth 11 applies the cleaning force to the inner surface of the cleaning tank 10 to achieve self-cleaning of the cleaning tank 10, that is the mopping cloth 11 can clean the inner surface of the cleaning tank 10, thereby avoiding or reducing debris remaining on the inner surface of the cleaning tank 10, and further avoiding or reducing the probability of the generation of an unpleasant odor in the cleaning tank structure 100.

[0044] Specifically, when the mopping cloth 11 rotates relative to the cleaning tank 10, the mopping cloth 11 applies a cleaning force to the inner surface of the cleaning tank 10 to achieve self-cleaning of the cleaning tank 10. Therefore, the rotating mopping cloth 11 applies the cleaning force to the inner surface of the cleaning tank 10 to achieve self-cleaning of the cleaning tank 10, that is the rotating mopping cloth 11 can clean the inner surface of the cleaning tank 10, thereby avoiding or reducing debris remaining on the inner surface of the cleaning tank 10, and further avoiding or reducing the probability of the generation of an unpleasant odor in the cleaning tank structure 100. The mopping cloth 11 is driven to rotate by a cleaning robot.

[0045] Specifically, the cleaning robot includes a body and the mopping cloth 11, and the mopping cloth 11 can be mounted on the bottom of the body. When the mopping cloth 11 of this embodiment rotates, the rotation axis of the mopping cloth 11 is substantially perpendicular to the bottom of the body. It can be understood that when the cleaning robot leaves the base station for normal operation, the rotation axis of the mopping cloth 11 is substantially perpendicular to the ground. When the cleaning robot enters the base station, a lowest point of the mopping cloth 11 is in the cleaning tank 10 near a front side of the base station 200, and a highest point of the mopping cloth 11 is in the cleaning tank 10 near a rear side of the base station 200.

[0046] In FIG. 4, the cleaning tank 10 is similar to a circular shape, and can be adapted to a mopping cloth 11 in a circular shape, so that the mopping cloth 11 can be cleaned in the cleaning tank 10. The cleaning tank 10 similar to a circular shape can also be adapted to a mopping cloth 11 in a triangular shape. It can be understood that in an embodiment, when a rotation center of the mopping cloth 11 remains unchanged, regardless of whether the shape of the mopping cloth 11 is triangular, quadrangular or other polygonal shapes, the cleaning tank 10 can be configured in a shape similar to a circle to match the mopping cloth 11. In another embodiment, when the rotation center of the mopping cloth 11 changes, the cleaning tank 10 may be in an irregular shape, but the cleaning tank 10 is adapted to the mopping cloth 11, so that the mopping cloth 11 can be cleaned in the cleaning tank 10.

[0047] Under a condition that the cleaning tank structure 100 is provided with a single cleaning tank 10, it can be used in conjunction with a cleaning robot having a single mopping cloth 11. The single mopping cloth 11 can rotate in the cleaning tank 10 in a clockwise direction R1 or a counterclockwise direction R2, which is not specifically limited in the present application.

[0048] Under a condition that the cleaning tank structure 100 is provided with two cleaning tanks 10 along a length direction L of the cleaning tank structure 100, it can be used in conjunction with a cleaning robot having two mopping cloths 11. The rotation directions of the two mopping cloths 11 respectively placed in the two cleaning tanks 10 during cleaning may be the same or different. For example, referring to FIG. 6, in an embodiment, the mopping cloth 11 placed in the left cleaning tank 10 can rotate in the clockwise direction R1, and the mopping cloth 11 placed in the right cleaning tank 10 can rotate in the counterclockwise direction R2. In an embodiment, the mopping cloth 11 placed in the left cleaning tank 10 can rotate in the counterclockwise direction R2, and the mopping cloth 11 placed in the right cleaning tank 10 can rotate in the clockwise direction R1. This is not specifically limit in the present application. The length direction L includes the left-right direction.

[0049] When the mopping cloth 11 of the cleaning robot needs cleaning, the cleaning robot can enter the base station 200, the mopping cloth 11 can be placed on the protruding strip 14, and the cleaning robot can drive the mopping cloth 11 to rotate, causing relative movement to occur between the protruding strip 14 and the mopping cloth 11, and the protruding strip 14 scrapingly cleans the mopping cloth 11.

[0050] In an embodiment, under a condition that the mopping cloth 11 is placed on the protruding strip 14, when the protruding strip 14 scrapingly cleans the mopping cloth 11, the rotating mopping cloth 11 can directly contact a contact

area 16 on the inner surface of the cleaning tank 10. Therefore, during the process of cleaning the mopping cloth 11, the rotating mopping cloth 11 can also clean the contact area 16, thereby avoiding or reducing debris remaining on the bottom surface 101 of the cleaning tank 10, and further avoiding or reducing the probability of the generation of an unpleasant odor in the cleaning tank structure 100.

[0051] In FIG. 1, along a vertical direction H of the cleaning tank structure 100, the vertical direction H of the cleaning tank structure 100 includes a height direction and an up-down direction. Optionally, in an embodiment, the entire bottom surface 101 of the cleaning tank 10 can be the contact area 16, that is, the entire bottom surface 101 of the cleaning tank 10 directly contacts the rotating and non-rotating mopping cloth 11.

[0052] Optionally, referring to FIG. 4, the protruding strip 14 extends along a radial direction of the cleaning tank 10. Thus, the protruding strip 14 has a longer length and a large area of a contact portion with the mopping cloth 11, improving the scraping and cleaning effect on the mopping cloth 11.

[0053] Optionally, the protruding strip 14 and the cleaning tank 10 are connected as an integral structure, thus the cleaning tank structure 100 has low cost and high rigidity. For example, the cleaning tank structure 100 may be integrally manufactured using an injection molding process, so that the protruding strip 14 and the cleaning tank 10 are connected as an integral structure.

[0054] The illustrated cleaning tank structure 100 is provided with two cleaning tanks 10, which can be adapted to a cleaning robot having dual-rotatable-trays mopping cloths. A bottom of each rotatable-tray mopping cloth may be provided with a mopping cloth 11, and the rotation of the rotatable-tray mopping cloth can drive the mopping cloth 11 to rotate. The rotation axis of the mopping cloth 11 is substantially perpendicular to the bottom of the body. When cleaning the two mopping cloths 11, rotation directions of the two mopping cloths 11 may be the same or opposite, which is not specifically limited in the present application. During the cleaning process of the cleaning robot, the rotation directions of the two mopping cloths 11 may be the same or opposite. It can be understood that in other embodiments, the cleaning tank structure 100 may also be provided with a single cleaning tank 10, which can be adapted to a cleaning robot having a single-rotatable-tray mopping cloth.

[0055] Optionally, in FIG. 1, the mopping cloth 11 may be provided with an opening near a center of the mopping cloth 11. Optionally, in other embodiments, the mopping cloth 11 may not be provided with an opening near a center of the mopping cloth 11.

[0056] Referring to FIG. 1 and FIG. 2, in some embodiments, the inner surface of the cleaning tank 10 includes the bottom surface 101, the bottom surface 101 includes at least one of a contact area 16 and a non-contact area 18, and the cleaning tank structure 100 is configured such that:

the contact area 16 directly contacts the mopping cloth 11, so that the mopping cloth 11 applies a cleaning force to the contact area. The contact area 16 is specifically in direct contact with the mopping cloth 11 whether it is rotating or not.

[0057] In the above cleaning tank structure 100, under a condition that the mopping cloth 11 is placed on the protruding strip 14, the contact area 16 is able to directly contact the mopping cloth 11. Therefore, during the process of cleaning the mopping cloth 11, when relative movement occurs between the cleaning tank 10 and the mopping cloth 11, the mopping cloth 11 can clean the contact area 16, thereby avoiding or reducing debris remaining on the bottom surface 101 of the cleaning tank 10, and further avoiding or reducing the probability of the generation of an unpleasant odor in the cleaning tank structure 100.

[0058] Under a condition that the mopping cloth 11 is placed on the protruding strip 14, a vertical distance between the non-contact area 18 and a plane where the mopping cloth 11 is located ranges from (0, 3] mm.

[0059] Thus, during the process of cleaning the mopping cloth 11, under a condition that the mopping cloth 11 is placed on the protruding strip 14, the rotating mopping cloth 11 can drive water to spin toward the non-contact area 18 to clean the non-contact area 18. At the same time, providing the non-contact area 18 can also reduce the friction between the mopping cloth 11 and the bottom surface 101 of the cleaning tank 10, reducing energy consumption, and allowing compatibility with lower-power motors.

[0060] Specifically, in an embodiment, under a condition that the mopping cloth 11 is placed on the protruding strip 14, the bottom surface 101 of the cleaning tank 10 further includes a non-contact area 18. When the protruding strip 14 scrapingly cleans the mopping cloth 11, a vertical distance W between the non-contact area 18 of the bottom surface 101 of the cleaning tank 10 and a plane where the mopping cloth 11 is located ranges from (0, 3] mm. During the process of cleaning the mopping cloth, the mopping cloth, when rotating, can drive water to spin toward the non-contact area to clean the non-contact area. For example, the vertical distance W between the non-contact area 18 of the bottom surface 101 of the cleaning tank 10 and the plane where the mopping cloth 11 is located may be 3 mm, 2.8 mm, 2.5 mm, 2 mm, 1.5 mm, 1 mm, or other values less than or equal to 3 mm. The vertical distance W between the non-contact area 18 of the bottom surface 101 of the cleaning tank 10 and the mopping cloth 11 may be specifically determined according to actual requirements, which is not specifically limited in the present application.

[0061] Optionally, in the embodiment shown in FIG. 3, the mopping cloth 11 includes pile 12 and a base plate 13, the pile 12 is provided on the bottom of the base plate 13, and the vertical distance W between the non-contact area 18 of the bottom surface 101 of the cleaning tank 10 and the plane where the mopping cloth 11 is located may be the vertical

distance between the non-contact area 18 and the pile 12.

[0062] Optionally, in FIG. 23, the contact area 16 may be an inclined surface, the non-contact area 18 may also be an inclined surface, and a slope rate of the non-contact area 18 is greater than a slope rate of the contact area 16. In FIG. 24, the contact area 16 may be a horizontal plane, and the non-contact area 18 may also be a horizontal plane. In FIG. 25, the contact area 16 may be a horizontal plane, and the non-contact area 18 may be an inclined surface. In FIG. 26, the contact area 16 may be an inclined surface, and the non-contact area 18 may be a horizontal plane. In FIG. 27, the contact area 16 may be an inclined surface, the non-contact area 18 may also be an inclined surface, and the slope rate of the non-contact area 18 is equal to the slope rate of the contact area 16. The contact area 16 may be a curved surface or an arc surface, and the non-contact area 18 may also be a curved surface or an arc surface.

[0063] Referring to FIG. 33, it can be seen from the effect diagram that when the vertical distance W between the non-contact area 18 and the mopping cloth 11 ranges from $(0, 3]$ mm, even in an area where the mopping cloth 11 is not in contact with the bottom surface 101 of the cleaning tank 10, the rotating mopping cloth 11 can still achieve a desired cleaning effect on the non-contact area 18, reducing the probability of the generation of an unpleasant odor in the cleaning tank structure 100.

[0064] Specifically, in FIG. 33, y represents a vertical compression amount between the mopping cloth 11 and the bottom surface 101 of the cleaning tank 10, in units of mm. When $y < 0$, it indicates that the mopping cloth 11 is spaced apart from the bottom surface 101 of the cleaning tank 10, and an absolute value of y represents a spacing amount (i.e., the vertical distance W). F represents the cleaning effect after one self-cleaning operation of the cleaning robot. In each test in which 5g of yellow mud is spread on the ground, the cleaning robot returned to the base station and then performed one self-cleaning operation, the weight z (in g) of the increased dirt in the cleaning tank 10 was weighed, and $F = 1 - z/5 \times 100\%$. After one self-cleaning operation, the cleaning effect $F \geq 90\%$ meets the cleaning requirements.

[0065] It can be seen from FIG. 33 that when $y \geq -3$ (i.e., the vertical distance W ranges from $(0, 3]$ mm), the cleaning effect $F \geq 90\%$ meets the cleaning requirements. When $-3 \leq y < 0$, the rotating mopping cloth 11 drives the water in the cleaning tank 10 to flow, rinsing the cleaning tank 10 with the water flow, thereby achieving the function of cleaning the cleaning tank 10. When $y > 0$, the mopping cloth 11 is compressed against the bottom surface 101 of the cleaning tank 10, and the friction between the mopping cloth 11 and the bottom surface 101 of the cleaning tank 10 ensures that the cleaning effect meets the requirements. Since the mopping cloth 11 is composed of the base plate 13 and the pile 12, and the base plate 13 is a hard material that is difficult to be compressed, the vertical compression amount between the mopping cloth 11 and the bottom surface 101 of the cleaning tank 10 cannot reach the thickness of the mopping cloth 11. The test data is shown in Table 1 below. The smaller z is, the less yellow mud remains in the cleaning tank 10, and the better the cleaning effect on the cleaning tank 10.

Table 1

y	z	F
-4	1.5	70%
-3	0.5	90%
0	0	100%
1.1 (accounting for 1/6 of a total thickness of the mopping cloth)	0	100%
2.2 (accounting for 1/3 of a total thickness of the mopping cloth)	0	100%
4.3 (accounting for 2/3 of a total thickness of the mopping cloth)	0	100%
6.0 (accounting for 100% of a total thickness of the mopping cloth)	0	100%

[0066] Referring to FIG. 4, FIG. 10, FIG. 20, and FIG. 31, in some embodiments, the cleaning tank structure 100 includes a base 20, and the cleaning tank 10 is provided within the base 20.

[0067] Thus, the base 20 can provide a mounting structure for the cleaning tank structure 100, facilitating the installation of the cleaning tank structure 100.

[0068] Specifically, in the embodiment shown in FIG. 4, the base 20 may be similar to a long tray shape. The cleaning tank structure 100 may be mounted in the base station 200 via the base 20. Two cleaning tanks 10 are provided on the base 20. Side walls of the two cleaning tanks 10 can be connected, and the two cleaning tanks 10 communicate with each other, so that the two cleaning tanks 10 can share one water outlet opening 26. Each cleaning tank 10 may also be disposed independently. Two protruding strips 14 are provided within each cleaning tank 10, and the two protruding strips 14 are disposed symmetrically to each other. Optionally, the base 20 may be connected as an integral structure with the cleaning tank 10 and the protruding strips 14.

[0069] Referring to FIG. 1a and FIG. 22, in some embodiments, the cleaning tank structure 100 includes a water

inlet opening 24 and a water outlet opening 26. The bottom surface 101 of the cleaning tank 10 connects the water inlet opening 24 with the water outlet opening 26. The bottom surface 101 of the cleaning tank 10 slopes from the water inlet opening 24 toward the water outlet opening 26. The bottom surface 101 of the cleaning tank 10 is a conical shape. The non-contact area 18 includes at least part of a circular area T0, the circular area T0 is a circular area formed with a center of the bottom surface 101 of the cleaning tank 10 as a circular center O and a preset radius.

[0070] Thus, the conical shape may be used to form the bottom surface 101 of the cleaning tank 10, and can meet the requirements for cleaning effect of the non-contact area 18.

[0071] Specifically, the conical bottom surface 101 of the cleaning tank 10 slopes from the water inlet opening 24 toward the water outlet opening 26, and the lowest point of the bottom surface 101 of the cleaning tank 10 is at the position where it connects to the water outlet opening 26. When the mopping cloth 11 is placed within the cleaning tank 10, the mopping cloth 11 is spaced apart from at least part of the circular area.

[0072] In FIG. 1a, the cleaning tank 10 on the left is taken as an example for explanation. Since the circular area T0 is a circular area formed with the center of the bottom surface 101 of the cleaning tank 10 as the center O and the preset radius, and the bottom surface 101 of the cleaning tank 10 is a conical shape, the circular area T0 in the middle of the bottom surface 101 of the cleaning tank 10 is lower than the edge of the bottom surface 101 of the cleaning tank 10. Compared to the edge of the bottom surface 101 of the cleaning tank 10, the circular area T0 forms a recess that can accumulate a certain amount of water flow, thereby cleaning the non-contact area 18 and meeting the requirements for cleaning effect. It can be understood that the preset radius of the circular area T0 is smaller than a radius of the cleaning tank 10.

[0073] Optionally, in FIG. 1a, the mopping cloth 11 has an opening in the middle, and the portion of the bottom surface 101 of the cleaning tank 10 exposed correspondingly through the opening can also be cleaned by the water flow spun by the mopping cloth 11 or the pile 12 of the mopping cloth 11 during rotating, meeting the requirements for cleaning effect. Optionally, in other embodiments, the mopping cloth 11 may not be provided with an opening in the middle.

[0074] The preset radius may be specifically defined according to requirements, which is not specifically limited in the present application.

[0075] In some embodiments, the protruding strip 14 divides the bottom surface 101 of the cleaning tank 10 into a first bottom surface area 101a and a second bottom surface area 101b;

the non-contact area 18 includes one or a combination of a first non-contact area 181 and a second non-contact area 182, the first non-contact area 181 is a part of a first circular area T1, the first circular area T1 is a circular area formed with a center of the first bottom surface area 101a as a circular center O and a first preset radius; the second non-contact area 182 is a part of a second circular area T2, the second circular area T2 is a circular area formed with a center of the second bottom surface area 101b as a circular center O and a second preset radius.

[0076] Thus, the protruding strip 14 can be used to divide the bottom surface 101 of the cleaning tank 10 into areas, and the first bottom surface area 101a and the second bottom surface area 101b may be configured individually to meet the requirements for cleaning effect of the non-contact area 18.

[0077] Optionally, the protruding strip 14 can be fixed in the cleaning tank 10, or can be detachably connected to the bottom surface of the cleaning tank 10.

[0078] Optionally, in FIG. 1a, two protruding strips 14 are provided within the cleaning tank 10, and the two protruding strips 14 divide the bottom surface 101 of the cleaning tank 10 into the first bottom surface area 101a and the second bottom surface area 101b. In FIG. 1a, the first bottom surface area 101a is a front bottom surface area, and the second bottom surface area 101b is a rear bottom surface area.

[0079] Optionally, the non-contact area 18 includes a combination of the first non-contact area 181 and the second non-contact area 182. Optionally, the non-contact area 18 includes the first non-contact area 181 or the second non-contact area 182.

[0080] The first bottom surface area 101a is a part of a first conical bottom surface, and the second bottom surface area 101b is a part of a second conical bottom surface. Optionally, in FIG. 1a, a radius of a circle where the first bottom surface area 101a is located is larger than a radius of a circle where the second bottom surface area 101b is located. Optionally, the radius of the circle where the first bottom surface area 101a is located is less than or equal to the radius of the circle where the second bottom surface area 101b is located.

[0081] The first non-contact area 181 is a part of the first circular area T1. Since the first circular area T1 is the circular area formed with the center of the first bottom surface area 101a as the center O and the first preset radius, and the first bottom surface area 101a is a part of the conical bottom surface, the first circular area T1 in the middle of the first bottom surface area 101a is lower than the edge of the first bottom surface area 101a. Compared to the edge of the first bottom surface area 101a, the first circular area T1 forms a recess that can accumulate a certain amount of

water flow, thereby cleaning the first non-contact area 181 and meeting the requirements for cleaning effect. It can be understood that the first preset radius is smaller than the radius of the first bottom surface area 101a.

[0082] The second non-contact area 182 is a part of the second circular area T2. Since the second circular area T2 is the circular area formed with the center of the second bottom surface area 101b as the center O and the second preset radius, and the second bottom surface area 101b is a part of the conical bottom surface, the second circular area T2 in the middle of the second bottom surface area 101b is lower than the edge of the second bottom surface area 101b. Compared to the edge of the second bottom surface area 101b, the second circular area T2 forms a recess that can accumulate a certain amount of water flow, thereby cleaning the second non-contact area 182 and meeting the requirements for cleaning effect. It can be understood that the second preset radius is smaller than the radius of the second bottom surface area 101b.

[0083] Optionally, in FIG. 1a, the first preset radius is equal to the second preset radius, and the center of the first circular area T1 coincides with the center of the second circular area T2 (the position where the center O is located in FIG. 1a). It can be understood that in other embodiments, the first preset radius and the second preset radius may not be equal, and the center of the first circular area T1 and the center of the second circular area T2 may not coincide.

[0084] Optionally, the number of protruding strips 14 in the cleaning tank 10 is not limited to two, and may be one or more than two.

[0085] Referring to FIGS. 1 to 3, in some embodiments, a compression amount between the mopping cloth 11 and the bottom surface 101 of the cleaning tank 10 ranges from $[0, T)$ mm, where T is the thickness of the mopping cloth 11.

[0086] Thus, the compression amount between the mopping cloth 11 and the bottom surface 101 of the cleaning tank 10 meets the requirements for cleaning effect.

[0087] Specifically, the thickness T of the mopping cloth 11 includes a length V2 of the pile 12 and a thickness V3 of the base plate 13. The compression amount between the mopping cloth 11 and the bottom surface 101 of the cleaning tank 10 ranges from $[0, T)$ mm, where T is the thickness of the mopping cloth 11. The greater the compression amount between the mopping cloth 11 and the bottom surface 101 of the cleaning tank 10, the greater the friction between the mopping cloth 11 and the bottom surface 101 of the cleaning tank 10, and the better the cleaning effect. It should be noted that when the compression amount between the mopping cloth 11 and the bottom surface 101 of the cleaning tank 10 approaches the thickness T of the mopping cloth 11, the friction between the mopping cloth 11 and the bottom surface 101 of the cleaning tank 10 is large, but still within the range where the mopping cloth 11 can rotate (i.e., the motor of the cleaning robot can still drive the mopping cloth 11 to rotate), and will not affect the cleaning of the mopping cloth 11.

[0088] In some examples, the compression amount between the mopping cloth 11 and the bottom surface 101 of the cleaning tank 10 may be 0 mm, $(1/T)$ mm, $(2/T)$ mm, $(3/T)$ mm, $(4/T)$ mm, $(5/T)$ mm, or other values within $[0, T)$, which is not specifically limited in the present application. The compression amount of 0 mm between the mopping cloth 11 and the bottom surface 101 of the cleaning tank 10 means that the contact surfaces between the pile 12 and the bottom surface 101 of the cleaning tank 10 are not compressed against each other.

[0089] Referring to FIG. 1 and FIG. 2, in some embodiments, the cleaning tank structure 100 is configured such that: under a condition that the mopping cloth 11 is placed within the cleaning tank 10, a horizontal distance between the edge of the mopping cloth 11 and the side wall of the cleaning tank 10 ranges from $(0, 8]$ mm.

[0090] Thus, the water carried by the mopping cloth 11 is spun to the side wall of the cleaning tank 10 by centrifugal force, achieving cleaning of the side wall of the cleaning tank 10.

[0091] Specifically, under a condition the mopping cloth 11 is placed within the cleaning tank 10 and rotates on the protruding strip 14 for cleaning, the edge of the mopping cloth 11 can maintain a certain horizontal distance from a part of the side wall of the cleaning tank 10 (such as a front side wall of the cleaning tank 10 shown in FIG. 2). The horizontal distance between the edge of the mopping cloth 11 and the side wall of the cleaning tank 10 ranges from $(0, 8]$ mm. For example, the horizontal distance U between the edge of the mopping cloth 11 and the side wall of the cleaning tank 10 may be 8 mm, 7.8 mm, 7.5 mm, 6 mm, 5.5 mm, 5 mm, or other values less than 8 mm. The horizontal distance U between the edge of the mopping cloth 11 and the side wall of the cleaning tank 10 may be specifically determined according to actual requirements, which is not specifically limited in the present application.

[0092] When the horizontal distance U between the edge of the mopping cloth 11 and the side wall of the cleaning tank 10 ranges from $(0, 8]$ mm, when the mopping cloth 11 rotates on the protruding strip 14 for cleaning, the water carried by the mopping cloth 11 is spun to the side wall of the cleaning tank 10 by centrifugal force. The water can clean the side wall of the cleaning tank 10, thereby achieving cleaning of the side wall of the cleaning tank 10. Additionally, when the horizontal distance U between the edge of the mopping cloth 11 and the side wall of the cleaning tank 10 ranges from $(0, 8]$ mm, it also facilitates the cleaning robot in placing the mopping cloth 11 in the cleaning tank 10, making positioning easier.

[0093] Referring to FIG. 34, it can be seen from the effect diagram that when the horizontal distance U between the edge of the mopping cloth 11 and the side wall of the cleaning tank 10 ranges from $(0, 8]$ mm, even if the edge of the

mopping cloth 11 is not in contact with the side wall of the cleaning tank 10, the rotating mopping cloth 11 can still achieve a desired cleaning effect on the area, where the rotating mopping cloth 11 does not contact, of the side wall of the cleaning tank 10, reducing the probability of the generation of an unpleasant odor in the cleaning tank structure 100.

[0094] Specifically, in FIG. 34, x represents a horizontal compression amount between the edge of the mopping cloth 11 and the side wall of the cleaning tank 10 (if a retaining strip 22 is provided, it is a side of the retaining strip 22 facing the cleaning tank 10), in units of mm. When $x < 0$, it indicates that the edge of the mopping cloth 11 is spaced apart from the side wall of the cleaning tank 10, and an absolute value of x represents a spacing amount, i.e., the horizontal distance U . F represents the cleaning effect after one self-cleaning operation of the cleaning robot. In each test in which 5g of yellow mud is spread on the ground, the cleaning robot returned to the base station and then performed one self-cleaning operation, the weight z (in g) of the increased dirt in the cleaning tank 10 was weighed, and $F = 1 - z/5 \times 100\%$. After one self-cleaning operation, the cleaning effect $F \geq 90\%$ meets the cleaning requirements.

[0095] In this test, the y value is fixed, e.g. $y = 1$ mm is set. It can be seen from FIG. 34 that when $-8 \leq x \leq 10$, the cleaning effect $F \geq 90\%$, meeting the cleaning requirements. When $x < -8$, the distance between the side wall of the cleaning tank 10 and the edge of the mopping cloth 11 is too large, and thus the side wall of the cleaning tank 10 cannot be cleaned even by relying on water flow and the pile 12 during the rotation of the mopping cloth 11, resulting in a blind spot and poor cleaning effect. When $x > 10$, the mopping cloth 11 is excessively compressed against the side wall of the cleaning tank 10, causing the mopping cloth 11 to bulge. This leads to a separation of some areas from the bottom surface 101 of the cleaning tank 10, with a very large spacing amount, affecting the cleaning effect. The test data is shown in Table 2 below.

Table 2 ($y=1$ mm (1/6.5 of a total thickness of the mopping cloth))

x	z	F
-10	1	80%
-8	0.5	90%
-4	0	100%
0	0	100%
4	0	100%
8	0.2	96%
10	0.48	90.4%
12	1.2	76%

[0096] Referring to FIG. 2, in some embodiments, the cleaning tank structure 100 is configured such that: under a condition that the mopping cloth 11 is placed within the cleaning tank 10, a compression amount between the edge of the mopping cloth 11 and the side wall of the cleaning tank 10 ranges from (0, 10] mm.

[0097] Thus, the compression amount between the edge of the mopping cloth 11 and the side wall of the cleaning tank 10 can achieve a desired cleaning effect.

[0098] Specifically, under a condition that the mopping cloth 11 is placed within the cleaning tank 10 and rotates on the protruding strip 14 for cleaning, the edge of the mopping cloth 11 can be compressed against a part of the side wall of the cleaning tank 10 (such as a rear side wall of the cleaning tank 10 shown in FIG. 2). Optionally, the compression amount between the edge of the mopping cloth 11 and the side wall of the cleaning tank 10 ranges from (0, 10] mm. For example, the compression amount between the edge of the mopping cloth 11 and the side wall of the cleaning tank 10 may be 10 mm, 9.8 mm, 9.5 mm, 9 mm, 8.5 mm, 8 mm, or other values less than 10 mm. The compression amount between the edge of the mopping cloth 11 and the side wall of the cleaning tank 10 may be specifically determined according to actual requirements, which is not specifically limited in the present application.

[0099] When the compression amount between the edge of the mopping cloth 11 and the side wall of the cleaning tank 10 ranges from (0, 10] mm, when the mopping cloth 11 is compressed against the side wall of the cleaning tank 10 to reach a maximum compression amount, the friction between the mopping cloth 11 and the side wall of the cleaning tank 10 is maximized, which facilitates mutual cleaning between the edge of the mopping cloth 11 and the side wall of the cleaning tank 10. It should be noted that when the maximum compression amount between the edge of the mopping cloth 11 and the side wall of the cleaning tank 10 ranges from (0, 10] mm, the mopping cloth 11 can still rotate (i.e., the motor of the cleaning robot can still drive the mopping cloth 11 to rotate), and it will not cause the motor to operate under overload, nor will it affect the cleaning by the rotation of the mopping cloth 11.

[0100] Optionally, with the vertical compression amount of the mopping cloth 11 fixed, the maximum compression

amount and the maximum spacing amount between the mopping cloth 11 and the side wall of the cleaning tank 10 in the horizontal direction are investigated.

[0101] Referring to FIG. 35, since the vertical compression amount of the mopping cloth 11 has a more significant impact on the cleaning effect, when the vertical compression amount of the mopping cloth 11 is relatively large (close to the critical value, $y=6.0$ mm, the compression amount equals the thickness of the mopping cloth 11, 6.0/6.5), and the mopping cloth 11 meets the cleaning requirements, the range of x in the horizontal direction, whether the y value affects the x range that meets the cleaning requirements is investigated.

[0102] It can be seen from FIG. 35 that when $y=6.0$ mm, and when $-8 \leq x \leq 10$, the cleaning effect $F \geq 90\%$, meeting the cleaning requirements. Meanwhile, comparing with Table 1, it is found that the y value has no significant effect on the x range that meets the cleaning requirements. Because the y value mainly affects the cleaning effect in the vertical direction, when the y value meets the cleaning requirements, it does not significantly affect the effective value of x . The test data is shown in Table 3 below.

Table 3 ($y=6.0$ mm) (a total thickness of the mopping cloth 6.0/6.5)

x	z	F
-10	1	80%
-8	0.4	92%
-4	0	100%
0	0	100%
4	0	100%
8	0.1	98%
10	0.45	91%
12	1.3	74%

[0103] Optionally, when the mopping cloth 11 reaches a maximum compression amount against the side wall of the cleaning tank 10 and the mopping cloth 11 reaches the maximum compression amount against the bottom surface 101 of the cleaning tank 10, the mopping cloth 11 can still rotate (i.e., the motor of the cleaning robot can still drive the mopping cloth 11 to rotate), and it will not cause the motor to operate under overload, nor will it affect the cleaning by the rotation of the mopping cloth 11.

[0104] It should be noted that the test data is data obtained by taking the average value(s) from multiple tests in the above tests where the thickness of the mopping cloth 11 was 6.5 mm.

[0105] In some embodiments, the cleaning tank structure 100 includes a retaining strip 22, the retaining strip 22 encloses to form the cleaning tank 10, and a distance between the edge of the mopping cloth 11 and the side wall of the cleaning tank 10 is a distance between the edge of the mopping cloth 11 and the retaining strip 22.

[0106] Thus, the cleaning tank 10 may be formed by the enclosure of the retaining strip 22, the structure is simple.

[0107] Specifically, the cleaning tank structure 100 may be provided with a plurality of retaining strips 22. The plurality of retaining strips 22 can enclose to form the cleaning tank 10, so that when the mopping cloth 11 is placed in the cleaning tank 10 for cleaning, the retaining strips 22 can retain water within the cleaning tank 10, preventing water from flowing out to other areas outside the cleaning tank 10.

[0108] Optionally, the retaining strips 22 may be made of hard rubber (such as materials of ABS, PC, etc.) or soft rubber (such as materials of TPU, silicone, etc.).

[0109] Optionally, referring to FIG. 10, the cleaning tank 10 may be formed by a first recess 130 provided on the top surface of the base 20, and the side wall of the cleaning tank 10 may be the side wall of the first recess 130.

[0110] Referring to FIG. 4 and FIG. 5, in some embodiments, the cleaning tank structure 100 includes a water inlet opening 24 and a water outlet opening 26. A plurality of protruding strips 14 are provided within the cleaning tank 10. The plurality of protruding strips 14 and the bottom surface of the cleaning tank 10 enclose to form a water delivery channel 28. The water delivery channel 28 communicates the water inlet opening 24 with the water outlet opening 26.

[0111] Thus, the water inlet opening 24 can deliver clean water through the water delivery channel 28, and at the same time, wastewater after cleaning can be discharged from the water outlet opening 26 through the water delivery channel 28.

[0112] Specifically, in FIG. 4, along a width direction D of the cleaning tank structure 100, the water inlet opening 24 can be disposed near the side direction of the width and near a rear side of the base 20. The water outlet opening 26 can be disposed near a front side of the base 20 in the D direction. The width direction includes the front-rear direction. Relative to the water delivery channel 28, the water inlet opening 24 is located at a higher position, and the water

outlet opening 26 is located at a lower position. Water entering from the water inlet opening 24 can flow to the water outlet opening 26 through the water delivery channel 28 under the function of gravity.

[0113] In FIG. 4, two protruding strips 14 and the bottom surface of the cleaning tank 10 form the water delivery channel 28. In an embodiment, the mopping cloth 11 can rotate on the protruding strip 14. During the processing of rotation, the mopping cloth 11 can be wetted by the clean water in the water delivery channel 28. The protruding strip 14 can scrapingly clean the wetted mopping cloth 11. Wastewater, stains, and other debris after scraping and cleaning can flow into the water outlet opening 26 through the water delivery channel 28, so that the wastewater can be discharged out through the water outlet opening 26. It can be understood that in other embodiments, the water delivery channel 28 may be formed not only by two protruding strips 14 and the bottom surface of the cleaning tank 10, but also by three, four, or other numbers of protruding strips 14 and the bottom surface of the cleaning tank 10, which is not specifically limited here.

[0114] Further, in FIG. 4, along the D direction, the water delivery channel 28 can partition the cleaning tank 10 into a front tank 30 and a rear tank 34. The front tank 30 is disposed near the front side of the base 20, and the rear tank 34 is disposed near the rear side of the base 20. A bottom surface of the front tank 30 is the first bottom surface area 101a, and a bottom surface of the rear tank 34 is the second bottom surface area 101b. The front tank 30 and the protruding strip 14 near the front tank 30 can form a first through opening 32. The bottom surface of the front tank 30 may be connected to the top of the water outlet opening 26. The protruding strip 14 near the front tank 30 scrapingly cleans the mopping cloth 11. Wastewater and other debris after scraping and cleaning can fall into the front tank 30 and finally flow into the water outlet opening 26 through the first through opening 32. The bottom surface of the rear tank 34 may be connected to the top of the water outlet opening 26. The protruding strip 14 near the rear tank 34 scrapingly cleans the mopping cloth 11. Wastewater and other debris after scraping can fall into the rear tank 34 and finally flow into the water outlet opening 26.

[0115] Referring to FIG. 19 and FIG. 20, in some embodiments, among the two protruding strips 14 enclosing to form the water delivery channel 28, at least one protruding strip 14 is provided with a first notch 36, and the first notch 36 communicates the water delivery channel 28 with the cleaning tank 10.

[0116] Thus, wastewater and other debris in the cleaning tank 10 can enter the water delivery channel 28 through the first notch 36, and then flow into the water outlet opening 26 for discharge.

[0117] Specifically, in FIG. 19, the two protruding strips 14 are symmetrically disposed in the cleaning tank 10, and the first notch 36 is provided in the middle of each protruding strip 14. When the mopping cloth 11 rotates in the cleaning tank 10 for cleaning, wastewater and other debris can fall into the cleaning tank 10 at both sides of the water delivery channel 28. By providing the first notch 36, the first notch 36 communicates with the water delivery channel 28, allowing the wastewater and other debris in the cleaning tank 10 to enter the water delivery channel 28 through the first notch 36, and then flow into the water outlet opening 26 for discharge, thereby preventing accumulation in the cleaning tank 10.

[0118] Referring to FIG. 19, in some embodiments, among the two protruding strips 14 enclosing to form the water delivery channel 28, at least one protruding strip 14 is provided with a through opening 38 at an end of the at least one protruding strip 14 near the water outlet opening 26, and the through opening 38 communicates the water delivery channel 28 with the cleaning tank 10.

[0119] Thus, wastewater and other debris in the cleaning tank 10 can further enter the water delivery channel 28 through the through opening 38 for discharge.

[0120] Specifically, each protruding strip 14 of the two protruding strips 14 is provided with the through opening 38 at the end of the protruding strip 14 near the water outlet opening 26. The through opening 38 may be provided along a direction of the water delivery channel 28, and the through opening 38 may be in a rectangular shape. When the mopping cloth 11 rotates in the cleaning tank 10 for cleaning, wastewater and other debris can fall into the cleaning tank 10 at both sides of the water delivery channel 28. By providing the through opening 38, the through opening 38 communicates with the water delivery channel 28, further allowing the wastewater and other debris in the cleaning tank 10 to enter the water delivery channel 28 through the through opening 38, and then flow into the water outlet opening 26 for discharge, thereby preventing accumulation in the cleaning tank 10.

[0121] The shape and the number of through openings 38 on the protruding strip 14 are not specifically limited. In other embodiments, the through openings 38 may be set in other shapes, and the number may also be set to be multiple.

[0122] In some embodiments, the protruding strip 14 is disposed to incline toward the water delivery channel 28.

[0123] Thus, an included angle between the protruding strip 14 and the bottom surface of the cleaning tank 10 outside the water delivery channel 28 can be made larger, preventing debris from remaining at the included angle position due to the included angle being small.

[0124] Specifically, in FIG. 4, the two protruding strips 14 can be disposed to incline toward the water delivery channel 28, and the included angle θ formed between the protruding strip 14 and the bottom surface of the cleaning tank 10 may be an obtuse angle. When the mopping cloth 11 is cleaned in the cleaning tank 10, debris after cleaning

can remain at the included angle position formed between the protruding strip 14 and the bottom surface of the cleaning tank 10. By inclining the two protruding strips 14 toward the water delivery channel 28, the included angle formed between the protruding strip 14 and the bottom surface of the cleaning tank 10 outside the water delivery channel 28 can be made larger, preventing debris from remaining at the included angle position due to the included angle being small.

[0125] Referring to FIG. 14 to FIG. 16, in some embodiments, the water delivery channel 28 includes a first section channel 40 and a second section channel 42. The first section channel 40 and the second section channel 42 are sequentially connected along a direction from the water inlet opening 24 to the water outlet opening 26. And relative to the water inlet opening 24, a depth of the second section channel 42 is greater than or equal to a depth of the first section channel 40.

[0126] Thus, the depth of the second section channel 42 is relatively large, preventing the mopping cloth 11 from causing secondary contamination within the second section channel 42.

[0127] Specifically, the water delivery channel 28 includes a connecting section channel 44, and the connecting section channel 44 is disposed to incline between the first section channel 40 and the second section channel 42.

Along the direction from the water inlet opening 24 to the water outlet opening 26, the first section channel 40, the connecting section channel 44, and the second section channel 42 are sequentially connected. Along the direction from the water inlet opening 24 to the water outlet opening 26, a depth of the connecting section channel 44 can be greater than or equal to the depth of the first section channel 40, and the depth of the second section channel 42 can be greater than or equal to the depth of the connecting section channel 44.

[0128] Optionally, in an embodiment, the connecting section channel 44 may be omitted, and the first section channel 40 may directly communicate with the second section channel 42, as shown in FIG. 16.

[0129] In an embodiment, when the mopping cloth 11 rotates to enable the protruding strip 14 to scrapingly clean the mopping cloth 11, the pile 12 of the mopping cloth 11 can be located within the first section channel 40. Clean water in the first section channel 40 can clean the pile 12 of the mopping cloth 11. The wastewater after cleaning can flow to the second section channel 42 via the connecting section channel 44. The depth of the second section channel 42 is relatively large, preventing the mopping cloth 11 or the pile 12 of the mopping cloth 11 from contacting the wastewater in the second section channel 42, thus preventing the mopping cloth 11 from secondary contamination within the second section channel 42.

[0130] Furthermore, debris (solid debris: such as particles, threads, sticky substances, fragments, etc.; liquid debris, such as wastewater) attached to the mopping cloth 11 can be scraped into the water delivery channel 28 by the protruding strip 14, and quickly flow to the water outlet opening 26 (the water outlet opening 26 is provided with a filter element 54 for filtering debris) by means of the water flow within the water delivery channel 28, thereby achieving an effective and high-speed scraping-cleaning effect on debris. This prevents the debris from being scraped to other areas of the bottom surface 101 of the cleaning tank 10. Since the water flow velocity is slower in other areas of the bottom surface 101 of the cleaning tank 10, this could cause the debris to stagnate, thereby resulting in repeated rubbing of the debris against the bottom surface of the mopping cloth 11, damaging the mopping cloth 11, slowing down the cleaning speed, and worsening the cleaning effect. By limiting the depth of the second section channel 42 to be greater than or equal to the depth of the first section channel 40, when the mopping cloth 11 is positioned over the second section channel 42, the protruding strip 14 contacts the mopping cloth 11, but the water flow does not contact the mopping cloth 11, thus preventing the mopping cloth 11 from secondary contamination.

[0131] The depth of the first section channel 40 refers to a vertical distance from a point on the protruding strip 14 to a bottom surface of the first section channel 40. The depth of the second section channel 42 refers to a vertical distance from a point on the protruding strip 14 to a bottom surface of the second section channel 42.

[0132] Optionally, the first section channel 40 may include a plurality of first sub-section channels that have different depths and are connected and in communication end-to-end. The second section channel 42 may include a plurality of second sub-section channels that have different depths and are connected and in communication end-to-end. The depth of the second section channel 42 may be an average depth of the second sub-section channels, and the depth of the first section channel 40 may be an average depth of the first sub-section channels.

[0133] In some embodiments, along the direction from the water inlet opening 24 to the water outlet opening 26, the depth of the first section channel 40 gradually increases, and the depth of the second section channel 42 gradually increases.

[0134] Thus, along a direction from water inlet to water outlet, it is more difficult for the mopping cloth 11 to contact the wastewater in the channel.

[0135] Specifically, in an embodiment, along the direction from the water inlet opening 24 to the water outlet opening 26, a depth of an end of the first section channel 40 farther from the water inlet opening 24 is greater than a depth of an end of the first section channel 40 closer to the water inlet opening 24, and the depth of the first section channel 40 gradually increases from the end closer to the water inlet opening 24 to the end farther from the water inlet opening 24. In an embodiment, along the direction from the water inlet opening 24 to the water outlet opening 26, a depth of an end

of the second section channel 42 closer to the water outlet opening 26 is greater than a depth of an end of the second section channel 42 farther from the water outlet opening 26, and the depth of the second section channel 42 gradually increases from the end farther from the water outlet opening 26 to the end closer to the water outlet opening 26, thereby making it more difficult for the mopping cloth 11 to contact the wastewater in the channel.

[0136] Referring to FIG. 14 to FIG. 16, in some embodiments, the first section channel 40 includes a first end 46 and a second end 48, the second section channel 42 includes a third end 50 and a fourth end 52, the first end 46 communicates with the water inlet opening 24, the second end 48 communicates with the third end 50, and the fourth end 52 communicates with the water outlet opening 26. A depth H1 of the first end 46 ranges from [1, 5] mm, depths H2 of the second end 48 and the third end 50 range from [2, 8] mm, a depth H3 of the fourth end 52 ranges from [5, 15] mm, and $H1 \leq H2 \leq H3$.

[0137] Thus, by determining the depth ranges of respective ends of the first section channel 40 and the second section channel 42, it can be further ensured that the mopping cloth 11 does not easily come into contact with the wastewater in the channel.

[0138] Specifically, in an embodiment, the first end 46 communicates with the water inlet opening 24, the second end 48 communicates with the third end 50, and the fourth end 52 communicates with the water outlet opening 26, thereby allowing water to be discharged into the water outlet opening 26. By setting the depth H1 of the first end 46 in the range of [1, 5] mm, the depths H2 of the second end 48 and the third end 50 in the range of [2, 8] mm, and the depth H3 of the fourth end 52 in the range of [5, 15] mm, enabling $H1 \leq H2 \leq H3$, it is further ensured that the mopping cloth 11 does not easily come into contact with the wastewater in the channel.

[0139] The depth H1 of the first end 46 may be 1 mm, 2 mm, 3 mm, 4 mm, 5 mm, or other values between 1 mm and 5 mm.

[0140] The depths H2 of the second end 48 and the third end 50 may be 2 mm, 3 mm, 4 mm, 5 mm, 6 mm, 7 mm, 8 mm, or other values between 2 mm and 8 mm.

[0141] The depth H3 of the fourth end 52 may be 5 mm, 6 mm, 7 mm, 8 mm, 9 mm, 10 mm, 11 mm, 12 mm, 13 mm, 14 mm, 15 mm, or other values between 5 mm and 15 mm.

[0142] Referring to FIG. 16, for the mopping cloth 11 at the first end 46 with depth H1 to the second end 48 with depth H2, it is necessary to ensure that the mopping cloth 11 can contact the water in the water delivery channel 28 and that the mopping cloth 11 does not completely block the water delivery channel 28. For the mopping cloth 11 at the fourth end 52 with depth H3, it is necessary to ensure that the mopping cloth 11 does not contact the wastewater in the water delivery channel 28. The values of H1, H2, and H3 are related to the height L1 of the protruding strip 14, the vertical compression amount y between the mopping cloth 11 and the bottom surface 101 of the cleaning tank 10, and a water flow height M of the water flow within the water delivery channel 28.

[0143] The gap L0 between the mopping cloth 11 and a top of the water delivery channel 28 is $L0 = H1 - L1 - y$. For $H1 = L1 + y + L0$, to satisfy that the mopping cloth 11 can be wetted by water at H1 and does not block the water delivery channel 28, it is necessary to satisfy $0 < L0 < M$, i.e., $L1 + y < H1 < M + L1 + y$. Similarly, for H2, it is necessary to satisfy $L1 + y < H2 < M + L1 + y$. For H3, it is necessary that the mopping cloth 11 does not contact the wastewater in the water delivery channel 28, i.e., $L0 > M$, which means $H3 > L1 + y + M$, and it is also required that $H1 < H2 < H3$. When $L1 = 1$, $y = 2$, $M = 3$ (units: mm), $3 < H1 < 6$, $3 < H2 < 6$, $H3 > 6$. Depending on the different parameters of L1, y, and M, the heights H1, H2, and H3 may be adjusted.

[0144] In some embodiments, along the direction from the water inlet opening 24 to the water outlet opening 26, an inclination angle of the bottom surface of the first section channel 40 relative to a horizontal plane is less than an inclination angle of the bottom surface of the second section channel 42 relative to the horizontal plane.

[0145] Thus, the second section channel 42 is more inclined, which facilitates faster wastewater flow and dirt washing.

[0146] Specifically, referring to FIG. 21, the inclination angle a of the bottom surface of the first section channel 40 relative to the horizontal plane is less than the inclination angle b of the bottom surface of the second section channel 42 relative to the horizontal plane, $a < b$, thereby making the second section channel 42 more inclined, which facilitates faster wastewater flow, and dirt washing.

[0147] Optionally, a and b may be acute angles. Optionally, a may be an acute angle, and b may be a right angle.

[0148] Referring to FIG. 4, in some embodiments, the cleaning tank structure 100 includes a water outlet opening 26 and a filter element 54. The water outlet opening 26 communicates with the cleaning tank 10, and the filter element 54 is accommodated in the water outlet opening 26.

[0149] Thus, the filter element 54 can filter the wastewater to prevent pipe blockage.

[0150] Specifically, in FIG. 4 to FIG. 8, the water outlet opening 26 is provided on the bottom surface of the cleaning tank 10. A filtering chamber 56 is provided within the filter element 54. Filtering openings 58 are provided at a bottom and/or side walls of the filtering chamber 56. Wastewater can be filtered through the filtering openings 58 and then flow out of the cleaning tank 10. Debris in the wastewater can remain in the filter element 54, preventing pipe blockage and also facilitating debris removal.

[0151] In an embodiment, the wastewater after scraping and cleaning by the mopping cloth 11 can flow into the filtering chamber 56. At this time, debris in the wastewater can be blocked by the filtering openings 58 and remain in the filter element 54. The filtered wastewater can be discharged through the water outlet opening 26, thereby filtering the wastewater and preventing pipe blockage.

[0152] Optionally, the filter element 54 is detachably disposed within the water outlet opening 26. Debris accumulated in the filter element 54 can be removed periodically by detaching the filter element 54. After cleaning, the filter element 54 is reinstalled in the water outlet opening 26. The number and shape of the filtering openings 58 are not specifically limited. The number of the filtering openings 58 may be multiple, and the shape of the filtering openings 58 may be set to a circular shape or other shapes. Optionally, the filter element 54 is also provided with a handle 60 to facilitate a user in detaching and installing the filter element 54.

[0153] Referring to FIG. 4 to FIG. 6, taking the left cleaning tank 10 as an example, during the process of the mopping cloth 11 being cleaned in the cleaning tank 10, the mopping cloth 11 can rotate clockwise. The mopping cloth 11 is first wetted by clean water near the water inlet opening 24, and after the mopping cloth is compressed against the protruding strip 14, the protruding strip 14 can cause the scraped debris and wastewater to flow into the water delivery channel 28 and then to flow with the water to the water outlet opening 26. Under a condition of continuous rotation of the mopping cloth 11, the mopping cloth 11 can continue to rotate to an area of the bottom surface where the rear tank 34 and the front tank 30 are located, to scrapingly clean the area of the bottom surface where the rear tank 34 and the front tank 30 are located. Debris can flow with the water to the water outlet opening. At the same time, since the water outlet opening 26 is disposed to be recessed, wastewater in the mopping cloth 11 flows into the water outlet opening 26 due to gravity.

[0154] It can be understood that the mopping cloth 11 in the right cleaning tank 10 rotates counterclockwise; for a specific explanation, reference can be made to the above description.

[0155] Referring to FIG. 10 to FIG. 13, FIG. 16, and FIG. 17, in some embodiments, the cleaning tank structure 100 includes a drain pipe 62. The drain pipe 62 communicates with the cleaning tank 10 via the water outlet opening 26. A bottom of the filter element 54 is provided with a recess 64, and the recess 64 correspondingly communicates with a communication opening 68 formed by the drain pipe 62 on a hole-wall of the water outlet opening 26.

[0156] Thus, the recess 64 at the bottom of the filter element 54 corresponds to the communication opening 68, allowing the water flow to flow more easily into the drain pipe 62.

[0157] Specifically, because the recess 64 correspondingly communicates with the communication opening 68, the communication opening 68 can communicate with a space enclosed by the recess 64. The filter element 54 does not block or only minimally blocks the communication opening 68. Wastewater flowing from the filter element 54 can more easily flow into the communication opening 68 and then flow out of the cleaning tank structure 100 through the drain pipe 62, thereby enabling wastewater to be timely discharged from the cleaning tank 10. A side wall of the recess 64 is provided with filtering openings 58. Corresponding to the recess 64, a protrusion portion 66 is formed within the filtering chamber 56. The protrusion portion 66 protrudes from a side wall of the filtering chamber 56 and is connected to a bottom of the filtering chamber 56. The protrusion portion 66 can block some debris with a large volume.

[0158] Referring to FIG. 9 to FIG. 13, in some embodiments, the cleaning tank structure 100 includes a water outlet opening 26 and a drain pipe 62. The drain pipe 62 communicates with the cleaning tank 10 via the water outlet opening 26. The bottom of the cleaning tank structure 100 is provided with an accommodating cavity 70, and the drain pipe 62 is located within the accommodating cavity 70.

[0159] Thus, the drain pipe 62 is located within the accommodating cavity 70, and the drain pipe 62 is short, which can reduce the cost of the cleaning tank structure 100.

[0160] Specifically, in an embodiment, the cleaning tank structure 100 may be manufactured by using a mold. The drain pipe 62 is located within the accommodating cavity 70, and does not extend outside the accommodating cavity 70. The drain pipe 62 is short. On one hand, a short drain pipe 62 allows the use of a shorter push rod to push the drain pipe 62 out of the mold, making the demoulding of the cleaning tank structure easier. On the other hand, the short drain pipe 62 also reduces material usage, lowering the cost of the cleaning tank structure 100. Overall, this can reduce the cost of the cleaning tank structure 100.

[0161] Optionally, the drain pipe 62 has a water pipe joint 72. The water pipe joint 72 is located within the accommodating cavity 70. A pipe can be sleeved onto the drain via the water pipe joint 72 to guide water flow out of the cleaning tank structure 100.

[0162] Referring to FIG. 2, and FIG. 4 to FIG. 7, in some embodiments, the cleaning tank structure 100 includes a first side wall 73 and a second side wall 75. The first side wall 73 and the second side wall 75 enclose to form the cleaning tank 10. The cleaning tank structure 100 is provided with a water inlet opening 24 and a station entry opening 78. The water inlet opening 24 communicates with the cleaning tank 10. The first side wall 73 and the second side wall 75 are respectively connected to two opposite edges of the water inlet opening 24. The first side wall 73 is closer to the station entry opening 78 than the second side wall 75. A diameter N1 of a circle where the first side wall 73 is located is greater than a diameter N2 of a circle where the second side wall 75 is located. A width E1 of the first side wall 73

along the horizontal direction is greater than A width E2 of the second side wall 75 along the horizontal direction.

[0163] Thus, it facilitates in overcoming an offset error when the cleaning robot returns to the base station.

[0164] Specifically, in FIG. 4, the first side wall 73 is a front side wall, and the second side wall 75 is a rear side wall. When the cleaning robot returns to the base station, it needs to step over the first side wall 73 to enter the cleaning tank 10. Along the D direction, since the first side wall 73 is closer to the station entry opening 78, the width E1 of the first side wall 73 along the horizontal direction is larger, which facilitates the cleaning tank structure 100 in overcoming the offset error when the cleaning robot returns to the base station, making it easier for the cleaning robot to enter the station.

[0165] Referring to FIG. 8, in some embodiments, the cleaning tank structure 100 includes a first retaining strip 74 and a second retaining strip 76. The first retaining strip 74 and the second retaining strip 76 enclose to form the cleaning tank 10. The first side wall 73 is a side wall of the first retaining strip 74 facing the cleaning tank 10, and the second side wall 75 is a side wall of the second retaining strip 76 facing the cleaning tank 10. A height D2 of the second retaining strip 76 is greater than a height D1 of the first retaining strip 74.

[0166] Thus, on one hand, it makes it easier for the cleaning robot to enter the base station; on the other hand, the higher second retaining strip 76 can also prevent or reduce wastewater from splashing out of the cleaning tank 10.

[0167] Specifically, the first retaining strip 74 is a front retaining strip, and the second retaining strip 76 is a rear retaining strip. The first retaining strip 74 is closer to the station entry opening 78. The cleaning robot needs to step over the first retaining strip 74 to enter the cleaning tank 10. The height D1 of the first retaining strip 74 is smaller, so the first retaining strip 74 is positioned lower, reducing resistance when the cleaning robot returns to the base station and making it easier for the cleaning robot to enter the station. The second retaining strip 76 is farther from the station entry opening 78. After the cleaning robot returns to the base station, the mopping cloth 11 may be placed in the cleaning tank 10. The higher second retaining strip 76 can prevent or reduce wastewater within the cleaning tank 10 from splashing out of the cleaning tank 10, avoiding additional cleaning burden on the user.

[0168] A diameter of a circle where the first retaining strip 74 is located is greater than a diameter of a circle where the second retaining strip 76 is located. When the mopping cloth 11 is located within a part of the cleaning tank 10 enclosed by the second retaining strip 76, an edge of the mopping cloth 11 is closer to the second retaining strip 76, resulting in a larger compression amount of the mopping cloth 11 against the second retaining strip 76, which can better clean the mopping cloth 11.

[0169] In FIG. 8, both the first retaining strip 74 and the second retaining strip 76 are in an arc-shape to form a cleaning tank 10 substantially in a circular shape. The circular cleaning tank 10 can be adapted for use with a rotating mopping cloth 11. It can be understood that the shapes of the cleaning tank 10 and the mopping cloth 11 are not specifically limited in the present application.

[0170] Optionally, both the first retaining strip 74 and the second retaining strip 76 may be soft retaining strips 22. Optionally, the first retaining strip 74 may be a soft retaining strip 22, and the second retaining strip 76 may be a hard retaining strip 22. Optionally, both the first retaining strip 74 and the second retaining strip 76 may be hard retaining strips 22. Optionally, the soft retaining strip 22 may be made of rubber (such as TPU), silicone, or other materials. Optionally, the hard retaining strip 22 may be made of plastic (such as ABS, PC) or other materials.

[0171] Optionally, referring to FIG. 10, the cleaning tank 10 may be formed by a first recess 130 provided on a top surface of the base 20, and the first side wall 73 and the second side wall 75 may be the side walls of the first recess 130.

[0172] In some embodiments, a connecting portion between the second side wall 75 and an edge of the water inlet opening 24 is closer to the center of the cleaning tank 10 than a connecting portion between the first side wall 73 and the edge of the water inlet opening 24. Along the rotation direction of the mopping cloth 11, the connecting portion between the second side wall 75 and the edge of the water inlet opening 24 is located behind the connecting portion between the first side wall 73 and the edge of the water inlet opening 24.

[0173] Thus, the cleaning effect on the mopping cloth 11 can be improved.

[0174] Specifically, the connecting portion between the second side wall 75 and the edge of the water inlet opening 24 is hereinafter referred to as a second connecting portion 80, and the connecting portion between the first side wall 73 and the edge of the water inlet opening 24 is hereinafter referred to as a first connecting portion 82.

[0175] Referring to FIG. 4, the mopping cloth 11 located in the left cleaning tank 10 rotates clockwise R1 during cleaning. Along the clockwise direction R1, the second connecting portion 80 is located behind the first connecting portion 82. When the left mopping cloth 11 is being cleaned, the left mopping cloth 11 rotates clockwise R1, so that when the mopping cloth 11 moves from a part of the cleaning tank 10 enclosed by the first side wall 73 to a part of the cleaning tank 10 enclosed by the second side wall 75, the pile 12 of the mopping cloth 11 can beat against the second connecting portion 80 which is closer to the center of the cleaning tank 10. This causes the wastewater and debris on the mopping cloth 11 to be beaten off and fall into the cleaning tank 10.

[0176] The mopping cloth 11 located in the right cleaning tank 10 rotates counterclockwise R2 during cleaning. Along the counterclockwise direction R2, the second connecting portion 80 is located behind the first connecting

portion 82. When the right mopping cloth 11 is being cleaned, the mopping cloth 11 rotates counterclockwise R2, so that when the mopping cloth 11 moves from a part of the cleaning tank 10 enclosed by the first side wall 73 to a part of the cleaning tank 10 enclosed by the second side wall 75, the pile 12 of the mopping cloth 11 can beat against the second connecting portion 80 which is closer to the center of the cleaning tank 10. This causes the wastewater and debris on the mopping cloth 11 to be beaten off and fall into the cleaning tank 10.

[0177] In summary, the cleaning effect on both mopping cloths 11 can be improved.

[0178] Furthermore, the connecting portion between the second side wall 75 and the edge of the water inlet opening 24 is closer to the center of the cleaning tank 10 than the connecting portion between the first side wall 73 and the edge of the water inlet opening 24, and along the rotation direction of the mopping cloth 11, the connecting portion between the second side wall 75 and the edge of the water inlet opening 24 is located behind the connecting portion between the first side wall 73 and the edge of the water inlet opening 24, the mopping cloth 11 can be better compressed, to scrape off debris from the mopping cloth 11. Especially for debris of large particles, they can be collected into the water outlet opening 26 via the water delivery channel 28 in the middle. Optionally, since the edge of the mopping cloth 11 tends to be dirtier, the cleaning effect can be enhanced by providing a corresponding compression member at the edge of the mopping cloth 11.

[0179] Referring to FIG. 11 to 13, in some embodiments, the cleaning tank structure 100 includes a first retaining strip 74. The first retaining strip 74 encloses to form a part of the cleaning tank 10. The cleaning tank structure 100 is provided with a water inlet opening 24 and a station entry opening 78. The water inlet opening 24 communicates with the cleaning tank 10. The first retaining strip 74 includes a first portion 88 and a second portion 90. The first portion 88 connects an edge of the water inlet opening 24 with the second portion 90. The second portion 90 is disposed near the station entry opening 78. Relative to the bottom surface of the cleaning tank 10, a height F2 of the second portion 90 is less than a height F1 of the first portion 88.

[0180] Thus, the height F1 of the first portion 88 is higher, which can prevent the mopping cloth 11 from splashing water out from the edge of the water inlet opening 24. The height F2 of the second portion 90 is lower, which can reduce the resistance when the cleaning robot enters the base station.

[0181] Specifically, the first retaining strip 74 may be in a circular arc-shape. The first retaining strip 74 can enclose to form a part of the cleaning tank 10 and can form a side wall of the cleaning tank 10. The first retaining strip 74 can be disposed near the front side of the base 20. In an embodiment, when the mopping cloth 11 is being cleaned in the cleaning tank 10, the mopping cloth 11 can rotate to cause water at the edge of the water inlet opening 24 to spin. The first portion 88 is connected to the edge of the water inlet opening 24, and the height F1 of the first portion 88 is higher, thus preventing the mopping cloth 11 from splashing water out from the edge of the water inlet opening 24.

[0182] The second portion 90 can be disposed near the station entry opening 78. The dual-rotatable-trays mopping cloths of the cleaning robot can enter the cleaning tank 10 through the station entry opening 78. The height F2 of the second portion 90 is lower, which facilitates the dual-rotatable-trays mopping cloths of the cleaning robot in entering the cleaning tank 10.

[0183] Optionally, the first retaining strip 74 is a soft retaining strip 22 (e.g., made of silicone), making the first retaining strip with good flexibility, easy deformation, and the ability to recover from deformation. This avoids causing excessive resistance to the cleaning robot when it returns to the base station and also protects the mopping cloth 11 of the cleaning robot.

[0184] Referring to FIG. 7, and FIG. 11 to FIG. 13, in some embodiments, the cleaning tank structure 100 includes a second retaining strip 76. The second retaining strip 76 encloses to form the other part of the cleaning tank 10. The first portion 88 and the second retaining strip 76 are respectively connected to two opposite edges of the water inlet opening 24. Relative to the bottom surface of the cleaning tank 10, the height D2 of the second retaining strip 76 is not less than the height F1 of the first portion 88. The second retaining strip 76 is provided with a detection opening 92. The cleaning tank structure 100 includes a water level detection apparatus 94. The water level detection apparatus 94 communicates with the cleaning tank 10 through the detection opening 92.

[0185] Thus, the height D2 of the second retaining strip 76 is not less than the height F1 of the first portion 88, which can further prevent the mopping cloth 11 from splashing water out from the edge of the water inlet opening 24. At the same time, by providing the water level detection apparatus 94, the water level in the cleaning tank 10 can be monitored to prevent water from overflowing from the cleaning tank 10.

[0186] Specifically, the second retaining strip 76 may be in a circular arc-shape. The second retaining strip 76 can enclose to form the other part of the cleaning tank 10 and can serve as the other side wall of the cleaning tank 10. The second retaining strip 76 can be disposed near the rear side of the base 20. In an embodiment, when the mopping cloth 11 is cleaned in the cleaning tank 10, the mopping cloth 11 can rotate to cause water at the edge of the water inlet opening 24 to spin. The first portion 88 and the second retaining strip 76 are respectively connected to the two opposite edges of a water opening. The height D2 of the second retaining strip 76 may be substantially equal to the height F1 of the first portion 88, further preventing the mopping cloth 11 from splashing water out from the edge of the water inlet opening 24.

[0187] An end of the second retaining strip 76 away from the water inlet opening 24 may be provided with a detection opening 92, and the detection opening 92 can communicate with the cleaning tank 10. Under a condition that the mopping cloth 11 is located in the cleaning tank 10 and clean water is introduced through the water inlet opening 24, the mopping cloth 11 can rotate in the cleaning tank 10, thereby driving water to various areas of the cleaning tank 10. When the water outflow from the water outlet opening 26 is less than the water inflow from the water inlet opening 24, the water level inside the cleaning tank 10 will rise. The water level detection apparatus 94 may be mounted on a side of the second retaining strip 76. The water level detection apparatus 94 can communicate with the cleaning tank 10 through the detection opening 92, thereby monitoring the water level in the cleaning tank 10 and preventing water from overflowing from the cleaning tank 10.

[0188] Referring to FIG. 4, in some embodiments, the cleaning tank structure 100 includes a third retaining strip 96. The third retaining strip 96 connects the first retaining strip 74 with the second retaining strip 76. The third retaining strip 96 encloses to form the water inlet opening 24.

[0189] Specifically, in FIG. 4, the third retaining strip 96 may be similar to a U-shape. One end of the third retaining strip 96 may be connected to the first portion 88, and the other end may be connected to the second retaining strip 76. A bottom end of the third retaining strip 96 is connected to the base 20, and the third retaining strip 96 encloses to form the water inlet opening 24, so that clean water can flow from the water inlet opening 24 into the water delivery channel 28.

[0190] It should be noted that an end surface of the first portion 88 away from the bottom surface 101 of the cleaning tank 10 (i.e., a top surface 128 of the first portion 88), an end surface of the second retaining strip 76 away from the bottom surface 101 of the cleaning tank 10 (i.e., a top surface 128 of the second retaining strip 76) and an end surface of the third retaining strip 96 away from the bottom surface 101 of the cleaning tank 10 (i.e., a top surface 128 of the third retaining strip 96) are located on a same first horizontal plane.

[0191] Referring to FIG. 4, in some embodiments, the cleaning tank structure 100 is provided with an air inlet 102, and the second retaining strip 76 is provided with a second notch 98. The air inlet 102 communicates with the cleaning tank 10 through the second notch 98.

[0192] Thus, air can enter the cleaning tank 10 to dry the mopping cloth 11 after cleaning.

[0193] Specifically, the air inlet 102 can be disposed near the rear side of the base 20. In FIG. 4, a second notch 98 may be provided in the second retaining strip 76 at a position near the air inlet 102. A fan (not shown in the figures) can blow hot air into the cleaning tank structure 100 through the air inlet 102. Since the second notch 98 communicates with the air inlet 102, after the mopping cloth 11 is cleaned, hot air can be blown toward the mopping cloth 11, while the mopping cloth 11 continues to rotate, thereby drying the mopping cloth 11.

[0194] Referring to FIG. 28 to FIG. 30, in some embodiments, the bottom surface of the cleaning tank 10 includes a helical surface 104. The helical surface 104 includes a starting end 106 and a terminating end 108 arranged along a helical direction of the helical surface 104. The protruding strip 14 is connected to the starting end 106. The cleaning tank structure 100 includes a drain structure 110, and the drain structure 110 is connected to the terminating end 108. The cleaning tank structure 100 is configured such that: under a condition that the mopping cloth 11 is placed on the protruding strip 14, the helical surface 104 contacts the mopping cloth 11, and the helical direction of the helical surface 104 is consistent with the movement direction of the mopping cloth 11.

[0195] Thus, while the protruding strip 14 scrapingly cleans the mopping cloth 11, the mopping cloth 11 can contact the helical surface 104. Therefore, during the process of cleaning the mopping cloth 11, the mopping cloth 11 can clean the helical surface 104 from the starting end 106 to the terminating end 108, thus debris can be discharged into the drain structure 110, avoiding or reducing debris remaining on the helical surface 104, and further avoiding or reducing the probability of the generation of an unpleasant odor in the cleaning tank structure 100.

[0196] Specifically, in FIG. 28, the bottom surface of the cleaning tank 10 includes the helical surface 104. Along the helical direction Y of the helical surface 104, the helical surface 104 may be provided with two ends, one end is the starting end 106 and the other end is the terminating end 108. Along the H direction, the helical surface 104 can helically extend from an upper part of the cleaning tank 10 toward a lower part of the cleaning tank 10, so that the starting end 106 is near the upper part of the cleaning tank 10, the terminating end 108 is near the lower part of the cleaning tank 10, and the starting end 106 is located above the terminating end 108. The protruding strip 14 may be connected to the starting end 106. The drain structure 110 may be connected to the terminating end 108.

[0197] In an embodiment, when the mopping cloth 11 of the cleaning robot needs to be cleaned, the mopping cloth 11 can be placed on the protruding strip 14, and the cleaning robot can rotate the mopping cloth 11, so that the protruding strip 14 scrapingly cleans the mopping cloth 11. While the protruding strip 14 scrapingly cleans the mopping cloth 11, the mopping cloth 11 can contact the helical surface 104. Therefore, during the process of cleaning the mopping cloth 11, the mopping cloth 11 can clean the helical surface 104 from the starting end 106 to the terminating end 108, therefore debris can be discharged into the drain structure 110, avoiding or reducing debris remaining on the helical surface 104, and further avoiding or reducing the probability of the generation of an unpleasant odor in the cleaning tank structure 100.

[0198] In FIG. 28, the water outlet opening 26 may be in a rectangular shape. The water outlet opening 26 may be provided on the bottom surface of the drain structure 110, near the rear side of the cleaning tank 10. The drain structure 110 is provided with a drain channel 112. Along the H direction, the drain channel 112 is located below the water delivery channel 28. The water delivery channel 28 communicates with the drain channel 112, and the drain channel 112 communicates with the water outlet opening 26.

[0199] In an embodiment, wastewater and other debris after cleaning the mopping cloth 11 can flow into the drain channel 112 through the water delivery channel 28. The drain channel 112 communicates with the water outlet opening 26, allowing the wastewater flowing to the drain structure 110 to be discharged away through the water outlet opening 26, preventing wastewater from blocking the drain channel 112.

[0200] Furthermore, the drain channel 112 can be disposed to incline from an end farther from the water outlet opening 26 toward an end closer to the water outlet opening 26, so that wastewater and other debris flowing into the drain channel 112 can accelerate toward the water outlet opening 26.

[0201] Referring to FIG. 28, the bottom surface of the cleaning tank 10 includes an inclined surface 114. Along the thickness direction Z of the protruding strip 14, the inclined surface 114 and the helical surface 104 may be provided on opposite sides of the two protruding strips 14. The helical surface 104 and the inclined surface 114 may be respectively provided on two sides of the water delivery channel 28. The inclined surface 114 may be connected to a side surface of the cleaning tank 10 near the rear side. In an embodiment, during the rotation cleaning process of the mopping cloth 11, the mopping cloth 11 can be scraped and cleaned by the protruding strip 14 adjacent to the inclined surface 114. The scraped debris can fall onto the inclined surface 114. By providing the inclined surface 114 with a downward slope from the side surface of the cleaning tank 10 toward the drain structure 110, debris can easily fall into the drain structure 110 for discharge when the debris cleaned from the mopping cloth 11 falls onto the inclined surface 114.

[0202] Referring to FIG. 30, in some embodiments, a plurality of protruding strips 14 are provided within the cleaning tank 10. The plurality of protruding strips 14 and the bottom surface of the cleaning tank 10 enclose to form the water delivery channel 28. The cleaning tank structure 100 includes a protruding member 116. The protruding member 116 protrudes from the bottom surface of the cleaning tank 10. The protruding member 116 includes a blocking surface 118 facing the water delivery channel 28. The blocking surface 118 is spaced apart from and opposite to an opening of the water delivery channel 28.

[0203] Specifically, in FIG. 30, the protruding member 116 may be similar to a cylindrical shape. Along an axial direction P of the helical surface 104, the protruding member 116 can be disposed to protrude from the helical surface 104. One side of the protruding member 116 facing the water delivery channel 28 can form the blocking surface 118. The blocking surface 118 is spaced apart from and opposite to the opening of the water delivery channel 28. A lower end of the blocking surface 118 may be connected to the drain channel 112, and the opening of the water delivery channel 28 may be connected to a top of the drain structure 110. In an embodiment, during the cleaning process of the mopping cloth 11 in the cleaning tank 10, the cleaned wastewater can be discharged through the opening of the water delivery channel 28. Because the water delivery channel 28 is disposed to incline from the water inlet opening 24 toward the drain structure 110, the wastewater flowing out of the opening of the water delivery channel 28 has a relatively high velocity. Without a blocking object in opposite, the wastewater might flow onto the helical surface 104. However, the wastewater flowing out of the opening of the water delivery channel 28 can be blocked by providing the blocking surface 118, thereby preventing the wastewater from splashing back onto the helical surface 104 and avoiding secondary contamination.

[0204] Furthermore, another side of the protruding member 116 can form a guiding surface 120. The guiding surface 120 may be connected to the helical surface 104. Wastewater and other debris fell onto the helical surface 104 can be guided by the guiding surface 120 to flow into the drain structure 110, preventing debris from accumulating on the helical surface 104. The guiding surface 120 may be an arc-shaped surface.

[0205] In some embodiments, the cleaning tank structure 100 includes a nano-layer (not shown in the figures). The nano-layer is provided on at least one of the bottom surface of the cleaning tank 10 and a circumferential side surface of the cleaning tank 10.

[0206] Thus, the hydrophobicity and oleophobicity of the nano-layer can be utilized to reduce the amount of dirt adhering to the bottom surface and the circumferential side surface of the cleaning tank 10.

[0207] Specifically, in an embodiment, the nano-layer may be provided on the bottom surface of the cleaning tank 10. In an embodiment, the nano-layer may be provided on the circumferential side surface of the cleaning tank 10, that is, on the sides of the first retaining strip 74 and the second retaining strip 76 that face the cleaning tank 10. In an embodiment, the nano-layer may be provided on both the bottom surface and the circumferential side surface of the cleaning tank 10.

[0208] The nano-layer has hydrophobicity and oleophobicity. By providing the nano-layer on the bottom surface of the cleaning tank 10 or the circumferential side surface of the cleaning tank 10, the amount of dirt adhering to the cleaning tank 10 is greatly reduced, the generation of an unpleasant odor from wastewater is slowed down, thereby

making the cleaning tank 10 easy to clean, greatly improving the user experience. The thickness and material of the nano-layer are not specifically limited. Optionally, the nano-layer may include an ultra-thin self-healing hydrophobic coating, and the thickness of the ultra-thin self-healing hydrophobic coating may be less than 100 nm (nanometer).

[0209] The nano-layer significantly improves the cleanliness degree of the cleaning tank 10, and its properties of acid, alkali, and corrosion resistance are comparable to the surface properties of the original material of the cleaning tank 10. Moreover, the coating process for the nano-layer is generally cheaper than that for super-hydrophobic coatings, which facilitates reduced costs. The manner of providing the nano-layer effectively enhances the cleanliness degree of the cleaning tank 10, making it difficult for dirt to adhere to the cleaning tank 10 and bacteria to grow, thereby making the cleaning tank 10 easy to clean and improving user experience.

[0210] Referring to FIG. 10, in some embodiments, the cleaning tank structure 100 includes a base 20, and a top surface 128 of the base 20 is formed with a first recess 130, and the first recess 130 constitutes the cleaning tank 10.

[0211] Thus, the cleaning tank 10 may be formed in the base 20 via the first recess 130, reducing the use of other materials.

[0212] Specifically, the top surface 128 can be recessed downward to form the first recess 130. The first recess 130 can be in the circular shape. Thus, the cleaning tank 10 may be formed in the base 20 via the first recess 130, reducing the use of other materials. Optionally, the first recess 130 may be manufactured by an integral forming process.

[0213] Referring to FIG. 10, in some embodiments, the top surface 128 of the base 20 is formed with a second recess 132, and the second recess 132 constitutes the water inlet opening 24, and the water inlet opening 24 communicates with the cleaning tank 10.

[0214] Thus, the water inlet opening 24 may be formed in the base 20 via the second recess 132, further reducing the use of other materials.

[0215] Specifically, the base 20 may be recessed downward to form the second recess 132. The second recess 132 constitutes the water inlet opening 24, and the water inlet opening 24 communicates with the cleaning tank 10. Thus, the water inlet opening 24 may be formed in the base 20 via the second recess 132, reducing the use of other materials. Optionally, the water inlet opening 24 may be in the form of a groove, and the second recess 132 may be manufactured by an integral forming process.

[0216] Referring to FIG. 5, in some embodiments, the protruding strip 14 includes a first side surface 17. The first side surface 17 faces a side wall of the cleaning tank 10 and connects to the bottom surface of the cleaning tank 10. A minimum distance of the first side surface 17 along a top of the protruding strip 14 to the bottom surface 101 of the cleaning tank 10 is greater than or equal to 2 mm.

[0217] Thus, it can be ensured that an area of the contact part between the mopping cloth 11 and the first side surface 17 of the protruding strip 14 is larger, improving the scraping and cleaning effect of the protruding strip 14 on the mopping cloth 11.

[0218] Specifically, in FIG. 5 and FIG. 7, the cleaning tank 10 is substantially in a circular shape. The first side surface 17 of the protruding strip 14 faces the circumferential side surface of the cleaning tank 10. The first side surface 17 connects the top of the protruding strip 14 with the bottom surface of the cleaning tank 10. The first side surface 17 of the protruding strip 14 may be a transition area from the top of the protruding strip 14 to the bottom surface 101 of the cleaning tank 10. The minimum distance Q of the first side surface 17 of the protruding strip 14 along the top of the protruding strip 14 to the bottom surface 101 of the cleaning tank 10 is greater than or equal to 2 mm. For example, the minimum distance Q of the first side surface 17 of the protruding strip 14 along the top of the protruding strip 14 to the bottom surface 101 of the cleaning tank 10 may be 2.2 mm, 2.5 mm, 3 mm, 3.5 mm, 4 mm, or other values greater than 2 mm. The upper limit of the minimum distance Q of the first side surface 17 of the protruding strip 14 along the top of the protruding strip 14 to the bottom surface 101 of the cleaning tank 10 may be specifically determined according to actual requirements, which is not specifically limited in the present application. Optionally, along the direction from the water inlet opening 24 to the water outlet opening 26, the top of the protruding strip 14 is not on the same horizontal plane, and the top of the protruding strip 14 has multiple connecting segments with sequentially decreasing slopes. Therefore, a distance of the first side surface 17 of the protruding strip 14 along from the top of the protruding strip 14 to the bottom surface 101 of the cleaning tank 10 will have multiple values. In this embodiment, the limit can be set based on an average distance from the multiple connecting segments to the bottom surface 101 of the cleaning tank 10.

[0219] The minimum distance Q of the first side surface 17 of the protruding strip 14 along the top of the protruding strip 14 to the bottom surface 101 of the cleaning tank 10 being greater than or equal to 2 mm can make an inclination angle of the first side surface 17 of the protruding strip 14 smaller, allowing the top of the protruding strip 14 to transition more gently to the bottom surface 101 of the cleaning tank 10. This can increase the area of the contact part between the mopping cloth 11 and the first side surface 17 of the protruding strip 14, improving the scraping and cleaning effect of the protruding strip 14 on the rotating mopping cloth 11.

[0220] Optionally, the protruding strip 14 further includes a second side surface 19, and the second side surface 19

of the protruding strip 14 is connected to the bottom surface of the water delivery channel 28. The second side surfaces 19 of the two protruding strips 14 can form the water delivery channel 28 together with the bottom surface 101 of the cleaning tank 10.

[0221] In some embodiments, as shown in FIG. 36, the cleaning tank structure 100 further includes a water outlet opening 26 and a spray head. The cleaning tank 10 communicates with the water outlet opening. The spray head is disposed above the cleaning tank 10, and the spray head is configured to spray water toward the cleaning tank 10 and/or the water outlet opening 26. Cleaning the water outlet opening 26 with water from the spray head can prevent stains from accumulating in the water outlet opening 26, preventing poor drainage of the cleaning tank 10. At the same time, the cleaning is simple and convenient, and the generation of an unpleasant odor in the cleaning tank 10 can be prevented. The spray head can be rotatably disposed above the cleaning tank 10, allowing the spray head to have a wider cleaning range over the cleaning tank 10 and the water outlet opening 26. The rotation angle of the spray head ranges from $[0^\circ, 60^\circ]$. Thus, the cleaning range is wider, and the water flow sprayed from the spray head 25 can be prevented from flowing out of the cleaning tank 10. The rotation angle of the spray head 25 may be $0^\circ, 5^\circ, 10^\circ, 20^\circ, 30^\circ, 35^\circ, 40^\circ, 45^\circ, 50^\circ, 60^\circ$, or any other value within $[0^\circ, 60^\circ]$. In some embodiments, the spray head 25 is provided with a nozzle 25a, and the nozzle 25a is in a fan shape. Thus, the water spray area formed by the water from the spray head 25 can be larger, and the cleaning range can be wider.

[0222] As shown in FIG. 37, the top of the protruding strip 14 includes a first segment 141, a second segment 142, and a third segment 143 sequentially connected along the direction from the water inlet opening 24 to the water outlet opening 26. Relative to the bottom surface of the cleaning tank 10, a height of the first segment 141 is greater than a height of the third segment 143.

[0223] Thus, the first segment 141 near the water inlet opening 24 has a greater height, a contact area between the mopping cloth 11 and the protruding strip 14 is larger, the clean water entering from the water inlet opening 24 can more easily wash away the stains on the mopping cloth 11. The third segment 143 has a lower height, the contact area between the mopping cloth 11 and the protruding strip 14 is smaller, wastewater does not easily adhere to the mopping cloth 11.

[0224] The cleaning tank structure 100 includes a first retaining strip 74 and a bottom plate 1001. The first retaining strip 74 and the bottom plate 1001 together enclose to form at least part of the cleaning tank 10. At least part of the first retaining strip 74 is movably connected to the bottom plate 1001. The cleaning tank 10 has an inlet-outlet 102. The at least part of the first retaining strip 74 is able to move between a first position and a second position. Under a condition of being in the first position, the at least part of the first retaining strip 74 closes the inlet-outlet 102 (as shown in FIG. 38). Under a condition of being in the second position, the at least part of the first retaining strip 74 opens the inlet-outlet 102 (as shown in FIG. 39).

[0225] In the above cleaning tank structure 100, at least part of the first retaining strip 74 is movably connected to the bottom plate 14. The at least part of the first retaining strip 74 in the second position opens the inlet-outlet 102 of the cleaning tank 10, thereby facilitating the cleaning robot to enter and exit the cleaning tank 10 through the inlet-outlet 102. The at least part of the first retaining strip 74 in the first position closes the inlet-outlet 102 of the cleaning tank 10, facilitating operations such as cleaning the mopping cloth 11 by the cleaning robot.

[0226] In some embodiments, the protruding strip 14 is rotatably located within the cleaning tank 10. The cleaning tank structure 100 is configured such that: under a condition that the mopping cloth 11 does not rotate, the protruding strip 14 rotates to cause relative movement to occur between the protruding strip 14 and the mopping cloth 11 for cleaning the mopping cloth 11. Thus, under a condition that the mopping cloth 11 does not rotate, the rotation of the protruding strip 14 can cause relative movement to occur between the protruding strip 14 and the mopping cloth 11, thereby achieving the effect of cleaning the mopping cloth 11.

[0227] In some embodiments, the cleaning tank structure 100 is configured such that: under a condition that the mopping cloth 11 rotates, a rotation direction of the protruding strip 14 is the same as a rotation direction of the mopping cloth 11, and a rotation speed of the protruding strip 14 is different from a rotation speed of the mopping cloth 11, causing relative movement to occur between the protruding strip 14 and the mopping cloth 11 for cleaning the mopping cloth 11 and cleaning the bottom surface 101 of the cleaning tank 10. Thus, under a condition that the rotation direction of the protruding strip 14 is the same as the rotation direction of the mopping cloth 11, the rotation speed of the protruding strip 14 is enabled to be different from the rotation speed of the mopping cloth 11, thereby enabling relative movement to occur between the protruding strip 14 and the mopping cloth 11.

[0228] In some embodiments, the cleaning tank structure 100 is configured such that: under a condition that the mopping cloth 11 rotates, the rotation direction of the protruding strip 14 is opposite to the rotation direction of the mopping cloth 11, causing relative movement to occur between the protruding strip 14 and the mopping cloth 11 for cleaning the mopping cloth 11 and cleaning the bottom surface 101 of the cleaning tank 10. Thus, a relative rotation speed between the protruding strip 14 and the mopping cloth 11 is greater, which can improve the cleaning effect of the protruding strip 14 on the mopping cloth 11.

[0229] In some embodiments, the cleaning tank structure 100 is configured such that: under a condition that the

mopping cloth 11 rotates, the protruding strip 14 does not rotate, causing relative movement to occur between the protruding strip 14 and the mopping cloth for cleaning the mopping cloth 11 and cleaning the bottom surface 101 of the cleaning tank 10. Thus, solely through the rotation of the mopping cloth 11, cleaning of both the mopping cloth 11 and the bottom surface 101 of the cleaning tank 10 can be achieved at the same time.

[0230] Specifically, the cleaning tank structure 100 may include a drive member 15 and a transmission member (not shown in the figures). The drive member may include a motor 152, and the drive member 15 is connected to a drive shaft 151 via the transmission member. The motor 152 can be installed on a backside surface of the cleaning tank 10, i.e., a side surface opposite to the side surface of the cleaning tank 10 contacting the mopping cloth 11. The drive shaft 151 is connected to the motor 152, passes through a top of the side wall of the water delivery channel 28, and is connected to the protruding strip 14. The motor 152 provides power to the drive shaft 151, and the drive shaft 151 drives the protruding strip 14 to rotate, thereby enabling relative movement to occur between the protruding strip 14 and the mopping cloth 11 in contact with the protruding strip 14, achieving the purpose of cleaning the mopping cloth 11. The transmission member connects to the drive member 15 and the protruding strip 14, the transmission member includes but is not limited to a belt, a reduction gear set, a rack, a lead screw, etc.

[0231] In some embodiments, the cleaning tank structure 100 includes a water inlet opening 24 and a water outlet opening 26. The cleaning tank 10 includes a plurality of tanks. At least two cleaning tanks 10 jointly communicate with one water inlet opening 24. Each cleaning tank communicates with one water outlet opening 26. The water inlet opening 24 communicates with the water outlet openings 26 via the cleaning tanks 10. The bottom surfaces 101 of the cleaning tanks 10 are disposed to incline along a direction from the water inlet opening 24 to the water outlet opening 26. The present application uses a single water inlet opening 24 to centrally supply water to at least two cleaning tanks, facilitating connection of the water inlet opening 24 with an external water source, and uses the respective water outlet openings 26 of the cleaning tanks 10 to separately discharge water. This can improve the efficiency of water inflow and outflow within the cleaning tanks 10, and also prevent solid contaminants from accumulating excessively in one water outlet opening 26, leading the generation of an unpleasant odor in the cleaning tank 10.

[0232] In some embodiments, the cleaning tank structure 100 includes a cleaning tank 10, a drain channel 112, and a movable filter element 54. The drain channel 112 forms a mounting opening 1120 on a top surface of the cleaning tank structure 100. The drain channel 112 includes a filtering section 1121 and a flow channel section 1122 that communicate with each other.

[0233] The filter element 54 includes a filtering portion 24 and a flow channel portion 26 that are connected to each other. The filter element 54 can be switched between a first position and a second position through the mounting opening 1120. In the first position, the filtering portion 24 is located in the filtering section 1121, the flow channel portion 26 is located in the flow channel section 1122, and the flow channel section 1122 communicates with the cleaning tank 10 via the filtering portion 24. In the second position, the filtering portion 24 is located outside the filtering section 1121, and the flow channel portion 26 is located outside the flow channel section 1122.

[0234] In the above cleaning tank structure 100, when the filter element 54 is in the first position, water in the cleaning tank 10 can flow into the flow channel section 1122 through the filtering portion 24, thereby filtering the water in the cleaning tank 10. When the filter element 54 is in the second position, the filtering portion 24 is located outside the filtering section 1121, and the flow channel portion 26 is located outside the flow channel section 1122, allowing the user to conveniently clean the drain channel 112 through the mounting opening 1120, preventing stains from remaining in the drain channel 112 to cause the generation of an unpleasant odor in the cleaning tank structure 100.

[0235] As shown in FIG. 42, in some embodiments, the cleaning tank structure 100 includes a cleaning tank 10 and a cleaning member. The cleaning member is located within the cleaning tank 10. The cleaning member includes a scraping portion and a combing portion 23. The scraping portion and the combing portion 23 are disposed to protrude from the bottom surface of the cleaning tank 10. The scraping portion in the present application may be the protruding strip 14, and the combing portion 23 is disposed on a side of the protruding strip 14 along the own length direction of the protruding strip 14, thereby forming the cleaning member.

[0236] The cleaning tank structure 10 is configured such that: under a condition that the mopping cloth 11 is placed within the cleaning tank 10, the mopping cloth 11 directly contacts the scraping portion and the combing portion 23, causing the combing portion 23 to comb the mopping cloth 11 and causing the scraping portion to scrapingly clean the mopping cloth 11.

[0237] In the above cleaning tank structure 100, when the mopping cloth 11 is cleaned in the cleaning tank 10, the mopping cloth 11 contacts the scraping portion and the combing portion 23, the mopping cloth 11 directly contacts the scraping portion and the combing portion 23. The combing portion 23 combs the mopping cloth 11 and the scraping portion scrapingly cleans the mopping cloth 11, so that the cleaning tank structure 10 cleans the mopping cloth 11 more thoroughly and with higher efficiency. In an embodiment, the combing portion 18 includes a plurality of protrusions, and an average height of the plurality of protrusions is less than or equal to the height of the scraping portion opposite thereto.

[0238] The cleaning tank structure 100 includes a cleaning tank 10 and a protruding strip 14. The protruding strip 14

is disposed to protrude from the bottom surface 101 of the cleaning tank 10. As shown in FIG. 43, the protruding strip includes a first segment 141 and a second segment 142. Relative to the bottom surface 101 of the cleaning tank 10, a height of the second segment 142 is greater than a height of the first segment 141.

[0239] The cleaning tank structure 100 is configured such that: under a condition that the mopping cloth 11 is placed in the cleaning tank 10, the mopping cloth 11 contacts the first segment 141, the second segment 142, and the contact area 16.

[0240] In the above cleaning tank structure 10, the second segment 142 is used to clean the mopping cloth 11. The first segment 141 can reduce the height to which the mopping cloth 11 is lifted, thereby reducing the gap between the mopping cloth 11 and the bottom surface 101 of the cleaning tank 10 to a certain extent. This allows good cleaning effect of the mopping cloth 11 on the bottom surface 102 (such as the contact area 16) of the cleaning tank 10, and reduces stain accumulation on the bottom surface 101 of the cleaning tank 10.

[0241] A base station 200 according to an embodiment of the present application includes the cleaning tank structure 100 according to any one of the above embodiments.

[0242] A cleaning device according to an embodiment of the present application includes the base station 200 according to any one of the above embodiments.

[0243] In the above base station 200 and cleaning device, under a condition that the mopping cloth 11 is placed on the protruding strip 14, the contact area 16 is able to directly contact the mopping cloth 11 whether it is rotating or not. Therefore, during the process of cleaning the mopping cloth 11, the rotating mopping cloth 11 can clean the contact area 16, thereby avoiding or reducing debris remaining on the bottom surface 101 of the cleaning tank 10, and further avoiding or reducing the probability of the generation of an unpleasant odor in the cleaning tank structure 100.

[0244] Optionally, in an embodiment, the cleaning device may include a base station 200. In another embodiment, the cleaning device may include the base station 200 and a cleaning robot. The cleaning robot includes a dual-rotatable-trays type cleaning robot (having two mopping cloths 11) and a single-rotary-tray type cleaning robot (having one mopping cloth 11). The rotation axis of the mopping cloth 11 is substantially perpendicular to the body of the cleaning robot.

[0245] In FIG. 32, the base station 200 includes a housing 122, and an accommodating space 124 may be provided in the housing 122 near the bottom. The cleaning tank structure 100 can be installed in the accommodating space 124, and an opening of the accommodating space 124 can communicate with the external environment. The base station 200 further includes a climbing plate 126, and the climbing plate 126 can be connected to an edge of the accommodating space 124 near the bottom of the base station 200. The cleaning robot can send the mopping cloth 11 into the cleaning tank 10 via the climbing plate 126. It can be understood that the cleaning tank structure 100 can be installed not only in the base station 200 but also in other devices for cleaning components of those devices.

[0246] In the embodiment shown in FIG. 4, the cleaning tank structure 100 can be used in conjunction with the dual-rotary-trays type cleaning robot. After completing cleaning, the cleaning robot can return to the base station 200, and place the mopping cloth 11 in the cleaning tank 10 for cleaning, and the base station 200 can also perform operations such as charging and dust collection for the cleaning robot at the same time. After the mopping cloth 11 of the cleaning robot is cleaned or after the cleaning robot is fully charged, the cleaning robot can leave the base station 200 to continue cleaning operations, or stay in the base station 200 until the next cleaning command.

[0247] Optionally, the base station 200 and the cleaning tank structure 100 can be integrated, eliminating the need to remove the cleaning tank structure 100 for cleaning. Optionally, the cleaning tank structure 100 can also be detachably installed in the base station 200, allowing the cleaning tank structure 100 to be used as a detachable component that the user can remove for cleaning.

[0248] A cleaning device of an embodiment of the present application may include a base station 200 and a cleaning robot. The base station 200 is in communication connection with the cleaning robot, the base station 200 includes a cleaning tank structure 100, the cleaning tank structure 100 includes a protruding strip 15 and a cleaning tank 10, the protruding strip 14 is provided within the cleaning tank 10, the cleaning robot includes a mopping cloth 11; and after the cleaning robot returns to the base station 200, the mopping cloth 11 is located within the cleaning tank 10 and placed on the protruding strip 14;

the cleaning device is configured such that:

after the cleaning robot returns to the base station 200, the cleaning device executes a first cleaning phase and a second cleaning phase;

the first cleaning phase includes:

the base station 200 supplies a first amount of clean water to the cleaning tank 10, the mopping cloth 11 and the protruding strip 14 create relative movement to clean the mopping cloth 11, and the base station 200 discharges wastewater from the cleaning tank 10;

the second cleaning phase includes:

the base station 200 supplies a second amount of clean water to the cleaning tank 10, the mopping cloth 11 and the protruding strip 14 create relative movement to clean the mopping cloth 11, and the base station 200 discharges wastewater from the cleaning tank 10; after the mopping cloth 11 is cleaned, the mopping cloth 11 rotates to spin water off the mopping cloth 11.

[0249] The communication connection may include but is not limited to wireless communication connection and wired communication connection. Wireless communication connection includes but is not limited to Bluetooth connection, infrared connection, WIFI (Wireless Fidelity, Wireless Fidelity) connection, mobile communication connection, ZigBee (ZigBee) connection, etc. Mobile communication connections include but are not limited to 2Generation (Generation, abbreviated as G), 3G, 4G, 5G, 6G and other network connections. WIFI connections include but are not limited to the 2.4GHz band and the 5GHz band. Wired communication connections include but are not limited to USB cable connection, TYPE-C cable connection, coaxial cable connection, etc.

[0250] In the above cleaning device, the mopping cloth 11 can be cleaned in two cleaning phases, and the second cleaning phase includes spinning water off the mopping cloth 11, thereby effectively cleaning the mopping cloth 11 and ensuring the cleaning effect on the mopping cloth 11 to a certain extent.

[0251] The above descriptions are merely specific embodiments of the present application, enabling those skilled in the art to understand or implement the present application. Various modifications to these embodiments will be readily apparent to those skilled in the art, and the generic principles defined herein can be implemented in other embodiments without departing from the spirit or scope of the present application. Therefore, the present application will not be limited to the embodiments shown herein, but is to be accorded the widest scope consistent with the principles and novel characteristics disclosed herein.

Claims

1. A cleaning tank structure, comprising:

a cleaning tank;
a protruding strip, wherein the protruding strip is located within the cleaning tank;
a water outlet opening, wherein the water outlet opening communicates with the cleaning tank;
a filter element, wherein the filter element is accommodated in the water outlet opening;
the cleaning tank structure is configured such that:
under a condition that a mopping cloth is placed on the protruding strip, the protruding strip scrapingly cleans the mopping cloth when relative movement occurs between the protruding strip and the mopping cloth, at least part of an inner surface of the cleaning tank directly contacts the mopping cloth; and when relative movement occurs between the cleaning tank and the mopping cloth, the mopping cloth applies a cleaning force to the inner surface of the cleaning tank to achieve self-cleaning of the cleaning tank.

2. The cleaning tank structure according to claim 1, wherein the inner surface of the cleaning tank comprises a bottom surface, the bottom surface comprises at least one of a contact area and a non-contact area, and the cleaning tank structure is configured such that:

the contact area directly contacts the mopping cloth, so that the mopping cloth applies a cleaning force to the contact area;
under a condition that the mopping cloth is placed on the protruding strip, a vertical distance between the non-contact area and a plane where the mopping cloth is located ranges from (0, 3] mm.

3. The cleaning tank structure according to claim 2, wherein the cleaning tank structure further comprises a water inlet opening, the bottom surface of the cleaning tank connects the water inlet opening with the water outlet opening, the bottom surface of the cleaning tank slopes from the water inlet opening toward the water outlet opening, the bottom surface of the cleaning tank is a conical shape, and the non-contact area comprises at least part of a circular area, the circular area is a circular area formed with a center of the bottom surface of the cleaning tank as a circular center and a preset radius.

4. The cleaning tank structure according to claim 3, wherein the protruding strip divides the bottom surface of the cleaning tank into a first bottom surface area and a second bottom surface area;

the non-contact area comprises one or a combination of a first non-contact area and a second non-contact

area, the first non-contact area is a part of a first circular area, the first circular area is a circular area formed with a center of the first bottom surface area as a circular center and a first preset radius;
the second non-contact area is a part of a second circular area, the second circular area is a circular area formed with a center of the second bottom surface area as a circular center and a second preset radius.

- 5
5. The cleaning tank structure according to claim 1, wherein when the mopping cloth rotates relative to the cleaning tank, the mopping cloth applies a cleaning force to the inner surface of the cleaning tank to achieve self-cleaning of the cleaning tank; and/or,

10 the cleaning tank structure comprises a base, and the cleaning tank is provided within the base; and/or, a compression amount between the mopping cloth and the bottom surface of the cleaning tank ranges from $[0, T)$ mm, wherein T is a thickness of the mopping cloth; and/or, the cleaning tank structure is configured such that under a condition that the mopping cloth is placed within the cleaning tank, a horizontal distance between an edge of the mopping cloth and a side wall of the cleaning tank ranges from $(0, 8]$ mm.

- 15
6. The cleaning tank structure according to any one of claims 1-5, wherein the cleaning tank structure is configured such that under a condition that the mopping cloth is placed within the cleaning tank, a compression amount between the edge of the mopping cloth and the side wall of the cleaning tank ranges from $(0, 10]$ mm.

- 20
7. The cleaning tank structure according to claim 6, wherein the cleaning tank structure comprises a retaining strip, the retaining strip encloses to form the cleaning tank; and/or,

25 the cleaning tank structure comprises a water inlet opening, wherein a plurality of protruding strips are provided in the cleaning tank, the plurality of protruding strips and the bottom surface of the cleaning tank enclose to form a water delivery channel, the water delivery channel communicates the water inlet opening with the water outlet opening; or, the cleaning tank structure comprises a first retaining strip and a bottom plate, the first retaining strip and the bottom plate together enclose to form at least part of the cleaning tank, at least part of the first retaining strip is movably connected to the bottom plate, the cleaning tank has an inlet-outlet, the at least part of the first retaining strip is able to move between a first position and a second position; under a condition of being in the first position, the at least part of the first retaining strip closes the inlet-outlet; under a condition of being in the second position, the at least part of the first retaining strip opens the inlet-outlet.

- 30
- 35 8. The cleaning tank structure according to claim 7, wherein among two of the protruding strips enclosing to form the water delivery channel, at least one of the protruding strips is provided with a first notch, the first notch communicates the water delivery channel with the cleaning tank, and/or; among two of the protruding strips enclosing the water delivery channel, at least one of the protruding strips is provided with a through opening at an end of the at least one of the protruding strips near the water outlet opening, the through opening communicates the water delivery channel with the cleaning tank.

- 40
9. The cleaning tank structure according to claim 7, wherein the protruding strip is disposed to incline toward the water delivery channel.

- 45
10. The cleaning tank structure according to claim 7, wherein the water delivery channel comprises a first section channel and a second section channel, the first section channel and the second section channel are sequentially connected along a direction from the water inlet opening to the water outlet opening; and relative to the water inlet opening, a depth of the second section channel is greater than or equal to a depth of the first section channel.

- 50
11. The cleaning tank structure according to claim 10, wherein along the direction from the water inlet opening to the water outlet opening, the depth of the first section channel gradually increases, and the depth of the second section channel gradually increases.

- 55
12. The cleaning tank structure according to claim 10, wherein the first section channel comprises a first end and a second end, the second section channel comprises a third end and a fourth end, the first end communicates with the water inlet opening, the second end communicates with the third end, and the fourth end communicates with the water outlet opening; a depth H1 of the first end ranges from $[1, 5]$ mm, depths H2 of the second end and the third end range from $[2, 8]$

mm, a depth H3 of the fourth end ranges from [5, 15] mm, and $H1 \leq H2 \leq H3$.

13. The cleaning tank structure according to claim 10, wherein along the direction from the water inlet opening to the water outlet opening, an inclination angle of a bottom surface of the first section channel relative to a horizontal plane is less than an inclination angle of a bottom surface of the second section channel relative to the horizontal plane.

14. The cleaning tank structure according to claim 1, wherein the cleaning tank structure comprises a drain pipe, the drain pipe communicates with the cleaning tank via the water outlet opening; and/or,

the cleaning tank comprises a first side wall and a second side wall, the cleaning tank structure is provided with a water inlet opening and a station entry opening, the water inlet opening communicates with the cleaning tank, the first side wall and the second side wall are respectively connected to two opposite edges of the water inlet opening; and the first side wall is closer to the station entry opening than the second side wall; a diameter of a circle where the first side wall is located is larger than a diameter of a circle where the second side wall is located, and a width of the first side wall along the horizontal direction is larger than a width of the second side wall along the horizontal direction.

15. The cleaning tank structure according to claim 14, wherein the cleaning tank structure comprises a first retaining strip and a second retaining strip, the first retaining strip and the second retaining strip enclose to form the cleaning tank, the first side wall is a side wall of the first retaining strip facing the cleaning tank, the second side wall is a side wall of the second retaining strip facing the cleaning tank, and a height of the second retaining strip is greater than a height of the first retaining strip; and/or,

a connecting portion between the second side wall and an edge of the water inlet opening is closer to a center of the cleaning tank than a connecting portion between the first side wall and the edge of the water inlet opening; and along a rotation direction of the mopping cloth, the connecting portion between the second side wall and the edge of the water inlet opening is located behind the connecting portion between the first side wall and the edge of the water inlet opening.

16. The cleaning tank structure according to claim 1, wherein the cleaning tank structure comprises a first retaining strip, the first retaining strip encloses to form a part of the cleaning tank, the cleaning tank structure is provided with a water inlet opening and a station entry opening, the water inlet opening communicates with the cleaning tank, the first retaining strip comprises a first portion and a second portion, the first portion connects an edge of the water inlet opening with the second portion, the second portion is disposed near the station entry opening; and relative to a bottom surface of the cleaning tank, a height of the second portion is less than a height of the first portion.

17. The cleaning tank structure according to claim 16, wherein the cleaning tank structure comprises a second retaining strip, the second retaining strip encloses to form the other part of the cleaning tank, the first portion and the second retaining strip are respectively connected to two opposite edges of the water inlet opening; and relative to the bottom surface of the cleaning tank, a height of the second retaining strip is not less than the height of the first portion; the second retaining strip is provided with a detection opening, the cleaning tank structure comprises a water level detection apparatus, the water level detection apparatus communicates with the cleaning tank via the detection opening, and/or;

the cleaning tank structure comprises a third retaining strip, the third retaining strip connects the first retaining strip with the second retaining strip, the third retaining strip encloses to form the water inlet opening, and/or; the cleaning tank structure is provided with an air inlet, the second retaining strip is provided with a second notch, and the air inlet communicates with the cleaning tank via the second notch.

18. The cleaning tank structure according to claim 1, wherein a bottom surface of the cleaning tank comprises a helical surface, the helical surface comprises a starting end and a terminating end arranged along a helical direction of the helical surface, and the protruding strip is connected to the starting end;

the cleaning tank structure comprises a drain structure, the drain structure is connected to the terminating end; the cleaning tank structure is configured such that: under a condition that the mopping cloth is placed on the protruding strip, the helical surface contacts the mopping cloth, and the helical direction of the helical surface

is consistent with a movement direction of the mopping cloth.

19. The cleaning tank structure according to claim 18, wherein a plurality of protruding strips are provided within the cleaning tank, the plurality of protruding strips and the bottom surface of the cleaning tank enclose to form a water delivery channel, the cleaning tank structure comprises a protruding member, the protruding member is disposed to protrude from the bottom surface of the cleaning tank, the protruding member comprises a blocking surface facing the water delivery channel, and the blocking surface is spaced apart from and opposite to an opening of the water delivery channel.

20. The cleaning tank structure according to any one of claims 1-19, wherein the cleaning tank structure comprises a nano-layer, the nano-layer is provided on at least one of the bottom surface of the cleaning tank and a circumferential side surface of the cleaning tank, and/or;

the cleaning tank structure comprises a base, a top surface of the base is formed with a first recess, the first recess constitutes the cleaning tank, and/or;

the top surface of the base is formed with a second recess, the second recess constitutes a water inlet opening, and the water inlet opening communicates with the cleaning tank.

21. The cleaning tank structure according to claim 1, wherein the protruding strip comprises a first side surface, the first side surface faces a side wall of the cleaning tank and connects to the bottom surface of the cleaning tank, a minimum distance of the first side surface along a top of the protruding strip to the bottom surface of the cleaning tank is greater than or equal to 2 mm; and/or, the filter element is detachably disposed within the water outlet opening.

22. The cleaning tank structure according to claim 1, wherein the cleaning tank structure further comprises a water outlet opening and a spray head, the cleaning tank communicates with the water outlet opening, the spray head is disposed above the cleaning tank, and the spray head is configured to spray water toward the cleaning tank and/or the water outlet opening; and/or,

the cleaning tank structure further comprises a water inlet opening, and a top of the protruding strip comprises a first segment, a second segment, and a third segment sequentially connected along a direction from the water inlet opening to the water outlet opening; and relative to the bottom surface of the cleaning tank, a height of the first segment is greater than a height of the third segment.

23. The cleaning tank structure according to claim 1, wherein the protruding strip is rotatably located within the cleaning tank;

wherein the cleaning tank structure is configured such that: under a condition that the mopping cloth does not rotate, the protruding strip rotates, causing the relative movement to occur between the protruding strip and the mopping cloth for cleaning the mopping cloth; and/or

the cleaning tank structure is configured such that: under a condition that the mopping cloth rotates, a rotation direction of the protruding strip is the same as a rotation direction of the mopping cloth, and a rotation speed of the protruding strip is different from a rotation speed of the mopping cloth, causing the relative movement to occur between the protruding strip and the mopping cloth for cleaning the mopping cloth and cleaning the bottom surface of the cleaning tank; and/or

the cleaning tank structure is configured such that: under a condition that the mopping cloth rotates, a rotation direction of the protruding strip is opposite to a rotation direction of the mopping cloth, causing the relative movement to occur between the protruding strip and the mopping cloth for cleaning the mopping cloth and cleaning the bottom surface of the cleaning tank; and/or

the cleaning tank structure is configured such that: under a condition that the mopping cloth rotates, the protruding strip does not rotate, causing the relative movement to occur between the protruding strip and the mopping cloth for cleaning the mopping cloth and cleaning the bottom surface of the cleaning tank.

24. The cleaning tank structure according to claim 1, wherein the cleaning tank structure comprises a cleaning member, the cleaning member comprises a scraping portion and a combing portion, and the scraping portion and the combing portion are disposed to protrude from the bottom surface of the cleaning tank;

the cleaning tank structure is configured such that: under a condition that the mopping cloth is placed within the cleaning tank, the mopping cloth directly contacts the scraping portion and the combing portion, causing the combing portion to comb the mopping cloth and causing the scraping portion to scrapingly clean the mopping

cloth.

25. The cleaning tank structure according to claim 2, wherein the protruding strip is disposed to protrude from the bottom surface of the cleaning tank, the protruding strip comprises a first segment and a second segment; and relative to the bottom surface of the cleaning tank, a height of the second segment is greater than a height of the first segment;

the cleaning tank structure is configured such that: under a condition that the mopping cloth is placed within the cleaning tank, the mopping cloth contacts the first segment, the second segment, and the contact area.

26. A cleaning tank structure, comprising a cleaning tank, a water inlet opening and a water outlet opening, wherein a plurality of protruding strips are provided in the cleaning tank, the plurality of protruding strips and a bottom surface of the cleaning tank enclose to form a water delivery channel, the water delivery channel communicates the water inlet opening with the water outlet opening;

the water delivery channel comprises a first section channel and a second section channel, the first section channel and the second section channel are sequentially connected along a direction from the water inlet opening to the water outlet opening; and relative to the water inlet opening, a depth of the second section channel is greater than or equal to a depth of the first section channel;

the first section channel comprises a first end and a second end, the second section channel comprises a third end and a fourth end, the first end communicates with the water inlet opening, the second end communicates with the third end, and the fourth end communicates with the water outlet opening;

a depth H1 of the first end ranges from [1, 5] mm, depths H2 of the second end and the third end range from [2, 8] mm, a depth H3 of the fourth end ranges from [5, 15] mm, and $H1 \leq H2 \leq H3$.

27. A base station, comprising the cleaning tank structure according to any one of claims 1-26.

28. A cleaning device, comprising the base station according to claim 27 and a cleaning robot, wherein the base station is in communication connection with the cleaning robot, the base station comprises the cleaning tank structure, the cleaning tank structure comprises the protruding strip and the cleaning tank, the protruding strip is provided within the cleaning tank, the cleaning robot comprises a mopping cloth; and after the cleaning robot enters the base station, the mopping cloth is located within the cleaning tank and placed on the protruding strip; the cleaning device is configured such that:

after the cleaning robot enters the base station, the cleaning device executes a first cleaning phase and a second cleaning phase;

the first cleaning phase comprises:

the base station supplies a first amount of clean water to the cleaning tank, the mopping cloth and the protruding strip create relative movement to clean the mopping cloth, and the base station discharges wastewater from the cleaning tank;

the second cleaning phase comprises:

the base station supplies a second amount of clean water to the cleaning tank, the mopping cloth and the protruding strip create relative movement to clean the mopping cloth, and the base station discharges wastewater from the cleaning tank; after the mopping cloth is cleaned, the mopping cloth rotates to spin water off the mopping cloth.

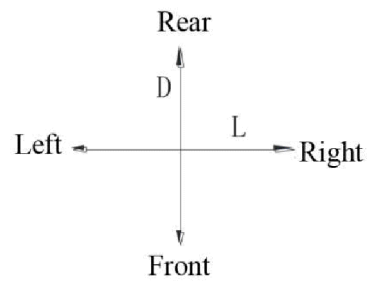
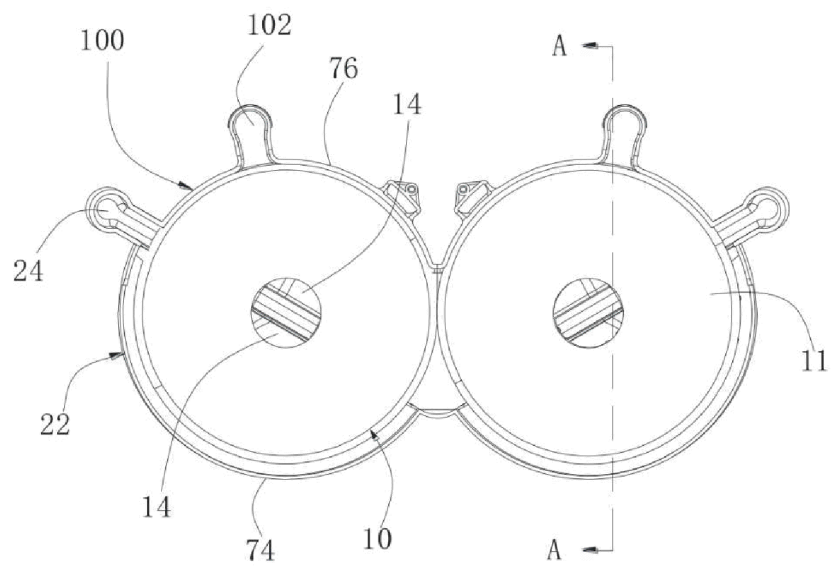


FIG. 1

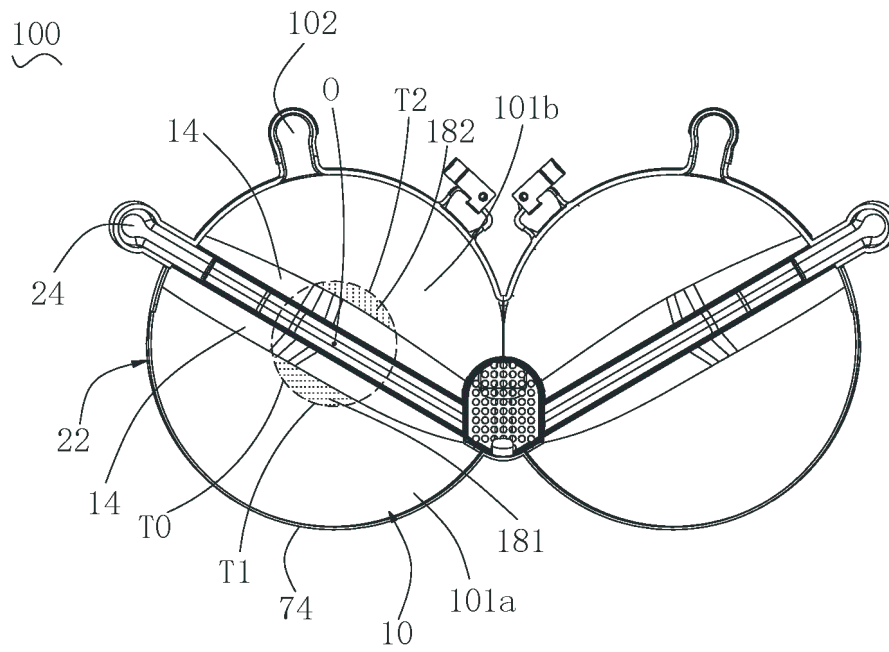


FIG. 1a

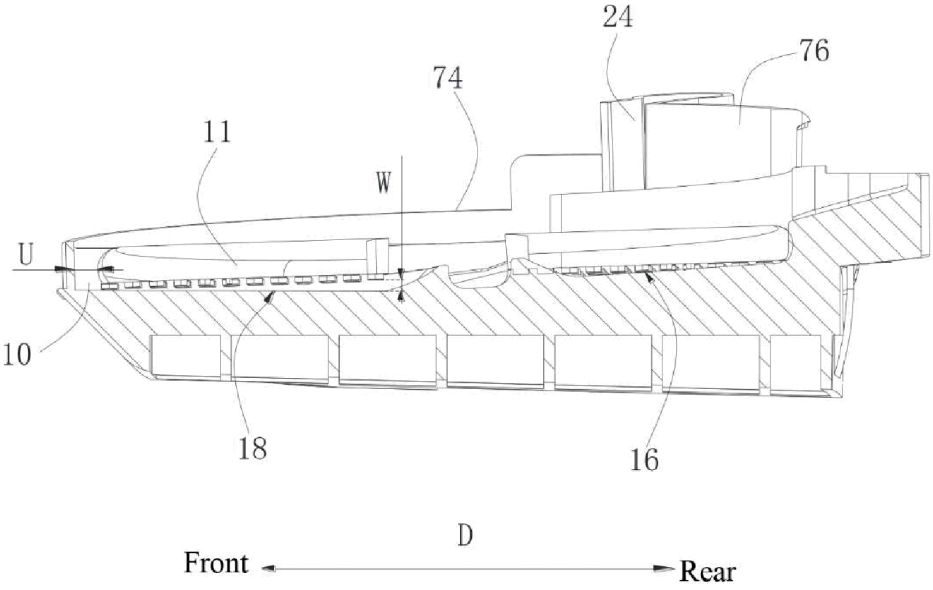


FIG. 2

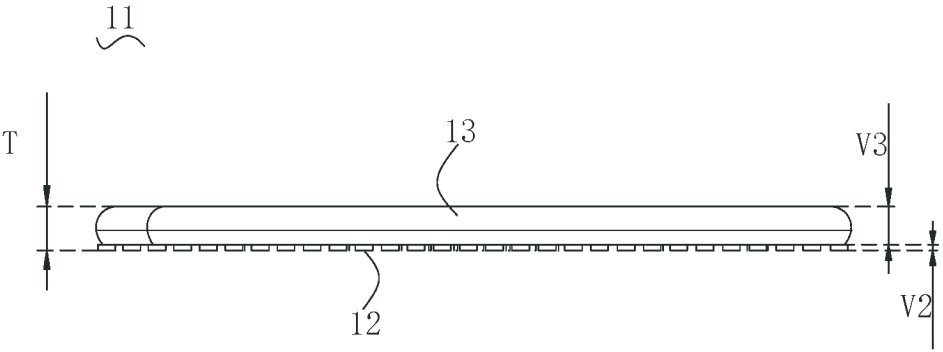


FIG. 3

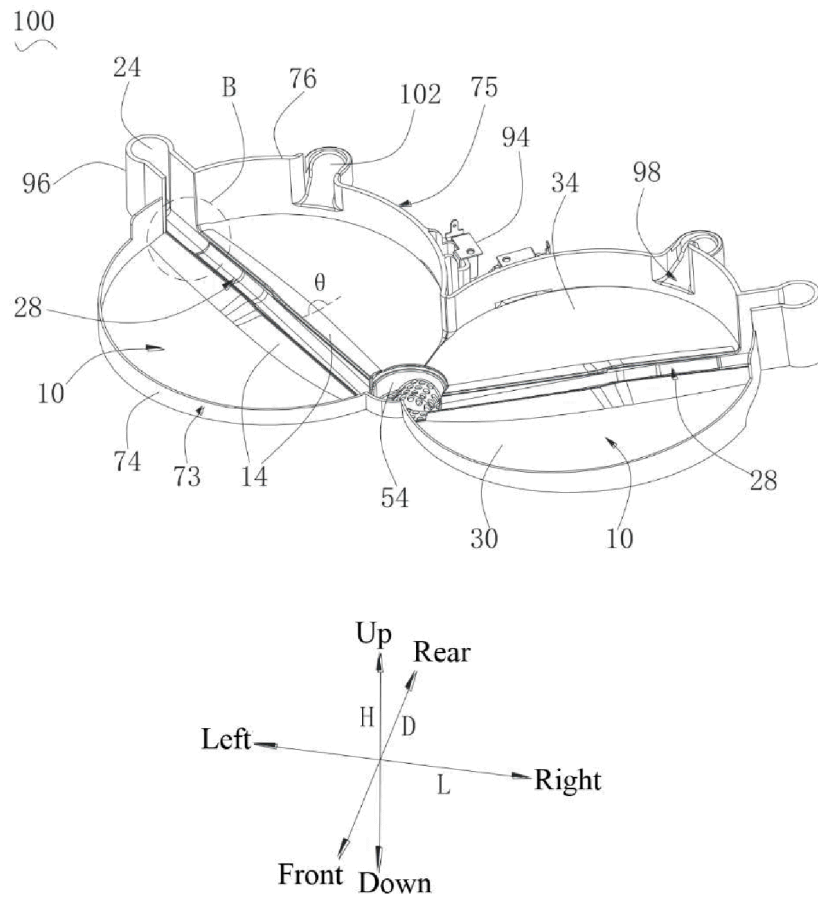


FIG. 4

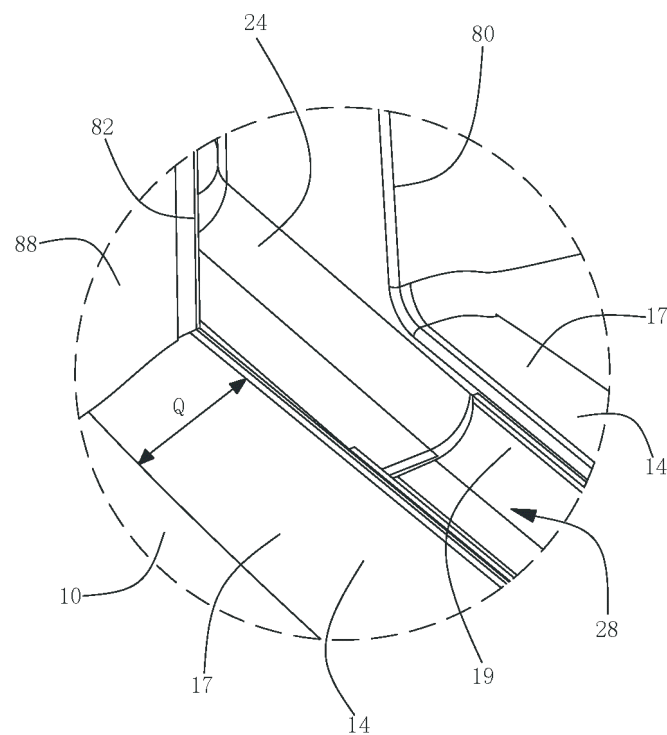


FIG. 5

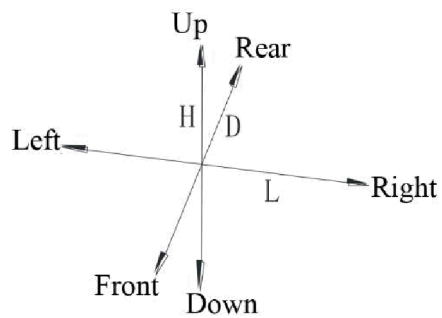
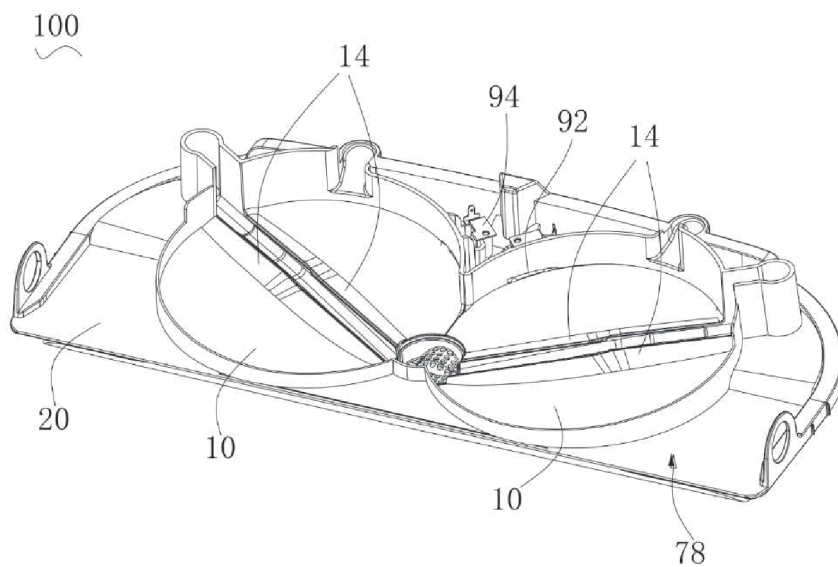
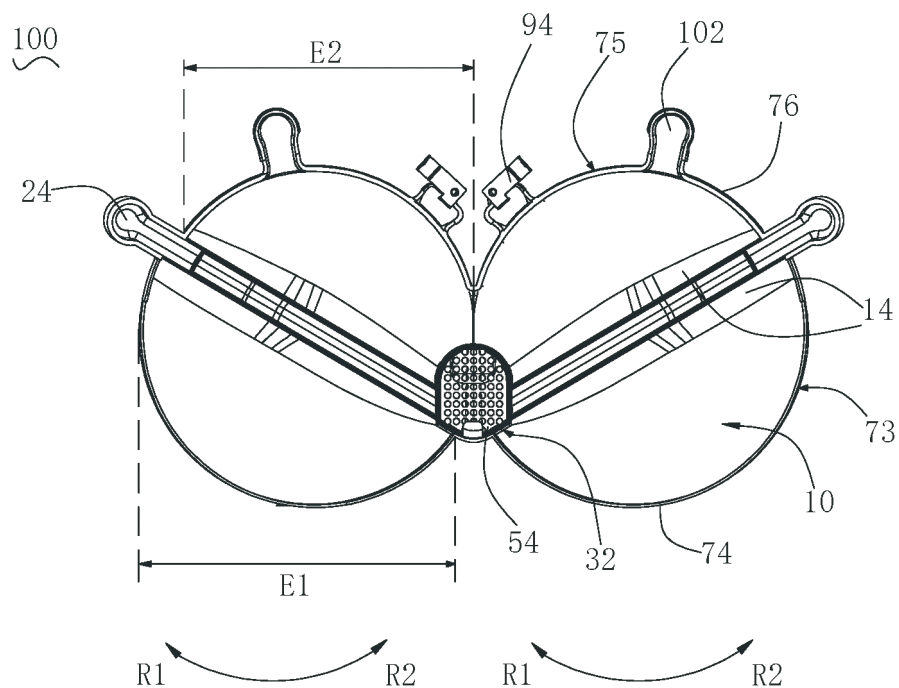


FIG. 7

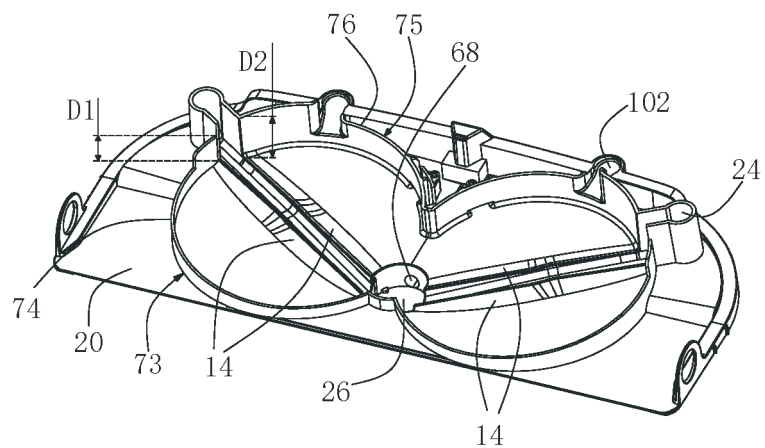


FIG. 8

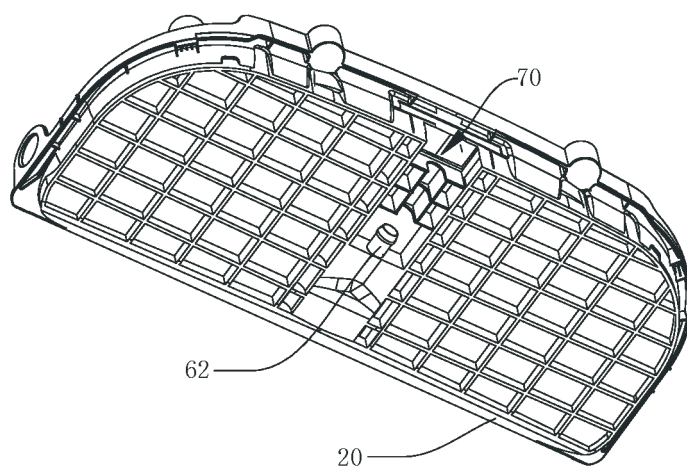


FIG. 9

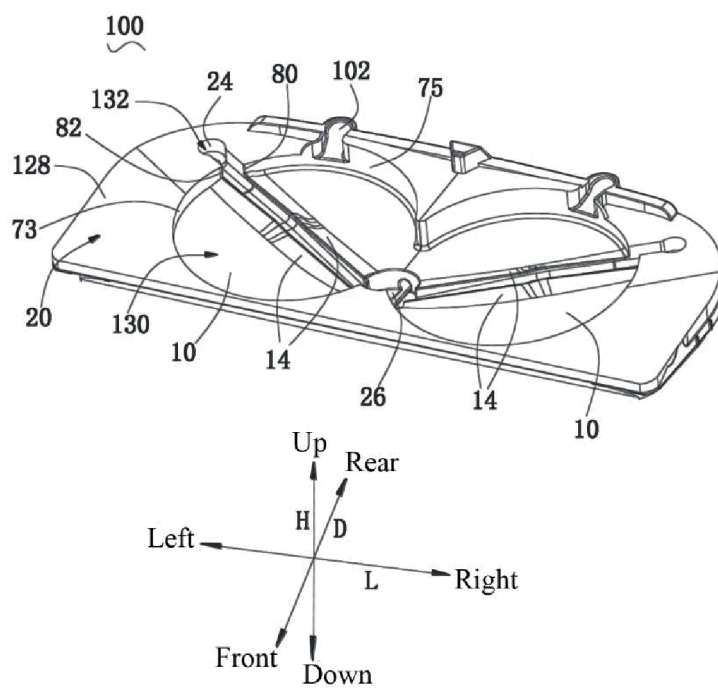


FIG. 10

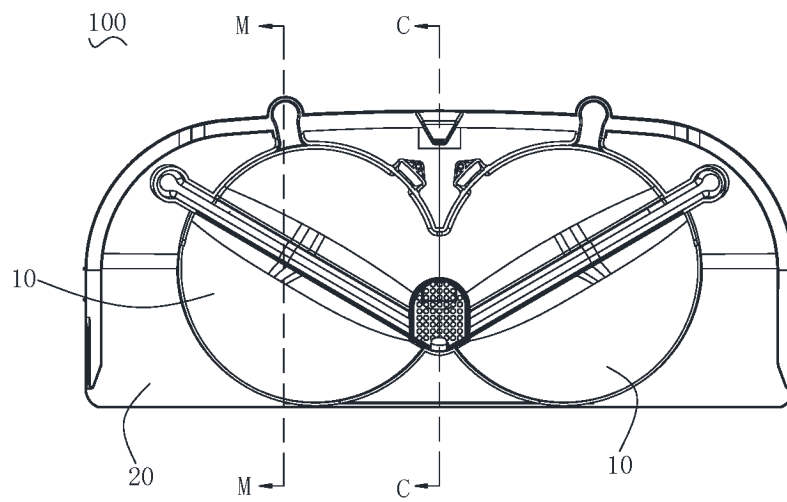


FIG. 11

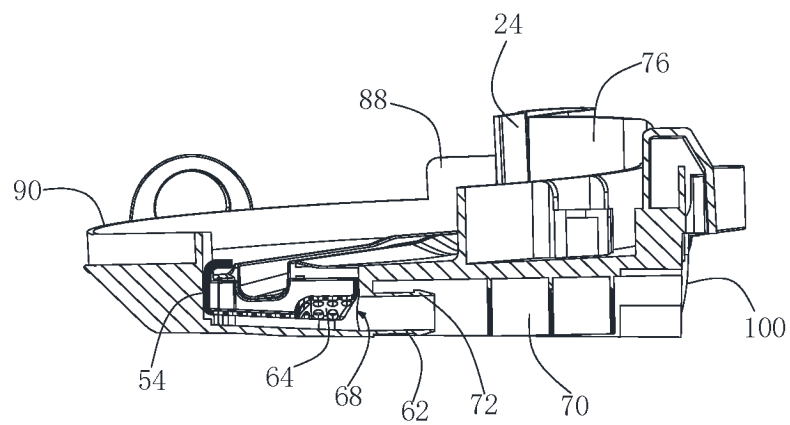


FIG. 12

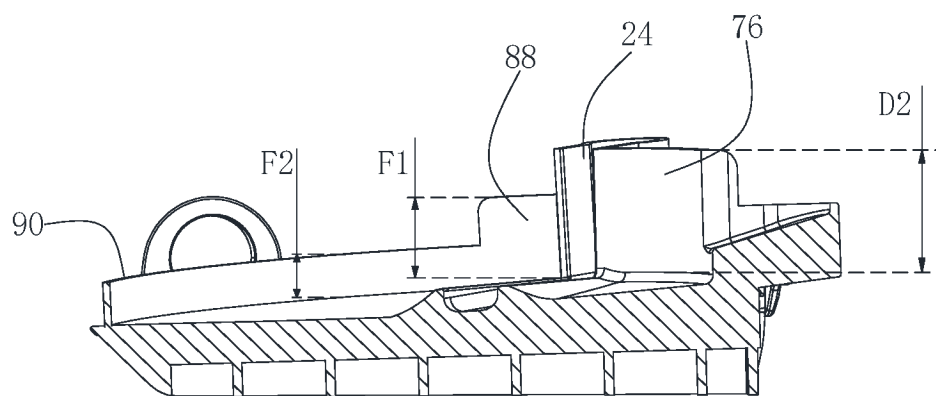


FIG. 13

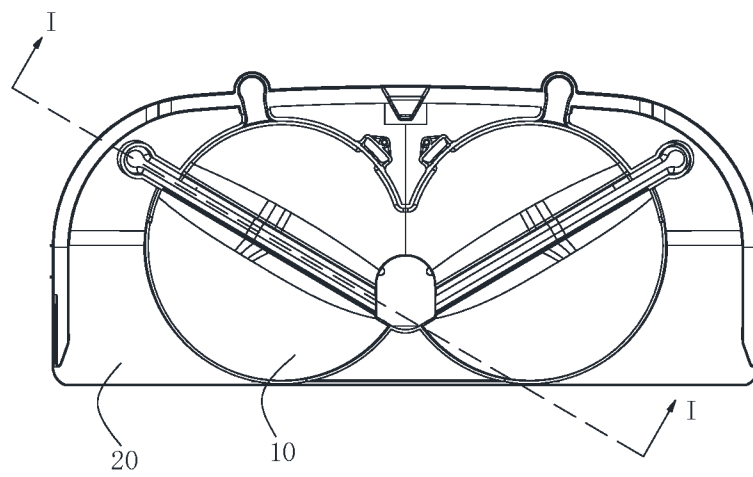


FIG. 14

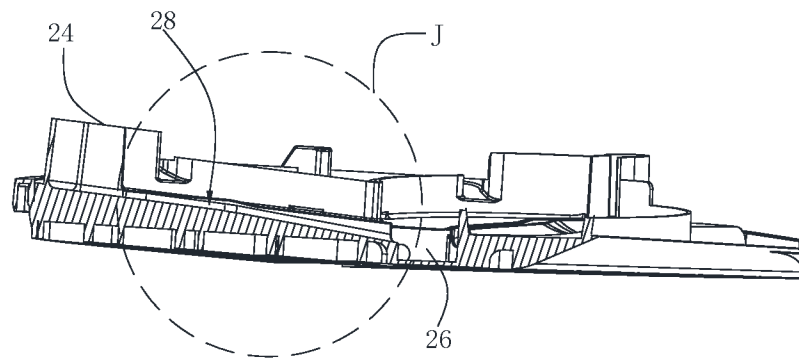


FIG. 15

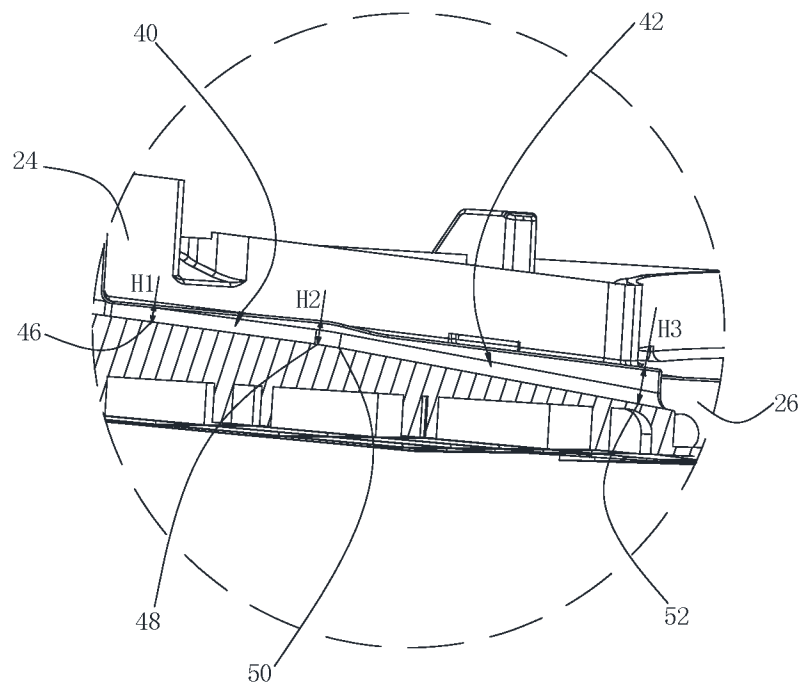


FIG. 16

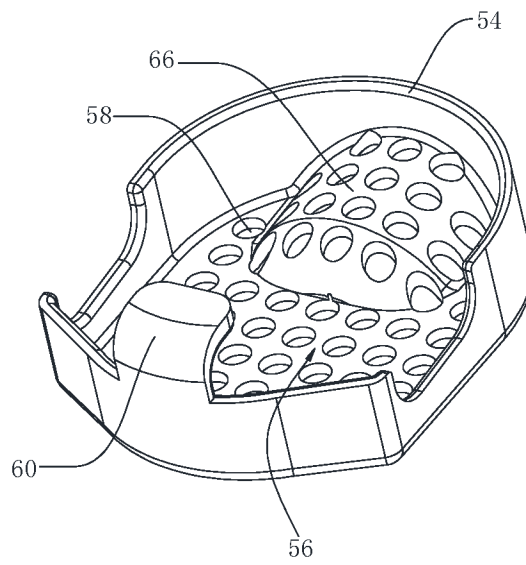


FIG. 17

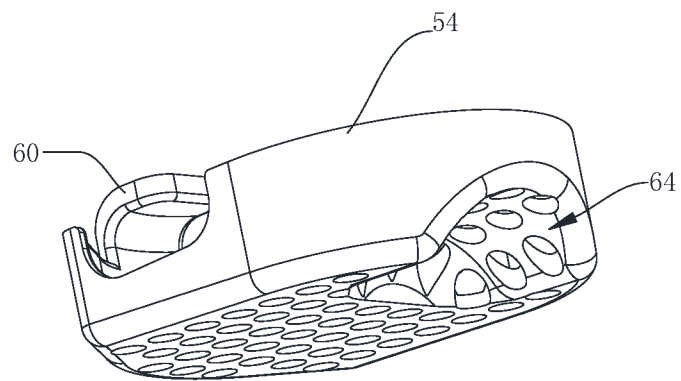


FIG. 18

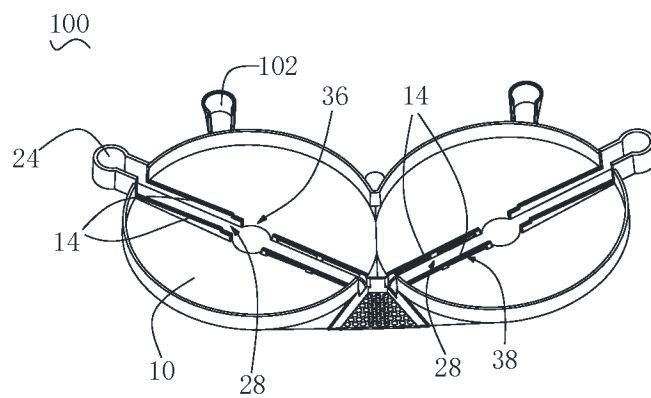


FIG. 19

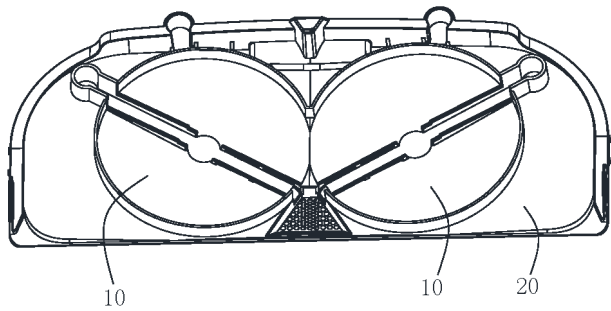


FIG. 20

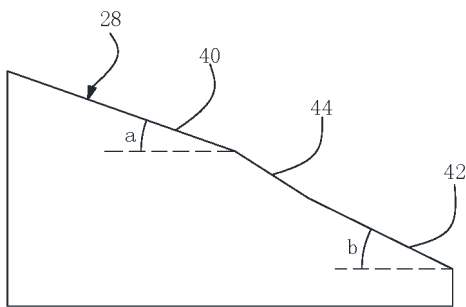


FIG. 21

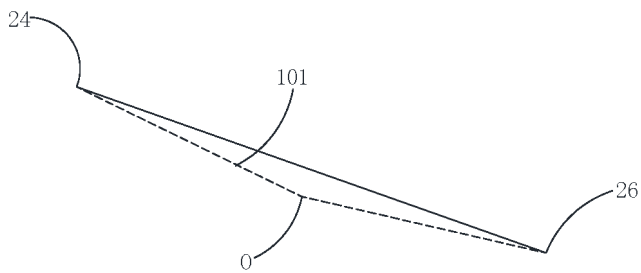


FIG. 22

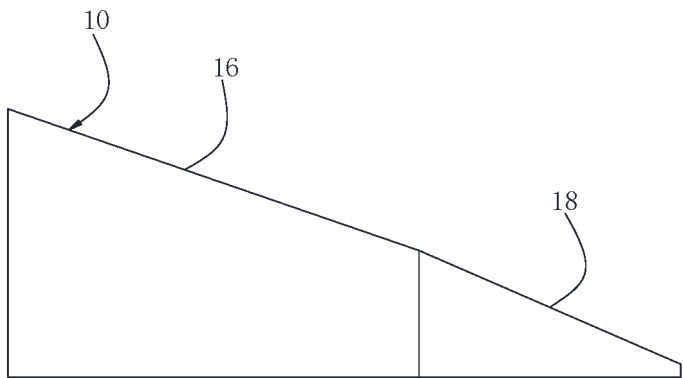


FIG. 23

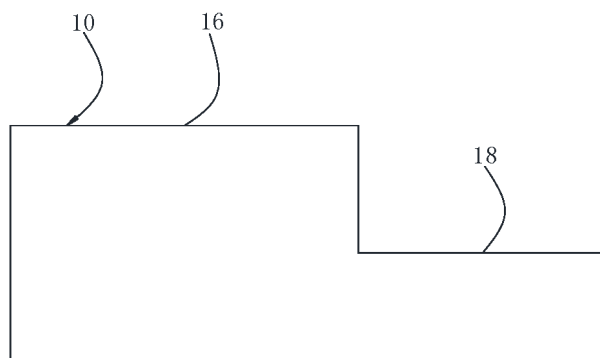


FIG. 24

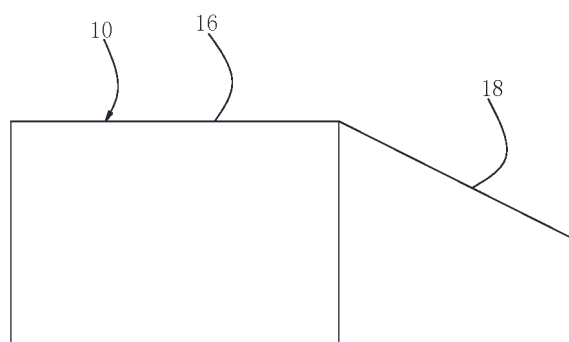


FIG. 25

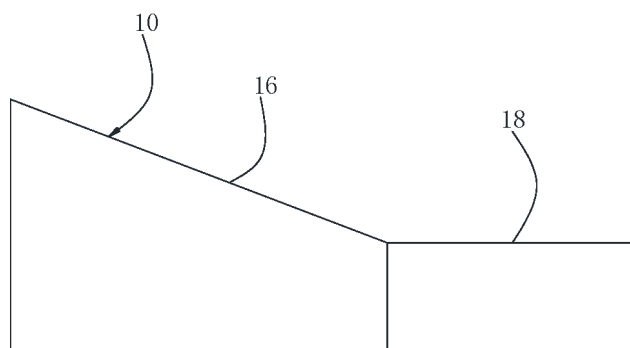


FIG. 26

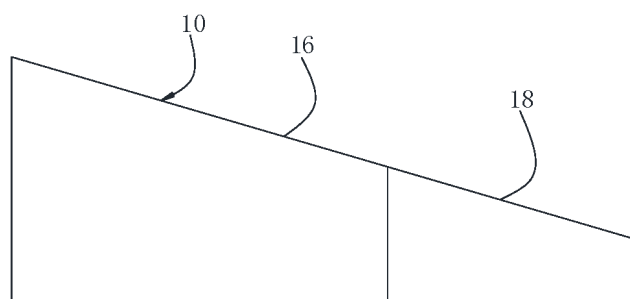


FIG. 27

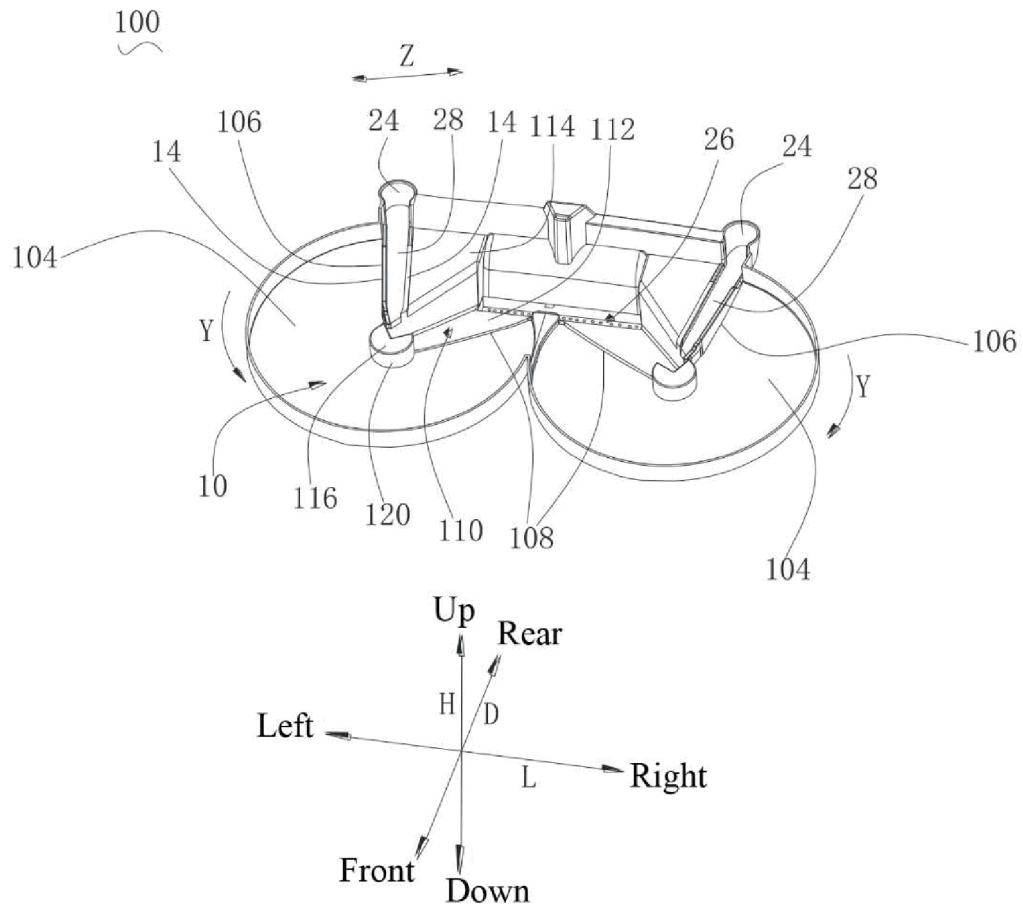


FIG. 28

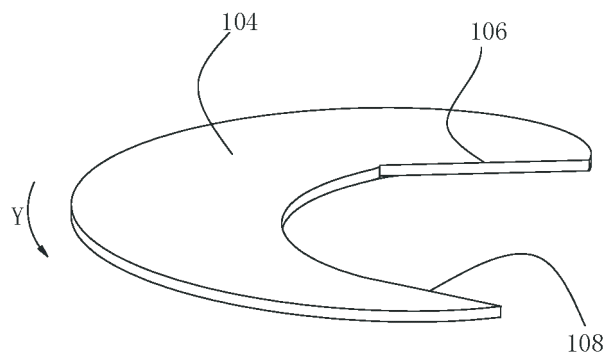


FIG. 29

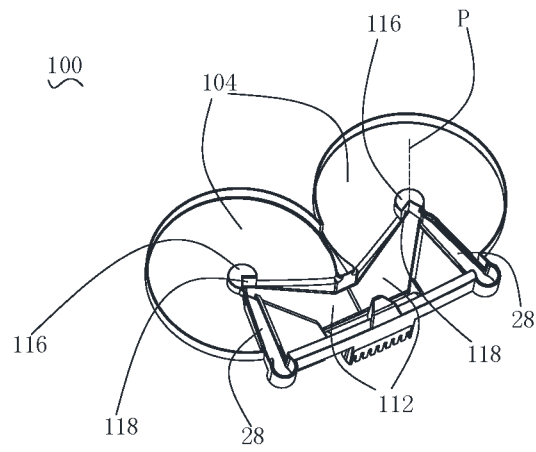


FIG. 30

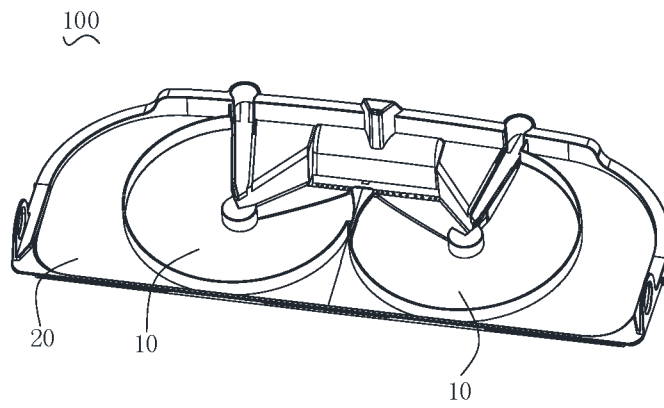


FIG. 31

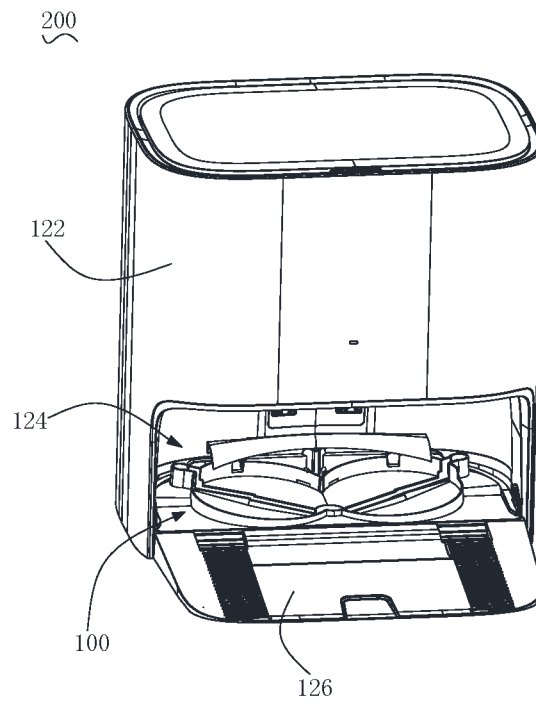


FIG. 32

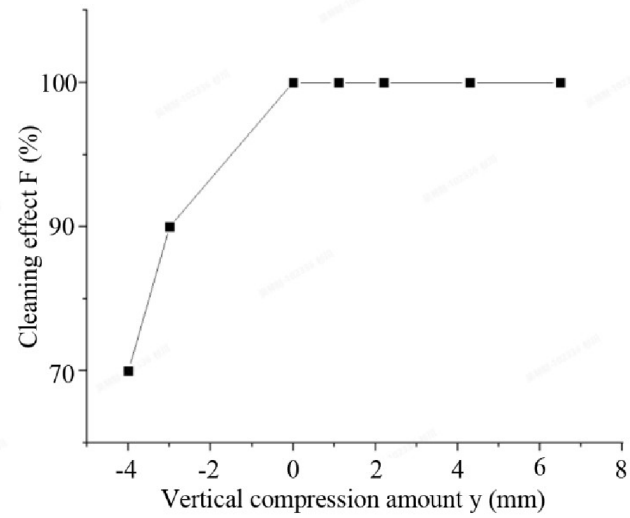


FIG. 33

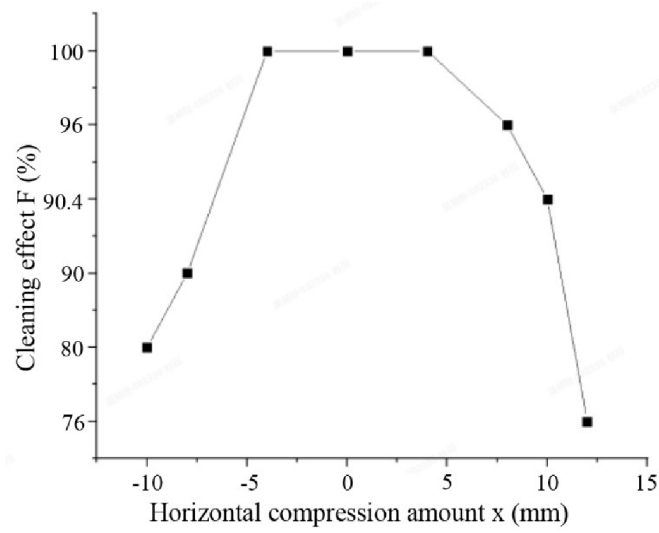


FIG. 34

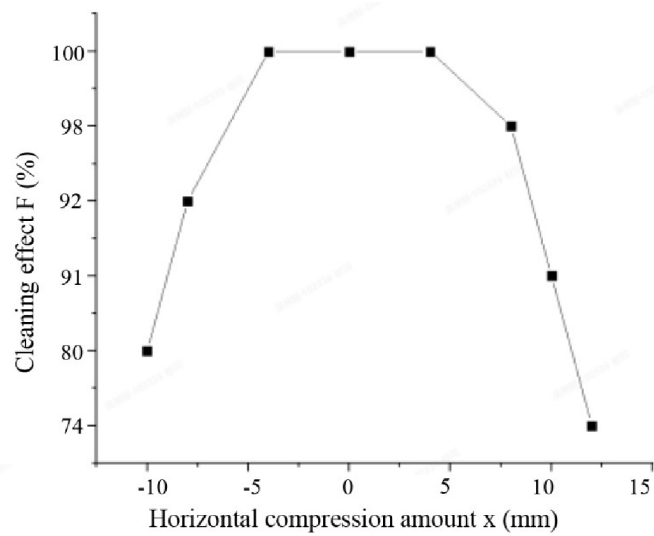


FIG. 35

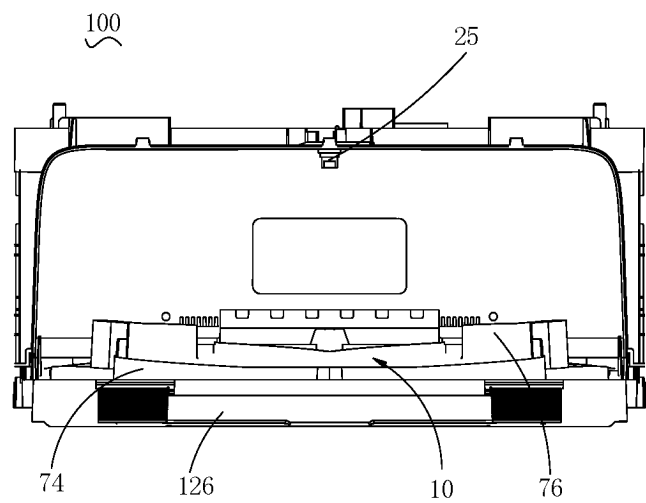


FIG. 36

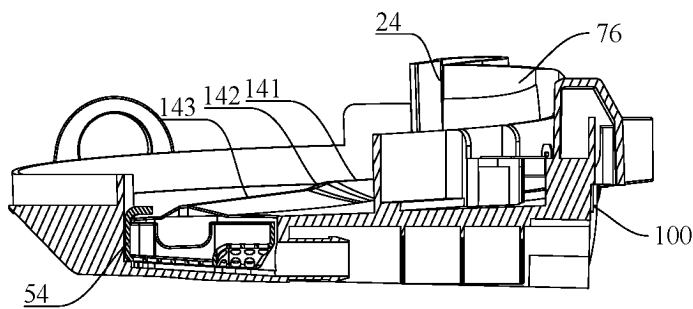


FIG. 37

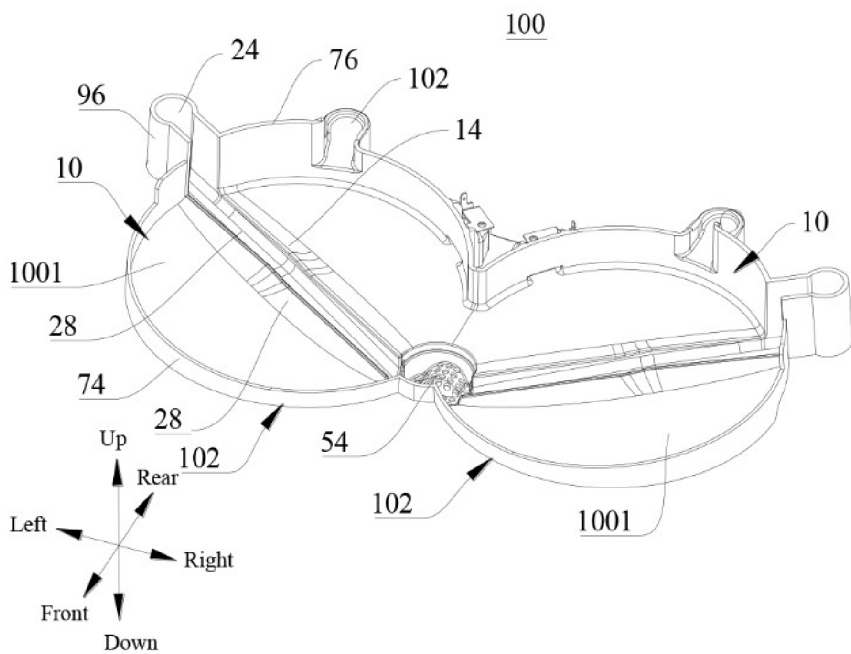


FIG. 38

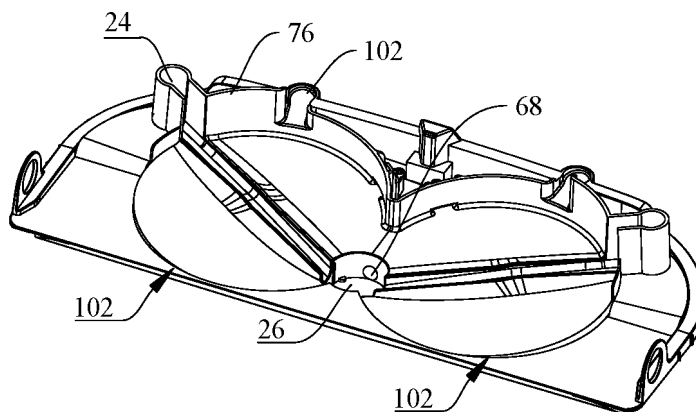


FIG. 39

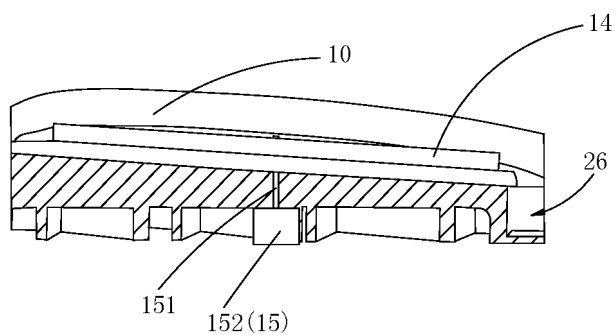


FIG. 40

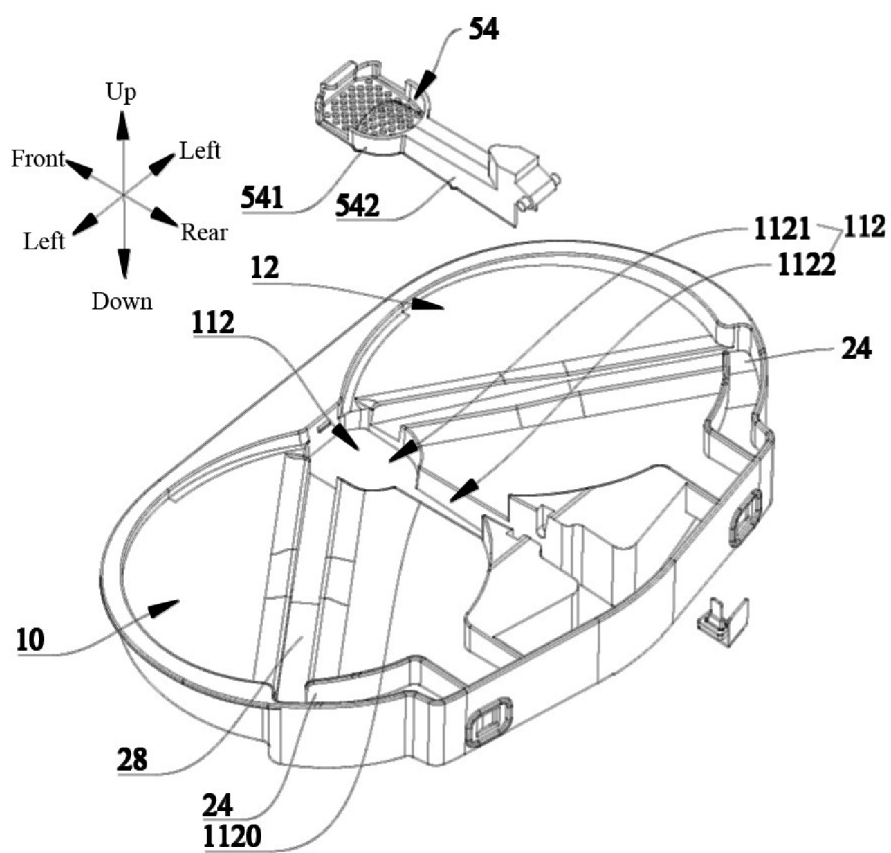


FIG. 41

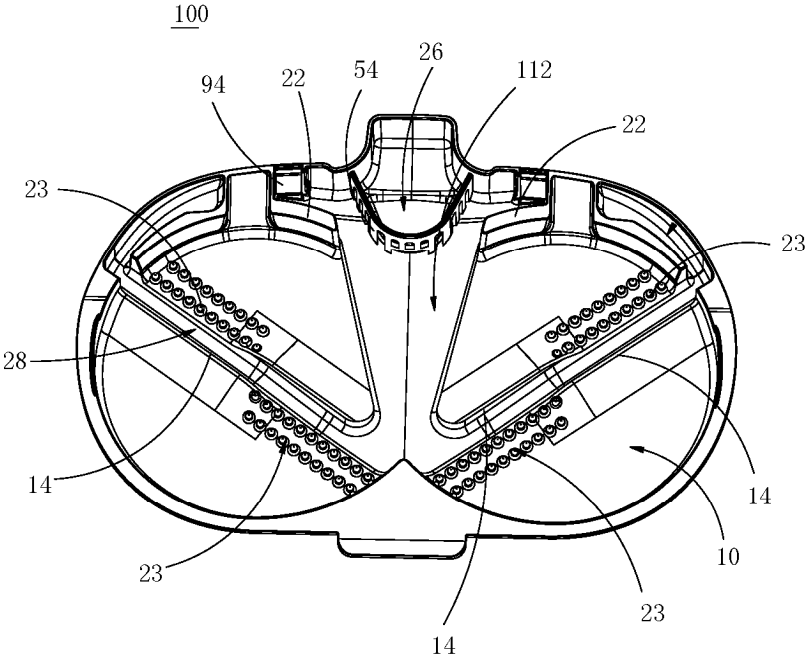


FIG. 42

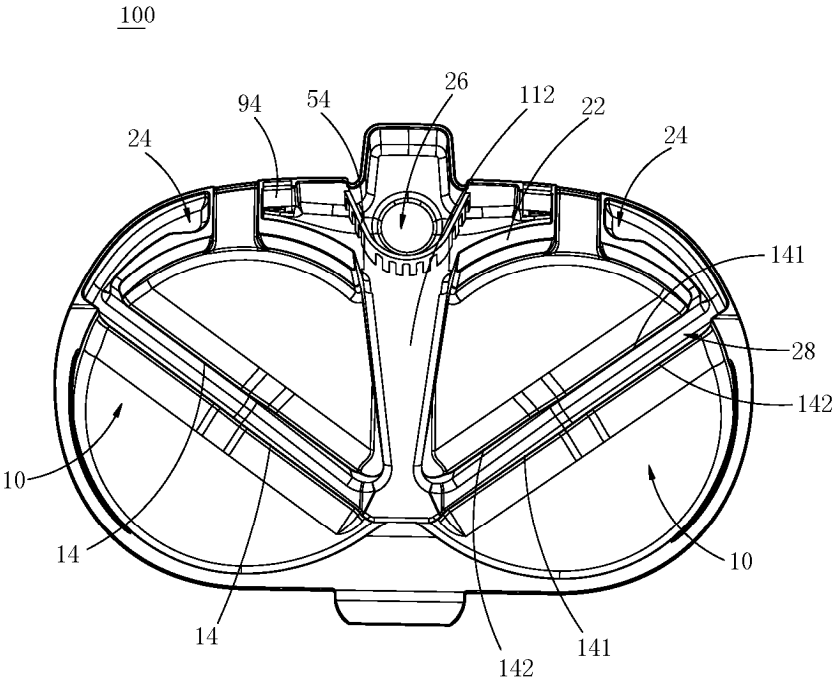


FIG. 43

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2024/139434

A. CLASSIFICATION OF SUBJECT MATTER

A47L11/283(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)

IPC:A47L11/-

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, ENTXT, WPABSC, ENTXT, DWPI: 杉川机器人, 吴林财, 回充站, 基站, 基座, 清洁槽, 清洗槽, 清洗站, 凸条, 突起, 挡条, 围挡, 刮条, 相对, 旋转, 运动, 转动, 自洁, 自清洁, 避免, 残留, 减少, 接触, 触碰, 刷, 条, 布, base, groove, mop, protrud+, rotat+, contact+, clean+ s robot

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 221903486 U (SHENZHEN 3IROBOTIX CO., LTD.) 29 October 2024 (2024-10-29) description, paragraphs 0115-0306, and figures 1-35	1-28
PX	CN 221997765 U (SHENZHEN 3IROBOTIX CO., LTD.) 15 November 2024 (2024-11-15) description, paragraphs 0060-0211, and figures 1-17	1-28
PX	CN 221997766 U (SHENZHEN 3IROBOTIX CO., LTD.) 15 November 2024 (2024-11-15) description, paragraphs 0067-0236, and figures 1-29	1-28
PX	CN 222149939 U (SHENZHEN 3IROBOTIX CO., LTD.) 13 December 2024 (2024-12-13) description, paragraphs 0082-0259, and figures 1-33	1-28
PX	CN 222149932 U (SHENZHEN 3IROBOTIX CO., LTD.) 13 December 2024 (2024-12-13) description, paragraphs 0040-0093, and figures 1-7	1-28
X	CN 114569027 A (UBTECH ROBOTICS CORP., LTD.) 03 June 2022 (2022-06-03) description, paragraphs 0040-0081, and figures 1-10	1, 27-28
Y	CN 114569027 A (UBTECH ROBOTICS CORP., LTD.) 03 June 2022 (2022-06-03) description, paragraphs 0040-0081, and figures 1-10	23-24

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

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"A" document defining the general state of the art which is not considered to be of particular relevance	"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
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"E" earlier application or patent but published on or after the international filing date	"&" document member of the same patent family
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"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	

Date of the actual completion of the international search 21 March 2025	Date of mailing of the international search report 25 March 2025
Name and mailing address of the ISA/CN China National Intellectual Property Administration (ISA/CN) China No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
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C. DOCUMENTS CONSIDERED TO BE RELEVANT		
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A	CN 115969272 A (SHARKNINJA (CHINA) TECHNOLOGY CO., LTD.) 18 April 2023 (2023-04-18) entire document	1-28
A	CN 215959652 U (MIDEA ROBOZONE TECHNOLOGY CO., LTD.) 08 March 2022 (2022-03-08) entire document	1-28
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INTERNATIONAL SEARCH REPORT
Information on patent family members

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CN	216675657	U	07 June 2022		None				
CN	115969272	A	18 April 2023		None				
CN	215959652	U	08 March 2022		None				
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					EP	4346535	A1	10 April 2024	
					EP	4346535	B1	23 October 2024	
					WO	2022248257	A1	01 December 2022	

REFERENCES CITED IN THE DESCRIPTION

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- CN 2024104090778 [0001]
- CN 2024111928652 [0001]
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