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(54) BASE AND CLEANING ROBOT SYSTEM

(57) A base (2) and a cleaning robot system, relating to the technical field of smart home. The base (2) for cleaning a cleaning mechanism of a cleaning robot (1) comprises a cleaning slot (301), the cleaning slot (301) is used for accommodating at least part of the cleaning mechanism and cleaning the at least part of the cleaning mechanism, the cleaning slot (301) comprises a first end and a second end, and the direction of a connecting line between the first end and the second end is substantially parallel to the extension direction of the cleaning mechanism. The cleaning slot (301) for accommodating a cleaning liquid is formed on a base body (300), and thus when the lower part of the cleaning mechanism moves into the cleaning slot (301), the cleaning mechanism is cleaned by using the cleaning liquid in the cleaning slot (301), that is, the cleaning robot (1) can be automatically cleaned in the cleaning slot (301).

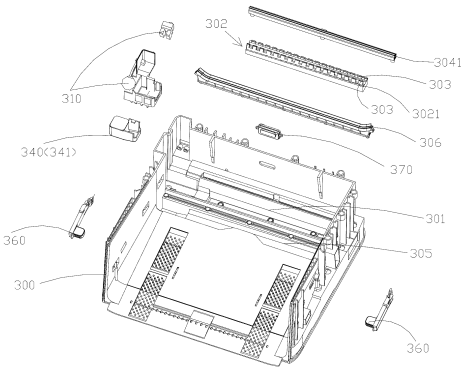


FIG.6

EP 4 260 787 A1

Description

CROSS-REFERENCE TO THE RELATED APPLICATION(S)

[0001] The present disclosure claims priority to Chinese Patent Application No. 202011458692.6, titled with "BASE STATION AND CLEANING ROBOT SYSTEM" and filed on December 11, 2020, the content of which is incorporated herein by reference in its entirety.

BACKGROUND

Technical Field

[0002] The present disclosure relates to the field of smart home technology, and in particular to a base station and a cleaning robot system.

Description of the Related Art

[0003] A cleaning robot integrated with sweeping and mopping functions in related technology includes a sweeping brushroll and a flat mopping cloth. After use, the flat mopping cloth is required to be cleaned, and at present, the flat mopping cloth have to be washed manually or directly replaced with a new one, which is extremely inconvenient for use.

BRIEF SUMMARY

[0004] The present disclosure provides a base station and a cleaning robot system for automatic cleaning of a mopping brushroll.

[0005] According to a first aspect of the present disclosure, there is provided a base station applicable to clean a cleaning mechanism of a cleaning robot. The base station includes: a cleaning tank, configured to accommodate at least part of the cleaning mechanism and clean the at least part of the cleaning mechanism, wherein the cleaning tank includes a first end face and a second end face, and the connection line of the center of the first end face and the second end face is substantially parallel to the rotation axis of the cleaning mechanism; and a cleaning wiper, configured to extend between the first end face and the second end face of the cleaning tank.

[0006] According to a second aspect of the present disclosure, there is provided a cleaning robot system, including: a cleaning robot, including a cleaning mechanism; and a base station, including a cleaning tank configured to accommodate at least part of the cleaning mechanism and clean the at least part of the cleaning mechanism, wherein the cleaning tank includes a first end face and a second end face, and the connection line between the first end face and the second end face is substantially parallel to an extension direction of the cleaning mechanism.

[0007] According to a third aspect of the present disclosure, there is provided a base station applicable to clean a cleaning mechanism of a cleaning robot. The base station includes: a cleaning tank, configured to accommodate at least part of the cleaning mechanism and clean the at least part of the cleaning mechanism; and a sewage tank in communication with the cleaning tank, wherein the sewage tank is provided with a liquid inlet, and cleaning liquid entering the sewage tank through the liquid inlet is configured to flush the cleaning liquid existing in the sewage tank.

[0008] In an embodiment of the present disclosure, a side wall of the sewage tank is provided with at least one offset liquid inlet.

[0009] In an embodiment of the present disclosure, the base station further includes: a first pump in fluid communication with a liquid inlet, configured to pump the cleaning liquid to the liquid inlet, wherein the liquid inlet is arranged in a direction offset from a wall and/or a bottom of the sewage tank.

[0010] In an embodiment of the present disclosure, the base station further includes: a first pump in fluid communication with a liquid inlet arranged on the cleaning tank, such that the cleaning liquid is fed for cleaning of the cleaning mechanism or self-cleaning of the cleaning tank.

[0011] In an embodiment of the present disclosure, the base station further includes: a second pump in fluid communication with a liquid outlet and configured to discharge the used cleaning liquid from the sewage tank.

[0012] In an embodiment of the present disclosure, the direction of the at least one liquid inlet is arranged in a direction offset from the wall and/or the bottom of the cleaning tank.

[0013] In an embodiment of the present disclosure, a plurality of liquid inlets are provided on the surface of the cleaning tank, the plurality of liquid inlets are distributed at different positions of the cleaning tank, such that the bottom wall and the side wall of the cleaning tank is flushed during the self-cleaning.

[0014] According to a fourth aspect of the present disclosure, there is provided a cleaning robot system, including: a cleaning robot including a cleaning mechanism; and a base station including a cleaning tank and a sewage tank, wherein the cleaning tank is configured to accommodate at least part of the cleaning mechanism and clean the at least part of the cleaning mechanism, and the sewage tank is in fluid communication with the cleaning tank and provided with a liquid inlet, such that the cleaning liquid entering the sewage tank through the liquid inlet is configured to flush the cleaning liquid existing in the sewage tank.

[0015] According to a fifth aspect of the present disclosure, there is provided a base station applicable to dry a cleaning mechanism of a cleaning robot. The base station includes: a drying mechanism, configured to dry the cleaning mechanism; a cleaning tank, configured to accommodate at least part of the cleaning mechanism and clean the at least part of the cleaning mechanism; and a

guide bottom surface, extending from the entrance of the base station to the cleaning tank for the cleaning robot to dock on the base station, wherein the cleaning tank and the drying mechanism are respectively arranged at the two opposite end portion of the base station.

[0016] In an embodiment of the present disclosure, at least one through hole is provided on the guide bottom surface, and the drying mechanism is configured to dry the cleaning mechanism through the through hole.

[0017] In an embodiment of the present disclosure, the drying mechanism is an exhaust fan.

[0018] In an embodiment of the present disclosure, the drying mechanism is a heating device arranged on the guide bottom surface, wherein the heating device is transversely arranged along the guide bottom surface and has a length substantially equal to cleaning mechanism.

[0019] In an embodiment of the present disclosure, the base station further includes: a first charging electrode, configured to be electrically connected with a second charging electrode of the cleaning robot.

[0020] In an embodiment of the present disclosure, the base station further includes a guide side surface, wherein the first charging electrode is arranged on the guide side surface, and the first charging electrode is further located above the cleaning tank.

[0021] According to a sixth aspect of the present disclosure, there is provided a cleaning robot system, including: a cleaning robot including a cleaning mechanism; and a base station. The base station includes: a drying mechanism configured to dry the cleaning mechanism; a cleaning tank configured to accommodate at least part of the cleaning mechanism and clean the at least part of the cleaning mechanism; and a guide bottom surface, extending from the entrance of the base station to the cleaning tank for the cleaning robot to dock on, wherein the cleaning tank and the drying mechanism are respectively arranged at two opposite end portion of the base station.

[0022] In an embodiment of the present disclosure, the cleaning robot dock on the base station in a first direction to clean the cleaning mechanism, and dock on the base station in a second direction, which is opposite to the first direction, to dry the cleaning mechanism.

[0023] According to a seventh aspect of the present disclosure, there is provided a cleaning robot system, including: a cleaning robot, including a cleaning mechanism; and a base station, including a cleaning tank and a sewage tank. The cleaning tank is configured to accommodate at least part of the cleaning mechanism and clean the at least part of the cleaning mechanism. The sewage tank is in fluid communication with the cleaning tank, and provided with at least a liquid inlet, such that the cleaning liquid entering the sewage tank through the liquid inlet is configured to flush the cleaning liquid existing in the sewage tank.

[0024] According to an eighth aspect of the present disclosure, there is provided a cleaning robot system, including: a cleaning robot, including a cleaning mechanism; and a base station, including a drying mechanism configured to dry the cleaning mechanism.

[0025] By providing the base station body with a cleaning tank configured to accommodate the cleaning liquid according to an embodiment of the present disclosure, the cleaning mechanism is cleaned with the cleaning liquid in the cleaning tank when the lower portion of the cleaning mechanism moves into the cleaning tank. That is, automatic cleaning of the cleaning robot in the cleaning tank can be achieved.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0026] Various objects, features and advantages of the present disclosure will become clearer by considering the following detailed description of embodiments in the present disclosure in combination with accompanying drawings. The accompanying drawings are only exemplary illustrations of the present disclosure, and are not necessarily drawn to scale. In drawings, the same reference numerals always denote same or similar components.

FIG. 1 illustrates a schematic diagram of a cleaning mechanism of a cleaning robot system at a first viewing angle, according to an embodiment of the present disclosure.

FIG. 2 illustrates a schematic diagram of a cleaning mechanism of a cleaning robot system at a second viewing angle, according to an embodiment of the present disclosure.

FIG. 3 illustrates a schematic cross-sectional view of a cleaning mechanism of a cleaning robot system, according to an embodiment of the present disclosure.

FIG. 4 illustrates a schematic diagram of a charging structure of a cleaning robot system at a first viewing angle, according to an embodiment of the present disclosure.

FIG. 5 illustrates a schematic diagram of a charging structure of a cleaning robot system at a second viewing angle, according to an embodiment of the present disclosure.

FIG. 6 illustrates an exploded structural diagram of a base station according to an embodiment of the present disclosure.

FIG. 7 illustrates a schematic structural diagram of a base station at a first viewing angle, according to an embodiment of the present disclosure.

FIG. 8 illustrates a schematic structural diagram of a base station at a second viewing angle, according to an embodiment of the present disclosure.

FIG. 9 illustrates a schematic diagram of a first internal structure of a base station, according to an embodiment of the present disclosure.

FIG. 10 illustrates a schematic diagram of a second

internal structure of a base station, according to an embodiment of the present disclosure.

FIG. 11 illustrates a schematic diagram of a third internal structure of a base station, according to an embodiment of the present disclosure.

FIG. 12 illustrates a partially structural diagram of a base station, according to an embodiment of the present disclosure.

FIG. 13 illustrates a schematic structural diagram of a liquid level detector of a base station in one state, according to an embodiment of the present disclosure.

FIG. 14 illustrates a schematic structural diagram of a liquid level detector of a base station in another state, according to an embodiment of the present disclosure.

FIG. 15 illustrates an exploded structural diagram of a cleaning robot, according to an embodiment of the present disclosure.

FIG. 16 illustrates a schematic structural diagram of a cleaning robot at a first viewing angle, according to an embodiment of the present disclosure.

FIG. 17 illustrates a schematic structural diagram of a cleaning robot at a second viewing angle, according to an embodiment of the present disclosure.

FIG. 18 illustrates a schematic structural diagram of a cleaning robot at a third viewing angle, according to an embodiment of the present disclosure.

FIG. 19 illustrates a schematic structural diagram of a cleaning robot at a fourth viewing angle, according to an embodiment of the present disclosure.

FIG. 20 illustrates a schematic structural diagram of a cleaning robot at a fifth viewing angle, according to an embodiment of the present disclosure.

FIG. 21 illustrates a schematic structural diagram of a cleaning robot at a sixth viewing angle, according to an embodiment of the present disclosure.

FIG. 22 illustrates a schematic diagram of an internal structure of a cleaning robot, according to an embodiment of the present disclosure.

FIG. 23 illustrates a schematic structural diagram of a first cleaning member of a cleaning robot at a working position, according to an embodiment of the present disclosure.

FIG. 24 illustrates a schematic structural diagram of a second cleaning member of a cleaning robot at a working position, according to an embodiment of the present disclosure.

FIG. 25A illustrates a first exploded structural diagram of a sweeping-mopping module of a cleaning robot, according to an embodiment of the present disclosure.

FIG. 25B illustrates an exploded structural diagram of a sweeping-mopping module of a cleaning robot, according to another embodiment of the present disclosure.

FIG. 25C illustrates a cross-sectional structural diagram of a sweeping-mopping module of a cleaning robot, according to another embodiment of the present disclosure.

FIG. 26 illustrates a second exploded structural diagram of a sweeping-mopping module of a cleaning robot, according to an embodiment of the present disclosure.

FIG. 27 illustrates a schematic structural diagram of a sweeping-mopping module of a cleaning robot at a first viewing angle, according to an embodiment of the present disclosure.

FIG. 28 illustrates a schematic structural diagram of a sweeping-mopping module of a cleaning robot at a second viewing angle, according to an embodiment of the present disclosure.

FIG. 29 illustrates a schematic structural diagram of a sweeping brushroll of a sweeping-mopping module at a working position, according to an embodiment of the present disclosure.

FIG. 30 illustrates a schematic structural diagram of a mopping brushroll of a sweeping-mopping module of a cleaning robot at a working position, according to an embodiment of the present disclosure.

FIG. 31 illustrates a schematic structural diagram of a position adjustment mechanism of a cleaning robot at a first viewing angle, according to an embodiment of the present disclosure.

FIG. 32 illustrates a schematic structural diagram of a position adjustment mechanism of a cleaning robot at a second viewing angle, according to an embodiment of the present disclosure.

FIG. 33 illustrates a schematic structural diagram of a position adjustment mechanism of a cleaning robot at a third viewing angle, according to an embodiment of the present disclosure.

FIG. 34 illustrates an exploded structural diagram of a position adjustment mechanism of a cleaning robot, according to an embodiment of the present disclosure.

FIG. 35 illustrates a schematic structural diagram of a position adjustment mechanism of a cleaning robot according to an embodiment of the present disclosure, in which a floater is disengaged from a rotation plate.

FIG. 36 illustrates a schematic structural diagram of a position adjustment mechanism of a cleaning robot, according to an embodiment of the present disclosure, in which a floater is connected with a rotation plate.

FIG. 37A illustrates a schematic structural diagram of a position adjustment mechanism of a cleaning robot at a first viewing angle, according to another embodiment of the present disclosure.

FIG. 37B illustrates a schematic structural diagram of a position adjustment mechanism of a cleaning robot at a second viewing angle, according to another embodiment of the present disclosure.

FIG. 37C illustrates a schematic structural diagram of a position adjustment mechanism of a cleaning

robot at a third viewing angle, according to another embodiment of the present disclosure.

LIST OF REFERENCE NUMERALS

[0027]

1. cleaning robot; 2. base station;
300. base station body; 301. cleaning tank; 3011. liquid outlet; 3012. liquid inlet; 302. cleaning wiper; 3021. connection plate; 303. protrusion; 304. diversion trench; 3041. guide plate; 305. auxiliary sink; 3051. liquid outlet; 306. sealing strip; 307. through hole; 308. guide bottom surface; 3081. anti-skid protrusion; 309. guide side surface; 310. liquid level detector; 311. signal transmitter; 312. support member; 313. connection rod; 314. first floater; 315. shielding member; 316. first filter; 320. first pump; 321. first container; 330. second pump; 331. second container; 340. second floater; 341. second filter; 350. drying mechanism; 360. first charging electrode; 361. guide wheel; 362. guide top surface; 363. first lock block; 364. second lock block; 370. communication module; 371. first Hall module; 372. second Hall module; 373. switch detection groove; 374. deceleration detection groove; 380. sewage tank;
200. body; 201. chasis; 202. side plate; 203. front bumper; 2031. protection sensor; 204. top cover; 205. walking wheel assembly; 206. caster wheel; 208. battery cover; 210. second charging electrode; 220. infrared communication module; 221. carpet recognition module; 222. wall-following sensor; 223. laser distance sensor;
100. fixing support; 111. floating support; 112. cover plate; 1121. anti-rolling tooth; 1122. wiper; 113. first accommodation chamber; 114. second accommodation chamber; 115. lock block assembly; 116. buffer pad; 110. rotation assembly; 120. sweeping brushroll; 130. mopping brushroll; 140. position adjustment mechanism; 150. side brush assembly; 151. side brush combing mechanism; 160. dust suction channel; 161. power component; 162. dust collector;
10. connection shaft; 20. rotation plate; 21. first protrusion; 22. third power source; 23. drive gear; 30. floater; 31. second protrusion; 32. first helical gear section; 33. output gear section; 40. connection rod shaft; 50. adapter; 60. second drive assembly; 61. first transmission gear; 611. second helical gear section; 612. transmission gear section; 62. second transmission gear; 63. power source; 64. first output gear; 65. second output gear; 66. third output gear; 67. fourth output gear; 70. stop rod; 71. notch; 72. sensor; 80. first drive assembly; 81. first gear; 82. second gear; 83. third gear; 84. fourth gear; 841. external spline; 85. second power source; 90. housing member; 91. first section; 92. second section; 93. output sleeve; 94. first seal; 95. second seal; 96. bearing.

DETAILED DESCRIPTION

[0028] Typical embodiments embodying features and advantages of the present disclosure will be described in detail in the following description. It should be understood that the present disclosure may have various changes in different embodiments, which do not depart from the scope of the present disclosure, and the description and drawings thereof are intended for illustration in their nature, rather than limiting the present disclosure.

[0029] The following description of different embodiments of the present disclosure are in accordance with the accompanying drawings which form a part of the present disclosure, and in which various structures, systems and steps that may implement various aspects of the present disclosure are illustrated exemplarily. It should be understood that other specific schemes of components, structures, devices, systems and steps may be used, and structural and functional modifications may be made without departing from the scope of the present disclosure. Moreover, although the terms "above", "between", "within" and the like may be used in this specification to describe various exemplary features and elements of the present disclosure, these terms are used herein for convenience only, for example, based on directions of examples illustrated in the accompanying drawings. Anything in this specification should not be understood to fall within the scope of the present disclosure in a specific three-dimensional direction of a structure.

[0030] Regarding a cleaning robot system according to an embodiment of the present disclosure, reference may be made to FIGS. 1 to 36, and the cleaning robot system includes a cleaning robot 1 and a base station 2.

[0031] The cleaning robot 1 includes a body 200 and a cleaning mechanism.

[0032] The cleaning mechanism includes at least one of a sweeping brushroll 120 and a mopping brushroll 130.

[0033] The mopping brushroll 130 is rotatably arranged on the body 200. The base station 2 includes a base station body 300 provided with a cleaning tank 301 for accommodating cleaning liquid. The mopping brushroll 130 is cleaned in the cleaning tank 301.

[0034] The base station body 300 is provided with a first charging electrode 360, and the body 200 is provided with a second charging electrode 210. The first charging electrode 360 is configured to be electrically connected with the second charging electrode 210, so that the base station 2 charges the cleaning robot 1. It should be understood that the first charging electrode 360described above is a general description, and in practice, the first charging electrode 360may be in a form of spring plate, roller or the like. The first charging electrode 360 in the form of spring plate or roller described above may be assembled onto the base station body 300 in various ways. For example, the spring plate may be offset relative to the base station body 300 due to the elasticity of the

spring plate itself. Alternatively, an additional biasing component, such as a spring or a torsion spring, may be provided to achieve the offset of the first charging electrode relative to the base station body 300. Further alternatively, the roller may be offset and reset relative to the base station body 300 through an elastic biasing and reset member.

[0035] In an embodiment of the present disclosure, the cleaning robot 1 is required to move onto the base station 2 for subsequent cleaning or charging.

[0036] For example, the cleaning robot 1 may move along the base station 2. That is, the cleaning robot 1 may carry out a docking movement, which may be understood in such a way that when a distance between the cleaning robot 1 and the base station 2 is less than a threshold, for example, when the cleaning robot 1 has arrived near the base station 2, the cleaning robot 1 moves in a certain direction apparently. An advancing direction of the docking movement may be understood as follows: in order to enable the mopping brushroll 130 to be cleaned in the cleaning tank 301, or to enable the first charging electrode 360 to be in contact with the second charging electrode 210, the cleaning robot 1 moves from a first position to a second position, wherein a direction from the first position to the second position is the advancing direction of the docking movement.

[0037] In an embodiment of the present disclosure, after a lower portion of the mopping brushroll 130 of the cleaning robot 1 moves into the cleaning tank 301, drive the mopping brushroll 130 to rotate to clean the mopping brushroll 130 using the cleaning liquid in the cleaning tank 301.

[0038] For example, the lower portion of the mopping brushroll 130 moves into the cleaning tank 301, that is, a part below the rotation axis of the mopping brushroll 130 is immersed in the liquid of the cleaning tank 301. During the rotation of the mopping brushroll 130, a circumferential surface of the mopping brushroll 130 is cleaned repeatedly, until the cleaning is completed.

[0039] It should be noted that a length direction of the cleaning tank 301 is substantially consistent with a length direction of the mopping brushroll 130, so that a part of the mopping brushroll 130 may be immersed in the cleaning liquid in the cleaning tank 301, and the mopping brushroll 130 can be cleaned during its rotation. The axis of the mopping brushroll 130 is substantially parallel to the length direction of the cleaning tank 301. The extension direction of the bottom of the cleaning tank 301 defines the length direction of the cleaning tank 301.

[0040] At least one embodiment of the present disclosure provides a base station for cleaning a cleaning mechanism of a cleaning robot, including a cleaning tank 301, configured to accommodate and clean at least part of the cleaning mechanism. The cleaning tank 301 includes a first end face and a second end face. A direction of a connection line between the center of the first end face and the second end face is substantially parallel to an extension direction of the cleaning mechanism.

[0041] By providing the base station body 300 with a cleaning tank 301 configured to accommodate the cleaning liquid, the mopping brushroll 130 is rotated to be cleaned by the cleaning liquid in the cleaning tank 301, when the lower portion of the mopping brushroll 130 moves into the cleaning tank 301. That is, automatic cleaning of the cleaning robot 1 in the cleaning tank 301 is achieved. In order to facilitate the cleaning liquid in the cleaning tank 301 to flow smoothly through one end portion of the cleaning tank 301 to a first filter 316 at the other end portion, the bottom of the cleaning tank 301 is configured to be a ramp at a small angle which is suitable for the cleaning liquid to flow spontaneously under gravity, without any external force, such as a pumping operation by a pump at the other end or tilting the base station body 300, etc. In this way, the bottom of the cleaning tank 301 is not parallel to a top plane of the cleaning tank 301, and the top plane and side walls of the cleaning tank 301 are substantially parallel to the rotation axis of the mopping brushroll 130.

[0042] The first end face and the second end face may be understood as the left end and the right end in the length direction of the bottom of the cleaning tank 301. The direction of the connection line between the center of the first end face and the second end face is substantially parallel to the extension direction of the cleaning mechanism. That is, the length direction of the cleaning tank 301 is substantially consistent with the length direction of the mopping brushroll 130. In practical applications, a certain included angle between the cleaning tank and the cleaning mechanism is not excluded. The included angle may range from 0 degree to 15 degree. Alternatively, the included angle may range from 0 degree to 10 degree.

[0043] In order to facilitate the cleaning liquid in the cleaning tank 301 to flow smoothly through one end portion of the cleaning tank 301 to the first filter 316 at the other end portion, the bottom of the cleaning tank 301 may be inclined at a small angle and is suitable for the cleaning liquid to flow automatically from one end to the other end under gravity, without any external operation, such as a pumping operation by a pump at the other end or tilting the base station body 300, etc. In this way, a the bottom of the cleaning tank 301 and the top plane of the cleaning tank 301 is not parallel to each other, and the top of the cleaning tank 301 is substantially parallel to the center axis of the mopping brushroll 130. At last, a cleaning wiper 302 is arranged at the bottom or side walls of the cleaning tank 301 which could effectively clean the mopping brushroll 130.

[0044] It should be noted that the cleaning mechanism may comprise at least one of the sweeping brushroll 120 and the mopping brushroll 130. That is, both the sweeping brushroll 120 and the mopping brushroll 130 may be cleaned by the cleaning tank 301. In an embodiment of the present disclosure, the first end face and the second end face are distributed in directions that are symmetrical relative to the center of the cleaning tank 301.

[0045] In some embodiments of the present disclosure, the mopping brushroll 130 may include a mopping cloth and a main structure. The mopping cloth is detachably wrapped around the main structure, so that when the mopping cloth gets dirty and/or cannot be cleaned any longer, it may be peeled off to replace a new one. In some embodiments of the present disclosure, it is not excluded that the mopping cloth may be multi-layered. That is, a new mopping cloth may be used after peeling off the dirty one. For a flat shaped mopping cloth, multiple layers of mopping cloth may be stacked and pasted together, and one layer may be peeled off after use.

[0046] In some embodiments of the present disclosure, the mopping brushroll 130 may include a water retaining layer configured to retain a certain amount of water. The water retaining layer may be one or more layers, and arranged around an inner core of the mopping brushroll. According to arrangement of other components, the water retaining layer may be fixed around the inner core in an integral cylindrical type or a partial cylindrical type. In some embodiments of the present disclosure, the mopping brushroll 130 may further include a cylindrical tank, wherein the cylindrical tank is wrapped around the inner core of the mopping brushroll, and the mopping cloth is wrapped around the cylindrical tank. Besides, a liquid inlet is arranged on the cylindrical tank and is in fluid communication with an external liquid supply source. In this way, liquid such as water may be supplied to the cylindrical tank through the external liquid supply source. In addition, a certain number of permeable outlets are distributed on the cylindrical tank for permeating the liquid to the mopping cloth. The permeable outlets may be small holes directly provided on an outer surface of the container. Alternatively, inside of the wall of the tank is provided with channels which are in fluid communication with the permeable outlets and the inner space of the tank. The purpose of the above arrangements is to achieve even distribution of liquid such as water on the mopping cloth, and the specific form is not limited herein.

[0047] In some embodiments of the present disclosure, the mopping brushroll 130 may include a heating mechanism, which may be a form of strip or plate extending along the axial direction of the mopping brushroll, so as to dry the mopping brushroll. Alternatively, the drying process may be achieved by removing water from the mopping brushroll through thermal resistance heating or ultrasonic atomization. Further, after the cleaning robot 1 is cleaned at the base station 2, the heating mechanism may dry the mopping brushroll. In some embodiments of the present disclosure, the heating mechanism may be arranged on the chassis 201. In some embodiments of the present disclosure, the mopping brushroll 130 and the chassis 201 both may be provided with a heating mechanism, respectively. In some embodiments of the present disclosure, the base station 2 may further be provided with a drying system, such as a drying mechanism 350, so as to dry the mopping brushroll.

[0048] It should be noted that the mopping brushroll 130 may be dried when the cleaning robot 1 is being charged by the base station 2. Alternatively, the mopping brushroll 130 may be dried in another state, which is not limited herein.

[0049] In an embodiment of the present disclosure, the cleaning liquid for cleaning the cleaning mechanism flows into the cleaning tank 301 through the first end portion, and the cleaning liquid flows out of the cleaning tank 301 through the second end portion. Alternatively, the cleaning liquid for cleaning the cleaning mechanism flows into the cleaning tank 301 through a position between the first end portion and the second end portion. The present disclosure is not limited herein, and selections may be made according to actual requirements.

[0050] In an embodiment of the present disclosure, the cleaning liquid for cleaning the cleaning mechanism flows out of the cleaning tank 301 through the second end portion, the base station further includes a first filter 316 which is disposed adjacent to the second end portion. That is, the cleaning liquid flowing out of the second end portion is filtered by the first filter 316.

[0051] In an embodiment of the present disclosure, as illustrated in Figs 6 to 8, a cleaning wiper 302 is arranged in the cleaning tank 301, and is configured to interfere with the mopping brushroll 130, so that the debris on the mopping brushroll 130 may be removed during the rotation of the mopping brushroll 130. The cleaning wiper 302 substantially extends about entire length of the mopping brushroll 130 in the cleaning tank 301, so that the entire length of the mopping brushroll 130 is cleaned at a time. That is, at least a cleaning wiper 302 is arranged substantially parallel to the rotation axis of the mopping brushroll 130 and is arranged between the first end face and the second end face of the cleaning tank 301. Thus, when the mopping brushroll 130 is in position, the at least a cleaning wiper 302 interferes with and clean the mopping brushroll 130 through active rotation of the mopping brushroll 130, thereby achieving the cleaning of the mopping brushroll.

[0052] In an embodiment of the present disclosure, as illustrated in FIG. 7, the cleaning wiper 302 includes a plurality of protrusions 303 arranged at intervals. In this case, the mopping brushroll 130 may be squeezed by the plurality of protrusion 303, thereby ensuring a gap to be formed between two adjacent protrusions 303, and allowing partial deformation of the mopping brushroll 130.

[0053] In an embodiment of the present disclosure, as illustrated in FIG. 6, the cleaning wiper 302 further includes a connection plate 3021, which is arranged on a side wall or a bottom wall of the cleaning tank 301 and extends along the extension direction of the cleaning tank 301. The plurality of protrusions 303 are arranged on the connection plate 3021 at intervals.

[0054] For example, the plurality of protrusions 303 and the connection plate 3021 are integrated in a structure. Thus, they can be easily installed in the cleaning tank 301, and the connection plate 3021 may be detachably installed on the cleaning tank 301, so as to facilitate

cleaning and replacement.

[0055] In an embodiment of the present disclosure, the connection plate 3021 may be fixedly connected to the cleaning tank 301. That is, the connection plate 3021 is undetachable relative to the cleaning tank 301.

[0056] In an embodiment of the present disclosure, the plurality of protrusions 303 forms a plurality of rows of protrusions. That is, the plurality of rows of protrusion are arranged in the cleaning tank 301 at intervals, and the protrusions 303 of two adjacent rows of protrusions are staggered. In an embodiment of the present disclosure, there are two rows of the protrusions, and the plurality of protrusions 303 forming the two rows of protrusions are arranged in a staggered manner in the width direction of the cleaning tank 301, referring to FIG. 6 and 7 for details.

[0057] In an embodiment of the present disclosure, the cleaning wiper 302 can vibrate in the cleaning tank 301. During the rotation of the mopping brushroll 130, the cleaning wiper 302 vibrates along the axis direction of the mopping brushroll 130. Alternatively, it should be understood that the cleaning wiper 302 may vibrate along the direction that perpendicular to the axis direction of the mopping brushroll 130, so as to increase interference with the mopping brushroll, thereby improving the cleaning efficiency.

[0058] In an embodiment of the present disclosure, as illustrated in FIG. 9, the base station further includes: a first pump 320, which is in fluid communication with the cleaning tank 301 and configured to pump the cleaning liquid into the cleaning tank 301; and a second pump 330, which is in fluid communication with the cleaning tank 301 and configured to pump the used liquid out of the cleaning tank 301. The first pump 320 and the second pump 330 achieve pumping in and pumping out of the liquid respectively, thus ensuring that the cleaning liquid in the cleaning tank 301 may be replaced in time and guaranteeing the cleaning effect.

[0059] For example, as illustrated in FIG. 9 and 10, a first liquid container 321 and a second liquid container 331 are arranged in the base station. The first liquid container 321 is configured to store clean cleaning liquid, and the second liquid container 331 is configured to store the used liquid pumped out from the cleaning tank 301.

[0060] The first pump 320 is in communication with the first liquid container 321, so as to pump the cleaning liquid from the first liquid container 321 into the cleaning tank 301. The second pump 330 is in communication with the second liquid container 331, so as to pump the used liquid from the cleaning tank 301 into the second liquid container 331.

[0061] Further, the first liquid container 321 may be configured to connect with a liquid supply system, which may include structures such as a faucet, an extra liquid storage tank or the like. The first liquid container 321 may be provided with a pipe as a pathway to connect with the liquid supply system, and the pathway may be provided with an on-off valve, such as a solenoid valve. In this way, the may be controlled to connect or disconnect according to the amount of liquid such as water in the first liquid container 321, thereby ensuring that there is no overflow while keeping sufficient liquid in the first liquid container 321. In some embodiments of the present disclosure, the first liquid container 321 may be removed away from the base station to fill liquid.

[0062] Accordingly, the second liquid container 331 may be provided with a drain pipe as a pathway, so that the dirty liquid in the second liquid container 331 is discharged through the pathway. The connection and disconnection of the pathway may be controlled, for example, by an on-off valve. Alternatively, a discharge pipe of the second liquid container 331 is provided with a drain pump, so that when the sewage level in the second liquid container 331 exceeds a predetermined threshold value, the drain pump is activated automatically or manually to evacuate the second liquid container 331. In some embodiments of the present disclosure, the second liquid container 331 may be removed away from the base station to drain the sewage.

[0063] In some embodiments of the present disclosure, the first liquid container 321 may be provided with a heater, such as a resistance heating pipe, etc., to heat the cleaning liquid and activate the activity of the detergent when cleaning the mopping brushroll 130, thereby improving the cleaning capability. In some embodiments of the present disclosure, the heater may be arranged in the cleaning tank 301 to heat the cleaning liquid in the cleaning tank 301.

[0064] In some embodiments of the present disclosure, the cleaning tank 301 is detachably arranged in the base station, so that the cleaning tank 301 may be removed for cleaning. The cleaning tank 301 may be of drawer type, and the cleaning tank 301 may be provided with an inlet opening. The opening is configured to connect with a pipe joint of the first liquid container 321, so that the opening is connected with the pipe joint after the cleaning tank 301 is installed in place.

[0065] In some embodiments of the present disclosure, the cleaning tank 301 is fixedly arranged. An upper portion of the base station including the first liquid container 321 and/or the second liquid container 331 may be movably arranged, for example, in a lift-to-open way or a pull-to-open way. When it is required to clean the cleaning tank 301, the upper portion of the base station may be lifted or pulled open to expose the cleaning tank 301, thereby facilitating to clean the cleaning tank 301.

[0066] In some embodiments of the present disclosure, the base station may include a protective cover, which helps to protect the base station. Further, after the cleaning robot is docked into the base station, the protective cover may provide an overall protection for the cleaning robot and the base station. The protective cover may be opened and closed manually or automatically. In some embodiments of the present disclosure, the protective cover may only enclose the cleaning tank 301 and the cleaning robot. This helps to prevent the sewage in the cleaning tank 301 from being spattered when the

base station cleans the cleaning robot, especially in a special environment such as bathroom. Further, this further helps to prevent exterior liquid (such as water) or moisture from wetting the cleaning robot.

[0067] In an embodiment of the present disclosure, the first pump 320 and the second pump 330 may operate at the same time, wherein the first pump 320 pumps the cleaning liquid into the cleaning tank 301, and the second pump 330 pumps the liquid out from the cleaning tank 301. That is, the cleaning liquid flows rapidly in the cleaning tank 301, which helps to achieve a rapid cleaning of the mopping brushroll 130 or the cleaning tank 301.

[0068] In some embodiments of the present disclosure, the cleaning liquid for cleaning the cleaning mechanism flows into the cleaning tank 301 through the first end face, and the cleaning liquid flows out of the cleaning tank 301 through the second end face. The first pump 320 pumps the cleaning liquid into the cleaning tank 301 through the first end face, and the second pump 330 pumps the cleaning liquid out from the cleaning tank 301 through the second end face.

[0069] In an embodiment of the present disclosure, the first pump 320 stops operating, and only the second pump 330 operates to drain the cleaning liquid out of the cleaning tank 301, thereby ensuring that the cleaning tank 301 is empty when it is not in use.

[0070] In an embodiment of the present disclosure, as illustrated in FIG. 11, the base station body 300 is provided with a liquid outlet 3011 and a liquid inlet 3012, which are both in fluid communication with the cleaning tank 301. The first pump 320 pumps the cleaning liquid from the first liquid container 321 into the cleaning tank 301 through the liquid inlet 3012, and the second pump 330 pumps the cleaning liquid out of the cleaning tank 301 into the second liquid container 331 through the liquid outlet 3011.

[0071] In an embodiment of the present disclosure, there are a plurality of liquid inlets 3012 which are arranged at intervals, and both end portion of the cleaning tanking 301 are respectively provided with at least one liquid inlets 3012, as illustrated in FIG. 11. When the second pump 330 pumps the used liquid out of the cleaning tank 301 into the second liquid container 331 through the liquid outlet 3011, the first pump 320 may spray the cleaning liquid at a high speed through the liquid inlets 3012. For example, the cleaning liquid may be water and the steadily falling water flow in the cleaning tank 301 is stirred, so that impurities in the used water are not easy to deposit. That is, the first pump 320 and the second pump 330 may operate at the same time. After the first pump 320 and the second pump 330 operate simultaneously for a certain period, the second pump 330 operates individually, so as to drain the used water off the cleaning tank 301. That is, self-cleaning of the cleaning tank 301 is achieved. In order to improve the effectiveness of self-cleaning of the cleaning tank 301, the liquid inlets 3012 may be distributed at various positions of the cleaning tank 301. This is aimed that when self-cleaning mode is activated, the liquid flow from the plurality of liquid inlets 3012 either washes the bottom wall and/or side walls of the cleaning tank directly, or agitates the existing cleaning liquid in the cleaning tank 301 to form irregular turbulence, or injects the cleaning liquid into the cleaning tank 301 through alternately opening and closing different inlets 3012, so as to effectively achieve the cleaning of the cleaning tank 301.

[0072] In an embodiment of the present disclosure, a sewage tank 380 is arranged downstream of the cleaning tank 301. A first filter 316 is arranged at the bottom of the sewage tank 380 and a liquid outlet 3011 is located below the filter 316. After starting the self-cleaning, the liquid flow sprayed from the liquid inlets 3012 flush the dirt in the cleaning tank 301 into the sewage tank 380, while at this time the residual dirt in the sewage tank cannot be completely cleaned only through the operation of the second pump 330. Therefore, at least an offset liquid inlet 3012 which is supplied with liquid by the first pump 320, is arranged on a side wall of the sewage tank 380 to flush the bottom and/or a side wall of the sewage tank at a certain angle, so as to stir the whole sewage liquid in the sewage tank 380 into a helical vortex. Thus, the sewage in the sewage tank 380 may be kept rotating during the pumping of the liquid, thereby avoiding the liquid flow substantially flowing in a certain direction which is caused by only pumping liquid from the liquid outlet 3011 located below the filter 316.

[0073] It should be understood that during the self-cleaning, the liquid inlet 3012 of the cleaning tank 301 and the liquid inlet 3012 of the sewage tank 380 are supplied with cleaning liquid at a high speed simultaneously. Thus, the liquid in the cleaning tank 301 and the sewage tank 380 is kept in a rotational flow state, and in combination with the work of the liquid outlet 3011 at the same time, the dirt in the cleaning tank 301 and the sewage tank 380 may be cleaned up automatically, thereby avoiding cleaning the cleaning tank or sewage tank manually.

[0074] It should be noted that the liquid inlet 3012 of the cleaning tank 301 and the liquid inlet 3012 of the sewage tank 380 both function as liquid supplier, but this does not specifically mean that the structures of the liquid inlet 3012 of the cleaning tank 301 and the liquid inlet 3012 of the sewage tank 380 are completely the same. The structures are not limited in the present disclosure and may be modified accordingly.

[0075] It should be noted that the first pump 320 may be a peristaltic pump, and liquid in the first liquid container 321 is supplied to the cleaning tank 301 through the peristaltic pump. When the cleaning robot docks onto the base station stably and the lower portion of the mopping brushroll 130 enters into the cleaning tank 301, the peristaltic pump supplies liquid to the cleaning tank 301 according to a predetermined parameter (including the amount of feeding liquid). The peristaltic pump may control the amount of feeding liquid precisely. Therefore, the feeding amount may be accurately controlled every time

based on the set parameter. At the same time, the mopping brushroll 130 rotates for self-cleaning. When the cleaning is completed, the second pump 330 pumps the sewage from the cleaning tank 301 into the second liquid container 331. Then, the next feeding, cleaning and pumping are successively carried out, until the cleaning of the mopping brushroll 130 is completed for a predetermined times. After the last pumping, the mopping brushroll 130 rotates to dry when no liquid exists in the cleaning tank 301. Subsequently, the cleaning robot undocks and leaves the base station 2.

[0076] In an embodiment of the present disclosure, the base station further includes: a cleaning solution container, configured to store the cleaning solution; and a cleaning solution pump in communication with the cleaning tank 301. The cleaning solution pump pumps the cleaning solution from the cleaning solution container into the cleaning tank 301, so as to mix with the cleaning liquid (typically water) supplied by the first pump 320. The cleaning solution may be a common cleaning agent such as detergent.

[0077] In an embodiment of the present disclosure, as illustrated in FIG. 6 and 7, the base station further includes a liquid level detector 310, which is arranged on the base station body 300 and configured to detect a liquid level of the cleaning liquid in the cleaning tank 301, thereby making it possible to determine whether there is cleaning liquid in the cleaning tank 301, and to control a feeding amount of the cleaning liquid into the cleaning tank 301, thereby avoiding the overflow or the like.

[0078] For example, the liquid level detector 310 may be in a signal connection with the first pump 320 and detects the liquid level of the cleaning liquid in the cleaning tank 301. When the liquid level in the cleaning tank 301 is lower than a first predetermined value, the first pump 320 is configured to pump the cleaning liquid into the cleaning tank 301. Alternatively, the liquid level detector 310 may be in a signal connection with the second pump 330. When the liquid level in the cleaning tank 301 is higher than a second predetermined value, the second pump 330 is configured to pump the cleaning liquid out of the cleaning tank 301.

[0079] It should be noted that the liquid level detector 310 may be a liquid level detector in the related arts, as long as the detection of the liquid level is achieved. The detection of the liquid level of the cleaning liquid herein does not necessarily mean that a specific height of the cleaning liquid is required, as long as it can be determined whether the cleaning liquid should be pumped into the cleaning tank 301 or the second pump 330 should be actuated to pump the cleaning liquid out of the cleaning tank 301.

[0080] In an embodiment of the present disclosure, as illustrated in FIGS. 13 and 14, the liquid level detector 310 includes: a signal transmitter 311; a signal receiver, arranged opposite to the signal transmitter 311; a support member 312, arranged on the base station body 300; a connection rod 313, rotatably arranged on the support member 312; a first floater 314, arranged at one end of the connection rod 313 and located in the cleaning tank 301, where the first floater 314 brings the connection rod 313 to rotate relative to the support member 312 under the effect of the cleaning liquid; and a shielding member 315, arranged on the other end of the connection rod 313, and movably located between the signal transmitter 311 and the signal receiver to disconnect signal connection between the signal transmitter 311 and the signal receiver; and , when the signal connection between the signal transmitter 311 and the signal receiver is disconnected, the first pump 320 pumps the cleaning liquid into the cleaning tank 301.

[0081] For example, as illustrated in FIG. 13, when there is no cleaning liquid in the cleaning tank 301, that is, the first floater 314 is located at the bottom of the cleaning tank 301, at this time the signal transmitter 311 is shielded, which indicates that there is no cleaning liquid in the cleaning tank 301. Then, the first pump 320 operates, the first floater 314 floats up, and the connection state of a signal between the signal transmitter 311 and the signal receiver changes, and the output signal of the liquid level detector 310 changes. That is, there is cleaning liquid in the first liquid container 321. If the connection state of the signal between the signal transmitter 311 and the signal receiver does not change, then it indicates that there is no cleaning liquid in the first liquid container 321 or there is no sufficient cleaning liquid in the first liquid container.

[0082] As illustrated in FIG. 14, the first floater 314 is located at an upper position. That is, the signal transmitter 311 is shielded. This indicates that the cleaning tank 301 is full of the cleaning liquid. During operation of the mopping brushroll 130, if the first floater 314 drops down, then the connection state of the signal between the signal transmitter 311 and the signal receiver changes, the output signal of the liquid level detector 310 changes, and the first pump 320 appropriately refills the cleaning liquid.

[0083] In an embodiment of the present disclosure, the first floater 314 may be a floating ball, and the signal transmitter 311 and the signal receiver form an optocoupler.

[0084] The above embodiment may be understood as below. When the first floater 314 is at the bottom or the top, an output signal of the liquid level detector 310 is "0." And when there is cleaning liquid in the cleaning tank 301, and the first floater 314 is located between the bottom and the top, the output signal of the liquid level detector 310 is "1." Therefore, the change of the liquid level in the cleaning tank 301 may be determined by the change of the signal and the operation states of the pumps. For example, when the first pump 320 is in an operation state and the change of the signal is 0-1-0, it indicates that the cleaning tank 301 is filled with liquid. And when the second pump 330 operates and the change of the signal is 1-0, it indicates that the liquid in the cleaning tank 301 is drained.

[0085] In an embodiment of the present disclosure, the

base station body 300 is provided with a first Hall module 371 and a second Hall module 372. The first Hall module 371 is configured to detect a liquid amount in the first liquid container 321. The base station body 300 may be further provided with a third Hall module, which is configured to detect the liquid amount in the second liquid container 331. In an embodiment of the present disclosure, the base station may be further provided with a fourth Hall module, which is configured to perform an in-place detection on the first liquid container 321 and/or the second liquid container 331.

[0086] In an embodiment of the present disclosure, as illustrated in FIGS. 7 and 8, the base station body 300 is provided with a diversion trench 304, which is located on a side of the cleaning tank 301 and in communication with the cleaning tank 301. In this case, after the cleaning liquid enters the diversion trench 304, the cleaning liquid returns to the cleaning tank 301. Therefore, the cleaning liquid may return to the cleaning tank 301 in time on the premise of ensuring that the cleaning liquid does not spatter.

[0087] For example, in conjunction with FIGS. 6 to 8, a guide plate 3041 is arranged on the base station body 300 to separate the diversion trench 304 from the cleaning tank 301 on the base station body 300, so that the diversion trench 304 and the cleaning tank 301 are arranged to be spaced from each other. But it is necessary to ensure that the diversion trench 304 and the cleaning tank 301 are in fluid communication with each other.

[0088] In an embodiment of the present disclosure, as illustrated FIGS. 6 to 8, the base station body 300 is provided with an auxiliary sink 305, which is located on a side opposite to the diversion trench of the cleaning tank 301 and is arranged independently of the cleaning tank 301. Typically, the cleaning liquid does not enter the auxiliary sink 305, and the auxiliary sink 305 serves as a protection configuration to ensure that the cleaning liquid does not affect the cleaning robot 1.

[0089] In an embodiment of the present disclosure, the second pump 330 is in communication with the auxiliary sink 305, so that after the cleaning liquid enters the auxiliary sink 305, the second pump 330 can pump out the cleaning liquid. That is, the cleaning tank 301 is isolated from the auxiliary sink 305. Therefore, it is necessary for the second pump 330 to pump the cleaning liquid entering the auxiliary sink 305.

[0090] In an embodiment of the present disclosure, as illustrated in FIGS. 6 and 8, a sealing strip 306 is arranged between the auxiliary sink 305 and the cleaning tank 301, so as to prevent the cleaning liquid in the cleaning tank 301 from entering the auxiliary sink 305. That is, typically, the cleaning liquid only enters the auxiliary sink 305 when the sealing strip 306 is damaged.

[0091] In an embodiment of the present disclosure, as illustrated in FIG. 11, the auxiliary sink 305 is provided with a liquid outlet 3051 which is in communication with the second pump 330.

[0092] In an embodiment of the present disclosure, the base station further includes a second floater 340 which is arranged in the auxiliary sink 305 to block the liquid outlet 3051. When there is cleaning liquid in the auxiliary sink 305, the second floater 340 floats up, so that the second pump 330 is in communication with the auxiliary sink 305.

[0093] For example, when the cleaning liquid does not enter the auxiliary sink 305, the second floater 340 blocks the liquid outlet 3051. When the cleaning liquid enters the auxiliary sink 305, that is, the cleaning liquid is required to be pumped, the second floater 340 floats up, so that the cleaning liquid in the auxiliary sink 305 is pumped away through the second pump 330.

[0094] In an embodiment of the present disclosure, the second floater 340 may be a floating ball.

[0095] In an embodiment of the present disclosure, the diversion trench 304 and the auxiliary sink 305 are located on either side of the cleaning tank 301, respectively. When the cleaning robot 1 carries out the cleaning of the mopping brushroll 130, the diversion trench 304 is arranged closer to a front end of the cleaning robot 1.

[0096] In an embodiment of the present disclosure, the base station body 300 is provided with a first filter 316 and a second filter 341. The first filter 316 is arranged on the liquid outlet 3011 of the cleaning tank 301, and may include a coarse filter screen and a fine filter screen. The second filter 341 is arranged on the liquid outlet 3051, and may be a filter screen.

[0097] The first filter 316 further includes a support which is configured to support the coarse filter screen and/or the fine filter screen.

[0098] In an embodiment of the present disclosure, the second Hall module 372 may be configured to perform an in-place detection on a filter screen assembly of the sewage tank. The first filter 316 is detachably installed on the base station. Therefore, the user may remove the first filter 316 for cleaning. Since the second Hall module 372 may detect whether the first filter 316 is in place, it can be ensured that the sewage in the cleaning tank 301 is filtered by the first filter 316 before being pumped. This helps to prevent large particles blocking the liquid outlet and even further damaging the pump, thereby prolonging the service life of the base station and improving the user experience.

[0099] As illustrated in FIGS. 7 and 11, a base station for cleaning a cleaning mechanism of a cleaning robot according to an embodiment of the present disclosure includes: a cleaning tank 301, which is configured to accommodate at least part of the cleaning mechanism and clean at least part of the cleaning mechanism; and a sewage tank 380, which is in communication with the cleaning tank 301 and provided with a liquid inlet 3012. The cleaning liquid which enters the sewage tank 380 through the liquid inlet 3012 flushes the cleaning liquid existing already in the sewage tank 380, so that the cleaning liquid in the sewage tank 380 is brought into a helical vortex, thereby improving the self-cleaning effect of the cleaning tank 301 and the sewage tank 380.

[0100] In an embodiment of the present disclosure, a depth of the sewage tank 380 is be greater than a depth of the cleaning tank 301.

[0101] It should be noted that the cleaning liquid which enters the sewage tank 380 through the liquid inlet 3012 may stir the cleaning liquid already in the sewage tank 380.

[0102] In some embodiments of the present disclosure, the liquid inlet 3012 may be arranged at a bottom of the sewage tank 380. Besides, the cleaning liquid may flush the cleaning liquid existing in the sewage tank 380 at a high speed from the bottom of the sewage tank 380, and may be reflected by the side wall of the sewage tank 380 and reflow, so as to stir the cleaning liquid in the sewage tank 380 to form turbulence or rotational flow.

[0103] In some embodiments of the present disclosure, a side wall of the sewage tank 380 is provided with a liquid inlet 3012. Besides, the cleaning liquid may flush the cleaning liquid in the sewage tank 380 at a high speed from a side of the sewage tank 380, and may be reflected by the side wall of the sewage tank 380 and reflow, so as to stir the cleaning liquid in the sewage tank 380 and bring it into a rotational flow state finally.

[0104] In an embodiment of the present disclosure, the sewage tank 380 may be provided with a plurality of liquid inlets 3012 arranged at intervals. Both the side wall and the bottom wall of the sewage tank 380 may be provided with liquid inlets 3012. Alternatively, the side wall of the sewage tank 380 may be provided with a plurality of liquid inlets 3012. For example, the cross section of the sewage tank 380 may be in a rectangular shape as a whole. At this time, at least two side walls of the sewage tank 380 may be provided with liquid inlets 3012, respectively. The cleaning liquid which enters through the liquid inlets 3012 may be sprayed onto adjacent walls thereto, so that the cleaning liquid in the sewage tank 380 is formed to a rotational flow state.

[0105] For example, an extension direction of the liquid inlet 3012 may be inclined to the side wall of the sewage tank 380 where it is located, so as to ensure that the cleaning liquid which enters through the liquid inlet 3012 may be sprayed onto adjacent wall thereto.

[0106] In an embodiment of the present disclosure, the cleaning tank 301 is also provided with a liquid inlet 3012, the sewage tank 380 is provided with a liquid outlet 3011, and the cleaning liquid in the sewage tank 380 may be discharged from the liquid outlet 3011. That is, during the self-cleaning, liquid is supplied through the liquid inlet 3012 of the cleaning tank 301 and the liquid inlet 3012 of the sewage tank 380 at a high speed at the same time. Thus, the liquid in the cleaning tank 301 and the sewage tank 380 is kept in a rotational flow state. Meanwhile, in conjunction with the work of the liquid outlet 3011, the dirt in the cleaning tank 301 and the sewage tank 380 may be cleaned up, thus avoiding cleaning of the cleaning tank or sewage tank manually.

[0107] It should be noted that any kinds of structures of the cleaning tank 301 and the sewage tank 380 for realizing self-cleaning, reference may be made to detailed structures involved in any of the above embodiments, such as the first pump 320, the second pump 330, the liquid level detector 310, etc., which will not be elaborated herein.

[0108] In an embodiment of the present disclosure, as illustrated in FIG. 11, the base station further includes a drying mechanism 350 which is arranged on the base station body 300. The drying mechanism 350 is configured to dry or blow-dry the mopping brushroll 130, so that the mopping brushroll 130 may be dried by the drying mechanism 350 after the mopping brushroll 130 is cleaned in the cleaning tank 301.

[0109] In an embodiment of the present disclosure, as illustrated in FIGS. 8 and 11, the base station body 300 is provided with a through hole 307 spaced from the cleaning tank 301. The drying mechanism 350 dries the mopping brushroll 130 through the through hole 307.

[0110] For example, there are a plurality of through holes 307 arranged on the base station body 300 at intervals, so that the mopping brushroll 130 above the through holes 307 may be dried by the drying mechanism 350.

[0111] It should be noted that the through holes 307 are spaced from the cleaning tank 301. That is, after the mopping brushroll 130 of the cleaning robot 1 is cleaned, the mopping brushroll 130 is required to leave the cleaning tank 301 and move to a position above the through holes 307 for drying.

[0112] Certainly, the through holes 307 may be arranged adjacent to the cleaning tank 301 in a reasonable way. Thus, after the mopping brushroll 130 is cleaned up, it may be directly dried or blow-dried.

[0113] In an embodiment of the present disclosure, the through hole 307 and the cleaning tank 301 are located at opposite end of the base station body 300. Therefore, the cleaning robot 1 is required to enter the base station in two different directions to clean and dry the mopping brushroll 130.

[0114] For example, the cleaning robot 1 may move backward for a certain distance to align the mopping brushroll 130 with the through hole 307. Alternatively, after the cleaning robot 1 leaves the base station, the cleaning robot 1 may dock in an opposite direction, so that the mopping brushroll 130 aligns with the through hole 307. As illustrated in FIGS. 1 to 3, the first end of the cleaning robot 1 enters the interior of the base station 2, so as to clean the mopping brushroll 130. As illustrated in FIGS. 4 and 5, the second end, which is opposite to the first end, of the cleaning robot 1 enters the interior of the base station 2, so as to dry the mopping brushroll 130. In a drying mode, the mopping brushroll 130 of the cleaning robot 1 may rotate slowly to accelerate the drying of the mopping brushroll 130. It should be understood that even if the drying mechanism 350 is out of service, the mopping brushroll 130 may also be kept rotating slowly to air dry it. As for the control over the slow rotation of the mopping brushroll 130, it may be set according to the

state of the cleaning robot 1. For example, the above operation is performed only when the cleaning robot 1 is in a charging state, and the above setting is carried out by mutual communication between the cleaning robot 1 and the base station body 300, which is not elaborated here.

[0115] In an embodiment of the present disclosure, the drying mechanism 350 may include a fan. For example, the drying mechanism 350 may be an exhaust fan.

[0116] It should be noted that in an embodiment of the present disclosure, the base station may only include the drying mechanism 350 and the first charging electrode 360. That is, the base station can not be used to clean the mopping brushroll 130 of the cleaning robot 1, but is configured to dry the mopping brushroll 130 and charge the cleaning robot 1. For detailed structures of the drying mechanism 350 and the first charging electrode 360 may be referred to any of the above embodiments.

[0117] In an embodiment of the present disclosure, as illustrated in FIG. 7, the base station body 300 includes a guide bottom surface 308 which is provided with an anti-skid protrusion 3081. The cleaning robot 1 moves onto the guide bottom surface 308 along the anti-skid protrusion 3081. The anti-skid protrusion 3081 may generate a certain friction force with the cleaning robot 1, which ensures that the cleaning robot 1 can move onto the base station 2 reliably, and assists in positioning the cleaning robot 1 during self-cleaning process.

[0118] In an embodiment of the present disclosure, the cleaning tank 301 is arranged on the guide bottom surface 308 and spaced apart from the anti-skid protrusion 3081. In this way, after the cleaning robot 1 moves a certain distance on the guide bottom surface 308, the mopping brushroll 130 becomes opposite to the cleaning tank 301, so as to carry out self-cleaning subsequently.

[0119] It should be noted that an anti-skid structure formed by the anti-skid protrusion 3081 corresponds to a walking wheel assembly 205 of the cleaning robot 1. When there are two walking wheel assemblies 205, there are two anti-skid structures accordingly. The anti-skid structure intersects with a drying channel mechanism formed by the plurality of through holes 307, and the guide bottom surface 308 is inclined arranged to facilitate the cleaning robot 1 to move onto the guide bottom surface 308.

[0120] In an embodiment of the present disclosure, the base station further includes a first charging electrode 360, which is arranged on the base station body 300 for electrical connection with a second charging electrode 210 of the cleaning robot 1, thereby achieving charging of the cleaning robot 1.

[0121] In an embodiment of the present disclosure, as illustrated in FIG. 12, the base station body 300 further includes a guide side surface 309. The first charging electrode 360 is arranged on the guide side surface 309, and the second charging electrode 210 is arranged on a side surface of the cleaning robot 1, so that the first charging electrode 360 may be electrically connected with the second charging electrode 210.

[0122] For example, the first charging electrode 360 is arranged above the cleaning tank 301. That is, the cleaning tank 301 is arranged on the guide bottom surface 308, and the first charging electrode 360 is arranged on the guide side surface 309. Along the height direction, the first charging electrode 360 is arranged above the cleaning tank 301, so as to ensure that the mopping brushroll 130 at the bottom of the cleaning robot 1 is cleaned in the cleaning tank 301 on the guide bottom surface 308 while the first charging electrode 360 arranged at a side of the cleaning robot 1 is electrically connected with the second charging electrode 210 arranged at the guide side surface 309 for charging.

[0123] In an embodiment of the present disclosure, a plurality of first charging electrodes 360 and a plurality of second charging electrodes 210 are arranged in pairs, and are respectively arranged at two opposite surfaces. That is, two first charging electrodes 360 are respectively arranged in pair at two opposite guide side surfaces 309. Of course, a plurality of paired first charging electrodes 360 and second charging electrodes 210 may be arranged at a same side of the base station body 300 and the cleaning robot 1 at the same time. Typically, two pairs of charging electrodes are arranged at one side of the cleaning robot 1 and the base station body 300, respectively.

[0124] In an embodiment of the present disclosure, as illustrated in FIG. 12, the base station body 300 further includes a guide side surface 309, and the base station further includes a guide wheel 361 which is arranged at the guide side surface 309 and is configured to contact with the cleaning robot 1. That is, when the cleaning robot 1 moves relative to the base station body 300, a side of the cleaning robot 1 contacts the guide wheel 361, which helps the cleaning robot to avoid contacting the guide side surface 309 and to position, meanwhile, to achieve rolling guidance and reduce frictional resistance.

[0125] For example, the guide wheel 361 is arranged above the cleaning tank 301. That is, the cleaning tank 301 is arranged on the guide bottom surface 308, and the guide wheel 361 is arranged at the guide side surface 309. Along the height direction, the guide wheel 361 is located above the cleaning tank 301. The guide wheel 361 may be a pulley.

[0126] In an embodiment of the present disclosure, the guide wheels 361 are arranged in pairs, and two guide wheels 361 in a pair are located at two opposite guide side surfaces 309 respectively.

[0127] In an embodiment of the present disclosure, both the guide wheel 361 and the first charging electrode 360 are located at the guide side surface 309, and the guide wheel 361 is spaced apart from the first charging electrode 360.

[0128] Due to a profile of the cleaning robot 1 being formed into a D-shaped configuration, when the cleaning robot 1 docks into the base station in a way for cleaning the mopping brushroll, a front portion with a transverse-

line shape is not as convenient as a circular shape for entering the base station. Therefore, by providing the guide wheel 361 at the guide side surface 309 of the base station body 300, it is convenient for the cleaning robot 1 to adjust direction at an initial position when entering the base station. That is, the effect of initial guidance for entering the base station is achieved. As described above, the guide wheel 361 and the first charging electrode 360 may form a single component, which not only achieves guidance, but also acts as a charging electrode to charge the cleaning robot 1.

[0129] In an embodiment of the present disclosure, the base station body 300 further includes a guide top surface 362, which is provided with a lock block configured to contact with the cleaning robot 1. The lock block can position the cleaning robot 1 during self-cleaning or charging of the cleaning robot 1 at the base station 2.

[0130] For example, the lock block is arranged above the cleaning tank 301. That is, the cleaning tank 301 is arranged on the guide bottom surface 308, and the lock block is arranged on the guide top surface 362. Along the height direction, the lock block is arranged above the cleaning tank 301.

[0131] In an embodiment of the present disclosure, as illustrated in FIGS. 1 and 2, the cleaning robot 1 cleans the mopping brushroll 130 in the base station 2. At this time, the lock block includes a first lock block 363 which is arranged in contact with the cleaning robot 1, so as to prevent the cleaning robot 1 from jumping during cleaning.

[0132] For example, in conjunction with FIG. 12, the guide side surface 309 is provided with a deceleration detection groove 374 and a switch detection groove 373. After a wall-following sensor 222 of the cleaning robot 1 detects the deceleration detection groove 374, the cleaning robot 1 decelerates and continues to move. When the wall-following sensor 222 detects the switch detection groove 373, the first lock block 363 comes into contacting with the cleaning robot 1, and the cleaning robot 1 stops moving. At this time, the lower portion of the mopping brushroll 130 of the cleaning robot 1 is immersed in the cleaning tank 301 for cleaning. In this process, the first lock block 363 prevents the cleaning robot 1 from jumping during self-cleaning. That is, the first lock block 363 is configured to limit the movement of the cleaning robot 1 in vertical direction.

[0133] In an embodiment of the present disclosure, there are a plurality of first lock blocks 363 which may be pulleys or bumps.

[0134] In an embodiment of the present disclosure, as illustrated in FIGS. 4 and 5, the cleaning robot 1 is being charged at the base station 2, or the mopping brushroll 130 is being dried through the drying mechanism 350. At this time, the lock block includes a second lock block 364, which configured to be in contact with the cleaning robot 1, so as to prevent the cleaning robot 1 from moving excessively, that is, ensuring that the first charging electrode 360 is reliably electrically connected with the second charging electrode 210, and the mopping brushroll 130 is dried by the drying mechanism 350.

[0135] In an embodiment of the present disclosure, the second lock block 364 is a limit block, which is configured as a protrusion protruding downward from the guide top surface 362 of the base station 2, and configured to limit the continued movement of the cleaning robot 1 in a certain direction. The second lock block 364 is configured to cooperate with a protrusion member disposed on the cleaning robot 1, such as a laser distance sensor 223. When the cleaning robot 1 enters the base station 2 in a certain way, and the protruding laser distance sensor 223 abuts on the second lock block 364 on the base station 2, the cleaning robot 1 cannot move anymore.

[0136] In an embodiment of the present disclosure, while the cleaning robot 1 is being charged at the base station 2, or while the mopping brushroll 130 is dried through the drying mechanism 350, or after the charging or the drying is completed, a dust collector may be removed when the cleaning robot is charged on a charging station or when the charging is completed. On the contrary, when the cleaning robot 1 is cleaned in the base station 2, the removal of the dust collector cannot be achieved since a position where the dust collector is arranged on the cleaning robot 1 interferes with some component of the base station 2.

[0137] In an embodiment of the present disclosure, the base station 2 is provided with a communication module 370. The communication module 370 of the base station 2 is in communication with an infrared communication module 220 of the cleaning robot 1, so that the cleaning robot 1 can acquire a state of the base station 2 and send instructions to the base station 2.

[0138] The cleaning robot according to an embodiment of the present disclosure can clean a surface to be cleaned through the mopping brushroll 130, and the mopping brushroll 130 may be cleaned automatically in the base station 2.

[0139] In an embodiment of the present disclosure, referring to FIGS. 15 to 36, the cleaning robot includes: a body 200 including a chassis 201; a sweeping brushroll 120; and a mopping brushroll 130. Both the sweeping brushroll 120 and the mopping brushroll 130 are arranged on the chassis 201 in a position-adjustable manner, so as to bring the sweeping brushroll 120 or the mopping brushroll 130 to be in a working position.

[0140] In the cleaning robot according to an embodiment of the present disclosure, the sweeping brushroll 120 and the mopping brushroll 130 are arranged on the chassis 201 in a position-adjustable manner, the sweeping brushroll 120 or the mopping brushroll 130 are enabled to be in an working position. Thus, the sweeping brushroll 120 or the mopping brushroll 130 can be operated individually, thereby avoiding large loss of energy and potential problems such as uncleanness resulted from synchronous cleaning of the sweeping brushroll 120 and the mopping brushroll 130.

[0141] It should be noted that the sweeping brushroll

120 and the mopping brushroll 130 are configured to clean a surface to be cleaned, such as the floor. As illustrated in FIGS. 23 and 29, when the sweeping brushroll 120 is in contact with the surface to be cleaned, and the mopping brushroll 130 is disengaged from the surface to be cleaned, a position where the sweeping brushroll 120 is located is the working position. Accordingly, as illustrated in FIGS. 24 and 30, when the sweeping brushroll 120 is disengaged from the surface to be cleaned, and the mopping brushroll 130 is in contact with the surface to be cleaned, a position where the mopping brushroll 130 is located is the working position. The working position indicates a position where cleaning can be carried out, that is, a position where the sweeping brushroll 120 or the mopping brushroll 130 of the cleaning robot cleans the surface to be cleaned.

[0142] It should be noted that, during docking of the cleaning robot 1, that is, during the cleaning robot 1 moves to the base station 2, both the sweeping brushroll 120 and the mopping brushroll 130 may be spaced apart from the base station 2. That is, neither the sweeping brushroll 120 nor the mopping brushroll 130 is at the working position. In other words, both the two are in an intermediate state, in which the cleaning robot 1 is made to walk easily under some special situations. Besides, the cleaning robot 1 is turned into the intermediate state by controlling a duty cycle of a switch drive mechanism or motor of the sweeping-mopping module. After the cleaning robot 1 moves into position, the mopping brushroll 130 is rotated to the working position, so that a lower portion of the mopping brushroll 130 is located in the cleaning tank 301. Alternatively, during docking of the cleaning robot 1, the sweeping brushroll 120 is at the working position, and after the cleaning robot 1 moves into position, the mopping brushroll 130 is rotated to the working position. Alternatively, during docking of the cleaning robot 1, the sweeping brushroll 120 is at the working position during a certain time period, while during some other time periods, neither the sweeping brushroll 120 nor the mopping brushroll 130 is at the working position. After the cleaning robot 1 moves into position, the mopping brushroll 130 is rotated to the working position. Docking states of the sweeping brushroll 120 and the mopping brushroll 130 are not limited herein, as long as the mopping brushroll 130 can be cleaned in the cleaning tank 301.

[0143] Although the present disclosure is described by taking cleaning of the mopping brushroll 130 in the cleaning tank 301 of the base station 2 as an example, it should be understood that the base station 2 according to an embodiment of the present disclosure may also be configured to clean the sweeping brushroll 120 in the cleaning tank 301. Alternatively, both the sweeping brushroll 120 and the mopping brushroll 130 may be cleaned in the cleaning tank 301 at the same time.

[0144] In an embodiment of the present disclosure, the sweeping brushroll 120 and the mopping brushroll 130 are both rotatably arranged relative to the chassis 201. That is, when the sweeping brushroll 120 is at the working position, the sweeping brushroll 120 rotates to clean the surface to be cleaned, and when the mopping brushroll 130 is at the working position, the mopping brushroll 130 rotates to clean the surface to be cleaned.

[0145] It should be noted that during self-cleaning of the mopping brushroll 130 in the base station 2, that is, while the lower portion of the mopping brushroll 130 is in the cleaning tank 301, the mopping brushroll 130 is also required to rotate for cleaning.

[0146] It should be noted that central lines of the sweeping brushroll 120 and the mopping brushroll 130 may be on one plane. That is, an extension direction of the sweeping brushroll 120 coincides with an extension direction of the mopping brushroll 130, and the rotation axis of the sweeping brushroll 120 is parallel to the rotation axis of the mopping brushroll 130.

[0147] In an embodiment of the present disclosure, as illustrated in FIGS. 15 and 16, the body 200 further includes a front bumper 203 which is arranged on a front edge of the chassis 201. The front bumper 203 includes a straight plate section which is located at a forefront end of the cleaning robot. The mopping brushroll 130 is disposed closer to the straight plate section with respect to the sweeping brushroll 120. That is, the mopping brushroll 130 is located at a front end of the body 200. The front bumper 203 may be a U-shaped structure, so that the body is D-shaped in whole, referring to FIGS. 1 to 8 for details.

[0148] It should be noted that, as illustrated in FIG. 16, the front bumper 203 is provided with a protection sensor 2031 which is arranged on the straight plate section of the front bumper 203, that is, arranged at the forefront end of the cleaning robot. The protection sensor 2031 is configured to detect a position of an obstacle with respect to the body 200 in response to colliding of the front bumper with the obstacle. The protection sensor 2031 may be a light blocking sensor, an optocoupler sensor, a Hall effect sensor, etc.

[0149] In some embodiments of the present disclosure, a plurality of protection sensors 2031 is arranged on the straight plate section of the front bumper 203. The front bumper 203 of the U-shaped structure further includes two side plate sections which arranged at either side of the straight plate section respectively, and one or more protection sensors 2031 may be arranged on each of the two side plate sections. Further, the protection sensor 2031 arranged on the straight plate section and the protection sensor 2031 arranged on the side plate sections may be triggered based on different sensitivities. Thus, when the cleaning robot travels or follows a wall, corresponding protection sensor 2031 may be triggered as required, so that the cleaning robot may recognize positions of obstacles correctly.

[0150] For example, a trigger pressure or a trigger stroke of the protection sensor 2031 arranged on the straight plate section may be greater than a trigger pressure or a trigger stroke of the protection sensor 2031

arranged on the side plate section. That is, the protection sensor 2031 arranged on the side plate section is easier to be triggered, so as to allow the cleaning robot to follow a wall more smoothly.

[0151] The protection sensor 2031 with different sensitivities may be adopted to achieve the trigger based on different sensitivities. That is, sensitivity of the protection sensor 2031 arranged on the straight plate section may be less than that of the protection sensor 2031 arranged on the side plate section. Alternatively, a buffer is arranged between the front bumper 203 and the chassis 201. For example, the buffer may be arranged on the straight plate section and the side plate section, so that a force required to press the straight plate section and the side plate section may be adjusted by adjusting the buffer. For example, a force of 2.5 N required to press the straight plate section and a force of 5 N required to press the side plate section can achieve trigger based on different sensitivities for the protection sensor 2031 arranged on the straight plate section and for the protection sensor 2031 arranged on the side plate section. The buffer may be a spring, a spring plate, steel wire, steel sheet and the like, which is not limited in the present disclosure. In an embodiment of the present disclosure, the straight plate section may be provided with two protection sensors 2031, the two side plate sections may be each provided with one protection sensor 2031, and each protection sensor 2031 may correspond to a buffer. Therefore, when pressing the front bumper 203 from the left front, the left, the right front and the right, sensitivity trigger pressures for the protection sensors 2031 may be substantially the same. For example, they may be about 2.5 N. By contrast, when pressing a right middle of the front bumper 203, a sensitivity trigger pressure for the protection sensor 2031 may be about 5 N. Thus, the protection sensor 2031 on the straight plate section and the protection sensor 2031 on the side plate section are triggered based on different sensitivities. At this time, each protection sensor 2031 may be identical. That is, the sensitivities of respective protection sensors 2031 are consistent with each, while the trigger based on different sensitivities is achieved by controlling an external force applied on the buffer.

[0152] It should be noted that the protection sensor 2031 may instead be arranged on a front edge of the chassis 201. An arrangement position of the protection sensor 2031 may correspond to the straight plate section and the side plate sections of the front bumper 203 in the U-shaped structure, which will not be elaborated herein.

[0153] When cleaning the mopping brushroll 130, the front bumper 203 docks into the base station 2 with the front bumper 203 facing the base station 2, that is, the front bumper 203 is located on an innermost side of the base station 2.

[0154] In an embodiment of the present disclosure, as illustrated in FIG. 15, the body 200 is provided with an infrared communication module 220, which is configured to achieve data communication between the cleaning robot and the base station 2. This helps to ensure that the cleaning robot can find the base station and move accurately relative to the base station, thereby achieving charging by the base station and cleaning of the mopping brushroll 130.

[0155] In an embodiment of the present disclosure, as illustrated in FIG. 15, the chassis 201 is provided with a carpet recognition module 221, which is arranged on a side of the chassis 201 close to the sweeping brushroll 120 or the mopping brushroll 130. The sweeping brushroll 120 and the mopping brushroll 130 may switch position according to the recognition result of the carpet recognition module 221. That is, the sweeping brushroll 120 or the mopping brushroll 130 may be placed in working position according to the type of the surface to be cleaned. For example, when mopping, if the carpet recognition module 221 recognizes a carpet material, then the mopping brushroll 130 may be raised and the sweeping brushroll 120 may be lowered, so that the mopping brushroll is in a non-working position to avoid wetting the carpet. Alternatively, if it recognized that the cleaning robot has reached an end of the carpet material and is going to enter a region of floor material, then an opposite operation is carried out, that is, the mopping brushroll 130 is lowered down to continue the mopping operation.

[0156] In an embodiment of the present disclosure, the carpet recognition module 221 may be an ultrasonic sensor, an infrared sensor, or the like, all of which recognize ground material by emitting a wireless signal and receiving the reflected signal by the ground during operation. For example, when the ground is floor, a receiver of the sensor will receive an echo signal which is emitted by a transmitter and reflected by the ground. And when the ground is carpet or the like, due to their poor reflection performance, the signal emitted by the transmitter cannot be effectively reflected to the receiver. Besides, the carpet recognition module 221 can further be used to detect whether the chassis 201 is parallel to the ground during traveling. If the chassis 201 is not parallel to the ground, the echo signal which is emitted by the transmitter of the sensor and reflected by the ground cannot be received by the receiver due to deviation. In view of this, it can be determined that the cleaning robot is not parallel to the surface to be cleaned. However, it is hard to determine whether the failure of receiving the reflected signal is caused by the carpet material or the non-parallel to the ground. At this time, it may be comprehensively determined in combination with results from other types of sensors, such as a gyroscope, etc. When the echo signal is not received, the switching or operation status of a cleaning assembly may be controlled by a controller which is electrically connected with the cleaning assembly. For example, the mopping brushroll 130 may be controlled to stop to rotate, so as to prevent the carpet from being wetted, or avoid that the water on the cleaning member is squeezed off due to the non-parallel to the ground, for example in a case of crossing over an obstacle. Thereafter, when the echo signal is detected again,

the operation of the mopping brushroll 130 is resumed. Alternatively, the controller stop all the cleaning assemblies to avoid the above situation, as long as the carpet recognition module 221 detects no echo signal.

[0157] In an embodiment of the present disclosure, as illustrated in FIG. 15, the body 200 is provided with a wall-following sensor 222 to ensure that the cleaning robot may travel reliably in a manner of following a wall. Besides, the wall-following sensor 222 may cooperate with the deceleration detection groove 374 and the switch detection groove 373 of the base station 2, so as to ensure that the cleaning robot moves stably and stops reliably.

[0158] In an embodiment of the present disclosure, the body 200 is provided with a cliff sensor. During the operation of the cleaning robot, in order to prevent the cleaning robot from falling from, for example, indoor stairs, higher steps, etc., the walking wheel assembly 205 may be controlled when the cliff sensor detects an edge of a cliff, so as to prevent the robot from falling from the steps. The cliff sensor typically adopts an ultrasonic or infrared sensor. The basic principle is to emit a signal to the surface to be cleaned by a transmitter arranged in the sensor, and to receive the signal reflected back from the surface to be cleaned by a receiver arranged in the sensor. On one hand, it may be determined whether there is a cliff based on the time interval between time points that the transmitter transmits a signal and the receiver receives the reflected signal. On the other hand, other environmental conditions may be further determined based on the intensity of the reflected signal received by the receiver, such as auxiliary determination about the material of the surface to be cleaned, determination about dirt degree of the surface to be cleaned, etc. On the basis of the determination about the dirt degree, cleaning capability of the cleaning robot or cleaning degree of the surface to be cleaned can be further determined. For example, two cliff sensors arranged on both sides of the cleaning assembly may respectively indicate the dirt difference at a certain point or a certain line perpendicular to a traveling direction of the cleaning robot before and after cleaning, and detailed calculation and statistics method will not be elaborated herein.

[0159] In an embodiment of the present disclosure, there are at least two walking wheel assemblies 205, and the movement of the cleaning robot is achieved by the walking wheel assemblies 205. Besides, the cleaning robot further includes a caster wheel 206, which may be configured to achieve nimble steering of the cleaning robot 1, etc.

[0160] In an embodiment of the present disclosure, as illustrated in FIG. 22, the body 200 is provided with a laser distance sensor 223 (LDS), *i.e.,* a laser radar. The LDS emits laser while rotating at a high speed, and then determines a distance between itself and an obstacle based on the light reflected by the obstacle upon incident on an obstacle after laser emission, thereby determining a position of the obstacle with respect to the LDS and locating the obstacle.

[0161] In an embodiment of the present disclosure, as illustrated in FIG. 15, the body 200 further includes a side plate 202, which is arranged on a side edge of the chassis 201. The body 200 further includes a second charging electrode 210, which is configured to be in contact with the first charging electrode 360 of the base station for charging, and arranged to be protruded from, flush with or recessed with respect to the side plate 202. In an embodiment of the present disclosure, the innermost side of the base station matched with the cleaning robot is provided with a member for wet cleaning of the cleaning mechanism of the cleaning robot, such as a water tank, etc. Therefore, after the cleaning robot moves to the base station, the cleaning robot cannot be charged at its back portion or at its front portion. Thus, according to an embodiment of the present disclosure, charging electrodes are arranged on the side portions of the cleaning robot and the base station, which is not only far away from the wet member to avoid a short circuit risk, but also convenient for design and arrangement.

[0162] It may be understood that during the cleaning robot docking into the base station or undocking from the base station, the side plate 202 of the body 200 may scratch the charging electrode on the base station, which may cause damage to the cleaning robot. In view of this, a floating electrode may be arranged on the base station, and a first magnetic part may be arranged at a rear portion of the floating electrode opposite to the cleaning robot. Similarly, a second magnetic part matched with the first magnetic part as mentioned above may be further arranged at a rear portion of the second charging electrode 210 of the cleaning robot, so as to form a magnetic assembly in which the two magnetic parts interact with each other. After the second charging electrode 210 of the cleaning robot is aligned with the floating electrode of the base station, the floating electrode eject out under the magnetic function and come into contact with the second charging electrode 210 for charging. Alternatively, the magnetic parts herein may be electromagnetic parts. When charging is completed, a main control unit may shut power supply to the electromagnetic magnetic parts to release the magnetic parts. In another embodiment of the present disclosure, the arrangement of the second charging electrode 210 on the side plate 202 of the body 200 is described as mentioned embodiments , while a guide wheel on the side of the base station may be made of appropriate material and electrically connected to a power supply in an appropriate way. In this case, the guide wheel may play roles of both guiding and charging. Alternatively, the guide wheel may be arranged on an inner surface of side wall of the base station in a floating manner. When the second charging electrode 210 of the cleaning robot moves to a position corresponding to the guide wheel, the floating guide wheel adapts to contact the second charging electrode 210 that may be protruded from, flush with or recessed with respect to the side plate 202, thereby achieving good contact.

[0163] In an embodiment of the present disclosure, as illustrated in FIG. 15, the body 200 further includes a top cover 204 which is connected with the chassis 201, thereby forming an overall framework of the cleaning robot. Further, a battery module is installed in the body 200, and enveloped in the body 200 by a battery cover 208, wherein the battery cover 208 is connected with the chassis 201.

[0164] In an embodiment of the present disclosure, as illustrated in FIGS. 25A and 26, the cleaning robot further includes a rotation assembly 110 on which both the sweeping brushroll 120 and the mopping brushroll 130 are arranged. The rotation assembly 110 is arranged on the chassis 201, so that the sweeping brushroll 120 and the mopping brushroll 130 are arranged on the chassis 201 through the rotation assembly 110. The rotation assembly 110 is rotatably arranged on the chassis 201 to enable the sweeping brushroll 120 and the mopping brushroll 130 to be switched to the working position. That is, the rotation assembly 110 helps to ensure that positions of the sweeping brushroll 120 and the mopping brushroll 130 are changed synchronously, so as to achieve position switching between the sweeping brushroll 120 and the mopping brushroll 130. Thus, it is ensured that one of the sweeping brushroll 120 and the mopping brushroll 130 is at the working position for subsequent cleaning.

[0165] It should be noted that the rotation of the rotation assembly 110 relative to the chassis 201 may be driven by a drive mechanism using related technology. For example, the drive mechanism includes a telescopic rod, which is connected with the rotation assembly 110 and drives the rotation assembly 110 through extension and retraction thereof, so that the rotation assembly 110 rotates relative to the chassis 201. Alternatively, the drive mechanism includes a drive shaft, which is connected with the rotation assembly 110 to drive the rotation assembly 110 through clockwise rotation and anticlockwise rotation of the drive shaft, so that the rotation assembly 110 rotates relative to the chassis 201.

[0166] It should be noted that the rotation assembly 110 may be directly installed on the chassis 201. Alternatively, the rotation assembly 110 may be indirectly installed on the chassis 201. That is, based on the premise that the rotation assembly 110 is rotatable relative to the chassis 201, the rotation assembly 110 may be installed on the chassis 201 through other component.

[0167] In an embodiment of the present disclosure, at least one of the sweeping brushroll 120 and the mopping brushroll 130 is rotatably arranged relative to the rotation assembly 110. That is, the sweeping brushroll 120 and/or the mopping brushroll 130 is configured to rotate for cleaning.

[0168] In an embodiment of the present disclosure, as illustrated in FIG. 26, the rotation assembly 110 has a first accommodation chamber and a second accommodation chamber. The sweeping brushroll 120 is arranged in the first accommodation chamber, and the mopping brushroll 130 is arranged in the second accommodation chamber, thereby ensuring that the sweeping brushroll 120 and the mopping brushroll 130 are arranged stably without risk of disengagement or the like.

[0169] In an embodiment of the present disclosure, at least part of the first accommodation chamber 113 and at least part of the second accommodation chamber 114 are arranged independently, so as to prevent interference or the like between the sweeping brushroll 120 and the mopping brushroll 130, and to guarantee the proper operation of the sweeping brushroll 120 and the mopping brushroll 130.

[0170] For example, the first accommodation chamber 113 and the second accommodation chamber 114 are arranged independently. That is, the sweeping brushroll 120 and the mopping brushroll 130 do not affect each other. When the sweeping brushroll 120 sweeps the floor, the dust does not enter the second accommodation chamber 114 in large amount, which keeps the mopping brushroll 130 from getting dirty; while the mopping brushroll 130 is a wet cleaning member containing a certain amount of moisture, it is also possible to prevent moisture on the mopping brushroll 130 from entering the first accommodation chamber 113.

[0171] In an embodiment of the present disclosure, as illustrated in FIG. 26, the rotation assembly 110 includes a floating support 111 rotatably arranged on the chassis 201, and a cover plate 112 connected with the floating support 111. The cover plate 112 and the floating support 111 form the first accommodation chamber and the second accommodation chamber. This not only ensures that the sweeping brushroll 120 and the mopping brushroll 130 are relatively separated, but also ensures stable installation of the sweeping brushroll 120 and the mopping brushroll 130.

[0172] For example, the sweeping brushroll 120 and the mopping brushroll 130 may be both rotatably arranged on the floating support 111, and the sweeping brushroll 120 and the mopping brushroll 130 may be both detachably installed on the floating support 111. Besides, the cover plate 112 is detachably connected with the floating support 111. That is, the sweeping brushroll 120 and the mopping brushroll 130 may be easily replaced.

[0173] It should be noted that a central axis of the sweeping brushroll 120 may be parallel to a central axis of the mopping brushroll 130.

[0174] In an embodiment of the present disclosure, the cover plate 112 is clamped, bonded with the floating support 111, or connected with the floating support 111 through a fastener. That is, a connection between the cover plate 112 and the floating support 111 is not limited as long as it is ensured that the cover plate 112 is detachably connected to the floating support 111.

[0175] In an embodiment of the present disclosure, the sweeping brushroll 120 and the mopping brushroll 130 are both non-detachably installed on the floating support 111. Besides, the cover plate 112 may also be non-detachably connected with the floating support 111.

[0176] In an embodiment of the present disclosure, as illustrated in FIGS. 26 and 27, an extension direction of the first accommodation chamber 113 is parallel to an extension direction of the second accommodation chamber 114. Besides, the cover plate 112 is provided with an anti-rolling tooth 1121 which is arranged towards a chamber opening of the first accommodation chamber 113. This helps to prevent large objects from being rolled into the first accommodation chamber 113 by the sweeping brushroll 120 when the sweeping brushroll 120 is in operation.

[0177] For example, there may be a plurality of anti-rolling teeth 1121 arranged on the cover plate 112 at intervals. That is, the plurality of anti-rolling teeth 1121 is sequentially arranged along the extension direction of the first accommodation chamber 113, so as to ensure that large objects are not rolled into the first accommodation chamber 113 by the sweeping brushroll 120.

[0178] It should be noted that the anti-rolling teeth 1121 extend from the cover plate 112 towards the sweeping brushroll 120 in an arc shape, forming a shape that substantially enveloping the sweeping brushroll 120.

[0179] In an embodiment of the present disclosure, as illustrated in FIGS. 21 and 27, the cover plate 112 is provided with a scraper 1122 which is arranged on one side of the cover plate 112 away from the second accommodation chamber 114. The scraper 1122 may be configured to scrape the garbage off the surface to be cleaned.

[0180] In an embodiment of the present disclosure, as illustrated in FIGS. 21 and 25A, the cleaning robot further includes a dust suction channel 160. One end of the dust suction channel 160 is in communication with the first accommodation chamber 113, and the other end of the dust suction channel 160 is connected with the body 200. Further, the dust suction channel 160 may be a flexible member, so that when the sweeping brushroll 120 is at the working position, the dust suction channel 160 is in an open state. When the sweeping brushroll 120 operates, the dust suction channel 160 is configured to form an air channel to absorb dust. By contrast, when the mopping brushroll 130 operates, the dust suction channel 160 does not need to operate, and the dust suction channel 160 is caused to deform when the rotation assembly 110 rotates. At this time, the dust suction channel 160 is not required to act as an air channel, therefore it can be in a closed state.

[0181] For example, two ends of the dust suction channel 160 are respectively connected with the rotation assembly 110 and the body 200. In this case, the rotation assembly 110 rotates relative to a fixing support 100, such that the sweeping brushroll 120 and the mopping brushroll 130 are switched at the working position. At this time, the dust suction channel 160 being a flexible member deforms with the rotation assembly 110, so as to ensure that the normal rotation of the rotation assembly 110 is not be hindered.

[0182] In an embodiment of the present disclosure, when the mopping brushroll 130 is at the working position, the dust suction channel 160 is in the closed state. Alternatively, when the mopping brushroll 130 is at the working position, the dust suction channel 160 may also be in the open state.

[0183] It should be noted that the dust suction channel 160 may be directly connected to the body 200. Alternatively, the dust suction channel 160 may be indirectly connected to the body 200.

[0184] In an embodiment of the present disclosure, the scraper 1122 is arranged adjacent to the dust suction channel 160. That is, the scraper 1122 may also form a better seal between the dust suction channel 160 and the first accommodation chamber 113 addition to scraping off the garbage on the surface to be cleaned. This ensures that the dust swept by the sweeping brushroll 120 enters the dust suction channel 160 under effect of a suction force.

[0185] In an embodiment of the present disclosure, as illustrated in FIG. 22, the cleaning robot further includes a power component 161, and air flow generated by the power component 161 may suction the dust swept by the sweeping brushroll 120 into the dust suction channel 160. The power component 161 may be a fan. The power component 161 may be arranged in the body 200.

[0186] In an embodiment of the present disclosure, as illustrated in FIGS. 25A and 26, the cleaning robot further includes a fixing support 100, and the rotation assembly 110 is rotatably arranged on the fixing support 100. For example, the installation and rotation are achieved by providing rotation shafts at two ends of the rotation assembly 110 and rotation holes at corresponding positions of the fixing support 100, respectively; or providing rotation holes at two ends of the rotation assembly 110 and rotation shafts at corresponding positions of the fixing support 100 respectively. The fixing support 100 is arranged on the chassis 201, so that the rotation assembly 110 is arranged on the chassis 201 through the fixing support 100. The fixing support 100 and the rotation assembly 110 form a module structure which may be installed on the chassis 201 as a whole.

[0187] In an embodiment of the present disclosure, the dust suction channel 160 may be connected with the fixing support 100. That is, the dust suction channel 160 is connected with the body 200 through the fixing support 100, and the power component 161 arranged in the body 200 is in communication with the dust suction channel 160.

[0188] In an embodiment of the present disclosure, as illustrated in FIG. 22, a dust collector 162 is provided in the body 200, the dust suction channel 160 is in communication with the dust collector 162, and the power component 161 is in communication with the dust collector 162. Thus, the dust can be suctioned into the dust collector 162 through the dust suction channel 160.

[0189] In an embodiment of the present disclosure, as illustrated in FIGS. 25A and 26, the cleaning robot further includes a position adjustment mechanism 140, which is connected with the rotation assembly 110 to drive the

rotation assembly 110 to rotate.

[0190] For example, the position adjustment mechanism 140 is configured to achieve the rotation of the rotation assembly 110. That is, the position adjustment mechanism 140 may be a drive mechanism using related technology. For example, the position adjustment mechanism 140 includes a telescopic rod which is connected with the rotation assembly 110. The rotation assembly 110 may be driven through extension and retraction of the telescopic rod, so as to make the rotation assembly 110 to rotate. Alternatively, the position adjustment mechanism 140 includes a drive shaft connected with the rotation assembly 110, so that the rotation assembly 110 is driven through clockwise rotation and anticlockwise rotation of the drive shaft, so as to cause the rotation assembly 110 to rotate.

[0191] It should be noted that when the rotation assembly 110 is rotationally connected with the chassis 201 directly, the position adjustment mechanism 140 may directly drive the rotation assembly 110 to rotate relative to the chassis 201. When the rotation assembly 110 is rotationally connected with the chassis 201 through the fixing support 100, the position adjustment mechanism 140 drives the rotation assembly 110 to rotate relative to the fixing support 100.

[0192] It should be noted that the fixing support 100 is fixedly connected with the chassis 201. Alternatively, the fixing support 100 may be detachably installed on the chassis 201. Further alternatively, the fixing support 100 cannot be removed from the chassis 201. That is, the fixing support 100 may constitute a part of the chassis 201.

[0193] In an embodiment of the present disclosure, as illustrated in FIGS. 31 to 36, the position adjustment mechanism 140 includes: a connection shaft 10; a rotation plate 20, where two ends of the connection shaft 10 are connected with the rotation assembly 110 and the rotation plate 20 respectively; a floater 30, which is movably arranged on the connection shaft 10, so as to be connected with or disengaged from the rotation plate 20; and a connection rod shaft 40, two ends of which are connected with the fixing support 100 and the rotation plate 20 respectively, wherein a central axis of the connection shaft 10 is not coincided with a central axis of the connection rod shaft 40. When the floater 30 is connected with the rotation plate 20 and the floater 30 rotates, the rotation plate 20 rotates relative to the fixing support 100 with the connection rod shaft 40 being a fixed point, which in turn causes the rotation assembly 110 to rotate relative to the fixing support 100 around a rotation shaft thereof being connected with the fixing support 100. It should be noted that one end of the connection rod shaft 40 which is connected to the fixing support 100 servers as a rotation fulcrum. Two ends of the rotation assembly 110 and the fixing support 100 are provided with respectively a connection rotation shaft and a rotation shaft hole. The connection rotation shaft and the rotation shaft hole are fitted with each other, such that the rotation assembly 110 rotates relative to the fixing support 100. For example, the position adjustment mechanism 140 enables the rotation assembly 110 to rotate relative to the fixing support 100 through the connection shaft 10, the rotation plate 20, the floater 30 and the connection rod shaft 40. Besides, it is required to ensure that the floater 30 is connected with the rotation plate 20 before the rotation assembly 110 rotates relative to the fixing support 100. That is, it is required to move the floater 30 along the connection shaft 10 so as to be connected with the rotation plate 20. Thus, the rotation of floater 30 brings the rotation plate 20 to rotate, which in turn brings an adapter 50 to rotate. One end of the connection rod shaft 40 is fixedly connected to the fixing support 100. Therefore, when the adapter 50 rotates to a certain position, it cannot continue to rotate. At this time, it is equivalent to that the adapter 50 is stuck and the floater 30 continues to provide a gearing torque for transmission. In this case, it may be understood that since the adapter 50 is in a stuck position, the rotation plate 20 is not allowed to rotate any more. That is, the above torque provided by the floater 30 cannot cause the rotation plate 20 to rotate any more. This only brings the result that the torque acts on the whole rotation assembly 110 in turn, thus bringing the rotation assembly 110 to rotate around a rotation shaft connected with the fixing support 100 in a direction opposite to a direction of the rotation of the floater 30.

[0194] It should be noted that there are a connection state and a separation state between the floater 30 and the rotation plate 20. Therefore, when the floater 30 and the rotation plate 20 are in a separation state, and it is required to drive the rotation assembly 110 to rotate relative to the fixing support 100 through the floater 30, then it should be ensured that the floater 30 and the rotation plate 20 are changed from the separation state to the connection state. At this time, the floater 30 rotates, so that the rotation plate 20 may be driven to rotate relative to the fixing support 100 with the connection rod shaft 40 being a fixed point, while the floater 30 and the rotation plate 20 are both connected to the connection shaft 10 and the connection shaft 10 is connected with the rotation assembly 110, thus, the connection shaft 10 may bring the rotation assembly 110 to rotate.

[0195] When the floater 30 rotates relative to the connection shaft 10, the floater 30 drives the rotation plate 20 to rotate, while the rotation plate 20 is connected with the fixing support 100 through the connection rod shaft 40, and the central axis of the connection shaft 10 is not coincide with the central axis of the connection rod shaft 40. Therefore, driven by the floater 30, the rotation plate 20 also rotates relative to the fixing support 100 with the connection rod shaft 40 being a fixed point, while rotating relative to the connection shaft 10. That is, the rotation plate 20 and the floater 30 perform rotation and revolution at the same time, thereby achieving rotation of the rotation assembly 110 relative to the fixing support 100.

[0196] It should be noted that the floater 30 may rotate relative to the connection shaft 10. Alternatively, the float-

er 30 may be circumferentially fixed to the connection shaft 10, that is, the floater 30 may drive the connection shaft 10 to rotate relative to the rotation assembly 110.

[0197] In an embodiment of the present disclosure, the floater 30 may be driven by an external drive mechanism to move relative to the connection shaft 10. For example, the external drive mechanism may include a telescopic rod, which is connected with the floater 30. The movement of the floater 30 along the connection shaft 10 may be achieved through extension and retraction of the telescopic rod. When the floater 30 rotates, the external drive mechanism may rotate synchronously with the floater 30.

[0198] For the rotation of the floater 30 and the axial movement of the floater 30 relative to the connection shaft 10, a transmission mechanism in the related technology may be adopted to enable the floater 30 to rotate. For example, a gear transmission mechanism, a chain transmission mechanism or a belt transmission mechanism may be adopted, which is not limited herein, as long as the transmission mechanism drives the floater 30 to rotate and move axially, and rotates relative to the connection rod shaft 40 along with the floater 30 at the same time.

[0199] In an embodiment of the present disclosure, the connection rod shaft 40 may be directly connected with the rotation plate 20, that is, no adapter mechanism is required between the connection rod shaft 40 and the rotation plate 20, as long as an axis line of the connection shaft 10 is ensured not to coincide with an axis line of the connection rod shaft 40. Thus, the rotation plate 20 rotates relative to the fixing support 100 with the connection rod shaft 40 as the fixed point. For example, the connection rod shaft 40 is fixedly connected with the rotation plate 20, that is, the connection rod shaft 40 is arranged offset from the connection shaft 10, and the connection rod shaft 40 is rotatable relative to the fixing support 100. In this case, when the floater 30 is connected with the rotation plate 20 and the floater 30 rotates, the rotation plate 20 brings the connection rod shaft 40 to rotate relative to the fixing support 100. At this time, the rotation plate 20 is similar to an eccentric disc. Alternatively, the connection rod shaft 40 may be rotatably connected with the rotation plate 20, and the connection rod shaft 40 may be fixedly connected with the fixing support 100.

[0200] In an embodiment of the present disclosure, as illustrated in FIG. 31 to 33, the position adjustment mechanism further includes an adapter 50, two ends of which are connected with the rotation plate 20 and the connection rod shaft 40 respectively, so that the connection rod shaft 40 is connected with the rotation plate 20 through the adapter 50. Therefore, a position relationship between the connection rod shaft 40 and the rotation plate 20 may not be particularly limited, and a reasonable layout among components may be ensured.

[0201] For example, in combination with FIG. 31, the adapter 50 may be a connection plate, and a connection point between the adapter 50 and the rotation plate 20 is arranged offset from the central line of the rotation plate 20, *i.e.,* being arranged offset from the central line of the connection shaft 10.

[0202] In an embodiment of the present disclosure, the connection rod shaft 40 is fixedly connected with the fixing support 100. Two ends of the adapter 50 are hinged with the rotation plate 20 and the connection rod shaft 40 respectively, so that when the rotation plate 20 rotates, the adapter 50 rotates relative to the rotation plate 20 and the connection rod shaft 40 to prevent being stuck.

[0203] For example, since the floater 30 and the rotation plate 20 rotate and revolve at the same time, it is desirable that the adapter 50 does not become stuck. Therefore, both ends of the adapter 50 are required to be hinged.

[0204] In an embodiment of the present disclosure, as illustrated in FIG. 31, a first protrusion 21 is arranged on a side of the rotation plate 20 facing the floater 30, and a second protrusion 31 is arranged on a side of the floater 30 facing the rotation plate 20. Thus, the first protrusion 21 and the second protrusion 31 contact with each other to serve as a displacement restrictor, when the floater 30 is connected with the rotation plate 20, thereby the floater 30 is ensured to bring the rotation plate 20 to rotate.

[0205] For example, there may be a plurality of first protrusions 21 arranged at intervals along a circumferential direction of the floater 30, and there may be a plurality of second protrusions 31 arranged at intervals along a circumferential direction of the rotation plate 20. When the floater 30 is connected with the rotation plate 20, the first protrusion 21 and the second protrusion 31 may arranged in a staggered manner, thus they are fixed with respect to each other. Alternatively, of the first protrusion 21 and the second protrusion 31, one is formed with a groove and the other is inserted into the groove to fix the two protrusions with respect to each other. A displacement restricting connection between the first protrusion 21 and the second protrusion 31 is not limited herein, as long as displacement therebetween is restricted and the two protrusions can be disengaged. In an embodiment of the present disclosure, the plurality of first protrusions 21 along with the rotation plate 20 may form an external helical gear, and the plurality of second protrusions 31 along with the floater 30 may form an internal helical gear. Alternatively, the plurality of first protrusions 21 along with the rotation plate 20 may form an internal helical gear, and the plurality of second protrusions 31 along with the floater 30 may form an external helical gear. The external helical gear is engaged with the internal helical gear.

[0206] In an embodiment of the present disclosure, the floater 30 is arranged rotatable in a first direction and a second direction. When the floater 30 rotates in the first direction, the floater 30 moves to be connected with the rotation plate 20 and causes the rotation assembly 110 to rotate by a preset angle relative to the fixing support 100, making the mopping brushroll 130 at the working position. When the floater 30 rotates in the second direc-

tion, the floater 30 moves to be disengaged from the rotation plate 20, and the sweeping brushroll 120 is made at the working position.

[0207] Specifically, when the floater 30 rotates in the first direction, the floater 30 moves in a direction close to the rotation plate 20, and moves to be connected with the rotation plate 20, as illustrated in FIG. 22. At this time, the floater 30 continues to rotate in the first direction, and thus drives the rotation plate 20 to rotate. Therefore, the rotation assembly 110 rotates from a first position to a second position relative to the fixing support 100, the mopping brushroll 130 is switched from the non-working position to the working position, and the sweeping brushroll 120 is switched from the working position to the non-working position. When the floater 30 rotates in the second direction, the floater 30 drives the rotation plate 20 to rotate, making the rotation assembly 110 to rotate from the second position to the first position relative to the fixing support 100, and the floater 30 is disengaged from the rotation plate 20, as illustrated in FIG. 21. Thus, the sweeping brushroll 120 is switched from the non-working position to the working position, and the mopping brushroll 130 is switched from the working position to the non-working position.

[0208] In an embodiment of the present disclosure, as illustrated in FIGS. 34 to 36, the position adjustment mechanism 140 further includes a stop rod 70 which is arranged on the fixing support 100 and provided with a notch 71. The notch 71 includes an oblique opening located at an open end and an inner opening extending behind the oblique opening. The oblique opening is used as a block when the sweeping brushroll 120 is at the working position, and the inner opening behind the oblique opening is configured to be a sliding-channel of the connection shaft 10 when the sweeping brushroll 120 and the mopping brushroll 130 switch their positions, referring to FIG. 22. As follows, it will be described in detail in several cases. When the sweeping brushroll 120 is at the working position and operates properly, a second power source 85 rotates in the second direction to drive the sweeping brushroll 120 to rotate and operate. At this time, the floater 30 is disengaged from the rotation plate 20, and a sleeve sleeved on the connection shaft 10 is facing the notch 71, so that the oblique opening of the notch 71 blocks the entrance of the sleeve, thereby limiting the position of the sleeve. When it is required to switch the working position of the cleaning member, the second power source 85 starts to rotate in the first direction opposite to the second direction. During the rotation, the floater 30 moves towards the rotation plate 20 and the sleeve is staggered from the notch 71 meanwhile. At the moment the floater 30 is engaged with the rotation plate 20 totally, the connection rod shaft 40 shifts to a stuck position subsequently, then the rotation assembly 110 rotates relative to the fixing support 100, until the connection shaft 10 enters the notch 71 on the stop rod 70, and the sweeping brushroll 120 and the mopping brushroll 130 are switched at the working position. That is, the switching of the rotation assembly 110 from the first status to the second status is completed, and a first power source 63 starts to work, thereby driving the mopping brushroll 130 to operate. When it is required to switch the working position of the cleaning member again, the second power source 85 starts to rotate in the first direction. At this time, the floater 30 engages with the rotation plate 20, and the connection shaft 10 is maintained in the notch 71, and the stop rod 70 blocks the floater 30 from moving along an axis direction of the connection shaft 10. Then, the floater 30 and the rotation plate 20 continue to engage and rotate e, until the connection rod shaft 40 reaches the stuck position again. After that, the rotation assembly 110 starts to rotate relative to the fixing support 100. During such rotation, the connection shaft 10 exits from the notch 71 of the stop rod 70 in pace with the rotation of the rotation assembly 110. When the connection shaft 10 comes out of the notch 71 completely, the connection shaft 10 starts to move along the direction that the floater 30 disengages from the rotation plate 20, until the floater 30 is completely disengaged from the rotation plate 20, so far the working position of the mopping brushroll 130 and the sweeping brushroll 120 is switched. That is, the switching of the rotation assembly from the second status to the first status is completed. Thereafter, the second power source 85 continues to work in the first direction, driving the sweeping brushroll 120 to operate properly.

[0209] In an embodiment of the present disclosure, the switching of the working position is achieved by clockwise rotation and anticlockwise rotation of the second power source 85, the proper operation of the sweeping brushroll 120 is also achieved by the second power source 85, and the proper operation of the mopping brushroll 130 is achieved by the first power source 63.

[0210] It should be noted that when the rotation assembly 110 rotates from the first position to the second position, that is, when the mopping brushroll 130 is switched from the non-working position to the working position, the position of the rotation assembly 110 could be determined by a sensor 72. This effectively controls the start, the stop and rotation directions of the two power sources, so as to stop the rotation of the floater 30 and then operate the cleaning member at the working position. That is, whether the mopping brushroll 130 is at the working position could be determined by the state of the sensor 72. After the rotation assembly 110 rotates from the second position to the first position, the floater 30 has been disengaged from the rotation plate 20, and the rotation assembly 110 stop to rotate relative to the fixing support 100. The sensor 72 may be an in-position switch assembly, such as a micro switch or an optocoupler switch. Alternatively, the sensor 72 may be a distance measuring sensor. In some embodiments of the present disclosure, the rotation assembly 110 is provided with a buffer pad 116, which is arranged opposite to the sensor 72 to prevent impact of the sensor 72 after the sensor 72 is rotated in place, thus protecting the sensor 72. When

the rotation assembly 110 rotates from the second position to the first position, that is, the sweeping brushroll 120 is switched from the non-working position to the working position, the sweeping brushroll 120 could engage with the surface due to a balancing weight on the floating support 111 and a tension spring of a lock block assembly 115, thereby starting sweeping.

[0211] In an embodiment of the present disclosure, as illustrated in FIGS. 31 and 32, the position adjustment mechanism 140 includes a first drive assembly 80 and a second drive assembly 60. The first drive assembly 80 is transmission connected with the mopping brushroll 130. When the mopping brushroll 130 is at the working position, the first drive assembly 80 drives the mopping brushroll 130 to operate. The second drive assembly 60 is transmission connected with the sweeping brushroll 120. When the sweeping brushroll 120 is at the working position, the second drive assembly 60 drives the sweeping brushroll 120 to operate.

[0212] In an embodiment of the present disclosure, as illustrated in FIG. 31, the position adjustment mechanism 140 includes a second drive assembly 60, which is transmission connected with the floater 30 to drive the floater 30 to rotate and move along the connection shaft 10 at the same time. The second drive assembly 60 and the rotation plate 20 as a whole rotates relative to the fixing support 100 synchronously. That is, the second drive assembly 60 may maintain a transmission connection relationship with the floater 30, thereby ensuring the power transmission.

[0213] It should be noted that the floater 30 may move relative to the connection shaft 10 while rotating. That is, the second drive assembly 60 needs to provide a force in an axial direction and a force in a circumferential direction to the floater 30 at the same time. It is not excluded herein that the second drive assembly 60 includes two independent drive mechanisms to provide forces in two directions to the floater 30 respectively.

[0214] In an embodiment of the present disclosure, as illustrated in FIG. 33, the floater 30 includes a first helical gear section 32. The second drive assembly 60 includes a first transmission gear 61 including a second helical gear section 611. The second helical gear section 611 is engaged with the first helical gear section 32 to drive the floater 30 to rotate. The floater 30 may be arranged movable relative to an axis direction of the second helical gear section 611.

[0215] For example, through adjusting the mating relationship between the first helical gear section 32 and the second helical gear section 611, , the second helical gear section 611 applies forces to the first helical gear section 32 in two directions. This helps to ensure that the first helical gear section 32 rotates and moves along the shaft direction synchronously, so that the floater 30 can be engaged with or disengaged from the rotation plate 20. Once the floater 30 is engaged with the rotation plate 20, the floater 30 stop to move along the connection shaft 10 due to the block of the rotation plate 20, but still rotates under the driving by the second helical gear section 611, so as to drive the rotation plate 20 to rotate.

[0216] In an embodiment of the present disclosure, as illustrated in FIGS. 32 and 33, the second drive assembly 60 further includes: a second transmission gear 62, which is engaged with the first transmission gear 61; and a first power source 63, which is connected with the second transmission gear 62 to drive the second transmission gear 62 to rotate.

[0217] For example, the first power source 63 is a motor, which drives the second transmission gear 62 to rotate, thereby in turn driving the first transmission gear 61 to rotate, and transmitting power to the floater 30 through the first transmission gear 61. In the embodiment, the motor could rotate clockwisely or anticlockwisely.

[0218] Alternatively, in an embodiment of the present disclosure, the first power source 63 may be directly transmission with the first transmission gear 61 to drive the first transmission gear 61 to rotate. Alternatively, additional transmission gear may be arranged between the first power source 63 and the second transmission gear 62 to fulfill the requirement of transmission ratio.

[0219] In an embodiment of the present disclosure, as illustrated in FIGS. 32 and 33, the floater 30 further includes an output gear section 33. The second drive assembly 60 further includes a first output gear 64 configured to connect with the sweeping brushroll 120. The output gear section 33 is engaged with the first output gear 64 to drive the first output gear 64 to rotate. The floater 30 may be arranged movable relative to an axis direction of the first output gear 64.

[0220] For example, the floater 30 may be configured to drive the rotation plate 20 to rotate, *i.e.,* achieving the rotation of the rotation assembly 110 relative to the fixing support 100. When the floater 30 rotates, it may also be configured to drive the sweeping brushroll 120 to operate. That is, a single power source performs two functions, thus reducing the setting of the power source to a certain extent.

[0221] It should be noted that after the floater 30 is engaged with the rotation plate 20, the rotation of the floater 30 causes the rotation assembly 110 to rotate relative to the fixing support 100. Therefore, after the floater 30 is engaged with the rotation plate 20, the rotation of the floater 30 may further drive the sweeping brushroll 120 and the mopping brushroll 130 to switch positions. After the floater 30 is disengaged from the rotation plate 20, the rotation of the floater 30 may bring the sweeping brushroll 120 to operate. That is, the floater 30 may rotate in two directions.

[0222] It should be noted that the floater 30 can move relative to the connection shaft 10. Therefore, the floater 30 is displaceable relative to the first transmission gear 61 and the first output gear 64 engaged therewith. But, the displacement has a fixed limit, so as to ensure that the floater 30 is kept engaged with the first transmission gear 61 and the floater 30 is also kept engaged with the first output gear 64.

[0223] In an embodiment of the present disclosure, the floater 30 includes a first helical gear section 32 and an output gear section 33. The second drive assembly 60 includes: a first transmission gear 61 including a second helical gear section 611, wherein the second helical gear section 611 is engaged with the first helical gear section 32 to drive the floater 30 to rotate; and a first output gear 64 connected with the sweeping brushroll 120, wherein the output gear section 33 is engaged with the first output gear 64 to drive the first output gear 64 to rotate. The floater 30 may be arranged movable along both the second helical gear section 611 and the first output gear 64. The floater 30 drives, through the rotation plate 20, the rotation assembly 110 to rotate relative to the fixing support 100, so that the sweeping brushroll 120 and the mopping brushroll 130 are switched at the working position. When the sweeping brushroll 120 is at the working position, the floater 30 may also drive, through the first output gear 64, the sweeping brushroll 120 to operate.

[0224] In an embodiment of the present disclosure, when the floater 30 rotates in the second direction, the floater 30 drives the sweeping brushroll 120 to operate. The position adjustment mechanism 140 further includes a first drive assembly 80, which is connected with the mopping brushroll 130 to drive the mopping brushroll 130 to operate. That is, after the mopping brushroll 130 is switched to the working position, the first drive assembly 80 can drive the mopping brushroll 130 to operate.

[0225] In an embodiment of the present disclosure, as illustrated in FIG. 34, the position adjustment mechanism 140 further includes a housing member 90, which is connected with the rotation assembly 110. The connection shaft 10 is connected with the housing member 90, so that the connection shaft 10 is connected with the rotation assembly 110 through the housing member 90. The first drive assembly 80 is arranged on the housing member 90. After the connection shaft 10 rotates to be clamped in the notch 71 from the outside of the notch 71 and makes the mopping brushroll 130 at the working position, the floater 30 stops rotating, the first drive assembly 80 drives the mopping brushroll 130 to operate, and the floater 30 comes into contact with the stop rod 70 and is stopped by the stop rod, and then the floater 30 continuous to move in the second direction.

[0226] For example, when the floater 30 rotates in the first direction, the floater 30 is configured to drive the rotation assembly 110 to rotate relative to the fixing support 100. That is, the rotation assembly 110 moves from the first position to the second position. When the floater 30 rotates in the second direction, the floater 30 drives the rotation assembly 110 to move from the second position to the first position. After that, the floater 30 is mainly configured to drive the sweeping brushroll 120 to operate. In an embodiment of the present disclosure, when the rotation assembly 110 is in the first position, the sweeping brushroll 120 is at the working position. That is, the rotation of the floater 30 in the second direction achieves the operation of the sweeping brushroll 120. When the rotation assembly 110 is in the second position, the mopping brushroll 130 is at the working position, and then the mopping brushroll 130 is driven to operate by the first driving assembly 80.

[0227] In an embodiment of the present disclosure, the position adjustment mechanism includes a first drive assembly 80 and a second drive assembly 60. The second drive assembly 60 drives the rotation assembly 110 to rotate relative to the fixing support 100, and may be configured to drive the sweeping brushroll 120 to operate. The first drive assembly 80 is configured to drive the mopping brushroll 130 to operate. Both the first drive assembly 80 and the second drive assembly 60 are arranged on the housing member 90.

[0228] For example, in connection with FIGS. 31 to 33, the first transmission gear 61 includes the second helical gear section 611 and the transmission gear section 612. The floater 30 includes the first helical gear section 32 and the output gear section 33. The second transmission gear 62 is engaged with the transmission gear section 612, thereby achieving the rotation of the first transmission gear 61. The second helical gear section 611 is engaged with the first helical gear section 32 so as to drive the floater 30 to move and to rotate. The output gear section 33 is engaged with the first output gear 64 so as to drive the sweeping brushroll 120 to operate through the first output gear 64.

[0229] It should be noted that there are a plurality of output gears between the first output gear 64 and the sweeping brushroll 120 to meet the requirement of transmission ratio. In an embodiment of the present disclosure, the first output gear 64 is engaged with a second output gear 65, the second output gear 65 is engaged with a third output gear 66, the third output gear 66 is engaged with a fourth output gear 67, and the fourth output gear 67 is connected with the sweeping brushroll 120, thereby driving the sweeping brushroll 120 to rotate.

[0230] In an embodiment of the present disclosure, the first drive assembly 80 includes a second power source 85, which is connected with a first gear 81 and drives the first gear 81 to rotate. The first gear 81 may be configured to drive the mopping brushroll 130 to operate. There may be a plurality of gears may be arranged between the first gear 81 and the mopping brushroll 130 to meet the requirement of transmission ratio. In an embodiment of the present disclosure, the first gear 81 is engaged with a second gear 82, the second gear 82 is engaged with a third gear 83, the third gear 83 is engaged with a fourth gear 84, and the fourth gear 84 is connected with the mopping brushroll 130, thereby driving the mopping brushroll 130 to rotate. The second power source 85 may be a motor. In an embodiment of the present disclosure, the second power source 85 may be a motor which is capable of rotate in a clockwise direction and an anticlockwise direction.

[0231] In some embodiments of the present disclosure, as illustrated in FIGS. 25B and 25C, the housing member 90 includes a first section 91 and a second sec-

tion 92. The first drive assembly 80 and the second drive assembly 60 are both arranged in the first section 91 and the second section 92. That is, the first section 91 and the second section 92 are configured to enclose the internal components of the position adjustment mechanism 140. The first section 91 and the second section 92 are detachably connected.

[0232] The first drive assembly 80 is connected with the mopping brushroll 130 through an adapter assembly. As illustrated in FIGS. 25B and 25C, the adapter assembly includes an output sleeve 93, a first seal 94, a second seal 95 and a bearing 96. Two ends of the output sleeve 93 are connected with the first drive assembly 80 and the mopping brushroll 130 respectively. The two ends of the output sleeve 93 are provided with a first mounting hole and a second mounting hole respectively. The fourth gear 84 of the first drive assembly 80 may be provided with an external spline 841. An internal spline is arranged in the first mounting hole and is configured to be connected with the external spline. The first seal 94 is located at an end of the fourth gear 84 and the first mounting hole, and may be a soft rubber. Accordingly, the mopping brushroll 130 and the second mounting hole may be connected through a splined connection. That is, the mopping brushroll 130 may be provided with an external spline, and an internal spline is arranged in the second mounting hole. The splined connection comprises full tooth surface contact, which increases a contact area of the torsion and reduces the stress. Thus, the capability to resist torsion is improved, and at the same time, a side clearance is made less due to the splined connection and each tooth is well engaged.

[0233] The output sleeve 93 is rotatably arranged in the second section 92, and a second seal 95 and a bearing 96 are arranged between the output sleeve 93 and the second section 92. This ensures a reliable sealing performance while guaranteeing that the output sleeve 93 is rotatably arranged in the second section 92. The bearing 96 may be a bearing of copper, and the second seal 95 may be of felt, which is of wool or wool fiber texture. The felt helps to avoid or reduce the entry of foreign matters such as dust and hair into the housing member 90 and avoid damage to an oil seal.

[0234] In some embodiments of the present disclosure, the second drive assembly 60 may be connected with the sweeping brushroll 120 through the adapter assembly. For the detailed structure of the adapter assembly, reference may be made to any of the above-mentioned embodiments, which will not be elaborated herein. The second drive assembly 60 and the sweeping brushroll 120 are matched with the adapter assembly. That is, the fourth output gear 67 and the sweeping brushroll 120 may be provided with an external spline respectively.

[0235] In an embodiment of the present disclosure t, the rotation assembly 110 is rotatably installed on the chassis 201. That is, compared with a case where the rotation assembly 110 is connected to the chassis 201 through the fixing support 100 as described above, the rotation assembly 110 according to an embodiment of the present disclosure may be rotatably installed on the chassis 201 directly. For example, the rotation of and the connection between the rotation assembly 110 and the chassis 201 may be achieved through shafts provided at both ends of the rotation assembly 110 and shaft holes provided at respective positions of the chassis 201. The cleaning robot further includes a rotation drive mechanism, which is connected with the rotation assembly 110 to drive the rotation assembly 110 to rotate.

[0236] It should be noted that in an embodiment of the present disclosure, the rotation drive mechanism may be similar in structure to the position adjustment mechanism 140 described above. But the difference may be in that a component of the position adjustment mechanism 140 which is connected with the fixing support 100 is required to be connected with the body 200, for example, being directly connected to the chassis 201.

[0237] For example, the connection rod shaft 40 is connected with the body 200, and the stop rod 70 is connected with the body 200. For other structure of the position adjustment mechanism 140, reference may be made to any of the embodiments described above, which will not be elaborated herein, as long as the position adjustment mechanism 140 is able to drive the rotation assembly 110 to rotate and further drive the sweeping brushroll 120 and the mopping brushroll 130 to operate respectively. The detailed structure and the layout arrangement may be adjusted according to actual requirement, which is not limited herein.

[0238] In some embodiments of the present disclosure, the rotation assembly 110 may be driven by a first motor to rotate relative to the chassis 201, so that the sweeping brushroll 120 and the mopping brushroll 130 are switched at the working position. The sweeping brushroll 120 may be driven by a second motor to rotate for operation. The mopping brushroll 130 may be driven by a third motor to rotate for operation.

[0239] For example, as illustrated in FIGS. 37A to 37C, compared with a case where the second drive assembly 60 drives the rotation assembly 110 and the sweeping brushroll 120 to rotate, the first drive assembly 80 drives the mopping brushroll 130 to rotate. In an embodiment of the present disclosure, the mopping brushroll 130 may still be driven by the first drive assembly 80 to rotate, and the detailed process is as same as that of the above embodiments, which will not be elaborated herein. A third power source 22 and a drive gear 23 are included, such that the drive gear 23 is engaged with the rotation plate 20, thereby allowing the third power source 22 to drive the rotation plate 20 to rotate in a clockwise direction and to rotate in an anticlockwise direction through the drive gear 23, and achieving the switching between the sweeping brushroll 120 and the mopping brushroll 130 at the working position. Compared with the above embodiments, the floater 30 according to an embodiment of the present disclosure does not move axially, but is directly driven by the second drive assembly 60 to rotate. There-

fore, though a respective gear transmission, the fourth output gear 67 is finally rotated, so that the fourth output gear 67 makes the sweeping brushroll 120 to rotate. The principle of achieving the rotation of the fourth output gear 67 is consistent with that of the above embodiment, which will not be elaborated herein. In an embodiment of the present disclosure, the third power source 22 and the drive gear 23 are included, such that the axial movement of the floater 30 may be saved, and the stop rod 70 may be saved.

[0240] In another embodiment of the present disclosure, a single drive mechanism and a complex transmission assembly may be adopted to achieve unified driving of the sweeping brushroll 120, the mopping brushroll 130 and the switching between sweeping-mopping. For example, while in a clockwise rotation, the drive mechanism may drive the rotation of the sweeping brushroll 120 and the rotation of the mopping brushroll 130 as well as the switching between a sweeping state and a mopping state respectively, according to the state of the sweeping-mopping module. When the sweeping brushroll 120 lands on the ground, the drive mechanism drives the sweeping brushroll 120 to rotate for sweeping through a gearbox. When the switching between the sweeping state and the mopping state is required, engaged teeth of the gearbox are switched, so that the drive mechanism may drive to switch between the sweeping state and the mopping state through the gearbox. When the switching is completed, the engaged teeth of the gearbox are switched again, so that the drive mechanism may drive the mopping brushroll 130 to rotate through the gearbox. When the switching between the sweeping state and the mopping state is required again, the engaged teeth of the gearbox are switched again, and the motor rotates in an anticlockwise direction to complete the switching between the sweeping state and the mopping state.

[0241] In an embodiment of the present disclosure, the sweeping brushroll 120 and the mopping brushroll 130 are sequentially arranged along the advancing direction of the cleaning robot. That is, the mopping brushroll 130 is in front and the sweeping brushroll 120 is in rear.

[0242] In an embodiment of the present disclosure, as illustrated in FIG. 25A, the cleaning robot further includes a side brush assembly 150, which is arranged on the chassis 201. When the sweeping brushroll 120 is at the working position, the side brush assembly 150 is also at the working position, so that the side brush assembly 150 is enabled to move dust outside the sweeping brushroll 120 into a coverage area of the sweeping brushroll 120, thereby ensuring a cleaning range.

[0243] For example, the side brush assembly 150 is located on one side of the sweeping brushroll 120. That is, the side brush assembly 150 and the sweeping brushroll 120 are disposed in a first region of the rotation assembly 110, while the mopping brushroll 130 is disposed in a second region of the rotation assembly 110. Through the rotation of the rotation assembly 110 relative to the fixing support 100, the first region and the surface to be cleaned are brought to be opposite to each other. That is, the side brush assembly 150 and the sweeping brushroll 120 are at the working position for cleaning the surface to be cleaned. When the second region is opposite to the surface to be cleaned, the mopping brushroll 130 is at the working position and is configured to mop the surface to be cleaned.

[0244] In an embodiment of the present disclosure t, the side brush assembly 150 includes an independent drive mechanism, which drives the brush to rotate for cleaning. The drive mechanism includes a motor.

[0245] In an embodiment of the present disclosure, as illustrated in FIG. 25A, the cleaning robot further includes a side brush combing mechanism 151 rotatably arranged on the rotation assembly 110. The side brush combing mechanism 151 is configured to fix the side brush assembly 150, and has a ring-shaped member substantially same as the side brush assembly 150. The side brush combing mechanism 151 is rotatable relative to the rotation assembly 110 out-of-plane. During the rotation process, bristles of the side brush assembly 150 may be combed in a direction substantially parallel to an axis of the side brush assembly 150. Thus, during closing the cover plate 112, the cover plate 112 does not interfere with the bristles and press the bristles into the cover plate 112. When closing the cover plate 112, the cover plate 112 touches an interference protrusion on the top of the ring-shaped member on the side brush combing mechanism 151. Besides, the interference protrusion is further pressed when closing the cover plate 112, so that the side brush combing mechanism 151 is brought to move along its rotation shaft towards a plane where the rotation assembly 110 is located. In this process, the side brush combing mechanism 151 further releases the combing interference with the bristles. When the cover plate 112 is closed and locked, the side brush combing mechanism 151 is also fully fastened with the rotation assembly 110, and the cover plate 112 will not press the bristles any more.

[0246] According to an embodiment of the present disclosure, a tension spring and a lock block assembly 115 on which the tension spring is installed are provided between the fixing support 100 and the floating support 111. The lock block assembly 115 includes a tension spring support, wherein an end of the tension spring support is fixed to the fixing support 100, and the tension spring is sleeved into the tension spring support from the other end thereof. The floating support 111 is provided with a tension spring support sleeve, and a reverse force may be provided to the floating support 111 through the tension spring. Thus, the cleaning assembly (*i.e.,* the sweeping brushroll 120 and the mopping brushroll 130) installed on the floating support 111 may be pressed against the surface to be cleaned. By providing the lock block assembly 115, the mass of the floating support 111 may be significantly reduced, without affecting the bonding force between the cleaning assembly and the surface to be cleaned.

[0247] According to another embodiment of the present disclosure, the base station is placed in a certain location in the home, such as a kitchen, a bathroom, a balcony, and other locations with a faucet and a drain. The base station is still provided with a water container, on which an inlet of the water container and an outlet of the water container are provided with a relief valve and a solenoid valve sequentially. An inlet of the solenoid valve is corresponding to an opening of an external inlet pipe arranged on the base station. The opening of the external inlet pipe is arranged at a suitable position on the base station and forms a connection portion connected with an external water source. Alternatively, it is also possible to only provide a hole on the base station, and the inlet of the inlet solenoid valve passes through the base station and is directly connected with the external water source. The inlet of the water container is connected to the external water source, such as a municipal water supply network, through the solenoid valve which is controllable. When the water container is required to be filled with water, a control unit of the base station controls the solenoid valve to open and fill the water container with water. The relief valve is arranged after the solenoid valve to adjust a pressure of the water flow entering the water container. Alternatively, in some cases, the relief valve is not provided, and the water container is directly connected to a faucet through the solenoid valve.

[0248] A floating ball configured to detect a water level is arranged in the water container, and a magnet, which corresponds to a Hall sensor arranged on the liquid container, is arranged on the floating ball. When the Hall sensor senses the magnet, it sends a control signal to the control unit. When the Hall sensor cannot sense the magnet due to the floating ball falling down, it also sends a control signal to the control unit. In an embodiment of the present disclosure, both the solenoid valve and the Hall sensor are connected to the control unit. When the control unit receives the signal from the Hall sensor, the control unit issues a control instruction to the solenoid valve. Alternatively, it should be understood that the solenoid valve may also be directly connected with the Hall sensor which serves as a trigger switch for the solenoid valve.

[0249] When the water in the water container is full or the water level falls to a certain height, the solenoid valve closes or opens based on a signal from the Hall sensor. In one case, the Hall sensor is configured to send a shutdown signal to the solenoid valve when the water container is full. At this time, the Hall sensor detects the magnet on the floating ball in a full-water state. In another case, when the water level in the water container falls to a certain height, the Hall sensor sends an open signal to the solenoid valve. At this time, the Hall sensor detects the magnet on the floating ball in a no-water state. The solenoid valve is controlled in the full-water state and the no-water state respectively in the two cases as discussed above. Therefore, the above two cases may also be combined in the water container, wherein Hall sensors are arranged at a full-water level and a no-water level in the water container respectively. When the magnet on the floating ball is detected by the Hall sensor at the full-water level, the water supply by the solenoid valve is stopped. When the magnet on the floating ball is detected by the Hall sensor at the no-water level, the water supply by the solenoid valve is turned on. Alternatively, it is possible to provide a Hall sensor only at the full-water level or the no-water level, while other detection method is adopted at the no-water level or the full-water level, which may be known from conventional arts and will not be elaborated herein.

[0250] During proper use, the water container has an outlet, which is connected with a water pump. When it is required to feed water to the cleaning tank, the water pump starts to operate, and pumps the clean water from the water container into the cleaning tank to clean the cleaning mechanism.

[0251] For the cleaning of the cleaning mechanism, adding detergent with a certain proportion can achieve a better cleaning effect. Therefore, a detergent accommodating container the may be arranged in the base station. The detergent accommodating container be a part of the water container and is spaced from a part accommodating clean water by a partition. When in use, the detergent is filled into the detergent accommodating container. Alternatively, the detergent accommodating container may be separately arranged. In an embodiment of the present disclosure, the detergent accommodating container may be an accommodation space for accommodating the bottled detergent. During use, an opening of the bottled detergent is opened and accommodating in the accommodation space in an appropriate orientation. When the detergent is required to be added, the detergent is extruded or sucked by a suitable mechanism.

[0252] In an embodiment of the present disclosure, an opening is opened at a side or bottom of the detergent accommodating container. The opening is connected with a detergent pump through a pipe, the detergent pump is configured to pump the detergent from the detergent accommodating container.

[0253] When clean the cleaning mechanism through clean water and detergent at the same time, the clean water and the detergent are required to be thoroughly mixed before entering the cleaning tank. Therefore, a mechanism for mixing the clean water and the detergent, such as a mixing screw rod, is arranged at a common outlet pipe after a parallel connection between the water pump and the detergent pump, in which the clean water and the detergent are thoroughly mixed, and then flow to the cleaning tank through an outlet of the mechanism.

[0254] From the above description, the sewage water is generated after cleaning the cleaning mechanism in the cleaning tank. There are openings arranged at the outlets of the cleaning tank and the auxiliary container due to their arrangements. Therefore, it is required to provide respective sewage water pumps to pump the

sewage water out from both the cleaning tank and the auxiliary container. In this regard, according to an embodiment of the present disclosure, a drainage pump is proposed, such as a submersible pump. The drainage pump is arranged at the rear of the base station, and includes a sewage water inlet for the cleaning tank and a sewage water inlet for the auxiliary container which are corresponding respectively to the openings of the cleaning tank and the auxiliary container. Besides, an anti-leak return port is further arranged on the drainage pump to prevent backflow. A drainage outlet is arranged downstream of the water flow of the drainage pump, and is configured to discharge the sewage water out of the base station. When in operation, an impeller of the drainage pump is located below the water surface, the liquid outlets of the cleaning tank and the auxiliary container are connected with the sewage water inlets of the drainage pump respectively, and the impeller of the drainage pump rotates at a high speed, so that a mixture of sewage and sediment is discharged from the sewage water pump under the effect of centrifugal force.

[0255] Through the above arrangement, the automatic liquid supply and the automatic drainage of the base station may be achieved without the active participation of users, which helps to realize the full automation of the base station.

[0256] Alternatively, in some embodiments of the present disclosure, for example, in a case that there is no municipal water supply network or no entrance for a sewer at a placement location of the base station, it is possible to only provide a structure for automatic drainage such as a drain or a structure for automatic liquid supply for various environments.

[0257] After reading the specification and practicing the content disclosed herein, one of ordinary skill in the art can easily think of other embodiments of the present disclosure. The present disclosure is intended to cover any variations, applications or modifications of the present disclosure, which follow the general principle of the present disclosure and include the common knowledge or conventional technical means in the art that are not disclosed in the present disclosure. The description and exemplary embodiments are only exemplary, and the true scope and spirit of the present disclosure are limited by the claims.

[0258] It should be understood that the present disclosure is not limited to the exact structure which has been described above and illustrated in the accompanying drawings, and various modifications and changes may be made without departing from the scope of the present disclosure. The scope of the present disclosure is limited only by the appended claims.

Claims

1. A base station applicable to clean a cleaning mechanism of a cleaning robot, the base station comprising:

   a cleaning tank (301), configured to accommodate at least part of the cleaning mechanism and clean the at least part of the cleaning mechanism, wherein the cleaning tank (301) comprises a first end face and a second end face, and a direction of a connection line between the first end face and the second end face is substantially parallel to an extension direction of a rotation axis of the cleaning mechanism; and
   a cleaning wiper (302), arranged to extend between the first end face and the second end face of the cleaning tank (301).

2. The base station according to claim 1, wherein

   the second end face is configured to discharge cleaning liquid accommodated in the cleaning tank (301) for cleaning the cleaning mechanism; and
   the base station further comprises a first filter (316) arranged close to the second end face.

3. The base station according to claim 1, wherein the cleaning wiper (302) is arranged within the cleaning tank (301) and configured to squeeze the cleaning mechanism.

4. The base station according to claim 3, wherein the cleaning wiper (302) comprises a plurality of protrusions (303) arranged at intervals.

5. The base station according to claim 4, wherein

   the cleaning wiper (302) further comprises a connection plate (3021) arranged on a bottom wall of the cleaning tank (301) and extending along an extension direction of the cleaning tank (301); and
   the plurality of protrusions (303) are arranged at intervals on the connection plate (3021).

6. The base station according to claim 1, further comprising:

   a first pump (320) in communication with the cleaning tank (301), configured to pump cleaning liquid into the cleaning tank (301); and
   a second pump (330) in communication with the cleaning tank (301), configured to pump the cleaning liquid out of the cleaning tank (301).

7. The base station according to claim 6, wherein the first pump (320) and the second pump (330) are configured to operate at the same time, the first pump (320) is configured to spout the cleaning liquid into the cleaning tank (301), and the second pump (330)

is configured to pump the cleaning liquid out of the cleaning tank (301).

8. The base station according to claim 7, wherein only the second pump (330) operates while the first pump (320) does not operate, such that the cleaning liquid is drained out of the cleaning tank (301).

9. The base station according to claim 6, further comprising:
a liquid level detector (310), configured to detect a liquid level of the cleaning liquid in the cleaning tank (301).

10. The base station according to claim 9, wherein the liquid level detector (310) comprises:

a signal transmitter (311);
a signal receiver, arranged opposite to the signal transmitter (311);
a support member (312);
a connection rod (313), rotatably arranged on the support member (312);
a first floater (314), arranged at a first end face of the connection rod (313) and located in the cleaning tank (301), wherein the first floater (314) is configured to drive the connection rod (313) to rotate relative to the support member (312) under an effect of the cleaning liquid; and
a shielding member (315), arranged at a second end face of the connection rod (313) and located between the signal transmitter (311) and the signal receiver, wherein the shielding member (315) is configured to disconnect a signal connection between the signal transmitter (311) and the signal receiver;
wherein in response to the signal connection between the signal transmitter (311) and the signal receiver being disconnected, the first pump (320) pumps the cleaning liquid into the cleaning tank (301).

11. The base station according to claim 6, further comprising:
a diversion trench (304), located on a first side of the cleaning tank (301) and being in communication with the cleaning tank (301), such that the cleaning liquid returns into the cleaning tank (301) after the cleaning liquid enters the diversion trench (304).

12. The base station according to claim 6 or 11, further comprising:

an auxiliary container (305), located on a second side of the cleaning tank (301) and arranged independently of the cleaning tank (301);
wherein the second pump (330) is in communication with the auxiliary container (305), such that the second pump (330) pumps away the cleaning liquid after the cleaning liquid enters the auxiliary container (305).

13. The base station according to claim 12, wherein a sealing strip (306) is arranged between the auxiliary container (305) and the cleaning tank (301), such that the cleaning liquid in the cleaning container (301) is prevented from entering the auxiliary container (305).

14. The base station according to claim 12, wherein

a liquid outlet (3051) is arranged on the auxiliary container (305), and the liquid outlet (3051) is in communication with the second pump (330), and
the base station further comprises a second floater (340), arranged in the auxiliary container (305) to provide shielding on the liquid outlet (3051),
wherein the second floater (340) floats up in response to the cleaning liquid existing in the auxiliary container (305), such that the second pump (330) is in communication with the auxiliary container (305).

15. The base station according to claim 1, further comprising:
a drying mechanism (350), configured to dry the cleaning mechanism.

16. The base station according to claim 15, further comprising a through hole (307) arranged apart from the cleaning tank (301);
wherein the drying mechanism (350) is configured to dry the cleaning mechanism through the through hole (307).

17. The base station according to claim 15, wherein the drying mechanism (350) and the cleaning tank (301) are located at two ends of the base station respectively.

18. The base station according to claim 1, further comprising a guide bottom surface (308) provided with an anti-skid protrusion (3081);

wherein the cleaning robot is configured to move onto the guide bottom surface (308) along the anti-skid protrusion (3081); and
the cleaning tank (301) is arranged on the guide bottom surface (308) and spaced from the anti-skid protrusion (3081).

19. The base station according to claim 1, further comprising:

a first charging electrode (360), configured to be electrically connected with a second charging electrode (210) of the cleaning robot.

20. The base station according to claim 19, further comprising:
a guide side surface (309), wherein the first charging electrode (360) is arranged on the guide side surface (309) and above the cleaning container (301).

21. The base station according to claim 1, further comprising:

a guide side surface (309); and
a guide wheel (361), arranged on the guide side surface (309) for contact with the cleaning robot, wherein the guide wheel (361) is located above the cleaning tank (301).

22. The base station according to claim 1, further comprising a guide top surface (362);
wherein a lock block configured to contact with the cleaning robot is arranged on the guide top surface (362) and above the cleaning tank (301).

23. A base station, applicable to clean a cleaning mechanism of a cleaning robot, comprising:

a cleaning container (301), configured to accommodate at least part of the cleaning mechanism and clean the at least part of the cleaning mechanism; and
a sewage tank (380) in communication with the cleaning tank (301), wherein the sewage tank (380) is provided with a liquid inlet (3012), and cleaning liquid entering the sewage tank (380) through the liquid inlet (3012) is configured to flush the cleaning liquid in the sewage tank (380).

24. The base station according to claim 23, wherein the liquid inlet (3012) is provided on a side wall of the sewage tank (380).

25. The base station according to claim 23 or 24, wherein the cleaning tank (301) is further provided with a liquid inlet (3012) , the sewage tank (380) is provided with a liquid outlet (3011) and the liquid outlet (3011) is configured to discharge the cleaning liquid in the sewage tank (380).

26. A cleaning robot system, comprising:

a cleaning robot (1), comprising a cleaning mechanism; and
a base station (2), comprising a cleaning tank (301) configured to accommodate at least part of the cleaning mechanism and clean the at least part of the cleaning mechanism, wherein the cleaning tank (301) comprises a first end face and a second end face, and a direction of a connection line between the first end face and the second end face is substantially parallel to an extension direction of the cleaning mechanism.

27. The cleaning robot system according to claim 26, wherein the cleaning mechanism comprises at least one of a sweeping brushroll (120) and a mopping brushroll (130).

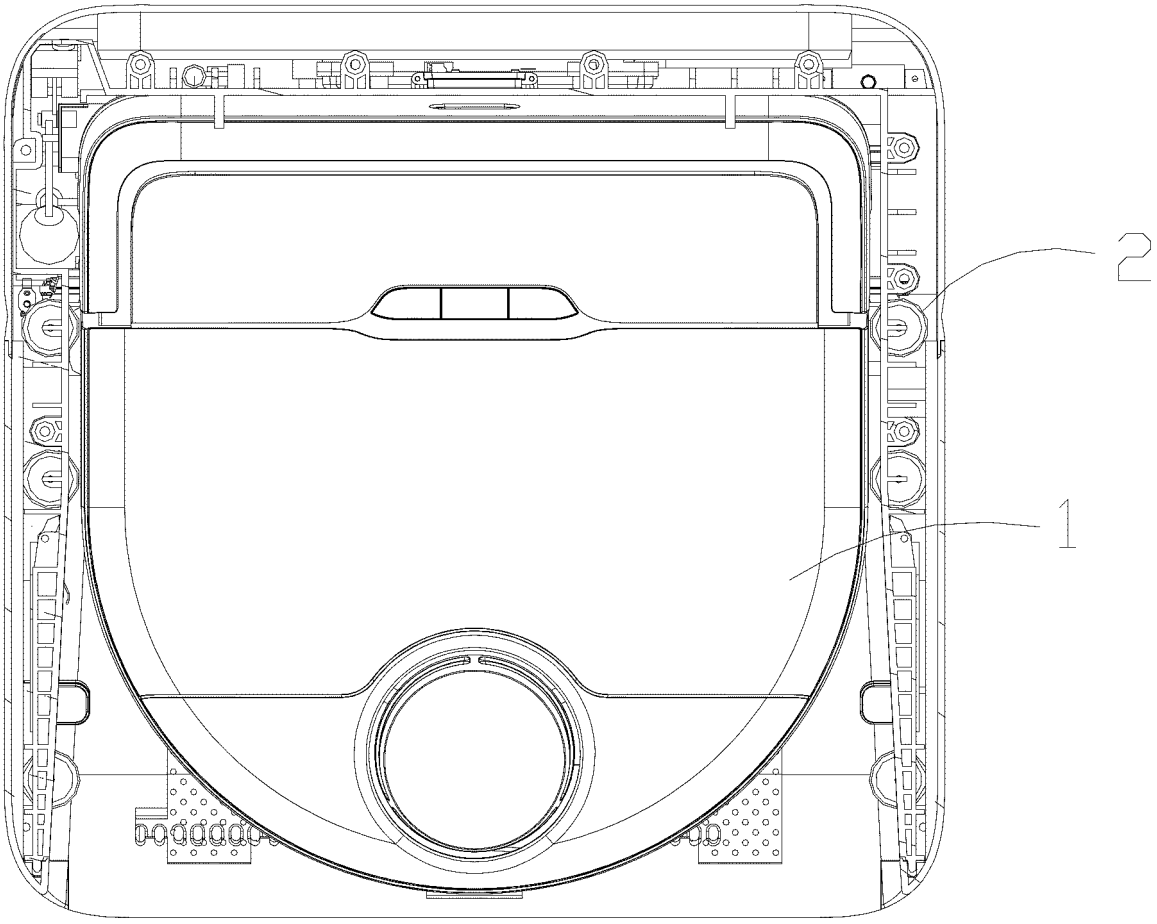


FIG.1

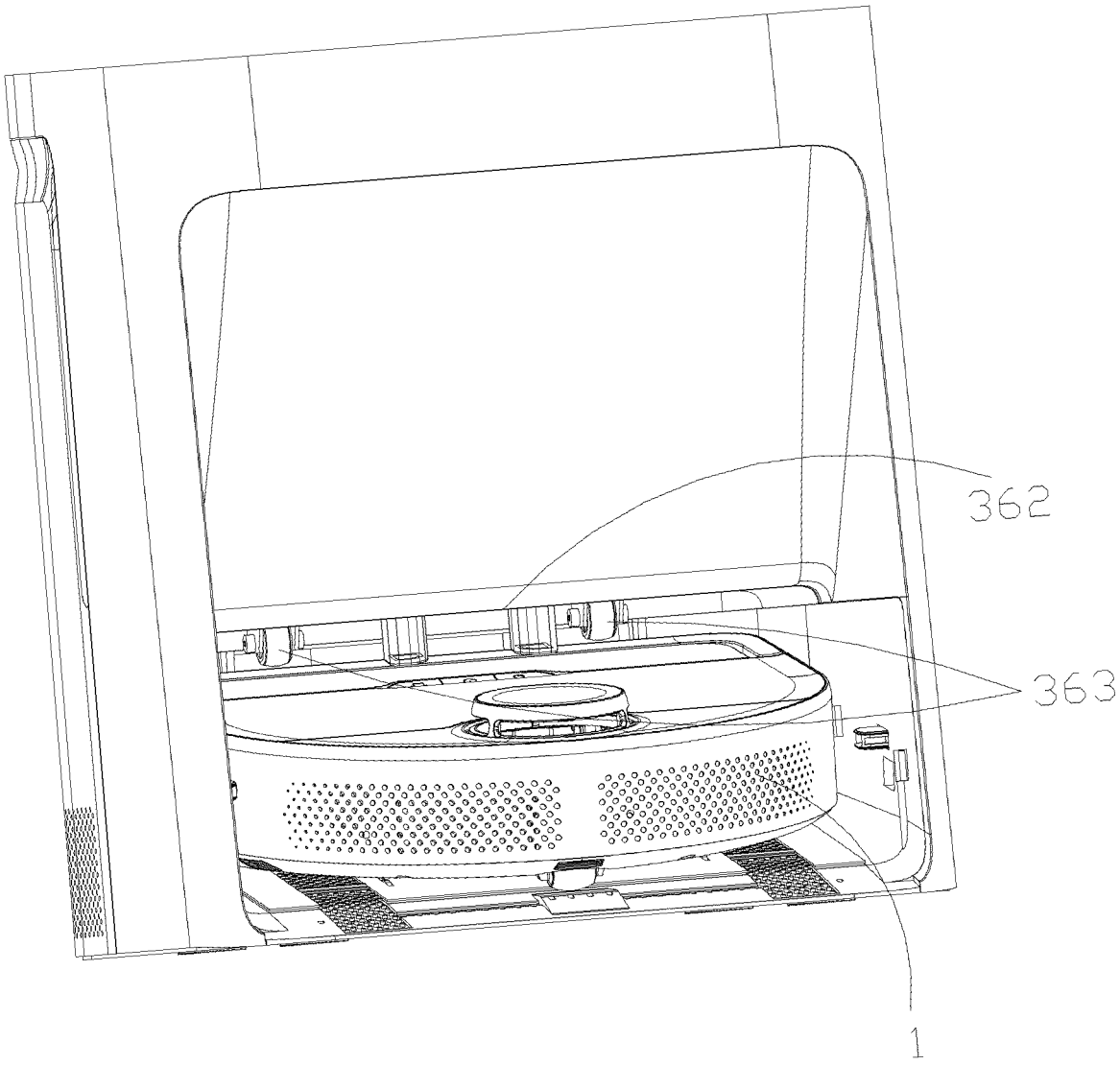


FIG.2

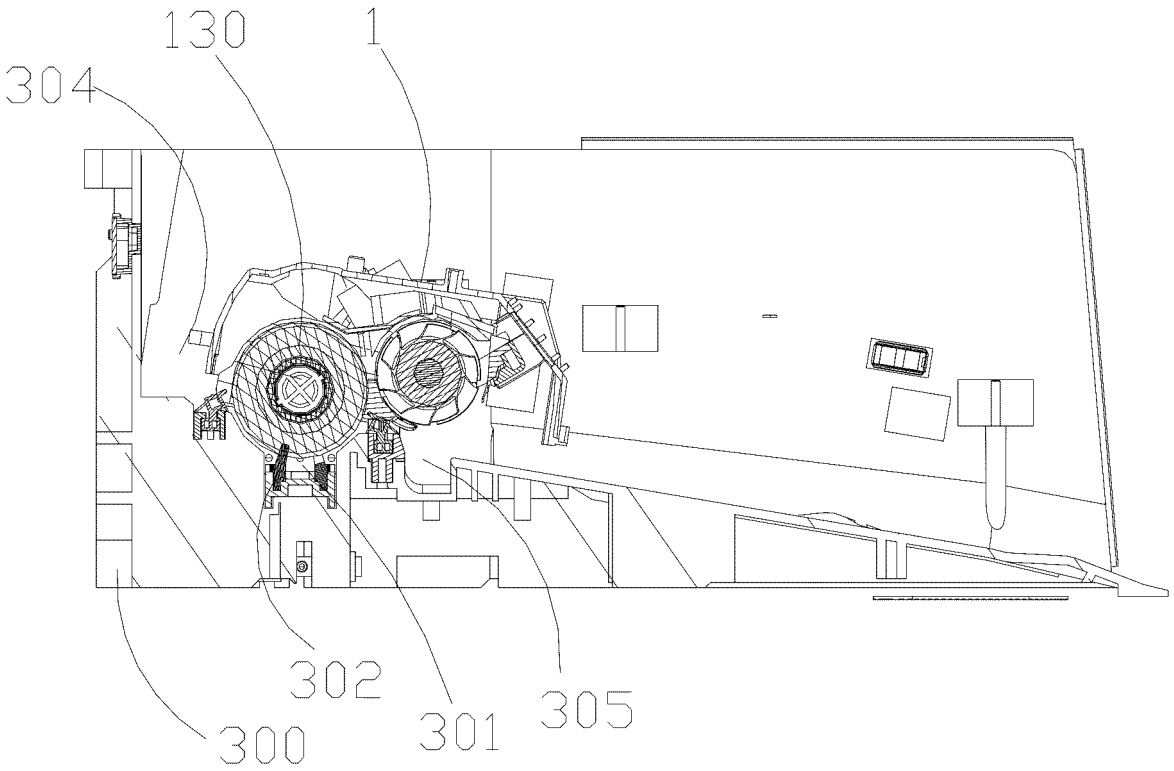


FIG.3

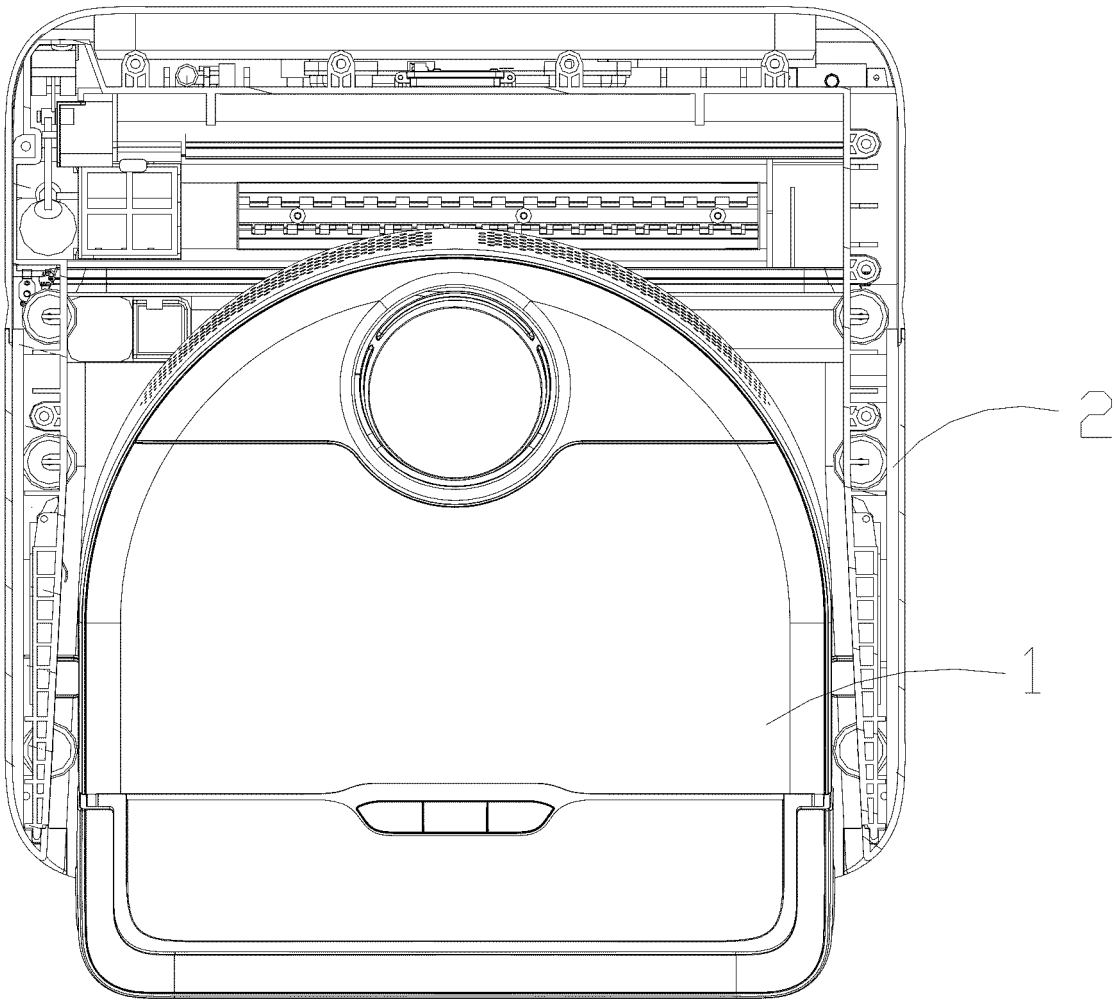


FIG.4

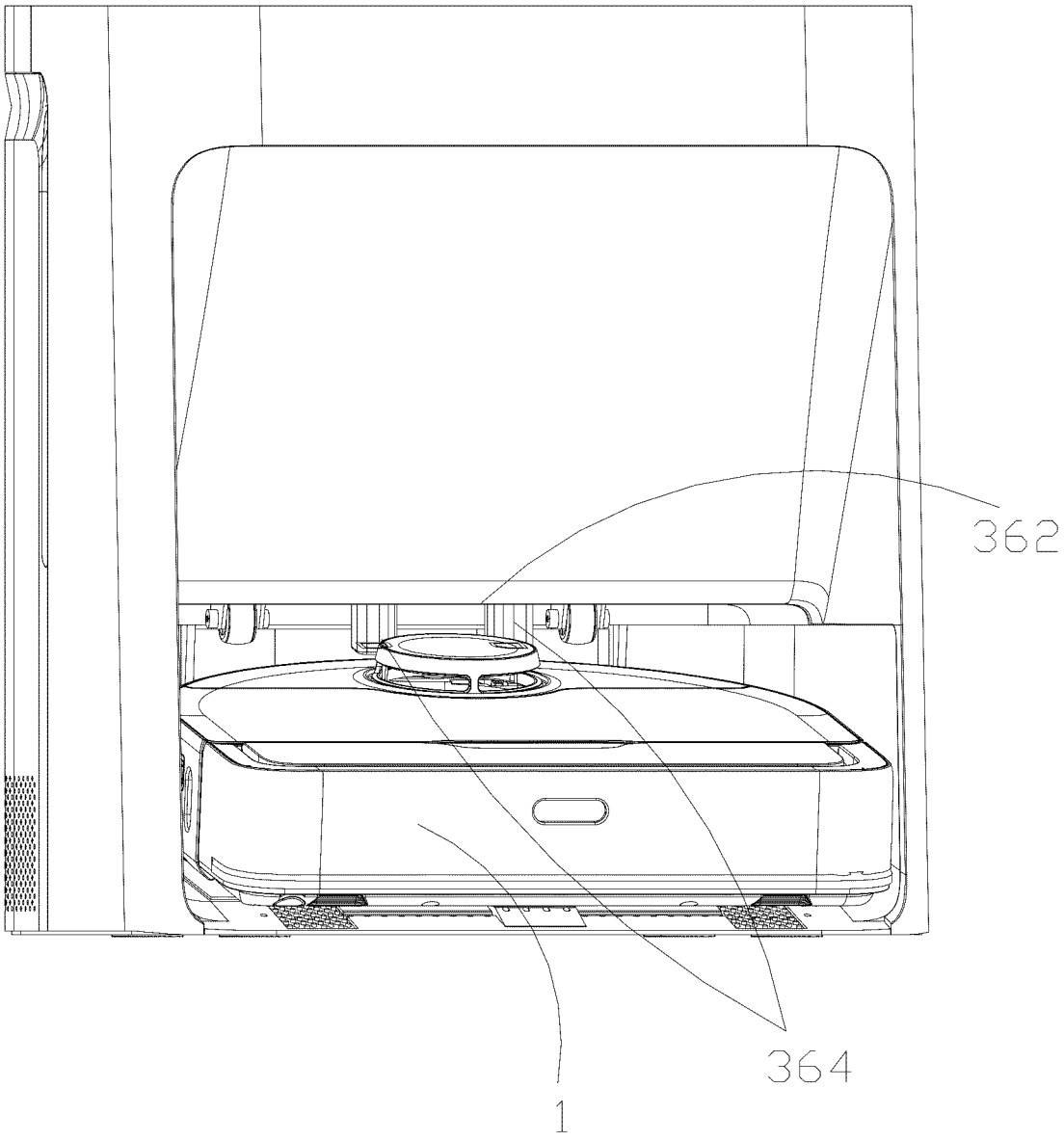


FIG.5

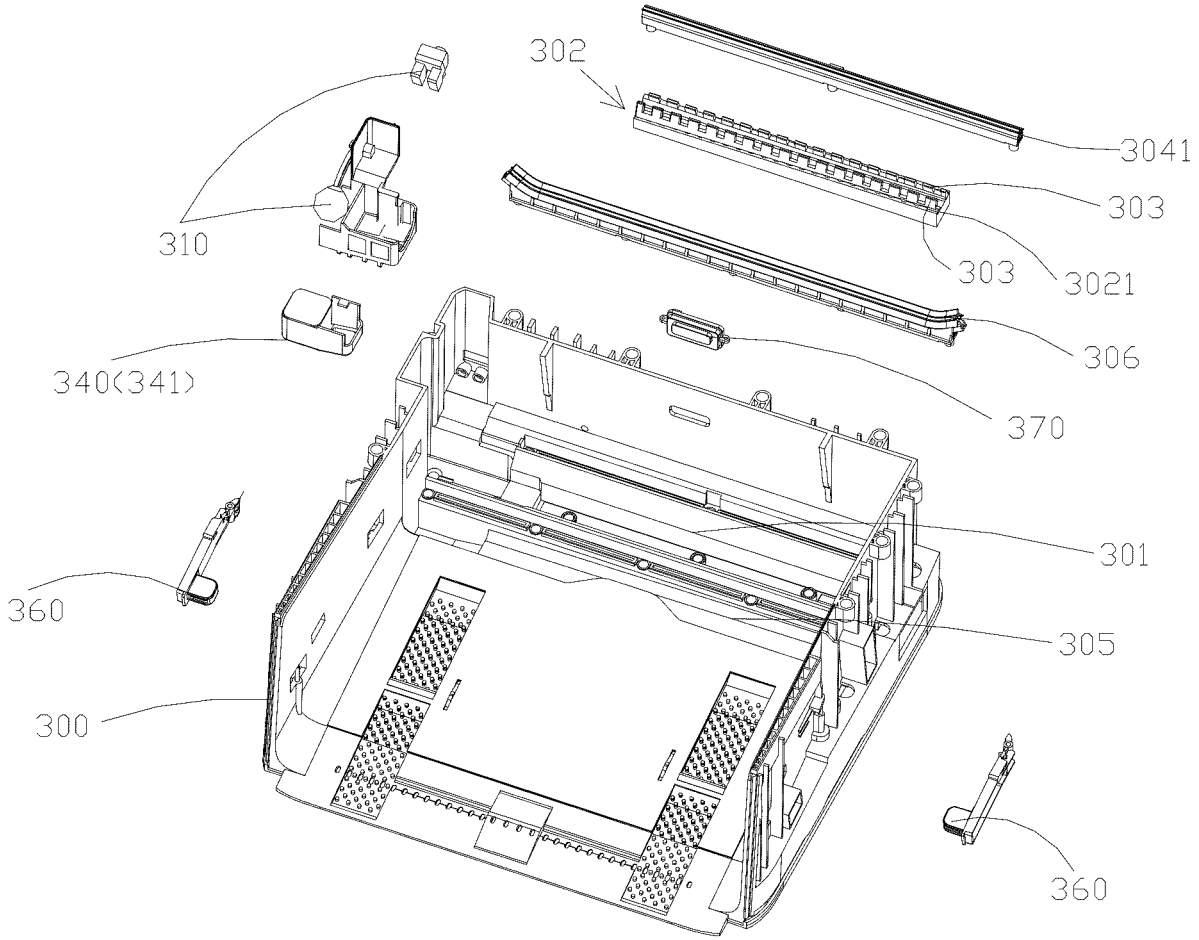


FIG.6

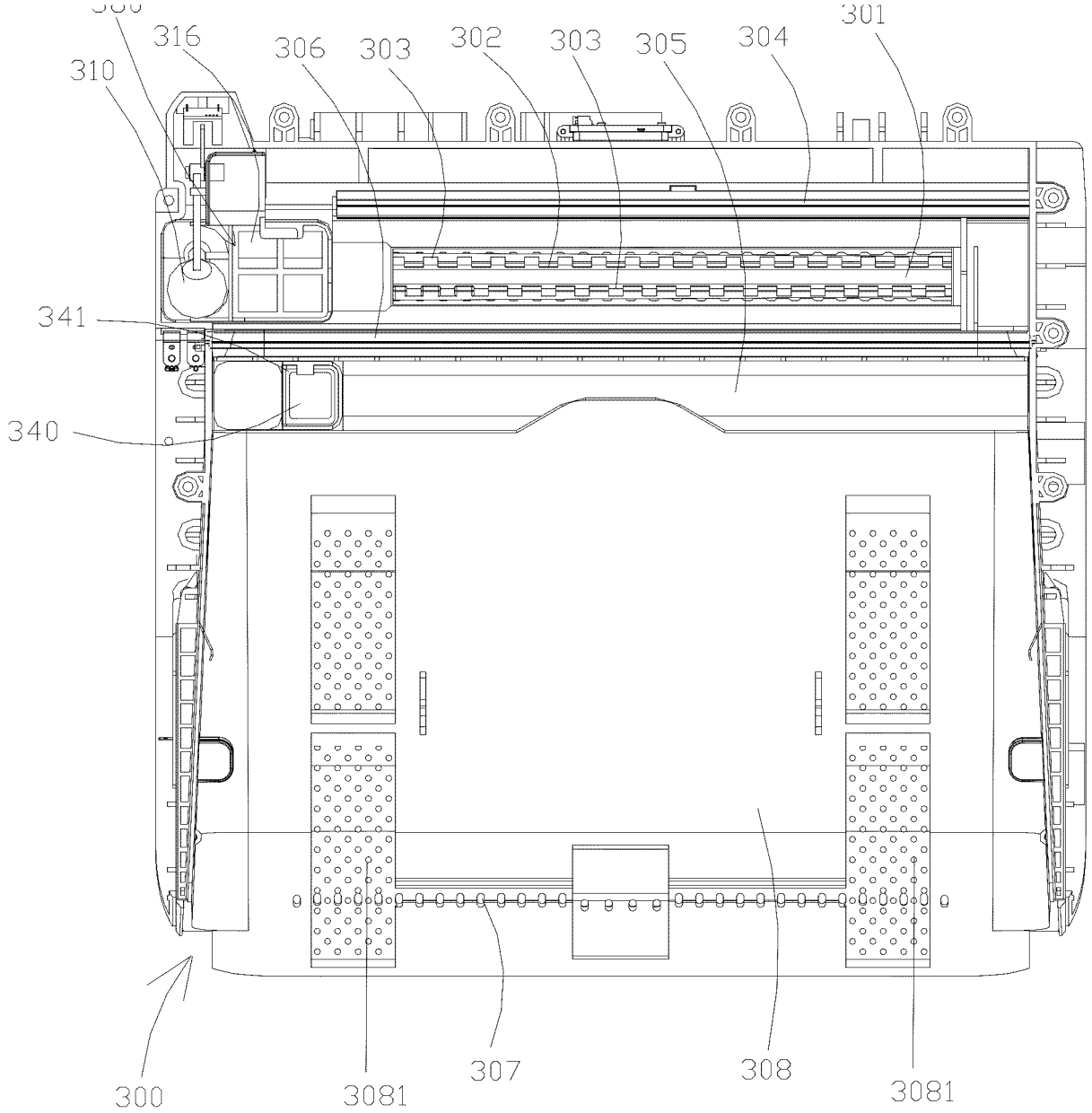

316
306
303
302
303
305
304
301
310
341
340
300
3081
307
308
3081

FIG.7

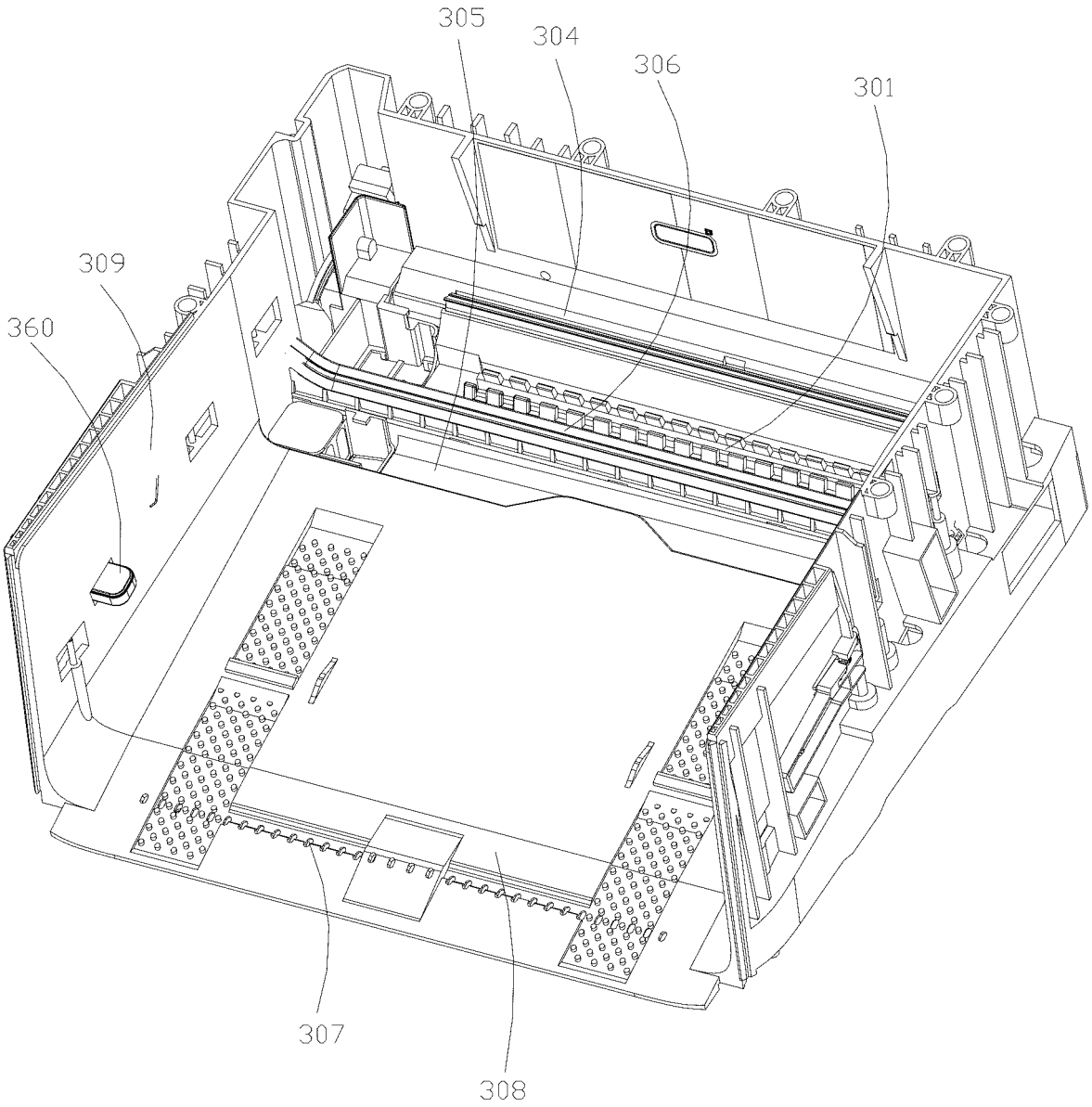


FIG.8

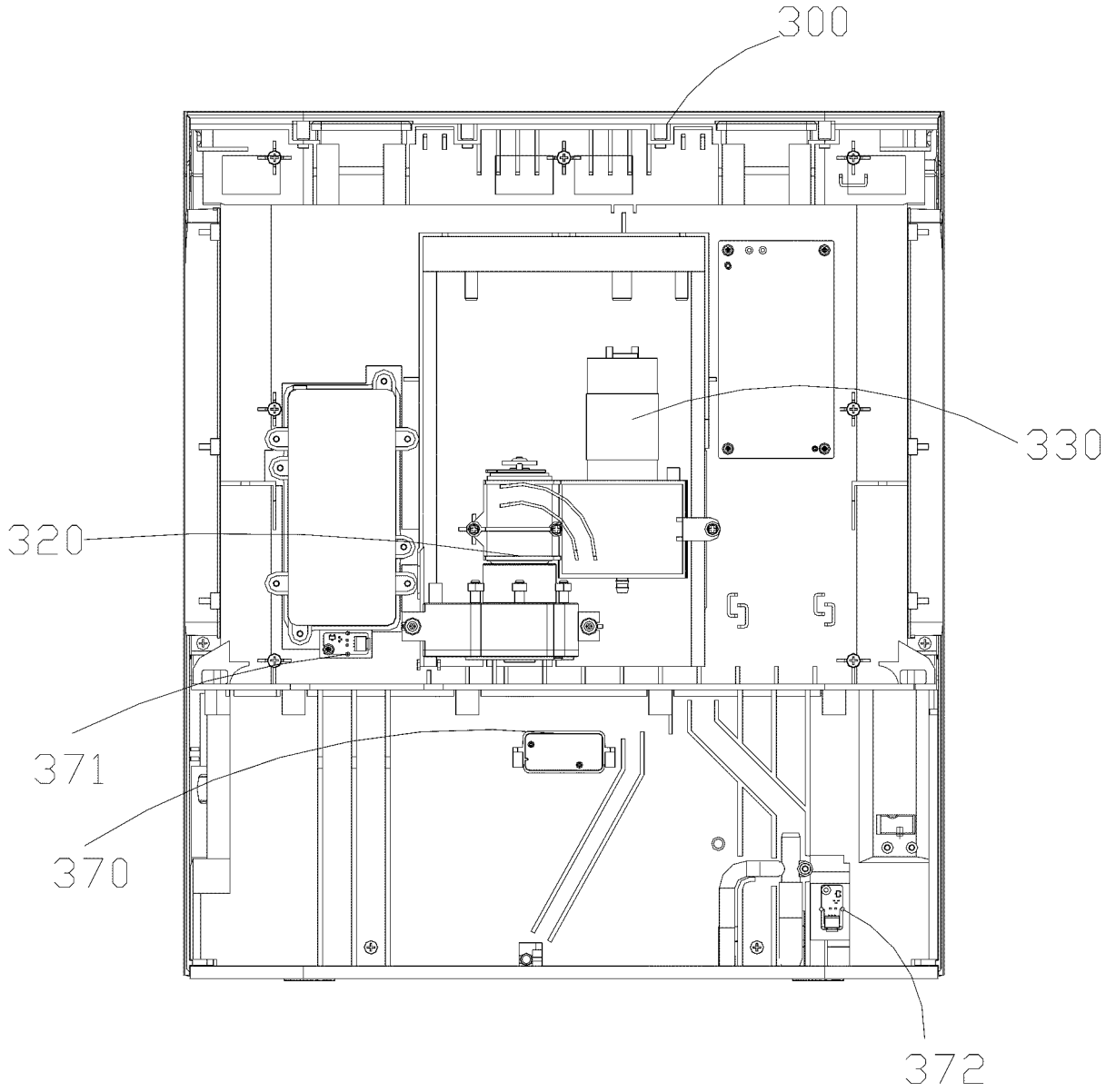


FIG.9

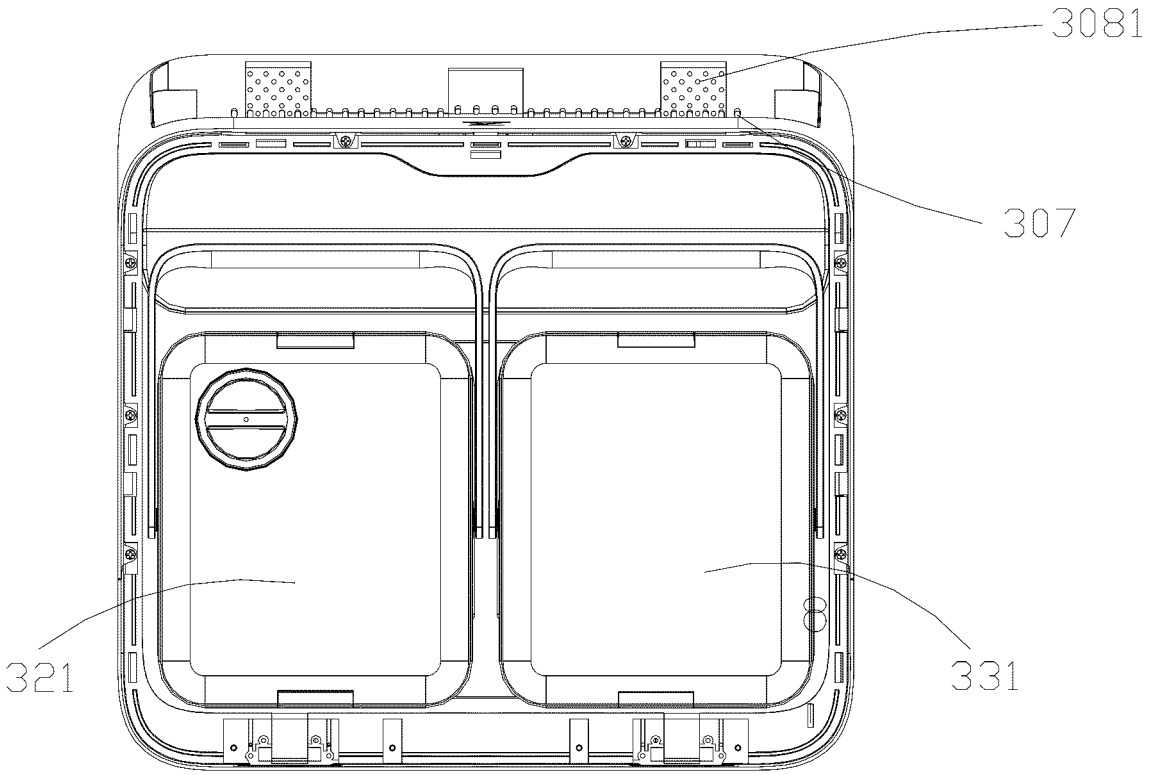


FIG.10

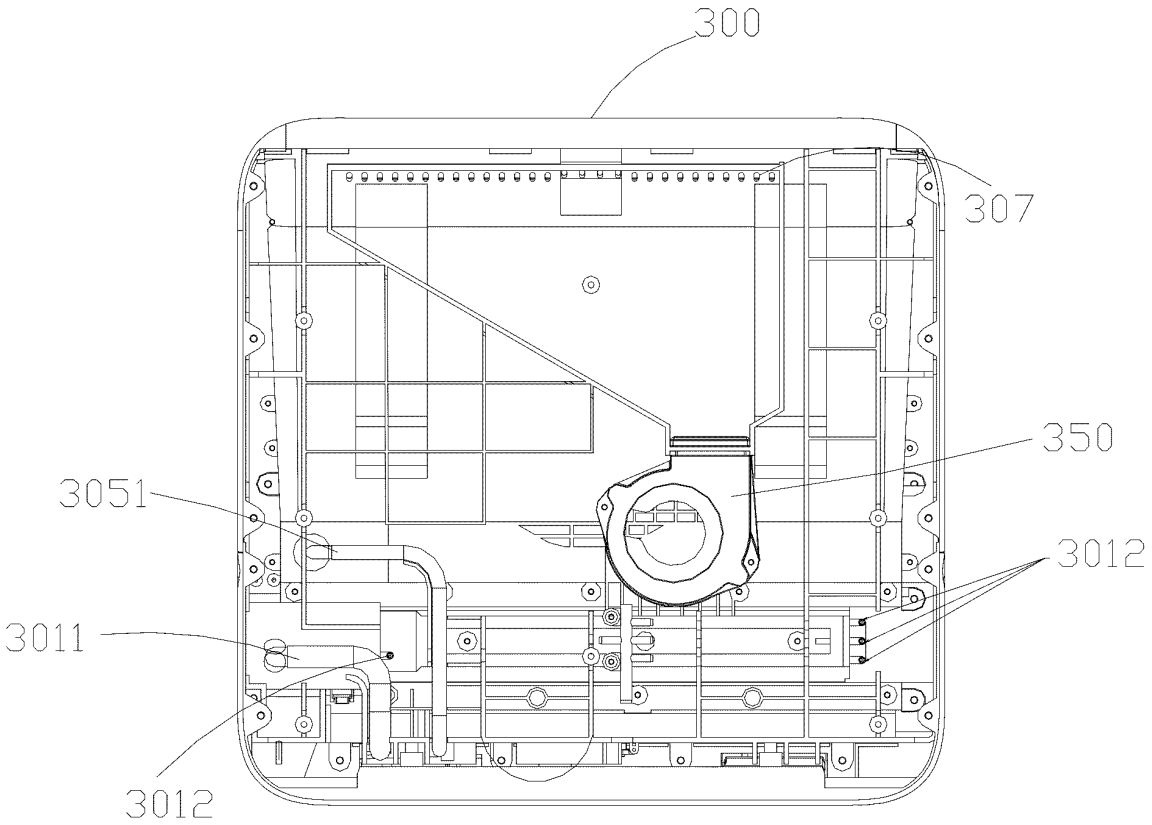


FIG.11

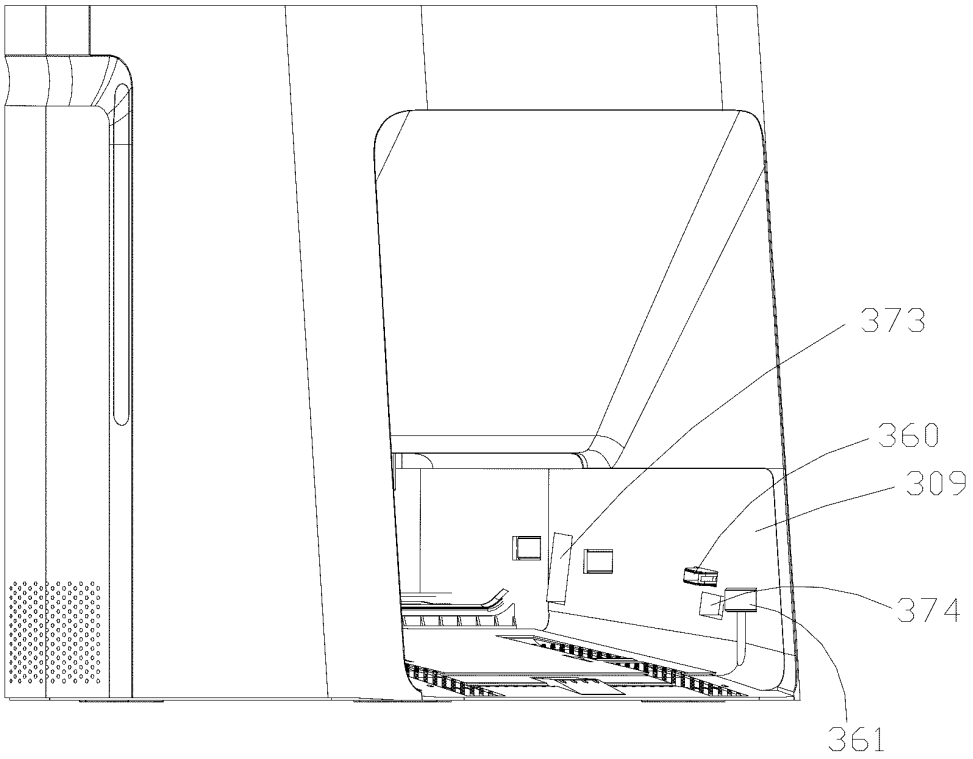


FIG.12

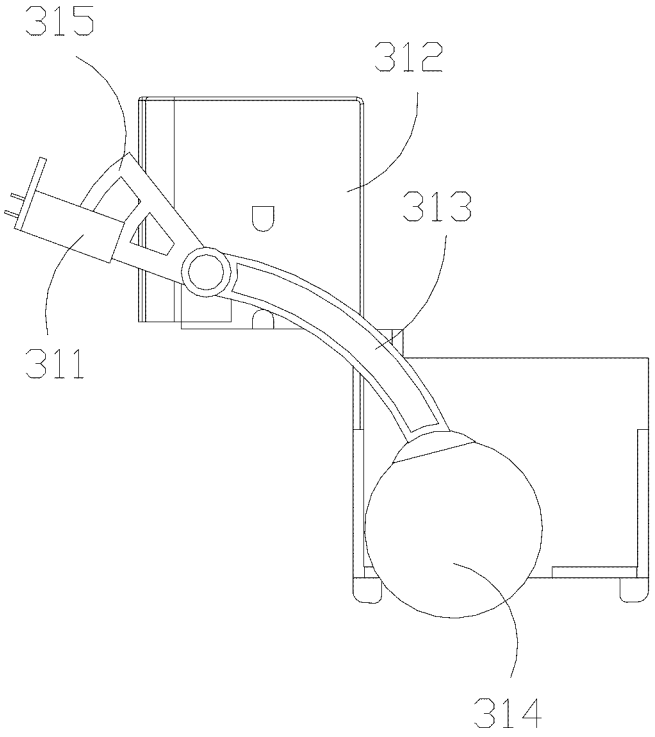


FIG.13

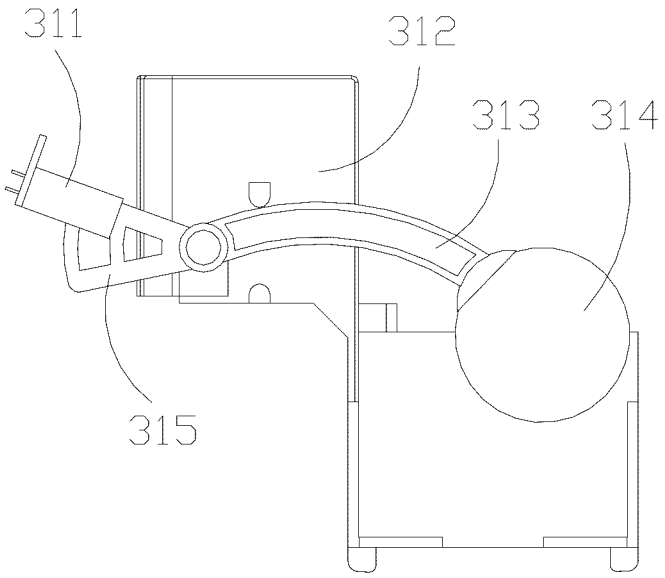


FIG.14

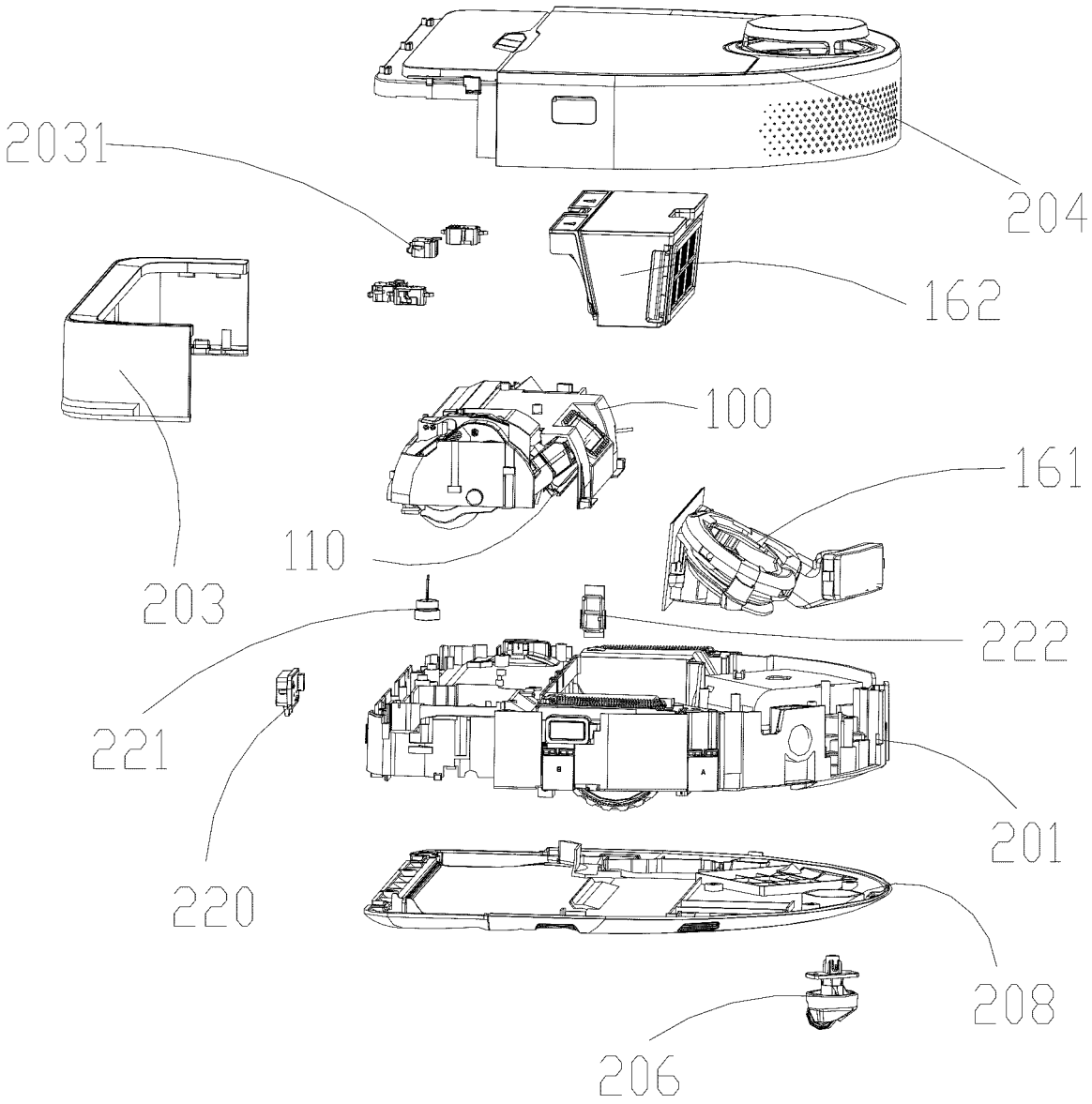


FIG.15

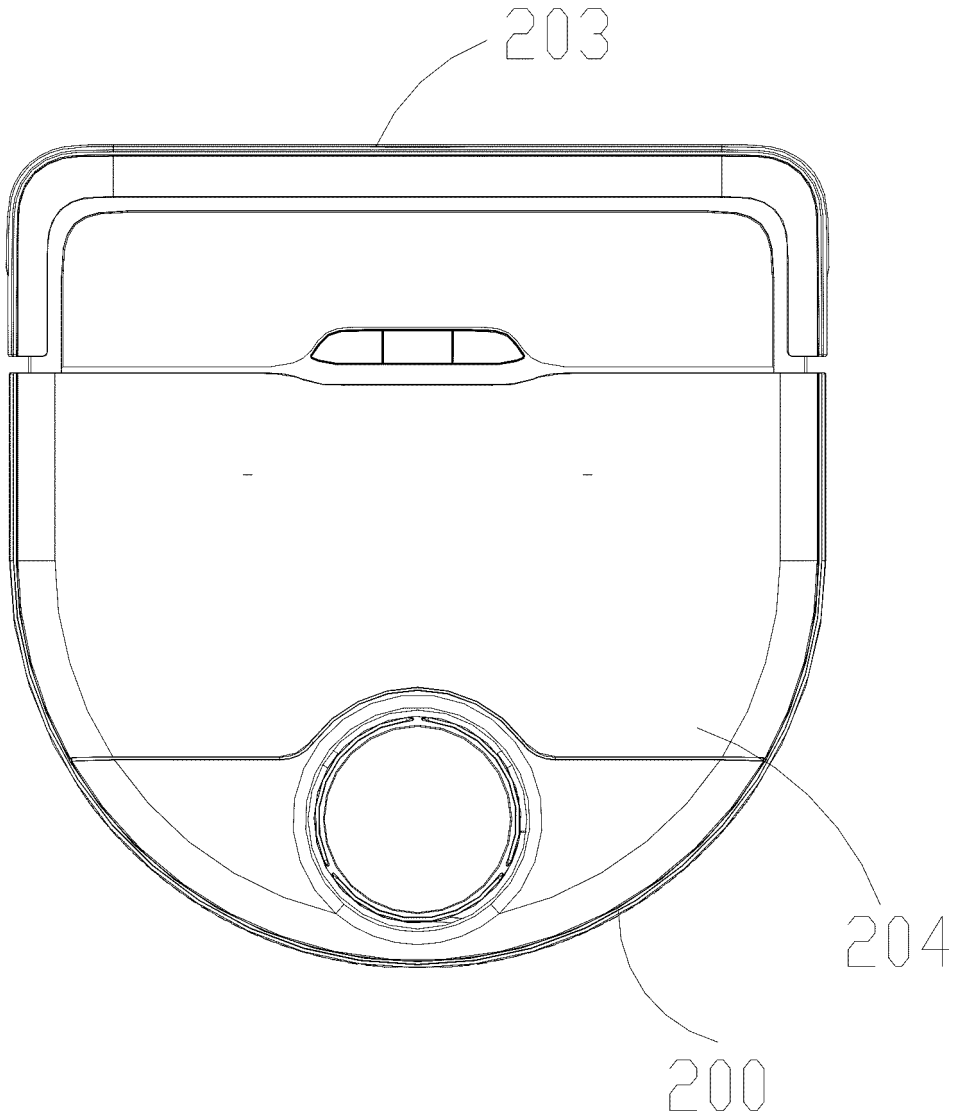


FIG.16

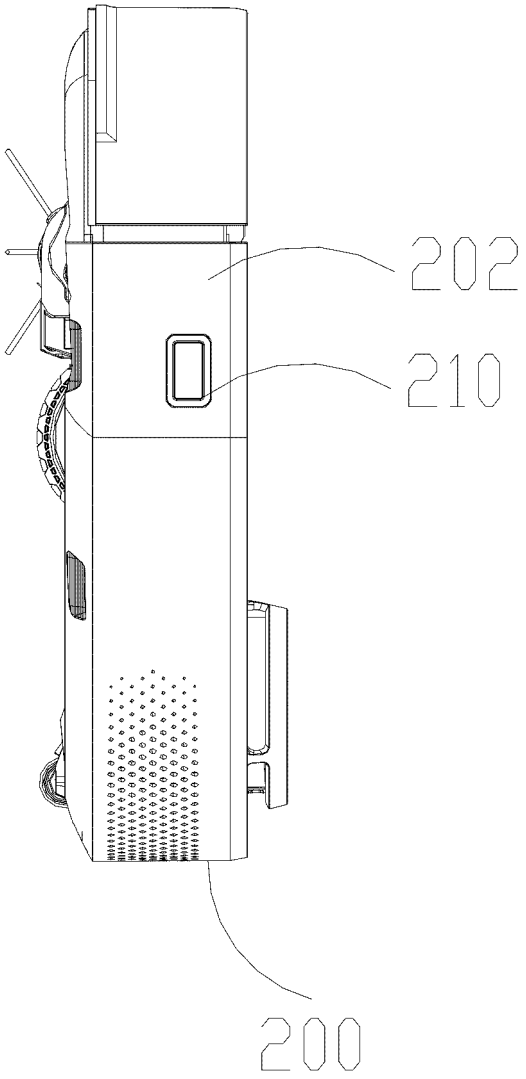


FIG.17

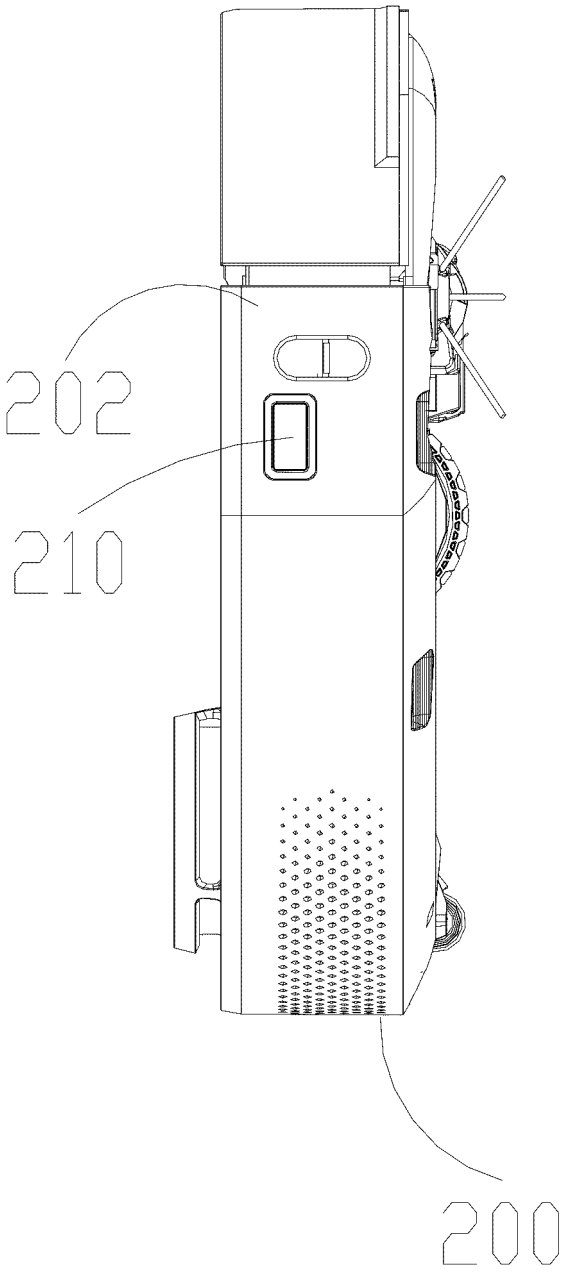


FIG.18

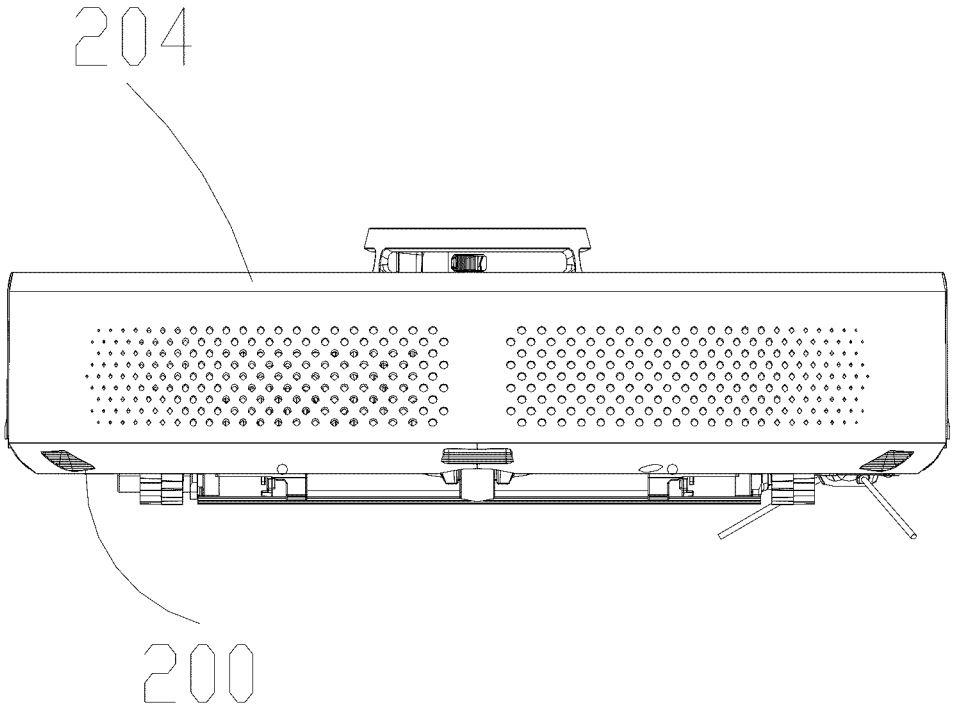


FIG.19

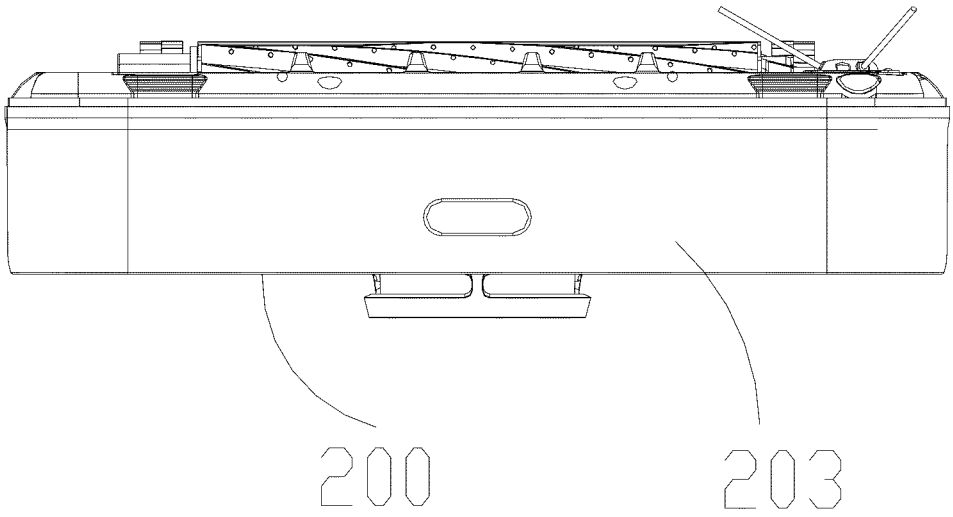


FIG.20

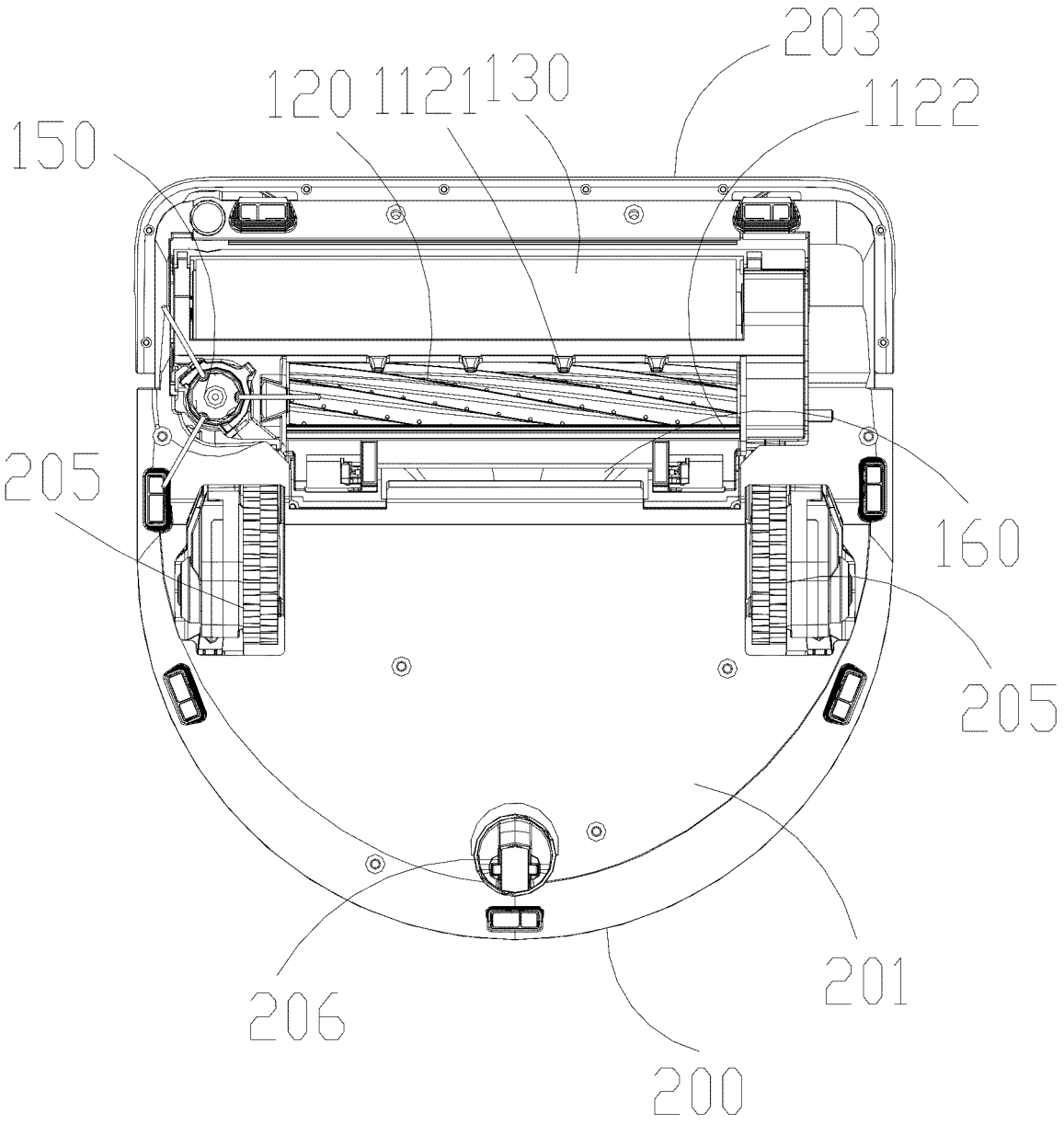


FIG.21

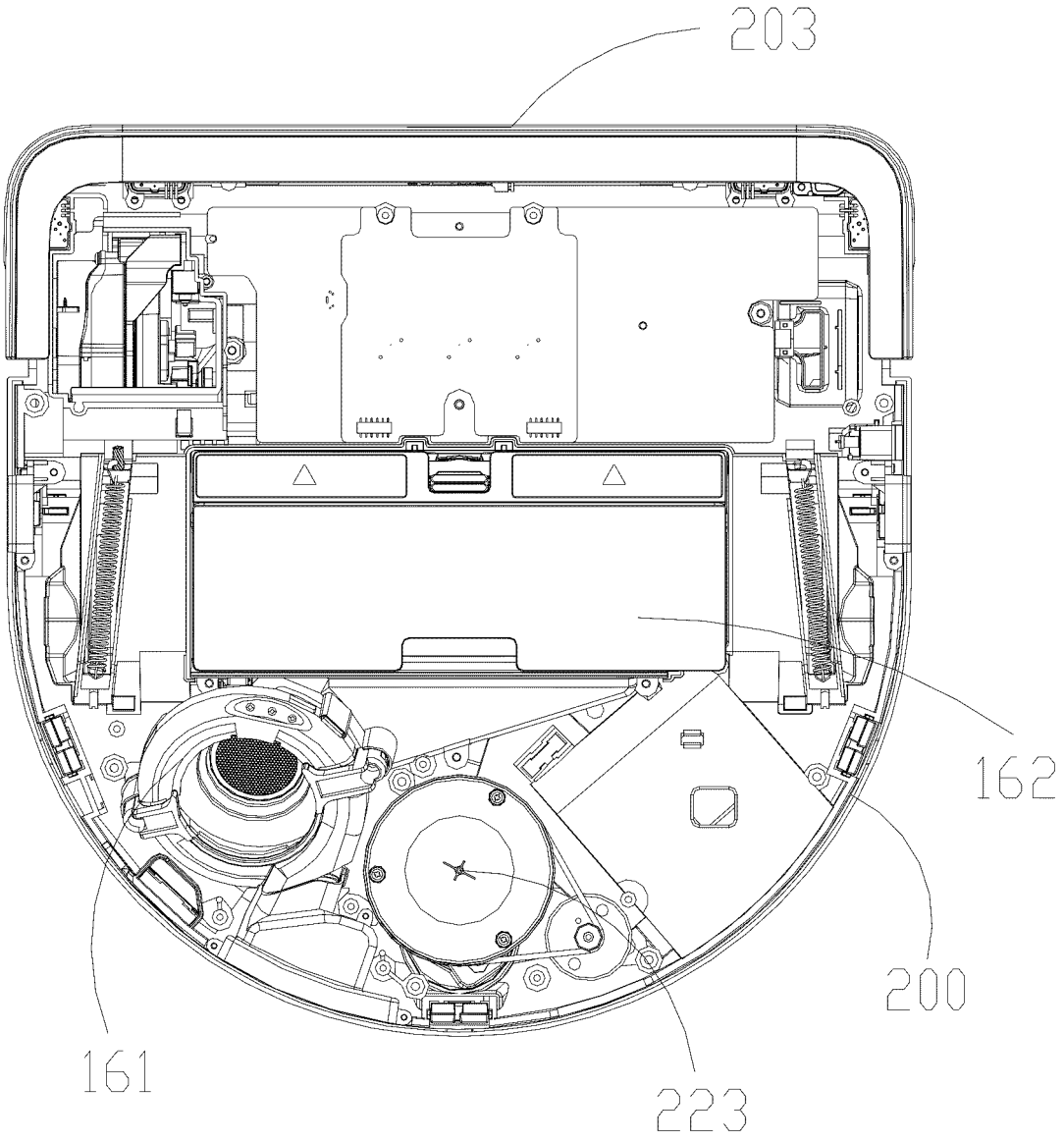


FIG.22

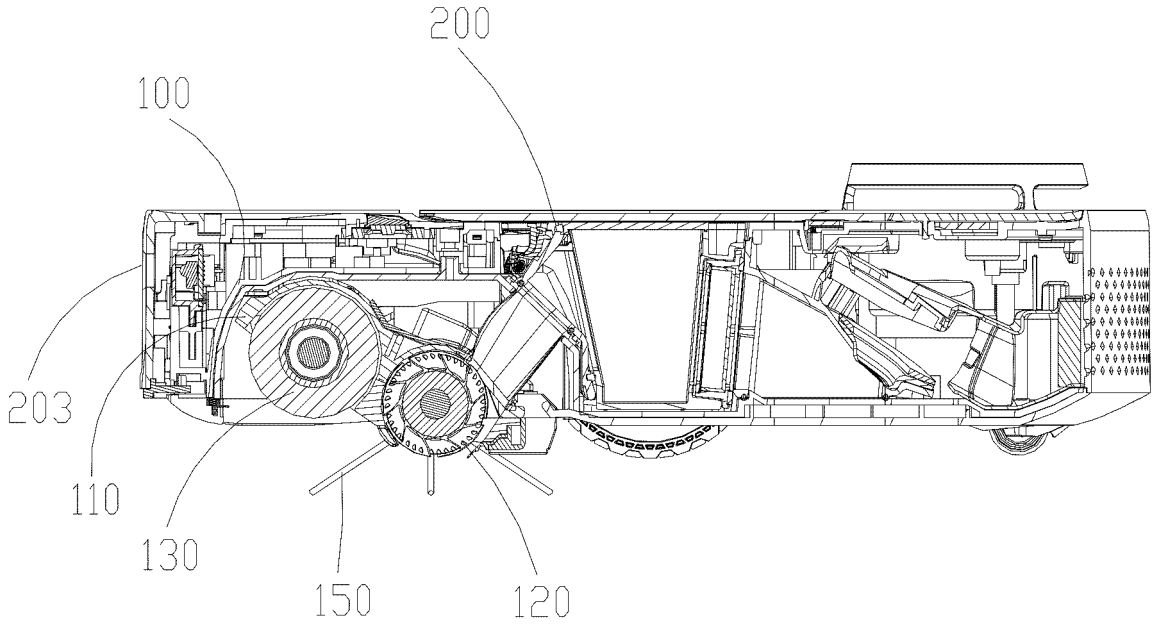


FIG.23

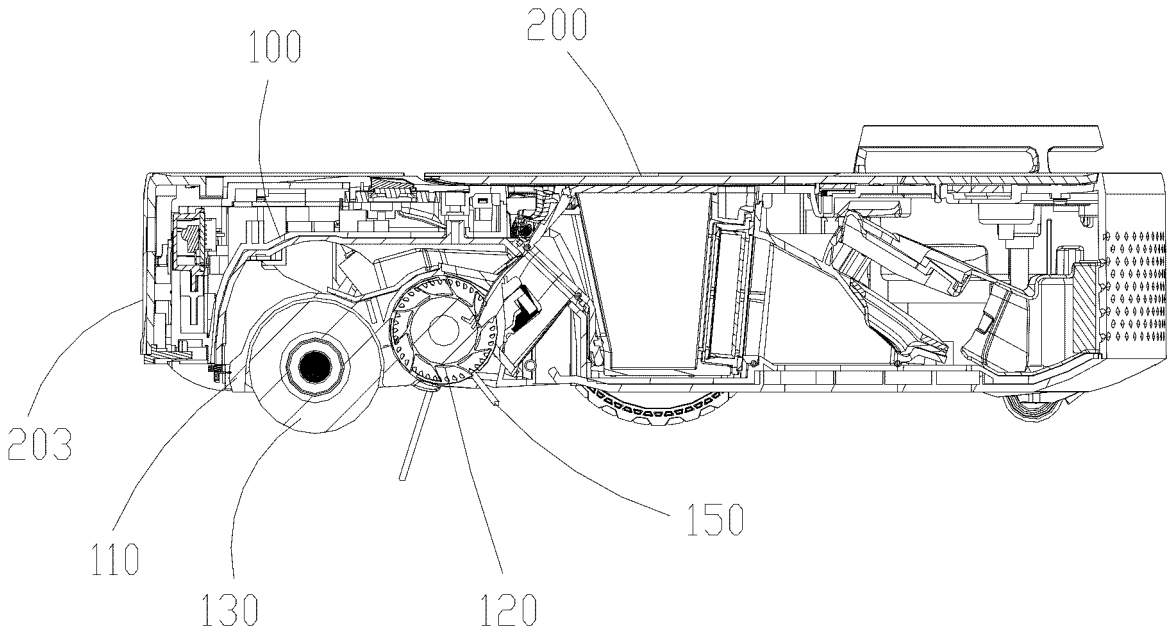


FIG.24

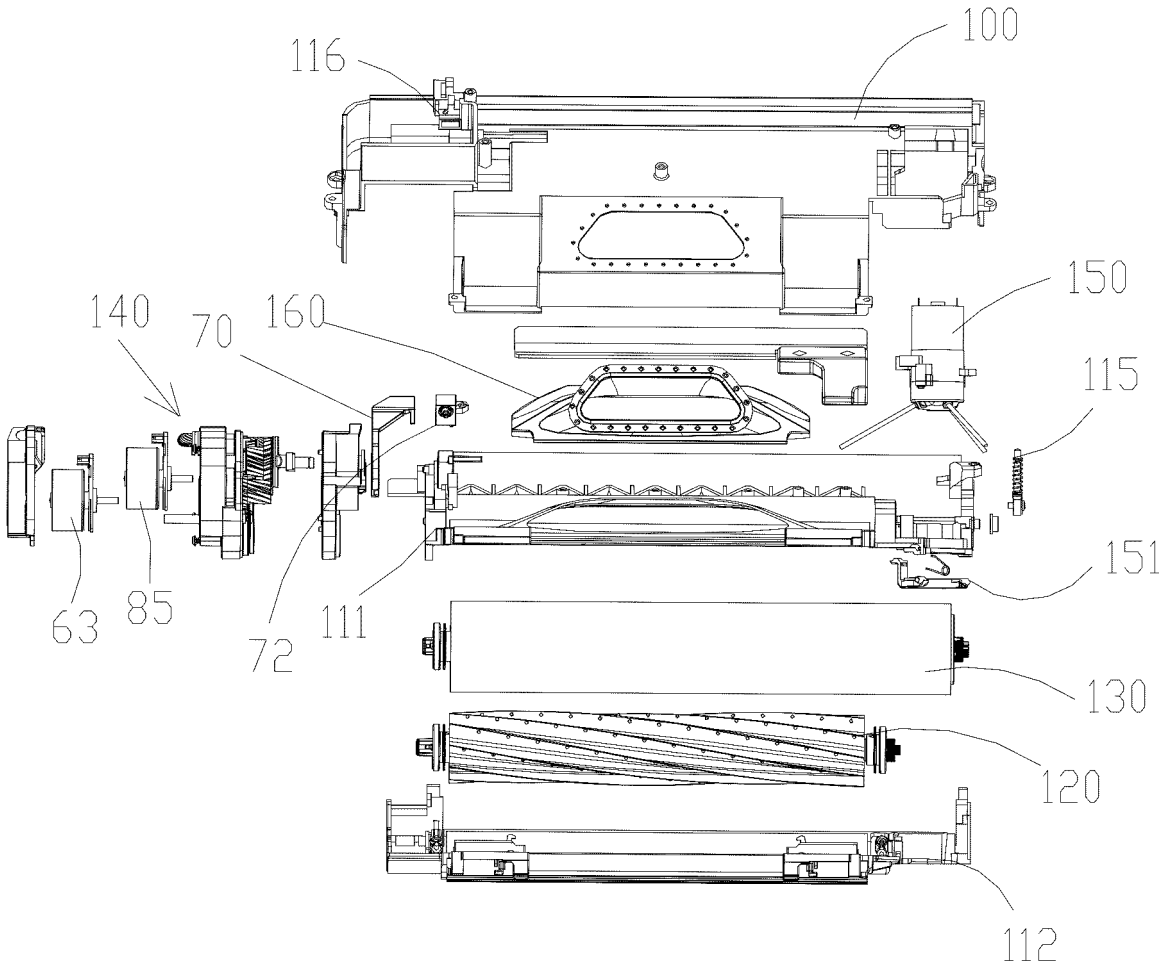


FIG.25A

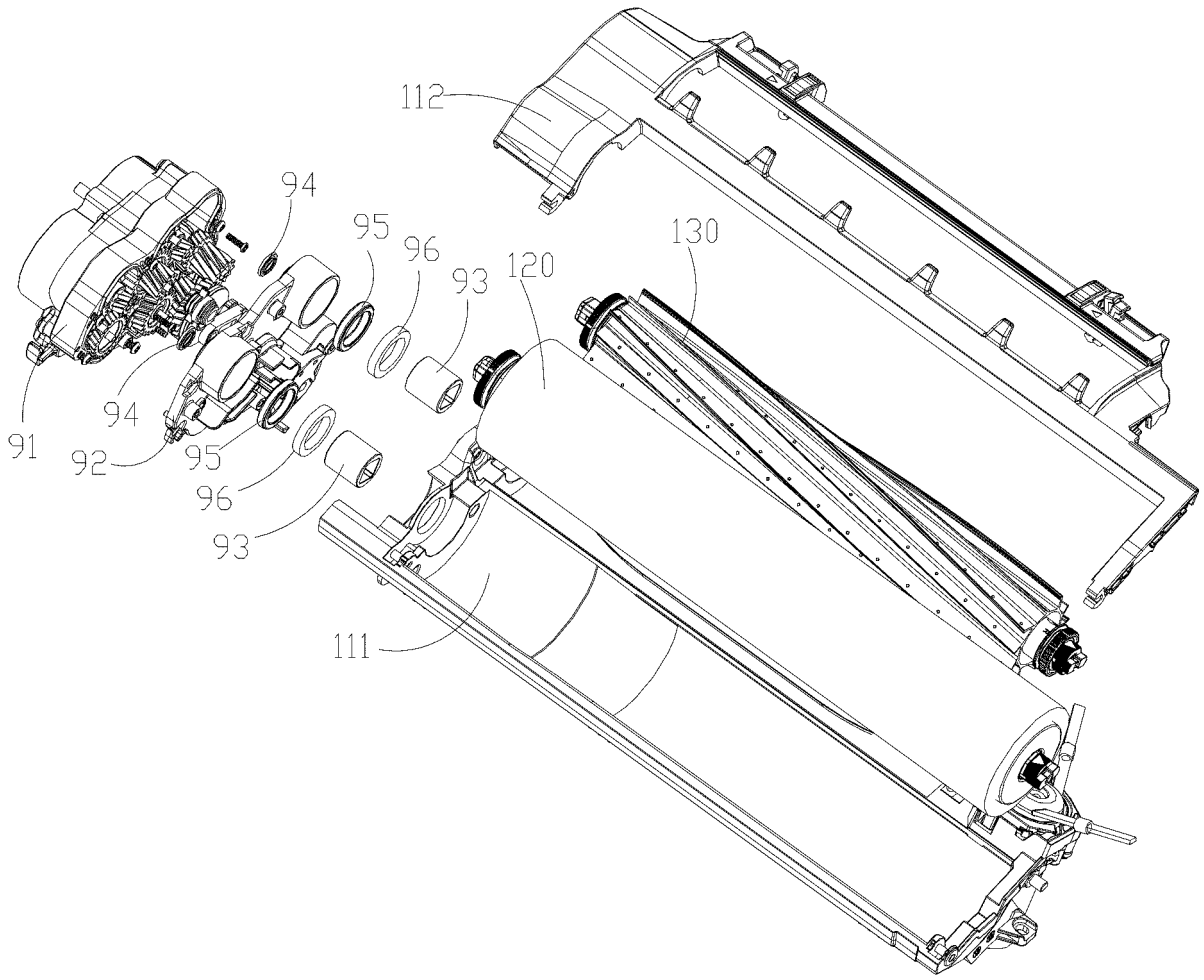


FIG.25B

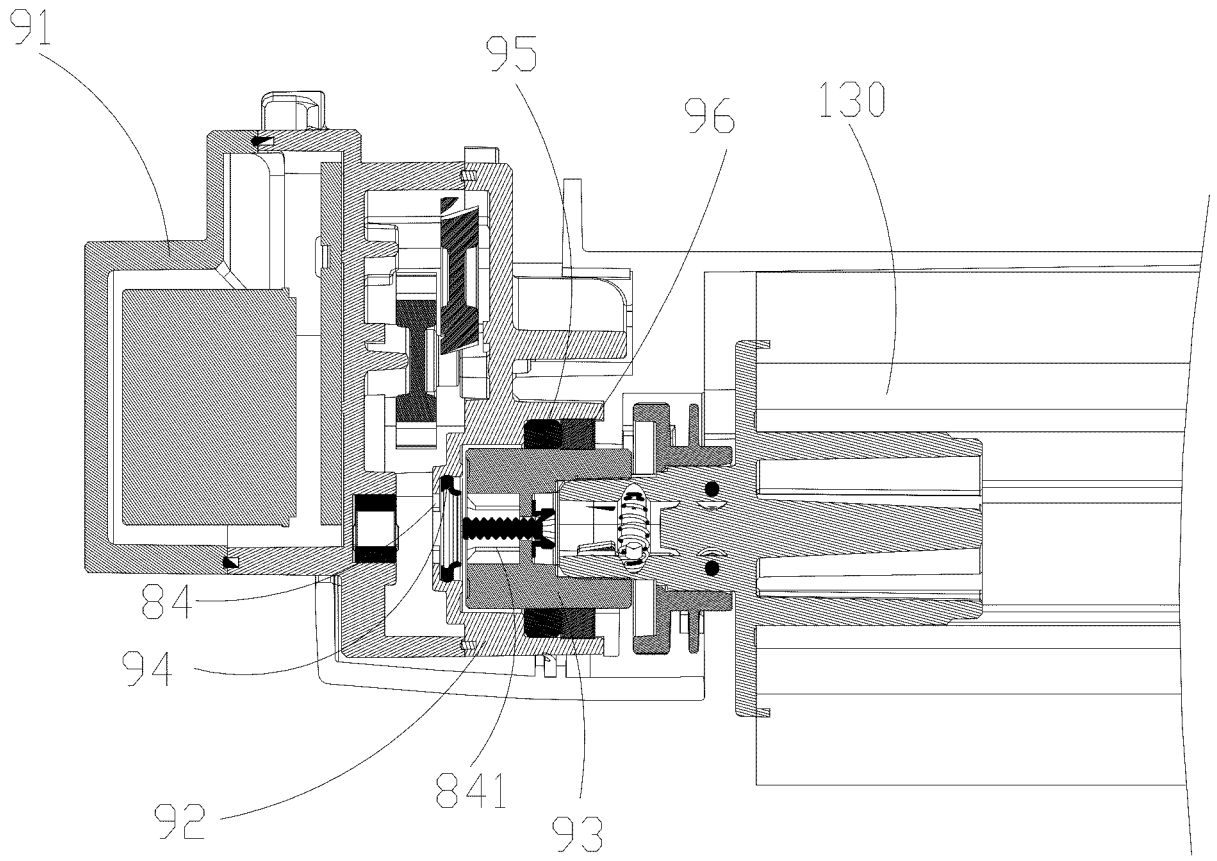


FIG.25C

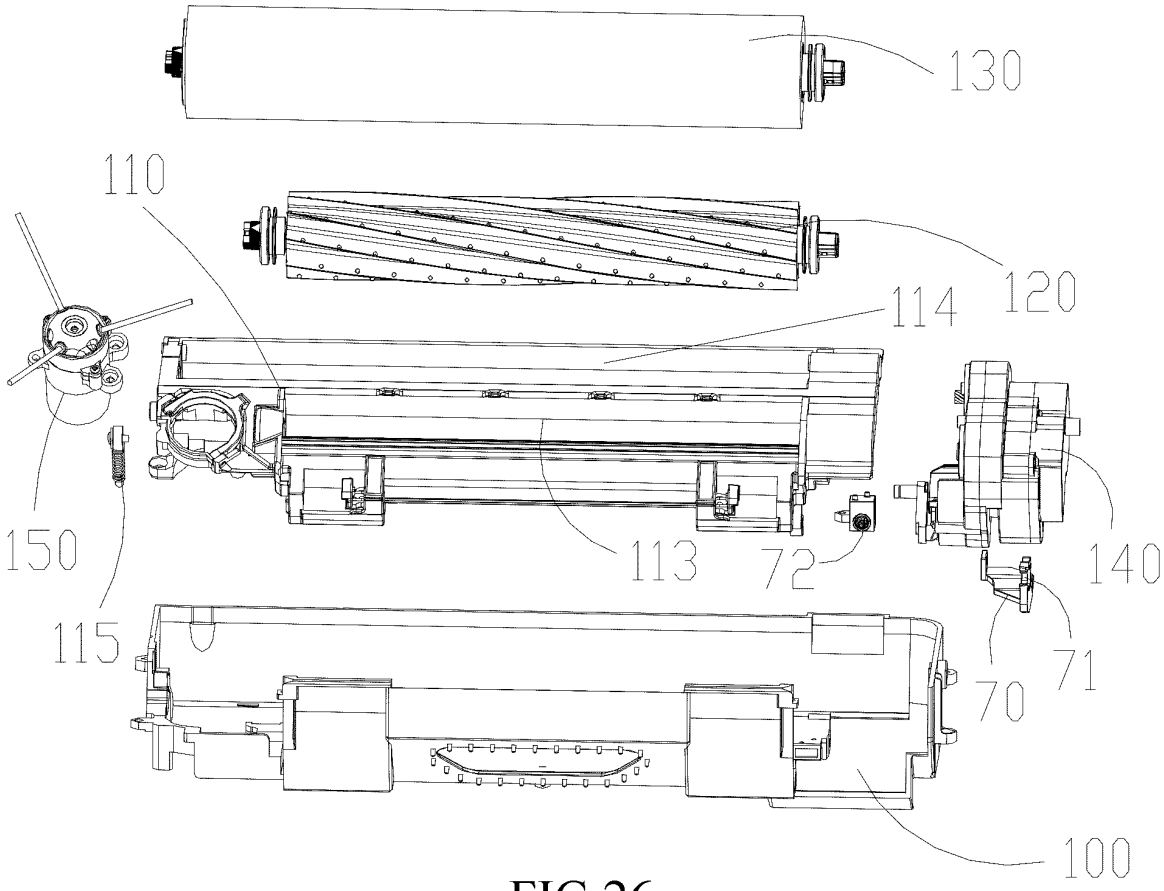

130
110
120
114
150
113
72
140
115
71
70
100

FIG.26

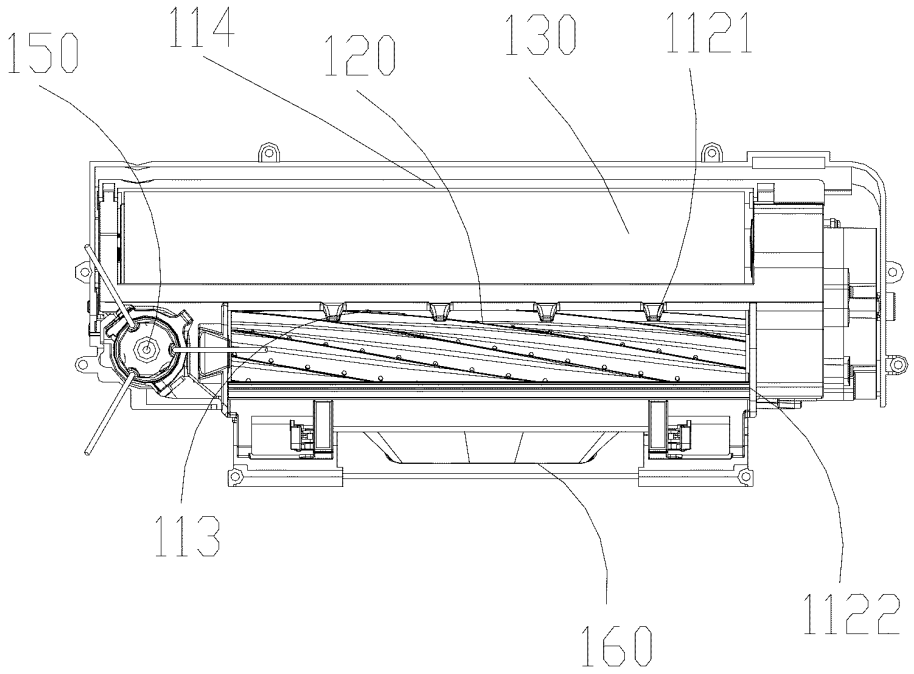

150
114
120
130
1121
113
160
1122

FIG.27

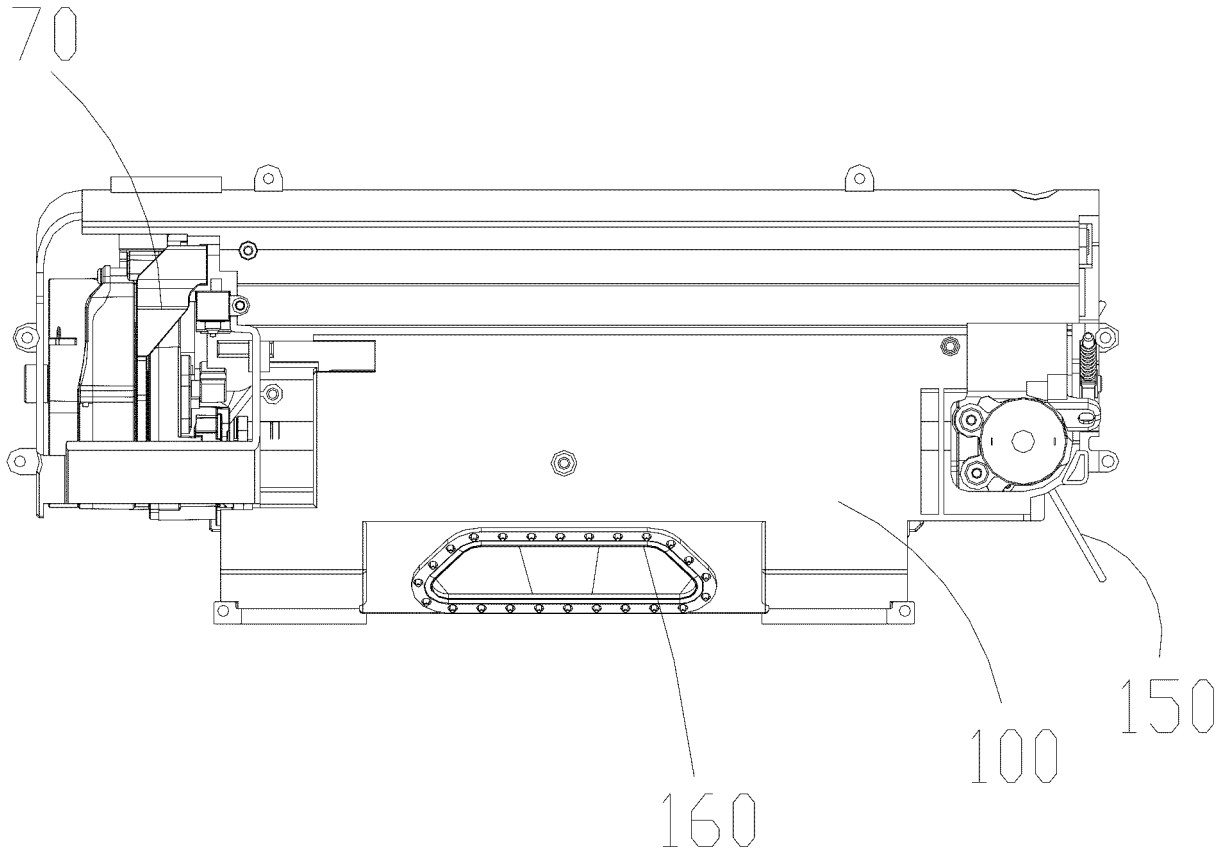


FIG.28

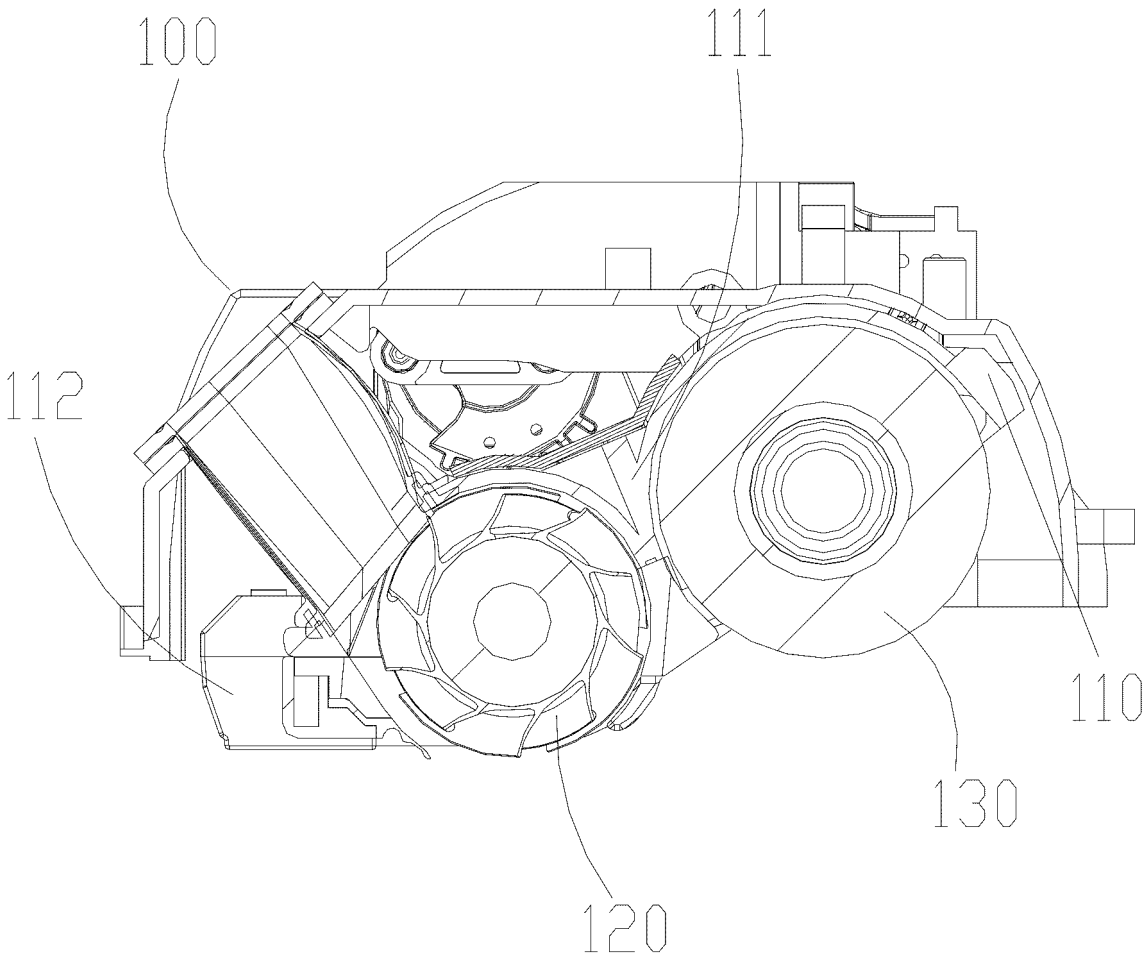


FIG.29

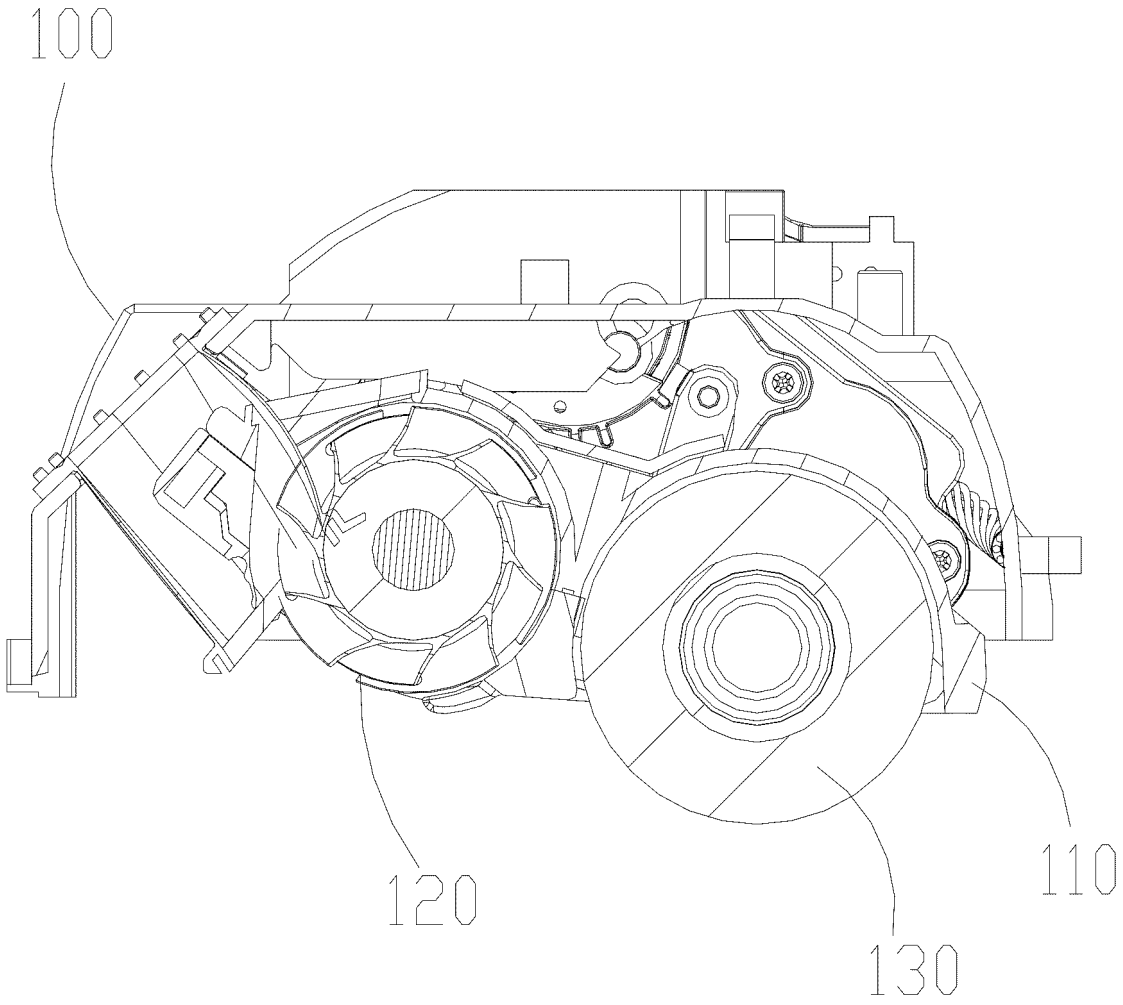


FIG.30

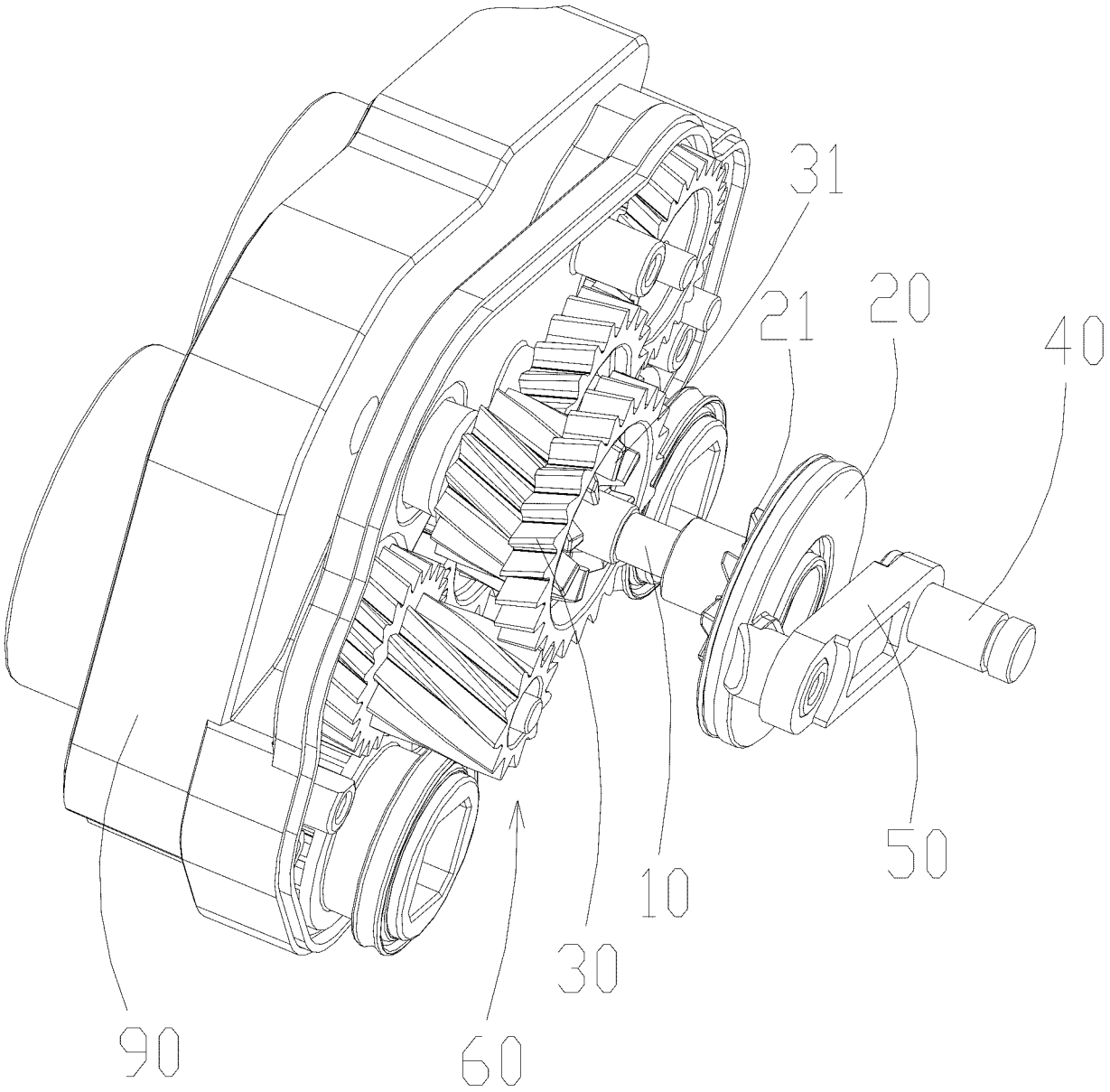


FIG.31

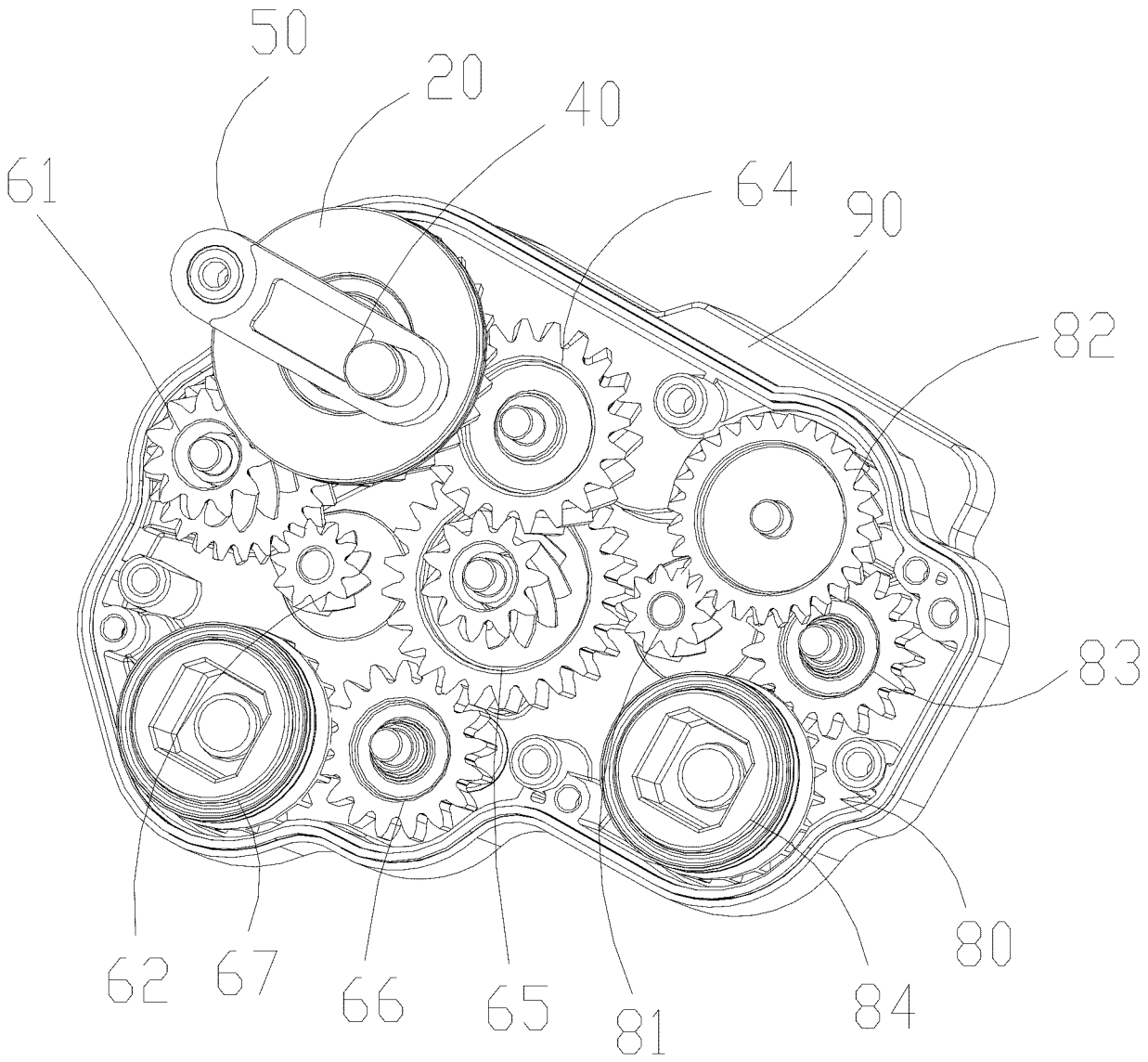


FIG.32

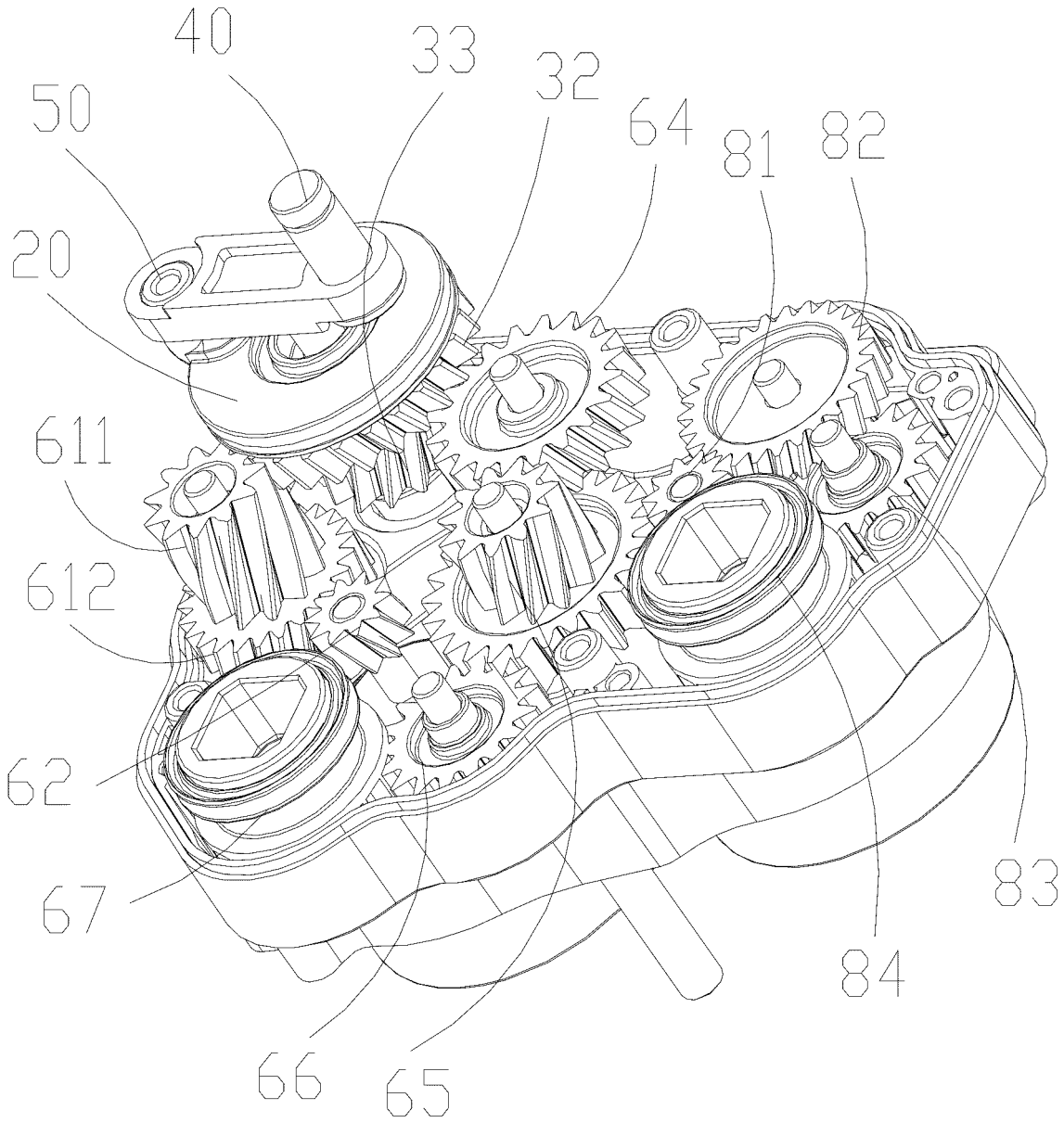


FIG.33

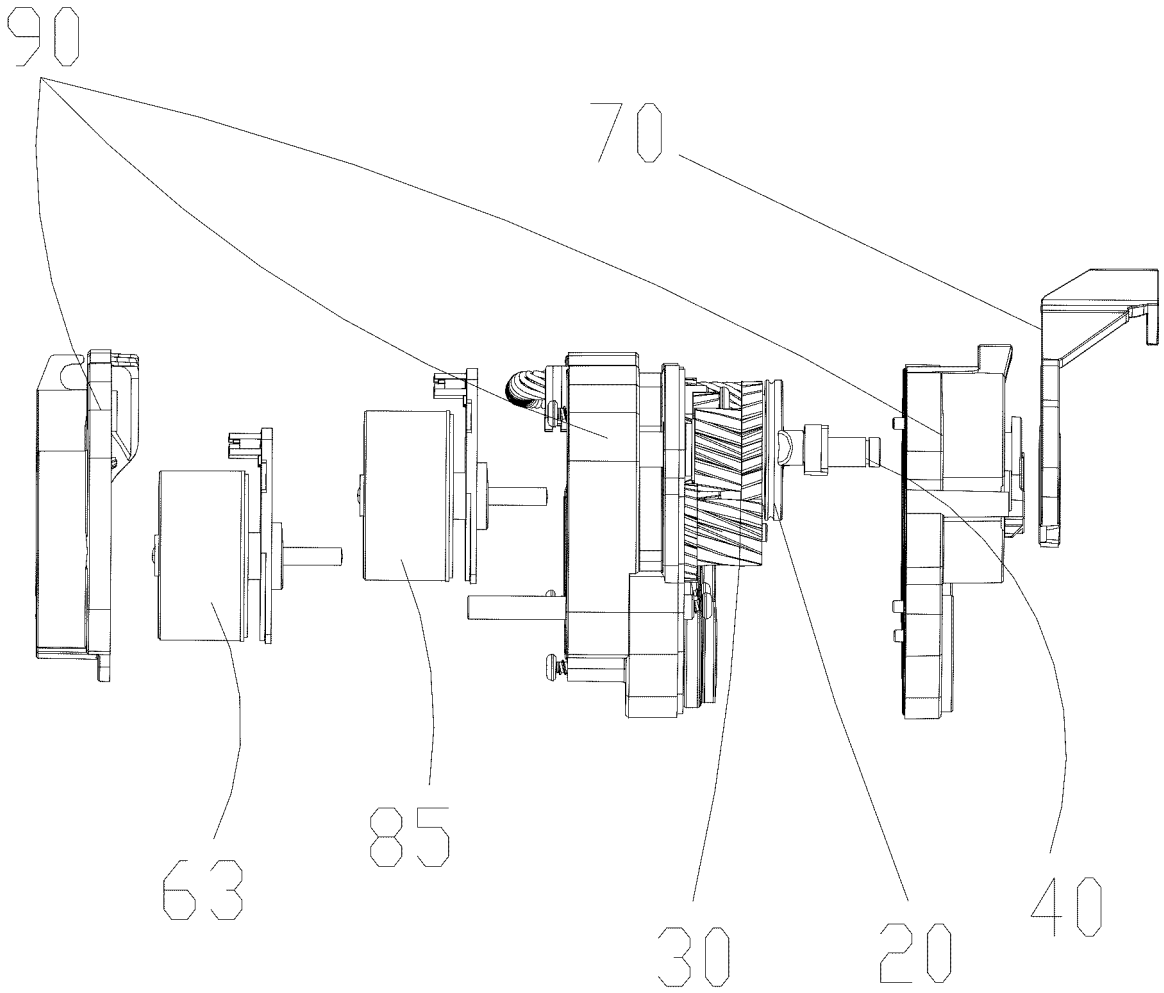


FIG.34

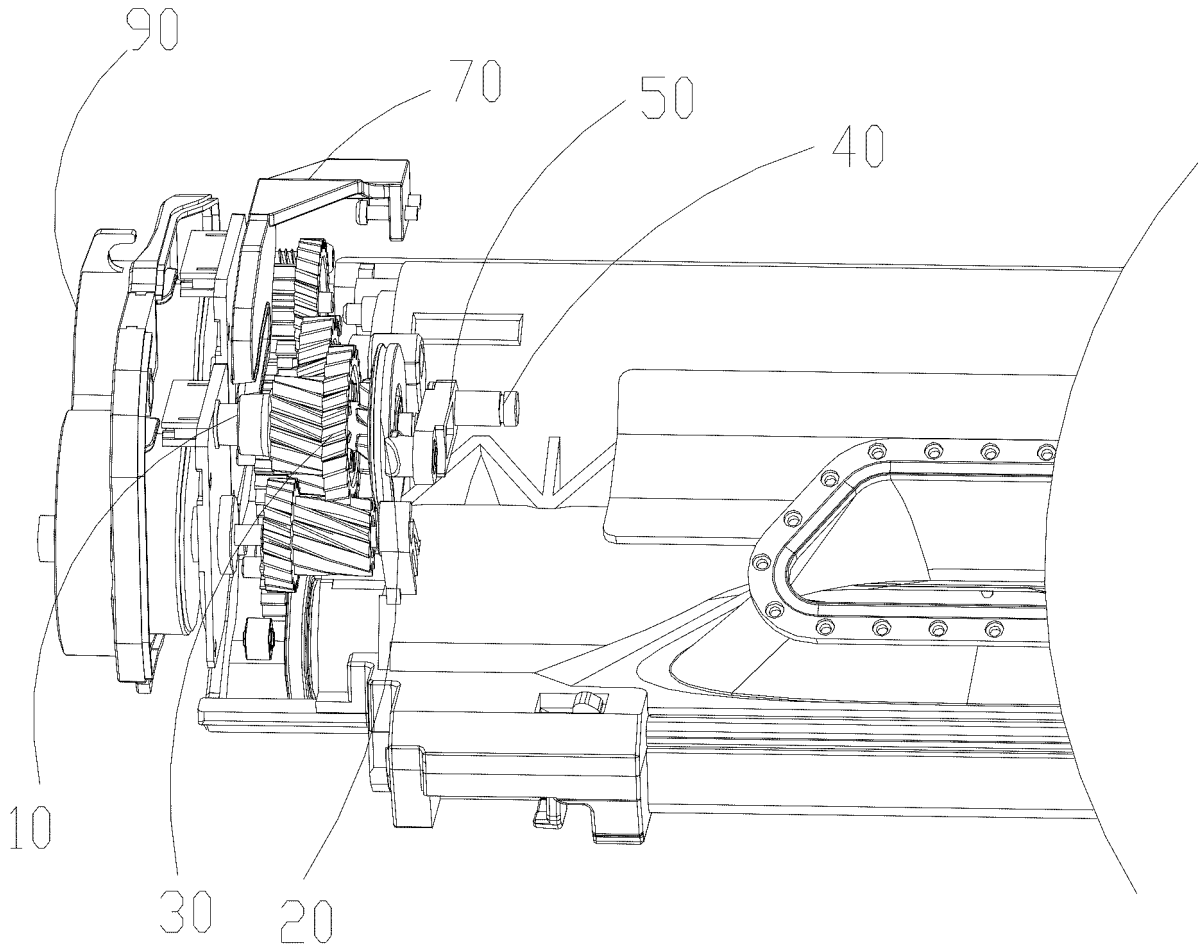


FIG.35

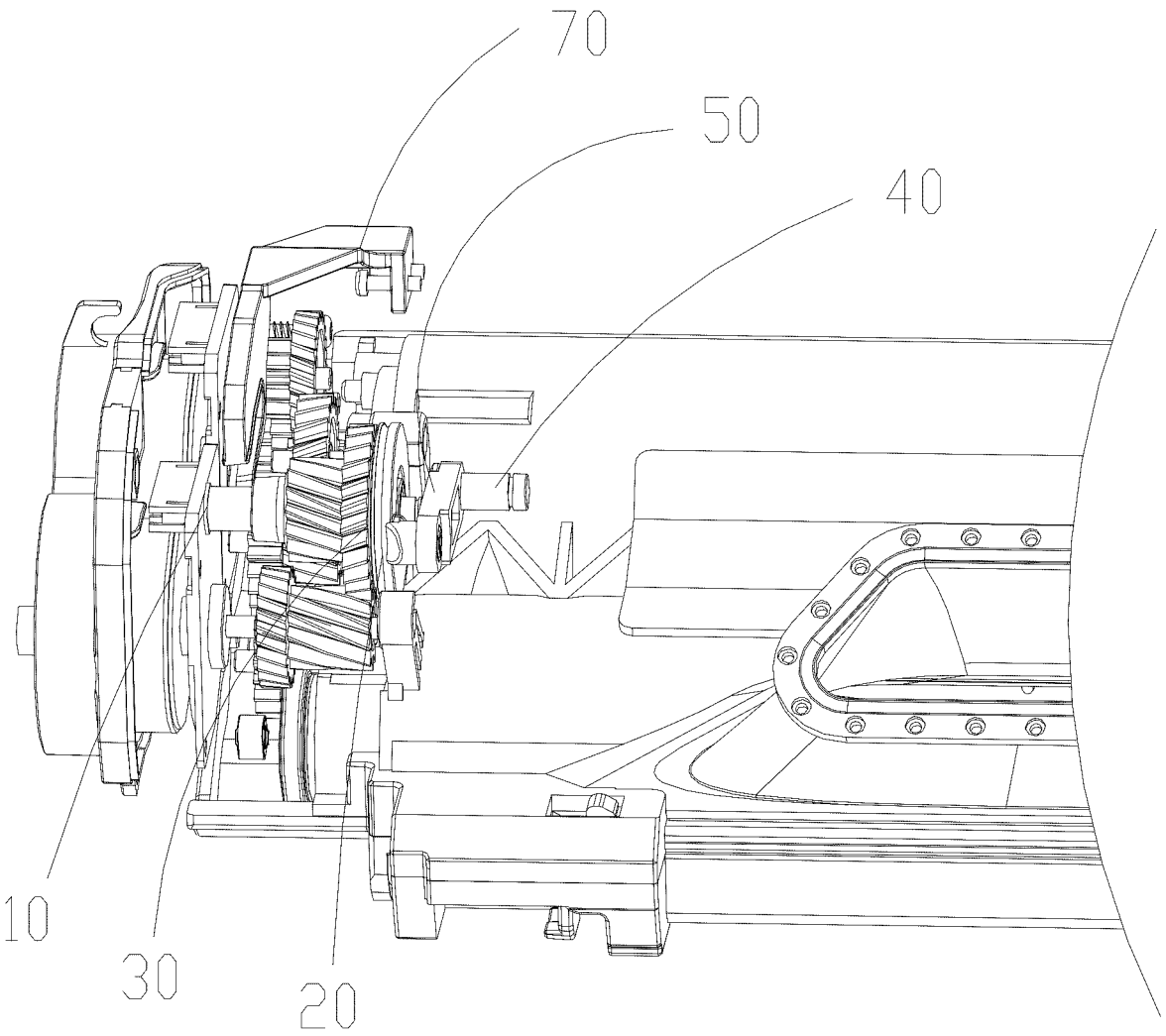


FIG.36

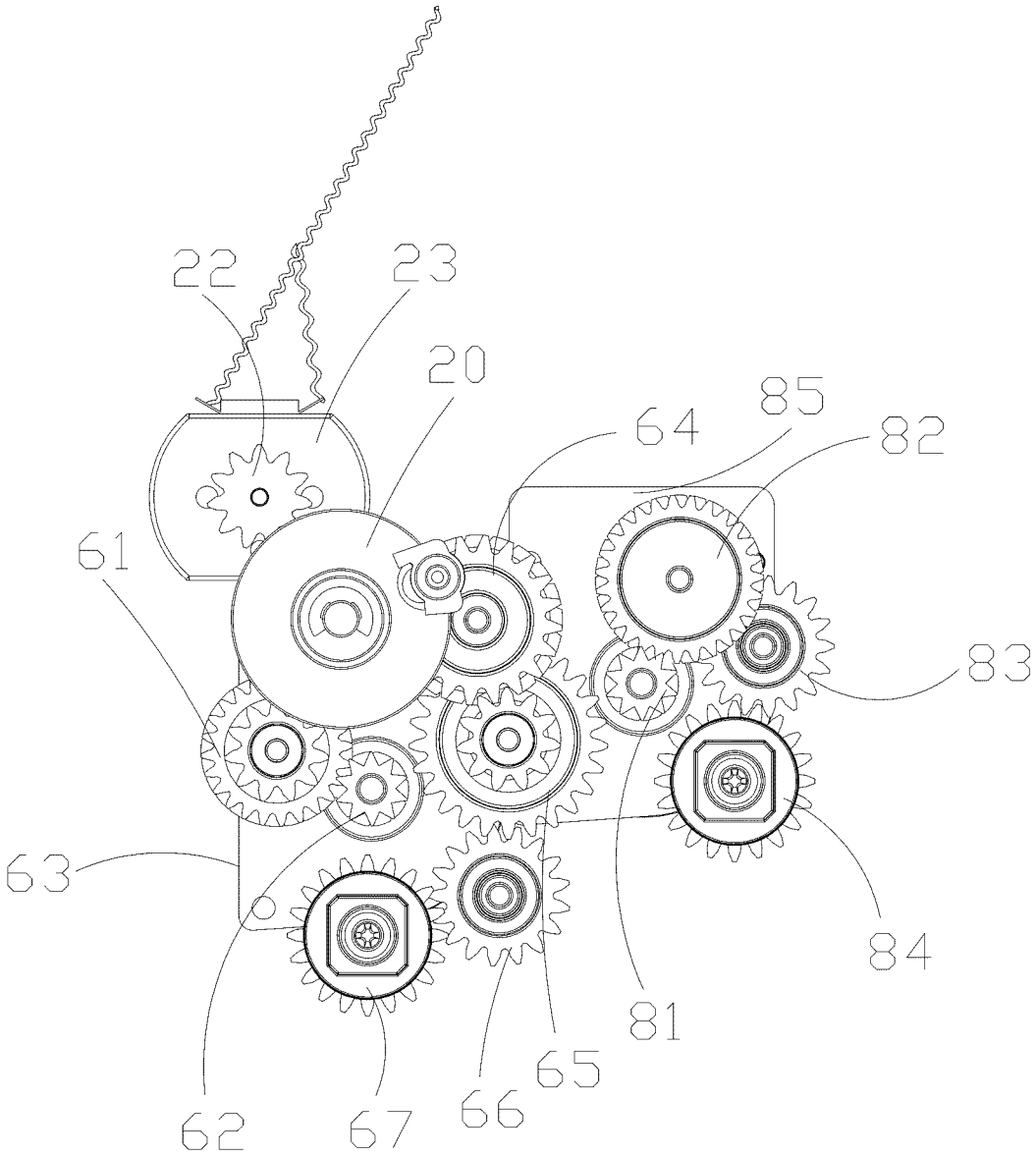


FIG.37A

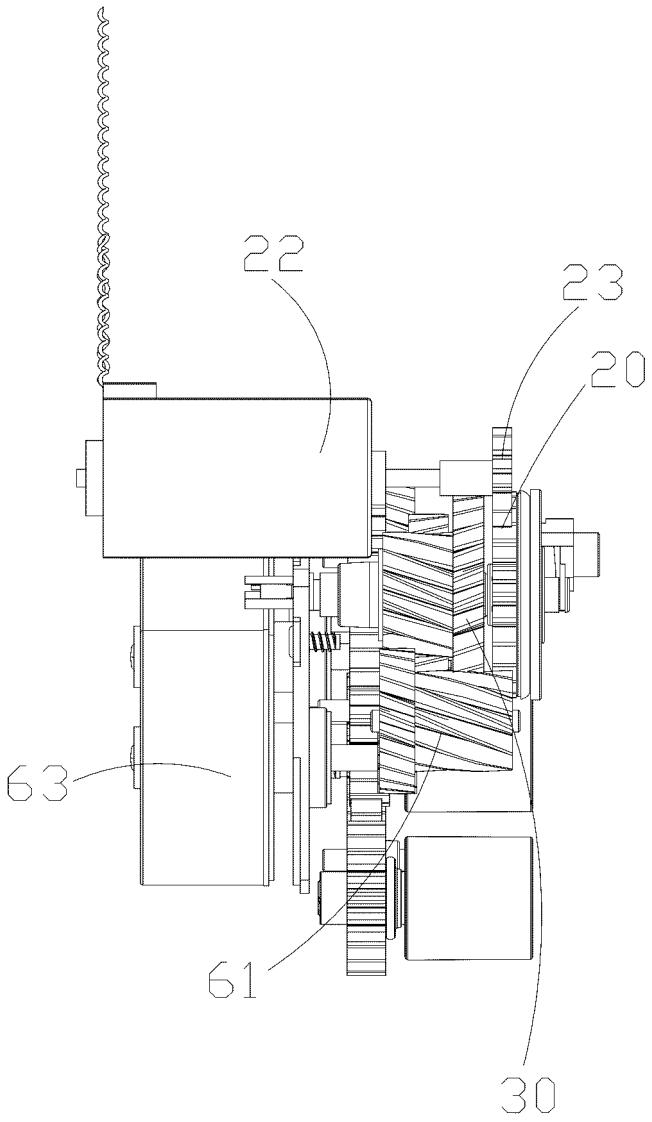


FIG.37B

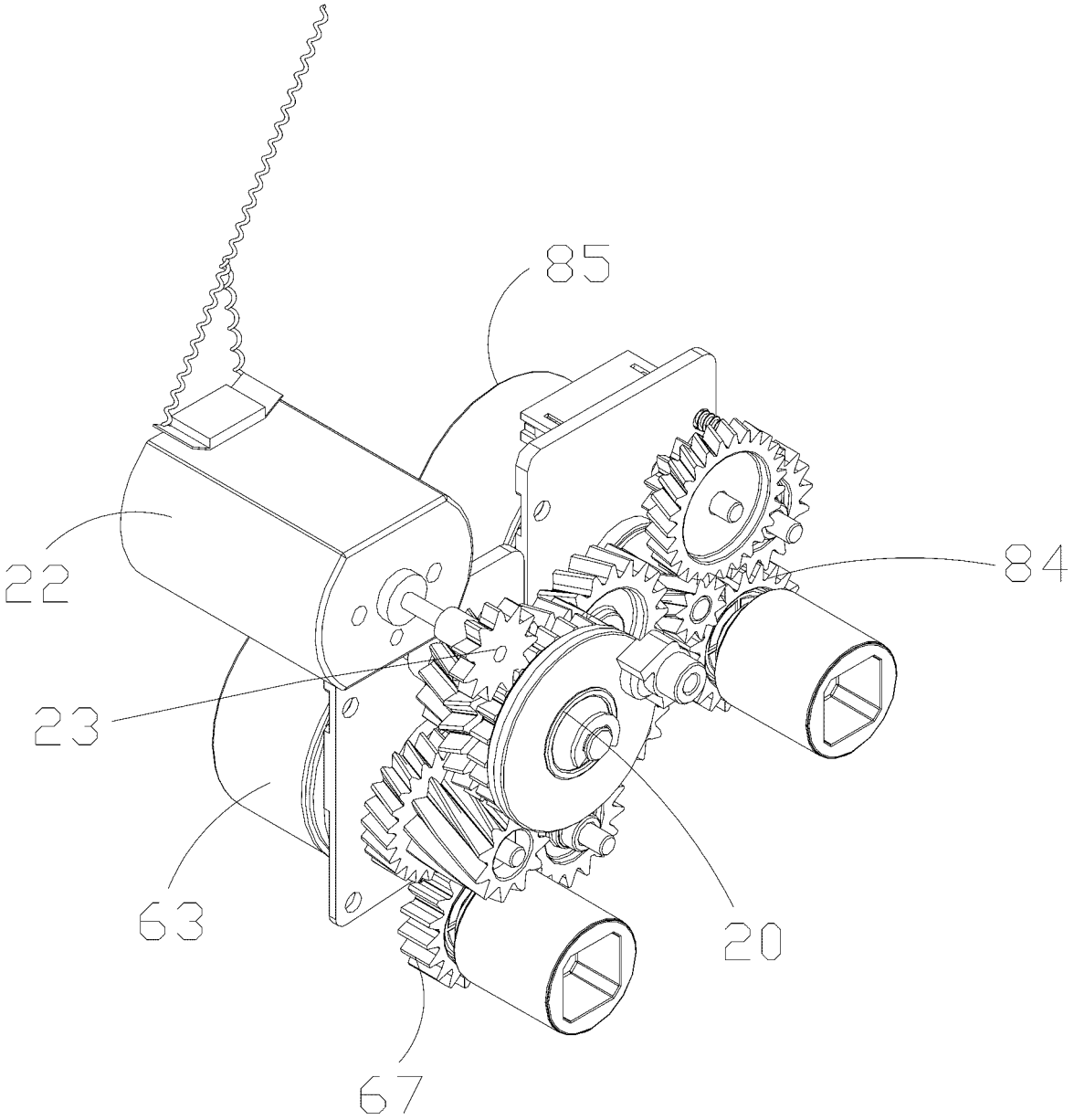


FIG.37C

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2021/118559

A. CLASSIFICATION OF SUBJECT MATTER

A47L 11/24(2006.01)i; A47L 11/28(2006.01)i; A47L 11/40(2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A47L

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

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

WPI, EPODOC, CNPAT, CNKI: 李行, 林翔, 段传林, 梁彬雄, 周永飞, 王晓亮, 彭松, 韩馨宇, 石头世纪科技, 清洁, 清洗, 拖吸, self?clean+, clean+, wip+, mop+, sweep+

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 111820824 A (PANASONIC HOME APPLIANCES (CHINA) CO., LTD.) 27 October 2020 (2020-10-27) description, paragraphs [0042]-[0061], and figures 1-4	1, 3-5, 19, 26-27
Y	CN 111820824 A (PANASONIC HOME APPLIANCES (CHINA) CO., LTD.) 27 October 2020 (2020-10-27) description, paragraphs [0042]-[0061], and figures 1-4	2, 6-18, 20-22
X	CN 112006615 A (HANGZHOU CRAFTSMAN DRAGON ROBOT TECHNOLOGY CO., LTD.) 01 December 2020 (2020-12-01) description, paragraphs [0112]-[0117], [0136]-[0178], figures 7-20	23-25
Y	CN 112006615 A (HANGZHOU CRAFTSMAN DRAGON ROBOT TECHNOLOGY CO., LTD.) 01 December 2020 (2020-12-01) description, paragraphs [0112]-[0117], [0136]-[0178], figures 7-20	6-14, 18, 20-21
Y	CN 211862710 U (YUNJING INTELLIGENT TECHNOLOGY (DONGGUAN) CO., LTD.) 06 November 2020 (2020-11-06) description, paragraphs [0065]-[0080], and figures 8-17	2, 15-17, 22

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

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
19 November 2021	**15 December 2021**
Name and mailing address of the ISA/CN **China National Intellectual Property Administration (ISA/CN)** **No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088, China** Facsimile No. **(86-10)62019451**	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2021/118559

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 111134582 A (YUNJING INTELLIGENT TECHNOLOGY (DONGGUAN) CO., LTD.) 12 May 2020 (2020-05-12) entire document	1-27
A	EP 3542695 A1 (YUNJING INTELLIGENCE TECHNOLOGY DONGGUAN CO., LTD.) 25 September 2019 (2019-09-25) entire document	1-27
A	KR 20090061461 A (LG ELECTRONICS INC.) 16 June 2009 (2009-06-16) entire document	1-27

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2021/118559

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 111820824 A	27 October 2020	None	
CN 112006615 A	01 December 2020	None	
CN 211862710 U	06 November 2020	None	
CN 111134582 A	12 May 2020	None	
EP 3542695 A1	25 September 2019	JP 2020500676 A	16 January 2020
		US 2020077858 A1	12 March 2020
		WO 2018107465 A1	21 June 2018
		JP 6883352 B2	09 June 2021
		KR 20190099407 A	27 August 2019
		KR 2289499 B1	12 August 2021
		US 20210228045 A1	29 July 2021
		US 20210228044 A1	29 July 2021
KR 20090061461 A	16 June 2009	KR 101412580 B1	26 June 2014

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CN 202011458692 **[0001]**