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(54) SELF-CLEANING MAINTENANCE STATION AND SELF-CLEANING SYSTEM

(57) Provided in the embodiments of the present disclosure are a self-cleaning maintenance station and a self-cleaning system. The self-cleaning maintenance station comprises a self-cleaning maintenance station body and a water storage tank, the water storage tank being mounted at the top end of the self-cleaning maintenance station body. The self-cleaning maintenance station body comprises: a water storage cavity having a semi-enclosure structure, arranged, with the opening facing upward and forward, at the top of the self-cleaning maintenance station body and configured to accommodate the water storage tank. The water storage tank is at least partially inserted into the water storage cavity to be mounted at the top end of the self-cleaning maintenance station body. In the present disclosure, a water opening of the water storage tank is arranged at the upper part of the water storage tank, so that liquid in the water storage tank is prevented from overflowing, and damage to electronic elements caused by overflowing liquid is avoided.

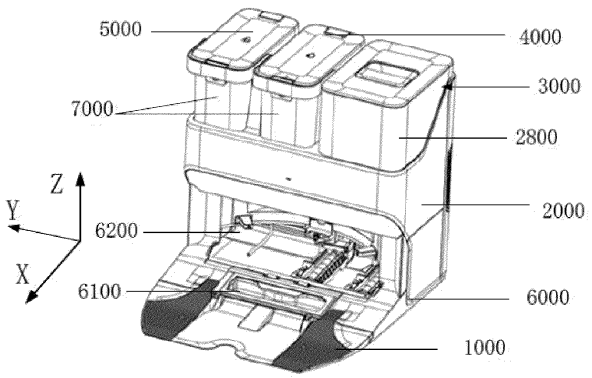

FIG. 1

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Description

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application is based on and claims priority to Chinese Patent Application No. 202111675742.0, filed on December 31, 2021, which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0002] The present disclosure relates to the field of cleaning robots, and, particularly, to a self-cleaning maintenance station and a self-cleaning system.

BACKGROUND

[0003] In recent years, with the development of science and technology, various cleaning supplies have emerged. These cleaning supplies reduce cleaning and sweeping burdens imposed on people, meet people's needs, and bring great convenience to people's lives. Among these cleaning supplies, automatic cleaning devices are favored because of their high intelligence.

[0004] An automatic cleaning device capable of sweeping and mopping can sweep and absorb dust and debris at a position to be cleaned, and perform wet wiping. After a cleaning operation is completed, a user needs to manually dispose of garbage in a dust box of the automatic cleaning device. For a position having relatively large amounts of dust and debris that are difficult to fully clean, because the space in the dust box in a body of the automatic cleaning device is finite, it is required to manually clear the dust box in a cleaning process at a high frequency, which greatly reduces cleaning efficiency. Moreover, frequent clearing of the dust box leads to poor user experience.

SUMMARY

[0005] The present disclosure aims to provide a self-cleaning maintenance station capable of facilitating mounting and demounting of a water tank.

[0006] According to an embodiment of the present disclosure, there is provided a self-cleaning maintenance station, which includes a self-cleaning maintenance station body and a water storage tank. The water storage tank is assembled at a top end of the self-cleaning maintenance station body. The self-cleaning maintenance station body includes: a water storage chamber, where the water storage chamber has a semi-enclosed structure, and the water storage chamber, with an opening facing upward and forward, is disposed at a top of the self-cleaning maintenance station body and is configured to accommodate the water storage tank. The water storage tank, after being at least partially inserted into the water storage chamber, is assembled at the top end of the dust collection pile body.

[0007] According to an embodiment of the present disclosure, there is further provided a self-cleaning system including an automatic cleaning device and the self-cleaning maintenance station as described in any of the above.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The accompanying drawings here, which are incorporated in the Description and constitute a part of the Description, show embodiments conforming to the present disclosure, and are used to explain the principles of the present disclosure together with the Description. Understandably, the accompanying drawings in the following description show merely some embodiments of the present disclosure, and those of ordinary skill in the art can also derive other accompanying drawings from these accompanying drawings without creative efforts.

FIG. 1 is a schematic diagram of an overall structure of a self-cleaning maintenance station according to some embodiments of the present disclosure.

FIG. 2 is a schematic structural diagram of a self-cleaning maintenance station body according to some embodiments of the present disclosure.

FIG. 3 is a schematic structural diagram of a water storage tank in a self-cleaning maintenance station according to some embodiments of the present disclosure.

FIG. 4 is a side view of a water storage tank in a self-cleaning maintenance station according to some embodiments of the present disclosure.

FIG. 5 is a schematic diagram of an inner structure of a water storage tank in a self-cleaning maintenance station according to some embodiments of the present disclosure.

FIG. 6 is a structural sectional view of a dust collection bin according to some embodiments of the present disclosure.

FIG. 7 is a structural diagram of assembling at a top surface of a fan in a dust collection bin according to some embodiments of the present disclosure.

FIG. 8 is a structural diagram of a shock-absorbing hood of a dust collection bin according to some embodiments of the present disclosure.

FIG. 9 is a structural diagram of assembling at a bottom surface of a fan in a dust collection bin according to some embodiments of the present disclosure.

FIG. 10 is a structural diagram of a shock-absorbing cushion of a dust collection bin according to some embodiments of the present disclosure.

FIG. 11 is a front view of a bottom plate of a self-cleaning maintenance station according to some embodiments of the present disclosure.

FIG. 12 is a side view of a bottom plate of a self-cleaning maintenance station according to some embodiments of the present disclosure.

FIG. 13 is a three-dimensional structural diagram of

a bottom plate of a self-cleaning maintenance station according to some embodiments of the present disclosure.

FIG. 14 is a diagram of an overall structure of a self-cleaning maintenance station and a dust box according to some embodiments of the present disclosure.

FIG. 15 is a sectional view of an air duct of a self-cleaning maintenance station according to some embodiments of the present disclosure.

FIG. 16 is a schematic diagram of an airflow direction in a self-cleaning maintenance station in a dust collection state according to some embodiments of the present disclosure.

DETAILED DESCRIPTION

[0009] To make the objectives, technical solutions, and advantages of the present disclosure clearer, the present disclosure will be further described in detail below with reference to the accompanying drawings. It is understood that the described embodiments are only some, but not all of the embodiments of the present disclosure. All other embodiments acquired by those of ordinary skill in the art without creative efforts based on the embodiments in the present disclosure are within the scope of protection of the present disclosure.

[0010] The terms used in the embodiments of the present disclosure are for the purpose of describing particular embodiments only, and are not intended to limit the present disclosure. The singular forms "alan", "said", and "the" used in the embodiments of the present disclosure and the appended claims are intended to include plural forms as well, unless otherwise clearly indicated in the context. The term "a plurality of" generally means at least two.

[0011] It should be understood that the term "and/or" used herein only describes an association relationship between associated objects, and indicates that there may be three kinds of relationships. For example, A and/or B may indicate that A exists alone, both A and B exist, and B exists alone. In addition, the character "/" in the present disclosure generally indicates an "or" relationship between the objects before and after the character.

[0012] It should be understood that, although the terms "first," "second," "third," and the like may be used for descriptions in the embodiments of the present disclosure, these descriptions should not be limited to these terms. These terms are only used for a distinguishing purpose. For example, without departing from the scope of the embodiments of the present disclosure, "first" may also be referred to as "second", and similarly, "second" may also be referred to as "first".

[0013] It should be further noted that the terms "include," "contain," or any other variants thereof are intended to cover the nonexclusive inclusion, such that a commodity or device including a series of elements includes not only these elements, but also other elements not listed explicitly or elements inherent to such a commodity or device. Without more limitations, the element defined by the phrase "including a ..." does not exclude the existence of other same elements in the commodity or device including the element.

[0014] Optional embodiments of the present disclosure are described in detail below with reference to the accompanying drawings.

[0015] Generally, a structure of a self-cleaning maintenance station in the related art is relatively complex. A water tank is disposed in a complex cover cap of the self-cleaning maintenance station, leading to inconvenience in removal, placement, and use. A connection opening of the water tank is formed in the bottom of the water tank. As a result, water in the water tank is prone to overflow, which may damage a device in the self-cleaning maintenance station. In addition, an air duct of the self-cleaning maintenance station is complex, and is not convenient for debris to enter a dust collection bin from a dust box.

[0016] In view of this, an embodiment of the present disclosure provides a self-cleaning maintenance station, in which a water tank and a dust collection hood are exposed outside a self-cleaning maintenance station body, so as to facilitate the mounting and use by a user. Moreover, a water opening is formed on the top of the self-cleaning maintenance station body, such that it is hard for water to overflow from the water tank. An air duct is directly disposed on a side wall of the self-cleaning maintenance station body, such that a path of the air duct is reduced, improving dust collection efficiency. Specifically, the self-cleaning maintenance station provided in this embodiment of the present disclosure is used as an example. FIG. 1 exemplarily shows a schematic diagram an overall structure of a self-cleaning maintenance station. FIG. 2 exemplarily shows a schematic structural diagram of a self-cleaning maintenance station body, with a sewage tank, a clean water tank, and a dust collection hood are removed.

[0017] For purpose of description of the behaviors of the self-cleaning maintenance station, directions are defined as follows: the self-cleaning maintenance station can be calibrated by the following three mutually perpendicular axes as defined: a transversal axis Y, a front and rear axis X, and a central vertical axis Z. A direction opposite an arrow direction of the front and rear axis X, namely, a direction in which an automatic cleaning device enters the self-cleaning maintenance station, is marked as "rearward direction". A direction along the arrow direction of the front and rear axis X, namely, a direction in which an automatic cleaning device leaves the self-cleaning maintenance station, is marked as "forward direction". The transversal axis Y is substantially in a direction of the width of the self-cleaning maintenance station body. The vertical axis Z is a direction extending upward from the bottom surface of the self-cleaning maintenance station.

[0018] As shown in FIG. 1, a direction in which a bottom plate 1000 of the self-cleaning maintenance station pro-

trudes from the self-cleaning maintenance station body 2000 is the forward direction, and a direction towards a rear wall of the self-cleaning maintenance station body 2000 is the rearward direction. A dust collection bin 3000 is located on the left side of the self-cleaning maintenance station. A clean water tank 4000 is located on the right side of the dust collection bin 3000. A sewage tank 5000 is located on the right side of the clean water tank 4000.

[0019] As shown in FIG. 1, the self-cleaning maintenance station provided in the present embodiment includes the bottom plate 1000 of the self-cleaning maintenance station, the self-cleaning maintenance station body 2000, as well as the dust collection bin 3000, the clean water tank 4000, and the sewage tank 5000 that are disposed side by side on the self-cleaning maintenance station body 2000. The bottom plate 1000 of the self-cleaning maintenance station is detachably or non-detachably connected to the self-cleaning maintenance station body 2000, facilitating transportation and maintenance of the bottom plate 1000 of the self-cleaning maintenance station and the self-cleaning maintenance station body 2000. As shown in FIG. 2, the self-cleaning maintenance station body 2000 includes a water storage chamber 2700, a dust collection chamber 2100, and an air duct (for example, the air duct 2500 shown in FIG. 6 or FIG. 15). The water storage chamber 2700 with an opening facing upward and forward is disposed at the top of the self-cleaning maintenance station body 2000, and includes a clean water chamber 2400 for accommodating the clean water tank 4000 and a sewage chamber 2300 for accommodating the sewage tank 5000. The dust collection chamber 2100 with an opening facing upward and forward and the water storage chamber 2700 are disposed by side by side at the top end of the self-cleaning maintenance station body 2000. The dust collection chamber 2100 forms the dust collection bin 3000 for accommodating a dust collection hood 2800. The upward and forward design of both the water storage chamber 2700 and the dust collection chamber 2100 facilitates the mounting and removal of the sewage tank 5000, the clean water tank 4000 and the dust collection hood 2800. Because all of the sewage tank 5000, the clean water tank 4000, and the dust collection hood 2800 are generally assembled to the self-cleaning maintenance station body 2000 from a front side and an upper side, this structural design conforms to user's using habits. In addition, the upward and forward design facilitates routine maintenance of components in the water storage chamber 2700 and the dust collection chamber 2100. The water tank is at least partially exposed outside the self-cleaning maintenance station body 1000, such that a user can conveniently mount and demount the water tank, and conveniently check a condition of a water level of a liquid in a tank body of the water tank. Moreover, compared with a design manner in which a water storage tank is completely disposed in a water storage chamber, the exposed design has the following advantage: when taking out or placing the water storage tank, a user does not need to first lift the water storage tank to a position higher than the highest position of a chamber body of the water storage chamber and then horizontally move out the water storage tank, such that a lifting process performed by the user is reduced, and the user can take out the water storage tank from the chamber body more easily.

[0020] The self-cleaning maintenance station body 2000 further includes the air duct (for example, the air duct 2500 shown in FIG. 6 or FIG. 15). The air duct is at least partially disposed on a side wall of the self-cleaning maintenance station body 2000. A body base 6000 at the bottom of the self-cleaning maintenance station body 2000 is communicated with the dust collection chamber 2100 through the air duct. In a dust collection process, garbage in the dust box enters the air duct through a dust collection opening of the body base 6000, and then enters the dust collection chamber 2100 through the air duct. The self-cleaning maintenance station body 2000 is configured to collect garbage in the dust box of the automatic cleaning device. The body base 6000 of the self-cleaning maintenance station includes a dust collection opening 6100. The dust collection opening 6100 is configured to be docked with a dust outlet of the automatic cleaning device. The garbage in the dust box of the automatic cleaning device enters the dust collection bin 3000 of the self-cleaning maintenance station body 2000 through the dust collection opening 6100. A sealing rubber gasket is also disposed around the dust collection opening 6100, and is used for sealing after the dust collection opening 6100 is docked with the dust outlet of the automatic cleaning device, thereby preventing leakage of the garbage while ensuring a dust collection effect.

[0021] As shown in FIG. 2, the water storage chamber 2700 and the dust collection chamber 2100 are formed by the rear wall, the front wall, and a plurality of side walls of the self-cleaning maintenance station body 2000 in a surrounding manner. A rear wall and a front wall of the water storage chamber 2700 are coplanar with those of the dust collection chamber 2100, and one side wall of the water storage chamber 2700 is coplanar with that of the dust collection chamber 2100. The height of the rear wall of the self-cleaning maintenance station body 2000 is higher than the height of the front wall of the self-cleaning maintenance station body 2000; the side walls of the self-cleaning maintenance station body 2000 are connected to the rear wall and the front wall; and an end surface of the side wall of the self-cleaning maintenance station body 2000 has an arc-shaped structure. The upward and forward design of both the water storage chamber 2700 and the dust collection chamber 2100 facilitates the mounting and demounting of the sewage tank 5000, the clean water tank 4000, and the dust collection hood 2800. The arc-shaped structure ensures stability and aesthetics of the sewage tank 5000, the clean water tank 4000, and the dust collection hood 2800 that are mounted in the water storage chamber 2700 and the dust collection chamber 2100.

[0022] The water storage chamber 2700 is configured

to accommodate the sewage tank 5000 and the clean water tank 4000. A raised platform 2600, attached to the rear wall of the water storage chamber 2700 and extending upwards along the bottom of the water storage chamber 2700 to a position slightly lower than a height of the rear wall of the water storage chamber, is included in the water storage chamber 2700. The top of the raised platform is provided with a plurality of soft rubber protruding openings. The soft rubber protruding openings are respectively configured to be connected to the sewage tank 5000 or the clean water tank 4000 assembled at a corresponding position. A partition plate 2710 that extends vertically is included in the water storage chamber 2700, and divides the water storage chamber 2700 into two parts. One part is the sewage chamber 2300 for accommodating the sewage tank 5000; and the other part is the clean water chamber 2400 for accommodating the clean water tank 4000.

[0023] In some embodiments, the soft rubber protruding openings include an air pump opening 2610 and a sewage tank connection opening 2620 that are correspondingly disposed at the top end of the raised platform 2600 at the assembling position of the sewage tank 5000. An air pump pumps air from the sewage tank 5000 through the air pump opening 2610; and the sewage tank 5000 has a sealed structure. Therefore, a negative pressure is formed inside the sewage tank in the pumping process, and sewage in a washing bin is pumped into the sewage tank 5000 through a sewage pipe and the sewage tank connection opening 2620. A clean water tank connection opening 2630 is correspondingly disposed at the top end of the raised platform 2600 at the assembling position of the clean water tank 4000. Under the action of a peristaltic pump, clean water in the clean water tank 4000 flows onto a scraper in the washing bin through the clean water tank connection opening 2630, so as to wash a cleaning head of the automatic cleaning device. The air pump opening 2610, the sewage tank connection opening 2620, and the clean water tank connection opening 2630 are disposed at the top end of the raised platform 2600, such that in a replacement process of the clean water tank or the sewage tank, water in the clean water tank can be prevented from overflowing from the tank and from flowing into the clean water chamber or the sewage chamber. Because the air pump opening 2610, the sewage tank connection opening 2620, and the clean water tank connection opening 2630 are in sealed connection with top ends of the sewage tank 5000 and the clean water tank 4000, compared with the connection to the bottom end of the clean water chamber or the sewage chamber, an operation is more convenient.

[0024] The self-cleaning maintenance station further includes the sewage tank 5000 and the clean water tank 4000 that are disposed on the water storage chamber side by side, as well as the dust collection hood 2800 disposed on the dust collection chamber 2100 and keeps abreast with the sewage tank and the clean water tank. The top surfaces of the sewage tank 5000, the clean water tank 4000, and the dust collection hood 2800 are flush to each other approximately, and front surfaces thereof are flush to each other approximately, too. After the sewage tank 5000, the clean water tank 4000, and the dust collection hood 2800 are assembled onto the self-cleaning maintenance station body 2000, a neatly arranged structure is formed, which not only facilitates mounting, demounting, and usage, but also provides the aesthetic neat appearance and enhances the user experience.

[0025] After the self-cleaning maintenance station is used for a long time, the soft rubber protruding openings are inevitably contaminated by sewage resulting from washing of a cleaning component, with stains remained. Due to the foregoing arrangement, the soft rubber protruding openings in the raised platform 2600 have open structures relative to the front wall, and even have open structures relative to the side walls, such that an arm or a cleaning tool can be in contact with the soft rubber protruding openings from all angles, facilitating a user to clear the dirt accumulated near the soft rubber protruding openings.

[0026] When the sewage tank 5000 and the clean water tank 4000 are assembled in the water storage chamber 2700, the top surfaces of the sewage tank 5000 and the clean water tank 4000 are higher than the rear wall of the self-cleaning maintenance station body 2000, and most of tank bodies of the sewage tank 5000 and the clean water tank 4000 are disposed outside the water storage chamber 2700. When the dust collection hood 2800 is assembled in the dust collection chamber 2100, the top surface of the dust collection hood 2800 is higher than the rear wall of the self-cleaning maintenance station body 2000, and most of the dust collection hood 2800 is disposed outside the dust collection chamber 2100. Due to the foregoing design, an amount of material required to form the self-cleaning maintenance station body is reduced; the upper portions of the sewage tank, the clean water tank, and the dust collection hood are exposed outside the chambers, such that a user can conveniently operate the sewage tank, the clean water tank, and the dust collection chamber by lifting a handle disposed at the top of each of the sewage tank, the clean water tank and the dust collection hood, and also achieves the technical effect of aesthetic design. Moreover, the top of the self-cleaning maintenance station body is designed with the lower front wall and the higher rear wall, and the upper front portions of the sewage tank, the clean water tank, and the dust collection hood are exposed outside the chambers, such that a user can observe water levels in the transparent sewage tank and clean water tank and a condition in the dust collection chamber conveniently, allowing for performing the corresponding operations on the sewage tank, the clean water tank and the dust collection chamber in time.

[0027] The dust collection hood 2800 includes an opening in sealed connection with the end surface of the dust collection chamber 2100. The opening is in sealed

connection with the end surface of the dust collection bin 3000. Due to the sealed connection, an interior of the dust collection bin 3000 is sealed completely, improving dust collection efficiency.

[0028] A washing chamber with an opening facing forward is defined between a lower portion of the self-cleaning maintenance station body 2000 and the body base 6000, and is configured to accommodate the automatic cleaning device when the automatic cleaning device returns to the self-cleaning maintenance station for maintenance operation. The washing bin is disposed at the bottom of the self-cleaning maintenance station body, and is configured to clean a cleaning component on the automatic cleaning device after the automatic cleaning device is matched with the washing chamber.

[0029] When the automatic cleaning device, for example, a sweeping robot, returns to the self-cleaning maintenance station after completing the sweeping operation, the automatic cleaning device moves to the body base 6000 along an inclined surface of the bottom plate 1000 of the self-cleaning maintenance station, such that the dust outlet of the automatic cleaning device is docked with the dust collection opening 6100 in the body base 6000, so as to transfer garbage in the dust box of the automatic cleaning device into the dust collection bin 3000 of the self-cleaning maintenance station body 2000.

[0030] In some embodiments, the body base 6000 and the body 2000 form undetachable integral part. The body base 6000 further includes a dust collection air path. The dust collection air path is disposed in the body base 6000, and is configured to recover garbage in the automatic cleaning device. An air inlet of the dust collection air path is the dust collection opening. An air outlet of the dust collection air path is communicated with the dust collection chamber 2100 through the air duct.

[0031] According to this embodiment of the present disclosure, the dust collection bin for accommodating the dust collection hood is disposed at the top end of the self-cleaning maintenance station body, such that the technical effect of one dust collection after multiple cleanings by the automatic cleaning device can be achieved, and the defects of reduced cleaning efficiency and poor user experience caused by frequent cleaning of the dust collection box on the automatic cleaning device are avoided.

[0032] Generally, the structure of a self-cleaning maintenance station in the related art is relatively complex. A water tank is disposed in a complex cover cap of the self-cleaning maintenance station, leading to inconvenience in removal, placement and use. A connection opening of the water tank is formed in the bottom of the water tank. As a result, water in the water tank is prone to overflow, which may very possibly damage a component in the self-cleaning maintenance station.

[0033] In view of this, an embodiment of the present disclosure provides a self-cleaning maintenance station. A water tank is at least partially exposed outside a self-cleaning maintenance station body, such that a user can mount and demount the water tank conveniently. A water opening of the water tank is formed in an upper portion of the water tank, such that it is hard for a liquid in the water tank to overflow, avoiding a phenomenon that an overflowed liquid damages an electronic element. The same structure has the same technical effect, and some of the technical effects are not repeated herein.

[0034] Specifically, the self-cleaning maintenance station provided in this embodiment of the present disclosure is used as an example. FIG. 1 exemplarily shows a schematic diagram of an overall structure of a self-cleaning maintenance station. FIG. 2 exemplarily shows a schematic structural diagram of a self-cleaning maintenance station body, with a sewage tank, a clean water tank, and a dust collection hood removed. FIG. 3 to FIG. 5 are schematic diagrams that show a water storage tank of a self-cleaning maintenance station of the present disclosure from different viewing angles.

[0035] As shown in FIG. 1, the self-cleaning maintenance station provided in this embodiment includes the bottom plate 1000 of the self-cleaning maintenance station, the self-cleaning maintenance station body 2000, and a water storage tank 7000. The bottom plate 1000 of the self-cleaning maintenance station is detachably or non-detachably connected to the self-cleaning maintenance station body 2000, facilitating transportation and maintenance of the bottom plate 1000 of the self-cleaning maintenance station and the self-cleaning maintenance station body 2000. The water storage tank 7000 is assembled at the top end of the self-cleaning maintenance station body 2000.

[0036] As shown in FIG. 2, the self-cleaning maintenance station body 2000 includes a water storage chamber 2700. The water storage chamber 2700 with an opening facing upward and forward is disposed at the top of the self-cleaning maintenance station body 2000. The water storage chamber 2700 is configured to accommodate the water storage tank 7000. The water storage tank 7000 may be a clean water tank 4000 or a sewage tank 5000. There may be a plurality of water storage tanks 7000. In some embodiments, the self-cleaning maintenance station body 2000 includes two water storage tanks 7000, namely, the clean water tank 4000 and the sewage tank 5000. Correspondingly, the water storage chamber 2700 includes a clean water chamber 2400 for accommodating the clean water tank 4000 and a sewage chamber 2300 for accommodating the sewage tank 5000. Due to the upward and forward design of the water storage chamber 2700, the water storage tank 7000 can be assembled onto the self-cleaning maintenance station body 2000 from the front side and the upper side. Such an assembling manner better conforms to the user's using habits, facilitating mounting and demounting of the water storage tank 7000. In addition, the upward and forward design facilitates daily maintenance of a component in the water storage chamber 2700.

[0037] The water storage chamber 2700 is formed by the rear wall, the front wall, and a plurality of side walls of the self-cleaning maintenance station body 2000 in a

surrounding manner. The height of the rear wall of the self-cleaning maintenance station body 2000 is higher than the height of the front wall of the self-cleaning maintenance station body 2000. The side walls of the self-cleaning maintenance station body 2000 are connected to the rear wall and the front wall. The end surface of the side wall of the self-cleaning maintenance station body 2000 has an arc-shaped structure. The arc-shaped structure ensures stability and aesthetics of the water storage tank 7000 mounted in the water storage chamber 2700.

[0038] A raised platform 2600, attached to the rear wall of the water storage chamber 2700 and extending upwards along the bottom of the water storage chamber 2700 to a position slightly lower than a height of the rear wall of the water storage chamber, is included in the water storage chamber 2700. The height of the raised platform 2600 is higher than a height of the highest water line of the water storage tank 7000. When the water storage tank 7000 is assembled in the water storage chamber 2700, the raised platform 2600 supports a water tank projecting portion (for example, a water tank projecting portion 7140 shown in FIG. 3 or FIG. 4) of the water storage tank 7000.

[0039] The top of the raised platform 2600 is provided with a plurality of soft rubber protruding openings. The soft rubber protruding openings are configured to be connected to the water storage tank 7000 assembled at the corresponding position. Specifically, the soft rubber protruding opening is configured to be connected to a sewage opening or a clean water opening formed in the water storage tank 7000.

[0040] In some embodiments, the soft rubber protruding openings include an air pump opening 2610 and a sewage tank connection opening 2620 that are correspondingly disposed at the top end of the raised platform 2600 at the assembling position of the sewage tank 5000. An air pump pumps air from the sewage tank 5000 through the air pump opening 2610; and the sewage tank 5000 has a sealed structure. Therefore, a negative pressure is formed inside the sewage tank in an air pumping process, and sewage in a washing bin is pumped into the sewage tank 5000 through a sewage pipe and the sewage tank connection opening 2620.

[0041] In some embodiments, the soft rubber protruding openings include a clean water tank connection opening 2630 correspondingly disposed at the top end of the raised platform 2600 at the assembling position of the clean water tank 4000. Under the action of a peristaltic pump, clean water in the clean water tank 4000 flows onto a scraper in the washing bin through the clean water tank connection opening 2630, so as to wash a cleaning head of the automatic cleaning device.

[0042] The air pump opening 2610, the sewage tank connection opening 2620, and the clean water tank connection opening 2630 are disposed at the top end of the raised platform 2600, such that in a replacement process of the clean water tank or the sewage tank, water in the clean water tank or the sewage tank can be prevented from overflowing from the tank and from flowing into the clean water chamber or the sewage chamber. Because the air pump opening 2610, the sewage tank connection opening 2620, and the clean water tank connection opening 2630 are in sealed connection with top ends of the sewage tank 5000 and the clean water tank 4000, compared with a connection to the bottom end of the clean water chamber or the sewage chamber, an operation is more convenient.

[0043] After the self-cleaning maintenance station is used for a long time, the soft rubber protruding openings are inevitably contaminated by sewage resulting from washing of a cleaning component, with stains remained. Due to the foregoing arrangement, the soft rubber protruding openings on the raised platform 2600 have open structures relative to the front wall, and even have open structures relative to the side walls, such that an arm or a cleaning tool can be in contact with the soft rubber protruding openings from all angles, facilitating a user to clear the dirt accumulated near the soft rubber protruding openings.

[0044] In some embodiments, the top of the raised platform 2600 may be provided with a plurality of soft rubber protruding points 2640; and the soft rubber protruding points 2640 are correspondingly matched with pits 7221 (as shown in FIG. 5) formed in the lower surface of the water tank projecting portion (for example, the water tank projecting portion 7140 shown in FIG. 3 or FIG. 4) of the water storage tank 7000. When the water storage tank 7000 is assembled in the water storage chamber 2700, the soft rubber protruding points 2640 on the water storage chamber 2700 are limited in the pits 7221 in the water storage tank 7000. The specific number of the soft rubber protruding points 2640 may be set according to an actual condition. The soft rubber protruding points 2640 may be symmetrically distributed at the top of the raised platform 2600. For example, in an embodiment, there are four soft rubber protruding points 2640 that are essentially uniformly distributed at the top of the raised platform 2600. Due to matched limiting between the soft rubber protruding points 2640 and the pits 7221, it can be ensured that the position of the water storage tank 7000 in the water storage chamber 2700 is more accurate, preventing the position offset of the water storage tank 7000.

[0045] A partition plate 2710 that extended vertically may be included in the water storage chamber 2700. The partition plate 2710 divides the water storage chamber 2700 into two parts. One part is the sewage chamber 2300 for accommodating the sewage tank 5000; and the other part is the clean water chamber 2400 for accommodating the clean water tank 4000. At least one shock-absorbing cushion 2711 is disposed at the top end of the partition plate 2710, and is configured to support the handle when the handle is lowered, so as to reduce vibration of the handle. Each of the two sides of the partition plate 2710 includes at least one limiting protrusion (not shown in the figure). A side wall of the sewage tank facing the partition plate 2710 and a side wall of the clean water

tank facing the partition plate 2710 each include at least one limiting recess (for example, the second recess 7120 shown in FIG. 3 or FIG. 4) matched with the limiting protrusion. After the sewage tank and the clean water tank are assembled in the sewage chamber and the clean water chamber, the limiting protrusion and the limiting recess are matched each other for limiting.

[0046] The water storage tank 7000 is detachably assembled at the top end of the self-cleaning maintenance station body 2000. Specifically, the water storage tank 7000 is detachably assembled in the water storage chamber 2700. Due to the detachable design of the water storage tank 7000 and the upward and forward design of the water storage chamber 2700, the water storage tank 7000 can be mounted and demounted very conveniently, which helps a user perform daily replacement of liquid in the water storage tank 7000. The water storage tank 7000 may be made of a transparent material to facilitate the observation of the liquid level in the water storage tank 7000.

[0047] In some embodiments, when the water storage tank 7000 is assembled in the water storage chamber 2700, the top surface of the water storage tank 7000 is higher than the rear wall of the water storage chamber 2700; and most of a tank body of the water storage tank 7000 may be disposed outside the water storage chamber 2700. The foregoing design may further optimize mounting and demounting of the water storage tank 7000, which helps the user perform daily replacement of the liquid in the water storage tank 7000, and can reduce a usage amount of a material of the self-cleaning maintenance station body 2000. In addition, the top of the self-cleaning maintenance station body 2000 is designed with the lower front wall and the higher rear wall, and the front upper portion of the water storage chamber 2700 is also exposed outside the chamber, such that the user can observe a condition of a water level in the transparent water storage chamber 2700, allowing for carrying out a corresponding operation on the water storage chamber 2700 in time.

[0048] The water storage tank 7000 may be a clean water tank 4000 or a sewage tank 5000. There may be a plurality of water storage tanks 7000. In some embodiments, the self-cleaning maintenance station body 2000 includes two water storage tanks 7000, namely, a clean water tank 4000 and a sewage tank 5000. The sewage tank 5000 and the clean water tank 4000 may be disposed in the water storage chamber 2700 side by side; and the top surfaces of the sewage tank 5000 and the clean water tank 4000 are flush to each other approximately, and the front surfaces of the sewage tank 5000 and the clean water tank 4000 are flush to each other approximately, too. After the sewage tank 5000 and the clean water tank 4000 are assembled onto the self-cleaning maintenance station body 2000, a neatly arranged structure is formed, which not only facilitates mounting, demounting, and usage, but also provides the aesthetic neat appearance and enhances the user experience.

[0049] The water storage tank 7000 includes an opening allowing a liquid to flow in or out. The opening is formed in an upper portion of the tank body. The height of the opening is higher than the highest water line 7111 of the water storage tank 7000. When the water storage tank 7000 is the clean water tank 4000, the opening is a clean water opening. When the water storage tank 7000 is the sewage tank 5000, the opening is a sewage opening. Because the height of the opening is higher than the highest water line of the water storage tank 7000, the liquid in the water storage tank 7000 can be prevented from overflowing from the water tank, particularly, the liquid is prevented from overflowing in a replacement process of the water tank. This further avoids damage to an electronic component caused by the overflowed liquid.

[0050] Referring to FIG. 3 to FIG. 5 as well, the water storage tank 7000 includes a water tank accommodating portion 7100 and a water tank top cover 7200. The water tank top cover 7200 substantially covers the water tank accommodating portion 7100. The water tank accommodating portion 7100 includes a water tank body portion 7130 and a water tank projecting portion 7140. The water tank top cover 7200 and the water tank accommodating portion 7100 jointly form a chamber body; and the water tank projecting portion 7140 protrudes from the water tank body portion 7130, such that the water storage tank has a substantially L-shaped structure.

[0051] The water tank accommodating portion 7100 is configured to accommodate a liquid. The side wall of the water tank accommodating portion 7100 includes at least one recess extending upwards from the bottom of the water tank accommodating portion. The recess may be matched with a protrusion in the water storage chamber 2700 for limiting. Specifically, in some embodiments, the side wall of the water tank accommodating portion 7100 includes a first recess 7110 extending upwards from the bottom of the water tank accommodating portion to a position higher than the highest water line 7111 and a second recess 7120 extending upwards from the bottom of the water tank accommodating portion to a preset height, where the height of the second recess 7120 is not limited. The first recess 7110 is matched with at least one part of the raised platform 2600 for limiting. The top surface of the first recess 7110 forms at least a part of the bottom surface of the water tank projecting portion 7140. The top surface of the first recess 7110 may include a clean water opening, a sewage opening, a pit 7221, or the like that is matched with and connected to the air pump opening 2610, the sewage tank connection opening 2620, the clean water tank connection opening 2630, or the soft rubber protruding point 2640 disposed on the raised platform 2600. The second recess 7120 is matched with a protrusion on an inner side wall of the water storage chamber 2700 for limiting. The water storage tank 7000 can be limited entirely by the recesses formed in the water tank accommodating portion 7100, such that the water storage tank 7000 is accurately disposed at a corresponding position on the water storage

chamber 2700, preventing the position offset of the water storage tank 7000.

[0052] The top cover 7200 covers the water tank accommodating portion 7100, is detachably connected to the water tank accommodating portion 7100, and can be opened or closed relative to the water tank accommodating portion 7100. When the top cover 7200 is closed, the liquid in the water tank accommodating portion 7100 is isolated from the outside, such that an external foreign matter can be prevented from falling into the water storage tank 7000. Optionally, when the top cover 7200 is closed, the top cover 7200 is in closed contact with the water tank accommodating portion 7100, such that the top cover 7200 and the water tank accommodating portion 7100 jointly form a closed structure.

[0053] The lower surface of the water tank projecting portion 7140 is provided with a clean water opening, a sewage opening, a pit 7221, or the like. When the water storage tank 7000 is the sewage tank 5000, the lower surface of the water tank projecting portion 7140 is provided with the sewage opening. When the water storage tank 7000 is the clean water tank 4000, the lower surface of the water tank projecting portion 7140 is provided with the clean water opening. When the water storage tank 7000 is assembled in the water storage chamber 2700, the water tank projecting portion 7140 is precisely supported by the raised platform 2600 in the water storage chamber 2700; and the sewage opening or clean water opening formed in the lower surface of the water tank projecting portion 7140 is connected to the soft rubber protruding opening at the top of the raised platform 2600.

[0054] In some embodiments, the water storage tank 7000 is the sewage tank 5000; the lower surface of the water tank projecting portion 7140 is further provided with an air pump connection opening; and the air pump connection opening is connected to the air pump opening 2610 at the top of the raised platform 2600. After the air pump opening 2610 is connected to the air pump connection opening, sewage may be pumped into the sewage tank 5000. In some embodiments, the air pump pumps air from the sewage tank 5000 through the air pump opening 2610 and the air pump connection opening; and the sewage tank 5000 has a closed structure. Therefore, a negative pressure is formed inside the sewage tank in the pumping process, and sewage in a washing bin is pumped into the sewage tank 5000 through a sewage pipe and the sewage tank connection opening 2620.

[0055] The lower surface of the water tank projecting portion 7140 may be further provided with a plurality of pits 7221. When the water storage tank 7000 is assembled in the water storage chamber 2700, the water tank projecting portion 7140 is precisely supported by the raised platform 2600 in the water storage chamber 2700; and the plurality of pits 7221 formed in the lower surface of the water tank projecting portion 7140 is matched with the soft rubber protruding points 2640 at the top of the raised platform 2600, so as to limit the water storage tank 7000. Due to matched limiting between the soft rubber protruding points 2640 and the pits 7221, it can be ensured that the position of the water storage tank 7000 in the water storage chamber 2700 is more accurate, preventing the position offset of the water storage tank 7000.

[0056] As shown in FIG. 5, in some embodiments, the water storage tank 7000 is the clean water tank 4000. In this case, the water storage tank 7000 may further include a water pipe support 7300 and a water pipe 7400. The water pipe support 7300 is disposed on a protruding structure 7900 in the clean water tank 4000. The protruding structure 7900 is correspondingly formed by the first recess 7110, and is higher than the highest water line of the clean water tank 4000. The water pipe 7400 extends from the water pipe support 7300 to the bottom of the clean water tank 4000, and the liquid may flow to the outer side of the clean water tank 4000 through the water pipe 7400. The water pipe 7400 includes a water pipe inlet and a water pipe outlet. The water pipe inlet is located at the bottom of the clean water tank 4000. The water pipe outlet is located at the water pipe support 7300, and may be connected to the clean water opening of the clean water tank 4000.

[0057] In some embodiments, the water storage tank 7000 is the clean water tank 4000. In this case, the water storage tank 7000 may further include a floating ball base 7500 and a floating ball 7600. The floating ball base 7500 is disposed at the bottom of the clean water tank 4000, and is configured for placement of the floating ball 7600. The floating ball 7600 is connected to the floating ball base 7500, can rotate round a fixed axis on the floating ball base 7500, and is configured to detect a water level in the water storage tank.

[0058] In some embodiments, the water storage tank 7000 is a clean water tank 4000. In this case, the water storage tank 7000 may further include a filter screen 7700. The filter screen 7700 is disposed at the end of the water pipe inlet, and is configured to filter the liquid when the liquid enters the water pipe 7400.

[0059] The water storage tank 7000 may further include a handle 7800. The handle 7800 may be hinged to the top of the water storage tank 7000. Due to the handle 7800, the water storage tank 7000 can be mounted and demounted more conveniently, which helps a user perform daily replacement of the liquid in the water storage tank 7000.

[0060] An embodiment of the present disclosure provides a self-cleaning maintenance station. A water tank is at least partially exposed outside the self-cleaning maintenance station body, such that a user can mount and demount the water tank conveniently. In addition, a water opening of the water tank is formed at the upper portion of the water tank, such that it is hard for a liquid in the water tank to overflow, avoiding damage to an electronic element caused by the overflowed liquid.

[0061] In the related art, a fan of a self-cleaning maintenance station is disposed in a fan compartment; the fan compartment is disposed at the bottom of a dust col-

lection bin; a ventilation hole is formed in the bottom of the dust collection bin; and when working, the fan produces a suction force to suck air from the dust collection bin, and the air is then discharged to the outside of a self-cleaning maintenance station body 2000 through an air duct in the fan compartment. Because a dust collection opening is relatively close to a washing bin, in a process that a robot climbs on a pile and leaves the pile, the robot may bring residual water in the washing bin into the dust collection opening. If there is too much water, when the fan operates, water may be sucked into the dust collection bin through the air duct. When water accumulated in the dust collection bin is excessive, the fan may be damaged, and an electric shock risk may occur.

[0062] In view of this, an embodiment of the present disclosure provides a self-cleaning maintenance station. The bottom of a dust collection bin is provided with a drain hole, through which a liquid entering the dust collection bin can be drained in time conveniently. The same structure has the same technical effect, and some of the technical effects are not repeated herein. Specifically, as shown in FIG. 1 and FIG. 2, a self-cleaning maintenance station includes a bottom plate 1000 of the self-cleaning maintenance station and a self-cleaning maintenance station body 2000. The bottom plate 1000 is detachably or non-detachably connected to the self-cleaning maintenance station body 2000, facilitating transportation. The self-cleaning maintenance station body 2000 includes a dust collection chamber 2100. A dust collection hood 2800 covers the dust collection chamber 2100 to form a dust collection bin 3000. The dust collection chamber 2100 is integrally disposed at the top end of the self-cleaning maintenance station body 2000. As shown in FIG. 6, the top end of the self-cleaning maintenance station body 2000 is recessed inwards to form the dust collection chamber 2100 for accommodating various dust collection components. The dust collection chamber 2100 includes a drain hole 2101. The drain hole 2101 is formed in the bottom of the dust collection chamber. There may be one or more drain holes 2101 that are formed based on the internal space of the dust collection chamber 2100, and are usually formed in relatively low positions at the bottom of the dust collection chamber, facilitating drainage of the liquid. The self-cleaning maintenance station body 2000 further includes an air duct 2500. One end of the air duct 2500 is communicated with a dust collection opening 6100 in a body base 6000. The other end of the air duct 2500 is communicated with the dust collection chamber 2100. A side wall of the dust collection chamber 2100 includes an air inlet 2102. The air inlet 2102 is communicated with the dust collection opening 6100 in the body base 6000 through the air duct 2500. The air duct is formed in a side wall of the self-cleaning maintenance station body 2000, extends downwards, and is communicated with the dust collection opening 6100 in the body base 6000 by passing through the body base 6000. When the self-cleaning maintenance station is in a dust collection state, an airflow inside the dust collection bin 3000 is led to the outside of the dust collection bin 3000 through the air duct 2500, and the drain hole 2101 is not communicated with the external environment of the dust collection bin 3000, so as to ensure that sufficient negative pressure is generated in the dust collection bin to suck garbage in a dust box into a dust collection bag through the dust collection opening and the air duct. When the self-cleaning maintenance station is not in the dust collection state, an internal air opening of the dust collection bin 3000 is closed, such that the airflow in the dust collection bin 3000 is not led to the outside of the dust collection bin 3000, and the drain hole 2101 is communicated with the outside of the dust collection bin 3000. In this case, if liquid exists in a dust collection process, the liquid, for example, water on mop cloth, enters the dust collection bin 3000 through the air duct, and then, after the drain hole 2101 is opened, the liquid flows out of the dust collection bin 3000, avoiding damage to a component in the dust collection bin, particularly damage to the fan.

[0063] In some embodiments, the dust collection bin 3000 further includes a drain valve 2103. The drain valve 2103 is disposed on the outer side of the bottom of the dust collection bin 3000 and near an outlet of the drain hole 2101, and is configured to: when the self-cleaning maintenance station is in the dust collection state, close the drain hole under the action of the negative pressure in the dust collection bin, such that the drain hole 2101 is not communicated with the external environment of the dust collection bin 3000. When the self-cleaning maintenance station is not in the dust collection state, the drain valve 2103 is opened under the action of gravity, such that the drain hole 2101 is communicated with the external environment of the dust collection bin 3000.

[0064] In some embodiments, the drain valve 2103 includes a fixed end 21031 and an elastic movable end 21032. The fixed end 21031 is fixedly mounted on an outer side at the bottom of the dust collection bin 3000 via screwing, binding, clamping, or another manner. The elastic movable end 21032 may be disposed at the outlet of the drain hole 2101 in such a manner that it is switchable between an open state and a closed state. The elastic movable end 21032 is made of a soft rubber plug material such as rubber or plastic. In a normal state, the drain hole 2101 is in an open state. If there is water at the bottom of the dust collection bin 3000, the water may be automatically drained from the drain hole 2101. When the fun is operating, a negative pressure is generated in the dust collection bin 3000, and the elastic movable end 21032 is automatically sucked and closed on the outer side of the drain hole to achieve sealing. After the fan stops, the elastic movable end 21032 is automatically opened under the action of gravity, and water (if any) in the dust collection bin 3000 is drained from the drain hole 2101 again.

[0065] In some embodiments, the side wall of the dust collection bin 3000 includes a water blocking structure 2104; and the water blocking structure 2104 is disposed

on an edge of the air inlet 2102, and is configured to block a liquid entering from the air inlet. Specifically, the water blocking structure 2104 includes a first blocking wall 21041 extending transversally along the edge of the air inlet 2102 and a second blocking wall 21042 extending downwards, where the first blocking wall 21041 and the second blocking wall 21042 form an air inflow region. In some embodiments, the second blocking wall 21042 extends downwards at least to a lower edge of the air inlet 2102 to block the liquid entering from the air inlet 2102.

[0066] In some embodiments, the self-cleaning maintenance station body 2000 further includes a fan compartment 2200, a fan channel 2210, and a fan 2220. The fan compartment 2200 is disposed under the dust collection bin 3000, and is configured to accommodate the fan 2220. The fan channel 2210 is configured to communicate the fan compartment 2200 with the dust collection bin 3000, such that a suction wind force is provided by the fan 2220. The fan 2220 is disposed in the fan compartment 2200, and is turned on or off under the control of a control system, so as to provide the suction wind force required for dust collection. In some embodiments, the fan channel 2210 extends upwards for a preset distance along the bottom of the dust collection bin 3000, such that the fan channel 2210 protrudes from the bottom of the dust collection bin 3000 to avoid the phenomenon that the fan is damaged by the liquid entering the fan compartment 2200 as the liquid entering the dust collection bin 3000 is not drained in time.

[0067] According to the self-cleaning maintenance station provided in this embodiment, a self-cleaning maintenance station body includes a dust collection bin. The dust collection bin includes a drain hole and an air duct, where the drain hole is formed in a bottom of the dust collection bin; one end of the air duct is communicated with a bottom plate; and the other end of the air duct is communicated with the dust collection bin. When the self-cleaning maintenance station is in a dust collection state, the air duct is communicated with the external environment of the dust collection bin, and the drain hole is not communicated with the external environment of the dust collection bin, which ensures the negative pressure state in the dust collection bin that is beneficial to a dust collecting operation. When the self-cleaning maintenance station is not in the dust collection state, the air duct is not communicated with the external environment of the dust collection bin, and the drain hole is communicated with the external environment of the dust collection bin, such that water entering the dust collection bin is drained in time to avoid damage to a component in the dust collection bin.

[0068] In a dust collection process of a fan in a self-cleaning maintenance station in the related art, rotation of the fan causes larger vibration. As a result, damage is brought to the wall of a fan compartment in contact with the fan, and moreover, larger noise is generated due to the vibration.

[0069] In view of this, an embodiment provides a self-cleaning maintenance station. A plurality of shock-absorbing devices is disposed in a fan compartment, to reduce vibration caused by rotation of a fan. The same structure has the same technical effects, and some of the technical effects are not repeated herein. Specifically, as shown in FIG. 1, FIG. 6, and FIG. 7, a self-cleaning maintenance station includes a bottom plate 1000 of the self-cleaning maintenance station and a self-cleaning maintenance station body 2000. The bottom plate 1000 of the self-cleaning maintenance station is detachably or non-detachably connected to the self-cleaning maintenance station body 2000. The self-cleaning maintenance station body 2000 includes a fan compartment 2200, a fan 2220, and a shock-absorbing device 2230. The fan compartment 2200 is integrally disposed in the self-cleaning maintenance station body 2000. The fan compartment 2200 includes an air inlet port 2240 and an exhaust port 2250. The air inlet port 2240 is configured to be communicated with a dust collection bin 3000 through a fan channel 2210. The fan rotates to suck air out of the dust collection bin 3000, to ensure that the negative pressure is generated in the dust collection bin 3000, and that the sucked air enters the fan through the air inlet port 2240 and is exhausted through the exhaust port 2250. The fan 2220 is disposed in the fan compartment 2200, and rotates clockwise or counterclockwise under the control of a control system. The shock-absorbing device 2230 is assembled on at least a part of the outer surface of the fan 2220, to reduce vibration of the fan 2220. The shock-absorbing device 2230 may be made of an elastic material such as rubber or plastic.

[0070] In some embodiments, specifically, as shown in FIG. 8, the shock-absorbing device 2230 includes: a shock-absorbing hood 2231 assembled on at least a part of a top end of the fan 2220 to reduce vibration of the fan. The shape of the shock-absorbing hood 2231 is matched with the structure of the top end of the fan, such that the shock-absorbing hood 2231 can just cover the top end of the fan. Specifically, in some embodiments, the shock-absorbing hood 2231 includes a shock-absorbing hood top surface 22311. The shock-absorbing hood top surface 22311 includes a first opening 22312 matched with the air inlet port 2240 and a projecting edge 22313 extending outwards along the first opening 22312, and is configured to be assembled between the top end of the fan 2220 and the air inlet port 2240 to reduce vibration of the fan. In some embodiments, an area of an opening of the projecting edge 22313 increases with the increase of an outward extending distance. Therefore, after the shock-absorbing hood 2231 is assembled on the top surface of the fan, and is assembled in the fan compartment, the horn-shaped projecting edge 22313 can just support the air inlet port of the fan compartment in a surrounding manner. This not only seals the air inlet port, but also reduces influence of vibration and noise. In some embodiments, the shock-absorbing hood top surface 22311 further includes at least one protrusion extending circumferentially and continuously around the

first opening 22312, and the protrusion is configured to reduce vibration of the fan 2220 after being abutted onto the inner wall of the top surface of the fan compartment 2200. In some embodiments, the shock-absorbing hood top surface 22311 further includes a first protrusion 22314, a second protrusion 22315, and a third protrusion 22316 that extend circumferentially and continuously around the first opening 22312. A groove 22317 extending circumferentially and continuously around the first opening 22312 is formed between the second protrusion 22315 and the third protrusion 22316. The first protrusion 22314, the second protrusion 22315, the third protrusion 22316, and the groove 22317 may deform under the action of pressing in an assembling process, such that the hard connection between the fan and the fan compartment is reduced, thereby reducing damage caused by vibration. In some embodiments, a plurality of discontinuous cavities is included inside the third protrusion 22316 to further reduce vibration of the fan.

[0071] In some embodiments, as shown in FIG. 8, the shock-absorbing hood includes a shock-absorbing hood side wall 22318. The shock-absorbing hood side wall 22318 extends downwards along the shock-absorbing hood top surface 22311. When the shock-absorbing hood 2231 covers the top surface of the fan, the shock-absorbing hood side wall 22318 covers a side surface of the fan. The shock-absorbing hood side wall 22318 includes a plurality of first convex beams 22319 disposed at intervals. The first convex beam 22319 is of a hollow structure. The outer wall of each first convex beam 22319 is abutted onto the side wall of the fan compartment 2200, so as to further reduce the vibration generated when the fan operates.

[0072] In some embodiments, as shown in FIG. 9, the shock-absorbing device 2230 further includes a shock-absorbing cushion 2232; and the shock-absorbing cushion 2232 is assembled on at least a part of the bottom end of the fan 2220 to reduce vibration of the fan 2220. In some embodiments, as shown in FIG. 10, the shock-absorbing cushion 2232 includes a second opening 22322 matched with the exhaust port, and a plurality of second convex beams 22321 extending transversally along the upper surface of the shock-absorbing cushion 2232. The second convex beam 22321 is of a hollow structure. A side wall of the second convex beam 22321 is in contact with a bottom of the fan 2220, to further reduce vibration of the fan. After the shock-absorbing cushion 2232 is assembled at the bottom end of the fan 2220, an air exhaust structure at the bottom end of the fan extends into the second opening 22322. The bottom end of the fan is in interference clamping with an assembling protrusion 22324 of the shock-absorbing cushion 2232. The plane of the bottom end of the fan is in contact with the plurality of second convex beams 22321 extending transversally along the upper surface of the shock-absorbing cushion 2232. The hollow second convex beams 22321 play the role in reducing vibration. In some embodiments, the shock-absorbing cushion 2232 further includes a plurality of third convex beams 22323 extending longitudinally along an inner side wall of the second opening 22322. The air exhaust structure at the bottom end of the fan extends into the second opening 22322, and then, is in tight contact with the plurality of third convex beams 22323. The third convex beam 22323 is of a hollow structure, to further reduce the vibration of the fan.

[0073] According to the self-cleaning maintenance station provided in this embodiment, a self-cleaning maintenance station body includes a fan disposed in a fan compartment, and a shock-absorbing device assembled on at least a part of the outer surface of the fan; and a plurality of shock-absorbing structures is disposed on the shock-absorbing device, such that influence of vibration of the fan on the self-cleaning maintenance station can be reduced.

[0074] In the related art, because a cleaning module (for example, a mop support of a wet-type cleaning module) on the bottom surface of an automatic cleaning device usually has an lifting structure, the cleaning module in a natural state is not clung to the bottom of the automatic cleaning device under the action of gravity. Moreover, if a dust collection opening of the automatic cleaning device is in the front of a washing bin, the cleaning module on the bottom surface of the automatic cleaning device has to pass through the dust collection opening during climbing on a pile and leaving the pile. When passing by the dust collection opening, the cleaning module (particularly, the mop support) is easily stuck in the dust collection opening. As a result, the automatic cleaning device cannot enter or leave the self-cleaning maintenance station successfully. Particularly, during the process that the automatic cleaning device climbs on the pile, it is more possible that the automatic cleaning device cannot climbs on the pile successfully because a driving force for backward climbing on the pile is generally small. In addition, when the cleaning module is the wet-type cleaning module, mop cloth that has just been washed is not dried completely, and if the mop cloth rubs against the dust collection opening, water on the mop cloth is squeezed into the dust collection opening, and then sucked into a dust collection box, causing damage to a fan.

[0075] In view of this, an embodiment of the present disclosure provides a self-cleaning maintenance station. A lifting structure is disposed on a bottom plate body, such that the scratching or jamming occurring to a cleaning module in the process that the automatic cleaning device climbs on a pile and leaves the pile can be avoided, and a success rate of the automatic cleaning device climbing on and leaving the pile can be improved. The same structure has the same technical effect, and some of the technical effects are not repeated herein.

[0076] Specifically, the self-cleaning maintenance station provided in this embodiment of the present disclosure is used as an example. FIG. 11 and FIG. 12 exemplarily show a bottom plate of a self-cleaning maintenance station connected to a body base from different

angles. FIG. 13 exemplarily shows a schematic structural diagram of a bottom plate of a self-cleaning maintenance station.

[0077] As shown in FIG. 1, the self-cleaning maintenance station provided in this embodiment includes a bottom plate 1000 of the self-cleaning maintenance station and a self-cleaning maintenance station body 2000.

[0078] The self-cleaning maintenance station body 2000 is configured to collect garbage in a dust box of the automatic cleaning device. In some embodiments, components such as a dust collection bin 3000, a clean water tank 4000, and a sewage tank 5000 may also be disposed on the self-cleaning maintenance station body 2000. A body base 6000 is integrally disposed under the self-cleaning maintenance station body 2000. In some embodiments, the bottom plate 1000 of the self-cleaning maintenance station is detachably or non-detachably connected to the body base 6000 to facilitate transportation.

[0079] In some embodiments, the body base 6000 under the self-cleaning maintenance station body 2000 includes a washing bin 6200; and the washing bin 6200 is configured to supplement a cleaning solution to a wet-type cleaning module of the automatic cleaning device, and/or accommodate debris removed from the wet-type cleaning module, and/or collect sewage generated in a process of cleaning the wet-type cleaning module, thereby facilitating subsequent treatment of the debris and the sewage. In some embodiments, the washing bin 6200 is disposed behind the dust collection opening 6100.

[0080] As shown in FIG. 11, the bottom plate 1000 of the self-cleaning maintenance station includes a bottom plate body 1100 and lifting structures 1300.

[0081] The bottom plate body 1100 is configured to support the automatic cleaning device when the automatic cleaning device returns to the bottom plate 1000 of the self-cleaning maintenance station. In other words, the automatic cleaning device may move onto the bottom plate 1000 of the self-cleaning maintenance station, and is supported by the bottom plate body 1100. Specifically, in a process in which the automatic cleaning device moves onto the bottom plate 1000 of the self-cleaning maintenance station, driving wheels of the automatic cleaning device travel on an inclined surface of the bottom plate body 1100.

[0082] Referring to FIG. 11 and FIG. 13 as well, the body base 6000 and the bottom plate body 1100 are sequentially arranged in a first direction X; and the bottom plate 1000 and the body base 6000 are connected to each other. Specifically, in the first direction X, the body base 6000 includes a starting end and a terminating end, and the bottom plate body 1100 also includes a starting end and a terminating end, where the terminating end of the body base 6000 is abutted with the starting end of the bottom plate body 1100. In some embodiments, the body base 6000 and the bottom plate body 1100 are detachably or non-detachably connected to each other, facilitating transportation.

[0083] The body base 6000 and the bottom plate body 1100 form at least one inclined surface that is continuous in the first direction X, to allow the driving wheels of the automatic cleaning device to travel on the inclined plane relatively smoothly. In some embodiments, the driving wheels of the automatic cleaning device are located on two sides of the bottom. Correspondingly, the body base 6000 and the bottom plate body 1100 form a continuous inclined surface matched with positions of the driving wheels, to allow the driving wheels to travel on the inclined plane. In some embodiments, the bottom plate body 1100 further includes a recessed portion 1121 and raised portions 1122. The recessed portion 1121 is located in the center of the bottom plate body 1100, and the raised portions 1122 are located on two sides of the recessed portion. An included angle between an upper surface of the recessed portion 1121 and the horizontal plane is smaller than an included angle between the upper surface of the raised portion 1122 and the horizontal plane.

[0084] In some embodiments, the included angle between the upper surface of the recessed portion 1121 and the horizontal plane may be nearly zero. The starting end of each raised portion 1122 and the terminating end of the body base 6000 are abutted with each other and are of the same height, such that the raised portions 1122 and the body base 6000 form two continuous inclined surfaces that are matched with the driving wheels. Because the recessed portion 1121 is disposed at the central position of the bottom plate body 1100, the automatic cleaning device is prevented from being blocked by or rubbed against the surface of the bottom plate body 1100 in a process of climbing on a pile and leaving the pile.

[0085] Further, each raised portion 1122 of the bottom plate body 1100 is provided with an anti-skid structure 1123 in the first direction X; and the anti-skid structure 1123 is at least disposed at the starting end and the terminating end of the bottom plate body 1100 in the first direction. The anti-skid structure 1123 may be a convex bar or groove of any shape, and for example, may be a strip protrusion extending in a second direction Y, wherein the second direction Y is perpendicular to the first direction X. The anti-skid structure 1123 disposed on the raised portion 1122 can further help the automatic cleaning device to climb on and leave the pile successfully.

[0086] In some embodiments, the body base 6000 includes an upper surface, denoted as a first upper surface. When the body base 6000 is placed on the horizontal ground, there is a preset tilt angle between the upper surface of the body base 6000 and a horizontal plane, where a slope factor corresponding to the preset tilt angle is denoted as a first slope factor. Similarly, the bottom plate body 1100 includes an upper surface, denoted as a second upper surface. When the bottom plate body 1100 is placed on the horizontal ground, there is a preset tilt angle between the upper surface of the bottom plate body 1100 and a horizontal plane, where a slope factor corresponding to the preset tilt angle is denoted as a

second slope factor. In some embodiments, the bottom plate body 1100 includes a recessed portion 1121 and raised portions 1122; and the second slope factor is a slope factor of the upper surface of the raised portion 1122 relative to the horizontal plane. In some embodiments, the following relationship may exist between the first slope factor and the second slope factor: the first slope factor is greater than the second slope factor. Because the automatic cleaning device has relatively small power when just climbing on the self-cleaning maintenance station, setting the second slope factor to a smaller value is beneficial for the automatic cleaning device to climb on a pile.

[0087] As shown in FIG. 13, the dust collection opening 6100 is configured to be docked with a dust outlet of the automatic cleaning device; and the garbage in the dust box of the automatic cleaning device enters a dust collection station of the self-cleaning maintenance station body 2000 through the dust collection opening 6100. In some embodiments, a sealing rubber gasket is also disposed around the dust collection opening 6100, and is used for sealing after the dust collection opening 6100 is docked with the dust outlet of the automatic cleaning device, thereby preventing leakage of the garbage. The dust collection opening 6100 is located on the upper surface of the body base 6000, and is approximately disposed at the edge of a joint between the body base 6000 and the bottom plate body 1100.

[0088] Referring to FIG. 11 and FIG. 12 as well, each lifting structure 1300 is disposed on the upper surface of the bottom plate body 1100, and is approximately disposed at the edge of a joint between the bottom plate body 1100 and the body base 6000. In some embodiments, the lifting structure 1300 is disposed on the recessed portion 1121 of the bottom plate body 1100, and configured to: in a process in which the automatic cleaning device moves back onto the bottom plate 1000 of the self-cleaning maintenance station (at this moment, a front side of a body of this device faces an outer side of the self-cleaning maintenance station body 2000, namely, the first direction X), press the cleaning module on the bottom surface of the automatic cleaning device, such that the cleaning module moves towards the interior of the automatic cleaning device. For example, the cleaning module on the bottom surface of the automatic cleaning device is pressed into the automatic cleaning device.

[0089] In a process in which the automatic cleaning device moves backwards onto the bottom plate 1000 of the self-cleaning maintenance station in the first direction X to allow the dust outlet of the automatic cleaning device to be docked with the dust collection opening 6100 in the body base 6000, if there is no lifting structure 1300 disposed on the upper surface of the bottom plate body 1100, the cleaning module (for example, the mop support of the wet-type cleaning module) of the automatic cleaning device may be stuck in the dust collection opening 6100 when passing by the dust collection opening 6100, such that the automatic cleaning device 100 cannot climb on or leave the pile successfully.

[0090] Because the lifting structure 1300 is disposed on the upper surface of the bottom plate body 1100, in a process in which the automatic cleaning device moves backwards onto the bottom plate 1000 of the self-cleaning maintenance station in the first direction X to enable the cleaning module of the automatic cleaning device to be docked with the washing bin in the self-cleaning maintenance station body 2000, first, the lifting structure 1300 may be abutted with at least a part of a frame of the cleaning module to enable the cleaning module to be lifted up for a specific height (for example, 8 mm), and at this moment, the cleaning module is pressed by the lifting structure 1300, such that the cleaning module moves towards the interior of the automatic cleaning device (for example, is pressed by the lifting structure 1300 into the automatic cleaning device); and then, as the automatic cleaning device continuously moves backwards in the first direction X, the frame of the cleaning module is passing above the dust collection opening 6100 and is gradually separated from the lifting structure 1300. In this process, even if the cleaning module is completely separated from the lifting structure 1300, the cleaning module can still gently pass the dust collection opening 6100 in a clinging manner because the cleaning module has been partially or completely located above the dust collection opening 6100. After completely passing the dust collection opening 6100, the cleaning module gradually returns under the action of gravity to a state before being pressed by the lifting structure 1300. That is, at least a part of the cleaning module protrudes from the automatic cleaning device in a direction distal from the automatic cleaning device. In this way, the cleaning module falls back under the action of gravity for a specific height (for example, 8 mm), such that the cleaning module is completely docked with the washing bin.

[0091] Because the lifting structure 1300 is disposed on the upper surface of the bottom plate body 1100, the dust collection opening 6100 can be avoided from blocking the cleaning module in the process that the automatic cleaning device climbs on or leaves a pile, thereby improving the success rate of the automatic cleaning device in entering and leaving the self-cleaning maintenance station is improved.

[0092] In some embodiments, the lifting structure 1300 includes a wedge-shaped component 1310 and a roller 1320.

[0093] The wedge-shaped component 1310 is disposed on the upper surface of the bottom plate body 1100, and protrudes from the upper surface of the bottom plate body 1100 in a direction distal from the upper surface. The wedge-shaped component 1310 includes a first inclined surface 1311, a first top surface 1313 and a second inclined surface 1312 in the first direction X sequentially. The first inclined surface 1311, the first top surface 1313, and the second inclined surface 1312 are abutted with each other sequentially in the first direction X.

[0094] An acute included angle between the first in-

clined surface 1311 and the upper surface of the bottom plate body 1100 having the first inclined surface is a first included angle α. An acute included angle between the second inclined surface 1312 and the upper surface of the bottom plate body 1100 having the second inclined surface is a second included angle β. In some embodiments, the first included angle α is smaller than the second included angle β, such that when the automatic cleaning device moves backwards onto the bottom plate body 1100 in the first direction X, the automatic cleaning device can be pressed gently and fall back quickly. Specifically, in some embodiments, the first included angle α may range from 5° to 25°, for example, may be 5° or 25°, may range from 10° to 15°, or may be 10° or 15°, such that when the automatic cleaning device moves backwards onto the bottom plate body 1100 in the first direction X, the cleaning module on the bottom surface of the automatic cleaning device is gently pressed by the lifting structure 1300. In some embodiments, the second included angle β may range from 75° to 90°, for example, may be 75° or 90°, may range from 80° to 85°, or may be 80° or 85°, such that the cleaning module falls back quickly under the action of gravity after the frame of the cleaning module is separated from the lifting structure 1300.

[0095] It can be understood that if the wedge-shaped component 1310 is disposed on the recessed portion 1121 of the bottom plate body 1100, the first included angle α is an included angle between the first inclined surface 1311 and the upper surface of the recessed portion 1121, and the second included angle β is an included angle between the second inclined surface 1312 and the upper surface of the recessed portion 1121. If the wedge-shaped component 1310 is disposed on the raised portion 1122 of the bottom plate body 1100, the first included angle α is an included angle between the first inclined surface 1311 and the upper surface of the raised portion 1122, and the second included angle β is an included angle between the second inclined surface 1312 and the upper surface of the raised portion 1122.

[0096] The roller 1320 is disposed on the first top surface 1313, and is configured to be in rolling contact with the cleaning module in a process that the cleaning module on the bottom surface of the automatic cleaning device is pressed to moves towards the interior of the automatic cleaning device. Due to the roller 1320, frictional resistance between the frame of the cleaning module and the wedge-shaped component 1310 can be reduced, thereby reducing abrasion between components, and prolonging service lives of the components.

[0097] In some embodiments, a part of the roller 1320 is embedded into the wedge-shaped component 1310, such that sliding contact between the lifting structure 1300 and the frame of the cleaning module can be smoothly transitioned to the rolling contact. In some embodiments, the roller 1320 is detachably connected to the wedge-shaped component 1310, such that the roller 1320 can be replaced conveniently.

[0098] In some embodiments, there are at least two lifting structures 1300. The at least two lifting structures 1300 are arranged oppositely in the second direction Y, where the second direction Y is perpendicular to the first direction X. In a process that the automatic cleaning device moves backwards onto the bottom plate body 1100 in the first direction X, the at least two lifting structures 1300 are separately abutted with the frame of the cleaning module, such that the cleaning module is evenly lifted up for a specific height. Force acting on the cleaning module can be better dispersed by setting two or more lifting structures 1300, to avoid deflection of the cleaning module in the second direction Y caused by uneven force.

[0099] In some embodiments, there are two lifting structures 1300. The two lifting structures 1300 are arranged oppositely in a second direction Y; and the two lifting structures 1300 are approximately disposed symmetric about a central axis of the bottom plate body 1100. A distance between the two lifting structures 1300 is equivalent to or slightly greater than the width of the dust collection opening 6100 in the second direction Y, such that a main brush cover under the automatic cleaning device can be prevented from being shielded.

[0100] In some embodiments, the bottom plate 1000 of the self-cleaning maintenance station further includes a beveled body 1400. The beveled body 1400 may be a slope, and is disposed on the surface of the bottom plate body 1100. Specifically, the beveled body 1400 may be disposed at the edge of a j oint between the bottom plate body 1100 and the body base 6000, and is approximately located in front of the dust collection opening 6100 and on the central axis of the bottom plate body 1100. In some embodiments, there are two lifting structures 1300 that are arranged oppositely in the second direction Y; and the beveled body 1400 is approximately disposed between the two lifting structures 1300. Because the beveled body 1400 is disposed on the surface of the bottom plate body 1100, when the automatic cleaning device climbs on a pile in a forward direction, a front end of the automatic cleaning device (particularly, a collision sensor disposed at the front end) can be avoided from being in contact with the edge of the dust collection opening 6100.

[0101] In some embodiments, the beveled body 1400 is disposed on the recessed portion 1121 of the bottom plate body 1100. In some embodiments, as shown in FIG. 13, both the beveled body 1400 and the lifting structure 1300 are disposed on the recessed portion 1121 of the bottom plate body 1100. Because the recessed portion 1121 is disposed at the central position of the bottom plate body 1100, and both the beveled body 1400 and the lifting structure 1300 are disposed on the recessed portion 1121, the automatic cleaning device can be prevented from being blocked by or rubbed against the surface of the bottom plate body 1100 in a process of climbing on a pile and leaving the pile.

[0102] In some embodiments, the lifting structure 1300 is disposed on the recessed portion 1121 of the bottom plate body 1100, and the height of the lifting structure

1300 is higher than the raised portion 1122, such that the cleaning module on the bottom surface of the automatic cleaning device can be pressed effectively, to allow the cleaning module to move towards the interior of the automatic cleaning device for a relatively large distance.

[0103] In some embodiments, the beveled body 1400 is disposed on the recessed portion 1121 of the bottom plate body 1100, and the height of the beveled body 1400 is approximately flush with the raised portion 1122. If the height of the beveled body 1400 is too low, the beveled body cannot perform a function of preventing the automatic cleaning device from touching the edge of the dust collection opening 6100 when the automatic cleaning device climbs on the pile. However, if the height of the beveled body 1400 is too high, the beveled body blocks the automatic cleaning device when the automatic cleaning device climbs on and leaves a pile.

[0104] In some embodiments, there is a preset distance between the lifting structure 1300 and the terminating end of the bottom plate body 1100, where the preset distance meets the following condition that in a process in which the automatic cleaning device moves back onto the bottom plate 1000 of the self-cleaning maintenance station, the lifting structure 1300 is not in contact with the cleaning module before the driving wheels of the automatic cleaning device reach the terminating end of the bottom plate body 1100. The reason for such an arrangement lies in that, before the driving wheels of the automatic cleaning device are in contact with the anti-skid structures 1123 at the starting ends, the retreat force of the automatic cleaning device is relatively small, and if the lifting structure 1300 is in contact with the cleaning module (for example, the mop cloth support) in this stage, the automatic cleaning device's way to the self-cleaning maintenance station is blocked. As a result, the automatic cleaning device may fail to climb on the pile. Correspondingly, when the driving wheels of the automatic cleaning device enter the terminating end of the bottom plate body 1100, the lifting structures 1300 may prop up the cleaning module. In this case, the automatic cleaning device has already stepped on the anti-skid structures 1123, and can successfully climb on or leave the pile with the assistance of the anti-skid structures 1123.

[0105] The present disclosure further provides a self-cleaning system, including an automatic cleaning device and the self-cleaning maintenance station as defined the foregoing embodiments.

[0106] According to the self-cleaning maintenance station and the self-cleaning system provided in the embodiments of the present disclosure, by arranging the lifting structures on the bottom plate body, the scratching or jamming occurring to the cleaning module in the process that the automatic cleaning device climbs on and leaves a pile can be avoided. Therefore, a success rate of the automatic cleaning device in climbing on and leaving the pile can be improved.

[0107] Generally, the structure of an air duct of a self-cleaning maintenance station in the related art is relatively complex, and needs to occupy a relatively large physical space, resulting in a relatively bulky appearance of the self-cleaning maintenance station. In addition, the complex structure of the air duct also weakens a dust collection effect to a certain extent. As a result, it is hard to suck all garbage from a dust box into a dust collection chamber of the self-cleaning maintenance station.

[0108] In view of this, an embodiment of the present disclosure provides a self-cleaning maintenance station. The structure of an air duct in the self-cleaning maintenance station is optimized and a path of the wind duct is reduced, such that the air duct of the self-cleaning maintenance station is smoother and has a more compact structure. Therefore, dust collection efficiency of an automatic cleaning device can be improved.

[0109] Specifically, the self-cleaning maintenance station provided in this embodiment of the present disclosure is used as an example. FIG. 14 exemplarily shows a schematic diagram of an overall structure of a self-cleaning maintenance station combined with a dust box. FIG. 15 and FIG. 16 specifically show the structure of an air duct of a self-cleaning maintenance station and an advancing direction of an airflow in the air duct in a dust collection state.

[0110] As shown in FIG. 14, the self-cleaning maintenance station provided in this embodiment includes a bottom plate 1000 of the self-cleaning maintenance station and a self-cleaning maintenance station body 2000. The bottom plate 1000 of the self-cleaning maintenance station is detachably or non-detachably connected to the self-cleaning maintenance station body 2000. Specifically, the bottom plate 1000 of the self-cleaning maintenance station is detachably or non-detachably connected to a body base 6000 under the self-cleaning maintenance station body 2000. The detachable connection manner can facilitate transportation and maintenance.

[0111] The self-cleaning maintenance station body 2000 is configured to collect garbage in the dust box of the automatic cleaning device. In some embodiments, components such as a dust collection bin 3000, a clean water tank 4000 and a sewage tank 5000 may also be disposed side by side on the self-cleaning maintenance station body 2000. Specifically, as shown in FIG. 2, the self-cleaning maintenance station body 2000 includes a water storage chamber 2700 and a dust collection chamber 2100. The water storage chamber 2700 with an opening facing upward and forward is disposed at the top of the self-cleaning maintenance station body 2000. The water storage chamber may further include a clean water bin for accommodating the clean water tank 4000 and a sewage bin for accommodating the sewage tank 5000. The dust collection chamber 2100 with an opening facing upward and forward is disposed at the top end of the self-cleaning maintenance station body 2000, is disposed side by side with the water storage chamber 2700, and constitutes a dust collection bin 3000 for accommodating a dust collection hood 2800. Due to the upward and forward design of both the water storage chamber 2700 and

the dust collection chamber 2100, convenience is brought for mounting and demounting of the sewage tank 5000, the clean water tank 4000, and the dust collection hood 2800.

[0112] The body base 6000 is disposed under the self-cleaning maintenance station body 2000. In some embodiments, the body base 6000 is integrally disposed under the self-cleaning maintenance station body 2000. The body base 6000 is further abutted with the bottom plate 1000 of the self-cleaning maintenance station. Specifically, the bottom plate 1000 of the self-cleaning maintenance station and the body base 6000 are disposed sequentially in a second direction, where the second direction is a direction opposite an arrow of the front and rear axis X.

[0113] As shown in FIG. 14, the dust collection opening 6100 is formed in the body base 6000, and is approximately located at the edge of a joint between the body base 6000 and the bottom plate 1000 of the self-cleaning maintenance station. The dust collection opening 6100 is configured to be docked with a dust outlet of the automatic cleaning device; and garbage in the dust box 300 of the automatic cleaning device enters the dust collection chamber 2100 of the self-cleaning maintenance station body 2000 through the dust collection opening 6100. In some embodiments, a sealing rubber gasket is also disposed around the dust collection opening 6100, and is used for sealing after the dust collection opening 6100 is docked with the dust outlet of the automatic cleaning device, thereby preventing leakage of the garbage. The dust collection opening 6100 substantially extends in a first direction, where the first direction is a direction opposite an arrow of the transversal axis Y, and the first direction is approximately perpendicular to the second direction. The first direction is also a length direction of the dust collection opening 6100. A distance by which the dust collection opening 6100 extends in the first direction may be denoted as a length L_1. In addition to the first direction, the dust collection opening 6100 also extends in a second direction. The second direction is a width direction of the dust collection opening 6100; and a distance by which the dust collection opening 6100 extends in the second direction may be denoted as a width W_1. It can be understood that a relationship between the length L_1 and the width W_1 is as follows: $L_1 > W_1$.

[0114] In some embodiments, the body base 6000 further includes a washing bin 6200. The washing bin 6200 is configured to clean a cleaning component on the automatic cleaning device, for example, supplement a cleaning solution to a wet-type cleaning module of the automatic cleaning device, and/or accommodate debris removed from the wet-type cleaning module, and/or collect sewage generated in a process of cleaning the wet-type cleaning module, thereby facilitating subsequent treatment of the debris and the sewage. In some embodiments, the washing bin 6200 is disposed behind the dust collection opening 6100. The washing bin 6200 extends in the second direction to the lower part of the self-cleaning maintenance station body 2000. A side wall may be formed between the self-cleaning maintenance station body 2000 and the washing bin 6200.

[0115] Referring to FIG. 15 and FIG. 16 as well, the self-cleaning maintenance station body 2000 further includes an air duct 2500. One end of the air duct 2500 is communicated with a dust collection opening 6100 in a body base 6000. The other end of the air duct 2500 is communicated with the dust collection chamber 2100. When the self-cleaning maintenance station is in a dust collection state, a sufficient negative pressure is generated in the dust collection bin 3000 to suck garbage in the dust box 300 into a dust collection bag through the dust collection opening 6100 and the air duct 2500. The air duct 2500 may be further classified into an air duct body 2510 and an air duct base 2520 based on its position. The air duct base 2520 is substantially located at the position shown in the dashed-line box at the lower right corner of FIG. 15. The air duct body 2510 is substantially located at the position shown in the dashed-line box at the upper right corner of FIG. 15. Solid arrows in FIG. 15 and FIG. 16 show moving trajectory of garbage in the air duct base 2520 and the air duct body 2510 under the action of airflows. Details are as follows.

[0116] The air duct base 2520 is located in the body base 6000, and is of an approximately L-shaped structure. One end of the air duct base 2520 is communicated with the dust collection opening 6100 in the length direction; and the other end of the air duct base 2520 is communicated with the air duct body 2510 on the side wall of the self-cleaning maintenance station body 2000. Specifically, the air duct base 2520 is communicated with the dust collection opening 6100 the length direction, extends in the first direction to a position near an edge of the body base 6000, and then extends in the second direction to the air duct body 2510. In some embodiments, the air duct base 2520 is communicated with the dust collection opening 6100 at one end of the dust collection opening 6100 in the length direction, such that an airflow and garbage driven thereby directly flow out of one end of the dust collection opening 6100 in the length direction and then go forward along a nearly straight line, reducing resistance to the airflow flowing out of the dust collection opening 6100. In some embodiments, the position at which the air duct base 2520 extends in the second direction is between an edge of the washing bin 6200 and an edge of the body base 6000, such that a finite space in the body base 6000 can be used sufficiently, reducing overall dimensions of a product. In some embodiments, the width of the air duct base 2520 is slightly smaller than the width of the dust collection opening 6100. The width of the air duct may be the maximum value of a cross section of the air duct. For example, when the cross section of the air duct is circular or nearly circular, the width of the air duct is the diameter of a circle or the length of a long axis of an ellipse. The width of the air duct base 2520 is reduced appropriately, such that a

flow velocity of an airflow in the air duct base 2520 can be increased. Therefore, garbage in the dust box 300 can pass through the air duct base 2520 more easily, thereby avoiding blockage of the air duct base 2520 and improving a dust collection effect. In some embodiments, the air duct base 2520 has a smoothly arc connection at the turn where the air duct base extends in the first direction and the second direction. Although the first direction and the second direction are nearly perpendicular to each other, the air duct base 2520 does not turn at a right angle at the turn between the first direction and the second direction, but turns with an arc that is tangent to both sides of the right angle to replace an original right angle, such that an airflow can flow through the air duct base 2520 more gently, without any abrupt change in the flow velocity. Similarly, smoothly arc connections may also be used at the turns when the air duct base 2520 extends in the second direction and the air duct body 2510 extends upwards.

[0117] The air duct body 2510 is disposed on at least the side wall of the self-cleaning maintenance station body 2000. One end of the air duct body 2510 is communicated with the air duct base 2520. The other end of the air duct body 2510 leads to the dust collection chamber 2100. The air duct body 2510 communicates the air duct base 2520 with the dust collection chamber 2100. Specifically, the air duct body 2510 extends upwards along the side wall of the self-cleaning maintenance station body 2000 to the dust collection bin 3000. A side wall along which the air duct body 2510 extends may be jointly formed by a side edge of the washing bin 6200 and a side edge of the self-cleaning maintenance station body 2000. Due to the foregoing design of the air duct body 2510, a spare space between the self-cleaning maintenance station body 2000 and the washing bin 6200 can be used sufficiently, enabling the structure to be more compact. In some embodiments, the width of the air duct body 2510 is greater than the width of the air duct base 2520. A width relationship between the air duct body 2510 and the air duct base 2520 is adjusted appropriately, such that a flow velocity of an airflow in the air duct base 2520 can be increased. Therefore, garbage in the dust box 300 can pass through the air duct base 2520 more easily, thereby avoiding blockage of the air duct base 2520 and improving a dust collection effect.

[0118] In some embodiments, the air duct body 2510 and the air duct base 2520 are two independent structures and are communicated with each other at a joint therebetween. The discrete structures can facilitate maintenance of the duct, particularly maintenance performed when the duct is blocked. In some embodiments, the air duct body 2510 and the air duct base 2520 are of an integral structure. Due to the integral structure, leakage of an airflow in the air duct can be avoided effectively.

[0119] The present disclosure further provides a self-cleaning system, including an automatic cleaning device and the self-cleaning maintenance station as defined in the foregoing embodiments.

[0120] Referring to FIG. 14 and FIG. 16 as well, the dust box 300 included in the automatic cleaning device is shown in the figures, and includes a dust inlet 310 and an air inlet 320. The air inlet 320 is formed in a side wall of the dust box 300 facing a first extending direction of the air duct base 2520. The dust inlet 310 is formed in a side wall of the dust box 300 facing the self-cleaning maintenance station body 2000. The dust inlet 310 is docked with the dust outlet of the automatic cleaning device.

[0121] In the dust collection state, the air inlet 320 of the dust box 300 is open; and a first fan in the self-cleaning maintenance station starts to operate to suck air out of the dust collection chamber 2100 and the air duct 2500. Therefore, air pressures in the dust collection chamber 2100 and the air duct 2500 become lower; an airflow in a U-shaped channel is formed among the air inlet 320 and the dust inlet 310 of the dust box 300, the dust outlet of the automatic cleaning device, and the dust collection opening 6100 and the air duct 2500 of the self-cleaning maintenance station, and brings away garbage in the dust box 300; and the garbage in the dust box 300 is finally sucked into the dust collection chamber 2100 under the driving of the airflow. The U-shaped channel is an optimal inflow and outflow channel for the airflow. Due to design of the U-shaped channel, the airflow flows more smoothly, such that garbage in the dust box can be taken out of the dust box more easily, and enter the dust collection bin through the air duct.

[0122] According to the self-cleaning maintenance station and the self-cleaning system provided in the embodiment of the present disclosure, the structure of the air duct in the self-cleaning maintenance station is optimized to reduce the path of the air duct, such that the air duct of the self-cleaning maintenance station is smoother and has a more compact structure. Therefore, dust collection efficiency of the automatic cleaning device can be improved.

[0123] Finally, it should be noted that various embodiments in the Description are described in a progressive manner, each embodiment focuses on the differences from the other embodiments, and the same or similar parts among the various embodiments may refer to one another.

[0124] The above embodiments are only used to illustrate the technical solutions of the present disclosure, and are not intended to limit the present disclosure. Although the present disclosure has been described in detail with reference to the foregoing embodiments, those ordinarily skilled in the art should understand that: they can still make modifications to the technical solutions described in the foregoing embodiments, or make equivalent substitutions to some of the technical features; and these modifications or substitutions do not deviate the essence of the corresponding technical solutions from the spirit and scope of the technical solutions of the embodiments of the present disclosure.

Claims

1. A self-cleaning maintenance station, comprising:

   a self-cleaning maintenance station body comprising a water storage chamber, and
   a water storage tank assembled at a top end of the self-cleaning maintenance station body, wherein
   the water storage chamber has a semi-enclosed structure, and the water storage chamber, with an opening facing upward and forward, is disposed at a top of the self-cleaning maintenance station body and is configured to accommodate the water storage tank; and
   the water storage tank, after being at least partially inserted into the water storage chamber, is assembled at the top end of the self-cleaning maintenance station body.

2. The self-cleaning maintenance station according to claim 1, wherein the water storage chamber is formed by a rear wall, a front wall, and side walls of the self-cleaning maintenance station body in a surrounding manner; a height of the rear wall of the self-cleaning maintenance station body is higher than a height of the front wall of the self-cleaning maintenance station body; and the side walls of the self-cleaning maintenance station body are connected to the rear wall and the front wall.

3. The self-cleaning maintenance station according to claim 2, wherein the water storage chamber comprises a raised platform attached to the rear wall of the water storage chamber, extending upwards along a bottom of the water storage chamber to a position lower than a height of the rear wall of the water storage chamber; a height of the raised platform is higher than the height of the front wall; and when the water storage tank is assembled in the water storage chamber, the raised platform supports an end of the water storage tank.

4. The self-cleaning maintenance station according to claim 3, wherein when the water storage tank is assembled in the water storage chamber, a top surface of the water storage tank is higher than the rear wall of the self-cleaning maintenance station body, and a body of the water storage tank is partially disposed outside the water storage chamber.

5. The self-cleaning maintenance station according to claim 3, wherein the water storage tank comprises a sewage tank and a clean water tank that are disposed in the water storage chamber side by side; top surfaces of the sewage tank and the clean water tank are substantially flush to each other; and front surfaces of the sewage tank and the clean water tank are substantially flush to each other.

6. The self-cleaning maintenance station according to claim 5, wherein the water storage chamber comprises a partition plate that divides the water storage chamber into a sewage chamber for accommodating the sewage tank and a clean water chamber for accommodating the clean water tank.

7. The self-cleaning maintenance station according to claim 6, wherein the sewage tank and the clean water tank further comprise handles that are freely and rotatably hinged to tops of the sewage tank and the clean water tank, respectively.

8. The self-cleaning maintenance station according to claim 7, wherein a shock-absorbing cushion is disposed at a top end of the partition plate, and is configured to support the handle when the handle is lowered to reduce vibration of the handle.

9. The self-cleaning maintenance station according to claim 6, wherein each of two sides of the partition plate comprises at least one limiting protrusion; a side wall of the sewage tank facing the partition plate and a side wall of the clean water tank facing the partition plate each comprise at least one limiting recess matched with the limiting protrusion; and after the sewage tank and the clean water tank are assembled in the sewage chamber and the clean water chamber, the limiting protrusion and the limiting recess are matched each other for limiting.

10. A self-cleaning system, comprising: an automatic cleaning device and the self-cleaning maintenance station according to any one of claims 1 to 9.

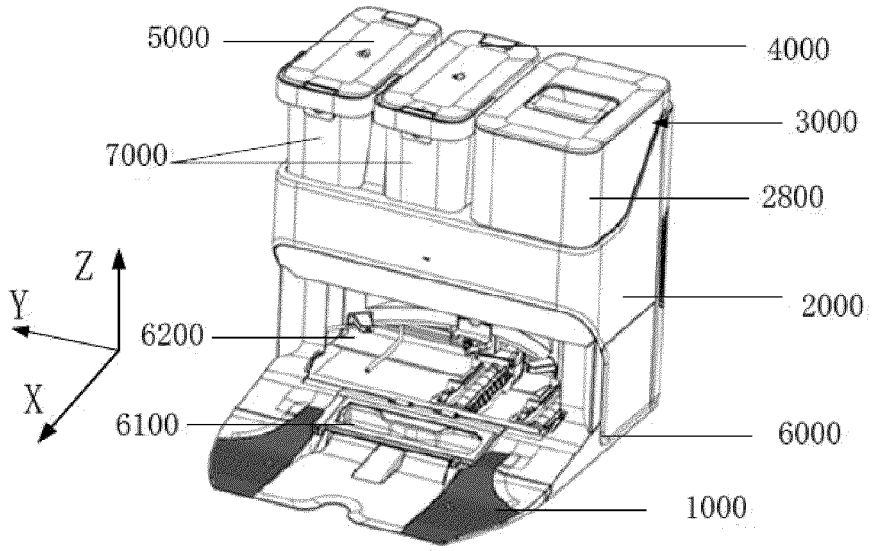
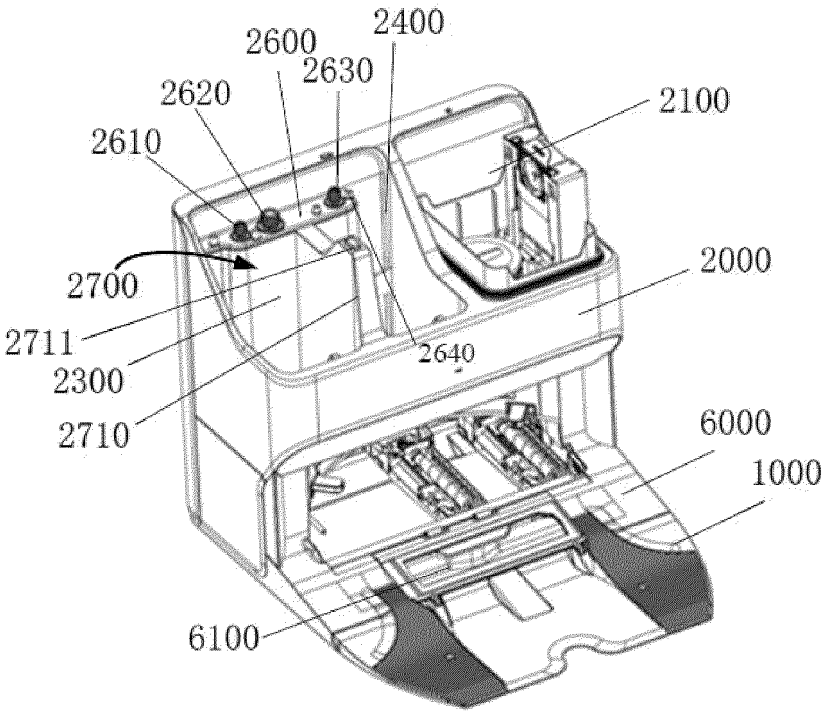


FIG. 1


2600
2400
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2620
2100
2610
2000
2700
2711
2640
2300
2710
6000
1000
6100

FIG. 2

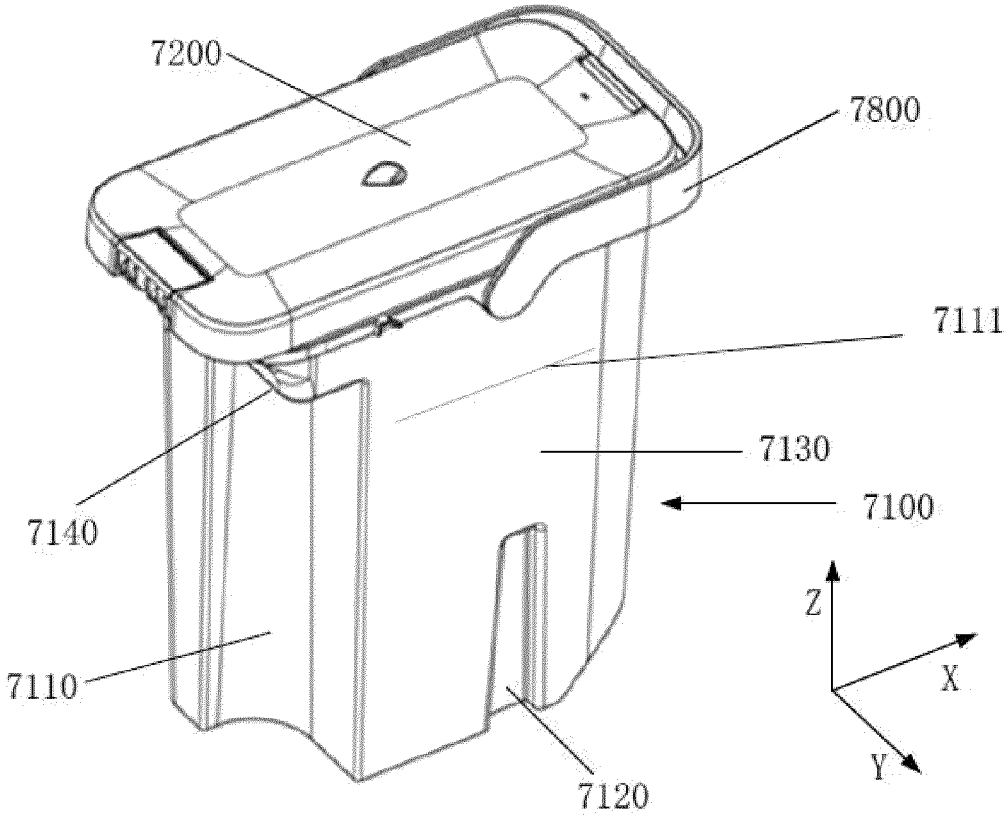


FIG. 3

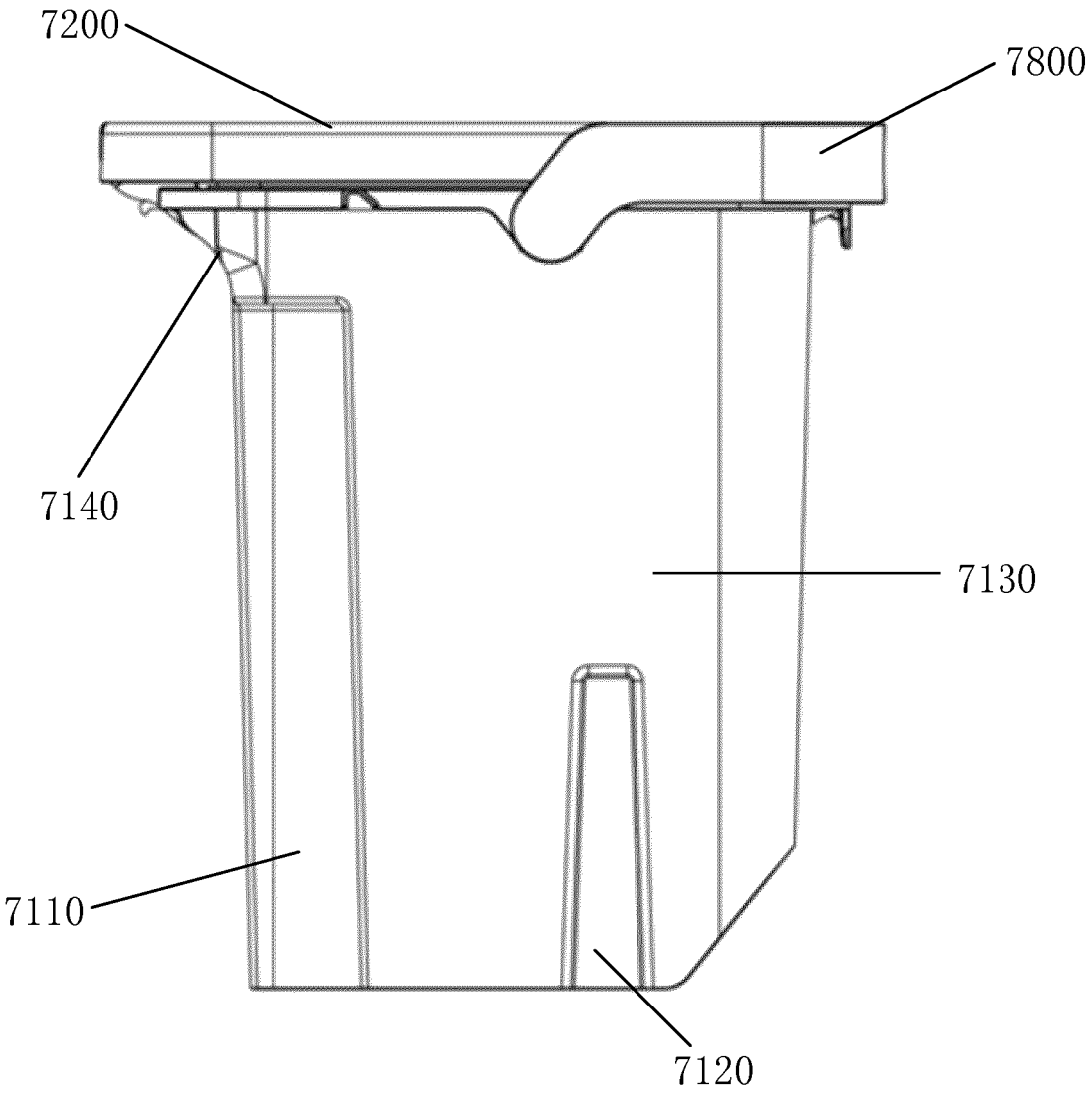


FIG. 4

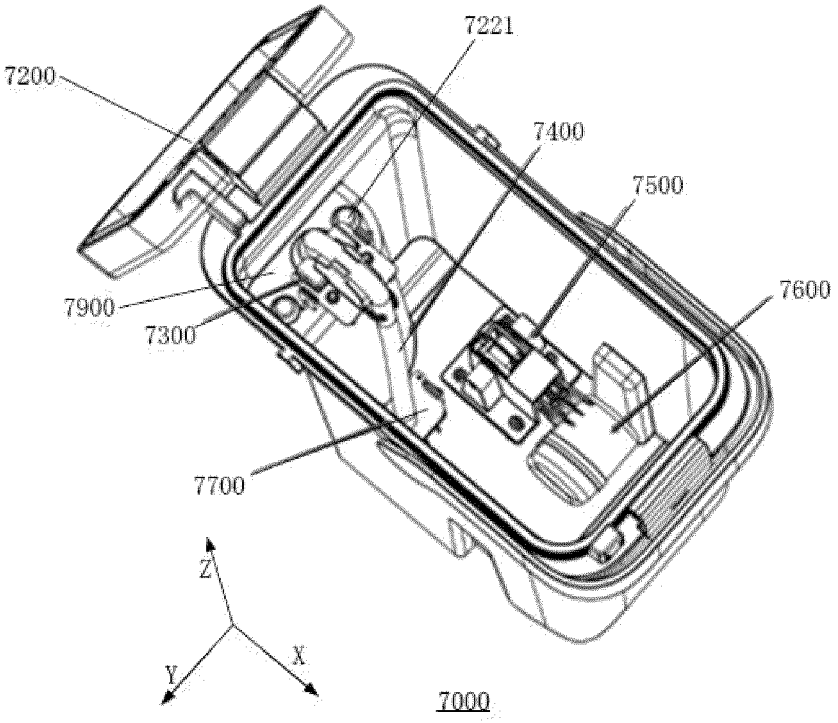
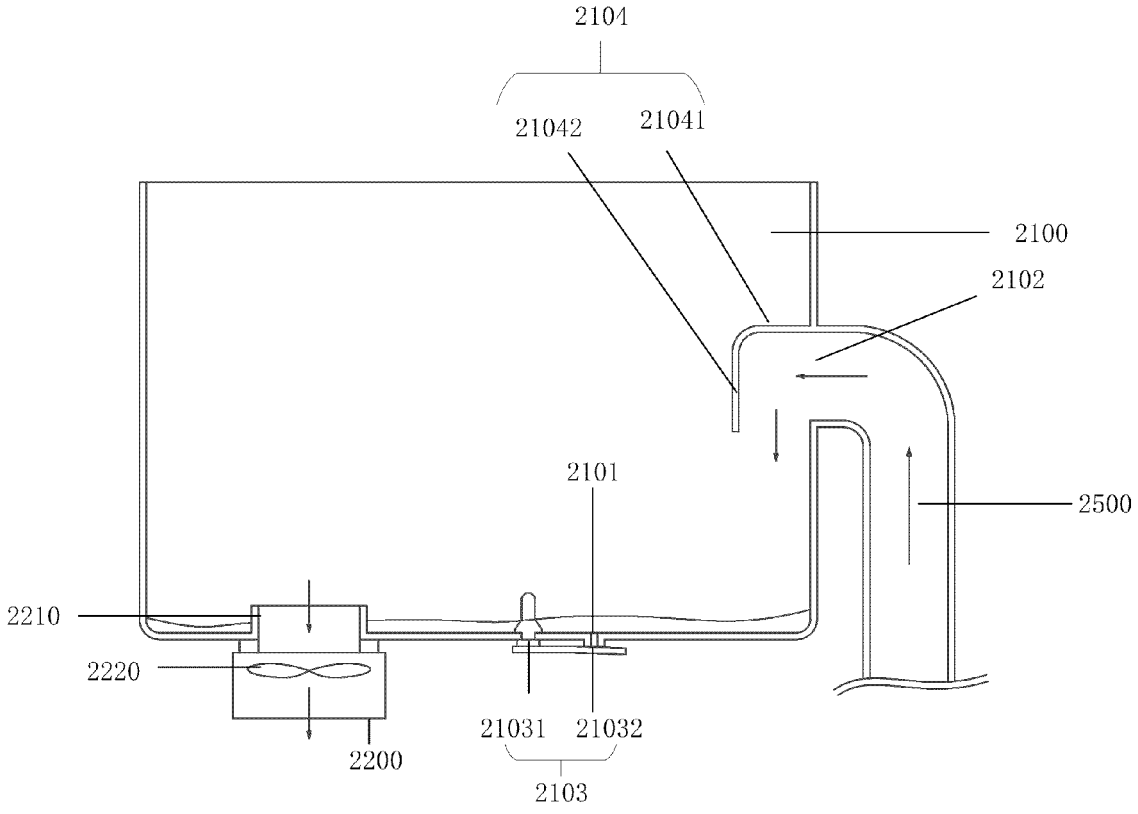

7221
7200
7400
7500
7600
7900
7300
7700
Z
X
Y
7000

FIG. 5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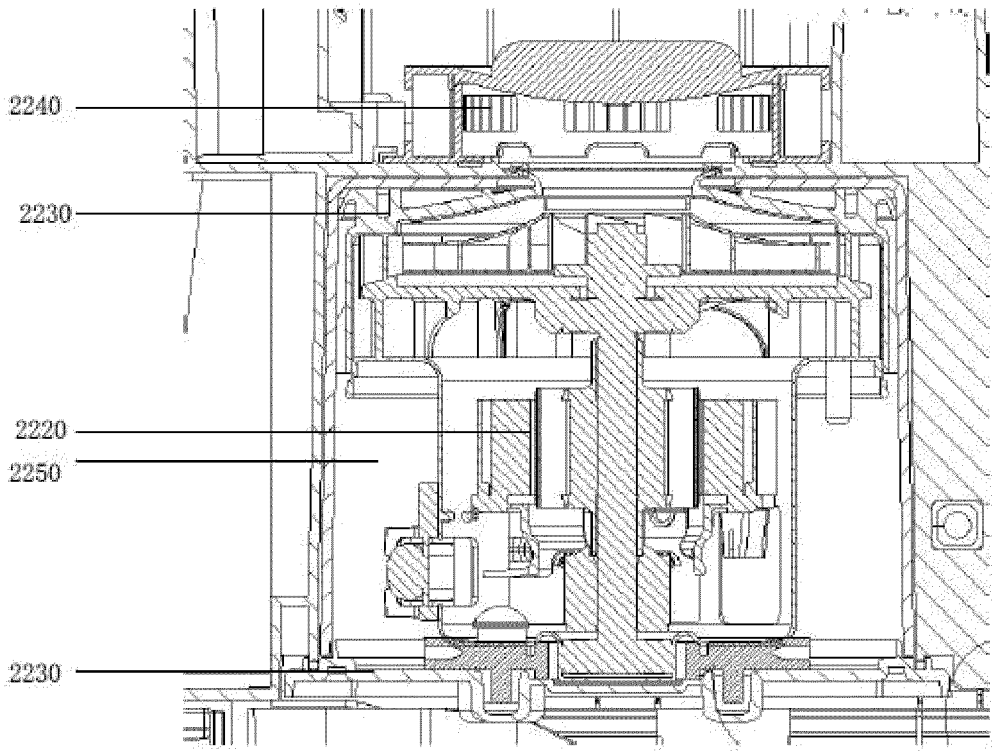
21042
21041
2100
2102
2101
2500
2210
2220
21031
21032
2200
2103

FIG. 6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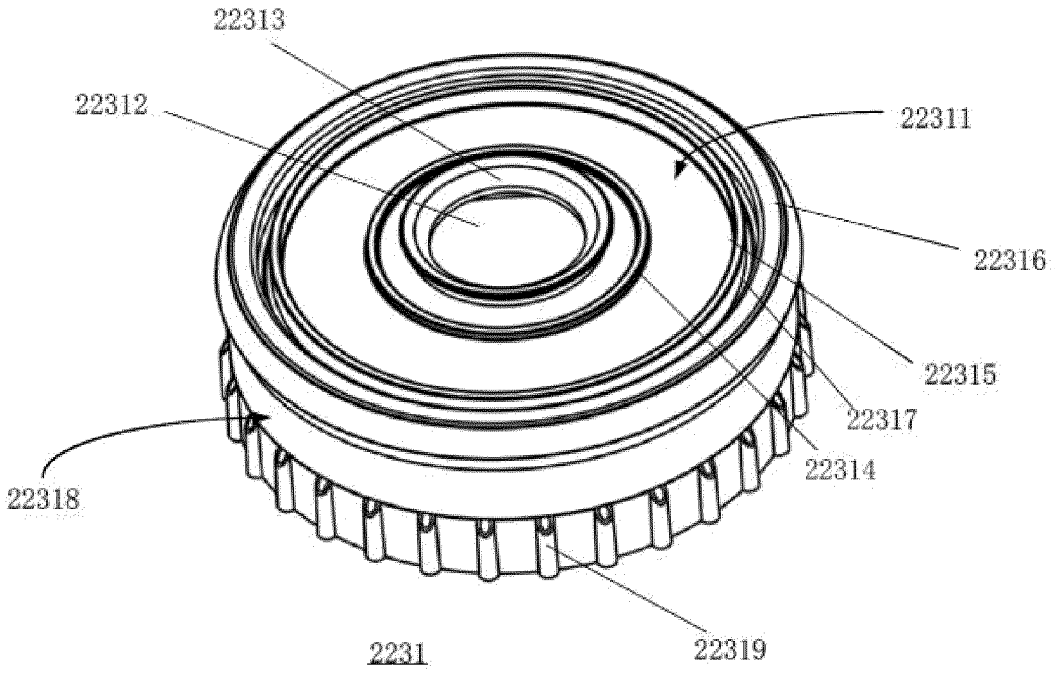
2230
2220
2250
2230

FIG. 7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22311
22316
22315
22317
22314
22318
22319
2231

FIG. 8

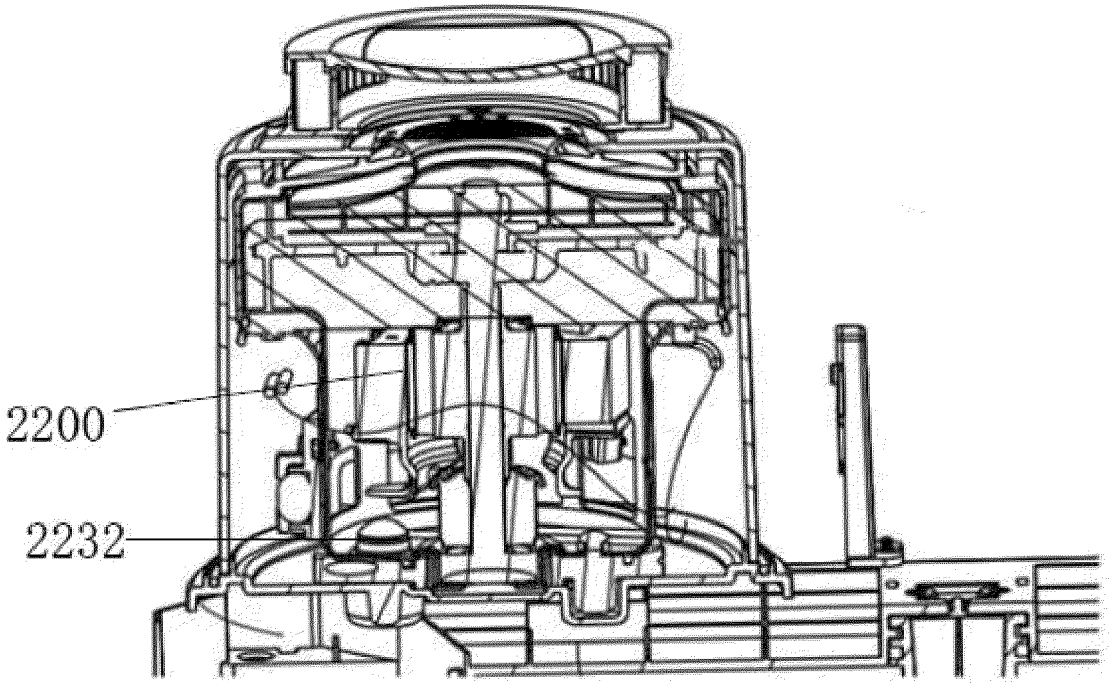


FIG. 9

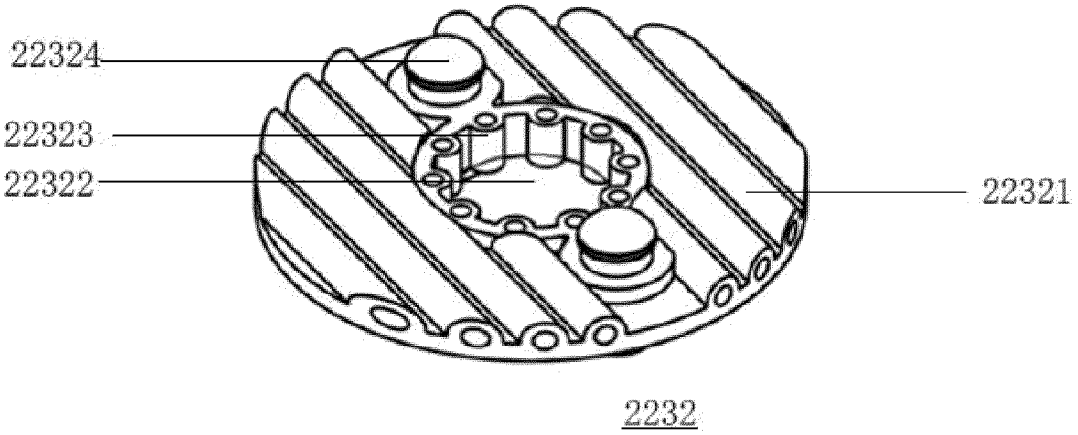


FIG. 10

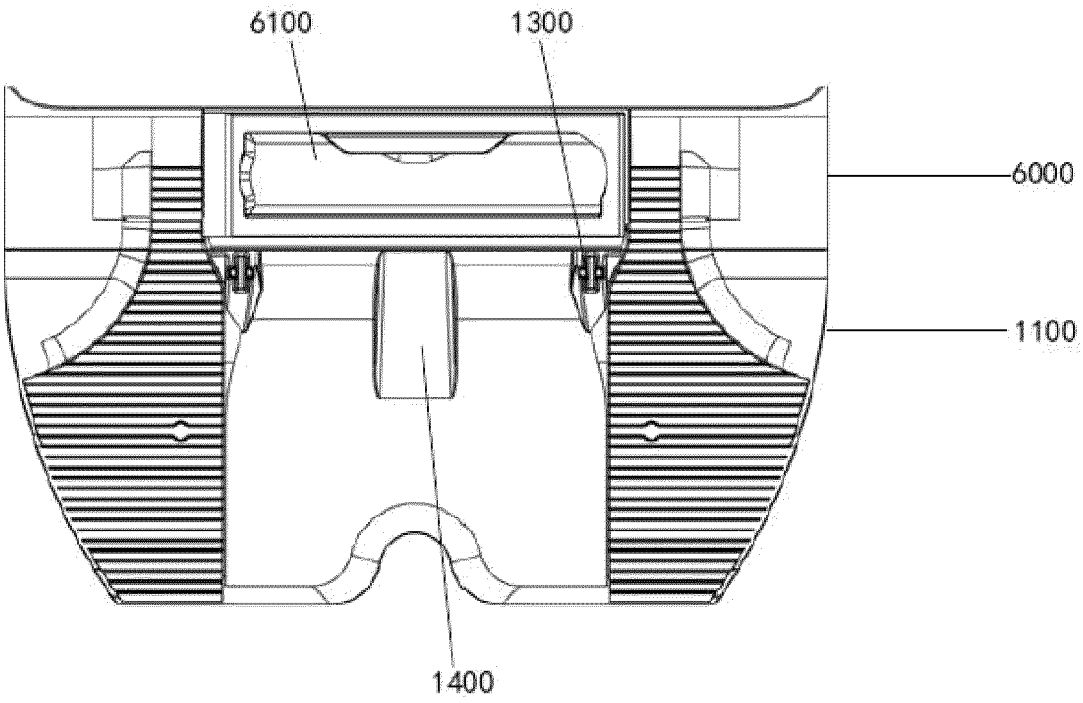


FIG. 11

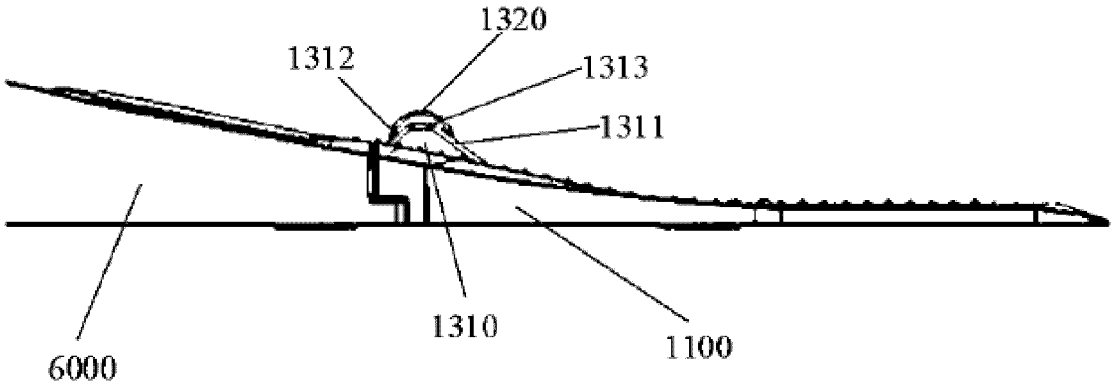
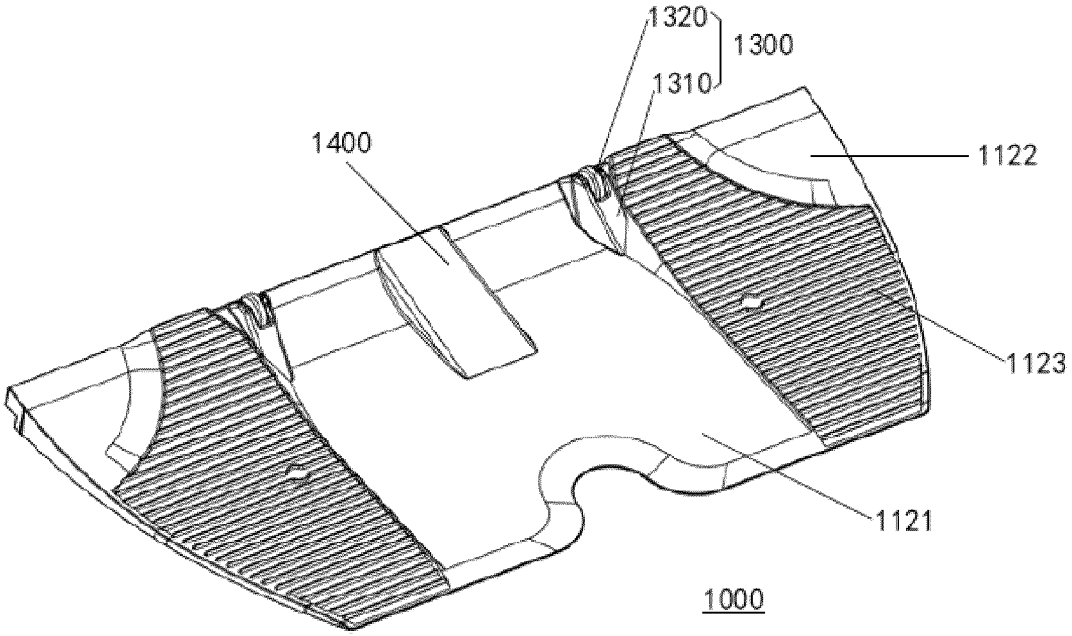


FIG. 12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1300
1310
1400
1122
1123
1121
1000

FIG. 13

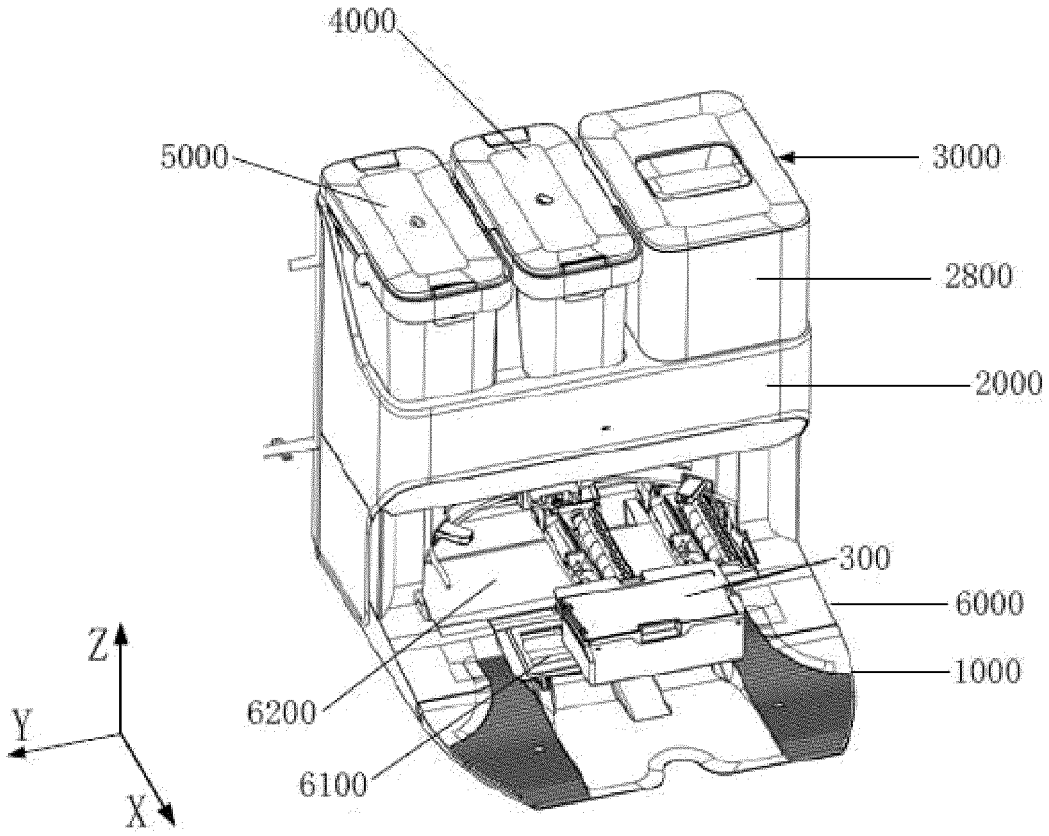
4000
5000
3000
2800
2000
300
6000
1000
6200
6100
Z
Y
X

FIG. 14

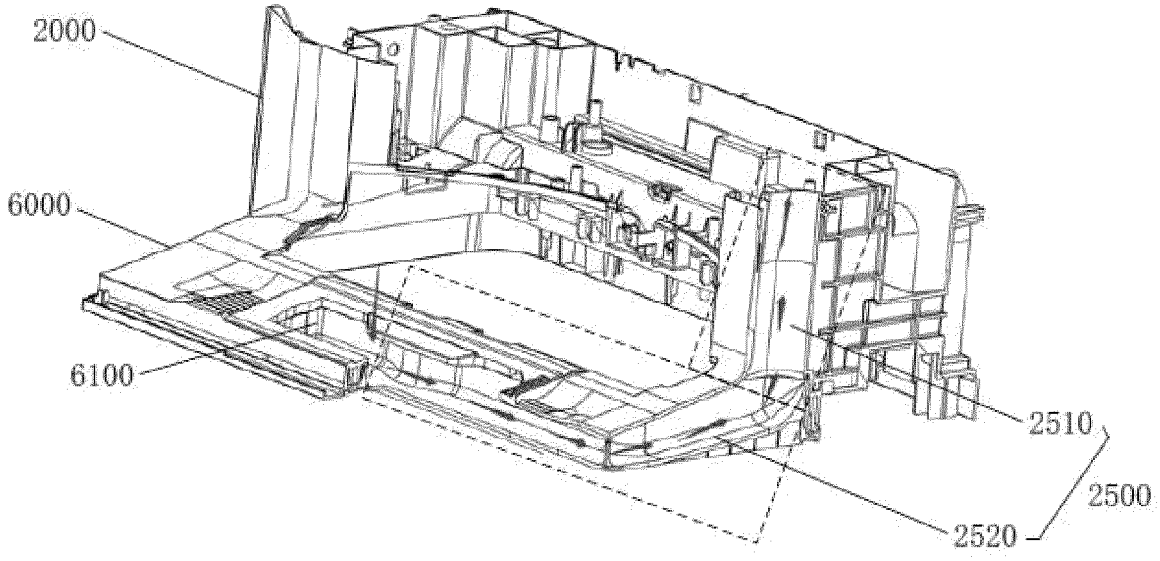

FIG. 15

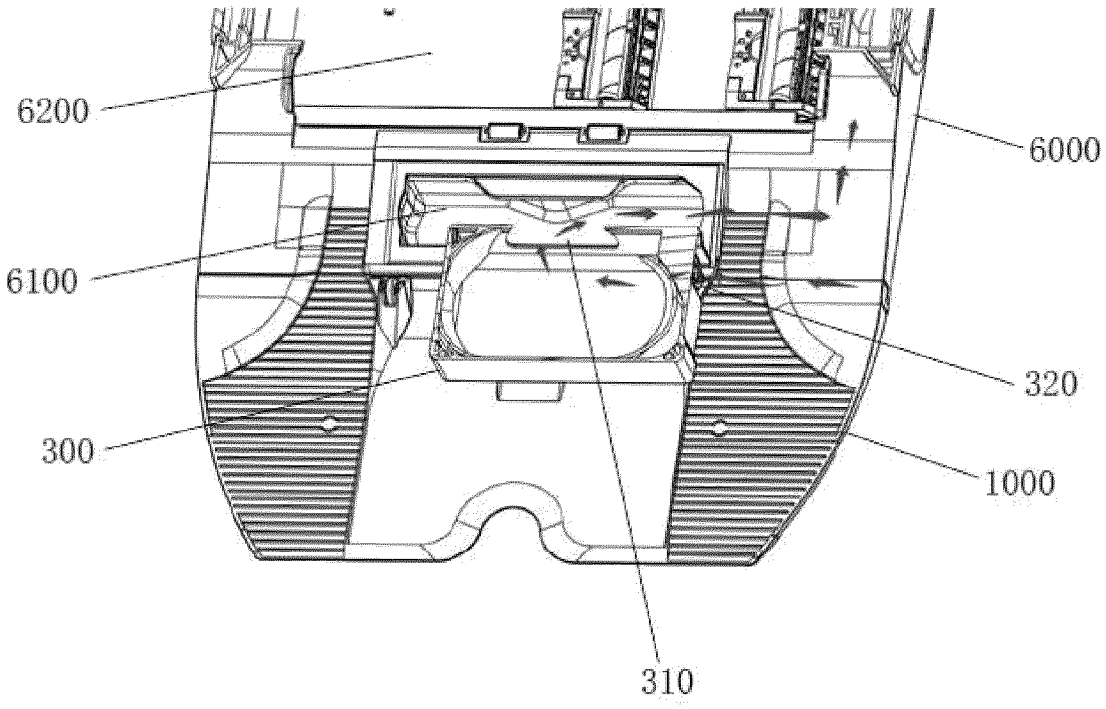

FIG. 16

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2022/109788

A. CLASSIFICATION OF SUBJECT MATTER

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

A47L11/-

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

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

CNABS, CNTXT, CNKI, 百度, BAIDU, 百度学术, BAIDU SCHOLAR, VEN, DWPI, ENTXT: 石头世纪, 米长, 杨志敏, 汪承洋, 科沃斯, irobot, 基站, 集成站, 维护站, 清洁系统, 清洁站, 工作站, docking station, base station, 储液盒, 储液箱, 储液容器, 水箱, container, 半包围

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 114601400 A (BEIJING ROBOROCK TECHNOLOGY CO., LTD.) 10 June 2022 (2022-06-10) entire document	1-10
PX	CN 216854605 U (BEIJING ROBOROCK TECHNOLOGY CO., LTD.) 01 July 2022 (2022-07-01) entire document	1-10
Y	CN 111839375 A (JIANGSU MIDEA CLEANING APPLIANCES CO., LTD. et al.) 30 October 2020 (2020-10-30) description, paragraphs 0043 and 0048, and figures 1 and 3	1-10
Y	CN 106580501 A (SHENZHEN FORTUNECOME TECHNOLOGY CO., LTD.) 26 April 2017 (2017-04-26) description, paragraph 0061, and figure 1	1-10
Y	CN 212415641 U (JIANGSU MIDEA CLEANING APPLIANCES CO., LTD. et al.) 29 January 2021 (2021-01-29) description, paragraphs 0029 and 0034, and figures 2-3	1-10

☑ 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
20 September 2022	**24 October 2022**
Name and mailing address of the ISA/CN **China National Intellectual Property Administration (ISA/CN)** **No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088, China** Facsimile No. **(86-10)62019451**	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2022/109788

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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A	CN 113017502 A (MEIZHI ZONGHENG TECHNOLOGY CO., LTD.) 25 June 2021 (2021-06-25) entire document	1-10
A	CN 214712387 U (MEIZHI ZONGHENG TECHNOLOGY CO., LTD.) 16 November 2021 (2021-11-16) entire document	1-10
A	CN 113243823 A (BEIJING SHUNZAO TECHNOLOGY CO., LTD.) 13 August 2021 (2021-08-13) entire document	1-10
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A	CN 215227297 U (ZHEJIANG SHAOXING SUPOR DOMESTIC ELECTRICAL APPLIANCE CO., LTD.) 21 December 2021 (2021-12-21) entire document	1-10
A	US 2020077858 A1 (YUNJING INTELLIGENCE TECHNOLOGY (DONGGUAN) CO., LTD. et al.) 12 March 2020 (2020-03-12) entire document	1-10
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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2022/109788

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CN 111839375 A	30 October 2020	None	
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REFERENCES CITED IN THE DESCRIPTION

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