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(54) **CLEANING DEVICE**

(57) The embodiments of the present disclosure provide a cleaning device, the cleaning device including a body and a floor brush. The floor brush is connected to one end of the device body; the device body is provided with a sewage storage box, and the box body of the sewage storage box is at least for storing and/or filtering garbage suctioned by the floor brush. When the cleaning device is tilted or laid flat for use, no sewage may flow back into the motor from the sewage storage box, which prevents causing the motor to stop or be damaged, and ensures a normal use of the cleaning device.

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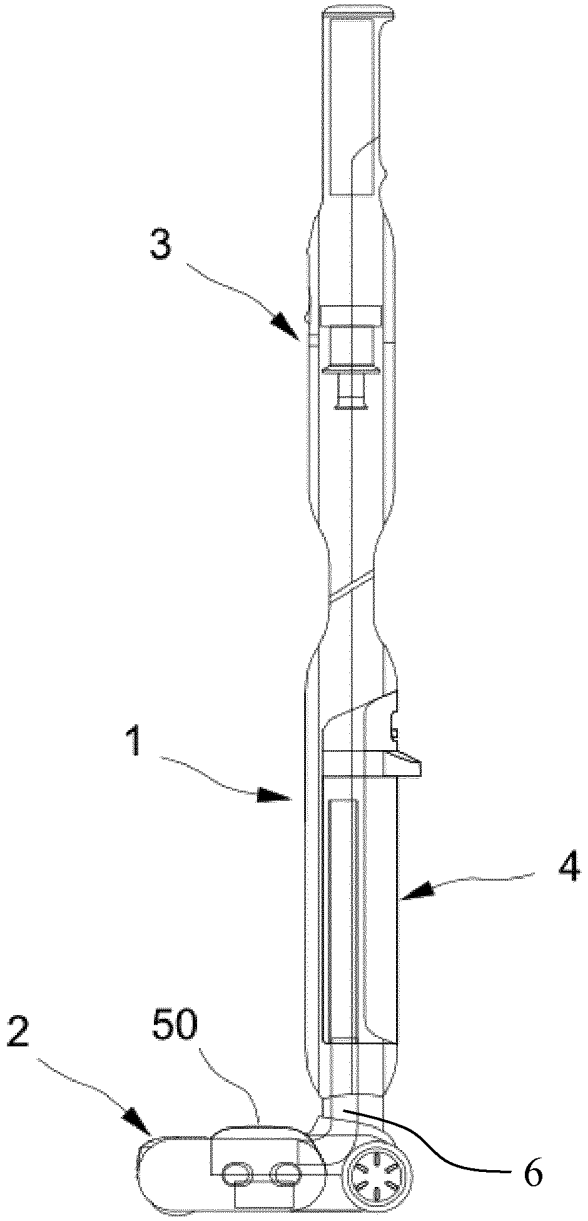

FIG. 2

Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to Chinese application No. 202110586889.6, filed on May 27, 2021, entitled "Dust-collecting, cleaning and handheld three-in-one dry-wet multifunctional handheld rod type dust collector", Chinese application No. 202110813176.9, filed on July 19, 2021, entitled "Sewage tank for cleaning device and cleaning device", Chinese application No. 202111007095.6, filed on August 30, 2021, entitled "A floor brush and cleaning device thereof', and Chinese Application No. 202111209222.0, filed on October 18, 2021, entitled "Sewage tank and cleaning device", the entire contents of each of which are incorporated herein by reference.

TECHNICAL FIELD

[0002] The present disclosure relates to the technical field of cleaning devices, and in particular to cleaning devices.

BACKGROUND

[0003] With the advancement of technology, a wet/dry vacuum cleaner, as a kind of cleaning device with a function of spraying water to wash the floor, is widely used in family life, industry, commerce and other fields. The wet/dry vacuum cleaner usually has a cleaning fluid box and a dirt box. The cleaning fluid box is configured to store a cleaning fluid configured to wash the floor, and the dirt box is configured to collect recycled sewage. Currently, the liquid box and the dirt box of the wet/dry vacuum cleaner are usually arranged on a device body of the vacuum cleaner, which causes the vacuum cleaner to be space-consuming, bulky, and inconvenient for a user.

[0004] Therefore, it is necessary to improve a structure of the vacuum cleaner and a structure of the dirt box in order to make the use of the cleaning device convenient.

SUMMARY

[0005] According to the embodiments of the present disclosure, a cleaning device is provided, including a body and a floor brush. The floor brush is connected to one end of the device body; the device body is provided with a sewage storage box; the box body of the sewage storage box is configured to store and/or filter at least garbage suctioned by the floor brush.

[0006] In some embodiments, the floor brush is rotatably connected to the one end of the device body; and the sewage storage box is connected to the floor brush through the first channel.

[0007] In some embodiments, the box body of the sewage storage box is provided with a second channel, and the second channel is connected to the first channel.

[0008] In some embodiments, a partition plate is provided in the box body, the partition plate divides an internal space of the box body into an upper space and a lower space, the second channel extends from the lower space through the partition plate to the upper space, the partition plate is provided with a first hole group and the anti-backflow structure, the anti-backflow structure is configured to allow sewage in the upper space to flow into the lower space through the first hole group and is configured to prevent sewage in the lower space from flowing into the upper space through the anti-backflow structure.

[0009] In some embodiments, at least a portion of an edge of the partition plate is in sealing contact with a sidewall of the box body.

[0010] In some embodiments, the anti-backflow structure includes a backflow prevention valve installed on the partition plate corresponding to the first hole group, the backflow prevention valve is in the lower space; and the backflow prevention valve communicates with the upper space through the first hole group.

[0011] In some embodiments, the partition plate includes a cambered plate.

[0012] In some embodiments, the partition plate is further provided with a fitting hole, and the second channel passes through the fitting hole.

[0013] In some embodiments, a side of the fitting hole is provided with an annular baffle, and the annular baffle extends towards the upper space.

[0014] In some embodiments, a circumference of the partition plate is provided with a baffle wall, and the baffle wall at least extends into the upper space.

[0015] In some embodiments, the partition plate is provided with a handle, and the handle is disposed in the upper space.

[0016] In some embodiments, the one end of the box body has an opening, the opening is provided with a cover body, an adapter tube is provided in the box body, one end of the adapter tube abuts the cover body, another end of the adapter tube is connected to one end of the second channel, and a sidewall of the adapter tube is provided with an outlet.

[0017] In some embodiments, the cover body is provided with a gas outflow channel, an inlet of the gas outflow channel is connected to the upper space, and the inlet of the gas outflow channel is arranged in a different direction from the outlet of the adapter tube.

[0018] In some embodiments, an outlet of the gas outflow channel is provided with a filter member, the filter member is configured to filter out solid substances and/or liquid substances entrained in gas.

[0019] In some embodiments, the gas outflow channel is provided with a cyclone separation structure, and the cyclone separation structure is configured to filter out solid substances and/or liquid substances entrained in gas.

[0020] In some embodiments, a bottom surface of the box body is provided with a sewage inlet; the cover body

includes a main body; the sewage inlet extends upward to form a sewage pipe, an upper portion of the sewage pipe forms a sewage outlet; the main body of the cover body is provided with an air inlet, the air inlet communicates with a cyclone filter assembly; and a fluid entering from the sewage pipe is separated into mixed gas and mixed liquid at a sewage outlet, and the mixed gas enters the cyclone filter assembly through the air inlet for cyclone dust-gas separation.

[0021] In some embodiments, the main body is provided with an accommodating cavity, an upper end of the main body is provided with a plug-in port connected to the accommodating cavity, and the cyclone filter assembly is placed into the accommodating cavity through the plug-in port and is detachably connected to the main body.

[0022] In some embodiments, the cover body further includes a baffle formed by the main body extending downwardly, the baffle encloses a periphery of the sewage outlet, a channel for passing the mixed gas is formed between the baffle and the bottom surface, and the sewage outlet and the air inlet are located on two sides of the baffle.

[0023] In some embodiments, the sewage pipe includes: a pipe body, the pipe body being formed by the sewage inlet extending upwardly; and the adapter tube including a first pipeline, a transition pipe and a second pipeline connected in sequence. The first pipeline is coaxially and detachably connected to the pipe body, the first pipeline is perpendicular to the second pipeline, and the sewage outlet is disposed on the second pipeline.

[0024] In some embodiments, a path that the mixed gas passes through before entering into the cyclone filter assembly is at least 2XL1 + L2, where L1 denotes a distance between a centerline of the second pipeline and the air inlet along a vertical direction, and L2 denotes distance between the centerline of the second pipeline and the baffle along the vertical direction.

[0025] In some embodiments, a ratio of the distance L1 between the centerline of the second pipeline and the air inlet along the vertical direction to the distance L2 between the centerline of the second pipeline and the baffle along the vertical direction is within 0.9-3.

[0026] In some embodiments, the cyclone filter assembly includes: a communicating tube. An upper end of the communicating tube is an air outlet; and a first clamping section disposed on the periphery of the communicating tube. The periphery of the first clamping section is connected to a sidewall of the accommodating cavity, the first clamping section includes a spiral bottom plate, the spiral bottom plate is helically surrounded by the periphery of the communicating tube, the spiral bottom plate, the communicating tube, and the main body jointly form a cyclone channel; after the air inlet communicates with the cyclone channel, and the mixed gas passes through the air inlet, the cyclone channel, and the communicating tube to achieve the cyclone dust-gas separation, clean gas is exhausted from the air outlet.

[0027] In some embodiments, an outer contour of a cross-section of the first clamping section gradually decreases from top to bottom, the accommodating cavity includes a first cavity and a second cavity arranged from top to bottom and connected, a size and a shape of the first cavity matches the first clamping section, and a cross-sectional area of the second cavity is less than a minimum cross-sectional area of the first cavity.

[0028] In some embodiments, the cyclone filter assembly includes: a cyclone filtering mechanism, the cyclone filtering mechanism is disposed within the accommodating cavity; and a soft rubber, the soft rubber is connected to the cyclone filter mechanism and at least a portion of the soft rubber protrudes circumferentially from a periphery of the cyclone filter mechanism, and the soft rubber protrudes from the periphery of the cyclone filter mechanism abuts the upper end of the main body.

[0029] In some embodiments, the cover body further includes an upper cover, the upper cover covers an upper end of the cover body, the upper cover includes a first upper end surface, an included angle between the first upper end surface and a horizontal plane is a first preset included angle; the soft rubber includes a second upper end surface and a connecting portion, the second upper end surface is disposed at an upper end of the cyclone filtering mechanism, the connecting portion is fixed to the cyclone filtering mechanism and protrudes out of a periphery of the cyclone filtering mechanism, and an included angle between the bottom surface of the connecting portion and the horizontal plane is a second preset included angle; and the included angle between the upper end of the cover body and the horizontal plane is a third preset included angle, and when the upper end of the cover body abuts against the bottom surface of the connecting portion, the first upper end surface is in a same plane as the second upper end surface.

[0030] In some embodiments, the backflow prevention valve includes a flexible valve body, a size of a cross-section of an outlet of the valve body along a second direction is greater than that along a third direction, and the second direction is perpendicular to the third direction.

[0031] In some embodiments, the backflow prevention valve includes an elastic valve piece provided on a lower surface of the partition plate.

[0032] In some embodiments, the partition plate is further provided with a second hole group, and gas in the lower space flows into the upper space through the second hole group.

[0033] In some embodiments, the first hole group and/or the second hole group are offset from a lowest point of the partition plate.

[0034] In some embodiments, the cover body is provided with a water level probe group, and the water level probe group is configured to monitor a level of sewage in the box body.

[0035] In some embodiments, the water level probe group includes a first probe group and a second probe

group, the first probe group and the second probe group extend towards the lower space, the second probe group extends into the upper space and is disposed above the first hole group, and a length of the first probe group is greater than a length of the second probe group.

[0036] In some embodiments, the first probe group extends into the lower space.

[0037] In some embodiments, the cover body is further provided with two flow baffles, the two flow baffles extend into the upper space, the two flow baffles are arranged at interval along the periphery of the cover body, at least a portion of a region of a side edge of each of the two flow baffles are arranged at interval from the sidewall of the box body, and an outlet of the second channel is disposed between the two flow baffles.

[0038] In some embodiments, the cover body is further provided with a backing plate, the backing plate is disposed between the inlet of the gas outflow channel and the adapter tube, and the backing plate is connected between two flow baffles.

[0039] In some embodiments, a size of the backing plate along a length of the device body is less than a size of each of the two flow baffles along the length of the device body.

[0040] In some embodiments, the floor brush is provided with a detachable cleaning fluid box.

[0041] In some embodiments, the device body includes a sewage storage box supporting seat, and the sewage storage box is provided on the device body through the sewage storage box supporting seat.

[0042] In some embodiments, the sewage storage box supporting seat includes a groove, and at least a portion of the sewage storage box is accommodated within the groove.

[0043] In some embodiments, the cleaning device further includes a handheld vacuum cleaner, the handheld vacuum cleaner is detachably installed at another end of the device body, one end of the handheld vacuum cleaner away from the device body is provided with a handle, and a battery is accommodated inside the handle.

[0044] In some embodiments, the one end of the handheld vacuum cleaner away from the device body is provided with the handle, and the battery is accommodated inside the handle.

[0045] In some embodiments, the handheld vacuum cleaner further includes a dust canister assembly and a motor, the dust canister assembly, the motor, and the handle are disposed in sequence along a first direction of the handheld vacuum cleaner, and widths of each of which is a distance from the dust canister assembly to a position of a plurality of positions on the handheld vacuum cleaner along the first direction are substantially the same.

[0046] In some embodiments, the handheld vacuum cleaner includes an attachment member, the attachment member is detachably connected to the handheld vacuum cleaner, and the attachment member includes at least one of: a de-mite brush, a flat brush, a bristle brush, a pet brush, or a hose.

[0047] In some embodiments, a shape of a combination of the device body and a sewage storage box is a column.

[0048] In some embodiments, areas of first cross-sections each of which corresponding to various positions of a main body portion of the combination along a lengthwise direction of the device body are substantially the same, and the first cross-section are cross-sections of the main body portion of the combination perpendicular to the lengthwise direction of the device body.

[0049] In some embodiments, areas of second cross-sections each of which corresponding to various positions of the main body portion of the handheld vacuum cleaner along the lengthwise direction of the device body are substantially the same, and the second cross-sections are cross-sections of the main body portion of the handheld vacuum cleaner perpendicular to the lengthwise direction of the device body.

[0050] In some embodiments, an area of a first cross-section and an area of a second cross-section are substantially the same.

[0051] The beneficial effects that may be brought about by the embodiments of the present disclosure include, but are not limited to: (1) the cleaning device in the embodiments of the present disclosure is capable of realizing three functions of floor vacuuming, floor cleaning, and handheld vacuuming; and through a series of structural arrangements such as connecting the handheld vacuum cleaner at the upper end of the device body, configuring the handheld vacuum cleaner and the device body as a whole in a form of a long column, and arranging the cleaning liquid box on the floor brush, a load weight is drastically reduced when the user operates the device body and requirements of multiple using scenarios for the user are satisfied. At the same time, the handheld vacuum cleaner and the sewage storage box may be independently detachable, which greatly facilitates the user's use and cleaning of sewage; (2) the sewage storage box in the embodiment of the present disclosure has a partition plate disposed inside the box to divide the box into the upper space and the lower space, and the anti-backflow structure is arranged on the partition plate. When the cleaning device lays flat for use, the anti-backflow structure prevents the sewage in the lower space from flowing into the upper space, the sewage may not flow to the motor, the motor may not stop, and the cleaning device still be able to clean normally; (3) the sewage storage box provided in the embodiments of the present disclosure includes the box body, the sewage pipe, and the cyclone filter assembly, the bottom surface of the box body is provided with the sewage inlet, the sewage inlet extends upward to form the sewage pipe, the upper end of the sewage pipe is provided with the sewage outlet, the cyclone filter assembly communicates with an interior of the box body, the cyclone filter assembly includes the air inlet, the fluid entering from the sewage pipe is separated into the mixed gas and the mixed liquid at the

sewage outlet, the mixed gas enters the cyclone filter assembly through the air inlet for cyclone dust-gas separation, the sewage outlet is located at the bottom of the air inlet and is located at each of both sides of a center axis of the box body, which prevents the mixed liquid from entering the air inlet directly from the sewage outlet, and there is a certain distance between the sewage outlet and the air inlet, so that the mixed gas is separated from the sewage outlet and then enters the air inlet after passing through a relatively long path, and the water in the mixed gas may be separated from the mixed gas in a flow of the relatively long path, which avoids that the water enters into a hippocampus or the motor, avoids the hippocampus to be bacterial, and also avoids that the motor is short-circuited, and ensures that the cleaning device work normally; (4) the floor brush provided in the embodiments of the disclosure retains a circumferential limiting function of an installation housing to the cleaning fluid box, and expands an upper structure of the cleaning fluid box to be substantially the same length as a maximum length of a working portion. Accordingly, the cleaning fluid box is stably connected to the installation housing and is also expanded by the upper structure; at the same time, as the upper structure of the cleaning fluid box conceals a circumferential limiting portion of the installation housing, an overall aesthetics of the floor brush is enhanced and an appearance of the floor brush is eye-catching. Further, the present disclosure makes the structure of the floor brush compact and practical by limiting the shape and size of the working portion of the floor brush; the floor brush provided by the embodiments of the present disclosure is compact and lightweight, the floor brush has a high cleaning efficiency in an open region, and efficiently cleans a bottom of a bed and nooks and crannies smoothly. Specifically, by limiting sizes and proportions of the working portion and the cleaning liquid box in terms of length, width, and height, laying out positions of various components in a roller brush installation cavity, arranging the motor inside the roller brush, adopting a magnetic suction structure for installing the cleaning liquid box and the supporting assembly, and limiting a length of the roller brush in a series of manners, the present disclosure minimizes the size of the floor brush while keeping a capacity of the cleaning liquid box unchanged, and ensures that cleaning efficiencies in a plurality of application scenarios. In addition, in the embodiments of the present disclosure, by constructing a rob of the cleaning device in a form of an elongated pole, adopting a fixed seat to connect the handheld vacuum cleaner and the sewage storage box, limiting the sizes and the proportions of the rob and the fixed seat, and adopting the supporting seat of the sewage storage box for supporting the sewage storage box and other structural arrangements, which maximally reduce the load weight of the user when operating the device body.

BRIEF DESCRIPTION OF THE DRAWINGS

[0052]

FIG. 1 is a main view illustrating a cleaning device according to some embodiments of the present disclosure;

FIG. 2 is a right view illustrating a cleaning device according to some embodiments of the present disclosure;

FIG. 3 is a disassembled view of a right view illustrating a cleaning device according to some embodiments shown in the present disclosure;

FIG. 4 is a schematic diagram illustrating a structure of a cleaning device according to some embodiments of the present disclosure;

FIG. 5 is a right view illustrating a cleaning device according to some embodiments of the present disclosure;

FIG. 6 is a schematic diagram illustrating a disassembled structure of a cleaning device shown in FIG. 5;

FIG. 7 is a schematic diagram illustrating a partial structure of a cleaning device shown in FIG. 5;

FIG. 8 is a schematic diagram illustrating an internal structure of a sewage storage box according to some embodiments of the present disclosure;

FIG. 9 is a schematic diagram illustrating an overall structure of a sewage storage box according to some embodiments of the present disclosure;

FIG. 10 is a schematic diagram illustrating a structure of a partition plate according to some embodiments of the present disclosure;

FIG. 11 is a schematic diagram illustrating a structure of a backflow prevention valve according to some embodiments of the present disclosure;

FIG. 12 is a schematic diagram illustrating a backflow prevention valve when being in an open state according to some embodiments of the present disclosure;

FIG. 13 is a schematic diagram illustrating a backflow prevention valve shown in a closed state according to some embodiments of the present disclosure;

FIG. 14 is a schematic diagram illustrating another backflow prevention valve according to some embodiments of the present disclosure;

FIG. 15 is a schematic diagram illustrating a structure of a cover body according to some embodiments of the present disclosure;

FIG. 16 is a schematic diagram illustrating a partition plate installed in a box body according to some embodiments of the present disclosure;

FIG. 17 is a schematic diagram illustrating a cleaning device when the cleaning device lays flat as shown in FIG. 4;

FIG. 18 is a schematic diagram illustrating a cleaning device shown when the cleaning device lays flat as according to some embodiments of the present dis-

closure;
FIG. 19 is a schematic diagram illustrating a cross-section I of a sewage storage box according to some embodiments of the present disclosure;
FIG. 20 is a schematic diagram illustrating a cross-section II of a sewage storage box according to some embodiments of the present disclosure;
FIG. 21 is a schematic diagram illustrating a cross-section of a sewage storage box according to some embodiments of the present disclosure
FIG. 22 is a schematic diagram illustrating a cross-section III of a sewage storage box according to some embodiments of the present disclosure;
FIG. 23 is a schematic diagram illustrating a structure of a cover body according to some embodiments of the present disclosure;
FIG. 24 is a schematic diagram illustrating a structure of a cover body according to some embodiments of the present disclosure;
FIG. 25 is a schematic diagram illustrating a structure of an adapter tube, an ash accumulation drum, and a filter basket according to some embodiments of the present disclosure;
FIG. 26 is a cross-sectional view illustrating an adapter tube and an ash accumulation drum according to some embodiments of the present disclosure;
FIG. 27 is an explosion view illustrating a cover body, a cyclone filter assembly, and a filter mechanism according to some embodiments of the present disclosure;
FIG. 28 is a schematic diagram illustrating a structure of a cyclone filter assembly shown in FIG. 1 according to some embodiments of the present disclosure;
FIG. 29 is a schematic diagram II of a structure of a cyclone filter assembly according to some embodiments of the present disclosure;
FIG. 30 is a schematic structural diagram III of a cyclone filter assembly according to some embodiments of the present disclosure;
FIG. 31 is a schematic diagram illustrating a structure of a cyclone filter assembly mating with a cover body according to some embodiments of the present disclosure;
FIG. 32 is a schematic diagram illustrating a structure of a cover body according to some embodiments of the present disclosure;
FIG. 33 is a cross-sectional view illustrating a sewage storage box according to some embodiments of the present disclosure;
FIG. 34 is a schematic diagram illustrating a structure of a filter mechanism according to some embodiments of the present disclosure.
FIG. 35 is a three-dimensional view illustrating a floor brush according to some embodiments of the present disclosure;
FIG. 36 is a right-hand view illustrating a floor brush according to some embodiments of the present disclosure;
FIG. 37 is a top view illustrating a floor brush according to some embodiments of the present disclosure;
FIG. 38 is an explosion view illustrating a structure of a floor brush according to some embodiments of the present disclosure;
FIG. 39 is a schematic diagram illustrating a structure of a cleaning fluid box according to some embodiments of the present disclosure;
FIG. 40 is a perspective view illustrating a cleaning fluid box according to some embodiments of the present disclosure;
FIG. 41 is a schematic diagram illustrating a structure of a valve assembly according to some embodiments of the present disclosure;
FIG. 42 is a schematic diagram illustrating a structure of a top cover according to some embodiments of the present disclosure;
FIG. 43 is a right view illustrating a cleaning fluid box according to some embodiments of the present disclosure;
FIG. 44 is a top view illustrating a cleaning fluid box according to some embodiments of the present disclosure;
FIG. 45 is a schematic diagram illustrating a fixed position of a motor according to some embodiments of the present disclosure;
FIG. 46 is a right view illustrating a roller brush according to some embodiments of the present disclosure;
FIG. 47 is a schematic diagram illustrating a connection between a roller brush and a gearbox body according to some embodiments of the present disclosure;
FIG. 48 is a cross-sectional view illustrating a supporting assembly according to some embodiments of the present disclosure; and
FIG. 49 is a schematic diagram illustrating a disassembled structure of a supporting assembly according to some embodiments of the present disclosure.

DETAILED DESCRIPTION

[0053] To more clearly illustrate the technical solutions of the embodiments of the present disclosure, the accompanying drawings that need to be used in the description of the embodiments would be briefly introduced below. Obviously, the accompanying drawing in the following description is merely some examples or embodiments of the present disclosure, and those skilled in the art can apply the present disclosure to other similar situations according to the drawings without any creative effort. Unless obviously obtained from the context or the context illustrates otherwise, the same numeral in the drawings indicates the same structure or operation.

[0054] A wet/dry vacuum cleaner is a cleaning device that absorbs both dust and sewage, and may also have a function of scrubbing water and washing the floor. The wet/dry vacuum cleaner (hereinafter referred to as a vac-

uum cleaner) generally has a cleaning fluid box, a water spray system connected to the cleaning fluid box, a recovery system, and a sewage storage box connected to the recovery system. The recycling system may include a motor arranged above the sewage storage box (e.g., on a side of the box away from the floor). During the use of the cleaning device, the water spray system may spray cleaning fluid from the cleaning fluid box onto the floor for washing requirements, and the recycling system may recycle a sewage into the sewage storage box. When the cleaning device is in operation, due to a structure of the sewage storage box, a device body of the cleaning device may cause water from the sewage storage box to enter the motor when it is tilted or when it is parallel to the ground, and stopping the motor or even damaging the motor. In some embodiments, both the cleaning fluid box and the sewage storage box are provided on the device body of the cleaning device, which can cause the device body of the cleaning device to be too bulky for operation by a user (or known as an operator or the user), and may also cause the device body to be difficult to be parallel to the floor, which is not conducive to cleaning in a space of limited height (e.g., a bottom of a bed).

[0055] The embodiments of the present disclosure provide a cleaning device, the cleaning device includes a device body, a floor brush, and a handheld vacuum cleaner. The floor brush and the handheld vacuum cleaner are respectively provided at two ends of the device body. The sewage storage box is provided on the device body, and the handheld vacuum cleaner is detachably connected to the device body. The cleaning device provided by the embodiments of the present disclosure is capable of realizing functions of floor vacuuming and floor cleaning through the floor brush, and the handheld vacuum cleaner may be detached from the device body to independently realize a function of handheld vacuuming, which has a high degree of functional integration and meets needs of many usage scenarios. For example, some hygienic dead corners (e.g. sofa crevices, a top or an inner of a closet, etc.) may be cleaned by the handheld vacuuming.

[0056] The cleaning device provided by the embodiments of the present disclosure may be described in detail below in conjunction with the accompanying drawings.

[0057] FIG. 1 is a main view illustrating a cleaning device according to some embodiments of the present disclosure. FIG. 2 is a right view illustrating a cleaning device according to some embodiments of the present disclosure. FIG. 3 is a disassembled view of a right view illustrating a cleaning device according to some embodiments shown in the present disclosure.

[0058] As shown in conjunction with FIG. 1, FIG. 2, and FIG. 3, a cleaning device 100 provided by embodiments of the present disclosure may include a device body 1, a floor brush 2, and a handheld vacuum cleaner 3. The floor brush 2 is connected to one end of the device body 1. The device body 1 is provided with a sewage storage box 4 (or a sewage storage box 300 illustrated in FIG. 19), and a box body of the sewage storage box 4 (e.g., box body 201 illustrated in FIG. 8) may be configured to at least store and/or filter garbage suctioned by the floor brush.

[0059] In some embodiments, the floor brush 2 is rotatably connected to one end of the device body 1 (e.g., the end of the device body 1 close to floor or referred to as a lower end of the device body 1), and further, the device body 1 has a first channel 6 (or referred to as a fluid channel, a body channel), and the first channel 6 may be configured to communicate the floor brush 2 with the sewage storage box 4. In some embodiments, a box body of the sewage storage box 4 is provided with a second channel, and the second channel may communicate with the first channel 6, thereby realizing a communication of the floor brush 2 and the sewage storage box 4. For example, in the sewage storage box 4 shown in FIG. 8, a box body 201 of the sewage storage box 4 is provided with a second channel 202, and the second channel 202 may be configured to communicate with the first channel 6. For another example, in the sewage storage box 300 shown in FIG. 19, the box body 301 of the sewage storage box 300 is provided with a sewage pipe 302 (equivalent to the second channel), and the sewage pipe 302 may be configured to communicate with the first channel 6. When the cleaning device 100 is in operation, the fluid (e.g., gas, liquid, solid garbage, etc., or a combination thereof) suctioned by the floor brush 2 may flow into the box body (the box body 201) of the sewage storage box 4 or the box body 301 of the sewage storage box 300 through the first channel 6 and the second channel (e.g., the second channel 202 or the sewage pipe 302).

[0060] It should be noted that when descriptions of the upper and lower directions such as "upper end" and "lower end" are involved in the present disclosure, an upper end generally refers to an end that is far from the floor, and the lower end refers to an end that is close to the floor during the use of the cleaning device, unless otherwise specified. For example, in FIG. 3, a direction indicated by the Y arrow in a first direction is "up" and an opposite direction is "down".

[0061] More descriptions regarding the sewage storage box 4 may be found in the related descriptions of the sewage storage box 4 shown in FIG. 8 or the sewage storage box 300 shown in FIG. 19. For example, the sewage storage box 4 in the above embodiment may be the sewage storage box 4 shown in FIG. 8 or the sewage storage box 300 shown in FIG. 19.

[0062] As shown in conjunction with FIG. 1, FIG. 2, and FIG. 3, in some embodiments, the cleaning device 100 may further include a handheld vacuum cleaner 3. The handheld vacuum cleaner 3 is detachably installed to an opposite end of the device body 1 (e.g., the end of the device body 1 that is away from the floor or is referred to as the upper end of the device body 1). In some embodiments, an end of the handheld vacuum cleaner 3 away from the device body 1 may be provided with a handle

32, which allows a user to operate the cleaning device 100 or operate the handheld vacuum cleaner 3 alone to clean by griping the handle 32. In some embodiments, the end of the handheld vacuum cleaner 3 away from the device body 1 may be directly constructed as the handle 32. Merely by way of example, a housing of the handheld vacuum cleaner 3 may be manufactured by designing the end of the housing of the handheld vacuum cleaner 3 away from the device body 1 to be shaped as the handle 32, and then manufacturing the housing of the handheld vacuum cleaner 3 through a one-piece molding process (e.g., an injection molding process, a 3D printing process, etc.). In some embodiments, the handle 32 may be a separate component relative to the handheld vacuum cleaner 3, and the handle 32 may be installed at the end of the handheld vacuum cleaner 3 away from the device body 1 when the handheld vacuum cleaner 3 is assembled. In some embodiments, the handle 32 may accommodate at least one battery 320 inside the handle 32, and the at least one battery 320 may power a work of the cleaning device 100 or a separate work of the handheld vacuum cleaner 3.

[0063] In some embodiments, when the cleaning device 100 is operated, the handheld vacuum cleaner 3 and the sewage storage box 4 are installed to the device body 1. The handheld vacuum cleaner 3 may be configured to provide suction to the floor brush 2 for suctioning sewage, and the sewage storage box 4 is configured to store suctioned sewage. In some embodiments, the handheld vacuum cleaner 3 may further include a dust canister assembly 31 and a motor 33. In some embodiments, when the handheld vacuum cleaner 3 is detached from the device body 1 for use, it may be applied to a scenario where the cleaning device 100 as a whole is not suitable for use, e.g., a scenario such as a surface of a sofa or a crevice, an interior of a cupboard or a top of a cupboard, etc., where a use of space is small and a surface to be cleaned is susceptible to being contaminated. It should be noted that the handheld vacuum cleaner 3 in the embodiments of the present disclosure may be a cordless handheld vacuum cleaner capable of realizing the handheld vacuuming (e.g., a causal handheld vacuuming), and more descriptions regarding the handheld vacuum cleaner 3 may not be repeated herein.

[0064] In some embodiments, the cleaning device 100 may have at least a first operating mode and a second operating mode. In some embodiments, a switching between the first operating mode and the second operating mode may be realized by assembling or disassembling of the handheld vacuum cleaner 3 with the device body 1.

[0065] In some embodiments, the first operating mode may also be referred to as a rod vacuum cleaner mode. Specifically, in the first operating mode, the handheld vacuum cleaner 3 communicates with the upper end of the device body 1 (the end of the device body 1 that is away from the floor (or the surface to be cleaned)), and a ventilation inlet 310 of the handheld vacuum cleaner 3 may communicate with the sewage storage box 4. When the user activates the handheld vacuum cleaner 3, the handheld vacuum cleaner 3 may generate the suction (e.g., generate a negative pressure inside the handheld vacuum cleaner by a highspeed rotation of the blades driven by the motor), and under a suction force of the handheld vacuum cleaner 3, after a mixed fluid of gases, dust and/or liquids flows from a suction inlet of the floor brush 2 (e.g., a suction inlet 434 on a floor brush 400 shown in FIG. 38) sequentially through the floor brush 2, a fluid channel within the device body 1 (e.g., a first channel 6), a first stage of the gas, the dust, and/or the liquid is separated(hereinafter referred to as a first stage of separation), and the dust and/or liquid is stored in the sewage storage box 4, and the fluid that has undergone the first stage of separation flows out of the sewage storage box 4, and then enters the dust canister assembly 31 of the handheld vacuum cleaner 3 through the ventilation inlet 310 of the handheld vacuum cleaner 3 for a second stage of dust-gas separation. Clean air may be obtained after the second stage of dust-gas separation, and the clean air may be discharged from the ventilation outlet of the handheld vacuum cleaner 3.

[0066] In some embodiments, the second operating mode may also be referred to as a handheld vacuum cleaner mode. In the second operating mode, the handheld vacuum cleaner 3 may be unlocked and separated from the device body 1, and the user can use the handheld vacuum cleaner alone for cleaning work. Specifically, under the suction of the handheld vacuum cleaner 3, fluid enters the dust canister assembly 31 from the ventilation inlet 310 of the handheld vacuum cleaner 3 for dust-gas separation, and separated clean air is discharged from the ventilation outlet of the handheld vacuum cleaner 3.

[0067] Notably, the fluid involved in the present disclosure may be a clean air stream or a stream entrained with the sewage. The sewage may be at least one of dust, solid sewage (e.g., cigarette butts, pieces of paper, grains of rice, etc.), and liquid sewage (e.g., orange juice, sewage water, egg liquid, etc.).

[0068] It should be understood that, in the rod vacuum cleaner mode, the sewage storage box 4 constitutes a first separation structure. The sewage liquid, the solid sewage, and the dust contained therein may be separated and stored in the sewage storage box 4 during a flow of a sewage-containing air stream through the sewage storage box 4. Due to the fact that the dust and a gaseous liquid (gaseous droplet) featured with a small size, a light weight and so on, it is inevitable that the dust and the gaseous liquid may be guided along with the air stream to the dust canister assembly 31. Accordingly, the dust canister assembly 31 constitutes a second separation structure, so that if the air stream entering the dust canister assembly 31 contains the sewage, the dust canister assembly 31 may separate the dust and gas therefrom, segregate and store the sewage in the dust canister assembly 31, and guide the air stream to the ventilation outlet of the handheld vacuum cleaner for discharge.

[0069] Based on the above arrangements, the cleaning device 100 provided by the embodiments of the present disclosure may have a basic vacuuming function, i.e., to clean dry solid sewage and dust, and also to clean wet garbage, fluid-containing or a garbage mixed with dry sewage, i.e., to have a versatile function for both dry and wet use. Moreover, the fluid absorbed by the floor brush 2 is separated from the dust by the sewage storage box 4 and the dust canister assembly 31 of the handheld vacuum cleaner 3 in two stages, so that relatively clean air may be obtained, which may reduce pollution of the air during a cleaning process. It is also possible to detach the handheld vacuum cleaner 3 separately for use, thereby realizing the function of the handheld vacuuming. The cleaning device 100 combines a variety of functions into one, thereby offering versatile usage modes, which is not only compact and practical in structure but also saves storage space required for a plurality of cleaning devices. For example, the handheld vacuum cleaner 3 may be installed on the device body 1 after being used separately, and does not need to be placed separately.

[0070] In some embodiments, the cleaning device 100 may further include a cleaning fluid supply assembly, the cleaning fluid supply assembly may include a cleaning fluid box 50 for storing the cleaning fluid, and the cleaning fluid box 50 is removably installed to the floor brush 2.

[0071] In some embodiments, the cleaning device 100 also has a function of cleaning the floor. The function of cleaning the floor may be primarily realized by the cleaning fluid supply assembly and the floor brush 2.

[0072] In some embodiments, the cleaning fluid supply assembly may further include a spray head and a pump, and the spray head and the pump may form a water spray system. In some embodiments, the pump may be configured to direct a cleaning fluid from the cleaning fluid box 50 to the spray head, and the spray head may act as an output end of the cleaning fluid supply assembly to spray the cleaning fluid onto the floor brush 2 or the floor, thereby cleaning the floor and/or for floor care. In some embodiments, the cleaning fluid may be water, or may be a cleaning agent, a conditioner, etc.

[0073] Positions of the two boxes are reasonably distributed by locating the sewage storage box 4 on the device body 1 and the cleaning fluid box 50 on the floor brush 2, so that the device body 1 is not too bulky and is easy for the user to operate by hand. In some embodiments, a distance between the cleaning fluid box 50 and the floor brush 2 is short by mounting the cleaning fluid box 50 on the floor brush 2, so that there is no need to arrange a long cleaning fluid hose between the cleaning fluid box 50 and the floor brush 2, and so that the spray head sprays the cleaning fluid correspondingly fast. In addition, the cleaning fluid box 50 is provided on the floor brush 2, which increases the weight of the floor brush 2, thereby increasing a pressure of the floor brush 2 on the floor, and improving a cleaning effect of the floor brush 2. In some embodiments, the sewage storage box 4 is provided on the device body 1 instead of providing on the floor brush 2, which may prevent the floor brush 2 from being too large due to a large number of attachments on the floor brush 2, thereby affecting a cleaning range of the floor brush 2. Therefore, based on the above-optimized structure, a problem of the device body being too bulky may be solved, which not only facilitates a handheld operation of the user, but also has many improvements such as being easy to clean in a height-restricted space.

[0074] In some embodiments, during a use of the cleaning device 100, it may be necessary to perform operations such as filling the cleaning fluid box 50 with water, cleaning, etc., or cleaning the sewage storage box 4. Therefore, both the cleaning fluid box 50 relative to the floor brush 2 and the sewage storage box 4 relative to the device body 1 may be disassembled in order to perform operations such as filling the cleaning fluid box 50 with water, cleaning, etc., or cleaning the sewage storage box 4 individually.

[0075] More descriptions regarding how the cleaning fluid supply assembly (e.g., the cleaning fluid box, the pump, the spray head, etc.), the floor brush 2, and the cleaning device 100 clean the floor may be found in FIG. 35 to FIG 50 and their related descriptions, and may not be repeated herein.

[0076] In some embodiments, referring to FIG. 3, the dust canister assembly 31, the motor 33, and the handle 32 may be sequentially arranged along a first direction Y of the handheld vacuum cleaner 3. The first direction Y of the handheld vacuum cleaner 3 may be a lengthwise direction thereof. The dust canister assembly 31, the motor 33, and the handle 32 may be arranged sequentially along the lengthwise direction of the handheld vacuum cleaner 3 from an end close to the device body 1 to an end remote from the device body 1. For example, the dust canister assembly 31, the motor 33, and the handle 32 are arranged sequentially from the bottom to the top. In some embodiments, the handheld vacuum cleaner 3 has a continuous width from the dust canister assembly 31 to the handle 32. In some embodiments, the handheld vacuum cleaner 3 has a width that is continuous from the dust canister assembly 31 to the handle 32 may be that the handheld vacuum cleaner 3 has the same or substantially the same width corresponding to each position along the first direction Y from the dust canister assembly 31 to the handle 32. In some embodiments, the handheld vacuum cleaner 3 may have a preset width. The expression "the handheld vacuum cleaner 3 has the same or substantially the same width corresponding to each position along the first direction Y from the dust canister assembly 31 to the handle 32" refers that a difference between a width corresponding to each position of the handheld vacuum cleaner 3 along the first direction Y from the dust canister assembly 31 to the handle 32 and a preset width is 1%, 2%, 3%, etc., of the preset width.

[0077] In some embodiments, when the handheld vacuum cleaner 3 is in an operating state (i.e., in the first operating mode or the second operating mode), the user grips the handle 32, the motor 33 is powered by the bat-

tery 320 and provides the suction (e.g., the motor 33 drives the blades to rotate at a high speed to generate the negative pressure), and under the suction effect, the fluid (e.g., the fluid that is suctioned to the sewage storage box 4 after the first stage of separation in the first operating mode or the fluid from an external environment in the second operating mode) flows into the dust canister assembly 31 through the ventilation inlet 310 for dust-gas separation, and the separated clean air may be discharged from the ventilation outlet of the handheld vacuum cleaner 3. By providing the handheld vacuum cleaner 3 with a continuous width from the dust canister assembly 31 to the handle 32, it may be ensured that an outer surface of the handheld vacuum cleaner 3 is relatively smooth and its width variation along the first direction Y is relatively small, such that the user is easy to comfortably grip the handle 32 during a vacuuming operation. In addition, the handheld vacuum cleaner 3 is provided with a continuous width from the dust canister assembly 31 to the handle 32, to make the flow of fluids in the handheld vacuum cleaner 3 (e.g., from the dust canister assembly 31 to the ventilation outlet) smooth; furthermore, when in an application scenario where the handheld vacuum cleaner 3 is overall parallel to a line of sight, the handheld vacuum cleaner 3 is able to cause as little interference to the line of sight as possible, facilitating the user to bring the air ventilation inlet 310 close to the object to be cleaned or install the handheld vacuum cleaner 3 to the upper end of the device body 1.

[0078] In some embodiments, when the sewage storage box 4 is installed to the device body 1, a combination of the device body 1 and the sewage storage box 4 is in a cylindrical shape or substantially a cylindrical shape. In some embodiments, a combination being in a cylindrical shape may refer that a cross-section corresponding to each position of the combination along a length of the device body is a circular cross-section with a same radius. In some embodiments, a cross-section of the combination has a preset radius, and the combination being substantially columnar refers that a difference between a radius of a circular cross-section corresponding to each position and the preset radius is 1%, 2%, 3%, etc., of the preset radius. The cross-section corresponding to each position of the combination along the lengthwise direction of the device body is a cross-section of the combination perpendicular to the lengthwise direction of the device body.

[0079] In some embodiments, the cross-sectional area of the main portion of the combination (or referred to as the intermediate portion of the combination, which includes a remaining portion after removing the portion above the device body 1 connected to the handheld vacuum cleaner and a portion below the device body 1 connected to the floor brush 2) is essentially unchanged along the lengthwise direction of the device body 1. At the same time, a cross-sectional area of the main portion of the handheld vacuum cleaner 3 (or referred to as an intermediate portion of the handheld vacuum cleaner 3, which includes the portion from the dust canister assembly 31 to the motor 33 (e.g., the remaining portion after removing the handle 32 and the ventilation inlet 310), is substantially unchanged along the length of the device body 1. In some embodiments, along the lengthwise direction of the device body 1, a cross-sectional area of a main portion of the combination being substantially unchanged refers that areas each of which of the first cross-sectional area corresponding to the each position of the main portion of the combination along the length of the device body are the same or substantially the same. The cross-sectional area of the main portion of the handheld vacuum cleaner 3 being substantially unchanged refers that refers that areas each of which of a second cross-sectional area corresponding to the each position of the main portion of the handheld vacuum cleaner 3 along the length of the device body (or along the first direction Y) are the same or substantially the same. The first cross-section is a cross-section of the main portion of the combination body perpendicular to the lengthwise direction of the device body, and the second cross-section is a cross-section of the main portion of the handheld vacuum cleaner perpendicular to the lengthwise direction of the device body. In some embodiments, the first cross-section of the main portion of the combination body has a first preset cross-sectional area, and an area of the first cross-section corresponding to each position of the main portion of the combination body along the lengthwise direction of the device body may be substantially the same (e.g., a difference between the area of the first cross-section and the area of the first preset cross-sectional area is 1%, 2%, 3%, etc., of the first preset cross-sectional area). Similarly, the second cross-section of the main portion of the handheld vacuum cleaner 3 has a second preset cross-sectional area, and an area of the second cross-section corresponding to each position of the main portion of the handheld vacuum cleaner 3 along the lengthwise direction of the device body is substantially the same (e.g., the difference between the area of the second cross-section and the second preset cross-sectional area is 1%, 2%, 3%, etc., of the area of the second preset cross-sectional area).

[0080] It may be appreciated that the area of the first cross-section or the second cross-section may have some changes (e.g., the area of the cross-section corresponding to some positions is different from the area of the cross-section corresponding to other positions) for the purpose of facilitating an installation of some necessary attachments on the combination body or the handheld vacuum cleaner 3. In some embodiments, the area of the first cross-section or the second cross-section may be an area of an outer contour of the cross-section perpendicular to the first direction Y (or the lengthwise direction of the device body) corresponding to each position of the combination body or the handheld vacuum cleaner 3 along the lengthwise direction of the device body.

[0081] In some embodiments, the area of the first

cross-section and the area of the second cross-section are the same or substantially the same. In some embodiments, the area of the first cross-section and the area of the second cross-section being substantially the same refers that the difference between the area of the first cross-section and the area of the second cross-section is within 1%, 2%, or 3%. By making the area of the first cross-section and the area of the second cross-section the same or substantially the same, a size of the cross-section of the handheld vacuum cleaner 3 may reasonably match the size of the cross-section of the device body 1 (the binding body), so that there is not much change in the cross-sectional sizes from the device body 1 to the handheld vacuum cleaner 3, to ensure that a shape of the outer contour of the cross-section of the handheld vacuum cleaner 3 perpendicular to the first direction Y of the device body 1 and the handheld vacuum cleaner 3 is consistent or substantially consistent. Further, the combination is in a shape of a column, so that when the handheld vacuum cleaner 3 is installed to the device body 1, a whole formed by the handheld vacuum cleaner 3, the device body 1, and the sewage storage box 4 is then basically in a shape of an elongated column, which makes the device body 1 easy to be parallel to the floor when the cleaning device 100 is needed to be put down and used, and it is easy to reach into a height-restricted space such as a bed floor. Aesthetic appearance of the cleaning device 100 as the whole is also improved.

[0082] In some embodiments, referring back to FIG. 3, the fluid channel is within the device body. In some embodiments, the fluid channel may include a fluid channel (i.e., the first channel 6) configured within the lower end of the device body 1 (located in a lower portion of the sewage storage box 4), and a fluid channel (not shown in the figure) configured within the upper end of the device body (located in an upper portion of the sewage storage box 4). The fluid channel (i.e., the first channel 6) within the lower end of the device body 1 may be configured to connect the floor brush 2 (the suction inlet) to the sewage storage box 4, and the fluid channel within the upper end of the device body 1 may be configured to communicate the sewage storage box 4 with the handheld vacuum cleaner 3 (the dust canister assembly 31 or the ventilation inlet 310). In some embodiments, the fluid channel within the upper end of the device body 1 may be a channel 116 as shown in FIG. 3 or a through-hole 1151 as shown in FIG. 7. In the first operating mode, the fluid within the sewage storage box 4 after the first stage of separation may pass through the fluid channel within the upper end of the device body into the dust canister assembly 31 of the handheld vacuum cleaner 3 for a second stage of dust-gas separation.

[0083] In some embodiments, the cleaning device 100 may further include an attachment member, which may be removably connected to the handheld vacuum cleaner 3. In some embodiments, the attachment member may include one or more of a mite removal brush, a flat brush, a bristle brush, a pet brush, and a hose. In some embodiments, the attachment member may be divided into a receiver member and a brush head member. The receiver member and the brush head member may be configured to be connected to the handheld vacuum cleaner 3 when the handheld vacuum cleaner 3 is used individually (e.g., in the second operating mode). In some embodiments, the receiver member may include a hose, a long receiver, etc., and the brush head member may include a de-mite brush, a flat brush, a bristle brush, a pet brush, etc. It may be understood that when the handheld vacuum cleaner 3 is used individually, the handheld vacuum cleaner may be used directly to complete a handheld vacuuming work, or the brush head member such as the de-mite brush, the flat brush, the bristle brush, the pet brush, etc., may be connected, and the receiver member such as the hose, the long receiver, etc., may be adapted between the handheld vacuum cleaner 3 and the brush head member, to realize the cleaning needs in different scenarios.

[0084] FIG. 4 is a schematic diagram illustrating a structure of a vacuum cleaner according to some embodiments of the present disclosure.

[0085] In some embodiments, the cleaning device 100 may also have a structural form as shown in FIG. 4. In FIG. 4, the area of the second cross-section of the main portion of the handheld vacuum cleaner 3 may be different from the area of the first cross-section of the combination of the device body 1 and the sewage storage box 4. For example, the area of the second cross-section may be less than the area of the first cross-section. In some embodiments, the cleaning device 100 may also not include the handheld vacuum cleaner 3. For example, a portion of an original handheld vacuum cleaner 3 in FIG. 4 may be a portion of the device body 1 that extends upwardly, and the area of the cross-section of the extended portion perpendicular to the lengthwise direction of the device body 1 is less than the area of the first cross-section. In some embodiments, as shown in FIG. 4, a motor 34 may be provided within the device body 1 and above the sewage storage box 4, and the motor 34 may provide the suction to the cleaning device 100 to absorb the fluid from the floor (or the surface to be cleaned).

[0086] FIG. 5 is a right view illustrating a cleaning device according to some embodiments of the present disclosure. FIG. 6 is a schematic diagram illustrating a disassembled structure of a cleaning device shown in FIG. 5. FIG. 7 is a schematic diagram illustrating a partial structure of a cleaning device shown in FIG. 5.

[0087] In some embodiments, the cleaning device 100 in the embodiments of the present disclosure may also have the structural form shown in FIG. 5 to FIG.7. A difference between structures shown in FIG. 5 to FIG 7 and the structure shown in FIG. 1 to FIG. 3 or FIG. 4 includes that locations at which the handheld vacuum cleaner 3 is disposed are different. For example, the handheld vacuum cleaner 3 shown in FIG. 1 to FIG. 3 or FIG. 4 is disposed at an end of the device body 1 that is away from

the floor, while the handheld vacuum cleaner shown in FIG. 5 to FIG. 7 is disposed on a same side of the device body 1 as the sewage storage box 4 (e.g., a front side of the device body 1).

[0088] Further, as shown in conjunction with FIG. 5 and FIG. 6, the device body 1 of the cleaning device 100 may include a rod 11 that is integrally in a form of a rod. A lower portion of the rod 11 may be provided with a floor brush connecting end 111 pivotally connected to the floor brush 2 (e.g., a connecting portion 420 of the floor brush 400 shown in FIG. 35), and the upper portion of the rod 11 is provided with a handle end 112 that is convenient for a user to grip.

[0089] The front side of the device body 1 is separately and detachably installed with the handheld vacuum cleaner 3 and the sewage storage box 4 (e.g., the sewage storage box 4 or 300), the handheld vacuum cleaner 3 is provided in an upper portion of the sewage storage box 4; and the device body 1 is configured with the first channel 6 communicating the floor brush 2 with the sewage storage box 4. Relative to an operating principle of the cleaning device 100 shown in FIG. 5 to FIG. 7, which is similar to that shown in FIG. 1 to FIG. 3, a relevant description of which may be referred to FIG. 1 to FIG. 3 and their related descriptions, and may not be repeated herein.

[0090] In some embodiments, as shown in FIG. 7, the device body 1 may include a fixed seat 115, the fixed seat 115 may be partially convex relative to a rod 11 of the device body 1, and the handheld vacuum cleaner 3 is detachably connected to the device body 1 through the fixed seat 115.

[0091] In some embodiments, the fixed seat 115 is provided with a through-hole 1151. An end of the dust canister assembly 31 having the ventilation inlet 310 and the through-hole 1151 may be fitted and connected. The expression "fitted and connected" refers that a shape of the end of the dust canister assembly 31 having the ventilation inlet 310 fits with a shape of the through-hole 1151, so that the dust canister assembly 31 may form a sealed channel with the through-hole 1151, and the fluid from the sewage storage box 4 may be treated. In addition, the user may directly remove the handheld vacuum cleaner 3 which is plugged on the fixed seat 115 for an individual use of the handheld vacuum cleaner 3. Accordingly, a fluid sealing and a locking stability between the handheld vacuum cleaner 3 and the sewage storage box 4 may be balanced. As an exemplary illustration, as shown in FIG. 6, the handheld vacuum cleaner 3 and the sewage storage box 4 are capable of being sealed and fluidly connected at the top and the bottom of the through-hole 1151, respectively. The fluid separated by the first stage of separation flows into the ventilation inlet 310 of the handheld vacuum cleaner 3 through the through-hole 1151.

[0092] In some embodiments, the sewage storage box 4 may be located at an end of the fixed seat 115 back away from the handheld vacuum cleaner 3, and the sewage storage box 4 is detachably connected to the device body 1 through the fixed seat 115. For example, an end of the sewage storage box 4 away from the floor brush 2 is fitted and connected to the end of the fixed seat 115 backing away from the handheld vacuum cleaner 3 to realize a detachable connection between the sewage storage box 4 and the fixed seat 115.

[0093] In some embodiments, to increase the reliability of the connection between the handheld vacuum cleaner 3 and the sewage storage box 4 and the device body 1, the device body 1 may include a first locking mechanism 113. The first locking mechanism 113 is configured to lock the handheld vacuum cleaner 3 to the device body 1. In some embodiments, the device body 1 may include a second locking mechanism 114. The second locking mechanism 114 is configured to lock the sewage storage box 4 to the device body. Both the handheld vacuum cleaner 3 and the sewage storage box 4 may be individually detachable relative to the device body 1 by arranging the first locking mechanism 113 and the second locking mechanism 114. In some embodiments, a first locking structure 113 or a second locking structure 114 may be any one of a locking structure, a clamping structure, a magnetic suction structure, a bonding structure, and the like.

[0094] As shown in FIG. 3, to enhance an installation stability of the sewage storage box 4, the device body 1 may also include a sewage storage box supporting seat 5. The sewage storage box supporting seat 5 may support the sewage storage box 4 from the bottom or a side of the sewage storage box 4 so that the sewage storage box 4 may be stably connected to the device body 1. In some embodiments, the sewage storage box supporting seat 5 may be disposed at the rear of the device body 1. The rear side of the device body 1 may be the side of the device body 1 facing the user when the user is operating the cleaning device 100 (e.g., the right side of the device body 1 shown in FIG. 3).

[0095] In some embodiments, the sewage storage box supporting seat 5 may be disposed as a groove. The groove is configured at a rear of the device body 1, and at least a large portion of the sewage storage box 4 is accommodated inside the groove. In some embodiments, more than half of a volume of the sewage storage box 4 is disposed in the groove, which enables the structure of the device body after the installation of the sewage storage box 4 to be relatively smooth and rounded, and difficult to being bumped or knocked into other objects.

[0096] In some embodiments, when the second locking structure 114 unlocks the sewage storage box 4, one end of the sewage storage box supporting seat 4 may automatically move away from the device body 1 to link the sewage storage box 4 to form a certain angle with the device body 1 to facilitate the user to take out the sewage storage box 4. The certain angle may be not greater than 45. For example, the certain angle may be 15°, 20°, 30°, 45°, etc. It should be noted that the angle may also be greater than 45° (e.g., 50°, 60°). A specific

value of the angle may be selected according to an actual situation, and it is sufficient to be able to realize that the user may take out the sewage storage box 7 and prevent the liquid in the sewage storage box 7 from overflowing.

[0097] In some embodiments, the sewage storage box supporting seat 5 is pivoted on the device body 1, and a plug member in a form of a plate or a block is constructed at one end of the sewage storage box supporting seat away from a pivoted portion. An elastic member is provided between the sewage storage box supporting seat 4 and the device body 1, the elastic member is capable of bouncing the sewage storage box supporting seat 5 relative to the device body 1, to cause the plug member to be automatically moved away from the device body 1. For example, in some embodiments, shown in conjunction with FIG. 6 and FIG. 7, one end of the sewage storage box 4 is fitted and connected to the fixed seat 115, and another end of the sewage storage box 4 is connected to the sewage storage box supporting seat 5. At this time, a portion of a sidewall of the sewage storage box 4 is affixed to the device body 1, and the elastic member is in a compressed state under an action of the sewage storage box 4 and the plug member. When the user separates the sewage storage box 4 from the fixed seat 115, the plug member moves away from the device body 1 under an elastic force of the elastic member, and at the same time, the plug member also drives the sewage storage box 4 away from the device body 1. In some embodiments, a spring member may include one or more of a spring, a leaf spring, a bellows, and the like. The sewage storage box 4 is provided with a plug-in member 41 capable of being connected to the plug member, so that when the plug member is rotated, the sewage storage box 4 is capable of being linked to the plug member through the plug-in member 41. For example, when the plug member is moved away from the device body 1 under the action of the elastic member, the sewage storage box 4 is moved away from the device body 1 together with the plug member, and a process of moving the sewage storage box 4 away from the device body 1 may be regarded as an automatic deployment of the sewage storage box 4. In some embodiments, it is also possible to switch the positions of the plug member and the plug-in member to realize a same effect of the automatic deployment of the sewage storage box 4.

[0098] When there is liquid in the sewage storage box 4, if an angle of the automatic deployment is too great, it is easy to make the liquid splash out or even overflow, therefore, the angle of the automatic deployment of the sewage storage box 4 relative to the device body 1 may be no greater than 45°, and a maximum rotation amplitude of the second locking structure 114 may be specifically limited by installing a limit plate on the device body 1. In addition, to avoid that the proves of the automatic deployment being too rapid to cause the liquid in the sewage storage box 4 to shake violently, in some embodiments, the pivot portion of the sewage storage box supporting seat 5 is provided with a rotary damper.

[0099] By providing a fixed seat 115 on the device body 1 which is convex relative to the device body 1, a center of gravity and most of the weight of the handheld vacuum cleaner 3 are supported on the fixed seat 115 rather than on the device body 1. In addition, the device body 1 is provided with a first locking mechanism 113, so that the handheld vacuum cleaner 3 may be stabilized and fixed by a cooperation between the fixed seat 115 and the first locking structure 113. In addition, a contact area between the device body 1 and the sewage storage box 4 may also be reduced by providing the sewage storage box supporting seat 5, the fixed seat 115, and the second locking structure 114 on the device body 1.

[0100] The vacuum cleaner provided in the embodiments of the present disclosure realizes a fixation of the handheld vacuum cleaner 3 or the sewage storage box 4 through the structure of the fixation seat 115, the locking structure (e.g., the first locking structure 113, the second locking structure 114), the sewage storage box supporting seat 5, etc., which may minimize a requirement for a support area of the device body 1, so that the rod body 11 may be constructed in a form of an elongated rod (referred to as elongated rod), thereby reducing an overall weight of the device body 1. For example, the overall weight of the device body may be reduced by more than 70%, and an appearance of a whole device is simple and fresh.

[0101] Further, a cross-sectional area of the elongated rod body 11 along its lengthwise direction is substantially free of significant change, it may be understood that the cross-sectional area (e.g., an area of the cross-section perpendicular to the lengthwise direction of the device body 11) is bound to have a partial change to facilitate the installation of the necessary attachments such as the locking structure, and herein, the free of significant change means that a majority of the cross-sectional area of the device body 11 along the lengthwise direction (a direction Y illustrated in FIG. 3) is free of significant change. The cross-sectional area of the rod body 11 may have a minimum value and a maximum value, and even a maximum cross-sectional area should be less than any one of the average cross-sectional area of the fixed seat 115, an average cross-sectional area of the handheld vacuum cleaner 3, and the average cross-sectional area of the sewage storage box 4. The average cross-sectional area of the fixed seat 115 is the average of the cross-sectional areas of the fixed seat 115 at different positions in the lengthwise direction of the rod body 11. The average cross-sectional area of the handheld vacuum cleaner 3 is an average of the cross-sectional areas of the handheld vacuum cleaner 3 at different positions along the lengthwise direction of the rod body 11. In some embodiments, the maximum cross-sectional area of the rod body 11 may be less than half of the cross-sectional area of any of the three to ensure a light weight of the rod body 11. In some embodiments, a ratio of a size U1 of the rod body 11 along a front-to-back direction (direction x may be referred to as a width direction illustrated in FIG. 7) to

a scale V1 of the device body 1 along the lengthwise direction (Y-direction illustrated in FIG. 7) may be within a range of 0.02 to 0.06. The size U1 of the rod body 11 along the width direction may be within a range of 43 mm to 49 mm, and a size V1 of the rod body 11 along the lengthwise direction may be within a range of 1000 mm to 1200 mm. The above arrangements may make the device body to realize a light weight as the whole, which is convenient for the user to grip and use, and the overall size and weight of the cleaning device 100 are optimized.

[0102] In some embodiments, the fixed seat may be approximately in a shape of a circular ring, and a ratio of a maximum size of the fixed seat along the width direction (e.g., U2 illustrated in FIG. 7) to the size U1 of the rod body 11 along the width direction may be within a range of 1.8-3, which make an overall width of the fixed seat and the rod body 11 to be designed to be as small as possible while ensuring a usage performance and facilitating a control of the rod body 11 to extend the floor brush 2 deep into the bed floor. When projected along the lengthwise direction of the device body 1, a ratio of a projection area of the fixed seat 115 to a projection area of the rod body 11 is within a range of 6.5 to 9. The projection area herein refers to an area enclosed by an outer edge of the cross-sectional area. Specifically, a projection area of the fixed seat 115 is within a range of 55cm^2 ~80cm^2.

[0103] In some embodiments, as shown in FIG. 1 to FIG. 4, the sewage storage box 4 may be provided on a rear side of the device body 1 (e.g., a side facing the user when the user operates the cleaning device 100). For example, the sewage storage box 4 may be provided on the sewage storage box supporting seat 5 (e.g., the groove). In some embodiments, as shown in FIG. 5 to FIG. 7, the sewage storage box 4 may be provided on the front side of the device body 1. It should be noted that when the present disclosure relates to a front-back orientation such as "front side", "rear side", and the like, the "front side" may, without special description, be a side back away from the user when the user operates the cleaning device 100 (e.g., a left side in FIG. 4), and the "rear side" may be a side facing the user (e.g., a right side in FIG. 4). For example, as shown in FIG. 4, a direction of an arrow A is "rear" and a direction opposite to the arrow A is "front".

[0104] It should be understood that the structural drawings of the cleaning device provided in FIGS. 1-FIG. 7 are merely provided for illustrative purposes and are not intended to limit the scope of the present disclosure. For those skilled in the art, various deformations and amendments may be made under the teaching of the present disclosure. And these deformations and amendments are within the scope of protection of the present disclosure. In some embodiments, the count of elements shown in the figures, may be adjusted according to the actual situation. In some embodiments, one or more elements shown in FIG. 1-FIG. 7 may be omitted, or one or more other elements may be added or deleted. In some embodiments, an element may be replaced by other original elements that may perform a similar function. In some embodiments, an element may be split into a plurality of subelements, or a plurality of elements may be combined into a single element.

[0105] The sewage storage box of the embodiments of the present disclosure may be described in detail below in conjunction with the accompanying drawings.

[0106] FIG. 8 is a schematic diagram illustrating an internal structure of a sewage storage box according to some embodiments of the present disclosure. FIG. 9 is a schematic diagram illustrating an overall structure of a sewage storage box according to some embodiments of the present disclosure

[0107] In some embodiments, the sewage storage box 4 in the cleaning device 100 shown in FIG. 1 to FIG. 7 may specifically be the sewage storage box 4 as shown in FIG. 8 and FIG. 9.

[0108] In conjunction with the sewage storage box shown in FIG. 8 and FIG. 9, the sewage storage box 4 may include a box body 201. The box body 201 is provided with the second channel 202 connected to the floor brush. As an exemplary illustration, a lower end (e.g., an end close to the floor) of the second channel 202 may be connected to the upper end of the first channel 6 illustrated in FIG. 2, thereby realizing a communication between the second channel 202 and the floor brush (e.g., the floor brush 2 illustrated in FIG. 2). In some embodiments, the second channel 202 is also referred to as a sewage channel. In some embodiments, a partition plate 203 may be provided within the box body 201, and the partition plate 203 may divide an internal space of the box body 201 into an upper space 204 and a lower space 205. The upper space 204 is close to the handheld vacuum cleaner 3, and the lower space 205 is close to the floor brush. The second channel 202 may extend upwardly from the lower space 205 through the partition plate 203 to the upper space 204. In some embodiments, the partition plate 203 may be provided with a first hole group 231 and an anti-backflow structure 230, and the anti-backflow structure 230 may be configured to allow the sewage in the upper space 204 to flow into the lower space 205 through the first hole group 231, and is configured to prevent the sewage in the lower space 205 from flowing into the upper space 204 through the first hole group 231. Further, the sewage entering the upper space 204 of the box body 201 from the second channel 202 may flow into the lower space 205 for storage at least through the first hole group 231, and the anti-backflow structure 230 may prevent the sewage in the lower space 205 from flowing back into the upper space 204 through the anti-backflow structure 230.

[0109] In some embodiments, as shown in FIG. 8, the second channel 202 and the box body 201 may be a one-piece structure. For example, the second channel 202 may be formed integrally by an injection molding process, which is simple and convenient to manufacture. In some embodiments, the second channel 202 and the box body

201 may also be a split structure, so that the second channel 202 may be removed from the box body 201 to thoroughly clean the second channel 202 and or the box body 201 when in need. In some embodiments, when the second channel 202 and the box body 201 are split structures, the two may be threadedly connected or sealingly clamped together.

[0110] In some embodiments, as shown in conjunction with FIG. 1 - FIG. 7 and FIG. 8, for the cleaning device 100 having the sewage storage box 4, when the device body 1 (or the sewage storage box 4) is held in a substantially upright position (e.g., when the angle of the device body 1 relative to a horizontal plane is greater than or equal to 90 degrees or greater than or equal to 60 degrees, hereinafter referred to as "upright"), the sewage is suctioned to the second channel 202 and flows from the second channel 202 into the upper space 204, and then enters the lower space 205 from the first hole group 231 through the anti-backflow structure 230 and is stored in the lower space 205. In some embodiments, the second channel 202 may communicate with the first channel 6, and when the cleaning device 100 is in operation, the sewage suctioned by the floor brush 2 may enter into the second channel 202 in sequence with the first channel 6. In some embodiments, when the device body 1 (or the sewage storage box 4) is tilted significantly (e.g., at an angle of less than or equal to 30 degrees relative to the horizontal plane, or even at an angle of about 2 degrees relative to the horizontal plane, hereinafter referred to as "flattened" or "lay flat"), the anti-backflow structure 230 prevents the sewage in the lower space 205 from flowing backward through the anti-backflow structure 230 and into the upper space 205. The anti-backflow structure 230 prevents the sewage in the lower space 205 from flowing backward through the anti-backflow structure and into the upper space 204, so that the sewage does not flow into the motor (motor 33 and/or motor 34). The motor does not stop, and the cleaning device 100 may still clean normally. As a result, the cleaning device having the sewage storage box 4 may be used not only in an upright position, but also with the device body 1 tilted significantly, or even flattened or laid flat, which greatly facilitates the use by the user.

[0111] In some embodiments, in the sewage storage box 4 shown in FIG. 8 and FIG. 9, one end of the box body 201 (e.g., an end close to the handheld vacuum cleaner 3) has an opening for dumping the sewage. The opening may be provided with a cover body 216, and the cover body 216 is provided with a gas outflow channel 218. An inlet 219 of the gas outflow channel 218 may be in communication with the upper space 204. A motor (e.g., the motor 33 or the motor 34) or a pumping device (e.g., a suction pump) being in communication with the motor may be provided at an outlet 221 of the gas outflow channel 218 to pump gas from the inside of the box body 201, thereby suctioning the sewage through the second channel 202 into the box body 201. In some embodiments, a filter member (not shown in the figures) is provided at the outlet 221 of the gas outflow channel 218. The filter member may be configured to filter out fine solid matter (i.e., a solid garbage) entrained in the gas to prevent a garbage clogging at the motor. In some embodiments, the filter member may be a hepa to improve a filtration. In some embodiments, the outlet 221 of the gas outflow channel 218 may be connected to the handheld vacuum cleaner 3, such that the gas obtained after the separation (e.g., a first stage of dust-gas separation) within the cavity 201 may enter the dust canister assembly 31 of the handheld vacuum cleaner 3 for a second stage of dust-gas separation through the outlet 221 of the gas outflow channel 218 to obtain the clean gas discharged from the ventilation outlet of the handheld vacuum cleaner 3.

[0112] In some embodiments, a cyclone separation structure 260 may be provided within the gas outflow channel 218. When the gas flows through the cyclone separation structure 260, the cyclone separation structure 260 separates a portion of the solid garbage carried by the gas (e.g., the first stage of separation), and the rest of the solid garbage is then filtered out by the filter member. In some embodiments, the cyclone separation structure 260 may be formed integrally with the cover body 216, and the cyclone separation structure 260 may be easily cleaned separately by detaching the cover body 216. In addition, by providing the cyclone separation structure 260, a workload of the filter member is reduced, a service life of the filter member is improved, a frequency of a maintenance or a replacement of the filter member is reduced, and to use the cleaning device 100 by the user is facilitated.

[0113] FIG. 10 is a schematic diagram illustrating a structure of a partition plate according to some embodiments of the present disclosure. As shown in FIG. 10, the first hole group 231 is provided on the partition plate 203. The anti-backflow structure 230 includes a backflow prevention valve 232 corresponding to the first hole group 231 installed on the partition plate 203. The backflow prevention valve 232 is disposed in a lower space 205 and communicates with the upper space 204 through the first hole group 231. Alternatively, a first portion 206 of an edge of the partition plate 203 may be in sealing contact with a sidewall of the box body 201. In some embodiments, a sealing ring may be provided between the edge of the partition plate 203 and a sidewall of the box body 201 to realize a sealing contact between the partition plate 203 and the box body 201. With this structure, the backflow prevention valve 232 may prevent the sewage in the lower space 205 from flowing through the backflow prevention valve 232 and entering the upper space 204 when the device body 1 is placed parallel to the ground. Additionally, a sealing between the edge of the partition plate 203 and the sidewall of the box body 201 may also prevent the sewage in the lower space 205 from flowing into the upper space 204 through a gap between the edge of the partition plate 203 and the sidewall of the box body 201. Accordingly, the sewage may also be prevented

from returning to the upper space 204 and being suctioned to the motor, and the cleaning device 100 may be placed parallel to the ground for use. In addition, when the sewage storage box 4 is cleaned, the partition plate 203 may be removed from the box body 201, and the first hole group 231 may filter out the solid garbage from the sewage, that is, the sewage is stored in the box body 201, and the solid garbage is carried on the partition plate 203, thereby realizing the separation of the solid garbage from the sewage. The solid garbage may then be emptied into a garbage basket separately, while the sewage may be emptied into a discharge device such as a toilet or a sink, thereby effectively preventing the discharge device such as the toilet or the sink from being clogged. In addition, the structure of the partition plate 203 with the first hole group 231 and the structure of the backflow prevention valve 232 are simple, a simple manufacturing process and a low cost, which makes it easy to use in the cleaning device 100.

[0114] In some embodiments, the first hole group 231 may include one or more first through-holes. In some embodiments, a count of first through-holes in the first hole group 231 may be within a range of 50 and 200 to improve an efficiency of the sewage flowing from the upper space 204 into the lower space 205. In some embodiments, to ensure a structural strength of the partition plate 203, a count of first through-holes in the first hole group 231 may be within a range of 70 to 150. In some embodiments, a count of first through-holes in the first hole group 231 may be within a range of 80 to 120.

[0115] In some embodiments, the first through-hole may be a bar-shaped hole, a circular hole, etc. having a regular shape or an irregular shape. In some embodiments, the first through-hole is the bar-shaped hole, and a length and a width of the bar-shaped hole is relatively great, which may ensure an efficiency of the sewage passing channel the first hole group 231, and may also effectively prevent the solid garbage from passing through the first through-hole, to make the partition plate 203 have a better filtering effect. In some embodiments, when the first through-hole is the bar-shaped hole, to ensure that the partition plate 203 has a relatively great filtration effect and that the solid garbage is not able to pass through the first hole group 231, a length-to-width ratio of the bar-shaped holes may be within a range of 0.5 to 2. In some embodiments, a length-to-width ratio of the bar-shaped holes may be within a range of 0.7 to 1.5. In some embodiments, a length-to-width ratio of the bar-shaped holes may be within a range of 0.8 to 1.2.

[0116] In some embodiments, an area of the first through-hole in the first hole group 231 may be within a range of $80mm^2$ to $100mm^2$, which ensures that the efficiency of the sewage passing through the first hole group 231 is improved, and also provides a better blockage of the solid garbage, and provides the better filtering effect. In some embodiments, an area of the first through-hole in the first hole group 231 may be within a range of $85mm^2$ to $100mm^2$. The area of the first through-hole in the first hole group 231 may be $90mm^2$ to $100mm^2$. In some embodiments, an area of the first through-hole in the first hole group 231 may be $98mm^2$, such that the efficiency of the sewage passing through the first hole group 231 is better enhanced and to block the solid garbage.

[0117] Since the first hole group 231 is provided on the partition plate 203, an area percentage of the first hole group 231 on the partition plate 203 (i.e., a ratio of a total area of the first through-holes in the first hole group 231 to an area of the partition plate 203) is related to the structural strength of the partition plate 203. To ensure that the partition plate 203 has a relatively better structural strength and that the channel of the sewage has a higher efficiency to pass through the first hole group 231. In some embodiments, the area percentage of the first hole group 231 on the partition plate 203 may be within a range of 0.1 to 0.5. In some embodiments, an area percentage of the first hole group 231 on the partition plate 203 may be within a range of 0.1 to 0.4. In some embodiments, an area percentage of the first hole group 231 on the partition plate 203 may be within a range of 0.2 to 0.3.

[0118] In some embodiments, the partition plate 203 is detachably installed within the box body 201 to easily remove the partition plate 203 from the box body 201. In some embodiments, as shown in FIG. 10, the partition plate 203 is provided with a handle 307, with the handle 207, and the handle 207 extends towards the opening of the box body 201 (i.e., the end provided with the cover body 216). Therefore, the user may easily lift the partition plate 203 out of the box body 201 by lifting up the handle 207 when cleaning the sewage storage box 4. The solid garbage carried on the partition plate 203 may also be removed from the box body 201, thereby separating the solid garbage from the sewage. In some embodiments, the partition plate 203 may also be directly connected to the cover body 216. In this way, when the cover body 216 is removed, the partition plate 203 may be removed at the same time. A situation where the sewage and solid garbage are mixed again due to forgetting to remove the partition plate 203 is prevented when the sewage in the storage box 4 is dumped.

[0119] In some embodiments, the partition plate 203 may include a cambered plate. In some embodiments, the partition plate 203 may be a cambered plate protruding toward the lower space, and the first hole group 231 may be offset from a lowest point of the partition plate 203. The lowest point of the partition plate 203 may be a location on an upper surface or a lower surface of the partition plate 203 that is at a minimum distance from the floor brush 2. The first hole group 231 offsetting from the lowest point of the partition plate 203 may be understood as a distance between the location of the first hole group 231 and the lowest point of the partition plate 203 along a radial direction of the partition plate 203. The solid garbage may be concentrated at the lowest point of the partition plate 203 by providing the partition plate 203 as a

protruding cambered plate, thereby reducing a chance of the first hole group 231 being blocked by the solid garbage, further facilitating the user to use the cleaning device 100.

[0120] In some embodiments, and continuing to refer to FIG. 10, the second hole group 210 is also provided on the partition plate 203, and the second hole group 210 communicates the upper space 204 with the lower space 205 freely. During use, the sewage may flow into the lower space 205 through the first hole group 231, and the air within the lower space 205 may flow into the upper space 204 through the second hole group 210 and thus be pumped away by a motor (e.g., motor 34), which may increase a pressure difference between the upper space 204 and the lower space 205 so that the sewage may flow smoothly from the upper space 204 into the lower space 205. In some embodiments, a portion of the sewage within the upper space 204 may flow from the second hole group 210 into the lower space 205. Thus, the second hole group 210 may filter out the solid garbage from the sewage. In some embodiments, the second hole group 210 may be offset from the first hole group 231 on a circumference of the partition plate 203. In some embodiments, the second hole group 210 being offset from the first hole group 231 on the circumference of the partition plate 203 may refer to that there is a distance between the second hole group 210 and the first hole group 231 on the circumference of the partition plate 203. A circumferential direction of the partition plate 203 may refer to a direction along the edge of the partition plate 203. Accordingly, the backflow prevention valve 232 may be closed when the cleaning device 100 is placed parallel to the ground for use, and a level of the sewage in the lower space 205 may be lower than the second hole group 210, such that the sewage water in the lower space 205 may also not flow through the second hole group 210 to the upper space 204. In some embodiments, the first hole group 231 may be radially opposed to the second hole group 210. In some embodiments, the first hole group 231 being radially opposed to the second hole group 210 may refer to that the first hole group 231 and the second hole group 210 are symmetrically centered relative to a geometric center of the partition plate 203 along the radial direction of the partition plate 203. This ensures that the distance between the first hole group 231 and the second hole group 210 along the circumference of the partition plate 203 is relatively great, so that even though there is a relatively great amount of sewage in the lower space 205, the level of the sewage is not higher than the second hole group 210, and ensures that the sewage in the lower space 205 also does not flow into the upper space 204 through the second hole group 210, which further facilitates the user to use the cleaning device 100. In some embodiments, the second hole group 210 may include one or more second through-holes. To ensure that the efficiency of the sewage passing through the second hole group 210 is improved, while well blocking the solid garbage and providing the good filtration, in some embodiments, an area of the second through-hole in the second hole group 210 may be within a range of 350 mm^2 to 400 mm^2. In some embodiments, the area of the second through-hole in the second hole group 210 may be within a range of 360 mm^2 to 390 mm^2. In some embodiments, the area of the second through-hole in the second hole group 210 may be within a range of 360 mm to 390 mm. In some embodiments, the area of the one or more second through-holes in the second hole group 210 may be within a range of 370 mm^2 to 380 mm^2. In some embodiments, the area of the second through-hole in the second hole group 210 may be 376mm^2, which enhances the efficiency of the sewage passing through the second hole group 210 and blocks the solid garbage.

[0121] To ensure that the partition plate 203 has a good structural strength and that the sewage has a high efficiency to pass through the second hole group 210, in some embodiments, an area percentage of the second hole group 210 in the partition plate 203 (e.g., the ratio of the total area of the second through-hole in the second hole group 210 to the area of the partition plate 203) may be within a range of 0.01 to 0.2. In some embodiments, the area percentage of the second hole group 210 in the partition plate 203 may be within a range of 0.02 to 0.1. In some embodiments, the area percentage of the second hole group 210 in the partition plate 203 may be within a range of 0.05 to 0.08.

[0122] In some embodiments, the second through-holes in the second hole group 210 may have same or different shapes, counts, etc., as the first through-hole in the first hole group 231. In some embodiments, more descriptions regarding the count, the shape of the second through-hole in the second hole group 210 may be found in the relevant descriptions of the count, the shape of the first through-hole in the first hole group 231, and may not be repeated herein.

[0123] In some embodiments, to prevent the sewage from flowing from the lower space 205 into the upper space 204 when the cleaning device 100 is tilted or laid flat (placed parallel to the ground) for use, it is also possible that only the second hole group 210 is provided on the partition plate 203 without the first hole group, in which case it is sufficient to arrange the cleaning device 100 not to be tilted facing the direction of the second hole group 210. For example, when the second hole group 210 is provided on the partition plate 203 close to the front side of the box body 201, the cleaning device 100 may then be tilted toward the rear side when in use. In some embodiments, where the partition plate 203 is provided as the cambered plate, the second hole group 210 may also be offset from the lowest point of the partition plate 203. Such that the chance of the second hole group 210 being clogged with the solid garbage may be reduced, thereby facilitating the user to use the cleaning device 100.

[0124] In some embodiments, continuing to refer to FIG. 10, a baffle wall 211 may be provided along a cir-

cumferential upright of the partition plate 203, and the baffle wall 211 may extend at least into the upper space 204. The baffle wall 211 may prevent the solid garbage from falling off the edge of the partition plate 203 into the box body 201 when the partition plate 203 is lifted out of the box body 201. In some embodiments, the baffle wall 211 may be provided with a leaching hole, which not only prevents the solid garbage from falling, but also allows the sewage remaining on the partition plate 203 to be discharged into the box body 201 through the leaching hole as well, thereby improving an effect of separating the solid garbage from the sewage. In some embodiments, a frame 212 may be provided uprightly along the circumferential direction of the partition plate 203, and then a strainer 213 may be provided in the frame 212, and the strainer 213 may play the role of the leaching hole, thereby forming the above baffle wall 211 having the leaching hole. In some embodiments, when the partition plate 203 is provided with the baffle wall 211, the handle 207 may be connected to the baffle wall 211, or may be integrally molded (e.g., the handle 207 may be a portion of an upward extension of the frame 212), which may not be repeated herein.

[0125] In some embodiments, continuing to refer to FIG. 9 and FIG. 10, the partition plate 203 is further provided with a fitting hole 214. The fitting hole 214 are offset from the first hole group 231 and the second hole group 210. For example, there is a distance between the fitting hole 214 and the first hole group 231 along the radial direction of the partition plate 203, and there is a distance between the fitting hole 214 and the second hole group 210 along the radial direction of the partition plate 203. The second channel 202 may be a pipe structure, and the second channel 202 may extend upwardly from the lower space 205 through the fitting hole 214 to the upper space 204. Such that the partition plate 203 may be easily fit into the box body 201. In some embodiments, the fitting hole 214 and the second channel 202 are in sealing contact (e.g., the sealing ring may be provided between the edge of the fitting hole 214 and the second channel 202), thereby preventing the exist of a gap between the edge of the fitting hole 214 and the second channel 202, to prevent the sewage from flowing from the lower space 205 through the gap between the edge of the fitting hole 214 and the second channel 202 into the upper space 204 when the cleaning device 100 is laid plat.

[0126] In some embodiments, the second channel 202 may also be provided such that the sewage opening thereof is disposed on the sidewall of the box body 201 and is in communication with the upper space 204. The sewage opening may be understood as an opening for the sewage to enter the box body 201 (the upper space 204) along the second channel 202. In an embodiment not shown, a top wall is provided at the top of the box body 201, an opening for dumping the sewage is provided on the top wall, and the cover body 216 may be covered on the opening. In this case, a sewage opening of the second channel 202 is then provided on the top wall of the box body 201 and in communication with the upper space 204.

[0127] In some embodiments, referring to FIG. 10, a side of the fitting hole 214 may be provided with an annular baffle 215, and the annular baffle 215 may extend into the upper space 204. Accordingly, the second channel 202 may extend through an annular space formed by the annular baffle 215, thereby making a connection between the partition plate 203 and the second channel 202 reliable. Such that an angle between the partition plate 203 relative to an axial direction of the second channel 202 is prevented from changing when the cleaning device 100 is tilted or laid flat, and even if the partition plate 203 (together with the baffle wall 211) is not skewed within the box body 201, the anti-backflow structure 230 on the partition plate 203 remains in its original position, thereby ensuring that the sewage does not flow out of the lower space 205 through the anti-backflow structure 230.

[0128] FIG. 11 is a schematic diagram illustrating a structure of a backflow prevention valve according to some embodiments of the present disclosure. In some embodiments, as shown in FIG. 11, the backflow prevention valve 232 may include a fitting 233 and a flexible valve body 234. The fitting 233 is provided at an inlet of the valve body 234. In some embodiments, a size of a cross-section of the outlet of the valve body 234 along a second direction may be greater that the size of the cross-section of the outlet of the valve body 234 along a third direction. The second direction is perpendicular to the third direction. That is, the valve body 234 may be a flattened opening valve body. Merely by way of example, the cross-section of the outlet of the valve body 234 may be rectangular, a size of the valve body 234 along the second direction may refer to a length of the rectangular, and a size of the valve body 234 in the third direction may refer to a width of the rectangular. In some embodiments, the fitting 233 and the valve body 234 may be a one-piece structure formed by the injection molding process, the 3D printing process, and other one-piece molding processes. In some embodiments, the fitting 233 and the valve body 234 may be separated structures, and then assembled to form the backflow prevention valve 232 by a connection process such as adhesive connection, clamping connection, etc. In some embodiments, the fitting 233 is installed to the partition plate 203 corresponding to the first hole group 231. In some embodiments, to facilitate the installation of the backflow prevention valve 232, in the sewage storage box 4 shown in FIG. 8, a conduit 208 may be provided on the lower surface of the partition plate 203 (the surface close to the floor brush 2) corresponding to the first hole group 231, and the fitting 233 may be connected to the conduit 208 to realize the connection between the backflow prevention valve 232 and the partition plate 203. In some embodiments, the fitting 233 may be elastic to be easily sleeved onto the conduit 208 and then be selectively fixed by the fixed member (e.g., a clamp). In some embodiments, the fitting 233 and the conduit 208 may also be connected through

a flange. In some embodiments, the fitting 233 and the conduit 208 may also be connected together through a threaded connection. For example, the fitting 233 is provided with internal threads, and the conduit 208 is provided with external threads on the external surface adapted to the above internal threads, and the fitting 233 and the conduit 208 may be connected together through a thread tightening. It should be noted that the above manner of the installation the backflow prevention valve 232 to the partition plate 203 is merely illustrated for the purpose of example and is not intended to be limited. Other processes (e.g., the adhesive connection, the clamping connection, etc.) may also be configured to install the backflow prevention valve 232 to the partition plate 203 and may not be repeated herein.

[0129] In some embodiments, the anti-backflow structure 230 may include only one backflow prevention valve 232 installed on the partition plate 230 corresponding to all the first through-holes in the first hole group 231. For example, the conduit 208 is provided on the lower surface of the partition plate 203 corresponding to the first hole group 231, one end of the conduit 208 is connected to a fitting 233 of the backflow prevention valve 232, another end is connected to the lower surface of the partition plate 230, and another end of the conduit 208 abuts against all of the first through-holes in the first hole group 231 so that the sewage from the upper space 204 is able to enter the same backflow prevention valve after passing through all of the first through-holes. In some embodiments, the anti-backflow structure 230 may include a plurality of backflow prevention valves 232 installed on the partition plate 203 corresponding to one or more of the first through-holes in the first hole group 231, respectively. For example, a plurality of conduits 208 are provided on the lower surface of the partition plate 230 corresponding to the first hole group 231, and one ends of the plurality of conduits 208 are respectively connected to the fitting 233 of the plurality of backflow prevention valves 232. Another ends of each of the plurality of conduits 208 are connected to the lower surface of the partition plate 230, and another ends of each of the plurality of conduits 208 is connected to one or more first through-holes in the first hole group 231, so that the sewage from the upper space 204 is able to flow into a corresponding backflow prevention valve 232 after passing through the one or more first through-holes.

[0130] In some embodiments, a count of backflow prevention valves 232 in the anti-backflow structure 230 may be arranged according to a count of first through-holes in the first hole group 231. In some embodiments, a ratio of the count of backflow prevention valves 232 in the anti-backflow structure 230 to the count of first through-holes in the first hole group 231 may be 1:1. For example, each of the backflow prevention valves in the anti-backflow structure 230 is installed on the partition plate 230 corresponding to one of the first through-holes in the first hole group, respectively. In some embodiments, the ratio of the count of backflow prevention valves 232 in the anti-backflow structure 230 to the count of first through-holes in the first hole group 231 may be 1:2. For example, each of the backflow prevention valves in the anti-backflow structure 230 is installed on the partition plate 230 corresponding to two first through-holes in the first hole group, respectively. In some embodiments, the ratio of the count of backflow prevention valves 232 in the anti-backflow structure 230 to the count of first through-holes in the first hole group 231 may be 1:4. For example, each of the backflow prevention valves in the anti-backflow structure 230 is installed on the partition plate 230 corresponding to four first through-holes in the first hole group, respectively. In some embodiments, the ratio of the count of backflow prevention valves 232 in the anti-backflow structure 230 to the count of first through-holes in the first hole group 231 may be 1:5. For example, each of the backflow prevention valves in the anti-backflow structure 230 is installed on the partition plate 230 corresponding to five first through-holes in the first hole group, respectively. In some embodiments, the ratio of the count of backflow prevention valves 232 in the anti-backflow structure 230 to the count of first through-holes in the first hole group 231 may be 1:10. For example, each of the backflow prevention valves in the anti-backflow structure 230 is installed on the partition plate 230 corresponding to ten first through-holes in the first hole group, respectively. It should be appreciated that the ratio of the count of backflow prevention valves 232 in the anti-backflow structure 230 to the count of first through-holes in the first hole group 231 may also be other values.

[0131] In some embodiments, the fitting 233 is elastic, the fitting 233 may also be made of the same material as the valve body 234. In some embodiments, the outer surface of the valve body 234 may be provided as a flat surface 235, which may close (i.e., the flattened opening being closed) the valve body 234 under the pressure from the external environment. When the cleaning device 100 is used in an upright position, as shown in FIG. 12, the sewage from the upper space 204 flows into the valve body 234 through the first hole group 231 and the conduit 208. A pressure P1 of the sewage acts on the valve body 234 and expands the valve body 234 (i.e., the flattened opening opens), and the sewage may then flow into the lower space 205 for storage. When the cleaning device 100 is laid flat for use, as shown in FIG. 13, a pressure P2 of the sewage in the lower space 205 acts on the flat surface 235 of the valve body 234, and the valve body 234 is pressurized, thereby causing the valve body 234 to be closed, so that the sewage in the lower space 205 may be prevented from flowing out of the valve body 234. At this time, the water temporarily stored in the upper space 204 is concentrated at the partition plate 203 and is away from the inlet 219 of the gas outflow channel 218. An amount of water is small, and the water may not be pumped out of the box body 201, thereby greatly reducing a probability of the motor stopping or being damaged. In some embodiments, when the cleaning device 100 is laid flat for use, if there is no or only a small amount of sewage

in the lower space 205 that is not sufficient to cause the backflow prevention valve 232 to close, sewage that is suctioned may also be temporarily stored in the upper space 204 and close to the partition plate 203 (some of the sewage may flow into the lower space 205), and may not be pumped out of the box body 201, and the motor may not be stalled or damaged as a result.

[0132] In some embodiments, as shown in FIG. 14, the backflow prevention valve 232 may also be an elastic valve piece 236 disposed on the lower surface of the partition plate 203 corresponding to the first aperture set 231. The elastic valve piece 236 may be adhered to and covered over the first aperture set 231 with the partition plate 203 to close off the first aperture set 231. Thus, the upper space 204 and the lower space 205 cannot be communicated through the first aperture set 231. When the cleaning device 100 is used in an upright position, the elastic valve piece 236 is pushed open toward the lower space 205 under the pressure of the sewage in the upper space 204 (as shown in FIG. 14, a dotted line illustrates a pushed-open elastic valve piece 236), and the sewage may flow through the first aperture group 231 into the lower space 205 for storage. When the cleaning device 100 is laid flat, the sewage within the lower space 205 may press the elastic valve piece 236 against the partition plate 203 and close off the first aperture group 231, which prevents the sewage within the lower space 205 from flowing out through the first aperture group 231.

[0133] As may be seen from the above, to ensure that when the sewage passes through the backflow prevention valve 232 and the sewage is located in the upper space 204, the backflow prevention valve 232 may be fully opened (e.g., the valve body 234 is expanded or the elastic valve piece 236 is pushed open toward the lower space 205), so that the sewage may flow from the upper space 204 into the lower space 205. After the sewage flows into the lower space 205, the backflow prevention valve 232 may be fully closed (e.g., the valve body 234 is closed or the elastic valve piece 236 is affixed to the partition plate 203 to close the first hole group 231), so that the sewage in the lower space 205 does not flow back to the upper space 204, and the valve body 234 or the elastic valve piece 236 needs to have a good ability of elastic deformation. To ensure that the valve body 234 or the elastic valve piece 236 has a good ability to elastically deform, in some embodiments, a material configured to make the valve body 234 or the elastic valve piece 236 may be rubber, silicone, etc. In some embodiments, the valve body 234 or the elastic valve piece 236 may be made of the rubber with a shore hardness D within a range of 20 degrees to 80 degrees. In some embodiments, the valve body 234 or the elastic valve piece 236 may be made of the rubber with a Shore hardness D within a range of 40 degrees to 80 degrees. In some embodiments, the valve body 234 or the elastic valve piece 236 may be made of the rubber with a Shore hardness D within a range of 60 degrees to 70 degrees. In some embodiments, the valve body 234 or the elastic valve piece 236 may be made of the silicone with a shore hardness D of 35 degrees. The silicone with a shore hardness D of 35 degrees has a better elasticity and hardness, which gives the valve body 234 or the elastic valve piece 236 both a better deformation ability and a better stiffness. In addition, the silicone has a good corrosion resistance, which prevents the valve body 234 or the elastic valve piece 236 from being corroded by the sewage for a long period of time, thereby resulting in a reduced service life.

[0134] In some usage scenarios, when the garbage suctioned by the cleaning device 100 is of a high temperature, the high temperature garbage passing through the backflow prevention valve 232 may cause the temperature of the backflow prevention valve 232 to increase, and the high temperature may have an effect on an elasticity of the valve body 234 or the elastic valve piece 236 of the backflow prevention valve 232, which may result in the sewage passing through the backflow prevention valve 232 poor efficiently. For example, when the elasticity of the valve body 234 or the elastic valve piece 236 decreases, a difficulty of opening the backflow prevention valve (i.e., unidirectional conduction of the backflow prevention valve 232 from the upper space 204 to the lower space 205) is increased, so that the efficiency of the sewage passing through the backflow prevention valve 232 is decreased. In addition, high temperatures may even lead to an ablation of the valve body 234 or the elastic valve plate 236, which reduces a service life of the backflow prevention valve 232. To make the backflow prevention valve have a good heat-resistant property and work properly even at high temperatures, in some embodiments, a heat-resistant temperature of the material configured to make the valve body 234 or the elastic valve piece 236 may be within a range of 25°C to 80°C. In some embodiments, the heat-resistant temperature of the material configured to make the valve body 234 or the elastic valve piece 236 may be within a range of 30°C to 70°C. In some embodiments, the heat-resistant temperature of the material configured to fabricate the valve body 234 or the elastic valve piece 236 may be within a range of 40°C to 60°C.

[0135] In some embodiments, the backflow prevention valve 232 may also be a duckbill valve, a membrane check valve, a solenoid check valve, or other types of check valve. In some embodiments, other types of backflow prevention valves or check valves may also be substituted for the backflow prevention valve 232 shown in FIG. 11, which may be within the scope of protection of the present disclosure as long as the other types of backflow prevention valves or check valves may fulfill a same function as the backflow prevention valve 232.

[0136] FIG. 15 is a schematic diagram illustrating a structure of a cover body according to some embodiments of the present disclosure.

[0137] In some embodiments, as shown in conjunction with FIG. 8 and 15, an adapter tube 217 may be provided within the box body 201, and the cover body 216 may

abut against one end of the adapter tube 217. Under the pressure of the cover body 216, the adapter tube 217 may be stable and may not wobble due to an impact of the sewage from the second channel 202, even in a case of a fast sewage flow rate.

[0138] In some embodiments, as shown in FIG. 8, another end of the adapter tube 217 may be connected to one end of the second channel 202. Another end of the adapter tube 217 is an inlet 223 of the adapter tube 217 and the end of the second channel 202 is an outlet 224 of the second channel 202. For example, the inlet 223 of the adapter tube 217 may be paired with the outlet 224 of the second channel 202. In some embodiments, the adapter tube 217 has an outlet 220, and the outlet 220 of the adapter tube 217 may be offset from the cover body 216. For example, an end portion of the adapter tube 217 towards the cover body 216 is closed, and the outlet 220 may be provided on the sidewall of the adapter tube 217. The movement path of the water-gas mixture within the box body 201 may be extended by providing the outlet 220 on the sidewall of the adapter tube 217, thereby improving a water-gas separation effect. Furthermore, a risk of water being pumped into the gas outflow channel 218 and thus reaching the motor may be reduced, thereby improving the service life of the cleaning device 100.

[0139] In some embodiments, the outlet 220 of the adapter tube 217 is offset from the inlet 219 of the gas outflow channel 218 along the circumference, that is, the inlet 219 of the gas outflow channel is arranged in a different direction from the outlet 220 of the adapter tube 217. For example, the outlet 220 is arranged on a sidewall of the adapter tube 217 away from the inlet 219. For example, the outlet 220 of the adapter tube 217 and the inlet 219 of the gas outflow channel 218 are opposite to each other along a radial direction of the adapter tube 217, and a height of the outlet 220 is lower than a height of the inlet 219, which maximizes a distance between the outlet 220 and the inlet 219, prolongs a movement path of a water-gas mixture within the box body 201, and improves a gas-water separation effect. The outlet 220 and the inlet 219 being radially opposite to each other in the radial direction of the adapter tube 217 may be understood as a line between the outlet 220 and the inlet 219 intersecting an axis of the adapter tube 217.

[0140] In some embodiments, the adapter tube 217 and the second channel 202 are integrated structures. For example, the adapter tube 217 may be a portion of the second channel 202. In such embodiments, the adapter tube 217 may be straight and have a diameter that is less than or equal to the diameter of the second channel 202 to facilitate channel through the fitting hole 214 of the partition plate 203.

[0141] In some embodiments, the adapter tube 217 and the second channel 202 are separated structures. For example, the adapter tube 217 may be manufactured separately and then assembled with the second channel 202. Accordingly, the second channel 202 may be merely manufactured as a straight tube, and there is no need to consider a dimensional relationship between the adapter tube 217 and the fitting hole 214, thereby simplifying a manufacture of the second channel 202 and the adapter tube 217.

[0142] In some embodiments, as shown in FIG. 15, the cover body 216 may be provided with a water level probe group 240, and the water level probe group 240 extends toward the lower space 205. The water level probe group 240 may be configured to monitor a level of the sewage within the box body 201. When the water level within the box body 201 reaches a preset threshold, the motor (e.g., the motor 33 or the motor 34) within the cleaning device 100 may stop rotating and alert the user to promptly dump the sewage within the box body 201. In some embodiments, the water level probe group 240 may employ a bipolar water level probe. In some embodiments, the water level probe group 240 may also employ a unipolar water level probe, or other forms of water level probes.

[0143] In some embodiments, continuing to refer to FIG. 15, the water level probe group 240 includes a first probe group 241 and a second probe group 242 extending toward the lower space 205. In some embodiments, the first probe group 241 may extend for a length greater than the extension length of the second probe group 242. In some embodiments, the second probe group 242 may extend into the upper space 204 and be directly above the first hole group 231. The first probe group 241 may be configured to monitor a water level within the box body 201 when the cleaning device 100 is used in an upright position. When the water level within the box body 201 reaches a preset threshold, the motor may stop rotating and alert the user to promptly dump the sewage within the box body 201. The second probe group 242 may be configured to monitor the water level within the box body 201 when the cleaning device 100 is laid flat for use. When the water level monitored by the second probe group 242 reaches a preset threshold, the motor may stop rotating and remind the user to promptly dump the sewage. As previously described, when the cleaning device 100 is laid flat for use, the anti-backflow structure 230 provided on the partition plate 203 may prevent the sewage in the lower space 205 from flowing backwardly through the anti-backflow structure 230 into the upper space 204, and cause the motor not to stop rotating, and the cleaning device 100 may still be able to clean normally. At this time, the sewage that is suctioned to the upper space 204 through the second channel 202 may accumulate in the upper space 204 at the partition plate 203. When the sewage accumulated in the upper space 204 is too much and flows to the cover body 216, the sewage may first flow to the second probe group 242. The second probe 242 may generate a signal to command the motor to stop rotating, thereby preventing the sewage from being suctioned to the motor and causing damage to the motor. Thus, the water level in the box body 201 may be monitored in real time by providing the first probe group 241 and the second probe group 242

to prevent sewage from being suctioned to the motor and causing damage to the motor. Accordingly, the service life of the cleaning device 100 is greatly extended.

[0144] In some embodiments, the first probe group 241 may extend into the lower space 205. In other words, the first probe group 241 may extend through the partition plate 203 to reach the lower space 205. Therefore, before the level of the sewage within the box body 201 (the lower space 205) reaches the partition plate 203, the first probe group 241 detects a threshold level of water, thereby causing the motor to stop rotating. Accordingly, the sewage is further prevented from being drawn into the motor and extends the service life of the cleaning device 100. In some embodiments, a depth of the first probe group 241 into the lower space 205 may be adjusted according to the actual situation. For example, the depth of the first probe group 241 into the lower space 205 may be adjusted according to a height of the partition plate 203 within the box body 201. In some embodiments, the higher the partition plate 203 is within the box body 201, the deeper the depth of the first probe group 241 into the lower space 205.

[0145] In some embodiments, the first probe group 241 may also be disposed in the upper space 204 and close to the partition plate 203. According to this structure, when the partition plate 203 are clogged, the level of the sewage in the lower space 205 is low and the sewage accumulates in the upper space 204, the first probe group 241 is still able to accurately monitor the level of the sewage and prevent the sewage from being suctioned to the motor. In some embodiments, the position of the first probe group 241 in the upper space 205 may be adjusted according to the actual situation. In some embodiments, the first probe group 241 may also be extended into the lower space 205 or the upper space 204. Alternatively, the first probe group 241 may be provided in both the upper space 204 and the lower space 205, according to the actual situation.

[0146] In some embodiments, the second probe group 242 may be disposed above the outlet 220 of the adapter tube 217. Accordingly, the sewage from the outlet 220 is prevented from being sprayed directly onto the second probe group 242, thereby reducing a misjudging probability of the second probe group 242.

[0147] In some embodiments, continuing to refer to FIG. 15, the cover body 216 may also be provided with two flow baffles 243 extending into the upper space 204, and the two flow baffles 243 are arranged at interval along the circumference of the cover body 216. At least a portion of the region of a side edge 244 of each flow baffle 243 is arranged at interval by the sidewall of the box body 201. The outlet 224 of the second channel 202 may be disposed between the two flow baffles 243. The two flow baffles 243 may direct the sewage splashed thereon to flow downwardly, thereby preventing the sewage splashing around inside the box body 201 and adversely affecting the use of the cleaning device 100. In addition, the air suctioned into the box body 201 from the second channel 202 may bypass the flow baffle 243 to reach the inlet 219 of the gas outflow channel 218 on the cover body 216, thereby making the movement path of a water-gas mixture more tortuous, prolonging the movement path of the water-gas mixture inside the box body 201, and improving the gas-water separation effect. As also shown in FIG. 15, the second probe group 242 may also be disposed between the two flow baffles 243. Accordingly, the cover body 216 may be compact, which is conducive to reducing a radial size of the sewage storage box 4, making the cleaning device 100 small, concise and flexible, and facilitating a cleaning of a narrow space.

[0148] In some embodiments, an upper region 245 of the side edge 244 of the flow baffle 243 is in contact with the sidewall of the box body 201, the lower region 246 is arranged at interval from the sidewall of the box body 201, and the outlet 224 of the second channel 202 is arranged to correspond to the upper region 245 of the side edge 244. Through this structure, the flow baffle 243 not only avoids the sewage from splashing all over the place inside the box body 201, but also forces the water-gas mixture to flow downwardly to cross the flow baffle 243, which makes the movement path of the water-gas mixture in the box body 201 long and the gas-water separation effect good.

[0149] In some embodiments, the cover body 216 may also be provided with a backing plate 247, which may be located between the inlet 219 of the gas outflow channel 218 and the adapter tube 217 (the outlet 220), and the backing plate 247 may be connected between the two flow baffles 243. Accordingly, the water-gas mixture may flow downwardly past the backing plate 247 before reaching the inlet 219 of the gas outflow channel 218, which also helps to prolong the movement path of the water-gas mixture within the box body 201, and the gas-water separation effect is good. In some embodiments, an extension length of the backing plate 247 may be smaller than an extension length of the flow baffle 243. The extension length of the backing plate 247 and the flow baffle 243 may be respectively a size of the backing plate 247 and a size of the flow baffle 243 along the length of the device body 1. Accordingly, the flow baffle 243 and the backing plate 247 may be prevented from excessively blocking the path of the water-gas mixture, and ensure a smooth air stream with a better cleaning effect when the cleaning device 100 is used. To effectively extend the movement path of the water-gas mixture within the box body 201, in some embodiments, an extension length of the backing plate 247 may be within a range of 50 mm to 100 mm. In some embodiments, the extension length of the backing plate 247 may be within a range of 60 mm to 100 mm. In some embodiments, the extension length of the backing plate 247 may be within a range of 70 mm to 95 mm. In some embodiments, the extension length of the backing plate 247 may be within a range of 70 mm to 95 mm. In some embodiments, the extension length of the backing plate 247 may be within a range of 75 mm to 90 mm. To prevent the flow baffle 243 and the

backing plate 247 excessively blocking of the path of the water-gas mixture, in some embodiments, a difference between the extension length of the flow baffle 243 and the extension length of the backing plate 247 may be within a range of 25mm to 40mm. In some embodiments, the difference between the extension length of the flow baffle 243 and the extension length of the backing plate 247 may be 28mm. In some embodiments, the difference between the extension length of the flow baffle 243 and the extension length of the backing plate 247 may be 28mm. A difference between the extension length of the folded flow plate 243 and the extension length of the backing plate 247 may be within a range of 28mm to 37mm. In some embodiments, the difference between the extension length of the folded flow plate 243 and the extension length of the backing plate 247 may be within a range of 30mm to 35mm.

[0150] In some embodiments, when the adapter tube 217 is split from the second channel 202, a water baffle (not shown in the figures) may also be provided between the adapter tube 217 above the outlet 220 and below the second probe group 242. The water baffle may be in contact with the sidewall of the box body 201. The water baffle plate may space the second probe group 242 and the outlet 220 of the adapter tube 217 by providing the water baffle plate, thereby effectively preventing the sewage from being directly sprayed onto the second probe group 242 and further reducing the chance of the misjudgment.

[0151] In some embodiments, as shown in FIG. 16, an installation region 250 is provided on a circumferential external surface of the box body 201 to cooperate with the device body 1, and the anti-backflow structure 230 is radially located away from the installation region 250 in the partition plate. When viewed from the cleaning device 100 as a whole, the installation region 250 may be located on the front side of the box body 201, and the anti-backflow structure 230 is disposed inside the box body 201 close to the rear side of the box body 201 (as shown in FIG. 1 to FIG. 4). Accordingly, when the cleaning device 100 is laid flat (as shown in FIG. 17 and FIG. 18), the anti-backflow structure 230 is closed and in a low position of the second hole group 210, and such that the sewage in the lower space 205 may be prevented from flowing through the anti-backflow structure 230 and flowing into the upper space 204, and the cleaning device 100 may be used normally. In some embodiments, in other types of cleaning devices, the sewage storage box 4 may also be provided at the front of the device body 1 (as shown in FIG. 5 to FIG.7 and FIG. 18), as long as the way the cleaning device is laid flat for use is adapted to an arrangement position of the anti-backflow structure 230, which may not be repeated herein. In addition, it should be noted that, as shown in FIG. 18, the sewage storage box 4 is provided at the front side of the device body 1, and the anti-backflow structure 230 is radially close to the installation region 250 of the partition plate 203. As a result, when the cleaning device 100 is laid flat (as shown in FIG. 18), the anti-backflow structure 230 is closed and in the low position of the second hole group 210, and thus prevents the sewage in the lower space 205 from flowing through the anti-backflow structure and flowing into the upper space 204, and the cleaning device 100 may be used normally.

[0152] Different usage scenarios of the cleaning device 100 may be described below in conjunction with FIG. 4 and FIG. 17, respectively. Referring to FIG. 4, FIG. 4 illustrates the cleaning device 100 in a first usage scenario. The first usage scenario may include a situation when the user uses the cleaning device 100 in the upright position. When the user uses the cleaning device 100 in the upright position, the motor 34 rotates, and upon activation of a water spray system (e.g., the cleaning fluid supply assembly of the previous disclosure), fresh water is sprayed from the cleaning fluid box onto the floor. The sewage from the floor is suctioned by the floor brush 2 then drawn into the upper space 204 of the box body 201 through the first channel 6, and the second channel 202. The sewage flows into the lower space 205 for storage through the first hole group 231 (and the backflow prevention valve 232) and/or the second hole group 210 in the partition plate 203. The solid garbage in the sewage is filtered by the partition plate 203 and remains in the upper space 204. When the first probe group 241 detects that the level of the sewage water in the box body 201 reaches the threshold value, the motor 34 stops rotating and alerts the user. For example, the first probe group 241 alerts the user to promptly dump the sewage water in the box body 201.

[0153] Referring to FIG. 17, FIG. 17 illustrates the cleaning device 100 in a second usage scenario. The second usage scenario may include a situation in which a user lays (or tilts) the cleaning device 100 flat for use. When the user lays the cleaning device 100 flat for use, the sewage in the lower space 205 is unable to reach the upper space 204 under the action of the anti-backflow structure 230 on the partition plate 203, and the sewage remains in the lower space 205. The motor 34 rotates, and the spraying system is activated, fresh water is sprayed from the fresh water box to the floor, and the sewage is again suctioned through the second channel 202 into the upper space 204 of the box body 201. At this time, the sewage is temporarily stored in the upper space 204, the motor 34 rotates normally, and the cleaning device 100 is used normally. When the second probe group 242 detects that the water level of the temporarily stored sewage in the upper space 204 reaches a threshold value, the motor 34 stops rotating and the user is alerted. When the cleaning device 100 is held upright, the sewage water temporarily stored in the upper space 204 may flow into the lower space 205 through the first hole group 231 (and the backflow prevention valve 232) and/or the second hole group 210.

[0154] FIG. 19 is a schematic diagram illustrating a cross-section I of a sewage storage box according to some embodiments of the present disclosure. FIG. 20 is

a schematic diagram illustrating a cross-section II of a sewage storage box according to some embodiments of the present disclosure. In some embodiments, the sewage storage box 4 in the cleaning device 100 shown in FIG. 1 to FIG. 7 may specifically be the sewage storage box 300 shown in FIG. 19 and FIG. 20.

[0155] As shown in FIG. 19 and 20, the sewage storage box 300 may include a box body 301 and a sewage pipe 302. The sewage pipe 302 may be the second channel 202 in the sewage storage box 4 shown in FIG. 8, or the sewage pipe 302 may at least include the second channel 202 in the sewage storage box 4 shown in FIG. 8. The box body 301 includes a bottom surface 303, the sewage inlet 304 is arranged on the bottom surface 303, and the sewage pipe 302 is formed by extending upwardly from the sewage inlet 304. A sewage outlet 3021 is arranged in the upper portion of the sewage pipe 302, and a fluid M entering from the sewage pipe 302 is separated into a mixed liquid a and a mixed gas c at the sewage outlet 3021, and the mixed liquid a separated from the sewage outlet 3021 flows downwardly due to its gravity and is stored in a bottom position of the box body 301, thereby realizing a first type of filtration of the sewage storage box 300: a separation of the mixed liquid an and the mixed gas c. In some embodiments, the sewage inlet 304 may be provided on the side of the box body 301, and a cyclone filter assembly 305 is provided in the box body 301, and dust entering from the sewage inlet 304 may perform a cyclone dust-gas separation through the cyclone filter assembly 305. For example, the mixed liquid and the mixed gas c are separated.

[0156] In some embodiments, continuing to refer to FIG. 19 and FIG. 20, the sewage storage box 300 may further include a cover body 306 and the cyclone filter assembly 305. In some embodiments, the cyclone filter assembly 305 may be a cyclone separation structure 260 as shown in FIG. 8, or may be a component that has a similar structure to, or performs the same function as the cyclone separation structure 260. Alternatively, the cyclone separation structure 260 shown in FIG. 8 may be a portion of the cyclone filter assembly 305. The cover body 306 may include a main body 3061, the main body 3061 may be plugged in the upper end of the box body 301, the main body 3061 is provided with an air inlet 3062, and the cyclone filter assembly 305 may be provided on the main body 3061 and connected to the air inlet 3062. The air inlet 3062 is located above the sewage outlet 3021. In some embodiments, the air inlet 3062 may be the inlet 219 illustrated in FIG. 8, or a structure having a similar structure or the same function as the air inlet 219. The mixed gas c separated from the sewage outlet 3021 continues to move upwardly to the inlet 3062 due to a lighter mass and flows into the cyclone filter assembly 305, and the cyclone filter assembly 305 may filter the mixed gas c. A dust d within the mixed gas c remains in the cyclone filter assembly 305, under an action of a vacuum environment, the filtered clean gas e is discharged from the cyclone filter assembly 305 and is discharged to the outside of the cleaning device 100 through the motor in the cleaning device 100 (e.g., the motor 34 or the motor 33 within the handheld vacuum cleaner 3), thereby preventing the gas from being discharged from the motor containing much dust d, ensuring a cleanliness of the outside environment, and also preventing problems of respiratory disease caused by an operator inhaling too much dust d, ensuring a physical health of the operator, thereby realizing a second filtration process of the sewage storage box 300: a separation of the clean gas e and the dust d.

[0157] In some embodiments, as shown in FIG. 21, the air inlet 3062 may be arranged in close to the sewage outlet 3021, but this may result in a portion of the mixed liquid sprayed from the sewage pipe 302 being sprayed into the air inlet 3062, and since the cyclone filter assembly 305 is unable to filter out moisture, the moisture that enters the air inlet 3062 may enter the cyclone filter assembly 305, the hepa, and the motor, in sequence. The moisture-containing gas tends to reduce the permeability of the hepa, and the humid environment tends to breed bacteria in the hepa. The hepa is a high-efficiency filter (filter paper) that is commonly used in the cleaning device to filter out 99% of fine particles in the air, so that the air passing through the cleaning device may be purified and removed, and secondary pollution may be minimized. In addition, gases with the moisture may be suctioned into the motor, causing the motor to be short-circuited, and leading to a malfunction of the cleaning unit 100.

[0158] To solve the above problem, as shown in FIG. 19, the sewage outlet 3021 and the air inlet 3062 may be located on both sides of a center axis 3012 of the box body 301, and there is a certain distance between the sewage outlet 3021 and the air inlet 3062, which may prevent a problem of the mixed liquid a being directly sprayed from the sewage outlet 3021 to the air inlet 3062, and the mixed gas c is discharged from the sewage outlet 3021 and then passes through a long path before entering the air inlet 3062, the moisture in the mixed gas c may be separated from the mixed gas c in the flow of the longer path, thereby preventing the moisture from entering the hepa or the motor, preventing a bacterial growth in the hepa, preventing the motor from being short-circuited, and ensuring a normal operation of the cleaning device 100.

[0159] In some embodiments, as shown in conjunction with FIG. 19, FIG. 20, and FIG. 22, the sewage outlet 3021 may be provided on the side of the sewage pipe 302 back from the inlet 3062. As shown in FIG. 22, a distance between the sewage outlet 3021 and an inner wall of the box body 301 directly opposite to the sewage outlet 3021 along a horizontal direction is L4, and the mixed gas c discharged from the sewage outlet 3021 first moves a length of L4 along the horizontal direction toward the inner wall of the box body 301 directly opposite to the sewage outlet 3021, the mixed gas c first moves the length of L4 along the horizontal direction towards the inner wall of the box body 301 directly opposite to the

sewage outlet 3021 to reach the inner wall of the box body 301 directly opposite to the sewage outlet 3021, the mixed gas c bends after colliding with the inner wall of the box body 301, and the mixed gas c then moves from the inner wall of the box body 301 toward a direction of the air inlet 3062. In comparison to the mixed gas c coming out of the sewage outlet 3021 directly toward the air inlet 3062, by the arrangement of the present embodiment, a movement path of the mixed gas c from the sewage outlet 3021 to the air inlet 3062 is extended. For example, an extension length of the movement path comes from a round-trip movement of the mixed gas c along the horizontal direction between a water outlet 3021 and the inner wall of the box body 301 directly opposite to the water outlet 3021. For example, an extension length is 2*L4, and a length of the movement path of the mixed gas c from the sewage outlet 3021 to the air inlet 3062 is 2*L4. The path that the mixed gas c passes through from the sewage outlet 3021 to the air inlet 3062 is long, and the moisture mixed in the mixed gas c and the dust d are well separated from the mixed gas c due to gravity, thereby further improving the cleanliness of the clean gas discharged from the cyclone filter assembly 305 and further decreasing a humidity of the clean gas discharged from the cyclone filter assembly 305.

[0160] In some embodiments, as shown in conjunction with FIG. 19, FIG. 20, and FIG. 22, the cover body 306 further includes a baffle 3063. The baffle 3063 extends downwardly from the main body 3061 and encloses a periphery of the sewage outlet 3021. The baffle 3063 forms a channel for passing through the mixed gas c with the bottom surface 303, and the sewage outlet 3021 and the air inlet port 3062 are disposed on both sides of the baffle 3063 sides of the baffle 3063.

[0161] In some embodiments, relative to a role of the baffle plate 3063, firstly, the baffle plate 3063 is able to partially block the mixed liquid sprayed from the sewage outlet 3021, thereby preventing the mixed liquid from being directly suctioned by the inlet port 3062 of the cyclone filter assembly 305, and reducing a risk of the short-circuit of the motor.

[0162] In some embodiments, as shown in conjunction with FIG. 19, FIG. 20, and FIG. 22, a first portion of the mixed gas c flowing from the sewage outlet 3021 may have an upward fractional velocity, the first portion of the mixed gas first tends to move upwardly, the first portion of the mixed gas reversely bends and moves downwardly after moving to the bottom surface of the main body 3061, and the first portion of the mixed gas after reversely bending passes through the channel and moves upwardly to the air inlet 3062 from the channel. The mixed gas that passes through from the sewage outlet 3021 to the air inlet 3062 is increased by bending the first portion of the mixed gas a plurality of times along a vertical direction, and the moisture and the dust mixed in the first portion of the mixed gas are separated from the first portion of the mixed gas due to the force of gravity, and the cleanness of the clean gas discharged from the cyclone filter assembly 305 is further improved, and the cleanliness of the clean gas e may be further improved and the humidity of the clean gas discharged from the cyclone filter assembly 305 may be further reduced.

[0163] In some embodiments, as shown in conjunction with FIG. 19, FIG. 20, and FIG. 22, a second portion of the mixed gas c flowing from the sewage outlet 3021 may have the downward fractional velocity, the second portion of the mixed gas first tends to move upwardly, the second portion of the mixed gas reversely moves to the channel and moves upwardly to the air inlet 3062 from the channel. A path that the second portion of the mixed gas passes through from the sewage outlet 3021 to the air inlet 3062 is increased by bending the first portion of the mixed gas a plurality of times along the vertical direction, and the moisture and the dust mixed in the second portion of the mixed gas are separated from the first portion of the mixed gas due to the force of gravity, the cleanness of the clean gas discharged from the cyclone filter assembly 305 is further improved, and the cleanliness of the clean gas e may be further improved and the humidity of the clean gas discharged from the cyclone filter assembly 305 may be further reduced.

[0164] In some embodiments, the structure of the sewage pipe 302 is illustrated in connection with FIG. 19, FIG. 20, and FIG. 22, and the sewage pipe 302 may include a pipe body 3022 and an adapter tube 3023. The pipe body 3022 is formed by an upward extension of the sewage inlet 304, and the adapter tube 3023 includes a first line 30231, a transition tube 30232, and a second pipeline 30233 that are sequentially connected. The first pipe 30231 is coaxially detachably connected to the pipe body 3022, the first pipe 30231 is perpendicular to the second pipe 30233, and the sewage outlet 3021 is provided on the second pipe 30233. Since the pipe body 3022 is long, if the pipe body 3022 being integrally molded with the adapter tube 3023 may result in a very complex mold of the sewage pipe 302, thereby resulting in a low mold opening success rate and a high mold opening cost. In this embodiment, the sewage pipes 302 is disassembled into two parts of the pipe body 3022 and the adapter tube 3023 that may be detached, and a structure of a mold corresponding to the pipe body 3022 and the adapter tube 3023 is simple, which facilitates a manufacture of each part independently, effectively improves the mold opening success rate, and effectively reduces the mold opening cost. In addition, because the inside of the adapter tube 3023 may be bent to form a corner, the inside of the adapter tube 3023 may have an accumulation of dust or impurities, and over a long period of time, the flow rate of the sewage discharged from the sewage outlet 3021 may be affected, and a filtration efficiency of the sewage storage box 300 may be affected. In this embodiment, the tube body 3022 and the adapter tube 3023 are detachably connected, and the operator may clean the interior of the adapter tube 3023 well and fast by removing the adapter tube 3023 from the tube body 3022. In some embodiments, the adapter tube 3023 may be the adapter

tube 217 illustrated in FIG. 8, or a structure or component having a similar structure or the same function as the adapter tube 217.

[0165] In some embodiments, as shown in FIG. 22, a distance between the centerline of the second pipeline 30233 and the air inlet 3062 along the vertical direction is L1, and a distance between the centerline of the second pipeline 30233 and a bottom end of the baffle plate 3063 is L2. If the existing sewage outlet 3021 would be arranged to be toward upwardly, a path that the existing mixed gas c passes through before entering the cyclone filter assembly 305 is L1. In this embodiment, through the arrangement of the baffle 3063, the path that the mixed gas c at least passes through before entering the cyclone filter assembly 305 is 2*L2+L1, resulting in a longer path for the mixed gas c to pass through before entering the cyclone filter assembly 305. Understandably, the path that the mixed gas c passes through is the length of the path passes through by the mixed gas c. In some embodiments, to ensure that the length of the sewage storage box 300 along the vertical direction is moderate and to avoid the sewage storage box 300 from being oversized along the vertical direction, the ratio L2/L1 of the sewage storage box 300 may be within a range of 0.9 to 3.

[0166] In some embodiments, as shown in FIG. 22, the maximum width of the inner wall of the box body 301 is W1, the distance between the side of the inlet port 3062 away from the sewage outlet 3021 and the sewage outlet 3021 along the horizontal direction is W2, and a ratio W2/W1 is 3/4 to 7/8. According to the above sizes, in the limited space of the box body 301, it may make the distance between the inlet port 3062 and the sewage outlet 3021 as great as possible, thereby realizing that the distance passed through by the mixed gas c from the sewage outlet 3021 to the inlet 3062 in the horizontal direction is as long as possible.

[0167] In some embodiments, as shown in conjunction with FIG. 19 and 22, a distance between the end face of the second pipeline 30233 and an outer peripheral surface of the pipe body 3022 along the horizontal direction is L3, and a distance between an end face of the second pipeline 30233 and the inner wall of the box body 301 along the horizontal direction is L4, and a ratio L3/L4 is within a range of 1/2 to 1, which effectively shortens the distance from the sewage outlet 3021 to the inner wall of the box body 301, the mixed liquid a sprayed from the sewage outlet 3021 may form a hanging wall with the inner wall of the box body 301 in a large amount, thereby making a great amount of dry garbage f (or referred to as the solid garbage) in the mixed liquid a to be hung on the inner wall of the box body 301, and realizing a good separation effect of the dry garbage f and a wet garbage b in the mixed liquid a.

[0168] In some embodiments, as shown in FIG. 19, FIG. 20, FIG. 23, and FIG. 24, the baffle plate 3063 is provided with the plugging groove 30631 extending along the vertical direction, the plugging groove 30631 forms an plug-in port 30632 at the bottom end of the baffle plate 3063, the second pipeline 30233 is plugged by the plug-in port30632 into the plugging groove 30631 and is able to slide along the plugging groove 30631, the plugging groove 30631 is compatible with the second pipeline 30233 to realize a guiding effect on the installation of the cover body 306 into the box body 301. In addition, the second pipeline 30233 is compatible with the plugging groove 30631 to make the cover body 306 and the box body 301 stable, and the sewage storage box 300 may prevent a loosening of the cover body 306 and the box body 301 during the process of use.

[0169] In some embodiments, as shown in conjunction with FIG. 19, FIG.24, and FIG.25, the adapter tube 3023 further includes a blocking plate 30234. The blocking plate 30234 is provided at the periphery of the second pipeline 30233 and extends in an upward direction and downward direction, and the blocking plate 30234 is provided at one side of the baffle plate 3063 when the second pipeline 30233 is plugged in the plugging groove 30631. The blocking plate 30234 blocks the plugging groove 30631, the blocking plate 30234 and the baffle plate 3063 form a complete shield plate, which avoids a portion of the mixed gas c from passing through directly from the plugging groove 30631 to flow into the air inlet 3062, thereby ensuring that the mixed gas c passes through the channel and then enters into the air inlet 3062, and the mixed gas c passes through the a relatively long path, and improving an automatic separation of the moisture and the dust. In addition, a trajectory length of the mixed liquid along a surface of an entity is prolonged, thereby realizing that much dry garbage f in the mixed liquid a is left on the surface of the entity, realizing a certain separation effect on the dry garbage f and the wet garbage b in the mixed liquid a.

[0170] In some embodiments, as shown in conjunction with FIG. 23 and FIG. 24, the plugging groove 30631 includes a plugging segment 30633 that is connected from bottom to top and a guiding segment 30634. The plug-in port 30632 is located at a lower end of the plugging segment 30633, a width of the plugging segment 30633 decreases from bottom to top, a width of the upper end of the plugging segment 30633 is the same as a width of the guiding segment 30634, and the width of the guiding segment 30634 is equal to a diameter of the second pipeline 30233. There may be a certain deviation in an alignment of the plugging groove 30631 with the second pipeline 30233 through the arrangement of the plugging segment 30633, and as the second pipeline 30233 gradually slides from the plugging segment 30633 into the guiding segment 30634, thereby realizing an accurate alignment of the second pipeline 30233 with the plugging segment 30633 along the circumferential direction.

[0171] In some embodiments, as shown in FIG. 26, a first pipeline 30231 is provided with a first through-hole 302311 and a second through-hole 302312 connected from the bottom to the top, the second through-hole 302312 is connected to the transition pipe 30232. A

cross-sectional area of the first through-hole 302311 is greater than a cross-sectional area of the second through-hole 302312, and an abutment surface 302313 is formed at a junction position of the first through-hole 302311 and the second through-hole 302312. A tube body 3022 is plugged in the first through-hole 302311 and abuts against the abutment surface 302313, which indicates that the tube body 3022 and the adapter tube 3023 are installed in place, and an efficiency of the user assembling the tube body 3022 and the adapter tube 3023 together is improved.

[0172] Combined with FIG. 19, FIG. 20, FIG. 22 and FIG. 27, the structure of the cyclone filter assembly 305 is illustrated, the main body 3061 is provided with an accommodating cavity 3064 connected to the air inlet 3062, the main body 3061 is provided with an accommodating cavity 3064, the cyclone filter assembly 305 is provided in the accommodating cavity 3064 and is connected to the main body 3061. The mixed gas c is sequentially connected to the main body 3061, and the mixed gas c sequentially passes through the air inlet 3062, the accommodating cavity 3064, and the cyclone filter assembly 305 for the cyclone dust-gas separation, the clean gas e is discharged from the cyclone filter assembly 305, and the dust d in the mixed gas c flowing through the cyclone channel is subjected to an action of the cyclone and an action of its gravity, and remains in the main body 3061, thereby realizing a good separation effect of the clean gas e and the dust d.

[0173] In some embodiments, as shown in FIG. 27, the main body 3061 includes an upper end of the main body 30611 located at the upper position thereof. The upper end of the main body 30611 is provided with an plugging interface 30612 connected to the accommodating cavity 3064, and the cyclone filter assembly 305 is put into the accommodating cavity 3064 through the plugging interface 30612, thereby realizing a detachable connection between the cyclone filter assembly 305 and the main body 3061, realizing a quick assembling and detachment of the cyclone filter assembly 305 and the cover body 306, facilitating the operator to clean the impurities on the cyclone filter assembly 305, and ensuring that the cyclone filter assembly 305 has a relatively great filtration effect on the dust in the future. In addition, by detaching the cover body 306 from the box body 301, and then filtering out the cyclone filter assembly 305 from the cover body 306, it is possible to check whether there are any impurities blocking the cyclone channel between the cyclone filter assembly 305 and the cover body 306, and to clean up a cyclone channel if necessary.

[0174] In some embodiments, as shown in conjunction with FIG. 19, FIG. 20, FIG. 27, FIG. 28, FIG. 29, and FIG. 30, the cyclone filter assembly 305 may include a communicating tube 3051 and a first clamping portion 3052. The communicating tube 3051 is provided with a communicating tube channel, and the communicating tube channel has an upper open end and a lower open end. The upper open end is an air outlet port 30511, and the first clamping portion 3052 is arranged on the periphery of the communicating tube 3051, the periphery of the first clamping portion 3052 abuts against the sidewall of the accommodating cavity 3064, the first clamping portion 3052 includes a spiral bottom plate 30521 connected to the communicating tube 3051, the spiral bottom plate 30521 is spirally surrounded around the periphery of the communicating tube 3051. The spiral bottom plate 30521, the communicating tube 3051, and the main body 3061 together form the cyclone channel. The air inlet 3062 communicates with the cyclone channel, and the mixed gas sequentially passes through the air inlet 3062, the cyclone channel, and the communicating tube 3051 to realize the cyclone dust and gas separation, and then the clean gas e is discharged from the outlet 30511 at the upper end of the communicating tube 3051.

[0175] In some embodiments, as shown in conjunction with FIG. 27, FIG. 28, and FIG. 29, the first clamping portion 3052 further includes a peripheral side plate 30522, a blocking baffle 30523, and a top plate 30524. The peripheral side plate 30522 is in a shape of ring, and the width of an unfolded peripheral side plate 30522 is gradually increased. The peripheral side plate 30522 is disposed around the periphery of the communicating tube 3051 and is arranged at interval from the periphery of the communicating tube 3051, and a bottom end line of the peripheral side plate 30522 is in a shape of spiral around the periphery of the communicating tube 3051. One end (a free end) with a great width is arranged at interval from the communicating tube 3051. The bottom end line of the circumferential side plate 30522 is spirally wrapped around the periphery of the connecting pipe 3051, the free end of the circumferential side plate 30522 is blocked and connected to the periphery of the connecting pipe 3051 through the blocking plate 30523. As shown in FIG. 29, a top end of the circumferential side plate 30522 is connected to the periphery of the connecting pipe 3051 through the blocking plate 30523. The outer peripheral surface of the connecting pipe 3051 may be connected through the top plate 30524, the lower end of the circumferential side plate 30522 is connected to the outer peripheral surface of the connecting pipe 3051 through the spiral bottom plate 30521, the spiral bottom plate 30521 surrounds the connecting pipe 3051 at a circumferential angle of more than 360 degrees, and a portion of the spiral bottom plate 30521 disposed at the lower part is disposed along the up and down direction in a portion of the spiral bottom plate 30521 disposed at a below of the upper portion 30521 and directly opposite. The two above portions of the spiral bottom plate 30521 that are directly opposite form a concave space. The concave space may be connected to the air inlet 3062 as shown in FIG. 19. As shown in FIG. 27, the first clamping portion 3052 may block the plug port 30612. As shown in FIG. 19 and FIG. 20, the mixed gas c entering from the inlet port 3062 moves downwardly under the blocking of the first clamping portion 3052. As shown in conjunction with FIG. 19, FIG. 27, and FIG. 28, the mixed gas c

rotates in a spiral shape under the guiding effect of the spiral base plate 30521. Through a combined effect of a blocking effect of the first clamping portion 3052 and the guiding effect of the spiral base plate 30521, the mixed gas c may realize a spiral downward movement, thereby realizing a relatively great cyclone separation effect. As shown in FIG. 19, the clean gas obtained by the cyclone separation action enters from the lower open end of the communicating tube 3051, moves upwardly to the air outlet 30511, and is discharged out of the cyclone filter assembly 305. In addition, as shown in FIG. 19 and 29, the top plate 30524 is provided with a top plate opening 305241 connected to the air outlet 30511, and the clean gas discharged from the air outlet 30511 may be discharged from the top plate opening 305241.

[0176] In some embodiments, as shown in FIG. 19, FIG. 20, FIG. 30, and FIG. 31, the outer contour of the cross-section of the first clamping portion 3052 are gradually decreased from top to bottom. As shown in FIG. 20, the accommodating cavity 3064 includes a first cavity and a second cavity arranged in rows from top to bottom and connected, the size and shape of the first cavity match those of the first clamping portion 3052, and the cross-sectional area of the second cavity is less than the cross-sectional area of the first cavity, which may realize that the first clamping portion 3052 is clamped at the position of the first cavity, and realize a good clamp fixing effect of the cyclone filter assembly 305 and the cover body 306. In addition, since the outer contour of the cross-section of the first clamping portion 3052 are gradually decreased from top to bottom, the user is convenient to remove the cyclone filter assembly 305 from the accommodating cavity 3064.

[0177] In some embodiments, as shown in FIG. 19 and 20, the cyclone filter assembly 305 may include a cyclone filtration mechanism 3053 (e.g., the cyclone separation structure 260 shown in FIG. 8) and a soft rubber 3054. The cyclone filtration mechanism 3053 is disposed in an accommodating cavity 3064, a soft rubber 3054 is connected to the cyclone filtration mechanism 3053 and at least a portion of the soft rubber 3054 protrudes out of the periphery of the cyclone filtration mechanism 3053 along the circumstance, and the soft rubber 3054 that protrudes out of the periphery of the cyclone filtration mechanism 3053 is connected to the upper end 30611 of the cover body. The upper end 30611 of the cover body may realize a great support effect on the cyclone filter assembly 305, and furthermore, due to a soft texture of the soft rubber 3054, even if the soft rubber 3054 contacts with the upper end of the cover body for a long period of time, the soft rubber 3054 or the upper end 30611 of the cover body may be prevented being damaged.

[0178] In some embodiments, as shown in FIG. 29, FIG. 30, and FIG. 31, the flexible rubber 3054 may include a second upper end surface 30541 and a connecting portion 30542 that are connected. The second upper end surface 30541 is disposed on the upper surface of the top plate 30524, the connecting portion 30542 is clamped to the periphery of the top plate 30524, and a location of the circumferential side plate 30522 close to the second upper end surface 30541 is provided with an annular snapping groove 305243. A portion of the connection portion 30542 is accommodated in the clamping groove 305243, and a portion of the of the connection portion 30542 protrudes out of the periphery of the circumferential side plate 30522, thereby realizing the fixation between the soft rubber 3054 and the top plate 30524. As shown in conjunction with FIG. 19 and FIG. 31, an upper opening 30544 is provided on the second upper end surface 30541, and the clean gas discharged from the top plate opening 305241 may be discharged through the upper opening 30544 and subsequently enter the motor of the cleaning device 100.

[0179] In some embodiments, as shown in FIG. 27 and FIG. 28, the flexible rubber 3054 may include two lugs 30543 disposed on both sides thereof, and as shown in FIG. 29, the top plate 30524 includes two lug clamping portions 305242. Each of the two lug clamping portions 305242 is clamped and sleeved on the periphery of the corresponding lug clamping portion 305242, thereby realizing the fixation between the two lugs 30543 and the lug clamping portion 305242. The operator may remove the cyclone filter assembly 305 from the cover body 306 by pulling on the two lugs 30543, which facilitates the user to apply a force to the cyclone filter assembly 305.

[0180] In some embodiments, as shown in FIG. 27, the cover body 306 further includes an upper cover 3065. The upper cover 3065 is clamped onto the upper end of the main body 3061, thereby realizing an effect of shielding an uneven structure and a locking structure of the main body 3061, and realizing an aesthetic effect of the sewage storage box 300. In addition, as shown in FIG. 27, the upper cover 3065 is provided with a groove 30651 at a position corresponding to the lugs 30543, and when the cyclone filter assembly 305 is installed on the cover body 306, the lugs 30543 are located in the corresponding groove 30651, and the arrangement of the groove 30651 may realize a good avoidance effect for the lugs 30543. In addition, when the cyclone filter assembly 305 is installed on the cover body 306, the upper surface of the lugs 30543 is disposed in a same plane as the upper surface of the upper cover 3065, thereby realizing the upper end of the sewage storage box 300 to be flat and have an attractive appearance. In addition, the sides of the lugs 30543 are arranged at interval from the sidewall of the groove 30651 along the horizontal direction, and the bottom surface of the lugs 30543 is arranged at interval from the bottom surface of the groove 30651 along the vertical direction, which facilitate the operator to extent the hands through the above interval, and enables the user to grip the lugs 30543.

[0181] In some embodiments, as shown in FIG. 19, FIG. 30, FIG. 31, and FIG. 32, the top cover 3065 includes a first upper end surface 30652. The first upper end surface 30652 is provided at a preset included angle with

the horizontal plane, the bottom surface of the connection portion 30542 is provided at the preset included angle with the horizontal plane, and the upper end of the main body 3061 is provided at the preset included angle with the horizontal plane. The included angle between the first upper end surface 30652 and the horizontal plane is a first preset included angle, the included angle between the floor surface of the connection portion 30542 and the horizontal plane of the connection portion 30542 is a second preset included angle, and the included angle between the upper end of the main body 3061 and the horizontal plane of the main body 3061 is a third preset included angle. When the upper end of the main body 3061 is in contact with the bottom surface of the connection portion 30542, the first upper end surface 30652 is disposed on the same plane as the second upper end surface 30541, and the arrangement of the above structures may play a role in preventing the problem of the cyclone filter assembly 305 being installed in an opposite direction relative to the cover body 306. If the cyclone filter assembly 305 is installed into the cover body 306 by turning 180 degrees along the horizontal direction, the first upper end surface 30652 and the second upper end surface 30541 may be arranged at an included angle and may not be disposed in a plane, so that the operator may easily find out that the cyclone filter assembly 305 is installed in the opposite direction.

[0182] In some embodiments, as shown in conjunction with FIG. 19, FIG. 20, FIG. 27 and FIG. 32, the lower end of the main body 3061 is provided with a dust discharge port 30613 located below the communicating tube 3051. The cover body 306 further includes a dust accumulation barrel 3066 connected to the adapter tube 3023, the dust accumulation barrel 3066 is located below the dust discharge port 30613, and the upper end of the dust accumulation barrel 3066 is provided with a dust ventilation inlet 30661. When the main body 3061 is plugged in the box body 301, the dust discharge port 30613 and the dust inlet port 30661 are directly opposite to each other, and the dust d in the accommodating cavity 3064 may sequentially pass through the dust discharge port 30613 and the dust inlet port 30661 and then enter the dust accumulating barrel 3066, and the dust accumulating barrel 3066 is capable of realizing the storage of dust d. When the operator removes the cover body 306 from the box body 301, the operator may realize the effect of removing the dust accumulation barrel 3066 and the adapter tube 3023 together from the box body 301 by handholding the dust accumulation barrel 3066, which facilitates cleaning and settling of the dust accumulation barrel 3066, the adapter tube 3023, and the filter mechanism 307 by the user. In some embodiments, as shown in FIG. 19 and FIG. 20, the distance between the upper end surface of the dust accumulation barrel 3066 and an opening 308 along the vertical direction is within a range of 10 mm to 20 mm, which facilitates a pickup of the user to the dust accumulation barrel 3066. In some embodiments, as shown in FIG. 25 and FIG. 26, the dust accumulation barrel 3066 and the adapter tube 3023 may be integrally molded by the injection molding process, thereby simplifying the installation efficiency of the dust accumulation barrel 3066 and the adapter tube 3023.

[0183] In some embodiments, as shown in FIG. 19 and FIG. 32, the cover body 306 further includes a filter grille 3067. The filter grille 3067 is disposed in the dust discharge port 30613, and the mixed gas c in the accommodating cavity 3064 contacting the filter grille 3067, which is capable of realizing that more dust d is separated from the mixed gas c, and is capable of improving the separation effect of the dust d from the clean gas e. In some embodiments, as shown in FIG. 32, the filter grille 3067 includes a central baffle plate 30671 and a plurality of connecting rods 30672, the central baffle plate 30671 is located in the middle of the dust discharge port 30613. Each connecting rod 30672 is respectively connected to the central baffle plate 30671 and the main body 3061, and the plurality of connecting rods 30672 are uniformly provided at interval at the periphery of the central baffle plate 30671. The dust d shown in FIG. 19 may enter the dust accumulation drum 3066 through the space between two adjacent connecting rods 30672.

[0184] In some embodiments, as shown in FIG. 19 and FIG. 20, the main body 3061 also includes a lower plug end 30614 located in a lower position of the main body 3061, the bottom end of the lower plug end 30614 is provided with a dust discharge port 30613, and the bottom end of the lower plug end 30614 is socketed to the dust accumulation barrel 3066 through the dust inlet 30661. A coordination of the lower plug end 30614 and the dust inlet 30661 may realize a fast and precise alignment plug effect of an air flue of the cyclone filter mechanism 3053 and the dust inlet 30661. The cooperation between the lower plug end 30614 and the dust inlet 30661 may realize an effect of a fast and accurate alignment between an air flue of the cyclone filtration mechanism 3053 and the dust inlet 30661. In some embodiments, as shown in FIG. 19 and 20, the cross-sectional area of the lower socketed end 30614 is gradually decreased from top to bottom, and the lower socketed end 30614 has a certain convergence effect on the dust d and then collects it into the dust accumulation barrel 3066, so that the dust d is more likely to enter the dust accumulation barrel 3066, and the dust discharge port 30613 is prevented from being clogged by the dust d.

[0185] In some embodiments, as shown in FIG. 19, FIG. 20, and FIG. 25, the cover body 306 further includes a sealing structure 3068. The sealing structure 3068 is disposed in the dust inlet 30661, and when the lower plug end 30614 is socketed in the dust inlet 30661, the sealing structure 3068 is provided to seal and abut against the periphery of the lower plug end 30614. The arrangement of the sealing structure 3068 may prevent the mixed gas c discharged from the sewage outlet from entering into the dust accumulation barrel 3066 through a gap between the lower plug end 30614 and the dust accumulation barrel 3066, prevent the mixed gas c from stirring

the dust d in the dust accumulation barrel 3066, prevent the dust d from being lifted up and entering into the air outlet 30511 for discharge, thereby ensuring that the air outlet 30511 discharges the clean gas e.

[0186] In some embodiments, as shown in FIG. 19 and FIG. 20, the cover body 306 further includes a second shield plate 3069. The second shield plate 3069 is connected to the main body 3061, the second shield plate 3069 is disposed between the lower end of the connecting pipe 3051 and the dust discharge port 30613 along the vertical direction. The arrangement of the second shield plate 3069 may prevent the air stream in the duct of the cyclone filter mechanism 3053 from stirring the dust d within the dust accumulation drum 3066, thereby causing the dust d to enter into the storage box 300 and then be discharged. The air stream of the second shielding plate 3069 may prevent the air stream in the duct of the cyclone filter mechanism 3053 from stirring the dust d in the dust accumulation barrel 3066, thereby causing the dust d to enter the cyclone filter mechanism 3053 and then be discharged from the sewage storage box 300. Specifically, as the dust d may accumulate in a position where the second shielding plate 3069 is connected to the central baffle plate and thereby causing the clogging of the dust discharge port 30613, the second shelter plate 3069 may be detachably connected to the air flue of the cyclone filter mechanism 3053, which facilitates the user to clean the dust d piled up in a connection position of the second shield plate 3069 and the central baffle plate 30671, thereby ensuring a smoothness of the dust discharge port 30613, and realizing a good recycling effect of the dust accumulation barrel 3066 on the dust d. In some embodiments, as shown in FIG. 19 and FIG. 20, the second shield plate 3069 and the central baffle plate 30671 may be detachably connected by screws, thereby facilitating the user to quickly disassemble and assemble the second shield plate 3069 and the central baffle plate 30671. In other embodiments, the screws may also be replaced with pins, clamping structures, etc.

[0187] In some embodiments, as shown in FIG. 19 and FIG. 20, a longitudinal cross-section of the second shield plate 3069 is in an upwardly convex curved-shape (i.e., the curved shape is raised upwardly). When horizontal projection areas are the same, a surface area of the second shield plate 3069 in the present embodiment is great, and the probability that the second shield plate 3069 may contact with the mixed gas c entering the air flue of the cyclone filtration mechanism 3053 is great. A count of times that solid particles inside the mixed gas c contacting with the mixed gas c is increased, the separation of a great amount of the dust d in the mixed gas c and the clean gas e may be realized, thereby realizing the separation of the great amount of dust d, and preventing the dust d from being discharged from the air outlet 5111.

[0188] In some embodiments, as shown in FIG. 19, FIG. 20 and FIG. 25, the sewage storage box 300 further includes a filter mechanism 307 disposed within the box 301. The filter mechanism 307 is disposed along the vertical direction (i.e., the lengthwise direction of the device body 1) between the sewage outlet 3021 and the bottom surface 303, and a mixed liquid a flows through the filter mechanism 307, and the dry garbage f within the mixed liquid a stays on the filter mechanism 307. The wet garbage b within the mixed liquid a flows into the space between the filter mechanism 307 and the bottom surface 303, and the filter mechanism 307 is capable of separating the dry garbage f and the wet garbage b from the mixed liquid a, thereby facilitating the user to greatly clean the storage box 300, and thereby realizing a third filtration process of the storage box 300.

[0189] In some embodiments, as shown in FIG. 19 and FIG. 20, since the filter mechanism 307 is disposed between the bottom surface 303 of the box body 301 and the cyclone filter assembly 305, the filter mechanism 307 may also have a certain blocking effect on the wet garbage b stored underneath the filter mechanism 307, thereby preventing wet garbage b caused by a vibration of the storage box 300 from splashing into the position of the air inlet 3062, and preventing the water entering into the hepa and the motor, and preventing the short-circuiting of the motor.

[0190] The cleaning device having the sewage storage box 300 (such as the cleaning device 100 shown in FIG. 1 to FIG. 7) may simultaneously realize three filter processes, and a consumer only need to purchase one cleaning device 100 to realize the cleanings of different environments, thereby truly realizing a multi-purpose, and the consumer does not need to switch between multiple cleaning devices having different functions or other cleaning devices, and the operation of the cleaning device having the sewage storage box 300 is simple and convenient.

[0191] In some embodiments, as shown in FIG. 19, the sewage outlet 3021 may be provided on the side of the sewage pipe 302 and directly opposite to the inner sidewall of the box body 301, and a portion of the dry garbage f may be retained on the inner sidewall of the box body 301 during the flow of the mixed liquid a from the sewage outlet 3021 along the inner sidewall of the box body 301, thereby further improving the separation effect between the dry garbage f of the mixed liquid a and the wet garbage b of the mixed liquid a. When the dry garbage f is affixed to the inner sidewall of the box body 301 air-dries to a certain extent, the dry garbage f may fall from the inner sidewall of the box body 301 to the filter mechanism 307.

[0192] In some embodiments, as shown in FIG. 25 and 27, the adapter tube 3023 is connected to the filter mechanism 307, so that when the operator removes the cover body 306 from the box body 301, the operator accommodating the dust accumulation barrel 3066 may realize the effect of removing the dust accumulation barrel 3066 and the adapter tube 3023 from the box body 301 together, which facilitates the operator to clean the dust accumulation barrel 3066, the adapter tube 3023, and the filter mechanism 307 with a great cleaning effect. Accordingly,

it need not to arrange a long rod connected to the filter mechanism 307, thereby simplifying the structure of the sewage storage box 300.

[0193] In some embodiments, as shown in FIG. 25 and FIG. 27, the adapter tube 3023 is pivotally connected to the filter mechanism 307, and the operator hand-holds the adapter tube 3023 and rotates the filter mechanism 307 relative to the adapter tube 3023, such that the axis of the adapter tube 3023 is arranged at 90 degrees to the axis of the filter mechanism 307, and a portion of the adapter tube 3023 protrudes out of the periphery of the filter mechanism 307. Since the periphery of the adapter tube 3023 is relatively clean, when the operator cleans the dry garbage f inside the filter mechanism 307, the inner face of the filter mechanism 307 faces downward, and the operator hand-holds the portion of the adapter tube 3023 that protrudes out of the circumferential side of the filter mechanism 307, so that the dry garbage f inside the filter mechanism 307 falling along the vertical direction does not dirty the hand of the user.

[0194] In some embodiments, the structure of the filter mechanism 307 is illustrated in conjunction with FIG. 19, FIG. 25, and FIG. 27, as shown in FIG. 19, FIG. 25, and FIG. 27, the filter mechanism 307 includes a connecting rod 3071 and a filter basket 3072. The connecting rod 3071 is pivotally connected to the adapter tube 3023, and the filter basket 3072 is connected to the connecting rod 3071. The filter basket 3072 is provided with filter holes, and the dry garbage f that enters into the filter basket is stored in the filter basket 3072. Since an accommodating space inside the filter basket 3072 is relatively large, and the dry garbage f of great volume may be stored, which may reduce the cleaning frequency of the filter mechanism 307 by the user, and may increase continuous working hours of the cleaning device 100 and the area of the cleaning area that may be operated.

[0195] In some embodiments, the structure of the filter basket 3072 is illustrated in conjunction with FIG. 19, FIG. 25, and FIG. 27, as shown in FIG. 19, FIG. 25, and FIG. 27, the filter basket 3072 includes a support skeleton 30721 and a filter mesh 30722. The upper end of the support skeleton 30721 is provided with a bearing port 30723, the circumferential side of the support skeleton 30721 is provided with an installation port 30724, the filter mesh 30722 is provided with a plurality of first filter holes 30725, and the filter mesh 30722 is blocked at the installation port 30724. Since working environments where the cleaning device 100 is applied to are different, such as a scenario to clean the dry garbage f of a great volume such as cleaning shredded paper and hair, and a scenario to clean a muddy soup that contains much dust, the operator may select the size of the first filter holes 4221 on the filter mesh 30722 according to different scenarios, thereby matching to different scenarios and improving a versatility of the sewage storage box 300. In some embodiments, the filter mesh 30722 may be the filter mesh 213 illustrated in FIG. 10, or a component having a similar structure or realizing the same function as the filter mesh 213.

[0196] In some embodiments, as shown in conjunction with FIG. 19, FIG. 25, and FIG. 27, the filter mesh 30722 may be provided to protrude outwardly, which results in a great storage space inside the filter basket 3072, thereby realizing a storage and a recycling of a great amount of dry garbage in the filter basket 3072. In some embodiments, the filter mesh 30722 may be made of a metal plate or a filter cloth. The filter cloth is capable of filtering tiny dust particles, and the metal plate has a relatively great strength and hardness, which may effectively improve the service life of the filter mesh 30722. In addition, a surface area of a convex filter mesh 30722 installed in the installation port 30724 of the same area is great, and the count of first filter holes 30725 on the convex filter mesh 30722 is great, which may improve the efficiency of separating the dry garbage f from the wet garbage b in the mixed liquid a.

[0197] In some embodiments, the structure of the support skeleton is illustrated in conjunction with FIG. 25 and FIG. 27, as shown in FIG. 25, and FIG. 27, the support skeleton 30721 includes a partition 30726 and an annular side peripheral plate 30727. The partition 30726 is provided with a plurality of second filter holes 30728. The annular side peripheral plate 30727 is connected to the partition 30726 and forms an accommodating space with the partition 30726. The annular side peripheral plate 30727 includes a plurality of installation ports 30724 provided at interval along the circumferential direction. The filter mesh 30722 is connected end to end to form a ring-shaped structure, and the outer surface of a portion of the filter mesh 30722 abuts the inner surface of the annular side peripheral plate 30727. A blocking of the plurality of installation ports 30724 may be achieved by just one filter mesh 30722, which may enhance a rapid assembly to the filter basket 3072 by the user and improve the efficiency of the disassembly and assembly of the filter basket 3072. In some embodiments, the partition plate 30726 may be the partition plate 203 illustrated in FIG. 10, or a component having a similar structure or realizing the same function as the partition plate 203. In some embodiments, the annular side peripheral plate 30727 may be the frame 212 illustrated in FIG. 10, or a component that has a similar structure or implements the same function as the frame 212. In some embodiments, the combination of the annular side perimeter plate 30727 and the frame 212 may be referred to as a baffle wall (e.g., the baffle walls 211 illustrated in FIG. 10).

[0198] In some embodiments, as shown in FIG. 22, a distance between the partition 30726 and the bottom surface 303 of the box body 301 is L5, a height of the box body 301 is H, and a ratio L5/H is within a range of 1/3 to 1/2, that is to say, 1/3 to 1/2 of the volume of the box body 301 may be configured to store the wet garbage b, such that the cleaning device 100 may storage a great amount of wet garbage b.

[0199] In some embodiments, as shown in FIG. 25, a height of the annular side peripheral plate 30727 may be

20 within a range of mm to 50 mm. Compared to the support skeleton 30721 that has only the partition 30726, the annular side peripheral plate 30727 of the filter basket 3072 has a certain height, which may realize the effect of increasing the accommodating space for storing the dry garbage (the dry garbage f shown in FIG. 19), thereby realizing the effect that the filter basket 3072 may store more dry garbage.

[0200] In some embodiments, as shown in FIGs. 20 and 25, the second filter holes 30728 are elongate holes, and the plurality of second filter holes 30728 are uniformly arranged around a centerline of the partition plate 30726, which may realize a uniform downflow of the wet garbage (wet garbage b shown in FIG. 19) at each position of the partition plate 30726, and prevent a portion of the second filter holes 30728 from being clogged due to an uneven distribution of the second filter holes 30728, thereby improving a solid-liquid separation efficiency of the filter basket 3072.

[0201] In some embodiments, as shown in FIG. 20 and FIG. 25, a through-hole 30729 is provided in the center of the spacer 30726, and the tube body 3022 passes through the through-hole 30729 to be connected to the adapter tube 3023, such that the filter basket 3072 does not skew within the box 301 when tilting or laying the cleaning device 100 flat. In some embodiments, the through-hole 30729 may be the fitting hole 214 illustrated in FIG. 10, or may be a component of the sewage storage box 300 that has a similar structure to the fitting hole 214, or is capable of performing the same function as the fitting hole 214 in the sewage storage box 4 shown in FIG. 8.

[0202] Further, the through-hole 30729 extends upwardly to form the conduit 30730, the tube body 3022 is plugged in the conduit 30730, and the outer peripheral surface of the tube body 3022 is pressed against the inner wall of the conduit 30730, which may improve the contact area between the filter basket 3072 and the tube body 3022, and may further prevent that the filter basket 3072 does not become skewed in the box body 301. In some embodiments, the conduit 30730 may be the annular baffle 215 illustrated in FIG. 10, or a component having a similar structure or realizing the same function as the annular baffle 215.

[0203] In some embodiments, as shown in conjunction with FIGs. 19, 20, and 25, the outer peripheral surface of the tube body 3022 and the inner wall of the conduit 30730 have an interference fit, which may realize a good fixing effect between the filter basket 3072 and the tube body 3022, thereby preventing the filter basket 3072 from sliding down toward the bottom surface 303 of the box body 301, preventing the filter basket 3072 contacting with the wet garbage b that has filtered out the dry garbage f again, and thereby ensuring that the dry garbage f and the wet garbage b are arranged independently of each other. Specifically, a diameter of the tube body 3022 are gradually decreased from the bottom to the top, and an external diameter of the tube body 3022 at a middle position is the same as the diameter of an inner hole of the conduit 30730, which may ensure the fixation of the filter basket 3072 with the tube body 3022 at the middle position of the tube body 3022. In addition, the diameter of the upper end of the tube body 3022 is less than the diameter of the inner bore of the conduit 30730, which also facilitates the operator to install the filter basket 3072 onto the tube body 3022.

[0204] In some embodiments, the partition plate 30726 is provided downwardly inclined from the through-holes 30729 to the edge of the partition plate 30726, which may make the mixed liquid have a tendency to flow downwardly, thereby improving the solid-liquid separation effect of the filter basket 3072, and preventing the liquid from depositing in the partition plate 30726. In addition, when the projection area of the partition plate 30726 in the horizontal plane is certain, the above structure may increase an overall surface area of the partition plate 30726, and a total area of the plurality of second filter holes 30728 is great, which may improve the separation efficiency of the dry garbage f and the wet garbage b.

[0205] In some embodiments, as shown in FIG. 19, an edge of the upper end of the annular side peripheral plate 30727 is in sealing contact with an inner peripheral surface of the box body 301. Accordingly, firstly, great particles or the great volume of dry garbage f cannot pass through the gap between the upper end edge of the annular side peripheral plate 30727 and the inner peripheral surface of the box body 301, thereby making the great particles or the great volume of dry garbage f remain in the filter mechanism 307 after the filter mechanism 307 undergoes the separating action, and preventing the great particles or the great volume of dry garbage f from entering the wet garbage b in the filter mechanism 307. In addition, the wet garbage b between the filter mechanism 307 and the bottom surface 303 does not pass through the gap between an upper edge of the annular peripheral plate 30727 and the inner peripheral surface of the box body 301, and the risk of the wet garbage b between the filter mechanism 307 and the bottom surface 303 entering the filter mechanism 307 due to vibration is prevented completely. Obviously, since the edge of the upper end of the annular side perimeter plate 30727 is in sealing contact with the inner peripheral surface of the box body 301, a relative displacement is prevented from undergoing between the filter basket 3072 and the box body 301 even if the sewage storage box 300 vibrates.

[0206] In some embodiments, as shown in FIG. 19, the cross-sectional area of the annular side perimeter plate 30727 is gradually decreased from the top to the bottom, such that there is a gap between the filter mesh 30722 and the inner perimeter of the box body 301, and the wet garbage b may pass through the first filtering aperture 4221 on the filter mesh 30722 into the space between the filter mechanism 307 and the bottom surface 303, thereby improving separation efficiency the mixing liquid a to separate the dry garbage f and the wet garbage b.

[0207] For ease of understanding, the working principle of the sewage storage box 300 under three different

operating conditions may be described in connection with FIG. 19.

[0208] In some embodiments, as shown in FIG. 19, when the cleaning device having a sewage storage box 300 (e.g., the cleaning device 100 shown in FIG. 1 to FIG. 7) merely performs a vacuuming condition, the fluid M merely includes the dust and the air, and a portion of the dust in the fluid M discharged from the sewage outlet 3021 moves downwardly to fall in the filter basket 3072, and another portion of the dust is mixed with the air to form the mixture of the clean gas c and enters the cyclone filter assembly 305 through the air inlet 3062, the dust d remains in the dust accumulation drum 3066, and the clean gas e is discharged from the cyclone filter assembly 305.

[0209] In some embodiments, as shown in FIG. 19, when the cleaning device having the sewage storage box 300 (e.g., the cleaning device 100 shown in FIG. 1 to FIG. 7) merely performs a water-suction condition, the fluid M merely includes the water and the air, and the water in the fluid M discharged from the sewage outlet 3021 moves downwardly to be stored at the bottom of the box 301, thereby enabling a recovery of the sewage. The air mixed in the fluid M sequentially passes through the air inlet 3062 and the cyclone filter assembly 305 and then is discharged from the cyclone filter assembly 305.

[0210] In some embodiments, as shown in FIG. 19, when the cleaning device (e.g., the cleaning device 100 shown in FIG. 1 to 7) having a sewage storage box 300 performs a dust and water mixture operating condition, the fluid M is separated in to a mixed liquid a and a mixed gas c at the sewage outlet 3021, the mixed liquid a has a general downward tendency to move downwardly. The mixed liquid a is separated into the dry garbage f and the wet refuse b (or wet garbage b (or referred to as liquid garbage), the dry garbage f remains in the filter mechanism 307, and the wet garbage b enters the bottom of the box body 301. The mixed gas c is separated into the clean gas e and the dust d at the cyclone filter assembly 305, the dust d remains in the dust accumulation barrel 3066 and the clean gas e is discharged from the cyclone filter assembly 305 through the air outlet 30511.

[0211] In some embodiments, the cover body 306 of the sewage storage box 300 may not be provided with a dust accumulation barrel 3066. Specifically, as shown in FIG. 33, the cover body 306 may include a first shield plate 30615. The first shield plate 30615 pivotally connecting with the main body 3061, and when the main body 3061 is plugged in the box body 301, the top of the tube body 3022 abuts the first shield plate so that the first shield plate 30615 seals off the dust discharge port 30613, and dust (e.g., dust d illustrated in FIG. 19) may be stored between the main body 3061 and the first shield plate 30615. When the cover body 306 is removed from the box body 301, the first blocking plate 30615 is rotated by gravity relative to the duct of the cyclone filtration mechanism 3053, thereby realizing the opening of the dust discharge port 30613, and the dust in the dust storage space may automatically fall into the filter basket 3072 below through the dust discharge port 30613, and the operator may clean the dust and the dry garbage (e.g., the dry garbage f shown in FIG. 19) at the same time when cleaning the filter basket 3072.

[0212] In some embodiments, the first shield plate 30615 may be connected to the main body 3061 by a pivot shaft. The pivot shaft is sleeved with a torsion spring, and two ends of the torsion spring are respectively offset from the first shield plate 30615 and the main body 3061, so that when the cover body 306 is removed from the box body 301, an elastic restoring force of the torsion spring may realize that the first shield plate 30615 automatically opens the dust discharge port 30613, thereby realizing that the dust falls into the filter basket 3072 greatly. In some embodiments, when the torsion spring is in a natural state, the first shield plate 30615 is at 60 degrees to the plane where the dust discharge port 30613 is located, so that when the main body 3061 is plugged in the box body 301, the tube body 3022 is facilitated to smoothly push the first shield plate 30615 to block the dust discharge port 30613.

[0213] In some embodiments, as shown in FIG. 33, the sewage pipes 302 is integrated molded in one piece, which may improve a processing and molding efficiency of the sewage pipe 302.

[0214] In some embodiments, as shown in FIG. 33, since the cover body 306 eliminates the arrangement of the dust accumulation barrel 3066, which makes the interior of the box body 301 has a great available space. The baffle plate 3063 may be arranged in a ring shape and enclosed around the a periphery circle of the sewage pipe 302 close to the sewage outlet 3021, so that an area of the baffle plate 3063 on the periphery of the sewage pipe 302 is great, and a great amount of dry garbage in the mixed liquid (e.g., a mixed liquid an illustrated in FIG. 19) may remain on a solid surface of the baffle pale 3063, thereby realizing a good separation effect of the dry garbage from the wet garbage (e.g., the wet garbage b illustrated in FIG. 19) in the mixed liquid.

[0215] In some embodiments, the structure of the filter mechanism 307 shown in FIG. 34 may be slightly different from the filter mechanism 307 of the filter mechanism 307 (e.g., the filter mechanism 307 shown in FIG. 19) in other embodiments of the present disclosure, and a main difference between the two is that, as shown in FIG. 33 and FIG. 34, the filter mechanism 307 may include a lifting hand 3073 and a filter basket 3072. The filter basket 3072 is connected to the lifting hand 3073, a distance between the upper end surface of the handle 3073 and the opening 308 along the vertical direction is within a range of 10 mm to 20 mm. When the cover body 306 is removed from the box body 301, the user may remove the filter basket 3072 from the box body 301 by accommodating the handle 3073, and the structure of the filter mechanism 307 is simple and easy for the user to operate.

[0216] In some embodiments, as shown in FIG. 34, the handle 3073 includes a connecting rod 30731 and a

handheld portion 30732. One end of the connecting rod 30731 is connected to the filter basket 3072. The handheld portion 30732 is connected to another end of the connecting rod 30731. The width of the handle 3073 is greater than the width of the connecting rod 30731, and the handheld portion 30732 is provided to facilitate the operator's accommodating and applying force. Specifically, the handle 3073 includes a connecting plate 30733, a first side plate 30734, a second side plate 30735, and a third side plate 30736. The connecting plate 30733 is connected to another end of the connecting rod 30731. The first side plate 30734, the second side plate 30735, and the third side plate 30736 are all perpendicular to and located on one side of the connecting plate 30733, the first side plate 30735, and the third side plate 30736. The first side plate 30734 and the third side plate 30736 are connected to both sides of the second side plate 30735. The distance between the first side plate 30734 and the third side plate 30736 is gradually increased from the bottom to the top, and the inverted trapezoidal handle 3073 is convenient for the operator to grip.

[0217] In some embodiments, as shown in FIG. 34, the filter mechanism 307 further includes a reinforcing plate reinforcement 30739. The reinforcing plate reinforcement 30739 is connected between the connecting rod 30731 and the handle 3073, thereby enhancing a strength of the filter mechanism 307 as a whole and the hardness, preventing a problem of deformation occurring during repeated pickups of the filter mechanism 307, and improving the service life of the filter mechanism 307.

[0218] In some embodiments, to improve a gripping effect of the operator on the handheld portion 30732 and prevent the problem of slippage between the hand and the handheld portion 30732, anti-slip patterns is arranged on the outer surface of the first side plate 30734, the second side plate 30735, and the third side plate 30736. In some embodiments, as shown in FIG. 34, a plurality of air-permeable holes 30737 are provided at interval on the first side plate 30734, the second side plate 30735, and the third side plate 30736, and the anti-slip patterns are arranged between the air-permeable holes 30737.

[0219] In some embodiments, as shown in FIG. 33, the handheld portion 30732 is located below the air inlet 3062 and is directly opposite to the air inlet 3062. The mixed gas (e.g., the mixed gas c shown in FIG. 19) may enter the air inlet 3062 through the air-permeable holes 30737 and then enter the cyclone channel to perform the cyclone effect, and the mixed gas collides with the first side plate 30734, the second side plate 30735, and the third side plate 30736 before entering the air inlet 3062. A portion of the solid particles in the mixed gas may make a free-fall movement to the filter mechanism 307 during the process of collision, thereby making the clean gas (e.g., the clean gas e illustrated in FIG. 19) that is subsequently discharged from the air inlet 3062 clean.

[0220] In some embodiments, as shown in FIG. 33 and FIG. 34, the partition 30726 may be provided with an anti-backflow structure 30738 to allow the sewage entering the upper space of the box body 301 from the sewage pipe 302 to enter at least the lower space for storage through the anti-backflow structure 30738, which prevents the sewage in the lower space from flowing through the anti-backflow structure 30738 and entering the upper space. In some embodiments, the anti-backflow structure 30738 may be the anti-backflow structure 230 described above (e.g., FIG. 8).

[0221] In some embodiments, for a cleaning device with a sewage storage box 300 (e.g., the cleaning device 100 shown in FIG. 1 to FIG. 7), when the device body 1 (or the sewage storage box 300) is in a substantially upright position (e.g., at an angle of 90 degrees or greater than or equal to 60 degrees relative to a horizontal plane, hereinafter referred to as "upright"), the sewage is suctioned into the sewage pipe 302, flows from the sewage pipe 302 into the upper space, and then flows into the lower space through the anti-backflow structure 30738 and is stored in the lower space. When the device body 1 (or the sewage storage box 300) is tilted significantly (e.g., at an angle of less than or equal to 30 degrees relative to the horizontal plane, or even at an angle of about 2 degrees relative to the horizontal plane, hereinafter referred to as "flattened"), the anti-backflow structure 30738 prevents the sewage in the lower space from flowing backward through the anti-backflow structure 30738 and flowing into the upper space. The anti-backflow structure 30738 prevents the sewage in the lower space from flowing backward through the anti-backflow structure 30738 and flowing into the upper space, so that the sewage does not flow to the motor (e.g., the motor 33 or the motor 34) in the cleaning device 100, and the motor does not stop, and the cleaning device 100 is still able to clean normally. As a result, the cleaning device 100 having the sewage storage box 300 may not only be used with the device body 1 standing in the position of upright, but also may be used with the device body 1 tilted sharply, or even laid flat, which greatly facilitates the use by the user.

[0222] FIG. 35 is a three-dimensional view illustrating a floor brush according to some embodiments of the present disclosure. In some embodiments, the floor brush 2 shown in FIG. 1 to FIG. 7 may specifically be a floor brush 400 as shown in FIG. 35. The floor brushes in the embodiments of the present disclosure may be described in detail below in connection with the accompanying drawings.

[0223] As shown in FIG. 35, the floor brush 400 may include a working portion 410 and a connecting portion 420. The floor brush 400 have opposing front and rear portions in a width direction thereof (e.g., the W-direction shown in FIG. 35), the connecting portion 420 is provided at a rear portion of the working portion 410, and the connecting portion 420 is connected to the device body 1. In some embodiments, the working portion 410 and the connecting portion 420 may be of a one-piece structure or may be of independent structures from each other. In some embodiments, the working portion 410 includes a

floor brush body 430 and a cleaning fluid box 440 (i.e., the cleaning fluid box 50 described above) detachably installed to the floor brush body 430. The floor brush body 430 may be in direct contact with a surface to be cleaned (e.g., a floor) for cleaning the garbage on the surface to be cleaned. The floor brush body 430 is provided with a suction port 434 for suctioning in garbage. The cleaning fluid box 440, as a portion of the cleaning fluid supply assembly, stores the cleaning fluid, such as the water, the cleaning agent, or the conditioner. In a usage scenario where the surface to be cleaned needs to be sprayed with wetness, the cleaning fluid is pumped from the cleaning fluid box 440 onto the surface to be cleaned.

[0224] In some embodiments, the cleaning fluid box 440 may be made of a transparent material or a non-transparent material to allow a user to determine the amount of cleaning fluid in the cleaning fluid box 440. In some embodiments, the cleaning fluid box 440 may be a one-piece molded structure. In some embodiments, the transparent material may include, but is not limited to, one or more of polymethyl methacrylate, polystyrene, polycarbonate, styrene acrylonitrile, ABS plastic, etc. In some embodiments, the cleaning fluid box 440 may also include a box body structure including a plurality of elements. For example, the cleaning fluid box 440 may include a first housing and a second housing disposed sequentially from top to bottom. A bottom of the first housing and a top of the second housing are connected to form the cleaning fluid box 440 having an internal cavity. In some embodiments, the first housing and the second housing may be connected through one or more of the adhesive connection, the clamping connection, the welded connection, etc. For example, the first housing and the second housing may be welded by an ultraviolet curing glue (UV glue). In some implementations, the materials of the first housing and the second housing may be the same or different. For example, to increase the weight of the cleaning fluid box 440 to further increase the pressure of the floor brush 1 on the cleaning surface and to improve the cleaning effect, in some embodiments, the first housing may be made of the materials such as polymethylmethacrylate, polystyrene, polycarbonate, styrene acrylonitrile, ABS plastic, and the second housing may be made of the materials such as glass, ceramic, metal (e.g., stainless steel), etc. In some embodiments, the shape of the cleaning fluid box 440 may be approximated as a rectangular structure, a trapezoidal structure, etc.

[0225] When the cleaning fluid box 440 is filled with the cleaning fluid, a projection of a center of gravity of the cleaning fluid box 440 along its height direction is located in a central region of the cleaning fluid box 440. It should be noted that the center of gravity of the cleaning fluid box 440 moves up and down along the height direction of the cleaning fluid box 440 with the amount of cleaning fluid. For example, when the cleaning fluid box 440 is a regular structural body (e.g., an approximate rectangular structure), the center of gravity of the cleaning fluid box 440 is a geometric center of the cleaning fluid box 440 when the amount of cleaning fluid in the cleaning fluid box 440 is at its maximum (i.e., when the cleaning fluid box 440 is filled with the cleaning fluid). As another example, when the amount of cleaning fluid in the cleaning fluid box 440 is less than a capacity of the cleaning fluid box 440, the center of gravity of the cleaning fluid box 440 is below the geometric center of the cleaning fluid box 440. Accordingly, when an outlet is provided at the bottom of the cleaning fluid box 440, the cleaning fluid may flow out of the outlet of the cleaning fluid box 440 more easily under its gravity. In addition, when the cleaning fluid box 440 is in an irregular structure, for example, the cleaning fluid box 440 has a region that is concave or protruding relative to a sidewall thereof, a projection of the center of gravity of the cleaning fluid box 440 along the height direction thereof is located in the middle region of the cleaning fluid box 440, so that when a user extracts the cleaning fluid box 440 containing the cleaning fluid, the center of gravity of the cleaning fluid box 440 is not excessively offset to facilitate the user to grip.

[0226] In some embodiments, the outlet of the cleaning fluid box 440 may be located in a central region of the bottom of the cleaning fluid box 440 to facilitate the cleaning fluid to flow out. In some embodiments, the outlet of the cleaning fluid box 440 may also be located at other locations of the cleaning fluid box 440. For example, the outlet of the cleaning fluid box 440 may be located at a side of the cleaning fluid box 440 to facilitate a placement of the pipe (e.g., a first pipe). The outlet of the cleaning fluid box 440 may be located on a side of the cleaning fluid box 440 that is backed away from the rod (e.g., the rod 11 shown in FIG. 6) to reduce the length of the pipe.

[0227] In some embodiments, the cleaning fluid in the cleaning fluid box 440 may also be sprayed through a cleaning fluid supply assembly (e.g., a nozzle 460 and a pump 461 shown in FIG. 38), the pump 461 is configured to pump the cleaning fluid from the cleaning fluid box 440 to the nozzle 460, and the nozzle 460 is served as an output end of the cleaning fluid supply assembly and sprays the cleaning fluid onto the floor to be cleaned, thereby serving to clean and/or condition the floor.

[0228] In some embodiments, the cleaning fluid box 440 may include a water inlet 4401 for injecting a cleaning fluid or an aqueous solution, the water inlet 4401 may be disposed at a top wall of the cleaning fluid box 440, and the water inlet 4401 extends through the top wall of the cleaning fluid box 440 and is in communication with a cavity within the cleaning fluid box 440. In some embodiments, an orifice plug may be provided at the water inlet 4401, which is matched with the water inlet 4401. For example, the two are matched and connected through the threaded connection, the interference fit, the plug-in connection, etc. In some embodiments, one or more cavities may be included in the cleaning fluid box 440. For example, one cavity may be included in the cleaning fluid box 440, and the cleaning fluid is located in the cavity.

As another example, the cleaning fluid box 440 may include a first cavity and a second cavity. The first cavity may be connected to the second cavity, the first cavity is configured to place a water solution, and the second cavity is configured to place the cleaning agent, and the cleaning agent may be dissolved or diluted by injecting the water solution into the first cavity, thereby forming a cleaning fluid.

[0229] In some embodiments, the cleaning fluid box 440 may include a first gripping portion 4402 for the user to hand-hold. The first gripping portion 4402 is disposed at the top wall of the cleaning fluid box 440. In some embodiments, the first gripping portion 4402 may be a fastener member. In some embodiments, the first gripping portion 4402 may include a first concave portion that is concave downwardly relative to the top of the cleaning solution box 440. The first concave portion forms a handle-like structure with the top wall of the cleaning solution box 440 above the first concave portion to allow a user to pick up the cleaning solution box 440. In some embodiments, the cleaning solution box 440 may further include a second gripping portion 4403, the second gripping portion 11204 is disposed at a sidewall of a side of the cleaning fluid box 440 facing the connection portion 420. For example, the second gripping portion 4403 may be a groove region of the sidewall of the side of the cleaning fluid box 440 facing the connection portion 420. In some embodiments, the first gripping portion 4402 and/or the second gripping portion 4403 may be located in a central region of the cleaning fluid box 440. The cleaning fluid box 440, when filled with the water, causes the center of gravity of the cleaning fluid box 440 to offset relative to a side away from the groove region since the bottom of the groove region of cleaning fluid box 440 requires other components (e.g., the first projection 43141 accommodating the pump 461 as described below) to be matched with the pump 461, but the center of gravity of the cleaning fluid box 440 is still in the projection of the first gripping portion 4402 or the second gripping portion 4403, so that the cleaning fluid box 440 remains substantially balanced when the user moves the cleaning fluid box 440 to the vicinity of the device body 1. In addition, the cleaning fluid box 440 is substantially in the shape of a dumbbell, and the user may grip the cleaning fluid box 440 by the first gripping portion 4402 or the second gripping portion 11204. For example, the first gripping portion 4402 is a clasp, and the second gripping portion 4403 is substantially in the form of a groove region, so that the user may pick up the cleaning fluid box 440 as gripping a dumbbell.

[0230] For ease of description, the lengthwise direction in the present disclosure may be represented by the L direction shown in FIG. 35, the height direction is represented by a H direction in FIG. 35, and the width direction is represented by a W direction in FIG. 35.

[0231] By installing the cleaning fluid box 440 on the floor brush body 430, it is possible to facilitate the user to operate the device body and cleaning of the underbed space by hand-holding. At the same time, the use of the above structure eliminates the need to arrange a relatively long cleaning fluid hose, resulting in a relatively fast spraying response. In addition, the overall weight of the floor brush 400 may be improved with the above arrangement, thereby increasing the force of the floor brush 400 to press down on the floor and improving the cleaning effect.

[0232] A size of the working portion 410 may be great by arranging the cleaning fluid box 440 on the floor brush 400 and such that the working portion is not being conveniently dragged to areas such as the bottom of the bed, corners, etc., for cleaning. In conjunction with FIG. 35, FIG. 36, and FIG. 37, to solve the above problem, in some embodiments, the working portion 410 may have an approximate rectangular shape with a projection along its height direction (the H direction illustrated in FIG. 35), and the working portion 410 may have a maximum size d1 of not more than 270 mm along its lengthwise direction (L direction illustrated in FIG. 35). Relative to other shapes, the projection of an approximate rectangular shape of the working portion 410 has a great cleaning range and occupies less space in a single push and pull, and at the same time may facilitate to arrange the connecting portion 420 and the cleaning fluid box 440. Furthermore, the efficiency of the working portion 410 in cleaning the edge position may be improved by adjusting a maximum size d1 of the working portion 410 along its lengthwise direction. When the maximum size d1 of the working portion 410 along its lengthwise direction is too small, the cleaning efficiency in the open area is low, and in some embodiments, a maximum length of the working portion is within a range of 250mm to 270mm.

[0233] The working portion 410 may not only serve as an upstream component for suctioning the garbage, but also cooperate with the connecting portion 420 to support the device body (or the handle) and other components of the cleaning device, and at the same time serve the role of installation the cleaning fluid box 440. To satisfy a stabilizing support role of the working portion 410 and an installation carrier role, the working portion 410 obtains as small a size as possible at the same time. In some embodiments, this may be realized by adjusting the length or width of the working portion 410. In some embodiments, a ratio of a maximum size d2 of the working portion 410 along its width direction to a maximum size d1 along its lengthwise direction is within a range of 0.5 to 0.7. It should be noted that the working portion 410 serves as a frame structure of the floor brush 400, and the size of the working portion 410 may be approximated as the size of the floor brush 400.

[0234] To ensure that the cleaning fluid supply assembly may wet a sufficient area, in some embodiments, a capacity of the cleaning fluid box 440 may be within a range of 0.35 L to 0.6 L. Since the cleaning fluid box 440 has a box body housing, the volume of the box body housing (the space required to be occupied) is bound to be greater than the capacity of the box body. In some

embodiments, a ratio of the capacity of the cleaning fluid box 440 to the volume of the cleaning fluid box 440 is not less than 0.35. Accordingly, when the capacity of the cleaning fluid box 440 is preset, the cleaning fluid box 440 may be limited to not occupy too much space, and enhance an overall compactness of the working section 410.

[0235] In some embodiments, a ratio of the volume of the cleaning fluid box 440 to the volume of the work portion 410 may be within a range of 0.3 to 0.6. Accordingly, when the length and the width of the working portion is determined, the height of the work portion 410 is constrained, so that the floor brush 400 may conveniently reach out to a height-constrained region such as the bottom of the bed, the bottom of the sofa, etc., for cleaning. In some embodiments, a ratio of a maximum size d3 of the working portion 41 along its height direction to the maximum size d1 along its lengthwise direction may be within a range of 0.25-0.55 to simultaneously satisfy a cleaning performance, a convenience, and an aesthetics of the working portion 410.

[0236] To fully utilize the installation space on the floor brush body 430 and to match the basic shape of the working portion 410, in some embodiments, the projection of the cleaning fluid box 440 along its height direction is substantially rectangular in shape, and a maximum size d4 of the cleaning fluid box 440 along its lengthwise direction is substantially the same as the maximum size d1 of the working portion 410 along its lengthwise direction. It may be understood that the distance between the two sides of the cleaning fluid box 440 along the lengthwise direction of the floor brush 400 is substantially equal to the distance between the two sides of the floor brush body 430. Accordingly, a circumferential limiting function of the installation housing on the cleaning fluid box 440 is preserved, and the upper structure of the cleaning fluid box 440 may be expanded to be substantially the same as the maximum size of the working portion 410 along its lengthwise direction. At the same time, the size of the cleaning fluid box 440 along its height direction and the size of the cleaning fluid box 440 along its width direction are facilitated to adjusted by designing the size of the cleaning fluid box 440 along its lengthwise direction to be as great as possible, thereby facilitating to design an installation position of the components on the working portion 410.

[0237] It should be noted that the cleaning fluid box 440 may not be in a regular rectangular shape when viewed from above due to the fact that the cleaning fluid box 440 needs to be installed with a necessary restriction structure and/or avoidance of other components (e.g., the connecting portion 420). Substantially rectangular means that both opposing sides have portions that are substantially parallel. Furthermore, the projection of the above working portion 410 along the height direction is also to be understood as being substantially the rectangular.

[0238] Further, a rear end of the cleaning fluid box 440 may constitute at least a rear end of the partially working portion 410. For example, the cleaning fluid box 440 is arranged as far back as possible to prevent parts located at the front of the floor brush body 430.

[0239] In some embodiments, as shown in FIG. 35, the floor brush body 430 may include an installation housing 431, an upper baffle cover 432, and a roller brush 433. The roller brush 433 is rotatably disposed at a front portion of the installation housing 431 for rolling and scrubbing the surface to be cleaned, and the upper baffle cover 432 may be disposed at an upper portion of the roller brush 433 for covering at least a portion of the roller brush and for serving as an installation carrier. Meanwhile, the cleaning fluid box 440 is disposed at the rear portion of the upper baffle cover 432. Based on the above position arrangement, the structure of the working portion 410 may be made more compact, and its space utilization is high and beautiful and practical.

[0240] In some embodiments, the cleaning fluid box 440 and the upper baffle cover 432 may be provided integrally, and the cleaning fluid box 440 needs to be removed along with the upper retaining cap 432 when the cleaning fluid is added.

[0241] In some embodiments, the cleaning fluid box 440 and the upper baffle cover 432 may be arranged up separately, where it may be understood that the cleaning fluid box 440 and the upper baffle cover 432 are mutually independent components, so that it may be convenient to take out the cleaning fluid box 440 separately to refill the cleaning fluid, thereby solving the problem of an inconvenient operation by the user when the cleaning fluid box 440 and the upper baffle cover 432 are set up integrally.

[0242] To further ensure that the working portion 410 may smoothly reach into the underbed area, the top of the working portion 410 may be an approximately planar structure, such that the top of the working portion 410 should not have the protruding portion as much as possible. Therefore, the top surface of the cleaning fluid box 440 and the top surface of the upper baffle cover 432 are substantially horizontal, and both of the aforementioned top surfaces should be substantially flat to prevent a step surface.

[0243] In the cleaning process, considering that both sides of the working portion 410 along the lengthwise direction are prone to collide with obstacles, to reduce the impact caused when bumping. In some embodiments, the upper baffle cover 432 and the cleaning fluid box 440, which are at the upper portion of the working portion 410, are configured with rounded or chamfered edges along both sides of the lengthwise direction of the floor brush.

[0244] In conjunction with FIG. 35 to FIG. 42, in some embodiments, the upper baffle cover 432 is detachably connected to an installation housing 431 to facilitate the cleaning, the disassembly, and the assembly of the roller brushes 433. Compared to the scheme of the integral arrangement the cleaning fluid box 440 and the upper

baffle cover 432, the upper baffle cover may be detachably connected on the installation housing 431 by separately arranging the cleaning fluid box 440 and the upper baffle cover 432, such that the structure of the working portion 410 is further optimized, which closely satisfies a usage habit of the user.

[0245] It should be noted that, if the width of the upper baffle cover 432 is too small, the beneficial effects of cleaning and removing the roller brushes may be hard to demonstrate. Accordingly, in some embodiments, a ratio of a maximum size d5 of the cleaning fluid box 440 along its width direction to a maximum size d2 of the work portion 410 along its width direction may be within a range of 0.5 to 0.7. The upper baffle cover 432 is provided with sufficient installation space by limiting the maximum size (e.g., the maximum width) of the cleaning fluid box 440 along its width direction.

[0246] As shown in conjunction with FIGs. 35, 38, and 39, in some embodiments, the installation housing 431 may include a bottom housing 4311 and a top cover 4312. A brush installation cavity 450 is formed between the bottom housing 4311 and the top cover 4312 for accommodating the roller brush 433. The installation housing 431 of the floor brush body 430 is constructed with a suction port 434 for sucking in garbage, the suction port 434 is located on the front side of the bottom housing 4311 and is located at the front side of the bottom housing 4311 and at the rear of the brush 433. A floor brush channel 451 (i.e., the first channel 6 illustrated in FIG. 2 through 5) is provided in the brush installation cavity 450 in fluid communication with the suction port 434. During the cleaning process, the garbage on the surface to be cleaned is moistened by the roller brush 433 and then suctioned away by the suction port 434 and continues to be guided by the floor brush channel 451. The end of the floor brush channel 451 away from the suction port 434 may be connected to the second channel 202 of the device body 1, thereby transmitting the garbage to the sewage storage box 4 (illustrated in FIG. 2 to FIG. 5).

[0247] Since the floor brush channel 451 occupies a certain height in the roller brush installation cavity 450, which necessitates a height limit for the cleaning fluid box 440 located in the upper portion of the roller brush installation cavity 450 to prevent an excessive height of the working portion 410. In some embodiments, as shown in conjunction with FIG. 36 and FIG. 43, a ratio of a maximum size d6 of the cleaning fluid box 440 along its height direction to a maximum size d3 of the working portion 410 along its height direction may be within a range of 0.4 to 0.7.

[0248] As shown in conjunction with FIG. 38 to FIG. 43, in some embodiments, an accommodating box 4313 is formed in the upper portion of the top cover 4312, and the cleaning fluid box 440 is disposed in the accommodating box 4313. In some embodiments, the cleaning fluid box 440 is detachably connected to the accommodating box 4313. To facilitate removing or putting the cleaning fluid box 440 in the accommodating box 4313, in some embodiments, as shown in conjunction with FIG. 41 and FIG. 42, a maximum size d6 of the cleaning fluid box 440 along its height direction may be greater than a size d8 of the accommodating box 4313 (or referred to as a depth of the accommodating box 4313) along its height direction. Based on the structure of the accommodating groove 4313 described above, along the lengthwise direction of the floor brush, both sides of the top cover 4312 are constructed with a protrusion 4314, and at the same time, both sides of the cleaning fluid box 440 are constructed with a groove 4315 capable of accommodating the protrusion 4314. According to, the cleaning fluid box 440 may be in a shape with a slightly longer upper portion and a slightly shorter lower portion than that of the protrusion 4314. The lower portion of the cleaning fluid box 440 is configured for restricting and installation, and the slightly long upper portion is conducive to expanding the capacity of the cleaning fluid box 440.

[0249] In some embodiments, a slightly long portion of the upper portion of the cleaning fluid box 440 is a protruded portion 4404 that projects in a lengthwise direction of the cleaning fluid box 440 to both sides of the cleaning fluid box 440 relative to the groove 4315. A protruded portion 1126 forms a step structure with the groove 4315, and the step structure is matched with the protrusion 4314. In some embodiments, the bottom of the water inlet 4401 of the cleaning fluid box 440 is higher than the step structure, that is, the water inlet 4401 of the cleaning fluid box 440 is higher than the connection location between the groove 4315 and the projections 4404. Further, the protruded portion 4404 of the cleaning fluid box 440 has a cavity in communication with the cleaning fluid box 440, i.e., the protruded portion 4404 is an internally hollow structure, so that when the cleaning fluid box 440 is filled with the cleaning fluid, the protruded portion 4404 of the cleaning fluid box 440 has a space above the groove 4315 where the cleaning fluid may be stored, thereby ensuring the capacity of the cleaning fluid box 440. As shown in FIG. 40, in some embodiments, the water inlet 4401 of the cleaning fluid box 440 is higher than the step structure formed by the projecting portion 4404 and the groove 4315, which ensures that the interior of the projecting portion 4404 may store the cleaning fluid, thereby increasing the storage space of the cleaning fluid box 440. In some embodiments, the maximum size d11 of the internal space of the protruded portion 4404 along its height direction may be within a range ofl0-20 mm. For example, the maximum size d11 of the internal space of the protruded portion 4404 along its height direction may be 14 mm. In some embodiments, the size d12 of the internal space of the protruded portion 4404 along the lengthwise direction of the floor brush 400 may be within a range of 8-15 mm. For example, the size d12 of the internal space corresponding to the protruded portion 4404 may be 11 mm.

[0250] If the sizes of the groove 4315 along its height direction are small, the protrusion 4314 is less restrictive to the groove 4315, and the cleaning fluid box 440 is

prone to wobble. If the sizes of the groove 4315 deep along its height direction are too great, the space expansion of the cleaning fluid box 440 located in the upper portion of the groove 4315 is limited, resulting in a little significance of the space expansion by such manner. To solve the above problem, as shown in conjunction with FIGs. 39 and 42, in some embodiments, a ratio of a size d10 of the groove 4315 along its height direction to a maximum size d6 of the cleaning fluid box 440 along its height direction may be within a range of 0.4 to 0.7.

[0251] If the protrusion 4314 is relatively thin, and the strength of the protrusion 4314 is relatively poor and such that is difficult to effectively define the cleaning fluid box 440. If the protrusion 4314 is relatively thick and the groove 4315 needs to be enlarged, the cleaning fluid box may sacrifice a certain capacity. Therefore, referring to FIG. 42, a size d7 of the protrusion 4314 along the length of the floor brush 400 is within a range of 7 mm to 10 mm.

[0252] In some embodiments, the cleaning fluid box 440 may be connected to the installation housing 431 by a connection structure such as a locking structure, a clamping structure, etc. However, considering that the above connection structure requires relatively much space and needs to be arranged in a conspicuous position, the cleaning fluid box 440 may be fixed to the installation housing 431 through a magnetic suction structure. In some embodiments, as shown in FIG. 38, FIG. 39, and FIG. 45, a first iron body 441 may be fixed at the bottom of the cleaning fluid box 440, and a first magnet 442 capable of generating the suction with the first iron body 441 is fixed in the roller brush installation cavity 450. Accordingly, the space occupancy of the connecting structure may be lowered, and the connecting structure is hidden, thereby making the structure of the working portion 410 compact and aesthetical. In some embodiments, the above magnetic suction structure may also be realized by interchanging the positions of the first iron body 441 and the first magnetic body 442, and arranging the two magnets for magnetic suction.

[0253] In some embodiments, as shown in FIG. 42 and FIG. 43, the bottom of the cleaning fluid box 440 may also be provided with a first fluid spout 443 and a positioning block 444. The first fluid spout 443 may form a valve assembly with a first fluid plug 4319 disposed in the installation housing 431, and when the two are plugged together, the cleaning fluid may flow out of the cleaning fluid box 440. The positioning block 444 may be plugged into the plug 4318 in the installation housing 431 to perform a positioning function. In addition, the valve assembly may be of other configurations. As shown in FIG. 40 and FIG. 41, in some embodiments, a valve assembly 4405 may be provided at the outlet 4401 of the cleaning fluid box 440, and at least a portion of the valve assembly 4405 may extend into the interior of the cleaning fluid box 440. In some embodiments, the valve assembly 4405 may include an assembly outlet 44051, a rod-release plugging component 44052, and a plugging member spring 44053. In some embodiments, the assembly outlet 44051 may be a structural body that is internally through, that is to say, the assembly outlet 44051 has an internal channel. The component outlet 44051 is installed to the outlet 4401 of the cleaning fluid box 440 through a threaded cap 44054. The rod-release plugging component 44052 is matched to the component outlet 44051 through a washer (e.g., an O-ring), and the rod-release plugging component 44052 may control opening and closing states of an internal channel of the component outlet 44501, i.e., the opening and closing states of the internal channel of the component outlet 44051 may be altered by changing the position of the rod-release plugging component 44052. Merely as exemplary illustration, in some embodiments, the rod-release plugging component 44052 is a cylindrical structure, and the rod-release plugging component 44052 may include at least a first cylindrical structure and a second cylindrical structure connected sequentially from top to bottom. A radius of the first cylindrical structure is greater than a radius of the second cylindrical structure, the radius of the first cylindrical structure is approximately the same as an inner diameter of the component outlet 44051. The second cylindrical structure is approximately the same as the inner diameter of the second cylindrical structure, and the radius of the second cylindrical body is less than the inner diameter of the component outlet 44051. The plugging member spring 44053 biases the valve assembly 4405 to the closed position within the spring housing 44056. Specifically, under the action of the plugging member spring 44053, the first cylindrical structural body of the rod-release plugging component 44052 is fitted and connected to the interior of the component outlet 44051, at which point the valve assembly 4405 closes and the cleaning fluid in the cleaning fluid box 112 is unable to flow out of the cleaning fluid box 440 and flow to the outside world. When the valve assembly 1130 is connected to the cleaning fluid supply assembly, the rod-release plugging component 44052 deforms the plugging member spring 1138 under the action of the pressure of the pipeline interface, and the first cylindrical structure body of the rod-release plugging component 44052 moves relative to the internal channel of the component outlet 44051, at which time, the second cylindrical structure body is located at the internal channel of the component outlet 44051. The second cylindrical structure body has a gap between the second cylindrical structure and a sidewall corresponding to the internal channel of the assembly outlet 1132, and the valve assembly 4405 is in the open state to release the fluid into a fluid delivery channel (e.g., a first pipe, a second pipe, and a third pipe). In some embodiments, the rod-release plugging component 44052 may be a reducer rod structure, that is, the radius of the rod-release plugging component 44052 decreases gradually from top to bottom. The principle regarding the rod-release plugging component 44052 may be the reducer rod structure and be matched with the assembly outlet 44051 may be referred to the above descriptions. In some embodiments, the valve assembly

4405 may also include a filter mesh plugging member (not shown in the figure), the filter mesh plugging member is configured to prevent particulates from entering the cleaning fluid supply assembly. In some embodiments, the filter mesh plugging member may be provided between the cleaning fluid box outlet 4401 and the valve assembly 4405. In some embodiments, the filter mesh plugging member may also be provided on one side of the outlet 4401 of the cleaning fluid box 440 away from the valve assembly 4405.

[0254] To ensure that the cleaning solution from the nozzle 460 to the floor to be cleaned may wet the floor, in some embodiments, a water outlet area of the valve assembly may be greater than 3 mm^2. In some embodiments, a water outlet area of the valve assembly is greater than 4 mm^2. In some embodiments, a water outlet area of the valve assembly is greater than 5 mm^2. In some embodiments, a water outlet area of the valve assembly is greater than 6 mm^2. In some embodiments, the valve assembly may be released from the rod-release plugging component 44052 or the valve assembly outlet 44051 by adjusting the rod-release plugging component 44052 or the inner diameter of the assembly outlet 44051 to ensure that the amount of water coming out of the valve assembly is maintained. For example, the water outlet area of the valve assembly is increased by decreasing the radius of the second cylindrical structure in the rod-release plugging component 44052. In some embodiments, as shown in FIG. 41, along a height direction of the cleaning fluid box 440 (the H direction illustrated in FIG. 35), a distance between the end of the rod-release plugging component 44052 away from the cleaning fluid box 440 and the cleaning fluid box 440 is less than a distance d11 from one end of the threaded cap 44054 away from the cleaning fluid box 440 and the cleaning fluid box 440. Accordingly, on the one hand, it is possible to prevent the rod-release plugging component 44052 from colliding with an external object and leaking, on the other hand, it is also convenient for the staff to testify the valve assembly 4405, and the staff may observe whether the valve assembly 4405 is normal by pressing the rod-release plugging component 44052. In some embodiments, a distance d11 may be within a range of 0.2 mm to 0.8 mm. In some embodiments, a pitch d11 may be within a range of 0.3 mm to 0.6 mm. In some embodiments, a pitch d11 may be within a range of 0.4 mm to 0.5 mm.

[0255] It should be noted that the valve assembly is not limited to the valve assembly composed of the first liquid spout 443 and the positioning block 444 as described above and the valve assembly 4405 illustrated in FIG. 40 and FIG. 41, and the valve assembly may be any kind of assembly that realizes liquid conduction/cut-off by pulling and inserting actions, which is not further limited herein. In addition, the shape of the rod-release plugging component 44052 may be of other shapes, for example, the rectangular body structure, the trapezoidal body structure, the circular table structure, etc., and accordingly, the shape of the internal channel of the assembly outlet 44051 is adapted to the shape of the rod-release plugging component 44052.

[0256] In some embodiments, the valve assembly described above may be any one of a count of assemblies that realize liquid conduction/cut-off by the pulling and inserting actions.

[0257] It should be noted that, the above maximum sizes of the cleaning fluid box 440 along the height direction thereof, the maximum sizes along the width direction thereof, and the maximum sizes along the lengthwise direction thereof refer to sizes (e.g., the height, the width, and the length) of the box of the cleaning fluid box 440, and do not include the projections, such as the first fluid spout 443 and the positioning block 444.

[0258] In some embodiments, as shown in FIG. 38, the cleaning fluid supply assembly further includes the nozzle 460 and the pump 461. The pump 461 may be configured to pump the cleaning fluid from the cleaning fluid box 440 to the nozzle 460, and the nozzle 460 may serve as an output end of the cleaning fluid supply assembly to spray the cleaning fluid onto the floor to be cleaned, thereby serving to clean and/or condition the floor. In some embodiments, the pump 461 may be disposed in the roller brush installation cavity 450, which is configured along the length of the floor brush 400 on one side of the floor brush channel 451, and the nozzle 460 is disposed on the upper baffle cover 432.

[0259] Referring to FIG. 42, to prevent an undue reduction in the capacity of the cleaning fluid box 440, the top of the pump 461 may be higher than the lowest surface inside the accommodating box 4313, i.e., a first protruding portion 43141 capable of at least partially accommodating the pump 461 is provided at the bottom surface of the accommodating box 4313. In conjunction with FIG. 38 and FIG. 40, correspondingly, the bottom of the cleaning fluid box 440 may be provided with a first concave portion (not shown in the figure) for preventing the first protruding portion 43141 of the first groove (not shown in the figures). In some embodiments, the top of the floor brush channel 451 may be higher than the lowest surface within the accommodating box 4313, i.e., the bottom surface of the accommodating box 4313 may be provided with a second protruding portion 4316 capable of at least partially accommodating the floor brush channel 451. Correspondingly, the bottom of the cleaning fluid box 440 may be provided with a second concave portion (not shown in the figure) to avoid the second protruding portion 4316. It may be understood that, to ensure a pumping volume of the cleaning liquid and a conveying volume of the garbage, the pump 461 and the floor brush channel 451 should respectively reach a certain height, and if the bottom surface of the accommodating box 4313 is basically arranged into a plane, the height of the plane may depend on the one that has a high top of the pump 461 and the floor brush channel 451, such that undoubtedly some space which may be used for expanding the capacity of the box of the cleaning liquid may be sacrificed. Accordingly, it is possible to define the cleaning fluid box

440 and the floor brush body 430 in terms of height, which ensures that the cleaning fluid box 440 has a sufficient capacity, and makes the structure of the working portion 410 more compact and practical, so that it is convenient for the user to use the floor brush in a height-restricted space, such as the bottom of the bed. It should be noted that, the lowest surface within the above accommodating box 4313 refers to a substantially plane bottom of the accommodating box 4313 that articulates with the first protruding portion 43141 and the second protruding portion 4316.

[0260] In some embodiments, as shown in FIG. 38, the installation housing 431 may be provided with a second liquid spout 4317, and the upper baffle cover 432 is provided with a second liquid plug 4321 capable of forming a valve assembly with the second liquid spout 4317. Specifically, the pump 461 has a pump inlet and a pump outlet, and the pump inlet may be in fluid communication with the first liquid plug 4319 through a first conduit, the pump outlet may be in fluid communication with the second liquid plug 4317 through a second conduit, and the second liquid plug 4321 is in fluid communication with the nozzle 460 through a third conduit 4322. The first conduit and the second conduit are configured in the roller brush installation cavity 450, the third conduit 4322 is configured in the upper baffle cover 432, and the nozzle 460 is located at the upper baffle cover 432 above the roller brush 433. When the surface to be cleaned is needed to be wet, the cleaning fluid in the cleaning fluid box 440 is activated by an action effect of the pump 461, and the cleaning fluid flows sequentially through the valve assembly including the first fluid spout 443 and the first fluid plug 4319 (shown in FIG. 42), the first conduit, the pump 461, the second conduit, the second fluid spout 4317 and the second valve assembly composed of the second fluid plug 4321, the third conduit 4322, and the nozzle 460, and flow out to the external environment to wet the surface to be cleaned in front of roller brush 433. In some embodiments, a count of nozzles 460 may be one or more. When the count of nozzles 460 is a plurality, the one or more nozzles 460 may be arranged at interval along the lengthwise direction of the upper baffle cover 432 (in the same direction n as the lengthwise direction of the roller brush 433 illustrated in FIG. 38) to increase a wetting area of the nozzles 460. An effective infusion and separate detachability between the plurality of parts of the cleaning fluid supply assembly may be realized by configuring the two valve assemblies and arranging the three conduits.

[0261] When a cleaning operation is performed, the roller brush 433 may be rotated by the drive of the motor 4331. In some embodiments, the motor 4331 may be provided in the above roller brush installation cavity 450 and is configured along the length of the floor brush on another side of the floor brush channel 451. In some embodiments, the motor 4331 may be provided inside the roller brush 433, which may further optimize the size of the working portion 410 and enhance a compactness of the working portion 410.

[0262] In embodiments in which the motor 4331 is provided within the roller brush 433, a first brush support portion is fixed to one side of the bottom housing 4311 for fixing the motor 4331. In some embodiments, a support arm 4333 may be constructed as a first brush support portion that extends forward along the width direction of the floor brush. One end of the motor 4331 is fixed to the support arm 4333 by a coupling sleeve 4334, and another end of the motor 4331 is connected to a gearbox body 4332, which may act directly on the roller brush 433 to drive the roller brush to rotate.

[0263] Referring to FIG. 45 and FIG. 46, in some embodiments, the roller brush 433 may include a brush barrel 4335 and brush bristles 4336 fixed to the periphery of the brush barrel 4335. The brush barrel 4335 is internally fixed with a partition 4337 perpendicular to its lengthwise direction, a plurality of connecting grooves 43371 are uniformly provided on the partition 4337, and a plurality of connecting columns 43372 are provided on an output shaft of the gearbox body 4332 capable of being embedded in the connecting grooves 43371 through a corresponding manner. The output shaft of the gearbox body 4332 is provided with a plurality of connecting posts 43372 that may be correspondingly plugged in the connecting grooves 43371. When the motor 4331 is activated, the connecting posts 43372 may apply force to the connecting grooves 43371 to realize the driving of the roller brush to rotate.

[0264] In some embodiments, the connecting posts 43372 extend outwardly along the radial direction of the output shaft of the gearbox body, and a great count thereof may result in a good transmission stability of the roller brush 433 and the gearbox body 4332. As a preferred embodiment in this embodiment, the count of connecting posts 43372 and connecting grooves 43371 may both be three. It should be noted that the count of connecting posts 43372 and the connecting grooves 43371 are not limited to three, but may also be one, two, or more than three, and a specific count thereof may be adaptively adjusted according to the actual situation.

[0265] When the cleaning is finished, sometimes the roller brush 433 needs to be disassembled separately for cleaning. Since the motor 4331 and the gearbox body 4332 are provided inside the brush cylinder 4335, the roller brush 433 may only be pulled out relative to the bottom housing 4311 along its length. However, when the roller brush 433 is installed again, there is a problem that the connecting post 43372 and the connecting grooves 43371 are not easily aligned, thereby resulting in a poor user experience. To solve this problem, in some embodiments, the connecting post 43372 may be substantially cylindrical, while outer edges of the connecting grooves 43371 are molded with rounded corners or chamfered corners 43373 at the same time. Based on the above structure, the substantially cylindrical connecting post 43372 may be smoothly embedded with the connecting grooves 43371 along the rounded or chamfered

corners in the process of plugging the roller brush 433.

[0266] As shown in conjunction with FIG. 43 and FIG. 44, in some embodiments, the bottom housing 4311 is detachably configured with a second brush support portion on another side of the bottom housing 4311 away from the support arm 4333 for a rotational support and an end limitation of the brush 433. In some embodiments, a supporting assembly 470 may be used as the second roller brush support portion.

[0267] As shown in conjunction with FIG. 35, FIG. 48, and FIG. 49, in some embodiments, the supporting assembly 470 may include a cover plate member 471, and the cover plate member 471 may be fixed to the installation housing 431 by a magnetic attraction structure. Specifically, the cover plate member 471 is provided with a second iron body 4711 on the side facing the bottom housing 4311, and the bottom housing 4311 is provided with a side plate 43111, and the side plate 43111 is provided with a second magnet (not shown in the figure). Such that the connection structure of the supporting assembly 470 is hided, which facilitates a control of the maximum size of the working portion 410 along its length. In other embodiments, a magnetic fixation of the supporting assembly 470 may also be realized by arranging the second iron body 4711 and the second magnet or by arranging the two magnets.

[0268] By fixing the supporting assembly 470 according to the magnetic structure, the sizes of the cover plate member 471 and the bottom housing 4311 along the lengthwise direction are facilitated to be controlled, and a length percentage of the roller brush 400 in the working portion 410 is optimized In some embodiments, a ratio of the maximum size of the roller brush 400 along the lengthwise direction to the maximum size d1 of the working portion 410 along the lengthwise direction may be not less than 0.9. Accordingly, when a single push-pull cleaning is operated, the roller brush may scrub as much of the surface to be cleaned as possible, so that there is not much difference between a scrubbing length (the maximum size of the roller brush along the lengthwise direction) and the maximum size of the working portion along the lengthwise direction, which improves the cleaning effect and enhances the cleaning efficiency.

[0269] To strengthen the connection relationship between the cover plate member 471 and the side plate 43111 and prevent the supporting assembly 470 from rotating relative to the side plate 43111, a portion of the cover plate member 471 may be embedded in the side plate 43111. In addition, to ensure that the cover body plate member 471 is installed in place, the side of the cover body plate member 471 facing the bottom housing 4311 is provided with a limiting groove 4712, and the side plate 43111 is provided with a limiting block 4713 that may be matched and plugged with the limiting groove 4712.

[0270] In some embodiments, as shown in FIG. 48, a support sleeve 472 is fixed to the side of the cover plate member 471 facing the bottom housing 4311, a first bearing member 473 is installed inside the support sleeve 472 through a clamping spring 4731. A connecting rod 474 is fixedly plugged in an inner ring of the first bearing member 473, and another end of the connecting rod 474 is interference plugged in the rotating sleeve 475.

[0271] In some embodiments, as shown in conjunction with FIG. 45 and FIG. 47, additionally, the connecting sleeve 4334 is fitted with a second bearing member 476, and in the state of use, the brush barrel 4335 is disposed on the rotating sleeve 475 and the second bearing member 476. The rotating sleeve 475 and second bearing member 476 respectively support the right side and the left side of the roller brush 433. Under the action of the two bearing members (the first bearing member 473 and the second bearing member 476), a rotational resistance of the roller brush 433 is reduced.

[0272] As shown in combination with FIG. 48 and FIG. 49, to prevent friction caused by inconsistent rotational speeds of the roller brush 433 and the rotating sleeve 475. In some embodiments, the rotating sleeve 475 may be provided with a flange 4751, a plurality of notches 4750 are provided on a flange 4751, and correspondingly, the brush barrel 4335 is constructed with a plurality of plugging blocks 43351. In the state of use, the plugging blocks 43351 may be correspondingly plugged in the notches 4750, thereby ensuring complete synchronization of the pacing of the roller brush 433 and the rotating sleeve 475 during circumferential rotation. In some embodiments, a size of the flange 4751 along its length may be not less than a thickness of the brush cylinder 4335, which is equivalent to block one end of the brush cylinder 4335 by the rotating sleeve 475 and blocking garbage from entering the brush cylinder 4335. The rotating sleeve 475 is provided with an annular groove along its circumferential direction, and a sealing ring 477 is configured in the annular groove and abuts an inner wall of the brush cylinder 4335, which further strengthens a blocking effect on the garbage.

[0273] In some embodiments, as shown in FIG. 48, a concave portion 4714 is provided on the side of the cover plate member 471 that is back to the bottom housing 4311, and a pulling block 4715 is installed in the concave portion 4714, so that a user may hand-pinch the pulling block 4715 to disassemble and assemble the supporting assembly 470. In some embodiments, the pulling block 4715 is fully disposed within the concave portion 4714, so that the pulling block 4715 does not protrude out of the plane of the dorsal side of the cover plate member 471, thereby not affecting the maximum size of the work section 410 along its length and not easily bumping into the obstacles.

[0274] In some embodiments, the pulling block 4715 and the support sleeve 472 may be connected together by bolts, screws, and the like, which facilitates the design for detachment and facilitates subsequent cleaning and maintenance of the components. In some embodiments, the cover plate member 471 may be provided with a limiting sleeve 4716, and the support sleeve 472 is interfer-

ence plugged in the limiting sleeve 4716. Accordingly, the installation stability of the support sleeve 472 may be improved to prevent the support sleeve 472 from shaking relative to the cover body plate member 471, thereby ensuring a rotational dynamic balance performance of the roller brush 433.

[0275] Since the rotating sleeve 475 is capable of rotating relative to the cover plate member 471, a gap needs to be configured between the rotating sleeve 475 and the cover plate member 471. A filamentous material such as hair and silk floss may enter the rotating sleeve 475 through the above gap during the cleaning process. To prevent the filamentous material from being entangled on rotating members (such as the first bearing member 473, the connecting rod 474, etc.). In some embodiments, the support sleeve 472 is provided with a flaring portion 4721 on the side facing the rotating sleeve 475, and the flaring portion 4721 encircles the rotating members (such as the first bearing member 473, the connecting rod 474, etc.), such that the channel between the rotating members and the external environment become twists and turns, thereby preventing the above filamentous material from contacting with the rotating members. At the same time, the flare portion 4721 does not hinder rotations of these rotating members. In a specific embodiment, along the height direction m (illustrated in FIG. 38) of the roller brush 433, a minimum distance between the flaring portion 4721 and the rotating sleeve 475 is not greater than 1.5 mm. Along the lengthwise direction n (illustrated in FIG. 38) of the roller brush 433, a minimum distance between the flaring portion 4721 and the rotating sleeve 475 is not greater than 1.5 mm. In this case, such a small distance further makes the filamentous material impossible to reach the rotating members. In this case, the support sleeve 472 and the rotating sleeve 475 are substantially coaxially disposed, so that the two minimum distances described above are respectively the minimum distances between the outer edge of the flaring portion 4721 and one inner wall of the rotating sleeve 475, and the minimum distance between the right end of the flaring portion 4721 and the other inner wall of the rotating sleeve 475,

[0276] Having thus described the basic concepts, it may be rather apparent to those skilled in the art after reading this detailed disclosure that the foregoing detailed disclosure is intended to be presented by way of example only and is not limiting. Various alterations, improvements, and modifications may occur and are intended to those skilled in the art, though not expressly stated herein. These alterations, improvements, and modifications are intended to be suggested by this disclosure, and are within the spirit and scope of the exemplary embodiments of this disclosure.

[0277] Moreover, certain terminology has been used to describe embodiments of the present disclosure. For example, the terms "one embodiment," "an embodiment," and/or "some embodiments" mean that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment of the present disclosure. Therefore, it is emphasized and should be appreciated that two or more references to "an embodiment" or "one embodiment" or "an alternative embodiment" in various portions of this specification are not necessarily all referring to the same embodiment. Furthermore, the particular features, structures, or characteristics may be combined as suitable in one or more embodiments of the present disclosure.

[0278] Similarly, it should be appreciated that in the foregoing description of embodiments of the present disclosure, various features are sometimes grouped together in a single embodiment, figure, or description thereof for the purpose of streamlining the disclosure aiding in the understanding of one or more of the various embodiments. This method of disclosure, however, is not to be interpreted as reflecting an intention that the claimed subject matter requires more features than are expressly recited in each claim. Rather, claimed subject matter may lie in less than all features of a single foregoing disclosed embodiment.

[0279] In some embodiments, the numbers expressing quantities or properties used to describe and claim certain embodiments of the application are to be understood as being modified in some instances by the term "about," "approximate," or "substantially." For example, "about," "approximate," or "substantially" may indicate ±20% variation of the value it describes, unless otherwise stated. Accordingly, in some embodiments, the numerical parameters set forth in the written description and attached claims are approximations that may vary depending upon the desired properties sought to be obtained by a particular embodiment. In some embodiments, the numerical parameters should be construed in light of the count of reported significant digits and by applying ordinary rounding techniques. Notwithstanding that the numerical ranges and parameters setting forth the broad scope of some embodiments of the application are approximations, the numerical values set forth in the specific examples are reported as precisely as practicable.

[0280] In closing, it is to be understood that the embodiments of the application disclosed herein are illustrative of the principles of the embodiments of the application. Other modifications that may be employed may be within the scope of the application. Therefore, by way of example, but not of limitation, alternative configurations of the embodiments of the application may be utilized in accordance with the teachings herein. Accordingly, embodiments of the present application are not limited to that precisely as shown and described.

Claims

1. A cleaning device, comprising a device body and a floor brush, wherein

   the floor brush is connected to one end of the

device body;
the device body is provided with a sewage storage box;
a box body of the sewage storage box is configured to at least store and/or filter garbage suctioned by the floor brush.

2. The cleaning device of claim 1, wherein

the floor brush is rotatably connected to the one end of the device body;
the device body includes a first channel; and
the sewage storage box is connected to the floor brush through the first channel.

3. The cleaning device of claim 2, wherein the box body of the sewage storage box is provided with a second channel, and the second channel is connected to the first channel.

4. The cleaning device of claim 3, wherein

a partition plate is provided in the box body,
the partition plate divides an internal space of the box body into an upper space and a lower space;
the second channel extends from the lower space through the partition plate to the upper space;
the partition plate is provided with a first hole group and an anti-backflow structure;
the anti-backflow structure is configured to allow sewage in the upper space to flow into the lower space through the first hole group and is configured to prevent sewage in the lower space from flowing into the upper space through the anti-backflow structure.

5. The cleaning device of claim 4, wherein a first portion of an edge of the partition plate is in sealing contact with a sidewall of the box body.

6. The cleaning device of claim 4 or claim 5, wherein

the anti-backflow structure includes a backflow prevention valve installed on the partition plate corresponding to the first hole group;
the backflow prevention valve is in the lower space; and
the backflow prevention valve communicates with the upper space through the first hole group.

7. The cleaning device of any one of claims 4-6, wherein the partition plate includes a cambered plate.

8. The cleaning device of any one of claims 4-7, wherein the partition plate is further provided with a fitting hole, and the second channel passes through the fitting hole.

9. The cleaning device of claim 8, wherein a side of the fitting hole is provided with an annular baffle, and the annular baffle extends towards the upper space.

10. The cleaning device of any one of claims 4-9, wherein a circumference of the partition plate is provided with a baffle wall, and the baffle wall at least extends into the upper space.

11. The cleaning device of any one of claims 4-10, wherein the partition plate is provided with a handle, and the handle is disposed in the upper space.

12. The cleaning device of any one of claims 4-11, wherein

the one end of the box body has an opening,
the opening is provided with a cover body,
an adapter tube is provided in the box body,
one end of the adapter tube abuts the cover body,
another end of the adapter tube is connected to one end of the second channel, and
a sidewall of the adapter tube is provided with an outlet.

13. The cleaning device of claim 12, wherein

the cover body is provided with a gas outflow channel,
an inlet of the gas outflow channel is connected to the upper space, and
the inlet of the gas outflow channel is arranged in a different direction from the outlet of the adapter tube.

14. The cleaning device of claim 13, wherein an outlet of the gas outflow channel is provided with a filter member, the filter member is configured to filter out solid substances and/or liquid substances entrained in gas.

15. The cleaning device of claim 13 or claim 14, wherein the gas outflow channel is provided with a cyclone separation structure, and the cyclone separation structure is configured to filter out solid substances and/or liquid substances entrained in gas.

16. The cleaning device of any one of claims 13-15, wherein

a bottom surface of the box body is provided with a sewage inlet;
the cover body includes a main body;
the sewage inlet extends upward to form a sewage pipe,

an upper portion of the sewage pipe forms a sewage outlet;
the main body of the cover body is provided with an air inlet,
the air inlet communicates with a cyclone filter assembly; and
a fluid entering from the sewage pipe is separated into mixed gas and mixed liquid at a sewage outlet, and
the mixed gas enters the cyclone filter assembly through the air inlet for cyclone dust-gas separation.

17. The cleaning device of claim 16, wherein the main body is provided with an accommodating cavity, an upper end of the main body is provided with a plug-in port connected to the accommodating cavity, and the cyclone filter assembly is placed into the accommodating cavity through the plug-in port and is detachably connected to the main body.

18. The cleaning device of claim 17, wherein

the cover body further includes a baffle formed by the main body extending downwardly,
the baffle encloses a periphery of the sewage outlet,
a channel for passing the mixed gas is formed between the baffle and the bottom surface, and
the sewage outlet and the air inlet are located on two sides of the baffle.

19. The cleaning device of claim 18, wherein the sewage pipe includes:

a pipe body, the pipe body being formed by the sewage inlet extending upwardly; and
an adapter tube including a first pipeline, a transition pipe and a second pipeline connected in sequence, wherein the first pipeline is coaxially and detachably connected to the pipe body, the first pipeline is perpendicular to the second pipeline, and the sewage outlet is disposed on the second pipeline.

20. The cleaning device of claim 19, wherein a path that the mixed gas passes through before entering into the cyclone filter assembly is at least 2XL1 + L2, wherein L1 denotes a distance between a centerline of the second pipeline and the air inlet along a vertical direction, and L2 denotes distance between the centerline of the second pipeline and the baffle along the vertical direction.

21. The cleaning device of claim 19 or claim 20, wherein a ratio of the distance L1 between the centerline of the second pipeline and the air inlet along the vertical direction to the distance L2 between the centerline of the second pipeline and the baffle along the vertical direction is within 0.9-3.

22. The cleaning device of any one of claims 17-21, wherein the cyclone filter assembly includes:

a communicating tube, wherein an upper end of the communicating tube is an air outlet; and
a first clamping section disposed on the periphery of the communicating tube, wherein

the periphery of the first clamping section is connected to a sidewall of the accommodating cavity,
the first clamping section includes a spiral bottom plate,
the spiral bottom plate is helically surrounded by the periphery of the communicating tube,
the spiral bottom plate, the communicating tube, and the main body jointly form a cyclone channel,
the air inlet communicates with the cyclone channel, and
the mixed gas passes through the air inlet, the cyclone channel, and the communicating tube in order to achieve the cyclone dust-gas separation.

23. The cleaning device of claim 22, wherein

an outer contour of a cross-section of the first clamping section gradually decreases from top to bottom,
the accommodating cavity includes a first cavity and a second cavity arranged from top to bottom and connected,
a size and a shape of the first cavity matches the first clamping section, and
a cross-sectional area of the second cavity is less than a minimum cross-sectional area of the first cavity.

24. The cleaning device of any one of claims 17-23, wherein the cyclone filter assembly includes:

a cyclone filtering mechanism, wherein the cyclone filtering mechanism is disposed within the accommodating cavity; and
a soft rubber, wherein the soft rubber is connected to the cyclone filter mechanism and at least a portion of the soft rubber protrudes circumferentially from a periphery of the cyclone filter mechanism, and the soft rubber protrudes from the periphery of the cyclone filter mechanism abuts the upper end of the main body.

25. The cleaning device of claim 24, wherein the cover

body further includes an upper cover, the upper cover covers an upper end of the cover body, the upper cover includes a first upper end surface, an included angle between the first upper end surface and a horizontal plane is a first preset included angle;

the soft rubber includes a second upper end surface and a connecting portion, the second upper end surface is disposed at an upper end of the cyclone filtering mechanism, the connecting portion is fixed to the cyclone filtering mechanism and protrudes out of a periphery of the cyclone filtering mechanism, and an included angle between the bottom surface of the connecting portion and the horizontal plane is a second preset included angle; and
the included angle between the upper end of the cover body and the horizontal plane is a third preset included angle, and when the upper end of the cover body abuts against the bottom surface of the connecting portion, the first upper end surface is in a same plane as the second upper end surface.

26. The cleaning device of any one of claims 6-25, wherein the backflow prevention valve includes a flexible valve body, a size of a cross-section of an outlet of the valve body along a second direction is greater than that along a third direction, and the second direction is perpendicular to the third direction.

27. The cleaning device of any one of claims 6-26, wherein the backflow prevention valve includes an elastic valve piece provided on a lower surface of the partition plate.

28. The cleaning device of any one of claims 4-27, wherein the partition plate is further provided with a second hole group, and gas in the lower space flows into the upper space through the second hole group.

29. The cleaning device of claim 28, wherein the first hole group and/or the second hole group are offset from a lowest point of the partition plate.

30. The cleaning device of any one of claims 13-25, wherein the cover body is provided with a water level probe group, and the water level probe group is configured to monitor a level of sewage in the box body.

31. The cleaning device of claim 30, wherein the water level probe group includes a first probe group and a second probe group, the first probe group and the second probe group extend towards the lower space, the second probe group extends into the upper space and is disposed above the first hole group, and a length of the first probe group is greater than a length of the second probe group.

32. The cleaning device of claim 31, wherein the first probe group extends into the lower space.

33. The cleaning device of any one of claims 13-25 and 30-32, wherein the cover body is further provided with two flow baffles, the two flow baffles extend into the upper space, the two flow baffles are arranged at interval along the periphery of the cover body, at least a portion of a region of a side edge of each of the two flow baffles are arranged at interval from the sidewall of the box body, and an outlet of the second channel is disposed between the two flow baffles.

34. The cleaning device of claim 33, wherein the cover body is further provided with a backing plate, the backing plate is disposed between the inlet of the gas outflow channel and the adapter tube, and the backing plate is connected between two flow baffles.

35. The cleaning device of claim 34, wherein a size of the backing plate along a length of the device body is less than a size of each of the two flow baffles along the length of the device body.

36. The cleaning device of any one of claims 1-35, wherein the floor brush is provided with a detachable cleaning fluid box.

37. The cleaning device of any one of claims 1-36, wherein the device body includes a sewage storage box supporting seat, and the sewage storage box is provided on the device body through the sewage storage box supporting seat.

38. The cleaning device of claim 37, wherein the sewage storage box supporting seat includes a groove, and at least a portion of the sewage storage box is accommodated within the groove.

39. The cleaning device of any one of claims 1-38, wherein

the cleaning device further includes a handheld vacuum cleaner,
the handheld vacuum cleaner is detachably installed at another end of the device body,
one end of the handheld vacuum cleaner away from the device body is provided with a handle, and
a battery is accommodated inside the handle.

40. The cleaning device of claim 39, wherein

the handheld vacuum cleaner further includes a dust canister assembly and a motor,
the dust canister assembly, the motor, and the handle are disposed in sequence along a first direction of the handheld vacuum cleaner, and

widths each of which being a distance from the dust canister assembly to a position of a plurality of positions on the handheld vacuum cleaner along the first direction are substantially the same.

41. The cleaning device of claim 39 or claim 40, wherein

the handheld vacuum cleaner includes an attachment member,
the attachment member is detachably connected to the handheld vacuum cleaner, and
the attachment member includes at least one of a de-mite brush, a flat brush, a bristle brush, a pet brush, or a water hose.

42. The cleaning device of any one of claims 39-41, wherein a shape of a combination of the device body and a sewage storage box is a column.

43. The cleaning device of claim 42, wherein areas of first cross-sections each of which corresponding to various positions of a main body portion of the combination along a lengthwise direction of the device body are substantially the same, and the first cross-section are cross-sections of the main body portion of the combination perpendicular to the lengthwise direction of the device body.

44. The cleaning device of claim 43, wherein areas of second cross-sections each of which corresponding to various positions of the main body portion of the handheld vacuum cleaner along the lengthwise direction of the device body are substantially the same, and the second cross-sections are cross-sections of the main body portion of the handheld vacuum cleaner perpendicular to the lengthwise direction of the device body.

45. The cleaning device of claim 44, wherein an area of a first cross-section and an area of a second cross-section are substantially the same.

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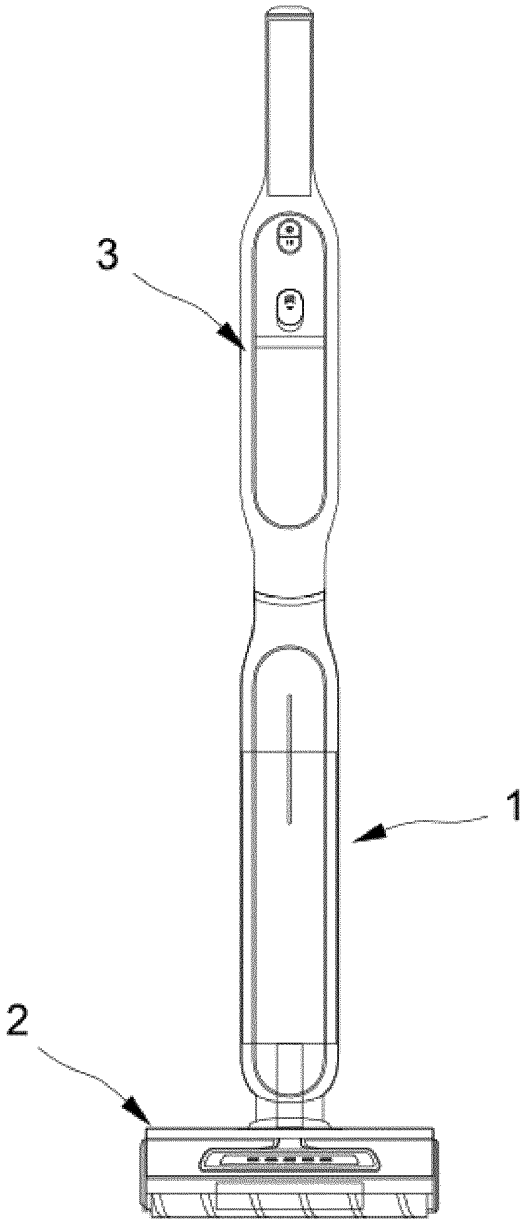

FIG. 1

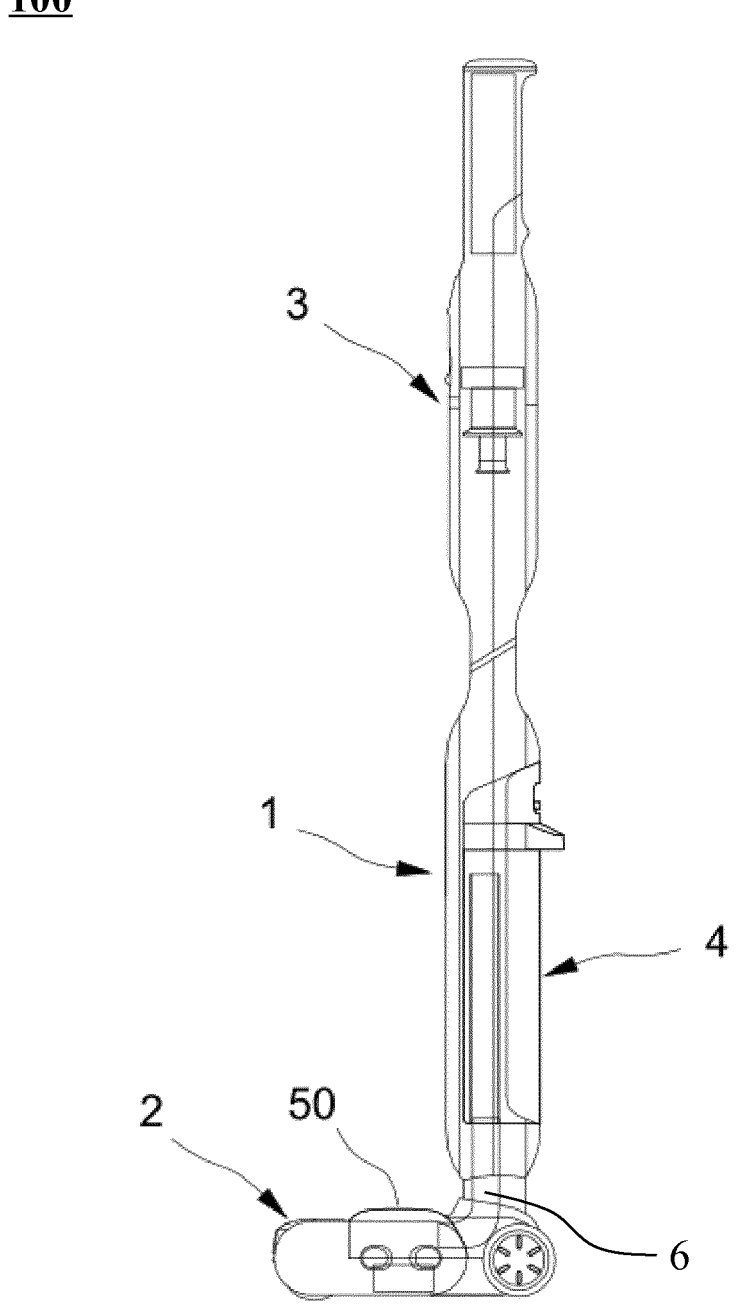

FIG. 2

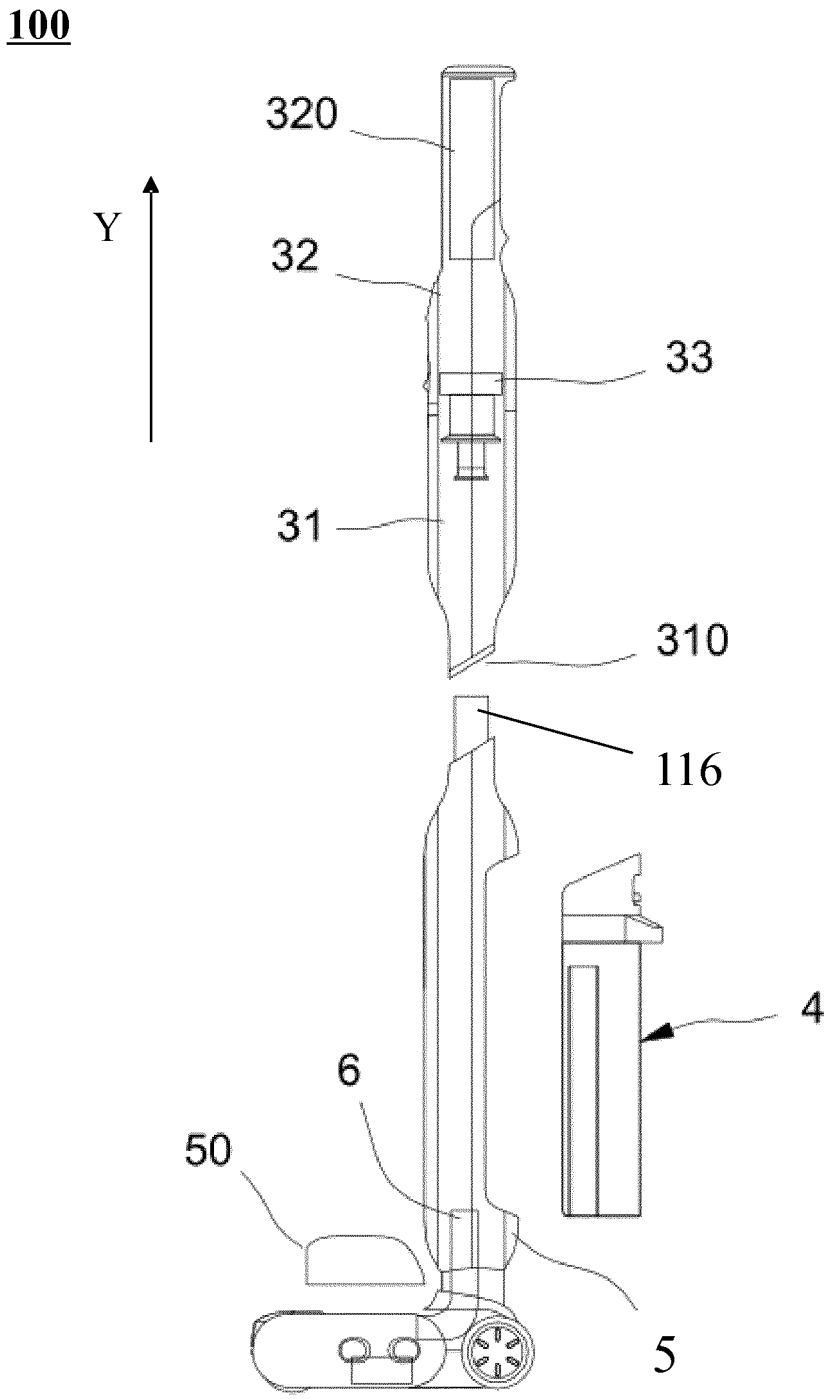

FIG. 3

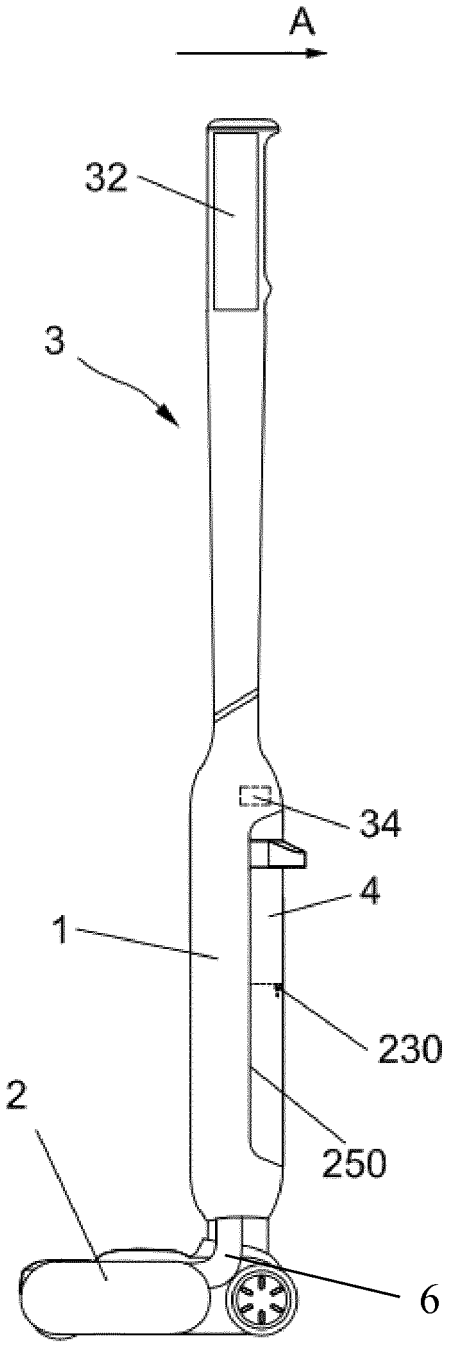

FIG. 4

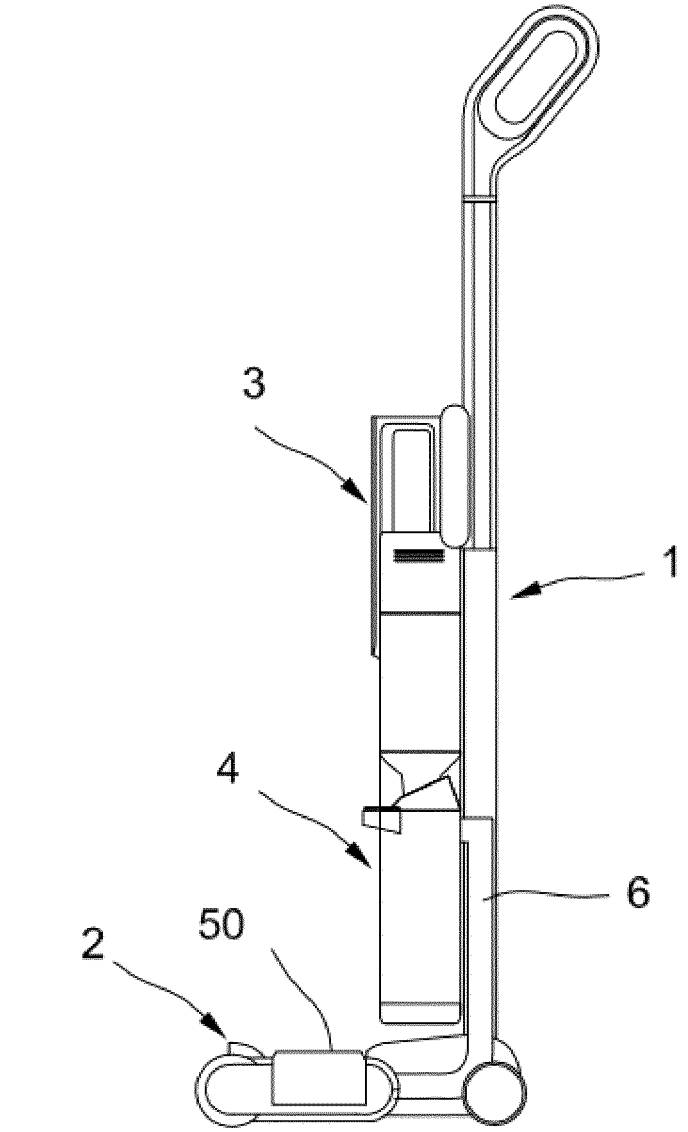

FIG. 5

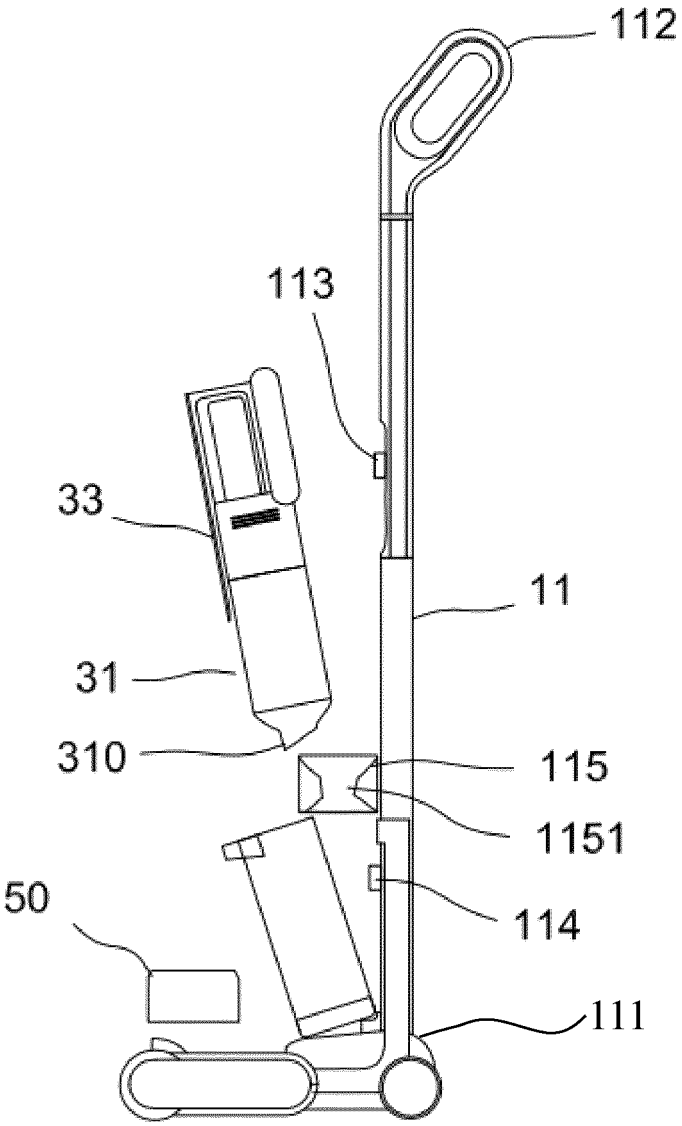

FIG. 6

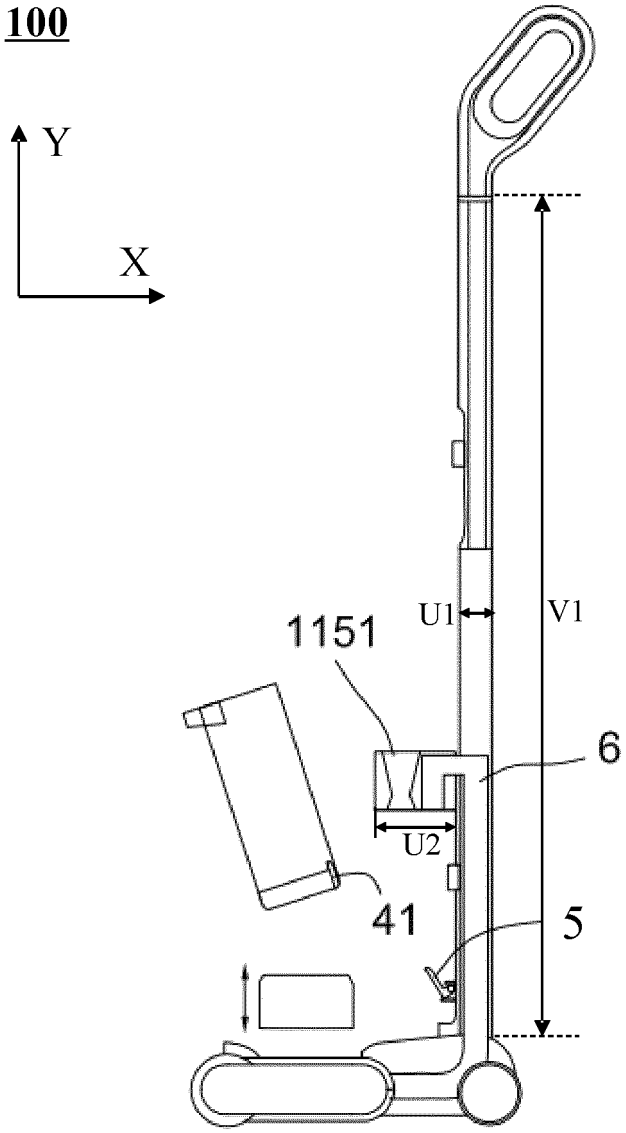

FIG. 7

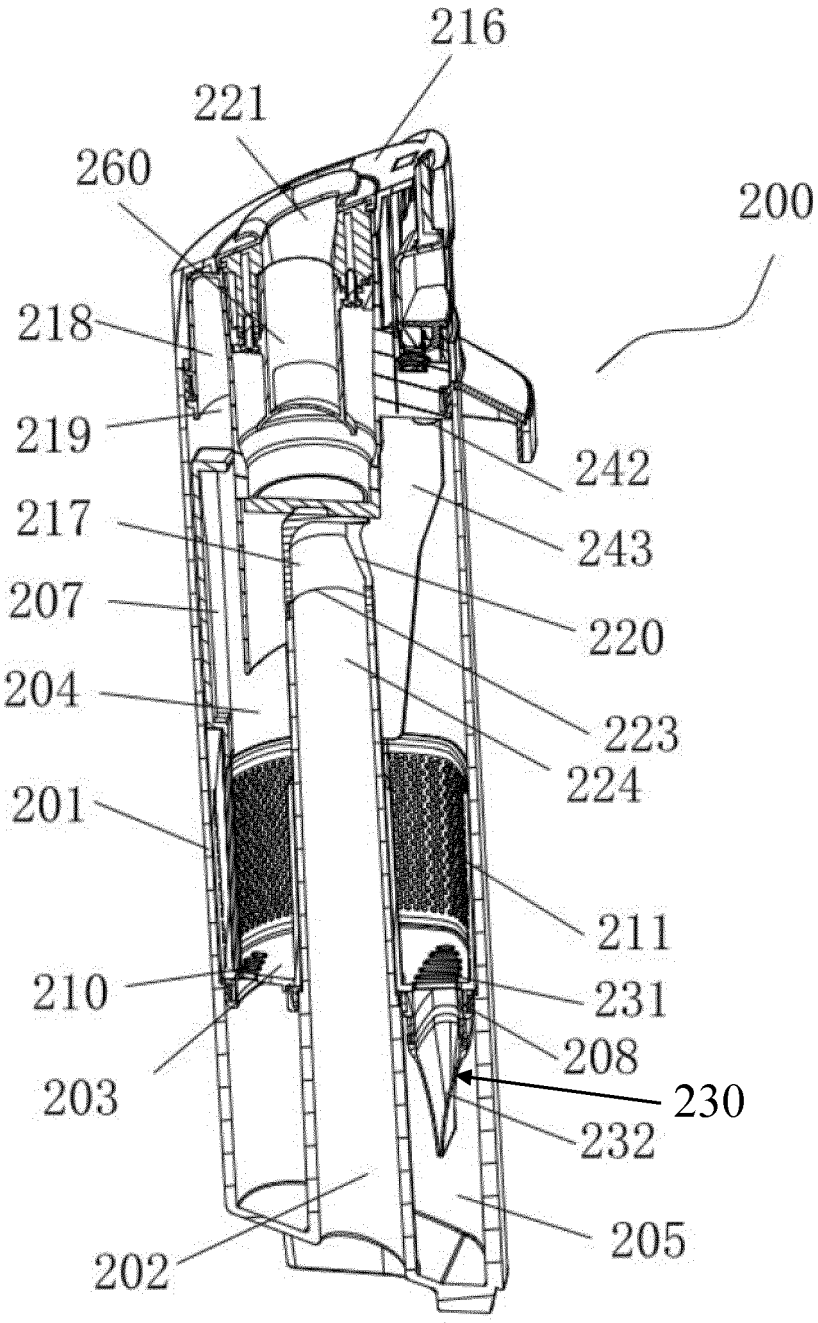
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FIG. 8

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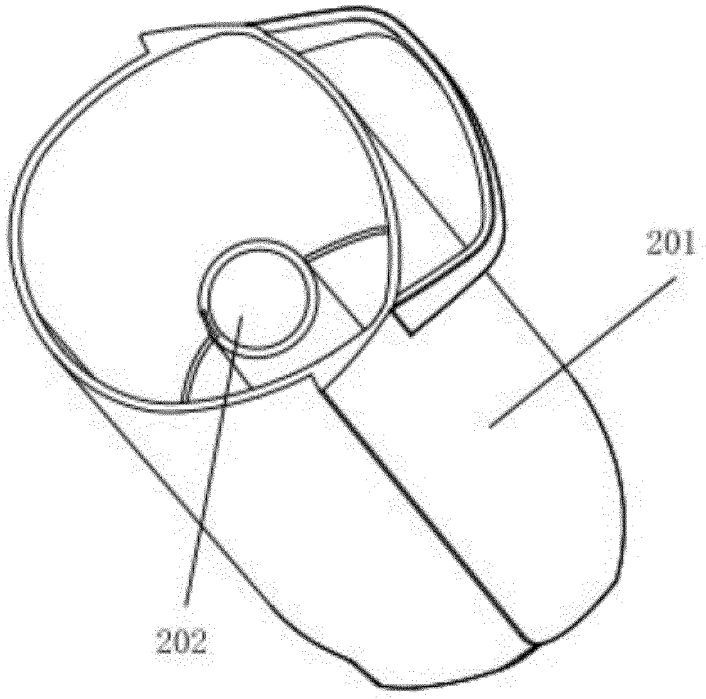

FIG. 9

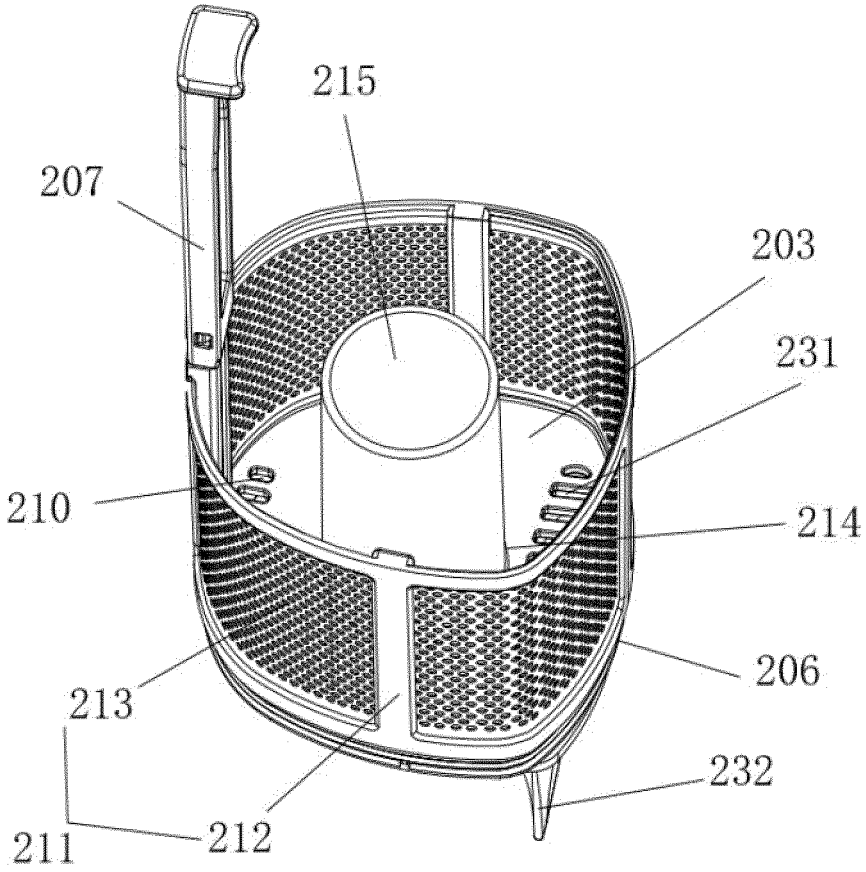

FIG. 10

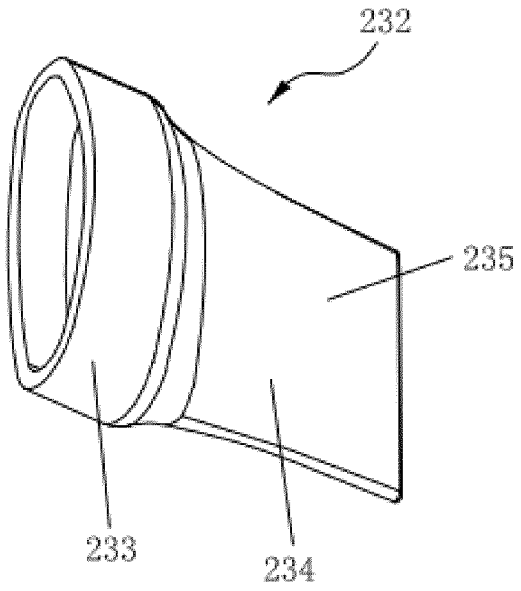

FIG. 11

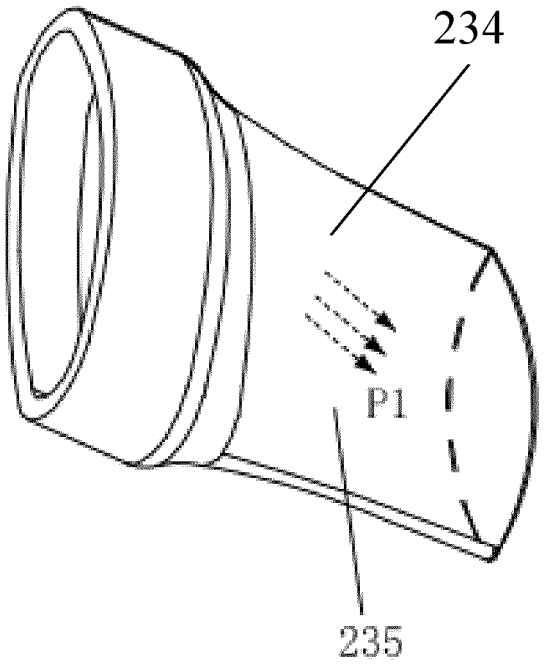

FIG. 12

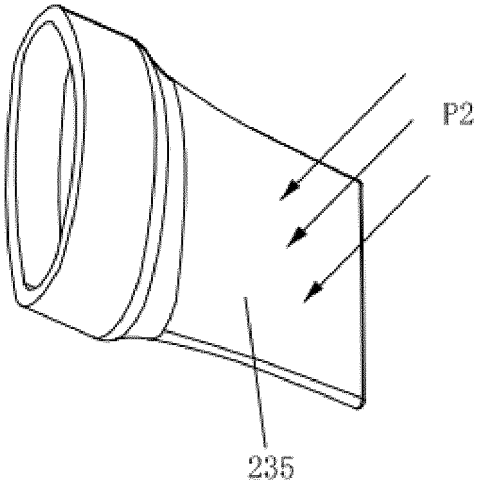

FIG. 13

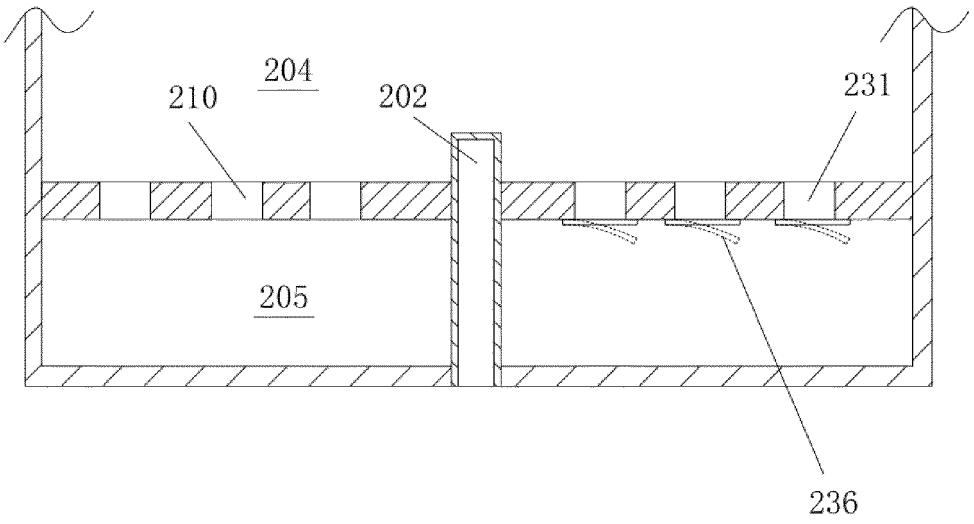

FIG. 14

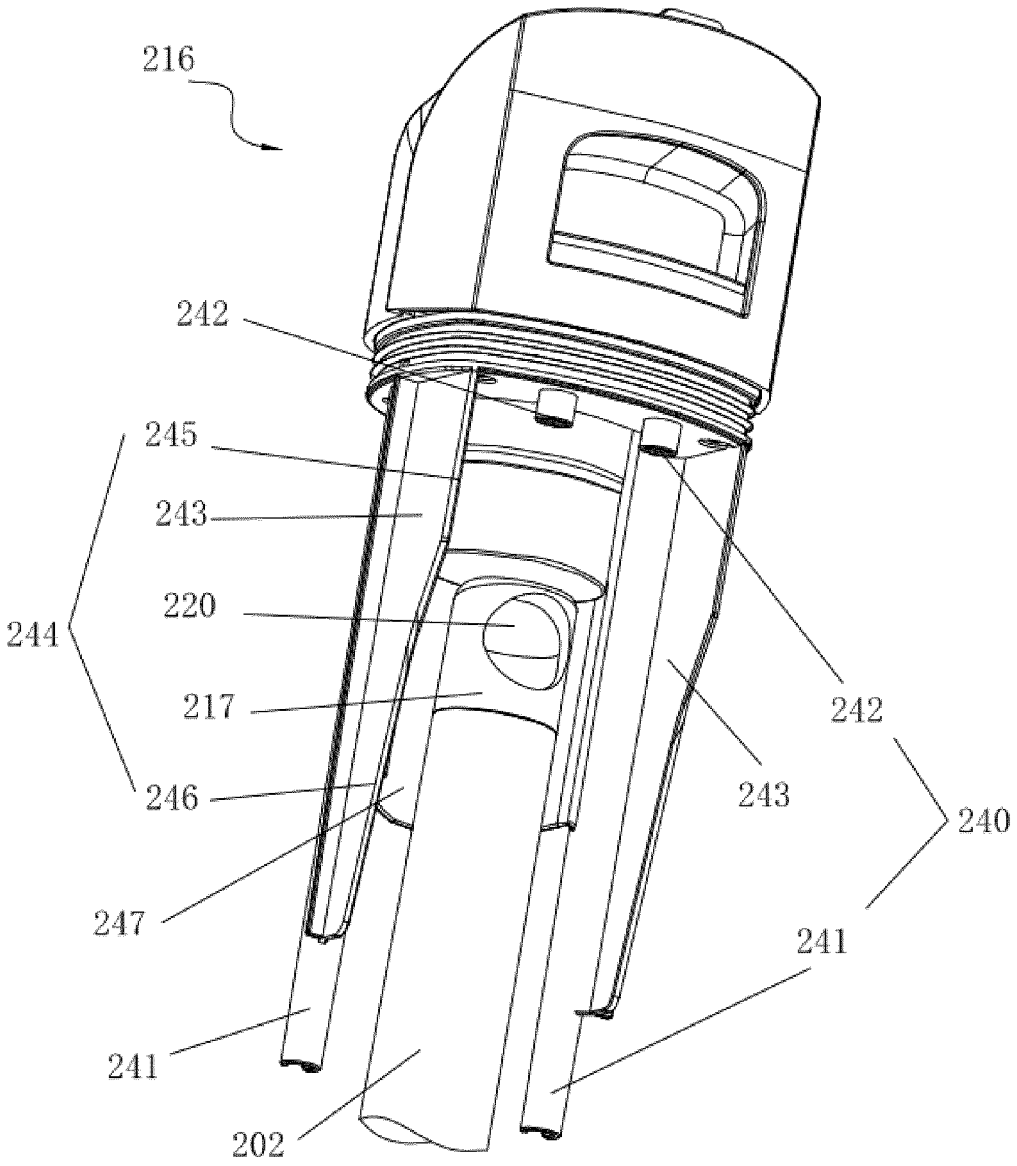

FIG. 15

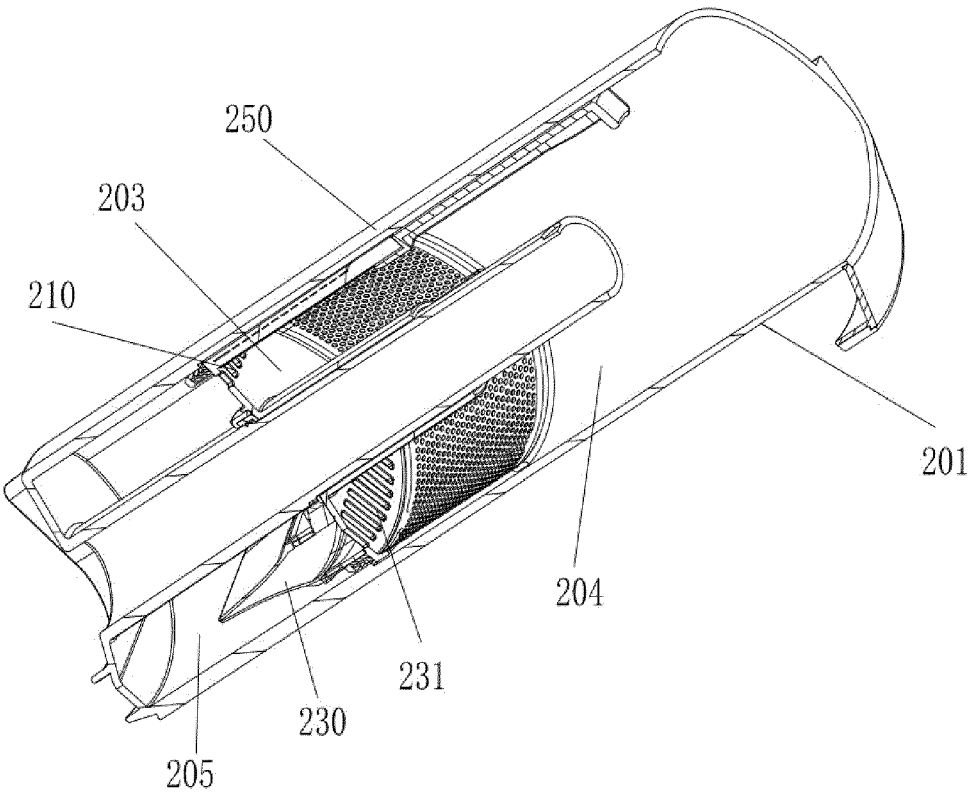

FIG. 16

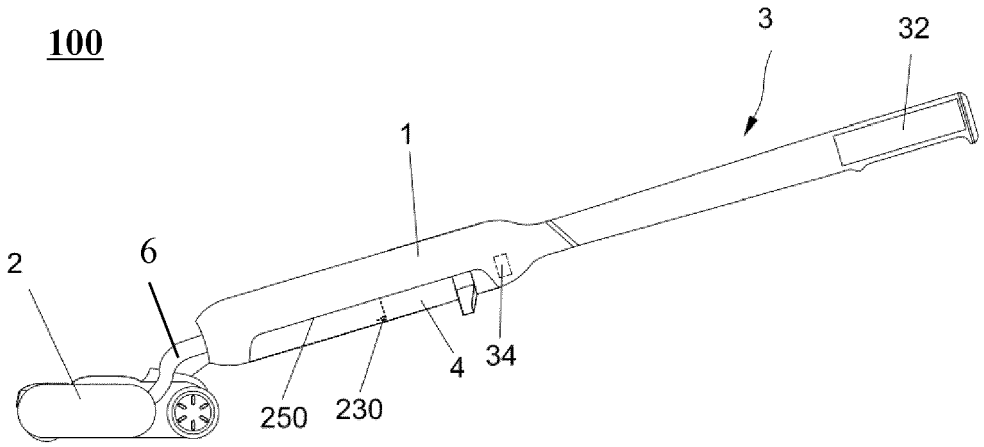

FIG. 17

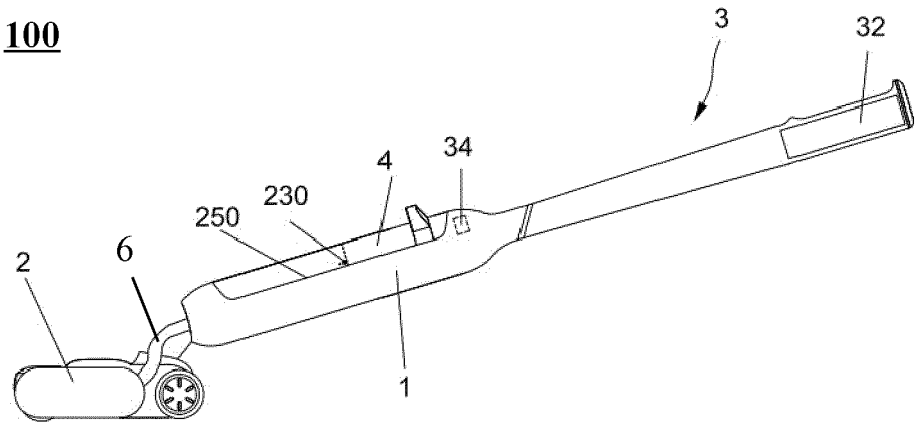

FIG. 18

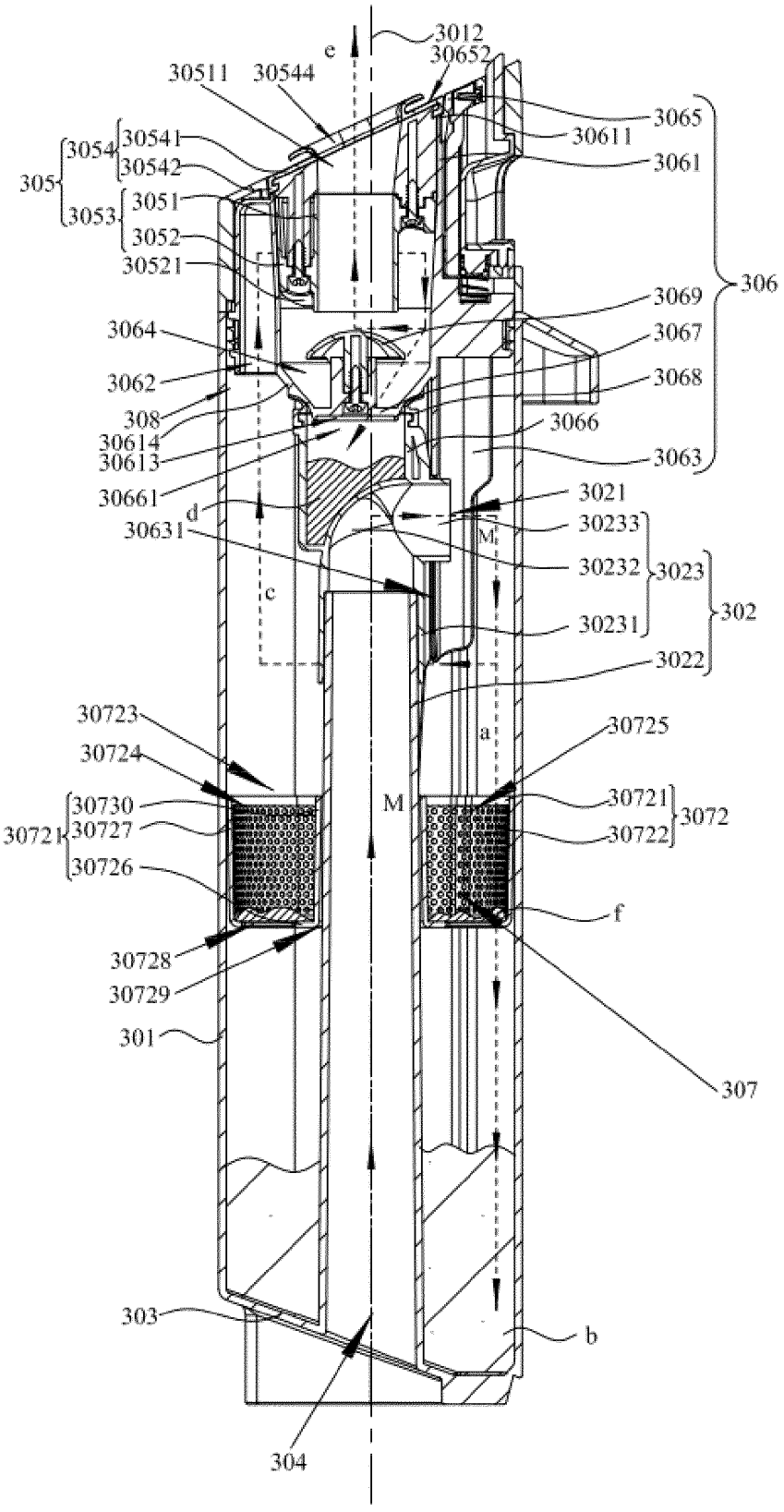
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FIG. 19

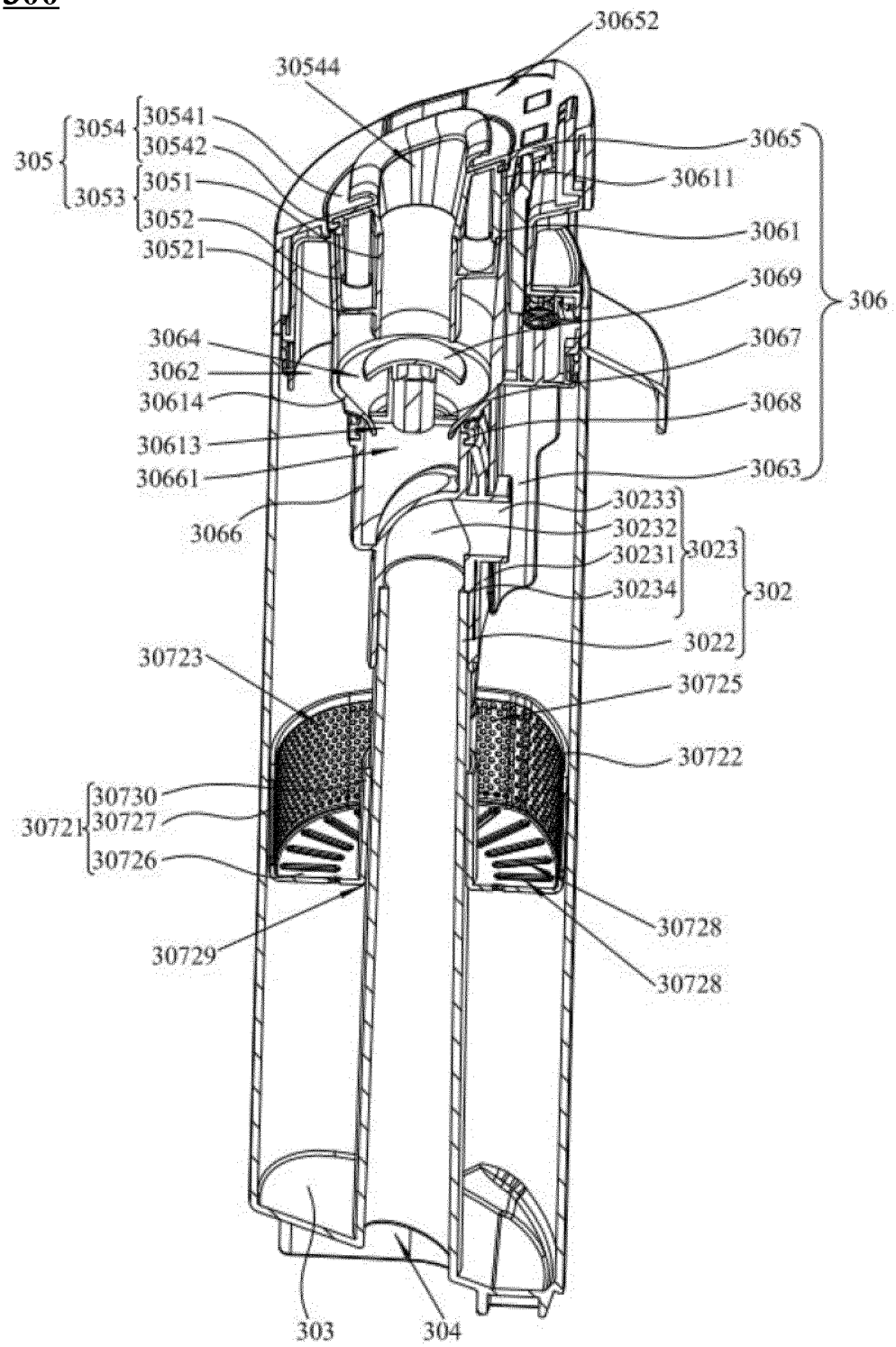
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FIG. 20

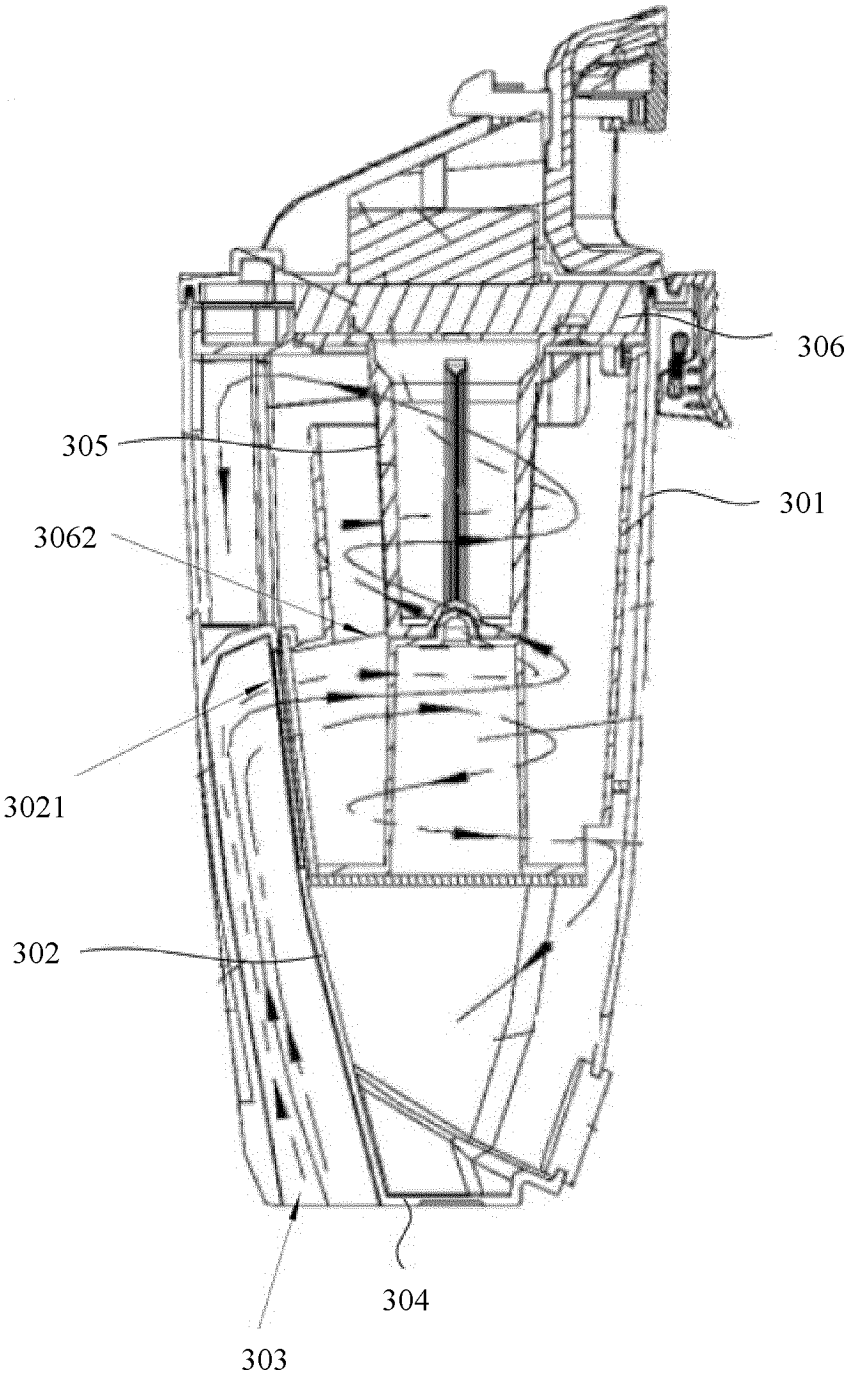
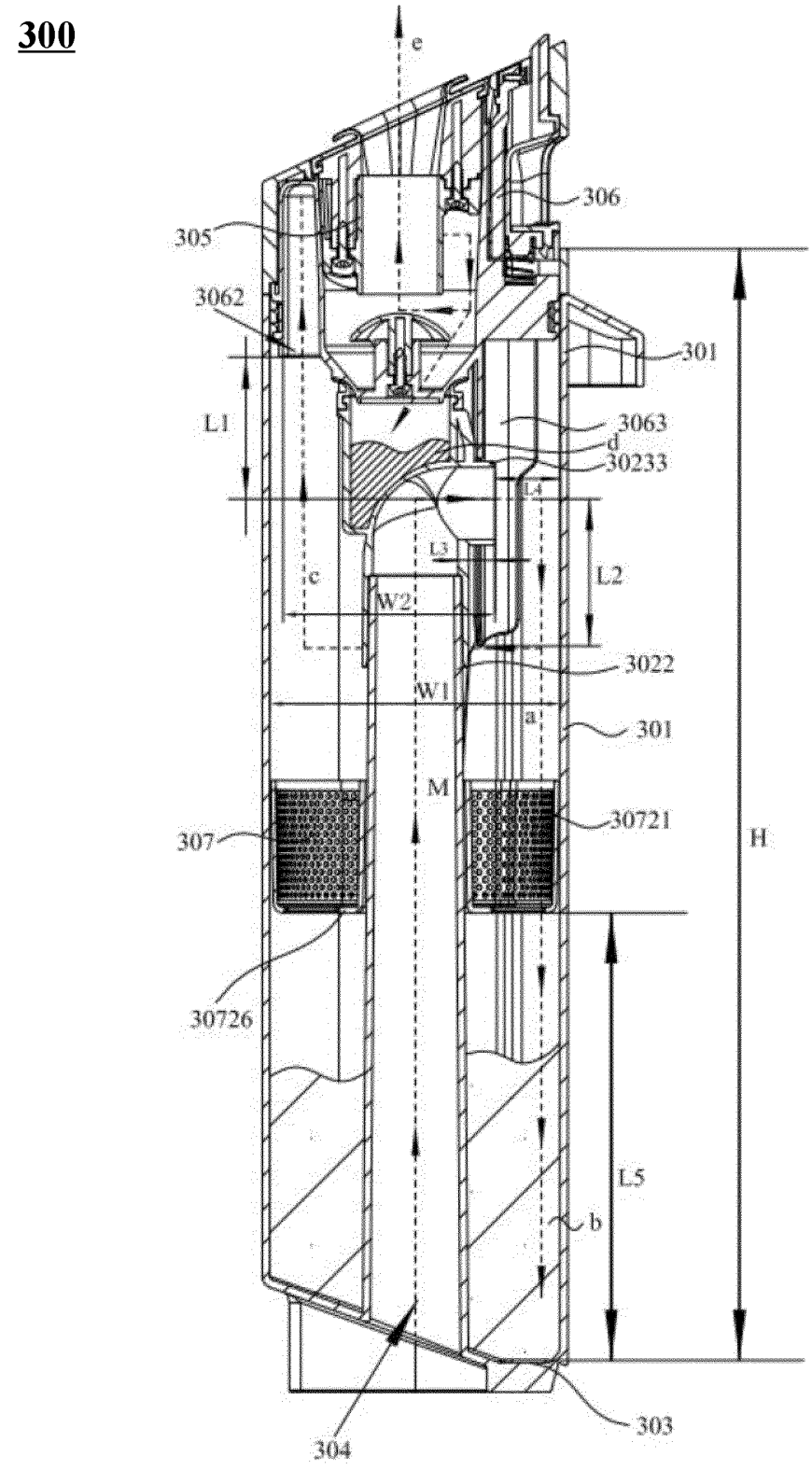


FIG. 21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30726
L5
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FIG. 22

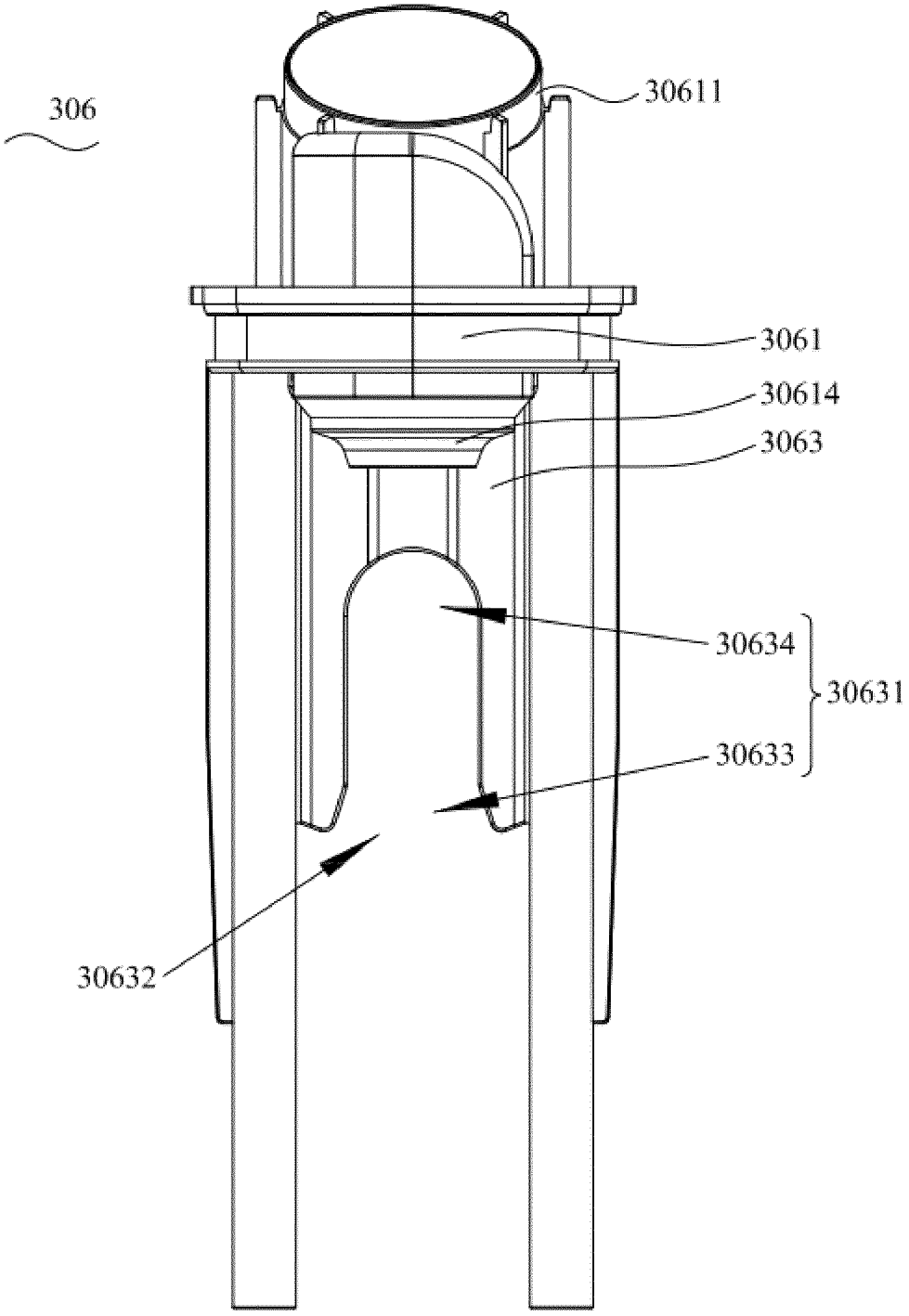

FIG. 23

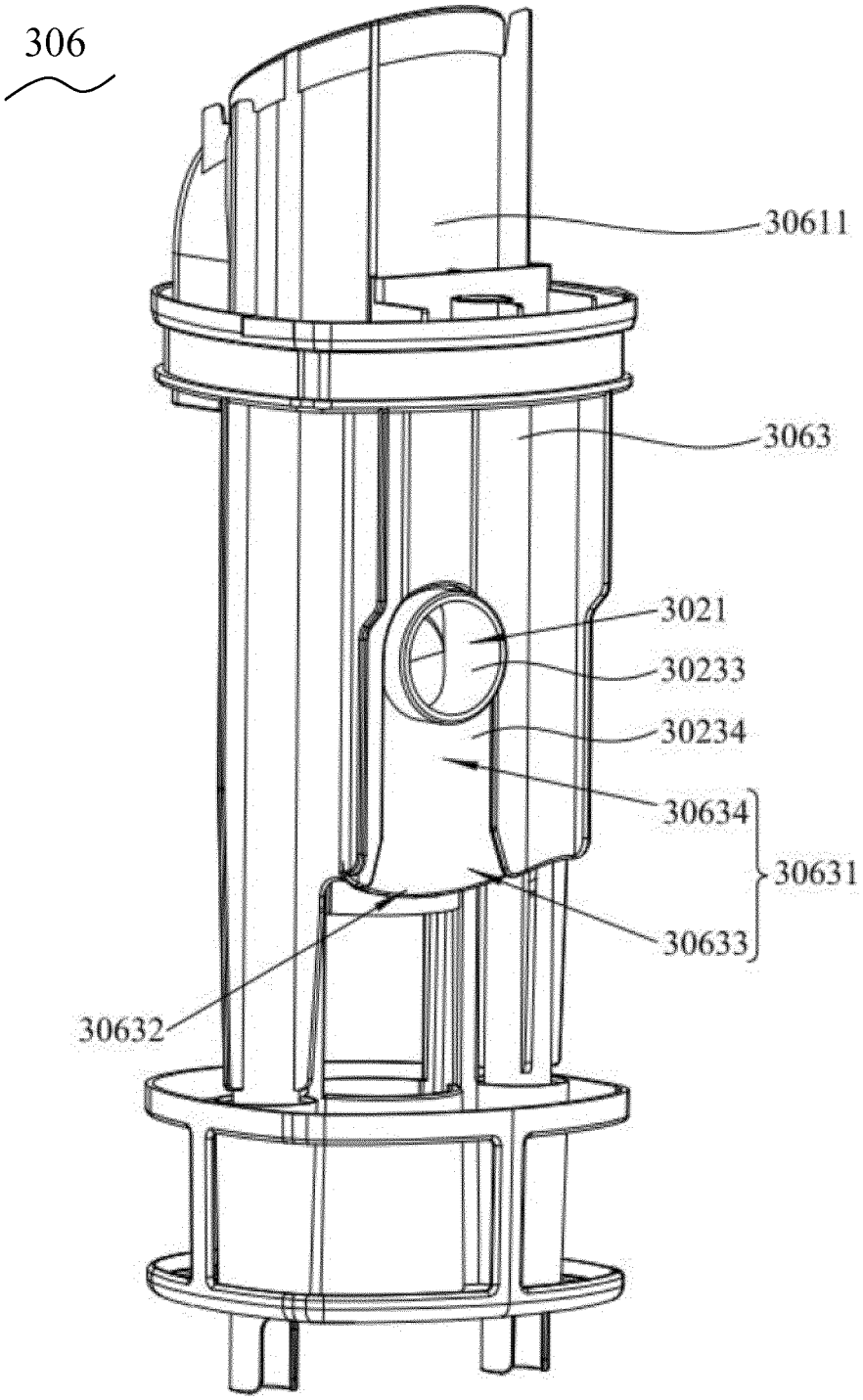

FIG. 24

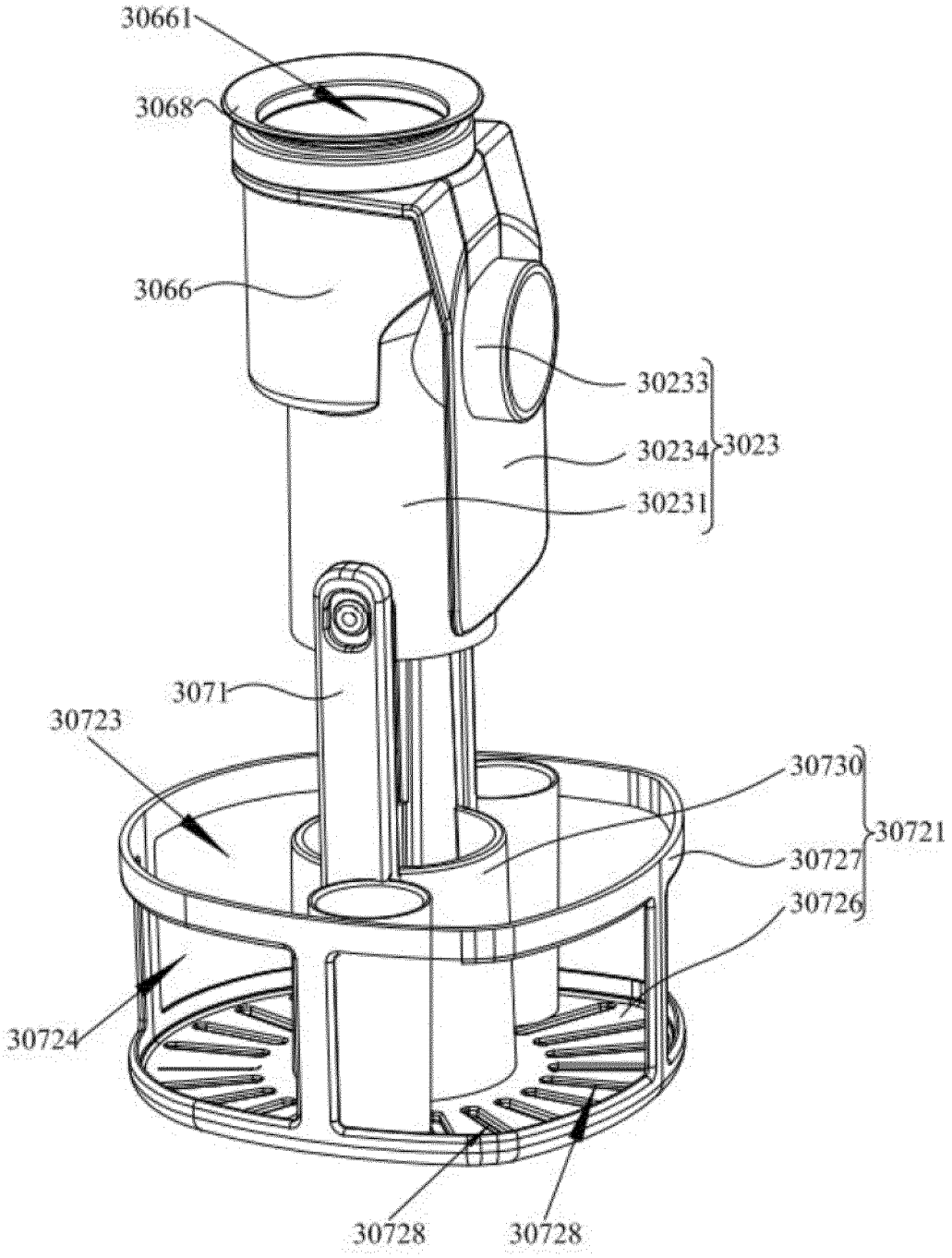
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FIG. 25

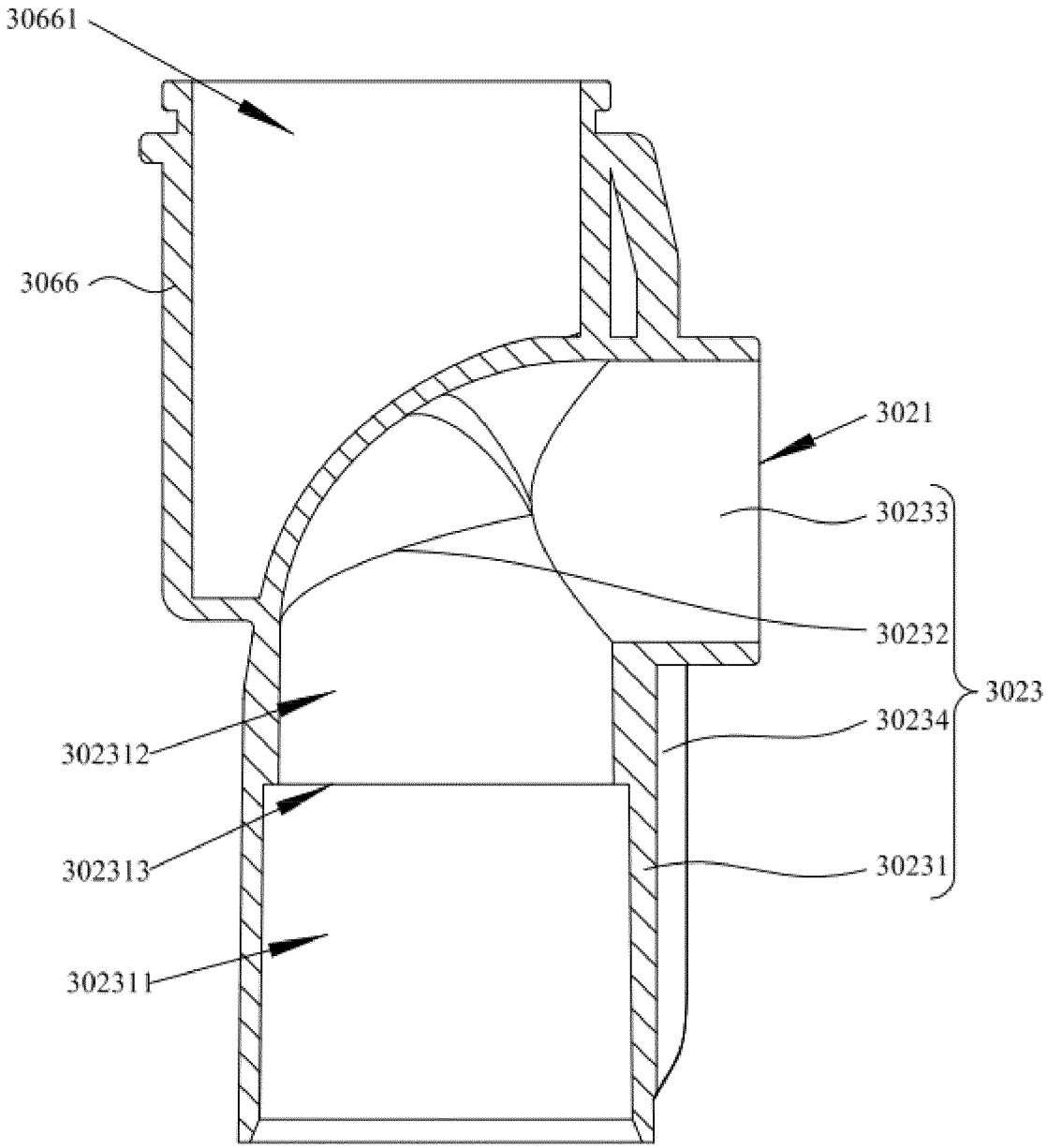
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FIG. 26

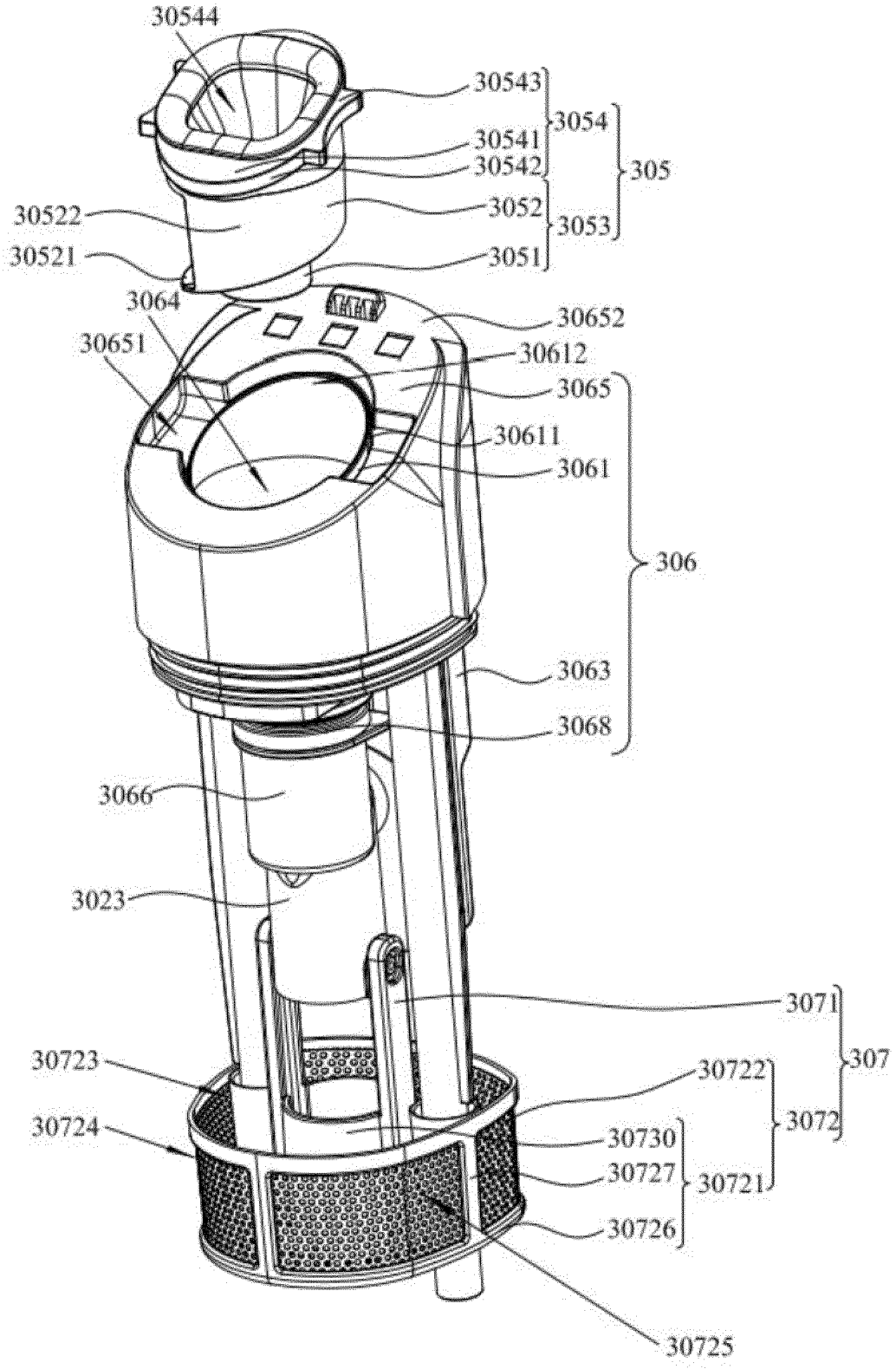
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FIG. 27

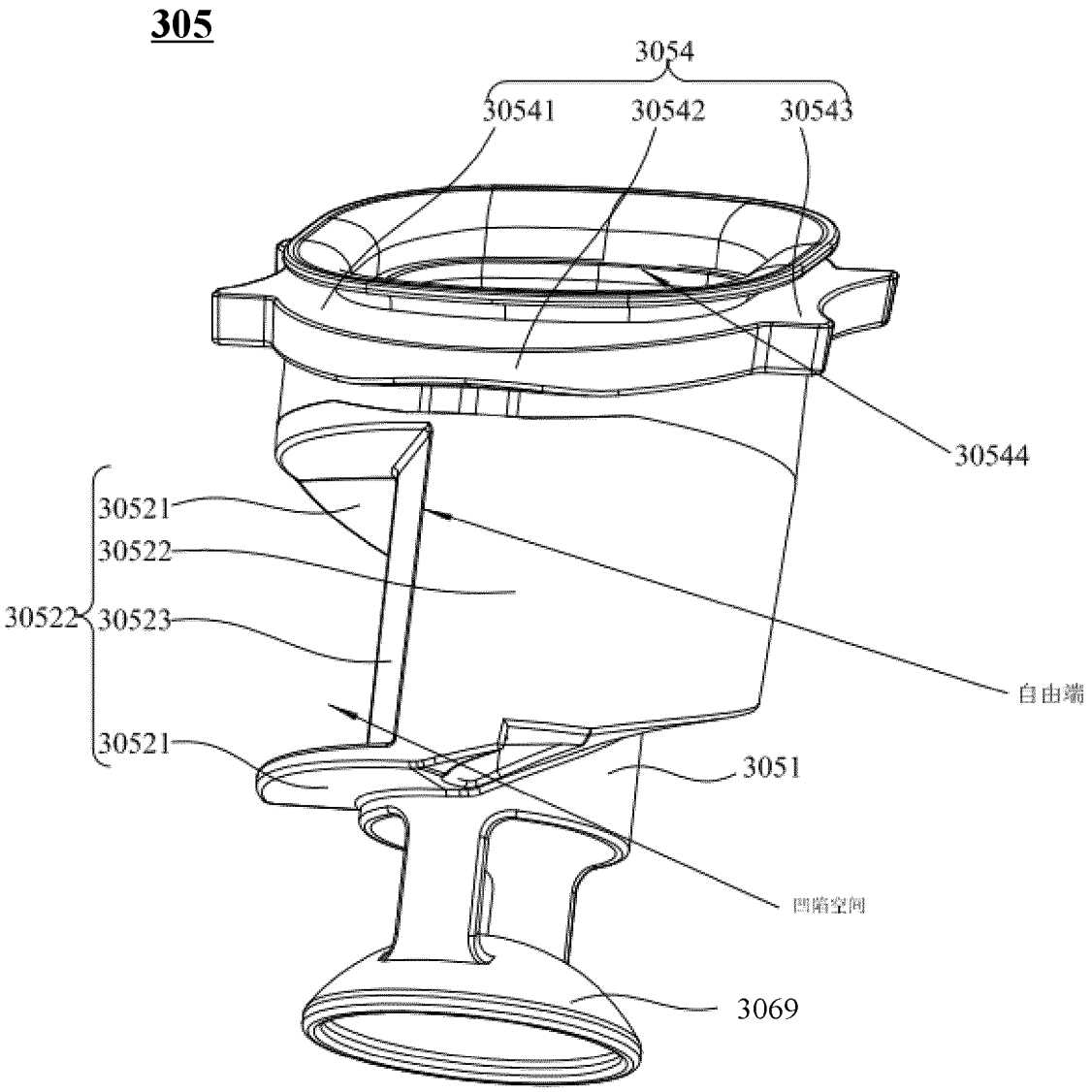
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FIG. 28

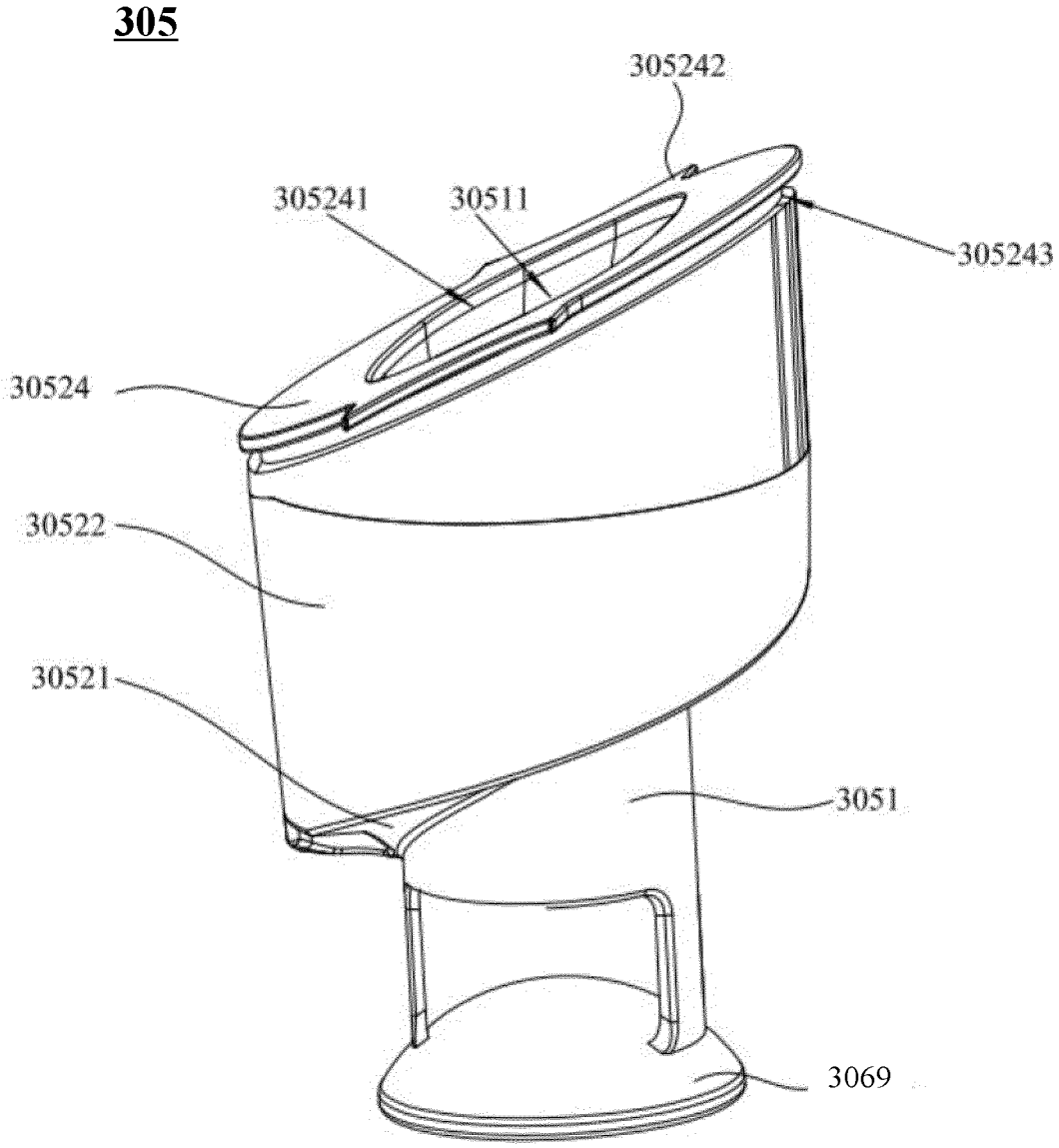

FIG. 29

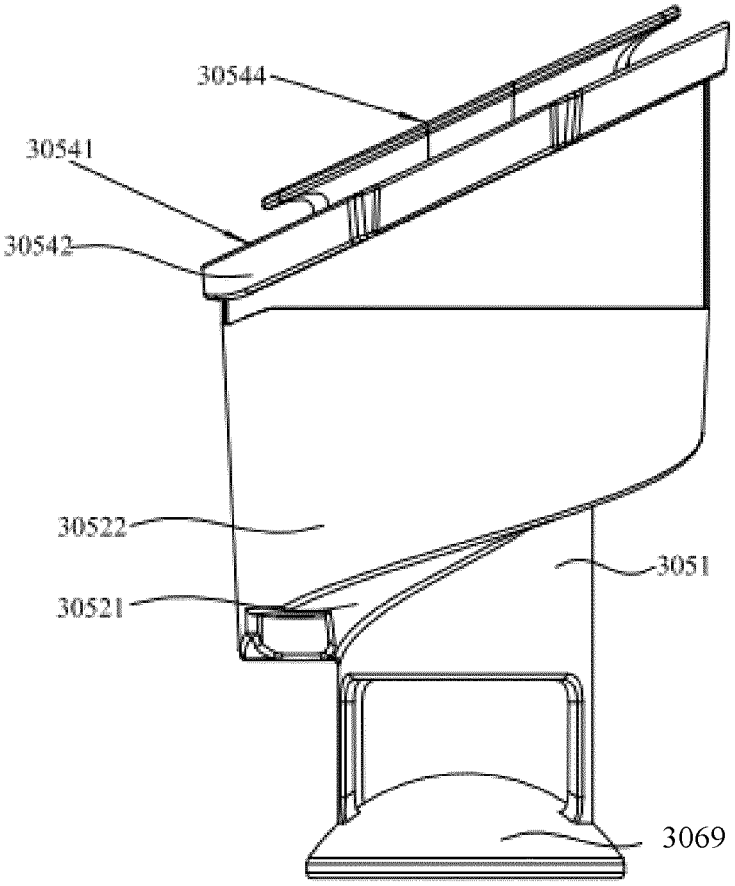

FIG. 30

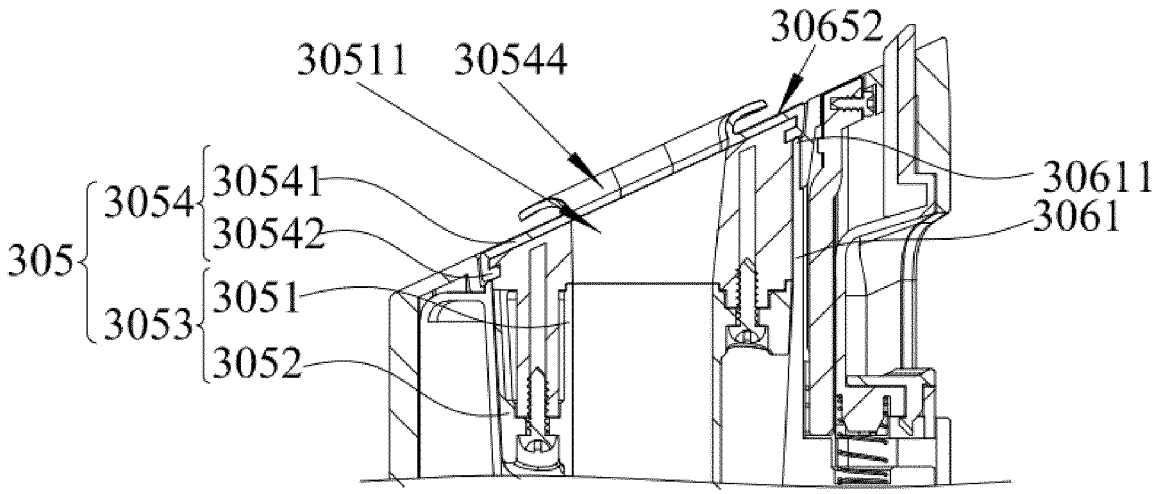
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FIG. 31

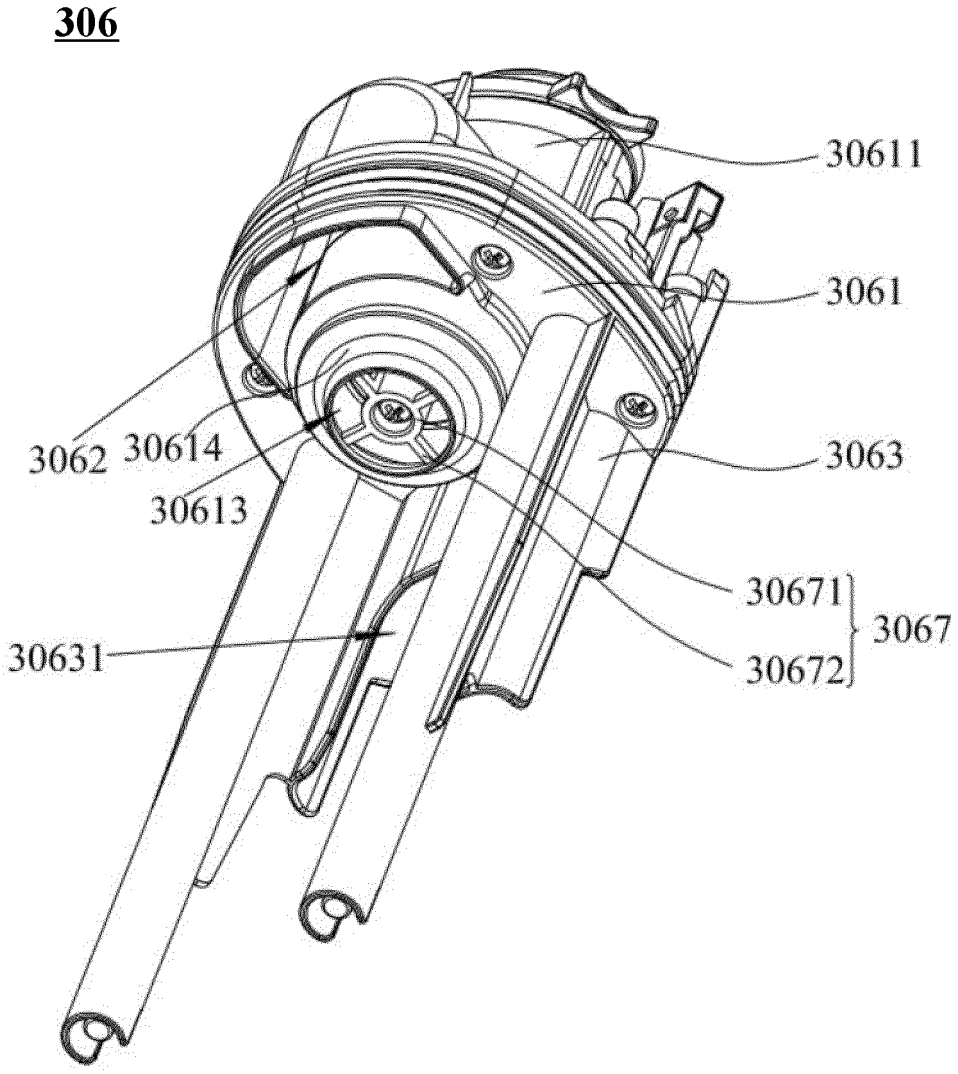

FIG. 32

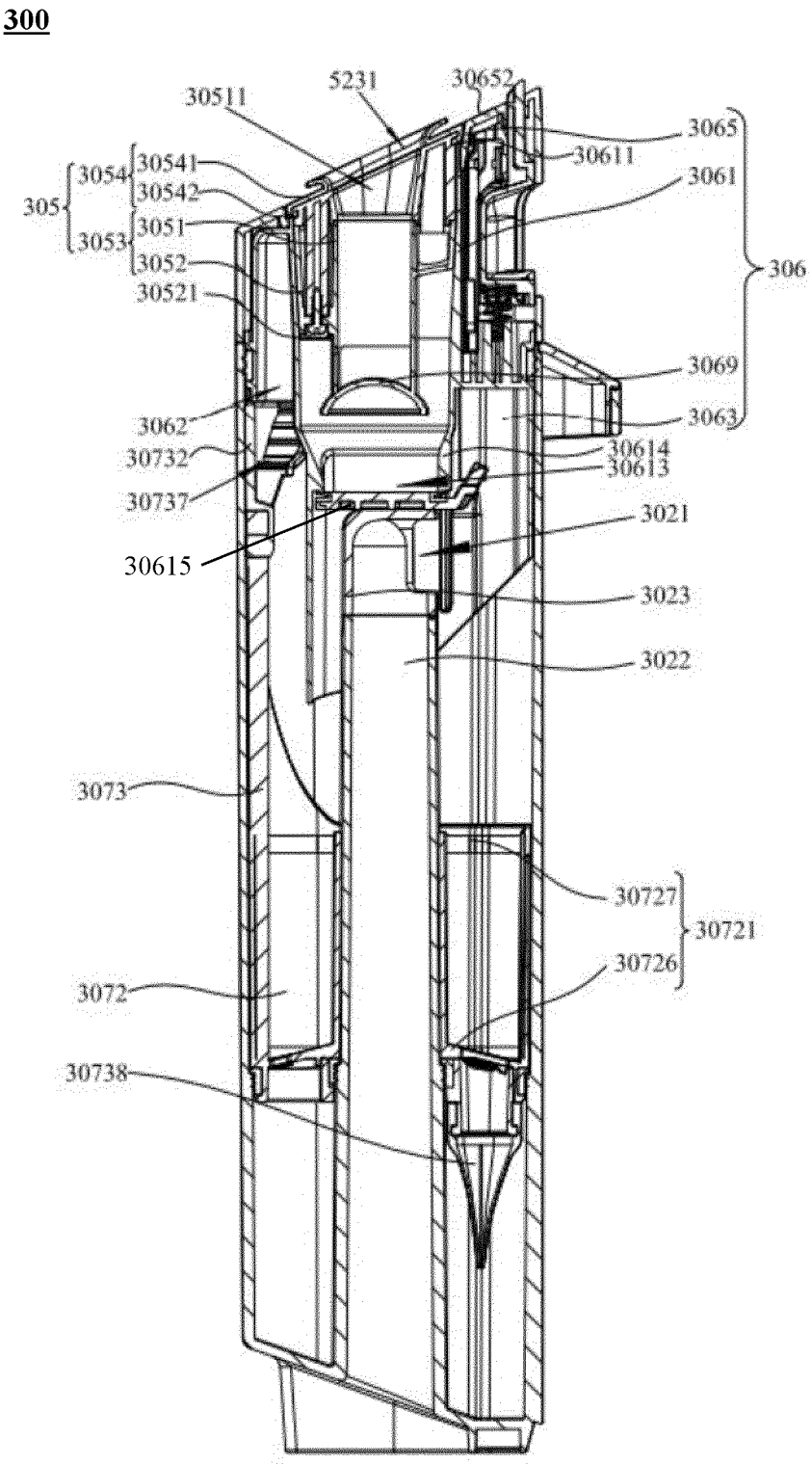
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FIG. 33

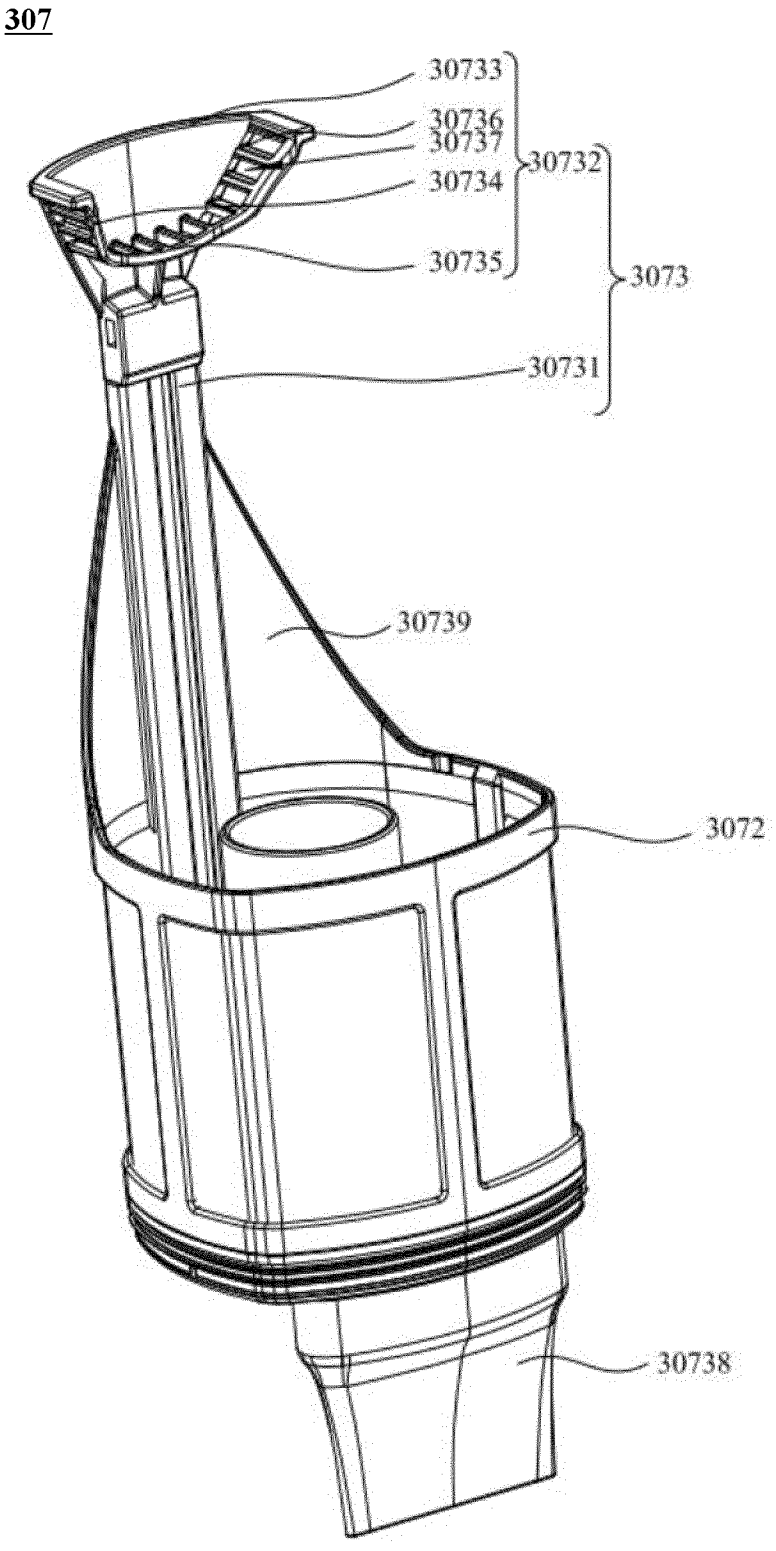
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FIG. 34

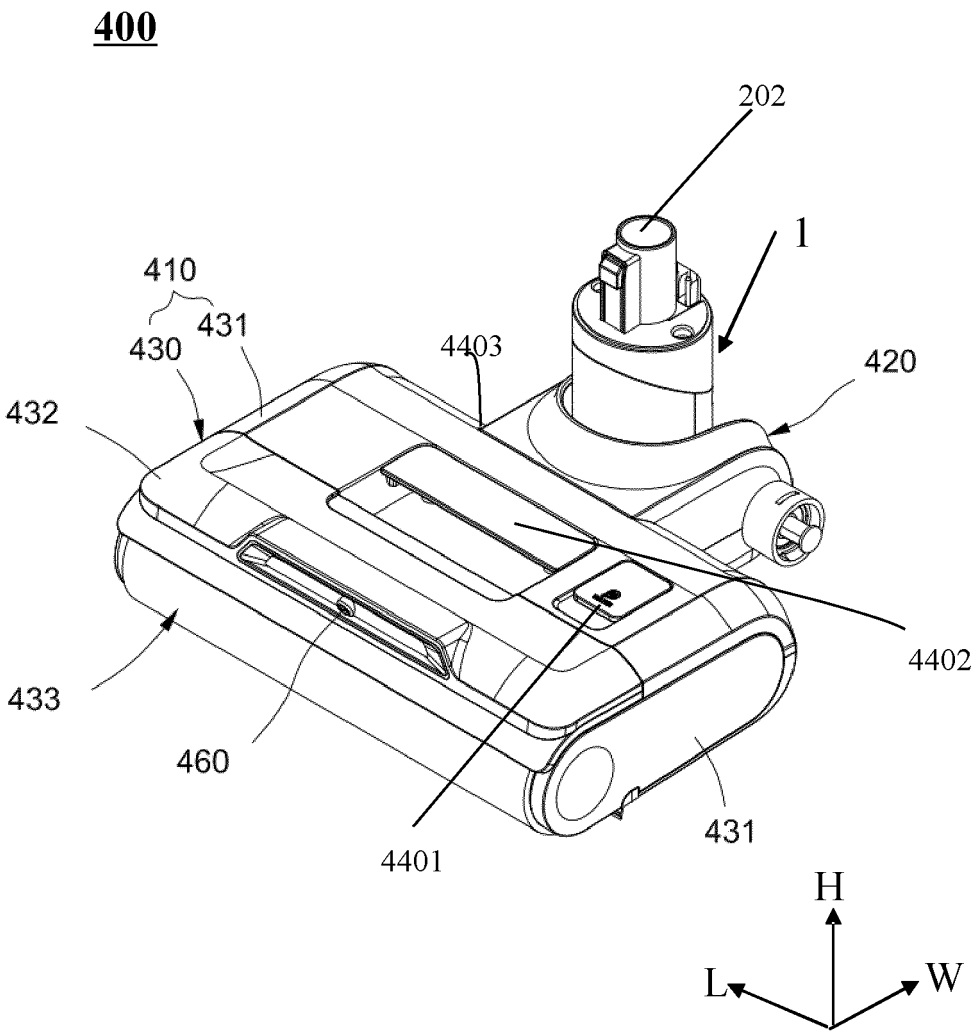

FIG. 35

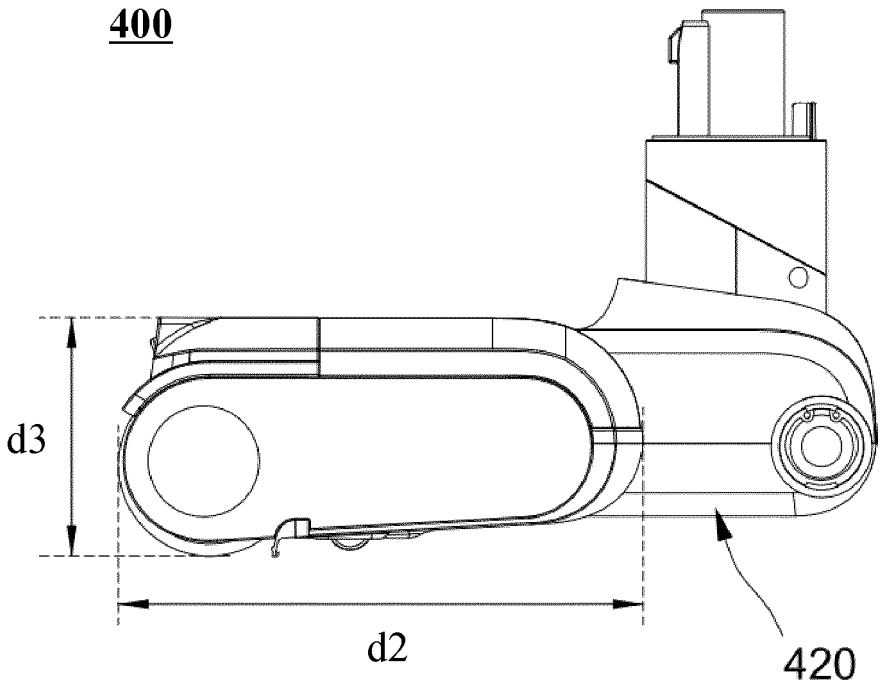

FIG. 36

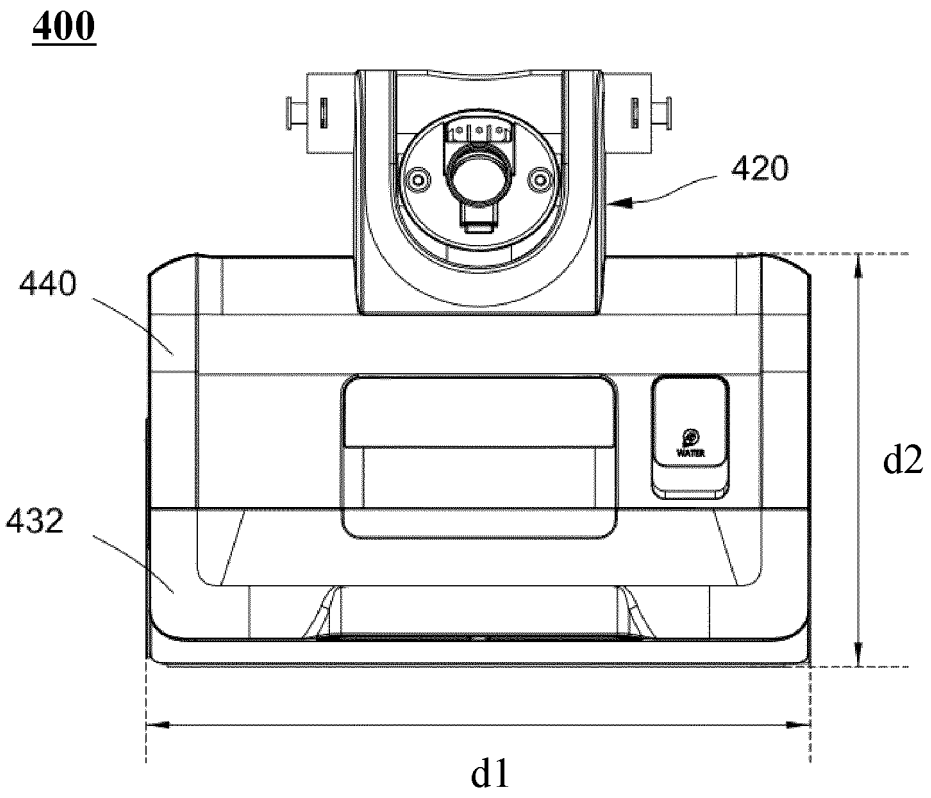

FIG. 37

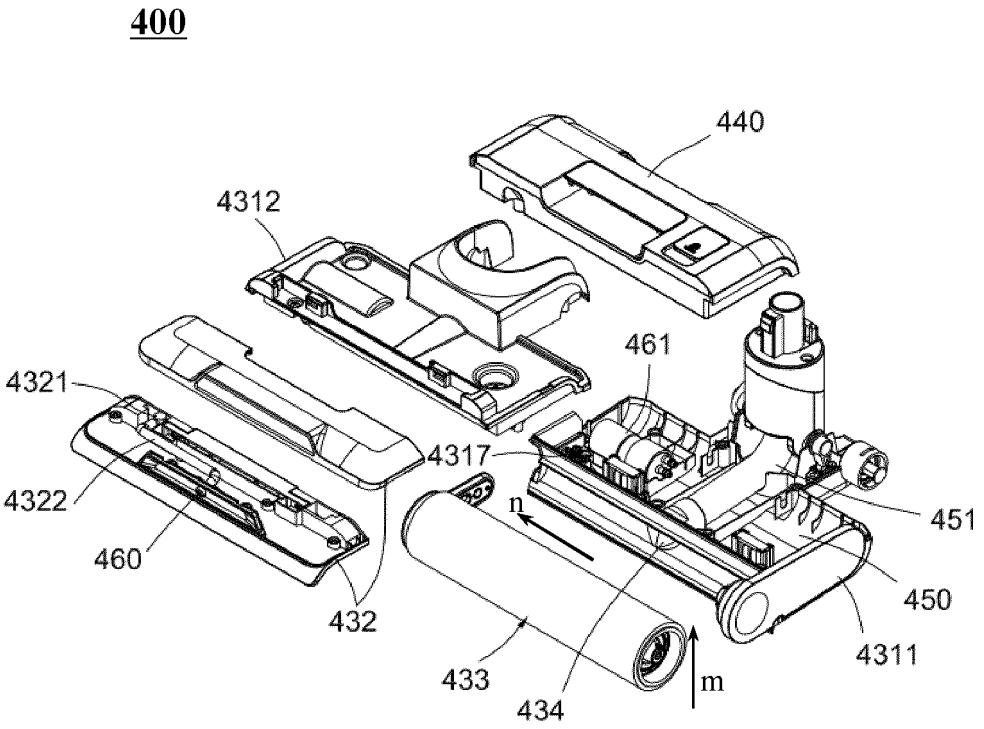

FIG. 38

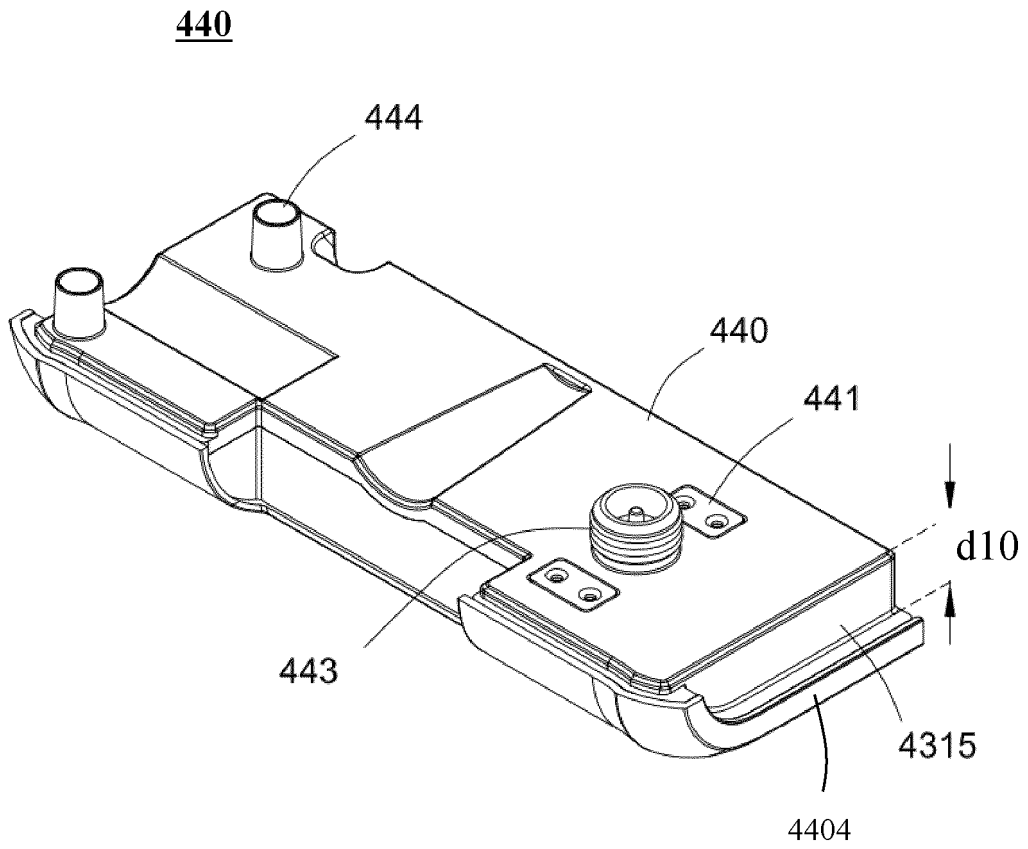

FIG. 39

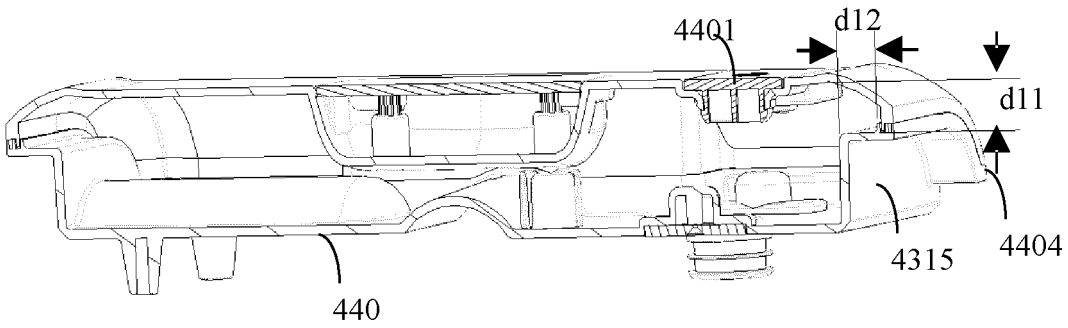

FIG. 40

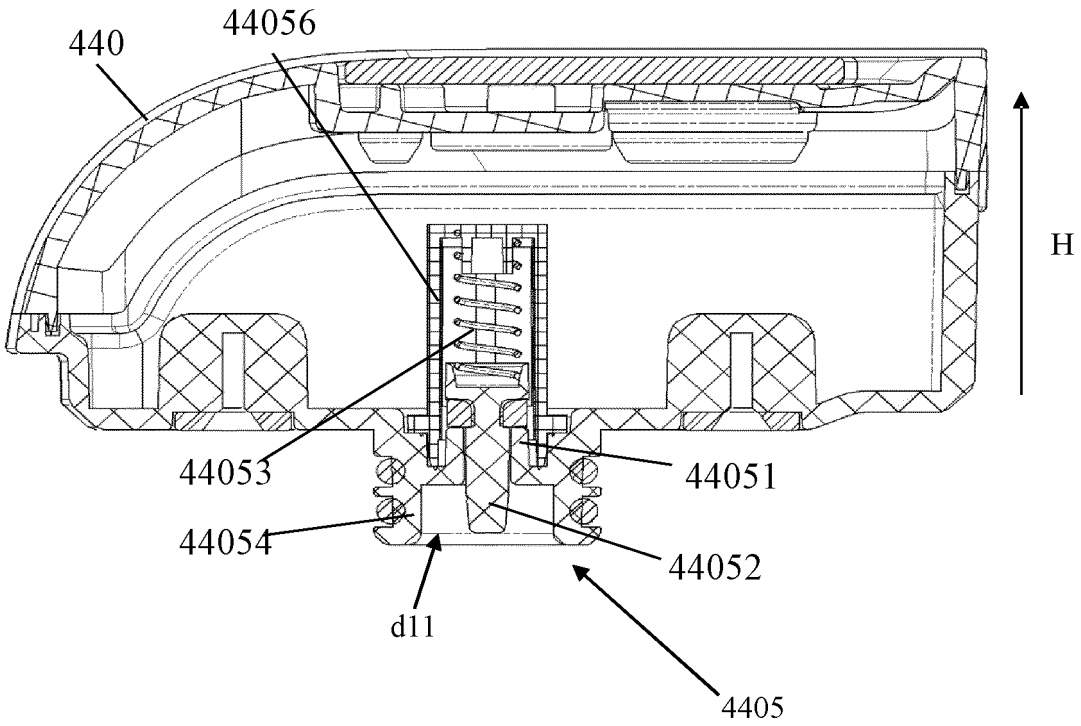

FIG. 41

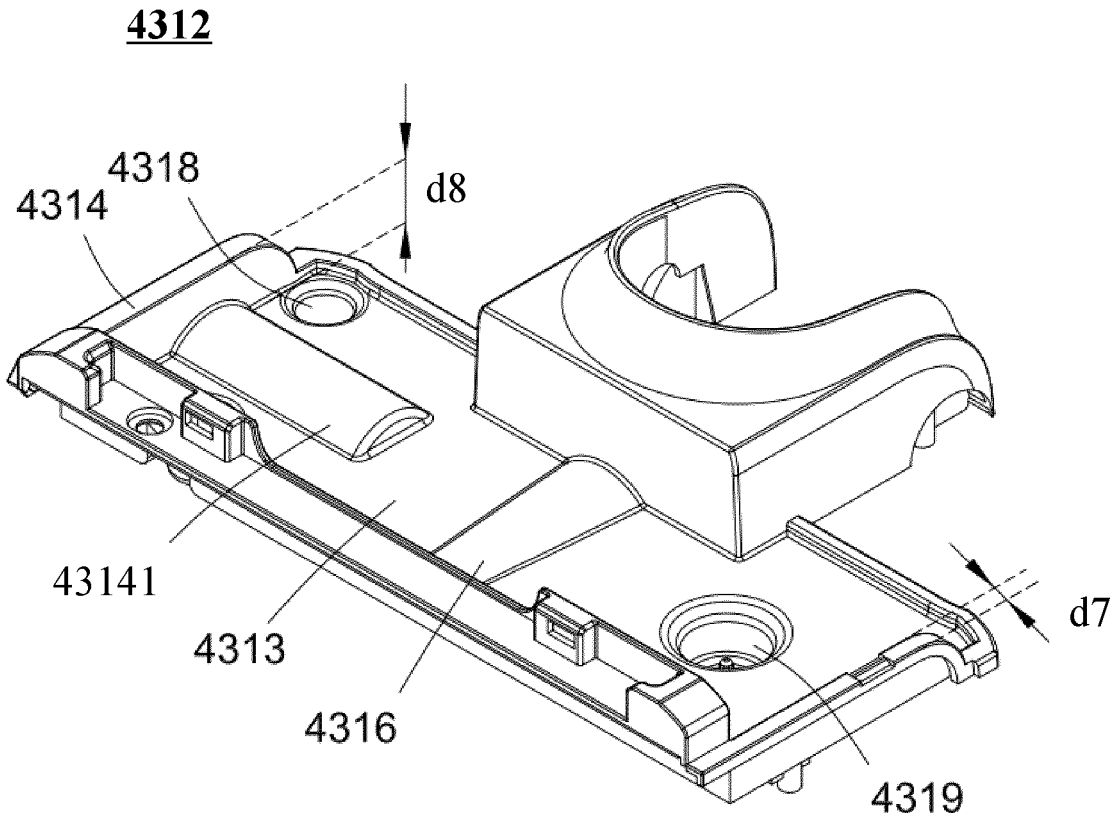

FIG. 42

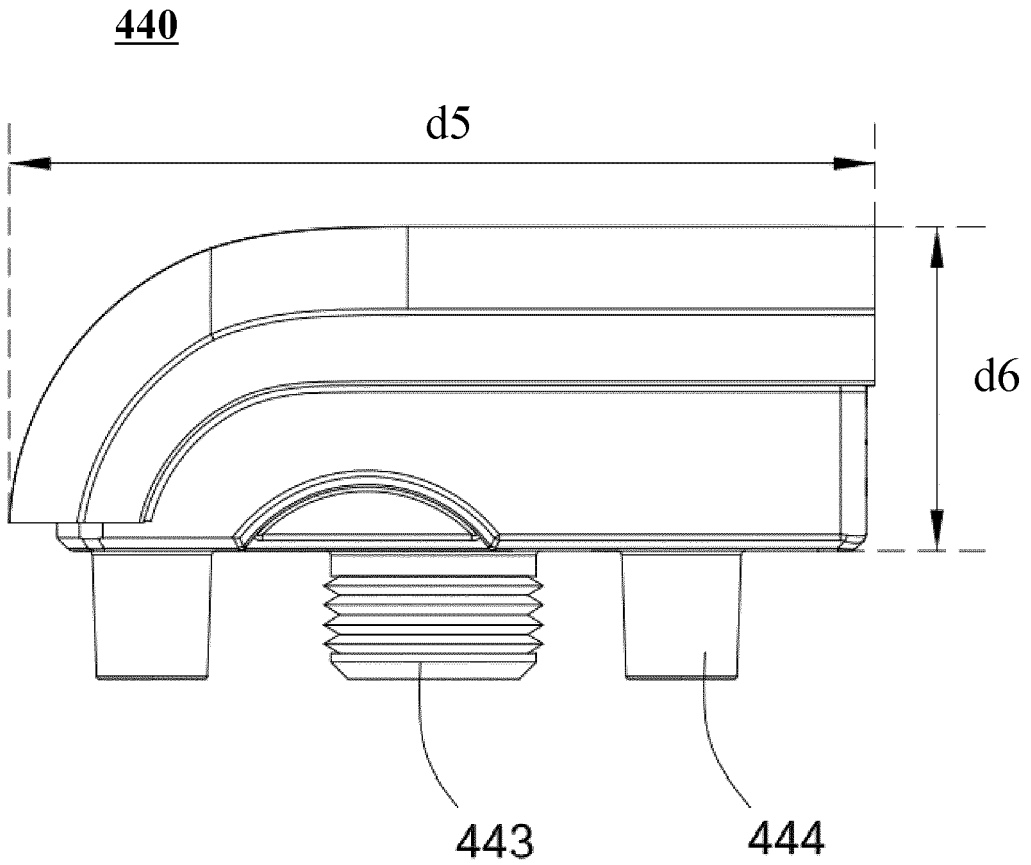

FIG. 43

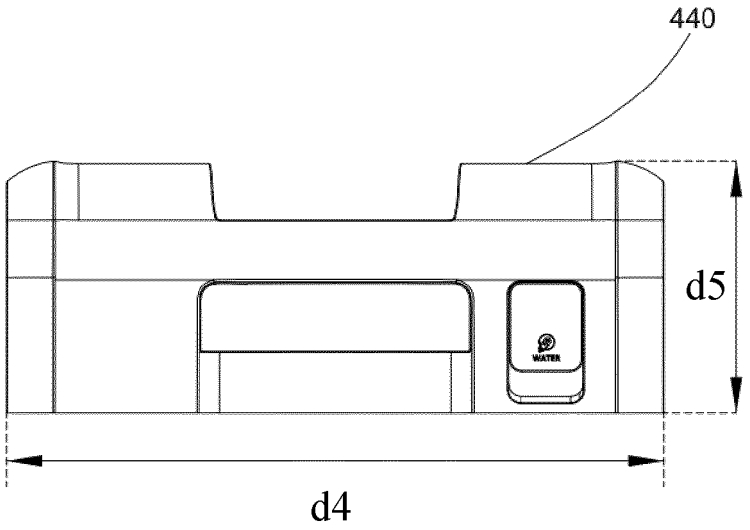

FIG. 44

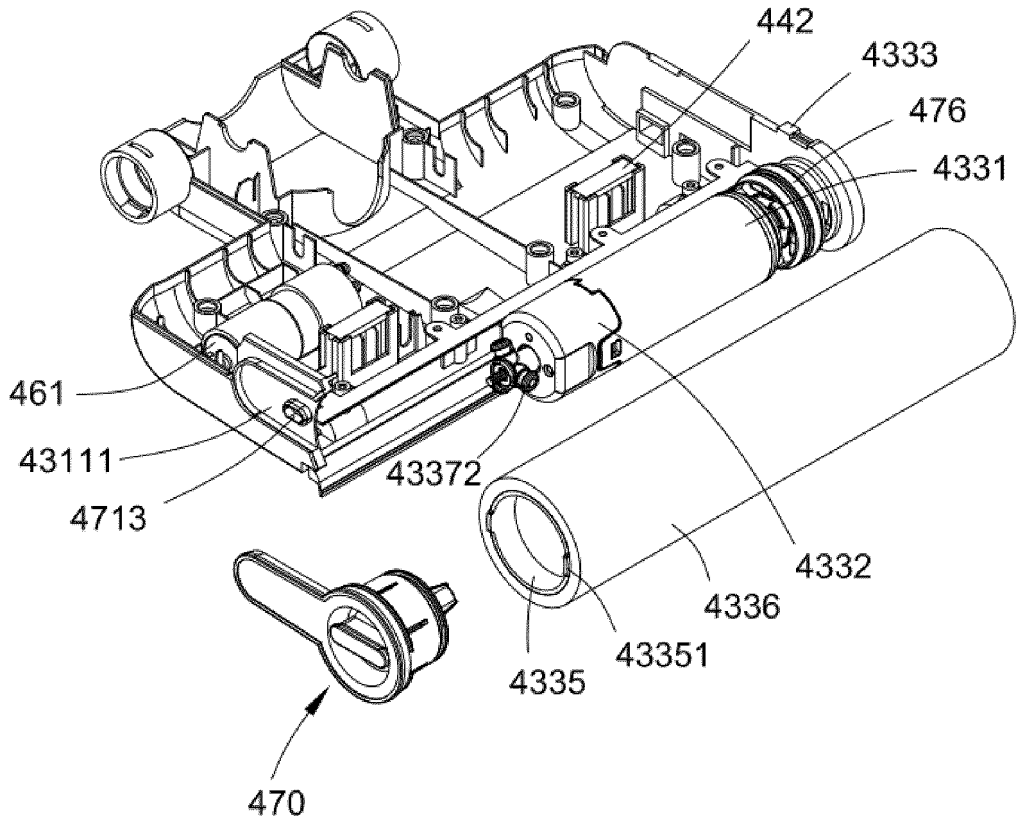
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FIG. 45

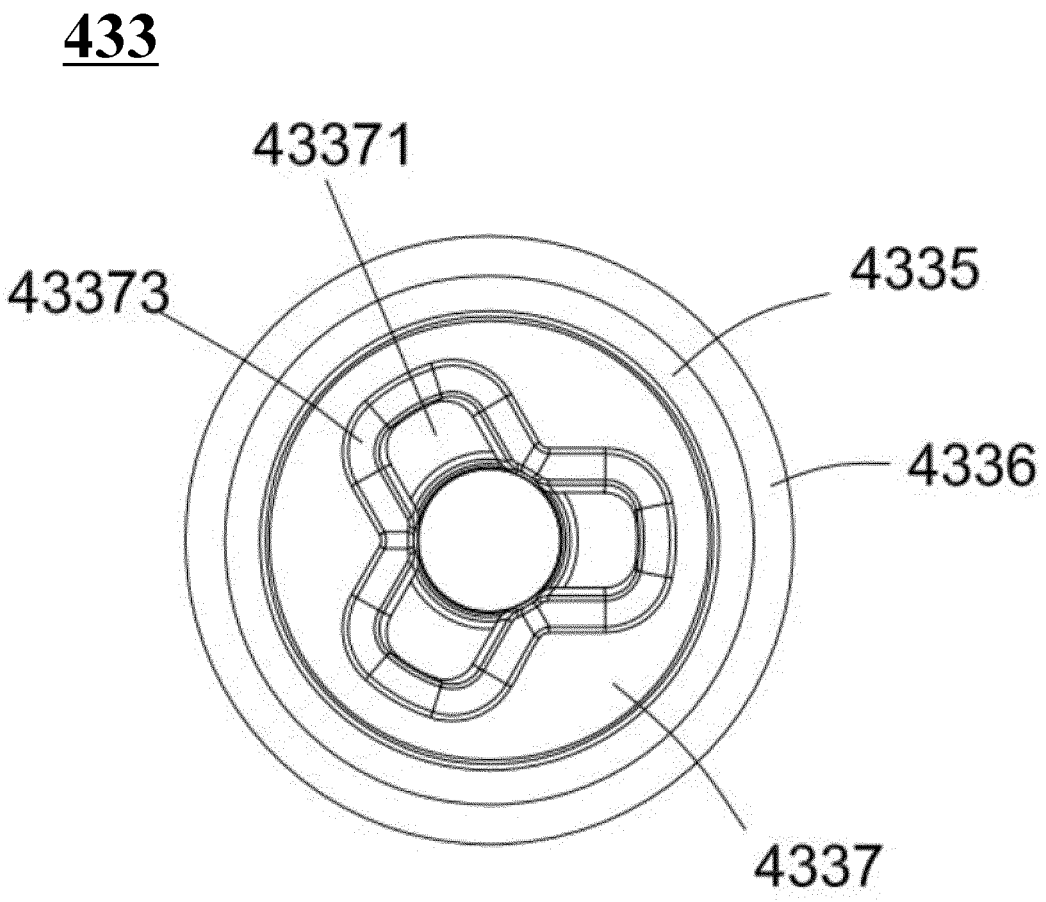

FIG. 46

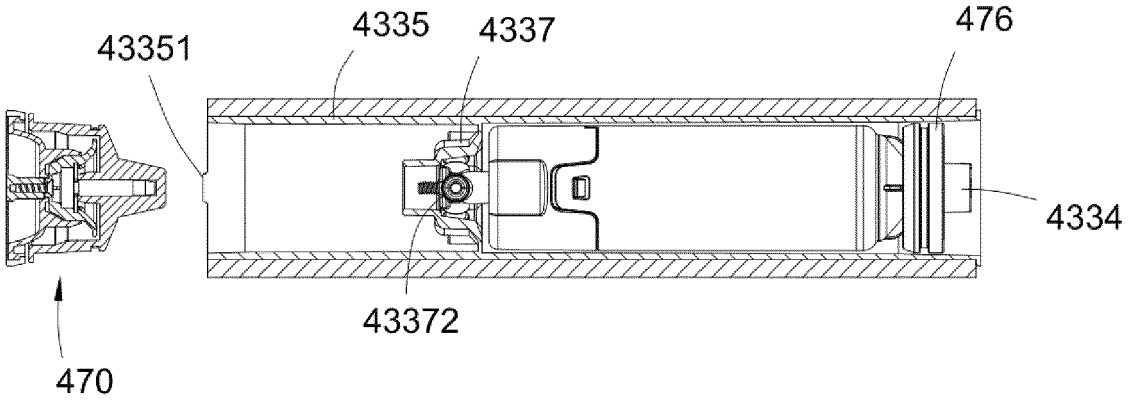

FIG. 47

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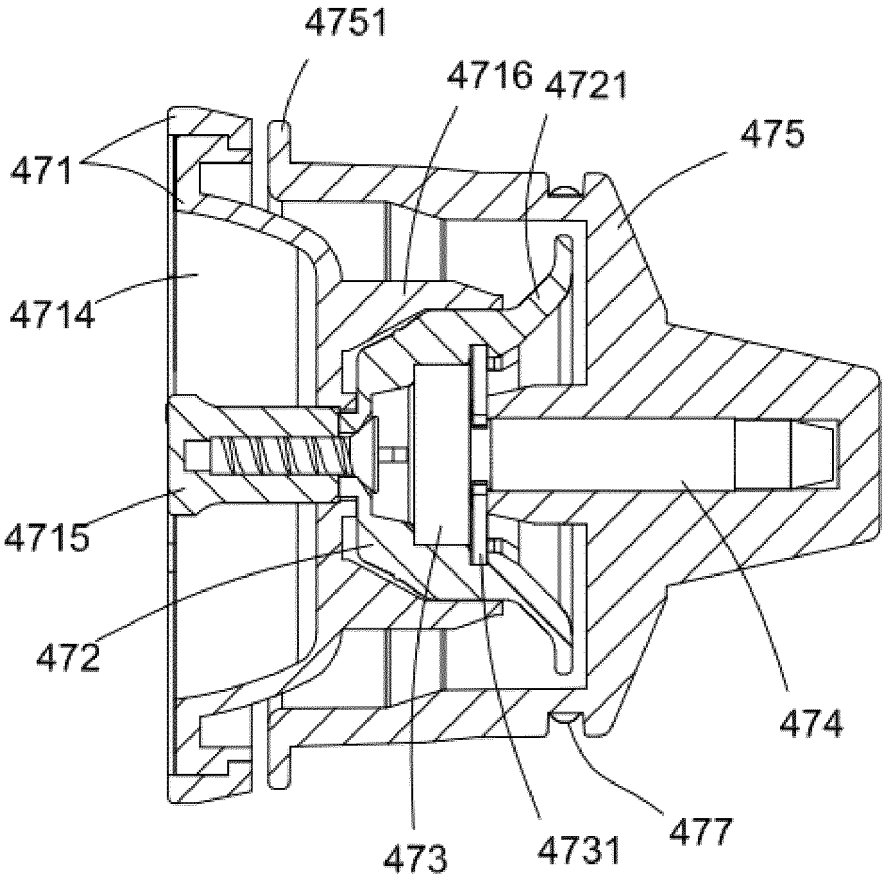

FIG. 48

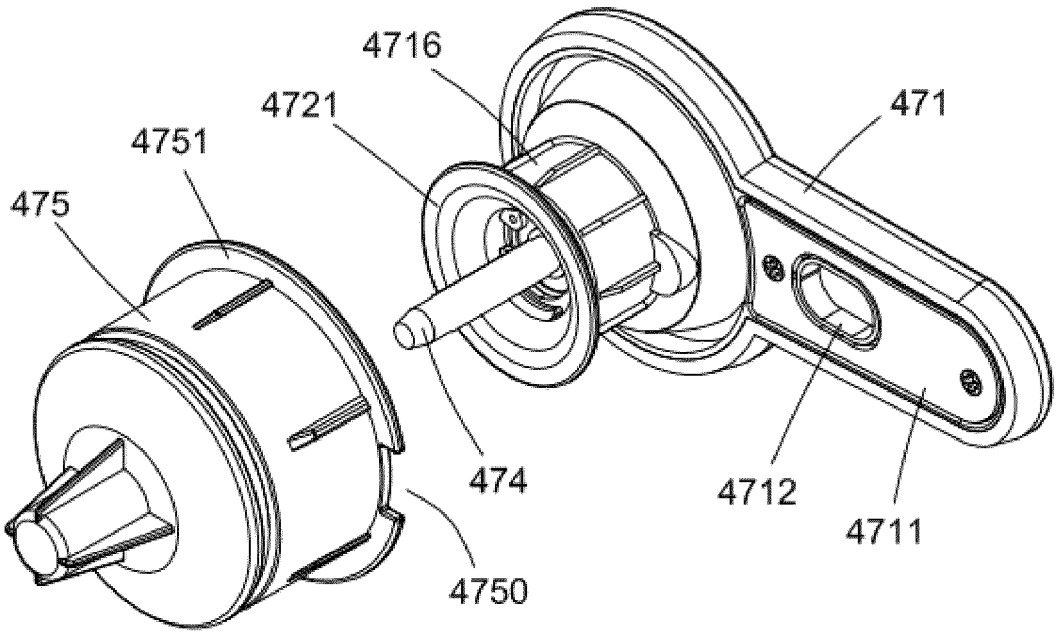

FIG. 49

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2022/092723

A. CLASSIFICATION OF SUBJECT MATTER

A47L 11/29(2006.01)i; A47L 11/30(2006.01)i; A47L 7/00(2006.01)i; A47L 9/00(2006.01)i; A47L 5/24(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)

A47L

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

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

CNKI, CNPAT, EPODOC, WPI: 莱克电气股份有限公司, 储污, 储液, 污水, 污液, 流体, 回收, 箱, 容器, 单向阀, 鸭嘴阀, 弹性阀片, 防逆, 止逆, 止回, 隔板, 挡板, 过滤, 滤网, 旋风, water, liquid, recycle, collect, contain, tank, receiver, casket, receptacle, reservoir, valve, plate, baffle, filter, cyclone

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 216060387 U (KINGCLEAN ELECTRIC CO., LTD.) 18 March 2022 (2022-03-18) description, paragraphs [0022]-[0041], and figures 1-3	1-3, 36-45
PX	CN 216060390 U (KINGCLEAN ELECTRIC CO., LTD.) 18 March 2022 (2022-03-18) description, paragraphs [0024]-[0054], and figures 1-3	1-3, 36-45
PX	CN 216060393 U (KINGCLEAN ELECTRIC CO., LTD.) 18 March 2022 (2022-03-18) description, paragraphs [0099]-[0110], and figures 14-16	1-3, 36-45
X	CN 112641397 A (ANHUI DAHAN ROBOT GROUP CO., LTD.) 13 April 2021 (2021-04-13) claim 1, and description, paragraphs [0037] and [0044]-[0045], and figures 1, 10 and 11	1-3, 36-38
Y	CN 112641397 A (ANHUI DAHAN ROBOT GROUP CO., LTD.) 13 April 2021 (2021-04-13) claim 1, and description, paragraphs [0037] and [0044]-[0045], and figures 1, 10 and 11	4-16, 26-35, 39-45
Y	US 2010192980 A1 (TURNER, J. C.) 05 August 2010 (2010-08-05) description, paragraphs [0123] and [0128]-[0131], and figures 1 and 13	4-16, 26-35

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

* Special categories of cited documents:
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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
12 July 2022	**27 July 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/CN2022/092723

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CN 212326293 U (non-official translation: DISHE (WUHAN) INTELLIGENT TECHNOLOGY CO., LTD.)12 January 2021 (2021-01-12) description, paragraphs [0056]-[0057]	4-16, 26-35
Y	CN 108903784 A (JIANGSU MIDEA CLEAN ELECTRIC APPLIANCE CO., LTD. et al.) 30 November 2018 (2018-11-30) description, paragraphs [0085]-[0086], and figures 1 and 4	39-45
X	CN 109832998 A (SUZHOU CHENGHE CLEANING EQUIPMENT CO., LTD.) 04 June 2019 (2019-06-04) description, paragraphs [0033]-[0042], and figures 1-6	1-3, 36-45
X	CN 210043932 U (SUZHOU EUP ELECTRIC CO., LTD.) 11 February 2020 (2020-02-11) description, paragraphs [0035]-[0043], and figures 1-5	1-2, 36-45
X	CN 209499621 U (POSITEC POWER TOOLS (SUZHOU) CO., LTD.) 18 October 2019 (2019-10-18) description, paragraphs [0076]-[0099], and figures 1-4	1-2, 36-45
A	JP 2005323671 A (KAO CORP.) 24 November 2005 (2005-11-24) entire document	1-45

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2022/092723

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
CN	216060387	U	18 March 2022	None			
CN	216060390	U	18 March 2022	None			
CN	216060393	U	18 March 2022	None			
CN	112641397	A	13 April 2021	None			
US	2010192980	A1	05 August 2010	GB	201001614	D0	17 March 2010
				AU	2010200291	A1	19 August 2010
				CA	2690912	A1	05 August 2010
				NZ	582896	A	22 December 2011
CN	212326293	U	12 January 2021	CN	113876244	A	04 January 2022
CN	108903784	A	30 November 2018	None			
CN	109832998	A	04 June 2019	None			
CN	210043932	U	11 February 2020	None			
CN	209499621	U	18 October 2019	None			
JP	2005323671	A	24 November 2005	JP	4439328	B2	24 March 2010

Form PCT/ISA/210 (patent family annex) (January 2015)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CN 202110586889 **[0001]**
- CN 202110813176 **[0001]**
- CN 202111007095 **[0001]**
- CN 202111209222 **[0001]**