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(54) **HIDDEN WATER TANK FOR MATCHING DIFFERENT DRIVING PANELS**

(57) The application discloses a hidden water tank capable of matching different driving panels, which belongs to the technical field of sanitary wares. The water tank comprises a water tank body, the water tank body comprising a water inlet assembly and a pneumatic drainage assembly; and a driving panel detachably connected to the water tank body, comprising one of a pneumatic driving panel, a mechanical driving panel and an electric driving panel. The mechanical driving panel and the pneumatic drainage assembly are connected through a first driving conversion module, and the first driving conversion module is used for converting a mechanical driving force into an air pressure- driving force; and the electric driving panel and the pneumatic drainage assembly are connected through a second driving conversion module, and the second driving conversion module is used for converting an electrical signal into an air-pressure-driving force. The application solves a problem that an existing hidden water tank cannot match different driving panels.

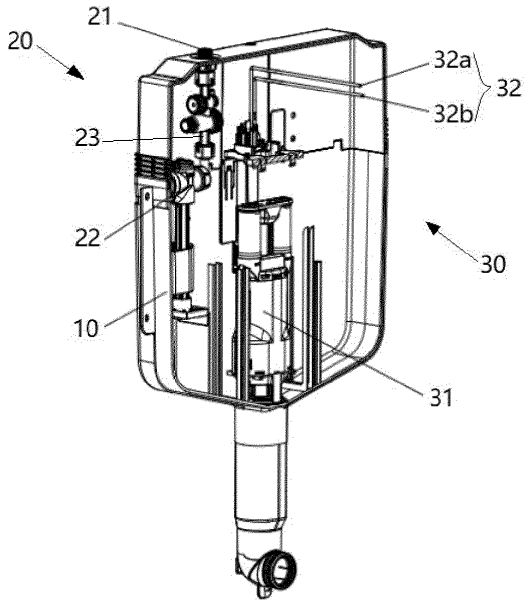

FIG. 1

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Description

CROSS REFERENCE TO RELATED APPLICATION

[0001] This application claims the benefit of priority to Chinese Patent Application No. 202220505786.2 filed in the Chinese Intellectual Property Office on March 8, 2022, and US Patent Application No. 18/113,586 filed in the US Patent and Trademark Office on February 23, 2023, which are hereby incorporated by reference in their entirety.

FIELD

[0002] The present disclosure relates to the technical field of sanitary ware, in particular to a hidden water tank capable of matching different driving panels.

BACKGROUND

[0003] A water tank body of a hidden water tank is usually mounted inside a wall, and the wall is mounted with a driving panel, which controls a drainage valve in the water tank to open and drain water through a driving device. The driving panel is provided with buttons for controlling the driving device.

SUMMARY

[0004] Hidden water tanks are classified as: 1. a mechanical driven hidden water tank equipped with a mechanical panel; 2. an air pressure-driven hidden water tank equipped with a pneumatic panel; and 3. an electric-driven hidden water tank equipped with an electronic induction panel. When one type of the water tanks is constructed in a bathroom, only a driving panel suitable for this water tank can be selected, but panels with other driving modes cannot be used. If a customer is not satisfied with this type of panel, or if the customer wants to upgrade a flush toilet, for example, from pneumatic driving to electric driving, the water tank can only be removed from a false wall and reconstruction is required, which results in a heavy workload and a high cost.

[0005] A technical problem to be solved by the present disclosure is a problem that a hidden water tank cannot match different driving panels.

[0006] Aiming at the above technical problem, the present disclosure provides the following technical solutions.

[0007] A hidden water tank capable of matching different driving panels comprises: a water tank body comprising a water inlet assembly and a pneumatic drainage assembly; and a driving panel detachably connected to the water tank body, comprising one of a pneumatic driving panel, a mechanical driving panel and an electric driving panel, wherein the mechanical driving panel and the pneumatic drainage assembly are connected through a first driving conversion module, and the first driving conversion module is used for converting a mechanical driving force into an air pressure-driving force; and the electric driving panel and the pneumatic drainage assembly are connected through a second driving conversion module, and the second driving conversion module is used for converting an electrical signal into an air pressure-driving force.

[0008] In some embodiments of the present disclosure, the water inlet assembly comprises a water inlet joint and a water inlet valve located on a water inlet pipeline, and the water inlet joint is connected to a water supply pipeline; and the pneumatic drainage assembly comprises a pneumatic drainage valve and an inflation tube located on the pneumatic drainage valve, and the inflation tube is used for receiving a driving force on the driving panel.

[0009] In some embodiments of the present disclosure, the pneumatic driving panel comprises a first panel body and a first flushing button mounted on the first panel body, the inflation tube (e.g., an inflation pipe) is connected to an output end of the first flushing button, and a piston or a gasbag (e.g., an airbag) is arranged in the first flushing button.

[0010] In some embodiments of the present disclosure, at least one inflation tube is arranged, and the quantity of the first flushing button(s) on the pneumatic driving panel is the same as that of the inflation tube(s).

[0011] In some embodiments of the present disclosure, the mechanical driving panel comprises a second panel body and a second flushing button mounted on the second panel body; the first driving conversion module comprises: a cylinder, wherein the cylinder is formed by a cylinder block and a cylinder head; and a piston, a pressurized seal element and a spring located in the cylinder, wherein a compressible sealing chamber is formed between the pneumatic rubber cup and the cylinder block; under the action of the spring, one end of the piston abuts against the cylinder head, and the other end of the piston acts on the pressurized seal element; and the piston is connected to the second flushing button through a connecting rod, and the inflation tube is connected to the compressible sealing chamber.

[0012] In some embodiments of the present disclosure, at least one inflation tube is arranged, and the quantity of the second flushing button(s) on the mechanical driving panel is the same as that of the inflation tube(s).

[0013] In some embodiments of the present disclosure, the electric driving panel comprises a third panel body and a human body sensor mounted on the third panel body, the second driving conversion module comprises an inflator pump, and the inflation tube is connected to an output end of the inflator pump.

[0014] In some embodiments of the present disclosure, the human body sensor comprises one of an infrared sensor, a microwave sensor, an ultrasonic sensor and a remote control sensor.

[0015] In some embodiments of the present disclosure, at least one inflation tube is arranged, and the quan-

tity of the inflator pump(s) is the same as that of the inflation tube(s).

[0016] In some embodiments of the present disclosure, the electric driving panel further comprises a prompt window, and the prompt window is used for prompting a user about a working state of the inflator pump.

[0017] Compared with the prior art, the technical solutions of the present disclosure have the following technical effects:

[0018] In the hidden water tank provided by the present disclosure, the water tank body is provided with the pneumatic drainage assembly, and the mechanical driving force is converted into the air pressure-driving force to match with the pneumatic drainage assembly by arranging the first driving conversion module in the mechanical driving panel; the electrical signal is converted into the air pressure-driving force by means of the second driving conversion module arranged in the electric driving panel. Thus, the water tank body can be adapted to the pneumatic driving panel, the mechanical driving panel and the electric driving panel. When upgrading the hidden water tank, a user does not need to replace the water tank body, but only needs to replace the driving panel, so that the upgrading requires less workload and the cost is low.

BRIEF DESCRIPTION OF THE FIGURES

[0019] Embodiments of the present disclosure is described in detail below with reference to the accompanying drawings, which help the understanding of the objects and advantages of the present disclosure, wherein:

FIG. 1 is a structural schematic diagram of a water tank body of a hidden water tank capable of matching different driving panels according to an example of the present disclosure;

FIG. 2 is a structural schematic diagram of a hidden water tank comprising a pneumatic driving panel according to an example of the present disclosure;

FIG. 3 is a structural schematic diagram of a hidden water tank comprising a mechanical driving panel according to an example of the present disclosure;

FIG. 4 is a schematic structural diagram of a first driving conversion module according to an example of the present disclosure;

FIG. 5 is a structural schematic diagram of a hidden water tank comprising an electric driving panel according to an example of present the disclosure;

FIG. 6 is a block diagram illustrating the hidden water tank comprising the electric driving panel according to an example of the present disclosure; and

FIG. 7 is a flow chart of a method for controlling the hidden water tank to flush water according to an example of the present disclosure.

DETAILED DESCRIPTION

[0020] The following disclosure aims to clearly and completely describe the technical solutions in the embodiments of the present disclosure with reference to the accompanying drawings. Apparently, the described embodiments are merely some but not all of the embodiments of the present disclosure . Based on the embodiments of the present disclosure, all other embodiments obtained by those having ordinary skill in the art without any creative work shall fall within the protection scope of the present disclosure.

[0021] In the description of the present disclosure , it should be noted that, the orientation or positional relationships indicated by the terms "center", "up", "down", "left", "right", "vertical", "horizontal", "inside", "outside" and the like are orientation or positional relationships based on the accompanying drawings. The terms are only for convenience and simplification of the description of the present disclosure and are not intended to indicate or imply that the indicated device or element must have a specific orientation or must be constructed and operated in a specific orientation. Thus, the terms cannot be understood as a limitation to the present disclosure. Moreover, the terms "first", "second" and "third" are used for descriptive purposes only and cannot be understood as indicating or implying relative importance.

[0022] In the description of the present disclosure, it should be noted that unless expressly stipulated and defined otherwise, terms such as "installation", "connected" and "connection", etc., should be understood broadly. For example, the connection may be a fixed connection, a detachable connection, or an integral connection; the connection may be a direct connection, an indirect connection through an intermediate medium, or an internal communication of two elements. The specific meaning of the above terms in the present disclosure can be understood in a specific case by those having ordinary skill in the art.

[0023] In addition, the technical features involved in different embodiments of the present disclosure described below can be combined with each other as long as the technical features do not constitute conflicts with each other.

[0024] FIG. 1-FIG. 6 show the specific implementation of a hidden water tank capable of matching different driving panels (hereinafter referred to as the "hidden water tank") provided by the present disclosure. The hidden water tank comprises a water tank body 10 and a driving panel detachably connected to the water tank body 10. The water tank body 10 comprises a water inlet assembly 20 and a pneumatic drainage assembly 30. The driving panel comprises one of a pneumatic driving panel 40, a mechanical driving panel 50, or an electric driving panel 60. The mechanical driving panel 50 and the pneumatic drainage assembly 30 are connected through a first driving conversion module 70. The first driving conversion module 70 is configured to convert a mechanical driving force into an air pressure-driving force (e.g., a first air pressure-driving force). The electric driving panel 60 and the pneumatic drainage assembly 30 are connected

through a second driving conversion module 80. The second driving conversion module 80 is configured to convert an electrical signal into an air pressure-driving force (e.g., a second air pressure-driving force).

[0025] In the hidden water tank, by arranging the first driving conversion module 70 and the second driving conversion module 80, the mechanical driving panel 50 and the electric driving panel 60 can be matched with the pneumatic drainage assembly 30. Thus, the water tank body 10 can be adapted for each of the pneumatic driving panel 40, the mechanical driving panel 50, and the electric driving panel 60. When upgrading the hidden water tank, a user does not need to replace the water tank body 10 but only needs to replace the driving panel. Thus, the upgrading requires less workload, and the cost is low.

[0026] FIG. 1 is a structural schematic diagram of a water tank body of a hidden water tank capable of matching different driving panels according to an example of the present disclosure. As shown in FIG. 1, the water inlet assembly 20 comprises a water inlet joint 21 located on a water inlet pipeline 23 and configured to be connected to a water supply pipeline and comprises a water inlet valve 22 located on the water inlet pipeline 23. By controlling the water inlet valve 22, the water supply pipeline can be fluidly connected to or disconnected from the water inlet pipeline 23, so that the water tank can be filled with water. The pneumatic drainage assembly 30 comprises a pneumatic drainage valve 31 and an inflation tube 32 (e.g., an inflation pipe) located on the pneumatic drainage valve 31. The inflation tube 32 is configured to receive a driving force on the driving panel, convert the driving force into pressure change of or in the inflation tube 32, and act on the pneumatic drainage valve 31 to open or close the pneumatic drainage valve 31, so as to flush a flush toilet at a high pressure.

[0027] Composition structures and working processes of each of the three driving panels are described in detail below.

<Pneumatic driving panel 40>

[0028] FIG. 2 is a structural schematic diagram of a hidden water tank comprising a pneumatic driving panel according to an example of the present disclosure. As shown in FIG. 2, the pneumatic driving panel 40 comprises a first panel body 41 and a first flushing button 42 mounted on the first panel body 41. The inflation tube 32 is connected to an output end of the first flushing button 42, and a piston or a gasbag (e.g., an airbag) is arranged in the first flushing button 42.

[0029] At least one inflation tube 32 is arranged, and the quantity of the first flushing button(s) 42 on the pneumatic driving panel 40 is the same as the quantity of the inflation tube(s) 32. In an embodiment, two inflation tubes 32 and two first flushing buttons 42 are provided on the pneumatic driving panel 40. The two first flushing buttons 42 are respectively configured to flush the flush toilet with a high flushing water volume and a low flushing water volume. More particularly, the first flushing button 42 comprises a high-volume flushing button 42a and a low-volume flushing button 42b, and the inflation tube 32 correspondingly comprises a high-volume flushing tube 32a and a low-volume flushing tube 32b. An opening time duration of the pneumatic drainage valve 31 is t1 after the high-volume flushing button 42a is triggered, and the opening time duration of the pneumatic drainage valve 31 is t2 after the low-volume flushing button 42b is triggered, and t1 is greater than t2.

[0030] During working, when the high-volume flushing button 42a or the low-volume flushing button 42b of the pneumatic driving panel 40 is pressed or triggered, the piston or the gasbag in the corresponding button is compressed, and the generated air pressure is filled into the pneumatic drainage valve 31 from a high-volume flushing air inlet joint 8 or a low-volume flushing air inlet joint 9 through the high-volume flushing tube 32a or the low-volume flushing tube 32b, so as to open the valve. A distance of the high-volume flushing button 42a acting on the high-volume flushing tube 32a is larger than a distance of the low-volume flushing button 42b acting on the low-volume flushing tube 32b. Thus, high-volume flushing or low-volume flushing may be realized, and a ceramic flush toilet can be cleaned by the water tank.

<Mechanical driving panel 50>

[0031] FIG. 3 is a structural schematic diagram of a hidden water tank comprising a mechanical driving panel according to an example of the present disclosure. FIG. 4 is a schematic structural diagram of a first driving conversion module according to an example of the present disclosure. As shown in FIG. 3 and FIG. 4, the mechanical driving panel 50 comprises a second panel body 51 and a second flushing button 52 mounted on the second panel body 51. The first driving conversion module 70 comprises a cylinder formed by a cylinder block 71 and a cylinder head 72. The first driving conversion module 70 also comprises a piston 73, a pneumatic rubber cup 74, and a spring 75 located in the cylinder. The piston 73 is connected to the second flushing button 52 through a connecting rod 76, and the inflation tube 32 is connected to a compressible sealing chamber formed between the cylinder block 71 and the pneumatic rubber cup 74. In an initial state, under the elastic force of the spring 75, one end of the piston 73 abuts against the cylinder head 72, and the other end of the piston 73 acts on the pneumatic rubber cup 74. When a user presses or triggers the second flushing button 52, the piston 73 is pushed to move so as to deform the pneumatic rubber cup 74. The pneumatic rubber cup 74 compresses an air volume in the sealing chamber between the cylinder block 71 and the pneumatic rubber cup 74, so that a pressing force is converted into an air pressure, which acts on the pneumatic drainage valve 31 through the inflation tube 32. Thus, the pneumatic drainage valve 31 is opened to realize drainage of the water tank. In other embodiments, the

pneumatic rubber cup 74 may also be a gasbag (e.g., an airbag) or other structural forms of pressurized seal elements.

[0032] At least one inflation tube 32 is arranged, and the quantity of the second flushing button(s) 52 on the mechanical driving panel 50 is the same as the quantity of the inflation tube(s) 32. In an embodiment, two inflation tubes 32 and two second flushing buttons 52 are provided on the mechanical driving panel 50. More particularly, the second flushing button 52 comprises a high-volume flushing button 52a and a low-volume flushing button 52b, and the inflation tube 32 correspondingly comprises a high-volume flushing tube 32a and a low-volume flushing tube 32b. An opening time duration of the pneumatic drainage valve 31 is t1 after the high-volume flushing button 52a is triggered, and the opening time duration of the pneumatic drainage valve 31 is t2 after the low-volume flushing button 52b is triggered, and t1 is greater than t2.

[0033] During working, when the high-volume flushing button 52a or the low-volume flushing button 52b of the mechanical driving panel 50 is pressed or triggered, the first driving conversion module 70 is driven to work, and the generated air pressure is filled into the pneumatic drainage valve 31 through the high-volume flushing tube 32a or the low-volume flushing tube 32b. Thus, the valve for high-volume flushing or low-volume flushing may be opened, and a ceramic flush toilet can be cleaned by the water tank.

<Electric driving panel 60>

[0034] FIG. 5 is a structural schematic diagram of a hidden water tank comprising an electric driving panel according to an example of present the disclosure. FIG. 6 is a block diagram illustrating the hidden water tank comprising the electric driving panel according to an example of the present disclosure. As shown in FIG. 5 and FIG. 6, the electric driving panel 60 comprises a third panel body 61 and a human body sensor 62 mounted on the third panel body 61. The human body sensor 62 comprises one of an infrared sensor, a microwave sensor, an ultrasonic sensor, or a remote control sensor. When a human body is located at a set distance in front of the infrared sensor, the microwave sensor, the ultrasonic sensor, or the remote control sensor, the infrared sensor, the microwave sensor, the ultrasonic sensor, or the remote control sensor receives a detection signal and sends the detection signal to a control module (e.g., a controller 90 as shown in FIG. 6). The second driving conversion module 80 comprises an inflator pump 81. The control module controls the inflator pump 81 to work after receiving the detection signal from the human body sensor 62. The inflation pump 81 starts to inflate and acts on the inflation tube 32 to open the pneumatic drainage valve 31. The controller 90 in the present disclosure can be implemented by any appliances or by any software or applications run by the appliances. The controller 90 may be connected to a workstation or another external device (e.g., control panel, remote) and/or a database for receiving user inputs, system characteristics, and any of the values described herein. The controller 90 may include a processor. Optionally, the controller 90 may include an input device and/or a sensing circuit in communication with any of the sensors. The sensing circuit receives sensor measurements from as described above. Optionally, the controller 90 may include a drive unit for receiving and reading non-transitory computer media having instructions. Additional, different, or fewer components may be included. The processor is configured to perform instructions stored in memory for executing the algorithms described herein.

[0035] The processor may be a general purpose or specific purpose processor, an application specific integrated circuit (ASIC), one or more programmable logic controllers (PLCs), one or more field programmable gate arrays (FPGAs), a group of processing components, or other suitable processing components. Processor is configured to execute computer code or instructions stored in memory or received from other computer readable media (e.g., embedded flash memory, local hard disk storage, local ROM, network storage, a remote server, etc.). The processor may be a single device or combinations of devices, such as associated with a network, distributed processing, or cloud computing.

[0036] In an embodiment, the controller 90 may be communicably connected to a storage configured to store the data as described in the present disclosure. The storage may include one or more devices (e.g., memory units, memory devices, storage devices, etc.) for storing data and/or computer code for completing and/or facilitating the various processes described in the present disclosure. The storage may include random access memory (RAM), read-only memory (ROM), hard drive storage, temporary storage, non-volatile memory, flash memory, optical memory, or any other suitable memory for storing software objects and/or computer instructions. The storage may include database components, object code components, script components, or any other type of information structure for supporting the various activities and information structures described in the present disclosure. The storage may be communicably connected to processor via a processing circuit and may include computer code for executing (e.g., by processor) one or more processes described herein. For example, the storage may include graphics, web pages, HTML files, XML files, script code, shower configuration files, or other resources for use in generating graphical user interfaces for display and/or for use in interpreting user interface inputs to make command, control, or communication decisions.

[0037] In order to realize drainage of the water tank with different volumes, at least one inflation tube 32 is provided, and the quantity of the inflator pump(s) 81 is the same as the quantity of the inflation tube(s) 32. Inflation volumes of the inflator pumps 81 are different. More

particularly, the inflator pump 81 comprises a first inflator pump 81a and a second inflator pump 81b. An exhaust volume output by the first inflator pump 81a in a preset time duration is larger than an exhaust volume output by the second inflator pump 81b. The inflation tube 32 correspondingly comprises a high-volume flushing tube 32a and a low-volume flushing tube 32b. An opening time duration of the pneumatic drainage valve 31 is t1 when the pneumatic drainage valve 31 is triggered by the high-volume flushing tube 32a, and the opening time duration of the pneumatic drainage valve 31 is t2 when the pneumatic drainage valve 31 is triggered by the low-volume flushing button 32b. Here, t1 is greater than t2.

[0038] The control module controls a first inflator pump 81a or a second inflator pump 81b to start according to a detection situation of the human body sensor 62. Specifically, when the human body sensor 62 is an infrared sensor, a microwave sensor, or an ultrasound sensor, the first inflator pump 81a or the second inflator pump 81b is controlled to start by sensing time durations when infrared rays, microwaves, or ultrasonic waves emitted by the infrared sensor, the microwave sensor, or the ultrasonic sensor are blocked. For example, when the blocked time duration T is greater than the first preset time duration T1, the first inflator pump 81a is controlled to start. When the blocked time duration T is greater than the second preset time duration T2, but less than the first preset time duration T1, the second inflator pump 81b is controlled to start. Here, T1 is greater than T2. When the human body sensor 62 is a remote control sensor, the remote control sensor includes two capacitive sensors arranged on the third panel body 61 at intervals. When the user blocks the first capacitive sensor with hand, the first inflator pump 81a is controlled to start. When the user blocks the second capacitive sensor with hand, the second inflator pump 81b is controlled to start.

[0039] As shown in FIG. 5, the electric driving panel 60 further comprises a prompt window, and the prompt window 63 is configured to notify a user about a working state of the inflator pump 81. Specifically, the prompt window 63 notifies, by lighting or flashing, the user about whether the inflator pump 81 is working or which inflator pump 81 is working. In one embodiment, two prompt windows 63 are provided, including one prompt window 63 configured to display a working state of the first inflator pump 81a and the other prompt window 63 configure to display a working state of the second inflator pump 81b. In another embodiment, one prompt window 63 is provided and configured to display the working state of the first inflator pump 81a and the working state of the second inflator pump 81b by different changes of lights of the prompt widow 63, such as different brightness or flashing frequency.

[0040] During working, when the human body sensor 62 on the third panel body 61 senses a human body, the control module controls the first inflator pump 81a or the second inflator pump 81b to start according to the detection situation of the human body sensor 62. The generated air pressure is filled into the pneumatic drainage valve 31 through the high-volume flushing tube 32a or the low-volume flushing tube 32b. Thus, the valve for high-volume flushing or low-volume flushing may be opened, and a ceramic flush toilet can be cleaned by the water tank.

[0041] In an embodiment, the present disclosure further provides a toilet including a base (e.g., a pedestal, bowl, etc.) and the hidden water tank as described above. The base is configured to be attached to another object such as a drainpipe, floor, or another suitable object. The base includes a bowl, a sump (e.g., a receptacle) disposed below the bowl, and a trapway fluidly connecting the bowl to a drainpipe or sewage line. The hidden water tank may be supported by the base, such as an upper surface of a rim. The hidden water tank may be integrally formed with the base as a single unitary body. In other embodiments, the hidden water tank may be formed separately from the base and coupled (e.g., attached, secured, fastened, connected, etc.) to the base. The toilet may further include a tank lid covering an opening and inner cavity in the hidden water tank. The toilet may include a seat assembly including a seat and a seat cover rotatably coupled to the base. The toilet may further include a hinge assembly.

[0042] In another embodiment, the toilet may be a tankless toilet. The toilet includes a base and a seat assembly coupled to the base. The base includes a bowl, a sump disposed below the bowl, and a trapway fluidly connecting the bowl to a drainpipe or sewage line. The toilet includes a waterline that supplies the toilet with water. The toilet may further include a seat assembly including a seat and a seat cover rotatably coupled to the base. The toilets described above are provided herein as non-limiting examples of toilets that may be configured to utilize aspects of the present disclosure.

[0043] In some examples, the bidet may be included in a seat or pedestal of a toilet. In other examples, the bidet may be manufactured separately from and attached or coupled to a seat or pedestal of a toilet. The bidet includes a housing. The housing is configured to receive a flow of water through a housing inlet and dispense the flow of water from a housing outlet. The housing inlet and housing outlet may be located on opposite ends of the housing from one another, such that water may flow through the housing from the housing inlet to the housing outlet. In some examples, the housing further includes a chamber. As the housing receives the flow of water, the chamber may fill with water and provide a flow of water between the housing inlet and the housing outlet. The chamber may be configured to contain the flow of water and direct the flow of water from the housing inlet to the housing outlet. After the chamber has filled with water, the flow of water may travel along a substantially linear path between the housing inlet and the housing outlet. In some examples, one or more walls within the housing may be included to help direct a flow of water between the housing inlet and the housing outlet. The bidet may

further include a housing inlet conduit configured to direct a flow of water to the housing inlet. The housing inlet conduit may be coupled to a water supply such as tank or waterline. The housing may further include a gear assembly or a portion of the gear assembly.

[0044] FIG. 7 is a flow chart of a method for controlling the hidden water tank to flush water according to an example of the present disclosure. The hidden water tank controlled by the method may be the hidden water tank according to any of the foregoing embodiments and may be configured to perform an operation, function, or the like as described in the present disclosure.

[0045] At act S 101, the driving panel of the hidden water tank may receive a driving force. As noted above, when the driving panel comprises the pneumatic driving panel 40, a user may press the first flushing button 42 to generate the driving force. When the driving panel comprises the mechanical driving panel 50, the user may press the second flushing button 52 to generate the driving force. When the driving panel comprises the electric driving panel 60, the controller 90 may generate the driving force.

[0046] At act S102, the inflation tube 32 of the hidden water tank may convert the driving force into an air pressure change in the inflation tube 32.

[0047] When the driving panel comprises the pneumatic driving panel 40, the first flushing button 42 of the pneumatic driving panel 40 compresses the piston or the airbag of the pneumatic driving panel 40 to fill the air into the pneumatic drainage valve 31 via the inflation tube 32 so as to open the pneumatic drainage valve 31.

[0048] When the driving panel comprises the mechanical driving panel 50, the second flushing button 52 of the mechanical driving panel 50 may move the piston 73 to deform the pneumatic rubber cup 74. The pneumatic rubber cup 74 may compress the air in the sealing chamber between the cylinder block 71 and the pneumatic rubber cup 74 to generate the air pressure acting on the pneumatic drainage valve 31 through the inflation tube 32 so as to open the pneumatic drainage valve 31.

[0049] When the driving panel comprises the electric driving panel 60, in response to the detection of the human body within the preset distance, the controller 90 may control the inflator pump 81 to inflate and act on the inflation tube 32 so as to open the pneumatic drainage valve 31.

[0050] At act S103, the air pressure change in the inflation tube 32 may open or close the pneumatic drainage valve 31.

[0051] Apparently, the above-mentioned embodiments are merely examples for clarity of illustration and are not intended to limit the modes of execution. For those of ordinary skill in the art, other different forms of changes or variations can be made on the basis of the above description. It is not necessary or possible to exhaust all the implementations here. Apparent changes or variations derived therefrom are still within the scope of protection of the present disclosure.

Claims

1. A hidden water tank capable of matching different driving panels, comprising:

   a water tank body, wherein the water tank body comprises a water inlet assembly and a pneumatic drainage assembly; and
   a driving panel detachably connected to the water tank body, comprising one of a pneumatic driving panel, a mechanical driving panel and an electric driving panel, wherein the mechanical driving panel and the pneumatic drainage assembly are connected through a first driving conversion module, and the first driving conversion module is used for converting a mechanical driving force into an air pressure-driving force; and the electric driving panel and the pneumatic drainage assembly are connected through a second driving conversion module, and the second driving conversion module is used for converting an electrical signal into an air pressure-driving force.

2. The hidden water tank capable of matching different driving panels according to claim 1, wherein the water inlet assembly comprises a water inlet joint and a water inlet valve located on a water inlet pipeline, and the water inlet joint is connected to a water supply pipeline; and the pneumatic drainage assembly comprises a pneumatic drainage valve and an inflation tube located on the pneumatic drainage valve, and the inflation tube is used for receiving a driving force on the driving panel.

3. The hidden water tank capable of matching different driving panels according to claim 2, wherein the pneumatic driving panel comprises a first panel body and a first flushing button mounted on the first panel body, the inflation pipe is connected to an output end of the first flushing button, and a piston or a gasbag is arranged in the first flushing button.

4. The hidden water tank capable of matching different driving panels according to claim 2 or claim 3, wherein at least one inflation tube is arranged, and the quantity of the first flushing buttons on the pneumatic driving panel is the same as that of the inflation tubes.

5. The hidden water tank capable of matching different driving panels according to claim 1 or claim 2, wherein the mechanical driving panel comprises a second panel body and a second flushing button mounted on the second panel body; and the first driving conversion module comprises:

   a cylinder, wherein the cylinder is formed by a cylinder block and a cylinder head; and

a piston, a pressurized seal element and a spring located in the cylinder, wherein a compressible sealing chamber is formed between the pressurized seal element and the cylinder block; under the action of the spring, one end of the piston abuts against the cylinder head, and the other end of the piston acts on the pressurized seal element; and the piston is connected to the second flushing button through a connecting rod, and the inflation pipe is connected to the compressible sealing chamber.

6. The hidden water tank capable of matching different driving panels according to claim 5, wherein at least one inflation tube is arranged, and the quantity of the second flushing buttons on the mechanical driving panel is the same as that of the inflation tubes.

7. The hidden water tank capable of matching different driving panels according to claim 1 or claim 2, wherein the electric driving panel comprises a third panel body and a human body sensor mounted on the third panel body, the second driving conversion module comprises an inflator pump, and the inflation tube is connected to an output end of the inflator pump.

8. The hidden water tank capable of matching different driving panels according to claim 7, wherein the human body sensor comprises one of an infrared sensor, a microwave sensor, an ultrasonic sensor and a remote control sensor.

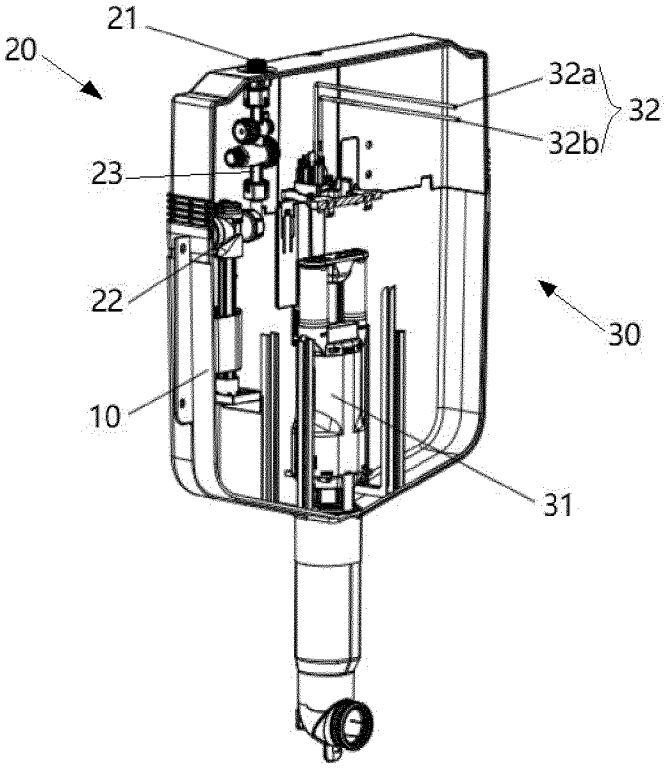
9. The hidden water tank capable of matching different driving panels according to claim 7 or claim 8, wherein at least one inflation tube is arranged, and the quantity of the inflator pumps is the same as that of the inflation tubes.

10. The hidden water tank capable of matching different driving panels according to claim 7, claim 8 or claim 9, wherein the electric driving panel further comprises a prompt window, and the prompt window is used for prompting a user about a working state of the inflator pump.

11. A toilet including a base and the hidden water tank of any one of claims 1 to 10.

12. A method of controlling a hidden water tank, e.g. the hidden water tank of any one of claims 1 to 10, to flush water comprising:

receiving a driving force at a driving panel of the hidden water tank;
converting the driving force into an air pressure change in an inflation tube of the hidden water tank; and
opening or closing a pneumatic drainage valve in response to the air pressure change in the inflation tube.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20
32a
32
32b
23
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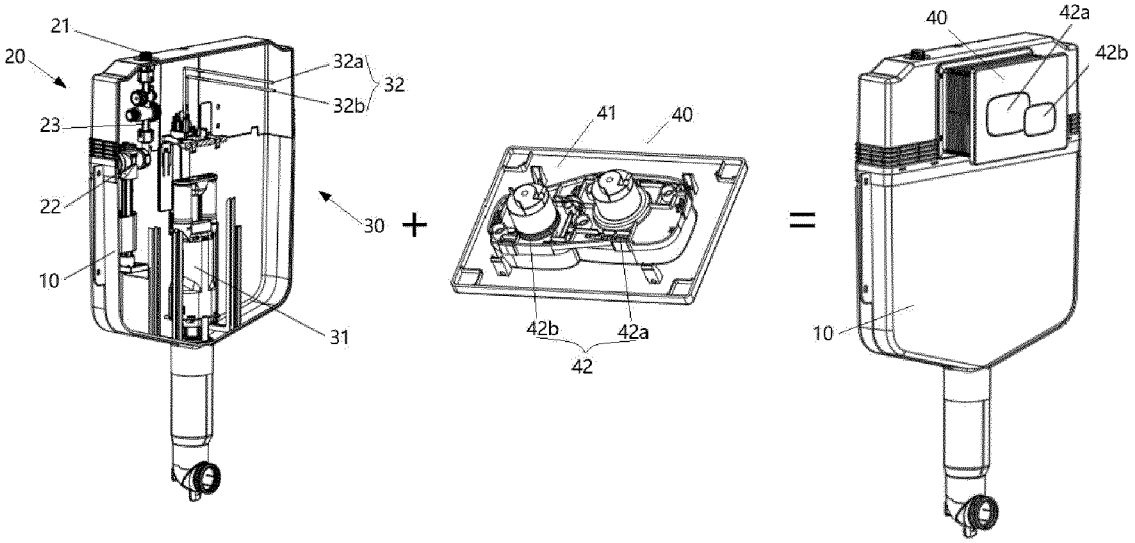
31

FIG. 1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32a
32
32b
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41
40
42b
42a
42
=
40
42a
42b
10

FIG. 2

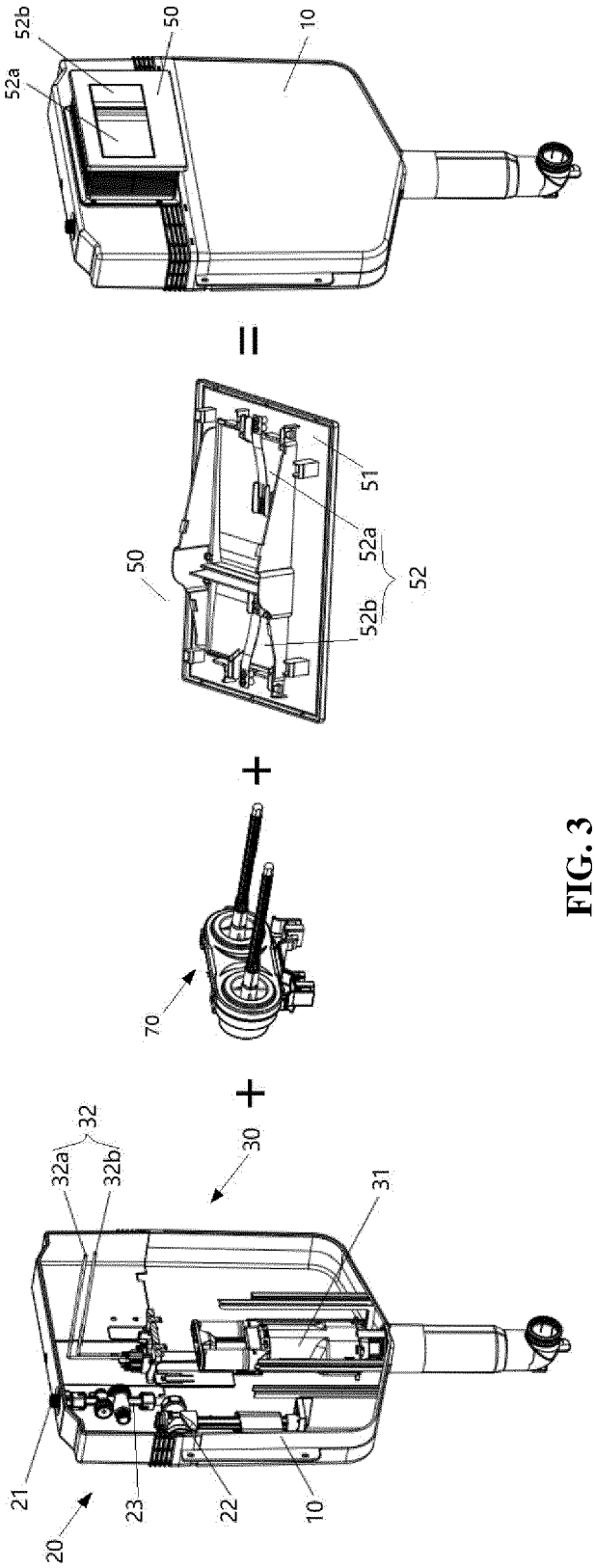

FIG. 3

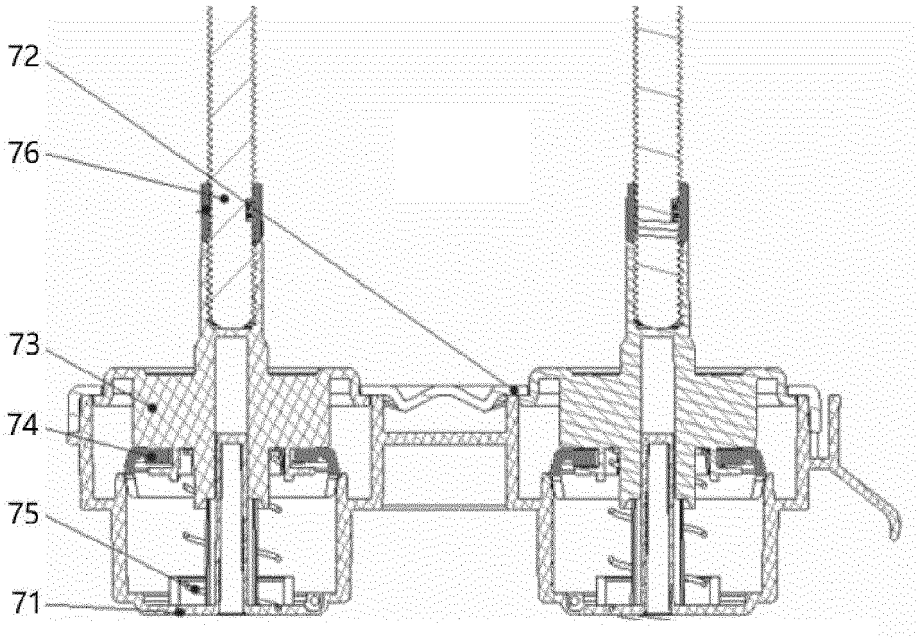

FIG. 4

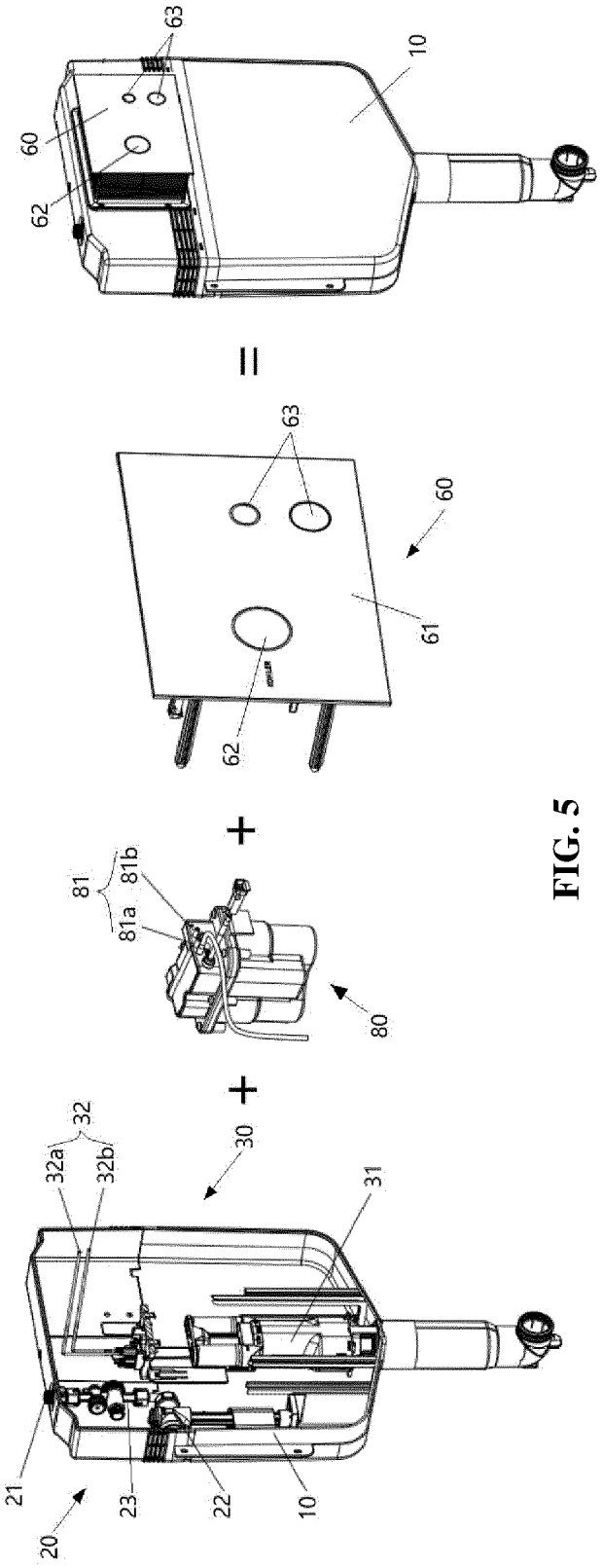

FIG. 5

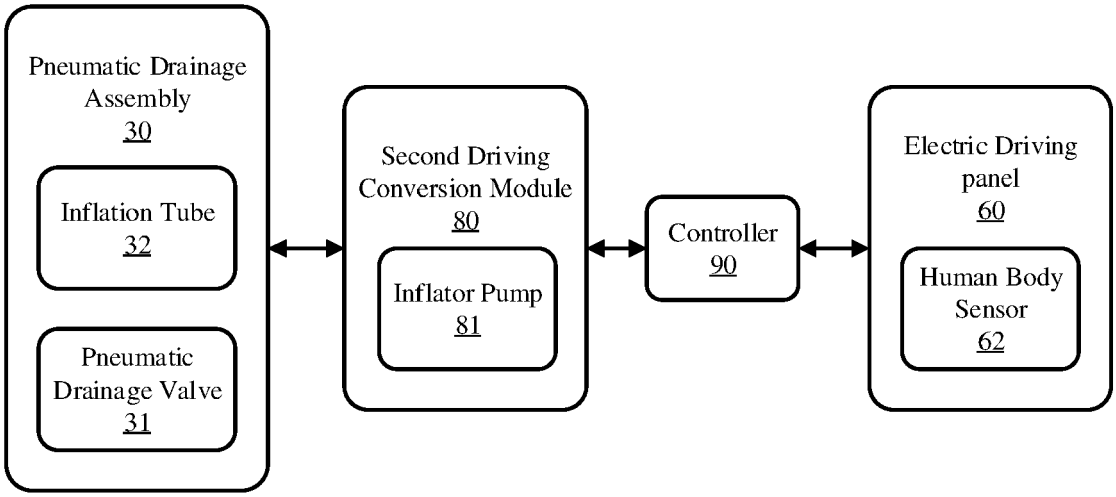
Pneumatic Drainage Assembly
30
Inflation Tube
32
Pneumatic Drainage Valve
31
Second Driving Conversion Module
80
Inflator Pump
81
Controller
90
Electric Driving panel
60
Human Body Sensor
62

FIG. 6

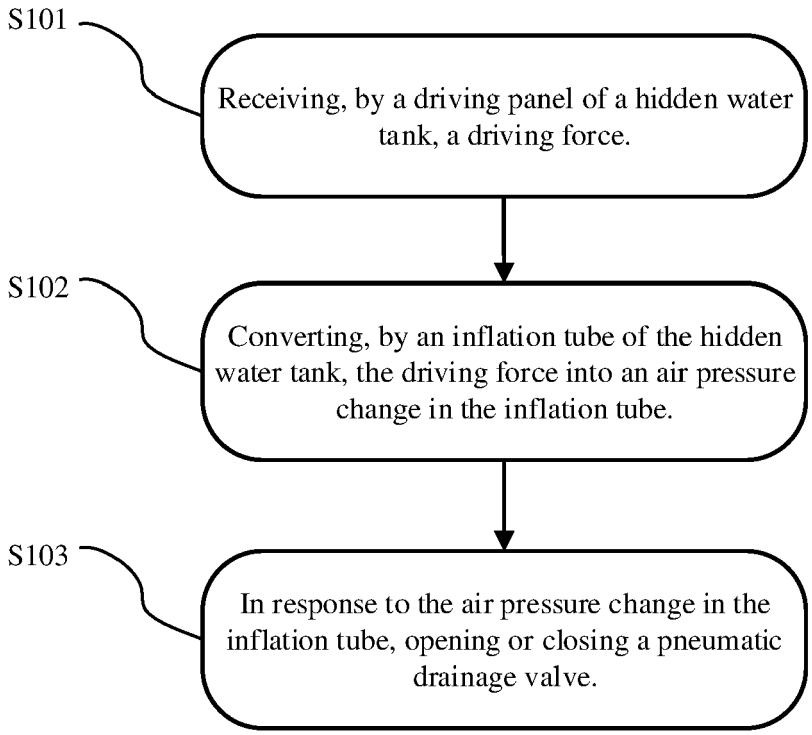
S101
Receiving, by a driving panel of a hidden water tank, a driving force.
S102
Converting, by an inflation tube of the hidden water tank, the driving force into an air pressure change in the inflation tube.
S103
In response to the air pressure change in the inflation tube, opening or closing a pneumatic drainage valve.

FIG. 7

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EUROPEAN SEARCH REPORT

Application Number
EP 23 15 9474

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Place of search	Date of completion of the search	Examiner
Munich	30 June 2023	Posavec, Daniel

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