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(54) FLUSHING SYSTEM AND TOILET DEVICE

(57) A flushing system and a toilet device (100). The flushing system comprises: one or more injection pipelines (20), a water output end/water output ends of which is/are configured to be connected to a toilet main body (1) and spray the toilet main body (1) and generate a siphonic sewage discharge; a first water supply pipeline (21) and a second water supply pipeline (22), water output ends of which are respectively connected to water intake ends of the injection pipelines (20), the first water supply pipeline (21) being provided with a booster pump (3); a control valve (4), which is connected to the first water supply pipeline (21) and the second water supply pipeline (22) and controls the connection/disconnection of the water output ends of the first water supply pipeline (21) and the second water supply pipeline (22), and the water intake ends of the injection pipelines (20); and a control device (5), which is connected to the control valve (4) and the booster pump (3) respectively, and is configured to control the water output end of the first water supply pipeline (21) to be in communication with the water intake end of the injection pipeline (20) when in a first working state, and to control the water output end of the second water supply pipeline (22) to be in communication with the water intake end of the injection pipeline (20) when in a second working state.

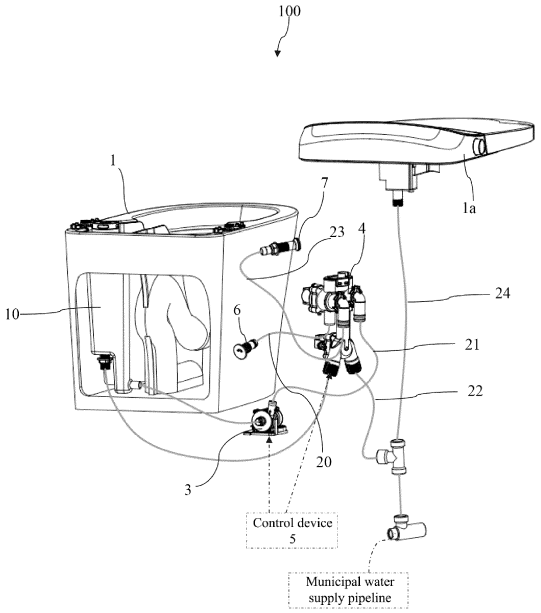


FIG. 1

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Description

[0001] This application claims priority to a Chinese patent application No. 202210995183. X, filed to CNIPA on August 18, 2022, entitled "Flushing System and Toilet Device", the contents of which should be regarded as being incorporated herein by reference.

Technical Field

[0002] The present application relates to, but is not limited to, the technical field of bathroom, and particularly relates to, but is not limited to, a flushing system and a toilet device.

Background

[0003] At present, the smart toilet with its own water pump flushing system on the market is more and more favored by consumers because of its stable flushing performance. In terms of flushing performance, such type of flushing system can not only meet the flushing of the tap water pipeline under high water pressure working condition, but also not be affected by the water pressure fluctuation of pipeline when the tap water pipeline is under a low pressure.

[0004] However, such type of flushing system also has some drawbacks. One prominent defect of them is that under abnormal working conditions, such as power failure working conditions, since driving the water pump requires a large power and it is impossible to drive the water pump in the power failure state of power grid, the flushing cannot be achieved in the power failure state.

Summary

[0005] The following is a summary of the subject matter described in detail herein. This summary is not intended to limit the protection scope of the claims.

[0006] An embodiment of the present disclosure provides a flushing system including:

one or more injection pipelines, a water output end/-water output ends of which being configured to be connected to a toilet main body and spray the toilet main body and generate siphonic sewage discharge;

a first water supply pipeline and a second water supply pipeline, water output ends of the first water supply pipeline and the second water supply pipeline both being connected to a water intake end of the injection pipeline, and the first water supply pipeline being provided with a booster pump;

a control valve, which is connected to the first water supply pipeline and the second water supply pipeline and controls the connection/disconnection between the water output ends of the first water supply pipeline and the second water supply pipeline and the water intake end of the injection pipeline; and

a control device, which is connected to the control valve and the booster pump, and is configured to control the water output end of the first water supply pipeline to be in communication with the water intake end of the injection pipeline when in a first working state, and to control the water output end of the second water supply pipeline to be in communication with the water intake end of the injection pipeline in a second working state.

[0007] An embodiment of the present disclosure further provides including a toilet main body, and a flushing system as described in any embodiment herein and mounted in cooperation with the toilet main body, and the toilet main body is provided with a flushing interface connected to the water output end of the injection pipeline.

[0008] Other aspects will become apparent after reading and understanding the drawings and detailed description.

Brief Description of Drawings

[0009] The accompanying drawings are used to provide further understanding of the technical solutions of the present disclosure, and constitute a part of the specification. They are used to explain the technical solutions of the present application together with the embodiments of the present disclosure and do not constitute a limitation on the technical solutions of the present application.

FIG. 1 is a perspective schematic diagram showing the connection between various components of a toilet device according to an embodiment of the present disclosure.

FIG. 2 is a side cross-sectional view of a toilet body according to an embodiment of the present disclosure.

FIG. 3 is a schematic diagram of a flushing state of a toilet body according to an embodiment of the present disclosure.

FIG. 4 is a perspective diagram of a control valve of a toilet device according to an embodiment of the present disclosure.

FIG. 5 is a cross-sectional view of one position of a control valve of a toilet device according to an embodiment of the present disclosure.

FIG. 6 is a cross-sectional view of another position of

a control valve of a toilet device according to an embodiment of the present disclosure.

FIG. 7 is a control logic diagram of a flushing system in a first working state according to an embodiment of the present disclosure.

FIG. 8 is a control logic diagram of a flushing system in a second working state according to an embodiment of the present disclosure.

Reference signs:

[0010] toilet device-100; toilet main body-1; water tank-10; basin body-11; sewage discharge channel-12; water sealing region-110; rim-brushing interface-13; flushing interface-14; injection pipeline-20; first water supply pipeline-21; second water supply pipeline-22; rim-brushing pipeline-23; toilet lid flushing pipeline-24; booster pump-3; control valve-4; valve body-40; first control mechanism-41; second control mechanism-42; communication channel-40a; first flow channel-401; second flow channel-402; third flow channel-403; fourth flow channel-404; fifth flow channel-405; solenoid valve core-410; solenoid valve core-420; control device-5; injector-6; ejector-7; angle valve-81; three-way connection pipe-82; energy storage power source-9; water tank-10.

Detailed Description

[0011] Technical solutions in the embodiments of the present disclosure will be clearly and completely described below with reference to the drawings in the embodiments of the present disclosure. Apparently, the described embodiments are only part of and not all of the embodiments of the present disclosure. Based on the embodiments of the present disclosure, all other embodiments obtained by those of ordinary skills in the art without making creative efforts fall within the protection scope of the present disclosure.

[0012] In addition, the technical solutions in different embodiments of the present disclosure can be combined with each other, but it needs to be based on the realization by those of ordinary skill in the art. When the combination of the technical solutions is contradictory or cannot be realized, it should be considered that the combination of the technical solutions does not exist and is not within the protection scope claimed by the present disclosure.

[0013] In the description of the present disclosure, it is to be understood that the orientations or position relationships indicated by the terms "center", "longitudinal", "transverse", "length", "width", "thickness", "upper", "lower", "front", "rear", "left", "right", "vertical", "horizontal", "top", "bottom", "inner", "outer", "clockwise", "counterclockwise", and the like are based on those shown in the drawings, which are only for convenience of describing the present disclosure and simplifying the description and are not intended to indicate or imply that the referred device or element must have a particular orientation, or is constructed and operated in a particular orientation, and therefore cannot be construed as limiting on the present disclosure.

[0014] Furthermore, the terms "first", "second" are only used for descriptive purposes and cannot be understood as indicating or implying relative importance or implying the quantity of technical features indicated.

[0015] In the description of the present disclosure, the term "a plurality of/multiple" refers to two or more.

[0016] In the description of the present disclosure, unless otherwise explicitly specified and defined, terms "mount", "connect" and "couple" should be understood in a broad sense. For example, it may be a fixed connection or may be a detachable connection, or may be an integral connection; it can be a mechanical connection, or may be an electrical connection, or may be in communication with each other; it may be a direct connection, or an indirect connection through an intermediate medium, or it may be an internal communication between two elements or an interaction between the two elements. For those of ordinary skills in the art, specific meanings of the above terms in the present disclosure can be understood according to specific situations.

[0017] In the present disclosure, unless otherwise explicitly specified and defined, a first feature being "above" or "below" a second feature may include direct contact between the first feature and the second feature, or it may also include the first feature and the second feature not being in direct contact but being in contact through other feature(s) between them. Moreover, the first feature being "on", "above" and "over" the second feature includes the first feature being directly above and obliquely above the second feature, or simply indicates that the level of the first feature is higher than that of the second feature. The first feature being "under", "below" and "underneath" the second feature includes the first feature being directly below and obliquely below the second feature, or simply indicates that the level of the first feature is lower than that of the second feature.

[0018] Various different implementations or examples are provided below to implement different structures of the present disclosure. In order to simplify the disclosure of the present application, components and arrangements of particular examples are described below. It is clear that, they are examples only and are not intended to limit the present disclosure. In addition, the present disclosure may repeat reference numbers and/or reference letters in different examples, and such repetition is for purposes of simplification and clarity, and itself does not indicate the relationship between the various embodiments and/or settings discussed. In addition, the present disclosure provides examples of various specific processes and materials, but those of ordinary skills in the art may be aware of the application of other processes and/or the use of other materials.

[0019] An embodiment of the present disclosure provides a toilet device 100, which can be used for an

injection siphonic smart toilet, and can be a sitting type or a squatting type. Embodiments of the present disclosure will be described in detail with reference to a sitting toilet device 100.

[0020] As shown in FIGS. 1 to 8, the toilet device 100 according to the embodiment of the present disclosure may include a toilet main body 1 and a flushing system mounted in cooperation with the toilet main body 1.

[0021] As shown in FIGS. 1-2, the toilet body 1 may include a water tank 10, a basin body 11, and a sewage discharge channel 12 communicated with the basin body 11, and the sewage discharge channel 12 is used to connect with a sewage system. The basin body 11 includes a water sealing region 110 communicated with the sewage discharge channel 12, and the water sealing region 110 is used for storing a water column with a certain height, so as to resist the change of air pressure difference in the sewage discharge channel 12 and prevent the gas in the sewage discharge channel 12 from escaping into the room.

[0022] As shown in FIG. 2, the toilet body 1 is provided with a rim-brushing interface 13 and a flushing interface 14 which can be in communication with the basin body 11 (since an injector 7 and an ejector 6 are respectively mounted, the rim-brushing interface 13 and the flushing interface 14 cannot be completely shown). In the embodiment of the present disclosure, the rim-brushing interface 13 is disposed at an upper portion of the basin body 11, and the flushing interface 14 is disposed at a lower portion of the basin body 11, and is disposed corresponding to the position of the water sealing region 110. In the embodiment of the present disclosure, the water tank 10 may be integrated into the toilet body 1, and in other embodiments, the water tank 10 may be designed separately from the toilet body 1, which is not limited herein.

[0023] As shown in FIG. 1, the flushing system may include one or more injection pipelines 20, water output end(s) of the injection pipeline(s) 20 is/are configured to be connected to the toilet main body 1 and spray the water sealing region 110 of the toilet main body 1 to generate a siphonic sewage discharge.

[0024] The flushing system may further include a first water supply pipeline 21 and a second water supply pipeline 22, and water output ends of the first water supply pipeline 21 and the second water supply pipeline 22 are connected to water intake end(s) of the injection pipeline(s) 20. The first water supply pipeline 21 is provided with an increasing pump 3, which can be used for outputting pressurized water and improving the impact force. The increasing pump 3 may be a flushing water pump, or an air pump, or the like.

[0025] The flushing system may further include a control valve 4 that is connected to the first water supply pipeline 21 and the second water supply pipeline 22 and controls the connection/disconnection between the water output ends of the first water supply pipeline 21 and the second water supply pipeline 22, and the water intake end(s) of the injection pipeline(s) 20.

[0026] The flushing system may further include a control device 5. The control device 5 may be electrically connected to the control valve 4 and the booster pump 3, and is configured to control the water output end of the first water supply pipeline 21 to be in communication with the water intake end of the injection pipeline 20 in a first working state, and control the water output end of the second water supply pipeline 22 to be in communication with the water intake end of the injection pipeline 20 in a second working state. The first state is a state in which the municipal power is connected, and the second state is a state in which the standby power source is connected.

[0027] The control valve 4 in the embodiment of the present disclosure adopts a control valve with integrated design, which can control the connection/disconnection of a plurality of water flows, and can reduce the number of connection components, thereby reducing the complexity of connection and reducing the cost. In an exemplary embodiment, the control valve 4 may be a plurality of control valve units that are independently designed, one of the control valve units controls the first water supply pipeline 21 and another of the control valve units controls the second water supply pipeline 22.

[0028] In an embodiment of the present disclosure, one or more injection pipelines 20 may be provided. When one injection pipeline 20 is provided, both the first water supply pipeline 21 and the second water supply pipeline 22 can be connected to the injection pipeline 20, and a single injection pipeline 20 can avoid providing a plurality of interfaces on the toilet body 1. When two injection pipelines 20 are provided, the first water supply pipeline 21 and the second water supply pipeline 22 may be connected to the corresponding injection pipelines 20, respectively.

[0029] The flushing system of the embodiment of the present disclosure is designed with a two-way flushing system, which can not only flush the toilet body 1 with pressurized water in a power-on state, but also flush the toilet body 1 with municipal water supply in a power failure state.

[0030] In the embodiment of the present disclosure, the water intake end of the first water supply pipeline 21 is configured to be connected to a municipal water supply pipeline (generally referred to as a tap water pipeline), and the water intake end of the second water supply pipeline 22 is configured to be connected to the water tank 10. The embodiment of the present disclosure adopts two independent water supply pipelines, and the two independent water supply pipelines do not affect each other, thereby facilitating the independent operation of the two water supply pipelines.

[0031] As shown in FIG. 1, the flushing system may further include a rim-brushing pipeline 23, a water intake end of which is configured to be connected to the second water supply pipeline 22. A water output end of the rim-brushing pipeline 23 is configured to be connected to the toilet body 1, and is used for generating rim-brushing water flow to clean the toilet body 1. The control valve 4

can also be connected to the rim-brushing pipeline 23, and can control the connection/disconnection between the water intake end of the rim-brushing pipeline 23 and the second water supply pipeline 22.

[0032] As shown in FIGS. 4 to 6, in the embodiment of the present disclosure, the control valve 4 adopts a hybrid multi-way valve, and the control valve 4 includes a valve body 40, a first control mechanism 41, and a second control mechanism 42. The valve body 40 is provided with a communication channel 40a, a first flow channel 401 and a second flow channel 402 which are located upstream of the communication channel 40a, a third flow channel 403 and a fourth flow channel 404 which are located downstream of the communication channel 40a.

[0033] The first control mechanism 41 is disposed in the valve body 40, and controls connection and disconnection between a water output end of the first flow channel 401 and a water intake end of the communication channel 4a. The water intake end of the first flow channel 401 is configured to be connected to the municipal water supply pipeline. A water intake end of the second flow channel 402 is communicated with the water output end of the first flow channel 401, and a water output end of the second flow channel 402 is connected to the water tank 10 to continuously supply water to the water tank 10.

[0034] A communication port between the first flow channel 401 and the second flow channel 402 is of a normally open type to continuously supply water to the water tank 10. The first control mechanism 41 controls the connection/disconnection relationship between the first flow channel 401 and the communication channel 40a. When the first flow channel 401 is communicated with the communication channel 40a, the water flows into the communication channel 40a and flows towards the second control mechanism 42 (see FIG. 5).

[0035] The second control mechanism 42 is disposed in the valve body 40, and can control the connection and disconnection between a water output end of the communication channel 40a and a water intake end of the third flow channel 403, and can control the connection and disconnection between a water output end of the fourth flow channel 404 and the water intake end of the third flow channel 403. A water output end of the third flow channel 403 is communicated with the water intake end of the injection pipeline 20. A water intake end of the fourth flow channel 404 is communicated with the water output end of the first water supply pipeline 21.

[0036] The valve body 40 is provided with a fifth flow channel 405 located downstream of the communication channel 40a, and a water output end of the fifth flow channel 405 is connected to the rim-brushing pipeline 23. The second control mechanism 42 is further configured to control the connection and disconnection between the water output end of the communication channel 40a and a water intake end of the fifth flow channel 405. When the toilet device 100 is supplying water, the water flows to the second control mechanism 42 through the communication channel 40a, and then the second control mechanism 42 distributes the water into the third flow channel 403 or the fifth flow channel 405 (see FIG. 6).

[0037] The control device 5 is configured to control the first control mechanism 41 to switch the water output end of the first flow channel 401 to be disconnected from the water intake end of the communication channel 40a when in the first working state (the power-on state in which the municipal power is connected). The control device 5 is further configured to control the second control mechanism 42 to switch the water output end of the fourth flow channel 404 to be in communication with the water intake end of the third flow channel 403, and to control the second control mechanism 42 to switch the water output end of the fourth flow channel 404 to be in communication with the water intake end of the fifth flow channel 405.

[0038] The control device 5 is configured to control the first control mechanism 41 to operate and switch the water output end of the first flow channel 401 to be in communication with the water intake end of the communication channel 40a when in the second working state (no-power state in which the standby power source is adopted). The control device 5 is further configured to control the second control mechanism 42 to switch the water output end of the communication channel 40a to be connected with the water intake end of the third flow channel 403, and to control the second control mechanism 42 to switch the water output end of the communication channel 40a to be in communication with the water intake end of the fifth flow channel 405.

[0039] The first control mechanism 41 and the second control mechanism 42 in the embodiment of the present disclosure each may adopt an electronically controlled control mechanism. A solenoid valve core 410 is provided inside of the first control mechanism 41 to realize the connection/disconnection of the waterway, and a solenoid valve core 420 is provided inside of the second control mechanism 42 to realize the switching of the waterway.

[0040] As shown in FIGS. 1-3, the flushing system may further include an injector 6 disposed at the water output end of the injection pipeline 20, and an ejector 7 disposed at a terminal of the rim-brushing pipeline 23. The injector 6 can be mounted in cooperation with the flushing interface 14 of the toilet body 1 for generating an injection flow of water to generate a siphonic sewage discharge. An ejection port of the ejector 7 can be mounted corresponding to a wall surface of the basin body 11 for generating a rim-brushing water flow to clean the toilet.

[0041] As shown in FIG. 1, the flushing system may further include a toilet lid flushing pipeline 24. A water intake end of the toilet lid flushing pipeline 24 may be connected to the municipal water supply pipeline, and a water output end of the toilet lid flushing pipeline 24 may be connected to a toilet lid 1a for flushing the toilet lid 1a.

[0042] As shown in FIGS. 7 and 8, the control device 5 can be connected to a switching power source, thereby supplying power to the booster pump 3 and the control

valve 4. Further, the control device 5 may be connected to an energy storage power source 9, and the energy storage power source 9 may supply power to the control valve 4 in a power failure state. The switching power source can refer to an AC power source (such as municipal power).

[0043] In the embodiment of the present disclosure, the control device 5 may adopt a PCBA electronic control board, and may be mounted in a control box of the toilet body 1. The PCBA electronic control board is provided with a power interface that can be connected to the municipal power and a power interface that is connected to the energy storage power source 9.

[0044] In the embodiment of the present disclosure, the energy storage power source 9 may refer to a mobile power source having a certain capacity, such as a standby power supply battery capable of storing electric energy. In an example, the energy storage power source 9 may be a super capacitor energy storage power source and be disposed at the PCBA electronic control board (see FIG. 7), and may supply power to the first control mechanism 41 and the second control mechanism 42. The control device 5 may also be configured to charge the energy storage power source 9 when in connection with the switching power source (in the power-on state).

[0045] The flushing system according to the embodiment of the present disclosure includes two water supply pipelines 21 and 22, both of which can flush the toilet body 1. The first water supply pipeline 21 is provided with a booster pump 3 capable of outputting a high pressure water flow to flush the toilet body 1, which can not only flush under the working condition of high water pressure of the tap water pipeline, but also not be affected by the fluctuation of water pressure of the pipeline when the tap water pipeline is in a low pressure. The second water supply pipeline 22 is capable of low-pressure flushing in a power failure state.

[0046] Since the power of the booster pump 3 is relatively high, it is required for the control device 5 to control the activation of the booster pump 3 while connected to the municipal power. When in a power failure state, that is, the control device 5 cannot be connected to the municipal power and supply power, the control device 5 needs to be connected to the energy storage power source 9, so that the control valve 4 is powered by the energy storage power source 9, and the second water supply pipeline 22 is controlled to activate water supply to flush the toilet body 1.

[0047] A working current of the booster pump 3 can be about 4000mA, and its working voltage can be about 10V, it can work continuously for 20 seconds, and the electric energy is about 4A*10*20=800kwh. A working current of a stepping motor of the control valve 4 may be about 100mA, its working voltage can be about 6V, it can work for 2 seconds cumulatively, and the electric energy is about 0.1A*6*2=1.2kwh. The stepping motor only runs in the processes of function activation and function switching. After the switching is done, it waits for the function to run completely, and then switch or reset is done again. The stepping motor drive can adopt a pulsed drive, and each pulse can be about 100mA. Compared with the equipment requiring continuous output for operation, it is also more energy-saving. Therefore, when the municipal power is not connected (i.e., in power failure), the energy storage power source 9 only provides power for the control valve 4 with small energy consumption.

[0048] A power supply circuit of the booster pump 3 and a power supply circuit of the control valve 4 according to the embodiment of the present disclosure can be independently designed, and the control device 5 is additionally provided with a power source interface that can be connected to the energy storage power source 9. The energy storage power source 9 separately supplies power to the control valve 4, so that the power consumption of the energy storage power source 9 can be reduced, and the energy storage power source 9 can be recycled for many times to reduce the cost.

[0049] The flushing system according to the embodiment of the present disclosure is designed with two water supply pipelines 21 and 22, which can not only high-pressure flush the toilet body 1 in the power-on state, but also low-pressure flush the toilet body 1 in the power failure state. In addition, the flushing system according to the embodiment of the present disclosure can be connected to the energy storage power source 9 to separately supply power to the second water supply pipeline 22 so as to realize low-voltage drive control, so that the energy storage power source 9 has low energy consumption, can be recycled for many times, and the cost is low.

[0050] As shown in FIG. 4, the flushing system according to the embodiment of the present disclosure introduces the municipal water supply pipeline (tap water source) by providing an angle valve 81, and then the angle valve is connected to a three-way connection pipe 82 through a pipeline. The three-way connection pipe 82 divides tap water into two ways, one way enters the water tank 10 through the control valve 4, the water entering the water tank 10 enters the control valve 4 through the first water supply waterway 21, and then enters the injection pipeline 20 through the control valve 4 to flush the toilet body 1; the other way enters the control valve 4 through the second water supply pipeline 22, and then enters the injection pipeline 20 through the control valve 4 to flush the toilet body 1 or enters the rim-brushing pipeline 23 to flush the rim of the toilet body 1 (see FIG. 3).

[0051] When the flushing system is in the power-on (municipal power) working state, the control device 5 (for example, the PCBA electronic control board) is connected to the power source (municipal power). When a flushing command is received, the control device 5 can control the booster pump 3 (flushing water pump) to operate, and control the control valve 4 to communicate the first water supply pipeline 21 and the injection pipeline 20 to flush the toilet body 1. The control device 5 can also control the control valve 4 to communicate the second water supply pipeline 22 and the rim-brushing pipeline 23

to perform rim-flushing for the smart toilet 1. At this time, the toilet lid flushing pipeline 24 (the smart toilet lid waterway indicated in FIG. 7) is communicated to flush the toilet lid.

[0052] When the flushing system is in a power (municipal power) failure state, the control device 5 is connected to the energy storage power source 9 (such as a standby power supply battery), and the energy storage power source 9 provides power to the control valve 4. When the flushing command is received, the control device 5 controls the control valve 4 to communicate the second water supply pipeline 22 and the injection pipeline 20 so as to flush the smart toilet 1, and the control device 5 can also control the control valve 4 to communicate the second water supply pipeline 22 and the rim-brushing pipeline 21 so as to flush the rim of the smart toilet 1. At this time, the toilet lid flushing pipeline 24 is disconnected and the toilet lid is not flushed. It needs to be noted that, in FIG. 8, "X" on the pipeline indicates that the waterway is blocked, and "/" indicates that the function cannot be used.

[0053] Since the standby power source implemented by the present disclosure only supplies power to the control valve 4, the battery consumption is slow, and the battery can be recycled for many times, thus reducing the cost, and avoiding a large energy waste and environmental pollution.

[0054] In the description of the present specification, descriptions with reference to terms "one embodiment", "certain embodiments", "schematic embodiments", "examples", "specific examples", or "some examples" and the like mean that specific features, structures, materials, or characteristics described in connection with the implementations or examples are included in at least one implementation or example of the embodiments of the present disclosure. In this specification, schematic representations of the above terms do not necessarily refer to the same implementations or examples. Further, the specific features, structures, materials, or characteristics described may be combined in a suitable manner in any one or more implementations or examples.

[0055] Although implementations disclosed herein are described above, the described contents are only implementations used for facilitating understanding of the present application, and are not intended to limit the present application. Without departing from the spirit and scope disclosed herein, any person skilled in the art to which the present application pertains may make any modifications and changes in the form and details of implementation, but the scope of patent protection of the present application shall still be defined by the appended claims.

Claims

1. A flushing system, comprising:

one or more injection pipelines, a water output end of an injection pipeline being configured to be connected to a toilet main body and spray the toilet main body and generate siphonic sewage discharge;

a first water supply pipeline and a second water supply pipeline, water output ends of the first water supply pipeline and the second water supply pipeline each being connected to a water intake end of the injection pipeline, and the first water supply pipeline being provided with a booster pump;

a control valve, which is connected to the first water supply pipeline and the second water supply pipeline and controls connection or disconnection between the water output ends of the first water supply pipeline and the second water supply pipeline and the water intake end of the injection pipeline; and

a control device, which is connected to the control valve and the booster pump, and is configured to control the water output end of the first water supply pipeline to be in communication with the water intake end of the injection pipeline when in a first working state, and to control the water output end of the second water supply pipeline to be in communication with the water intake end of the injection pipeline in a second working state.

2. The flushing system of claim 1, wherein a water intake end of the first water supply pipeline is configured to be connected to a water tank, and a water intake end of the second water supply pipeline is configured to be connected to a municipal water supply pipeline.

3. The flushing system of claim 2, further comprising a rim-brushing pipeline, wherein a water intake end of the rim-brushing pipeline is connected to the water output end of the second water supply pipeline, and a water output end of the rim-brushing pipeline is configured to be connected to the toilet body for generating a rim-brushing water flow to clean a basin body of the toilet body;

wherein the control valve is also connected to the rim-brushing pipeline and is capable of controlling connection or disconnection between the water intake end of the rim-brushing pipeline and the water output end of the second water supply pipeline.

4. The flushing system of claim 3, wherein the control valve comprises a valve body, a first control mechanism, and a second control mechanism;

the valve body is provided with a communication channel, a first flow channel and a second flow channel which are located upstream of the com-

munication channel, a third flow channel and a fourth flow channel which are located downstream of the communication channel;
the first control mechanism is disposed in the valve body and is configured to control connection or disconnection between a water output end of the first flow channel and a water intake end of the communication channel; a water intake end of the first flow channel is configured to be connected to the municipal water supply pipeline, a water intake end of the second flow channel is communicated with the water output end of the first flow channel, and a water output end of the second flow channel is configured to be connected to the water tank;
the second control mechanism is disposed in the valve body and is configured to control connection or disconnection between a water output end of the communication channel and a water intake end of the third flow channel, and to control connection or disconnection between a water output end of the fourth flow channel and the water intake end of the third flow channel;
a water output end of the third flow channel is communicated with the water intake end of the injection pipeline; and a water intake end of the fourth flow channel is configured to be in communication with the water output end of the first water supply pipeline.

5. The flushing system of claim 4, wherein the valve body is further provided with a fifth flow channel located downstream of the communication channel, a water output end of the fifth flow channel is connected to the rim-brushing pipeline, and the second control mechanism is further configured to control connection or disconnection between the water output end of the communication channel and a water intake end of the fifth flow channel, and to control connection or disconnection between the water output end of the fourth flow channel and the water intake end of the fifth flow channel.

6. The flushing system of claim 5, wherein,

the control device is configured, in the first working state, to control the first control mechanism to switch so that the water output end of the first flow channel is disconnected from the water intake end of the communication channel, and control the second control mechanism to switch so that the water output end of the fourth flow channel is in communication with the water intake end of the third flow channel, and control the second control mechanism to switch so that the water output end of the fourth flow channel is in communication with the water intake end of the fifth flow channel;

the control device is configured, in the second working state, to control the first control mechanism to switch so that the water output end of the first flow channel is in communication with the water intake end of the communication channel, and to control the second control mechanism to switch so that the water output end of the communication channel is in communication with the water intake end of the third flow channel, and to control the second control mechanism to switch so that the water output end of the communication channel is in communication with the water intake end of the fifth flow channel.

7. The flushing system of claim 3, further comprising an injector disposed at a water output end of the injection pipeline, and an ejector disposed at a terminal of the rim-brushing pipeline;
wherein both the injector and the ejector are configured to be mounted in cooperation with the toilet body.

8. The flushing system of claim 4, wherein the control device is configured to be capable of connecting to a switching power source to supply power to the booster pump, the flushing system further comprises an energy storage power source connected to the control device to supply power to the control valve; the control device is further configured to charge the energy storage power source when connected to the switching power source.

9. The flushing system of claim 8, wherein the control device is an electronic control board, the energy storage power source is disposed on the electronic control board, and the energy storage power source is configured to supply power to the first control mechanism and the second control mechanism.

10. A toilet device, comprising a toilet main body and a flushing system according to any one of claims 1 to 9 mounted in cooperation with the toilet main body, wherein the toilet main body is provided with a flushing interface connected to a water output end of the injection pipeline.

11. The toilet device of claim 10, wherein the toilet main body is further provided with a rim-brushing interface connected to a rim-brushing pipeline of the flushing system, an injector of the toilet main body is mounted in cooperation with the flushing interface, and an ejector of the toilet main body is mounted in cooperation with the rim-brushing interface.

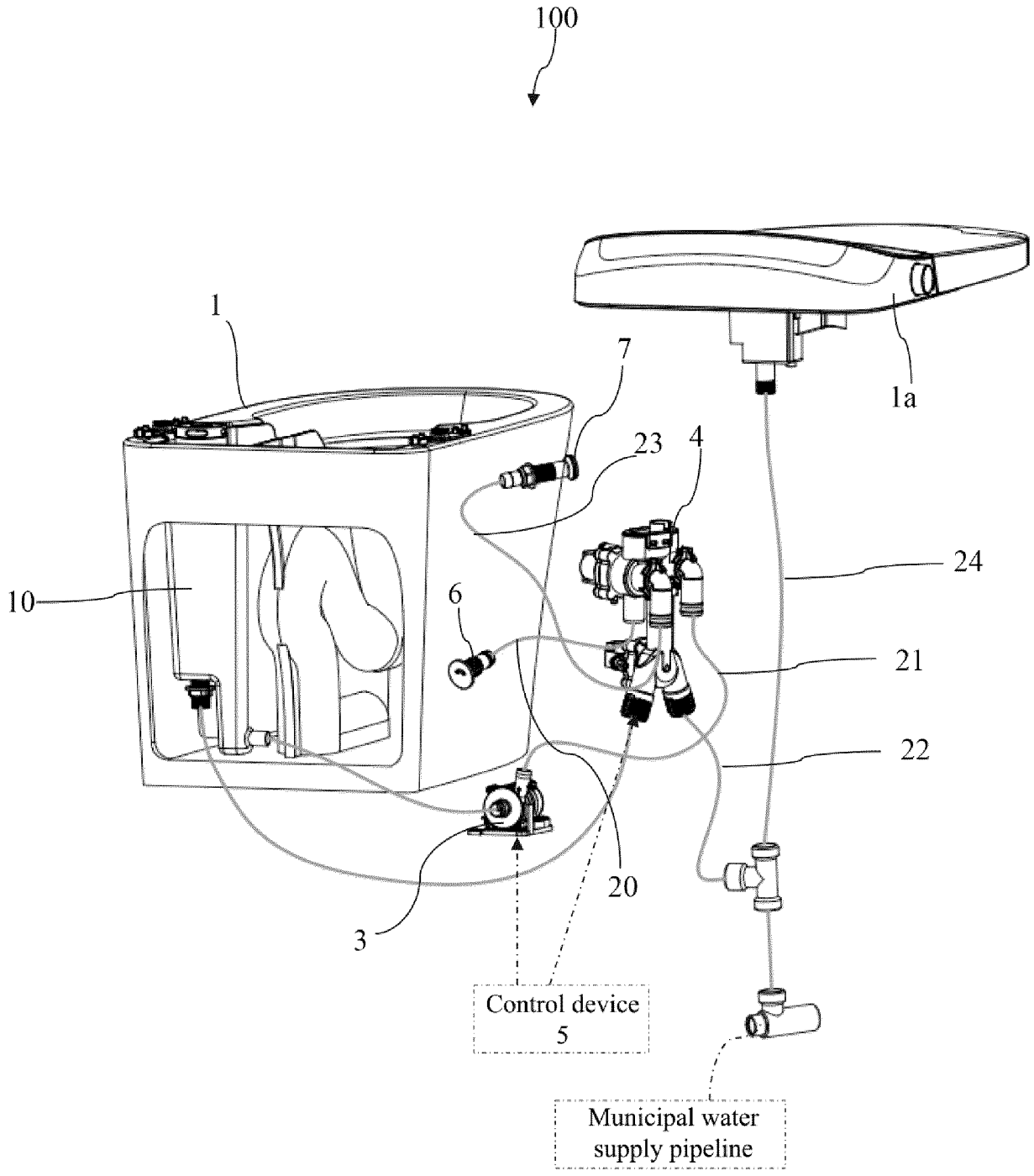

100
1
7
1a
23
4
24
10
6
21
22
20
3
Control device
5
Municipal water
supply pipeline

FIG. 1

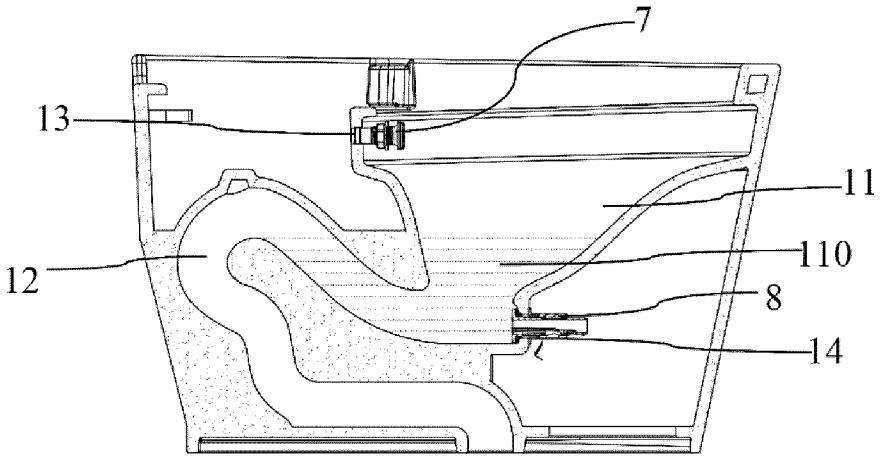


FIG. 2

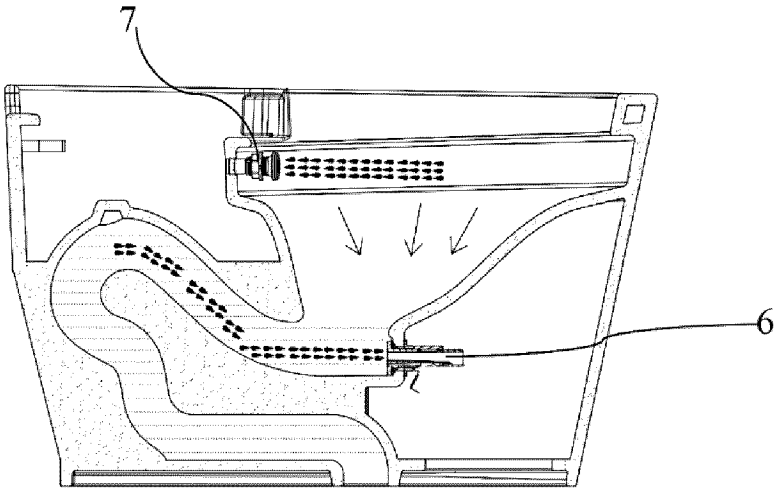


FIG. 3

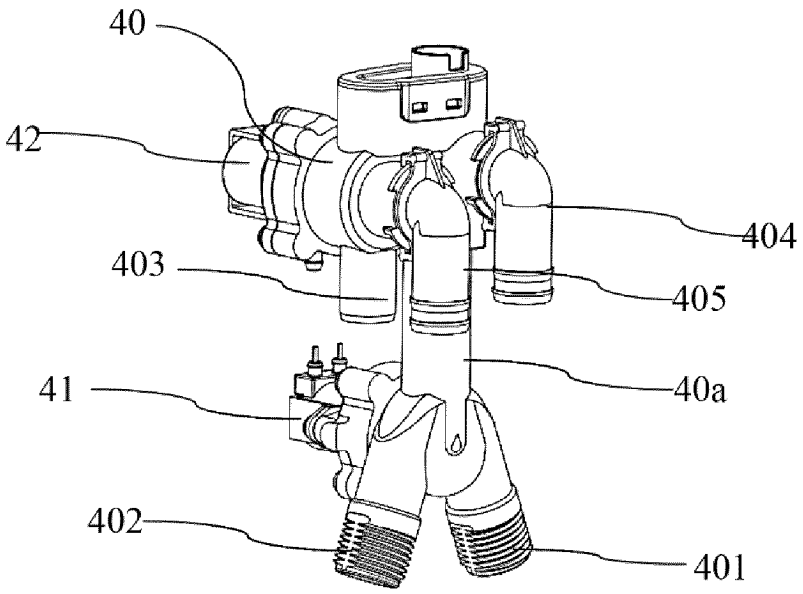


FIG. 4

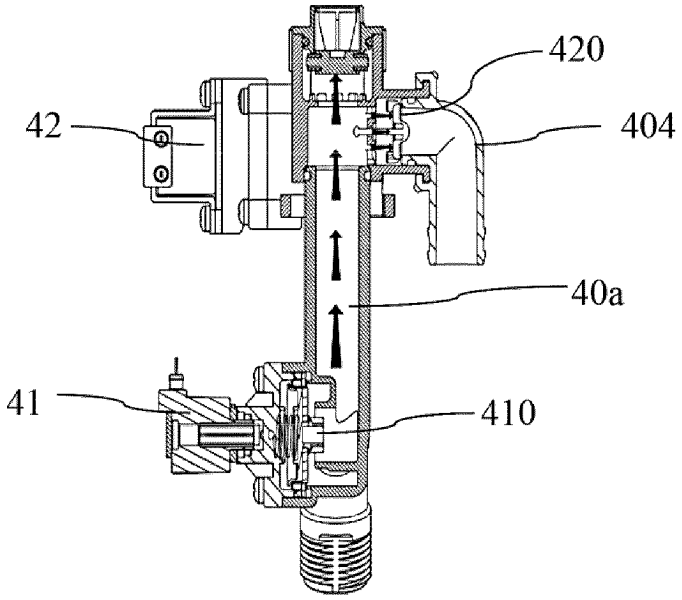


FIG. 5

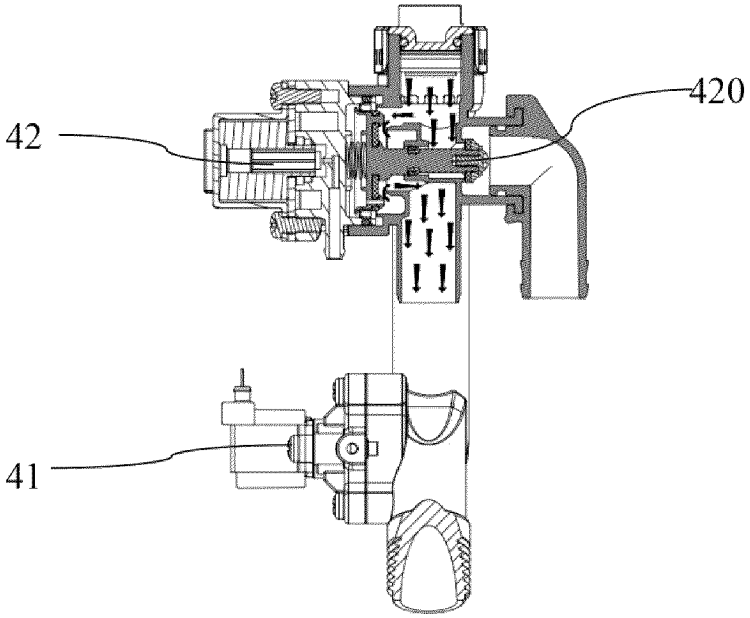


FIG. 6

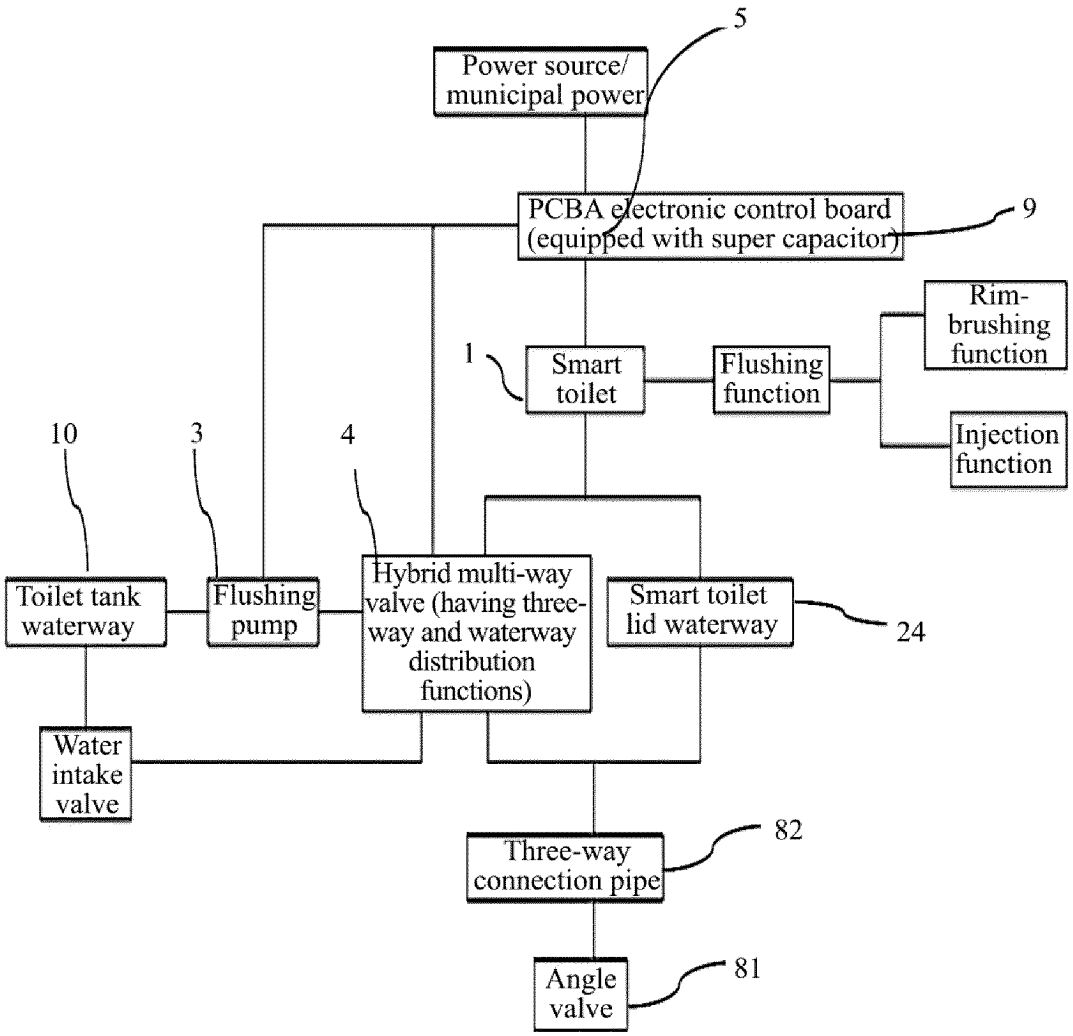

5
Power source/ municipal power
PCBA electronic control board (equipped with super capacitor)
9
1
Smart toilet
Flushing function
Rim-brushing function
Injection function
10
3
4
Toilet tank waterway
Flushing pump
Hybrid multi-way valve (having three-way and waterway distribution functions)
Smart toilet lid waterway
24
Water intake valve
Three-way connection pipe
82
Angle valve
81

FIG. 7

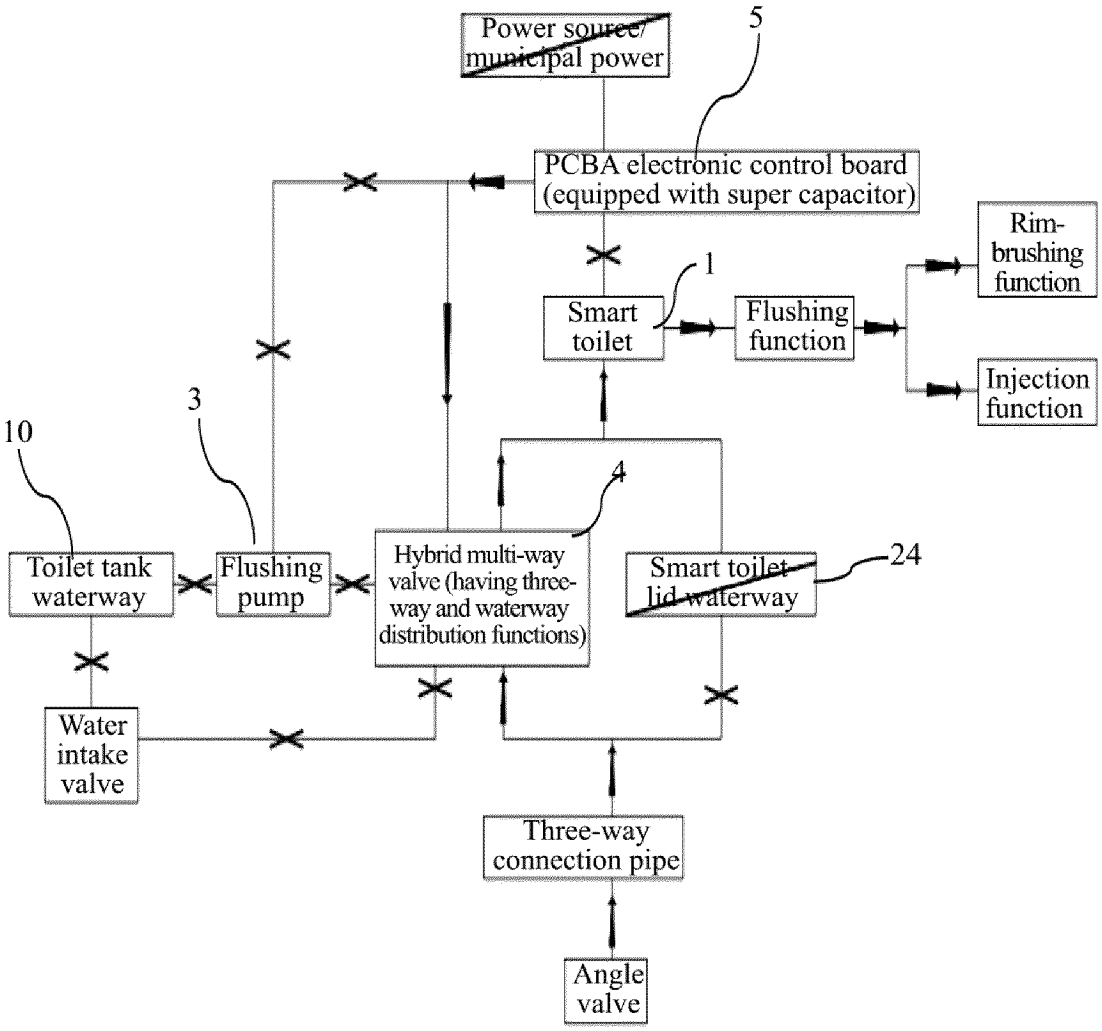

Power source/ municipal power
5
PCBA electronic control board (equipped with super capacitor)
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Toilet tank waterway
Flushing pump
Hybrid multi-way valve (having three-way and waterway distribution functions)
Smart toilet lid waterway
24
Water intake valve
Three-way connection pipe
Angle valve

FIG. 8

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2023/113118

A. CLASSIFICATION OF SUBJECT MATTER

E03D11/13(2006.01)i; E03D1/38(2006.01)i; E03D3/00(2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: E03D11; E03D1; E03D3

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

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

CNTXT; ENTXTC; CJFD; VEN; ENTXT: 马桶, 冲洗, 阀, 控制, 供水, 管路, 停电, 断电, 异常, flush toilet, jet pump, valve, pipe

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 115354724 A (XIAMEN KOMOO INTELLIGENT TECHNOLOGY CO., LTD.) 18 November 2022 (2022-11-18) claims 1-10	1-11
X	CN 114457885 A (SHENZHEN BEIXUN TECHNOLOGY CO., LTD.) 10 May 2022 (2022-05-10) description, paragraphs 16-29 and 74-95, and figures 1-36	1-3, 7, 10-11
A	CN 114457885 A (SHENZHEN BEIXUN TECHNOLOGY CO., LTD.) 10 May 2022 (2022-05-10) description, paragraphs 16-29 and 74-95, and figures 1-36	4-6, 8, 9
A	CN 211447137 U (JOMOO KITCHEN & BATH CO., LTD.) 08 September 2020 (2020-09-08) entire document	1-11
A	CN 213204352 U (ZHUZHOU MEGMEET ELECTRICAL CO., LTD.) 14 May 2021 (2021-05-14) entire document	1-11

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

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"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"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
03 November 2023	**14 November 2023**
Name and mailing address of the ISA/CN **China National Intellectual Property Administration (ISA/CN)** **China No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088**	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2023/113118

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2020051227 A (TOTO LTD.) 02 April 2020 (2020-04-02) entire document	1-11
A	JP 2008174944 A (TOTO LTD.) 31 July 2008 (2008-07-31) entire document	1-11
A	US 6502251 B1 (TOTO LTD.) 07 January 2003 (2003-01-07) entire document	1-11

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2023/113118

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
CN	115354724	A	18 November 2022	None			
CN	114457885	A	10 May 2022	None			
CN	211447137	U	08 September 2020	None			
CN	213204352	U	14 May 2021	None			
JP	2020051227	A	02 April 2020	JP	7134407	B2	12 September 2022
JP	2008174944	A	31 July 2008	JP	5051611	B2	17 October 2012
US	6502251	B1	07 January 2003	TR	200101525	T1	21 December 2001
				HK	1040424	A1	07 June 2002
				ID	28957	A	19 July 2001
				WO	0123678	A1	05 April 2001
				KR	20010093119	A	27 October 2001
				TW	476837	B	21 February 2002
				PL	347742	A1	22 April 2002
				EP	1134322	A1	19 September 2001
				EP	1134322	A4	02 May 2003
				JP	3312625	B2	12 August 2002
				AU	6593500	A	30 April 2001
				AU	763797	B2	31 July 2003

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CN 202210995183X **[0001]**