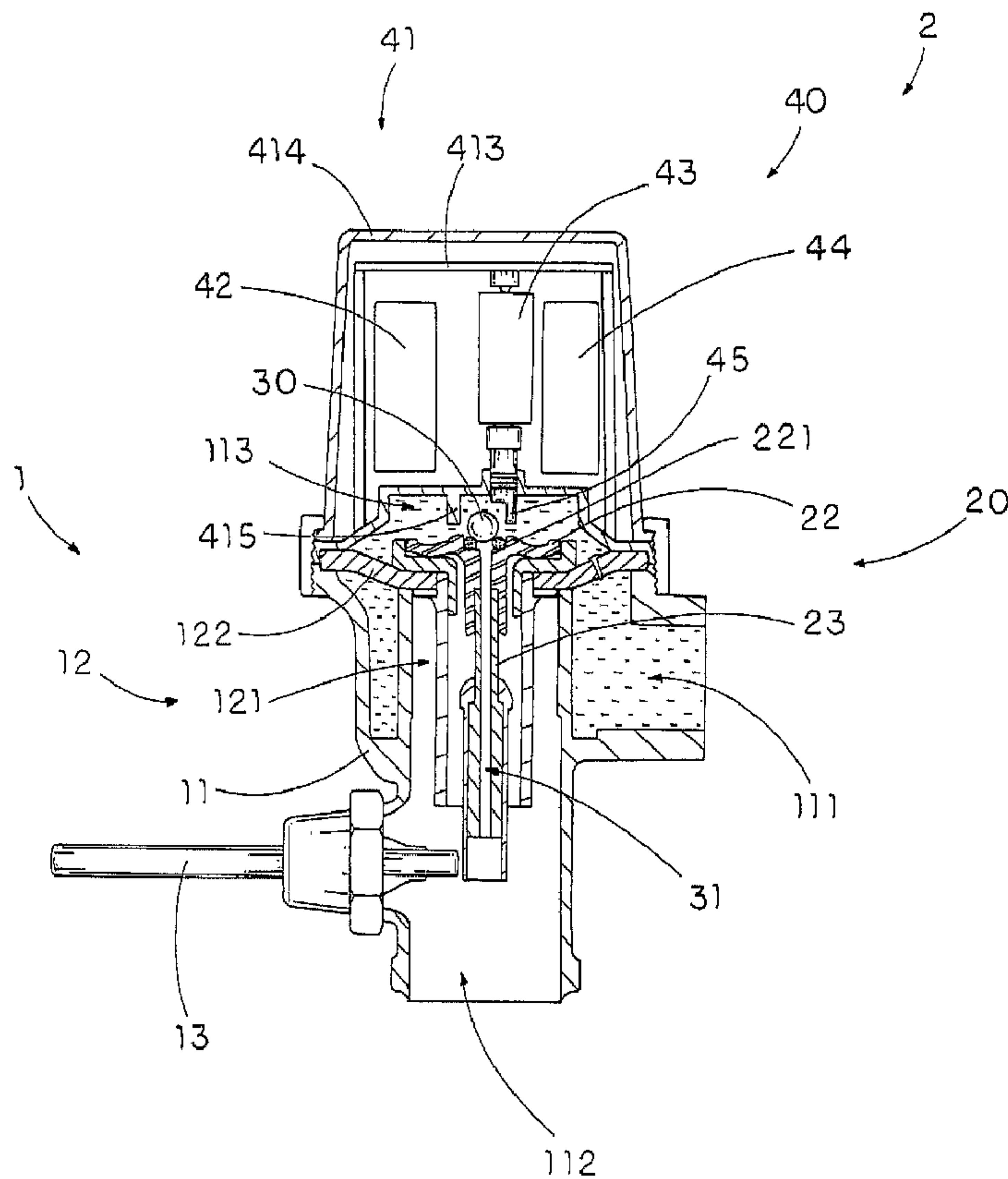




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 (54) Title: AUTOMATIC FLUSH ACTUATION APPARATUS



(57) Abrégé/Abstract:

An automatic flush actuation apparatus, which is incorporated with a flushing system having a water inlet, a water outlet, and a water chamber communicating therebetween, that includes a valve member being moved by a flush lever for releasing the water



(57) **Abrégé(suite)/Abstract(continued):**

pressur within the water chamber to allow the water passing from the water inlet to the water outlet, and a sensor-operated powering assembly including a relief valve provided at the valve member for controlling the water flowing to the water outlet and an actuator arranged in such a manner that while sensing a presence of a user of the flushing system, the actuator is driven to move the relief valve to an opened position fo releasing the water pressur within the water chamber to allow the water passing to said water outlet.

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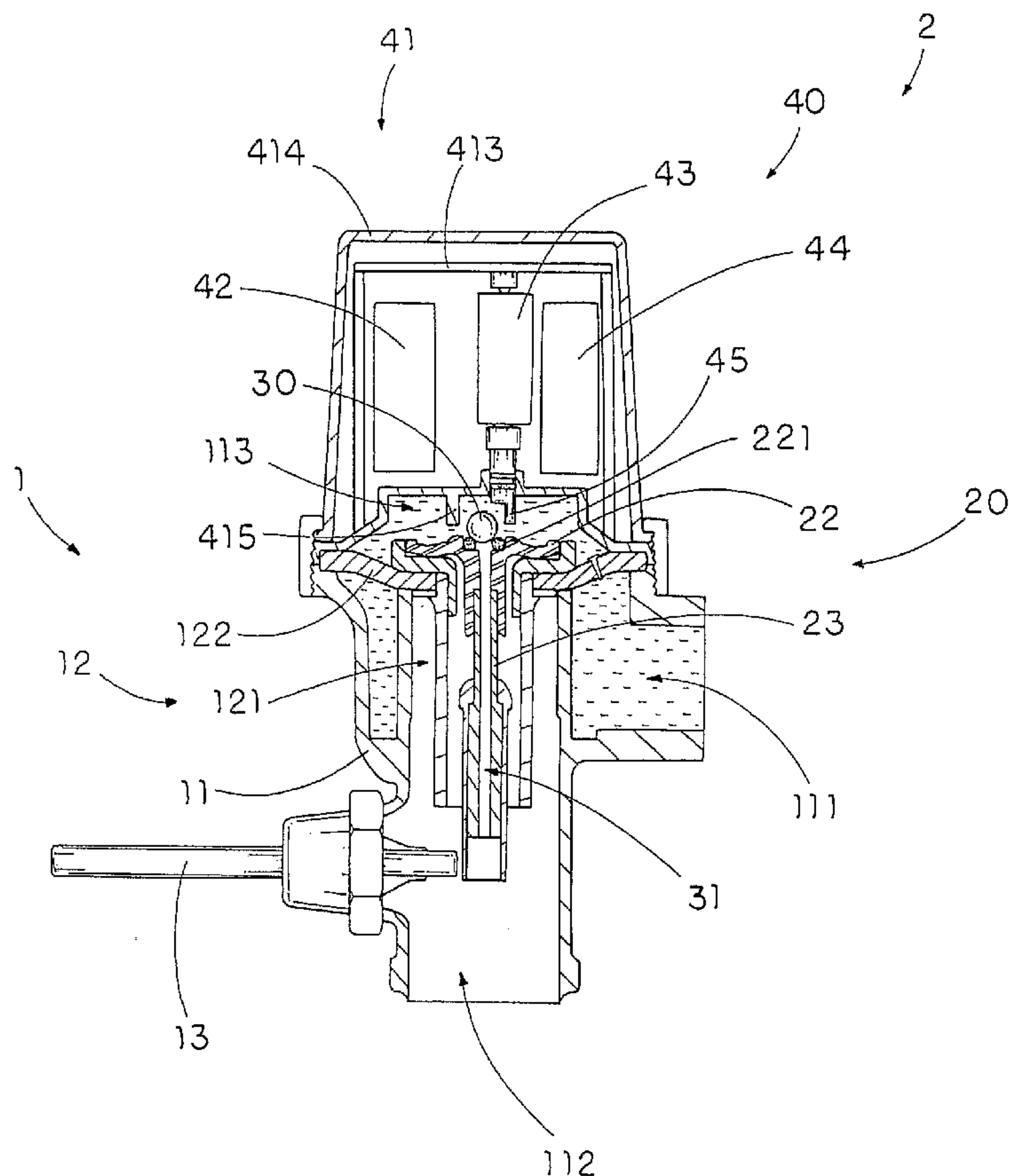
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[Continued on next page]

(54) Title: AUTOMATIC FLUSH ACTUATION APPARATUS



(57) Abstract: An automatic flush actuation apparatus, which is incorporated with a flushing system having a water inlet, a water outlet, and a water chamber communicating therebetween, that includes a valve member being moved by a flush lever for releasing the water pressure within the water chamber to allow the water passing from the water inlet to the water outlet, and a sensor-operated powering assembly including a relief valve provided at the valve member for controlling the water flowing to the water outlet and an actuator arranged in such a manner that while sensing a presence of a user of the flushing system, the actuator is driven to move the relief valve to an opened position for releasing the water pressure within the water chamber to allow the water passing to said water outlet.

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Title

Automatic Flush Actuation Apparatus

Field of the Present Invention

The present invention relates to a toilet and urinal facility, and more particularly to an automatic flush actuation apparatus which is capable of incorporating with a conventional commercial manual restroom flushing system, such as urinal and water closet, so as to selectively operate the automatic flush actuation apparatus automatically through the use of a sensor or normally through an actuation lever.

Background of the Present Invention

10 Manual operated toilet room flush valves for use on urinals and water closets in public restrooms are well known. As shown in Fig. 1, a conventional manual operated automatic flush actuation apparatus comprises a valve body A1 having a water inlet A11 and a water outlet A12, a diaphragm A2 having a water channel A21 communicating between the water inlet A11 and the water outlet A12, a relief valve A3 disposed at the diaphragm A2 for
15 blocking the water flowing from the water inlet A11 to the water outlet A12 through the water channel A21, and a flush lever A4 arranged to move the relief valve A3 at a position that the water is allowed to flow to the water outlet A12 for completing the flushing operation.

For hygiene purposes, an automatic operated toilet room flush valve is developed. For example, U.S. patents 5,169,118 and 5,244,179 disclose a solenoid operated automatic
20 flush valve which is battery-operated and utilizes a latching solenoid to limit power drain on the battery. Accordingly, when the infrared sensor detects the presence of a user of a urinal or toilet, the flush valve is automatically driven to open to complete the flushing operation. However, the flush valves, according to the above patents, have several common drawbacks.

The presence of the user sensed by the infrared sensor will cause the solenoid to move
25 the diaphragm to a valve open position. It is known that the solenoid is made of a number of circular wire loops to generate a magnetic force when an electric current is passed through the wire loops. The solenoid may come in contact with water such that the solenoid may accumulate rusting particles from the water, which may remain on the solenoid. It is one of the common problems to cause a failure of operation of the flush valve. In other words, the
30 conventional manual operated flush valve is more reliable than the solenoid operated automatic flush valve. Thus, the maintenance cost of the solenoid operated automatic flush valve is higher than that of the conventional manual operated flush valve.

In addition, the structural design of the solenoid operated automatic flush valve is different from that of the manual operated flush valve. In other words, when the flushing

system is incorporated with the solenoid operated automatic flush valve, the flushing system will lose the mechanical-manual operated feature. Therefore, there is no alternative to operate the flushing cycle when the solenoid operated automatic flush valve has failed to operate.

In order to install the solenoid operated automatic flush valve into the conventional
5 flushing system, the mechanical-manual operating mechanism of the flush valve must be totally removed, which is a waste of resources in order to incorporated with the solenoid operated automatic flush valve.

The configuration of the solenoid operated automatic flush valve is complicated, wherein once the solenoid is broken or the battery is dead, the facility should call a technician
10 to open an outer cover and disassemble an inner cover for the replacement of the solenoid or the battery. Due to the complicated structure of the solenoid operated automatic flush valve, the solenoid operated automatic flush valve requires a skilled technician to replace the broken solenoid and/or even replace the battery, which may further increase the maintenance cost of the infrared operated automatic flush valve.

15 **Summary of the Present Invention**

A main object of the present invention is to provide an automatic flush actuation apparatus which is capable of incorporating with a conventional commercial manual restroom flushing system, such as urinal and water closet, so as to automatically operate the flush valve through the use of a sensor.

20 Another object of the present invention is to provide an automatic flush actuation apparatus without altering the original structural design of the manual operated flush valve in order to incorporate with the present invention. Therefore, the user is able to mechanically-manually operate the flushing cycle for the restroom flushing system if the automatic operation system is not functioning properly.

25 Another object of the present invention is to provide an automatic flush actuation apparatus which is reliable and that can be easily installed and maintained.

Another object of the present invention is to provide an automatic flush actuation apparatus, wherein a covering cap has a battery opening that allows a power source exposing to outside. Therefore, any individual is able to simply replace the power source without detaching
30 the covering cap from the flushing system, so as to reduce the maintenance cost of the present invention.

Another object of the present invention is to provide an automatic flush actuation apparatus, wherein the covering cap further has a sensor opening that allows a CPU exposing to

outside. Therefore, any individual is able to make adjustments via the sensor switch through the CPU opening without detaching the covering cap from the flushing system.

Another object of the present invention is to provide an automatic flush actuation apparatus, which is powered by an electric motor so as to avoid water damage and to enhance
5 performance and reliability.

Another object of the present invention is to provide an automatic flush actuation apparatus, which provides an economic and efficient solution for incorporating with the conventional manual operated flushing system in a simple and economical way.

Accordingly, in order to accomplish the above objects, the present invention provides
10 an automatic flush actuation apparatus for a flushing system which comprises a valve body having a water inlet, a water outlet and a water chamber communicating therebetween, a valve seat, having a flush channel, normally sealed with the water chamber and disposed between the water inlet and the water outlet for retaining a predetermined water pressure within the water chamber so as to block water flowing from the water inlet to the water outlet, and a flush lever
15 coupled with the valve body, wherein the flush valve comprises:

a valve member adapted for being disposed at the valve seat to control the water flowing from the water inlet to the water outlet, wherein the valve member is capable of being moved by the flush lever between a manual-operated closed position and a manual-operated opened position, wherein at the manual-operated closed position, the valve member is arranged
20 for sealedly sitting at the valve seat to block the water from passing through the water outlet, and at the manual-operated opened position, the valve member is moved to an opened position for releasing the water pressure within the water chamber to allow the water to pass from the water inlet to the water outlet through the water chamber; and

a sensor-operated powering assembly, comprising:

25 a housing, which is adapted for mounting on the valve body; a replaceable power source received in the housing; a CPU electrically connected with the power source for sensing a presence of a user of the flushing system, so as to active the power generator; a power generator electrically connected to the CPU; a relief valve provided at the valve member for controlling the water flowing from the water inlet to the water outlet through the water
30 chamber; and an actuator driven by the power generator to move the relief valve between an auto-operated closed position and an auto-operated opened position, wherein at the auto-operated closed position, the relief valve is sealedly closed for blocking the water passing to the water outlet, and at the auto-operated opened position, the relief valve is moved to an opened position by the actuator for releasing the water pressure within the water chamber to allow the
35 water passing to the water outlet.

These and other objectives, features, and advantages of the present invention will become apparent from the following detailed description, the accompanying drawings, and the appended claims.

Brief Description of the Drawings

5 Fig. 1 is a sectional view of a conventional manual operated flushing system.

Fig. 2 is a sectional view of an automatic flush actuation apparatus according to a preferred embodiment of the present invention.

Figs. 3A and 3B illustrate a manual operation of the flushing cycle for the automatic flush actuation apparatus according to the above preferred embodiment of the present invention.

10 Figs. 4A and 4B illustrate an automatic sensor operation of the flushing cycle for the automatic flush actuation apparatus according to the above preferred embodiment of the present invention.

Fig. 5 is an exploded perspective view of a sensor-operated powering device of the automatic flush actuation apparatus according to the above preferred embodiment of the present
15 invention.

Fig. 6 illustrates an alternative mode of the relief valve of the automatic flush actuation apparatus according to the above preferred embodiment of the present invention.

Figs. 7A and 7B illustrate the operation of the relief valve of the alternative mode according to the above preferred embodiment of the present invention.

20 Detailed Description of the Preferred Embodiment

Referring to Fig. 2 of the drawings, an automatic flush actuation apparatus 2 for a flushing system 1 according to a preferred embodiment of the present invention is illustrated, wherein the automatic flush actuation apparatus 2 is capable of incorporating with a conventional manual operated flushing system to achieve both manual and automatic
25 operations to start a flushing cycle of the flushing system 1.

The flushing system 1, such as the conventional manual operated flushing system, comprises a valve body 11 having a water inlet 111, a water outlet 112 and a water chamber 113 that is normally sealed between the water inlet 111 and the water outlet 112, a valve seat 12, having a flush channel 121, disposed between the water inlet 111 and the water outlet 112

to block water flowing from the water inlet 111 to the water outlet 112, and a flush lever 13 coupled with the valve body 11.

The valve seat 12 comprises a diaphragm 122, having a bleed hole 100, sealedly disposed in the valve body 11 in a movable manner to define the water chamber 113 above the diaphragm 122 to communicate between the water inlet 111 and the water outlet 112. In other words, once the water within the water chamber 113 is released to reduce the water pressure therein, the diaphragm 122 is forced to bend upwardly so that the water is capable of passing from the water inlet 111 to the water outlet 112 to complete the flushing cycle of the flushing system.

10 Accordingly, the water is flowed into the water chamber 113 from the water inlet 111 through the bleed hole 100 on the diaphragm 122 in such a manner that the water within the water chamber 113 provides a predetermined water pressure against the diaphragm 122 to normally block the water flowing to the water outlet 112.

The automatic flush actuation apparatus 2 comprises a valve member 20 and a sensor-
15 operated powering assembly 40.

The valve member 20 is adapted for being disposed at the valve seat 12 to control the water flowing from the water inlet 111 to the water outlet 112. The valve member 20 is capable of being moved by the flush lever 13 between a manual-operated closed position and a manual-operated opened position, wherein at the manual-operated closed position, the valve
20 member 20 is arranged for sealedly sitting at the valve seat 12 to block the water passing to the water outlet 112, and at the manual-operated opened position, the valve member 20 is moved to an opened position for releasing the water pressure within the water chamber 113 through the flush channel 121 so as to allow the water passing from the water inlet 111 to the water outlet 112.

25 As shown in Figs. 2 and 5, the sensor-operated powering assembly 40 comprises a housing 41, which is adapted for mounting on the valve body 11, having a power source compartment 411 and a CPU cavity 412, a power source 42 replaceably received in the power source compartment 411, a power generator 43 electrically connected to the CPU 44, and the CPU 44 which is received in the CPU cavity 412 of the housing 41, electrically connected with
30 the power source 42 for sensing a presence of a user of the flushing system 1, so as to active the power generator 43.

The sensor-operated powering assembly 40 further comprises a relief valve 30 provided at the valve member 20 for controlling the water flowing from the water inlet 111 to the water outlet 112 through the water chamber 113 and an actuator 45 driven by the power
35 generator 43 to move the valve stopper 32 between an auto-operated closed position and an auto-operated opened position.

Accordingly, at the auto-operated closed position, the relief valve 30 is sealedly closed for blocking the water passing to the water outlet 112, and at the auto-operated opened position, the relief valve 30 is moved to an opened position by the actuator 45 for releasing the water pressure within the water chamber 113 to allow the water passing to the water outlet 112.

5 According to the preferred embodiment, the valve member 20 comprises a sealing platform 22 arranged for sealedly supporting on the diaphragm 122 of the valve seat 12 to normally close the flush channel 121 and a valve controlling shaft 23 downwardly extended from the sealing platform 22 for communicating with the flush lever 13 within the flush channel 121.

10 As shown in Fig. 3A, by actuating the flush lever 13, the valve controlling shaft 23 is pushed to drive the sealing platform 22 at a position offset with respect to the diaphragm 122 such that the water within the water chamber 113 is allowed to flow out through the flush channel 121 and release the water pressure within the water chamber 113 because the amount of water flowing out through the flush channel 121 is much larger than the amount of water
15 flowing in through the bleed hole 100. Thus, when the water pressure within the water chamber 113 reduces, the diaphragm 122 is pushed upwardly for allowing the water passing to the water outlet 112, so as to start the flushing cycle of the flushing system 1 manually as the conventional manual-operated flushing system, as shown in Fig. 3B.

 Once the flush lever 13 is returned back to its original position, the sealing platform
20 22 is forced to sealedly sit on the diaphragm 122 due to the water pressure so as to sealedly close the flush channel 121. Therefore, the diaphragm 122 is dropped down by refilling the water back into the water chamber 113 to increase the water pressure therein so as to sealedly close the water outlet 112 to stop the water passing thereto. It is worth to mention that since the sealing platform 22 is normally sealed on the diaphragm 122, no water is allowed to flow
25 through the flush channel 121 to the water outlet 112 until the flushing cycle is started.

 The relief valve 30 has a water passage 31 axially extended along the valve member 20 for communicating the water chamber 113 with the water outlet 112, and a valve stopper 32 disposed on the valve member 20 to normally close the water passage 31 for controlling the water flowing from the water inlet 111 to the water outlet 112.

30 As shown in Fig. 2, the water passage 31 is coaxially extended from the sealing platform 22 to a bottom end of the valve controlling shaft 23 for communicating the water chamber 113 with the water outlet 112.

 The valve stopper 32, having a ball-shape, sits on the sealing platform 22 at an opening of the water passage 31 to normally close the water passage 31 for blocking the water
35 pressure releasing from the water chamber 113. Accordingly, the sealing platform 22 has a circular retaining seat 221 protruding upwardly around the opening of the water passage 31 wherein the valve stopper 32 is disposed at the retaining seat 221 of the valve member 20 so as

to hold the valve stopper 32 in position. It is worth to mention that when the valve member 20 is moved between the manual-operated closed position and the manual-operated opened position, the valve stopper 32 remains at the opening of the water passage 31 to block the water passing the water outlet 112.

5 As shown in Fig. 5, the housing 41 comprises a supporting frame 413 supported above the valve stopper 32 and a valve cap 414, having a transparent window 4141, adapted for detachably mounting on the valve body 11 to protectively enclose the supporting frame 413, wherein the power source 42, the power generator 43, and the CPU 44 are supported by the supporting frame 413 and enclosed by the valve cap 414 while the CPU 44 is capable of
10 communicating with outside through the transparent window 4141.

According to the preferred embodiment, the power source 42 comprises a battery replaceably disposed in the power source compartment 411 to electrically connect with the CPU 44. It is worth to mention that the power source 42 can be used as an AC current to electrically plug into an electric outlet for supplying electricity to the CPU 44.

15 The power generator 43, according to the preferred embodiment, is an electric motor electrically connected to the CPU 44 wherein the power generator 43 is actuated via the CPU 44 to drive the actuator 45 to rotate. Accordingly, the power generator 43 can be a conventional solenoid electrically connected to the CPU 44 to drive the actuator 45 so as to move the valve stopper 32 between the auto-operated closed position and the auto-operated
20 opened position. It is worth to mention that the electric motor is more reliable than the solenoid because the electric motor provides simple mechanical work rather than using the magnetic force, so as to minimize the failure operation of the power generator 43 and to reduce the maintenance cost of the present invention.

The CPU 44 comprises a control processor 441 supported in the housing 41 and a
25 sensor 442 which is electrically connected to the control processor 441 and aligned with the transparent window 4141 of the valve cap 414. Accordingly, the sensor 442 is an infrared sensor arranged to detect the presence of the user by means of infrared signal in such a manner that when the sensor 442 sends an infrared signal through the transparent window 4141 for detecting the presence of the user of the flushing system, the control processor 441 is activates
30 the power generator 43 to actuate valve stopper 32 to open the relief valve 30.

In addition, the control processor 441 is a control circuitry to control the configuration of the flushing cycle wherein the control processor 441 is adapted to control the time of the flushing cycle, the water volume for each flushing cycle, the detecting range of the sensor 442, and the motion of the electric motor of the power generator 43. Thus, a default configuration is
35 preset in the control processor 441 such that the automatic flush actuation apparatus of the present invention is capable of returning to its original settings through the control processor 441. It is worth to mention that the control processor 441 also controls the power of the power source 42 wherein when there is no sufficient power to actuate the power generator 43, the

control processor 441 will control the relief valve 30 to remain in the closed position. In other words, only the manual operation of the flush lever 13 is capable of starting the flushing cycle when the control processor 441 stops the actuation of the relief valve 30.

The actuator 45 is rotatably extended from the power generator 43 wherein the
5 actuator 45 has a driving end portion 451 downwardly and rotatably extended from a bottom side of the supporting frame 413 to contact with the valve stopper 32. Accordingly, the driving end portion 451 of the actuator 45, having a semi-circular cross section, has a flat contacting surface 4511 and a curved contacting surface 4512, wherein the driving end portion 451 of the actuator 45 is arranged to be driven to rotate via the power generator 43 to move the valve
10 stopper 32 at the auto-operated closed position that the valve stopper 32 is contacted with the flat contacting surface 4511 of the actuator 45 to retain the valve stopper 32 at the opening of the water passage 31 for blocking the water passing to the water outlet 112 as shown in Fig. 2, and to move the valve stopper 32 at the auto-operated opened position that the valve stopper 32 is contacted with the curved contacting surface 4512 of the actuator 45 to move the valve
15 stopper 32 to offset the opening of the water passage 31 for allowing the water passing to the water outlet, as shown in Fig. 4A.

It is worth to mention that when the actuator 45 moves the valve stopper 32 away from the opening of the water passage 31, the water within the water chamber 113 is allowed to flow out through the water passage 31 so as to reduce the water pressure within the water
20 chamber 113, as shown in Fig. 4A. Then, the diaphragm 122 is pushed upwardly for allowing the water flowing from the water inlet 111 to the water outlet 112, as shown in Fig. 4B. Once the valve stopper 32 is moved back into its original position to close the water passage 31, the diaphragm 122 is dropped down by refilling the water back into the water chamber 113 to increase the water pressure therein so as to sealedly close the water outlet 112 to stop the water
25 passing thereto.

The sensor-operated flushing cycle of the flushing system 1 is controlled by the rotation of the actuator 45. Once the driving end portion 451 of the actuator 45 is rotated back to its original position, i.e. valve stopper 32 is contacted with the flat contacting surface 4511 of the actuator 45, the valve stopper 32 is forced to sealedly sit on the valve member 20 by
30 means of water pressure to close the water passage 31. Therefore, the diaphragm 122 is dropped down by pressure to sealedly close the water outlet 112 to stop the water passing thereto.

It is worth to mention that the volume of water used in one flushing cycle for the flushing system 1 can be controlled by the power generator 43 through the CPU 44 to control
35 the rotational speed of the actuator 45. The volume of water used in each flushing cycle can be adjustably controlled by controlling the rotational cycle of the actuator 45, i.e. how long the actuator 45 drives the valve stopper 32 to stay in the opened position and the closed position.

In other words, the water volume of each flushing cycle will be increased when the CPU 44 delays the rotational cycling time of the actuator 45.

Accordingly, when the valve stopper 32 is moved between the auto-operated closed position and the auto-operated opened position, the valve member 20 is remained at its manual-
5 operated closed position. Since the manual operation and the sensor operation employ with different water pathways, i.e. the flush channel 121 and the water passage 31, the manual and sensor operations do not interrupt with each other and function individually.

Therefore, to start the flushing cycle of the flushing system, the individual is able to either manually operate the flush lever 13 to move the valve member 20 to an offset position so
10 as to release the water pressure through the flush channel 121 or automatically operate the CPU 44 to move the valve stopper 32 to an offset position so that the water pressure is allowed to be released through the water passage 31. In other words, even though the sensor-operated powering assembly 40 fails to operate due to the battery, the individual is still able to complete the flushing cycle for the flushing system manually.

15 In order to securely hold the valve stopper 32 in position, the supporting frame 413 of the housing 41 further comprises a locating ring 415 integrally and downwardly protruded from the bottom side of the supporting frame 413 to coaxially align with the water passage 31 so as to form as a boundary for the valve stopper 32 to move within the locating ring 415. In other
20 words, the locating ring 415 limits the movement of the valve stopper 32 to prevent the valve stopper 32 from becoming dislocated on the valve member 20 and to guide the valve stopper 32 returning back to the opening of the water passage 31 after completing the flushing cycle.

As shown in Fig. 5, the valve cap 414 further comprises an outer casing 4142 having a power source opening 4143 aligned with the power source compartment 411 to expose the power source 42 to outside through the power source opening 4143 and a CPU opening 4144
25 aligned with the CPU cavity 412 to expose the CPU 44 to outside through the CPU opening 4144, and a power source cover 4145 detachably mounted on the outer casing 4142 to cover the power source opening 4143, wherein the transparent window 4141 is detachably mounted on the outer casing 4142 to enclose the CPU 44 within the valve cap 414.

Therefore, an individual is able to replace the power source 42 and to adjust the
30 settings of the CPU 44 by detaching the power source cover 4145 and the transparent window 4141 respectively without removing the entire valve cap 414 so as to simplify the replacement operation and adjustment of the present invention. It is worth to mention the valve cap 414, such as the conventional cap, is securely mounted on the valve body 11 via a locking ring 400 such that the individual must use a wrench to unscrew the locking ring 400 in order to detach
35 the valve cap 414. It is worth to mention that the locking ring 400 is arranged to sealedly mount the diaphragm 122 of the valve seat 12 on the valve body 11 to prevent water leakage thereof. However, it would be inconvenient to replace the power source 42 and to adjust the CPU 44 if the valve cap 414 must be detached from the valve body 11 and then sealedly

attached back onto the valve body 11. Thus, the water may leak to the outside when the valve cap 414 is opened, especially if the valve cap 414 is not perfectly sealed onto the valve body 11.

In addition, the valve cap 414 further comprises a cover locker 4146 provided on the outer casing 4142 to securely lock up the power source cover 4145 and the transparent window 4141 to enclose the power source opening 4143 and the CPU opening 4144 respectively. It is worth to mention that the locking and unlocking operation of the cover locker 4146 is simply in comparison with the locking and unlocking operation of the valve cap 414, so as to provide a quick and easy replacement operation of the present invention.

In comparison with the conventional manual operated flushing system, the conventional manual operated flushing system can keep most of the major components, such as the valve body 11, valve seat 12 and the flush lever 13, in order to incorporate with the automatic flush actuation apparatus 2 of the present invention, so as to minimize the cost of incorporating the conventional manual operated flushing system with the automatic flush actuation apparatus 2 of the present invention.

Fig. 6 illustrates an alternative mode of the relief valve 30 wherein the relief valve 30 further comprises a resilient element 33' having a biasing end biasing against the valve stopper 32 so as to normally retain the valve stopper 32 at the auto-operated closed position. The resilient element 33', according to the preferred embodiment, is a compression spring disposed within the water passage 31 for applying an urging force against the valve stopper 32 so as to normally pull the valve stopper 32 to sealedly close the opening of the water passage 31. As shown in Fig. 6, the biasing end of the resilient element 33' coupled with the valve stopper 32 and an opposed affixing end coupled with a bottom end of the water passage 31 for applying the pulling force against the valve stopper 32.

As shown in Fig. 7A, when the driving end portion 451 of the actuator 45 is driven to rotate to move the valve stopper 32 to the offset position so as to allow the water to flow through the water passage 31, the resilient element 33' is forced to stretch for applying the urging pressure against the valve stopper 32. After the driving end portion 451 of the actuator 45 moves back to its original position, the resilient element 33' rebounds to its original form to pull the valve stopper 32 back on the retaining seat 221 of the sealing platform 22 for sealing the water passage 31 so as to block the water to flow therethrough, as shown in Fig. 7B. Therefore, the resilient element 33' ensures the valve stopper 32 of the relief valve 30 returning back to the auto-operated closed position after each flushing operating.

In addition, the automatic flush actuation apparatus 2 of the present invention is capable of incorporating with most conventional flushing systems to provide the sensor operation of the flushing system with or without the flush lever 13 for starting the flushing cycle. It is worth to mention that the valve member 20 can be embodied as the valve seat 12

when the automatic flush actuation apparatus 2 of the present invention is incorporated with the conventional sensor-operation flushing system.

One skilled in the art will understand that the embodiment of the present invention as shown in the drawings and described above is exemplary only and not intended to be limiting.

5 It will thus be seen that the objects of the present invention have been fully and effectively accomplished. The above embodiments are shown and described for the purposes of illustrating the functional and structural principles of the present invention and is subject to change without departure from such principles.

10

CLAIMS:

1. A automatic flush actuation apparatus for a flushing system which comprises a valve body having a water inlet, a water outlet, and a water chamber communicating between said water inlet and said water outlet, a valve seat normally sealed with said water chamber for retaining a predetermined water pressure within said water chamber so as to block water flowing from said water inlet to said water outlet, wherein said flush valve comprises:

a valve member adapted for being sealedly disposed on said valve seat; and

a sensor-operated powering assembly, comprising:

a housing adapted for mounting on said valve body;

a replaceable power source received in the housing; a power generator;

a CPU electrically connected with said power generator and said power source for activating said power generator while sensing a presence of a user of said flushing system;

a relief valve provided at said valve member for controlling said water flowing from said water inlet to said water outlet through said water chamber, wherein said relief valve has a water passage axially extended along said valve member for communicating said water chamber with said water outlet, and a valve stopper disposed on said valve member to normally close said water passage for controlling said water flowing from said water inlet to said water outlet, wherein said valve stopper, having a ball-shape, sits on said valve member at an opening of said water passage to normally close said water passage for retaining said water pressure within said water chamber, wherein said relief valve further comprises a resilient element having a biasing end biasing against said valve stopper and an affixing end coupled with a bottom end of said water passage for applying a pulling force against said valve stopper so as to normally retain said valve stopper at an auto-operated closed position; and

an actuator driven by said power generator to move said relief valve between an auto-operated closed position and an auto-operated opened position, wherein at said auto-operated closed position, said valve stopper is sealedly closed for blocking said water passing to said water outlet, and at said auto-operated opened position, said valve stopper is moved to an opened position by said actuator for releasing said water pressure within said water chamber to allow said water passing to said water outlet, wherein said actuator has a driving end portion downwardly and rotatably extended from a bottom side of said housing to contact with said valve stopper, wherein said driving end portion of the actuator, having a semi-circular cross section, has a flat contacting surface and a curved contacting surface and is arranged to be driven to rotate via said power generator to move said valve stopper at said auto-operated closed position that said valve stopper is contacted with said flat contacting surface of said actuator to retain said valve stopper at said opening of said water passage for blocking said water passing to said water outlet, and to move said valve stopper at said auto-operated opened position that said valve stopper is contacted with said curved contacting surface of said actuator to move said valve stopper to an offset position from said opening of said water passage for allowing said water passing to said water outlet.

2. An automatic flush actuation apparatus for a flushing system which comprises a valve body having a water inlet, a water outlet, and a water chamber communicating between said water inlet and said water outlet, a valve seat, having a flush channel, normally sealed with said water chamber for retaining a predetermined water pressure within said water chamber so as to block water flowing from said water inlet to said water outlet, and a flush lever coupled with said valve body, wherein said flush valve comprises:

a valve member adapted for being disposed at said valve seat to control said water flowing from said water inlet to said water outlet, wherein said valve member is capable of being moved by said flush lever between a manual-operated closed position and a manual-operated opened position, wherein at said manual-operated closed position, said valve member is arranged for sealedly sifting at said valve seat to block said water passing to said water outlet, and at said manual-operated opened position, said valve

member is moved to an opened position for releasing said water pressure within said water chamber to allow said water to pass from said water inlet to said water outlet through said water chamber; and

a sensor-operated powering assembly, comprising:

a housing, which is adapted for mounting on said valve body;

a replaceable power source received in the housing;

a power generator;

a CPU electrically connected with said power generator and said power source for sensing a presence of a user of said flushing system and activating said power generator;

a relief valve provided at said valve member for controlling said water flowing from said water inlet to said water outlet through said water chamber, wherein said relief valve has a water passage axially extended along said valve member for communicating said water chamber with said water outlet and comprises a valve stopper disposed on said valve member to normally close said water passage for controlling said water flowing from said water inlet to said water outlet, wherein said valve stopper, having a ball-shape, sits on said valve member at an opening of said water passage to normally close said water passage for retaining said water pressure within said water chamber, wherein said relief valve further comprises a resilient element having a biasing end biasing against said valve stopper and an affixing end coupled with a bottom end of said water passage for applying a pulling force against said valve stopper so as to normally retain said valve stopper at an auto-operated closed position; and

an actuator driven by said power generator to move said relief valve between an auto-operated closed position and an auto-operated opened position, wherein at said auto-operated closed position, said relief valve is sealedly closed for blocking said water passing to said water outlet, and at said auto-operated opened position, said relief valve is moved to an opened position by said actuator for releasing said

water pressure within said water chamber to allow said water passing to said water outlet, wherein said actuator has a driving end portion downwardly and rotatably extended from a bottom side of said housing to contact with said valve stopper, wherein said driving end portion of the actuator, having a semi-circular cross section, has a flat contacting surface and a curved contacting surface and is arranged to be driven to rotate via said power generator to move said valve stopper at said auto-operated closed position that said valve stopper is contacted with said flat contacting surface of said actuator to retain said valve stopper at said opening of said water passage for blocking said water passing to said water outlet, and to move said valve stopper at said auto-operated opened position that said valve stopper is contacted with said curved contacting surface of said actuator to move said valve stopper to an offset position from said opening of said water passage for allowing said water passing to said water outlet.

3. An automatic flush actuation apparatus for a flushing system which comprises a valve body having a water inlet, a water outlet, and a water chamber communicating between said water inlet and said water outlet, a valve seat, having a flush channel, normally sealed with said water chamber for retaining a predetermined water pressure within said water chamber so as to block water flowing from said water inlet to said water outlet, and a flush lever coupled with said valve body, wherein said flush valve comprises:

a valve member adapted for being disposed at said valve seat to control said water flowing from said water inlet to said water outlet, wherein said valve member is capable of being moved by said flush lever between a manual-operated closed position and a manual-operated opened position, wherein at said manual-operated closed position, said valve member is arranged for sealedly sitting at said valve seat to block said water passing to said water outlet, and at said manual-operated opened position, said valve member is moved to an opened position for releasing said water pressure within said water chamber to allow said water to pass from said water inlet to said water outlet through said water chamber, wherein said valve member comprises a sealing platform arranged for sealedly supporting on said valve seat to normally close said flush channel, and a valve controlling shaft downwardly extended from said sealing platform for

communicating with said flush lever within said flush channel, wherein said water passage is coaxially extended from said sealing platform to a bottom end of said valve controlling shaft; and

a sensor-operated powering assembly, comprising:

a housing, which is adapted for mounting on said valve body;

a replaceable power source received in the housing;

a power generator;

a CPU electrically connected with said power generator and said power source for sensing a presence of a user of said flushing system and activating said power generator;

a relief valve provided at said valve member for controlling said water flowing from said water inlet to said water outlet through said water chamber, wherein said relief valve has a water passage axially extended along said valve member for communicating said water chamber with said water outlet, and a valve stopper disposed on said valve member to normally close said water passage for controlling said water flowing from said water inlet to said water outlet, wherein said valve stopper, having a ball-shape, sits on said valve member at an opening of said water passage to normally close said water passage for blocking said water passing to said water outlet, wherein said relief valve further comprises a resilient element having a biasing end biasing against said valve stopper and an affixing end coupled with a bottom end of said water passage for applying a pulling force against said valve stopper so as to normally retain said valve stopper at an auto-operated closed position; and

an actuator driven by said power generator to move said relief valve between an auto-operated closed position and an auto-operated opened position, wherein at said auto-operated closed position, said relief valve is sealedly closed for blocking said water passing to said water outlet, and at said auto-operated opened position, said relief valve is moved to an opened position by said actuator for releasing said

water pressure within said water chamber to allow said water passing to said water outlet, wherein said actuator has a driving end portion downwardly and rotatably extended from a bottom side of said housing to contact with said valve stopper, wherein said driving end portion of the actuator, having a semi-circular cross section, has a flat contacting surface and a curved contacting surface and is arranged to be driven to rotate via said power generator to move said valve stopper at said auto-operated closed position that said valve stopper is contacted with said flat contacting surface of said actuator to retain said valve stopper at said opening of said water passage for blocking said water passing to said water outlet, and to move said valve stopper at said auto-operated opened position that said valve stopper is contacted with said curved contacting surface of said actuator to move said valve stopper to an offset position from said opening of said water passage for allowing said water passing to said water outlet.

4. An automatic flush actuation apparatus for a flushing system which comprises a valve body having a water inlet, a water outlet, and a water chamber communicating between said water inlet and said water outlet, a valve seat having a flush channel, normally sealed with said water chamber for retaining a predetermined water pressure within said water chamber so as to block water flowing from said water inlet to said water outlet, and a flush lever coupled with said valve body, wherein said flush valve comprises:

a valve member adapted for being disposed at said valve seat to control said water flowing from said water inlet to said water outlet, wherein said valve member is capable of being moved by said flush lever between a manual-operated closed position and a manual-operated opened position, wherein at said manual-operated closed position, said valve member is arranged for sealedly sitting at said valve seat to block said water passing to said water outlet, and at said manual-operated opened position, said valve member is moved to an opened position for releasing said water pressure within said water chamber to allow said water to pass from said water inlet to said water outlet through said water chamber, wherein said valve member comprises a sealing platform arranged for sealedly supporting on said valve seat to normally close said flush channel, and a valve controlling shaft downwardly extended from said sealing platform for

communicating with said flush lever within said flush channel, wherein said water passage is coaxially extended from said sealing platform to a bottom end of said valve controlling shaft, wherein said sealing platform has a circular retaining seat protruding upwardly around said opening of said water passage; and

a sensor-operated powering assembly, comprising:

a housing, which is adapted for mounting on said valve body;

a replaceable power source received in the housing;

a power generator;

a CPU electrically connected with said power generator and said power source for activating said power generator while sensing a presence of a user of said flushing system;

a relief valve provided at said valve member for controlling said water flowing from said water inlet to said water outlet through said water chamber, wherein said relief valve has a water passage axially extended along said valve member for communicating said water chamber with said water outlet, and a valve stopper disposed on said valve member to normally close said water passage for controlling said water flowing from said water inlet to said water outlet, wherein said valve stopper, having a ball-shape, sits on said valve member at an opening of said water passage to normally close said water passage for blocking said water passing to said water outlet, wherein said relief valve further comprises a resilient element having a biasing end biasing against said valve stopper so as to normally retain said valve stopper at an auto-operated closed position, wherein said valve stopper is disposed at said retaining seat of said sealing platform so as to hold said valve stopper in position; and

an actuator driven by said power generator to move said relief valve between an auto-operated closed position and an auto-operated opened position, wherein at said auto-operated closed position, said relief valve is sealedly closed for blocking said water passing to said water outlet, and at said auto-operated opened position,

said relief valve is moved to an opened position by said actuator for releasing said water pressure within said water chamber to allow said water passing to said water outlet, wherein said actuator has a driving end portion downwardly and rotatably extended from a bottom side of said housing to contact with said valve stopper, wherein said driving end portion of the actuator, having a semi-circular cross section, has a flat contacting surface and a curved contacting surface and is arranged to be driven to rotate via said power generator to move said valve stopper at said auto-operated closed position that said valve stopper is contacted with said flat contacting surface of said actuator to retain said valve stopper at said opening of said water passage for blocking said water passing to said water outlet, and to move said valve stopper at said auto-operated opened position that said valve stopper is contacted with said curved contacting surface of said actuator to move said valve stopper to an offset position from said opening of said water passage for allowing said water passing to said water outlet.

5. The automatic flush actuation apparatus, as claimed in claim 4, wherein said housing further comprises a locating ring integrally and downwardly protruded from a bottom side of said housing to coaxially align with said water passage so as to form as a boundary for said valve stopper to move within said locating ring.
6. The automatic flush actuation apparatus, as claimed in claim 5, wherein said power generator is an electric motor actuated by said CPU to drive said actuator to rotate.
7. The automatic flush actuation apparatus, as claimed in claim 6, wherein said CPU comprises a control processor supported in said housing and a sensor which is electrically connected to said control processor for detecting said presence of said user of said flushing system, so as to actuate said power generator through said control processor.
8. An automatic flush actuation apparatus for a flushing system which comprises a valve body having a water inlet, a water outlet, and a water chamber communicating between said water inlet and said water outlet, a valve seat normally sealed with said water chamber for retaining a predetermined water pressure within said water chamber so as to

block water flowing from said water inlet to said water outlet, wherein said flush valve comprises:

a valve member adapted for being sealedly disposed on said valve seat; and

a sensor-operated powering assembly, comprising:

a replaceable power source received in a housing;

a power generator;

a CPU electrically connected with said power generator and said power source for activating said power generator while sensing a presence of a user of said flushing system;

a housing adapted for mounting on said valve body, wherein said housing comprises a supporting frame having a power source compartment for receiving said power source therein and a CPU cavity for receiving said CPU therein, and a valve cap which has a transparent window aligned with said CPU and is adapted for mounting on said valve body to protectively enclose said supporting frame within said valve cap, wherein said valve cap comprises an outer casing having a power source opening aligned with said power source compartment to expose said power source to outside through said power source opening, and a power source cover detachably mounted on said outer casing to cover said power source opening, wherein said outer casing further has a CPU opening aligned with said CPU cavity to expose said CPU to outside through said CPU opening, wherein said transparent window is detachably mounted on said outer casing to enclose said CPU within said valve cap;

a relief valve provided at said valve member for controlling said water flowing from said water inlet to said water outlet through said water chamber, wherein said relief valve has a water passage axially extended along said valve member for communicating said water chamber with said water outlet, and a valve stopper disposed on said valve member to normally close said water passage for controlling said water flowing from said water inlet to said water outlet, wherein

said valve stopper, having a ball-shape, sits on said valve member at an opening of said water passage to normally close said water passage for retaining said water pressure within said water chamber, wherein said relief valve further comprises a resilient element having a biasing end biasing against said valve stopper so as to normally retain said valve stopper at an auto-operated closed position; and

an actuator driven by said power generator to move said relief valve between an auto-operated closed position and an auto-operated opened position, wherein at said auto-operated closed position, said valve stopper is sealedly closed for blocking said water passing to said water outlet, and at said auto-operated opened position, said valve stopper is moved to an opened position by said actuator for releasing said water pressure within said water chamber to allow said water passing to said water outlet, wherein said actuator has a driving end portion downwardly and rotatably extended from a bottom side of said housing to contact with said valve stopper, wherein said driving end portion of the actuator, having a semi-circular cross section, has a flat contacting surface and a curved contacting surface and is arranged to be driven to rotate via said power generator to move said valve stopper at said auto-operated closed position that said valve stopper is contacted with said flat contacting surface of said actuator to retain said valve stopper at said opening of said water passage for blocking said water passing to said water outlet, and to move said valve stopper at said auto-operated opened position that said valve stopper is contacted with said curved contacting surface of said actuator to move said valve stopper to an offset position from said opening of said water passage for allowing said water passing to said water outlet.

9. The automatic flush actuation apparatus, as claimed in claim 8, wherein said housing further comprises a locating ring integrally and downwardly protruded from a bottom side of said supporting frame to coaxially align with said water passage so as to form as a boundary for said valve stopper to move within said locating ring.
10. The automatic flush actuation apparatus, as claimed in claim 9, wherein said power generator is an electric motor actuated by said CPU to drive said actuator to rotate.

11. The automatic flush actuation apparatus, as claimed in claim 10, wherein said CPU comprises a control processor supported in said housing and a sensor which is electrically connected to said control processor for detecting said presence of said user of said flushing system, so as to actuate said power generator through said control processor.
12. An automatic flush actuation apparatus for a flushing system which comprises a valve body having a water inlet, a water outlet, and a water chamber communicating between said water inlet and said water outlet, a valve seat, having a flush channel, normally sealed with said water chamber for retaining a predetermined water pressure within said water chamber so as to block water flowing from said water inlet to said water outlet, and a flush lever coupled with said valve body, wherein said flush valve comprises:
 - a valve member disposed at said valve seat to control said water flowing from said water inlet to said water outlet, wherein said valve member is capable of being moved by said flush lever between a manual-operated closed position and a manual-operated opened position, wherein at said manual-operated closed position, said valve member is arranged to sealedly sit at said valve seat for blocking said water passing to said water outlet, and at said manual-operated opened position, said valve member is moved to an opened position for releasing said water pressure within said water chamber to allow said water to pass from said water inlet to said water outlet through said water chamber; and
 - a sensor-operated powering assembly, comprising:
 - a housing mounted on said valve body;
 - a replaceable power source received in said housing;
 - a power generator received in said housing;
 - a CPU electrically connected with said power generator and said power source for activating said power generator while sensing a presence of a user of said flushing system;
 - a relief valve, provided at said valve member, for controlling said water flowing from said water inlet to said water outlet through said water chamber, wherein said relief valve

has a water passage communicating said water chamber with said water outlet and comprises a valve stopper disposed on said valve member to normally close said water passage and a resilient element biasing against said valve stopper so as to normally retain said valve stopper at an opening of said water passage to close said water passage; and

an actuator driven by said power generator to move said valve stopper between an auto-operated closed position and an auto-operated opened position, wherein at said auto-operated closed position, said valve stopper retains at said opening of said water passage for blocking said water passage to said water outlet so as to normally close said water passage, and at said auto-operated opened position, said valve stopper is moved by said actuator to an offset position from said opening of said water passage for releasing said water pressure within said water chamber to allow said water passing to said water outlet.

13. The automatic flush actuation apparatus, as claimed in claim 12, wherein said water passage of said relief valve is axially extended along said valve member to communicate said water chamber with said water outlet and said resilient element of said relief valve has one end coupled with said valve stopper and another end coupled with a bottom end of said water passage for applying a pulling force against said valve stopper so as to normally retain said valve stopper at said auto-operated closed position by closing said opening of said water passage.
14. The automatic flush actuation apparatus, as claimed in claim 13, wherein said valve member comprises a sealing platform arranged for sealedly supporting on said valve seat to normally close said flush channel, and a valve controlling shaft downwardly extended from said sealing platform for communicating with said flush lever within said flush channel, wherein said water passage is coaxially extended from said sealing platform to a bottom end of said valve controlling shaft.
15. The automatic flush actuation apparatus, as claimed in claim 12, wherein said actuator has a driving end portion downwardly and rotatably extended from a bottom side of said housing to contact with said valve stopper, wherein said actuator has a driving end portion which arranged to be driven by said power generator to rotate to move said valve stopper between said auto-operated closed position for blocking said water passing to

said water outlet and said auto-operated opened position for allowing said water passing to said water outlet.

16. The automatic flush actuation apparatus, as claimed in claim 14, wherein said actuator has a driving end portion downwardly and rotatably extended from a bottom side of said housing to contact with said valve stopper, wherein said driving end portion of the actuator, having a semi-circular cross section, has a flat contacting surface and a curved contacting surface and is arranged to be driven to rotate via said power generator to move said valve stopper at said auto-operated closed position that said valve stopper is contacted with said flat contacting surface of said actuator to retain said valve stopper at said opening of said water passage for blocking said water passing to said water outlet, and to move said valve stopper at said auto-operated opened position that said valve stopper is contacted with said curved contacting surface of said actuator to move said valve stopper to said offset position from said opening of said water passage for allowing said water passing to said water outlet.
17. The automatic flush actuation apparatus, as claimed in claim 14 wherein said actuator has a driving end portion downwardly and rotatably extended from a bottom side of said housing to contact with said valve stopper, wherein said driving end portion of the actuator, having a semi-circular cross section, has a flat contacting surface and a curved contacting surface and is arranged to be driven to rotate via said power generator to move said valve stopper at said auto-operated closed position that said valve stopper is contacted with said flat contacting surface of said actuator to retain said valve stopper at said opening of said water passage for blocking said water passing to said water outlet, and to move said valve stopper at said auto-operated opened position that said valve stopper is contacted with said curved contacting surface of said actuator to move said valve stopper to said offset position from said opening of said water passage for allowing said water passing to said water outlet.
18. The automatic flush actuation apparatus, as claimed in claim 13, wherein said valve stopper, having a ball-shape, sits on said valve member at said opening of said water passage to normally close said water passage for retaining said water pressure within said water chamber.

19. The automatic flush actuation apparatus, as claimed in claim 14, wherein said valve stopper, having a ball-shape, sits on said valve member at said opening of said water passage to normally close said water passage for blocking said water passing to said water outlet.
20. The automatic flush actuation apparatus, as claimed in claim 16, wherein said sealing platform has a circular retaining seat protruding upwardly around said opening of said water passage, wherein said valve stopper is disposed at said retaining seat so as to hold said valve stopper in position.
21. The automatic flush actuation apparatus, as claimed in claim 18, wherein said housing further comprises a locating ring integrally and downwardly protruded from a bottom side of said housing to coaxially align with said water passage so as to form as a boundary for said valve stopper to move within said locating ring.
22. The automatic flush actuation apparatus, as claimed in claim 19, wherein said housing further comprises a locating ring integrally and downwardly protruded from a bottom side of said housing to coaxially align with said water passage so as to form as a boundary for said valve stopper to move within said locating ring.
23. The automatic flush actuation apparatus, as claimed in claim 20, wherein said housing further comprises a locating ring integrally and downwardly protruded from a bottom side of said housing to coaxially align with said water passage so as to form as a boundary for said valve stopper to move within said locating ring.
24. The automatic flush actuation apparatus, as claimed in claim 12, wherein said power generator is an electric motor actuated by said CPU to drive said actuator to rotate.
25. The automatic flush actuation apparatus, as claimed in claim 14, wherein said power generator is an electric motor actuated by said CPU to drive said actuator to rotate.
26. The automatic flush actuation apparatus, as claimed in claim 23, wherein said power generator is an electric motor actuated by said CPU to drive said actuator to rotate.

27. The automatic flush actuation apparatus, as claimed in claim 12, wherein said CPU comprises a control processor supported in said housing and a sensor which is electrically connected to said control processor for detecting said presence of said user of said flushing system, so as to actuate said power generator through said control processor.
28. The automatic flush actuation apparatus, as claimed in claim 14, wherein said CPU comprises a control processor supported in said housing and a sensor which is electrically connected to said control processor for detecting said presence of said user of said flushing system, so as to actuate said power generator through said control processor.
29. The automatic flush actuation apparatus, as claimed in claim 15, wherein said CPU comprises a control processor supported in said housing and a sensor which is electrically connected to said control processor for detecting said presence of said user of said flushing system, so as to actuate said power generator through said control processor.
30. An automatic flush actuation apparatus for a flushing system which comprises a valve body having a water inlet, a water outlet, and a water chamber communicating between said water inlet and said water outlet, a valve seat normally sealed with said water chamber for retaining a predetermined water pressure within said water chamber so as to block water flowing from said water inlet to said water outlet, wherein said flush valve comprises:
- a valve member disposed at said valve seat; and
 - a sensor-operated powering assembly, comprising:
 - a housing mounted on said valve body;
 - a replaceable power source received in said housing;
 - a power generator received in said housing;
 - a CPU electrically connected with said power generator and said power source for activating said power generator while sensing a presence of a user of said flushing system;

a relief valve, provided at said valve member, controlling said water flowing from said water inlet to said water outlet through said water chamber, wherein said relief valve has a water passage communicating said water chamber with said water outlet and comprises a valve stopper disposed on said valve member to normally close said water passage and a resilient element biasing against said valve stopper so as to normally retain said valve stopper at an opening of said water passage to close said water passage; and

an actuator driven by said power generator to move said valve stopper between an auto-operated closed position and an auto-operated opened position, wherein at said auto-operated closed position, said valve stopper retains at an opening of said water passage for blocking said water passage to said water outlet so as to normally close said water passage, and at said auto-operated opened position, said valve stopper is moved by said actuator to an offset position from said opening of said water passage for releasing said water pressure within said water chamber to allow said water passing to said water outlet.

31. The automatic flush actuation apparatus, as claimed in claim 30, wherein said housing comprises a supporting frame having a power source compartment receiving said power source therein and a CPU cavity receiving said CPU therein, and a valve cap which has a transparent window aligned with said CPU and is mounted on said valve body to protectively enclose said supporting frame within said valve cap.
32. The automatic flush actuation apparatus, as claimed in claim 31, wherein said valve cap comprises an outer casing having a power source opening aligned with said power source compartment to expose said power source to outside through said power source opening, and a power source cover detachably mounted on said outer casing to cover said power source opening.
33. The automatic flush actuation apparatus, as claimed in claim 32, wherein said outer casing further has a CPU opening aligned with said CPU cavity to expose said CPU to outside through said CPU opening, wherein said transparent window is detachably mounted on said outer casing to enclose said CPU within said valve cap.
34. The automatic flush actuation apparatus, as claimed in claim 31, wherein said water passage of said relief valve is axially extended along said valve member to communicate

said water chamber with said water outlet and said resilient element of said relief valve has one end coupled with said valve stopper and another end coupled with a bottom end of said water passage for applying a pulling force against said valve stopper so as to normally retain said valve stopper at said auto-operated closed position by closing said opening of said water passage.

35. The automatic flush actuation apparatus, as claimed in claim 33, wherein said water passage of said relief valve is axially extended along said valve member to communicate said water chamber with said water outlet and said resilient element of said relief valve has another affixing end coupled with a bottom end of said water passage for applying a pulling force against said valve stopper so as to normally retain said valve stopper at said auto-operated closed position by closing said opening of said water passage.
36. The automatic flush actuation apparatus, as claimed in claim 31, wherein said actuator has a driving end portion downwardly and rotatably extended from a bottom side of said housing to contact with said valve stopper, wherein said actuator has a driving end portion which arranged to be driven by said power generator to rotate to move said valve stopper between said auto-operated closed position for blocking said opening of said water passing to said water outlet and said auto-operated opened position for allowing said water passing to said water outlet.
37. The automatic flush actuation apparatus, as claimed in claim 34, wherein said actuator has a driving end portion downwardly and rotatably extended from a bottom side of said housing to contact with said valve stopper, wherein said driving end portion of the actuator, having a semi-circular cross section, has a flat contacting surface and a curved contacting surface and is arranged to be driven to rotate via said power generator to move said valve stopper at said auto-operated closed position that said valve stopper is contacted with said flat contacting surface of said actuator to retain said valve stopper at said opening of said water passage for blocking said water passing to said water outlet, and to move said valve stopper at said auto-operated opened position that said valve stopper is contacted with said curved contacting surface of said actuator to move said valve stopper to said offset position from said opening of said water passage for allowing said water passing to said water outlet.

38. The automatic flush actuation apparatus, as claimed in claim 35, wherein said actuator has a driving end portion downwardly and rotatably extended from a bottom side of said housing to contact with said valve stopper, wherein said driving end portion of the actuator, having a semi-circular cross section, has a flat contacting surface and a curved contacting surface and is arranged to be driven to rotate via said power generator to move said valve stopper at said auto-operated closed position that said valve stopper is contacted with said flat contacting surface of said actuator to retain said valve stopper at said opening of said water passage for blocking said water passing to said water outlet, and to move said valve stopper at said auto-operated opened position that said valve stopper is contacted with said curved contacting surface of said actuator to move said valve stopper to said offset position from said opening of said water passage for allowing said water passing to said water outlet.
39. The automatic flush actuation apparatus, as claimed in claim 36, wherein said valve stopper, having a ball-shape, sits on said valve member at said opening of said water passage to normally close said water passage for retaining said water pressure within said water chamber.
40. The automatic flush actuation apparatus, as claimed in claim 37, wherein said valve stopper, having a ball-shape, sits on said valve member at said opening of said water passage to normally close said water passage for retaining said water pressure within said water chamber.
41. The automatic flush actuation apparatus, as claimed in claim 38, wherein said valve stopper, having a ball-shape, sits on said valve member at said opening of said water passage to normally close said water passage for retaining said water pressure within said water chamber.
42. The automatic flush actuation apparatus, as claimed in claim 39, wherein said housing further comprises a locating ring integrally and downwardly protruded from a bottom side of said supporting frame to coaxially align with said water passage so as to form as a boundary for said valve stopper to move within said locating ring.

43. The automatic flush actuation apparatus, as claimed in claim 40, wherein said housing further comprises a locating ring integrally and downwardly protruded from a bottom side of said supporting frame to coaxially align with said water passage so as to form as a boundary for said valve stopper to move within said locating ring.
44. The automatic flush actuation apparatus, as claimed in claim 42, wherein said housing further comprises a locating ring integrally and downwardly protruded from a bottom side of said supporting frame to coaxially align with said water passage so as to form as a boundary for said valve stopper to move within said locating ring.
45. The automatic flush actuation apparatus, as claimed in claim 30, wherein said power generator is an electric motor actuated by said CPU to drive said actuator to rotate.
46. The automatic flush actuation apparatus, as claimed in claim 33, wherein said power generator is an electric motor actuated by said CPU to drive said actuator to rotate.
47. The automatic flush actuation apparatus, as claimed in claim 41, wherein said power generator is an electric motor actuated by said CPU to drive said actuator to rotate.
48. The automatic flush actuation apparatus, as claimed in claim 30, wherein said CPU comprises a control processor supported in said housing and a sensor which is electrically connected to said control processor for detecting said presence of said user of said flushing system, so as to actuate said power generator through said control processor.
49. The automatic flush actuation apparatus, as claimed in claim 33, wherein said CPU comprises a control processor supported in said housing and a sensor which is electrically connected to said control processor for detecting said presence of said user of said flushing system, so as to actuate said power generator through said control processor.
50. The automatic flush actuation apparatus, as claimed in claim 41, wherein said CPU comprises a control processor supported in said housing and a sensor which is electrically connected to said control processor for detecting said presence of said user of said flushing system, so as to actuate said power generator through said control processor.

51. The automatic flush actuation apparatus, as claimed in claim 47, wherein said CPU comprises a control processor supported in said housing and a sensor which is electrically connected to said control processor for detecting said presence of said user of said flushing system, so as to actuate said power generator through said control processor.
52. An automatic flush actuation apparatus for a flushing system which comprises a valve body having a water inlet, a water outlet, and a water chamber communicating between said water inlet and said water outlet, and a valve seat, having a flush channel, normally sealed with said water chamber for retaining a predetermined water pressure within said water chamber so as to block water flowing from said water inlet to said water outlet, wherein said automatic flush actuation apparatus comprises:
- a valve member adapted for being disposed at said valve seat to control said water flowing from said water inlet to said water outlet; and
- a sensor-operated powering assembly, comprising:
- a power source;
 - a power generator;
 - a CPU electrically connected with said power source and said power generator for sensing a presence of a user of said flushing system, so as to activate said power generator;
 - a relief valve provided at said valve member for controlling said water flowing from said water inlet to said water outlet through said water chamber, wherein said relief valve has a water passage extended along said valve member to communicate said water chamber with said water outlet and comprises a valve stopper and a retaining element normally retaining said valve stopper on said valve member to close said water passage for controlling a water flowing from said water inlet to said water outlet; and
 - an actuator driven by said power generator to move said relief valve between an auto-operated closed position and an auto-operated opened position, wherein at

said auto-operated closed position, said valve stopper is sealedly retained to close said water passage for blocking said water passing to said water outlet, and at said auto-operated opened position, said valve stopper is moved to an opened position by said actuator for releasing said water pressure within said water chamber to allow said water passing to said water outlet, wherein said retaining element is a resilient element coupling with said valve stopper so as to normally retain said valve stopper at said auto-operated closed position, wherein said resilient element is a compression spring disposed within said water passage for applying an urging force against said valve stopper so as to normally pull said valve stopper to close an opening of said water passage.

53. The automatic flush actuation apparatus, as claimed in claim 52, wherein said resilient element has a biasing end coupled with said valve stopper and an opposed affixing end coupled with a bottom end of said water passage for applying a pulling force against said valve stopper.

54. An automatic flush actuation apparatus for a flushing system which comprises a valve body having a water inlet, a water outlet, and a water chamber communicating between said water inlet and said water outlet, and a valve seat, having a flush channel, normally sealed with said water chamber for retaining a predetermined water pressure within said water chamber so as to block water flowing from said water inlet to said water outlet, wherein said automatic flush actuation apparatus comprises:

a valve member adapted for being disposed at said valve seat to control said water flowing from said water inlet to said water outlet; and

a sensor-operated powering assembly, comprising:

a power source;

a power generator;

a CPU electrically connected with said power source and said power generator for sensing a presence of a user of said flushing system, so as to activate said power generator;

a relief valve provided at said valve member for controlling said water flowing from said water inlet to said water outlet through said water chamber, wherein said relief valve has a water passage extended along said valve member to communicate said water chamber with said water outlet and comprises a valve stopper and a retaining element normally retaining said valve stopper on said valve member to close said water passage for controlling a water flowing from said water inlet to said water outlet; and

an actuator driven by said power generator to move said relief valve between an auto-operated closed position and an auto-operated opened position, wherein at said auto-operated closed position, said valve stopper is sealedly retained to close said water passage for blocking said water passing to said water outlet, and at said auto-operated opened position, said valve stopper is moved to an opened position by said actuator for releasing said water pressure within said water chamber to allow said water passing to said water outlet, wherein said retaining element is a resilient element coupling with said valve stopper so as to normally retain said valve stopper at said auto-operated closed position, wherein said valve stopper, having a ball-shape, sits on said valve member at an opening of said water passage to normally close said water passage for blocking said water passing to said water outlet, wherein said resilient element is a compression spring disposed within said water passage for applying an urging force against said valve stopper so as to normally pull said valve stopper to close an opening of said water passage, wherein said resilient element has a biasing end is coupled with said valve stopper and an opposed affixing end coupled with a bottom end of said water passage for applying a pulling force against said valve stopper.

55. The automatic flush actuation apparatus, as claimed in claim 54, wherein said actuator has a driving end portion downwardly and rotatably extended from a bottom side of said water chamber to contact with said valve stopper, wherein said driving end portion of the actuator has a curved contacting surface and is arranged to be driven to rotate via said power generator, at said auto-operated closed position, said valve stopper is retained by said resilient element at an opening of said water passage for blocking said water passing

to said water outlet, wherein when said valve stopper is moved by said driving end portion of said actuator to said auto-operated opened position, said valve stopper is contacted with said curved contacting surface of said actuator and moved to an offset position from said opening of said water passage for allowing said water passing to said water outlet.

56. The automatic flush actuation apparatus, as claimed in claim 55, wherein said power generator is an electric motor actuated by said CPU to drive said actuator to rotate.
57. The automatic flush actuation apparatus, as claimed in claim 56, wherein said CPU comprises a control processor supported in said water chamber and a sensor which is electrically connected to said control processor for detecting said presence of said user of said flushing system, so as to actuate said power generator through said control processor.
58. The automatic flush actuation apparatus, as claimed in claim 55, wherein said valve member also comprises a valve controlling shaft downwardly extended for communicating with a flush lever coupled with said valve body within said flush channel, wherein said valve member is capable of being moved by said flush lever between a manual-operated closed position and a manual-operated opened position, wherein at said manual-operated closed position, said valve member is arranged for sealedly sitting at said valve seat to block said water passing to said water outlet, and at said manual-operated opened position, said valve member is moved to an opened position for releasing said water pressure within said water chamber to allow said water to pass from said water inlet to said water outlet through said water chamber, whereby when said sensor-operated powering assembly is not functioned, an user is able to operate said flushing system by means of said flush lever.
59. An automatic flush actuation apparatus for a flushing system which comprises a valve body having a water inlet, a water outlet, and a water chamber communicating between said water inlet and said water outlet, and a valve seat, having a flush channel, normally sealed with said water chamber for retaining a predetermined water pressure within said water chamber so as to block water flowing from said water inlet to said water outlet, wherein said automatic flush actuation apparatus comprises:

a valve member adapted for being disposed at said valve seat to control said water flowing from said water inlet to said water outlet; and

a sensor-operated powering assembly, comprising:

a power source;

a power generator;

a CPU electrically connected with said power source and said power generator for sensing a presence of a user of said flushing system, so as to activate power generator;

a relief valve provided at said valve member for controlling said water flowing from said water inlet to said water outlet through said water chamber, wherein said relief valve has a water passage extended along said valve member to communicate said water chamber with said water outlet and comprises a valve stopper and a retaining element normally retaining said valve stopper on said valve member to close said water passage for controlling a water flowing from said water inlet to said water outlet; and

an actuator driven by said power generator to move said relief valve between an auto-operated closed position and an auto-operated opened position, wherein at said auto-operated closed position, said valve stopper is sealedly retained to close said water passage for blocking said water passing to said water outlet, and at said auto-operated opened position, said valve stopper is moved to an opened position by said actuator for releasing said water pressure within said water chamber to allow said water passing to said water outlet, wherein said retaining element is a resilient element coupling with said valve stopper so as to normally retain said valve stopper at said auto-operated closed position, wherein said valve member comprises a sealing platform arranged for sealedly supporting on said valve seat to normally close said flush channel, wherein said water passage is coaxially extended from said sealing platform to a bottom end of said valve controlling shaft, wherein said valve stopper, having a ball-shape, sits on said valve member

at an opening of said water passage to normally close said water passage for blocking said water passing to said water outlet, wherein said resilient element is a compression spring disposed within said water passage for applying an urging force against said valve stopper so as to normally pull said valve stopper to close an opening of said water passage, wherein said resilient element has a biasing end is coupled with said valve stopper and an opposed affixing end coupled with a bottom end of said water passage for applying a pulling force against said valve stopper.

60. The automatic flush actuation apparatus, as claimed in claim 59, wherein said sealing platform has a circular retaining seat protruding upwardly around said opening of said water passage, wherein said valve stopper is disposed at said retaining seat so as to hold said valve stopper in position.

61. An automatic flush actuation apparatus for a flushing system which comprises a valve body having a water inlet, a water outlet, and a water chamber communicating between said water inlet and said water outlet, and a valve seat, having a flush channel, normally sealed with said water chamber for retaining a predetermined water pressure within said water chamber so as to block water flowing from said water inlet to said water outlet, wherein said automatic flush actuation apparatus comprises:

a valve member adapted for being disposed at said valve seat to control said water flowing from said water inlet to said water outlet; and

a sensor-operated powering assembly, comprising:

a power source;

a power generator comprising an electric motor; a CPU electrically connected with said power source and said electric motor of said power generator for sensing a presence of a user of said flushing system, so as to activate said power generator;

a relief valve provided at said valve member for controlling said water flowing from said water inlet to said water outlet through said water chamber, wherein

said relief valve has a water passage extended along said valve member to communicate said water chamber with said water outlet and comprises a valve stopper and a retaining element normally retaining said valve stopper on said valve member to close said water passage for controlling a water flowing from said water inlet to said water outlet;

and an actuator driven by said electric motor of said power generator to rotate so as to move said relief valve between an auto-operated closed position and an auto-operated opened position, wherein at said auto-operated closed position, said valve stopper is sealedly retained to close said water passage for blocking said water passing to said water outlet, and at said auto-operated opened position, said valve stopper is moved to an opened position by said actuator for releasing said water pressure within said water chamber to allow said water passing to said water outlet.

62. The automatic flush actuation apparatus, as claimed in claim 61 further comprising a housing adapted for mounting on said valve body, wherein said housing comprises a supporting frame having a power source compartment for receiving said power source therein and a CPU cavity for receiving said CPU therein, and a valve cap which has a transparent window aligned with said CPU and is adapted for mounting on said valve body to protectively enclose said supporting frame within said valve cap.
63. The automatic flush actuation apparatus, as claimed in claim 62, wherein said valve member comprises a sealing platform arranged for sealedly supporting on said valve seat to normally close said flush channel, wherein said water passage is coaxially extended from said sealing platform to a bottom end of said valve controlling shaft.
64. The automatic flush actuation apparatus, as claimed in claim 63, wherein said sealing platform has a circular retaining seat protruding upwardly around said opening of said water passage, wherein said valve stopper is disposed at said retaining seat so as to hold said valve stopper in position.
65. The automatic flush actuation apparatus, as claimed in claim 64, wherein said valve stopper, having a ball-shape, sits on said valve member at an opening of said water

passage to normally close said water passage for retaining said water pressure within said water chamber.

66. The automatic flush actuation apparatus, as claimed in claim 65, wherein said retaining element comprises a compression spring disposed within said water passage for applying an urging force against said valve stopper to normally pull said valve stopper to close an opening of said water passage so as to normally retain said valve stopper at said auto-operated closed position.
67. The automatic flush actuation apparatus, as claimed in claim 66, wherein said valve cap comprises an outer casing having a power source opening aligned with said power source compartment to expose said power source to outside through said power source opening, and a power source cover detachably mounted on said outer casing to cover said power source opening.
68. The automatic flush actuation apparatus, as claimed in claim 67, wherein said actuator has a driving end portion downwardly and rotatably extended from a bottom side of said housing to contact with said valve stopper, wherein said driving end portion of the actuator has a curved contacting surface and is arranged to be driven to rotate via said power generator, at said auto-operated closed position, said valve stopper is retained by said retaining element at an opening of said water passage for blocking said water passing to said water outlet, wherein when said valve stopper is moved by said driving end portion of said actuator to said auto-operated opened position, said valve stopper is contacted with said curved contacting surface of said actuator and moved to an offset position from said opening of said water passage for allowing said water passing to said water outlet.
69. The automatic flush actuation apparatus, as claimed in claim 68, wherein said valve member further comprises a valve controlling shaft downwardly extended for communicating with a flush lever coupled with said valve body within said flush channel, wherein said valve member is capable of being moved by said flush lever between a manual-operated closed position and a manual-operated opened position, wherein at said manual-operated closed position, said valve member is arranged for sealedly sitting at

said valve seat to block said water passing to said water outlet, and at said manual-operated opened position, said valve member is moved to an opened position for releasing said water pressure within said water chamber to allow said water to pass from said water inlet to said water outlet through said water chamber, whereby when said sensor-operated powering assembly is not functioned, an user is able to operate said flushing system by means of said flush lever.

70. The automatic flush actuation apparatus, as claimed in claim 65, wherein said valve cap comprises an outer casing having a power source opening aligned with said power source compartment to expose said power source to outside through said power source opening, and a power source cover detachably mounted on said outer casing to cover said power source opening.
71. The automatic flush actuation apparatus, as claimed in claim 65, wherein said actuator has a driving end portion downwardly and rotatably extended from a bottom side of said housing to contact with said valve stopper, wherein said driving end portion of the actuator has a curved contacting surface and is arranged to be driven to rotate via said power generator, at said auto-operated closed position, said valve stopper is retained by said retaining element at an opening of said water passage for blocking said water passing to said water outlet, wherein when said valve stopper is moved by said driving end portion of said actuator to said auto-operated opened position, said valve stopper is contacted with said curved contacting surface of said actuator and moved to an offset position from said opening of said water passage for allowing said water passing to said water outlet.
72. The automatic flush actuation apparatus, as claimed in claim 65, wherein said valve member further comprises a valve controlling shaft downwardly extended for communicating with a flush lever coupled with said valve body within said flush channel, wherein said valve member is capable of being moved by said flush lever between a manual-operated closed position and a manual-operated opened position, wherein at said manual-operated closed position, said valve member is arranged for sealedly sitting at said valve seat to block said water passing to said water outlet, and at said manual-operated opened position, said valve member is moved to an opened position for

releasing said water pressure within said water chamber to allow said water to pass from said water inlet to said water outlet through said water chamber, whereby when said sensor-operated powering assembly is not functioned, an user is able to operate said flushing system by means of said flush lever.

73. The automatic flush actuation apparatus, as claimed in claim 62, wherein said valve stopper, having a ball-shape, sits on said valve member at an opening of said water passage to normally close said water passage for retaining said water pressure within said water chamber.
74. The automatic flush actuation apparatus, as claimed in claim 62, wherein said retaining element comprises a compression spring disposed within said water passage for applying an urging force against said valve stopper to normally pull said valve stopper to close an opening of said water passage so as to normally retain said valve stopper at said auto-operated closed position.
75. The automatic flush actuation apparatus, as claimed in claim 62, wherein said valve cap comprises an outer casing having a power source opening aligned with said power source compartment to expose said power source to outside through said power source opening, and a power source cover detachably mounted on said outer casing to cover said power source opening.
76. The automatic flush actuation apparatus, as claimed in claim 61, wherein said valve member comprises a sealing platform arranged for sealedly supporting on said valve seat to normally close said flush channel, wherein said water passage is coaxially extended from said sealing platform to a bottom end of said valve controlling shaft.
77. The automatic flush actuation apparatus, as claimed in claim 76, wherein said sealing platform has a circular retaining seat protruding upwardly around said opening of said water passage, wherein said valve stopper is disposed at said retaining seat so as to hold said valve stopper in position.
78. The automatic flush actuation apparatus, as claimed in claim 61, wherein said valve stopper, having a ball-shape, sits on said valve member at an opening of said water

passage to normally close said water passage for retaining said water pressure within said water chamber.

79. The automatic flush actuation apparatus, as claimed in claim 61, wherein said retaining element comprises a compression spring disposed within said water passage for applying an urging force against said valve stopper to normally pull said valve stopper to close an opening of said water passage so as to normally retain said valve stopper at said auto-operated closed position.
80. The automatic flush actuation apparatus, as claimed in claim 61, wherein said actuator has a driving end portion downwardly and rotatably extended from a bottom side of said water chamber to contact with said valve stopper, wherein said driving end portion of the actuator has a curved contacting surface and is arranged to be driven to rotate via said power generator, at said auto-operated closed position, said valve stopper is retained by said retaining element at an opening of said water passage for blocking said water passing to said water outlet, wherein when said valve stopper is moved by said driving end portion of said actuator to said auto-operated opened position, said valve stopper is contacted with said curved contacting surface of said actuator and moved to an offset position from said opening of said water passage for allowing said water passing to said water outlet.
81. The automatic flush actuation apparatus, as claimed in claim 61, wherein said valve member further comprises a valve controlling shaft downwardly extended for communicating with a flush lever coupled with said valve body within said flush channel, wherein said valve member is capable of being moved by said flush lever between a manual-operated closed position and a manual-operated opened position, wherein at said manual-operated closed position, said valve member is arranged for sealedly sitting at said valve seat to block said water passing to said water outlet, and at said manual-operated opened position, said valve member is moved to an opened position for releasing said water pressure within said water chamber to allow said water to pass from said water inlet to said water outlet through said water chamber, whereby when said sensor-operated powering assembly is not functioned, an user is able to operate said flushing system by means of said flush lever.

82. An automatic flush actuation apparatus for a valve body having a water inlet, and a water outlet and a water chamber communicating between said water inlet and said water outlet, wherein said automatic flush actuation apparatus comprises:

a valve member adapted for being disposed in said water chamber to control said water flowing from said water inlet to said water outlet; and

a powering assembly, comprising:

a power generator;

a relief valve provided at said valve member for controlling said water flowing from said water inlet to said water outlet through said water chamber, wherein said relief valve has a water passage extended along said valve member to communicate said water chamber with said water outlet and comprises a valve stopper and a retaining element normally retaining said valve stopper on said valve member to close said water passage for controlling said water flowing from said water inlet to said water outlet; and

an actuator driven by said power generator to move said relief valve between an auto-operated closed position and an auto-operated opened position, wherein at said auto-operated closed position, said valve stopper is sealedly retained to close said water passage for blocking said water passing to said water outlet, and at said auto-operated opened position, said valve stopper is moved to an opened position by said actuator for releasing said water pressure within said water chamber to allow said water passing to said water outlet, wherein said powering assembly is a sensor-operated powering assembly further comprising a power source and a CPU electrically connected with said power source and said power generator for sensing a presence of a user of said automatic flush actuation apparatus so as to active said power generator, wherein said valve member comprises a sealing platform sealedly supported on a valve seat to normally block said water flow from said water inlet to said water outlet, wherein said water passage is coaxially extended from said sealing platform to a bottom end thereof, wherein said retaining element is a compression spring disposed in said water passage for

applying an urging force against said valve stopper so as to normally pull said valve stopper to close an opening of said water passage.

83. An automatic flush actuation apparatus for a valve body having a water inlet, and a water outlet and a water chamber communicating between said water inlet and said water outlet, wherein said automatic flush actuation apparatus comprises:

a valve member adapted for being disposed in said water chamber to control said water flowing from said water inlet to said water outlet; and

a powering assembly, comprising:

a power generator;

a relief valve provided at said valve member for controlling said water flowing from said water inlet to said water outlet through said water chamber, wherein said relief valve has a water passage extended along said valve member to communicate said water chamber with said water outlet and comprises a valve stopper and a retaining element normally retaining said valve stopper on said valve member to close said water passage for controlling said water flowing from said water inlet to said water outlet; and

an actuator driven by said power generator to move said relief valve between an auto-operated closed position and an auto-operated opened position, wherein at said auto-operated closed position, said valve stopper is sealedly retained to close said water passage for blocking said water passing to said water outlet, and at said auto-operated opened position, said valve stopper is moved to an opened position by said actuator for releasing said water pressure within said water chamber to allow said water passing to said water outlet, wherein said retaining element has a biasing end coupled with said valve stopper and an opposed affixing end coupled with a bottom end of said water passage for applying a pulling force against said valve stopper.

84. An automatic flush actuation apparatus for a valve body having a water inlet, and a water outlet and a water chamber communicating between said water inlet and said water outlet, wherein said automatic flush actuation apparatus comprises:

a valve member adapted for being disposed in said water chamber to control said water flowing from said water inlet to said water outlet; and

a powering assembly, comprising:

a power generator;

a relief valve provided at said valve member for controlling said water flowing from said water inlet to said water outlet through said water chamber, wherein said relief valve has a water passage extended along said valve member to communicate said water chamber with said water outlet and comprises a valve stopper and a retaining element normally retaining said valve stopper on said valve member to close said water passage for controlling said water flowing from said water inlet to said water outlet; and

an actuator driven by said power generator to move said relief valve between an auto-operated closed position and an auto-operated opened position, wherein at said auto-operated closed position, said valve stopper is sealedly retained to close said water passage for blocking said water passing to said water outlet, and at said auto-operated opened position, said valve stopper is moved to an opened position by said actuator for releasing said water pressure within said water chamber to allow said water passing to said water outlet, wherein said powering assembly is a sensor-operated powering assembly further comprising a power source and a CPU electrically connected with said power source and said power generator for sensing a presence of a user of said automatic flushing actuation apparatus so as to active said power generator, wherein said valve member comprises a sealing platform sealedly supported on a valve seat to normally block said water flow from said water inlet to said water outlet, wherein said water passage is coaxially extended from said sealing platform to a bottom end thereof, wherein said retaining element has a biasing end coupled with said valve stopper and an

opposed affixing end coupled with a bottom end of said water passage for applying a pulling force against said valve stopper.

85. The apparatus, as claimed in claim 84, wherein said actuator has a driving end portion downwardly and rotatably extended from a bottom side of said water chamber to contact with said valve stopper, wherein said driving end portion of the actuator has a curved contacting surface and is arranged to be driven to rotate via said power generator, wherein at said auto-operated closed position, said valve stopper is retained by said retaining element at an opening of said water passage for blocking said water passing to said water outlet, wherein when said valve stopper is moved by said driving end portion of said actuator to said auto-operated opened position, said valve stopper is contacted with said curved contacting surface of said actuator and moved to an offset position from said opening of said water passage for allowing said water passing to said water outlet.
86. The apparatus, as claimed in claim 85, wherein said power generator is an electric motor driving said actuator to rotate.
87. An automatic flush actuation apparatus for a valve body having a water inlet, and a water outlet and a water chamber communicating between said water inlet and said water outlet, wherein said automatic flush actuation apparatus comprises:
- a valve member adapted for being disposed in said water chamber to control said water flowing from said water inlet to said water outlet; and
- a powering assembly, comprising:
- a power generator;
- a relief valve provided at said valve member for controlling said water flowing from said water inlet to said water outlet through said water chamber, wherein said relief valve has a water passage extended along said valve member to communicate said water chamber with said water outlet and comprises a valve stopper and a retaining element normally retaining said valve stopper on said valve member to close said water passage for controlling said water flowing from said water inlet to said water outlet; and

an actuator driven by said power generator to move said relief valve between an auto-operated closed position and an auto-operated opened position, wherein at said auto-operated closed position, said valve stopper is sealedly retained to close said water passage for blocking said water passing to said water outlet, and at said auto-operated opened position, said valve stopper is moved to an opened position by said actuator for releasing said water pressure within said water chamber to allow said water passing to said water outlet, wherein said actuator has a driving end portion downwardly and rotatably extended from a bottom side of said water chamber to contact with said valve stopper, wherein said driving end portion of the actuator has a curved contacting surface and is arranged to be driven to rotate via said power generator, wherein at said auto-operated closed position, said valve stopper is retained by said retaining element at an opening of said water passage for blocking said water passing to said water outlet, wherein when said valve stopper is moved by said driving end portion of said actuator to said auto-operated opened position, said valve stopper is contacted with said curved contacting surface of said actuator and moved to an offset position from said opening of said water passage for allowing said water passing to said water outlet.

88. An automatic flush actuation apparatus for a valve body having a water inlet, and a water outlet and a water chamber communicating between said water inlet and said water outlet, wherein said automatic flush actuation apparatus comprises:

a valve member adapted for being disposed in said water chamber to control said water flowing from said water inlet to said water outlet; and

a powering assembly, comprising:

a power generator;

a relief valve provided at said valve member for controlling said water flowing from said water inlet to said water outlet through said water chamber, wherein said relief valve has a water passage extended along said valve member to communicate said water chamber with said water outlet and comprises a valve stopper and a retaining element normally retaining said valve stopper on said

valve member to close said water passage for controlling said water flowing from said water inlet to said water outlet; and

an actuator driven by said power generator to move said relief valve between an auto-operated closed position and an auto-operated opened position, wherein at said auto-operated closed position, said valve stopper is sealedly retained to close said water passage for blocking said water passing to said water outlet, and at said auto-operated opened position, said valve stopper is moved to an opened position by said actuator for releasing said water pressure within said water chamber to allow said water passing to said water outlet, wherein said powering assembly is a sensor-operated powering assembly further comprising a power source and a CPU electrically connected with said power source and said power generator for sensing a presence of a user of said automatic flush actuation apparatus so as to active said power generator, wherein said valve member comprises a sealing platform sealedly supported on a valve seat to normally block said water flow from said water inlet to said water outlet, wherein said water passage is coaxially extended from said sealing platform to a bottom end thereof, wherein said actuator has a driving end portion downwardly and rotatably extended from a bottom side of said water chamber to contact with said valve stopper, wherein said driving end portion of the actuator has a curved contacting surface and is arranged to be driven to rotate via said power generator, wherein at said auto-operated closed position, said valve stopper is retained by said retaining element at an opening of said water passage for blocking said water passing to said water outlet, wherein when said valve stopper is moved by said driving end portion of said actuator to said auto-operated opened position, said valve stopper is contacted with said curved contacting surface of said actuator and moved to an offset position from said opening of said water passage for allowing said water passing to said water outlet.

89. An automatic flush actuation apparatus for a valve body having a water inlet, a water outlet and a water chamber communicating between said water inlet and said water outlet, wherein said automatic flush actuation apparatus comprises:

a valve member adapted for being sealedly disposed on said valve seat; and

a powering assembly, comprising:

a housing adapted for mounting on said valve body;

a power source received in the housing;

a power generator;

a CPU electrically connected with said power source and said power generator for sensing a presence of a user of said flushing system, so as to active said power generator; a relief valve provided at said valve member for controlling said water flowing from said water inlet to said water outlet through said water chamber, wherein said relief valve has a water passage extended along said valve member and comprises a valve stopper and a retaining element normally retains said valve stopper at an auto-operated closed position; and

an actuator driven by said power generator to move said relief valve between said auto-operated closed position and an auto-operated opened position, wherein at said auto-operated closed position, said valve stopper is retained by said retaining element to close said water passage for blocking said water passing to said water outlet, and at said auto-operated opened position, said valve stopper is moved to an opened position by said actuator for releasing said water pressure within said water chamber to allow said water passing to said water outlet, wherein said housing comprises a supporting frame having a power source compartment for receiving said power source therein and a CPU cavity for receiving said CPU therein, and a valve cap which has a transparent window aligned with said CPU and is adapted for mounting on said valve body to protectively enclose said supporting frame within said valve cap, wherein said actuator has a driving end portion downwardly and rotatably extended from a bottom side of said housing to contact with said valve stopper, wherein said driving end portion of the actuator has a curved contacting surface and is arranged to be driven to rotate via said power generator, wherein at said auto-operated closed position, said valve stopper

is retained by said retaining element at said opening of said water passage for blocking said water passing to said water outlet, wherein when said valve stopper is moved by said driving end portion of said actuator to said auto-operated opened position, said valve stopper is contacted with said curved contacting surface of said actuator and moved to an offset position from said opening of said water passage for allowing said water passing to said water outlet.

90. An automatic flush actuation apparatus for a valve body having a water inlet, a water outlet and a water chamber communicating between said water inlet and said water outlet, wherein said automatic flush actuation apparatus comprises:

a valve member adapted for being sealedly disposed on said valve seat; and

a powering assembly, comprising:

a housing adapted for mounting on said valve body;

a power source received in the housing;

a power generator;

a CPU electrically connected with said power source and said power generator for sensing a presence of a user of said flushing system, so as to active said power generator; a relief valve provided at said valve member for controlling said water flowing from said water inlet to said water outlet through said water chamber, wherein said relief valve has a water passage extended along said valve member and comprises a valve stopper and a retaining element normally retains said valve stopper at an auto-operated closed position; and

an actuator driven by said power generator to move said relief valve between said auto-operated closed position and an auto-operated opened position, wherein at said auto-operated closed position, said valve stopper is retained by said retaining element to close said water passage for blocking said water passing to said water outlet, and at said auto-operated opened position, said valve stopper is moved to an opened position by said actuator for releasing said water pressure within said

water chamber to allow said water passing to said water outlet, wherein said housing comprises a supporting frame having a power source compartment for receiving said power source therein and a CPU cavity for receiving said CPU therein, and a valve cap which has a transparent window aligned with said CPU and is adapted for mounting on said valve body to protectively enclose said supporting frame within said valve cap, wherein said valve stopper having a round bottom end sits on said valve member and positioning at an opening of said water passage to normally close said water passage for blocking said water flowing from said water inlet to said water outlet, wherein said retaining element has a biasing end coupling with said valve stopper so as to normally retain said valve stopper at said auto-operated closed position, wherein said power generator is an electric motor actuated by said CPU to drive said actuator to rotate, wherein said actuator has a driving end portion downwardly and rotatably extended from a bottom side of said housing to contact with said valve stopper, wherein said driving end portion of the actuator has a curved contacting surface and is arranged to be driven to rotate via said power generator, wherein at said auto-operated closed position, said valve stopper is retained by said retaining element at said opening of said water passage for blocking said water passing to said water outlet, wherein when said valve stopper is moved by said driving end portion of said actuator to said auto-operated opened position, said valve stopper is contacted with said curved contacting surface of said actuator and moved to an offset position from said opening of said water passage for allowing said water passing to said water outlet.

91. An automatic flush actuation apparatus for a valve body having a water inlet, and a water outlet and a water chamber communicating between said water inlet and said water outlet, wherein said automatic flush actuation apparatus comprises:
- a valve member adapted for being disposed in said water chamber to control said water flowing from said water inlet to said water outlet; and
- a powering assembly, comprising:

a power generator;

a relief valve provided at said valve member for controlling said water flowing from said water inlet to said water outlet through said water chamber, wherein said relief valve has a water passage extended along said valve member to communicate said water chamber with said water outlet and comprises a valve stopper and a resilient element disposed in said water passage for applying an urging force against said valve stopper to normally retain said valve stopper on said valve member so as to close said water passage for controlling said water flowing from said water inlet to said water outlet; and

an actuator driven by said power generator to move said relief valve between an auto-operated closed position and an auto-operated opened position, wherein at said auto-operated closed position, said valve stopper is sealedly retained to close said water passage for blocking said water passing to said water outlet, and at said auto-operated opened position, said valve stopper is moved to an opened position by said actuator for releasing said water pressure within said water chamber to allow said water passing to said water outlet; wherein said actuator has a driving end portion downwardly and rotatably extended from a bottom side of said water chamber to contact with said valve stopper, wherein said driving end portion of the actuator has a curved contacting surface and is arranged to be driven to rotate via said power generator, wherein at said auto-operated closed position, said valve stopper is retained by said resilient element at an opening of said water passage for blocking said water passing to said water outlet, wherein when said valve stopper is moved by said driving end portion of said actuator to said auto-operated opened position, said valve stopper is contacted with said curved contacting surface of said actuator and moved to an offset position from said opening of said water passage for allowing said water passing to said water outlet.

92. An automatic flush actuation apparatus for a valve body having a water inlet, a water outlet and a water chamber communicating between said water inlet and said water outlet, wherein said automatic flush actuation apparatus comprises:

a valve member adapted for being sealedly disposed on said valve seat; and

a powering assembly, comprising:

a housing adapted for mounting on said valve body;

a power source received in the housing;

a power generator;

CPU electrically connected with said power source and said power generator for sensing a presence of a user of said flushing system, so as to active said power generator;

a relief valve provided at said valve member for controlling said water flowing from said water inlet to said water outlet through said water chamber, wherein said relief valve has a water passage extended along said valve member and comprises a resilient element disposed in said water passage for applying an urging force against a valve stopper to normally retain said valve stopper at an auto-operated closed position; and

an actuator driven by said power generator to move said relief valve between said auto-operated closed position and an auto-operated opened position, wherein at said auto-operated closed position, said valve stopper is retained by said resilient element to close said water passage for blocking said water passing to said water outlet, and at said auto-operated opened position, said valve stopper is moved to an opened position by said actuator for releasing said water pressure within said water chamber to allow said water passing to said water outlet; wherein said actuator has a driving end portion downwardly and rotatably extended from a bottom side of said housing to contact with said valve stopper, wherein said driving end portion of the actuator has a curved contacting surface and is arranged to be driven to rotate via said power generator, wherein at said auto-operated closed position, said valve stopper is retained by said resilient element at said opening of said water passage for blocking said water passing to said water outlet, wherein when said valve stopper is moved by said driving end portion of said

actuator to said auto-operated opened position, said valve stopper is contacted with said curved contacting surface of said actuator and moved to an offset position from said opening of said water passage for allowing said water passing to said water outlet.

93. An automatic actuation apparatus for a valve body having a water inlet and a water outlet, comprising:

a valve member adapted for sealedly disposed between said water inlet and said water outlet to control water flowing from said water inlet to said water outlet; and

a powering assembly, comprising:

a power generator,

a relief valve having a water passage extended along said valve member for communicating with said water outlet, and comprising a valve stopper disposed at an opening of said water passage to close said water passage, and

a resilient element disposed in said water passage, wherein said resilient element has a biasing end coupled with said valve stopper and an opposed affixing end coupled within said water passage for applying an urging force against said valve stopper to normally retain said valve stopper on said opening of said water passage; and

an actuator driven to be rotated by said power generator to move said relief valve between an auto-operated closed position and an auto-operated opened position, wherein at said auto-operated closed position, said valve stopper is sealedly retained at said valve stopper to close said water passage for blocking said water passing to said water outlet, and at said auto-operated opened position, said actuator is driven to rotate to contact with said valve stopper and to push said valve stopper to an offset position from said opening of said water passage for allowing said water passing to said water outlet.

94. The automatic actuation apparatus, as claimed in claim 93, wherein said actuator has a driving end portion downwardly extended to contact with said valve stopper and a curved

contacting surface provided at said driving end portion, wherein when said valve stopper is moved by said driving end portion of said actuator to said auto-operated opened position, said valve stopper is contacted with said curved contacting surface of said actuator and moved to said offset position from said opening of said water passage for allowing said water passing to said water outlet.

95. The automatic actuation apparatus, as claimed in claim 94, wherein said valve stopper has a round bottom end sitting on said valve member to normally close an opening of said water passage for blocking said water passing to said water outlet.
96. The automatic actuation apparatus, as claimed in claim 95, wherein said powering assembly further comprises a CPU operatively activating said power generator for controlling a time of a flushing cycle, wherein said CPU controllably activates said power generator to control a rotational speed of said actuator so as to control the time of said flushing cycle.
97. The automatic actuation apparatus, as claimed in claim 96, wherein said CPU further controls a rotational cycle of said actuator to control a time of said valve stopper being retained at said auto-operated closed position for controlling a volume of said water for each of said flushing cycles.
98. The automatic actuation apparatus, as claimed in claim 93, wherein said powering assembly further comprises a CPU operatively activating said power generator for controlling a time of a flushing cycle, wherein said CPU controllably activates said power generator to control a rotational speed of said actuator so as to control the time of said flushing cycle.
99. The automatic actuation apparatus, as claimed in claim 98, wherein said CPU further controls a rotational cycle of said actuator to control a time of said valve stopper being retained at said auto-operated closed position for controlling a volume of said water for each of said flushing cycles.

100. A method of controlling a flushing cycle of a flushing system via a valve body having a water inlet, a water outlet, and a valve member being disposed between said water inlet and said water outlet; wherein said method comprises the steps of:
- (a) providing a water passage axially extending along said valve member to communicate with said water outlet;
 - (b) normally retaining a valve stopper to close said water passage by blocking an opening of said water passage for controlling said water flowing from said water inlet to said water outlet, wherein said valve stopper is normally retained by the steps of:
 - (b.1) disposing a resilient element along said water passage,
 - (b.2) coupling an end of said resilient element within said water passage, and
 - (b.3) coupling an opposed end of said resilient element with said valve stopper for applying an urging force against said valve stopper to normally retain said valve stopper on said opening of said water passage;
 - (c) rotationally driving an actuator to push said valve stopper to an opened position that does not block said water passage for allowing said water passing to said water outlet; and
 - (d) controlling a time of said valve stopper being stayed at said opened position to control a time of said flushing cycle, wherein said time of said valve stopper being stayed at said opened position is adjustably controlled by a rotational speed of said actuator and a rotational cycle of said actuator so as to further control a volume of said water for each of said flushing cycles.
101. The method, as claimed in claim 100, wherein the step (c) further comprises the steps of:
- (c.1) providing a curved contacting surface at a driving end portion of said actuator; and

(c.2) rotationally driving said actuator to contact said curved contacting surface with said valve stopper so as to move said valve stopper at an offset position from said opening of said water passage.

102. The method as claimed in claim 101, wherein in the step (c), said actuator is actuated to rotate in responsive to a presence of a user in front of said flushing system.
103. The method, as claimed in claim 102, wherein said actuator is actuated to rotate by an electric motor.
104. The method as claimed in claim 100, wherein in the step (c), said actuator is actuated to rotate in responsive to a presence of a user in front of said flushing system.
105. The method, as claimed in claim 100, wherein said actuator is actuated to rotate by an electric motor.
106. A powering assembly of an automatic actuation apparatus comprising a relief valve for controlling volume of water used in a flushing cycle of a flushing system which, when executed by a control processor in said automatic actuation apparatus, cause said control processor to perform flushing operations of:
- detecting a presence of a user of said flushing system;
- activating said control processor to adjustably control a time of said flushing cycle and water volume for said flushing cycle by moving said relief valve from an closed position to an opened position;
- starting said flushing cycle of said flushing system; and
- completing said flushing cycle of said flushing system in responsive to said time of said flushing cycle and said water volume for said flushing cycle.
107. The powering assembly, as recited in claim 106, wherein said control processor controllably adjusting a time of said relief valve staying at said opened position, such that said control processor delays said time of said relief valve staying at said opened position for increasing said water volume of said flushing cycle.

108. The powering assembly, as recited in claim 106, further comprising an actuator controlled by said control processor to move said relief valve between said opened position and said closed position, wherein said control processor controllably adjusts a driven speed of said actuator, that is a time said actuator driving said relief valve to stay in said opened position, for controllably adjusting said volume of water used in said flushing cycle for said flushing system, such that said control processor delays said driving time of said actuator for increasing said water volume of said flushing cycle.
109. The powering assembly, as recited in claim 107, further comprising an actuator controlled by said control processor to move said relief valve between said opened position and said closed position, wherein said control processor controllably adjusts a driven speed of said actuator, that is a time said actuator driving said relief valve to stay in said opened position, for controllably adjusting said volume of water used in said flushing cycle for said flushing system, such that said control processor delays said driving time of said actuator for increasing said water volume of said flushing cycle.
110. The powering assembly, as recited in claim 108, wherein said control processor controls a rotational speed of said actuator for controllably adjusting said volume of water used in said flushing cycle for said flushing system.
111. The powering assembly, as recited in claim 109, wherein said control processor controls a rotational speed of said actuator for controllably adjusting said volume of water used in said flushing cycle for said flushing system.
112. An automatic actuation apparatus for controlling volume of water used in a flushing cycle of a flushing system, comprising a control processor and a relief valve actuated by said control processor, said control processor performing flushing operations of:
- detecting a presence of a user of said flushing system;
 - activating said control processor to adjustably control a time of said flushing cycle and water volume for said flushing cycle by moving said relief valve from a closed position to an opened position;
 - starting said flushing cycle of said flushing system; and

completing said flushing cycle of said flushing system in responsive to said time of said flushing cycle and said water volume for said flushing cycle.

113. The automatic actuation apparatus, as recited in claim 112, wherein said control processor controllably adjusting a time of said relief valve staying at said opened position, such that said control processor delays said time of said relief valve staying at said opened position for increasing said water volume of said flushing cycle.
114. The automatic actuation apparatus, as recited in claim 112, further comprising an actuator controlled by said control processor to move said relief valve between said opened position and said closed position, wherein said control processor controllably adjusts a driven speed of said actuator, that is a time said actuator driving said relief valve to stay in said opened position, for controllably adjusting said volume of water used in said flushing cycle for said flushing system, such that said control processor delays said driving time of said actuator for increasing said water volume of said flushing cycle.
115. The automatic actuation apparatus, as recited in claim 113, further comprising an actuator controlled by said control processor to move said relief valve between said opened position and said closed position, wherein said control processor controllably adjusts a driven speed of said actuator, that is a time said actuator driving said relief valve to stay in said opened position, for controllably adjusting said volume of water used in said flushing cycle for said flushing system, such that said control processor delays said driving time of said actuator for increasing said water volume of said flushing cycle.
116. The automatic actuation apparatus, as recited in claim 114, wherein said control controls a rotational speed of said actuator for controllably adjusting said volume of water used in said flushing cycle for said flushing system.
117. The automatic actuation apparatus, as recited in claim 115, wherein said control processor controls a rotational speed of said actuator for controllably adjusting said volume of water used in said flushing cycle for said flushing system.

118. Method of controlling volume of water used in each sensor-operated flushing cycle of a flushing system comprising an automatic flush actuation apparatus, comprising the steps of:
- (a) detecting a presence of a user of said flushing system;
 - (b) activating a control processor to adjustably control a time of said flushing cycle and water volume for said flushing cycle;
 - (c) starting said flushing cycle of said flushing system; and
 - (d) completing said flushing cycle of said flushing system in responsive to said time of said flushing cycle and said water volume for said flushing cycle.
119. The method as recited in claim 118 wherein, in the step (b), said time of said flushing cycle is adjustably controlled by moving a relief valve of said automatic flush actuation apparatus from an auto-operated closed position to an auto-operated opened position.
120. The method, as recited in claim 119, wherein, in the step (b), said volume of water used in said flushing cycle is adjustably controlled by controlling a time of said relief valve staying at said auto-operated opened position, wherein said control processor delays said time of said relief valve staying at said auto-operated opened position for increasing said water volume of said flushing cycle.
121. The method, as recited in claim 119, wherein said relief valve comprises a valve stopper being driven by an actuator to move between said auto-operated closed position and said auto-operated opened position.
122. The method, as recited in claim 119, wherein said relief valve comprises a valve stopper being driven by an actuator to move between said auto-operated closed position and said auto-operated opened position.
123. The method, as recited in claim 121, wherein said control processor adjustably controls a driven speed of said actuator, that is a time said actuator driving said valve stopper to stay in said auto-operated opened position, for adjustably controlling said volume of water used in said flushing cycle for said flushing system, such that said control processor

delays said driving time of said actuator for increasing said water volume of said flushing cycle.

124. The method, as recited in claim 122, wherein said control processor adjustably controls a driven speed of said actuator, that is a time said actuator driving said valve stopper to stay in said auto-operated opened position, for adjustably controlling said volume of water used in said flushing cycle for said flushing system, such that said control processor delays said driving time of said actuator for increasing said water volume of said flushing cycle.
125. The method, as recited in claim 122, wherein said actuator is driven by a power generator to rotate and to drive said valve stopper to move from said auto-operated closed position to said auto-operated opened position.
126. The method, as recited in claim 124, wherein said actuator is driven by a power generator to rotate and to drive said valve stopper to move from said auto-operated closed position to said auto-operated opened position.
127. The method, as recited in claim 122, wherein said volume of water used in said flushing cycle for said flushing system is controlled through said control processor to control a rotational speed of said actuator.
128. The method, as recited in claim 126, wherein said volume of water used in said flushing cycle for said flushing system is controlled through said control processor to control a rotational speed of said actuator.
129. The method, as recited in claim 118, wherein said control processor is selectively adjusted to control said time of said flushing cycle, said water volume for said flushing cycle, a detecting range of a sensor for detecting presence of the user of said flushing system.
130. The method, as recited in claim 128, wherein said control processor is selectively adjusted to control said time of said flushing cycle, said water volume for said flushing cycle, a detecting range of a sensor for detecting presence of the user of said flushing system.

131. A method of controlling a flushing cycle of a flushing system, wherein the method comprises the steps of:
- (a) normally retaining a valve stopper at a closed position for controlling water flowing from a water inlet to a water outlet;
 - (b) driving an actuator in a rotational manner to move said valve stopper from said closed position to an opened position; and
 - (c) controlling a time of said valve stopper being stayed at said opened position to control a time of said flushing cycle so as to control a volume of said water for each of said flushing cycles.
132. The method, as recited in claim 131, wherein said time of said valve stopper is adjustably controlled by a rotational speed of said actuator.
133. The method, as recited in claim 131, wherein said time of said valve stopper is adjustably controlled by a rotational cycle of said actuator.
134. The method, as recited in claim 132, wherein said time of said valve stopper is adjustably controlled by a rotational cycle of said actuator.
135. The method, as recited in claim 131 wherein, in the step (b), said actuator is actuated in responsive to a presence of a user of said flushing system.
136. The method, as recited in claim 134 wherein, in the step (b), said actuator is actuated in responsive to a presence of a user of said flushing system.
137. The method, as recited in claim 131, wherein said actuator is actuated by an electric motor.
138. The method, as recited in claim 136, wherein said actuator is actuated by an electric motor.
139. Method for controlling the flush volume of a flushing system via a relief valve, comprising the steps of:

- (a) detecting the presence of a user;
 - (b) activating a control processor in responsive to the detection of the user;
 - (c) adjusting a time of a flushing cycle and water volume for said flushing cycle in responsive to an activation of said control processor;
 - (d) starting said flushing cycle of said flushing system; and
 - (e) completing said flushing cycle of said flushing system in responsive to said time of said flushing cycle and said water volume for said flushing cycle.
140. The method as recited in claim 139 wherein, in the step (c), said time of said flushing cycle is adjusted by moving said relief valve from an auto-operated closed position to an auto-operated opened position.
141. The method, as recited in claim 139, wherein, in the step (c), said volume of water used in said flushing cycle is adjusted by adjusting a time of said relief valve staying at an auto-operated opened position.
142. The method, as recited in claim 140, wherein said relief valve comprises a valve stopper being driven by an actuator to move between said auto-operated closed position and said auto-operated opened position.
143. The method, as recited in claim 141, wherein said relief valve comprises a valve stopper being driven by an actuator to move between an auto-operated closed position and said auto-operated opened position.
144. The method, as recited in claim 143, wherein said control processor adjusts a time said actuator driving said valve stopper to stay in said auto-operated opened position for adjusting said volume of water used in said flushing cycle for said flushing system.
145. The method, as recited in claim 144, wherein said control processor adjusts a time said actuator driving said valve stopper to stay in said auto-operated opened position for adjusting said volume of water used in said flushing cycle for said flushing system.

146. The method, as recited in claim 142, wherein said volume of water used in said flushing cycle for said flushing system is controlled through said control processor to adjust a rotational speed of said actuator.
147. The method, as recited in claim 143, wherein said volume of water used in said flushing cycle for said flushing system is controlled through said control processor to adjust a rotational speed of said actuator.

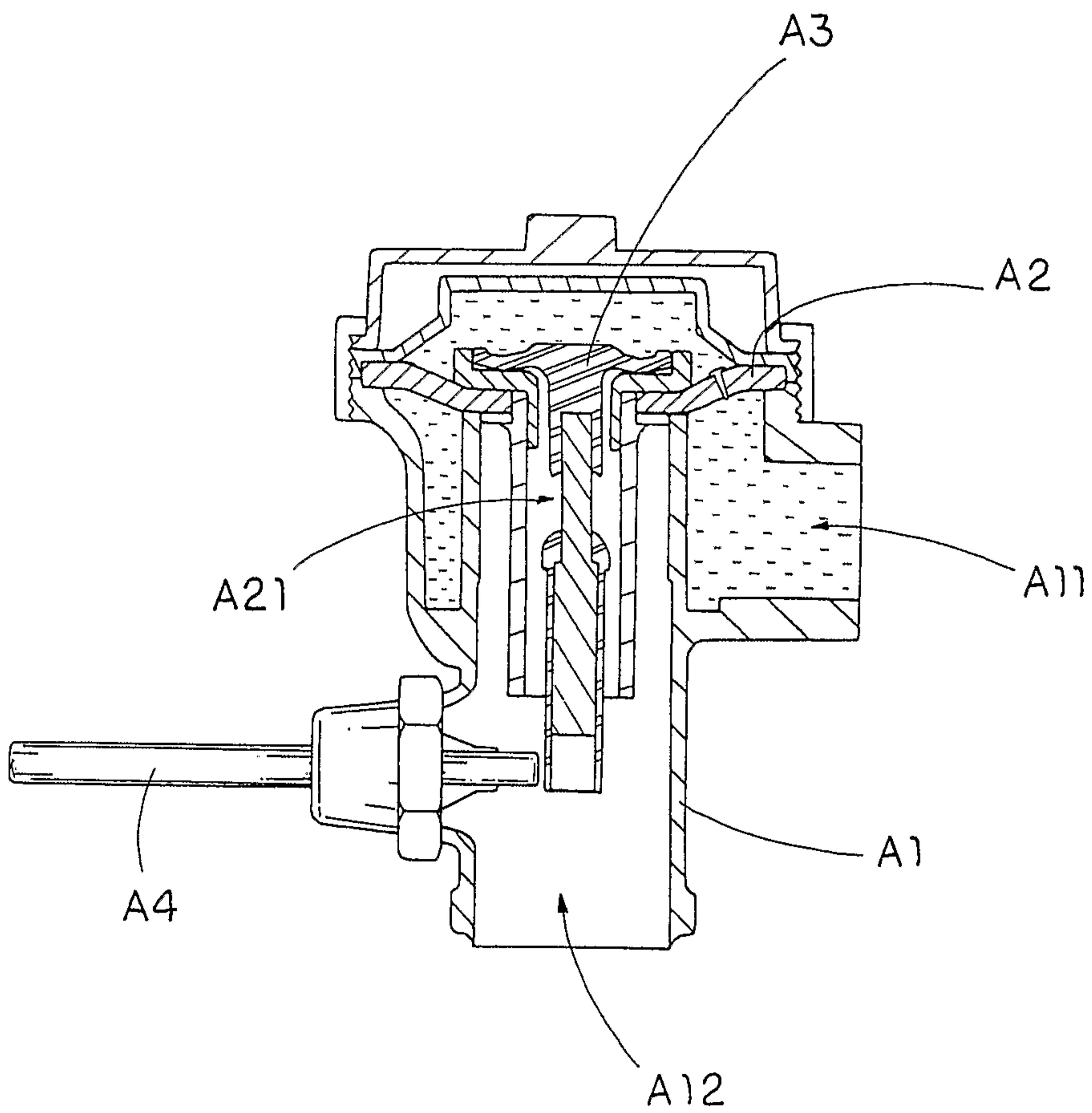


FIG. 1
PRIOR ART

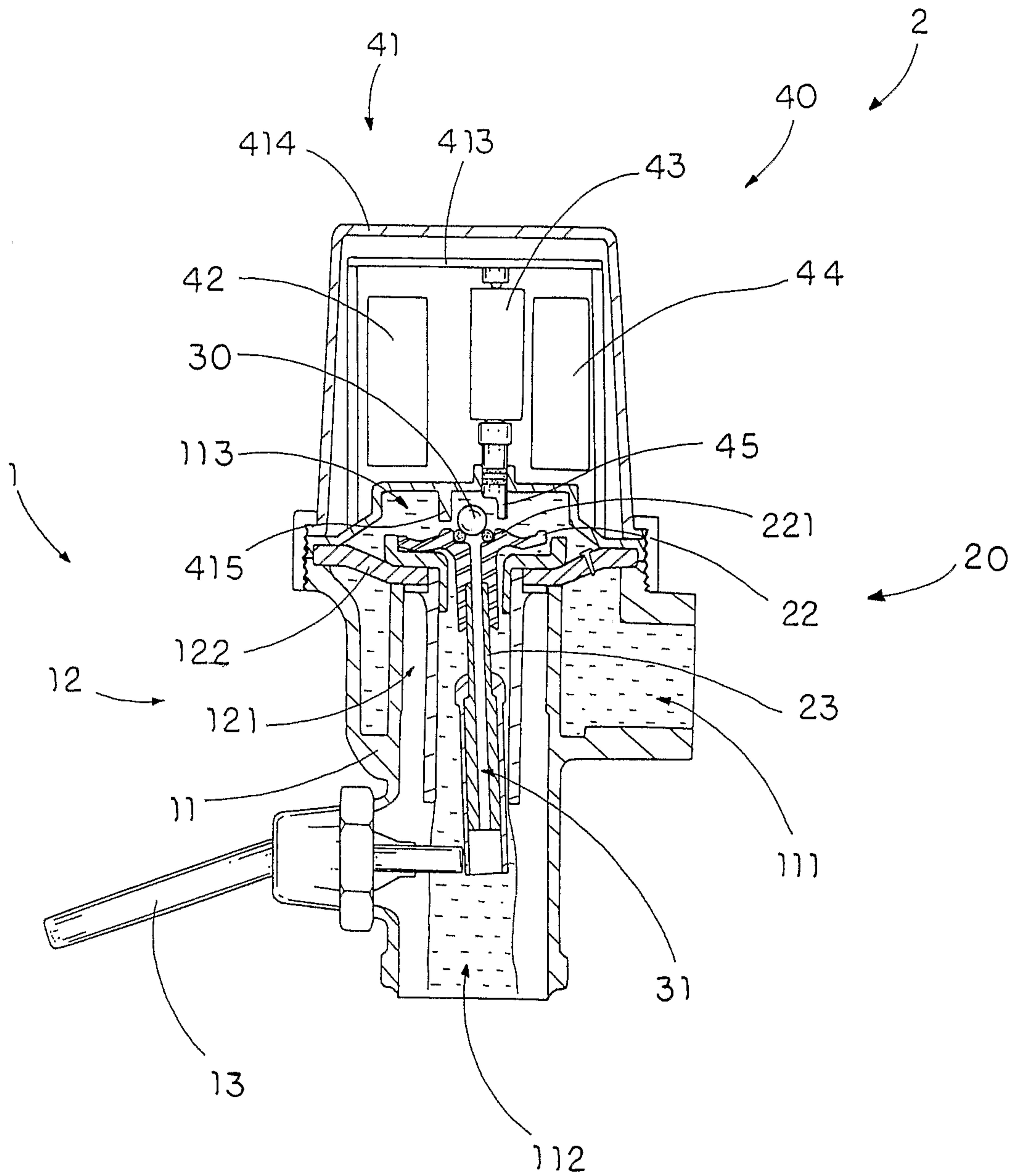


FIG. 3A

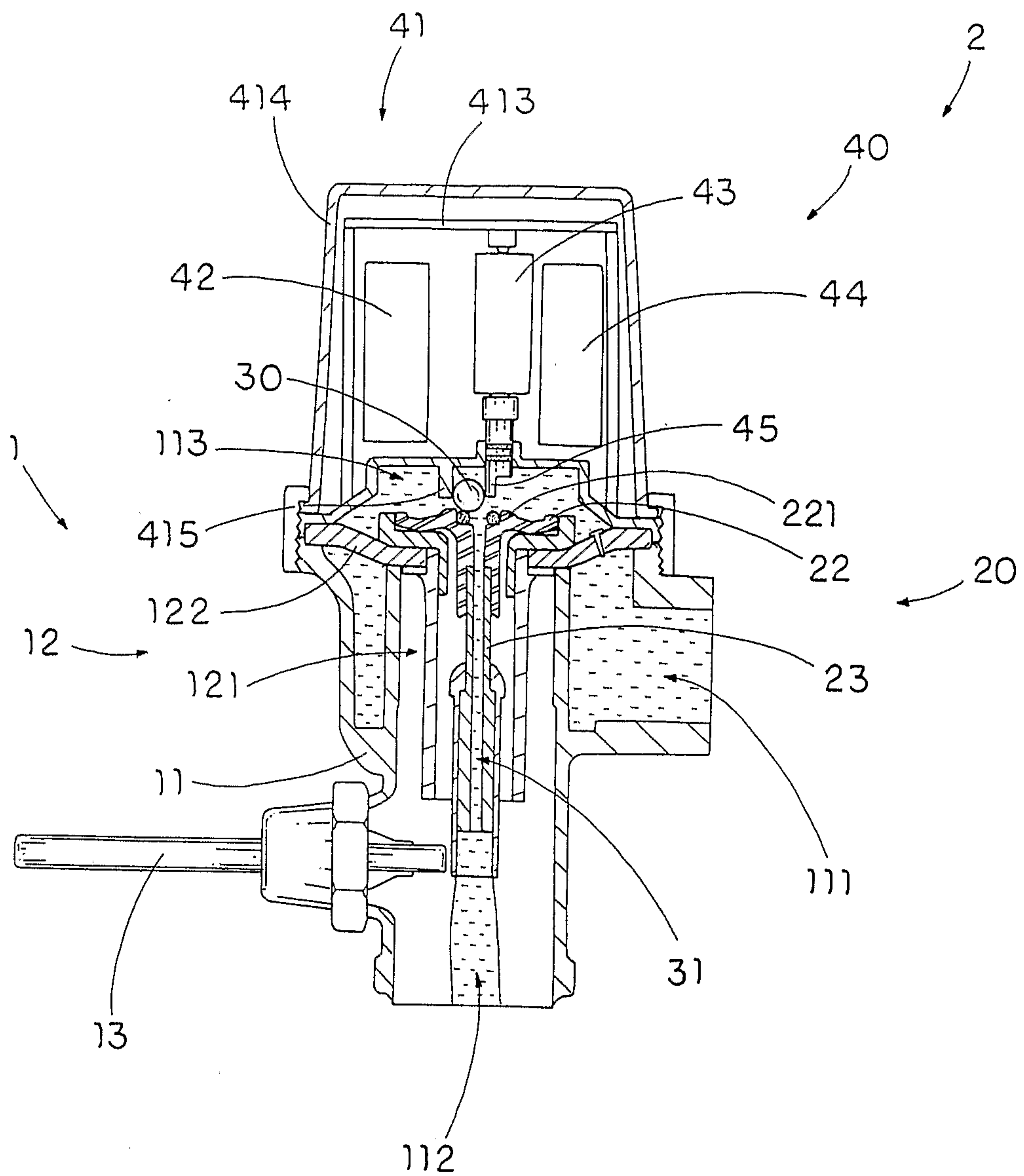


FIG. 4A

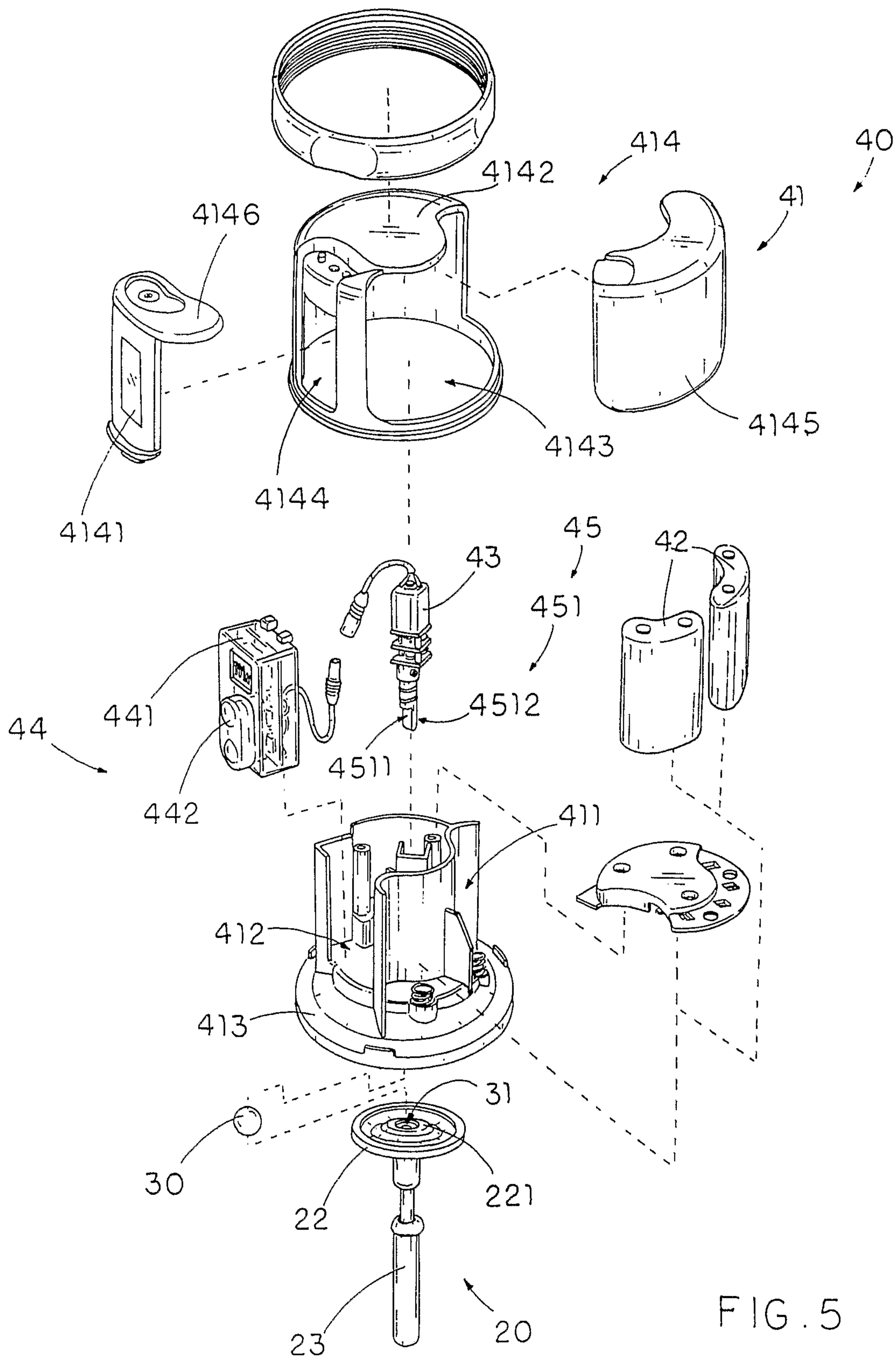


FIG. 5

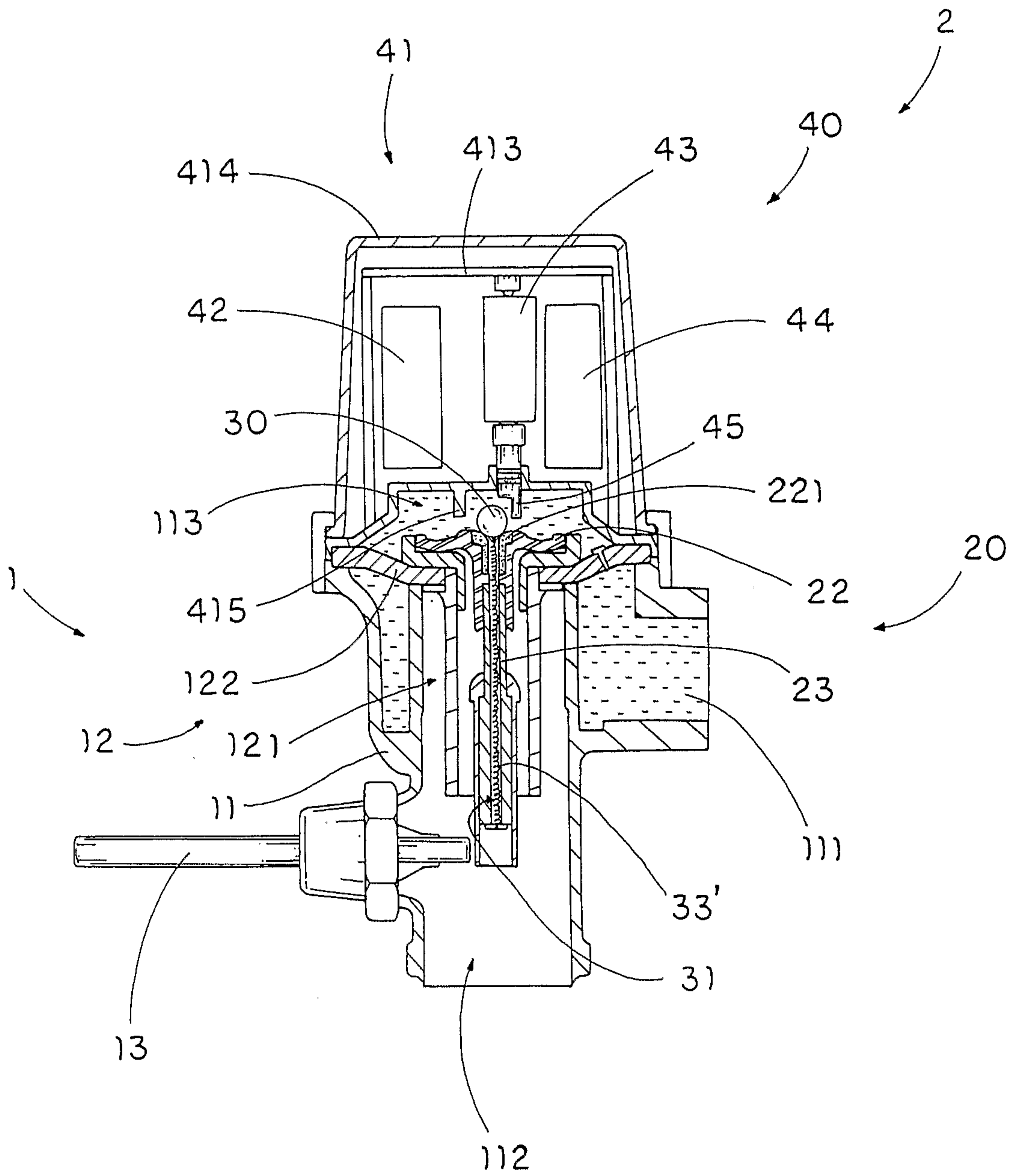


FIG. 6

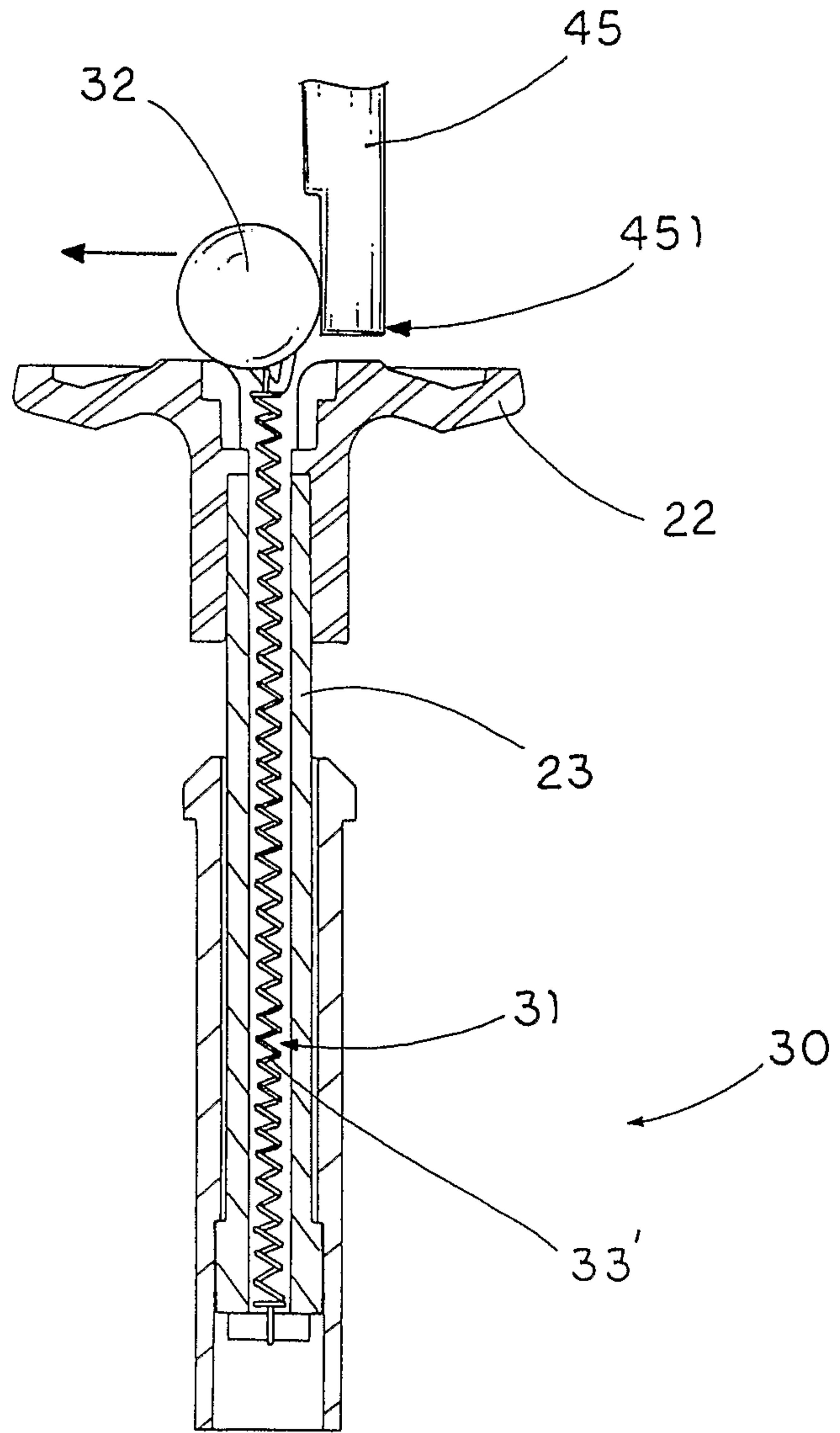


FIG. 7A

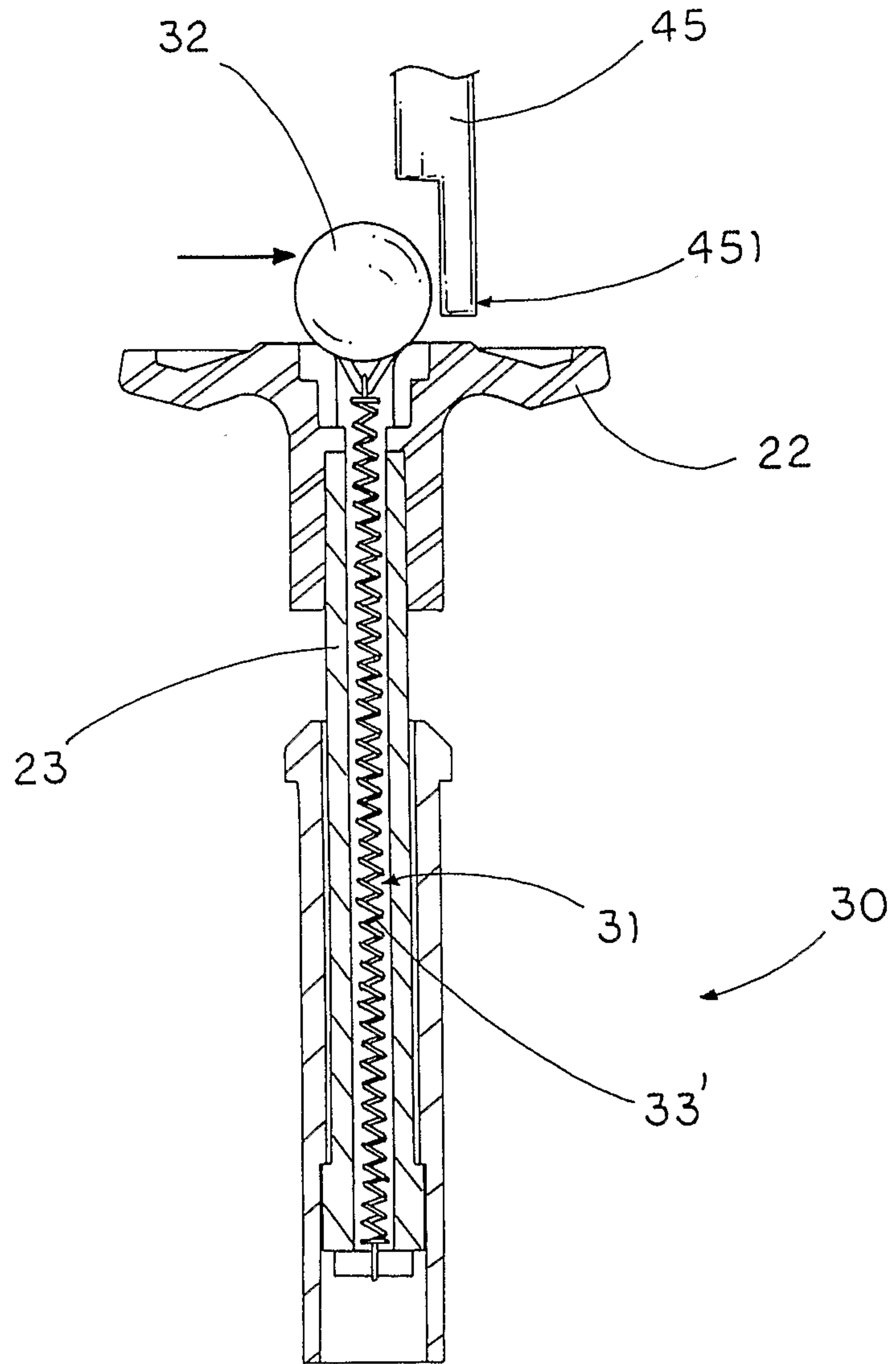


FIG. 7B

