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(54) TWO-DISTANCE TOUCH FREE AUTOMATIC TYPE WATER SUPPLY DEVICE AND METHOD

(57) A two-distance touch free automatic type water supply method includes: when a sensor (132) located adjacent to the outlet (116) of a shell (110) senses an appearance of an external object at a first distance from the sensor (132), the sensing signal is an open signal, whereby water of the outlet (116) is supplied; when the sensor (132) senses a disappearance of the external object at the first distance from the sensor (132), the sensing signal is a closed signal, whereby water of the outlet (116) is not supplied; when the sensor (132) senses a first appearance and a first disappearance of the external object at a second distance from the sensor (132), the sensing signal is an open signal, whereby water of the outlet (116) is supplied; and when the sensor (132) senses a second appearance and a second disappearance of the external object at the second distance from the sensor (132), the sensing signal is a closed signal, whereby water of the outlet (116) is not supplied.

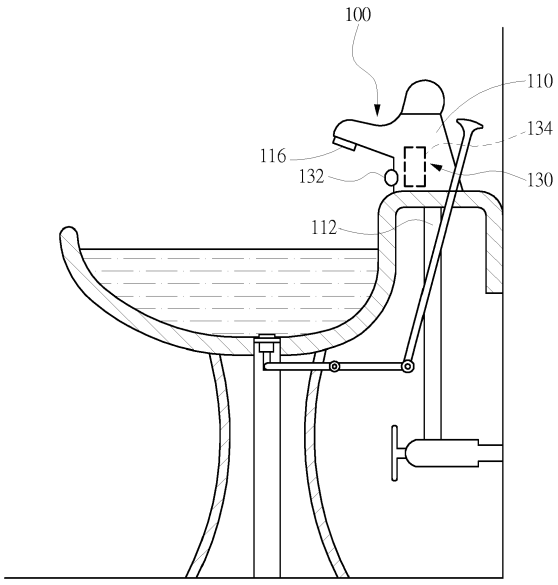

FIG. 1

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Description

Cross-Reference to Related Application

[0001] This application claims the benefit of Taiwan Patent Application No. 103129835, filed on August 29, 2014, which is hereby incorporated by reference for all purposes as if fully set forth herein.

BACKGROUND OF THE INVENTION

Field of Invention

[0002] The present disclosure relates to a two-distance touch free automatic type water supply device, and more particularly to a two-distance touch free automatic type water supply device whose an electronic control unit includes an only sensor, which can be a long distance mode sensor and a short distance mode sensor simultaneously.

Related Art

[0003] Recently, a common faucet is provided with a rotational switch located thereon for controlling the faucet to supply water, whereby humans can wash their hand. During the actual use, a user first applies soap to his hand, and then turns on the rotational switch, whereby the faucet can supply clean water to wash the hand so as to finish the washing step. After the washing step, two hands need to take water to wash the surface of the rotational switch sometimes, such that the soap cannot be attached on the rotational switch. But, it is inconvenient and is wasted in the water resource.

[0004] The above-mentioned faucet is a touch type faucet, and thus a touch free automatic type faucet is developed in order to avoid the problem that the touch type faucet is inconvenient and wasted in the water resource.

[0005] According to the touch free automatic type faucet, when a hand of a user is put at a position below an outlet, the touch free automatic type faucet senses an appearance of the hand. Then, the touch free automatic type faucet is turn on, and the water flows through the outlet. When the hand of the user leaves the position below the outlet, the touch free automatic type faucet senses a disappearance of the hand. Then, the touch free automatic type faucet is turn off, and the water cannot flow through the outlet.

[0006] However, when a great quantity of water is needed for a washing work, the hand of the user must be put at the position below the outlet all the time, whereby the touch free automatic type faucet is turn on, and the water flows through the outlet all the time so as to provide a great quantity of water. It is inconvenient for the user.

[0007] Accordingly, a need remains for a two-distance touch free automatic type water supply device to solve the foregoing problems.

SUMMARY OF THE INVENTION

[0008] The objective of the present disclosure is to provide a two-distance touch free automatic type water supply device, whose an electronic control unit includes an only sensor, which can be a long distance mode sensor and a short distance mode sensor simultaneously.

[0009] To achieve the foregoing objective, the present disclosure provides a two-distance touch free automatic type water supply device, including: a shell, an electronic control unit and a driving unit. The shell includes an inlet, a flow channel and an outlet, wherein the outlet is communicated with the inlet through the flow channel. The electronic control unit includes: a sensor adjacent to the outlet for sensing an external object and then generating a sensing signal; and a control circuit electrically connected to the sensor and receiving the sensing signal for generating a control signal. An end of the driving unit is disposed in the shell, and the other end of the driving unit is physically connected to the flow channel for automatically controlling whether water of the outlet is supplied according to the control signal. When the sensor senses an appearance of an external object at a first distance from the sensor, the sensing signal is an open signal, whereby the water of the outlet is supplied; when the sensor senses a disappearance of the external object at the first distance from the sensor, the sensing signal is a closed signal, whereby the water of the outlet is not supplied; when the sensor senses a first appearance and a first disappearance of the external object at a second distance from the sensor, the sensing signal is an open signal, whereby the water of the outlet is supplied, wherein the first distance is different from the second distance; and when the sensor senses a second appearance and a second disappearance of the external object at the second distance from the sensor, the sensing signal is a closed signal, whereby the water of the outlet is not supplied.

[0010] According to the two-distance touch free automatic type water supply device of the present disclosure, the electronic control unit includes an only sensor, which can be a long distance mode sensor and a short distance mode sensor simultaneously, wherein a long distance is the first distance, a short distance is the second distance, and the second distance is different from the first distance. Thus, the electronic control unit doesn't need to include at least two sensors used to be the long distance mode sensor and the short distance mode sensor, whereby the number of elements of the electronic control unit can be decreased, the design of the electronic control unit can be simplified, and further the cost of the two-distance touch free automatic type water supply device can be decreased

[0011] To make the aforementioned and other objects, features and advantages of the present disclosure clearer, detailed illustration is provided in the following with

reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012]

FIG. 1 is a schematic plan view of a two-distance touch free automatic type water supply device according to the first embodiment of the present disclosure, showing that the two-distance touch free automatic type water supply device is installed to a wash basin.

FIG. 2 is a partially cross-sectional view of a shell of a two-distance touch free automatic type water supply device according to the first embodiment of the present disclosure.

FIG. 3 is a schematic view showing a long distance mode of a two-distance touch free automatic type water supply method according to an embodiment of the present disclosure.

FIG. 4 is a schematic view showing a short distance mode of a two-distance touch free automatic type water supply method according to an embodiment of the present disclosure.

FIG. 5 is a schematic plan view of a two-distance touch free automatic type water supply device according to the second embodiment of the present disclosure, showing that the two-distance touch free automatic type water supply device is installed to a wash basin.

FIG. 6 is a partially cross-sectional view of a shell of a two-distance touch free automatic type water supply device according to the second embodiment of the present disclosure.

FIG. 7 is an exploded perspective view of a valve core according to the second embodiment of the present disclosure.

FIGS. 8a to 8c are schematic views showing that a mark of the cold/hot rotary switch in a left direction, a middle direction and a right direction respectively according to the second embodiment of the present disclosure.

FIG. 9 is a perspective view of a two-distance touch free automatic type water supply device according to the third embodiment of the present disclosure.

FIG. 10 is a partially cross-sectional view of a shell of a two-distance touch free automatic type water supply device according to the third embodiment of the present disclosure.

FIG. 11 a schematic view showing that a two-distance touch free automatic type water supply device can be installed at a conventional touch type faucet according to the third embodiment of the present disclosure.

FIG. 12 is a schematic plan view of a two-distance touch free automatic type water supply device according to the fourth embodiment of the present disclosure, showing that the two-distance touch free automatic type water supply device is installed to a wash basin.

FIGS. 13a and 13b are partially cross-sectional views of a shell of a two-distance touch free automatic type water supply device according to the fourth embodiment of the present disclosure.

FIG. 14 is an exploded perspective view of a valve core according to the fourth embodiment of the present disclosure.

FIGS. 15a to 15c are schematic views showing that a mark of the automatic/manual mode cold/hot rotary switch in a left direction, a middle direction and a right direction respectively according to the fourth embodiment of the present disclosure.

DETAILED DESCRIPTION OF THE INVENTION

[0013] The present disclosure will become more fully understood from the detailed description given herein below and the accompanying drawings which are given for illustration only, and thus are not limitative of the present disclosure.

[0014] FIG. 1 is a schematic plan view of a two-distance touch free automatic type water supply device 100 according to the first embodiment of the present disclosure. The two-distance touch free automatic type water supply device 100 is installed to a wash basin. FIG. 2 is a partially cross-sectional view of a shell of a two-distance touch free automatic type water supply device 100 according to the first embodiment of the present disclosure. In this embodiment, the two-distance touch free automatic type water supply device 100 can be a touch free automatic type faucet. Referring to FIGS. 1 and 2, the two-distance touch free automatic type water supply device 100 includes a shell 110, an electronic control unit 130 and a driving unit 140. The shell 110 includes an inlet 112, a flow channel 114 and an outlet 116, wherein the outlet 116 is communicated with the inlet 112 through the flow channel 114.

[0015] Referring to FIG. 1 again, the electronic control unit 130 includes a sensor 132 and a control circuit 134. The sensor 132 is adjacent to the outlet 116. In this embodiment, the sensor 132 is disposed onto the shell 110 (e.g., the sensor 132 is mounted on the shell 110 or embedded into the shell 110). In another embodiment, the sensor 132 is disposed on the control circuit 134 and is exposed out from the shell 110. The sensor 132 is adapted to sense an external object (e.g., a hand) and then to generate a sensing signal. The sensor 132 can be an infrared sensor or a microwave sensor. The control circuit 134 is disposed in the shell 110, and is electrically connected to the sensor 132. The control circuit 134 receives the sensing signal, and then generates a control signal. For example, the control circuit 134 can include a semiconductor chip (not shown) for receiving the sensing signal, and then generating the control signal.

[0016] Referring to FIG. 2 again, an end of the driving unit 140 is disposed in the shell 110, and the other end

of the driving unit 140 is physically connected to the flow channel 114 for automatically controlling whether the water of the outlet 116 is supplied according to the control signal. The driving unit 140 can be a solenoid valve. An electrical cord (not shown) passes through the water basin. A power source, e.g., a dry battery (not shown), is disposed below the shell 110 for providing electrical power to the electronic control circuit 130 and the driving unit 140 through the electric cord.

[0017] Referring to FIG. 3, it depicts a long distance mode of a two-distance touch free automatic type water supply method according to an embodiment of the present disclosure. When the sensor 132 senses an appearance of an external object at the first distance D1 from the sensor 132, the sensing signal is an open signal whereby the water of the outlet 116 is supplied; and when the sensor 132 senses a disappearance of the external object at the first distance D1 from the sensor 132, the sensing signal is a closed signal, whereby the water of the outlet 116 is not supplied. The first distance D1 can be set from 10 to 15 centimeters. Preferably, the first distance D1 can be set from 12 to 15 centimeters. The long distance mode can provides a suitable quantity of water for washing the hand, but the external object (e.g., the hand) needs to appear at the position being far slightly from the outlet 116 all the time.

[0018] For example, when the hand of the user appears at the position being far slightly from the outlet 116 (e.g., the position at the first distance D1 from the sensor 132), the sensor 132 senses an appearance of the hand, and the sensing signal is an open signal. The control circuit 134 receives the sensing signal, and then generates a control signal. Then, the driving unit 140 opens the outlet 116 according to the control signal, and the water flows through the outlet 116. When the hand of the user disappears at the position being far slightly from the outlet 116 (e.g., the position at the first distance D1 from the sensor 132), the sensor 132 senses a disappearance of the hand, and the sensing signal is a closed signal. The control circuit 134 receives the sensing signal, and then generates a control signal. Then, the driving unit 140 closes the outlet 116 according to the control signal, and the water doesn't flow through the outlet 116.

[0019] Referring to FIG. 4, it depicts a short distance mode of a two-distance touch free automatic type water supply method according to an embodiment of the present disclosure. When the sensor 132 senses a first appearance and a first disappearance of an external object at a second distance D2 from the sensor 132, the sensing signal is an open signal, whereby the water of the outlet 116 is supplied; and when the sensor 132 senses a second appearance and a second disappearance of the external object at the second distance D2 from the sensor 132, the sensing signal is a closed signal, whereby the water of the outlet 116 is not supplied. The second distance D2 can be set from 2 to 8 centimeters. Preferably, the second distance D2 can be set from 2 to 3 centimeters. The short distance mode can continuously supply the water for providing a great quantity of water, but the external object (e.g., the hand) doesn't need to appear at the position being near slightly from the outlet 116 all the time.

[0020] For example, when the hand of the user appears and disappears at the position being near slightly from the outlet 116 (e.g., the position at the second distance D2 from the sensor 132) for the first time, the sensor 132 senses the first appearance and the first disappearance of the hand, and the sensing signal is an open signal. The control circuit 134 receives the sensing signal, and then generates a control signal. Then, the driving unit 140 opens the outlet 116 according to the control signal, and the water continuously flows through the outlet 116. When the hand of the user appears and disappears the position being near slightly from the outlet 116 (e.g., the position at the second distance D2 from the sensor 132) for the second time, the sensor 132 senses the second appearance and the second disappearance of the hand, and the sensing signal is a closed signal. The control circuit 134 receives the sensing signal, and then generates a control signal. Then, the driving unit 140 closes the outlet 116 according to the control signal, and the water doesn't flow through the outlet 116.

[0021] The above-mentioned corresponding steps of the long distance mode and the short distance mode of the two-distance touch free automatic type water supply method of the present disclosure are not desired to limit the present disclosure. According to the two-distance touch free automatic type water supply method in another embodiment, the corresponding steps of the long distance mode and the short distance mode can be interchanged to each other. For example, according to a short distance mode, when the sensor 132 senses an appearance of an external object at the second distance D2 from the sensor 132, the sensing signal is an open signal so as to switch on the water supply of the outlet 116; and when the sensor 132 senses a disappearance of the external object at the second distance D2 from the sensor 132, the sensing signal is a closed signal so as to switch off the water supply of the outlet 116. The second distance D2 can be set from 2 to 8 centimeters. According to a long distance mode, when the sensor 132 senses a first appearance and a first disappearance of an external object at the first distance D1 from the sensor 132 (the first distance D1 is longer than the second distance D2), the sensing signal is an open signal so as to switch on the water supply of the outlet 116; and when the sensor 132 senses a second appearance and a second disappearance of the external object at the first distance D1 from the sensor 132, the sensing signal is a closed signal so as to switch off the water supply of the outlet 116. The first distance D1 can be set from 10 to 15 centimeters

[0022] According to the two-distance touch free automatic type water supply device of the present disclosure, the electronic control unit includes an only sensor, which can be a long distance mode sensor and a short distance mode sensor simultaneously, wherein a long distance is

the first distance, a short distance is the second distance, and the second distance is different from the first distance. Thus, the electronic control unit doesn't need to include at least two sensors used to be the long distance mode sensor and the short distance mode sensor, whereby the number of elements of the electronic control unit can be decreased, the design of the electronic control unit can be simplified, and further the cost of the two-distance touch free automatic type water supply device can be decreased.

[0023] FIG. 5 is a schematic plan view of a two-distance touch free automatic type water supply device 200 according to the second embodiment of the present disclosure. The two-distance touch free automatic type water supply device 200 is installed to a wash basin. FIG. 6 is a partially cross-sectional view of a shell of a two-distance touch free automatic type water supply device 200 according to the second embodiment of the present disclosure. In this embodiment, the two-distance touch free automatic type water supply device 200 can be a touch free automatic type faucet for mixing cold water and hot water. Referring to FIGS. 5 and 6, the two-distance touch free automatic type water supply device 200 includes a shell 210, an electronic control unit 230 and a driving unit 240. The electronic control unit 230 includes a sensor 232 and a control circuit 234. The shell 210 includes an inlet 212, a flow channel 214 and an outlet 216, wherein the outlet 216 is communicated with the inlet 212 through the flow channel 214. The inlet 212 includes a cold water pipe 222 and a hot water pipe 224.

[0024] The two-distance touch free automatic type water supply device 200 in the second embodiment is similar to the two-distance touch free automatic type water supply device 100 in the first embodiment, and the similar elements have been designated by similar reference numbers. The difference between the two-distance touch free automatic type water supply devices 200, 100 in the second and first embodiments is that: the two-distance touch free automatic type water supply device 200 further includes a cold/hot rotary switch 250 and a valve core 260, as shown in FIG. 6. The cold/hot rotary switch 250 is adapted to set whether the water supply of the outlet 216 is hot water, warm water or cold water. An end of the valve core 260 is physically connected to the cold/hot rotary switch 250, and the other end of the valve core 260 is physically connected to the inlet 212 for controlling a mixture ratio of cold water to hot water of the inlet 212.

[0025] Referring to FIGS. 7 and 6, the valve core 260 includes a control rod 262 and a throttling plate 264. One end of the control rod 262 is mechanically connected to the cold/hot rotary switch 250. The throttling plate 264 is physically connected to the other end of the control rod 262, and includes two through apertures 266, which are corresponding to the cold water pipe 222 and the hot water pipe 224 of the inlet 212 respectively, whereby when the cold/hot rotary switch 250 drives the control rod 262 and further rotates the throttling plate 264, an overlapping area between one of the two through apertures 266 and the cold water pipe 222 and an overlapping area between the other one of the two through apertures 266 and the hot water pipe 224 can be adjusted. A lower portion of the control rod 262 includes a chamber 267, which has a side aperture 268. When the two through apertures 266 are overlapped with the cold water pipe 222 and the hot water pipe 224 of the inlet 212 respectively, the side apertures 268 is overlapped with the flow channel 214 correspondingly.

[0026] When a user rotates a mark 252 of the cold/hot rotary switch 250 in a left direction (shown in FIG. 8a), a middle direction (shown in FIG. 8b) or a right direction (shown in FIG. 8c), whereby the water supply of the outlet 216 can be set to the hot water (H), the warm water (W) or the cold water (C). After the water supply of the outlet 216 can be set to the hot water (H), the warm water (W) or the cold water (C), the long distance mode of the two-distance touch free automatic type water supply method of the present disclosure can provides a suitable quantity of hot water, warm water or cold water for washing the hand, but the hand needs to appear at the position being far slightly from the outlet 216 all the time. The short distance mode of the two-distance touch free automatic type water supply method of the present disclosure can continuously supply the water for providing a great quantity of hot water, warm water or cold water, but the hand doesn't need to appear at the position being near slightly from the outlet 216 all the time.

[0027] FIG. 9 is a perspective view of a two-distance touch free automatic type water supply device 300 according to the third embodiment of the present disclosure. FIG. 10 is a partially cross-sectional view of a shell 310 of a two-distance touch free automatic type water supply device 300 according to the third embodiment of the present disclosure. Referring to FIGS. 9 and 10, the two-distance touch free automatic type water supply device 300 includes a shell 310, an electronic control unit 330 and a driving unit 340. The electronic control unit 330 includes a sensor 332 and a control circuit 334. The shell 310 includes an inlet 312, a flow channel 314 and an outlet 316, wherein the outlet 316 is communicated with the inlet 312 through the flow channel 314.

[0028] The two-distance touch free automatic type water supply device 300 in the third embodiment is similar to the two-distance touch free automatic type water supply device 100 in the first embodiment, and the similar elements have been designated by similar reference numbers. The difference between the two-distance touch free automatic type water supply devices 300, 100 in the third and first embodiments is that: the two-distance touch free automatic type water supply device 300 can be installed at a conventional touch type faucet 302, shown in FIG. 11. The inlet 312 of the two-distance touch free automatic type water supply device 300 is communicated with an outlet 304 of the conventional touch type faucet 302.

[0029] After a user installs the two-distance touch free automatic type water supply device 300 to the touch type

faucet 302 by himself, the long distance mode of the two-distance touch free automatic type water supply method of the present disclosure can provides a suitable quantity of water for washing the hand, but the hand needs to appear at the position being far slightly from the outlet 316 all the time. The short distance mode of the two-distance touch free automatic type water supply method of the present disclosure can continuously supply the water for providing a great quantity of water, but the hand doesn't need to appear at the position being near slightly from the outlet 316 all the time.

[0030] FIG. 12 is a schematic plan view of a two-distance touch free automatic type water supply device 400 according to the fourth embodiment of the present disclosure. The two-distance touch free automatic type water supply device 400 is installed to a wash basin. FIGS. 13a and 13b are partially cross-sectional views of a shell of a two-distance touch free automatic type water supply device according to the fourth embodiment of the present disclosure. In this embodiment, the two-distance touch free automatic type water supply device 400 can be a touch free automatic type faucet for mixing cold water and hot water in an automatic/manual mode. Referring to FIGS. 12, 13a and 13b, the two-distance touch free automatic type water supply device 400 includes a shell 410, an electronic control unit 430 and a driving unit 440. The electronic control unit 430 includes a sensor 432 and a control circuit 434. The shell 410 includes an inlet 412, two flow channels 414a, 414b and an outlet 416, wherein the outlet 416 is communicated with the inlet 412 through the flow channel 414a or the flow channel 414b. The inlet 412 includes a cold water pipe 422 and a hot water pipe 424.

[0031] The two-distance touch free automatic type water supply device 400 in the fourth embodiment is similar to the two-distance touch free automatic type water supply device 100 in the first embodiment, and the similar elements have been designated by similar reference numbers. The difference between the two-distance touch free automatic type water supply devices 400, 100 in the fourth and first embodiments is that: the two-distance touch free automatic type water supply device 400 further includes an automatic/manual mode cold/hot rotary switch 450 and a valve core 460, as shown in FIG. 13a and 13b. The automatic/manual mode cold/hot rotary switch 450 is adapted to set whether the water supply of the outlet 416 is hot water, warm water or cold water in an automatic mode, the water supply of the outlet is hot water, warm water or cold water in a manual mode, or the water supply of the outlet is in a stop mode. An end of the valve core 460 is physically connected to the automatic/manual mode cold/hot rotary switch 450, and the other end of the valve core 460 is physically connected to the inlet 412 for controlling a mixture ratio of cold water to hot water of the inlet 412.

[0032] Referring to FIGS. 14, 13a and 13b, the valve core 460 includes a control rod 462 and a throttling plate 464. One end of the control rod 462 is mechanically connected to the automatic/manual mode cold/hot rotary switch 450. The throttling plate 464 is physically connected to the other end of the control rod 462, and includes two first and two second through apertures 466a, 466b, wherein the two first through apertures 466a or the two second through apertures 466b are corresponding to the cold water pipe 422 and the hot water pipe 424 of the inlet 412 respectively, whereby when the automatic/manual mode cold/hot rotary switch 450 drives the control rod 462 and further rotates the throttling plate 464, an overlapping area between one of the two first through apertures 466a and the cold water pipe 422 and an overlapping area between the other one of the two first through apertures 466a and the hot water pipe 424 can be adjusted in the automatic mode; or, an overlapping area between one of the two second through apertures 466b and the cold water pipe 422 and an overlapping area between the other one of the two second through apertures 466b and the hot water pipe 424 can be adjusted in the manual mode. A lower portion of the control rod 462 includes a chamber 467, which has a side aperture 468. During the automatic mode, when the two through apertures 466a are overlapped with the cold water pipe 422 and the hot water pipe 424 of the inlet 412 respectively, the side apertures 468 is overlapped with the flow channel 414a correspondingly, too, shown in FIG. 13a. At the same time, the water flows through the inlet 412, the valve core 460, the flow channel 414a, the driving unit 440 and the outlet 416 in order. Or, during the manual mode, when the two through apertures 466b are overlapped with the cold water pipe 422 and the hot water pipe 424 of the inlet 412 respectively, the side apertures 468 is overlapped with the flow channel 414b correspondingly, too, shown in FIG. 13b. At the same time, the water flows through the inlet 412, the valve core 460, the flow channel 414b and the outlet 416 in order. Or, during the stop mode, when the two through apertures 466a or the two through apertures 466b are not overlapped with the cold water pipe 422 and the hot water pipe 424 of the inlet 412 respectively, the side apertures 468 is not overlapped with the flow channel 414a or the flow channel 414b correspondingly, either (not shown).

[0033] When a user rotates a mark 452 of the automatic/manual mode cold/hot rotary switch 450 in a left direction (shown in FIG. 15a), whereby the water supply of the outlet 416 can be set to the hot water (H), the warm water (W) or the cold water (C) in the automatic mode (A mode). After the water supply of the outlet 416 can be set to the hot water (H), the warm water (W) or the cold water (C), the long distance mode of the two-distance touch free automatic type water supply method of the present disclosure can provides a suitable quantity of hot water, warm water or cold water for washing the hand, but the hand needs to appear at the position being far slightly from the outlet 416 all the time. The short distance mode of the two-distance touch free automatic type water supply method of the present disclosure can continuously supply the water for providing a great quantity of hot wa-

ter, warm water or cold water, but the hand doesn't need to appear at the position being near slightly from the outlet 416 all the time.

[0034] When a user rotates a mark 452 of the automatic/manual mode cold/hot rotary switch 450 in a middle direction (shown in FIG. 15b), whereby the water supply of the outlet 416 can be set to in the stop mode (S mode).

[0035] When a user rotates a mark 452 of the automatic/manual mode cold/hot rotary switch 450 in a right direction (shown in FIG. 15c), whereby the water supply of the outlet 416 can be set to the hot water (H), the warm water (W) or the cold water (C) in the manual mode (M mode).

[0036] The foregoing is considered as illustrative only of the implementation manners or embodiments of the technical solutions adopted by the present disclosure to solve the problems and it's not desired to limit the scope of the disclosure. Accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the disclosure.

Claims

1. A two-distance touch free automatic type water supply device, comprising:

a shell comprising an inlet, a flow channel and an outlet, wherein the outlet is communicated with the inlet through the flow channel;
an electronic control unit comprising:

a sensor adjacent to the outlet for sensing an external object and then generating a sensing signal; and
a control circuit electrically connected to the sensor and receiving the sensing signal for generating a control signal; and

a driving unit, wherein an end of the driving unit is disposed in the shell, and the other end of the driving unit is physically connected to the flow channel for automatically controlling whether water of the outlet is supplied according to the control signal;
wherein:

when the sensor senses an appearance of an external object at a first distance from the sensor, the sensing signal is an open signal, whereby the water of the outlet is supplied;
when the sensor senses a disappearance of the external object at the first distance from the sensor, the sensing signal is a closed signal, whereby the water of the outlet is not supplied;
when the sensor senses a first appearance and a first disappearance of the external object at a second distance from the sensor, the sensing signal is an open signal, whereby the water of the outlet is supplied, wherein the first distance is different from the second distance; and
when the sensor senses a second appearance and a second disappearance of the external object at the second distance from the sensor, the sensing signal is a closed signal, whereby the water of the outlet is not supplied.

2. The two-distance touch free automatic type water supply device according to claim 1, wherein the first distance is set from 10 to 15 centimeters, and the second distance is set from 2 to 8 centimeters.

3. The two-distance touch free automatic type water supply device according to claim 1, wherein the driving unit is a solenoid valve.

4. The two-distance touch free automatic type water supply device according to claim 1, further comprising:

a cold/hot rotary switch adapted to set whether the water supply of the outlet is hot water, warm water or cold water; and
a first valve core, wherein an end of the first valve core is physically connected to the cold/hot rotary switch, and the other end of the first valve core is physically connected to the inlet for controlling a mixture ratio of cold water to hot water of the inlet.

5. The two-distance touch free automatic type water supply device according to claim 4, wherein the first valve core comprises:

a control rod mechanically connected to the cold/hot rotary switch; and
a throttling plate physically connected to the control rod, and comprising two through apertures, which are corresponding to the cold water pipe and the hot water pipe of the inlet respectively, whereby when the cold/hot rotary switch drives the control rod and further rotates the throttling plate, an overlapping area between one of the two through apertures and the cold water pipe and an overlapping area between the other one of the two through apertures and the hot water pipe can be adjusted.

6. The two-distance touch free automatic type water supply device according to claim 1, wherein the two-distance touch free automatic type water supply device is a touch free automatic type faucet.

7. The two-distance touch free automatic type water supply device according to claim 1, wherein the two-distance touch free automatic type water supply device is installed at a touch type faucet.

8. The two-distance touch free automatic type water supply device according to claim 1, further comprising:

an automatic/manual mode cold/hot rotary switch adapted to set whether the water supply of the outlet is hot water, warm water or cold water in an automatic mode, the water supply of the outlet is hot water, warm water or cold water in a manual mode, or the water supply of the outlet is in a stop mode; and
a second valve core, wherein an end of the second valve core is physically connected to the automatic/manual mode cold/hot rotary switch, and the other end of the second valve core is physically connected to the inlet for controlling a mixture ratio of cold water to hot water of the inlet.

9. The two-distance touch free automatic type water supply device according to claim 8 wherein the second valve core comprises:

a control rod mechanically connected to the automatic/manual mode cold/hot rotary switch; and
a throttling plate physically connected to the control rod, and comprising two first and two second through apertures, wherein:

during the automatic mode the two first through apertures are corresponding to the cold water pipe and the hot water pipe of the inlet respectively, whereby when the automatic/manual mode cold/hot rotary switch drives the control rod and further rotates the throttling plate, an overlapping area between one of the two first through apertures and the cold water pipe and an overlapping area between the other one of the two first through apertures and the hot water pipe can be adjusted in the automatic mode; and during the manual mode the two second through apertures are corresponding to the cold water pipe and the hot water pipe of the inlet respectively, whereby when the automatic/manual mode cold/hot rotary switch drives the control rod and further rotates the throttling plate, an overlapping area between one of the two second through apertures and the cold water pipe and an overlapping area between the other one of the two second through apertures and the hot water pipe can be adjusted in the manual mode.

10. A two-distance touch free automatic type water supply device, comprising:

a shell comprising an inlet, a flow channel and an outlet, wherein the outlet is communicated with the inlet through the flow channel;
an electronic control unit comprising:

an only sensor adjacent to the outlet for sensing an external object and then generating a sensing signal; and
a control circuit electrically connected to the sensor and receiving the sensing signal for generating a control signal; and

a driving unit, wherein an end of the driving unit is disposed in the shell, and the other end of the driving unit is physically connected to the flow channel for automatically controlling whether water of the outlet is supplied according to the control signal;
wherein:

when the sensor senses an appearance of an external object at a first distance from the sensor, the sensing signal is an open signal, whereby the water of the outlet is supplied;
when the sensor senses a disappearance of the external object at the first distance from the sensor, the sensing signal is a closed signal, whereby the water of the outlet is not supplied;
when the sensor senses a first appearance and a first disappearance of the external object at a second distance from the sensor, the sensing signal is an open signal, whereby the water of the outlet is supplied, wherein the first distance is different from the second distance; and
when the sensor senses a second appearance and a second disappearance of the external object at the second distance from the sensor, the sensing signal is a closed signal, whereby the water of the outlet is not supplied.

11. A two-distance touch free automatic type water supply method, comprising the following steps of:

providing a sensor, wherein the sensor is adjacent to an outlet for sensing an external object and then generating a sensing signal;
when the sensor senses an appearance of an external object at a first distance from the sen-

sor, the sensing signal is an open signal, whereby the water of the outlet is supplied;
when the sensor senses a disappearance of the external object at the first distance from the sensor, the sensing signal is a closed signal, whereby the water of the outlet is not supplied;
when the sensor senses a first appearance and a first disappearance of the external object at a second distance from the sensor, the sensing signal is an open signal, whereby the water of the outlet is supplied, wherein the first distance is different from the second distance; and
when the sensor senses a second appearance and a second disappearance of the external object at the second distance from the sensor, the sensing signal is a closed signal, whereby the water of the outlet is not supplied.

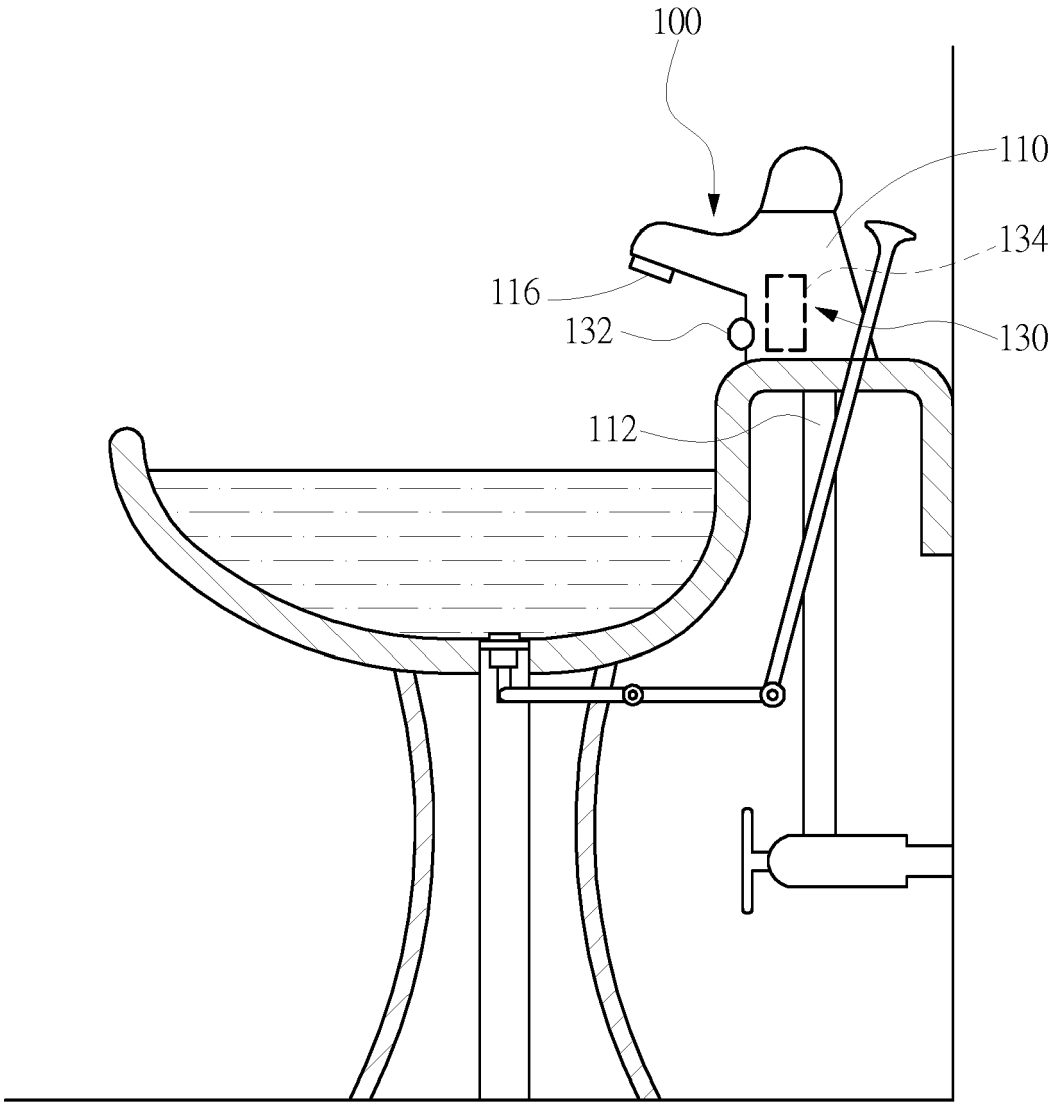

FIG. 1

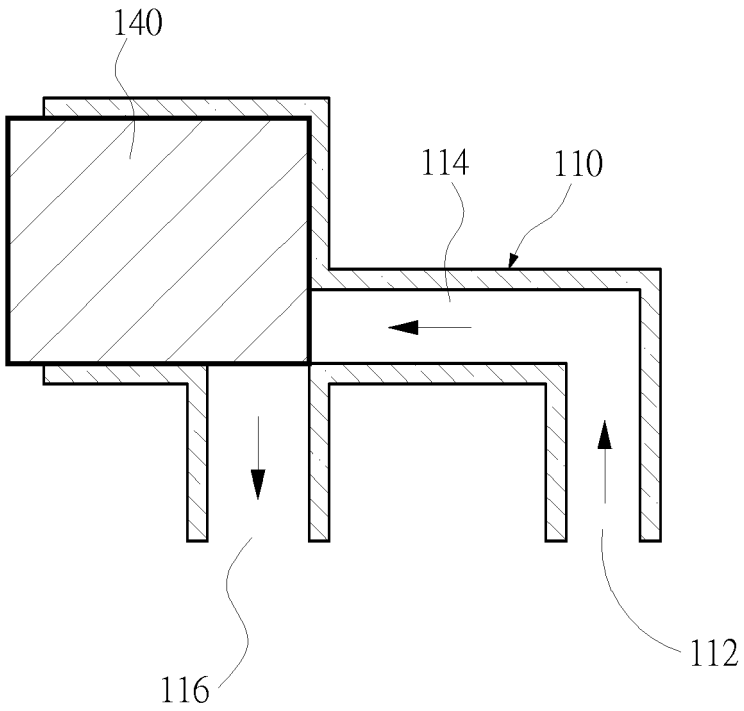

FIG. 2

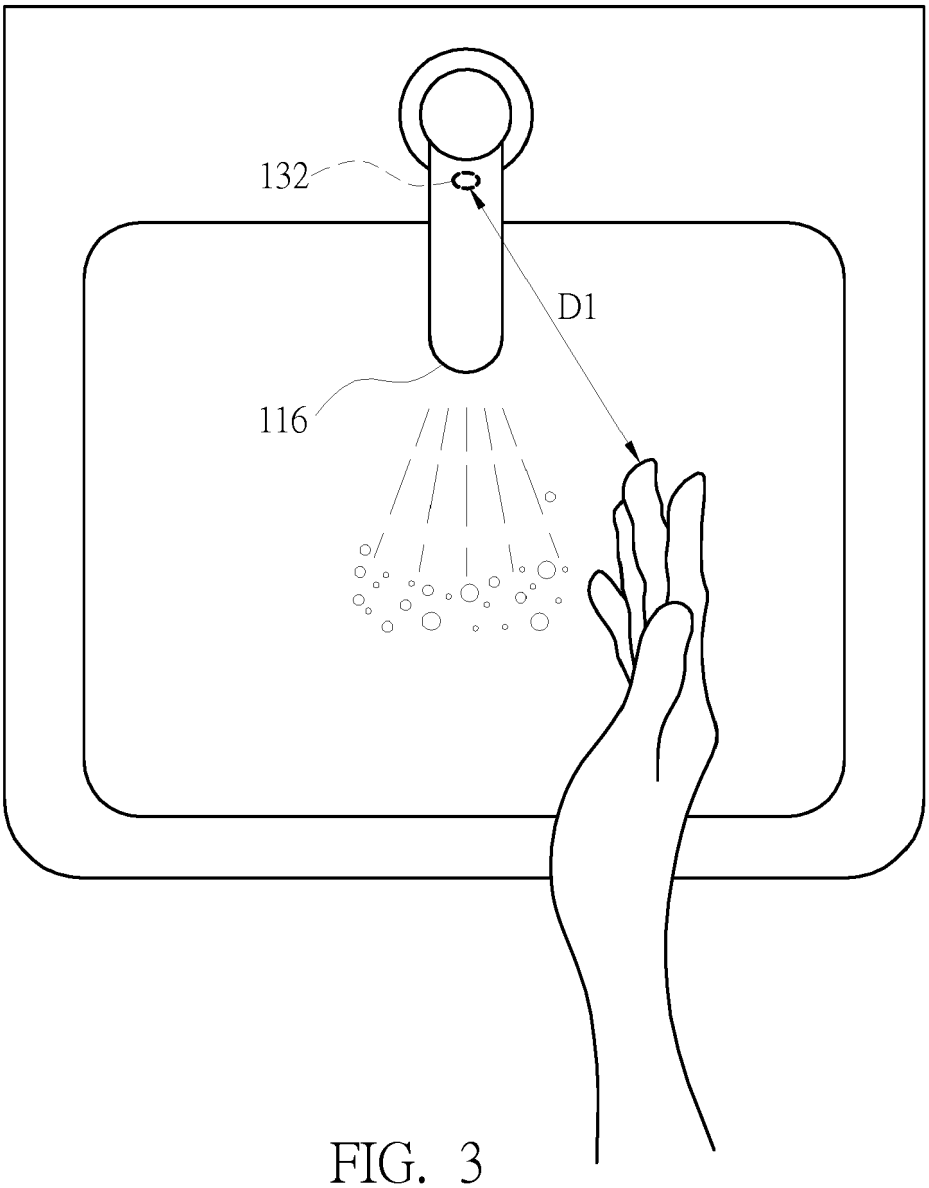

FIG. 3

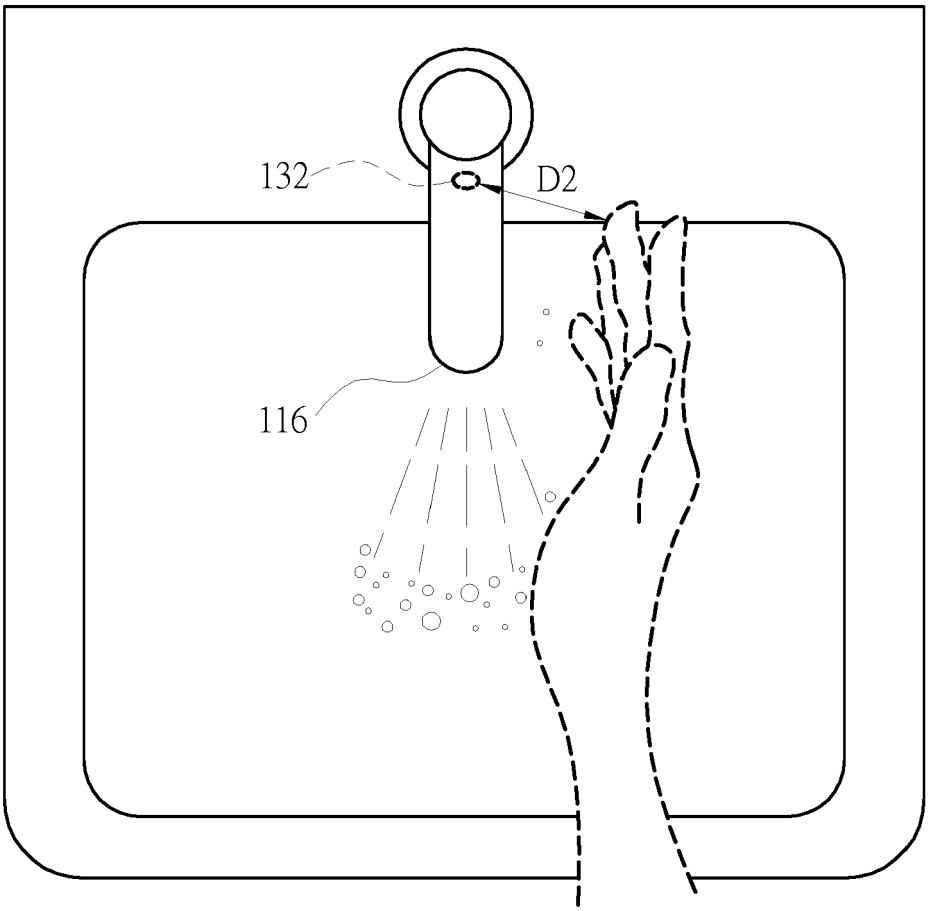

FIG. 4

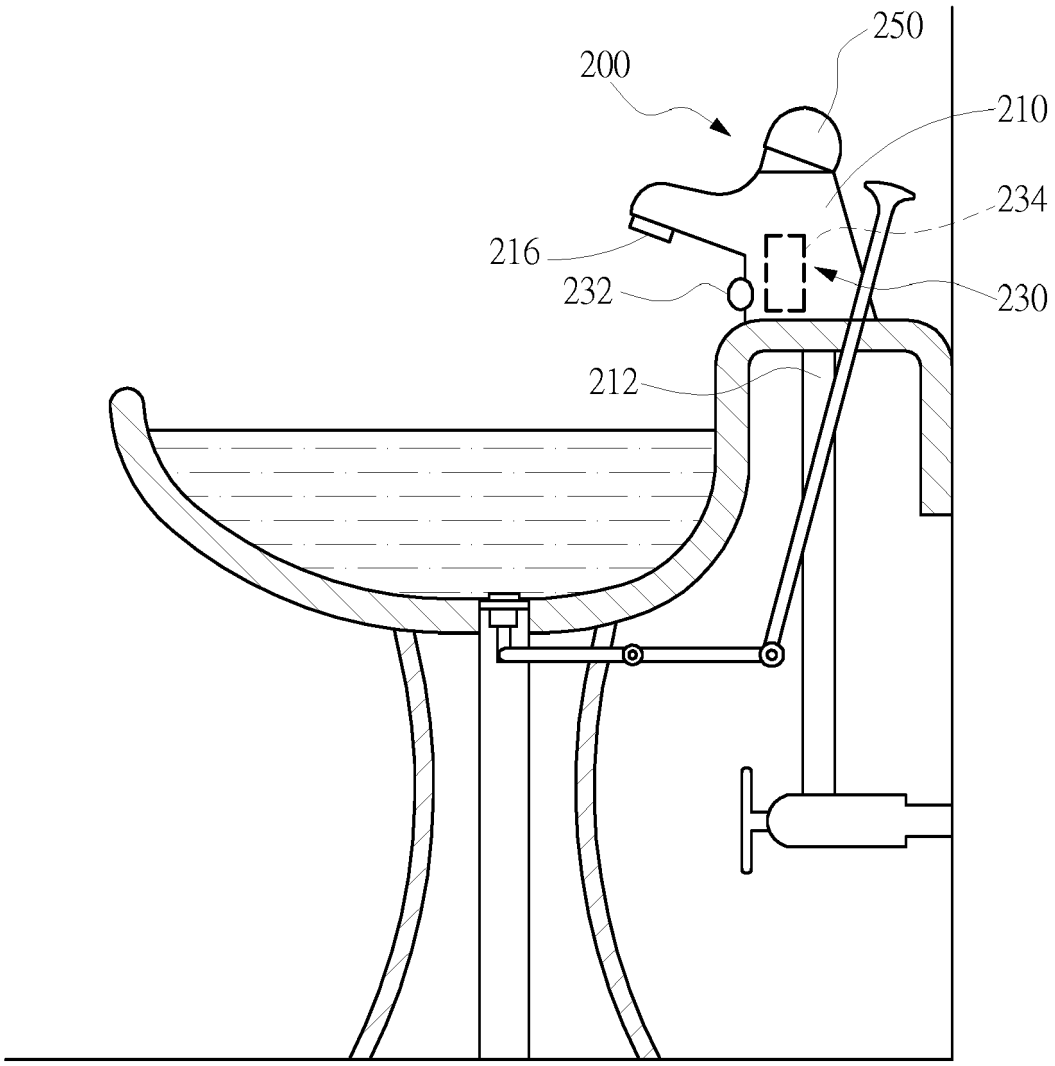

FIG. 5

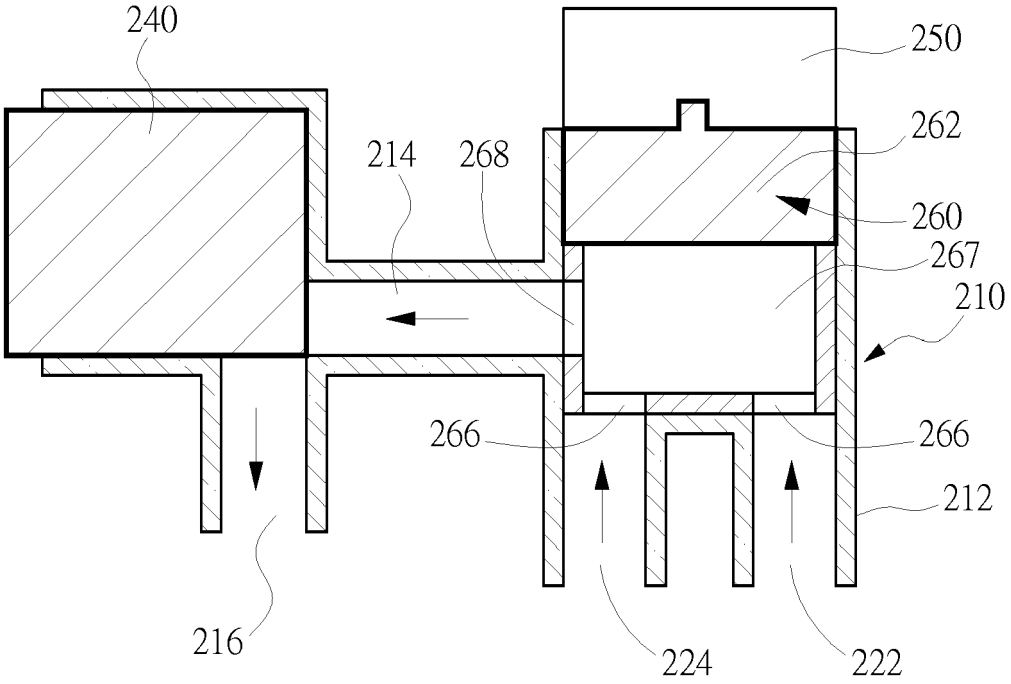

FIG. 6

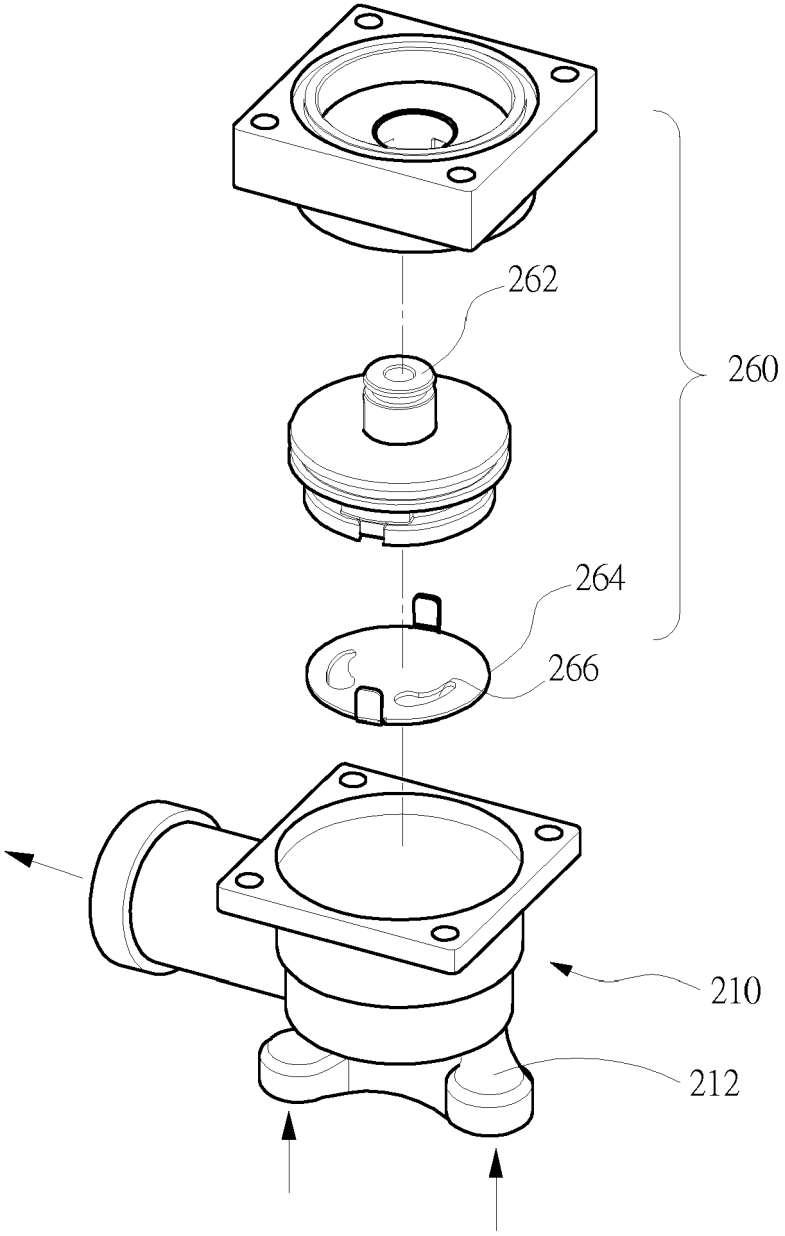

FIG. 7

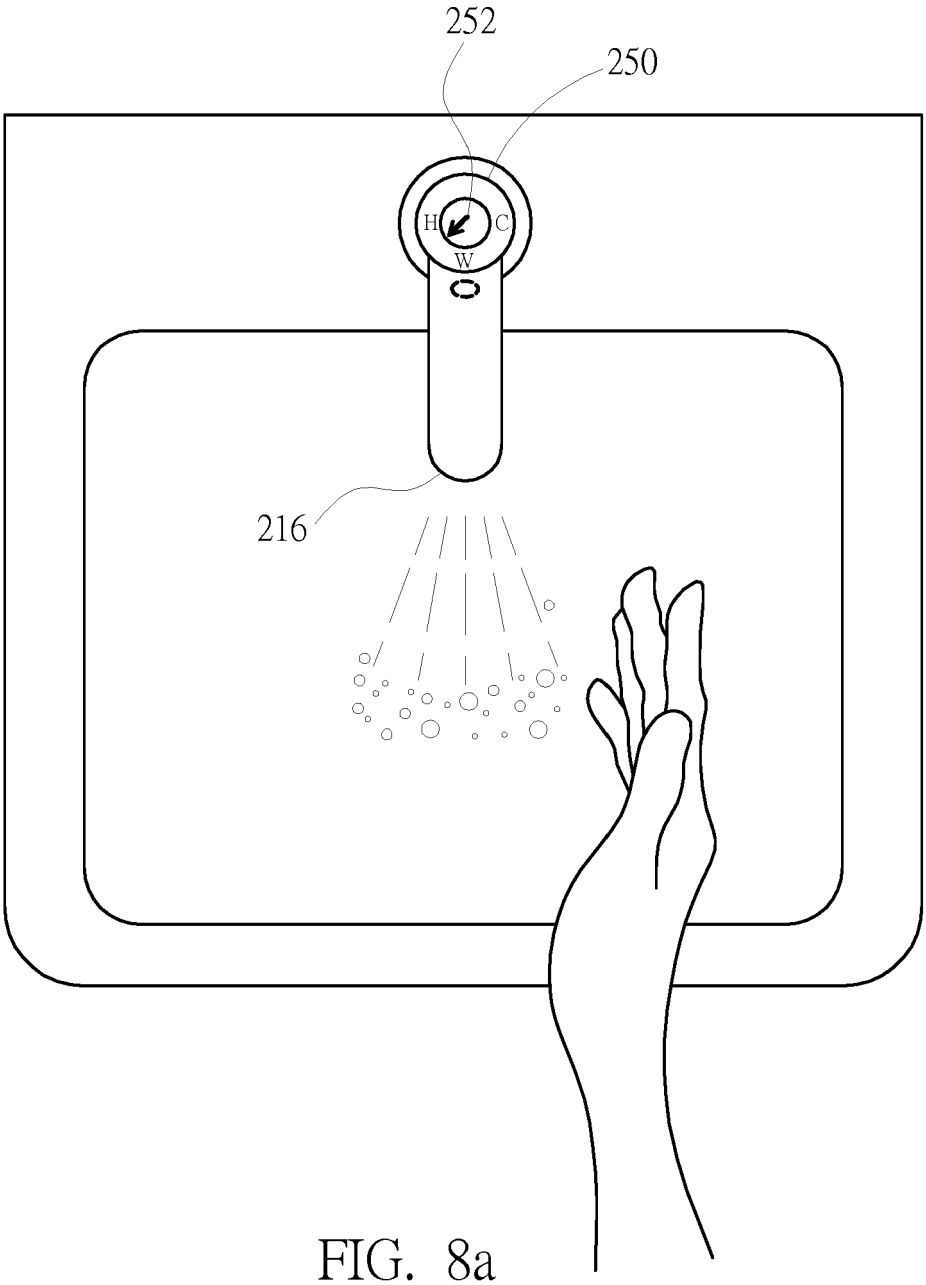

FIG. 8a

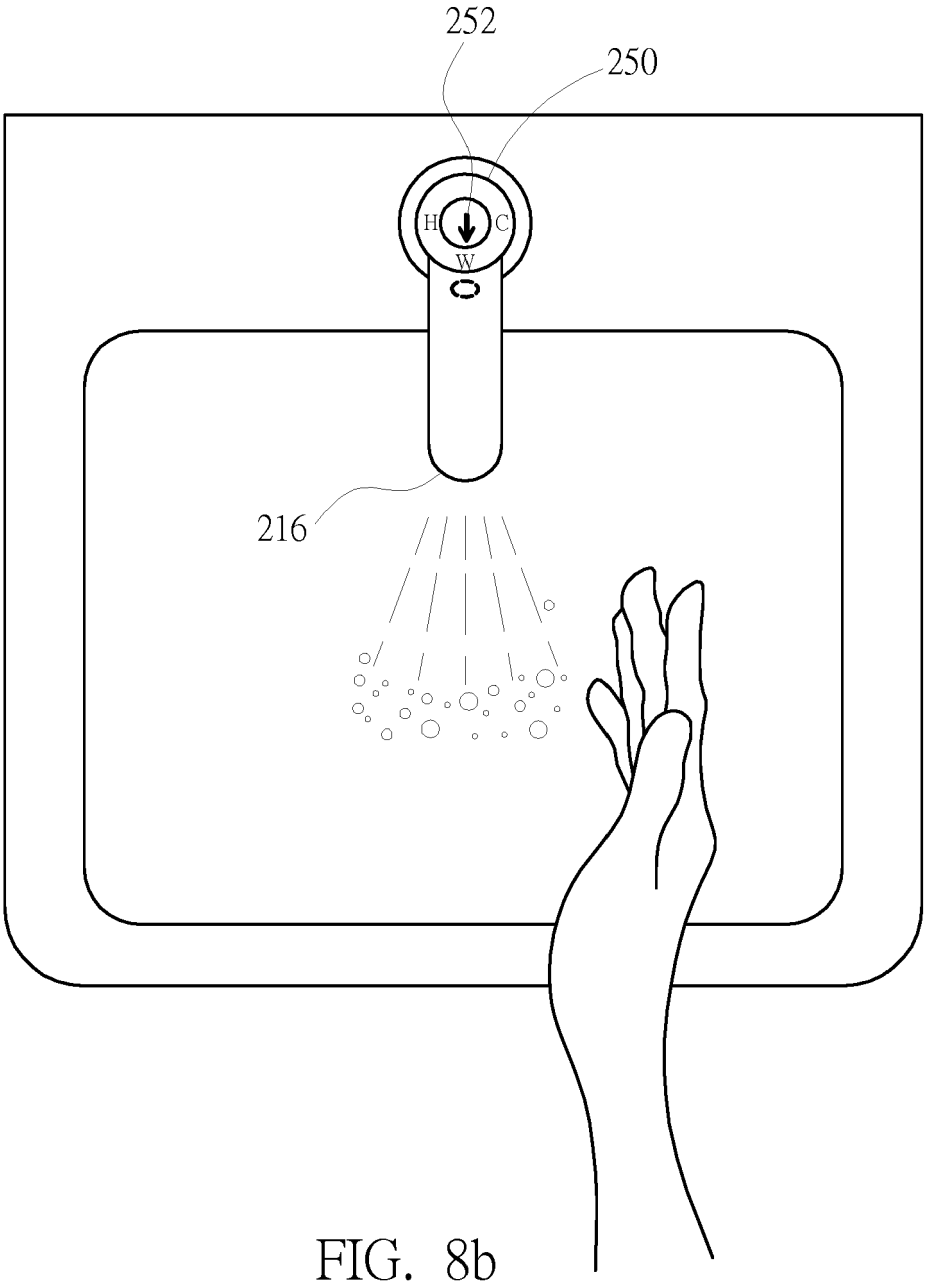

FIG. 8b

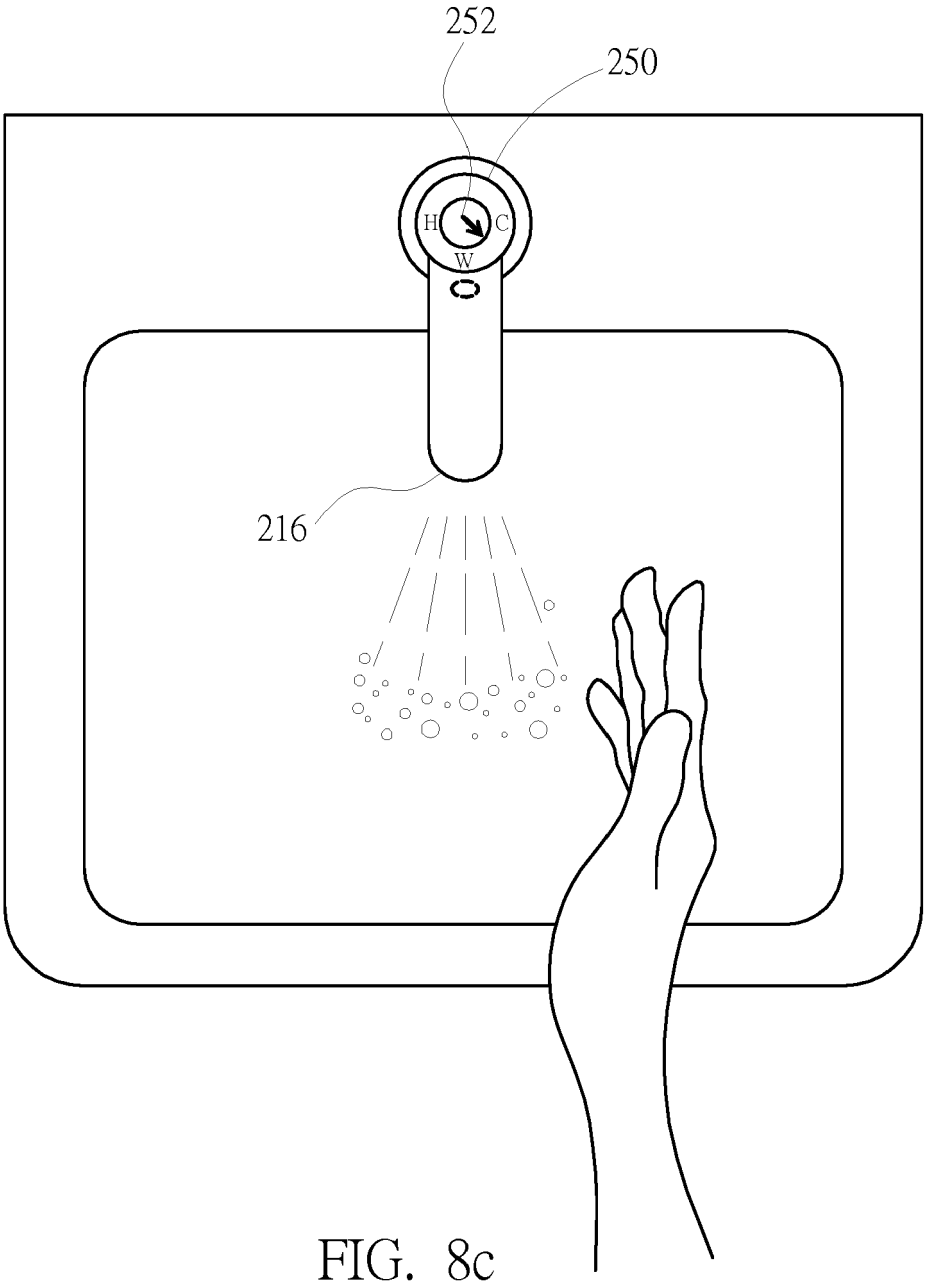

FIG. 8c

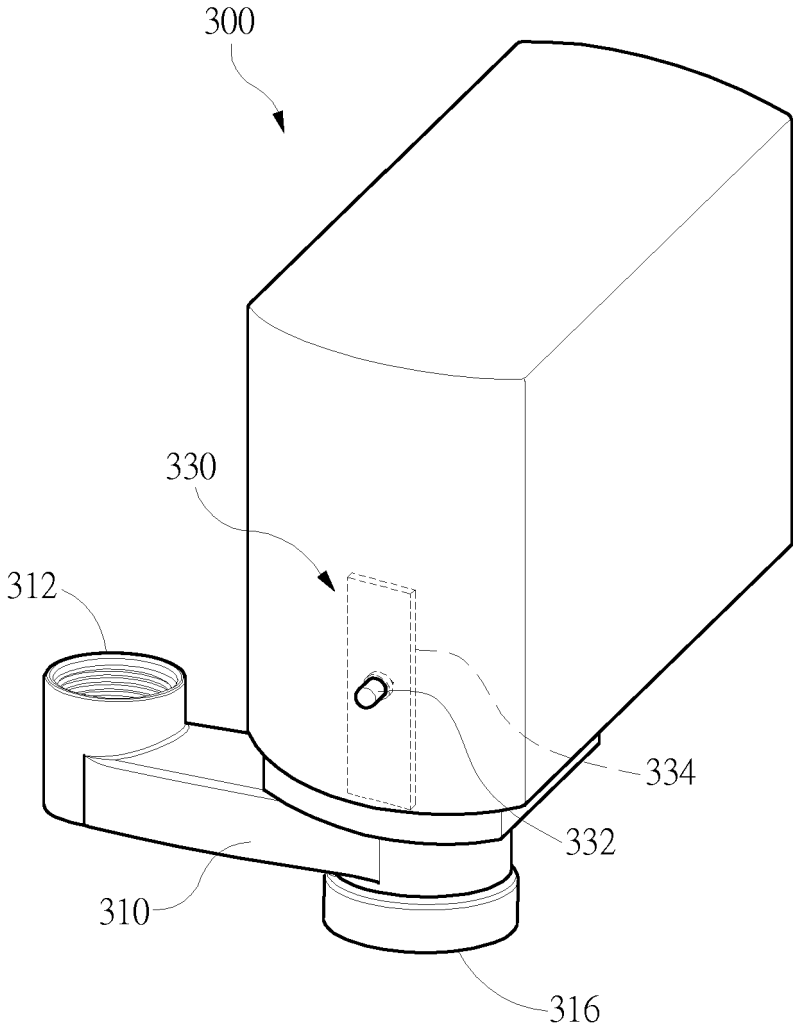

FIG. 9

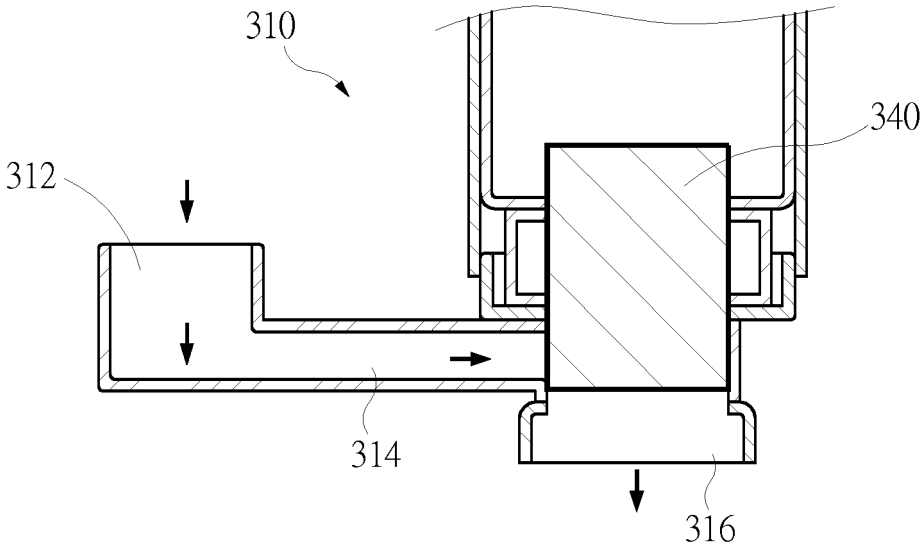

FIG. 10

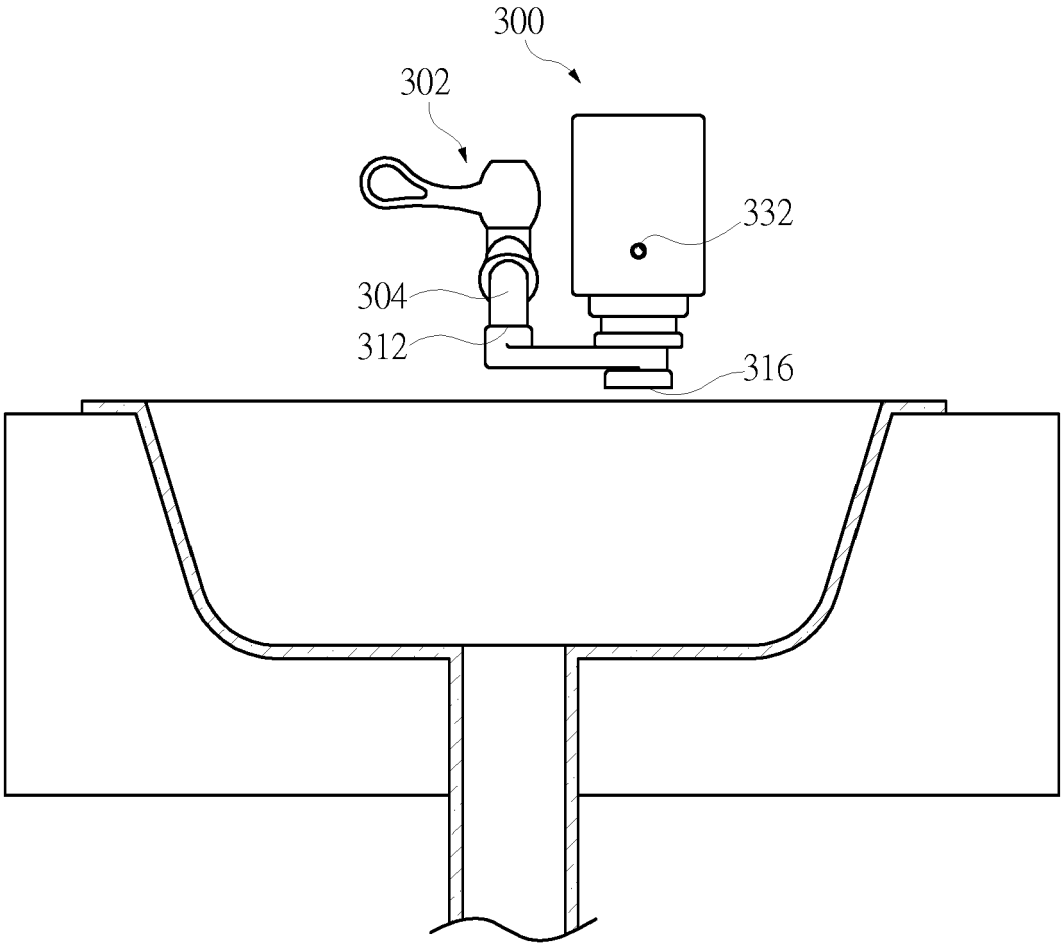

FIG. 11

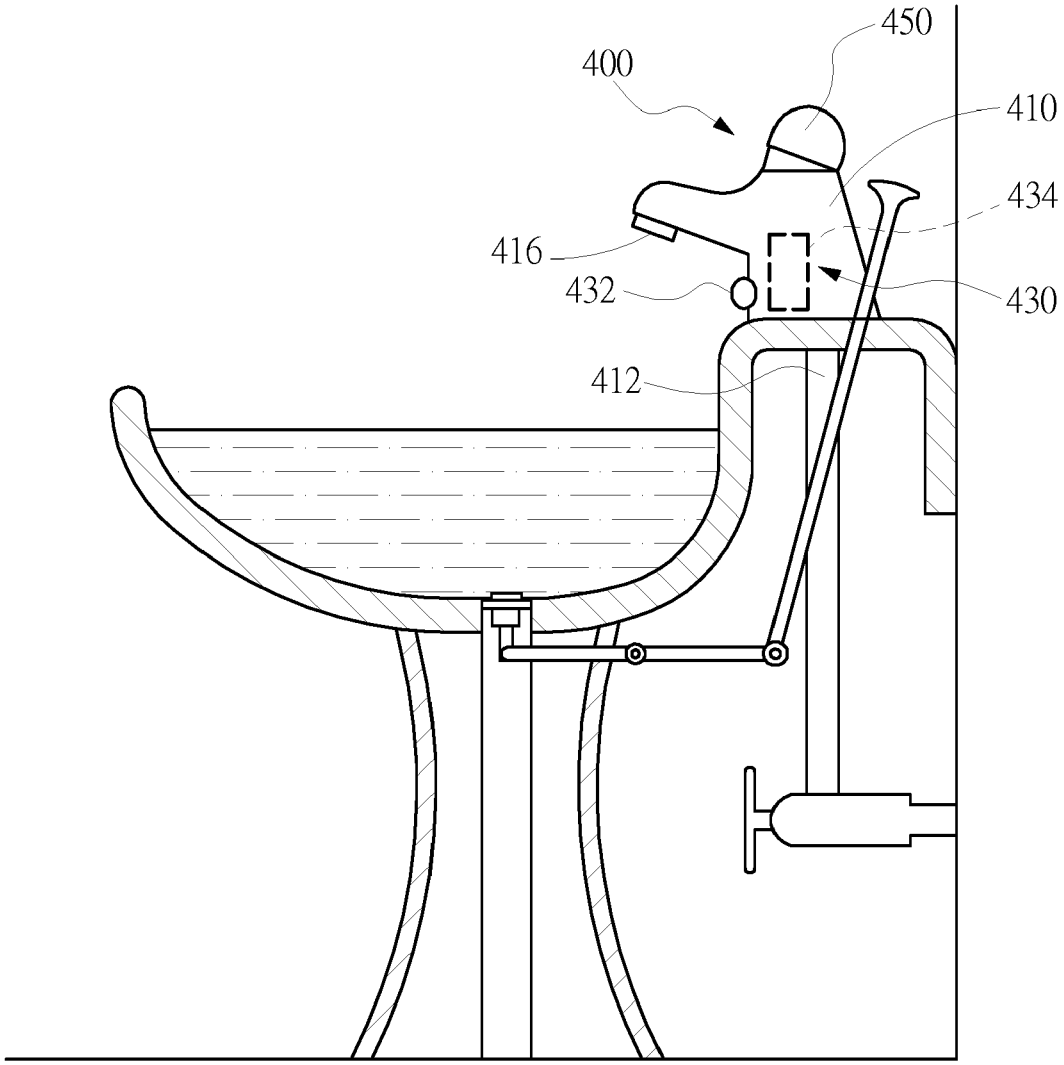

FIG. 12

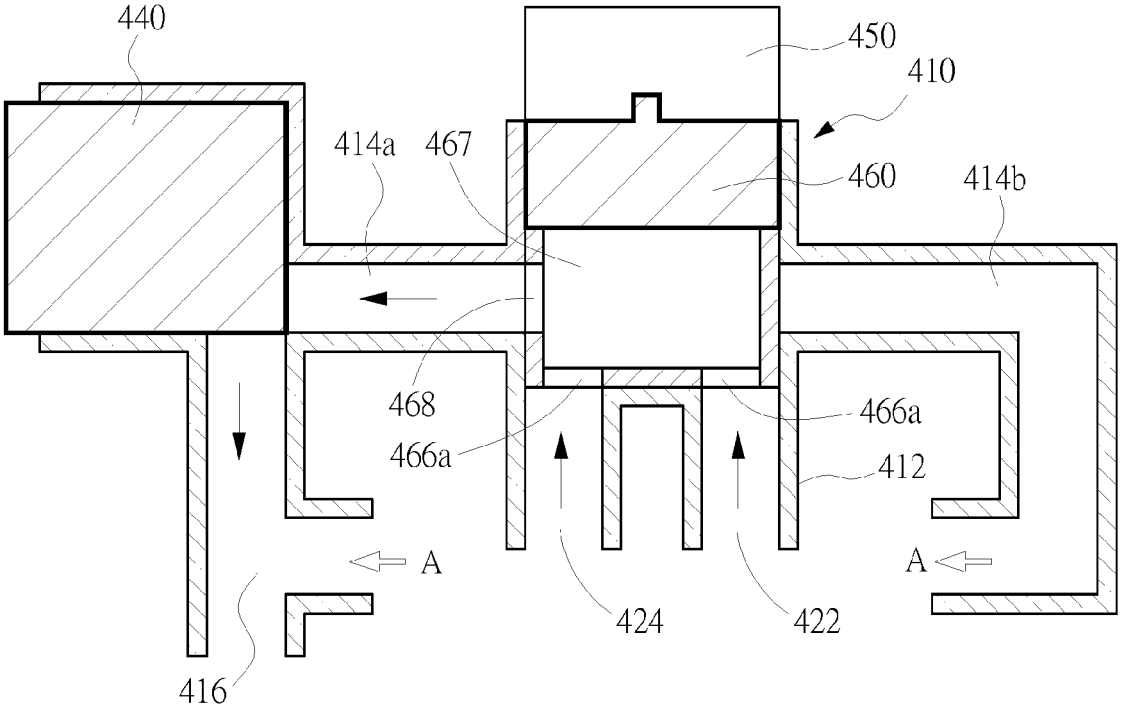

FIG. 13a

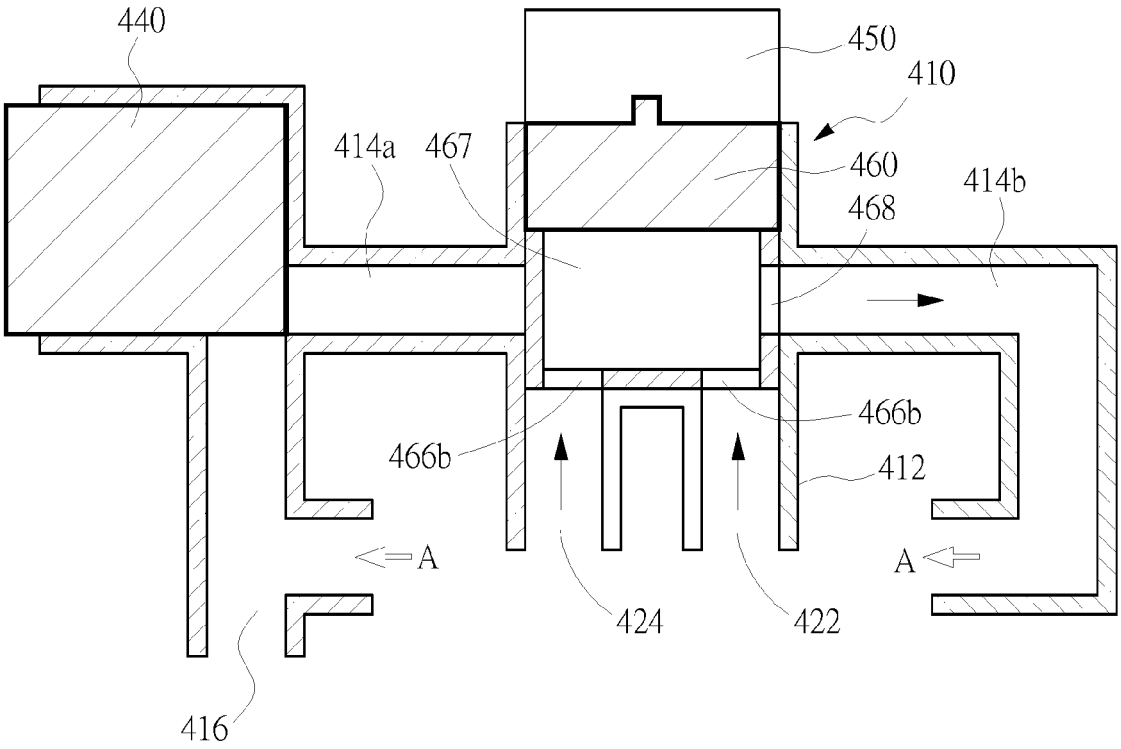

FIG. 13b

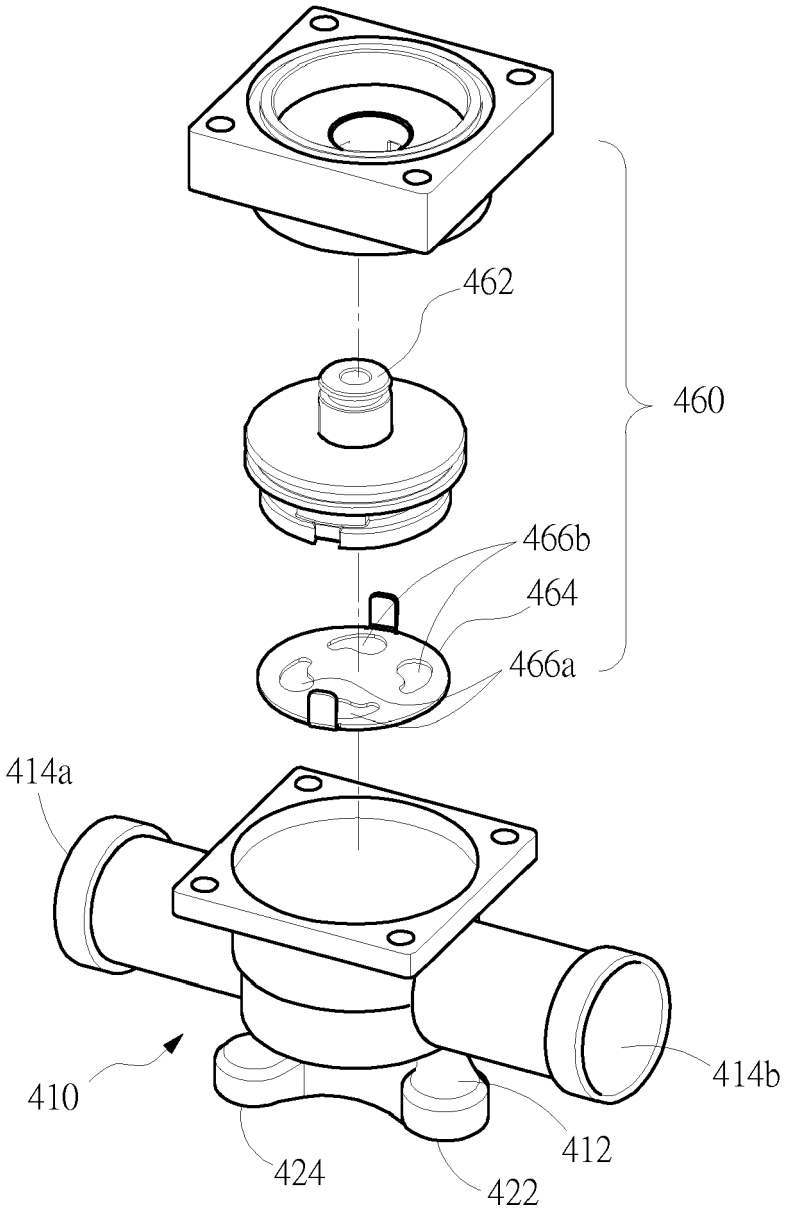

FIG. 14

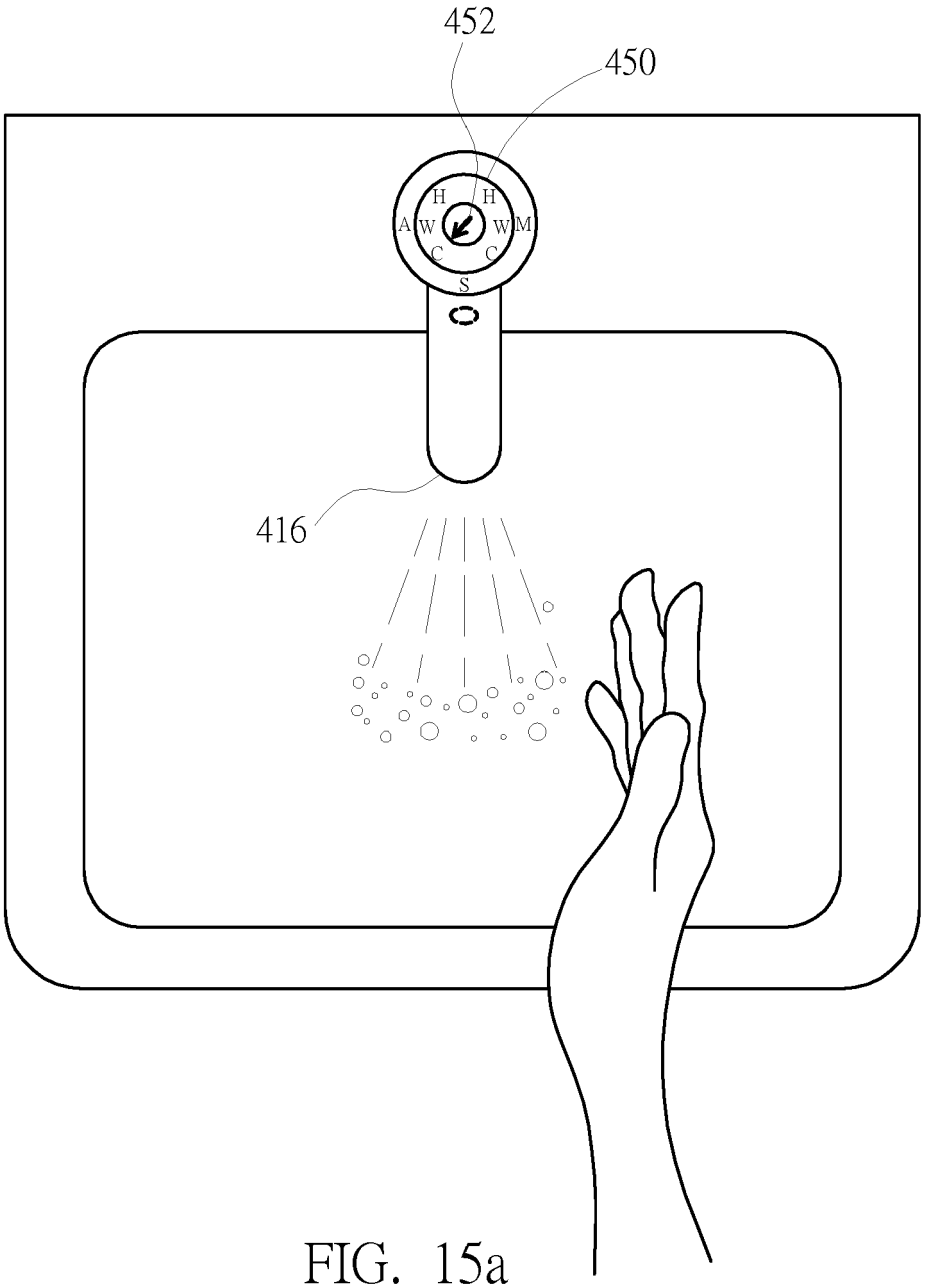

FIG. 15a

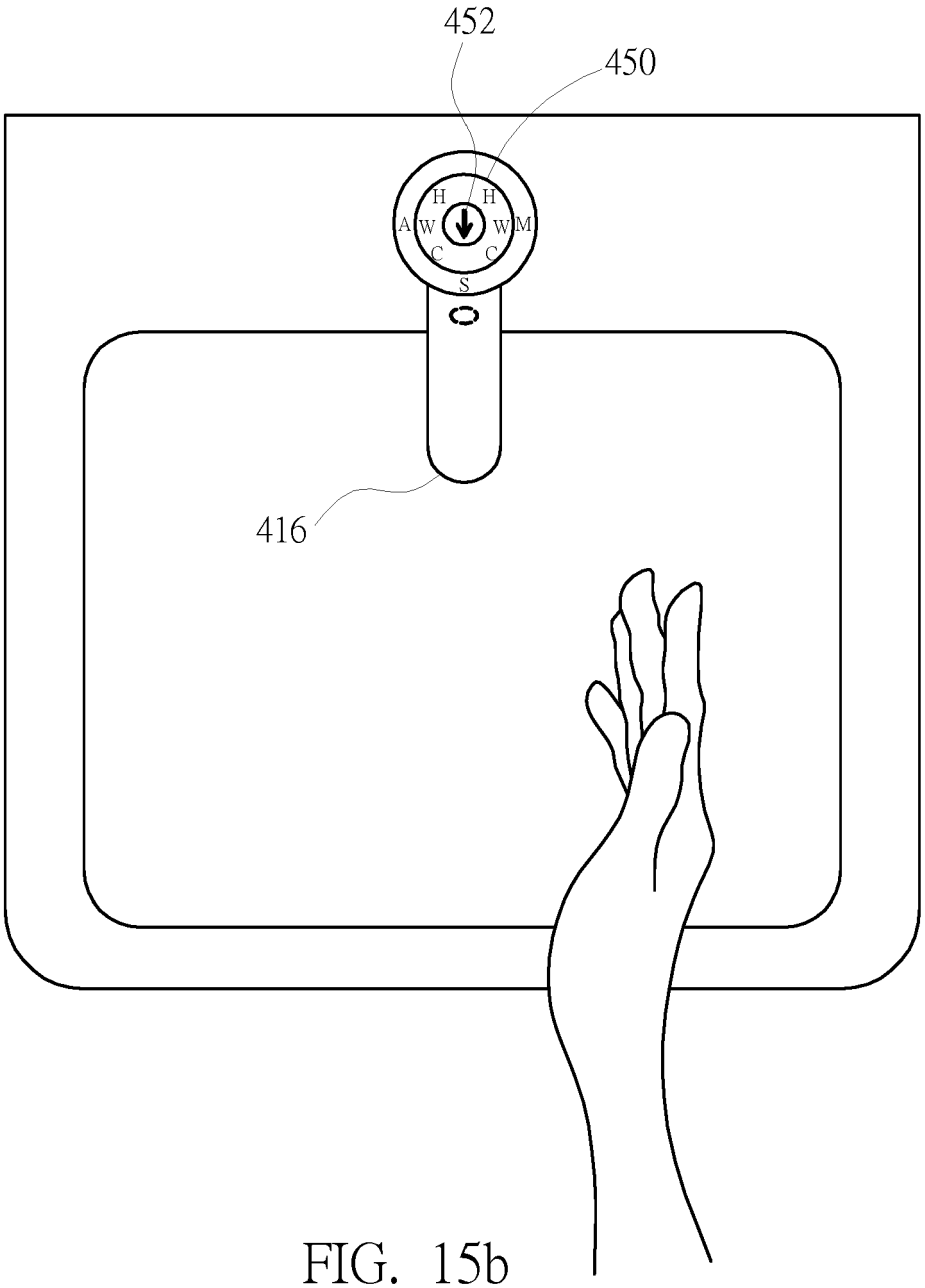

FIG. 15b

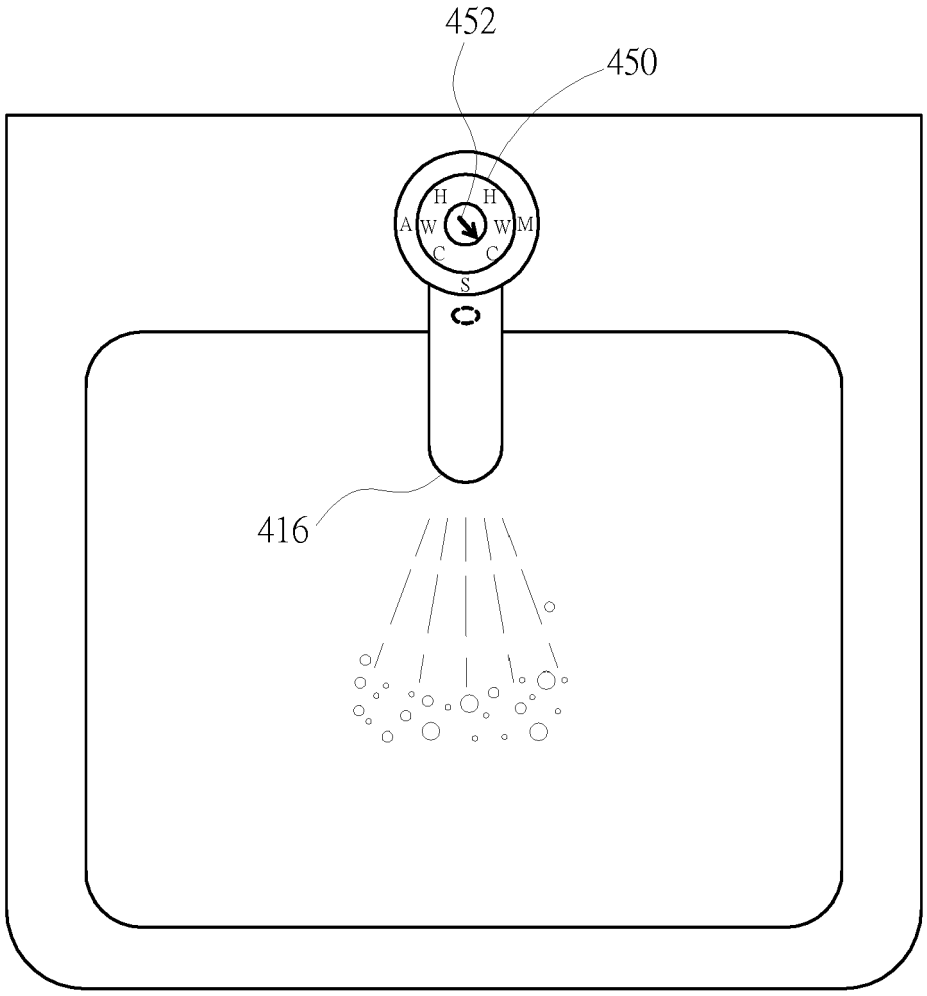

FIG. 15c

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EUROPEAN SEARCH REPORT

Application Number
EP 15 17 9185

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 0 864 700 A2 (ORAS OY [FI]) 16 September 1998 (1998-09-16) * column 3, line 6 - column 5, line 36; figure 2 *	1-4,6-8, 10,11	INV. E03C1/05
X	US 5 868 311 A (CRETU-PETRA EUGEN [US]) 9 February 1999 (1999-02-09) * column 3, line 14 - column 10, line 46; figures 1-5 *	1,4,6-8, 10,11	
X	GB 2 460 034 A (PEGLER LTD [GB]) 18 November 2009 (2009-11-18) * page 2, line 3 - page 10, line 14; figure 1 *	1-4,6-8, 10	
X A	US 2007/170384 A1 (GOODMAN MATTHEW PHILIP [US]) 26 July 2007 (2007-07-26) * page 1, paragraph 22 - page 3, paragraph 30; figures 1-5 *	1-4,6,7, 11 10	
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			E03C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	21 December 2015	Fajarnés Jessen, A

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