

A Water Diverting Device

Technical Field

The present invention relates to a water diverting device.

Background Technology

5 Current water separating devices, such as a diverting device for a water faucet or divider, all use the traditional pushing/pulling method to change water discharge direction. Their most significant shortcoming is difficult operation, poor sealing and short service life. Their operation is also affected by water pressure, and if water is not discharged at a specified pressure, the water diverter will move downward under its weight and water
10 will not be discharged at the lower position.

Summary of Invention

A technical problem solved by the present invention is to provide a water diverting device that is easy to operate and has a long service life. Therefore the present invention
15 provides the following technical design: a water diverting device comprises a water inlet and outlet pipeline which comprises an upper sealing seat and a lower sealing seat respectively for the two outlets, and a water diverting switch fits with the upper sealing seat and the lower sealing seat, whereby the water diverting switch is used to switch over between the two outlets. The water diverting switch includes a sliding shaft and a fixed
20 base, whereby the fixed base comprises a sliding through hole for passing the sliding shaft, and a retaining hook having a hook part. On the sliding shaft, there are a first stop position and a second stop position, each respectively shaped to fit with the hook part of

the retaining hook, and the first stop position and the second stop position are each located at different heights on the sliding shaft, with the first stop position being closer to a head of the sliding shaft than the second stop position. On the sliding shaft, there is further a first unidirectional slide channel for the hook part of the retaining hook. The first unidirectional slide channel allows the sliding shaft move from a state where the first stop position is fitting with the hook part of the retaining hook to a state where the second stop position is fitting with the hook part of the retaining hook. A second unidirectional slide channel for the hook part of the retaining hook, the second unidirectional slide channel allows the sliding shaft move from a state where the second stop position is fitting with the hook part of the retaining hook to a state where the first stop position is fitting with the hook part of the retaining hook. The first unidirectional slide channel comprises a first slide way section starting at the first stop position and a second slide way section connected with the first slide way section and leading to the second stop position, the connection from the second slide way section with the first slide way section being located farther away from the head of the sliding shaft than the second stop position. The second unidirectional slide channel comprises a third slide way section starting at the second stop position and a fourth slide way section connected with the third slide way section, the connection from the fourth slide way section with the third slide way section being located farther away from the head of the sliding shaft than the second stop position, and the fourth slide way section is connected with the first slide way section or connected to the first stop position. The water diverting switch further comprises a spring pushing the sliding shaft along a direction from the head of the sliding shaft towards a tail of the sliding shaft, the head of the sliding shaft being connected with a valve core, and the positions of the upper sealing seat and the lower sealing seat corresponding with a movement distance of the valve core.

Applying the technical design of the present invention, the object of the present invention is achieved by the moving and static arrangement of the fixed base and the

sliding shaft, and the fit between the sealing seats and the valve core. The water dispensing direction can be changed by only pressing a diverting switch. Thus, the present invention is easy to operate and better complies with a user's ergonomic habit of applying a force, with good sealing effect, excellent durability and long service life. In addition, the present invention has high operation reliability and its water diverting function is implemented without being affected by water pressure.

Brief Description of Drawings

Fig.1 is a sectional view of one embodiment of the present invention when it is applied for a faucet and is in an upper water dispensing position.

Fig.2 is the sectional view of the embodiment shown in Fig.1 when it is applied for the faucet and is in a lower water dispensing position.

Fig.3 is the diagram of a sliding shaft of the present invention.

Fig.4 is front view of the sliding shaft shown in Fig. 3 located in a unidirectional slide channel and stop position.

Fig.5 is a sectional view of another embodiment of the present invention when it is applied for the faucet and is in an upper water dispensing position.

Fig.6 is the sectional view of the embodiment shown in Fig.5 when it is in a lower water dispensing position.

Fig.7 is the sectional view of the present invention when it is applied for a water diverter and is in an upper water dispensing position.

Fig.8 is the sectional view of the present invention when it is applied for a water diverter and is in a lower water dispensing position.

Preferred Embodiments

Embodiment 1:

5 Referring to Fig.1, Fig.2, Fig.3 and Fig.4. This embodiment is the embodiment of the present invention that is used for a faucet 100. The present invention comprises a water inlet piping inlet 101 and two water outlet piping outlets 103 and 104. The two water outlet piping outlets of the water diverting device are provided respectively with a upper sealing seat 102 and a lower sealing seat 105. The water diverting device is fitted
10 with a water diverting switch that fits with the sealing seats and is used to switch over between the two outlets. The water diverting switch includes a fixed base 3 connected with the inlet and outlet pipelines. The water diverting switch also has a sliding shaft 2 and there is a sliding through hole 31 of the sliding shaft in the fixed base. A head 21 of the sliding shaft is inserted into and extends beyond the sliding through hole 31. In this
15 embodiment, a tail of the sliding shaft is connected with a button 1 at tail threads of the sliding shaft. The switch has a spring 4 pushing the connection of the button and the sliding shaft along a direction from head 21 of the sliding shaft towards its tail. The spring is located between the fixed base and the button. The sliding shaft head is connected with a valve core 20, and the positions of the above-mentioned upper sealing
20 seat and lower sealing seat correspond with the movement distance of the valve core.

As shown in the figures, the water outlet 104 is under the sealing seat 105. Item 23 is a sealing gasket mounted on the valve core. The spring 4 may be at any position where the sliding shaft is able to obtain a force for moving from the head to the tail.

Item 106 is a seal ring mounted on the sliding shaft between the sliding shaft and the
25 fixed base. Item 107 is a seal ring mounted between the fixed base and the faucet 100.

The water diverting switch is provided with a retaining hook 6 for the sliding shaft. The retaining hook is connected on the fixed base. On an outer side of the fixed base

there is a ring spring 5 for fixing the retaining hook. The retaining hook can also be connected on a part connected with the fixed base.

On the surface of the sliding shaft, there are a first stop position 71 and a second stop position 72 fitting with a hook part of the retaining hook, and the first stop position and second stop position are located at different heights on the sliding shaft, with the first stop position close to the head 21 of the sliding shaft. On the surface of the sliding shaft, there is a first unidirectional slide channel for the hook part of the retaining hook 6. The first unidirectional slide channel allows the sliding shaft 2 move from the state where the first stop position 71 is fitting with the hook part 60 of the retaining hook 6 to the state where the second stop position 72 is fitting with the hook part 60 of the retaining hook 6. On the surface of the said sliding shaft 2, there is a second unidirectional slide channel for the hook part 60 of the retaining hook 6. The second unidirectional slide channel allows the sliding shaft 2 move from the state where the second stop position 72 is fitting with the hook part 60 of the retaining hook 6 to the state where the first stop position 71 is fitting with the hook part 60 of the retaining hook 6. The first unidirectional slide channel comprises a first slide way section 81 starting at the first stop position 71 and a second slide-way 82 connected with the first slide way section 81 and leading to the second stop position 72, whereby the connection from the second slide-way 82 with the first slide-way section 81 is located farther away from the head 21 of the sliding shaft 2 than the second stop position 72. The second unidirectional slide channel consists of a third slide way section 83 starting at the second stop position 72 and a fourth slide way section 84 connected with the third slide way section 83, whereby the connection from the fourth slide-way section 84 with the third slide-way section 83 is located farther away from the head 21 of the sliding shaft 2 than the second stop position 72, and the fourth slide way section 84 is connected with the first slide way section 81 or connected to the first stop position 71.

Relative unidirectional slide movement between the first and the second

unidirectional slide channels, and the hook part 60 can be provided through a slide channel design on a wall of the first and the second unidirectional slide channels, or a slide channel design on a bottom of the first and the second unidirectional slide channels. In this embodiment, such relative unidirectional slide movement is provided through the design of the slide channel on the bottom, so that the switch has higher operation reliability and longer service life. Its design scheme is as follows: the first slide way section 81 and second slide way section 82 are connected in the form of a step, and at a connection 91, a channel bottom of the second slide way section 82 is lower than that of the first slide way section 81. The third slide way section 83 and fourth slide way section 84 are connected in the form of a step, and at a connection 92, a channel bottom of the fourth slide way section 84 is lower than that of the third slide way section 83. The second slide way section 82 has a down step 93 near the second stop position 72. The fourth slide way section 84 and first slide way section 81 are connected in the form of a step, and at a connection 94, a channel bottom of the first slide way section 81 is lower than that of the fourth slide way section 84.

This embodiment fits with the immovable slide way on sliding shaft 2 through swinging of the hook part 60 of the retaining hook 6. The sliding shaft 2 has a positioning sliding channel 22 in the axial direction and the fixed base 3 has a protruding positioning block part 32 whose shape can be used to fit with the retaining hook 6, as shown in Figs. 1 and 2. In addition, the retaining hook 6 is connected by hooking to the protruding positioning part 32 of the fixed base 3. A circumferential positioning mechanism can also be the positioning channel that is provided in other position on the fixed base 3, such as an inner hole. The protruding positioning part 32 of the fixed base 3 is positioned at another corresponding position on the sliding shaft 2. Furthermore, the circumferential positioning mechanism can also be any other common circumferential positioning mechanism between shaft and sleeve or provide corresponding positioning function by means of a device.

In operation, the sliding shaft 2 can also be used to rotate by a specified angle to provide a fit between the slide way and retaining hook 6, but it is not as convenient and comfortable in use as in the embodiment of Figs. 1-4.

During the operation of the water diverting device, a pressure force is applied on the button 1, and the button 1 drives the sliding shaft 2 to move down towards the sealing seat 105. In this case, the hook end 60 of retaining hook 6 is positioned on the fixed base 3 by the ring spring 5. The hook part 60 of the retaining hook 6 moves up the first slide way section 81 from the first stop position 71. When the button 1 is depressed all the time, the hook part 60 of the retaining hook 6 moves into a second hook part at the connection 91. When the button 1 is released, the button 1 and the sliding shaft 2 move up under the action of spring 4, but as the first slide way section 81 and second slide way section 82 are connected in the form of a step, and at the connection 91, the channel bottom surface of the second slide way section 82 is lower than that of the first slide way section 81, the hook part 60 of the retaining hook 6 cannot move back on the original way and can only move to the second stop position 72 area on second slide way section 82 to connect with a vector point of the second stop position 72, which is a state position of the switch and provides downward travel of the sliding shaft. In this case, the spring 4 is compressed and sealing gasket 23 on the valve core 20 gets into contact with the lower sealing seat 105. The lower water outlet 104 is in sealing state, and the water diverting device is in upper water dispensing state, and water flows out of the outlet 103.

A user may depress the button again. Since the second slide way section 82 has a down step at the position near second stop position 72, and the hook part 60 of the retaining hook 6 cannot move back on the original way and can only move up along the third slide way section 83, the hook part 60 moves into the fourth slide way section 84. When the button 1 is released, the button 1 and the sliding shaft 2 move up under the action of spring 4. As the third slide way section 83 and fourth slide way section 84 are connected in the form of a step, and at the connection 92, the channel bottom surface of

the fourth slide way section 84 is lower than that of the third slide way section 83, the hook part 60 of the retaining hook 6 cannot move back on the original way and can only move down to the first stop position 71 along the fourth slide way section 84 or move down into the first slide way section 81 along the fourth slide way section 84 and finally
5 returns to the first stop position 71 and connect with the first stop position 71, which is another state position of the switch and finishes upward movement of the sliding shaft 2. In this case, sealing gasket 23 on the valve core 20 gets into contact with the sealing seat 102. The upper water outlet 103 is in sealing state, and the water diverting device is in lower water dispensing state and water flows out of the outlet 104.

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Embodiment 2:

The fixed base 3 in Embodiment 1 can also be formed by some parts connected with each other. Referring to Fig.5, in an embodiment shown therein, the fixed base includes a mounting piece 33 and a connection sleeve 34 connected with its rear part. The
15 connection sleeve 34 is connected with the water inlet pipeline 102 and water outlet pipelines 103 and 104. The sliding shaft 2 is smaller near its tail or between its middle and tail and goes through the connection sleeve 34. The connection sleeve 34 has a small hole 35 that fits with the smaller part of the sliding shaft 2. The retaining hook 6 is connected to the mounting piece 33. A ring spring for fixing the retaining hook 6 is
20 provided on an outer side of the mounting piece 33.

Hence, the seal ring 106 as known from Embodiment 1 can be mounted on the smaller part of the sliding shaft 2 in Embodiment 2, and is connected under sealing condition with the small hole 35 on the connection sleeve 34 in order to reduce sliding resistance.

25 In this embodiment 2, there is a supporting bracket 41 for the spring 4 on outer side of the sealing seat. The spring 4 is positioned between supporting bracket 41 and the valve core 20 connected on the head 21 of the sliding shaft 2, so as to reduce a structure

height by using its internal space.

Other parts of this embodiment 2 are the same as Embodiment 1. Same item numbers in Fig.5 and Fig.6 as in Figures 1~4 have the same meanings as in Figures 1~4.

5 **Embodiment 3:**

With reference to Fig.7 and Fig.8, in this embodiment, the present invention is installed on the water diverter. The same water diverting device as in Embodiment 2 is used in this embodiment.

10 In Fig.7 and Fig.8, same item numbers in these figures as in Fig.5 and Fig.6 have the same meanings as in Fig.5 and Fig.6.

Claims

1. A water diverting device comprising a water inlet and outlet pipeline which comprises an upper sealing seat and a lower sealing seat respectively for the two outlets, and a water diverting switch fitted with the upper sealing seat (102) and the lower sealing seat (105);
- 5 whereby the water diverting switch is used to switch over between the two outlets; the water diverting switch comprising a sliding shaft and a fixed base, whereby the fixed base comprises a sliding through hole for passing the sliding shaft, a circumferential positioning mechanism for the sliding shaft comprising the sliding shaft having a positioning slot in the axial direction, and the fixed base having a positioning block part engaged into the positioning slot, a retaining
- 10 hook having a hook part, the retaining hook being connected to the positioning block part, a first stop position and a second stop position on the sliding shaft, each stop position respectively shaped to fit with the hook part of the retaining hook, and the first stop position and the second stop position being each located at different heights on the sliding shaft, with the first stop position being closer to a head of the sliding shaft than the second stop position, a
- 15 first unidirectional slide channel on the sliding shaft for the hook part of the retaining hook, the first unidirectional slide channel allowing the sliding shaft to move from a state where the hook part of the retaining hook is engaged into the first stop position to a state where the hook part of the retaining hook is engaged into the second stop position, and a second unidirectional
- 20 slide channel on the sliding shaft for the hook part of the retaining hook, the second unidirectional slide channel allowing the sliding shaft move from a state where the hook part of the retaining hook is engaged into the second stop position to a state where the hook part of the retaining hook is engaged into the first stop position, the first unidirectional slide channel comprising a first slide way section starting at the first stop position and a second slide way
- 25 section connected with the first slide way section and leading to the second stop position, the connection from the second slide way section with the first slide way section being located

farther away from the head of the sliding shaft than the second stop position, the second unidirectional slide channel comprising a third slide way section starting at the second stop position and a fourth slide way section connected with the third slide way section, the connection from the fourth slide way section with the third slide way section being located
5 farther away from the head of the sliding shaft than the second stop position, and the fourth slide way section is connected with the first slide way section or connected to the first stop position, the water diverting switch further comprising a spring pushing the sliding shaft along a direction from the head of the sliding shaft towards a tail of the sliding shaft, the head of the sliding shaft being connected with a valve core, and the positions of the upper sealing seat and
10 the lower sealing seat corresponding with a movement distance of the valve core.

2. The water diverting device according to Claim 1, wherein the first slide way section and the second slide way section are connected in the form of a step, and at the connection between the first slide way section and the second slide way section, a channel bottom surface
15 of the second slide way section is lower than a channel bottom surface of the first slide way section; the third slide way section and fourth slide way section are connected in the form of a step, and at the connection between the third slide way section and the fourth slide way section, a channel bottom surface of the fourth slide way section is lower than a channel bottom surface of the third slide way section; the second slide way section has a down step near the
20 second stop position; the fourth slide way section and the first slide way section are connected in the form of a step, and at the connection between the fourth slide way section and the first slide way section, the channel bottom surface of the first slide way section is lower than the channel bottom of the fourth slide way section.

25 3. The water diverting device according to Claim 1, wherein the retaining hook is

retained onto the fixed base by a ring spring.

4. The water diverting device according to Claim 1, wherein the fixed base includes a mounting piece and a connection sleeve, connected with the rear part of the mounting piece;
5 the sliding shaft is smaller near its tail or between its middle and tail and goes through the connection sleeve; the connection sleeve having a small hole that fits with the smaller part of the sliding shaft.

5. The water diverting device according to Claim 4, wherein the retaining hook is
10 connected by hooking to the mounting piece and there is a ring spring for fixing the retaining hook on an outer side of the mounting piece.

6. The water diverting device according to Claim 1, wherein the tail of the sliding shaft is connected with a button, and the spring is located between the fixed base and the button.

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7. The water diverting device according to Claim 1, wherein there is a spring bracket on an external side of the lower sealing seat (105) and the spring is between the spring bracket and valve core.