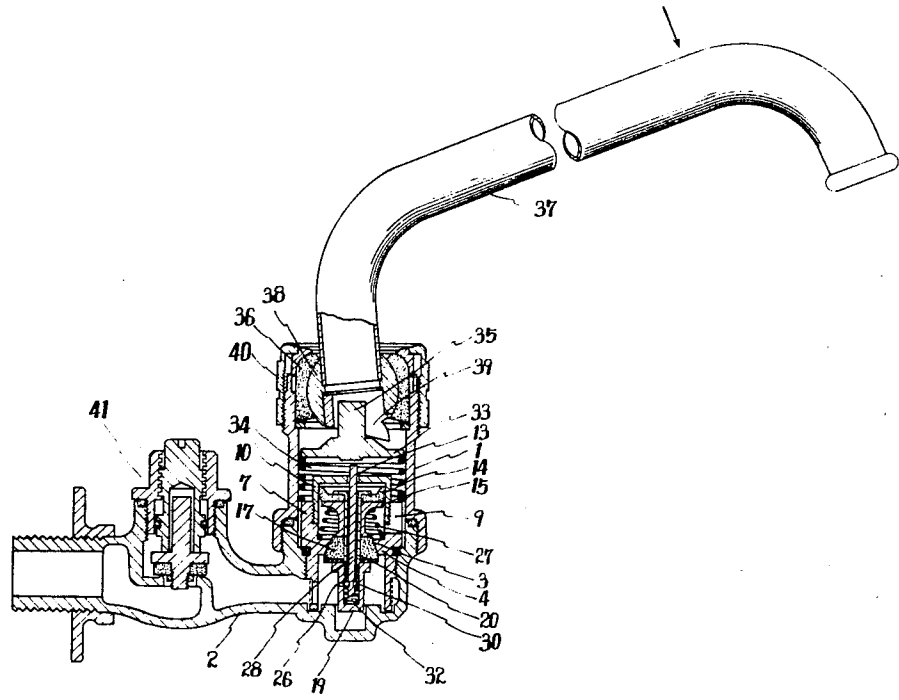


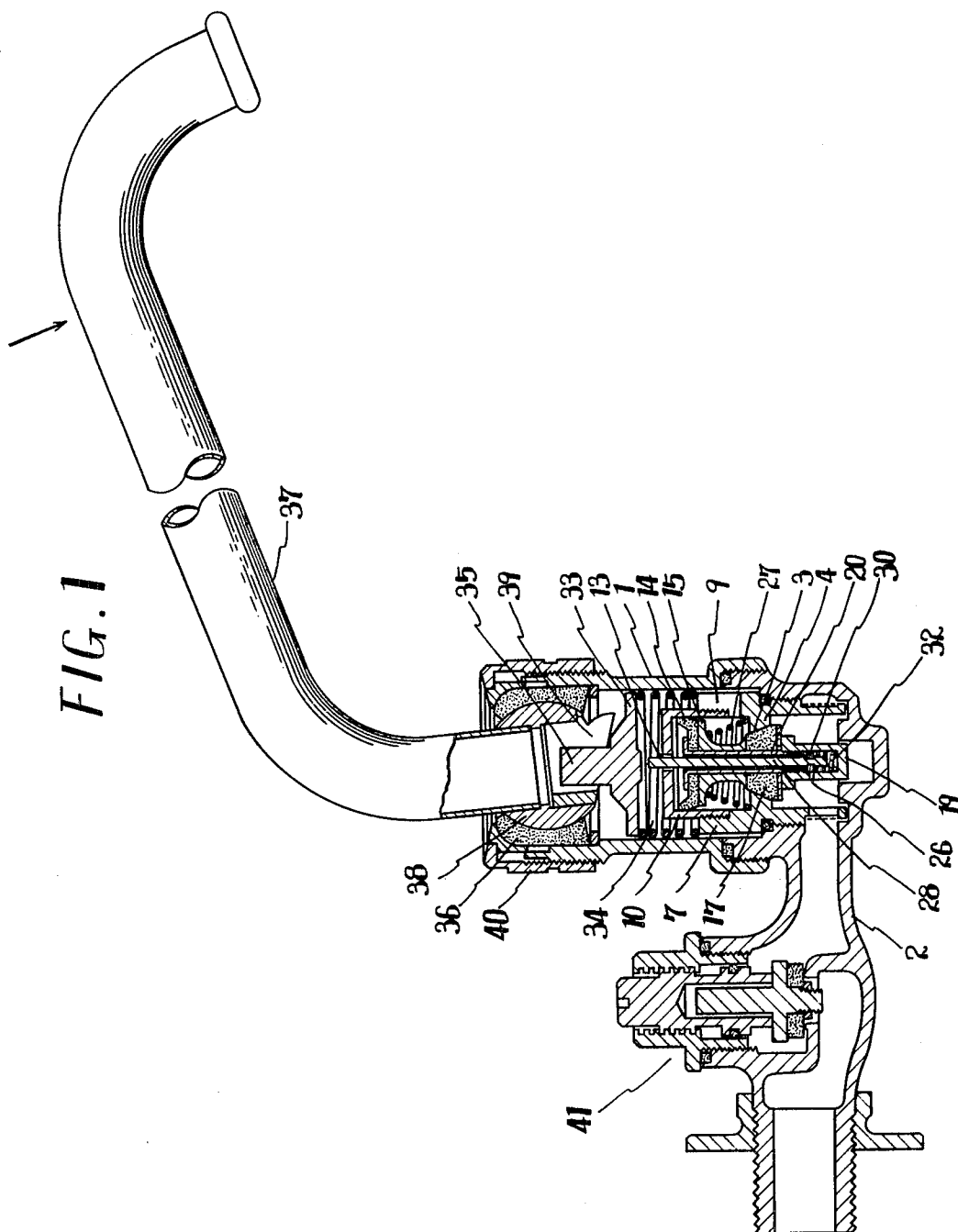
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[54] **METHOD CONTROLLING A WATER SUPPLY AND THE SWIVEL FAUCET**
2 Claims, 4 Drawing Figs.
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137/614.2, 251/39
[51] Int. Cl..... **E03c 1/04,**
F16r 31/383
[50] Field of Search..... **137/616.5,**
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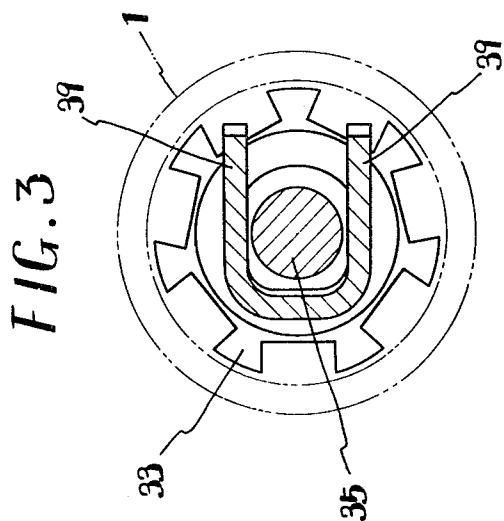
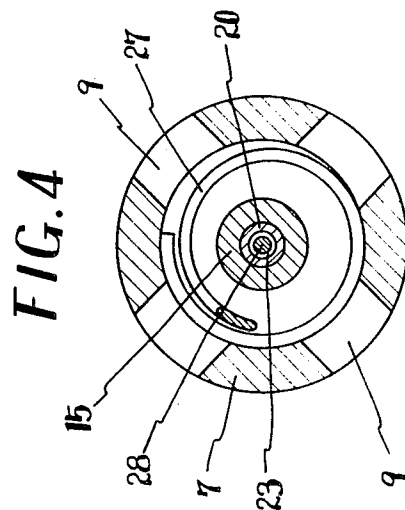
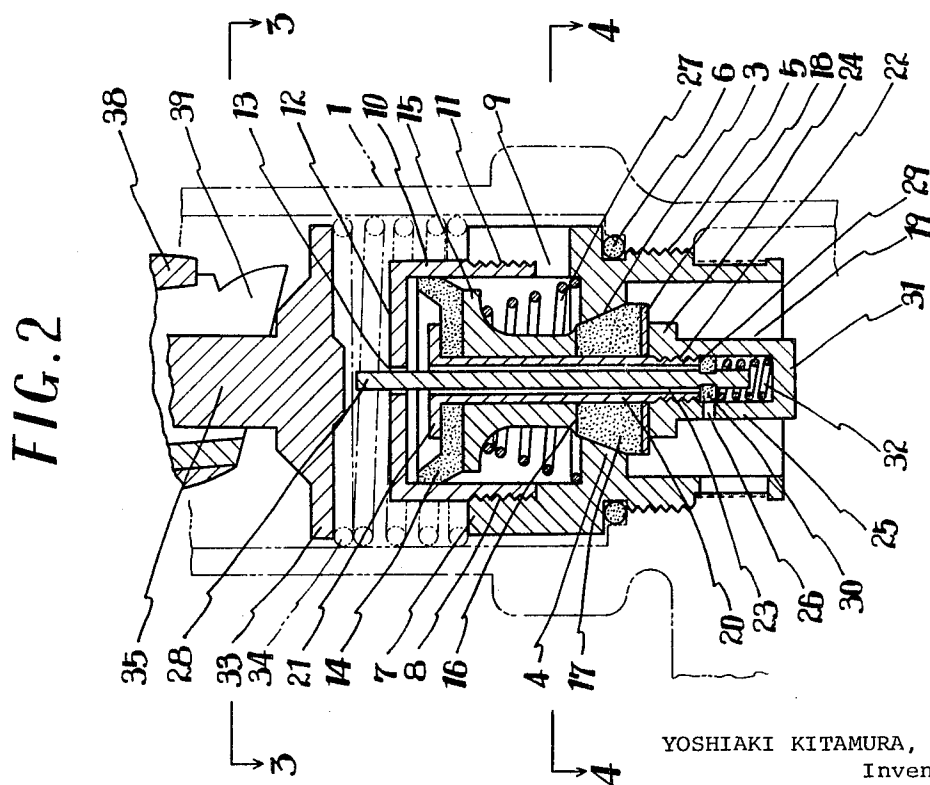
ABSTRACT: This invention relates to an apparatus and method for controlling a water supply by means of vertical movements of a drain pipe, wherein a swivel faucet has a freely movable discharge pipe and further relates to the control of drainage and stoppage thereof by vertical movements of an open end of the drainpipe along a holding section provided at the upper part of the faucet body.





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METHOD CONTROLLING A WATER SUPPLY AND THE SWIVEL FAUCET

Formerly various types of the water faucets existed in general. Specifically that the type of faucet provided with a somewhat long drainpipe which could be rotated into vertical and horizontal directions, and performs the opening and the closing of the faucet has been developed. This faucet functions well under normal water pressures, but had such drawbacks as its uncertainty in operation where the water pressure goes down below 2 atmospheric pressures in high buildings and hilly areas and exceeds 5 atmospheric pressures in low lands and, especially its operation becomes uncertain in case of a low pressure. Also, water-hammering was brought up in case of enlarging the opening of the open and shut valve.

It is an object of the present invention to offer a swivel faucet which could be employed over wide ranges of water pressures with great stability, and which dissolves the drawbacks formerly existing.

A further object is to provide a swivel faucet which can discharge water by means of a light pressure applied to the tip end of a drain pipe whether such drainpipe rotates either to the left or to the right.

A still further object is to provide a swivel faucet which can discharge water from a drainpipe by opening a main water passage with displacement of a piston housed inside the water faucet body due to water pressure.

These and other objects are accomplished by the parts, improvements, combinations and arrangements comprising the invention, a preferred embodiment of which is shown by way of example in the accompanying drawings, and herein described in detail. Various modifications and changes in details of construction are comprehended within the scope of the attached claims.

The invention may be defined in general terms as comprising a swivel faucet body to which a freely movable drainpipe is connected. A press-down piece is provided at the upper part of the faucet body and engages with an actuating rod provided inside of the faucet body. A piston is automatically actuated by the upward and downward displacement of the said actuating rod due to the upward and downward movement of the said drainpipe, and a main water passage hole, closed by the packing to which the said piston is connected, is opened for discharging the pressured water from the drainpipe of the faucet body. Referring to the drawings:

FIG. 1 is a vertical sectional view of the swivel faucet of the present invention.

FIG. 2 is an enlarged vertical sectional view showing the movable section in detail.

FIG. 3 is a plan view showing the relation between the press-down piece and the cam piece on line 3—3 of FIG. 2.

FIG. 4 is a plan view showing the relation between the cylinder provided in the faucet body and the movable section on line 4—4 of FIG. 2.

Referring to the figures, the faucet body 1 is connected to the connection part 2, which is in turn, connected to the water supply pipe, and provided with the partition 4 which has a main water passage hole 3 of a large diameter drilled at its lower section in the middle of the interior of the faucet body. The said partition 4 is spirally attached to the faucet body 1 with the packing 6 therebetween by means of outer threads 5, and has inner threads 8 spirally fitted with the threads 11 of cylinder 10. The breaks 9 are cut out to provide passage of water as shown in FIG. 2 and FIG. 4. The cylinder 10 formed into the shape of a cup is installed upside down and a small hole 13 is drilled through its upper end 12. On the inside wall of the cylinder 10 a dish-shaped packing 14 made of rubber is inserted to be freely movable. A movable section is composed of the packing 14, a piston 15 which supports the former, a seat 16, a main water passage hole packing 17, a washer 18, a cylindrical cap 19 and a hollow center tube 20. The flange 21 and threads 22 are provided at the upper part and the lower part of the said hollow center tube 20, respectively. Threads 24 of cap 19 are spirally fitted with the threads 22 of the hollow center tube so to tighten the foregoing piston components

against the flange 21. Pressurized water inside the connection part 2 is introduced into cap 19 through a small water passage hole 26 which is drilled into the cylindrical body 25 of the cap 19. A spring 27 is installed between the partition 4 and the piston 15 to urge the movable section upwardly and to maintain the main water passage hole packing 17 closed against the main water passage hole 3.

An actuating rod 28 of a small diameter is inserted through a hollow section 23 within tube 20 and has its upper end inserted through hole 13 and positioned immediately under the press-down piece 33. An actuating rod packing 30 is positioned around rod 28 adjacent the lower end 29 of the tube 20. A spring 32 is positioned between packing 30 and the bottom part 31 of the cap 19. The press-down piece 33 is provided with a saw-toothed edge on its periphery and is adapted to press down the actuating rod 28 by being positioned directly opposite to the upper end 12 of the cylinder 10 as shown on FIG. 2, and is urged away from end 12 by a spring 34. A holding rod 35 protrudes upwardly from the center of the top surface of the press-down piece 33. A holding section 36 the inside surface of which is a spherical surface is inserted into the upper part of the faucet body 1. A hollow spherical body 38 formed at the bottom part of the drainpipe 37 is inserted freely movable into the inside of the said holding section 36. The cam pieces 39 and 39 are so installed in the hollow spherical body 38 that the inside of the drainpipe 37 may not be closed and the holding rod 35 protrudes from the press-down piece 33 mentioned above is held between both cam pieces 39 and 39. With the upward and downward rotational movement of the drainpipe 37 the press-down piece 33 is made to press down against the pressure of the spring 34 by the way of the inclined end surfaces of both cam pieces 39 and 39. 40 in the figure shows the nut which tightens the holding section 36 to the faucet body 1 and 41 shows an anticounterflow valve device installed on the connecting section 2 of the faucet body 1.

Since this invention possesses its structure as described above, the main water passage hole 3 is held closed because the water pressure added into the faucet body 1 from the connection section 2 acts to push up the packing 17 when the drainpipe 37 is kept at an upward position as shown on FIG. 1 and 2. The upper part of the faucet body 1 above the partition 4 being below atmospheric pressure, the press-down piece 33, being pushed upward by the spring 34, is separated from the actuating rod 28 which protrudes upwardly through the small hole 13 of the cylinder 10. When the tip end of the drainpipe 37 is pressed down under this condition, the spherical body 38 below its base section rotates toward the right as shown in the figure and the press-down piece 33 is pressed down due to the lowering of the inclined end surfaces of the cam pieces 39 and 39. By the way of the displacement of the press-down piece 33 the actuating rod 28 is pressed down into the cylinder 10 under the surface of the said piece and causes the packing 30 installed at the lower part of the actuating rod 28 to descend, thus unblocking hole 26. The pressurized water flowing into the faucet body 1 runs into the cylinder 10 from the small water passage hole 26 through the hollow section 23. The pressure acting on the wide surface of the packing 14 gradually, the piston 15 is pushed down against the force of spring 27 thereby opening the main water passage hole 3. Due to this, the pressurized water rises up along the periphery of the cylinder 10 from the main water passage hole 3 through the cutouts 9, 9...as shown on FIG. 4, then, it flows out from the tip end of the drainpipe 37 after entering into the said pipe from the inside of the spherical body 38. To stop the water supply the tip end of the drainpipe 37 is returned to its incline-up position by holding up its tip end. The packing 30 thus closes the small water passage hole 26 and stops the water supply into the hollow center tube 20 by eliminating the pushing pressure due to the cam pieces 39 and 39 and by restoring the actuating rod 28 to its original position due to the force of the spring 32. Consequently, since the water pressure inside the cylinder 10 passes to the outside of the cylinder 10

through the small hole 13 provided in the upper section 12, the same pressure exists inside and outside of the cylinder 10 due to the abrupt decrease in the water pressure. As a result, the piston 15 is pushed up by the restoring force of the spring 27 and the discharging of water from the drainpipe 37 is stopped with the closing of the main water passage hole 3 by the packing 17 incorporated with the said piston.

The invention comprises the foregoing construction and operation, therefore, when the drainpipe 37 is rotated into any horizontal direction desired within the holding section 36 of the faucet body 1, the pressure of the water within the cylinder 10 would be directly acted on and the supplying of water could be commenced immediately by increasing the water pressure and opening the main water passage hole 3.

Incidentally, the main water passage hole packing 17, even while in supplying water, tends to close the main water passage hole 3 by receiving the pressure of the leakage water supplied from the connection section 2 and the pressure of the spring 27. However, the water, which flows into the hollow center tube 20, always leaks at a definite rate from the small hole 13 of the section 12 and the piston 15 stays at the definite position by suppressing the foregoing tendency in order to maintain the water pressure within the cylinder 10 at that of the water supply. Accordingly, the opening of the main water passage hole packing 17 incorporated with the said piston 15 is maintained and the definite quantity of water will always be discharged.

Thus, according to this invention, the water supply control is performed by changes in the water pressure within the cylinder 10 due to upward and downward movements of the drainpipe 37 and, furthermore, the leakage from the small hole 13 of the cylinder section 12 is performed gradually while supplying water. Consequently, the movement of the main water passage hole packing 17 is done slowly whereby water hammering is prevented. Moreover, even when employed at a lower water pressure, the control may be operated certainly and without deterioration of parts. Many of the previously known faucets had the main water passage hole packing tightened with force by threads which required many turns, so that the packing deteriorated quickly and replacement in a short period due to water leakage and short life. However, according to this invention, the operation is excellent because the main water passage hole 3 is closed by the packing 17 which receives the pushing force of the water pressure and the spring 27 within the cylinder 10 and, also, because the main water passage hole 3 is opened by the change of the water

pressure within the cylinder 10 due to the upward and downward rotational movements of the drainpipe 37. Furthermore, the packing 17 moves upward and downward only within the cylinder 10 and is durable for a long period without deterioration. And, furthermore, it could perform a reliable operation without any water leakage even at either a low pressure or a high pressure.

What is claimed is:

1. A swivel faucet comprising a faucet body adapted to be attached to a water supply; a partition positioned within said faucet body and having a main water passage hole therein and cutouts around the outer wall thereof; a cylinder attached to said partition and having an upper section with a central hole therethrough; a movable section movably mounted within said cylinder and said partition, said movable section including a dish-shaped packing positioned within said cylinder, a piston supporting said dish-shaped packing, a main water passage hole packing adjacent said piston and engaging said main water passage hole, a hollow tube having an upper flange, and a cylindrical cap threaded onto said hollow tube to hold said dish-shaped packing, said piston and said main water passage hole packing between said flange and said cap, said cylindrical cap having a small water passage hole therethrough; an actuating rod positioned within said hollow tube and having the upper end thereof extending through said central hole; an actuating rod packing fitted around said actuating rod and adapted to block said small water passage hole; means to urge said actuating rod out of said central hole; means to urge said main water passage hole; a press-down piece positioned within said faucet body and directly above said upper end of said actuating rod; means to urge said press-down piece away from said actuating rod; a drainpipe having cammed surfaces on the lower edge thereof and contacting said press-down piece; and means for positioning said drainpipe such that as it is rotated downwardly, said press-down piece pushes down said actuating rod, thereby unblocking said small water passage hole, thereby allowing water to push down said movable section and open said main water passage hole, whereby said water flows therethrough, through said cutouts and out said drainpipe.

2. A swivel faucet as claimed in claim 1, wherein said means for positioning includes a holding section positioned within said faucet body and having an inside spherical surface; a hollow spherical body formed at said lower end of said drainpipe and freely movable within said holding section; and a holding rod protruding upwardly from said press-down piece and positioned between said cammed surfaces.

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