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OPERATING MECHANISM FOR FAUCETS

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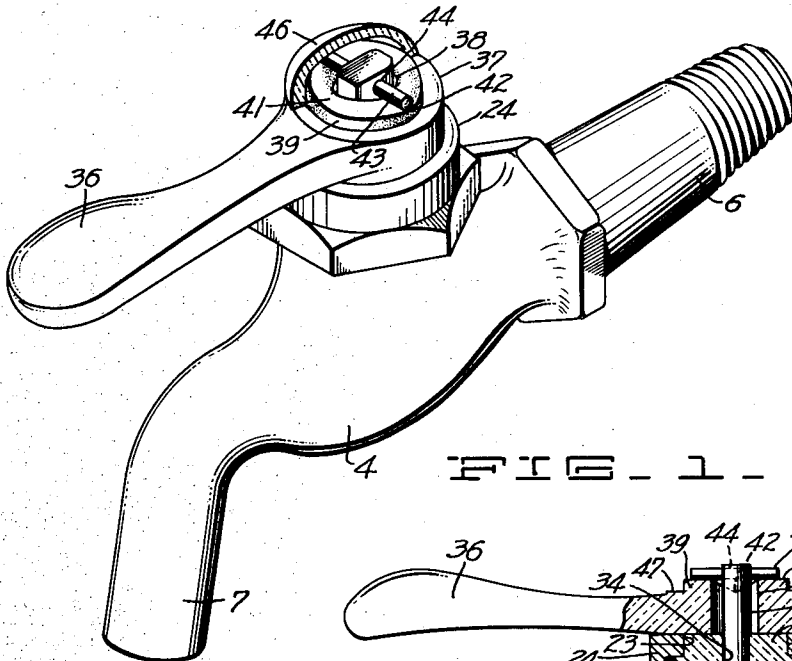


FIG. 1-

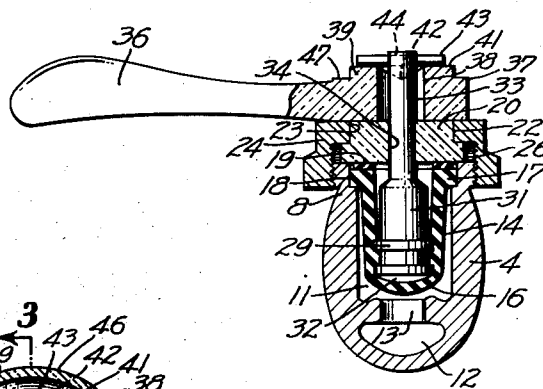


FIG. 2-

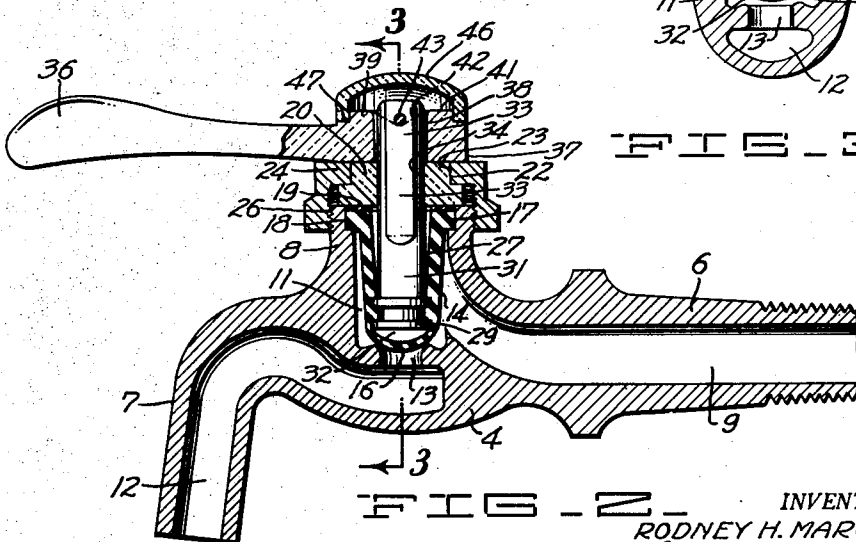


FIG. 3-

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OPERATING MECHANISM FOR FAUCETS

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5 Claims. (Cl. 251—24)

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This invention relates to faucets or valves for controlling the flow of fluids and has particular reference to the structure of such devices which effects the flow control.

An object of the invention is to provide a valve or faucet provided with an operating handle or the like which is capable of opening and closing the valve by cyclic movement in a plurality of angularly intersecting planes.

Another object of the invention is to provide, in a flow control device of the character described, means for permanently connecting a valve closure element to its stem or control element without the use of screws or other such attachment members.

A further object of the invention is to provide, in a faucet having an operating member movable selectively in horizontal and vertical directions to open the faucet to permit fluid flow there-through, a resilient closure element which serves, when stressed, as a spring for returning the operating member to its off position.

Still another object of the invention is to provide, in a faucet of the character described having associated with the operating handle thereof a cam for effecting opening of the valve upon movement of the handle, an element carried by the valve stem which cooperates with the cam to effect valve operation and which further serves as a readily releasable means for connecting the stem and handle together.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of the preferred form of the invention which is illustrated in the drawings accompanying and forming part of the specification. It is to be understood, however, that variations in the showing made by the said drawings and description may be adopted within the scope of the invention as set forth in the claims.

Referring to the drawing:

Figure 1 is a perspective view of the faucet of my invention with the pin retaining cap shown in vertical section so as to disclose the underlying structure.

Figure 2 is a longitudinal vertical sectional view of the faucet.

Figure 3 is a vertical sectional view taken in the plane indicated by the line 3—3 of Figure 2 and showing the positions of the operating parts when the valve of the faucet is in its full open position.

The faucet of the present invention possesses a certain degree of similarity to that shown and

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described in United States Patent No. 2,089,977 issued to me on August 17, 1937. In the latter structure a resilient plug member similar to the one used herein is employed as the valve closure element which is operated by a vertically movable stem actuated by an eccentric arrangement provided with a handle operable in a vertical path of movement to open and close the valve so as to control fluid flow therethrough. The faucet of the present invention differs from the previous type in that movement of the operating handle along either vertical or horizontal paths of movement will effect opening of the valve and, in one case, the handle will be automatically returned, when released, to off position while in another case the handle may be retained in a selected setting.

In detail, the structure of my invention may be incorporated in any type of low or medium pressure valve such as the try bibb shown as an example in the drawing and comprising a body 4 having a threaded inlet stem 6 and a spout 7 projecting from opposite sides thereof and a bonnet extension 8 rising therefrom. An inlet duct 9, concentric with the stem 6 opens into a cylindrical chamber 11, concentric with the bonnet extension 8, and an outlet passage 12 extending through the spout 7 communicates with the chamber 11 through a valve port 13 provided in the bottom end of the chamber. Disposed in and extending of the chamber 11 is a plug member 14, composed of rubber or other yieldable material of a similar nature, having a preferably rounded lower end forming a valve 16 overlying and closing the valve port 13 and provided at its upper end with a peripheral flange 17 seated in a counter-bored portion 18 of the chamber 11 extending into the latter from the upper end of the bonnet extension 8. The engagement of the flange 17 in the counterbore 18 serves to center the plug member 14 in coaxial relationship with the chamber 11 and with the valve port 13. Overlying the upper end of the plug member 14 is a yieldable compression washer 19 which is engaged by a guide disk 20 of circular form concentric with the washer and of sufficient diameter to overlie the upper end of the bonnet extension 8 beyond the periphery of the counterbore 18. The guide disk is provided with an upper diametrically reduced plug portion 22 which enters and extends through a central aperture 23 formed in a bonnet 24 having internal screw threads 26 which engage mating screw threads provided externally of and at the upper end of the bonnet extension 8. Tightening of the bonnet on its

threads will pinch the flange 21 of the guide disk against the upper end of the bonnet extension thus clamping the guide disk in place and compressing the washer 19 against the upper end of the plug member 14. In its normal free condition the plug member is of such a length that when its valve portion 16 is resting on and closing the valve port the lower face of the flange 17 will be resting on or will be spaced slightly above the bottom surface of the counterbore 18. Thus, when the bonnet is cinched down the resulting compression of the washer 19 plus that which may occur in the plug member will forcibly urge the valve portion 16 against and to close the valve port 13.

Means is provided for axially compressing the plug member so as to raise the valve portion 16 clear of the valve port and thus open the latter to permit fluid flow from the inlet duct 9, through the valve port and into and through the outlet passage 12. Concentric with and extending axially into the plug member 14 from the upper end thereof is a cylindrical, downwardly convergent recess 27 into the bottom of which is permanently molded the circular ridges 29 formed on the lower end of a cylindrical stem 31 which extends concentrically upwardly and out of the recess. The extreme lower end 32 of the stem is rounded and substantially corresponds in shape with the valve 16 so that the yieldable end material forming the valve is provided with a solid backing member against which it may be compressed to add to its forcible closure of the valve port. The relationship between the stem 31 and the plug member 14 is such that, when the stem is moved axially upwardly, its interconnection with the plug member will cause a similar axial compression of the plug member to raise the valve portion 16 from its seat to open the valve port. It will be noted that compression of the washer 19 and the plug member flange 17 in the counterbore 18 effects a seal which prevents leakage of any of the fluid under pressure in the inlet duct 9 and the chamber 11 outwardly through the bonnet 24. The upper portion of the stem 31 is milled to provide thereon a pair of diametrically opposed and longitudinally extending flattened portions 33 which give the upper portion of the stem an elongated substantially quadrilateral cross-sectional form. This particular shaped portion of the stem, which passes slidably through a correspondingly shaped aperture 34 provided centrally of the guide disk 20, prevents rotational movement of the stem relative to its associated parts. An operating handle 35 is provided at one end of which is an integral hub 37 provided with a central cylindrical aperture 38 through which the stem extends. The upper face of the hub is provided with a concentric boss 39 whose upper annular surface has an undulatory cam curvature providing a pair of diametrically opposed elevated ridges 41 and a pair of diametrically opposed notches 42 disposed at right angles to the ridges 41. Preferably, the ridges 41 are positioned so that a plane intersecting them coincides with the longitudinal axis of the handle 36. A cam follower is provided in the form of a pin 43 which is in slidable engagement with a transaxial aperture 44 provided at the upper extremity of the stem 31 and which has its respective end portions lying against the operating handle cam at diametrically opposed points on the surface of the latter. Means preventing axial disengagement of the pin 43 from the aperture 44 is pro-

vided in a cap 45 positioned concentrically of the hub 37 and frictionally engaging the peripheral shoulder 47 of the cam boss 39.

It will be seen from the drawing that opening of the valve to permit fluid flow therethrough may be accomplished in either of two independent ways. As shown in Figure 2, the valve is closed when the follower pin 43 is resting in the cam notches 42. However, as soon as the operating handle 36 is manually moved in a horizontal plane to the right or to the left the upwardly inclined surfaces of the cam will be forced under the follower pin thus forcing the latter to move upwardly along a path coinciding with the axis of the stem and thereby axially compressing the plug member 14 to open the valve as was hereinbefore described. The handle may be rotated a quarter turn in either direction until the follower pin rests on the high points of the cam, as shown in Figure 3, when the valve will be fully open. When this condition obtains, the plug member 14 will be under full compression with the result that, when the handle 36 is released, the downward pressure of the follower pin against the cam will effect frictional holding of the handle to adjusted position. It will also be seen that when the operating handle is in its off position, shown in Figure 2, manual depression or elevation of the distal end of the handle in a vertical plane will cause a rocking movement to be imparted to the hub 37 about fulcrum points on the perimeter of the bottom surface thereof where the vertical axial plane of the handle intersects the perimeter. The resulting vertical lift imparted to the stem will effect opening of the valve which will be returned to its closed position upon release of the handle due to the released expansive force of the compressed plug member.

The faucet of my invention just described may be readily serviced without the need of tools other than a wrench to remove and replace the bonnet 24. When the bonnet is released from the valve body, the operation of renewing the valve consists of nothing more than removing the cap 45, withdrawing the pin 43 and inserting a new plug member with its associated stem, and replacing the unit in the valve body by reattaching and tightening the bonnet.

I claim:

1. In a faucet having a valve port through which fluid may flow to be discharged from the faucet, a resilient plug member disposed in axial concentricity with said valve port, said plug member having a fixedly held upper portion and a movable lower portion engaging and normally closing said valve port, a movable operating handle on said faucet, a stem guide on said faucet, a stem slidably engaging said stem guide concentric with and secured to said plug member adjacent said movable end thereof, means cooperative between said stem and stem guide for limiting said stem to axial movement relative to said guide, and means carried by said stem and said operating handle cooperative upon movement of said handle in either direction vertically or horizontally for moving said stem and movable portion of said plug member away from said valve port.

2. In a faucet having a valve port through which fluid may flow to be discharged from the faucet, a resilient plug member disposed in axial concentricity with said valve port and having therein an axially extending recess, said plug member having a lower movable end portion

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normally overlying and closing said valve port and an upper fixedly held end portion, a stem guide on said faucet, a stem slidably engaged with said stem guide and entering the recess of said plug member, peripheral ridges on the end of said stem within the plug recess, said plug having within the recess thereof portions intimately engaging said stem ridges for securing the stem and plug member together, means cooperative between said stem and stem guide for limiting movement of the stem to an axial direction, an operating handle on said faucet and movable relative to said stem, and means connecting said stem and operating handle whereby said stem will be moved to move the lower end of said plug member away from said valve port when said operating handle is moved in either direction horizontally or vertically.

3. In a faucet having a body provided with an open ended chamber into which fluid may flow from a source of supply and having in the bottom thereof a valve port through which fluid may be discharged from the chamber and the faucet, said body having a counterbore at the open end of and bordering said chamber, a resilient plug member disposed in and concentric with said chamber, said plug member having an axially extending recess therein, a movable lower portion thereof disposed over and closing the valve port and a peripheral flange at the upper end thereof seated in said counterbore, a stem guide overlying the open end of said chamber and arranged to compress said plug member flange in said counterbore to effect a sealed closure for the chamber, a stem slidably engaged in said stem guide and connected with said movable portion of the plug member, means cooperative between the stem and stem guide for limiting movement of the stem to axial directions, an operating handle on said faucet, and means connecting said stem and operating handle whereby said stem will be moved to move the movable end of the plug member away from said valve port when said operating handle is moved in either direction horizontally or vertically.

4. In a faucet having a body provided with an open ended chamber into which fluid may flow from a source of supply and having in the bottom thereof a valve port through which fluid may be discharged from the chamber and the faucet, said body having a counterbore at the open end of and bordering said chamber, a resilient plug member disposed in and concentric with said chamber, said plug member having an axially extending recess therein, a movable lower portion thereof disposed over and closing the valve port and a peripheral flange at the upper end thereof seated in said counterbore, a stem guide overlying the open end of said chamber and arranged to compress said plug member flange in said counterbore to effect a sealed closure for the chamber, said stem guide having an elongated aperture therein, a stem having a portion thereof shaped correspondingly with and

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slidable in said aperture and connected with said movable portion of the plug member, means securing said stem guide against movement in said valve body, an operating handle on said faucet, said operating handle having a hub provided with a central aperture through which said stem passes, a cam follower attached to said stem and overlying said operating handle hub, and an undulant cam on said hub engaging said cam follower for axially elevating said stem when said operating handle is moved in either direction horizontally or rocked in either direction vertically.

5. In a faucet having a body provided with an open ended chamber into which fluid may flow from a source of supply and having in the bottom thereof a valve port through which fluid may be discharged from the chamber and the faucet, said body having a counterbore at the open end of and bordering said chamber, a resilient plug member disposed in and concentric with said chamber, said plug member having an axially extending recess therein, a movable lower portion thereof disposed over and closing the valve port and a peripheral flange at the upper end thereof seated in said counterbore, a stem guide overlying the open end of said chamber and arranged to compress said plug member flange in said counterbore to effect a sealed closure for the chamber, said stem guide having an elongated aperture therein, a stem having a portion thereof shaped correspondingly with and slidable in said aperture and connected with said movable portion of the plug member, means securing said stem guide against movement in said valve body, an operating handle on said faucet, said operating handle having a hub provided with a central aperture through which said stem passes, a cam follower attached to said stem and overlying said operating handle hub, an undulant cam on said hub engaging said cam follower for axially elevating said stem when said operating handle is moved in either direction horizontally or vertically, and a member engaged with said operating handle and enclosing said cam follower for retaining said follower in position.

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Number	Country	Date
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603,632	France	of 1926