

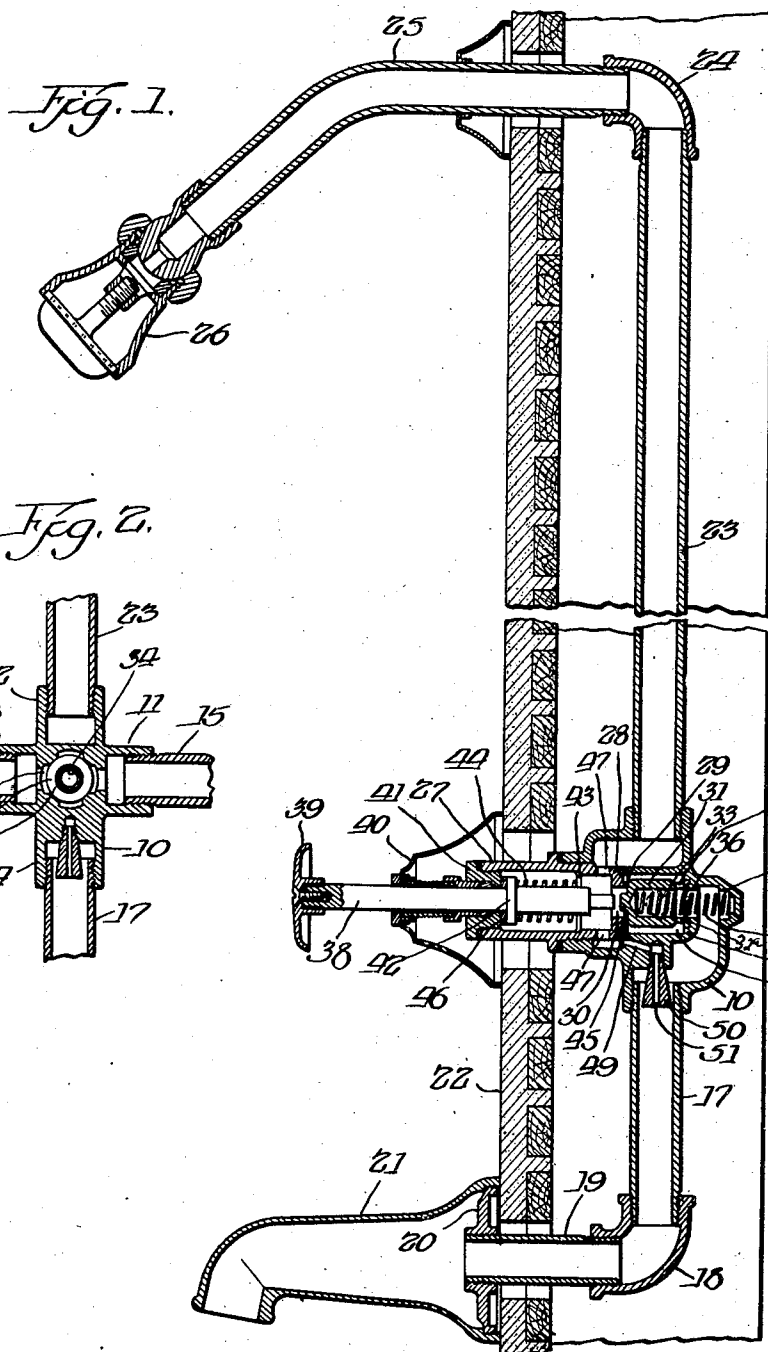
March 3, 1942.

C. GROEN

2,274,787

DIVERTER VALVE

Filed Dec. 11, 1940



Inventor:

Christopher Groen:

By: *McKinnon, Heston, Pym & Knight*  
Attys.

# UNITED STATES PATENT OFFICE

2,274,787

## DIVERTER VALVE

Christopher Groen, Oak Park, Ill., assignor to  
A. Y. McDonald Mfg. Co., Dubuque, Iowa, a  
corporation of Iowa

Application December 11, 1940, Serial No. 369,523

4 Claims. (Cl. 251-137)

My invention relates to a diverter valve of a semi-automatic type for use with a combined tub and shower bath. It has particular reference to a valve having hot and cold water connections, the hot and cold water being mixed when both supply pipes are open, and in which the normal flow of water is to the tub. After the desired temperature of the water is obtained by the adjustment of the valves, the flow of water can be shifted to the shower by the manual manipulation of an inner valve by the user. When the valves controlling the flow of water are closed, the inner valve automatically returns to its original position, so that when the water-controlling valves are subsequently opened the flow will be to the tub without any attention or manipulation on the part of the user.

Another and further object of my invention is the provision of a diverter valve in which the flow of water from the tub to the shower can be easily and quickly accomplished by the used by a push exerted upon a stem, thus moving a spring-controlled valve in the main valve into such position that the flow of water to the tub is shut off and the water diverted to the shower.

A further object of my invention is the provision of a diverter valve which is substantially incapable of use in such manner that hot water will initially be directed into the shower, thus avoiding the flow of water to the shower in an accidental manner and eliminating danger of accident or injury to the user by hot water flowing from the shower nozzle.

Another and further object is the provision of a diverter valve in which water which may accidentally leak into the outlet pipe leading from the valve to the shower, is directed into the tub, thereby avoiding pounding or knocking of the valve controlling the flow of water therethrough, and also avoiding any possible build-up of water in the pipes leading to the shower head which might cause injury to the user. For instance, hot water leaking past the supply valve and into the shower head might be forced therefrom when the user manipulates the valve to operate the shower, so that the first water therefrom might be scalding hot. Because of the particular construction of the valve, this water is allowed to flow into the tub so that injury or accident is thus avoided.

These and other objects will be better and more fully understood by reference to the accompanying sheet of drawings, and in which—

Figure 1 is a vertical, sectional view of my im-

proved valve and connections, showing its installation for use in a bath tub; and

Figure 2 is a vertical sectional view through the valve and its various connecting parts to which the water supply pipes are connected.

Referring specifically to the drawing and in which like reference characters refer to like parts throughout, a valve body 10 is shown having the usual integral projecting portions 11, 12, 13 and 14, to which water supply pipes 15 and 16 are connected in the usual manner, one of these pipes leading to a source of hot water and the other to a source of cold water. A short nipple 17 is provided which is connected to the valve body 10 at one of its ends, and to which an elbow 18 is secured at its lower end. Another nipple 19 is connected to the elbow 18 and to the base member 20 of an over-rim tub spout 21, with the nipple 19 extending through an opening in the usual bathroom wall 22. A longer pipe section 23 is connected to the extension 12 on the valve body 10 and extends upward therefrom, with an elbow 24 at the upper end which in turn is connected to a shower tube 25 extending through an opening in the wall 22. A shower head 26 of the usual form is provided on the end of the tube 25 and is adapted to extend over the usual bath tub (not shown).

Forming a part of the valve body 10 is a center piece 27 externally threaded at one of its ends for engagement with the main valve body 10, with a projecting end portion 28 extending into the valve body 10, with a valve seat 29 formed thereon and a port 30 at the central bore thereof. A valve 31 is mounted in a chamber 32 in the valve body 10, upon ribs 32a, 32a, preferably four in number, which project into the chamber 32 from the valve body 10 and extend parallel with the longitudinal axis of the valve 31. The valve 31 has a longitudinal recess 33 therein within which a spring 34 is mounted, the spring 34 being seated at one of its ends in a recess 35 formed in the outer wall of the valve member 10, and extends through a port 36 formed in an inner wall 37 of the valve body 10. A seat is formed on the wall 37 around the port 36 against which the valve 31 seats when it is in the shower-operating position.

A stem 38 having a push button 39 on the outer end thereof is mounted in a casing 40, which abuts against the wall 22. A gland member 41 is fitted into the outer end of the center piece 27. A washer 42 is mounted on the inner end of the stem 38, with a web 43 being provided across the inner end of the center piece 27. A spring

44 is mounted on the stem 38 between the web 43 and washer 42 so that the stem is normally held in the outer position as shown in Figure 1 of the drawing. The inner end of the stem 38 is adapted to engage against an abutment 45 formed on valve member 31, so that an inward push on the stem 38 pushes the valve 31 rearward against the seat in a vertical wall 37. A rubber washer 46 is fitted around the stem 38 between the inner end of the gland 41 and the washer 42, so that water is prevented from flowing outward around the stem 38. The inner end of the center piece 27 has ports 47, 47 formed therein through which the water flows on its way to the shower head, with a port 49 being provided leading to a drain plug 50 secured to the inner portion of the valve body 10 having an outlet opening 51 therein through which the water is discharged into the nipple 17.

In operation, the device is exceedingly simple and semi-automatic in that the attention of the operator is necessary only when the water is diverted from the tub into the shower. The normal position of the valve 31 is shown in Figure 1 of the drawing, in which position the water supplied to the tub enters the valve body 10 from the supply pipes 15 and 16, passes into the chamber 32, out through the port 36 into a chamber in the valve body which leads to the nipple 17, and into the tub through the over-rim spout 21.

When the user wishes to operate the shower, he first regulates the flow of water to the proper temperature desired, and then pushes the stem 38 inward by pressure on the button 39. This moves the valve 31 rearward so the port 36 is closed and the port 30 is opened, so that the water flows therethrough into the center piece 27, out through the ports 47 in one end of the center piece, and into the chamber in the valve body communicating with the pipe 23 which conveys the water to the shower head. The pressure of the water overcomes the force of the spring 34 as long as the water under pressure flows through the port 30, and holds the valve 31 against the rear wall of the chamber 32 so that the flow of water to the tub is prevented as long as the water is flowing through the valve body, thereby insuring continuous operation of the shower. Upon the valve 31 being shifted to shower position, the user removes the pressure upon the stem 38 which is immediately returned to the position shown in Figure 1 of the drawing and out of engagement with the valve 31. A small leakage will occur from the chamber, through the ports 49 and through the bore 51 in the plug 50. This flow is so small, however, as to be immaterial in the proper functioning of the apparatus.

When the operator has finished with the shower, he closes the valves in the pipes 15 and 16 in a normal manner thus shutting off the flow of water to the chamber 32. As soon as the pressure is reduced, the valve 31 is forced to the forward side of the chamber 32 by the action of the spring 34, thereby closing the port 30 so that when the valves, controlling the flow of water, are opened again, the flow will be to the tub and it will be necessary to again use the push rod 38 to force the valve 31 away from the port 30, before the shower will function. In this manner it is impossible to operate the shower without an intentional act upon the part of the user.

One of the main differences in construction and operation of my improved valve over other types now in use, is that the manually controlled push rod 38 is controlled by the user and

by the return spring 44, so that immediately after the shifting of the valve 31 to the shower position by force exerted upon the push rod 38, the push rod 38 is immediately returned to its most outward position as shown in Figure 1, by the spring 44. The valve 31 is then independent of the push rod or other manual control means and is responsive only to and controlled by the water pressure. Upon closing of the water control valves in pipes 15 and 16, the control spring 34 has only to overcome the friction between the valve 31 and chamber housing 10 in order that the valve 31 be returned to the tub position as shown in Figure 1. In other words, the valve spring 34 does not have to overcome the packing friction around the push rod 38, as is common in other constructions now in use. The spring 34 may be made of such strength that it is responsive to varying water pressures so that if during the operation of the shower either the cold or hot water flow is stopped or reduced in volume, the water flow to the shower would automatically be diverted to the tub, thus avoiding either shock or injury to the user.

Leakage between the valve member 31 and the port 30 flows out through the port 47, channel 49 and plug member 50 into the tub, so that there will be no build-up of pressure in either the chamber or valves or the connecting pipes leading to the shower head. Pounding or chattering of the valve is thus prevented due to the inability of the water to form in these spaces to cause back pressure, and the projection from the shower head of cold water which may collect in the pipe after use of the shower is discontinued, is also eliminated. It further affords means for draining water from the chamber and pipe after the water to the shower head is shut off, so that a column of water oftentimes standing in the vertical shower pipes is allowed to drain away, eliminating an initial projection of cold water onto the user when the shower is initially used.

While I have described more or less precisely the details of construction, I do not wish to be understood as limiting myself thereto, as I contemplate changes in form and the proportion of parts and the substitution of equivalents as circumstances may suggest or render expedient without departing from the spirit or scope of my invention.

I claim:

1. A diverter valve comprising, in combination, a valve body having a plurality of water inlets and a plurality of water outlets, one adapted for connection to a shower head and another adapted for connection to a tub spout, and having a central chamber with ports communicating with each of said outlets, a valve in said chamber operable to alternately open and close the said ports, spring means normally holding the said valve in closed position with respect to one of said ports, a push rod disconnected from said valve adapted to engage the said valve whereby the valve is moved away from the normally closed port and into engagement with the normally open port, the valve having an area exposed to water pressure whereby it is held in said position by the flow of water through the valve body, and a drain plug extending into the opening of the valve body leading to the tub and in aspirating relationship to the flow of water through said opening, the valve body having a drain opening therein leading from the chamber in said valve communicating the shower outlet with said drain plug.

2. A diverter valve comprising in combination, a valve body having a plurality of water inlets and a plurality of water outlets and having a central chamber with ports communicating with the said outlets, a valve in said chamber operable to alternately open and close the said outlet ports, a spring in the valve body engaging the valve and normally adapted to hold the valve in closed position with respect to one of said outlet ports, a push rod disconnected from said valve and manually operable whereby the said valve is displaced to open one of said outlet ports and to close the other, and means whereby the said push rod is automatically restored to its normal position when pressure thereon is released, the valve when displaced from its normal position having an area exposed to water pressure whereby it is held in displaced position by the flow of water through the valve body.

3. A diverter valve comprising in combination, a valve body having a plurality of water inlets and a plurality of water outlets and having a central chamber with ports communicating with the said outlets, a valve in said chamber operable to alternately open and close the said outlet ports, a spring in the valve body engaging the valve and normally adapted to hold the valve in closed position with respect to one of said outlet ports, a push rod disconnected from said valve and

manually operable whereby the said valve is displaced to open one of said outlet ports and to close the other, and a spring normally exerting pressure on said push rod tending to force the push rod away from said valve, the valve when displaced from its normal position having an area exposed to water pressure whereby it is held in displaced position by the flow of water through the valve body.

4. A diverter valve comprising in combination, a valve body having a plurality of water inlets and a plurality of water outlets and having a central chamber with ports communicating with the said outlets, a valve in said chamber operable to alternately open and close the said outlet ports, a spring in the valve body engaging the valve and normally adapted to hold the valve in closed position with respect to one of said outlet ports, a push rod disconnected from said valve and manually operable whereby the said valve is displaced to open one of said outlet ports and to close the other, and a spring mounted on said push rod whereby the said push rod is returned to its normal position when force exerted thereon is removed, the valve when displaced from its normal position having an area exposed to water pressure whereby it is held in displaced position by the flow of water through the valve body.

CHRISTOPHER GROEN.