Sept. 29, 1936. H. E. SCHNEIDER 2,055,562

DIVERTER NOZZLE

Filed June 22, 1935

Fig. 1

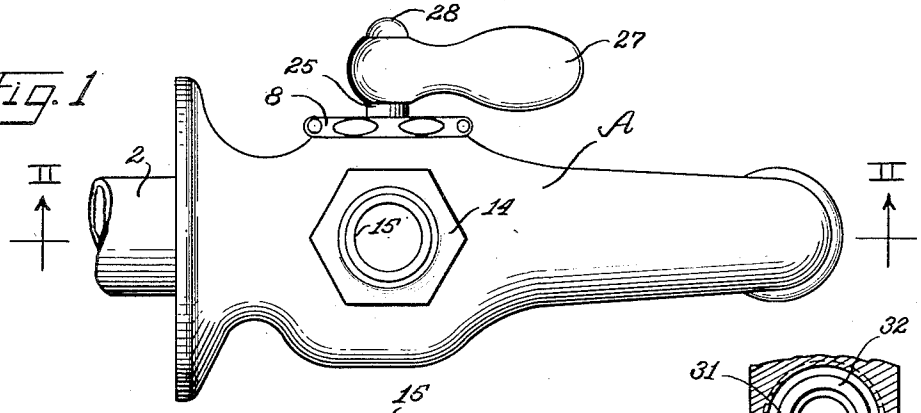


Fig. 5

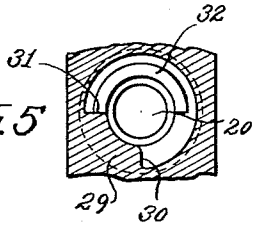


Fig. 2

Fig. 4

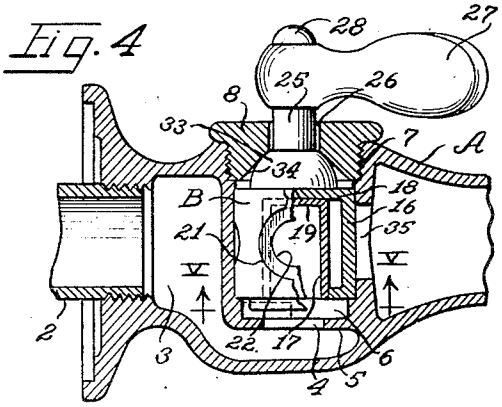
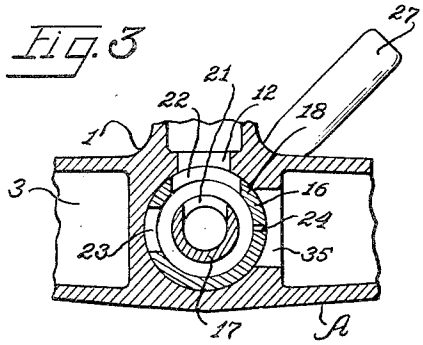


Fig. 3



Inventor

Henry E. Schneider.

By Charles O'Neill Attys

Patented Sept. 29, 1936 2,055,562

UNITED STATES PATENT OFFICE

2,055,562

DIVERTER NOZZLE

Henry E. Schneider, Erie, Pa., assignor to Hays Manufacturing Company, Erie, Pa., a corporation of Pennsylvania

Application June 22, 1935, Serial No. 27,881

5 Claims. (Cl. 251—109)

The present invention relates to a diverter nozzle and more particularly to a nozzle for a bath tub, which has a connection for a shower bath, together with valve means for controlling the flow of mixed hot and cold water to either the tub or the shower, or vice versa.

An object of the present invention is to provide a diverter nozzle for a bath tub, adapted to receive a shower bath connection, wherein water communication or flow to the tub or shower may be changed as desired and in which flow communication to the shower is automatically cut off with the cessation of water supply to the nozzle.

Another object of the present invention is to provide a diverter nozzle construction adapted for a shower bath connection, wherein flow communication to the shower is maintained solely by water flow and which communication to the shower is automatically cut off on cessation of water flow from the supply, requiring manual reestablishment of flow to the shower.

A further object of the present invention is to provide a novel packless valve construction which is self-sealing against leakage.

A still further object of the present invention is to provide a cylindrical valve member wherein fluid enters axially and escapes radially, whereby the fluid pressure is utilized to exert endwise thrust on the member to seal it against leakage, without employment of packing material.

The invention has for a further object the provision of a valve member comprising two concentrically arranged cylinders closed at corresponding ends with fluid entry at one end of the inner cylinder, and each cylinder provided with a radial discharge port, with the ports arranged in radial alignment.

A further object of the present invention is to provide a diverter nozzle for a bath tub wherein water flow may be directed into the tub or into a shower and wherein water flow communication to the shower is automatically cut off when the water supply to the nozzle is stopped.

An additional object of the present invention is to provide a diverter nozzle, of the class described, wherein water flow to a tub or shower bath may be established at will and wherein valve means are provided of such nature that when flow communication to the tub is open there is drainage escape from the shower to the tub, which arrangement prevents water flow to the shower, under such conditions, by creation of a vacuum from the flow of water to the tub.

The above other and further objects of the present invention will be apparent from the following description and accompanying drawing.

The accompanying drawing illustrates an embodiment of the present invention and the views thereof are as follows:

Figure 1 is a top plan view of a diverter nozzle constructed in accordance with the principles of the present invention.

Figure 2 is an elevational view, partially in section, along the line II—II of Figure 1, of the nozzle of Figure 1.

Figure 3 is a fragmental vertical sectional view through the valve portion of the nozzle, showing the arrangement of the parts when water flow is established between the supply and the shower, with flow to the tub stopped.

Figure 4 is a fragmental horizontal sectional view, partially in plan, showing the position occupied by the valve member when flow communication is established between the supply and the shower and illustrating the formation of a passageway in the nozzle for delivery of water to the valve member axially thereof, for effecting sealing relationship of the valve, to prevent leakage, without packing.

Figure 5 is a view partially in elevation and partially in sections taken on line V—V of Fig. 4, showing an end view of the valve member and the illustrated form of stop means for limiting the oscillation of the valve member in two directions.

The drawing will now be explained.

The diverter nozzle A has, at its wall end a threaded opening 1 to receive a supply pipe 2 from a hot and cold water mixing valve, not shown. The pipe 2 discharges into a chamber 3, of circuitous form, communicating with an opening 4, in a wall 5, within the nozzle, for entry of water into the valve chamber 6 of the nozzle.

The valve chamber 6 is cylindrical, with its axis transversely of the nozzle A, opened at one end 7 through which the valve member, indicated as a whole at B, may be installed and removed for repair or replacement. The end 7 of the valve chamber is normally closed by a threaded cap 8, as may be observed in Fig. 4.

The discharge end 9 of the nozzle A is bent downwardly to direct water flowing therefrom toward the bottom of a tub.

Formed as an integral part of the nozzle A is an upstanding neck 10 which defines a chamber 11 communicating by means of an orifice 12 with the valve chamber 6, the upper end of the neck 10 is threaded at 13 to receive a coupling nut 14 for securing a shower bath pipe or connection 15 to the nozzle.

Between the valve chamber 6 and the discharge end of the nozzle is an orifice 35 for water flow to the tub when the valve member B establishes communication between the supply pipe 2 and the tub.

The valve member B comprises two concentrically arranged, radially spaced cylindrical parts 16 and 17 which are closed at similar ends as at 18 and 19 respectively. The opposite end of the

inner part 17 is open to the valve chamber 6 and comprises a fluid entry port 20 to the inner cylindrical part 17. The fluid entry port 20 is an axial entry port so that incoming water under pressure from the supply pipe 2 acts against the closed end 19 of the inner cylindrical part 17 of the valve member B.

The inner cylindrical part 17 is provided with a radial exit port 21 while the outer cylindrical part 18 is provided with a radial exit port 22, of greater size than the port 21. The ports 21 and 22 are arranged in radial alignment.

The outer cylindrical part 16 is provided with an additional port 23 at 90° to the port 22. The outer cylindrical part 18 is also provided with a bleeder opening 24 with its axis diametrically opposed to the axis of the additional port 23.

The valve member B is actuated by a stem 25 which passes through a centrally disposed aperture 26 in the plug 8. A handle 27 is secured to the outer end of the stem 25, as by a screw 28.

Formed as an integral part of the wall 5 of the nozzle casting is an abutment 29 having shoulders 30 and 31 (Fig. 5). The end of the valve member B, opposite to the stem 25 is provided with an arcuate projection 32 having its ends terminating in the diameter of the valve member, which ends constitute projections for bearing against the shoulders 30 and 31 respectively as the valve member B is oscillated to limit the extent of oscillation of the member.

The handle 27 is so disposed on the stem 25 that when the valve member B is in position to establish flow communication between the supply pipe 2 and the tub through the discharge end 9 of the nozzle A, the handle lies at an angle of approximately 45° below the horizontal, as may be observed in Fig. 2, and when the valve member B is oscillated in the opposite direction to establish communication between the supply pipe 2 and the shower the handle is at 45° above the horizontal, as may be observed in Fig. 3. The mounting of the handle 27, in the manner stated, is effective to cause gravital movement of the valve member B from shower communication to tub communication, when the supply of water to the supply pipe 2 is stopped, so that the valve member B thus automatically closes flow communication between the supply pipe 2 and the shower pipe 15 when the water supply is stopped.

Figure 2 illustrates the position of the valve member B when it has been rocked in a direction to establish flow communication to the tub. In this position, the exit ports 21 and 22 are horizontally disposed and in communication with the orifice 35 to the discharge end of the nozzle A. The additional port 23, of the outer cylindrical part 16 of the valve member, is open to the chamber 11 of the neck 10 so that whatever water there may be in the shower may drain into the nozzle A thence to the tub.

When the valve member B is in the position of Fig. 2, that is with water flow communication to the tub established, and water is flowing, the passage of the water through the exit ports 21 and 22 creates sufficient suction within the space between the cylindrical parts 16 and 17 to prevent passage of any water upwardly to the shower.

Fig. 3 illustrates the position of the valve member B and flow communication between the supply pipe 2 and the shower 15 is established. It will be observed here that the exit ports 21 and 22 discharge upwardly into the chamber 11 of the neck 10, thence to the shower 15. The additional port 23 of the outer cylindrical parts 18 is closed by reason of the fact that it is against a portion of the wall of the nozzle casing, and the bleeder opening 24 is in communication with the discharge end of the nozzle A.

The provision of the bleeder 24 is to relieve water head pressure in the shower, that is in the pipe 15 connected to the neck 10, when closing the water supply to the pipe 2. This pressure relief enables the gravital movement of the valve member B, that is the handle 27, to drop, so that as soon as the water supply stops the valve member B automatically moves from the position shown in Fig. 3 to that shown in Fig. 2, thus cutting off flow communication to the shower. This is an important feature to prevent wetting of any one when opening the water supply to the nozzle A. If the valve were open to the shower, then such person would be accidentally wetted to his or her detriment. With the automatic valve of the present invention, such accident is avoided.

The valve member B has adjacent its stem end a semi-spherical bearing portion 33 which is maintained in contact with a conical surface 34 of the plug 8. As water under pressure enters the axial entry port 20 of the valve member B, the pressure of the water forces the spherical member 33 against the conical surface 34 thus effectively establishing a seal therebetween to prevent leakage of water through the plug 8 and accomplishes efficient and effective sealing without the utilization of packing material. This sealing effect is present, irrespective of the angular position of the valve member B whenever water is admitted to the nozzle A from the supply pipe 2.

It will be observed that the diverter nozzle of the present invention is one which may be readily applied to any bath tub where it is desired to use a shower bath or to install a shower bath in such tub. The provision of the novel means of the present invention enables ready diversion of water to the shower from the tube or vice versa. The gravital action of the valve member assures at all times that flow communication to the shower is cut off whenever the water supply is stopped. This is a safety feature of obvious advantage.

To establish flow communication between the supply pipe 2 and the shower, it is necessary first of all to open the supply pipe 2 to water pressure whereupon the handle 27 is grasped and swung from the position of Fig. 2 to the position of Fig. 3, such swinging then establishing fluid flow communication to the shower. The pressure of the water passing to the shower, under these conditions, is sufficient to maintain the valve member B in flow communication to the shower. This is made possible by the axial entry ports and the radial exit ports from the valve member. As soon as the water supply is stopped, the water head pressure in the shower is relieved through the bleeder 24 and the valve member B is then rotated in clockwise direction as viewed in Fig. 3 to the position of Fig. 2, thus shutting off flow communication to the shower and opening it to the tub. Any water that there may be in the shower drains downwardly through the additional port 23 and to the tub through the discharge end 9 of the nozzle.

The invention has been described herein more or less precisely as to details, yet it is to be understood that the invention is not to be limited thereby, as changes may be made in the arrangement or proportion of parts and equivalents may be substituted without departing from the spirit and scope of the invention.

The invention is claimed as follows:

1. A diverter nozzle for a bath tub including a shower connection, hollow cylindrical valve means having an end admission port and a lateral exit port oscillatable at the juncture of the axes of the shower and tub outlets and adapted by gravital action to normally close flow communication to the shower, said valve means being manually operable to establish flow communication to the shower and being maintained in such flow communication by pressure of the water flow, and said valve means adapted to close flow communication to the shower by gravital action on cessation of water flow.

2. In a diverter nozzle for a bath tub, said nozzle having a valve chamber having a water entry port at one end and a removable plug at the other end, a hollow cylindrical valve member within said chamber having a water entry port at one end adjacent said chamber port and having its other end closed and provided with a semi-spherical projection and having a lateral exit port, and said plug having a frusto-conical recess to receive said projection and provide a bearing for the same and to afford self-sealing engagement between the same when water enters said valve member through its end port.

3. In combination with a diverter nozzle, an oscillatable valve member comprising two concentrically arranged and radially spaced cylindrical parts, each of said parts being closed at similar ends, the inner part having an axially disposed fluid entry port, each of said parts having a lateral exit port with said exit ports in radial alignment, said nozzle having passage means for admitting water axially to said valve member through said entry port, means for oscillating said valve member to establish flow communication through the nozzle to the tub or to the shower, said outer cylindrical part having an additional port open to the shower when said member is in flow communication with the tub to establish drainage between the shower and tub, the radial alignment of said exit ports causing creation of suction in the space between said parts to prevent water flow to the shower when said valve member is in flow communication with the tub.

4. In a diverter nozzle for a bath tub, said nozzle having a valve chamber having a water entry port at one end and a removable plug at the other end, a hollow cylindical valve member within said chamber having a water entry port at one end adjacent said chamber port and having its other end closed and provided with a semi-spherical projection and having a lateral exit port, and said plug having a frusto-conical recess to receive said projection and provide a bearing for the same and to afford self-sealing engagement between the same when water enters said valve member through its end port, said valve member being installed in and removed from said chamber through said other end of the chamber when said plug is removed.

5. An oscillatable valve construction for a diverter nozzle comprising two concentric radially spaced hollow cylinders connected together at their ends and formed to provide a chamber between the cylinders, said inner cylinder having one end open for water admission, said cylinders having aligned lateral exit ports, and the outer of said cylinders having another port circumferentially spaced from the aligned ports, the radial spacing of said cylinders forming a passageway for drainage between said another port and one of said aligned ports.

HENRY E. SCHNEIDER.