

1

2,939,474

PORTABLE DIVERTER VALVE

Benjamin J. De Simone, 16177 Alcima Ave., Pacific Palisades, Calif., and Donald F. Crozat, 2310 30th St., Santa Monica, Calif.

Filed Oct. 11, 1957, Ser. No. 689,616

6 Claims. (Cl. 137-119)

This invention relates generally to diverter valve assemblies and more particularly to an improved portable type diverter valve which may be readily attached to any conventional sink faucet spout.

Diverter valves are well known in the art and generally include a complete plumbing fixture adapted to be substituted for a conventional sink faucet and associated hot and cold water valves to provide means for diverting water flow from a conventional spout through an auxiliary spray unit. While present diverter valve assemblies and spray units are widely used at the present time, they are relatively expensive to manufacture and install. In fact, the plumbing installation charge itself constitutes one of the major deterrents to increased sales of combination faucets and spray units. As a consequence, many modern day kitchen sinks incorporate in their initial designs a diverter valve and spray unit system. However, this is of little help to the thousands of homes outfitted with conventional sink fixtures in which the provision of a completely new plumbing fixture incorporating a diverter valve and spray unit, or the modification of the existing fixture is, in either event, relatively expensive.

Bearing the above in mind, it is a primary object of the present invention to provide a portable type diverter valve structure which may be employed with any conventional spray unit, and which is designed to be connected directly to a conventional sink faucet such that the purchaser himself may readily install the same without any modification of the existing plumbing structure.

More particularly, it is an object to provide a portable diverter valve of the above type which meets all of the sanitary requirements and regulations of the plumbing code with respect to such items.

Still another important object is to provide a device of the above type which is relatively inexpensive to manufacture and which is substantially foolproof in operation.

Briefly, these and many other objects and advantages of the present invention are attained by providing a cylindrical housing structure having upper and lower open ends. The upper open end of the housing is provided with internal threads designed to threadedly engage the conventional screw threads on existing sink faucet spouts. In the event the spout is not provided with threads, a simple adapter may be employed for securing the housing to the end of the faucet. The housing itself incorporates a cylindrical core unit having a reduced diameter body portion provided with lateral ports and co-axially positioned within the housing. The exterior of the reduced diameter portion and the inside cylindrical walls of the housing define an annular space. The housing itself includes a lateral passage means extending from the annular space.

A diverter valve body member is provided having a cylindrical shape of diameter intermediate the diameter of the core body and the inside diameter of the housing such that the upper end of the valve body may be telescoped back and forth between first and second positions

2

within the annular space. The arrangement is such that when the valve body member is telescoped wholly within the annular space, water passing from the spout into the interior of the core body passes out the lateral ports into the valve member to pass out the lower end of the housing. On the other hand, when the valve member is telescoped to its second position, the water entering the interior of the core body passes out the lateral ports and through the lateral passage means to a suitable spray unit. The positioning of the valve body itself may be readily effected manually and is biased to its first position by a spring and held in its second position by water pressure. Accordingly, when the faucet is used in a conventional manner, water will always pass out through the bottom of the housing unless it is intentionally diverted to the spray unit by moving the valve member to its second position.

A better understanding of a preferred embodiment of the invention will be had by referring to the accompanying drawings, in which:

Figure 1 is an enlarged elevational cross sectional view of the portable diverter valve illustrating the operating components thereof in one position for directing water directly from a spout out the end of the diverter valve housing; and,

Figure 2 is a view similar to Figure 1 illustrating the operating components of the diverter valve in a second position for diverting water from the spout out of a lateral passage to a conventional spray unit (not shown).

Referring first to Figure 1, there is illustrated a cylindrically shaped housing 10 having an open upper end provided with internal screw threads 11. These screw threads are size .859-27 meaning that the thread diameter is .859 inch and that there are 27 threads per inch. This is a standard size thread employed at the ends of most conventional kitchen faucet spouts and thus housing 10 may be easily attached to the spout by the purchaser.

As shown in Figure 1, immediately below the internal threads 11 there is provided an annular O-ring 12 which serves the dual function of providing a water tight seal with the sink faucet spout and of retaining within the housing a screen member 13 in the form of a flat metallic disc provided with a plurality of openings such as indicated at 14.

Within the upper interior portion of the housing 10, there is provided a cylindrically shaped core body 15 having an inclined annular upper ledge 16 upon which is seated a conically shaped anti-siphon check valve 17. As shown in the view of Figure 1, the apex portion of the conical end of the flexible check valve 17 opens under water pressure to admit water to the interior of the core body 15. When there is no water pressure, or there is back pressure, the conical flexible member 17 will seat up against the openings 14 in the screen 13 thereby preventing back flow to the spout. A small water relief passage 18 is provided at one edge of the entrance portion of the core body 15 extending from the annular ledge 16 to communicate with the interior of the housing, the purpose of which will become clearer as the description proceeds.

As shown in Figure 1, the core body 15 includes a reduced diameter body portion 19 defining with the inside wall of the housing 10 an annular space 20. The side walls of the reduced diameter body portion 19 of the core member include lateral openings 21 and the bottom of the core includes a vacuum breaker opening 22 covered by a flexible member 23 serving as a check valve. At the upper and lower ends of the reduced diameter body portion 19 of the core, there are provided annular sealing O-rings 24 and 25, respectively.

A generally cylindrically shaped valve member 26 is

provided with an enlarged annular end 27 adapted to telescope within the annular space 20 from a first upper position in which the upper end 27 of the valve body is seated against the sealing ring 24 to a second lower position in which the end 27 of the valve body is in sealing relationship with the lower O-ring seal 25 as illustrated in Figure 2. The diameter of the main portion of the valve member 26 is intermediate between the diameter of the reduced diameter body portion 19 of the core 15 and the inside diameter of the housing 10 such that the telescoping movement back and forth within the annular space 20 may readily take place.

Preferably, the upper end 27 of the valve member 26 also includes an outer peripheral O-ring seal 28 adapted to make sealing engagement with the inside wall 29 of the housing 10. A biasing spring 30 is positioned between the exterior surface of the valve member 26 and the inside wall portion 29 of the housing to bias the valve member into the upper position shown in Figure 1. Preferably, the lower end of the housing 10 includes an inwardly and upwardly turned annular flange 31 serving to define an annular pocket seating the lower end of the spring 30 while the upper end thereof abuts under the enlarged end portion 27 of the valve member 26 as shown.

To insure that any water within the annular space 20 or within the housing area for the spring 30 will not escape between the relative sliding portions of the valve member 26 and the upturned flange 31 of the housing, an additional O-ring seal 32 may be provided and positioned to seat on the upper ends of the upturned flange 31 when the valve member 26 is in its second or lower position as illustrated in Figure 2.

The extreme lower end of the valve member 26 is provided with external threads 23 for receiving a retaining cap 34 in turn supporting a screen 35 or aerating mechanism if desired. The cap 34 serves as a convenient manual means for moving the valve member 26 from the position illustrated in Figure 1 to the position illustrated in Figure 2.

Still referring to Figure 1, the housing 10 includes a lateral passage means 36 including a check valve head 37 adapted to seat on a valve seat 38 and normally biased to this position by a spring 39. This lateral passage means may be provided with a shaped outlet for connection to a hose passing to a conventional spray.

In operation, the housing 10 is threaded to the end of a conventional faucet spout as by the internal threads 11 and tightened sufficiently to form a water tight seal with the O-ring 12. The spring 30 normally biases the valve member 26 to its upper position as illustrated in Figure 1. Upon turning on either hot or cold water or a mixture of both the water will enter, as indicated by the arrows, through the upper open end of the housing through the openings 14 of the screen 13 and apex portion of the flexible anti-siphon check valve 17 to pass into the interior of the core body 15. From the interior of the core body, water will flow out the lateral ports 21 and down through the central portion of the valve member 26 through the outlet screen 35 into the sink. Water is blocked from passing out the lateral passage 36 by the sealing of the valve member 26 in its upper position against the sealing O-ring 24.

When it is desired to pass the water out the lateral passage 36 to the spray unit, the operator simply grasps the cap 34 and telescopes the valve member 26 downwardly until the O-ring 32 seats against the upper ends of the upturned flange 31 of the housing as illustrated in Figure 2. By this action, water within the interior of the core body will pass out through the lateral ports 21 into the annular space 20 and will be prevented from entering into the interior of the valve member 26 by the sealing of the valve member against the lower O-ring seal 25 of the core. Movement of the valve member

26 to the second position illustrated in Figure 2 also places the annular space 20 in communication with the lateral passage 36 such that the check valve 37 is subjected to water pressure within the annular space resulting in a flow of water from the diverter housing into this lateral passage. It will be noted, as mentioned heretofore, that water in the annular space 20 is prevented from passing between the valve member 26 and lower portion of the housing by the O-ring seal 28 and the seal 32 seating against the upper annular flange 31. There is thus no possibility of dripping or the like from the lower end of the housing when the valve member 26 is in the position illustrated in Figure 2.

When the water at the source is turned off, the pressure is relieved such that the check valve 37 in the lateral passage will close the outlet to the spray unit and the spring 30 will return the valve member 26 to its upper position as illustrated in Figure 1. Subsequent turning on of the water will then cause it to flow in the manner indicated by the arrows in Figure 1 in a conventional manner.

The described structure presents many advantages. For example, should the conically shaped flexible check valve 17 be inadvertently omitted in the assembly of the device, water passing through the openings 14 will also pass down the water relief passage 18 and thus out the lateral passage 36 as well as into the reduced diameter core body portion 19 and out the lateral ports 21 through the main portion of the housing. In other words, the fact that the anti-siphon check valve 17 has been inadvertently omitted will be immediately evident by this safety feature of having water flow out both the spray unit and the lower end of the housing simultaneously. When the anti-siphon check valve 17 is in position, however, it will seal off the water relief passage 18 as indicated in Figure 1.

This valve also, as mentioned heretofore, acts to prevent back siphoning of water into the spout by seating upwardly against the openings 14 in the screen 13. However, in the event that the anti-siphon flexible conical valve member 17 were omitted, and the valve member 26 became stuck in its lower position as illustrated in Figure 2, the flexible member 23 will bow upwardly as indicated by the dotted lines in Figure 2 to permit air to pass into the central interior of the core body and thus break any vacuum that may be formed in the plumbing system.

From the foregoing description, it will be evident that the present invention provides a very simple and easily operable diverter valve of small size which may be readily attached by unskilled personnel directly to a sink faucet spout. The entire structure is such that positive action will take place in that the main lower housing opening is thoroughly sealed against any possible water dripping out therefrom when the valve member is in the second position illustrated in Figure 2. Similarly, when the valve is in the position illustrated in Figure 1 the water path is completely sealed from passing out of the lateral passage 36 to the spray unit. Finally, the construction permits any inadvertent errors in the manufacture such as the omission of the conical check valve 17 to be immediately detected as a consequence of the water relief passage 18 in the upper portion of the core member 15.

Minor modifications falling within the scope and spirit of the present invention will occur to those skilled in the art. The portable diverter valve assembly is, therefore, not to be thought of as limited to the specific embodiment disclosed for illustrative purposes.

What is claimed is:

1. A diverter valve comprising, in combination: a cylindrical housing including an inner cylindrical core body defining an annular space with the inside wall of said housing; a movable cylindrically shaped valve member having an interior flow passage therein and having one

5

end adapted to be telescoped over said core and moved back and forth within said annular space between first and second positions respectively, said valve member being in sealing relationship with said core body and said inside wall of said housing; said core including lateral ports opening into said annular space at points between said first and second pistons, said ports being in communication with said interior flow passage when said valve member is in said first position; and lateral passage means passing from said annular space at a point between said first and second positions to the exterior of said housing, whereby liquid passing into said core is directed out said ports and through said interior flow passage of said valve member when said valve member is in said first position and directed out said ports to said annular space to pass out said lateral passage means when said valve member is in said second position.

2. The subject matter of claim 1, including a screen member positioned adjacent the top entrance of said core body; and a conically shaped flexible member positioned between said screen member and said top entrance whereby back pressure seats said conically shaped flexible member against said screen member to block liquid within said core from passing out said entrance.

3. The subject matter of claim 1, in which the lower end of said core body includes a vacuum breaker port opening; and check valve means closing off said port in response to water pressure in said core.

4. The subject matter of claim 3, in which said cylindrical core body includes a water relief passage adjacent its entrance placing said entrance in direct communication with said lateral passage means in the absence of said conically shaped flexible member.

5. The subject matter of claim 1, in which said lateral passage means includes a check valve responsive to water pressure within said annular space to open said passage means.

6

6. A diverter valve comprising, in combination: a cylindrical housing having open upper and lower ends; a cylindrical core body fitted within said housing and having a reduced diameter body portion defining with the inside wall of said housing an annular space; said core body including lateral ports; a cylindrically shaped diverter valve member having an interior flow passage therein and having a diameter intermediate the diameter of said housing and core body whereby the upper end of said valve member is adapted to be telescoped into said annular space between first and second positions, said upper end of said valve member being in sealing relationship with the core body and said inside wall of said housing and said ports being in communication with said interior flow passage when said valve member is in said first position; and a lateral passage means extending from said housing at a point adjacent said core body between said first and second positions whereby moving of said valve body into said annular space to said first position blocks said lateral ports from communication with said annular space so that liquid entering said interior of said core body passes out said ports into said interior flow passage of said valve member to pass out the lower end thereof and moving said valve member downwardly to said second position places said lateral ports in communication with said annular space so that liquid in said core body passes out said ports and through said lateral passage means.

References Cited in the file of this patent

UNITED STATES PATENTS

1,105,547	Coffield	July 28, 1914
1,128,077	Taylor	Feb. 9, 1915
2,587,961	Bletcher	Mar. 4, 1952
2,600,554	Lyons	June 17, 1952
2,670,571	Wilson	Mar. 2, 1954