

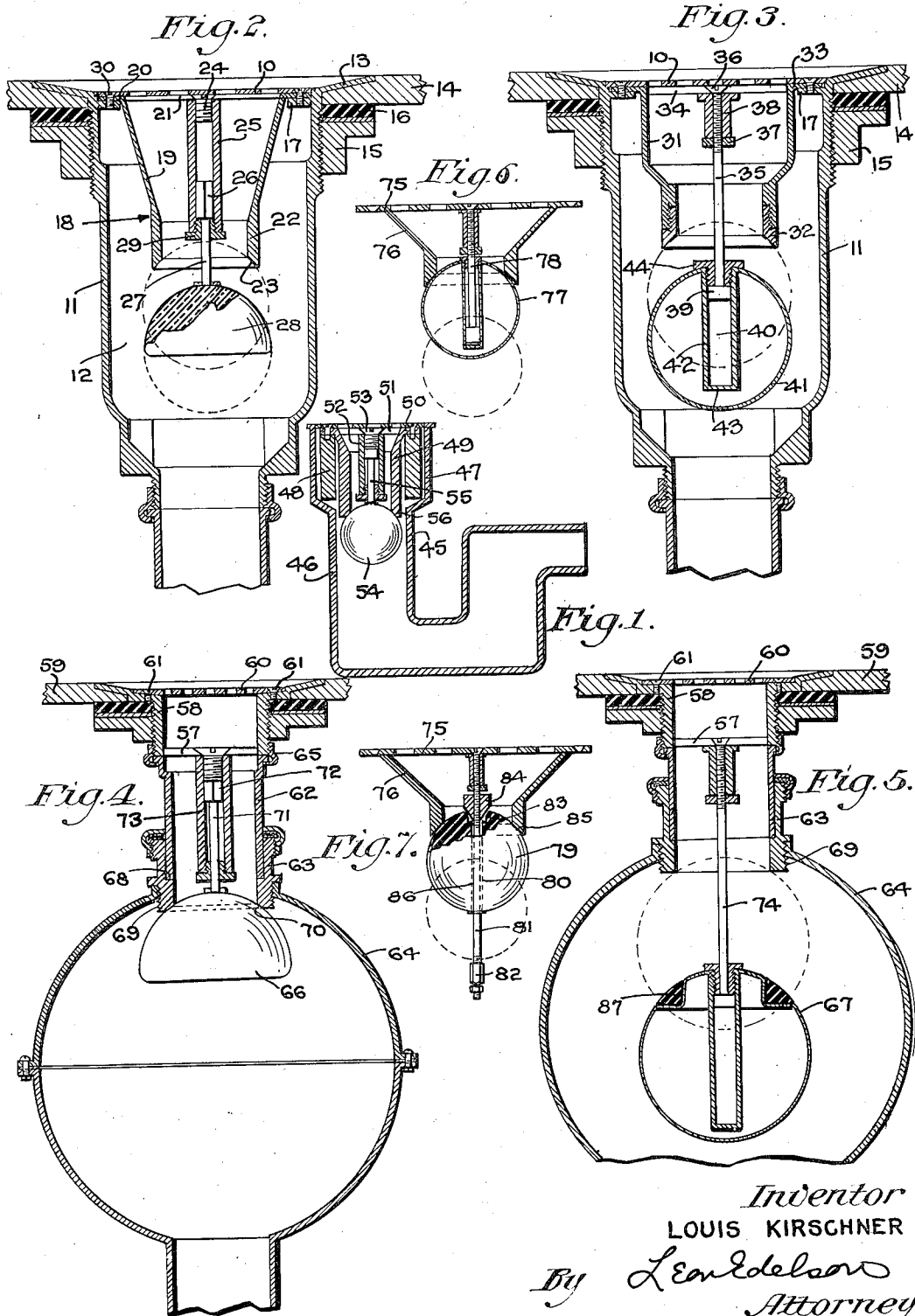
Aug. 4, 1936.

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2,049,909

DRAIN TRAP VALVE

Filed Dec. 15, 1932



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UNITED STATES PATENT OFFICE

2,049,909

DRAIN TRAP VALVE

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Application December 15, 1932, Serial No. 647,338

4 Claims. (Cl. 182—25)

This invention relates generally to drain traps and more particularly to the construction of an improved back-pressure valve which is operative automatically to prevent any back flow through the trap or waste pipe, although permitting unrestricted normal passage of the water through the waste pipe into the sewer.

Among the principal objects of this invention is the provision of a back-pressure valve assembly which can be easily and quickly installed or set into desired position; which can be as readily removed for purposes of cleaning, repairing or inspecting the same; and which while simple and inexpensive to manufacture is exceedingly efficient and durable in use.

A further object of the invention is the provision of a back-pressure valve and drain assembly which is so designed and constructed as to be readily adapted for installation within the hub or enlarged head of any of the ordinary types of drain pipes, the assembly being thus adapted for installation immediately beneath the outlet of an elevated basin or in connection with drain pipes the upper ends of which lie substantially flush into the floor or ground surface.

Other objects and advantages of the invention will be apparent more fully hereinafter.

The invention consists substantially in the combination, construction, location and relative arrangement of parts, all as will appear more fully hereinafter, as shown in the accompanying drawing and as finally pointed out in the appended claims.

In the said accompanying drawing:—

Figure 1 is a vertical sectional view showing the installation of one form of the back pressure valve assembly in the hub of a standard type of floor drain;

Figure 2 is a vertical sectional view of the valve assembly installed in the upper end of a drain pipe such as would be employed in connection with an elevated basin or the like;

Figure 3 is a vertical cross-sectional view similar to Figure 2 but showing a modified form of valve assembly;

Figure 4 is a vertical sectional view showing the valve assembly in a modified form of installation;

Figure 5 shows an installation similar to Figure 4 wherein a modified form of valve assembly is employed;

Figure 6 is a vertical sectional view of a combined strainer and valve assembly; and

Figure 7 is a modified form of combined strainer and valve assembly.

Referring now to the drawing and more particularly to Figures 1, 2, and 3, it will be observed that the constructions shown therein are each characterized in that the back pressure valve assembly is adapted to be installed and maintained in position independently of the strainer 10, the latter being of the usual form comprising preferably a horizontally disposed perforated plate which is adapted to be positioned within the enlarged upper end of a drain pipe. In the arrangement shown in Figure 2 the drain pipe section 11 is enlarged to provide a chamber 12, the upper end of which is provided with an annular flange 13. This drain pipe section 11 is suspended downwardly through a suitable opening provided in the bottom of an elevated basin 14 or the like and is secured in position by a locking ring 15 which coacts with the annular flange 13 of the drain pipe section to secure the latter to the basin. Preferably, packing material 16 is interposed between the locking ring 15 and the bottom of the basin 14 in order to secure a water-tight connection between the pipe section 11 and the basin.

The pipe section 11 is provided at its upper end with an interiorly projecting flange 17 affording an annular seat for the valve assembly, designated generally by the reference numeral 18. This valve assembly, in the form shown in Figure 2, comprises a substantially conically shaped member the upper end of which is provided with an outwardly directed annular flange 20 adapted for seating engagement upon the annular seat 17 of the pipe section 11. Extending diametrically across the top of the member 19 and lying substantially in the plane of the annular flange 20 thereof is a centrally apertured strap 21, this strap 21 being preferably formed as an integral part of the member 19. The bottom end of the member 19 is reduced in diameter, as at 22, and is provided with a valve seat 23.

Secured to the diametrically extending strap 21 by means of a screw 24 projecting through the central aperture thereof is a vertically extending tubular guide member 25, this latter member being arranged centrally within the member 19. Slidably received within the bore of the tubular guide member 25 is the enlarged head 26 of a float valve stem 27, the float 28 being secured in any desired manner to the lower end of said stem 27. A suitably apertured plug 29 is threaded into the bottom end of the tubular guide member 25 and serves as the lower

abutment for the enlarged head 26 of the valve stem. The screw 24 serves as the upper abutment for said head.

The member 19 together with its associated valve and valve step guide member is secured within the pipe section 11 by means of suitable securing screws 30, these same securing screws serving also to secure the strainer 10 in position immediately above the valve body 19.

It will be observed that in the arrangement shown in Figure 2 the valve assembly may be readily removed as a unit from the pipe section 11, it being merely necessary to remove these securing screws 30. Also, it will be observed that the valve stem guide member 25 may be readily removed from the valve body 19 simply by removing the screw 24 and that the valve stem itself and its associated float valve 28 may be removed from the member 25 upon removal of the bottom plug 29.

In the arrangement shown in Figure 3 the drain pipe section 11 and its connection to the basin 14 is in all respects similar to the arrangement shown in Figure 2. The valve body 31 is, however, somewhat modified particularly in that it is provided with a removable valve seat 32. The upper end of this valve body 31 is also provided with an annular flange 33 which is adapted to be seated upon the internal annular flange 17 of the pipe section 11. The valve body 31 is also provided with a diametrically extending strap 34, as in the arrangement shown in Figure 2, from the center point of which is suspended a stem 35, the upper end of this stem 35 being provided with a kerfed head 36. The stem 35 is preferably secured to the diametrically extending strap member 34 by means of a locking nut 37 and a sleeve 38 embracing the upper portion thereof, the sleeve 38 being clamped against the under surface of the strap 34 by the locking nut 37.

The lower extremity of the stem 35 is provided with an enlarged head 39 which is adapted to be accommodated within the vertically extending bore 40 of a float 41. This float 41 is preferably constructed of metal within the interior of which is provided a vertically extending tube 42 the bottom end of which is closed, as at 43, and the upper end of which is adapted to threadedly receive a plug 44 through which the stem 35 is projected. It will thus be observed that in the arrangement shown in Figure 3 the stem 35, which is fixedly secured to the strap 34 of the valve body 31, serves as a guide member along which the float 41 is vertically movable.

Figure 1 illustrates the adaptability of the valve assembly of the type such as is shown in Figure 2 for installations wherein the upper end of the drain pipe is substantially flush with the floor or ground. Thus, in Figure 1, the drain pipe, designated by the reference numeral 45, is shown as being of the ordinary U-water-seal type, the vertically extending branch 46 of which is provided at its upper end with an enlarged hub 47. Fitted within this hub 47 and adapted to be permanently secured therein in any desired manner is a tubular bushing 48. Suspended centrally within the hub 47 of the drain is the valve body 49, the upper end of this valve body being provided with an annular flange 50 adapted for seating engagement upon the upper edge of the bushing 48. As in the arrangement shown in Figures 2 and 3, the valve body 49 is also formed with a diametrically extending strap 51 from which is suspended a tubular valve stem guide

member 52, the latter being secured to the strap 51 by means of a threaded stud 53 exactly as in the arrangement shown in Figure 2. Also as shown in Figure 2, the float valve 54 of the arrangement shown in Figure 1 is provided with a valve stem 55 having an enlarged head which is vertically slidable within the bore of the member 52. The bottom edge of the valve body 49 is beveled, as at 56, to provide a valve seat for the float valve 54.

In the arrangements shown in Figures 4 and 5, the float valve assembly in each case is suspended from the cross bars 57 which are ordinarily provided at the bottom end of the usual type of sink fitting 58. This fitting 58 is ordinarily projected through the central opening provided therefor in the bottom sink or basin 59 and serves not only as a connection for the drain pipe but also as a means for securing the strainer 60 in position, the strainer being ordinarily secured to the fitting 58 by means of the screws 61. The arrangements of Figures 4 and 5 are further alike in that each is provided with a drain pipe comprising the sections 62, 63, and 64, the section 62 being coupled to the fitting 58 by coupling ring 65, while intermediate section 63 serves not only as a connection between the sections 62 and 64 but also as a valve seat for a float valve 66 of Figure 4 and 67 of Figure 5. The section 64 is considerably enlarged to afford ample space for the passage of the water past the float valve when the latter is in its lowermost position (see for example Figure 5). To this end, the intermediate fitting 63 is provided with an interiorly threaded shoulder 68 constituting a seat for the bottom end of the fitting 62 while the lower end of the fitting 63 is exteriorly threaded, as at 69, for engagement with the upper end of the enlarged section 64. The valve seat 70 for the float valve is in each case disposed interiorly of the enlarged section 64.

In the arrangement of Figure 4 the float valve 66 and its associated parts are secured to the cross straps 57 of the fitting 58 in substantially the same manner as in the arrangement shown in Figure 2, the valve stem 71 being provided with an enlarged head 72 slidable within the tubular member 73. On the other hand, in the arrangement shown in Figure 5 the float valve 67 and its associated parts are secured to the cross straps 57 of the fitting 58 substantially in the same manner as in the arrangement shown in Figure 3, the float 67 being vertically movable relatively to the fixed stem 74.

In the arrangement shown in Figures 6 and 7, the strainer is shown as a part of the valve assembly. In these arrangements, it will be observed that the strainer 75 is formed as an integral part of the valve body 76, it being apparent that this combined strainer and valve body is adapted for positionment within a pipe section such as the section 11 of Figure 2 or the hub 47 of Figure 1. In Figure 6 the float valve 77 is vertically movable relatively to the fixed stem 78 as in the arrangements of Figures 3 and 4, the sole difference being that the stem 78 is fixed directly to the strainer 75 instead of to a cross strap as in the other arrangements.

The construction shown in Figure 7 differs somewhat from that shown in Figure 6 in that the float valve 79 is centrally bored, as at 80, to permit the same to move vertically upon the fixed stem 81 the lower end of which is provided with a stop nut 82 which is vertically adjustable to limit the downward displacement of the float 75.

valve 79. In the arrangement of Figure 7, the float 79 is preferably of rubber, the upper extremity of the bore 80 thereof being beveled, as at 83, to accommodate a vertically adjustable tapered nut 84 which functions to seal the upper end of the bore 80 when the float 79 is in contact with its seat 85. Preferably, the bore 80 is lined with a metal tubular sleeve 86.

In the various arrangements, it will be observed that different forms of float valves have been shown. It will be understood of course that the float valves and their supporting means may be interchanged as desired in order to best suit conditions. For example, in Figure 2 the float valve is shown as being constructed of sponge rubber. It will be understood of course that it may be constructed instead entirely of metal, as in Figure 3, or it may be constructed in the form of a metallic shell in which is set a renewable rubber or other composition annulus 87 (see Figure 5) for contacting engagement with the valve seat. Furthermore, it will be observed that the float 28 of Figure 2 is in the form of a substantially semi-spherical member. It may also be spherically shaped. The invention is susceptible of various changes and modifications without departing from the real spirit or general principles of the invention and accordingly it is intended to claim the same broadly, as well as specifically, as indicated in the appended claims.

What is claimed as new and useful is:

1. A drain trap valve for drain pipes and the like comprising, in combination, a substantially vertically disposed tubular member connected to the upper end of an enlarged drain pipe section, the lower extremity of said member being provided with an annular valve seat, a diametrically extending cross-strap arranged within said member, a post member removably supported by said cross-strap and extending axially of said member, a float member operatively associated with said post member and movable vertically with respect thereto into and out of engagement with said valve seat, and a bushing threadedly engaging one of said members and slidably engaging the other of said members, said members being separable from each other upon removal of said bushing.

2. A drain trap valve for drain pipes and the like comprising, in combination, a main body member suspended within the upper end of an enlarged drain pipe section, the lower extremity of said body member being provided with an annular valve seat, a cross-strap extending diametrically across the upper end of said main body, a tubular post secured to said cross-strap

and extending coaxially with respect to said body member, a bushing threaded into the lower end of said post, a valve stem projected through said bushing and vertically movable within said tubular post, said valve stem having an enlargement at its upper extremity for coaction with said bushing to limit its downward movement relatively to said post, and a float secured to the lowermost extremity of said valve stem and adapted, when raised, to seat against said valve seat whereby to prevent the passage of water upwardly through said body member, said float and valve stem being separable as a unit from said post upon removal of said bushing from the latter.

3. A drain trap valve for drain pipes and the like comprising, in combination, a main body member suspended within the upper end of an enlarged drain pipe section, the lower edge of said body member being provided with an annular valve seat, a cross-strap extending diametrically across the upper end of said main body, a stem extending axially through said body and suspended from said cross-strap, a float vertically slidable upon said stem for movement into and out of engagement with said valve seat, said float being provided with an axial bore and said stem being provided with an enlarged head disposed within said bore, and means threaded into the bore of said float to limit the movement of said head therewithin and adapted upon removal from said float to permit the separation of the latter from said stem.

4. In a construction of the character described, in combination, a drain pipe having an enlarged upper section, said section being provided with an interiorly projecting annular flange, a valve seat body secured to said flange for suspension within said drain pipe section, said valve seat body being provided with a diametrically extending cross-strap, a tubular post suspended from said cross-strap and arranged coaxially with respect to said valve seat body, means accessible from above said cross-strap for quick-detachably securing said post thereto, a float having a stem slidably within said post whereby said float is adapted for movement into and out of engagement with an annular valve seat formed in the bottom edge of said valve seat body, and a strainer overlying the upper end of said valve seat body, said strainer being removable from the drain pipe independently of said valve seat body and the aforesaid parts directly associated therewith whereby to afford access to said securing means for said post.

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