June 23, 1953 E. N. BURNETT 2,642,894

VALVE CONSTRUCTION

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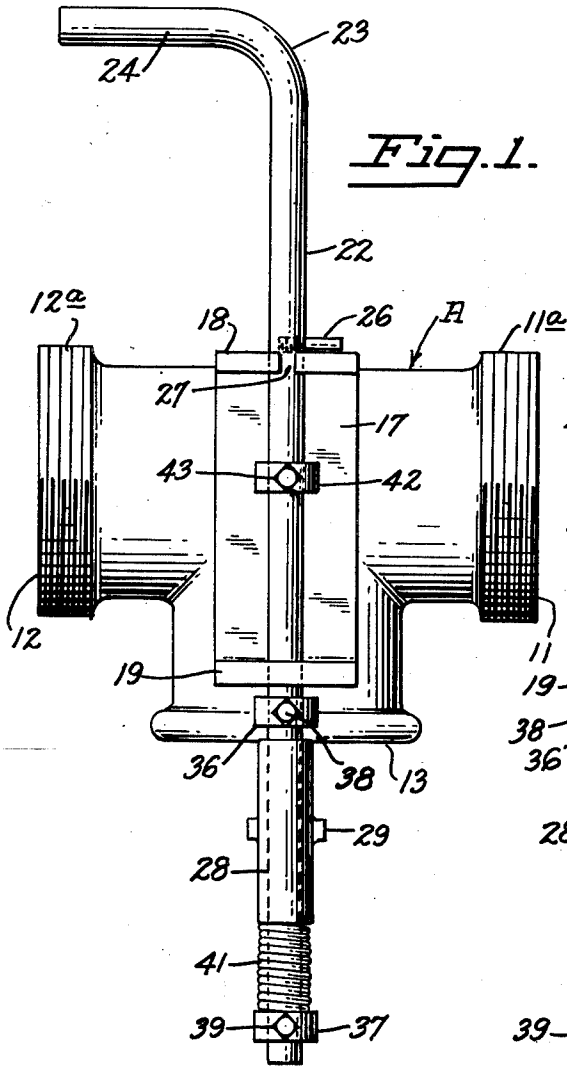


Fig. 1.

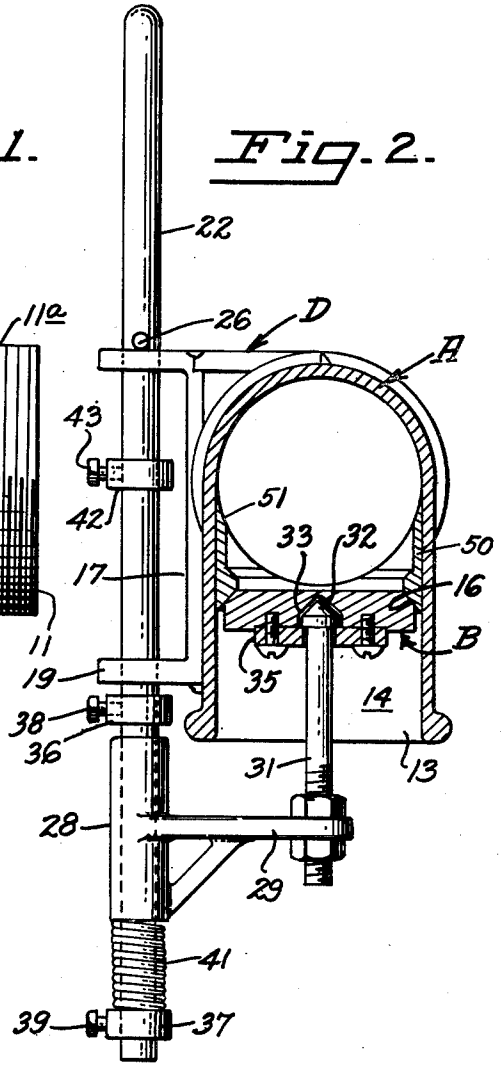


Fig. 2.

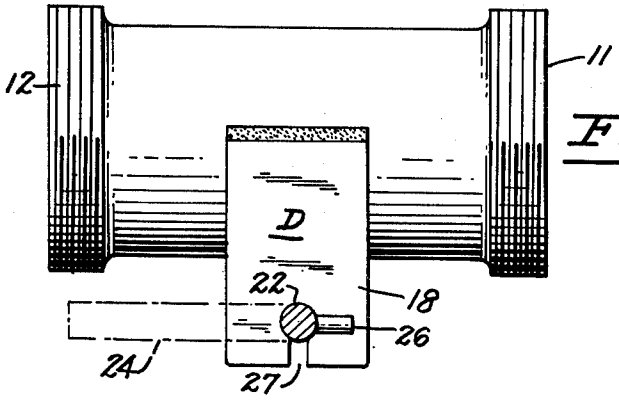


Fig. 3.

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Fig. 4.

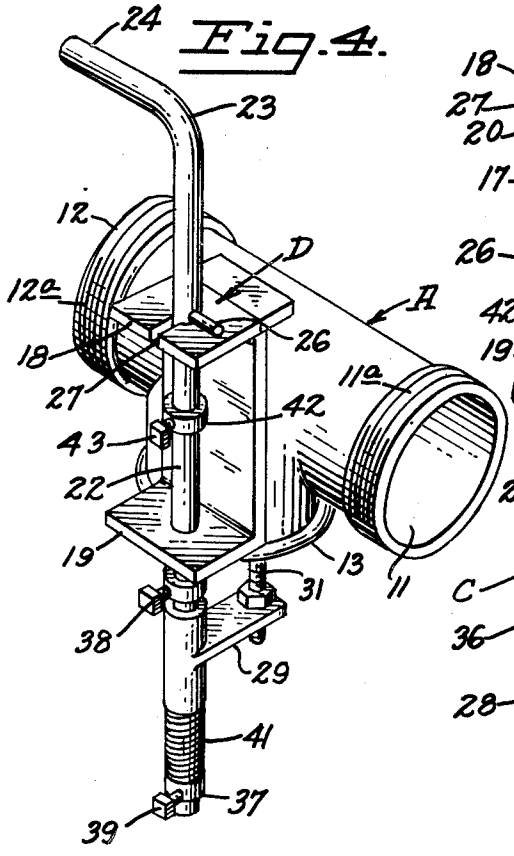
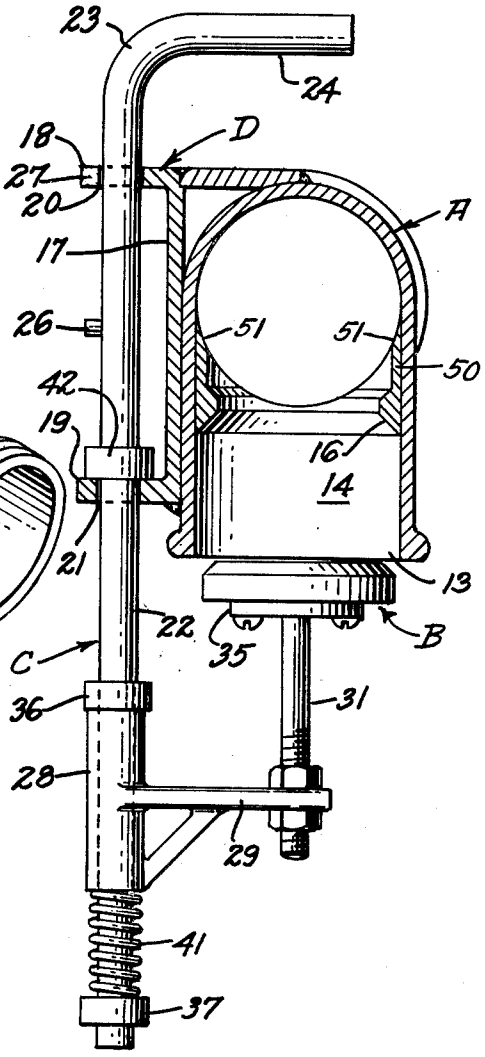


Fig. 5.



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VALVE CONSTRUCTION

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2 Claims. (Cl. 137—703)

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This invention relates to an improved valve construction and more particularly relates to a new and improved poppet-type drain valve.

The particular embodiment of the present invention which is illustrated in the drawings and which will be described hereinafter in greater detail comprises generally a valve housing having at least one inlet port, and a drain port defining a bore having a valve seat. A valve head carrier comprising a manually operable shaft disposed exteriorly of the valve housing and laterally with respect to the drain port is adapted upon appropriate manual manipulation to move the said valve head into and out of seating engagement with the valve seat.

It is contemplated that the present invention will have particular utility in food and beverage plants wherein liquid foods or beverages are piped from one location to another during processing or canning operations. In such systems it is frequently necessary to drain the pipe lines and to thoroughly cleanse and sterilize them. A disadvantage often encountered in using more or less conventional drain valves in food or beverage plant systems is that such valves are often formed with obstructions interiorly of the housing on which sediment is likely to collect or on which food deposits are likely to form. Thus it becomes difficult to keep the lines clean and sterile without necessitating disassembly of the valves and careful cleansing of the various component valve parts which establish obstructions on which sediment or food deposits seem to habitually collect.

Another somewhat characteristics disadvantage of conventional drain valves is that most of them are somewhat slow to operate, as for example, a valve which operates on a screw handle principle requires an operator to turn the valve handle a considerable number of revolutions to open or close said valve. In large scale plant operations where a great number of drain valves are required, the rapidity in which the valves can be opened and closed is, of course, of considerable importance in maintaining labor costs at a minimum.

A principal object of the present invention is to provide a drain valve of novel construction which substantially avoids or minimizes the disadvantages above enumerated ordinarily attendant with use of more or less conventional valve constructions.

Another principal object of the present invention is to provide a valve construction of the type hereinabove generally referred to wherein a minimum of valve parts are disposed within the valve

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housing so as to present a substantially obstruction-free housing and drain port which facilitates maintenance of a sanitary valve condition.

A further object is to provide a drain valve which may be rapidly and easily opened and closed. In the embodiment of the valve construction illustrated in the drawings, the only manual operation required to open the valve is to turn the valve handle about a quarter of a turn. Similarly, to close the valve, an operator need only pull upwardly on the handle and rotate same about a quarter of a turn.

A more specific object of the present invention is to provide a valve construction having a self-centering valve head arrangement which insures positive and rapid seating of said head in its associated seat.

Other objects of the present invention will become apparent upon reading the following specification and referring to the accompanying drawings in which similar characters of reference represent corresponding parts in each of the several views.

In the drawings.

Fig. 1 is a view in side elevation of the invention.

Fig. 2 is a view in end elevation, partly in section of the invention.

Fig. 3 is a top plan view, partly in section, of the invention.

Fig. 4 is a perspective view of the invention.

Fig. 5 is an end elevational view, partly in section with the valve open.

Referring now more particularly to the drawings, there is indicated generally a T-shaped valve housing A having oppositely disposed inlet ports 11 and 12 which connect with one another and with depending drain port 13. Said inlet ports are formed with conventional pipe threads 11*a* and 12*a*, respectively, to permit the valve to be incorporated in conventional fashion within a pipe or conduit system. Drain port 13 defines a bore 14 formed with an inwardly projecting annular valve seat 16.

The present invention also comprises generally a valve head B, and a valve head carrier C which, in turn, is mounted slidably on a suitable bracket indicated generally at D.

Bracket D comprises, more particularly, a U-shaped member defining a web 17 and outwardly projecting legs 18 and 19. The bracket is secured rigidly (by welding or the like) exteriorly of the housing and laterally with respect to bore 14. Legs 18 and 19 of the bracket are formed with registering apertures 20 and 21, respectively,

which are adapted to slidably receive vertically disposed shaft 22 of the valve head carrier assembly heretofore indicated at C. The upper end of shaft 22 is formed with a right angle bend 23 forming a handle portion 24. Shaft 22 is also provided with an outwardly projecting pin 26 proportioned to slide through bayonet slot 27 formed in the top leg 18 of the bracket when the shaft is moved vertically upwardly or downwardly during valve opening or closing operations.

Sleeve 28, mounted slidably and rotatably on shaft 22, supports a projecting arm 29, to the outer end of which is secured an upwardly projecting valve pin 31. The upper end of pin 31 is enlarged and is formed with a centering taper 32 engageable loosely within a complementary centering socket 33 formed in the underside of valve head B. A suitable retaining plate 35, screwed to the under side of valve head B, is adapted to retain the enlarged tapered centering taper 32 within socket 33. The purpose and function of this latter described arrangement of parts will be described more fully hereinafter.

Mounted on shaft 22 and disposed between a pair of spaced collars 36 and 37 having set-screws 38 and 39, respectively, are sleeve 28 and coil spring 41. Spring 41 acts to normally spring bias said sleeve upwardly into abutting engagement against collar 36. A third collar 42 is provided on the shaft between legs 18 and 19 of the bracket and may be adjustably positioned on the shaft by means of screw 43 to limit the extent of permissible movement of shaft 22 slidably downwardly with respect to supporting bracket D. Preferably collar 42 is adjustably positioned far enough up on the shaft so that said collar will not engage the top of bracket leg 19 until said shaft has moved downwardly sufficiently far to allow valve head B to swing clear of drain port 13. This arrangement allows valve head B to be swung outwardly from the drain port to either side thereof and prevents continued splashing of liquid thereover when the valve is opened to drain the lines.

In operation, to open the drain valve, handle 24 is rotated approximately a quarter of a turn from its position indicated in Figs. 1 through 4, inclusive, whereby pin 26 is brought into registry with slot 27 formed in upper leg 18 of bracket D. This movement permits the handle and shaft together with the entire valve head carrier assembly to drop downwardly to a position indicated in Fig. 5 wherein it is seen that collar stop 42 engages the upper surface of lower bracket leg 19. Downward movement of the shaft and its associated valve head carrier assembly functions, of course, to move valve head B downwardly well out of engagement with valve seat 16, thereby fully opening the valve.

To close the valve, the above described operations are reversed—the shaft is moved upwardly so that pin 26 passes through slot 27, and the valve handle is then rotated approximately a quarter of a turn to its position indicated in Figs. 1 through 4, inclusive. Preferably, collars 36 and 37 are adjustably positioned on the shaft in such manner that valve head B contacts valve seat 16 during upward movement of the shaft prior to time that the shaft has been moved upwardly far enough for pin 26 to clear the top of leg 18. In short, the arrangement is preferably such that during the last quarter of an inch or so of upward movement of the shaft the valve head seats against the force of coil spring 41, which, as heretofore indicated, functions to normally spring bias sleeve 28 (carrying the valve pin and valve head) against collar 36.

Valve head B being rockably supported by virtue of the modified ball and socket connection comprising tapered pin 31 and socket 33 is to a considerable extent self-centering with respect to valve seat 16. Such an arrangement insures positive seating of the valve as it establishes a means whereby the valve head is permitted to find its way into proper and tight engagement with its seat.

As heretofore indicated, an important feature of the present valve construction is that relatively few of the valve parts are disposed within the valve housing or are they located within or in alignment with the drain port or bore proper. Therefore, the interior of the housing remains substantially free of obstructions on which sediment can collect or on which deposits might form and cleaning and sterilization of the valve is rendered comparatively simple.

It is also pointed out that the portion of the valve defining the valve seat may be made in the nature of an insert. More specifically, in the embodiment shown in the drawings the valve seat comprises a sleeve 50 insertable within bore 14 of the housing and formed with oppositely disposed semi-circular cut-outs such as indicated at 51. These cut-outs, when the sleeve insert has been properly positioned in the housing, are adapted for registry with inlet ports 11 and 12, respectively, thus providing a free and substantially unobstructed passage through said housing. The sleeve insert is preferably forcibly driven into the valve housing, and if desired may be pinned, welded or otherwise secured permanently within the housing.

Although the present invention has been described in some detail by way of illustration and example for purposes of clarity of understanding, it is understood that certain changes and modifications may be made within the spirit of the invention and the scope of the appended claims.

I claim:

1. A valve construction comprising, a valve housing having an inlet port and a depending drain port, said drain port defining a bore formed with a valve seat, a valve head for said valve seat, a bracket mounted exteriorly of said housing and laterally of said bore, a shaft disposed parallel to the axis of said bore supported slidably and rotatably by said bracket and arranged for movement in the direction of its own axis, a stop element associated with said shaft to limit the extent of permissible downward movement of said shaft, a sleeve mounted slidably on said shaft, a spring mounted on said shaft spring biasing said sleeve in a direction upwardly of said shaft, a projecting arm carried by said sleeve and movable correspondingly therewith, said arm supporting said valve head, said valve head being movable with said arm and shaft into and out of seating engagement with said valve seat, a projecting pin provided on said shaft cooperable with a slot in said bracket for releasably locking said shaft in position when said shaft, said arm, and said valve head have been moved to an upward position whereat said valve head is seated in said seat against the force of said spring.

2. A drain valve comprising, a valve housing having an inlet port and a drain port, said drain port defining a bore formed with a valve seat, a valve head for said seat, a bracket located exteriorly of said valve housing and laterally of said bore, a shaft disposed parallel to the axis of

said bore mounted slidably on said bracket for movement in the direction of its own axis, a projecting arm mounted slidably on said shaft and supporting said valve head in substantially axial alignment with said bore and valve seat, said valve head movable with said shaft and arm into and out of seating engagement with said valve seat, a spring element provided on said shaft and associated with said arm spring biasing said arm upwardly along said shaft whereby said valve head carried by said arm normally engages said seat against the force of said spring element.

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