Jan. 30, 1945. G. T. DOWNEY 2,368,120

FUEL DRAIN VALVE

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Fig. 1.

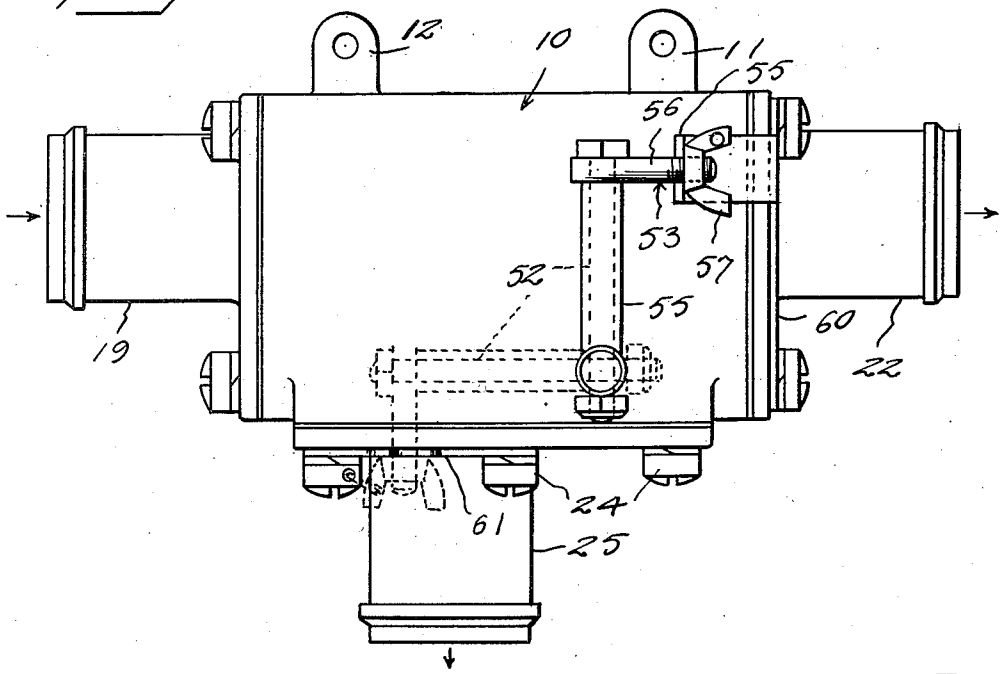
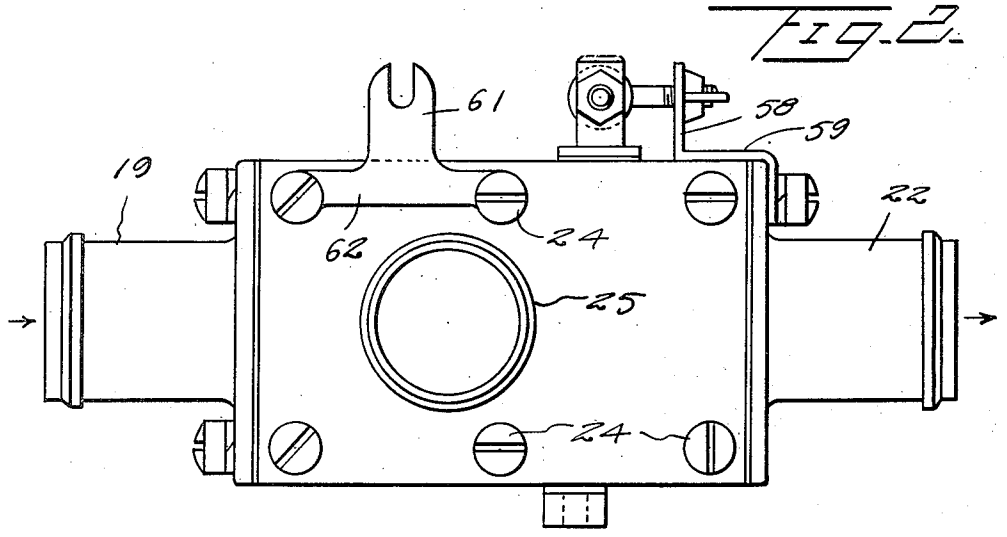


Fig. 2.



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Fig. 4.

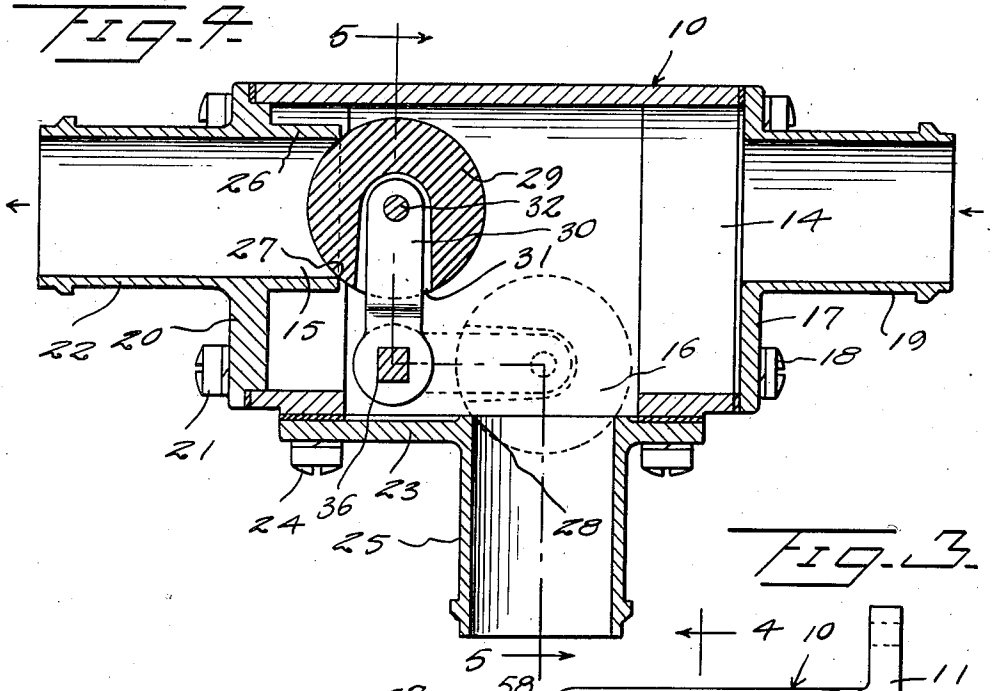


Fig. 3.

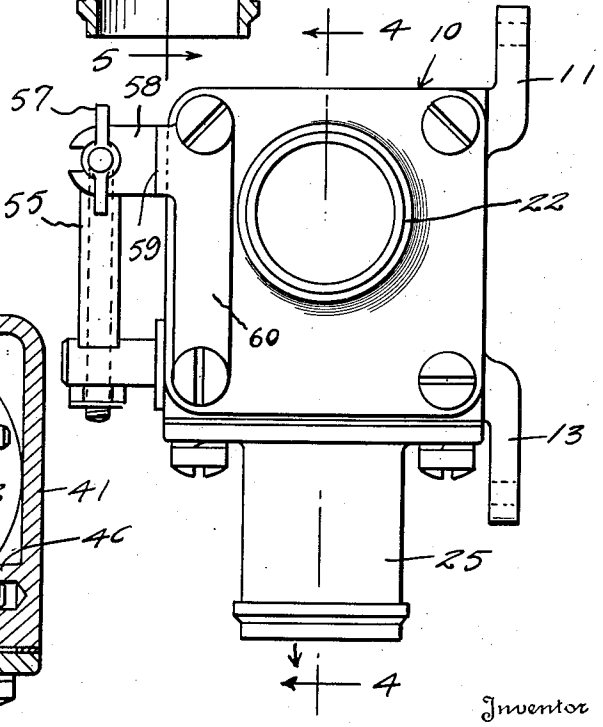
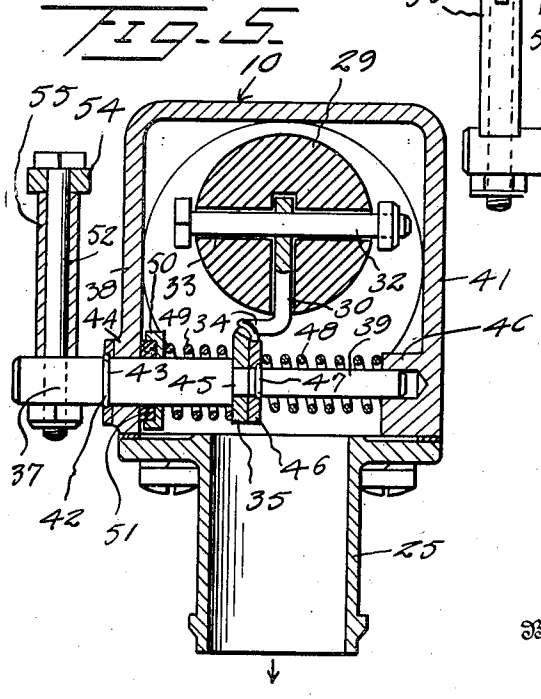


Fig. 5.



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UNITED STATES PATENT OFFICE

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FUEL DRAIN VALVE

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Application February 24, 1944, Serial No. 523,704

3 Claims. (Cl. 251—13)

This invention relates to drain valves designed to drain fluids.

An object of this invention is to provide an improved drain valve which will permit draining of fluid from one side of the valve without creation of any air pockets in the other side of the valve. In practice this drain valve has been designed to be interposed in a fuel supply line between an internal combustion engine and a supply tank so that the tank can be drained at will and any fuel in the line between the valve and the engine will be retained therein, thereby preventing creation of air pockets when the drain side of the valve has been closed.

Another object of this invention is to provide a drain valve which is formed of a housing having an inlet port and two outlet ports, a selected one of the outlet ports being closed by means of a pivoted or swinging valve plug.

This invention further aims to provide a drain valve embodying a swinging valve plug of spherical configuration, and means whereby the valve plug may be firmly held in a selected port closing position.

A further object of this invention is to provide a drain valve which embodies the use of a rubber or yieldable plug so that the plug need not be ground to the valve seat and will inherently conform to the valve seat.

With the foregoing objects in view, and others which may hereinafter more fully appear, the invention consists of the novel construction, combination and arrangement of parts, as will be more specifically described, and illustrated in the accompanying drawings wherein are shown embodiments of the invention, but it is to be understood that changes, variations and modifications may be resorted to which fall within the scope of the invention, as claimed.

In the drawings:

Figure 1 is a detail side elevation of a drain valve constructed according to an embodiment of this invention.

Figure 2 is a bottom plan of the device.

Figure 3 is a detail end elevation of the device.

Figure 4 is a sectional view taken on the line 4—4 of Figure 3.

Figure 5 is a sectional view taken on the line 5—5 of Figure 4.

Referring to the drawings the numeral 10 designates generally a housing which is polygonal in transverse section, and is provided with a plurality of mounting lugs 11, 12 and 13 whereby the housing may be firmly mounted on a suitable support. The housing 10 is provided with an intake port 14 at one end thereof, an outlet port 15, at the opposite end thereof, and with a second outlet port 16 between the ports 14 and 15 at right angles to the port 15. The housing 10 is open at each end thereof and the intake end is closed by means of a plate 17 secured by fastening members 18.

A nipple 19 is carried by the plate 18 and provides a means whereby a hose or other tubular connection may be secured to the plate 19 for admitting fluid into the interior of the housing 10.

A plate 20 is secured by fastening members 21 to the opposite end of the housing 10, and has formed integral therewith a coupling nipple 22 whereby a hose or tubular duct may be connected to the outlet end of the housing 10. A plate 23 is secured by fastening members 24 to the lower side of the housing 10 and has formed integral therewith an outlet or drain nipple 25 by means of which a drain hose or tubular member may be connected with the housing 10.

The nipple 22, as shown in Figure 4, is provided with a tubular extension 26 extending into the housing 10, and formed at its inner end with a valve seat 27. The inner end of the nipple 25 is also formed with a valve seat 28.

A spherical valve plug 29 is positioned within the housing 10, being swingable from the full line position shown in Figure 4, to the dotted line position shown in the same figure, so that the plug 29 may be positioned for selectively closing either outlet port 15, or outlet port 16.

The plug 29 is of inherently yieldable construction being preferably formed of rubber or rubber composition, and is mounted on an arm 30 which extends loosely into a slot 31 formed in the ball or plug 29. A bolt 32 is extended through an opening 33 formed in the plug 29 at right angles to the slot 31, and engages through the arm 30 so as to secure the plug 29 on the arm 30. The arm 30 is provided with a right angular intermediate portion 34, as shown in Figure 5, and also includes a hub or bearing portion 35 having a square or polygonal opening 36. A plug operating shaft 37 is journalled through the forward wall 38 of the housing 10, and is formed with a reduced inner end portion 39 which is journalled in a bearing 40 formed in the opposite side wall 41 of the housing 10. A split locking ring 42 is removably mounted in an annular groove 43 formed in the shaft 37, and is adapted to bear against the bearing boss 44 which is formed in the wall 38.

The shaft 37, at the junction between the reduced portion 39 and the larger portion of the

shaft, is formed with a polygonal portion 45 on which the hub 35 is adapted to be mounted so that the arm 30 will be held against rotation with respect to the shaft 37. A washer 46 is mounted on the reduced shaft portion 39 and bears against the adjacent side of the hub 35 and is locked against endwise movement by means of a split locking ring 47.

A spring 48 is positioned about the reduced shaft portion 39 bearing at one end against the washer 46 and at the opposite end against the bearing 40. A second spring 49 is disposed about the shaft 37 within the housing 10 and bears at one end against the hub 35 and at the other end against a cup-shaped washer 50. A compressible gasket 51 is interposed between the washer 50 and the inner side of the housing 10 so that pressure of the spring 49 will coact not only with the spring 48 in holding the shaft 37 against endwise movement, but the spring 49 will also compress the gasket 50 so as to seal the shaft 37 with respect to the housing 10.

The shaft 37 has secured thereto a right angularly disposed bolt 52 and a locking eye-bolt 53 has the eye 54 thereof engaged about the bolt 52. A sleeve 55 is interposed between the eye 54 and the shaft 37 so that the bolt 52 will be held against endwise movement. The eye-bolt 53 includes a threaded shank 56 having a wing nut 57 threaded thereon. The shank 56, in one position of the plug 29, is adapted to engage a slotted arm 58 which includes a right angularly disposed extension 59 formed integral with a holding bar 60. The bar 60 is secured to the outer side of the plate 17 by the fastening members 18.

The arm 58, as shown in Figures 1 and 2, extends inwardly from the adjacent ends of the housing 10, and holds the bolt 52 at substantially right angles to the length of the housing 10. In the full line position of the bolt 52, shown in Figure 1, the plug 29 is engaged with the valve seat 27. The plug 29 may be swung downwardly to engage the seat 28 by loosening the wing nut 57 and engaging this nut with a slotted arm 61 which is carried by a bar 62. The bar 62 is secured to the plate 23 by a pair of fastening members 24.

In the full line position of the plug 29, shown in Figure 4, the plug is in the draining position so that the fluid will drain from the housing 10 through the drain port 16. In the operative position of the plug 29, where the intake port 14 is to be in communication with the outlet port 15, and in which position the plug 29 will be in its normal position the plug 29 will be swung downwardly to the dotted line position shown in Figure 4 to engage the valve seat 28. In this latter normal position the eye-bolt 53 will be engaged with the slotted arm 61.

With a construction as hereinbefore described, when it is desired to drain the fuel from a tank or to drain other liquids from a supply source the valve plug 29 is shifted from the valve seat 28 and engaged with the valve seat 27. Any liquid in the outlet nipple 22 and the pipe or hose connection coupled to the nipple 22 will be retained in the nipple and the duct so that no air pockets will be formed in the fuel line between the housing 10 and the engine or other element with which the drain valve is connected.

By using a resilient ball shaped valve plug the plug will inherently seat on the selected valve seat so that it is not necessary to grind the plug to the valve seat and the selected port will be tightly closed when the plug 29 is swung to such selected port.

In practice, the drain valve hereinbefore disclosed is designed for positioning in the fuel supply line between the tank and the engine so that the tank may be drained without draining the fuel between the valve and the engine.

I claim:

1. A drain valve comprising a housing having an inlet ports, and a pair of outlet ports, a valve seat at the inner end of each outlet port, a shaft rotatably carried by said housing, a right angularly disposed arm on said shaft within said housing, a ball-shaped plug carried by said arm and engageable with a selected outlet port, a right-angularly disposed member fixed to said shaft exteriorly of said housing, an eye-bolt loosely carried by said member, and a pair of slotted arms fixed to said housing at right angles to each other, and engageable by said eye-bolt for locking said plug in selected seat engaging position.

2. A drain valve as set forth in claim 1, including a pair of springs about said shaft in said housing on opposite sides of said first arm for holding said plug centrally of said housing.

3. A drain valve comprising a housing having an inlet port and a pair of outlet ports, a valve seat at the inner end of each outlet port, a shaft rotatably carried by said housing, a right angularly disposed arm on said shaft within said housing, a valve plug carried by said arm and engageable with a selected outlet port, a right angularly disposed member fixed to said shaft exteriorly of said housing, an eye-bolt loosely carried by said member, and a pair of slotted arms fixed to said housing at right angles to each other, and engageable by said eye-bolt for locking said plug in selected seat engaging position.

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