July 15, 1952 C. A. BROWN 2,603,236

SEDIMENT DRAIN BULB VALVE CONSTRUCTION

Filed June 24, 1946

Fig. 1

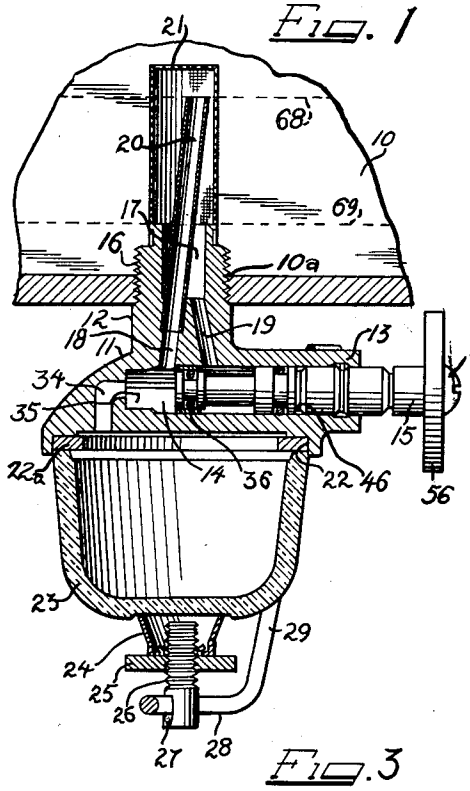


Fig. 2

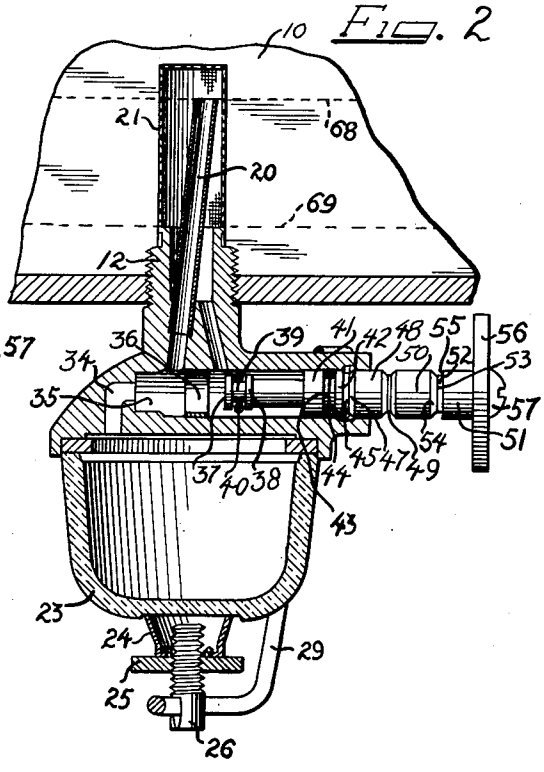


Fig. 3

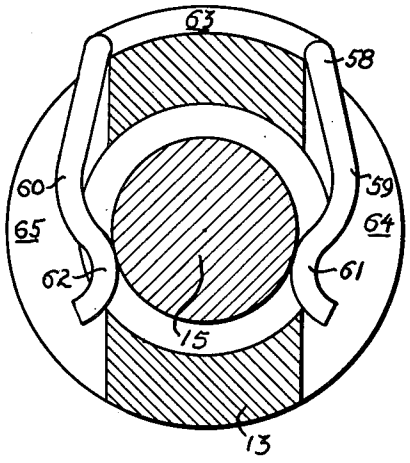


Fig. 4

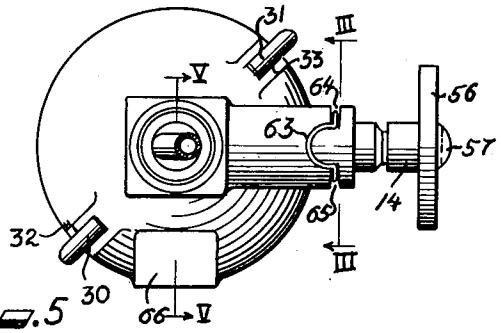
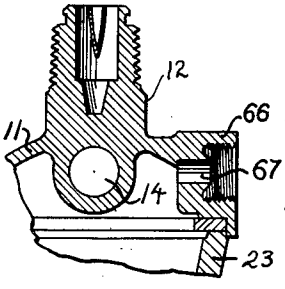


Fig. 5



Inventor
CLYDE A. BROWN

by Attys

Patented July 15, 1952

2,603,236

UNITED STATES PATENT OFFICE

2,603,236

SEDIMENT DRAIN BULB VALVE CONSTRUCTION

Clyde A. Brown, Chicago, Ill., assignor to The Dole Valve Company, Chicago, Ill., a corporation of Illinois

Application June 24, 1946, Serial No. 678,964

3 Claims. (Cl. 137—546)

1

The present invention relates to a sediment drain bulb valve construction of the type which by way of illustrative example may be used in conjunction with a gasoline tank on an automotive vehicle, such for example as a farm tractor, for preventing sediment in the gasoline tank from reaching the vehicle engine.

An object of the invention is the provision of a valve stem or plunger operable by push pull action for use in drain device of the foregoing character.

Another object of the present invention is to provide a push pull valve and stem arrangement wherein the operative position of the stem is definitely known at all times.

A further object of the present invention is to provide a push pull stem and valve body arrangement wherein the stem and body have notch and detent means for holding the stem in any determined endwise position of adjustment.

A still further object of the present invention is to provide in a valve construction means for use in a sediment bulb and wherein guesswork necessary in the operation of a screw type valve stem for determining its operative position is eliminated.

The invention has for an additional object the provision of a valve body and stem arrangement wherein the operative position of the stem may be predetermined and in which the operator is made aware of the fact whenever the stem has been moved to an operative position.

Another and yet further object of the present invention is to provide a push pull valve stem held in operative position by a snap ring.

The invention has for a still further object the provision of a push pull stem held in operative position by pressure means.

Another and further object of the present invention is to provide a valve construction in which the valve stem is operated by push pull action and the stem is held in adjusted position by notch and detent means, which cooperate to prevent movement of the stem beyond its limit of movement in either direction.

In accordance with the general features of the invention there is provided a sediment receiving housing having a fluid inlet and outlet and push pull plunger means for controlling the flow of fluid through the housing from the inlet and outlet and manually movable to different positions in accordance with requirements of use of fluid.

The above, other and further objects of the present invention will be apparent from the following description and the accompanying drawing which illustrates the preferred form of the invention.

2

The views of the drawing are as follows:

Figure 1 is a vertical central sectional view through a sediment drain bulb valve construction of the present invention showing a portion of a gasoline tank to which the valve is attached, and showing the valve stem in the position it occupies for normal operation of the vehicle and with the reserve supply of gasoline closed against entry to the valve structure.

Figure 2 is a view similar to Figure 1 showing the position of the valve stem to open flow communication between the reserve supply of gasoline in the tank and the valve structure.

Figure 3 is an enlarged cross section taken in the plane of line III—III of Figure 4.

Figure 4 is a top plan view of the valve structure removed from a tank and showing the stem in the position illustrated in Figure 1; and

Figure 5 is a sectional view taken in the plane of line V—V of Figure 4.

As shown on the drawing:

Figure 1 illustrates a fragmental portion of the gasoline tank 10 of a tractor or other automotive vehicle, in the bottom of which is a threaded aperture 10a. The valve body is designated generally as 11 and includes an upstanding section or neck 12 and a lateral body portion 13 in which a chamber 14 is formed in which a valve stem 15 is endwise movable for controlling gasoline flow through the chamber 14. The upper end of the neck 12 is exteriorly threaded at 16 to connect the valve body 11 to the tank 10 by threading the neck 12 into the aperture 10 in the tank. The neck 12, downwardly from the upper end thereof, is counterbored at 17. A passage 18 is formed in the neck between the counterbored portion 17 and the chamber 14. A second passageway 19 is also formed in the neck affording communication between the counterbored portion 17 and the chamber 14. Referring to Figures 1 and 2 it will be observed that the passages 18 and 19 enter the chamber 14 in spaced relation lengthwise thereof, and also communicate with the counterbored portion 17 in spaced relation. The upper end of the passageway 18 is formed to receive a pipe 20, which is the inlet pipe to the chamber 14 from the interior of the gasoline tank 10, for gasoline flow under normal operating conditions.

The upper end of the neck is provided with a screen 21 which surrounds the pipe 20 and which prevents the entry of foreign matter into the inlet pipe 20 and passages 17 and 19.

The lower face of the body 11 is counterbored at 22, as is shown in Figures 1 and 2. A gasket 22a is inserted in the counterbore and against the gasket a transparent bowl 23 is held.

A cup 24 is operatively connected to a thumb nut 25 which engages a screw 26. The head of the screw is slotted at 27 to receive the bight 28 of a spring clamp 29. The screw 26 is manipulated to tighten the bowl 23 against the gasket in leak tight relationship whereupon the spring clamp is applied with its bight in the slot in the head of the screw to hold the cup in operative position. The spring clamp 29 is preferably in the form of a wire bent into substantially U-shape, with its ends inturned at 30 and 31 to engage notches 32 and 33 respectively formed in the top portion of the valve body 11, as may be observed in Figure 4. The spring clamp is applied in holding position by spreading the ends and snapping them over the edge of the body so that their ends 30 and 31 engage the notches thus holding the spring clamp and the bowl 23 in operative relation.

A passageway 34 is formed in the valve body to enable flow of gasoline from the chamber 14 into the bowl 23 whenever the stem 15 is moved to open communication between the tank and bowl.

Referring to Figures 1 and 2, it will be observed that the chamber 14 is of cylindrical shape for the major portion of its length. At the end of the chamber adjacent the passageway 34 the diameter of the chamber is reduced as at 35. For convenience the portion 35 of reduced diameter of the chamber 14 may sometimes be herein referred to as the end bore.

Inserted in the bore or chamber 14 is a ring 36 secured in the bore between the passages 18 and 19 and constitute a valve seat under certain conditions.

The stem 15 is preferably of one piece construction and formed as shown in Figures 1 and 2. Reference to the stem construction will be made, as to left hand and right hand, as the stem is shown in Figures 1 and 2.

The left hand end of the stem has an end flange 37, and spaced axially from it is another flange 38, the flanges 37 and 38 defining a cylindrical groove 39. The diameters of the flanges 37 and 38 are the same and are such as to pass through the seating ring 36. Within the groove 39 is an O ring 40 the outer diameter of which under certain conditions engages the inner surface of the sealing ring 36 in sealing relationship as is illustrated in Figure 1.

Axially spaced, to the right, from the flange 38 is a cylindrical flange 41 the outer diameter of which is substantially that of the chamber 14. Spaced to the right from the flange 41 is another flange 42 of the same diameter but of less axial extent. Flanges 41 and 42 define between them a cylindrical groove 43 in which is another O ring 44. To the right of flange 42 the stem is formed with another groove 45 having a cylindrical bottom 46 and a sloping wall 47. The other wall of the groove 45 is formed by the right hand face of the flange 42 which, it may be observed, lies in a plane at right angles to the axis of the stem. This plane surface of the flange 42 constitutes a stop for limiting outward movement of the stem 15, as will be more fully explained. The groove 45 is sometimes herein mentioned as an end groove.

The O rings 40 and 44 may be made of any suitable rubber like material or resilient synthetic plastic and operate in a manner now well known in the trade by those familiar with the use of O rings.

The sloping wall 47 of the groove 45 merges with the cylindrical portion 48 of the stem 15 having an outer diameter the same as that of the flanges 41 and 42. Between the cylindrical portion 48 and the next cylindrical portion 50, to the right of the portion 48 is an internal groove 49 having inclined walls which make an angle of substantially 90° with each other and each wall making an angle of substantially 45° with respect to the axis of the stem. This groove is sometimes herein termed an intermediate or middle groove.

To the right of the cylindrical portion or surface 50 is another cylindrical surface 51 the outer diameter of which is the same as surfaces 48 and 50. The portions 50 and 51 are separated by a groove 52 having a cylindrical bottom 53 of less diameter than the portions 50 and 51, an inclined side wall 54 sloping downwardly to the bottom 53 from the cylindrical surface 50. The outer wall 55 of the groove lies in a plane which is at right angles to the axis of the stem 15 and which wall will hereinafter be sometimes mentioned as a stop. The groove 52 will sometimes be mentioned as an end groove.

Attached to the outer or right hand end of the stem 15 is a disc-like knob 56 held in place by a screw 57.

For engagement with the grooves 45, 49 and 52 of the stem 15, to hold it in endwise adjusted position, pressure means herein illustrated include what is termed a snap ring 58 bent from a piece of wire to form two legs 59 and 60 which are provided with inwardly bent offsets 61 and 62 with the convex portions of the offsets towards each other. The bight 63 is preferably curved to form a loop as shown in Figure 4, which loop is bent to conform to the curvature of the outer surface of the lateral body portion 13 of the valve structure, as may be readily observed in Figures 3 and 4.

The lateral portion 13 of the body is slotted at 64 and 65 to receive the legs 59 and 60 of the snap ring, as may be observed in Figures 3 and 4. The snap ring is applied to the lateral portion 13 by forcing the offset portions 61 and 62 over the stem 15 to bring the bight against the outer surface of the lateral portion 13. When installed in the manner described, it will be observed that the convex portions of the offsets 61 and 62 engage the stem 15 below its axis. The offset portions 61 and 62 of the legs engage in any of the grooves 45, 49 or 52 to positively latch the stem 15 in adjusted position. Figure 3 shows the manner of engagement of the offset portions 61 and 62 with one of the stem grooves.

Referring to Figure 5 it will be noted that the chamber or bore 14 is out of communication with the cup 23 except through the passage 34.

The body 11 has formed in it a collar 66 which is arranged at 90° with respect to the lateral body portion 13, as may be noted in Figure 4. A connection (not shown) is made with the collar 66 and a carburetor. Gasoline entry to the collar is through a small bore 67 opening at one end into the collar and at the other end to the interior of the body.

Referring to Figures 1 and 2 the dotted lines 68 and 69 represent the reserve capacity of the tank 10. As long as the tank is filled to a point above the inlet pipe 20 gasoline will flow into the valve structure through the pipe 20. It is to be understood that, of course, all of the capacity

of the counterbored portion 17, the passages 18 and 19, and the chamber 14 as well as the cup 23 are filled with gasoline.

Figure 4 shows the position of the valve stem 15 in normal or running position. That is to say the position of the valve stem when there is gasoline in the tank 10 above the upper end of the inlet pipe 20.

Whenever the vehicle operator observes collection of sediment in the bowl 23, he closes the passageway 34 by pushing the stem 15 to the left so that the O ring 40 in the left hand end of the stem will seal against the cylindrical surface of the end bore 35 thus cutting off flow communication between the chamber 14 and the bowl 23. The bowl may then be removed by loosening the thumb nut 25 swinging the spring clamp to one side, removing the bowl 23, emptying its dirty contents and cleaning it and restoring it to the position shown in Figures 1 and 2 whereupon the spring clamp 29 is swung back into holding position, whereupon the thumb nut is tightened to hold the bowl in operative position.

The operator then moves the stem 15 to the right, that is to the normal running position shown in Figure 1 to thereby establish flow communication between the interior of the tank 10 and the bowl 23 and from it to the carburetor through the collar 66.

In the event the gasoline supply in the tank 10 falls below the upper limit 68 flow of gasoline will no longer take place through the inlet tube 20. To establish flow communication between the reserve supply of gasoline, that is the gasoline within the tank between the lines 68 and 69, and the bowl 23, the stem 15 is moved farther to the right, to the position shown in Figure 2 thus opening the passageway 19 to the chamber 14 and thence to the bowl 23.

The arrangement of the O rings 40 and 44, on the stem 15, is such that when the stem is moved to close communication between the bowl and the chamber 14, that is when the stem is moved to the left of the position shown in Figure 1, flow of gasoline from the tank will be shut off from the passageway 34 and the O ring 44 will lie to the right of the passage 19, thus preventing escape of gasoline out through the chamber 14 and along the stem.

It is apparent that the stem 15 is operated by push pull action.

The utilization of the snap ring 58 and its manner of engagement with any of the grooves 45, 49 or 52 of the stem, is such that the operator can feel engagement of the snap ring with any of the grooves, as he pushes or pulls the stem, thus assuring himself that the stem is in proper operative position for the selected adjustment.

The utilization of the snap ring 58 and the grooves 45, 49 and 52 of the stem, may be said to operate with click action so that the operator can perceive the click as he manipulates the stem.

The face of the flange 42 which is at right angles to the axis of the stem serves as a stop, when the stem 15 is pulled to the right, and this face is brought into engagement with snap ring 59. It would be impossible for the offset or bowed portions 61 and 62 of the snap ring fingers to separate to an extent whereby the stem 15 could be moved to the right beyond its limit of travel as determined by the flange 42 contacting the snap ring. The inclined wall 47 of the groove 45, when the stem is moved to the left as viewed in the drawings, spreads the offset portions 61 and 62 so that the cylindrical surface 48 may be slid, to the left, through the snap ring. Continued movement of the stem to the left eventually brings the intermediate or middle groove 49 into engagement by the offset portions 61 and 62 of the snap ring which engagement causes the ring to engage the groove with snap action. The inclined walls of this groove, make it easy for the stem to be moved in either direction with respect to the snap ring.

When the stem 15 has been moved to the left so that the side wall 54 of the groove 52 abuts the snap ring further movement of the stem to the left will be stopped as the offset portions 61 and 62 will not rise over the walls because of the fact that it is in a plane in right angles to the axis of the stem.

A valve construction of the present invention is one which may readily be manufactured at economical costs, as the valve body may be cast or die cast, and the stem may be readily turned without holding the construction thereof to close manufacturing tolerances.

It is to be observed that the push pull stem 15 is one which may be very quickly and readily adjusted to suit conditions existing at any time, with full assurance that the stem will be moved to its proper position of adjustment to not interfere with the gasoline flow from the tank to the carburetor, as might otherwise occur if the stem were a threaded stem and the operator of the vehicle was not sure of the proper adjustment of the threaded stem.

It will, of course, be understood that various details of construction may be varied through a wide range without departing from the principles of this invention and it is, therefore, not the purpose to limit the patent granted hereon otherwise than necessitated by the scope of the appended claims.

I claim as my invention:

1. In a sediment drain bulb valve construction, in combination, a valve body defining a lateral cylindrical valve chamber and an upstanding inlet neck, a pair of inlet tubes mounted in said neck communicating with said lateral cylindrical valve chamber, a plunger-type valve stem characterized by a plurality of axially spaced annular grooves formed in its surface for selectively controlling said inlet tubes and a snap ring seated in said valve body and surrounding said stem selectively engageable with said grooves for locking said stem in desired position.

2. In a sediment drain bulb valve construction for a fluid container, in combination, a valve body characterized by a lateral body portion defining a cylindrical valve chamber and an upstanding neck portion defining a pair of acutely inclined counterbores which intersect said valve chamber at predetermined spaced intersections thereby forming a series of lands, a pair of inlet pipes of varying lengths fitted into said counterbores and adapted to communicate with upper and lower levels of the fluid container, and a plunger-type valve stem receivable in said valve chamber selectively seatable on said lands defined in said valve chamber for controlling fluid flow from said inlet pipes through said valve body.

3. In a sediment drain bulb valve construction, in combination, a valve body characterized by a lateral body portion defining a cylindrical valve chamber and an upstanding inlet neck portion defining a pair of substantially vertical spaced inlet counterbores which intersect and communi-

cate with said valve chamber at predetermined spaced intervals thereby forming a plurality of spaced lands between said points of intersection, a mesh strainer surrounding said inlet neck, an insert type inlet tube receivable in said inlet counterbores for selectively projecting fluid inlet level of one of said counterbores a predetermined spaced vertical dimension above the other counterbore inlet level, a plunger-type valve stem characterized by a seating portion defining a series of annular flats and lands cooperating with said inlet counterbores and said lands of said chamber to selectively control the flow of fluid from said inlet counterbores through said valve chamber and further characterized by a body portion defining a plurality of annular grooves formed in its surface, and a resilient snap ring seated in said valve body surrounding body portion of said stem for selective locking engagement with said grooves when said plunger valve is manipulated within said chamber.

CLYDE A. BROWN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,095,016	McDevitt	Apr. 28, 1914
1,459,934	Stiles	June 26, 1923
1,548,363	Horst	Aug. 4, 1925
1,950,854	Lerch	Mar. 13, 1934
2,222,346	Eickstaedt	Nov. 19, 1940
2,326,487	Overbeke	Aug. 10, 1943

FOREIGN PATENTS

Number	Country	Date
12,487	Great Britain	June 11, 1911
274,578	Germany	May 25, 1914
361,002	Germany	Oct. 10, 1922
670,224	Germany	Jan. 14, 1939