

Dec. 31, 1935.

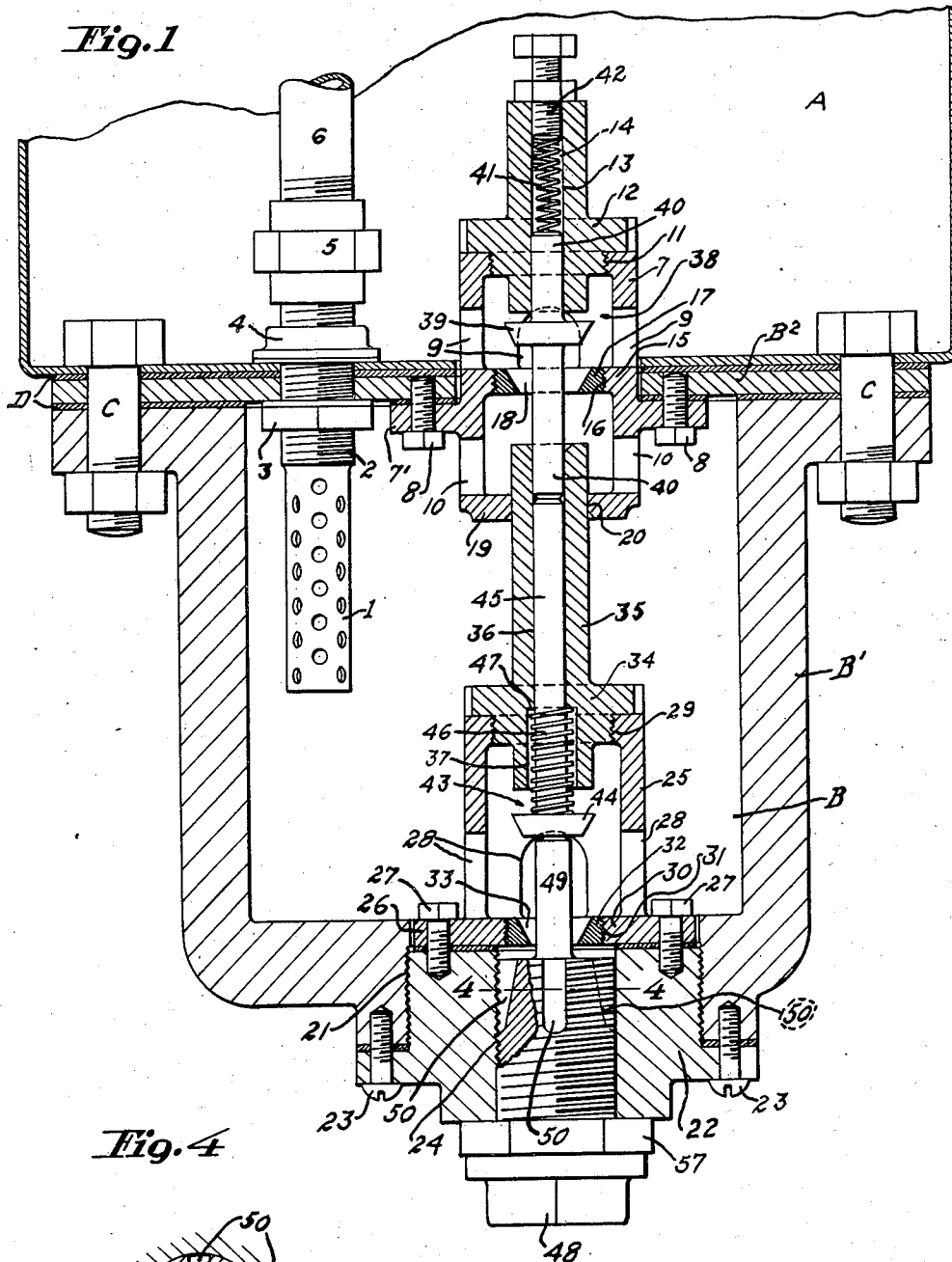
R. C. STEPHENS

2,026,196

VALVE STRUCTURE

Filed June 2, 1933

2 Sheets-Sheet 1



INVENTOR
R.C. STEPHENS
BY *J.H. Cook*
ATTORNEY

Dec. 31, 1935.

R. C. STEPHENS

2,026,196

VALVE STRUCTURE

Filed June 2, 1933

2 Sheets-Sheet 2

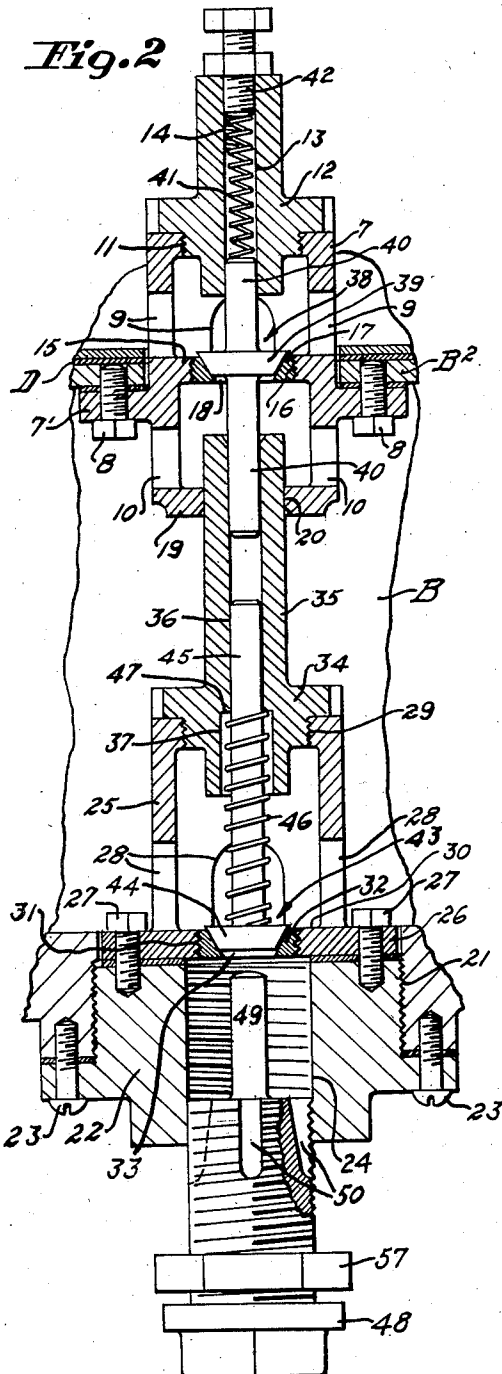
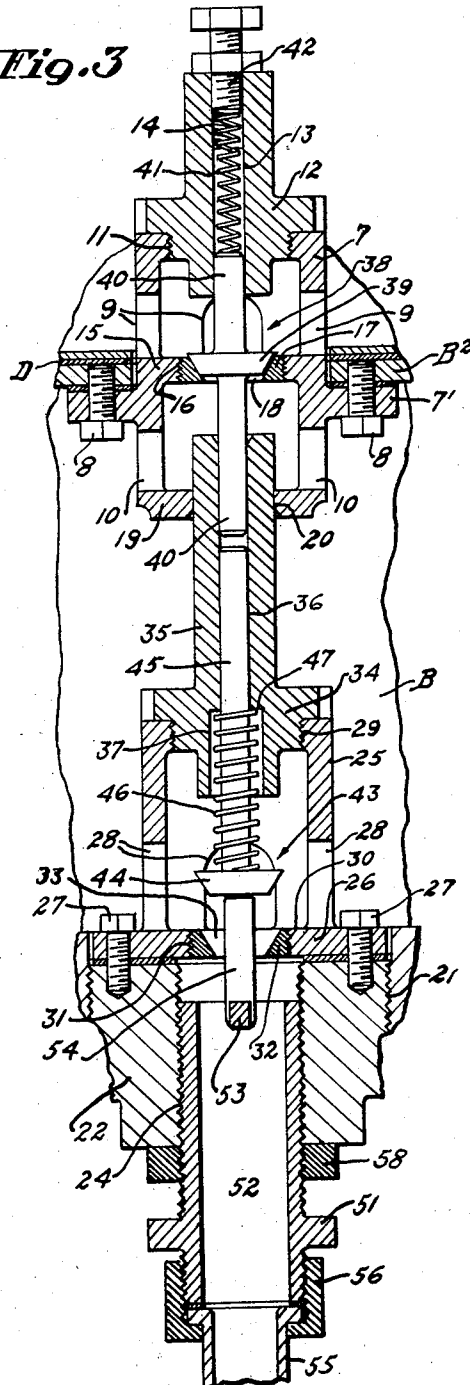


Fig. 3



INVENTOR
R.C. STEPHENS
BY J. H. G. [Signature]
ATTORNEY

UNITED STATES PATENT OFFICE

2,026,196

VALVE STRUCTURE

Robert C. Stephens, Springfield, Mo.

Application June 2, 1933, Serial No. 673,978

11 Claims. (Cl. 137—21)

This invention relates generally to valve structures, and more specifically to valve structures of the safety type adapted for use in association with receptacles containing gasoline and other highly inflammable liquids, the predominant object of the invention being to provide an extremely simple and inexpensive valve structure of this type which is capable of very efficiently performing its intended function.

It is quite well known that serious explosions and damaging fires have been caused heretofore when persons have been attempting to withdraw from receptacles containing inflammable liquid the bodies of liquid, or sediment and other heavier matter which settled to the bottoms of the receptacles, or into sediment chambers forming parts thereof. The main purpose of this invention is to provide an improved valve structure which is adapted for association with an inflammable liquid receptacle having a sediment chamber, and which is capable of such operation that the contents of the sediment chamber may be withdrawn therefrom while the content of the main receptacle is confined therein. Because of this situation the hazard which would be present due to the warm body of liquid being unconfined is eliminated. Also, the improved valve structure is capable of such operation that the contents of both the sediment chamber and the main receptacle may be withdrawn in an entirely safe manner.

Fig. 1 is a fragmentary vertical section of a receptacle which has the improved valve structure associated therewith.

Fig. 2 is a fragmentary vertical view of the valve structure shown in Fig. 1, but showing parts thereof in changed position.

Fig. 3 is a view similar to Fig. 2, but showing a different element for unseating the lower valve member.

Fig. 4 is a cross-section on line 4—4 of Fig. 1.

In the drawings, wherein is shown for the purpose of illustration, merely, one embodiment of the invention, A designates a receptacle which is adapted to receive a body of gasoline or other inflammable liquid, said receptacle being of any construction which would be suitable for the purpose. The receptacle A has associated with it a sediment chamber B which is secured by suitable fastening devices C to the bottom wall of the receptacle A. The sediment chamber B comprises a lower chamber portion B' and a top plate B² which constitutes the top wall of the sediment chamber, said fastening devices C being extended through apertures formed through the bottom

wall of the receptacle A, the top plate B² and an annular, outwardly extended flange formed on the lower chamber portion B' of the sediment chamber B. In order to provide fluid-tight joints between the lower chamber portion B' and the top plate B², and between said top plate and the bottom wall of the receptacle A, suitable gaskets D are employed.

Extended downwardly into the sediment chamber B is a perforated pipe 1 which at its upper end is screw-threaded, as indicated at 2 in Fig. 1. The screw-threaded portion 2 of the pipe 1 is extended through aligned apertures formed through the bottom wall of the receptacle A, the top plate B² and the upper gasket D, said screw-threaded portion receiving a nut 3 which, with the flange 4, serves to clamp the pipe 1 in position. Attached to the extreme upper end of the pipe 1 by means of a suitable coupling 5 is a conductor, which, in the case where the receptacle A is associated with an internal combustion engine, leads to the carburetor (not shown) of such internal combustion engine.

Fixed to the top plate B² is a valve casing 7 which preferably is of cylindrical shape, said valve casing being extended through aligned openings formed through the bottom wall of the receptacle A and through the top plate B², and being provided with an outwardly extended annular flange 7' through which suitable fastening devices 8 for securing the valve casing to said top plate extend. At a point above the top plate B² the wall of the valve casing is provided with a plurality of openings 9 through which liquid may enter said valve casing from the receptacle A. Also, at a point below the top plate B² the wall of the valve casing is provided with similar openings 10 through which liquid may pass from the valve casing into the sediment chamber B. The upper end portion of the valve casing 7 is internally screw-threaded, as indicated at 11 in the drawings, and screwed into this screw-threaded portion of said valve casing is a guiding element 12. The guiding element 12 extends substantial distances above and below the top of the valve casing 7 and formed vertically through said element is an opening 13 which is screw-threaded at its upper end as indicated at 14. At a point intermediate the top and bottom of the valve casing 7 said valve casing is provided with a horizontal wall 15 which has a screw-threaded opening 16 formed therethrough. This screw-threaded opening receives an externally screw-threaded disk 17 having a tapered opening formed therethrough which pro-

vides a valve seat 18. The valve casing includes a bottom wall 19 through which an opening 20 is formed.

The bottom wall of the sediment chamber B is provided with a screw-threaded opening into which an externally screw-threaded plug 22 is screwed, said plug being provided with an outwardly extended flange through which suitable fastening devices 23 are extended for securing said plug to the wall of the sediment chamber. The plug 22 has a screw-threaded opening 24 formed centrally therethrough, and secured to said plug at the top face thereof is a valve casing 25 which resembles somewhat the valve casing 7 already referred to herein. The valve casing 25 includes an outwardly extended flange 26 at its lower end, through which fastening devices 27 extend for securing said valve casing to the plug 22. Also the wall of the valve casing 25 is provided with a plurality of openings 28 through which liquid may flow into the valve casing from the sediment chamber, and the valve casing at its upper end is provided with a screw-threaded opening 29. At its lower end the valve casing 25 is provided with a bottom wall 30 having a screw-threaded opening 31 formed therein, said screw-threaded opening receiving an externally screw-threaded disk 32, which is provided with a tapered opening formed therethrough that serves as a valve seat 33. Screwed into the screw-threaded opening 29 at the upper end of the valve casing 25 is a guiding element 34, which includes a tubular portion 35 that extends upwardly and passes into the interior of the upper valve casing 7 through the opening 20 in the bottom wall 19 thereof. The opening 36 formed through the guiding element 34 is enlarged at its lower end, as indicated at 37.

Associated with the valve casing 7 is a valve member 38 which comprises a valve head 39 and stem portion 40, which extend upwardly and downwardly from said valve head. The upper stem portion 40 of the valve member 38 is extended into the opening 13 of the guiding element 12, while the lower stem portion of said valve member is extended into the opening 36 in the tubular portion 35 of the guiding element 34. In this manner the valve member is guided for vertical movement as the valve head moves toward and from the valve seat 18. Arranged above the upper stem portion 40 is a coil spring 41 which is interposed between the top face of the upper stem portion 40 and the lower end of a screw-threaded element 42 which is screwed into the enlarged, screw-threaded opening 14 at the upper end of the guiding element 12. The coil spring 41 tends to force the valve member 38 downwardly, and the screw-threaded element 42 may be manipulated to regulate the tension exerted by said coil spring.

Associated with the valve casing 25 is a second valve member 43 which comprises a valve head 44, which is movable toward and from the valve seat 33, and a stem 45 which extends upwardly from said valve head and is arranged largely within the opening 35 formed through the guiding element 34 for guided vertical movement. The valve member has associated with it a coil spring 46 which is interposed between the top face of the valve head 44 and a shoulder 47 at the upper end of the enlarged lower portion 37 of the opening 36 formed through the guiding element 34, said coil spring tending to force the associated valve member downwardly.

Screwed into the screw-threaded opening 24

formed through the plug 22 is a secondary plug 48, which is provided with an upwardly extended stem 49. The secondary plug 48 is also provided with a plurality of grooves 50 spaced circumferentially of the outer surface of said secondary plug, as shown in Fig. 4, said grooves being open at the top face of the plug and at the outer circumferential face thereof. The grooves 50 are of elongated, tapered shape, as shown in Fig. 1, and extend from the top face of the secondary plug to a point some distance below said top face.

In the use of the improved structure disclosed herein, the normal positions of the valve members 38 and 43 are as shown in Fig. 1, that is, with the valve heads of both valve members raised off of their seats. This arrangement of the valve members permits liquid to flow from the receptacle A through the upper openings 9 of the valve casing 7 into the interior of said valve casing, and through the lower openings 10 of said valve casing 7 into the sediment chamber B. Also, liquid and sediment within the sediment chamber may flow through the openings 28 of the valve casing 25 into the interior of said valve casing, leakage of said liquid from the sediment chamber B being prevented by the plug 22 and secondary plug 48. It will be noted that in the normal condition of the structure the stem 49 of the secondary plug 48 holds the valve member 43 in an elevated position, and because the top face of the stem 45 of said valve member 43 contacts with the bottom face of the lower stem 48 of the valve member 38, said valve member 38 is likewise held in an elevated position.

If it be assumed now that it is desired to drain all or a portion of the contents of the sediment chamber therefrom, the secondary plug 48 is unscrewed so as to move same downwardly, the valve members 38 and 43 moving downwardly correspondingly under the action of the coil springs 41 and 46. The valve head of the upper valve member 38 does not move as far as the valve head of the lower valve member to reach its seated position, hence said upper valve head will be seated so as to close communication between the receptacle A and the sediment chamber B while the lower valve head is still in an unseated condition. This relationship of the upper and lower valve members is illustrated in Fig. 3. As the downward movement of the secondary plug 48 continues, the valve head of the lower valve member finally reaches its seat at which time both valve heads are seated and the lower portions of the grooves 50 have passed beyond the lower face of the plug 22, as shown in Fig. 2. This will permit the matter which was trapped between the top of the secondary plug and the head of the lower valve head 44 to drain from within the opening 24 through the grooves 50. With the secondary plug 48 in the lowered position in which it is shown in Fig. 2, and with the lower valve head seated, the user will be apprised as to whether or not the lower valve unit is leaking, for, if after the matter which was trapped above the secondary plug 48 has drained therefrom fluid continues to drain through the grooves 50, the leaking condition of the lower valve unit will be apparent.

After the heads of both valve members have been seated as shown in Fig. 2, and the test as to the tightness of the seating of the lower valve head has been made, the secondary plug 48 is entirely removed from the screw-threaded opening 24. The user then inserts his fingers, or some suitable instrument, upwardly into the

screw-threaded opening 24 and unseats the valve head 44 of the lower valve member 43. Thus the contents of the sediment chamber B, or any part thereof, may be permitted to flow from said sediment chamber, and because the lower valve member is not moved upwardly far enough to unseat the upper valve member there is no danger that the contents of the main receptacle will escape therefrom, as the closed upper valve member will prevent this. If, however, it should be desired to withdraw the contents of the main receptacle therefrom, the lower valve member is moved upwardly far enough to unseat the upper valve head whereby the contents of the main receptacle will pass into the sediment chamber and will be discharged from said sediment chamber through the opening 24.

It is apparent, therefore, that withdrawal of fluid from the sediment chamber B and from the main receptacle A of the structure is under such absolute control of the user of the improved structure that the withdrawal may be accomplished with the maximum safety, whereby the great hazards of fire and explosions heretofore present are reduced to a minimum.

When it is desired to conduct liquids from the improved structure to another receptacle or to a remote point, a fitting 51 (Fig. 3) is screwed into the screw-threaded opening 24 in the plug 22. This fitting is provided with an opening 52 formed entirely therethrough, and at the upper end thereof a cross element 53 is provided which supports a stem 54. At the lower end of the fitting 51 a conductor 55 is attached to the fitting 51 with the aid of a suitable coupling 56. When the fitting 51 is employed, said fitting may be screwed upwardly in the screw-threaded opening 24 far enough for the stem 54 to insert only the lower valve member 43, or, if desired, said fitting may be screwed an added distance into the opening 24 so as to unseat the upper valve member 38 in addition to the lower valve member 43.

An important feature of the present invention relates to the ease with which the lower valve unit, including the valve casing 25, valve member 43, guiding element 34, etc., may be removed from the sediment chamber B for repairs or replacement. It is noted that this valve unit is supported entirely by the plug 22, hence the entire valve unit may be removed by simply removing the plug 22 from the threaded opening 21 and moving the valve unit downwardly through said opening 21. The upper valve unit may be removed from the structure through the opening 21, or the entire sediment chamber may be removed to give access to said upper valve unit.

In order to prevent accidental unseating of the valve member 38 of the upper valve unit because of unintended movement of the secondary plug 48 or of the fitting 51 in an upward direction, I provide said secondary plug with a lock nut 57 and said fitting with a similar lock nut 58, which must be manipulated so as to shift their positions with respect to the secondary plug and the fitting before said plug or fitting may be moved upwardly sufficiently to unseat the valve head of the upper valve unit.

I claim:

1. A valve structure for a fluid receptacle provided with a sediment chamber which communicates with said fluid receptacle, comprising a valve unit including a valve head movable toward and from a valve seat for controlling passage of fluid from said receptacle to said sediment chamber, a second valve unit including a valve head

movable toward and from a valve seat for controlling passage of fluid from said sediment chamber, the last-mentioned valve unit being operable independently of the first-mentioned valve unit to permit withdrawal of matter from the sediment chamber while the first-mentioned valve unit closes communication between the fluid receptacle and the sediment chamber, and means whereby movement of the second-mentioned valve unit is transmitted from said second-mentioned valve unit to the first-mentioned valve unit when it is desired to unseat the valve heads of said valve units simultaneously.

2. A valve structure for a fluid receptacle provided with a sediment chamber which communicates with said fluid receptacle, comprising a valve unit including a valve head movable toward and from a valve seat for controlling passage of fluid from said receptacle to said sediment chamber, a second valve unit including a valve head movable toward and from a valve seat for controlling passage of fluid from said sediment chamber, the last-mentioned valve unit being operable independently of the first-mentioned valve unit to permit withdrawal of matter from the sediment chamber while the first-mentioned valve unit closes communication between the fluid receptacle and the sediment chamber, and means comprising stems associated with valve heads forming parts of said valve units, which stems are adapted to be brought into contact relation, for transmitting movement from the second-mentioned valve unit to the first-mentioned valve unit when it is desired to operate said valve units simultaneously.

3. A valve structure for a fluid receptacle provided with a sediment chamber which communicates with said fluid receptacle, comprising a valve casing arranged at the point of communication between said receptacle and said sediment chamber, a valve seat within said valve casing, a valve head movable toward and from said valve seat, means for guiding said valve head during movement thereof, said sediment chamber being provided with an outlet opening in the wall thereof, a second valve casing arranged at the outlet opening of the sediment chamber, a valve seat within said second valve casing, a valve head movable toward and from the valve seat of said second valve casing, guiding means for said valve head, the valve head within the second-mentioned valve casing being operable independently of the valve head of the first-mentioned valve casing, so that matter may be withdrawn from the sediment chamber while communication between the receptacle and the sediment chamber is closed by the first-mentioned valve head, means for imparting movement from the second-mentioned valve head to the first-mentioned valve head when it is desired to operate said valves simultaneously, and means for closing the outlet opening of said sediment chamber when the valve heads within both of said valve casings are unseated.

4. A valve structure for a fluid receptacle provided with a sediment chamber which communicates with said fluid receptacle, comprising a valve casing arranged at the point of communication between said receptacle and said sediment chamber, a valve seat within said valve casing, a valve head movable toward and from said valve seat, means for guiding said valve head during movement thereof, said sediment chamber being provided with an outlet opening in the wall thereof, a second valve casing arranged at the outlet

opening of the sediment chamber, a valve seat within said second valve casing, a valve head movable toward and from the valve seat of said second valve casing, guiding means for said valve head, the valve head within the second-mentioned valve casing being operable independently of the valve head of the first-mentioned valve casing so that matter may be withdrawn from the sediment chamber while communication between the receptacle and the sediment chamber is closed by the first-mentioned valve head, stem means for imparting movement from the second-mentioned valve head to the first-mentioned valve head when it is desired to operate said valves simultaneously, and means for closing the outlet opening of said sediment chamber when the valve heads within both of said valve casings are unseated.

5. A valve structure for a fluid receptacle provided with a sediment chamber which communicates with said fluid receptacle and has an outlet opening formed in a wall thereof, comprising a valve unit for controlling passage of fluid from said receptacle to said sediment chamber, a closure element for said outlet opening of the sediment chamber, a second valve unit for controlling passage of matter from said sediment chamber through the outlet opening thereof, said second valve unit being supported by said closure element and being removable from the sediment chamber therewith, and means for imparting movement from said second-mentioned valve unit to the first-mentioned valve unit when it is desired to operate said valve units simultaneously to open same.

6. A valve structure for a fluid receptacle provided with a sediment chamber which communicates with said fluid receptacle and has an outlet opening formed in a wall thereof, comprising a valve unit for controlling passage of fluid from said receptacle to said sediment chamber, a closure element for said outlet opening of the sediment chamber, a second valve unit for controlling passage of matter from said sediment chamber through the outlet opening thereof, said second valve unit being supported by said closure element and being removable from the sediment chamber therewith, and stem means for imparting movement from said second-mentioned valve unit to the first-mentioned valve unit when it is desired to operate said valve units simultaneously to open same.

7. A valve structure for a fluid receptacle provided with a sediment chamber which communicates with said fluid receptacle, comprising a valve unit for controlling passage of fluid from said receptacle to said sediment chamber, a second valve unit for controlling passage of fluid from said sediment chamber, the last-mentioned valve unit being operable independently of the first-mentioned valve unit to permit withdrawal of matter from the sediment chamber while the first-mentioned valve unit closes communication between the fluid receptacle and the sediment chamber, means for transmitting movement from the second-mentioned valve unit to the first-mentioned valve unit when it is desired to operate said valve units simultaneously to open same, and means comprising an element adapted for insertion into and movable within the discharge opening of said sediment chamber for moving said second valve unit to its open position.

8. A valve structure for a fluid receptacle provided with a sediment chamber which communicates with said fluid receptacle, comprising a

valve unit for controlling passage of fluid from said receptacle to said sediment chamber, a second valve unit for controlling passage of fluid from said sediment chamber, the last-mentioned valve unit being operable independently of the first-mentioned valve unit to permit withdrawal of matter from the sediment chamber while the first-mentioned valve unit closes communication between the fluid receptacle and the sediment chamber, means for transmitting movement from the second-mentioned valve unit to the first-mentioned valve unit when it is desired to operate said valve units simultaneously, and means comprising an element adapted for insertion into and movement within the discharge opening of said sediment chamber for moving said second valve unit to its open position, said element being provided with a fluid passageway formed therein.

9. A valve structure for a fluid receptacle provided with a sediment chamber which communicates with said fluid receptacle, comprising a valve unit for controlling passage of fluid from said receptacle to said sediment chamber, a second valve unit for controlling passage of fluid from said sediment chamber, the last-mentioned valve unit being operable independently of the first-mentioned valve unit to permit withdrawal of matter from the sediment chamber while the first-mentioned valve unit closes communication between the fluid receptacle and the sediment chamber, means for transmitting movement from the second-mentioned valve unit to the first-mentioned valve unit when it is desired to operate said valve units simultaneously, and means comprising an element adapted for insertion into and movement within the discharge opening of said sediment chamber for moving said second valve unit to its open position, said element being provided with a plurality of fluid passageways formed therein at the outer surface thereof, and said element being movable within said discharge opening of said sediment chamber to positions where said passageways place the space within the upper portion of said discharge opening in communication with the outside of the sediment chamber.

10. A valve structure for a fluid receptacle provided with a sediment chamber which communicates with said fluid receptacle, comprising a valve unit for controlling passage of fluid from said receptacle to said sediment chamber, a second valve unit for controlling passage of fluid from said sediment chamber, the last-mentioned valve unit being operable independently of the first-mentioned valve unit to permit withdrawal of matter from the sediment chamber while the first-mentioned valve unit closes communication between the fluid receptacle and the sediment chamber, means for transmitting movement from the second-mentioned valve unit to the first-mentioned valve unit when it is desired to operate said valve units simultaneously, and means comprising an element adapted for insertion into and movement within the discharge opening of said sediment chamber for moving said second valve unit to its open position, and shiftable means for limiting upward movement of said element within said discharge opening.

11. A valve structure for a fluid receptacle provided with a sediment chamber which communicates with said fluid receptacle, comprising a valve unit for controlling passage of fluid from said receptacle to said sediment chamber, a second valve unit for controlling passage of fluid

from said sediment chamber, the last-mentioned valve unit being operable independently of the first-mentioned valve unit to permit withdrawal of matter from the sediment chamber while the first-mentioned valve unit closes communication between the fluid receptacle and the sediment chamber, means for transmitting movement from the second-mentioned valve unit to the first-mentioned valve unit when it is desired to operate

said valve units simultaneously, and means comprising an element adapted for insertion into and movement within the discharge opening of said sediment chamber for moving said second valve unit to its open position, and shiftable means comprising a lock nut mounted on said element for limiting upward movement of said element within said discharge opening.

ROBERT C. STEPHENS.