Our invention relates to the field of tanks, and more particularly to a combination pressure and vacuum tank adapted to load and unload liquid material therefrom.

Frequently in the petroleum industry it is desirable to recover crude oil from such locations in the field as sumps or the cellars under derricks where suitable pumping equipment is normally not available, and to temporarily store the recovered oil until it can be transported to permanent storage facilities or used for maintenance purposes. It has been found from experience that oil recovered from sumps and cellars is normally mixed with considerable foreign material, and that such material may have a highly abrasive action on pumps which are used for such recovery purposes. In addition, the oil present in sumps may be only a relatively thin film floating on water, with the result that it is not practical to attempt to recover same with conventional pumping equipment.

Although the film of oil floating on water in a sump may be relatively thin, the amount of oil which is potentially recoverable from such sump will normally run from 50 barrels upwardly. It is therefore to recover this oil situated in a sump rather than having it burned from the surface of the water on which it is floating as is a common practice in some localities that we have devised our present invention.

It is a major object of our invention to provide a portable apparatus that can be moved to a location where crude oil is situated and load same into a tank without having the oil flow through a pump, that will be adapted to temporarily store the recovered oil until such time as it can be transported to permanent storage facilities or used in the field for maintenance work, and will be adapted to unload the oil from the temporary storage tank without having it flow through a pump during this operation.

Another object of our invention is to furnish an apparatus that will recover crude oil when it is situated as a relatively thin film on a body of water, that will be little affected by abrasive foreign material held in suspension in the oil, will have a simple mechanical structure, can be easily manufactured, will have a minimum of working parts, and can sold at a price which will be recovered in a relatively short time from the previously considered waste oil that is now salvaged.

A further object of our invention is to supply an apparatus that requires but one pump to alternately place air pressure and vacuum on the storage tank, that automatically stops loading oil upon the storage tank being filled, that is provided with a nozzle particularly adapted for skimming and recovering oil floating on water, and can easily be operated by one man.

These and other objects and advantages of our invention will become apparent from the following description of a preferred form thereof, and from the drawings illustrating that form in which:

Fig. 1 is a side elevational view of our combination pressure and vacuum oil storage tank mounted on a conventional power-operated truck;

Fig. 2 is an end elevational view of the device;

Fig. 3 is a vertical cross-sectional view of the device taken on the line 3—3 of Fig. 2;

Fig. 4 is a fragmentary perspective view of a combination bumper and spray pipe used in connection with the tank;

Fig. 5 is a vertical cross-sectional view of the tank taken on the line 5—5 of Fig. 3;

Fig. 6 is a vertical cross-sectional view of a float-valve assembly and scrubber used in the device, with the valve in the open position;

Fig. 7 is a vertical cross-sectional view of the float-valve assembly, with the valve in the closed position;

Fig. 8 is a horizontal cross-sectional view of the toggle mechanism used in connection with our float valve taken on the line 8—8 of Fig. 6;

Fig. 8A is a plan view of a modified form of toggle mechanism which can be used in connection with our float-valve;

Fig. 9 is a perspective view of the device being used in recovering an oil film floating on water in a sump;

Fig. 10 is a vertical cross-sectional view of a nozzle adapted for skimming oil from the surface of water in a sump;

Fig. 11 is a vertical cross-sectional view of another form of nozzle which is also adapted for skimming oil from the surface of water in a sump;

Fig. 12 is a plan view of a pump with a hori-
horizontal cross-sectional view of the valve control used in connection therewith, with the valve being positioned whereby air pressure is placed on the tank; and,

Fig. 13 is a plan view of the pump with a horizontal cross-sectional view of the control used in connection therewith, with the valve being positioned whereby a vacuum is placed on the tank.

Referring now to Fig. 1 for the general arrangement of our invention, it will be seen that a cylindrical tank T is supported in a longitudinal position from the chassis of a motor-powered vehicle V, with the vehicle being provided with a pump P whereby either air pressure or a vacuum can be placed on the tank. Thus upon air pressure being applied to the tank T the oil contained therein is forced outwardly through a discharge valve D as can best be seen in Fig. 2, and upon vacuum being applied thereto oil is drawn into the tank through a valve S provided for that purpose. It will of course be apparent that during the time the tank T is filled with oil the valve D is in the closed position.

The tank T is preferably formed from welded steel plates in the form of an elongated cylindrical shell 10 having bumped ends 11 of a conventional design, with the entire tank assembly being constructed sufficiently heavy as to withstand both the air pressure and vacuum to which it will be subjected. Laterally spaced along the upper portion of the shell are two hand holes 12, each having a cover plate 13 provided thereon which is removably held in place by a conventional screw mechanism adapted for this purpose. Either of the hand holes 12 is sufficiently large as to have a hose lowered therein whereby the tank can be flushed out, with the progress of the work being observed from the opposite hand hole.

Situated on the upper portion of the tank T between the forwardly disposed hand hole 12 and the forward pumped end 11 is a vertical upwardly extending flanged condition 14. A flange 15 inverted dome 15 is pivotally mounted on an upright member 16 which is welded or otherwise secured to the upper portion of the shell 10, with the dome being adapted when rotated to a vertical position to engage the nozzle 14 to which it is secured by bolts in a conventional manner.

A 90-degree elbow 17 extends downwardly from the lower rearward portion of the tank T, and has a valve D affixed to its outer end whereby the flow of fluid from the tank T can be controlled. Although any one of the conventional type valves can be used as the valve D, we have found it convenient to apply a quick opening valve which is placed in the open or closed position by a single vertical movement of the handle 18. Another 90-degree elbow 19 extends downwardly from the lower rearward portion of the tank T adjacent to the elbow 17, and has the valve S mounted on its rearward end. The valve S is also of the quick opening type and is actuated by a vertically movable handle 20. In Figs. 2 and 3 it will be seen that the discharge valve D is of somewhat larger size than the valve S for reasons which will hereinafter be explained. A stand pipe 21 extends vertically upwardly within the confines of the tank T from the upper end of the elbow 19, with the upper end of the stand pipe being spaced approximately one-quarter of the inside diameter of the tank T from the upper inner surface thereof.

In Fig. 1 it will be seen that a combination bumper and spray pipe 22 is transversely posi-
viously mentioned valves when he is in a position to the rear of the vehicle V to fully observe the progress being made in the loading or unloading of oil.

Upon the rotatable portion of the plug cock 43 being placed in the position shown in Fig. 12, air is pulled inwardly through the combined air intake and discharge muffler 41 to flow through a pipe 42 into the cock 40. The air on entering the cock 40 flows through a bore 43 formed in the rotatable portion thereof to enter a suction line 44 leading to the pump 37, and from whence it is discharged through a pipe 45 to again enter the cock. The air flows from the pipe 45 through a bore 46 provided in the rotatable portion of the cock to enter a pipe 47 which is sealed to and passes through the forwardly positioned tank end 11. When it is desired to remove air from the tank T to permit same to be filled with fluid, the rotatable plug portion of the valve 40 is rotated 90 degrees in a counterclockwise direction to the position shown in Fig. 13 and air drawn from the tank T through the pipe 47 and bore 46 to enter the pump intake line 44, and from whence it is discharged from the pump through a pipe 45, bore 42, pipe 42, and muffler 41 to the atmosphere. Thus, with the above described valving arrangement the pump P can be utilized in providing either air pressure or vacuum on the tank T by simply rotating the movable portion of the cock 40 ninety degrees.

The pipe 47 after passing through the forwardly positioned tank end 11 proceeds rearwardly to a vertically positioned separator 48 to which it is placed in communication by conventional pipe fittings. Separator 48 is formed as an enclosed hollow cylinder having a flanged connection 49 extending upwardly from the top portion thereof, and a drain pipe 50 which is of considerably smaller diameter than the separator which proceeds downwardly from the base portion thereof. Drain pipe 50 passes through the lower portion of the tank T to which it is sealed, and is provided on the lower end on the exterior of the tank with a valve 50a. By the use of the valve 50a either foam or oil which has accumulated in the separator 48 can be removed therefrom by simple rotation of the separator and placing a suitable container thereunder for the oil to drain in. It will be noted that the nozzle 49 extends downwardly inside the separator 48 a substantial distance below where the pipe 47 enters, in order that foam or oil entering the separator will not be drawn outwardly through the pipe 41 into the pump.

As the impeller on the blower type pressure and vacuum pump which we prefer to use fits very closely to the interior surface of the housing it is highly undesirable to have any foreign material such as oil or water enter the confines of the pump.

A vertically positioned and upwardly extending pipe 51 having a flange on its lower end is affixed to the upper face of the flange connection 49 in a conventional manner by the use of bolts. The upper open end of the pipe 51 serves as a valve seat 52, and is formed with a downwardly and inwardly extending bevel that is preferably faced with brass. An annular ring 53 is secured to the interior face of pipe 51 as can best be seen in Fig. 6, and serves as a support for two laterally spaced guide strips 54 that are supported from the upper surface thereof, and two similar guide strips 55 that are fixed to the bottom face thereof. Each of the strips 54 and 55 is formed with a centrally disposed arcuate indentation on the interior edge thereof which serves as a guide for a vertically moveable rod 56. A horizontally positioned annular valve disc 57 is rigidly mounted on the rod 56, and is provided with a downwardly and inwardly beveled peripheral surface 58 formed therein which contains an annular ring 59 formed from a resilient material which is adapted to seat on the valve seat 52.

The rod 56 is moveably supported from a horizontally positioned pin 59 that engages the forward end of a lever 60, which lever as can best be seen from Fig. 6 is pivotally supported from an arm 61 that extends upwardly from a horizontal support 62 which is affixed to the exterior surface of the pipe 51. A vertical bore 63 is formed in the rearward end portion of the support 62 and has a rod 64 slidably mounted therein. The rod 64 on its upper end is pivotally connected to the rearward end of the lever 60, and on its lower end is provided with a horizontally positioned annular pressure plate 65. Situated below the pressure plate 65 are two vertically spaced horizontal arms 66 which also extend rearwardly from the exterior surface of the pipe 51, with each arm being formed with a vertical bore 67 therein which is in alignment with the bore 63. A vertically positioned rod 68 is slidably mounted in the arms 66, and is provided on its upper end with a horizontally positioned pressure plate 69 which is adapted to contact the plate 63 when the rod 68 is moved upwardly by a spherical float 70 that is affixed to the lower end thereof.

In order that the valve disc 57 will either be occupying the open position shown in Fig. 6 or the closed position shown in Fig. 7, two oppositely disposed strips 75 of phosphor bronze or a corrosion resisting metal are positioned between the strips 54 and 55, with one end of each of the strips 75 being pivotally and slidably connected to a pin 71 that extends through the rod 56, and the other end of each of the strips being rotationally supported from an individual horizontally positioned pin 78 that is mounted in a convenient manner from the interior base of the ring 53. Each of the strips 75 is sufficiently long so that it will pivot and slide on the pin 71 to act as a toggle, and will not remain in a stable position in the horizontal plane, but will force the disc 57 either into the open or closed position when actuated by a pair of helical springs 79. Extending along the longitudinal sides of the strips 75 are the two laterally spaced helical springs 79 which are supported between two crossbars 80, each of which is mounted on the outer end of one of the strips 75. The springs 79 are at all times in tension, and have sufficient strength to hold the valve disc 57 in the open position until the tension of the springs is overcome by pressure applied to the plate 63 which occurs from the pressure exerted by float 70 as the level of oil in the tank rises. However, once the valve disc 57 has been placed in the closed position as shown in Fig. 7 the springs 79 have sufficient strength to maintain it in this position until air is forced into the separator 48 by use of the pump P.

An alternate form of toggle mechanism is shown in Fig. 8A which is of extremely simple construction. Two strips 75' of a thin resilient material are pivotally connected at one end to the pin 71, and on the other end to a horizontally positioned pin 78' as previously described. The strips 75' are sufficiently long so that they will not remain in a horizontal plane in which post-
tion they are slightly bowed, but will assume either an upwardly or downwardly extending position to hold the valve disc 57 in an open or closed position respectively. This form of toggle is differentiated from the previously described form in that no springs 79 are used for the toggle action, which is achieved by the resiliency of the strips 78 themselves.

Upon it being desired to use the tank T in removing oil from a sump the truck V is moved into a convenient location with reference thereto. A length of hose 82 which is normally carried in a longitudinally extending rack 83 that is supported from the tank T as best be seen in Figs. 1 and 2 is removed, and by the use of a coupling 82A affixed thereto is connected to the valve S.

In Fig. 9 it will be noted that the hose 82 is used in the skimming of oil from a sump, and that a fan shaped nozzle 84 is affixed to the outer end thereof. However, when the hose 82 is being used for removing oil from such a location as a cellar under a derrick the nozzle 84 can be dispensed with and the lower end of the hose dropped directly under the surface of the liquid. In Fig. 10 is shown a vertical cross-sectional view of one form of our nozzle 84 which we have found to be particularly effective in the removing of thin films of oil from the surface of water. The upper end of the nozzle 84 is formed with an internally tapped portion 85 which permits it to be threaded to the nipple provided on the lower end of the hose 82, and from which the balance of the fan shaped nozzle slopes outwardly to terminate in a relatively narrow slit 86 which is provided on the lower edge thereof with an inwardly extending lip 87. It will be apparent that upon the nozzle 84 being used for the recovery of oil as shown in Fig. 9 that air is drawn inwardly through the passage 86 with a very high velocity by the pump P, with the result that the oil floating on the water is drawn inwardly through the nozzle in a very efficient manner and but slightly contaminated by the water on which it is floating. It has been found from experiments that the inwardly extending lip 87 shown in Fig. 10 aids materially in skimming oil from the water, as does the downwardly extending lip 88 shown in the alternate form of nozzle 84 in Fig. 11. The lip 88 is preferably formed by folding the lower edge portion of the orifice of nozzle 84 rearwardly on itself for reinforcing purposes. Both of the nozzles shown in Figs. 85 and 11 are identical except as to the structures 87 and 88, and although the above described lips 87 and 88 are definitely advantageous in removing oil from a body of water the theoretical reason as to why this occurs is not fully understood.

As the tank T is subjected to both vacuum and air pressure it is of course essential that the tank be restrained to withstand such varying conditions, and at the same time permit all of the oil which is held within the confines of the tank to drain from the valve D. In Fig. 5 it will be noted that an inverted L-shaped clip 93 is affixed to the interior of the shell 10, but that an open space 91 is left between the lower ends of the member which permit liquid to flow along the bottom portion of the tank T. An annular member 92 having the proper structural cross section is situated directly under the member 90 on the lower exterior surface of the tank, and substantially overlaps the lower portion of the interior member 98, extending upwardly to within a relatively short distance of an L-shaped clip 93 which is positioned on each side of the tank T. Stud bolts 94 engage vertically positioned bores formed in both members 93 and 94, and thus the tank T is firmly held in position on the member 92 without recourse to straps extending around the exterior surface of the tank itself.

Situated between the upper surface of the member 92 and the exterior surface of the tank T is a felt pad 92A which permits a slight movement of the tank with relation to the member 92 as the tank is being transported over rough terrain, but at the same time holds the tank in a fixed position on the truck bed. The members 92, as can be seen in Fig. 5 are supported from vertically positioned plates 94 which are affixed to the longitudinally extending channel-shaped members 95 that form a portion of the truck chassis.

In Figs. 3 and 5 it will be seen that a vertically extending baffle 96 is affixed to the forward face of the reinforcing member 90 inside the tank T, and is strengthened by welding angle iron members 97 to the interior surface of the tank T. In order that access may be easily had to the hand holes 13 and the dome 18 a longitudinally extending runway 98 is provided directly above the hose racks 83 on each side of the vehicle V as can best be seen in Figs. 1 and 2.

The operation of our invention is quite simple. The vehicle V is moved to a position whereby a length of hose 82 can be affixed to the suction valve S and the hose is either dropped into a sump from which it is desired to recover oil, or should the oil be floating on the surface of a liquid one of the nozzles 84 is affixed to the outer end of the hose 82 and the oil skimmed therefrom as previously described.

However prior to starting the recovery of oil either by use of the hose 82 itself, or with a nozzle 84 affixed thereto, it is necessary to place a vacuum on the tank which is accomplished by starting the pump P and moving one of the rods 36 to rotate the movable portion of the cock 40 to the position shown in Fig. 13.

As the vacuum on the tank T increases air is drawn inwardly through the hose 82 with great velocity and carries with it oil from the sump from which recovery is taking place. Oil and water from the pump P operating to create a vacuum on the tank T oil will immediately be drawn upwardly into the tank when the lower end of hose 82 is placed beneath the surface of the oil etc. as is done when oil is being recovered from the cellar under a derrick. Oil will continue to enter the tank T through the elbow 19 and standpipe 21 until the liquid level therein is only a short distance from the interior top portion of the tank T. At this time the liquid level contacts the spherical float 70 as shown in Fig. 6 and the rod 68 moves the pressure plate 63 upwardly until it contacts the lower surface of pressure plate 65. As further pressure is applied to the plate 65 the rod 58 supporting the valve disc 57 is moved downwardly as are the strips 75 until they act as a toggle due to springs 79, and snap downwardly on reinforcing member 90 as shown in Fig. 6 to that shown in Fig. 7. Upon this member the resilient ring 59 is pressed into contact with the valve seat 52 and an air tight seal is effected between the scrubber 48 and the interior of tank T. It will be apparent from an examination of Fig. 3 that now the member can be withdrawn from the tank T through the pipe 47 until such time as the valve disc 57 again occupies the position shown in Fig. 6. Thus the springs 79 are now holding...
the valve disc 57 in a closed position where it will so remain until air pressure is placed on the lower face of valve disc 57 by operation of the pump P to move the disc into the open position. As the tank T is now loaded the vehicle V is driven to a location where the oil contained in the tank will either be placed in permanent storage facilities or used in maintenance work on the field. In the normal recovery of oil from sumps and cellars under derricks it is quite usual for the vehicle V to be driven over relatively rough roads with the result that the oil contained in the tank T is in a constant state of movement and sloshes from one end of the tank to the other. However the movement of the oil within the tank is somewhat restricted by the vertically positioned baffles 56 which have a tendency to hold the movement of the oil to a minimum. It will be apparent that were it not for the valve disc 57 being held in a closed position by the previously described toggle valve there would be a distinct tendency for oil and foam to pass over into the separator 48 during the time that the valve disc 57 is in the open position due to the vertical movement of the float 70. However, from an examination of Figs. 6 and 7 it will be seen that this is impossible for while the level of the oil moves upwardly and downwardly due to the movement of truck T over rough terrain, the float 70 moves therewith, there is no fixed connection between the pressure plates 53 and 59 and the vertical movement of the spherical float 70 has no influence on the position of the valve disc 57 once it has assumed the closed position shown in Fig. 7. Upon the vehicle V leaving the location where it is desired to unload the oil from the tank T the pump P is started and one of the rods 38 moved to place the rotatable portion of cock 40 in the position shown in Fig. 12 whereupon air pressure is placed on the valve disc 57 and it is moved upwardly to assume the open position shown in Fig. 6.

It will be apparent that upon the valve disc 57 being moved to the open position by air pressure that there is air pressure on the upper surface of the liquid 109 as shown in Fig. 3, and upon the valve D being immediately discharged therefrom. However it frequently happens that in the recovery of oil from such locations as the cellars under derricks that it is mixed with a considerable amount of foreign material, and that this material when drawn upwardly into the tank T settles along the bottom thereof in a pattern shown by the phantom line 101 in Fig. 3. Upon this contingency occurring we have found that the foreign material has a tendency to pack very solidly, and that even by the application of pressure to the surface of the liquid 109 that the settling material will not be forced from the discharge valve D.

To alleviate this condition the upper portion of the liquid in the tank T is drained therefrom by using the standpipe 21, elbow 19, and the suction valve S for discharging purposes, and the level of the liquid lowered to the top of the standpipe 21. With the pump P operating vacuum and air pressure are alternately placed on the tank T by movement of the cock 40 to first the position shown in Fig. 12 and then to the position shown in Fig. 13. This alternate application of pressure and vacuum has been found from experience to cause the solidly packed foreign material to be churned up with the oil into a mixture that can be drained from the tank T through the valve D in the normal manner. However, for the application of alternate air pressure and vacuum to be most effective in churning up the deposited material the space in the interior upper portion of the tank down to the top of the standpipe 21 must be made available for the application of such air pressure and vacuum by the above described operation. Thus it will be seen that whether the recovered oil is totally free of foreign material or whether it is heavily contaminated therewith the above described device is not only fully capable of loading the oil without flowing through the pump P, but is equally capable of discharging the oil under the same conditions. It will also be seen that while we have illustrated our invention with particular reference to the petroleum industry that it will also have numerous other industrial uses where it is desired to recover liquid products.

Although it has been found that a conventional float valve assembly can be used to actuate the valve disc 57 such a valve has the disadvantage that it is actuated by the movement of oil in the tank as the vehicle V travels over rough ground. This of course is not in the float alternately opening and closing the valve disc 57, with the result that oil and foam spill over into the scraper 45 when the valve disc 57 is in the open position. Such oil and foam must be drained from the separator by the use of valve 59c to prevent it from being drawn into pump P through the pipe 47, and possibly doing considerable damage thereto.

While the above device herein described is fully capable of attaining the objects and providing the advantages hereinbefore stated, it is to be understood that it is merely illustrative of the presently preferred form of our invention, and that we do not mean to limit ourselves to the details of construction herein shown and described other than as defined in the appended claims.

We claim:

1. A portable vacuum and pressure tank apparatus, which includes: a tank; a pump operable to alternately furnish either air pressure or a vacuum; pipe means connecting said pump to the interior of said tank, said pipe means including an end portion disposed at the upper portion of said tank; a first valve selectively operable so as to admit liquid material into said tank upon said pump being operated to place a vacuum upon said pipe means; float-operated valve means positioned in said end portion for closing said end portion when the level of said liquid material reaches a predetermined height within said tank; means for holding said float-operated valve means closed until said pump is operated to place a positive air pressure on said pipe means; and a second valve selectively operable to permit said liquid material to be discharged from said tank upon said pump being operated to place positive air pressure on said pipe means.

2. In a portable vacuum and pressure tank apparatus having a tank, a vehicle supporting said tank, a pump supported on said vehicle and being operable to alternately furnish either air pressure or a vacuum, pipe means connecting said pump to the interior of said tank and including an end portion disposed at the upper portion of said tank, and a valve selectively actuable to admit liquid material into said tank upon said pump being operated to place a vacuum upon said pipe means, the combination of said apparatus which includes: float means positioned in said end portion to close said end por-
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In a portable vacuum and pressure tank apparatus of the class described having a tank, and power driven pump means adapted to supply either air pressure or vacuum to the interior of said tank; a separator positioned in said tank and connected to said pump; a float valve connected to said separator to control the communication between said separator and the interior of said tank; valve means selectively actuable to permit liquid to be discharged from said tank when said pump means is operated so as to place air pressure on the interior of said tank; valve means selectively actuable to permit liquid to be admitted within said tank when said pump means is operated so as to place a vacuum upon the interior of said tank; and spring means to hold said float valve closed until said pump means is operated so as to place air pressure on the interior of said tank.

4. A portable vacuum and pressure tank apparatus which includes: a tank; power driven pump means adapted to supply either air pressure or a vacuum to said tank; a pipe connecting said pump means to said tank; a cylindrical separator vertically positioned in said tank, with said separator having a beveled valve seat formed at the upper end thereof, and a lower discharge pipe, the upper portion of said separator being formed with an annular baffle passageway in communication with said pipe; a valve disc adapted to engage said valve seat; spring means for holding said valve disc against said seat; a pivotally mounted arm movably connected to said valve disc; a float, which upon rising to a predetermined elevation, pivots said arm to seat said disc; means for permitting the discharge of liquid from said tank upon said pump placing air pressure on the interior of said tank through said separator valve seat; and valve means connected to said tank for permitting liquid to be discharged from said tank upon said pump placing a vacuum on the interior of said tank and said valve disc out of communication, said spring means holding said disc closed until air pressure is placed on said valve disc by said pump.

5. A portable vacuum and pressure tank apparatus which includes: a tank; a power driven pump adapted to supply either air pressure or a vacuum to said tank; a pipe connecting said pump to the upper portion of said tank; a separator in said tank, with said separator having a beveled valve seat, and said separator being connected at the end of said pipe; a valve disc adapted to engage said valve seat; spring means for holding said valve disc in position in said seat; a pivotally mounted lever movably connected to said valve disc; a downwardly extending rod pivotally connected to the opposite end of said lever; a slideably mounted member in substantially vertical alignment with said rod; a float affixed to said member; valve means connected to the lower portion of said tank for permitting the discharge of liquid from said tank upon said pump placing air pressure on the interior of said tank through said separator valve seat; and valve means connected to said tank for permitting the admission of liquid into said tank upon said pump placing a vacuum on the interior of said tank through said separator valve seat; the loading of said liquid being stopped upon said float being raised to a predetermined position whereupon said member is moved upwardly to contact said rod and rotate said lever sufficiently to place said disc in said valve seat so as to block further communication between said separator and the interior of said tank, and said disc remaining so positioned due to said spring means until air pressure is placed on said disc by said pump.
said pump to overcome the force of said toggle mechanism.

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