

Sept. 21, 1943.

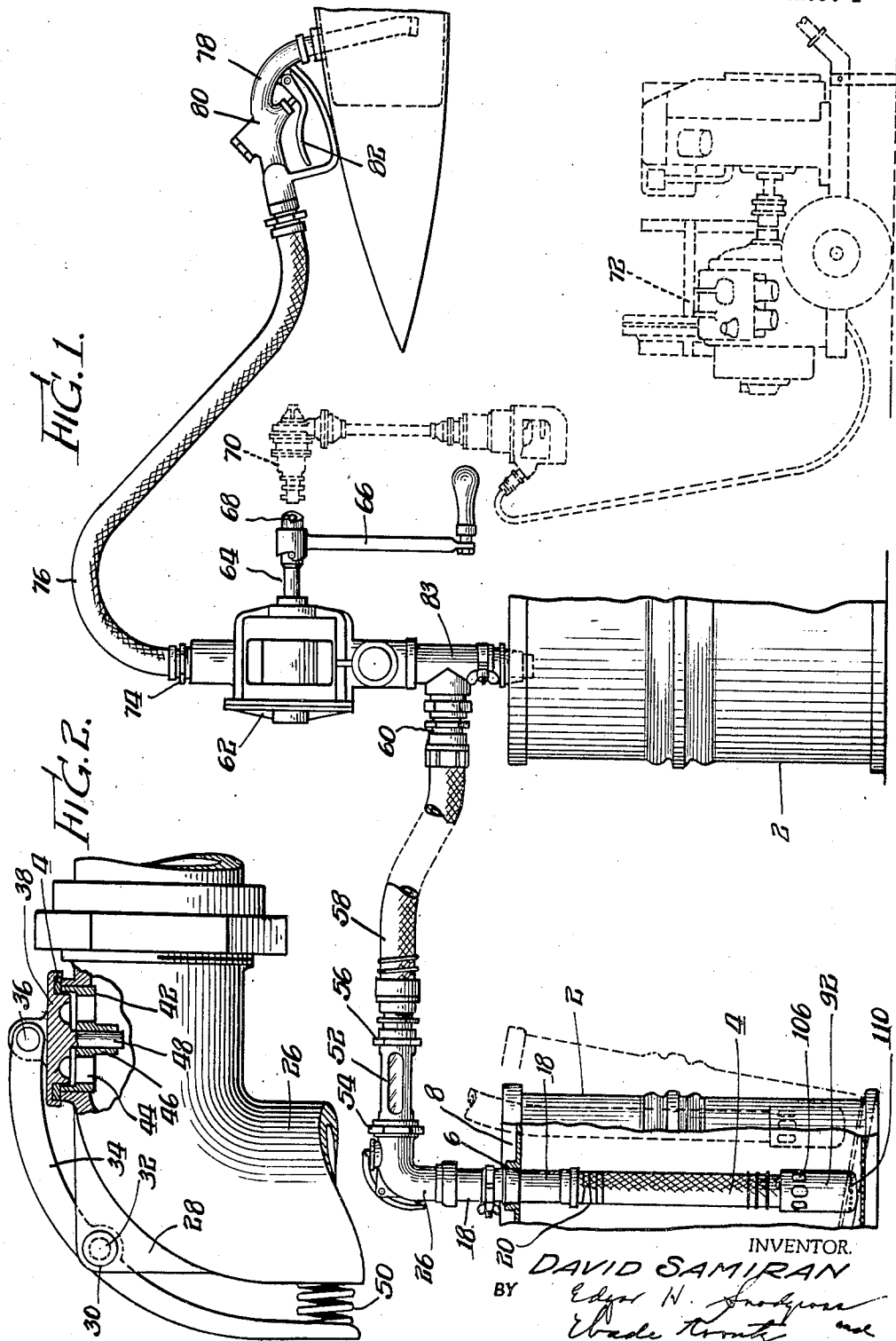
D. SAMIRAN

2,329,728

LIQUID DISPENSING DEVICE

Filed March 12, 1940

4 Sheets-Sheet 1



INVENTOR
DAVID SAMIRAN

BY *Edgar N. Jackson*
Wade Smith and
ATTORNEYS

Sept. 21, 1943.

D. SAMIRAN

2,329,728

LIQUID DISPENSING DEVICE

Filed March 12, 1940

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FIG. 5.

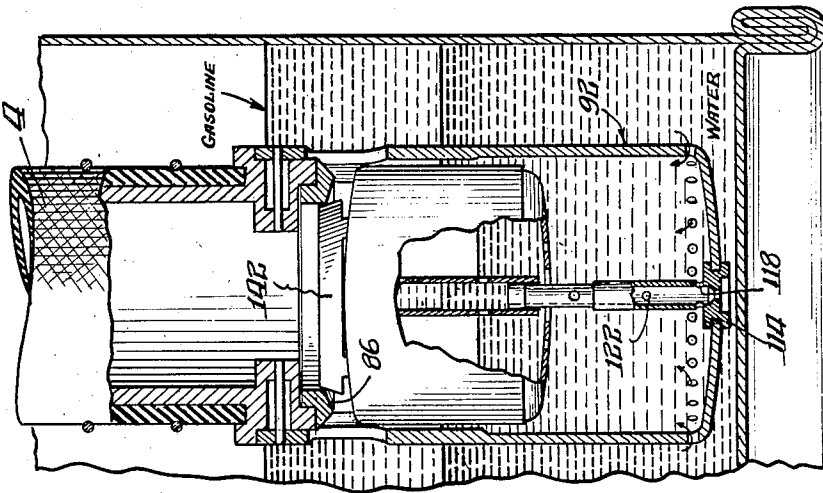


FIG. 4.

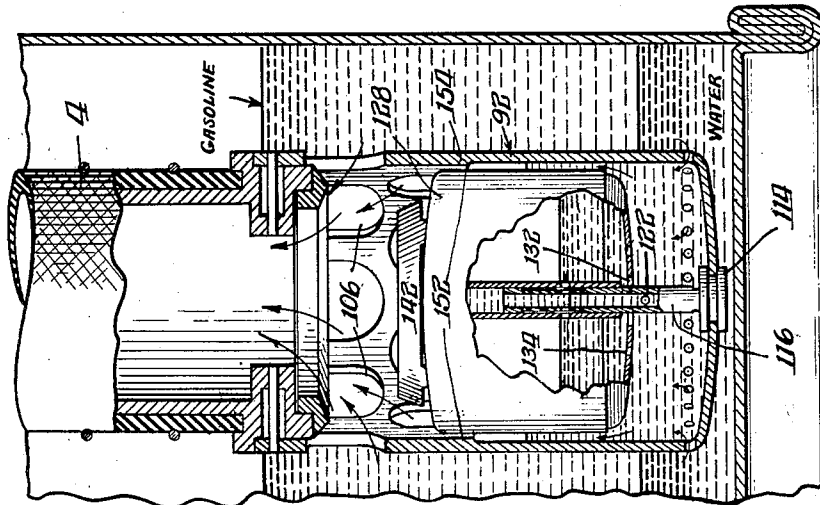
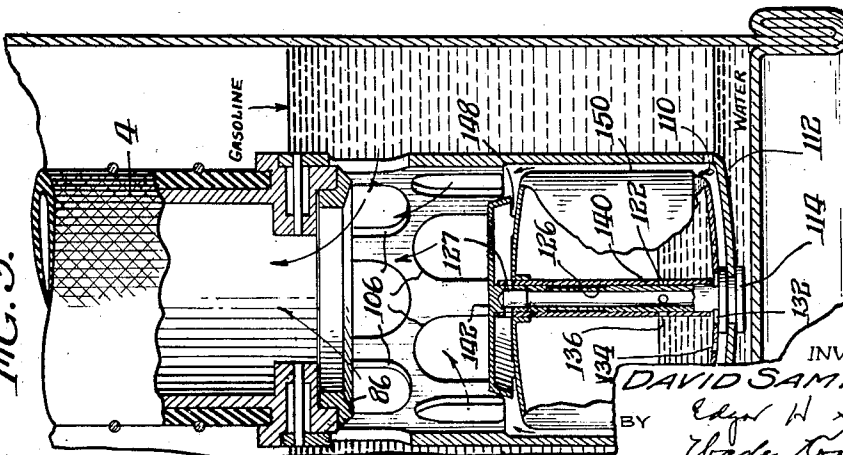


FIG. 3.



INVENTOR.
DAVID SAMIRAN
BY *Edgar H. Anderson*
Charles K. Smith
ATTORNEYS

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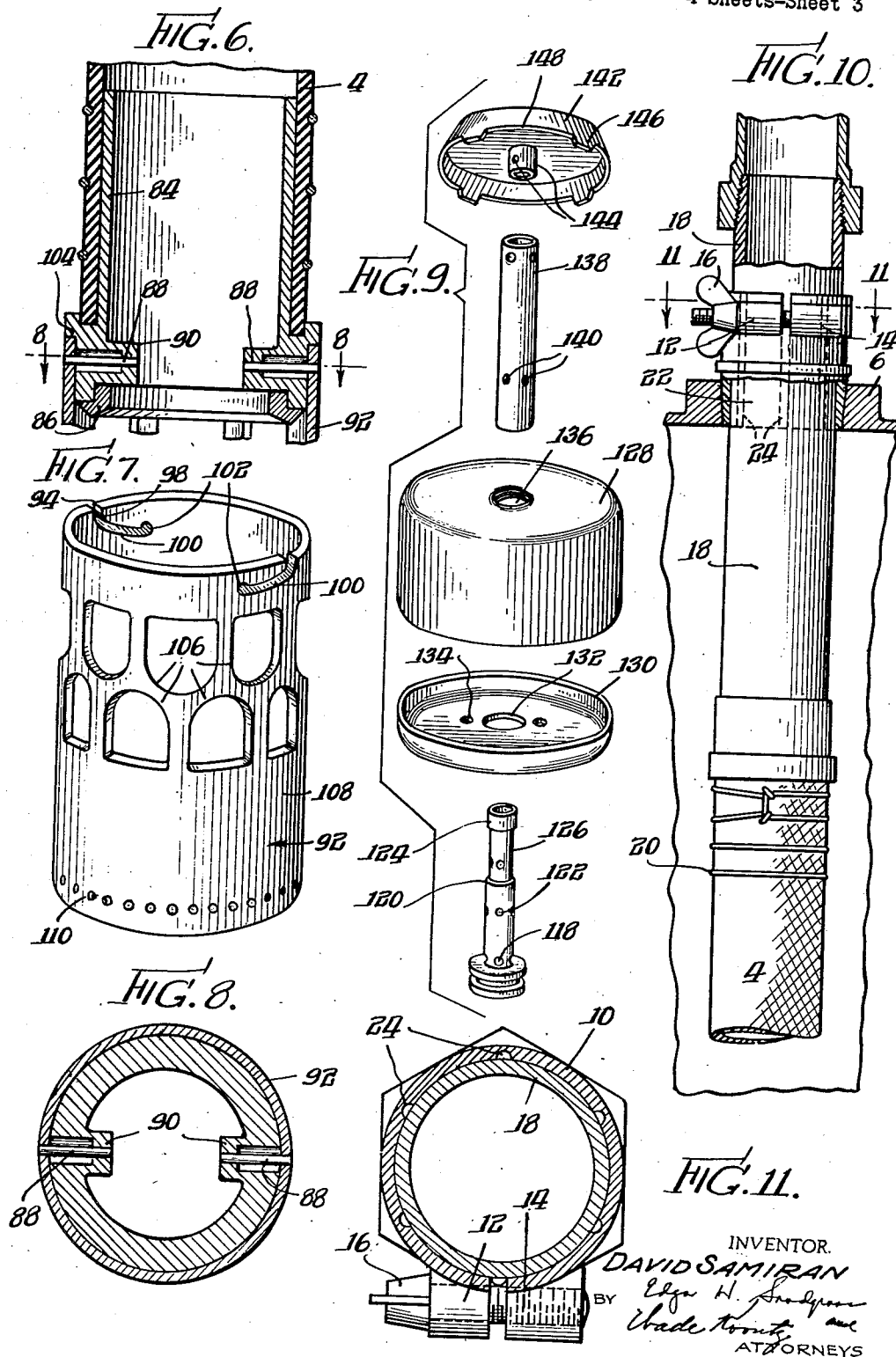
D. SAMIRAN

2,329,728

LIQUID DISPENSING DEVICE

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4 Sheets-Sheet 3



INVENTOR.

DAVID SAMIRAN

BY *Edgar H. Shadyron*
Chas. K. Smith
ATTORNEYS

Sept. 21, 1943.

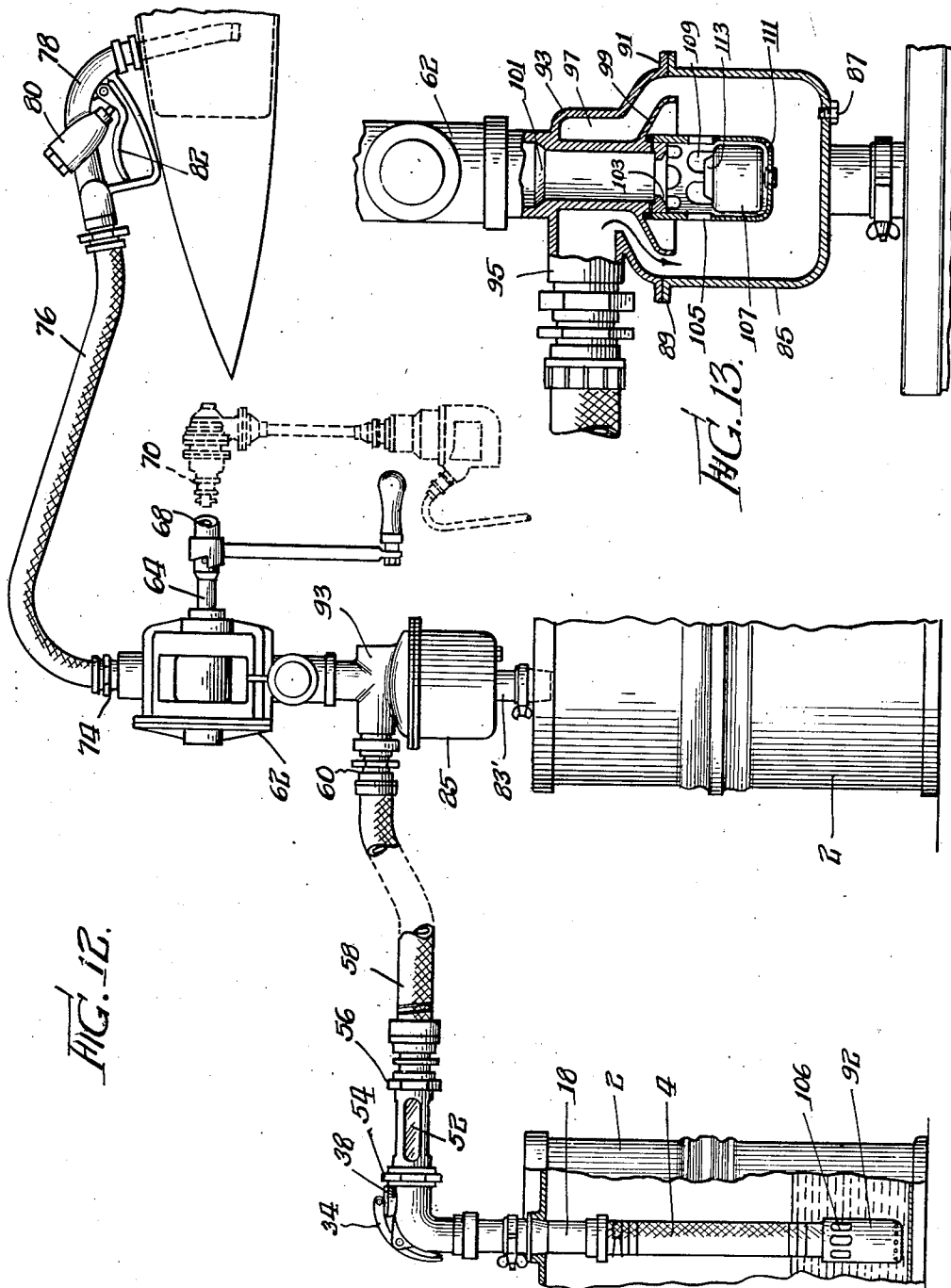
D. SAMIRAN

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LIQUID DISPENSING DEVICE

Filed March 12, 1940

4 Sheets-Sheet 4



UNITED STATES PATENT OFFICE

2,329,728

LIQUID DISPENSING DEVICE

David Samiran, Fairfield, Ohio

Application March 12, 1940, Serial No. 323,560

16 Claims. (Cl. 221—95)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

The invention herein described may be manufactured and used by or for the Government for governmental purposes without the payment to me of any royalty thereon.

This invention relates to the discharge of fluids of different specific gravities from a tank or container, and particularly relates to means, and specifically float controlled means, for preventing the passage of a fluid of heavier specific gravity during the discharge of a fluid of lighter specific gravity.

Among the objects of the present invention are to provide a device for discharging fluid of lighter specific gravity from a chamber having a valved discharge port and wherein the chamber is adapted to contain fluids of different specific gravities, there being means for creating a pressure differential in the discharge outlet and on the fluids in the chamber to force the fluid of lighter specific gravity through the discharge outlet, and wherein there is employed in the chamber a float having a density differential relative to the fluid of lighter specific gravity wherein the float will sink in such fluid and having a density differential relative to the fluid of heavier specific gravity, and providing means for normally confining the float in a zone relatively remote from the discharge outlet, in which zone the pressure differential in the outlet and on the fluids in the tank is incapable of overcoming the density differential between the float and the fluids, and wherein said float, upon a rise in level of the fluid of heavier specific gravity, is moved toward the discharge outlet into a zone where the pressure differential in the outlet and on the fluids in the tank overcomes the density differential between the float and the fluid of lighter specific gravity, whereby rapidly to close the valved discharge outlet; to provide, in association with the foregoing, means for insuring the closure of the valve prior to any possibility of the fluid of heavier specific gravity passing the valved discharge outlet, and this is accomplished in one adaptation of the invention by accelerating the upward movement of the float relative to the movement of the fluid of heavier specific gravity as the float moves from the zone in which the float remains immobile to the zone wherein the float is moved by the pressure differential to closing position, whereby the float is always maintained above and in advance of the movement of the fluid of heavier specific gravity, so that in no case can this latter fluid be discharged through the outlet with the fluid of lighter spe-

cific gravity; and to provide a tank or chamber adapted to contain fluids or liquids of different specific gravities, and particularly non-miscible fluids or liquids of different specific gravities, with a discharge conduit having a valve seat and a valve operative to close upon said seat to stop the discharge therefrom, means for discharging fluid or liquid, and particularly the liquid of lighter specific gravity, from said tank or chamber through said conduit by means of a pressure differential in the outlet and on the fluids in the tank, wherein means is provided responsive to the flow of fluid or liquid of heavier specific gravity in the tank toward said outlet, whereby, when the level of such fluid or liquid approaching the discharge outlet reaches a predetermined point, means is provided for increasing the velocity of flow of the fluid or liquid of lighter specific gravity relative to the velocity of flow of the fluid or liquid of heavier specific gravity to accelerate the closure of the discharge line to preclude the discharge therethrough of the fluid or liquid of heavier specific gravity with the fluid or liquid of lighter specific gravity.

More specifically, the objects of the present invention are to provide means for dispensing or discharging gasoline or other liquid petroleum products, and particularly those comprising liquid fuels for internal combustion engines, from a tank or a drum to a point of discharge, say, for instance, into the tank of an airplane or an automotive vehicle or a receptacle, in such a manner that if there be accumulated water present in the tank from which the gasoline or other fuel is being withdrawn float control means is provided so that the water only and not the fuel will move the float from an inactive position into a zone wherein the discharging fuel will cause the float to move to a position to close a valve in the discharge line; and in association with such an instrumentality I provide means for imparting to the discharging liquid fuel a velocity greater than the velocity of movement of the water as the latter moves toward the discharge outlet, whereby to accelerate the movement of the float to valve closing position and thus maintain the float always ahead of the movement of the water, whereby to cause the valve to close before the water can reach the valved discharge outlet, thus preventing the discharge of water from the tank with the liquid fuel; to provide a liquid dispensing device which is of compact structure and small size adapted to be inserted in the standard fill opening of a gasoline tank or drum carrying gaso-

line for filling airplanes or the like; to provide a dispensing device having the foregoing characteristics which may be dependably mounted directly in the threaded fill opening of a gasoline tank or drum and in a manner to permit the adjustment of the device with respect to the bottom of the tank or drum; to provide a device of the foregoing character which is constructed to permit the passage of replacement air into the tank or drum while at the same time precluding the passage of water into the tank or drum; to provide in a mechanism for dispensing liquids by suction from a tank or drum, a shut-off valve in the discharge line automatically operated by a float adapted to be controlled by a rise in level of the liquid of heavier specific gravity to shut off the liquid being discharged from the tank or drum, there being means in association therewith for breaking the suction effect upon the discharge line so as to permit the opening of the valve when desired; to provide a compact, light-weight, efficient and durable device adapted for quick insertion into the fill opening of a fuel tank or drum or other receptacle adapted to contain liquid to be dispensed and wherein the pump associated with the dispensing line may be operated either by hand or by power; to provide in association with a device of the foregoing character a mounting therefor whereby the device may be dependently mounted in the threaded fill opening of a standard fuel drum or receptacle and wherein the power device for operating the pump associated with the dispensing line may similarly be detachably mounted in the threaded fill opening of a second drum or tank, whereby the operating device may be utilized for discharging the contents of a succession of drums of liquid in a minimum of time while precluding the possibility of the discharge of water with the liquid fuel; to provide in a device of the foregoing construction and having the foregoing advantages a conduit formed of flexible material, preferably rubber composition, adapted to receive on its lower end a metallic cylinder or control casing having a plurality of liquid inlet openings for the gasoline or similar liquid, in combination with a float device carrying a valve adapted to close upon a seat associated with the conduit of flexible material and in combination with a quickly detachable type of bayonet fitting disposed between the casing and the conduit for predeterminedly positioning the casing exactly with respect to the conduit, whereby the uniform location of the liquid inlet of the casing with respect to the valve seat in association with the flexible conduit is always predetermined and maintained in such predetermined position so that the valve may effectively close upon its seat when in such predetermined location; to provide a simple, compact and light-weight liquid dispenser adapted to be power or manually driven and so arranged that when in operation it may be quickly inserted into the fill openings of a succession of tanks containing gasoline or other liquid fuel for the purpose of quickly and efficiently discharging the gasoline or liquid contents of said tanks into a remotely located tank without stopping the operation of the power driven liquid suction means of the device and in a manner so as to cause the closure of the discharge or dispensing line in the event of the presence of a predetermined volume of water in any of the tanks; to provide an extremely sensitive float construction adaptable to a liquid dispensing line having a pump adapted to suck liquid

through said line from a tank; to provide a self-adjusting float for a liquid dispensing device adapted to cause the automatic closure of a valve in the presence of a definite volume of water in the tank from which the gasoline is being discharged; to provide a device for dispensing gasoline or other petroleum product fuel which will prevent the dispensing of water through the dispensing line and/or which will control the grade of liquid which passes through the dispensing line, thereby dispensing gasoline of one grade while preventing the dispensing of gasoline of a different grade; and to provide these and other objects of invention as will be apparent from a perusal of the following specification when taken in connection with the accompanying drawings, wherein:

Figure 1 is a perspective view of one form of my improved construction for a liquid dispensing device equipped with means for quickly dispensing gasoline or other liquid fuel for internal combustion engines from a tank or drum and for preventing the discharge of water therefrom, the device being shown as either hand operated or power operated;

Figure 2 is a partial sectional view showing mechanism for breaking the pressure in the suction line when desired;

Figures 3, 4 and 5 are successive views showing positions of the float and the valve;

Figure 6 is a perspective view of the bayonet type of joint for drawing the control cylinder into fixed position with respect to the fitting on the bottom side of the hose or discharge conduit;

Figure 7 is a perspective view of the control cylinder;

Figure 8 is a section on the line 8—8 of Figure 6;

Figure 9 is an expanded view of parts of the float;

Figure 10 is an outside view showing the mechanism for suspending the hose or segregator in the fill opening of a tank or drum;

Figure 11 is a section on the line 11—11 of Figure 10;

Figure 12 is a view of a modified device showing the incorporation of means for dispensing one grade of gasoline while preventing the discharge of a gasoline of a different grade; and

Figure 13 is a detail section of a portion of the view shown in Figure 12.

Heretofore it has been proposed to operate a shut-off valve in the dispensing line through which liquid of lighter specific gravity is being drawn, by means of a float valve which was buoyant in liquid of heavier specific gravity, such, for instance, as water, and which was adapted to close when the water reached a predetermined level. However, in devices of this type, if the velocity of discharge of the liquid of lighter specific gravity were of a relatively high order and the float were sensitive enough to the water, the water level would be relatively close to the upper level of the float, and hence, when the float was raised into the zone of suction of the discharging liquid of lighter specific gravity, the rising column of liquid of heavier specific gravity would likewise be sucked into the discharge line before the valve could close.

In order to prevent the level of the water from rising to the point where the suction of the line will draw the water into it, I have found that the float must be made responsive to close the valve before that level is reached, and I have accomplished this by utilizing a level of the water in the float chamber to effect a desired veloc-

ity of flow of gasoline past the float to raise the float into valve closing position.

In the following specification I shall describe one adaptation of my invention, not by way of limitation but by way of exemplifying one form of its construction and operation. In the embodiment illustrated, I have shown the invention as forming a compact, light-weight dispensing device for discharging gasoline or other liquid fuel for internal combustion engines from a tank or drum or underground storage tank into any kind of a receptacle, such, for instance, as the fuel tank of an airplane or automotive vehicle or any other receptacle. Specifically, I have illustrated the invention as a device for discharging gasoline from one or more standard sized gasoline drums into the tank of an airplane. The dispensing device includes a discharge or dispensing line of a size adapted to be inserted into the fill opening of a standard drum containing gasoline, and the dispensing device includes a pump disposed in the dispensing or discharge line adapted to be either manually or power operated for causing a continuous suction through the line. The device also includes a control chamber or casing, preferably at the lower end of the line, which is adapted gradually to be inserted into the tank or drum until the casing is suspended in close proximity to the bottom of the drum. This chamber has liquid inlets, a valve seat and a float carrying a valve to close upon the seat. The float and the chamber surrounding the float are constructed and arranged to cause the float to be very sensitive to water and to rise so as to move the valve to closed position. More particularly, the float and the chamber surrounding it are constructed in association with the gasoline inlet at the upper part of the chamber and with a combined water and gasoline inlet at the bottom part of the chamber, including the formation of the inner portion of the chamber wall surrounding the float, providing a circumferential liquid flow passage, and particularly providing, when the float is moved to an upward position, a restriction in such passage whereby, when gasoline only is in the float chamber the gasoline flowing around the float in an upward direction and the gasoline flowing from the tank through the upper inlet ports and through the discharge port will not move the float upwardly in a substantial manner. However, when water enters the float chamber, the buoyancy of the water plus the velocity of the liquid flowing through the passage between the float and the inner wall of the chamber plus the velocity effect of the liquid passing through the upper inlet port of the chamber to the outlet will cause the float to rise to a position where it is substantially within the zone of influence of the main body of gasoline passing through the upper inlet ports, which velocity will cause the float to move still further upwardly and cause the valve to shut. In order to prevent an upwardly moving column of water present in the float chamber, the top level of which is slightly below the top of the float, from being drawn into the discharging stream of gasoline which passes through the valved outlet, I have arranged by movement of the valve in association with the inner wall of the chamber to form the restricted passageway hereinbefore referred to, through which the gasoline flowing about the float is adapted to pass on its way to the discharge outlet, whereby the gasoline in flowing through this restricted passage will have imparted thereto increased velocity,

which, acting upon the float, will give the float a movement of acceleration the velocity of which is greater than the movement of the column of water moving through this passage, whereby the float and the valve operated or carried by it are always maintained above the moving column of water and so that the valve will be closed before the water can reach the valve. Thus the dispensing line is closed to prevent the dispensing of water with the gasoline. The device may then be removed from the tank and slowly inserted in another similar tank in position quickly to discharge the contents of this tank, and so on for a number of tanks until the tank of the airplane has been filled.

While I have shown a device in the form illustrated, it is to be understood that except for restrictions in the claims appended to this specification the invention is not limited to the construction shown nor is it limited to utilization in connection with the type of tank shown nor with the type of fluids mentioned.

Referring now to the drawings in detail, I have shown any type of tank 2 adapted to hold a quantity of liquid to be discharged therefrom, and while the liquid need not necessarily be gasoline or other petroleum product suitable for fuel for internal combustion engines, I desire to describe the invention with respect to such fuel and particularly with respect to a device for withdrawing fuel from a tank or drum for filling tanks of airplanes and automotive vehicles or other receptacles. I particularly desire to describe the invention as adaptable to discharging gasoline or other suitable liquid from a standard drum 2 of gasoline. Such drums are of standard construction, and in the filling of airplanes of relatively small size the contents of a number of these drums of gasoline are successively discharged into the fill tank or tanks of the airplane. Experience has shown that these tanks or drums may contain considerable water, due to various causes. Since water is heavier than gasoline the water collects below or beneath the strata of gasoline at the bottom of the tank. The discharge of water along with the gasoline into the fill tank of an airplane is greatly to be avoided.

Referring to my present invention in detail, the device comprises a flexible tubular conduit 4, preferably of rubber or rubber substitute, which is adapted to be adjustably suspended or attached by means of a threaded fill opening 6 within the drum 2 or other tank, including underground storage tanks for service station pumps. It will be noted that this fill opening 6 is raised considerably above upper surface 8 of the drum so that water collecting on the top of the drum cannot easily flow into the fill opening. This attaching means shown in Figure 11 comprises a split ring 10, preferably of exterior hexagonal shape, having registering lugs 12 and 14 suitably apertured to permit the passage therethrough of fastening bolt 16 for drawing this split ring together snugly against a metal pipe section 18, which is coupled by any suitable means such as wire 20 to the upper end of the flexible tubular section 4. The lower portion of the split nut 10 is provided with a threaded exterior as at 22 for threadedly engaging the screw threads of the fill opening 6 of the drum. By loosening the thumb-nut of the bolt 16 the metal section 18 may be raised or lowered with respect to the fill opening 6 of the drum whereby to position the bottom of the dispenser at adjustable heights relative to the bottom of the drum 2. In addition, at spaced intervals

around the inner wall of the split ring 10 the latter is provided with a plurality of vertically extending passages 24 which permit air from atmosphere to pass freely downwardly into the interior of the drum 2 so as to replace the volume of the liquid being discharged from the drum by the dispenser. This arrangement thereby prevents the passage of water collecting on the head of the drum into the drum, since these passages 24 are raised considerably above the level of the water collected on the top of the drum, as shown in Figure 1. By forming the section 4 of the dispenser of flexible material, as the liquid is discharged from the drum and reaches the bottommost portion, the drum may be tilted, as shown by the dotted lines in Figure 1, and the dispenser may be moved, which will permit the bottom cylinder of the device, hereinafter described, to depend into the corner of the drum so as to practically pump or discharge all of the liquid from the drum. In order to permit this, the bottom of the cylinder, as shown clearly in Figure 1 and in the other figures of the drawings, is curved or rounded.

The upper portion of the metal section 18 is provided with an elbow section 26 of metal, shown particularly in Figure 2. At the upper left-hand corner of this metal section 26 there are a pair of projecting ears 28 with registering apertures 30 through which passes a pin 32 forming a bearing for a curved lever 34, one end of which is pivoted as at 36 to a valve 38 having a yieldable seat 40 adapted normally to be spring pressed against a seat 42 in an opening 44 in the elbow section 26. A central spider 46 forms a guideway for a central pin 48 of the valve 38 to permit its opening and closing movement. The other end of the lever 34 abuts a spring 50, which normally holds the valve to its seat. By pushing upon the spring pressed end of the valve, the latter may be raised from its seat to permit air from the atmosphere to enter the conduit section 26 and hence the conduit 4.

Immediately adjacent the elbow portion 26 is a sight gauge or flow observing section 52 which is suitably coupled as at 54 to the elbow 26 and is correspondingly coupled as at 56 to an additional length 58 of flexible dispensing hose of suitable internal cross sectional diameter. The opposite end of this hose section 58 is coupled as at 60 to any type of pump 62 adapted to be driven by shaft 64 either from a hand crank 66 or by means of a suitable clutch connector 68 adapted to be driven by a power operated device 70, in turn driven from a prime mover 72. This pump is preferably provided with the usual spring loaded by-pass. The details of construction of this prime mover and power connector or coupler 70 form the subject matter of a separate application and are not herein specifically claimed. The discharge side of the pump is connected as at 74 to a flexible hose 76 provided with a discharge nozzle 78 having a valve 80 and the usual type of valve lever 82. This nozzle may be provided with any type of cone-shaped strainer, not shown, which is inserted in the nozzle where the nozzle proper joins the body 80 of the valve. This nozzle, as is well known in the art, is adapted to be inserted in the fill opening of the tank of an airplane or automotive vehicle or other receptacle to be filled.

I prefer to provide a fitting similar to the fitting shown in Figure 10 so that base portion 83 of the pump may be detachably mounted directly in the fill opening of another gasoline drum 2. In this

way a very convenient means is provided for mounting the pumping mechanism in any drum or tank of gasoline that has not been discharged, while at the same time the dispensing device itself, hereinafter more fully described, is adapted to be inserted in a drum to be discharged.

On reference to Figure 6, it will be seen that the bottom portion of the flexible hose 4 is attached in any suitable manner to a metallic coupling or pipe 84, which coupling at its lowermost portion carries a ring-shaped valve seat 86 having an inclined or beveled surface on which the closure valve is adapted to seat, as hereinafter described. In addition, just above the valve seat 86 the fitting 84 is provided with a pair of inwardly extending spring wire pins 88 having their inner ends fixed in lugs 90 of the fitting. The outer portions of the pins can freely shift or flex in surrounding bores formed in the lugs 90 whereby these pins 88 have universal movement or are, in a sense, resiliently mounted with respect to the lugs 90 of the fitting 84. The pins 88 form part of a bayonet type coupling between the fitting 84 and the cylinder 92, shown in perspective in Figure 7. The cylinder 92 is preferably formed of metal and is provided at its upper end with opposed slots 94 each having a vertical portion 98 and a downwardly extending or inclined lateral portion 100, which terminates at its end in a semi-circular preformed slot 102. When the slots in the upper portion of the cylinder, are placed opposite the pins, the pins 88 will register with the portions 98 of these slots to permit the cylinder to move upwardly with respect to the fitting 84, at which time, by turning the cylinder relatively to the fitting 84, the pins will move along the downwardly inclined portions 100 of the slots, whereby to draw the cylinder snugly upwardly against a shoulder seat 104 on the outer wall of the fitting, whereby to provide an exact seating of this cylinder 92 with respect to the metal seat 104 of the fitting. The end of the pins 88 will eventually spring into the circular ends 102 of the bayonet joint, whereby resiliently to hold the cylinder in locked position but providing a quickly detachable means for removing the cylinder for cleaning, repair or otherwise.

The upper portion of the peripheral wall of the cylinder is provided with a series of gasoline inlet ports 106 which may be of any specific arrangement or shape provided their capacity is predetermined with respect to other features of the device. Below the gasoline inlet ports 106 the chamber is provided with an imperforate wall portion 108 and at the bottom the wall is provided with a series of gasoline and water inlet ports 110. It will be noted that these ports 110 are not positioned on the bottom of the chamber for reasons hereinafter set forth, but are positioned as low as possible on the side wall of the chamber. It will also be noted that the bottom of the chamber is rounded as at 112. Centrally of the bottom the chamber is provided with an opening in which is swaged or riveted a mounting 114 of an upstanding tubular guide 116, provided at its bottommost portion with inlet openings 118. This guide extends upwardly a substantial distance and is provided with an intermediate portion 120 of reduced diameter. Somewhat intermediate of this portion and the openings 118, the guide is provided with openings 122 for the passage of liquid. In addition, the tubular guide is provided above the intermediate portion 120 with an enlarged tubular head 124 forming with the lower enlarged portion of the guide an elongated tub-

ular guide for a central tubular portion of the float about to be described, thus permitting the float to rise or fall with a precise vertical movement.

The float itself is preferably formed of metal and, as shown, comprises a substantially cylindrical hollow body preferably formed of an upper cup-shaped portion 128 and a lower, shallower cup-shaped portion 130 suitably joined together in any desired manner. The bottom portion is formed with a central larger opening 132 to receive the guide 120 and is provided with liquid openings 134 on either side thereof. The upper shell of the float 128 is provided with a central opening 136 in which is fitted a corresponding tube 138 which is provided with a series of ports 140 somewhat near its lower end and a series of ports 141 near its upper end. The upper portion of the float is formed as a valve 142, having an interior depending lug or sleeve 143 having a series of ports 144, the sleeve 143 being fastened by means of screws or otherwise to the upper end of the tubular guide 138, whereby the float 128, its guide 138, and the top valve 132 are as one. The underside of the valve 142 is provided with a series of depending lugs 146, which provide a series of openings 148 between the lugs through which liquid may pass outwardly, as hereinafter described. When the float is assembled it will, as shown in Figure 5, slide vertically by means of the tubular guide 138 upon the stationary central upstanding guide 120 rigidly fastened to the chamber or cylinder 92. The side wall of the valve is shown as tapered or inclined, whereby as it raises it will seat, as shown in Figure 5, against the inner wall of the valve seat 86. In this way, these two surfaces are self-cleaning, while at the same time forming a water-tight valve for closing liquid connection between the chamber or cylinder 92 and the conduit 4.

Operation

In describing the operation of the device, it will be customary to mount the pump suitably on any type of support, such, for instance, as by means of its standard 83 mounted in the threaded fill opening of a drum and with the nozzle disposed in a tank to be filled, such, for instance, as the tank of an airplane, as shown by dotted lines in Figure 1. The pump is now put in operation either by the hand crank 66 or by the power actuated device shown in dotted lines, whereby a continuous suction is maintained at the bottommost part of the chamber or cylinder 92 through the larger gasoline entry holes 106 and the smaller holes 110 disposed at the bottom of this chamber. The chamber is now inserted in a vertical direction through the fill opening 6 of the drum 2 and is slowly lowered into the gasoline or other petroleum product fuel contained in the drum 2. As soon as both sets of inlet holes 106 and 110 are submerged in the liquid, the suction of the pump will at once draw gasoline both through the ports 106 and through the smaller ports 110. At this time the float will be in the position shown in Figure 3. The gasoline will be sucked in through the ports 106, past the valve seat 86, and upwardly through the conduit 84. At the same time gasoline will be sucked through the ports 110 and thence upwardly through circumferential passages 150 in the same direction. Simultaneously, gasoline will flow along the bottom portion of the chamber between it and the float and will enter the float

openings 134 into the interior of the float 151. Inasmuch as this float is ballasted to be buoyant in water and not in gasoline, the float will not rise. However, the gasoline entering the interior of the float will pass through registering openings 122 in upstanding central guide 126 and the openings 140 in the hollow shiftable guide 138 of the movable portion of the float, so that this liquid in the float will then flow upwardly through the interior of the hollow guide 126, whence it will be discharged outwardly through registering openings 141 and 144 on the underside of the valve, thence will pass through the apertured portions 148 beneath the valve, and thence will flow outwardly and upwardly past the valve seat 86 into the conduit 4. The dispenser is slowly and continually lowered until it reaches the approximate position shown in Figure 3 of the drawings with respect to the interior of the drum. The fitting 22 of the dispenser, shown in Figure 10, is then inserted in the fill opening 6 of the drum and the device is then anchored in position. In the meantime, the pump is continuing to suck the gasoline from the tank and discharge it through the nozzle into the fill tank of the airplane. This discharge will take place at from approximately forty-five to fifty-five gallons per minute. Figure 1 shows a situation where the water line is below the level of the bottommost holes 110 of the chamber or cylinder. In this position, since the bottom of the chamber or cylinder is imperforate, water will have no chance to flow into the flow line along with the gasoline.

In most any one of these gasoline drums or tanks there is a considerable mud deposit on the bottom part of the interior of the tank, and it will be noted that by placing the openings 110 in the side wall of the cylinder the openings will be above any layer of mud into which the bottom portion of the cylinder 92 may be placed. Hence, the flow of gasoline through the ports 110 will not disturb this layer of mud. When the level of the gasoline has been drawn down to such a point that the holes 110 would no longer be immersed, the tank is tilted to the dotted line position shown in Figure 1, at which time the cylinder 92 is free to tilt into the cornermost portion of the tank, whereby to withdraw substantially all of the gasoline from the tank. In this connection, the flexible portion 4 of the dispensing line or flow line permits lateral movement of the casing into this corner of the tank and, furthermore, by reason of the rounded formation of the under side of the cylinder 92 this lateral movement of the cylinder relative to the bottom of the tank is permitted. During the movement of the gasoline through the apertures 134 of the lower portion of the float into the interior of the float, air will be trapped in the upper portion of the interior of the float just above the gasoline level line therein.

After the first drum has been discharged, the device is then removed from its mounting in the fill opening of this drum and with the pump still in operation is reinserted into the fill opening of a second drum to be discharged. In the same manner, all of the drums may be discharged until the airplane tank has been filled.

If the device be lowered into a drum of gasoline which contains sufficient strata of water underlying the gasoline, for instance as shown in Figure 4, when the casing is first submerged in the gasoline with the pump operating, the gasoline will be withdrawn, as hereinbefore described,

from the drum and discharged through the conduit. The cross sectional area of the passage located between the inner wall of the casing and the float, combined with the construction of the float itself, is insufficient to cause the float to move upwardly. In short, the differential of pressure at the discharge line and on the top of the gasoline in the drum, as compared to the buoyancy of the float in gasoline and as compared to the velocity of travel of the gasoline through this passage immediately surrounding the float, is insufficient to raise the float. However, where water is present in the bottom of the drum, when the lower end of the casing carrying the inlet ports is immersed in this water the latter will flow into the ports and into the float chamber and will tend to flow upwardly through the circumferential passages surrounding the drum and will tend to follow the gasoline flowing through this passage. Inasmuch as the float is constructed to be buoyant in water, the float will immediately begin to rise with the flow of this column of water, with the water substantially one-fourth of an inch below the top of the float. As the float carrying this valve approaches the zone of influence of the gasoline flowing at high velocity through the ports 106 from the tank into the discharge conduit 4, the suction effect, if a column of water were close enough, would cause the water to be sucked upwardly with the gasoline, past the valve seat 86, and into the conduit 4, thence into the tank of the airplane. However, by providing a restricted passageway 154 just below the lowermost portion of the inlet ports 106, the rising column of gasoline at this restricted passageway is given an increased velocity which, acting upon the float in combination with the buoyant effect of the water on the float and coupled with the velocity of the gasoline passing inwardly through the openings 106, imparts an increased lifting effect to the float, giving it a speed of travel over and above that of the upwardly moving column of water, which thereby quickly carries the float upwardly into the zone of influence of the gasoline flowing through the inlet ports 106 upwardly, which, in turn, causes the float to move quickly upwardly carrying the valve to closed position. This extra speed imparted to the float and its valve relative to the speed of movement of the column of water precludes the water reaching the valve seat 86 before the valve closes. Hence, no water can be discharged with the gasoline into the conduit 4.

Simultaneously with the entry of the water through the ports 110, this water will likewise be drawn through the openings 134 into the interior of the float 128, causing it to replace the gasoline. The gasoline, in the meantime, is being discharged upwardly through the openings 118, 122 and 140, thence upwardly through the central hollow guides 126 and 138, through the passages 141 and 144 and out through the passage 148 on the underside of the valve, thence upwardly past the valve seat and out through the discharge line 4. This replacement of the gasoline by the water in the interior of the valve continues until the gasoline has been replaced by the water, as shown in Figure 5, at which time the valve 142 will have closed upon its seat 86. Due to the constructional buoyancy of the float 128 in the water, the suction of the swiftly flowing gasoline through the restricted passageway 152 and the suction of the gasoline through the ports 106, the upper surface of the float is al-

ways maintained above the level of the water so that the valve is always quickly brought to a close before any water can pass across the valve seat 86 along with the discharging gasoline. The float is ballasted to be buoyant in water, so that it is always about one-fourth of an inch above the level of the water. The holes 110 are placed substantially at the bottom of the cylinder so that the water level both inside and outside of this cylinder 92 is equalized, whereby the float is raised proportionately to the inside level so as always to be above the inside level, and therefore always higher than the outside level of the gasoline. The present float is adjusted to float on the water a given amount in accordance with the teachings of my prior Patents Nos. 2,115,043 and 2,078,977, the construction of the latter patent being the preferred teaching.

The vertical distance between the valve seat 86 and the lower edge of the lowermost of holes 106 is arranged so that the volume or area of these openings 106 is about three times the cross sectional area of the intake opening at the valve seat. The larger the cross sectional area of the opening in the valve seat, the better. For instance, the larger the cross sectional area of the opening in the valve seat the shorter may be the over-all height of the zone in which the openings 106 are placed. This is due to the turbulence set up by the inflow of the gasoline from the interior of the drum through the openings 106 and thence upwardly across the valve seat into the conduit 4, it being borne in mind that as the liquid is pulled inwardly across the valve seat there will be a sort of conical flow of the liquid across this valve seat. The smaller the opening in the valve seat the smaller will be the cross-sectional area of this conical stream. Upper portions of the upper row of holes 106, if the opening in the valve seat is small, may not be within the suction zone and hence will be relatively inoperative to cause liquids to pass there-through from the outer tank into the discharge conduit 4. By enlarging the cross sectional area of the opening through the valve seat 86 the zone of flow would be much wider and the upper row of holes would come within the suction zone and would be effective to pass liquid from the tank into the discharge conduit 4. Hence, by making the cross sectional area of the valve seat 86 larger it will be possible to shorten the height of the zone in which the ports 106 are formed, which will likewise permit the shortening of the height from the valve seat 86 to the bottommost portion of the chamber or cylinder 92, which would be advisable to permit the quicker removal of the maximum amount of gasoline from the tank. With regard to the area of the inlet ports 106, the more area the better. In general, the total area of the inlet ports must be approximately three times the cross sectional area of the valve seat to get the high velocity of from forty-five to fifty-five gallons per minute. As before stated, there is a definite, determinable ratio between the size of the lower holes 110 and the capacity of the dispenser. In the present device, with the parts shown in Figures 6 to 10, inclusive, which are actual size, and with the standard type of drum holding about fifty-five gallons of gasoline, the gasoline can be emptied therefrom in about one minute. If the pump of greater pulling capacity be employed it will try to pull the gasoline through the larger holes as well as through the smaller holes, and this tendency to pull the gasoline through the smaller holes will

likewise tend to raise the float and close the valve. Therefore, the smaller holes will have to be made smaller in order to prevent such closure of the valve and in order to take care of this greater pulling capacity of the pump. At the same time, it is to be understood that the float must be sensitive to the water and not to the velocity of the liquid passing through it. This definite ratio is predeterminable and may be established. The float is of the self-adjusting type, as taught by my prior Patent No. 2,115,043, above mentioned.

It will be noted with reference to this float that air and liquid come in at three places in the float, the bottom, the center and the side, and air entering the interior of the float goes out the central guide to the top opening of the float, but upon a rise of the gasoline within the float air will be trapped in the float, which will make it self-adjusting. As the float and cylinder are lowered in the tank, gasoline will flow into the float openings at the center and bottom, as hereinbefore described, and gasoline will be trapped in the float below the air in the float chamber as the float finally moves into the lower stratum of the water which happens to be present. When this water which accumulates in the bottom of the tank to a sufficient height and flows through the openings 110 the water will displace the gasoline trapped in the interior of the float chamber, the gasoline flowing upwardly through the central guide tube and the water beginning to displace it. The position shown in Figure 4 illustrates the maximum height due to suction that water can reach, because then the float rises enough to get into the region where the velocity of the gasoline is greatest through the ports 106, and thereafter the velocity of the gasoline is the element that carries the float upwardly to valve closing position. In short, the float is preliminarily raised by the water received through the smaller holes 110, and it is thereafter raised to closed position by the velocity of the gasoline flowing through the holes 106, plus the velocity of the gasoline flowing through the restricted passageway 154 and plus the buoyant column of water. This water underlying the gasoline in the passages 150 and 154 never passes the upper portion of the float. This is due to the raising of the float opposite the inwardly projecting flange 152 forming the restricted channel 154, thereby causing the gasoline to travel with increased velocity at this point.

When the water has risen to a point sufficiently high to cause the closure of the valve, as hereinbefore described, the device is then withdrawn from the drum 2. However, the suction produced by the continued operation of the pump will hold the valve closed upon its seat 86, and in order to permit the valve to open it is necessary to press upon the lever 34 to open the valve 38 to break this vacuum, whereupon the valve, which has now been ballasted with water instead of gasoline, will drop to open position. By arranging to have the water flow into the interior of the float and replace the gasoline, the float is given a heavier ballast and hence the water ballast, being heavier, will assist in pulling down the float to open the valve as soon as the valve 38 has been opened to reduce the suction effect of the pump on the float. It will be understood that in place of the float valve arrangement and means for self-ballasting same just described, a ballasted float valve, such as

described in Patent No. 2,078,977, issued to me on May 4, 1937, may be used with equal facility.

It will thus be seen that I have provided a very simple and compact type of device for quickly discharging gasoline and similar fluids from tanks for the purpose of filling other tanks, while at the same time absolutely precluding the passage of water from the tank being discharged to the tank being filled.

10 It will be seen that in the present device, if the closing of the valve opening 86 by the float control valve 142 were made dependent solely upon the position of the level of the water, then, because of the exceedingly high speed of the gasoline flowing through the openings 106 and the valve seat 86, water would be sucked through these openings prior to the closing of the valve, and, therefore, this has been avoided by causing the float to bring the valve upwardly to close the valve opening when the water level is at a point sufficiently below the point where the suction effect on the water is such as to draw the water through the valve seat opening 86. In order to prevent the water level from rising to a point where the suction will have this suction effect thereon, the float is constructed to be responsive to close the valve before that level is reached. This is accomplished by utilizing a desired velocity of flow of the gasoline through the restricted passageway 54 past the float for a given capacity fluid flow per unit of time and to establish a level of the water in the float chamber such that the float will be sensitive to change in the position of the level of the water externally of the float chamber. When the water has risen above the position shown in Figure 3, the level of the water in the float chamber is also changed, causing the float to rise, and thus as the float reaches the position shown in Figure 4, the velocity of the gasoline through this restricted passage is greater than the velocity of the water, thereby producing a correspondingly greater lifting effect upon the float, causing it rapidly to rise to a position where, in turn, it is affected by the velocity of flow through the openings 106, which assist in closing the valve quickly on its seat 86. The relation of the size of the openings 106 and the annular passageway 150 between the float and the inner imperforate wall of the cylinder, as shown in Figure 3, is such that the velocity of the incoming gasoline will not overcome the density differential between the float and the gasoline. However, when the float rises as shown in Figure 4, the float forms with the upper inner wall portion 152 of the chamber a relatively restricted annular opening which produces this increased velocity of the gasoline flowing through the passageway 154, which, in turn, tends to overcome the density differential of the float and causes the float to move more rapidly into the closed position shown in Figure 5.

In some instances, as shown in Figure 12, it may be desirable to provide means in dispensing to differentiate between the grades of gasoline, that is, it may be desirable to dispense gasoline of one grade which will be characterized by a predetermined specific gravity while at the same time preventing the discharge thereof with of gasoline of another grade, which, of course, is characterized by an entirely different specific gravity. This additional separation may be accomplished in the device shown in Figure 12 along with the mechanism which prevents the discharge of water through the dispensing line.

The means provided is preferably incorporated as a part of the support 83 shown in Figure 1 except that in Figure 12 a support 83' is formed with a chamber 85 having a drain opening 87 at its bottom and flanged as at 89 so as to receive an air-tight cover 91 forming a part of a top 93 having a liquid inlet 95 connecting with the dispensing hose 58. The inlet 95 is directed downwardly as shown at 97 around a circularly shaped liquid deflector 99, which extends outwardly and downwardly whereby to decelerate the liquid flowing inwardly through the inlet 95 and likewise to direct this liquid in a downward direction in the chamber 85.

Centrally of the chamber there is a vertically extending outlet 101 which connects with the inlet of the pump 62. The bottom portion of this outlet 101 provides a valve seat 103 which is identical with the valve seat 86 of Figure 6. The remaining parts of this separator, including a cylinder 105, a float 107 and ports 109 and 111 correspond in construction with the similar parts of the device shown in Figures 3 to 11, inclusive, except that the float 107 is preferably of the ballasted type shown in my prior Patent No. 2,078,977, which operates to control the grade of fluid which passes through the chamber 85 so that gasoline of one specific gravity is continuously discharged through said chamber, but entrained gasoline of a different grade, and, therefore, of a different specific gravity is not passed through the chamber but separated from the desired grade of gasoline. The float 107 is arranged to be buoyant to the grade of gasoline of the specific gravity which is not desired, and hence when the entrained gasoline flows through the chamber 85, due to the greater size of the chamber and the expansion of that part of the liquid flow line connecting the dispensing line 58 and the chamber 85, the liquid is decelerated as it flows into the chamber to a relatively slow velocity at this point, whereby to permit the force of gravity acting upon the gasoline of heavier specific gravity to cause it to separate out and to flow to the bottom of the chamber and collect there. The gasoline which does not separate out will continuously flow through the openings 109 past the valve seat 103 and will be pulled out by the pump 62. Upon the accumulation of a sufficient body of undesired gasoline in the chamber 85 the level thereof entering the relatively smaller holes 111, under the principles of operation hereinbefore described with respect to the float 123 in Figures 3 to 5, inclusive, will cause the float to rise, moving valve 113 on its seat 103 to close off the flow line at this point so that no further gasoline will be delivered by the pump to the tank to be filled. In this manner, the device shown in Figure 12 will not only prevent the discharge of water from the reservoir but will likewise prevent the discharge of gasoline of an undesired grade, while at the same time permitting the continuous discharge of a petroleum product fuel or gasoline of the desired grade.

It is to be understood that in the claims hereinafter set forth any reference to the word "gasoline" is to be construed as covering the delivery of petroleum product fuel.

The invention is hereby claimed as follows:

1. In a device of the character described, a chamber for immersion in non-miscible fluids of different specific gravities, said chamber having a discharge outlet, means for creating a pressure difference in the outlet and on the fluids to

force the fluid of lighter specific gravity through the outlet, a valve for said outlet, a float in said chamber and operatively connected to said valve, said float having a density differential relative to the fluid of lighter specific gravity whereby the float sinks in the fluid of lighter specific gravity, and having a density differential relative to the fluid of heavier specific gravity so that it floats in said latter fluid, means for normally confining the fluid in a zone relatively remote to the outlet and in which the pressure difference in the outlet and on the fluid is incapable of overcoming the density differential between the float and the fluid of lighter specific gravity, and flow directing means cooperating with said float as said float approaches the outlet for directing a restricted stream of fluid of lighter specific gravity along said float thereby to apply to the float a lifting force for causing upward movement of the float relative to the fluid of heavier specific gravity and rapidly close the valve.

2. A device for emptying a tank containing non-miscible liquids of different specific gravities, said device comprising a discharge line submergible in the tank, a valve in said line, a valve operating means responsive to the level of the liquid of heavier specific gravity and to the velocity of liquid of lighter specific gravity flowing into said line, means cooperating with said valve operating means to cause liquid to flow past the operating means at a relatively low velocity when the liquid of heavier specific gravity is below a predetermined level, and means cooperating with said operating means to cause a liquid of lighter specific gravity to flow past said valve operating means at an increased velocity sufficient to operate the valve operating means and close the valve when the liquid of heavier specific gravity reaches said predetermined level.

3. In a device of the class described a dispensing line submergible in liquid to be dispensed, means providing an inlet chamber at the lower end of said line, a valve in said chamber for controlling said line, said chamber having upper and lower portions, the upper portion being smaller in cross section than the lower, a float in said chamber for operating said valve and movable from one portion of said chamber to the other, the upper portion of the chamber having an inlet for the liquid of lighter specific gravity and the lower portion of the chamber having an inlet for both liquids, means for forcing the liquid to be dispensed into said line through said chamber, said float being ballasted to remain in the lower portion of the chamber during the flow of liquid of lighter specific gravity through said lower portion of the chamber into the upper portion of the chamber and towards said line and to move into the upper portion of the chamber by liquid of heavier specific gravity entering the lower portion of the chamber, said upper portion of the chamber being of such size in relation to the size and ballast of the float as to increase the velocity of the liquid of lighter specific gravity flowing from the lower portion of the chamber sufficiently to lift the float relative to the liquid of heavier specific gravity and thereby close said valve before the liquid of heavier specific gravity would accumulate to a sufficient level to close the valve.

4. A device for emptying a tank adapted to contain non-miscible liquids of different specific gravities, said device comprising a suction pipe

submergible in said tank, means forming an inlet chamber at the lower end of said pipe, said chamber having upper and lower portions, a valve in said chamber for opening and closing said pipe, the upper portion of the chamber having an inlet through which the liquid of lighter specific gravity is adapted to flow into said pipe, the lower portion of the chamber having an inlet through which both liquids may enter said chamber, a float operating said valve and adapted to rise from the lower into the upper portion of said chamber in response to liquid of heavier specific gravity accumulating in said lower portion of the chamber, the inner wall of said chamber between said upper and lower portions being reduced in cross section to form with said float a first flow passage of limited cross section below the inlet port in the upper portion of the chamber, the inner wall of said lower portion of the chamber forming with the float a second flow passage of relatively larger cross section than said first flow passage to permit the flow of liquid of lighter specific gravity through said second passage without causing the float to rise, said float being buoyant in liquid of heavier specific gravity and rising from the lower portion of the chamber as liquid of heavier specific gravity enters said chamber to form said first smaller flow passage, said first flow passage being of such size that the velocity of the liquid of lighter specific gravity flowing about said float in said passage raises said float relative to the liquid of heavier specific gravity and into the upper portion of the chamber within the zone of the inlet port in said upper portion of the chamber, thereby restricting the size of the passage for the liquid of lighter specific gravity flowing from said inlet port to the upper portion of the chamber, said last mentioned passage being of such a size in relation to the float that when thus restricted the velocity of liquid passing therethrough is sufficient to quickly move said float further upwardly relative to the fluid of heavier specific gravity to thereby close the valve.

5. A device for emptying a tank adapted to contain gasoline and water, a suction conduit adapted to be inserted downwardly into said tank, means at the lower end of said conduit forming a liquid inlet chamber, a float in said chamber, said chamber having a gasoline inlet port above the float when the float is in the lower portion of the chamber, said chamber having gasoline and water inlet ports in the lower portion of said chamber below the float when said float is in said portion of the chamber, said float being buoyant in water and sinking in gasoline, a valve operatively associated with said float for opening and closing said conduit, the water in said tank entering the lower portion of the chamber and rising therein as the suction pipe is inserted downwardly into the tank, means operative as the float due to the entrance of water reaches a predetermined level in said chamber causing said float to move upwardly in said chamber at a greater speed than the speed of rise of the entering water thereby to cause the float to operate the valve to closed position before the water can be drawn into said conduit.

6. A device for emptying a tank adapted to contain non-miscible liquids of different specific gravities, a suction conduit adapted to be inserted downwardly into said tank, means providing an inlet chamber at the lower end of said conduit, a float in said chamber responsive to the level of liquid of heavier specific gravity entering said

chamber from said tank, a valve carried by said float for opening and closing said conduit, said float having means providing passages therein and therethrough permitting the liquid of lighter specific gravity to accumulate in said float when the liquid of heavier specific gravity is below a predetermined level in said chamber and permitting the liquid of heavier specific gravity to replace the liquid of lighter specific gravity when the liquid of heavier specific gravity is above a predetermined level in said chamber, said float being ballasted to move said valve to closed position when the liquid of heavier specific gravity is above said predetermined level, means for breaking the suction in said conduit to cause the float to drop and the valve to be opened as the conduit is withdrawn from the tank, the ballast of the float in relation to the liquid of heavier specific gravity accumulating in the float being such as to cause the float to move rapidly downwardly in liquid of heavier specific gravity when the suction in said conduit is broken to insure emptying of the suction conduit into the tank as the conduit is withdrawn from the tank.

7. A device for emptying a tank containing liquid to be dispensed and having a discharge pipe fitting, said device comprising a discharge pipe and a fitting for detachably connecting the discharge pipe to the discharge pipe fitting of the tank, the fitting of the discharge pipe including a split sleeve journaled on the discharge pipe and formed to interfit with the discharge pipe fitting of the tank, releasable means for clamping said sleeve to the discharge pipe against relative rotation, said sleeve having passageways extending therethrough for permitting air at atmospheric pressure to enter the tank and force the liquid from said tank through said discharge pipe upon application of a suction pressure to said pipe.

8. A device for emptying a tank adapted to contain a liquid to be dispensed, said device comprising a suction conduit adapted to be inserted in the tank, a casing at the lower end of said conduit for submersion within the liquid in the tank as the conduit is inserted therein, said casing having liquid inlet ports, a valve in said casing for opening and closing said conduit, a float in said casing for opening and closing said valve, said float being buoyant in liquid of heavier specific gravity than the liquid to be dispensed and sinking in the lighter liquid to be dispensed, said suction conduit having an opening therein upwardly of the portion which is adapted to be entered into the tank for breaking the suction pressure within said conduit thereby to permit the valve to open, and valve means controlling said air admitting opening in the suction conduit.

9. A device for emptying a tank adapted to contain non-miscible liquids of different specific gravities, said device comprising a discharge conduit in the tank, a casing at the bottom end of said conduit, said casing having inlet ports for said liquids, a valve in said casing for opening and closing said conduit, and a float in said casing, a guide tube in said casing and extending upwardly from the bottom end thereof, said float comprising a hollow metal body and a tube interfitting with said guide tube, said valve being mounted on said float, said hollow metal body having liquid inlet ports through its bottom wall, the tube of the float and the guide tube having lateral openings adapted to register at different elevations of the hollow metal body, said float tube opening through the top wall of the hollow met-

al body, the inlet ports in the hollow metal body, the openings in the float tube and the guide tube, and the openings in the float tube through the top wall of the hollow metal body permitting liquid of lighter specific gravity to flow through the float when the liquid of heavier specific gravity is below a predetermined level and permitting the liquid of lighter specific gravity to be replaced by a liquid of heavier specific gravity when the liquid of heavier specific gravity is above the predetermined level.

10. A device of the character described, comprising a conduit, means providing a chamber having an inlet connected to the one end of said conduit, and having an outlet through which the gasoline of lighter specific gravity is forced, means in said chamber for separating the gasoline of heavier specific gravity from the gasoline of lighter specific gravity, a casing depending into said chamber and having an outlet connected to the outlet of said chamber, said casing having an upper inlet port for the gasoline of lighter specific gravity and a lower inlet port for both gasolines, a valve in said casing for closing the outlet of said casing, a float in said casing operating said valve, said float being buoyant in the gasoline of heavier specific gravity and sinking in the gasoline of lighter specific gravity for operating said valve to closed position upon accumulation of gasoline of heavier specific gravity in said casing to a predetermined level, a casing at the other end of said conduit adapted to be submerged in a reservoir which may contain a desired gasoline of one specific gravity and desired gasoline of a heavier specific gravity and also water, said casing having an outlet connected to said conduit, said casing having upper inlet ports for the gasolines and a lower inlet port for the gasolines and water, a valve in said casing for opening and closing the outlet of said casing, a float between said upper and lower inlet ports and upwardly shiftable in said casing relatively close to the inner walls of said casing whereby to provide a circumferential liquid flow passage for said liquid of lighter specific gravity for operating said float and valve, said float being buoyant in the water and sinking in the gasolines for moving said last mentioned valve to closed position upon accumulation of water in said last mentioned casing to a predetermined level.

11. A device for emptying a plurality of conventional gasoline drums having a standard, threaded fill and discharge fitting in one end thereof, said device comprising a discharge pipe adapted to be inserted in one of said drums through said fitting and having a cooperative fitting adapted to be detachably connected to said drum fitting, said cooperative fitting being adapted to permit entry of air into one of said drums, a suction pump having a dispensing hose and means for operating said pump, means connecting said first mentioned pipe to said suction pump, said means including a pipe coupling providing a sole support for said suction pump, said pipe coupling having a support provided with a fitting identical to the cooperative fitting of said discharge pipe of said first device adapted detachably to fit in the opening of the discharge fitting of said additional conventional gasoline drums having a standard discharge pipe fitting similar to the discharge pipe fitting of said first tank whereby any such drum may be utilized as a base on which to detachably mount said suction pump, and means for detachably secur-

ing said coupling to one of said conventional drums having a similar discharge pipe fitting whereby said coupling and said suction pump are supported upon said second tank.

12. A device for discharging liquid of lighter specific gravity from a tank containing non-miscible liquids of different specific gravities, said device comprising a pipe adapted to be inserted downwardly into the liquids in said tank, means providing an inlet chamber at the lower end of said pipe, and a float chamber below said inlet chamber, a float in said float chamber, said float being buoyant in the liquid of heavier specific gravity and sinking in the liquid of lighter specific gravity, said float chamber opening into said inlet chamber to permit the float to rise from the float chamber into the inlet chamber, a valve controlled by said float for opening and closing said pipe, said inlet chamber having a side wall with an inlet opening for the liquid of lighter specific gravity, said float chamber having a wall with an inlet opening for the admission of either liquid as the pipe is inserted downwardly into the tank, said float being proportioned to rise into the inlet chamber upon admission of the liquid of heavier specific gravity into said float chamber through the inlet opening of said float chamber and to form with the side wall of said inlet chamber a restricted passage above the float increasing the velocity of the liquid of lighter specific gravity flowing upwardly about the float, and said float being so proportioned that the liquid of lighter specific gravity flowing about the float at the increased velocity raises the float relative to the liquid of heavier specific gravity rapidly to valve closing position.

13. In a device of the character described for discharging a fluid of lighter specific gravity from a chamber adapted to contain fluids of different specific gravities and having a discharge outlet, a liquid discharge conduit adapted to be associated with said outlet and having a portion adapted to project into said chamber, the lower portion of said projecting conduit being immersed in the fluids in said chamber and the lower end of said lower portion being closed, said lower portion having a valve seat in its upper portion, the side walls of said lower portion adjacent the junction with the closed end having relatively small inlet openings, the side walls of said conduit portion above said openings being imperforate a substantial distance upwardly thereabove, the side walls of said conduit portion above the imperforate section having liquid openings, the combined cross-sectional area which is about three times the cross-sectional opening of the valve seat, a float of substantially the same cross-sectional shape as the shape of said conduit portion vertically shiftable in said conduit portion, said float having a density differential relative to the fluid of lighter specific gravity, whereby the float sinks in the fluid of lighter specific gravity and having a density differential relative to the fluid of heavier specific gravity so that it floats in said latter fluid whereby said float is normally confined in a zone relatively remote from the larger liquid openings in said conduit portion, said float having vertical walls disposed relatively close to the imperforate inner walls of said conduit portion, thereby leaving a circumferential liquid passageway therebetween, the inner wall of said conduit portion immediately below the bottom of said liquid openings therethrough extending inwardly sufficiently whereby, when said float rises opposite

said inwardly extending wall portion, to provide a restricted passageway forming a continuation of said circumferential liquid passageway, and a valve carried by the upper portion of said float and adapted to seat against the valve seat of said conduit upon a predetermined rise in level of said float.

14. In a device of the character described for discharging a fluid of lighter specific gravity from a chamber adapted to contain fluids of different specific gravities and having an outlet, means for creating a pressure difference between the outlet and the surface of the fluids to force the fluid of lighter specific gravity through the outlet, a valve for said outlet, a float in said chamber and operatively connected to said valve, said float having a density differential relative to the fluid of lighter specific gravity whereby the float sinks in the fluid of lighter specific gravity, and having a density differential relative to the fluid of heavier specific gravity so that it floats in said latter fluid, and means for normally ballasting the interior of said float with liquid of lighter specific gravity for confining the float in a zone relatively remote from the outlet and in which the difference between the fluid pressure at the outlet and on the float is incapable of overcoming the density differential between the floats and the fluids and means operative on the rise in said chamber of the level of the liquid of heavier specific gravity for replacing the liquid in said float of lighter specific gravity with the rising liquid of heavier specific gravity and for imparting to the float rising under the influence of the rise in level of liquid of heavier specific gravity an accelerated movement over and above the rate of rise in the level of the liquid of heavier specific gravity whereby to cause the valve carried by said float to close on said valve seat before liquid of heavier specific gravity can pass through said valve seat.

15. In a device of the character described for discharging a fluid of lighter specific gravity from a chamber adapted to contain fluid of different specific gravities and having a discharge outlet, a discharge conduit associated with said outlet and projecting downwardly into said chamber, said downwardly projecting portion having a valve seat and adjacent fluid inlet openings through which liquid in the chamber may pass through said valve seat to said discharge outlet, means for creating a pressure difference between the outlet and the surface of the fluids in the chamber to force the fluid of lighter specific gravity through the openings, the valve seat and through said outlet, a float carrying a valve, said

float being shiftably mounted relatively to the lower end of said downwardly projecting discharge conduit, said float having a density differential relative to the fluid of lighter specific gravity whereby the float normally sinks in the fluid of lighter specific gravity to a position relatively remote from said inlet openings and said float having a density differential relative to the fluid of heavier specific gravity so that it floats in the latter fluid to a position to cause the valve to close on said valve seat with said latter fluid operable upon the walls of said float in response to the rise in level thereof to accelerate the upward movement of the float whereby to cause the valve carried thereby to move to closed position before the liquid of heavier specific gravity reaches the valve seat.

16. In a device of the character described for discharging a fluid of lighter specific gravity from a chamber adapted to contain fluids of different specific gravities and having a discharge outlet, a liquid discharge conduit adapted to be associated with said outlet having a portion adapted to project into said chamber, a lower portion of said projecting conduit being immersed in the fluids in said chamber and the lower end of said lower portion being closed, said lower portion having a valve seat in its upper portion, the side walls of said lower portion adjacent the junction with the closed end thereof having relatively small inlet openings, the side walls of said lower portion above said openings being imperforate a substantial distance upwardly thereabove and said side walls above the imperforate section having liquid openings, the combined cross-sectional area of which is about three times the cross-sectional opening of the valve seat, a float of substantially the same cross-sectional shape as the shape of said conduit portion vertically shiftable in said conduit portion, said float being hollow and provided with a central vertically disposed hollow guideway, a guide post centrally mounted on the end wall of the lower portion of said conduit and upstanding therefrom and telescopingly slidable within and relatively to the hollow guideway of said float, a liquid inlet port connecting the interior of said lower portion of said conduit with said stationary guideway and with the interior of said float and the hollow guideway of said float and means connecting the upper portion of said hollow guideway of said float with the outside of the upper portion of said float and a valve mounted on the upper portion of said float and shiftable with the float to closed position on the valve seat.

DAVID SAMIRAN.