G. B. MAEGLY.

APPARATUS FOR SUPPLYING FUEL TO HYDROCARBON MOTORS.

APPLICATION FILED NOV. 1, 1915.

1,352,671.

Patented Sept. 14, 1920.

2 SHEETS—SHEET 1.

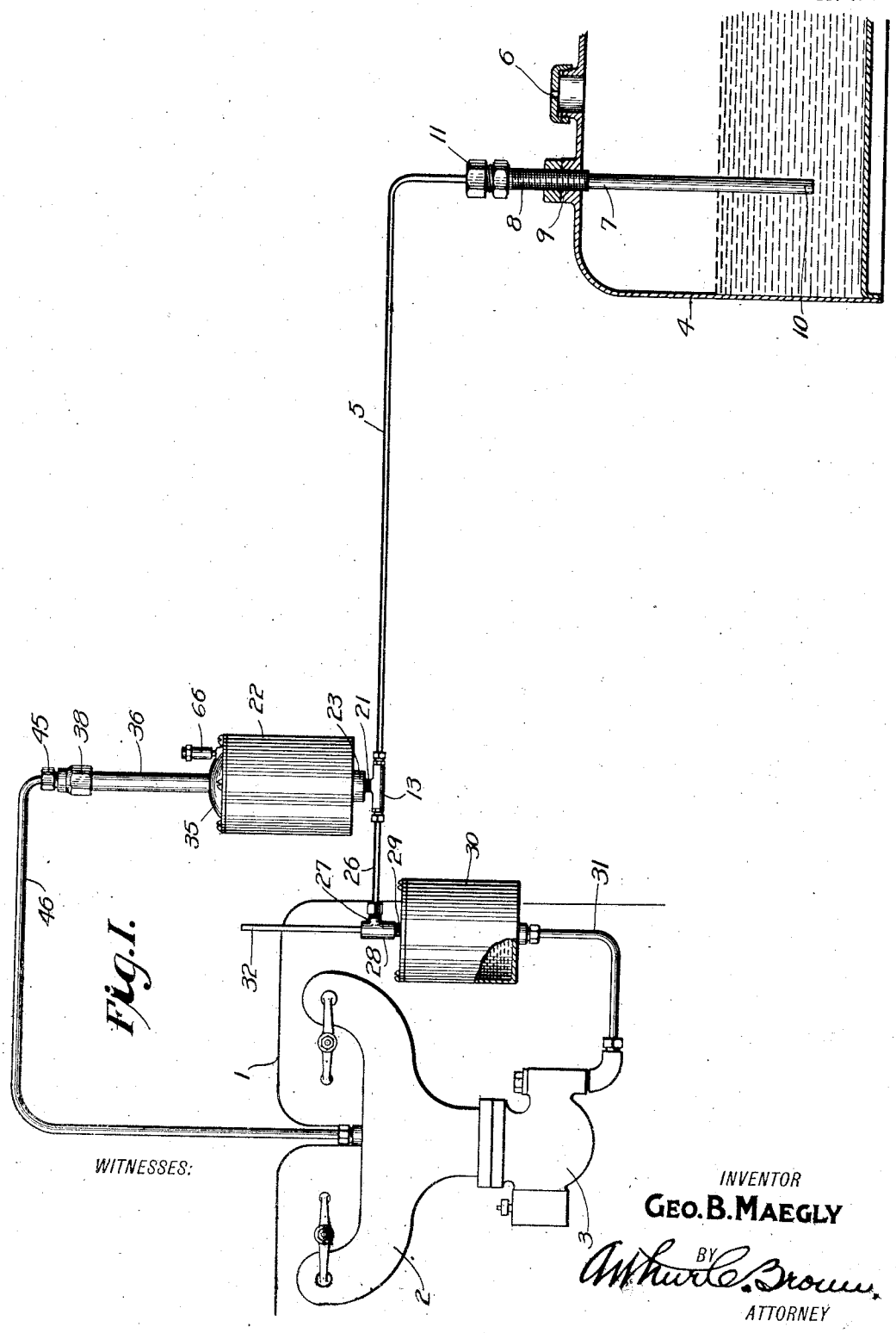

Fig. 1.

WITNESSES:

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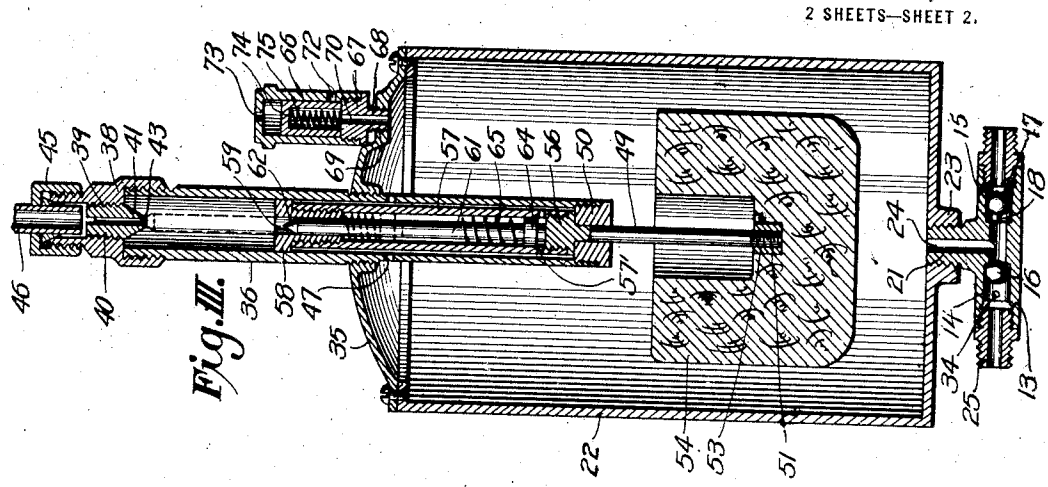

Fig. III.

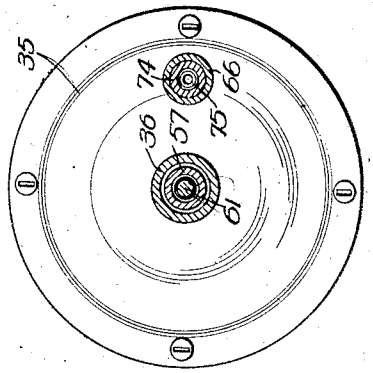

Fig. IV.

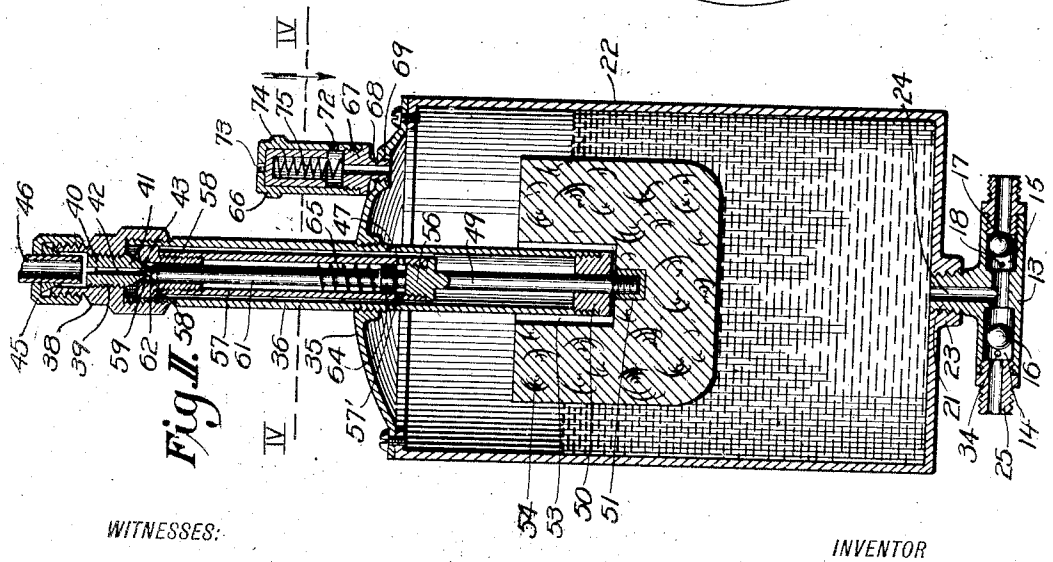

Fig. II.

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APPARATUS FOR SUPPLYING FUEL TO HYDROCARBON-MOTORS.

1,352,671. Specification of Letters Patent. Patented Sept. 14, 1920.

Application filed November 1, 1915. Serial No. 59,122.

To all whom it may concern:

Be it known that I, GEORGE B. MAEGLY, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Apparatus for Supplying Fuel to Hydrocarbon-Motors; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in apparatus for supplying fuel to hydro-carbon motors, and more particularly to an apparatus for use in combination with the storage tank and carbureter of a motor driven vehicle; the principal object of the invention being to provide simplified means whereby the suction created by the pistons of the motor is used to automatically pump liquid fuel from a storage tank and to elevate and store the same so that it may be flow by gravity to the carbureter, and to so control the flow as to maintain an adequate supply at all times.

The preferred form of my improvements is illustrated in the accompanying drawings, wherein:—

Figure I is an elevational view of a gasolene supply apparatus containing my improvements; the main storage tank and part of the auxiliary storage tank being in section for better illustration.

Fig. II is an enlarged vertical section of the float chamber, showing the suction controlling mechanism with the parts in position for closing the float chamber to suction from the manifold.

Fig. III is a similar view, showing the parts in position for admitting suction to the float chamber.

Fig. IV is a cross-section on the line IV—IV, Fig. II.

Referring more in detail to the drawings:

1 designates a motor, of any ordinary type, having an intake manifold 2 that is supplied with fuel vapor from a carbureter 3, and 4 designates a gasolene storage tank which is mounted on the vehicle at a distance from the motor.

Leading from the tank 4 is a conduit 5 through which gasolene from the storage tank is delivered to the carbureter 3, the tank 4 being normally open to atmosphere through a vent port 6, preferably located in the filler cap of the tank. Extending into the tank from the conduit 5 is a tube 7 having a neck 8 threaded into a collar 9 on the storage tank, and having a lower end 10 terminating adjacent the bottom of the tank but normally spaced vertically therefrom, the tube 7 being retained by a gland 11 thereon and the parts being so arranged that the tube 7 may be screwed into the collar 9 and extended farther into the tank when occasion requires.

This arrangement is designed to give notice to the operator when the gasolene supply is running low; and also to insure an available reserve supply sufficient to carry him to a station at which his supply may be replenished.

It will be apparent that when the gasolene level is below the bottom of the tube 7, the motor will stop for want of fuel. The operator may then screw the tube 7 into the tank sufficiently to reach the remaining gasolene, and by turning the motor over a few times thus lift a supply sufficient for restarting the motor, after which the reserve supply is automatically made available for the carbureter.

Mounted on the conduit 5 is a T-fitting 13; the body of which is provided with chambers 14—15 in its opposite ends, and containing the valve balls 16—17; the conduit 5 having a fitting threaded into the chamber 15 and comprising a seat for the ball valve 17, so that back pressure of gasolene in the system will seat the ball and prevent back-flow to the tank 4, a pin 18 being located in the chamber 14 at the side of the ball opposite the conduit, so that when there is suction in the system the ball will be drawn away from its seat and permit free passage for the gasolene.

The body of the fitting 13 comprises a threaded shank 21 mounted in a suction tank 22, the said shank being threaded into a boss 23 on the bottom of the tank, and having a channel 24 through which con-

stant communication is maintained between the interior of the tank and the fitting 13.

Seated in the end of the chamber 14 is a fitting 25 of a conduit 26, the opposite end of which is located in a branch 27 of a fitting 28 on a neck 29, that is carried by and opens into a supply tank 30, having a conduit 31 opening from the bottom thereof and leading to the carbureter 3.

A vent pipe 32 extends upwardly from the fitting 28 to a point approximately as high as the top of tank 22. Through this pipe the tank 30 is constantly open to atmosphere, and provides the air vent, adapted to permit the gasolene to flow to the carbureter.

Communication between the tank 22 and the supply tank is controlled by the check valve 16 which is adapted to find its seat when there is suction in the tank 22, and thus prevent the gasolene from being drawn back from the supply tank to the suction tank; a retaining pin 34 is adapted to hold the check valve and permit the gasolene to flow into tank 30 when there is atmospheric pressure in the tank 22.

The tank 22 is sealed by a cap 35, and extending through the latter is a guide tube 36, having a threaded mounting in the cap and projecting downwardly into the tank.

Mounted on the upper end of the tube 36 is a head 38 having a bore 39, and threaded into said bore is a valve plug 40, having a tapered valve portion 41 located within the tube and having a central passage 42 comprising a valve seat 43 at its lower end; the said plug being removable from the head 38 when replacement may be necessary.

Mounted on the head 38 is a gland nut 45, and extending through the latter and in open communication with the central passage 42 is a tube 46, which leads to, and opens into the intake manifold 2 of the motor 1, so that when in operation, suction created by the pistons in the motor cylinders is transferred through the tube 46 to the tube 36 and thence through ports 47 in said tube to the interior of the suction tank.

In order to control the suction in the tank 22 I provide the tube with a valve and operating mechanism, comprising a float rod 49 slidably mounted in a bearing 50. The rod 49 projects downwardly and is threaded into a socket 51, of a fitting 53, of a float 54 in the tank 22.

The upper end of the rod 49 carries a head 56, guided loosely in the tube 36 and mounted on said head is a valve cage 57, the upper end of which comprises a flanged head 58, having a bore 59 adapted for receiving the tapered end 41 of the valve plug 40, through which suction reaches the tank 22; the upper end of the bore 59 serving as a valve seat for the end 41 of the valve 40.

Located within the cage 57 is a needle valve 61, the upper end of which is loosely mounted in the bore 59 of the flanged head 58, and has a conical tip 62 adapted for seating in the end of the plug 40 in order to close the central passage 42. The needle valve 61 has a collar 64 on its lower end, and surrounding said needle valve and resting on the collar 64 is a compression spring 65, that engages the lower end of the flanged head 58 when the needle valve is at the upper limit of its movement and the cage 57 is at its lower limit, as illustrated in dotted lines in Fig. III; the spring 65 being adapted to prevent the needle valve from returning, when it is first disconnected from its seat, as will presently be more fully described, and the cage 57 having a port 57′ at its lower end through which air may flow to lift the valve 61 when suction is in the tube 46.

As the tank 22 is airtight I provide automatic means for relieving the vacuum in order that fuel drawn thereinto may freely flow to the supply tank 30 when the suction from the motor is cut off. This means preferably comprises a valve casing 66 having a head 67 threaded into its lower end, and provided with a shank 68 which is threaded into an opening 69 in the cap of tank 22, the said shank having a bore 70 by which communication is established between the chamber of the tank and that of the casing 66. The casing 66 has a vent port 72 adjacent the head 67 and is provided with a vent 73 in open communication with atmosphere, and slidably mounted within the casing 66 is a cup valve 74.

Seated on the top of the head 67 is a spring 75, the upper end of which is located within and bears against the valve 74, so that the tension of the spring 75 yieldingly retains the cup valve at the upper limit of its travel, and with the port 72 normally uncovered and the tank 22 open to atmosphere, it is apparent that when there is vacuum in the tank 22, atmospheric pressure will force the cup valve 74 down against the tension of the spring 75 and cover the port 72, and thus seal and make the tank 22 airtight.

Assuming that the parts are constructed and assembled as described, and that there is a supply of fuel in the tank 30, but none in the tank 22, the valves and ports will be in the positions illustrated by full lines in Fig. III. Assuming further that the motor is running on the fuel supplied by the tank 30, the suction created by the motor is communicated through tube 46, tube 36, and port 47 to the tank 22.

As soon as the pressure within the tank is sufficiently reduced, atmospheric pressure passing through vent 73 will force the cup valve downwardly against the tension of spring 75; this action closing the vent port 72. Simultaneously atmospheric pressure will force the valve 16 to its seat and the

tank will be otherwise sealed as long as the valve 61 is off its seat. Atmospheric pressure will now force the gasolene in storage-tank 4 upwardly through the tube 7, and conduit 5, past the check valve 17, and into the tank 22.

As the gasolene rises in the tank 22, the float 54 is lifted therewith and when the float reaches a pre-determined height, the cage 57 will have reached the upper limit of its movement so that the seat of the bore 59 will engage the tapered end 41 of the valve plug 40, and thus restrict the suction to the bore 59. The needle valve will now be forced upwardly until it finds its seat 43; this closes the tube 42 and cuts off the suction from the motor. It will be understood that the area of the bore of tube 42 and the weight of the valve 61 are so proportionately related that the suction above the valve will hold the latter to its seat, but that the additional weight of the float is sufficient to overcome the suction, and pull the valve from its seat, and leave it free to drop into its cage.

As soon as the suction is shut off by the valve 61 finding its seat, the tension of the spring 75 will lift the cup valve and uncover the vent port 72; this relieves the vacuum below the valve and permits tank 22 to evacuate into and replenish tank 30.

As the gasolene flows out of the tank 22, the float 54 lowers and draws the cage 57 with it, the needle valve 61 however, being held to its seat by suction until the float reaches the lower limit of its movement. As the float approaches this position the lower end of the head 58 engages the spring 65 that surrounds the needle valve, and the weight of the float is transferred to the valve and the latter is pulled from its seat and drops by gravity into the cage, the action of the spring insuring the positive separation of the needle valve from its seat and prevents the chattering which would otherwise be the tendency.

As soon as the valve 61 leaves its seat, suction is again admitted to the tank 22, and the filling operation heretofore described is repeated; it being apparent that the supply tank is uniformly replenished, and the needs of the carbureter automatically met without care or attention on the part of the driver.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters-Patent, is:

1. In combination, a source of suction, a float tank connected therewith, a storage tank below the level of said float tank and connected with said float tank, a float in said float tank, a valve operated by said float and controlling the connection of said source of suction, and a second valve also controlling the connection of said source of suction, said second valve closing with said first named valve, but remaining closed until after said first named valve has opened and moved a predetermined amount.

2. In combination with source of suction and a liquid fuel storage tank, a float tank, a connection between the float tank and storage tank, a connection between the float tank and source of suction whereby flow from the storage tank is induced by suction from said source comprising a double valve seat, a float in the float tank, a valve member mounted on the float and adapted for communication with one of said valve seats, to primarily close communication between the float tank and source of suction, and a secondary valve member carried by the first named member and adapted for communication with the second valve seat and for removal from its co-operative relation with its valve seat under influence of the first named valve member upon return of the float.

3. In combination with a source of suction, a liquid fuel storage tank, a float tank having communication with the storage tank and with the source of suction, a double valve seat in the line of communication to the source of suction, a float in the float tank, a valve member on the float adapted for seating on one of said valve seats when the float is raised, a second valve member supported by the first and movable thereby to the other valve seat and adapted for support in said valve seat by suction in the line of communication, whereby said line is closed by the second valve member while the first valve member is lowered with the float, means on the first valve member for unseating the second member when the float has reached a pre-determined level, and means for controlling the intake of free air to the float tank.

4. In combination with a source of suction, a liquid fuel storage tank, a float tank having communication with the fuel tank and with the source of suction, a double valve seat in the line of communication to the source of suction, a float in the float tank, a valve member on the float adapted for seating on one of said valve seats when the float is raised, a second valve member supported by the first and movable thereby to the other valve seat and adapted for support in said valve seat by suction in the line of communication, whereby said line is closed by the second valve member as the first valve member is lowered with the float, means on the first named valve member for unseating the second member when the float has reached a predetermined level, means for controlling the intake of free air to the float tank, a collar on the second valve member, and a spring surrounding said member and adapted for compression when the said member is seated, to accelerate the unseating of said member.

5. In combination with a source of suc-

tion, a liquid fuel storage tank, a float tank having communication with the storage tank and with the source of suction, a valve seat in the line of communication to the source of suction, a float in the float tank, a valve cage on the float movable toward and from said valve seat, a valve member slidable in said cage and adapted for support thereby to seat the valve member when the float is raised, means on the cage for unseating said valve when the float is lowered to a pre-determined level, and an automatic valve for controlling the intake of free air to the float tank.

6. In combination, a source of suction, a float tank connected therewith, a storage tank below the level of said float tank and connected with said float tank, a float in said float tank, a valve operated by said float and controlling the connection of said source of suction, a second valve also controlling the connection of said source of suction, said second valve closing with said first named valve but remaining closed until after said first named valve has opened and moved a predetermined amount, an atmosphere inlet for said float tank, and a valve closing by suction controlling said atmosphere inlet.

7. In combination with a source of suction, a liquid fuel storage tank, a float tank, a conduit leading from the source of suction to the float tank and comprising a valve member closing by suction, a conduit leading from the storage tank to the float tank, whereby flow of liquid to the float tank is induced by suction from said source, a conduit leading from the float tank, a valve adapted for direct mechanical coöperation with the said valve member and for support in such position by suction from said source to close communication through the conduit leading from the source of suction, and float actuated mechanism for seating and unseating said valve.

8. In combination with a source of suction, a liquid fuel storage tank, a float tank, a conduit leading from the source of suction to the float tank and comprising a valve member closing by suction, a conduit leading from the storage tank to the float tank, whereby flow of liquid to the float tank is induced by suction from said source, a conduit leading from the float tank, a valve adapted for direct mechanical coöperation with the said valve member and for support in such position by suction from said source to close communication through the conduit leading from the source of suction, float actuated mechanism for seating and unseating said valve, and means for maintaining communication between the float tank and atmosphere while said valve is seated.

9. In combination with a source of suction, a liquid fuel storage tank, a float tank, a conduit leading from the source of suction to the float tank and comprising a valve member closing by suction, a conduit leading from the storage tank to the float tank, whereby flow of liquid to the float tank is induced by suction from said source, a conduit leading from the float tank, a valve adapted for direct mechanical coöperation with the said valve member and for support in such position by suction from said source to close communication to said source, float actuated mechanism for seating and unseating said valve, and means for maintaining communication between the float tank and atmosphere while said valve is seated and for automatically closing such communication when the valve is opened.

10. In combination with a source of suction, a float tank, a float within the tank, a valve integral with the float and movable with the latter, and a second valve within and governed by the float valve and adapted for controlling suction from said source.

11. In combination with a source of suction, a liquid elevating mechanism comprising a float tank, a valve chamber above and in open communication with the float tank, a concentrically arranged valve seat in the upper end of said valve chamber, a second valve seat concentrically arranged within the first named seat, a float within the float tank, a valve on said float slidably mounted within the valve chamber and adapted for registration with said first named valve seat, and a needle valve slidably mounted and concentrically arranged within the floating valve and adapted for registration with the second named valve seat.

12. In a device of the character described, a float tank, a valve chamber opening into said tank, a float in said tank, an upwardly extending stem rigidly mounted on said float and slidably mounted in the valve chamber, a valve cage on said stem, a plunger valve slidably mounted in the valve cage, and a conduit opening to said tank and adapted for closure by the plunger valve.

13. The combination with a float tank, of a valve chamber in said tank, a conduit having a valve seat in one end of said chamber, a second valve seat concentrically arranged within the first named seat, a floating valve within the chamber and adapted for registration with the first named seat and a needle valve concentrically mounted within the floating valve and adapted for registration with the second named valve seat.

14. The combination with a tank, of intake and exhaust conduits communicating with said tank, an automatic valve for controlling admission of air to the tank, a valve chamber having communication with the interior of the tank, a valve seat at the outer end of said chamber, a conduit leading to said valve seat, a valve cage slidably mounted in said chamber and having an extension

leading to the exterior thereof opposite the valve seat, and having a port, a float on said extension within the tank, a plunger valve slidably mounted within the cage and having a valve portion at one end adapted for closing said valve seat and having means at its opposite end for engagement by the valve cage to unseat said valve portion.

15. The combination with a tank, of intake and exhaust conduits communicating with said tank, an automatic valve for controlling admission of air to the tank, a valve chamber having communication with the interior of the tank, a valve seat at the outer end of said chamber, a conduit leading to said valve seat, a valve cage slidably mounted in said chamber and having an extension leading to the exterior thereof opposite the valve seat, a float on said extension within the tank, a plunger valve slidably mounted within the cage and having a valve portion at one end adapted for closing said valve seat and having means at its opposite end for engagement by the valve cage for unseating said valve portion, and yielding means for urging said plunger valve away from the valve seat.

16. The combination with a tank, of intake and exhaust conduits communicating with said tank, an automatic valve for controlling admission of air to the tank, a valve chamber having communication with the interior of said tank, a valve member at the outer end of said chamber, a guide at the inner end of said chamber, a valve cage movably mounted in said chamber and having an interior collar at one end, a head at the opposite end of the valve cage, a valve rod slidably mounted in said collar and adapted to engage said head, a collar on said rod, the valve rod at its upper end adapted for cooperation with the valve member in said chamber, and a spring surrounding said rod and adapted for engaging the valve rod away from said valve member.

In testimony whereof I affix my signature.

GEORGE B. MAEGLY.