

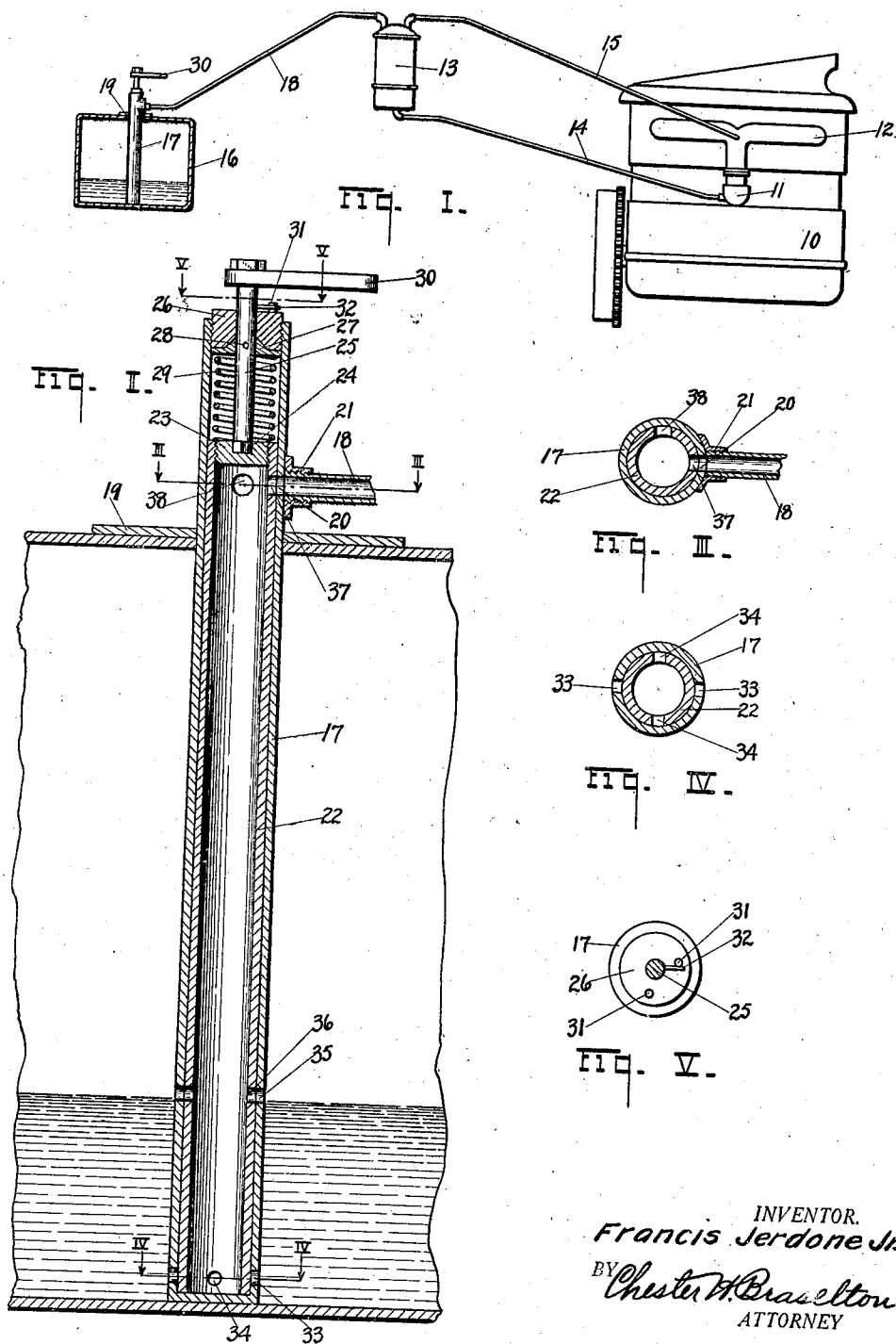
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FUEL RESERVE SUPPLY SYSTEM

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FUEL-RESERVE-SUPPLY SYSTEM.

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To all whom it may concern:

Be it known that I, FRANCIS JERDONE, Jr., residing at Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Fuel-Reserve-Supply Systems, of which I declare the following to be a full, clear, and exact description.

My invention relates to a fuel reserve supply system for internal combustion engines, and has for its object to provide a simple and inexpensive device for regulating the amount of fuel to be fed from the main supply tank to the engine, which will operate to call the attention of the driver to the fact that the main supply has been reduced to a predetermined amount.

Another object of the invention is to provide, in connection with the vacuum fuel feed system of an internal combustion engine, an improved valve arrangement, which when in one position of adjustment will permit the greater portion of the fuel in the tank to be drawn therefrom, and which will prevent the remaining portion or reserve supply from being used, until the device is manually operated to place it in position to permit the reserve supply to be consumed by the engine.

Another object of the invention is to provide improved means for controlling a reserve supply of fuel in the main fuel supply tank, which will obviate the use of a partition in said tank for separating the reserve supply from the main supply of fuel.

To these and other ends the invention comprises certain novel features of construction and arrangement of parts as will be hereinafter more fully pointed out and claimed, it being understood that various changes may be made in the manner of constructing and operating the device without departing from the spirit of the invention.

A construction illustrating one embodiment of my invention is shown in the accompanying drawing forming a part of this specification, in which:

Figure I is a diagrammatic view embodying the invention.

Figure II is a fragmentary, sectional elevation of a tank to which my invention is applied, the fuel control device being also shown in section.

Figure III is a sectional plan taken on line III—III of Figure II.

Figure IV is a sectional plan taken on line IV—IV of Figure II, and

Figure V is a sectional plan taken on line V—V of Figure II.

Similar reference characters refer to similar parts throughout the several views of the drawing.

Heretofore in the construction of fuel reserve supply systems, it has been customary to provide a fuel supply tank having a partition therein for separating the reserve supply of fuel from the main supply, with a valve for controlling the passageways leading from the separate compartments.

One object of the present invention is to avoid the use of a partition and to provide a valve upon a conduit projected into the supply tank, said valve having two positions of adjustment, one of which will permit the consumption of all but the reserve supply, which can be withdrawn from the tank only when the valve is placed in the other position of adjustment.

Referring to the drawing, 10 represents an internal combustion engine having a carburetor 11 and a manifold 12, which are respectively connected with a vacuum fuel feed tank 13 by means of the conduits 14 and 15, as shown in Figure I. The gravity vacuum feed tank 13 is connected with the main supply tank 16 by means of the tube or hollow member 17 projecting into said tank, and the supply pipe 18 leading therefrom to the upper end of said vacuum tank. The tube 17 is projected into the tank 16 preferably to the bottom thereof, and at its upper end is suitably connected with a plate 19, preferably by soldering, which in turn is connected with the upper wall of the tank 16 in any desired manner. The conduit 18 is connected with the outlet opening 20 in the side wall of the tube 17, by means of a threaded connection 21 which is located at a point slightly above the top of the tank 16, as shown in Figure II. A tube 22 is rotatably mounted in the tube 17, and comprises a valve for controlling the reserve supply of fuel in a manner which will presently be described. The tube 22 is open at its lower end but is closed at its upper end by a screw plug 23 having a socket or squared recess therein adapted to receive the correspondingly shaped end 24 of the valve stem 25 which is rotatably mounted in the screw plug 26 closing the upper end of the tube

17, as shown in Figure II. The lower face of the screw plug 26 is provided with a conical recess for receiving the correspondingly shaped valve 27, which may be driven upon the stem or rigidly connected therewith by means of a pin 28. The lower end of the valve tube 22 is seated upon the end wall of the tube 17, and is adapted to rotate thereon. A handle 30 is provided for rotating the valve stem to effect rotation of the valve tube, the extent of rotation of said tube being governed by the stops 31 upon the screw cap 26 which are adapted to be engaged by a finger 32 projecting laterally from the valve stem, as shown in Figure V, said finger being arranged to move between said stops to engage one or the other according to the position of adjustment of the valve. Adjacent the bottom of the tube 17, apertures 33 are provided which are adapted to register with the apertures 34 in the valve tube 22, when said tube is in position to permit the use of the reserve supply of fuel in the tank 16. The tube 17 is also provided at a suitable distance above the apertures 33 with apertures 35, which normally register with apertures 36 in the valve tube to permit the main supply of fuel to be withdrawn from the tank through the communicating apertures 37 and 20, the latter discharging into the conduit 18 extending to the vacuum feed tank 13 from which the fuel is fed by gravity to the carburetor 11 through the conduit 14. An aperture 38 is also provided in the upper end of the valve tube to permit the discharge of the fuel through the conduit 18 when the valve is in position to permit the use of the reserve supply of fuel from the bottom of the tank 16. The apertures 35 and 36 in the tubes 17 and 22 may be located at any desired point above the bottom of the tank, the height of these apertures depending upon the quantity of fuel which may be determined upon as the amount for constituting the reserve supply. By closing the upper end of the valve tube 22 with the plug 23, air is prevented from entering the tube to interfere with the proper functioning of the vacuum fuel feed system, and furthermore since the upper end of the tube 17 is closed by the screw plug 26 and valve 27, air is prevented from leaking into said tube and around the tube 22 through the apertures 37 and 38. The conical shaped valve 27 is always yieldingly held upon its seat by means of the spring 29, which also serves to retain the tube 22 in proper position longitudinally within the tube 17. In the operation of my improved device, with the parts in normal position, and with the tank 16 substantially filled with fuel, the engine may be operated to consume the major portion of the fuel, or all except that which constitutes the reserve supply. When the fuel in the tank has been reduced to the point indicated

in Figure II, there remains only the reserve supply which can not be used with the valve in normal position as shown, since air will enter through the ports 35 and 36 into the tube 22, and prevent the proper functioning of the vacuum fuel feed system. When the engine is stopped for lack of fuel, the driver's attention is called to the fact that only the reserve supply remains in the tank, and that it is necessary to take steps to replenish the supply. In order to start the engine to permit the machine to be driven to the next fuel supply station, the driver is required to rotate the tube 22 through an angle of 90° to bring the apertures 34 in registering relation with the apertures 33, and the aperture 38 in registering relation with the aperture 20 at the upper end of the tube 17, and in doing this, the apertures 35 in the tube 17 will be closed and fuel may then be withdrawn from the tank through the apertures 33 and 34, thereby permitting the use of the reserve supply of fuel by the engine. When a new supply of fuel is placed in the tank greater than the reserve supply, the valve tube 22 is rotated back to the position shown in Figure II, in which position the device is normally maintained, it being understood that if the driver is unable to secure a fresh supply of fuel greater than the reserve supply, that the valve tube 22 will not be moved back to normal position.

It will be understood, of course, that the engine will not stop immediately upon the closing of the valve in the main supply tank, as there will be sufficient fuel in the gravity feed tank and carburetor to supply the engine for a relatively short period of time, after which the driver's attention is called to the fact that the fuel control valve is closed and must be set in open position. When the engine stops for lack of fuel in the carburetor, it must be started by external mechanism and kept going until sufficient fuel is pumped into the gravity feed tank and fed to the carburetor to permit the engine to be run by the explosion of gas in the cylinders. A comparatively few revolutions of the crank shaft will suffice for this purpose, and this work may be performed by the engine starter, or the engine may be cranked by hand if not provided with a self starter.

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

1. A fuel control device comprising a tube adapted to be projected into a tank and provided with an outlet aperture and with inlet apertures at different levels, and a yieldingly mounted tube rotatable within the first mentioned tube to alternately open and close said inlet apertures, and having outlet apertures arranged to communicate with the first mentioned outlet aperture for the different

positions of adjustment of said yielding mounted tube.

2. A fuel control device comprising a tube adapted to be projected into a tank and provided with an outlet aperture and with inlet apertures at different levels, a second tube rotatably and yieldingly mounted in the first mentioned tube adapted to alternately open and close said inlet apertures, and an operating member for said inner tube projecting through the outer end of the first mentioned tube.

3. A fuel control device comprising a hollow member adapted to be projected into a tank and provided with an outlet aperture and with inlet apertures at different levels, means for alternately opening and closing said inlet apertures, an operating member therefor extending through the wall of said hollow member, and means for effecting an air tight joint around said operating member at the point where it extends through said hollow member.

4. A fuel control device comprising a tube adapted to be projected into a tank and to extend therefrom, the inner portion of said tube being provided with inlet apertures at different levels, and the extended portion with an outlet aperture adapted for connection with an aspirator, a second tube within the first for alternately opening and closing said inlet apertures, a spring between the outer ends of said tubes, a stem projecting through said spring into operating engagement with the inner tube and a handle connected with said stem.

5. A fuel control device comprising a tube adapted to be projected into a tank and to extend therefrom, the inner portion of said tube being provided with inlet apertures at different levels and the outer portion with an outlet aperture arranged for connection with a conduit, a second tube within the first provided with inlet apertures adapted to alternately communicate with the first mentioned inlet apertures, and having outlet apertures arranged to communicate with the first mentioned outlet aperture, a closure for the outer end of each of said tubes, a spring in the outer tube interposed between said closures, a stem projecting through the outer closure and operatively connected with said inner tube, a handle for rotating said stem, and stops for limiting the rotation of said stem whereby the inlet apertures of the inner tube are alternately brought into registering relation with the inlet apertures of the outer tube.

6. A fuel control device comprising a tube adapted to be projected into a tank, and to extend therefrom, the inner portion of said tube being provided with inlet apertures at different levels and said extended portion with an outlet aperture adapted for connection with a conduit, a second tube rotatably

mounted in the first mentioned tube provided with inlet apertures arranged to alternately communicate with the first mentioned inlet aperture and having outlet apertures adapted to communicate with the first mentioned outlet aperture, a cap for the outer end of each of said tubes, a stem projecting through the outer cap and operatively engaging the inner cap, a valve upon said stem rotatable upon the inner face of said outer cap to prevent air from entering the tube through said cap, a spring interposed between said valve and inner cap, and a handle for rotating said stem.

7. A fuel control device comprising a tube adapted for insertion in a fuel tank as a unit through one wall thereof to a point adjacent the opposite wall with the discharge end projecting through the first mentioned wall, said tube having inlet openings at different levels sealed by the fuel in the tank and forming an air-tight compartment, a suction producing apparatus connected with said tube, said openings being uncovered when the liquid in the tank falls below certain predetermined levels, and means operable from the discharge end of the tube for closing each of said openings when the liquid falls below the same.

8. A fuel control device comprising a tube adapted for insertion in a tank with the discharge end projecting therefrom and arranged for connection to a conduit, said tube having inlet openings therein, an adjustable member mounted within said tube and adapted to alternately open and close said inlet openings when moved from one position of adjustment to another, a member closing the discharge end of said tube, an operating member for said adjustable member projecting through said closing member, and a spring within said tube yieldingly engaging said adjustable member.

9. In combination, a fuel control system comprising a fuel tank in which the fuel is subjected to atmospheric pressure, a vacuum fuel feed system including a tube projecting into said tank and having a plurality of fuel inlet openings at different levels therein, the system being rendered inoperative when the openings are unsealed, a member disposed longitudinally of said tube and movable to alternately open and close said openings, and means operable from a point adjacent to that at which the tube discharges from the tank for actuating said movable member.

10. A fuel control device comprising a tube insertable through the top of a tank to a point adjacent to the bottom thereof, said tube having a discharge passageway adjacent the upper end thereof and upper and lower inlet passageways below said discharge passageway, a closure for the outer end of the tube, a spring pressed valve

within the tube for controlling said upper inlet passageway, and actuating means for the valve operable through said closure.

11. A fuel control device comprising a tube
5 insertable through the top of a tank to a point adjacent the bottom thereof, said tube having a discharge passageway adjacent the upper end thereof and upper and lower inlet openings below said discharge
10 passageway, a closure for the outer end of the tube having an opening therethrough, a valve for controlling said upper inlet opening, an operating member for said valve projecting through the opening in said closure, a valve adapted to render the opening
15 in said closure air-tight, and spring means acting upon said valves to maintain them in proper position with respect to the openings which they control.

12. The combination with a fuel tank of a feed pipe extending down into the same, having an opening in its lower end and an air vent formed therein at a distance from its lower end, a suction producing apparatus connected with said feed pipe, means co-
25 operating with said feed pipe for opening and closing the air vent and also completely cutting off the feed of the fuel when desired, located within the tank, and means exterior of the tank for making the first-named means effective.

13. The combination with a fuel tank, of a fuel pipe extending down into the same and formed with an air vent at the desired reserve level normally covered by the main supply of the fuel, a suction producing apparatus connected with said fuel pipe, and means co-operating with the fuel pipe for effecting the opening, closing and partial closing of the air vent and to completely cut off the fuel feed when desired.

14. The combination with a fuel tank, of a feed pipe extending down into the tank and having upper and lower fuel inlet openings, a suction producing apparatus connected with the discharge end of the pipe, a valve rotatable to close the upper inlet opening to permit the suction producing apparatus to draw the fuel through the lower inlet opening, and a spring yieldingly holding the valve in its different positions of adjustment.

15. The combination with a fuel tank and a gas engine including a vacuum producing apparatus, of an enclosure within the tank having a feed passage and upper and lower inlet passages, means connecting the feed passage with the vacuum producing apparatus, a valve mounted within the tank and operable to close said upper inlet passage, whereby the fuel may be drawn through the lower inlet passage, an operating member for the valve extending through a wall of the enclosure, and a member rigid
65 with said operating member for sealing the

opening in the wall through which the operating member is extended at all positions of the latter.

16. The combination with a fuel tank, of a hollow member extending downwardly within the tank to a point adjacent the bottom thereof and having a feed passage and upper and lower inlet passages, a suction producing apparatus connected with said feed passage to draw the fuel therethrough, and means rotatable to open or close either of said inlet passages.

17. The combination with a fuel tank, of a fuel control device projecting into the tank and including relatively movable members having upper and lower sets of inlet openings, one of said members having an operating portion projecting through an opening in the other whereby it is moved to open or close either set of said inlet openings, means for sealing said opening in all positions of said members, and a suction producing apparatus connected with said device and adapted to draw the fuel there-through.

18. The combination with a fuel tank, of a fuel control device including two relatively movable members within the tank, one of which is provided with a feed passage, said members being adapted to co-operate to permit fuel to enter said passage at either of two different levels and to prevent the entrance of the fuel to the passage at either of said levels, and a suction producing apparatus connected with said feed passage.

19. The combination with a fuel tank, of a fuel control device including two telescoping tubes disposed within the tank and having upper and lower sets of co-operating inlet openings, one of said tubes being rotatable whereby either set of inlet openings may be closed or opened at will, means for operating said rotatable tube, and a suction producing apparatus connected with said device.

20. The combination with a fuel tank, of a fuel control device including two telescoping tubes disposed within the tank and having upper and lower sets of co-operating inlet openings, one of said tubes being rotatable whereby either set of inlet openings may be closed or opened at will, means for indicating when said rotatable tube is in the desired position of adjustment, and a suction producing apparatus connected with said device.

21. The combination with a fuel tank, of a hollow member extending downwardly within the tank to a point adjacent the bottom thereof and having an inlet opening between its ends at the desired level for the reserve supply, a suction producing apparatus connected with the upper end of said hollow member and adapted to draw fuel upwardly therethrough, a valve within

the tank adapted to open and close said inlet opening, and a spring adapted to hold said valve in the desired position of adjustment.

5 22. The combination with a fuel tank, of a tube extending downwardly within the tank to a point adjacent the bottom thereof and having inlet openings at different levels, a tubular valve for controlling said opening,
10 a spring acting upon said valve in a direction longitudinally of said tube to hold the valve in the desired position of adjustment, and a suction producing apparatus connected with the upper end of said tube.

15 23. The combination with a fuel tank, of a control device including two telescoping tubes disposed within the tank and having co-operating inlet openings, one of said tubes being rotatable to open and close the inlet in the other, a spring adapted to hold
20 said rotatable tube in the desired position of adjustment, and a suction producing apparatus connected with one of said tubes.

25 24. The combination with a fuel tank, of a fuel control device including two telescoping members, one of which projects into

the tank and forms a suction conduit having an inlet opening adapted for communication with the tank and the other being rotatable to control said inlet opening; a
30 spring acting upon said rotatable tube to maintain it in the desired position, and a suction producing apparatus connected with the upper end of the tube forming said suction conduit. 35

25. The combination with a fuel tank, of a fuel control device comprising a suction tube projecting into the tank and having an inlet opening adapted for communication with the tank at the level desired for
40 the reserve supply, a tubular member rotatable to open and close said inlet opening, a closure for said suction tube having a valve seat therein, an operating member for said tubular member extending through said
45 closure and having a valve disposed upon said seat, and a spring adapted to urge said valve upon its seat.

In testimony whereof, I affix my signature.

FRANCIS JERDONE, JR.